AGENDA
REVISED
MILWAUKIE PLANNING COMMISSION
Tuesday, May 23, 2017, 6:30 PM

MILWAUKIE CITY HALL
10722 SE MAIN STREET

1.0 Call to Order - Procedural Matters

2.0 Planning Commission Minutes – Motion Needed

2.1 March 28, 2017 *(sent 5/19/17)*

3.0 Information Items

4.0 Audience Participation – This is an opportunity for the public to comment on any item not on the agenda

5.0 Public Hearings – Public hearings will follow the procedure listed on reverse

5.1 Summary: Rusk Rd Planned Development
Applicant/Owner: Brownstone Development, Inc. / Turning Point Church
Address: 13333 SE Rusk Rd
File: PD-2017-001 (master file)
Staff: Brett Kelver

6.0 Worksession Items

7.0 Planning Department Other Business/Updates

8.0 Planning Commission Committee Updates and Discussion Items – This is an opportunity for comment or discussion for items not on the agenda.

9.0 Forecast for Future Meetings:

May 25, 2017	1. Special Session: North Milwaukie Industrial Area Framework Plan and Implementation Strategy
June 13, 2017	1. Public Hearing: PD-2017-002 13333 SE Rusk Rd *continued tentative* 2. Public Hearing: DEV-2017-006/VR-2017-002 29th Ave Triplex 3. Public Hearing: S-2017-002 4217 SE Railroad Ave 4. Public Hearing: VR-2017-004 11630 SE 27th Ave ADU

Milwaukie Planning Commission Statement

The Planning Commission serves as an advisory body to, and a resource for, the City Council in land use matters. In this capacity, the mission of the Planning Commission is to articulate the Community's values and commitment to socially and environmentally responsible uses of its resources as reflected in the Comprehensive Plan

1. **PROCEDURAL MATTERS.** If you wish to speak at this meeting, please fill out a yellow card and give to planning staff. Please turn off all personal communication devices during meeting. For background information on agenda items, call the Planning Department at 503-786-7600 or email planning@ci.milwaukie.or.us. Thank You.

2. **PLANNING COMMISSION MINUTES.** Approved PC Minutes can be found on the City website at www.cityofmilwaukie.org

3. **CITY COUNCIL MINUTES** City Council Minutes can be found on the City website at www.cityofmilwaukie.org

4. **FORECAST FOR FUTURE MEETING.** These items are tentatively scheduled, but may be rescheduled prior to the meeting date. Please contact staff with any questions you may have.

5. **TIME LIMIT POLICY.** The Commission intends to end each meeting by 10:00pm. The Planning Commission will pause discussion of agenda items at 9:45pm to discuss whether to continue the agenda item to a future date or finish the agenda item.

Public Hearing Procedure

Those who wish to testify should come to the front podium, state his or her name and address for the record, and remain at the podium until the Chairperson has asked if there are any questions from the Commissioners.

1. **STAFF REPORT.** Each hearing starts with a brief review of the staff report by staff. The report lists the criteria for the land use action being considered, as well as a recommended decision with reasons for that recommendation.

2. **CORRESPONDENCE.** Staff will report any verbal or written correspondence that has been received since the Commission was presented with its meeting packet.

3. **APPLICANT'S PRESENTATION.**

4. **PUBLIC TESTIMONY IN SUPPORT.** Testimony from those in favor of the application.

5. **NEUTRAL PUBLIC TESTIMONY.** Comments or questions from interested persons who are neither in favor of nor opposed to the application.

6. **PUBLIC TESTIMONY IN OPPOSITION.** Testimony from those in opposition to the application.

7. **QUESTIONS FROM COMMISSIONERS.** The commission will have the opportunity to ask for clarification from staff, the applicant, or those who have already testified.

8. **REBUTTAL TESTIMONY FROM APPLICANT.** After all public testimony, the commission will take rebuttal testimony from the applicant.

9. **CLOSING OF PUBLIC HEARING.** The Chairperson will close the public portion of the hearing. The Commission will then enter into deliberation. From this point in the hearing the Commission will not receive any additional testimony from the audience, but may ask questions of anyone who has testified.

10. **COMMISSION DISCUSSION AND ACTION.** It is the Commission's intention to make a decision this evening on each issue on the agenda. Planning Commission decisions may be appealed to the City Council. If you wish to appeal a decision, please contact the Planning Department for information on the procedures and fees involved.

11. **MEETING CONTINUANCE.** Prior to the close of the first public hearing, *any person* may request an opportunity to present additional information at another time. If there is such a request, the Planning Commission will either continue the public hearing to a date certain, or leave the record open for at least seven days for additional written evidence, argument, or testimony. The Planning Commission may ask the applicant to consider granting an extension of the 120-day time period for making a decision if a delay in making a decision could impact the ability of the City to take final action on the application, including resolution of all local appeals.

The City of Milwaukie will make reasonable accommodation for people with disabilities. Please notify us no less than five (5) business days prior to the meeting.

Milwaukie Planning Commission:

Greg Hemer, Chair
Adam Argo, Vice Chair
Shannah Anderson
John Henry Burns
Sherry Grau
Scott Jones
Kim Travis

Planning Department Staff:

Denny Egner, Planning Director
David Levitan, Senior Planner
Brett Kelver, Associate Planner
Vera Kolias, Associate Planner
Mary Heberling, Assistant Planner
Alicia Martin, Administrative Specialist II
Avery Pickard, Administrative Specialist II

CITY OF MILWAUKIE
PLANNING COMMISSION
MINUTES
Milwaukie City Hall
10722 SE Main Street
TUESDAY, MARCH 28, 2017
6:30 PM

COMMISSIONERS PRESENT
Greg Hemer, Chair
Adam Argo, Vice Chair
Shannah Anderson
Scott Barbur
John Burns
Sherry Grau

STAFF PRESENT
Denny Egner, Planning Director
Amy Koski, Economic Dev. Coordinator
Brett Kelver, Associate Planner

COMMISSIONERS ABSENT
Kim Travis

1.0 Call to Order – Procedural Matters*
Chair Hemer called the meeting to order at 6:30 p.m. and read the conduct of meeting format into the record.

***Note**: The information presented constitutes summarized minutes only. The meeting video is available by clicking the Video link at http://www.milwaukieoregon.gov/meetings.*

2.0 Planning Commission Minutes – There were none.

3.0 Information Items

Denny Egner, Planning Director, reminded the Commissioners of the April 6th Volunteer Dinner to be held at Bob's Red Mill.

4.0 Audience Participation –This is an opportunity for the public to comment on any item not on the agenda. There was none.

5.0 Public Hearings – None

6.0 Worksession Items
6.1 Summary: North Milwaukie Industrial Area (NMIA) update
Staff: Amy Koski

Amy Koski, Economic Development Coordinator, presented the staff report on the NMIA Framework Plan via PowerPoint, and noted the progress made on the Plan since last fall, the input received through public engagement, as well as the existing economic conditions, benefits, and challenges in the NMIA. Staff sought input on the five goal areas to provide direction as the draft Framework Plan was developed. The Commission would review the draft Plan in April and hold a public hearing in May to make a recommendation to Council.

Mr. Egner added the zoning would be addressed following the Plan's adoption, but a zoning concept would be presented for discussion. Applying the M-TSA Subarea 4 zoning of the Tacoma Station Area Plan to the areas on either side of that district was being considered rather than adding new zoning to the area.

Ms. Koski addressed questions about the ownership of property in the NMIA and why the Plan and subsequent zoning were needed to attract other uses and higher density, while still allowing warehouse and other traditional industrial uses, and the eco-district concept.

Commissioner Grau appreciated how consistent the Advisory Committee's vision was with the larger visioning process for Milwaukie.

Commissioner Burns suggested the eco-district concept might be too big to be an objective, but components, like eco roofs, could be added as a development incentive, especially considering how visible roofs in the NMIA were when driving by.

6.2 Summary: Downtown Design Guidelines Update
Staff: Brett Kelver

Mr. Egner briefly highlighted the history and purpose of the Downtown Design Guidelines (Guidelines) and the Development Design Standard amendments adopted in 2015. He invited the three Design and Landmarks Committee (DLC) members present to join the discussion. He noted that over the past year, the DLC had been reviewing and revising the Guidelines, and specifically, the Milwaukie Character Section, to better align the Guidelines with the Development Design Standards since the Guidelines had not been revised in conjunction with the Code amendments. With at least two downtown development proposals expected by the end of the year, staff wanted to review how the development code and Guidelines worked together, and work to better align the two code documents to facilitate development downtown that reflected the desired "Milwaukie Character."

Brett Kelver, Associate Planner, distributed two handouts for use as a reference as he described how the Guidelines and current development code worked for reviewing projects downtown, noting how some developers would never need to address the design guidelines given how the current code and review processes were structured. Although some "Milwaukie Character" guidelines were already codified, the DLC needed to identify which design guidelines were not captured and determine how to codify those into the downtown development standards. The concern was that a developer might meet all the development standards but not need to consider the Guidelines. The original hope was that the code requirements would provide what the Guidelines envisioned, but there had never been a systematic comparison.

Key discussion items and responses to Commissioners' questions were as follows:

- To better align the documents, the Guidelines could be pulled into the downtown development standards; or the Guidelines could be retained and the Code language adjusted, such as by adopting some specific design standards to better tie the documents together. Another option was to provide for stronger enforcement of the Guidelines document; however the guidelines were subjective.
- The Guidelines provided an easy reference for potential developers to get a 'feel' for the desired look for a building downtown, but the project would still need to adhere to the code. The Guidelines were originally written to make the review process semi-flexible, to encourage interesting and innovative designs.
    - "Milwaukie Character" was a catch-all phrase to give the DLC some discretion as to what the community's character was, but it was hard to capture the desired design in words.
    - The key word was 'feel.' The Guidelines could not be used to design a façade that met code requirements, and they had no regulatory backing to ensure developers followed through.

- The Guidelines were qualitative, and the code was quantitative. If the code could be made robust enough to carry both, the Guidelines would no longer be necessary. Parts of the Guidelines were outdated, no longer adequate, or not progressive enough, and portions of the preface were no longer valid. Some topics discussed in Visioning Town Hall meetings were not fully captured in the Guidelines.
- Identifying additional standards that captured the quality desired and that could be met in a clear and objective way would be challenging. It might not be possible to capture all the objective "Milwaukie Character" guidelines as standards.
- The City needed to provide flexible design guidelines to ensure certain architectural features and distinct characteristics were included in projects downtown, but enforcement of the Guidelines to achieve the "Milwaukie Character" was difficult.
- The design review process and code amendments were done to provide developers with more certainty in meeting the code standards, but now a simple building could be approved that did not fit the vision for downtown. Certain requirements, like fences, trash barrels, and street furniture, were also removed from the design review process so developers could avoid an extensive process for minor site improvements.
    - The Code could define the dimensions for a bench and then refer to the Guidelines for street furniture suggestions, but suggestions were not enforceable because the process did not provide for a Type II review.
    - Requiring applicants to apply a certain number of design options from a menu was suggested. If the recommended designs were used, it would be a Type II review, but if a different design was proposed, the review would follow a qualitative Type III review process. Unfortunately, the Guidelines did not have that much specificity.
- Currently, even with Type III, the most discretionary review, if an applicant could not meet one of the seven elements of the downtown design standards, only the Guideline(s) specifically related to that element would be discussed; there was no requirement to address all of them. To provide a clear and objective track for review, the City must be able to identify which standards and Guidelines were not met by a particular proposal. The challenge was creating "Milwaukie Character" standards.
    - Changing the Type III approval criteria so applicants must show how a project was consistent with all of the Guidelines was an option. However, to maintain the more clear and objective track, the code needed to be more robust. Currently, if the Type II standards were met, the applicant did not have to address the Guidelines.
- A nexus was needed between Type I, II, and III reviews, the code, and the application of the Guidelines, respective to the processes. The nexus could be adopted into a matrix-type document to be used by staff and applied by the City's advisory bodies.
- A consultant could help with aligning the current Guidelines and development standards by adding any qualitative elements missing in the code and doing the detailed wordsmithing, which would shift the DLC from a writing to a reviewing mode and would move the process forward more quickly.
    - The consultant could also help update the Guidelines document and create a more distinctive break between the Type II clear and objective standards and the more discretionary Type III process. The tricky part was creating a flexible process so an applicant would not be pushed into the entire Guideline process simply because one specific requirement could not be met.
    - Further work by the consultant and DLC could result in the Guidelines document being obsolete; however, the document might take another form. The intent was to build a discretionary track that provided more freedom of design and allowed for alternative design features other than what was codified.

- Nothing could be applied to those application submittals expected before the matrix was solidified or the revised Guidelines fully implemented. Those applications would adhere to the existing code; the first was expected in May.
- Focusing more carefully on the matrix comparing the 19.304 Downtown Development Standards with the 19.508 Downtown Design Standards was suggested to help determine where there were gaps. The DLC had not been looking at the downtown development standards, but such a comparison might help alleviate some concerns about projects being approved in the interim.
- Milwaukie's downtown area was very viable, so the City was not in desperate straits to allow someone to build whatever they wanted. Having high standards was not necessarily bad, and the code was not necessarily holding development back, it was market-driven.

Mr. Egner assured staff would keep both the DLC and Planning Commission informed about any next steps as the process moved forward.

7.0 Planning Department Other Business/Updates

7.1 Planning Commission Group Photo

The Planning Commission group photo was taken for the City's website.

8.0 Planning Commission Committee Updates and Discussion Items – This is an opportunity for comment or discussion for items not on the agenda.

Commissioner Anderson reported on the last Vision Advisory Committee meeting where input received from the Town Hall and surveys had been assigned to the four areas: people, place, prosperity, planet. The Committee was now working through those Strategies, which would be posted as a draft to the Visioning website soon.

Chair Hemer thanked Commissioner Barbur for his four years of service on the Planning Commission.

9.0 Forecast for Future Meetings:

April 11, 2017	1. Worksession: Land Use Approval Criteria Discussion
April 25, 2017	1. Worksession: NMIA Review of Framework Plan and Implementation

Mr. Egner highlighted several development applications in for completeness reviews and expected before the Planning Commission soon. He addressed clarifying questions.

Meeting adjourned at approximately 8:34 pm.

Respectfully submitted,

Alicia Martin, Administrative Specialist II

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Greg Hemer, Chair

MILWAUKIE
Dogwood City of the West

To: **Planning Commission**

Through: **Dennis Egner, Planning Director**

From: **Brett Kelver, Associate Planner**

Date: **May 16, 2017, for May 23, 2017, Public Hearing**

Subject: **File:** PD-2017-001 (master file)
Applicant: Brownstone Development, Inc.
Owner(s): Turning Point Church
Address: 13333 SE Rusk Rd
Legal Description (Map & Tax Lot): 2S2E06AD, lots 600, 700, 900, 901
NDA: Lake Road NDA

ACTION REQUESTED

Review the final development plan proposed with land use application master file #PD-2017-001 and its associated applications and forward a recommendation to City Council based on the recommended Findings and Conditions of Approval found in Attachments 1 and 2 (to be distributed under separate cover). This action would allow for development of a 92-unit planned development subdivision, including some disturbance to the designated natural resource areas and floodplain on the site, pending approval of the final development plan by City Council.

BACKGROUND INFORMATION

The 17.5-acre subject property at 13333 SE Rusk Rd is currently developed with the Turning Point Church in the southeast corner of the site. Mount Scott Creek flows across the northern portion of the property, with a 0.7-acre wetland and 100-year floodplain boundary in the low-lying western half of the site. The applicant is in the process of adjusting the boundaries of the site to establish the church on its own lot and use the remaining property for a planned development subdivision (see Figure 1). The proposal would establish 92 single-family rowhouse units on individual lots, built clustered in 4-unit buildings. A large open space tract on the western side of the site would contain the designated natural

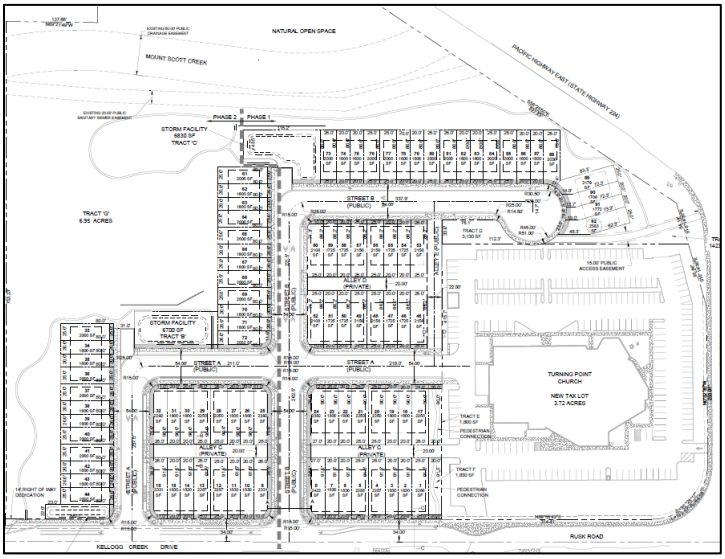

Figure 1. Proposed development

resource and floodplain areas as well as a soft-surface trail system. Additional tracts would contain stormwater facilities, pedestrian and bicycle connections, and a community garden.

A. Site and Vicinity

The site is located at 13333 SE Rusk Rd. The southeastern corner of the site (approximately 3.7 acres) contains the Turning Point Church, with ingress from Rusk Road and an additional access to Kellogg Creek Drive through the proposed development site to the west. The remainder of the site (approximately 13.8 acres) is undeveloped (see Figure 2). Mount Scott Creek flows east to west across the property, leaving an approximately 2-acre section of the site largely inaccessible on the north side of the creek. A delineated

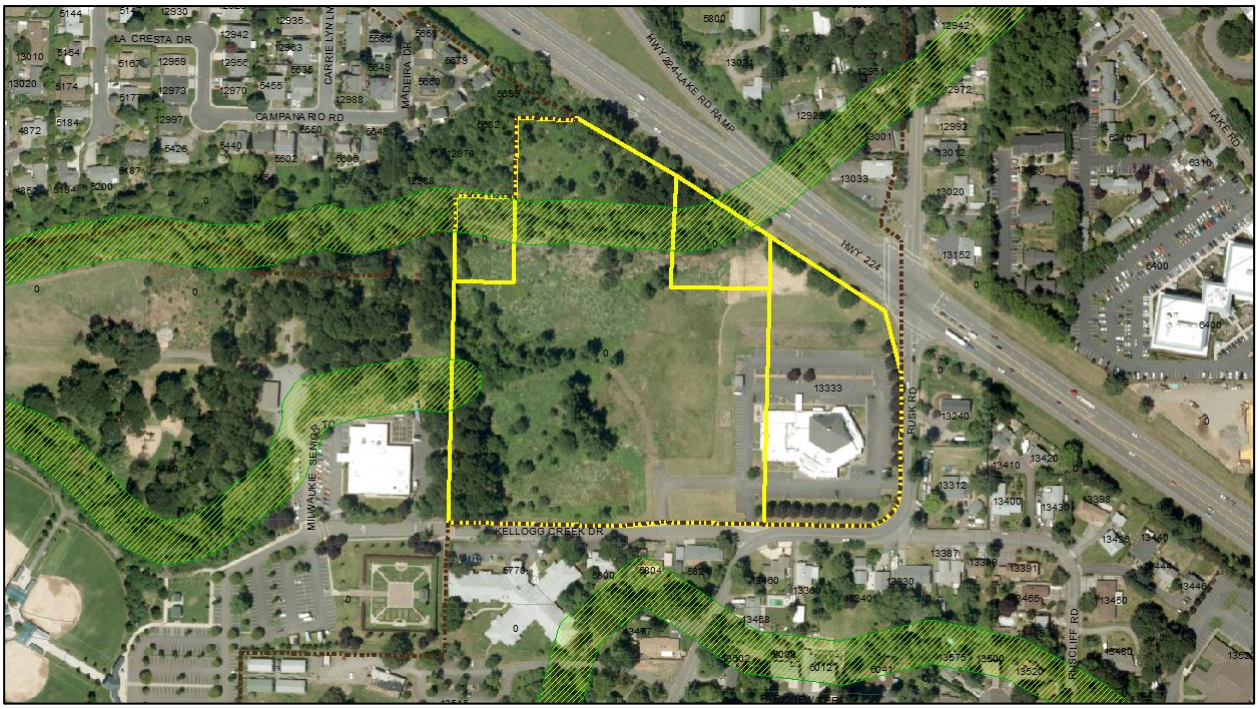

Figure 2. Site and vicinity

wetland approximately 0.7 acres in size extends across the low-lying area on the western portion of the property. Water Quality Resource (WQR) and Habitat Conservation Area (HCA) designations follow the creek and wetland, and the 100-year floodplain covers a substantial portion of the low-lying western half of the site. South of the wetland, along the southwest boundary of the property, a stand of mature white oak trees is not included in the HCA designation but represents a natural resource worthy of evaluation for protection, as half of those trees are proposed for removal.

Highway 224 is adjacent to the north of the site. The Turning Point Church is adjacent to the east. To the south, across Kellogg Creek Drive in unincorporated Clackamas County, there are 3 single-family houses (zoned R-10) and the Deerfield Village assisted living facility. Adjacent to the west is North Clackamas Park, with the Milwaukie Center and an open wetland area immediately adjacent to the subject property.

B. Zoning Designation

Residential R-10 and Residential R-3 (site is split-zoned—see Figure 3)

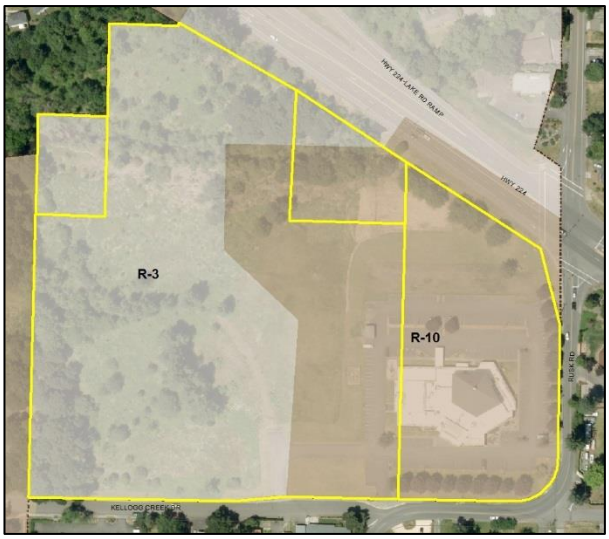

Figure 3. Zoning designation

C. Comprehensive Plan Designation

Low Density Residential (LD) and Medium Density Residential (Med. D)

D. Land Use History

- **June 1981:** City Council approved Ordinance 13-1981 to annex the subject property into Milwaukie (land use file #A-80-07). A concurrent request to re-zone the property from R-10 to R-2 was withdrawn (file #ZC-80-07).
- **October 1984:** Planning Commission approved a Community Service Overlay for use of the site by the Milwaukie Assembly of God (file #CS-84-02).
- **October 1987:** City Council approved Ordinance 1638 to amend the Comprehensive Plan ma p's land use designation for the subject property and Ordinance 1639 to change the zoning of the western portion of the property from R-10 to R-3. In addition, a conditional use was approved for a 162-unit senior housing project on the western portion of the site (file #s CPA-87-01, ZC-87-05, and CU-87-05).
- **November 1987:** The Planning Director approved a minor land partition to separate the existing church on the east side of the site from the senior housing project approved by file #CU-87-05 (file #MLP-87-04). The senior housing project (named Parkside Village) was never developed and the partition was never finalized.
- **July 1992:** Planning Commission approved a 5,500-sq-ft addition to the church building for classrooms, foyer, chapel, and storage; as well as the establishment of a regulation softball field on the northern portion of the site (file #s CSO-92-03 and NR-92-01). The staff report indicates that portions of the wetlands on site were filled in 1980 and again in 1990 in violation of Division of State Lands (DSL) regulations; the fill was required to be removed and the wetlands restored in 1991. It does not appear that the softball field was ever developed.
- **September 1997:** Planning Commission denied a sign permit request to locate an electronic reader board sign on the property near the intersection of Highway 224 and Rusk Rd (file #SP-97-01).
- **September 2014:** The Planning Director approved a minor modification to the existing Community Service Use for the church, for removal of approximately 75 of 300 existing parking spaces as part of a natural resource restoration effort near Mount Scott Creek (file #s CSU-14-06 and NR-14-06). The site was overparked by approximately 100 spaces, so the proposal brought the off-street parking situation closer into conformance with the applicable standards. The project involved revegetating the area where the spaces were removed and did not directly impact

any designated natural areas, but it required approval of a Construction Management Plan due to its location within 100 ft of the HCA on the site.

E. Proposal

The applicant is proposing a subdivision to create 92 lots for 4-unit rowhouse development, setting aside much of the floodplain and designated natural resource areas on the site within a large open space tract. The applicant is utilizing the Planned Development (PD) process, which allows greater flexibility of design than would otherwise be possible through the standards of the underlying zoning for the site.

The project requires approval of the following applications:

1. Planned Development (master file, #PD-2017-001)

   The Planned Development process allows for adjustments in lot sizes, lot dimensions, and some development standards; a blending of standards across the split-zoned site; and a potential increase in density (up to 20% above the maximum normally allowed).

2. Zoning Map Amendment (ZA-2017-001)

   The City's Zoning Map would be changed, adding the PD designation to the existing R-10 and R-3 designations for the site.

3. Subdivision, preliminary plat (S-2017-001)

   The proposed subdivision would create 92 lots for residential development, in addition to 8 different tracts for stormwater facilities, open space, and pedestrian and bicycle connections.

4. Natural Resource Review (NR-2017-001)

   The proposal to disturb portions of the existing Water Quality Resource (WQR) and Habitat Conservation Area (HCA) on the site must demonstrate compliance with the applicable provisions of MMC Section 19.402, including the requirements to provide an analysis of alternatives and to avoid, minimize, and mitigate for impacts.

5. Transportation Facilities Review (TFR-2017-001)

   The project's impacts on traffic must be evaluated to determine whether improvements to the transportation system are warranted.

6. Variance Request (VR-2017-003)

   The applicant has requested variances for two aspects of the project: (1) to reduce the minimum spacing requirement between the driveway of Lot 72 and the intersection with Street A; and (2) to waive the requirement that all new lots must provide adequate buildable area outside the WQR and/or HCA (31 of the 92 proposed lots do not meet this requirement).

7. Community Service Use, minor modification (CSU-2017-001)

   The proposed adjustments to the church site require a minor modification to the existing Community Service Use (CSU) approval for the site.

See Attachment 3 for a list of the applicant's materials.

F. Land Use Review Process

Milwaukie Municipal Code (MMC) Section 19.311 outlines the review process for approval of a Planned Development. Ordinarily, after receiving "approval in principle" from the Planning Commission of a preliminary development plan, the applicant would initiate a Type IV review process by submitting a final development plan along with a proposed subdivision and any other applicable reviews. The Planning Commission would consider the application package and make a recommendation to the City Council for a final decision. In this case, the applicant has opted to move directly into the Type IV process and has presented its preliminary development plan as the final development plan. The applicant is aware of the risks associated with the possibility that the Planning Commission may not approve the development plan in principle and may not forward a recommendation for approval to City Council. All of the other associated land use applications are also subject to the Type IV review process.

KEY ISSUES

Summary

Staff has identified the following key issues for the Planning Commission's deliberation. Aspects of the proposal not listed below will be addressed in the Findings (see Attachment 1, to follow under separate cover) and generally require less analysis and discretion by the Commission.

A. How do the preliminary proposals for stormwater management and floodplain alteration affect the overall development plan?

B. Have the project's impacts on traffic been thoroughly evaluated?

C. What is the appropriate balance between providing housing units and protecting natural resources on the subject property?

D. Does the project provide enough "exceptional advantages in living conditions and amenities not found in similar developments" to warrant the additional proposed density as allowed by MMC Subsection 19.311.3.C?

Analysis

A. How do the preliminary proposals for stormwater management and floodplain alteration affect the overall development plan?

The applicant is proposing to construct new public streets to access 92 new lots. Stormwater runoff from the new public streets would be managed by three proposed detention ponds (Tracts A, B, and C). Stormwater from private property is usually required to be managed on the property itself (as per MMC Chapter 13.14). If a final technical analysis concludes that on-site management is not possible (e.g., due to an elevated water table and/or low infiltration rates), the City's regulations allow for alternatives such as use of the street runoff systems (e.g., curb weep holes or direct pipes). A preliminary stormwater report was included in the applicant's submittal materials to demonstrate that the site has sufficient capacity to ensure that post-development flows do not exceed pre-development flows from the new street network. The preliminary report does not directly address runoff from the new lots, and staff has noted several errors or discrepancies in the applicant's preliminary stormwater report. However, staff's assessment and conclusion is that the site has enough area to allow for any adjustments that may be deemed necessary

through a final technical review of the proposed facilities, outside of the land use approval process.

Likewise, the proposal involves significant alteration of the designated floodplain area on the site. In fact, the applicant has indicated that they believe the actual floodplain boundary to be even more extensive than what is shown on the Flood Insurance Rate Maps provided by the Federal Emergency Management Agency (FEMA), based on a topographic survey to identify the base flood elevation on the site. The City's flood hazard regulations require that a project result in no net change in the volume of material in the floodplain, so any "fill" or addition of material must be balanced with an equivalent "cut" or removal of material. In the case of this proposal, a significant area within the floodplain must be filled in order to establish many of the lots on the western side of the property, so the applicant has proposed to excavate within another portion of the site to replace the volume of floodplain lost due to the fill. The applicant is proposing to do a formal FEMA map change based on final grading plan approval from the City. From the initial information provided, staff is convinced that the applicant will be able to complete the necessary technical studies to demonstrate compliance with the applicable flood hazard standards, even if the details of the final design have not been confirmed.

Both elements typically require only preliminary reports and data at this early stage of a development. The Commission's role is to confirm that the site has capacity to provide the required stormwater management service and to balance any cut and fill within the floodplain. To require the applicant to provide the level of detail needed for final approval of these technical aspects would be inconsistent with the City's current regulations and practices. The preliminary nature of the applicant's information is all that is required for land use approval; final technical review and approval is the responsibility of the City's Engineering department.

However, this lends a degree of uncertainty to the overall development plan, which could change based on final technical revisions. The applicant naturally assumes considerable risk with a project as complex as the current proposal and must balance the costs of technical studies with those associated with the potential need to revisit the land use approval process if the final plan becomes inconsistent with the one approved by the Commission and Council. The more clearly the Commission can identify those aspects of the plan that are essential to the approval (e.g., number and general configuration of lots, allowable areas and amounts of natural resource disturbance, specific public benefits and amenities provided by the project, etc.), the easier it is for all parties to know what kinds of changes to the plan could constitute significant inconsistencies and warrant additional review.

B. Have the project's impacts on traffic been thoroughly evaluated?

The Transportation Facilities Review process required the applicant to prepare a Traffic Impact Study (TIS), which involves estimates and forecasting based on traffic modeling and actual count data at specific intersections. City staff and the City's traffic consultant coordinated with the applicant to define a scope of work for the TIS and then reviewed the results as part of the application submittal process.

Compared to the technical issues of stormwater management and floodplain alteration, there is generally greater certainty about how the results of the TIS affect the overall development plan. This is because there are fixed standards for elements such as roadway width and the requirement for sidewalks and landscape strips that are tied to the functional classification of the street. There are accepted methodologies for determining the nature and degree of anticipated impacts, given the number and type of residential

units proposed and the current level of service (LOS) provided at the various subject intersections.

The addition of 92 units on the subject property will certainly increase the number of vehicle trips in the area. The issue is whether the increase in trips will cause any of the study intersections to fall below the acceptable LOS, and if so, what improvements are warranted to prevent intersection failure. The City uses a data-based assessment and rating system to make those determinations. ODOT facilities like Highway 224 have unique metrics for LOS and thus different trigger points for improvements than Milwaukie. For the proposed development, the TIS concluded that the increase in vehicle trips will not cause any of the study intersections to fail.

As part of the discretionary review process, the assumptions and conclusions of the TIS can be challenged to some degree. The City, other agencies, and the public can all still weigh in, and there is room for discussion of traffic impacts and how mitigation needs are determined. Comments provided by ODOT and Clackamas County Engineering indicate that the TIS may have employed a faulty assumption about the northbound right-turn lane on Rusk Road at the Highway 224 intersection. This may warrant a revision to the TIS and a condition requiring an extension of the existing right-turn lane. Staff is reviewing the TIS to identify any other needed adjustments in methodology and/or assumption.

C. What is the appropriate balance between providing housing units and protecting natural resources on the subject property?

One of the conclusions of the 2016 Housing Needs Analysis (HNA) prepared for Milwaukie was that, over the next 20 years, there is a need for single-family attached units that are affordably priced as workforce housing (below $380,000), similar to the ones being proposed. As one of few such large residentially zoned parcels in Milwaukie, the subject property presents an important opportunity to establish such needed housing, with the added benefit of a small increase (up to 20%) in density as a Planned Development if the project can demonstrate exceptional design.

However, the property includes significant natural resources (Mount Scott Creek and a delineated wetland, as well as a stand of mature white oak trees) spread over a broad area, which makes it difficult to develop the site without negatively impacting them. Where the proposed development is closest to the delineated wetland (on the west side of the site), there are approximately 10 proposed lots and 1 stormwater facility whose creation would have significant impacts on the wetland itself. The approval criteria provided in MMC Subsection 19.402.12.B require that the applicant demonstrate (1) that intrusion into WQR and HCA areas has been avoided to the extent practicable, and that there are no practicable, less intrusive alternatives; (2) that adverse impacts have been minimized to the extent practicable; and (3) that detrimental impacts to the ecological functions of natural resource areas have been sufficiently mitigated on site.

The applicant has attempted to demonstrate that the proposed plan does as much as possible to avoid natural resource impacts, and to limit impacts when avoidance is not possible. The resource areas that remain will be enhanced by the removal of invasive plants and debris and the installation of native plantings. The applicant asserts that their plan is the most practicable plan for meeting the City's housing need while maintaining the health and essential function of the WQR and HCA on the site.

Staff has encouraged the applicant to expand upon the analysis of alternatives that was submitted with the Natural Resource Review report. Staff has identified at least a few

additional options that warrant some address and exploration as potentially feasible alternatives:

a) Planned Development proposal with a smaller or no density bonus (max. 80 units)

b) Residential Cluster Development as outlined in MMC Subsection 19.402.14.C, which allows transfers of density across a site to avoid or minimize impacts to WQRs and/or HCAs

c) Cottage Cluster Housing as outlined in MMC Subsection 19.505.4

d) Planned Development proposal with fewer lots but adding a multifamily component to achieve some increase in density (up to 20%)

e) Conventional subdivision with the entire site rezoned to R-3

f) Conventional subdivision with split zoning, but with some allowance for WQR and/or HCA disturbance (compared to the no-disturbance alternative included in the applicant's submittal)

In general, decreasing disturbance to the WQR and HCA results in fewer lots. With this proposal, the Planning Commission and City Council are faced with evaluating the community benefits of having additional new homes in Milwaukie against the resulting impacts to the WQR and HCA on the site. Given that the property is zoned for residential use, it is important for the decision-makers to consider how many units they expect or hope to see developed on this site to meet the City's long-term housing goals. The Commission can deliberate about what an acceptable level of WQR and HCA disturbance, if any, may be for this site. In addition, the Commission may consider whether there is any economically feasible alternative vision for development of the site with another type(s) of housing, such as multifamily or cottage cluster.

D. Does the project provide enough "exceptional advantages in living conditions and amenities not found in similar developments" to warrant the additional proposed density as allowed by MMC Subsection 19.311.3.C?

The subject property is split-zoned Residential R-10 and R-3 and includes a significant area of natural resources and floodplain. The Planned Development process allows the applicant to effectively blend the two zones' densities across the site while concentrating development away from the naturally constrained areas. If the applicant can demonstrate exceptional design in the project, there is an opportunity to increase the density up to 20% above the maximum normally allowed.

The applicant has asserted that the proposed development provides the following exceptional features:

- Over 7 acres of open space, protecting natural resource and floodplain areas on the site and providing recreational opportunities with a soft-surface trail system
- Configuration of lots that preserves visual and spatial connections to the natural open space
- Unfenced stormwater facilities planted with low-lying grasses that maintain views of the open space and provide connection points between the trail system and the rest of the development
- Community garden for use by residents, located in the northeastern portion of the site

- Trees planted as screening between Highway 224 and the adjacent lots in the northeast corner of the site
- 92 units of attached single-family housing that is affordable for working people with moderate incomes
- Compact development in proximity to a large public park and with access to a major roadway (Highway 224)

Many of the stated attributes of the proposed development are directly related to its location or to code requirements, rather than to its design. Proximity to a large park and a major roadway and the provision of open space as required are not design features in and of themselves. The proposed community garden is on a tract that is otherwise not easily developable and does not appear to be an integrated and central part of the overall development. Likewise, the provision of trees for screening lots from the adjacent highway is a basic buffer that one would expect for this location.

If the Commission determines that the project design is lacking in exceptional features, it would be useful for the group to identify general ideas for adjustments that would improve the design. For example, Lots 33-44 could potentially be shifted 30 to 45 ft to the east and Stormwater Tracts A and B reconfigured to preserve a number of the existing white oak trees in the southwestern corner of the site that are proposed to be removed. The shift would potentially result in the loss of 4 to 6 lots (Lots 15, 16, 31, 32, 71, and 72) but would enhance the open space area and capitalize on the preservation of an existing natural resource. Another staff suggestion would be to consider eliminating some of the lots on the west side of Street B, to create a more open plan with better visual access to the natural area. Playground equipment could also be installed along the pedestrian path in Tracts E and F, supplanting the play area lost from the adjacent church site due to the proposed development. And there may be other ideas for improvement that can be explored.

CONCLUSIONS

Staff's recommendation to the Planning Commission is as follows:

Continue the hearing to a date certain to allow the applicant to make revisions to the Planned Development application. Staff believes that, as proposed, the development plan does not sufficiently meet the standard for providing exceptional land use design and amenities to qualify for the proposed increase in allowable density, as allowed by MMC Subsection 19.311.3.C.

Staff has the following suggestions for adjustments to the proposed development plan:

1. Reduce the overall number of lots, to diminish the degree of disturbance to the WQR and HCA and to provide a greater sense of openness and connection to the wetland area on the western portion of the site. In particular, consider eliminating Lots 33-34 and 65-70.
2. Shift Lots 33-44 to the east by 30 to 45 ft and reconfigure Stormwater Tracts A and B accordingly, to preserve more of the existing white oak trees in the southwestern corner of the site.
3. Install playground equipment along the pedestrian connection on Tracts E and F, as space allows, as an additional amenity for residents of the development as well as to compensate for removal of the pre-existing church playground.

4. Connect the two soft-surface paths with an elevated walkway (boardwalk) through the western edge of the wetland. This would result in some additional disturbance to the WQR, but an argument could be made that those impacts, if minimized and mitigated for, might be justified by the additional public benefit of expanding the proposed trail system and improving the proposed recreational amenity.

The recommended Findings and Conditions of Approval (Attachments 1 and 2, respectively), which are being finalized and will be distributed prior to the hearing under separate cover, are written for approval of the project as proposed. They will be available for the Commission in the event that the group decides to recommend approval based on the current design. However, staff believes that revisions to the proposal are necessary for a recommendation of approval. It is staff's hope that the May 23 hearing will provide enough time to get through the staff and applicant presentations, public testimony, and Commissioner deliberations, so that the group can identify a specific list of revisions for the applicant to address at a continued hearing.

CODE AUTHORITY AND DECISION-MAKING PROCESS

The proposal is subject to the following provisions of the Milwaukie Municipal Code (MMC).

- MMC Section 19.1007 Type IV Review
- MMC Section 19.311 Planned Development Zone (PD)
- MMC Section 19.902 Amendments to Maps and Ordinances
- MMC Title 17 Land Division
- MMC Section 19.301 Low Density Residential Zones (including R-10)
- MMC Section 19.302 Medium and High Density Residential Zones (including R-3)
- MMC Section 19.402 Natural Resources
- MMC Subsection 19.505.5 Building Design Standards for Rowhouses
- MMC Chapter 19.600 Off-Street Parking and Loading
- MMC Chapter 19.700 Public Facility Improvements
- MMC Section 19.904 Community Service Uses
- MMC Section 19.911 Variances
- MMC Chapter 19.1200 Solar Access Protection

This application is subject to Type IV review, which requires the Planning Commission to consider whether the applicant has demonstrated compliance with the code sections shown above and make a recommendation to City Council for a final decision. In Type IV reviews, the Commission assesses the application against review criteria and development standards and evaluates testimony and evidence received at the public hearing, in order to determine what recommendation to forward to the Council.

The Commission has four decision-making options as follows:

A. Continue the hearing, to allow for additional public testimony and/or the provision of additional information from the applicant. The Commission may be able to identify specific information needs or suggested revisions to the proposed development plan. The applicant has provided a waiver to the 120-day clock, adding 60 days to the time the City

has to make a final decision. The applicant may need to provide an additional waiver to the 120-day clock in the future, depending on the outcome of the continued hearing.

B. Recommend approval of the application subject to the recommended Findings and Conditions of Approval.

C. Recommend approval of the application with minor modifications to the recommended Findings and Conditions of Approval. Such modifications need to be read into the record.

D. Recommend denial of the application upon finding that it does not meet approval criteria.

The final decision on these applications, which includes any appeals to the City Council, must be made by October 4, 2017, based on the applicant's 60-day extension of the 120-day clock and in accordance with the Oregon Revised Statutes and the Milwaukie Zoning Ordinance. The applicant can make additional waivers to the time period in which the application must be decided.

COMMENTS

Notice of the proposed changes was given to the following agencies and persons: City of Milwaukie Engineering, Building, and Public Works Operations departments; City Attorney; Clackamas Fire District #1; Lake Road Neighborhood District Association (NDA); Oak Grove Community Council; Clackamas County Department of Transportation and Development; Oregon Department of Transportation (ODOT); TriMet; Metro; and North Clackamas Parks and Recreation District.

In addition, public notice of the proposal was provided 20 days in advance of the May 23 hearing to property owners and current residents within 500 ft of the site. The extended notification boundary is greater than the 400-ft notice required by MMC Subsection 19.1007.3.D but matches the notice area for the public information meeting held by the applicant prior to submittal of the application.

The following is a summary of the comments received by the City. See Attachment 4 for further details.

- **Michelle Wyfells, Planner II, TriMet:** Given the imminent changes to re-route the existing bus service on Kellogg Creek Drive (Line 152), TriMet has no comments on the proposal.
- **Matt Amos, Fire Inspector, Clackamas Fire District #1 (CFD#1):** Comments related to fire access and water supply requirements, including notes on required turning radii and approvable turnarounds.

  Staff Response: *Comments and requirements from CFD#1 are incorporated into the Recommended Conditions as appropriate.*

- **Rob Livingston, Erosion Control Specialist, City of Milwaukie Public Works:** Due to the site being over 5 acres, a 1200C construction stormwater permit from DEQ will be required. A maintenance agreement with the City must be established for the stormwater facilities on site. For the City's erosion control permit, more information will be required on how hydric soils will be managed during excavation of the wetland area. Given the number of new households proposed and the accompanying number of anticipated household pets, a dispensing device(s) for pet-waste bags should be required in the large natural open space area. There is also concern for the likelihood of negative impacts to water quality and fish habitat from household pets recreating in Mount Scott Creek.

The proposed stormwater facilities do not show details for detention prior to discharge into Mount Scott Creek, particularly regarding how or where stormwater discharge will be mitigated. Many of the proposed plantings are near buildings and sidewalks—tree plantings closer to the creek would improve shade, reducing stream temperatures and mitigating for the development's removal of large mature trees from the site. The plantings proposed in Additional Enhancement Areas A and B do not provide meaningful streambank enhancement or vegetative shading for the creek.

Staff Response: *The Public Works comments are integrated into the Recommended Findings and Conditions as appropriate. Some requirements will be addressed in conjunction with other related permits. Conditions have been proposed related to the provision of pet-waste bag dispensers and signage limiting pet access to Mount Scott Creek. A condition is proposed to require additional tree plantings along the creek.*

- **Paul Hawkins, Land Use Chair, Lake Road NDA:** The FEMA flood data for this location is dated, so it is unclear whether the three proposed detention ponds will be adequate. The "Y" intersection of Rusk Road and Kellogg Creek Drive is less than ideal, and traffic currently backs up on Rusk Road at the Highway 224 intersection during weekday commuting hours.

  Staff Response: *The stormwater and floodplain issues are addressed under the Key Issue discussion (Topic A), above. The applicant's traffic study has been reviewed by City staff and the City's on-call traffic consultant (DKS Associates) and deemed to be largely accurate with respect to anticipated impacts of the proposed development on the Level of Service (LOS) provided by the intersection of Rusk Road and Highway 224. The increase in trips resulting from the proposed development does not cause the Rusk Road/Highway 224 intersection to drop below an acceptable LOS into a range that is considered failing, though a condition is proposed to require extension of the northbound right-turn lane on Rusk Road at the Highway 224 intersection.*

- **Rebecca Hamilton, Regional Planner, Metro:** Metro notes that the application would require a Type III Variance to allow impacts to designated natural areas for creating 31 of the 92 proposed lots. The City of Milwaukie's Municipal Code is consistent with Metro's Functional Plan. If the City of Milwaukie is satisfied that the application has met its requirements for a Type III Variance, and if there is no request for an amendment to the City's comprehensive plan or zoning code, then Metro has no comment on this application.

  Staff Response: *The requested variance is being evaluated by the Planning Commission and City Council as part of this review. The proposed development involves an amendment to the City's zoning map, to add the "PD" designation to the zoning for the subject property, but does not include amendments to the Comprehensive Plan or zoning code.*

- **Joseph Edge, Director, Oak Grove Community Council:** The trip estimates for the proposed development appear to be low, as the proposed units will perform more like single-family detached dwellings than townhouses, given their proposed price point and the likelihood that two wage-earners employed outside the household will live in each unit. The stormwater calculations are based on a pre-development curve number that is too high and does not accurately represent the pre-development conditions that should be more conservatively assumed for the site, especially considering the flood potential of the area. The loss of large white oak trees in the southwestern corner of the site is unacceptable, as these mature, old-growth trees cannot be sufficiently replaced with new trees. An alternative that preserves those trees and combines the 12 units in the

southwestern portion of the site into a multifamily building elsewhere on the site would be more acceptable.

Staff Response: *The trip estimates are based on assumptions and analysis grounded in the Institute of Transportation Engineers (ITE) trip generation manual, which does not specifically address nuances like price point and household employment for different housing types. Staff and the City's on-call traffic consultant (DKS Associates) concur that the applicant's Traffic Impact Study is accurate and adequate for the proposed development. The stormwater and floodplain issues are addressed under the Key Issue discussion (Topic A), above. The recommendation to preserve the existing white oak trees in the southwestern corner of the site is included in the list of suggested revisions to the development plan (Key Issue C), above.*

- **Sarah Hartung, Senior Biologist, ESA (City's On-Call Natural Resource Consultant):** A report providing peer review of the applicant's Natural Resource Review report has been provided.

  Staff Response: *The conclusions of ESA's report are integrated into the Recommended Findings and Conditions as appropriate.*

- **Marah Danielson, Development Review Planner, ODOT Region 1:** The proposed zone change results in only a small increase in additional trips to the state highway. The applicant's Traffic Impact Analysis (TIA) shows a high number of crashes at both the Rusk Road and Webster Road intersections with Highway 224. Since the TIA analyzed the northbound right-turn movement at the Rusk Road/Highway 224 intersection as a right-turn lane where there is only a flare for a turn lane, ODOT recommends a condition requiring installation of a northbound right-turn lane at the Rusk Road/Highway 224 intersection.

  Staff Response: *A condition is proposed to require extension of the northbound right-turn lane on Rusk Road at the Highway 224 intersection.*

- **Alex Roller, Engineering Tech II, City of Milwaukie Engineering Department:** Comments related to the proposal's compliance with Milwaukie Municipal Code (MMC) Title 12 Streets, Sidewalks, and Public Places; MMC Title 18 Flood Hazard Regulations; and MMC Chapter 19.700 Public Facility Improvements, with relevant recommended conditions of approval.

  Staff Response: *The Engineering Department's comments are integrated into the Recommended Findings and Conditions as appropriate.*

- **Kenneth Kent, Senior Planner, Clackamas County Department of Transportation and Development, Engineering Division:** Both Kellogg Creek Drive and Rusk Road are under the County's jurisdiction, so County standards and requirements apply where frontage improvements are concerned. On Kellogg Creek Drive, half-street improvements are required (minimum 16-ft roadway, curb or curb and gutter, 5-ft landscape strip, 5-ft sidewalk), with no bike lane striping. Recommendation that the existing church driveway at Rusk Road be closed, due to poor sight-distance and the difficulty of ensuring one-way ingress to the site without a median on Rusk Road. Recommendation that the applicant's traffic impact study be updated to (1) evaluate the study intersections to include estimated summer traffic volumes from North Clackamas Park, (2) include impacts of closure of the existing church driveway at Rusk Road, (3) reevaluate queuing on Rusk Road at the Highway 224 intersection using the SimTraffic program, and (4) evaluate the need for a northbound left-turn lane at the Rusk Road intersection with Kellogg Creek Drive. Suggestion that an analysis or evaluation of parking availability within the proposed

development (in driveways, garages, and on-street) be conducted to understand the potential impacts of overflow parking in the adjacent neighborhood.

Staff Response: *The County's requirements for street improvements on Kellogg Creek Drive are integrated into the Recommended Findings and Conditions as appropriate. The City plans to take jurisdiction of Kellogg Creek Drive in the near future and would prefer to have a striped bike lane to make a safer connection to North Clackamas Park. The City does not support closure of the existing church driveway on Rusk Road and asserts that physical modifications to the driveway will adequately address the County's concerns. Staff is reviewing the County's recommendations for updates to the TIS and will provide a response at the May 23 hearing. The applicant has presented an estimate of available on-street parking within the proposed development—a copy is included as Attachment 3-s.*

- **Kathryn Krygier, Planning and Development Manager, and Tonia Williamson, Natural Resource Coordinator, North Clackamas Parks & Recreation District (NCPRD):** Concern that increased traffic resulting from the proposed development will impact access to nearby NCPRD facilities. Note that the applicant's Traffic Impact Study (TIS) was not conducted during the time when activity at the ballfield complex in North Clackamas Park is at its peak (April through July). Concerns about safety at the intersection of Rusk Road and Kellogg Creek Drive. Suggestion that a parking study be conducted to examine the issue of visitor parking within the proposed development. Concern that the bike lane between Rusk Road and Street B appears to dead-end. Questions about the soft-surface trail system, including public accessibility, maintenance, and assessment of natural resource impacts, with a note that the trails are short and discontinuous. Request for a phasing plan, if phasing is proposed. Concern about the potential for increased flooding resulting from development within designated natural resource areas on the site. Suggestion that the applicant has not sufficiently demonstrated that impacts to natural resources will be minimized.

  Staff Response: *Staff and the City's traffic consultant concur with the applicant's TIS assertion that increased summer park traffic does not substantially affect the performance of the study intersections, in large part because the typical peak for park traffic is later than the evening peak for adjacent street traffic (4:00 p.m. to 6:00 p.m.). Staff is reviewing the TIS conclusions about impacts to the Rusk Road/Kellogg Creek Drive intersection and will provide a response at the May 23 hearing. The applicant has presented an estimate of available on-street parking within the proposed development—a copy is included as Attachment 3-s. As shown on various sheets in the applicant's plan set, shared-lane bicycle markings through the proposed development street network effectively continue the bicycle path proposed between Rusk Road and Street B. Conditions of approval are recommended to establish a public access easement over the soft-surface trail system and to connect the two main trail loops; maintenance will be the responsibility of the Homeowners Association established for the proposed development. As proposed, the soft-surface trails are exempt from natural resource review (as per MMC Subsection 19.402.4.A.17). Recommended conditions of approval are proposed to address project phasing. The requirements to balance cut and fill within floodplain areas are addressed by MMC Title 18 Flood Hazard Regulations, which prevent proposed floodplain alterations from increasing potential flooding. Staff has recommended that the applicant more thoroughly demonstrate that no other practicable alternatives exist to minimize the proposed impacts to designated natural resource areas.*

- **Laura Hickman, area resident:** Concern about traffic impacts resulting from the proposed development; including pedestrian and bicycle safety to and from area homes, North

Clackamas Park, and nearby schools. Questions about the methodology and assumptions of the TIS.

Staff Response: *Similar questions about traffic impacts are addressed in response to other comments above.*

- **Ray Olma, area resident:** Traffic on Highway 224 and Rusk Road is already bad and will be made worse by trips from the proposed development. Concern for pedestrian safety on and crossing Rusk Road, which does not have sidewalks.

  Staff Response: *Similar questions about traffic impacts are addressed in response to other comments above.*

- **Jamie Marshall, area resident:** Existing infrastructure (including water treatment facilities and I-205) is inadequate to support the proposed development.

  Staff Response: *The proposed development's impacts on traffic are being evaluated as part of this review and are addressed in response to other comments above. Water service is available from Clackamas River Water and sewer service is available from Clackamas County's Water Environment Services; both are adequate to support the proposed development.*

- **Melanie Frisch, area resident:** Concern about traffic impacts (inadequate infrastructure) and impacts to natural resources.

  Staff Response: *Similar questions about traffic impacts are addressed in response to other comments above. Impacts to natural resources are addressed in the Recommended Findings (see Attachment 1, to be distributed separately), specifically the findings for MMC Section 19.402.*

ATTACHMENTS

Attachments are provided as indicated by the checked boxes. All material is available for viewing upon request.

	Early PC Mailing	PC Packet	Public Copies	E-Packet
1. Recommended Findings in Support of Approval *(to be distributed separately prior to hearing)*	☐	☐	☐	☐
2. Recommended Conditions of Approval *(to be distributed separately prior to hearing)*	☐	☐	☐	☐
3. Applicant's Narrative and Supporting Documentation *(all materials received April 7, 2017, unless otherwise noted)*				
a. Narratives	☒	☐	☒	☒
1) Planned Development, Variance, Zone Change				
2) Minor Modification to Community Service Use, Subdivision Preliminary Plat, Transportation Facilities Review, Natural Resources Review				
3) Supplemental Information for Variance Request *(received April 20, 2017)*				

	Early PC Mailing	PC Packet	Public Copies	E-Packet
b. Exhibit A – Development Plan Set 1) C000 Cover Sheet 2) C100 Existing Conditions 3) C101 & 102 Tree Protection & Removal Plan 4) C201 Preliminary Plat 5) C202 Typical Street Sections 6) C300 Grading Plan 7) C400 Composite Utility Plan 8) C500 Public Improvement Plan 9) L100 & 110 Landscape Plan & Enlargements 10) A100 Townhome Renderings 11) A2, A4, & A6 Alley-facing unit plans 12) 2.0, 4.0, 6.0, 7.0, & 7.1 Street-facing unit plans	☒	☐	☒	☒
c. Exhibit A-1 – Revised Landscaping Plans, Sheets L100 & 110 *(received April 12, 2017)*	☒	☐	☒	☒
d. Exhibit B – Preapplication Notes from August 2016	☒	☐	☒	☒
e. Exhibit C – City Planning Process Memo, dated October 4, 2016	☒	☐	☒	☒
f. Exhibit D – Wetland Delineation Report by Pacific Habitat Services	☒	☐	☒	☒
g. Exhibit E – Drainage Report prepared by DOWL	☒	☐	☒	☒
h. Exhibit E-1 – Stormwater Response Memo from DOWL	☒	☐	☒	☒
i. Exhibit E-2 – Floodplain Analysis Memo from DOWL, dated January 23, 2017	☒	☐	☒	☒
j. Exhibit F – Geotechnical Evaluation prepared by GEO Consultants Northwest	☒	☐	☒	☒
k. Exhibit G – Traffic Impact Study prepared by Kittleson & Associates	☒	☐	☒	☒
l. Exhibit H – Neigbhorhood Meeting Materials prepared by DOWL	☒	☐	☒	☒
m. Exhibit I – Arborist Report prepared by Morgan Holen & Associates	☒	☐	☒	☒
n. Exhibit J – Natural Resource Review report prepared by Pacific Habitat Services *(received April 12, 2017)*	☒	☐	☒	☒
o. Exhibit J-1 – Revised Figures 1A, 2, 9, & 9A *(received April 20, 2017)*	☒	☐	☒	☒
p. Exhibit K – Memo from Johnson Economics	☒	☐	☒	☒
q. Kellogg Creek Development Alternative Site Plan	☒	☐	☒	☒
r. Community Garden Site Plan	☒	☐	☒	☒
s. Parking Availability Map *(received May 15, 2017)*	☐	☒	☒	☒

	Early PC Mailing	PC Packet	Public Copies	E-Packet
4. Comments Received				
a. Michelle Wyfells, Metro (*April 20, 2017)*	☒	☐	☒	☒
b. Matt Amos, Clackamas Fire District #1 *(April 25 & May 4)*	☒	☐	☒	☒
c. Rob Livingston, City Public Works Dept. *(April 25 & 27)*	☒	☐	☒	☒
d. Paul Hawkins, Lake Road NDA *(April 28)*	☒	☐	☒	☒
e. Rebecca Hamilton, Metro *(May 1)*	☒	☐	☒	☒
f. Joseph Edge, Oak Grove Community Council *(May 1)*	☒	☐	☒	☒
g. Sarah Hartung, ESA (City consultant) *(May 1)*	☒	☐	☒	☒
h. Marah Danielson, ODOT Region 1 *(May 3)*	☒	☐	☒	☒
i. Alex Roller, City Engineering Dept. *(May 5)*	☒	☐	☒	☒
j. Kenneth Kent, Clackamas County Engineering *(May 8)*	☐	☒	☒	☒
k. Kathryn Krygier and Tonia Williamson, North Clackamas Parks & Recreation District *(May 11)*	☐	☒	☒	☒
l. Laura Hickman, area resident *(May 11)*	☐	☒	☒	☒
m. Ray Olma, area resident *(May 15)*	☐	☒	☒	☒
n. Jamie Marshall, area resident *(May 15)*	☐	☒	☒	☒
o. Melanie Frisch, area resident *(May 15)*	☐	☒	☒	☒
p. Alex Roller, City Engineering Dept., revised memo *(May 16)*	☐	☒	☒	☒
5. List of Record	☐	☐	☐	☐

Note: The List of Record is maintained and updated throughout the review process and is available for viewing upon request.

Key:

Early PC Mailing = paper materials provided to Planning Commission at the time of public notice 20 days prior to the hearing.

PC Packet = paper materials provided to Planning Commission 7 days prior to the hearing.

Public Copies = paper copies of the packet available for review at City facilities and at the Planning Commission meeting.

E-Packet = packet materials available online at https://www.milwaukieoregon.gov/planning/planning-commission-170.

Recommended Findings in Support of Approval
Master File #PD-2017-001
Kellogg Creek Planned Development

Sections of the Milwaukie Municipal Code not addressed in these findings are found to be inapplicable to the decision on this application.

1. The applicant, Brownstone Development, Inc., has applied for approval to create a 92-unit Planned Development subdivision on property currently addressed at 13333 SE Rusk Rd. The site is split zoned Medium Density Residential R-3 on the western half and Low Density Residential R-10 on the eastern half. The land use application master file number is PD-2017-001, with accompanying file numbers ZA-2017-001, S-2017-001, NR-2017-001, TFR-2017-001, VR-2017-003, and CSU-2017-001.

2. The subject property is comprised of a single lot that is the result of a recent lot consolidation and property line adjustment process (land use files PLA-2017-001 andLC-2017-001). Previously, the subject property was comprised of four lots totaling 17.55 acres, with the Turning Point Church located in the southeastern corner of the site and addressed as 13333 SE Rusk Rd. Three of the lots on the western side of the original property were consolidated, and the property line between this new lot and the remaining church lot was subsequently adjusted to accurately reflect the location of the church building and accompanying off-street parking areas. The resulting church site is approximately 3.7 acres, and the subject property being subdivided is approximately 13.8 acres.

3. The applicant has proposed to divide the subject property into 92 lots for 4-unit rowhouse development, with tracts for stormwater (3 facilities), open space (nearly 7 acres), a community garden, and a pedestrian connection to Kellogg Creek Drive along the eastern edge of the development. A network of new public streets will provide access to the new development, with two points of vehicle access to Kellogg Creek Drive and pedestrian and bicycle access to an existing sidewalk at the intersection of Rusk Road and Highway 224. Private alleys will provide additional access to the rear of some of the proposed rowhouses. Previously, the church site depended on an access through the subject property; access to the church site will be retained through one of the new public streets. The proposal includes a variance request for locating the driveway access for one of the proposed lots slightly closer to a street intersection than the City code allows.

4. Mount Scott Creek flows across the northern portion of the subject property, and a large wetland (approximately 0.7 acres) is located within the 100-year floodplain designated over most of the western half of the site. Water Quality Resource (WQR) and Habitat Conservation Area (HCA) designations exist around the creek and wetland, and portions of these natural resource areas will be disturbed by the proposed development. The applicant has proposed mitigation plantings within the WQR and HCA and to balance cut and fill within the floodplain. The proposal includes a variance request for configuring several of the new lots in such a way that there is little or no buildable area outside the WQR or HCA.

5. The proposal is subject to the following provisions of the Milwaukie Municipal Code (MMC):
   - MMC Section 19.1007 Type IV Review
   - MMC Section 19.311 Planned Development Zone (PD)
   - MMC Section 19.301 Low Density Residential Zones (including R-10)
   - MMC Section 19.302 Medium and High Density Residential Zones (including R-3)
   - MMC Section 19.902 Amendments to Maps and Ordinances

- MMC Title 17 Land Division
- MMC Title 18 Flood Hazard Regulations
- MMC Section 19.402 Natural Resources
- MMC Chapter 19.500 Supplementary Development Regulations
- MMC Chapter 19.600 Off-Street Parking and Loading
- MMC Chapter 19.700 Public Facility Improvements
- MMC Section 19.904 Community Service Uses
- MMC Section 19.911 Variances
- MMC Chapter 19.1200 Solar Access Protection

6. The application submittal includes a proposed Planned Development, Zoning Map Amendment, Subdivision (preliminary plat), Natural Resource Review, Transportation Facilities Review, Variance Request, and minor modification to the church as an existing Community Service Use. Of all of the application components, the Planned Development and Zoning Map Amendment require the highest level of review (Type IV); as per MMC Subsection 19.1001.6.B, all are being processed with Type IV reivew.

   The application has been processed and public notice provided in accordance with MMC Section 19.1007 Type IV Review. As required by MMC Subsection 19.1002.2, a preapplication conference was held on August 11, 2016. Public notice was sent to property owners and current residents within 500 ft of the subject property. MMC Subsection 19.1007.3.D requires a 400-ft radius for public notice, but the applicant requested a broader notice radius to correspond with the notice sent for the applicant's voluntary neighborhood meeting prior to submittal. As required by law, a public hearing with the Planning Commission was held on May 23, 2017, resulting in a recommendation for final decision by the City Council. A public hearing with the City Council was held on *[month/day]*, 2017, as required by law.

   These findings are worded to reflect the City Council's role as final decision-maker; they represent the Planning Commission's recommendation to the City Council.

7. MMC Chapter 19.300 Base Zones

   As a Planned Development, the proposed subdivision is subject to the requirements for Planned Developments as established in MMC Section 19.311. The Planned Development (PD) zone is a superimposed zone applied in combination with regular existing zones. The subject property is split-zoned R-10 and R-3, so the underlying zone requirements of MMC Sections 19.301 and 19.302, respectively, are relevant and must be addressed as well.

   a. MMC Section 19.311 Planned Development Zone (PD)

      The purpose of a Planned Development (PD) zone is to provide a more desirable environment than is possible through the strict application of Zoning Ordinance requirements, encouraging greater flexibility of design and providing a more desirable use of public and private common open space. PD zones can promote variety in the physical development pattern of the city and encourage a mix of housing types.

      (1) MMC Subsection 19.311.2 Use

         The City Council approves the final development plan of a PD zone, in consideration of the proposal's conformance to the following standards:

         (a) Conformance to the City's Comprehensive Plan

As addressed in more detail in Finding 8, the proposed Planned Development conforms to the City's Comprehensive Plan and is consistent with the relevant policies and goals.

(b) Formation of a compatible and harmonious group

As proposed, the development will provide 92 single-family attached units in the form of 23 four-unit rowhouses. Approximately half of the units will be alley-loaded, with driveways and garages located in the rear; the other half will be front-loaded, with driveways and garages accessing the streets. Although the two types of structures will have different front facades, according to the applicant's submittal materials, the size, orientation, architecture, color palette, and articulating features will be similar and will lend a sense of group compatibility.

(c) Suitability to the capacity of existing and proposed community utilities and facilities

The existing public utilities and facilities in the vicinity of the subject property are all of sufficient size and capacity to support the proposed development. As required, the new streets and utilities provided within the proposed development itself will be suitable to serve it.

(d) Cohesive design and consistency with the protection of public health, safety, and welfare in general

The proposed street network, comprised of public streets, a public alley, and pedestrian and bicycle paths, is cohesively designed and meets the various applicable City standards for spacing and sight-distance. Frontage improvements on the new public streets and along the subject property's frontage on Kellogg Creek Drive, including sidewalks, landscaping, and streetlights will meet applicable City standards. A soft-surface trail system through a portion of the open space area will offer recreational opportunities while limiting impacts to natural areas.

(e) Affordance of reasonable protection to the permissible uses of properties surrounding the site

No commercial or other nonresidential uses are proposed as part of the development. Surrounding properties are zoned for low-density residential uses, and the proposed development will not limit any future development or redevelopment of those properties. Access to the adjacent church site will be modified to allow a safe connection to Kellogg Creek Drive through the new street system of the proposed development. Future redevelopment of the church site may require further modifications to its access, but the proposed development does not preclude such redevelopment. The northern portion of the site, which is adjacent to the rear of several residential lots on Kayla Court, will not be accessible across Mount Scott Creek and will not present any new impacts as a result of the proposed development.

(2) MMC Subsection 19.311.3 Development Standards

MMC 19.311.3 establishes that the various applicable standards and requirements of MMC Title 19, including those of the underlying zone(s), are applicable in a PD zone, unless the Planning Commission grants a variance

from said standards in its approval of the PD or the accompanying subdivision plat. The City Attorney has concurred with the conclusion of City staff that a formal variance request is not required for adjustments related to the flexibility inherent in the stated purpose of the PD zone to encourage greater flexibility of design and provide a more efficient and desirable use of common open space, with an allowance for some increase in density as a reward for outstanding design (e.g., housing type, lot size, lot dimension, setbacks, and similar standards).

(a) Minimum Size of a PD Zone

MMC Subsection 19.311.3.A requires a minimum of 2 contiguous acres of land for a Planned Development.

The subject property is approximately 13.8 acres in size and provides an adequate area for development.

(b) Special Improvements

MMC Subsection 19.311.3.B establishes the City's authority to require the developer to provide special or oversize sewer lines, water lines, roads and streets, or other service facilities.

The City's Engineering Department has determined that no special or oversize facilities are required to ensure that the proposed development provides adequate public facilities.

(c) Density Increase and Control

MMC Subsection 19.311.3.C allows an increase in density of up to 20% above the maximum allowed in the underlying zone(s), if the City Council determines that the proposed Planned Development is outstanding in planned land use and design and provides exceptional advantages in living conditions and amenities not found in similar developments constructed under regular zoning.

Subtracting the area occupied by floodplain, proposed rights-of-way, and required open space, as required by the density-calculation standards provided in MMC Subsection 19.202.4, the maximum allowable density for the net area of the subject property is 80 units. The applicant has proposed a total of 92 units, which is a 15% increase. The applicant has listed the following elements as evidence of the project's outstanding design and exceptional advantages:

- *Over 7 acres of open space, which will protect natural resource and floodplain areas on the site and provide recreational opportunities with a soft-surface trail system*
- *Overall site design that provides a sense of openness and visual permeability between the natural open space tract and the residential lots, nearly half of which will have backyards that are directly adjacent to the open space*
- *Unfenced stormwater facilities planted with low-lying grasses that maintain views of the open space and provide connection points between the trail system and the rest of the development*

- *A community garden for use by residents, located in the northeastern portion of the site*
- *Trees planted as screening between Highway 224 and the adjacent lots in the northeast corner of the site*
- *92 units of attached single-family housing offered at a price point that is affordable for working people with moderate incomes*
- *Compact development in proximity to a large public park (North Clackamas Park) and with access to a major roadway (Highway 224)*

The applicant has asserted that, without the Planned Development process, the site would be difficult to develop at a level that would meet the City's minimum density standard, at least without resulting in greater impacts to the designated natural resources on the site and a loss of some of the proposed amenities like the soft-surface trails and community garden. In effect, the proposed development is outstanding by virtue of being the only practicable and feasible layout for the site that provides new housing targeted at working people with moderate incomes.

As per the recommendation of the Planning Commission, the City Council finds that the proposed development provides sufficiently outstanding design features and extraordinary amenities to justify the proposed density increase.

(d) Peripheral Yards

MMC Subsection 19.311.3.D requires that yards along the periphery of any Planned Development zone be at least as deep as the front yard required in the underlying zone(s). Open space may serve as peripheral yard.

The front yard requirements of the underlying zones are 20 ft for R-10 and 15 ft for R-3. The large open space tract on the north and west sides of the proposed development provides a buffer of well over 20 ft. Where the proposed development is adjacent to the church property on the east, a 22-ft-wide public alley provides a peripheral buffer for Lots 45 and 53, and the 20-ft-wide pedestrian connection on tracts E and F provides a peripheral buffer for Lots 1 and 17. The pedestrian-bicycle connection between the cul-de-sac and the sidewalk at Rusk Road, in the northeastern corner of the site, provides 15 ft of separation for Lot 92; together with the proposed 5-ft side yard, a total of 20 ft will be provided as a buffer for this lot.

(e) Open Space

MMC Subsection 19.311.3.E requires that a Planned Development set aside land as open space, for scenic, landscaping, or other recreational purposes within the development. A minimum of one-third of the gross area of the site must be provided as open space and/or outdoor recreational areas, with at least half of this area being of the same general character as the area containing dwelling units.

The gross area of the subject property is approximately 13.8 acres, so a minimum of 4.6 acres must be provided as open space, with at least 2.3 acres available for recreational purposes. The applicant has proposed to

establish an open space tract of approximately 7 acres, with a soft-surface trail system making approximately 2.5 acres available for recreation.

(3) MMC Subsection 19.311.6 Planning Commission Review of Preliminary Development Plan and Program

MMC 19.311.6 establishes that the Planning Commission shall review an applicant's preliminary development plan and program for a PD and shall notify the applicant whether the proposal appears to satisfy the provisions of this section or has any deficiencies. Upon the Commission's approval in principle of the preliminary plan and program, the applicant shall file a final development plan and program and an application for zone change.

The applicant has submitted a development plan and program for the proposed PD and has requested that the Commission consider it to be the final development plan and program submittal, along with the accompanying application for zone change.

(4) MMC Subsection 19.311.8 Subdivision Plat

MMC 19.311.8 requires that the submittal of a final development plan and program be accompanied by an application for subdivision preliminary plat, where the PD involves the subdivision of land.

The proposal involves a 92-unit subdivision, and the applicant has included an application for subdivision preliminary plat with the submittal of a final development plan and program.

(5) MMC Subsection 19.311.9 Application for Zone Change

MMC 19.311.9 requires that an application for zone change accompany the submittal of a final development plan and program.

Along with the final development plan and program, the applicant has included an application for zone change to apply the PD zone to the subject property.

(6) MMC Subsection 19.311.10 Planning Commission Action on Final Development Plan and Program

MMC 19.311.10 requires that the Planning Commission hold a public hearing using Type IV review to consider a final development plan and program, zone change application, and subdivision preliminary plat. If the Planning Commission finds that the final development plan and program is in compliance with the preliminary approval and with the intent and requirements of the applicable provisions of the zoning ordinance, it shall forward a recommendation for approval to the City Council for adoption.

As required, the Planning Commission held a public hearing on May 23, 2017, in accordance with the Type IV process outlined in MMC Section 19.1007 and considered the proposed development plan and program, zone change application, subdivision preliminary plat, and other accompanying reviews. The Planning Commission found that the development plan and program is in compliance with the intent and requirements of the applicable provisions of MMC Title 19 Zoning and forwarded a recommendation of approval to the City Council for adoption.

(7) MMC Subsection 19.311.11 Council Action on Final Development Plan and Program

MMC 19.311.11 requires that the City Council consider the final development plan and program and zone change application through the Type IV review process, upon receipt of a recommendation from the Planning Commission. Upon consideration of the proposal, the Council may adopt an ordinance applying the PD zone to the subject property and adopt the final development plan and program as the standards and requirements for that PD zone. The Council may also continue consideration and refer the matter back to the Planning Commission with recommendations for amendment, or may reject the proposal and abandon further hearings and proceedings.

The Council considered the final plan and program and zone change application, as well as the accompanying applications for subdivision preliminary plat and associated reviews, in accordance with the Type IV review process outlined in MMC Section 19.1007. The Council held a public hearing on [month/day], 2017, and adopted an ordinance applying the PD zone to the subject property, which adopted the final development plan and program as the standards and requirements for the new PD zone (Ordinance ####).

The City Council finds that the applicable standards and requirements of MMC 19.311 are met. As per Ordinance ####, the final development plan and program is adopted as the standards and requirements and the PD zone designation is applied to the subject property.

b. MMC Sections 19.301 Low Density Residential Zones (including R-10) and 19.302 Medium and High Density Residential Zones (including R-3)

The subject property is split-zoned Residential R-10 and Residential R-3. MMC 19.301 and 19.302 establish the allowable uses and development standards for the residential R-10 and R-3 zones, respectively. As noted in Finding 7-a(2), although the underlying zone standards are primarily applicable, the PD zone allows adjustment to some of those standards. This applies to such underlying zone limitations as housing type, lot size, lot dimension, setbacks, and similar standards that relate to flexibility of design, greater efficiency in the use of common open space, and minor increases in density allowed as a reward for outstanding design.

(1) Permitted Uses

As per MMC Table 19.301.2, rowhouse development is not a permitted use in the R-10 zone; rowhouses are an outright permitted use in the R-3 zone (as per MMC Table 19.302.2). As noted in Finding 7-a, the primary purposes of the PD zone include encouraging greater flexibility of design and providing a more efficient use of common open space, so housing types not ordinarily permitted in the base zone may be proposed.

The applicant has proposed a 92-unit development comprised of 23 four-unit rowhouse buildings. The proposed design maximizes the development potential of the subject property, providing a public street network and utility infrastructure while minimizing impacts to the natural resource and floodplain areas on the site, which will remain protected in open space.

(2) Lot and Development Standards

The applicant has proposed to apply a single set of lot and development standards across the entire site, which is zoned R-3 on the western half and R-10 on the eastern half. As discussed in Finding 7-a(2), above, adjustments to underlying zone standards that are related to the flexibility of design afforded by the PD process are allowed and do not require a formal variance request. Table 7-b(2) compares the applicable standards for development in the R-10 and R-3 zones with the standards proposed as the final development plan and program for this PD zone.

Table 7-b(2)
Lot and Development Standards

Standard	R-10 Requirement	R-3 Requirement[1]	Proposed PD Requirement
1. Minimum Lot Size	10,000 sq ft	3,000 sq ft	Lots range from 1,600 sq ft to approx. 2,420 sq ft
2. Minimum Lot Width	70 ft	30 ft	Lot widths range from 18 ft to 31 ft
3. Minimum Lot Depth	100 ft	80 ft	Lot depths range from 80 to 91 ft
4. Minimum street frontage	35 ft	30 ft	Typical range is 20 to 25 ft; two lots on cul de sac are <20 ft
5. Front Yard	20 ft	15 ft	Front-loaded lots = 18 ft Alley-loaded lots = 10 ft to 14 ft
6. Side Yard	10 ft	0 ft (common) 5 ft (exterior)	Common wall = 0 ft Exterior wall = 5 ft
7. Street-Side Yard	20 ft	15 ft	5 ft to 7 ft
8. Rear Yard	20 ft	15 ft	Front-loaded lots = 15 ft Alley-loaded lots = 18 ft
8. Maximum Building Height	2.5 stories or 35 ft (whichever is less)	2.5 stories or 35 ft (whichever is less)	2 stories, <35 ft
9. Side yard height plane limit	45 degree slope at 20 ft height	45 degree slope at 20 ft height	≤20 ft
10. Maximum lot coverage	30%	40% (+20% for rowhouses)	Lots range from 46% to 59%
11. Minimum vegetation	35%	35%	Small vegetated areas on each lot, with access to large open space area to west
12. Front yard minimum vegetation	40%	40%	Front yard areas not occupied by driveways and walkways will be vegetated
13. Minimum density	3.5 units per acre	11.6 units per acre	Minimum of 66 units for entire site

14. Maximum density	4.4 units per acre	14.5 units per acre	Maximum of 80 units for entire site (Applicant has requested a 15% density increase to a total of 92 units)

[1] R-3 requirements from MMC Table 19.302.2 for rowhouses

The lot and development standards that will govern development on the subject property are shown in Table 7-b(2) and effectively establish a component of the final development plan and program for this PD zone.

8. MMC Section 19.902 Amendments to Maps and Ordinances

MMC 19.902 establishes the process for amending the City's Comprehensive Plan and land use regulations, including the zoning map. Specifically, MMC Subsection 19.902.6 establishes the review process and approval criteria for zoning map amendments.

a. MMC Subsection 19.902.6.A Review Process

MMC 19.902.6.A provides that, generally, changes to the zoning map that involve 5 or more properties or encompass more than 2 acres of land are legislative and are therefore subject to Type V review; otherwise, they are quasi-judicial in nature and subject to Type III review. The City Attorney has the authority to determine the appropriate review process for each proposed zoning map amendment.

The proposed zoning map amendment encompasses a single property of approximately 13.8 acres and is related to a proposed planned development, which requires Type IV review. The City Attorney has determined that the proposed zoning map amendment is quasi-judicial in nature and requires Type III review. The concurrent planned development requires Type IV review, which is also a quasi-judicial process. The City Council finds that the Type IV review process is appropriate for the proposed zoning map change.

b. MMC Subsection 19.902.6.B Approval Criteria

MMC 19.906.2.B establishes the following approval criteria for zoning map amendments:

(1) The proposed amendment is compatible with the surrounding area based on the following factors:

(a) Site location and character of the area

(b) Predominant land use pattern and density of the area

(c) Expected changes in the development pattern for the area

The area surrounding the subject property includes North Clackamas Park and low to moderate density residential development, as well as the Deerfield Village assisted living center (40 apartment units) located directly across Kellogg Creek Drive from the site. The proposed development will preserve over half of the site area as natural open space with access through soft-surface trails for low-impact recreational use. The location offers easy access to Highway 224, North Clackamas Park, several nearby schools, and employment centers along the Highway 224 and Interstate 205 corridors.

The 92 units of proposed rowhouses will be arranged in a compact pattern accessible by fully constructed local streets, with landscape strips, street trees, and on-street parking. Although the residential portion of the proposed

development will be more dense than most of the surrounding neighborhood, the Deerfield Village assisted living center is similar in density and aesthetic to an apartment or multifamily development. The proposed development is consistent with the single-family attached housing that Milwaukie's 2016 Housing Needs Analysis predicts will be developed over the next 20 years.

The proposed zoning amendment is compatible with the surrounding area based on the factors listed above.

(2) The need is demonstrated for uses allowed by the proposed amendment.

The draft 2016 Housing Needs Analysis prepared for Milwaukie notes a particular need for single-family attached units like the proposed rowhouses.

(3) The availability is shown of suitable alternative areas with the same or similar zoning designation.

Functionally, the PD designation is a form of overlay zone designation that can be applied to sufficiently sized properties for greater flexibility in developing the site. This criterion is more applicable to standard base zone designations and is intended to ensure that a suitable number of other properties with the same base zone designation will remain available for development.

This criterion is not applicable to a proposal to add the PD designation to a base zone.

(4) The subject property and adjacent properties presently have adequate public transportation facilities, public utilities, and services to support the use(s) allowed by the proposed amendment, or such facilities, utilities, and services are proposed or required as a condition of approval for the proposed amendment.

The applicant's submittal materials include a traffic impact study, utility plans, and preliminary stormwater drainage report to demonstrate that public facilities are or will be made adequate to serve the proposed development.

Existing water and sanitary sewer services in Kellogg Creek Drive are provided by Clackamas River Water (CRW) and Clackamas County's Water and Environment Services (WES), respectively, and are adequate to serve the proposed new units. Within the public rights-of-way that will serve the proposed development, new water and sanitary sewer mains will be constructed as per City standards and will be maintained by the City, though they will connect to the CRW and WES facilities in Kellogg Creek Drive.

The applicant proposes to manage stormwater runoff from the new public streets with three large, shallow bioswale facilities. The applicant's preliminary drainage report, prepared by a qualified professional engineer, explains in more detail how stormwater will be managed and demonstrates that post-development runoff will not exceed the applicable pre-development standards.

Within the newly dedicated public rights-of-way that will serve the proposed lots, public streets will be constructed to meet applicable City standards, with paved travel lanes, curb and gutter, landscape planter strips, and sidewalks. On Kellogg Creek Drive along the subject property frontage, the existing right-of-way will be also be improved to provide the required width travel lane, striped bicycle lane, on-street parking strip, curb and gutter, landscape planter strip, and setback sidewalk.

The subject property and adjacent properties presently have adequate public transportation facilities, public utilities, and services to support the proposed development.

(5) The proposed amendment is consistent with the functional classification, capacity, and level of service of the transportation system. A transportation impact study may be required subject to the provisions of Chapter 19.700.

The applicant prepared a traffic impact study (TIS) to evaluate the proposed development's anticipated impacts on the transportation system. The TIS concluded that traffic volumes from the proposed development will not cause any of the intersections in the study area to fall below acceptable levels of service.

As discussed in Finding 14-xx, the City's traffic consultant has reviewed the applicant's TIS and concluded that, with the exception of one error related to measurement of the northbound right-turn lane on Rusk Road at the Highway 224 intersection, the methodology and conclusions of the TIS are sound. As proposed, the northbound right-turn leg of the Rusk Road/Highway 224 intersection would fall below the acceptable level of service. A condition has been established to require extension of the northbound right-turn lane on Rusk Road so the Highway 224 intersection maintains an acceptable level of service.

As conditioned, the proposed amendment is consistent with the functional classification, capacity, and level of service of the transportation system.

(6) The proposed amendment is consistent with the goals and policies of the Comprehensive Plan, including the Land Use Map.

The Land Use Map within the City's Comprehensive Plan (Comp Plan) reflects the split zoning of the subject property, with a Low Density designation for the portion zoned R-10 and a Medium Density designation for the portion zoned R-3. The proposed amendment would add the Planned Development (PD) designation to each of the zone designations for the subject property but would not affect the designations on the Land Use Map.

The Comp Plan includes a number of goals and policies that are applicable to the proposed development.

(a) Chapter 1 Citizen Involvement

The goal of Chapter 1 is to encourage and provide opportunities for citizens to participate in all phases of the planning process. Prior to submitting the application, the applicant held an open meeting to present and discuss the project. The Lake Road Neighborhood District Association and to property owners and residents within 500 ft of the site were invited. According to the applicant's submittal materials, approximately 30 people attended the meeting, held on November 3, 2016. The applicant noted the various concerns raised by neighbors and has noted that several aspects of the original plan were revised as a result.

The Type IV review process utilized for consideration of any Planned Development provides for public hearings by both the Planning Commission and City Council, where citizens have the opportunity to present testimony and participate in the decision-making process. A public hearing on the proposed development was held by the Planning

Commission on May 23, 2017, and was continued to [month/day], 2017; a public hearing was held by the City Council on [month/day], 2017. The Commission and Council considered testimony from citizens en route to reaching the decision reflected in these findings.

(b) Chapter 2 Plan Review and Amendment Process

The goal of Chapter 2 is to establish a process for review and amendment of the Comp Plan, as a basis for land use decisions and with public participation. Policies related to the objective of implementing the Comp Plan include a requirement that zone changes and other planning actions be consistent with the intent of the Comp Plan. The applicant's narrative and supporting materials are evidence of the required review process at work, with opportunities for public involvement at Commission and Council hearings as noted above.

(c) Chapter 3 Environmental and Natural Resources

Chapter 3 focuses on conservation of the City's remaining natural resources.

(i) Natural Hazards Element

The goal of the Natural Hazards element is to provide appropriate safeguards for development in areas of known natural hazards, such as floodplains. Policies include the direction to establish regulations to prevent development from increasing stormwater runoff and standards to ensure the strength and quality of construction materials within the floodplain. The finished elevations of the lowest floors of buildings and streets must be a minimum of 1 ft above the 100-year flood elevation, and actions are encouraged to retain the floodplain as minimally undeveloped open space.

The subject property includes a designated floodplain area, and the proposed development involves some alteration of the floodplain. As discussed in Finding 10, the applicant proposes to balance the amount of fill that will be added within the floodplain with the removal of an equal amount of material. The fill will raise those areas of residential construction and streets at least 1 ft above the base flood elevation. The remaining floodplain areas on the site will be included in a large open space tract.

(ii) Open Spaces, Scenic Areas, and Natural Resources Element

The goal of the Open Spaces element is to conserve open space and protect and enhance natural resources to create an aesthetically pleasing urban environment. Policies include the protection of natural resources through conservation and mitigation, designation of riparian area buffers, regulation of the placement and design of stormwater drainage facilities, and protection of existing upland areas and values related to wildlife habitat and erosion control.

As discussed in more detail in Finding 11, the applicant's submittal materials include a natural resource report that analyzes practicable alternatives to the proposed development and demonstrates that its proposal does the most to avoid impacts to the WQR and HCA parts

of the site, minimizes impacts where unavoidable, and sufficiently mitigates for the allowed disturbance. The applicant's submittal materials include a preliminary drainage report that explains how the proposed stormwater management facilities are designed to ensure that post-development runoff will not exceed pre-development levels.

(d) Chapter 4 Land Use

Chapter 4 provides objectives and policies to guide the development of vacant lands and redevelopment of existing features, considering a variety of needs such as housing, employment, and recreation.

(i) Residential Land Use and Housing Element

The goal of the Residential Land Use element includes the provision of new housing that is adequate to meet the needs of local residents and the regional housing market.

Policies related to buildable lands include the use of zoning to implement the policies and standards of various other elements of the Comp Plan and requirement of a report demonstrating consistency with the policies of Chapter 3 (Environmental and Natural Resources) for sites with special resource designations. Policies related to residential land use design include an allowed density bonus of up to 20% for Planned Unit Developments in exchange for exceptional design quality or special project amenities, a requirement that Planned Unit Developments provide areas dedicated to open space and/or outdoor recreation, and encouragement for preservation of existing tree canopy and connected vegetated corridors. Policies related to housing choice include the development of larger subdivisions and Planned Unit Developments that use innovative techniques for the purpose of reducing housing costs while creating an attractive living environment.

The applicant's narrative includes an address of the proposal's consistency with the various applicable goals, objectives, and policies of the Comp Plan, including those of Chapter 3. As addressed in Finding 7-a-(2)(c), the applicant has proposed a density increase of 15%, based on the exceptional design and special amenities of the proposed development. The proposed development includes nearly half of the overall site retained as open space, with the developable lots configured in such a way as to preserve as many of the existing trees on the site as practicable and to avoid impacts to the riparian corridor along Mount Scott Creek. The applicant asserts that the number of proposed lots will create a certain economy of scale that will allow the new units to be sold at an affordable price and meet one of the community's housing needs.

(ii) Recreational Needs Element

The goal of the recreational needs element is to provide for the recreational needs of current and future city residents by maximizing the use of existing public facilities, encouraging the development of private recreational facilities, and preserving the opportunity for future public recreational use of vacant private lands.

The subject property is adjacent to the eastern edge of North Clackamas Park, and future residents in the proposed development will have easy access to this existing public facility. Within the proposed open space tract, a soft-surface trail system will be available for recreational use by both future residents and the public at large (through a public access easement).

(e) Chapter 5 Transportation, Public Facilities, and Energy Conservation

Chapter 5 addresses the City's responsibility to provide its current and future residents with a full range of urban services, including streets, sewer, and water.

(i) Transportation Element

The City's Transportation System Plan (TSP) is an ancillary Comp Plan document that contains the City's long-term transportation goals and policies. The applicant's TIS demonstrates consistency with the TSP and asserts that the proposed development will not result in significant impacts to the surrounding transportation system. As discussed in Finding 14-xx, the City's traffic consultant has reviewed the applicant's TIS and concluded that, with the exception of one error related to measurement of the northbound right-turn lane on Rusk Road at the Highway 224 intersection, the methodology and conclusions of the TIS are sound. A condition has been established to address this error.

(ii) Public Facilities and Services Element

The goal of the Public Facilities element is to provide for the orderly and efficient arrangement of public facilities and services to serve urban development. The proposed development includes the extension of existing water and sewer services to serve the new lots, as well as stormwater facilities designed to ensure that post-development runoff does not exceed pre-development levels.

(iii) Energy Conservation Element

The goal of the Energy Conservation element is to conserve energy by encouraging energy-efficient land use patterns and transportation systems. The proposed development is a compact arrangement of 92 units of rowhouse housing that is located close to large employment corridors across Highway 224 and along Interstate 205.

As conditioned, the proposed amendment is consistent with the goals and policies of the Comprehensive Plan, including the Land Use Map.

(7) The proposed amendment is consistent with the Metro Urban Growth Management Functional Plan and relevant regional policies.

The Metro Urban Growth Management Functional Plan includes a number of titles that address various aspects of the region's goals and policies for urban development.

(a) Title 1 Housing Capacity

The proposed development will provide a large number of needed housing units in a compact urban form.

(b) Title 3 Water Quality and Flood Management

The proposed development is configured to avoid and/or minimize impacts to the designated natural resources on the site. Proposed alterations to the floodplain will be done in accordance with local and federal requirements.

(c) Title 7 Housing Choice

The proposed development will provide single-family attached housing and will support Metro's policies for expanding housing choice with a needed housing type in Milwaukie.

(d) Title 13 Nature in Neighborhoods

The proposed development supports Metro's policies for conserving and enhancing habitat areas by avoiding and minimizing impacts to the designated natural resources on the site, as well as by establishing a large open space tract that includes wetlands, floodplain, existing mature native trees, and the riparian corridor along Mount Scott Creek.

The proposed amendment is consistent with the Metro Urban Growth Management Functional Plan and relevant regional policies.

(8) The proposed amendment is consistent with relevant State statutes and administrative rules, including the Statewide Planning Goals and Transportation Planning Rule.

Several of the Statewide Planning Goals are relevant to the proposed amendment:

(a) Goal 2 Citizen Involvement

Prior to submitting the application, the applicant held an open meeting to present and discuss the proposed development with neighbors. The applicant made several revisions to the original concept plan as a direct result of the discussion at that meeting. The Type IV review process for Planned Development proposals requires public hearings with both the Planning Commission and the City Council, allowing additional opportunities for citizens to submit written and oral testimony before the decision-makers. A public hearing on the proposed development was held by the Planning Commission on May 23, 2017, and was continued to [month/day], 2017; a public hearing was held by the City Council on [month/day], 2017.

(b) Goal 5 Natural Resources

The proposed development is subject to the applicable standards of MMC Section 19.402 Natural Resources, which provide protections for designated natural resource areas. As discussed in more detail in Finding 11, the applicant has proposed to avoid impacts to WQR and HCA parts of the site as much as practicable, to minimize impacts where unavoidable, and to sufficiently mitigate for the allowed disturbance.

(c) Goal 7 Areas Subject to Natural Hazards

The subject property includes a significant area of floodplain. As addressed in Finding 10, the applicant proposes substantial alteration of the floodplain in accordance with local and federal requirements, including the provision

that the amount of fill material placed in the floodplain must be balanced by an equal removal of material from within the floodplain.

(d) Goal 12 Transportation and Transportation Planning

As addressed in Finding 14 and elsewhere in these findings, with the conditioned correction of one minor error noted by City staff, the applicant's TIS demonstrates that the proposed development will not require changes to the functional classification of existing or planned transportation facilities and will not result in significant impacts on the transportation system.

As conditioned, the proposed amendment is consistent with relevant State statutes and administrative rules, including the Statewide Planning Goals and Transportation Planning Rule.

The proposed amendment, as conditioned, is consistent with the applicable criteria for zoning map amendments.

As conditioned, the City Council finds that the proposed amendment to the City's Zoning Map is approvable.

9. MMC Title 17 Land Division

MMC Title 17 establishes the City's regulations and procedures for lot consolidations, land divisions, property boundary changes, and creation of streets and rights-of-way. As per MMC Section 17.04.050, all decisions on boundary changes and land divisions expire 1 year after the date of approval, with one 6-month extension allowed upon submission of a formal request to the original decision-making authority.

a. MMC Chapter 17.12 Application Procedure and Approval Criteria

MMC 17.12 establishes the application procedures and approval criteria for land divisions and property boundary changes. Specifically, MMC Subsection 17.12.020.E provides that applications for subdivision preliminary plat are subject to Type III review.

MMC Section 17.12.040 establishes the following approval criteria for preliminary plat:

(1) The proposed preliminary plat complies with Title 19 of this code and other applicable ordinances, regulations, and design standards.

The proposed preliminary plat is for a planned development subdivision of 92 lots for rowhouse development, with tracts for stormwater facilities, open space, a community garden, and a pedestrian connection to Kellogg Creek Drive along the eastern edge of the development. The subject property is a 13.8-acre parcel that was created from a larger 17.5-acre property by a Property Line Adjustment and Lot Consolidation application (file #s PLA-2017-001 and LC-2017-001) approved in May 2017.

As addressed throughout these findings, the proposed subdivision complies with the applicable standards of Title 19 and other applicable ordinances, regulations, and design standards.

The Planning Commission finds that this standard is met.

(2) The proposed division will allow reasonable development and will not create the need for a variance of any land division or zoning standard.

The proposed division will allow reasonable development on all developable lots, without creating the need for any additional variances of land division or zoning standards beyond those addressed in these findings.

The Planning Commission finds that this standard is met.

(3) The proposed subdivision plat name is not duplicative and the plat otherwise satisfies the provisions of ORS 92.090(1).

The proposed subdivision name, Kellogg Creek, is not duplicative, and the plat otherwise satisfies the provisions of ORS 92.090(1).

The Planning Commission finds that this standard is met.

(4) The streets and roads are laid out so as to conform to the plats of subdivisions already approved for adjoining property as to width, general direction, and in all other respects unless the City determines it is in the public interest to modify the street or road pattern.

The Whitman's Lake-East Heights subdivision of 2001 is adjacent to the subject property to the north, across Mount Scott Creek from the proposed development. The Whitman's Lake-East Heights subdivision includes a public street (Madeira Drive) that bends away from the subject property and does not provide a connection point to the subject property. The proposed development does not include a crossing of Mount Scott Creek nor any developable lots or streets adjacent to the adjoining subdivision to the north.

The Planning Commission finds that this standard is not applicable.

(5) A detailed narrative description demonstrating how the proposal conforms to all applicable code sections and design standards.

The applicant has provided a detailed narrative description that demonstrates how the proposal conforms to all applicable standards and addresses variance requests as needed.

The Planning Commission finds that this standard is met.

The Planning Commission finds that the applicable procedures and approval criteria for the proposed subdivision, as outlined in MMC 17.12, are met.

b. MMC Chapter 17.16 Application Requirements and Procedures

MMC 17.16 establishes application requirements for land divisions and property boundary changes, including for preliminary plat for subdivision. The application must include all required forms and fees, as well as the information specified on the Submittal Requirements and Preliminary Plat checklists.

The applicant's submittal materials include all required forms and fees for the proposed subdivision, as well as plan sheets, narratives addressing the various applicable standards and criteria, and supporting documents and reports.

The Planning Commission finds that the application requirements and procedures of MMC 17.16 are met.

c. MMC Chapter 17.20 Preliminary Plat

MMC 17.20 establishes the information required with the preliminary plat, including existing and proposed conditions, a drainage summary report, proposed deed restrictions (if any), and proposed public improvements.

The applicant's preliminary plat materials include existing and proposed conditions, a preliminary drainage report, and plans for proposed improvements (including grading, landscaping, public utilities, and frontage improvements). No deed restrictions are proposed.

The Planning Commission finds that the preliminary plat requirements of MMC 17.20 are met.

d. MMC Chapter 17.28 Design Standards

MMC 17.28 establishes general design standards for land divisions and property boundary changes.

(1) MMC Section 17.28.020 Public Facility Improvements

MMC 17.28.020 requires that all land divisions that increase the number of lots are subject to the requirements and standards of MMC Chapter 19.700 Public Facility Improvements.

The proposed subdivision will increase the number of lots. The applicable standards of MMC 19.700 are addressed in Finding 12.

(2) MMC Section 17.28.030 Easements

MMC 17.28.030 requires that easements for public utilities (including sewers and water mains) be dedicated wherever necessary.

The proposed subdivision will establish new public streets, where the public utility infrastructure will be located. Three tracts for stormwater facilities and three tracts for pedestrian and/or bicycle access will be established and dedicated to the public. A condition has been established to ensure that easements for stormwater outfalls, for public access across private alleys, or for any other public utilities will be dedicated as needed.

(3) Specifically, MMC Section 17.28.040 provides standards for general lot design, including a requirement for rectilinear lots and a 10% limit on the cumulative lateral shift of compound lot line segments.

10. MMC Title 18 Flood Hazard Regulations

MMC Title 18 provides standards intended to minimize public and private losses due to flood conditions in specific areas. The regulations established in MMC Title 18 do this in part by controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel flood waters; controlling filling, grading, dredging, and other development which may increase flood damage; and preventing or regulating the construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards in other areas. As per MMC Section 18.04.100, a development permit is required prior to any construction or development within the flood management area.

The subject property includes flood hazard and flood management areas as identified on the Flood Insurance Rate Maps prepared by the Federal Emergency Management Agency (FEMA) and acknowledged by the City for the purposes of implementing this title. The applicant is proposing a revision to the FIRM map, to demonstrate that new lots will not be in the modified floodplain. Although no buildings will be built below the floodplain elevation, the proposed development includes cut and fill within the floodplain.

The proposed development is subject to the applicable provisions of MMC Title 18.

a. MMC Section 18.04.150 General Standards

MMC 18.04.150 provides general standards for all special flood hazard and all flood management areas.

(1) MMC Subsection 18.04.150.C Utilities

MMC 18.04.150.C requires that all new water and sanitary sewer systems be designed to minimize or eliminate infiltration of floodwaters into the system.

A condition has been established to ensure that all new utilities are installed underground and shall otherwise be designed to minimize or eliminate infiltration of floodwaters into the system, including stubs for utility service prior to surfacing any streets.

(2) MMC Subsection 18.04.150.D Subdivisions

MMC 18.04.150.D requires that all subdivision proposals must be consistent with the need to minimize flood damage. Public utilities and facilities shall be located and constructed to minimize or eliminate flood damage. Adequate drainage shall be provided to reduce exposure to flood damage. Base flood elevation data shall be provided for subdivision proposals that contain at least 50 lots or 5 acres.

The base flood elevation is is 69.9 located at cross section C on FEMA map number FM41005C0036D (NAVD 1988 datum). The proposed development would establish 92 units on approximately 13.8 acres and was designed to minimize flood damage by elevating the developable portions of the site at least 1 ft above base flood elevation. As proposed, all public utilities are located outside the floodplain, except for the sanitary sewer connection to the existing sanitary sewer located within the existing floodplain and those public utilities that will be in Kellogg Creek Drive, a portion of which lies within the existing floodplain. The site will be graded to provide positive drainage to reduce exposure to flood damage. Proposed street grades meet or exceed the minimum grade allowed by the City's Public Works Standards, and street cross sections match typical sections provided by the City to ensure proper drainage.

(3) MMC Section 18.04.150.F Balanced Cut and Fill

MMC 18.04.150.F provides requirements for the displacement of flood storage area by the placement of fill or structures.

As per the applicant's submittal materials, all fill added to the floodplain will be balanced with an equal amount of soil removed from the floodplain meeting the "no net fill" requirement. Excavation will occur on the same parcel as the proposed development and will not occur below the bankfull stage.

As conditioned, the proposed development is consistent with the applicable general standards for all special flood hazard and all flood management areas.

b. MMC Section 18.04.160 Specific Standards

MMC Subsection 18.04.160.A provides specific standards for residential construction, including a requirement that new construction of any residential structure shall have the lowest floor, including basement, elevated 1 ft above base flood elevation.

As proposed, all new primary residential structures will have the lowest floor elevated at least 1 ft above base flood elevation.

The City Council finds that, pending approval of the applicant's proposed revision to the appropriate FIRM map and as conditioned, the proposed development is consistent with the applicable standards of MMC Title 18.

11. MMC Section 19.402 Natural Resources

MMC 19.402 establishes regulations for designated natural resource areas. The standards and requirements of MMC 19.402 are an acknowledgment that many of the riparian, wildlife, and wetland resources in the community have been adversely impacted by development over time. The regulations are intended to minimize additional negative impacts and to restore and improve natural resources where possible.

a. MMC Subsection 19.402.3 Applicability

MMC 19.402.3 establishes applicability of the Natural Resource (NR) regulations, including all properties containing Water Quality Resources (WQRs) and Habitat Conservation Areas (HCAs) as shown on the City's Natural Resource (NR) Administrative Map.

Mount Scott Creek flows across the northern portion of the subject property, and a large wetland (approximately 0.7 acres) is located within the 100-year floodplain designated over most of the western half of the site. The City's NR Administrative Map shows Water Quality Resource (WQR) and Habitat Conservation Area (HCA) designations around the creek and wetland, and portions of these natural resource areas will be disturbed by the proposed development.

As presented in the applicant's submittal materials, the proposed development will temporarily or permanently disturb approximately 115,700 sq ft of WQR and/or HCA area. At that scale, the proposed activity is not listed as exempt according to the standards outlined in MMC 19.402.4.

The City Council finds that the requirements of MMC 19.402 are applicable to the proposed activity.

b. MMC Subsection 19.402.7 Activities Requiring Type II Review

MMC 19.402.7 establishes that certain activities within a designated WQR and/or HCA are subject to Type II review in accordance with MMC 19.1005. As per MMC 19.402.7.E, this includes boundary verifications that propose substantial corrections to the NR Administrative Map, including identifying the precise location of wetlands, as required by MMC 19.402.15.A.

The subject property includes a delineated wetland. As provided in MMC Subsection 19.402.15.A, the Type II review process is required to confirm the specific location of wetlands. However, the proposed activity requires other applications that are being processed concurrently with Type IV review. As provided in MMC Subsection 19.1001.6.B.1, concurrent applications are processed according to the highest numbered review type, with a single decision to be issued that includes findings for all concurrent applications.

The City Council finds that the boundary verification for wetlands shall be processed concurrently with Type IV review.

c. MMC Subsection 19.402.8 Activities Requiring Type III Review

MMC 19.402.8 establishes that certain activities within a designated WQR and/or HCA are subject to Type III review in accordance with MMC 19.1006. As per MMC

19.402.8.A.1, this includes activities allowed in the base zone that are not otherwise exempt or permitted as a Type I or II activity.

The subdivision of land containing a WQR and/or HCA is subject to Type III review and the standards established in MMC Subsections 19.402.13.H and 13.I. The level of disturbance proposed within the designated WQR and HCA areas on the subject property exceeds the levels allowed by Type I and II review, as provided in MMC 19.402.6 and 402.7, respectively. As such, the activity is subject to Type III review and the discretionary process established in MMC 19.402.12. As noted in Finding 11-b above, the Natural Resource review is associated with other applications being processed concurrently with Type IV.

The City Council finds that the proposed activity is subject to Type III review and will be processed concurrently with other applications requiring Type IV review.

d. MMC Subsection 19.402.9 Construction Management Plans

MMC 19.402.9 establishes standards for construction management plans, which are required for projects that disturb more than 150 sq ft of designated natural resource area. Construction management plans must provide information related to site access, staging of materials and equipment, and measures for tree protection and erosion control.

The applicant's Natural Resource Review report includes a construction management plan that provides the information required by MMC 19.402.9, including tree protection measures. The plan will be formally reviewed at the time of submittal for development permits.

e. MMC Subsection 19.402.11 Development Standards

MMC 19.402.11 establishes development standards for projects that impact a designated natural resource, including requirements to protect natural resource areas during development and general standards for required mitigation (e.g., plant species, size, spacing, and diversity).

In particular, MMC Subsection 19.402.11.C establishes mitigation requirements for disturbance within WQRs. The requirements vary depending on the existing condition of the WQR, according to the categories established in MMC Table 19.402.11.C. For Class A "Good" WQR conditions, MMC Table 19.402.11.C requires that the applicant submit a plan for mitigating water quality impacts related to the development; for Class C "Poor" WQR conditions, the table requires restoration and mitigation with native species using a City-approved plan.

The proposed development will permanently disturb approximately 34,700 sq ft and temporarily disturb approximately 19,000 sq ft within the WQR. The portion of the WQR closest to Mount Scott Creek is categorized as Class A ("Good"); other portions are categorized as Class C ("Poor"). In addition, the proposed development will permanently disturb approximately 46,300 sq ft and temporarily disturb approximately 15,400 sq ft within the HCA-only areas on the site.

Using the mitigation planting ratio provided in MMC Subsection 19.402.11.D.2.b as a guide, the applicant proposes to plant 5 trees and 25 shrubs per 500 sq ft of disturbance area. For the total WQR and HCA disturbance of approximately 115,700 sq ft (both permanent and temporary disturbance), the applicant proposes to plant 1,160 native trees and 5,790 native shrubs within a specific mitigation area. As proposed, the mitigation plantings will meet the minimum requirements established in

MMC Subsection 19.402.11.B. Mitigation trees will be of at least ½-in caliper (measured at 6 ft above the ground level after planting) and shrubs will be of at least 1-gallon size and at least 12-in height.

ESA, the City's consultant for on-call natural resource services, has evaluated the proposed mitigation plan and concluded that, with a few adjustments, it adequately addresses the proposed WQR and HCA disturbance. ESA provided a few additional recommendations to improve the mitigation plan, including retaining the existing white oak saplings that appear to have been planted on the site as part of an ongoing restoration effort and re-evaluating the assessment of WQR classification at several of the sample points to ensure that mitigation plantings are distributed appropriately. Conditions have been established to ensure that these recommendations are implemented.

As conditioned, the City Council finds that the applicable development standards of MMC 19.402.11are met.

f. MMC Subsection 19.402.12 General Discretionary Review

MMC 19.402.12 establishes the discretionary review process for activities that substantially disturb designated natural resource areas.

(1) Impact Evaluation and Analysis

MMC Subsection 19.402.12.A requires an impact evaluation and alternatives analysis in order to determine compliance with the approval criteria for discretionary review and to evaluate alternatives to the proposed development. A technical report prepared by a qualified natural resource professional is required and should include the following components:

- Identification of ecological functions
- Inventory of vegetation
- Assessment of water quality impacts
- Alternatives analysis
- Demonstration that no practicable alternative method or design exists that would have a lesser impact on the resource and that impacts are mitigated to the extent practicable
- Mitigation plan

The applicant's submittal materials include a technical report prepared by Pacific Habitat Services, Inc., a private firm providing a range of environmental consulting services including natural resource assessment, wetland delineation, and environmental restoration. The technical report includes an impact evaluation and alternatives analysis consistent with the required components listed above, as well as an inventory of existing vegetation and discusses the ecological function of the existing WQR and HCA areas within the project area. The report also provides a mitigation plan for permanent and temporary impacts to the WQR and HCA.

The technical report considers two alternatives to the proposed development configuration: (1) another planned development scenario with no regard for natural resources on the site (resulting in greater impacts to the WQR and HCA) and (2) a subdivision following the existing split zoning of the site and configured to produce almost no disturbance of the WQR and HCA. The report concludes

that the proposed development is the most practicable alternative that results in the least impact to the natural resources on the site.

The City Council finds that the applicant's impact evaluation and alternatives analysis is sufficient for purposes of reviewing the proposed activity against the approval criteria provided in MMC 19.402.12. This standard is met.

(2) Approval Criteria

MMC Subsection 19.402.12.B provides the approval criteria for discretionary review as follows:

Note: ESA reviewed the applicant's technical report and presented its assessment to the City in a summary memo, which informs this portion of the findings.

- Avoid – The proposed activity avoids the intrusion of development into the WQR and/or HCA to the extent practicable, and has less detrimental impact to the natural resource areas than other practicable alternatives.

  Mount Scott Creek cuts across the northern portion of the nearly 14-acre development site, resulting in significant areas of designated WQR and HCA. Developing the site to achieve even the minimum density without any impacts to the WQR and HCA is difficult. The applicant has proposed a Planned Development instead of a conventional subdivision to have the flexibility to blend the densities allowed by the split R-10 and R-3 zoning of the site. This flexibility allows the applicant to direct the development generally away from the WQR and HCA. By using 4-unit rowhouse structures, the applicant is able to provide a larger number of units in a more compact form than a conventional subdivision would allow. Considering the other alternatives noted in Finding 11-f(1) above, the proposed development will have less detrimental impact to the natural resource areas on the site than other practicable alternatives.

- Minimize – If the applicant demonstrates that there is no practicable alternative to avoid disturbance of the natural resource, then the proposed activity shall minimize detrimental impacts to the extent practicable.

  As noted in the above discussion of avoiding impacts, the proposed development is configured to reduce impacts to the WQR and HCA to the greatest extent practicable. The proposed development is compact by design and focuses major site impacts away from the WQR and HCA where practicable.

- Mitigate – If the applicant demonstrates that there is no practicable alternative that will avoid disturbance of the natural resource, then the proposed activity shall mitigate for adverse impacts to the resource area. The applicant shall present a mitigation plan that demonstrates compensation for detrimental impacts to ecological functions, with mitigation occurring on the site of the disturbance to the extent practicable, utilization of native plants, and a maintenance plan to ensure the success of plantings.

  As noted in Finding 11-e, the applicant's submittal includes a mitigation plan for the WQR and HCA disturbance that will accompany the proposed development. Over 1,160 native trees and 5,790 native shrubs will be

planted in the areas of permanent and temporary disturbance, and nuisance plants and noxious material and debris will be removed. Conditions have been established to ensure that all mitigation plantings are species from the Milwaukie Native Plants List and that existing restoration plantings are preserved where possible.

As conditioned, the City Council finds that the proposed development meets the approval criteria for discretionary review as established in MMC 19.402.12.B.

(3) Limitations and Mitigation for Disturbance of HCAs

MMC Subsection 19.402.12.C establishes the discretionary review process for mitigation of more HCA disturbance than would be allowed by the nondiscretionary standards of MMC Subsection 19.402.11.D.1. In such cases, the applicant must submit an Impact Evaluation and Alternatives Analysis consistent with the standards established in MMC 19.402.12.A and subject to the approval criteria established in MMC 19.402.12.B.

As discussed in Finding 11-f(1), the applicant's submittal materials include a technical report that provides an evaluation of impacts to the WQR as well as to those impacted HCA areas beyond the WQR, consistent with the standards established in MMC 19.402.12.A. As discussed in Finding 11-f(2), the proposed development, with the conditions noted therein, meets the approval criteria established in MMC 19.402.12.B.

As conditioned, the City Council finds that the proposed development meets the discretionary standards for disturbance of HCAs as established in MMC 19.402.12.C.

The City Council finds that, as conditioned, the proposed development meets the applicable discretionary review standards of MMC 19.402.12.

g. MMC Subsection 19.402.15 Boundary Verification and Map Administration

MMC 19.402.15 establishes standards for verifying the boundaries of WQRs and HCAs and for administering the City's Natural Resource (NR) Administrative Map.

The locations of WQRs are determined based on the provisions of MMC Table 19.402.15. For streams, the WQR includes the feature itself and a vegetated corridor that extends 50 ft from the ordinary high water mark or 2-year recurrence interval flood elevation. Where the slope exceeds 25% for less than 150 ft, the vegetated corridor is measured with a 50-ft width from the break in the 25% slope. For wetlands, a wetland delineation report prepared by a professional wetland specialist and approved by the Department of State Lands (DSL) is required.

For HCAs, the City's NR Administrative Map is assumed to be accurate with respect to location unless challenged by the applicant, using the procedures outlined in either MMC Subsection 19.402.15.A.1 or MMC Subsection 19.402.15.A.2.b.

The technical report provided by the applicant includes a detailed topographic map showing the accurate boundaries of the WQR using the provisions of MMC Table 19.402.15, as well as a wetland delineation report prepared in accordance with the standards of DSL. A condition has been established to require a formal letter of concurrence by DSL prior to the issuance of any development permits.

The applicant is not challenging the accuracy of the NR Administrative Map with respect to the HCA location on the site. However, as a result of the disturbance

allowed by the approval of the proposed development, the NR Administrative Map shall be adjusted accordingly to remove those HCA locations that will be permanently disturbed by the proposed development.

In addition, the City has conducted a review of the mapped HCA in accordance with the detailed verification procedures provided in MMC 19.402.15.A.2.b and confirmed that the NR Administrative Map is inaccurate with respect to the HCA boundary in the southwestern corner of the subject property. The City's documentation of this boundary verification was provided as an exhibit at a public hearing with the Planning Commission on [month/day], 2017, and demonstrates where the HCA boundary shall be extended to include the tree canopy provided by the existing white oak trees in the southwestern portion of the site.

The City Council finds that the City's NR Administrative Map shall be adjusted to reflect the detailed information provided by the applicant with respect to the location of the delineated wetland on the site and the permanent disturbance to the HCA, as well as to reflect the adjusted HCA boundary based on information provided by the City.

The City Council finds that, as conditioned, the proposed development, including disturbance of the designated natural resource area on the subject property, meets all applicable standards of MMC 19.402.

12. MMC Chapter 19.500 Supplementary Development Regulations

    MMC 19.500 provides supplementary standards for development.

    a. MMC Subsection 19.504.9 On-Site Walkways and Circulation

       MMC 19.504.9 establishes standards for on-site walkways, including requirements that on-site walkways be at least 5 ft wide, constructed of hard surface materials that are permeable for stormwater, and lighted to a minimum level of 0.5 footcandles.

       The proposed development includes pedestrian and bicycle pathways on Tracts E, F, and H. A condition has been established to ensure that all such on-site pathways are designed and constructed to meet the applicable standards of MMC 19.504.9.

       As conditioned, the City Council finds that this standard is met.

    b. MMC Subsection 19.505.5 Building Design Standards for Rowhouses

       MMC 19.505.5 establishes design standards for rowhouse development.

       (1) MMC Subsection 19.505.5.C Rowhouse Design Standards

           As per MMC Subsection 19.505.5.C.1, rowhouses are subject to the design standards for single-family housing as established in MMC Subsection 19.505.1. As per MMC Subsection 19.505.5.C.2, rowhouses shall include either a vertical or horizontal transition area between the public right-of-way and the private entry of the dwelling.

           The proposed development's compliance with the applicable standards of MMC 19.505.5.C will be confirmed through the development review process outlined in MMC Section 19.906 at the time of development. As proposed, the new rowhouse units will have covered front porches that appear to meet the standards for providing a horizontal transition between the right-of-way and the front entry.

(2) MMC Subsection 19.505.5.D Number of Rowhouses Allowed

As per MMC 19.505.5.D, no more than 4 consecutive rowhouses may share a common wall, though sets of 4-unit rowhouse structures may be adjacent to one another.

The proposed development is comprised of 23 structures with 4 rowhouse units each. No more than 4 consecutive rowhouses will share a common wall.

(3) MMC Subsection 19.505.5.E Rowhouse Lot Standards

MMC 19.505.5.E establishes standards for the size and dimension of rowhouse lots in various zones. Generally, rowhouse development is not allowed on lots less than 35 ft wide.

As discussed in Finding 7-b, the Planned Development process allows some flexibility of design, including in lot size and dimension. As proposed, the new lots will range in width from 18 to 31 ft and in size from 1,600 sq ft to approximately 2,420 sq ft. Approval of the final development plan and program effectively makes the standards of MMC 19.505.5.E inapplicable.

(4) MMC Subsection 19.505.5.F Driveway Access and Parking

MMC Subsection 19.505.5.F.1 establishes restrictions on garages on the front façade of a rowhouse as well as on off-street parking areas and driveway accesses in the front yard. A minimum of 30 ft of street frontage is required, no more than 2 shared accesses are allowed for 4 rowhouses, and outdoor on-site parking areas and garage door width shall not exceed 10 ft. For rowhouses that do not provide garages or parking areas on the front façade, MMC Subsection 19.505.5.F.2 establishes standards for consolidated access.

As discussed in Finding 7-b and noted in Finding 12-c above, the Planned Development process allows for reduced lot widths. The proposed development's compliance with the other applicable standards of MMC 19.505.5.F will be confirmed through the development review process outlined in MMC Section 19.906 at the time of development. As proposed, the new 4-unit rowhouse structures with front-facing garages will share 2 driveway accesses, with on-site parking and maneuvering areas no wider than 10 ft and garage doors no wider than 10 ft. The new rowhouse structures with rear-facing garages will share access off private alleys.

(5) MMC Subsection 19.505.5.G Accessory Structure Setbacks

MMC 19.505.5.G provides that there is no required side yard setback between an accessory structure and a side lot line abutting another rowhouse lot, though all other accessory structure regulations in MMC Subsection 19.502.2.A apply.

No accessory structures are proposed as part of the proposed development, and the applicant has not requested any adjustment to this standard.

The City Council finds that the proposed development meets the standards of MMC 19.505.5 that are applicable to the subdivision and final development plan and program of the Planned Development, noting that consistency with all applicable standards will be confirmed as part of the development review process outlined in MMC Section 19.906 at the time of submittal for development permits for the new rowhouses.

The City Council finds that, as conditioned, the proposed development is consistent with the applicable standards of MMC Chapter 19.500.

13. MMC Chapter 19.600 Off-Street Parking and Loading

MMC 19.600 regulates off-street parking and loading areas on private property outside the public right-of-way. The purpose of these requirements includes providing adequate space for off-street parking, minimizing parking impacts to adjacent properties, and minimizing environmental impacts of parking areas.

MMC Section 19.605 establishes standards to ensure that development provides adequate vehicle parking based on estimated parking demand. MMC Table 19.605.1 provides minimum and maximum requirements for a range of different uses. For rowhouses, a minimum of 1 off-street parking space is required per dwelling unit, with no maximum limit.

MMC Section 19.607 establishes standards for off-street parking areas for residential uses, including for rowhouses. Standards include minimum dimensions for off-street parking spaces and limitations on required spaces being located in the front yard setback.

As proposed, all rowhouse units will have attached garages. Units with front-facing garages have a single-car garage; units with rear-facing garages have a two-car garage. As proposed, all garages will be located outside the front yard setback and of adequate dimension. A final determination of the proposed development's consistency with the applicable standards of MMC 19.600 will be made as part of the development review process outlined in MMC Section 19.906 at the time of submittal for development permits for the new rowhouses.

The City Council finds that the proposed development meets the standards of MMC 19.600 that are applicable to the subdivision and final development plan and program of the Planned Development, noting that consistency with all applicable standards will be confirmed as part of the development review process outlined in MMC Section 19.906 at the time of submittal for development permits for the new rowhouses.

14. MMC Chapter 19.700 Public Facility Improvements

MMC 19.700 establishes provisions to ensure that development provides public facilities that are safe, convenient, and adequate in rough proportion to their public facility impacts.

a. MMC Section 19.702 Applicability

MMC 19.702 establishes the applicability of the provisions of MMC 19.700, including land divisions, new construction, and modification or expansion of an existing structure or a change or intensification in use that result in any projected increase in vehicle trips or any increase in gross floor area on the site.

The applicant proposes to subdivide the subject property to create 92 lots for rowhouse development as well as several other tracts for open space, stormwater facilities, and pedestrian/bicycle connections. The proposed land division triggers the requirements of MMC 19.700.

b. MMC Section 19.703 Review Process

MMC 19.703 establishes the review process for development that is subject to MMC 19.700, including requiring a preapplication conference, establishing the type of application required, and providing approval criteria.

The applicant had a preapplication conference with City staff prior to application submittal, on August 11, 2016. The proposed development triggers a Transportation

Impact Study (as addressed in Finding 14-c). The proposal's compliance with MMC 19.700 has been evaluated through a concurrent Transportation Facilities Review application. Finding 14-f addresses the proposal's compliance with the approval criteria established in MMC Subsection 19.703.3, particularly the required transportation facility improvements.

c. MMC Section 19.704 Transportation Impact Evaluation

MMC 19.704 establishes the process and requirements for evaluating development impacts on the surrounding transportation system, including determining when a formal Transportation Impact Study (TIS) is necessary and what mitigation measures will be required.

The proposed development will trigger a significant increase in trip generation above the existing church use on a portion of the site and therefore requires a TIS. City Engineering staff and the City's on-call traffic consultant (DKS) provided the applicant with a scope of work for the TIS. Kittleson & Associates, the applicant's traffic consultant, prepared the TIS that was included with the applicant's larger submittal for the proposed planned development.

The TIS concluded that the proposed development does not trigger mitigation of impacts beyond the required frontage improvements and bike lane requirements, for which conditions of approval have been established. The TIS also concluded that the surrounding transportation system will continue to operate at the same level of service as before the proposed development.

However, ODOT and Clackamas County have expressed concern regarding the analysis performed for the right-turn lane for northbound traffic at the Rusk Road/Highway 224 intersection. The TIS indicates a turn lane with a queuing length of 50 ft. The City agrees with ODOT and Clackamas County that this value may be overestimated. The TIS also indicates that the right-turn-on-red allowance is 50 vehicles per hour, which likely is not how this intersection functions where one through-vehicle can block the entire turn lane.

DKS, the City's consultant, has re-analyzed this intersection with the left turn, through movement, and right turn all together as a single lane. Also, the right-turn-on-red movement was reduced to zero vehicles, which is a more accurate representation of how the intersection currently functions. With these adjustments, the resulting volume-to-capacity ratio (v/c) of the single lane is greater than 1.0, indicating a need for mitigation requirements. A condition has been established to require extension of the right-turn lane on Rusk Road at the Highway 224 intersection, to ensure that the surrounding transportation system will continue to operate at the same level of service as before the proposed development

As conditioned, the applicant's TIS is sufficient to meet the requirements of MMC 19.704.

d. MMC Section 19.705 Rough Proportionality

MMC 19.705 requires that transportation impacts of the proposed development be mitigated in proportion to its potential impacts.

The City has determined that conditions established to require improvements on Kellogg Creek Drive and in the right-turn lane on Rusk Road at the Highway 224 intersection meet the proportionality requirements for the proposed development.

As conditioned, the proposed development is consistent with MMC 19.705.

e. MMC Section 19.707 Agency Notification and Coordinated Review

MMC 19.707 establishes provisions for coordinating land use application review with other agencies that may have some interest in a project that is in proximity to facilities they manage.

The application was referred to the Oregon Department of Transportation (ODOT), Clackamas County, Metro, and TriMet for comment. The section of Kellogg Creek Drive fronting the subject property is under the jurisdiction of Clackamas County. The County has regulatory authority where transportation impacts and improvement standards are concerned, and the County's Department of Transportation and Development (DTD) provided comments that have been incorporated into these findings and the associated conditions of approval as appropriate.

f. MMC Section 19.708 Transportation Facility Requirements

MMC 19.708 establishes the City's requirements and standards for improvements to public streets, including pedestrian, bicycle, and transit facilities. However, the subject property's public street frontage is along Kellogg Creek Drive, which is under the jurisdiction of Clackamas County. Where the City has more restrictive standards than the County for certain elements, it is the City's practice to defer to the County standards when the proposed development demonstrates that there is no practicable alternative and that the proposal presents the minimum exception necessary to provide a safe and functional design. Such situations are evaluated at the time of development permit review.

The County DTD provided comments on the application, with recommended findings and conditions that address the County's requirements for such elements as access management, clear vision, street design, and bicycle and pedestrian facilities. Those comments have been incorporated into these findings and conditions of approval as appropriate.

(1) MMC Subsection 19.708.1 General Street Requirements and Standards

MMC 19.708.1 provides general standards for streets, including for access management, clear vision, street layout and connectivity, and intersection design and spacing.

As proposed, the development is consistent with the applicable standards of MMC 19.708.1.

(2) MMC Subsection 19.708.2 Street Design Standards

MMC 19.708.2 provides design standards for streets, including dimensional requirements for the various street elements (e.g., travel lanes, bike lanes, on-street parking, landscape strips, and sidewalks).

The street to the east of Lots 45 and 53 does not comply with minimum City standards, as the required sidewalk and planter strips are not proposed. The City has allowed this reduced cross section because of the pending adoption of a low-volume residential standard cross section with pedestrian routes on the street surface. The 22-ft right-of-way width accommodates the minimum 10-ft travel lanes, curb, and separation from the private property.

The proposed cross sections for Kellogg Creek Drive and all remaining internal streets conform to applicable requirements and are consistent with MMC 19.708.2.

(3) MMC Subsection 19.708.3 Sidewalk Requirements and Standards

MMC 19.708.3 provides standards for public sidewalks, including the requirement for compliance with applicable standards of the Americans with Disabilities Act (ADA).

As proposed, the development is consistent with all applicable standards of MMC 19.708.3.

(4) MMC Subsection 19.708.4 Bicycle Facility Requirements and Standards

MMC 19.708.4 provides standards for bicycle facilities.

Per Milwaukie's Transportation System Plan (TSP), a bike lane is required connecting the northeast corner of the property to the southwest corner of the property. The applicant has proposed to construct an on-street bike route through the development. A multiuse path will connect the northeast turnaround on Street B to the Rusk Road/Highway 224 intersection.

As proposed, the development is consistent with all applicable standards of MMC 19.708.4.

(5) MMC Subsection 19.708.5 Pedestrian/Bicycle Path Requirements and Standards

MMC 19.708.5 provides standards for pedestrian and bicycle paths.

Pedestrian access is required at the end of the proposed cul-de-sac, which is satisfied through a 15-ft multiuse path extended to Rusk Road. Pedestrian access is also required from the east end of Street A to Kellogg Creek Drive, which is satisfied through a pedestrian connection in Tracts E and F.

As proposed, the development is consistent with all applicable standards of MMC 19.708.5.

(6) MMC Subsection 19.708.6 Transit Requirements and Standards

MMC 19.708.6 provides standards for transit facilities.

The portion of Kellogg Creek Drive fronting the proposed development is classified as a transit route in the Milwaukie TSP. However, transit facilities are already in place. As a result, transit facility improvements are not required for the proposed development.

As proposed, the development is consistent with all applicable standards of MMC 19.708.6.

Conditions have been established in response to these County findings, to ensure that the proposed development will meet all applicable standards of MMC 19.708, the Clackamas County Roadway Standards, and any other applicable County requirements.

As conditioned, the City Council finds that the proposed development meets the applicable public facility improvement standards of MMC 19.700.

15. MMC Section 19.904 Community Service Uses

MMC 19.904 establishes standards for community service uses, including churches, schools, and parks. MMC Subsection 19.904.5.C authorizes the approval of minor modifications to an approved community service, provided that such modification:

a. Does not increase the intensity of any use.

The proposed modification includes reconfiguring the existing driveway at Rusk Road to reinforce its status as an ingress-only access (left and right turns in), removing some existing parking spaces along the western edge of the parking lot to create access points between the church and the proposed development, and removal of the existing play area adjacent to the western edge of the parking area. The proposed modification will not add square footage to the church use or otherwise result in an increase in activity or use of the church site.

b. Meets all requirements of the underlying zone relating to building size and location and off-street parking and the standards of Title 19.

The applicable standards of Title 19 are those related to off-street parking (MMC Chapter 19.600) and access (MMC Section 19.708 and MMC Chapter 12.16).

As proposed, 10 existing parking spaces will be eliminated from the church parking lot. The church, which has 400 seats, has a minimum parking requirement of 100 spaces (at a ratio of 1 space for every 4 seats, as per MMC Table 19.605.1) and a maximum allowance of 200 spaces (at a ratio of 1 space for every 2 seats). There are currently 225 spaces in the church parking lot. Removal of 10 spaces will bring the church site closer to conformance with the current standards.

In addition, the proposal includes a 6-ft landscape buffer along the northern and western perimeter of the existing parking area, adjacent to the proposed development, which will bring the site closer to conformance with the perimeter landscaping standards of MMC Subsection 19.606.2 and will screen the parking area from the proposed development.

One of the purposes of MMC Section 19.708 Transportation Facility Requirements, and the intent of MMC Chapter 12.16, is to ensure safe access to public streets. The proposed modifications to the existing church driveway at Rusk Road will ensure that the driveway is used for ingress only, which will improve safety on Rusk Road by reducing potential conflicts due to poor sight distance at that location.

c. Does not result in deterioration or loss of any protected natural feature or open space, and does not negatively affect nearby properties.

The proposed modifications to the existing church parking lot and driveway access at Rusk Road do not impact any designated natural resource area or open space feature.

d. Does not alter or contravene any conditions specifically placed on the development by the Planning Commission or City Council.

The property was annexed into the city limits in 1981 (land use file #A-80-07). In 1983, use of the site for pasture land and grazing for horses was approved as a conditional use (file #C-83-08); however, the conditional use application was subsequently withdrawn.

The site was approved as a CSU for church use by the Milwaukie Assembly of God in 1984 (file #CS-84-02). Conditions of approval included requirements to provide plans for landscaping, public facilities, and exterior lighting, as well as a traffic study and right-of-way dedication along Rusk Rd and Kellogg Creek Dr.

In 1987, the City Council approved a zone change for the western portion of the property, from R-10 to R-3, along with a conditional use approval for senior housing

and an amendment to the Comprehensive Plan map (file #CPA-87-01, ZC-87-05, CU-87-05, with Ordinance #1639). The senior housing project (called Parkside Village) was never developed.

In 1992, the City approved a 5,500-sq-ft addition to the church building (file #CSO-92-03, NR-92-01). Conditions of approval included requirements to install the approved landscaping and to direct lighting away from the designated natural resource area.

In 1997, the Planning Commission denied a sign permit request to locate an electronic reader board sign on the property near the intersection of Highway 224 and Rusk Rd (file #SP-97-01).

In 2014, the Planning Director approved a minor modification to the existing CSU for the church, for removal of approximately 75 of 300 existing parking spaces as part of a natural resource restoration effort near Mount Scott Creek (file #s CSU-14-06 and NR-14-06). There were no conditions of approval.

The proposed modification does not alter or contravene any of the past conditions placed on the church development by the Planning Commission.

e. Does not cause any public facility, including transportation, water, sewer and storm drainage, to fail to meet any applicable standards relating to adequacy of the public facility.

With regard to public facilities, the proposed modification will affect only the existing church driveway at Rusk Road. As proposed, the driveway will be modified to further limit egress movements at that location, which, due to limited sight distance and the proximity to the intersection of Rusk Road and Highway 224, will improve public safety. A new in/out access to the church site will be established through the proposed development and will be designed to meet applicable standards. The new access will focus more church trips on Kellogg Creek Drive, a local street, instead of on Rusk Road, a collector. The proposed modification will not cause any public facility to fail to meet any applicable standards relating to adequacy.

As proposed, the City Council finds that the proposed development meets the approval criteria for a minor modification to the existing community service use.

16. MMC Section 19.911 Variances

MMC Section 19.911 establishes the variance process for seeking relief from specific code sections that have the unintended effect of preventing reasonable development or imposing undue hardship.

a. MMC Subsection 19.911.2 Applicability

MMC 19.911.2 establishes applicability standards for variance requests.

Variances may be requested to any standard of MMC Title 19, provided the request is not specifically listed as ineligible in MMC Subsection 19.911.2.B.

The applicant has requested two variances: (1) to reduce the 45-ft driveway spacing standard established in MMC Section 12.16.040 for Lot 72; and (2) to exempt 31 of the 92 proposed lots from the requirement of MMC Subsection 19.402.13.I.2 to provide adequate buildable area outside of the WQR and HCA. The second variance request would permit an additional number of units to be constructed through a 15% increase in density, as allowed in a Planned Development zone (MMC Section 19.311).

The request would not eliminate the restriction on a prohibited activity, change a required review type, allow a use not allowed outright in the R-10 or R-3 zone, or otherwise produce any of the results listed in MMC Subsection 19.911.2.B. The requests are each eligible for a variance as per MMC 19.911.2.

b. MMC Subsection 19.911.3 Review Process

MMC 19.911.3 establishes review processes for different types of variances. MMC Subsection 19.911.3.C establishes the Type III review process for larger or more complex variations to standards than those allowed through the Type II review process as per MMC Subsection 19.911.3.B, variations that require additional discretion and warrant a public hearing.

The applicant has requested variances to the driveway spacing standard established in MMC Section 12.16.040 and to the requirement that all new lots have adequate buildable area outside of the WQR and HCA. These requests are not eligible for Type II review as provided in MMC 19.911.3.B and so are subject to Type III review as per MMC 19.911.3.C. As noted in Finding 6, since the variance requests are associated with a proposed Planned Development, which itself requires Type IV review, the variances are also subject to Type IV review as per MMC Subsection *19.1001.6.B.*

c. MMC Subsection 19.911.4 Approval Criteria

MMC 19.911.4 establishes approval criteria for variance requests. Specifically, MMC Subsection 19.911.4.B.1 provides approval criteria for Type III variances where the applicant elects to utilize the Discretionary Relief Criteria:

(1) The applicant's alternatives analysis provides, at a minimum, an analysis of the impacts and benefits of the variance proposal as compared to the baseline code requirements.

<u>Driveway Spacing Variance</u>: To meet the 45-ft driveway spacing standard, Lot 72 would need to shift to the north by approximately 20 ft, which would shift the whole block of lots north of Lot 72 as well. This would result in additional impacts to the natural resource area. Allowing the driveway to remain in its proposed location will help minimize impacts to natural resources. Potential impacts from allowing a driveway that does not meet the spacing standard will be minimal and can be mitigated, as described in Finding 16-c(3), below.

<u>Adequate Buildable Area Variance</u>: As noted above, 31 of the 92 proposed lots are affected by the requested variance. Eliminating the lots in question would reduce the proposed development below the minimum density of 66 units required for the site with the proposed street configuration. In addition, eliminating those lots would remove the need for the requested density bonus, which was being justified by the inclusion of several amenities (e.g., community garden, additional landscaping) that would likely be removed from the proposal. The proposed disturbance to the WQR and HCA will be mitigated with native plantings to enhance the remaining natural resource areas.

The City Council finds that the applicant's analysis of alternatives is sufficient to address the impacts and benefits of both of the proposed variances. This criterion is met.

(2) The proposed variance is determined to be both reasonable and appropriate, and it meets one or more of the following criteria:

(a) The proposed variance avoids or minimizes impacts to surrounding properties.

(b) The proposed variance has desirable public benefits.

(c) The proposed variance responds to the existing built or natural environment in a creative and sensitive manner.

Driveway Spacing Variance: The driveway for Lot 72 is shared with Lot 71. Allowing the driveway to remain as proposed benefits the layout of both lots. Given the proximity of Lot 72 and the adjacent lots to the north to the designated natural resources on the site, allowing the driveway as proposed has the benefit of avoiding the need for further natural resource disturbance if Lot 72 and the adjacent lots were to shift to the north.

Adequate Buildable Area Variance: The requested variance does not affect any adjacent properties outside the proposed development. Approval of the variance allows the development of 92 units of housing instead of 61 units, which helps address an identified housing need for the community. The overall development layout is configured to minimize intrusion into the floodplain and designated natural resource areas on the site, and to focus impacts on WQR and HCA resources that are of lower ecological value and/or that have already been impacted by past development activity. Mitigation plantings will enhance remaining natural resources on the site.

The City Council finds that the requested variances are reasonable and appropriate and that they both meet one or more of the criteria provided in MMC Subsection 19.911.B.1.b.

(3) Impacts from the proposed variance will be mitigated to the extent practicable.

Driveway Spacing Variance: The City's clear vision standards will ensure a high level of visibility for vehicles using the driveway to Lot 72. Street B, which runs in front of Lot 72, is not a through street and ends in a cul de sac. Traffic volumes on the northern section of Street B where Lot 72 is located will be relatively low and should not result in significant queuing in front of Lots 71 and 72.

Adequate Buildable Area Variance: The applicant has provided a mitigation plan for disturbed natural resource areas that includes removal of nuisance plants, noxious materials, and debris within the WQR and HCA areas on the site. As proposed, more than 1,150 native trees and 5,750 native shrubs will be planted. Two other areas beyond the disturbance zones will be enhanced with removal of nuisance plants and debris and additional native plantings. As proposed, the mitigation plan will enhance the natural resource areas that remain.

The City Council finds that both variance requests will be mitigated to the extent practicable.

The City Council finds that the proposed development meets the approval criteria for a Type III variance request, as provided in MMC 19.911.4.B.

As proposed, the City Council finds that both of the requested variances are allowable as per the applicable standards of MMC 19.911.

17. MMC Chapter 19.1200 Solar Access Protection

A primary purpose of MMC 19.1200 is to orient new lots and parcels to allow utilization of solar energy. In particular, MMC Section 19.1203 establishes solar access provisions for

new development. In particular, MMC Subsection 19.1203.2 establishes the applicability of MMC Subsection 19.1203.3 as applications for the creation of lots in single-family zones. Exceptions are allowable to the extent the Planning Director finds that the applicant has shown one or more of the conditions listed in MMC Subsections 19.1203.4 and 19.1203.5 exist and that exemptions or adjustments are warranted.

a. MMC Subsection 19.1203.3 Design Standard

MMC 19.1203.3 establishes a solar design standard for at least 80% of the lots in any proposed development, including basic requirements for north-south dimension and front-lot-line orientation with respect to a true east-west axis. There are two other options for compliance, either establishing a protected solar building line or demonstrating a level of performance with respect to protection from shading.

The proposed development is for 92 lots, only 32 of which (approximately 35%) have a minimum north-south dimension of at least 90 ft, all with the front lot line oriented within 30 degrees of a true east-west axis. However, 64 lots (approximately 70%) have a minimum north-south dimension of at least 80 ft. Of the remaining 28 lots, all have their long axis oriented within 30 degrees of a true east-west axis, but due to the attached nature of the rowhouses in the proposed development, the ground floor south wall of most of the units will be shaded by the adjacent unit to the south.

The applicant has requested an adjustment to the design standard of MMC 19.1203.3.

b. MMC Subsection 19.1203.5 Adjustment to Design Standard

MMC 19.1203.5 allows the reduction of the number of lots that must comply with MMC 19.1203.3 to the minimum extent necessary, if the applicant demonstrates that the standard would cause or is subject to certain conditions, such as adverse impacts on density, cost, or amenities.

Considering the flexibility of design afforded to planned developments in MMC Section 19.311, the allowance for a density bonus as discussed in Finding 7-a, and the site constraints presented by natural resources and floodplain on the site, the design standard of MMC 19.1203.3 presents a particular challenge for the subject property. To configure more lots with a north-south axis of at least 90 ft would result in additional disturbance to natural resources or the floodplain. Reducing the number of lots accordingly would substantially reduce the effectiveness of the Planned Development option for a site that is otherwise well suited for flexible design.

As proposed, 64 of the 92 proposed lots (approximately 70%) are close to meeting the design standard of MMC 19.1203.3, with a north-south dimension of at least 80 ft. In a planned development scenario, where adjustments to conventional lot size and dimensional requirements are expected, and where strict adherence to the design standard would result in a significant decrease in density or increase in disturbance to natural resource and floodplain areas, a request to reduce the number of lots that must comply is reasonable.

The City Council finds that the request to adjust the number of lots that must comply with the design standard of MMC 19.1203.3 is warranted. The 64 lots with a north-south axis of at least 80 ft are sufficient to meet the requirements of MMC 19.1200.

As proposed, and with the approved reduction noted above, the City Council finds that the proposed development complies with the applicable standards of MMC 19.1200.

18. The application was referred to the following departments and agencies on April 13, 2017, with additional materials sent on April 26, 2017:

    - Milwaukie Building Department
    - Milwaukie Engineering Department
    - Milwaukie Public Works Department
    - ESA (City's on-call consultant for natural resource review)
    - Clackamas Fire District #1
    - Lake Road Neighborhood District Association (NDA) Chairperson and Land Use Committee (LUC)
    - Clackamas County Department of Transportation and Development
    - Metro
    - Oregon Department of Transportation (ODOT)
    - TriMet
    - North Clackamas Parks and Recreation District
    - Oak Grove Community Council

    The comments received are summarized as follows, including comments received in response to the public notice posted on the site and mailed to property owners and residents within 500 ft of the site:

    a. **Michelle Wyfells, Planner II, TriMet:** Given the imminent changes to re-route the existing bus service on Kellogg Creek Drive (Line 152), TriMet has no comments on the proposal.

    b. **Matt Amos, Fire Inspector, Clackamas Fire District #1 (CFD#1):** Comments related to fire access and water supply requirements, including notes on required turning radii and approvable turnarounds.

    c. **Rob Livingston, Erosion Control Specialist, City of Milwaukie Public Works:** Due to the site being over 5 acres, a 1200C construction stormwater permit from DEQ will be required. A maintenance agreement with the City must be established for the stormwater facilities on site. For the City's erosion control permit, more information will be required on how hydric soils will be managed during excavation of the wetland area. Given the number of new households proposed and the accompanying number of anticipated household pets, a dispensing device(s) for pet-waste bags should be required in the large natural open space area. There is also concern for the likelihood of negative impacts to water quality and fish habitat from household pets recreating in Mount Scott Creek.

       The proposed stormwater facilities do not show details for detention prior to discharge into Mount Scott Creek, particularly regarding how or where stormwater discharge will be mitigated. Many of the proposed plantings are near buildings and sidewalks—tree plantings closer to the creek would improve shade, reducing stream temperatures and mitigating for the development's removal of large mature trees from the site. The plantings proposed in Additional Enhancement Areas A and B do not provide meaningful streambank enhancement or vegetative shading for the creek.

    d. **Paul Hawkins, Land Use Chair, Lake Road NDA:** The FEMA flood data for this location is dated, so it is unclear whether the three proposed detention ponds will be adequate. The "Y" intersection of Rusk Road and Kellogg Creek Drive is less than

ideal, and traffic currently backs up on Rusk Road at the Highway 224 intersection during weekday commuting hours.

e. **Rebecca Hamilton, Regional Planner, Metro:** Metro notes that the application would require a Type III Variance to allow impacts to designated natural areas for creating 31 of the 92 proposed lots. The City of Milwaukie's Municipal Code is consistent with Metro's Functional Plan. If the City of Milwaukie is satisfied that the application has met its requirements for a Type III Variance, and if there is no request for an amendment to the City's comprehensive plan or zoning code, then Metro has no comment on this application.

f. **Joseph Edge, Director, Oak Grove Community Council:** The trip estimates for the proposed development appear to be low, as the proposed units will perform more like single-family detached dwellings than townhouses, given their proposed price point and the likelihood that two wage-earners employed outside the household will live in each unit. The stormwater calculations are based on a pre-development curve number that is too high and does not accurately represent the pre-development conditions that should be more conservatively assumed for the site, especially considering the flood potential of the area. The loss of large white oak trees in the southwestern corner of the site is unacceptable, as these mature, old-growth trees cannot be sufficiently replaced with new trees. An alternative that preserves those trees and combines the 12 units in the southwestern portion of the site into a multifamily building elsewhere on the site would be more acceptable.

g. **Sarah Hartung, Senior Biologist, ESA (City's On-Call Natural Resource Consultant):** A report providing peer review of the applicant's Natural Resource Review report has been provided to City staff and has been integrated into the Recommended Findings and Conditions of Approval.

h. **Marah Danielson, Development Review Planner, ODOT Region 1:** The proposed zone change results in only a small increase in additional trips to the state highway. The applicant's Traffic Impact Analysis (TIA) shows a high number of crashes at both the Rusk Road and Webster Road intersections with Highway 224. Since the TIA analyzed the northbound right-turn movement at the Rusk Road/Highway 224 intersection as a right-turn lane where there is only a flare for a turn lane, ODOT recommends a condition requiring installation of a northbound right-turn lane at the Rusk Road/Highway 224 intersection.

i. **Alex Roller, Engineering Tech II, City of Milwaukie Engineering Department:** Comments related to the proposal's compliance with Milwaukie Municipal Code (MMC) Title 12 Streets, Sidewalks, and Public Places; MMC Title 18 Flood Hazard Regulations; and MMC Chapter 19.700 Public Facility Improvements, with relevant recommended conditions of approval.

j. **Kenneth Kent, Senior Planner, Clackamas County Department of Transportation and Development, Engineering Division:** Both Kellogg Creek Drive and Rusk Road are under the County's jurisdiction, so County standards and requirements apply where frontage improvements are concerned. On Kellogg Creek Drive, half-street improvements are required (minimum 16-ft roadway, curb or curb and gutter, 5-ft landscape strip, 5-ft sidewalk), with no bike lane striping. Recommendation that the existing church driveway at Rusk Road be closed, due to poor sight-distance and the difficulty of ensuring one-way ingress to the site without a median on Rusk Road. Recommendation that the applicant's traffic impact study be updated to (1) evaluate the study intersections to include estimated summer traffic

volumes from North Clackamas Park, (2) include impacts of closure of the existing church driveway at Rusk Road, (3) reevaluate queuing on Rusk Road at the Highway 224 intersection using the SimTraffic program, and (4) evaluate the need for a northbound left-turn lane at the Rusk Road intersection with Kellogg Creek Drive. Suggestion that an analysis or evaluation of parking availability within the proposed development (in driveways, garages, and on-street) be conducted to understand the potential impacts of overflow parking in the adjacent neighborhood.

k. **Kathryn Krygier, Planning and Development Manager, and Tonia Williamson, Natural Resource Coordinator, North Clackamas Parks & Recreation District (NCPRD):** Concern that increased traffic resulting from the proposed development will impact access to nearby NCPRD facilities. Note that the applicant's Traffic Impact Study (TIS) was not conducted during the time when activity at the ballfield complex in North Clackamas Park is at its peak (April through July). Concerns about safety at the intersection of Rusk Road and Kellogg Creek Drive. Suggestion that a parking study be conducted to examine the issue of visitor parking within the proposed development. Concern that the bike lane between Rusk Road and Street B appears to dead-end. Questions about the soft-surface trail system, including public accessibility, maintenance, and assessment of natural resource impacts, with a note that the trails are short and discontinuous. Request for a phasing plan, if phasing is proposed. Concern about the potential for increased flooding resulting from development within designated natural resource areas on the site. Suggestion that the applicant has not sufficiently demonstrated that impacts to natural resources will be minimized.

l. **Laura Hickman, area resident:** Concern about traffic impacts resulting from the proposed development; including pedestrian and bicycle safety to and from area homes, North Clackamas Park, and nearby schools. Questions about the methodology and assumptions of the TIS.

m. **Ray Olma, area resident:** Traffic on Highway 224 and Rusk Road is already bad and will be made worse by trips from the proposed development. Concern for pedestrian safety on and crossing Rusk Road, which does not have sidewalks.

n. **Jamie Marshall, area resident:** Existing infrastructure (including water treatment facilities and I-205) is inadequate to support the proposed development.

o. **Melanie Frisch, area resident:** Concern about traffic impacts (inadequate infrastructure) and impacts to natural resources.

p. **Alex Roller, Engineering Tech II, City of Milwaukie Engineering Department:** Revisions to comments provided in the earlier memo related to MMC Title 12 Streets, Sidewalks, and Public Places; MMC Title 18 Flood Hazard Regulations; and MMC Chapter 19.700 Public Facility Improvements.

q. **Dan Sweet, area resident:** Comments in opposition to the proposed development, based on concerns about traffic, flooding, and stormwater runoff.

r. **Vincent Alvarez, Chair, Lake Road NDA:** Concerns about the proposed destruction of existing wetlands and removal of healthy white oak trees, flooding potential, and traffic impacts.

s. **Bruce Reiter, area resident:** *[comments to be summarized]*

t. **John Green-Hite, area resident:** *[comments to be summarized]*

u. **Joan Young, area resident:** *[comments to be summarized]*

v. **Howard Lanoff, area resident:** *[comments to be summarized]*

w. **Georgia Bogner, area resident:** *[comments to be summarized]*

x. **Chris Runyard, ecological restoration specialist:** *[comments to be summarized]*

y. **Linda Hundley, area resident:** *[comments to be summarized]*

z. **Jennifer Stipetic, area resident:** *[comments to be summarized]*

aa. **Andrew Collins-Anderson, Executive Director of North Clackamas Urban Watersheds Council:** *[comments to be summarized]*

ATTACHMENT 2

Recommended Conditions of Approval
Master File #PD-2017-001
Kellogg Creek Planned Development

Conditions

1. The applicant shall submit a final plat application within 6 months of the preliminary plat approval in accordance with MMC Section 17.24.040. The applicant shall obtain approval of the final plat prior to the expiration of this preliminary plat approval. If the applicant chooses to phase the final plat approval, a revised stormwater report shall be provided with the submittal for each phase. A payment and performance bond for 100% of the cost of the required public improvements shall be provided with the submittal materials for the first phase.

2. The applicant's final plat application shall include the items listed on the City of Milwaukie Final Plat Checklist. The following specific items and changes are required as part of the application:

   a. Provide a written narrative describing all changes made to the final plat that are not related to these conditions of approval.

   b. Provide a final plat that substantially conforms to the plans approved by this action, which are the plans stamped received by the City on April 7, 2017; and modified by the revised landscaping plans received on April 12, 2017; the revised Natural Resource Review report and plans received on April 12, 2017; and the revised mitigation plans received on April 20, 2017; except as otherwise modified by these conditions of approval.

   c. The modifications required by these conditions of approval include the following revisions to all relevant plan sheets:

      (1) As per Finding 14-c, extend the northbound right-turn lane at the Rusk Road/Highway 224 intersection sufficient to meet applicable ODOT standards.

      (2) As per Finding 12-a, provide sufficient detail to demonstrate that the pedestrian and bicycle pathways on Tracts E, F, and H are at least 5 ft wide, constructed of hard surface materials that are permeable for stormwater, and meet all other applicable design standards of MMC Subsection 19.504.9.E, including the requirement for lighting to a minimum level of 0.5 footcandles.

      (3) As per Finding 11-f(2), revise the mitigation planting plan to ensure that all mitigation plantings are species found on the Milwaukie Native Plants List.

      (4) As per Finding 11-f(2), re-evaluate the assessment of WQR classification at the various sample points noted in the applicant's technical report. Revise the configuration of Mitigation Area A accordingly.

   d. The final plat submittal shall include a complete set of revised plans. The revised plans shall be consistent with one another, accurate with respect to the proposed development details, drawn to scale, and providing a legend that clearly identifies all detailed features. The final plat shall include spaces for signatures by the Milwaukie Planning Director and Milwaukie Engineering Director, and a note indicating that the subdivision is subject to the requirements of City of Milwaukie Land Use Application master file PD-2017-001.

   e. Provide a concurrence letter from DSL regarding the delineated wetland on the site.

   f. Provide a draft of all proposed public easements and/or deed restrictions as required by this approval, including for public access to the soft-surface trail system on Tract G; public access to the bicycle and pedestrian connection from Street B to Rusk

Road on Tract G; public access to the pedestrian connection across Tracts E and F; and private access through Alley C for the church.

g. Provide a draft of the proposed Convenants, Conditions, and Restrictions (CC&Rs) for the homeowners association that will be established for the proposed development. Details shall address maintenance of the soft-surface trail system, publicly accessible pedestrian and bicycle connections on the various tracts, and common areas such as the community garden.

3. Prior to approval of the Final Plat, the following items shall be resolved:

a. Submit a final stormwater management plan to the City of Milwaukie Engineering Department for review and approval. The plan shall be prepared in accordance with Section 2 – Stormwater Design Standards of the City of Milwaukie Public Works Standards. Submit full-engineered plans for construction of all required public improvements, reviewed and approved by the City of Milwaukie Engineering Department. All utilities shall conform to the Milwaukie Public Works Standards.

b. Obtain a City right-of-way permit for construction of all required public improvements listed in these recommended conditions of approval for the public right(s)-of-way under City of Milwaukie jurisdiction.

c. Pay an inspection fee equal to 5.5% of the cost of the public improvements.

d. Provide a payment and performance bond for 100% of the cost of the required public improvements.

e. Provide an erosion control plan and obtain an erosion control permit.

f. Dedicate 14 ft of right-of-way on SE Kellogg Creek Drive fronting the subject property to accommodate the required parking and bike facilities.

g. Install all underground utilities, including stubs for utility service prior to surfacing any streets. Utilities shall be designed to minimize or eliminate infiltration of floodwaters into the system. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of floodwaters into the system and discharge from the systems into floodwaters. Relocate or provide a private utility easement for all utilities encroaching onto adjacent properties.

h. Construct a 5-ft set-back sidewalk, 4-ft planter strip, curb and gutter, 7-ft parking strip, and 10-ft travel lane for each half of right-of-way on Street A and Street B.

i. Construct all ADA ramps and driveways on Street A and Street B.

j. Extend the right-turn lane for northbound traffic at the Rusk Road/Highway 224 intersection in accordance with the applicable ODOT standards.

k. Construct a driveway approach to meet all guidelines of the Americans with Disabilities Act (ADA) to each new lot that takes direct access from a public street. The driveway approach aprons shall be between 9 ft and 20 ft in width and least 7.5 ft from the side property line.

l. Clear vision areas shall be maintained at all driveways and accessways and on the corners of all property adjacent to an intersection. Remove all signs, structures, or vegetation more than 3 ft in height located in “vision clearance areas” at intersections of streets, driveways, and alleys fronting the proposed development.

m. Provide a 12-month Maintenance Bond upon completion of the construction.

n. Provide a final approved set of Mylar and electronic PDF “As Constructed” drawings to the City of Milwaukie prior to final inspection.

o. Construct and receive County Engineering inspection for all required public improvements in the public right(s)-of-way under Clackamas County jurisdiction. All frontage improvements in or adjacent to Clackamas County right-of-way shall be designed and constructed in accordance with *Clackamas County Roadway Standards*.

Prior to commencement of site work the applicant shall obtain a Development Permit from the Clackamas County Engineering Division for design and construction of required improvements to Kellogg Creek Drive. To obtain the Permit, the applicant shall submit plans prepared and stamped by an Engineer registered in the State of Oregon, provide a Performance Guarantee, and pay an Inspection Fee. The Performance Guarantee is 125% of the approved Engineer's cost estimate for the required improvements.

Prior to commencement of utility work within the Kellogg Creek Drive or Rusk Road rights-of-way, a Utility Placement Permit shall be obtained from the Clackamas County Engineering Division.

Required improvements to Kellogg Creek Drive include the following:

(1) A minimum 16-ft-wide one-half street improvement for a local roadway. The applicant shall widen Kellogg Creek Drive so that the minimum total road width along the site frontage is 32 ft. The structural section for Kellogg Creek Drive improvements shall consist of 4 in of asphalt concrete, per *Clackamas County Roadway Standards Standard* Drawing C100.

(2) Standard curb, or curb and gutter if curbline slope is less than 1%.

(3) Adjacent to the curb, a 5-ft landscape strip, including street trees, shall be constructed along the entire site frontage.

(4) A minimum 5-ft-wide unobstructed sidewalk shall be constructed along the entire site frontage, per Standard Drawing S960. Where the sidewalk does not connect to sidewalk on adjacent property, the end of the sidewalk shall include a concrete ADA accessible ramp, providing a transition from the new sidewalk to the edge of the pavement.

(5) Inbound and outbound tapers shall be provided per Section 250.6.4 of the *Clackamas County Roadway Standards*. The full road improvement shall extend to the westerly project property line, with the outbound taper beginning at that point.

(6) Dual curb ramps shall be constructed at proposed intersections with Kellogg Creek Drive, per Standard Drawing S910. A perpendicular curb ramp shall be constructed at the westerly project boundary, per Standard Drawing S940. Crosswalk striping shall be modified as necessary based on required road widening. The designer shall complete the County ADA Assessment Checklist and provide a copy with the improvement plans. The County has adopted the following curb ramp design and construction standards:

Feature	Design Standard	Construction Standard
Ramp Slope	7.5%	8.33%
Ramp Cross Slope	1.5%	2.0%
Landing (turning space) Cross Slope	1.5%	2.0%

(7) Drainage facilities shall be in conformance with Water Environment Services regulations and *Clackamas County Roadway Standards*, Chapter 4. Stormwater detention facilities shall not be located within the public right-of-way.

(8) The applicant shall grant an 8-ft-wide public utility easement adjacent to the public right-of-way along the entire site frontage of Kellogg Creek Drive.

p. Record all required easements and/or deed restrictions with the Clackamas County Recorder's office and provide a copy of each to the City Planning Department.

q. Submit a letter from the project landscape designer attesting that all required site plantings have been completed in conformance with the approved site plans and with City standards, including all mitigation plantings. This includes removal of all invasive or nuisance species vegetation (as identified on the Milwaukie Native Plant List), noxious materials, and man-made debris such as concrete rubble from within all WQR and HCA locations on the site, on the north and south sides of the creek, as per Finding 11.

r. As per Finding 11, demarcate the boundary of the delineated wetland within the open space tract, using permanent signage and/or split-rail fencing.

s. As per Finding 11, provide at least two pet-waste bag dispensing devices dispersed along the soft-surface trail system.

4. Prior to issuance of any building permit, the following shall be resolved:

   a. Obtain approval of the necessary FEMA map revision for those lots that are currently in the floodplain.

5. Prior to final inspection of any building permit, the following shall be resolved:

   a. Provide a narrative describing all actions taken to comply with these conditions of approval. In addition, describe any changes made after the issuance of this land use decision that are not related to these conditions of approval.

   b. Connect all residential roof drains to a private drywell or other approved structure. Private properties may only connect to public storm system if percolation tests show that infiltration cannot be obtained on site or if the water table is too shallow. In the event the storm management system contains underground injection control devices, submit proof of acceptance of the storm system design from the Department of Environmental Quality.

6. Ongoing conditions of approval include the following:

   a. As per Finding 7, fencing in yards adjacent to the open space tract shall remain free of sight-obscuring materials, to allow visibility into the adjacent open space.

   b. As per Finding 11, where practicable, lights on lots adjacent to WQR and HCA areas shall be placed so that they do not shine directly into any WQR and/or HCA location.

Additional Requirements

The following items are not conditions of approval necessary to meet applicable land use review criteria. They relate to other development standards and permitting requirements contained in the Milwaukie Municipal Code (MMC) and Public Works Standards that are required at various points in the development and permitting process.

1. Prior to commencement of any earth-disturbing activities, the applicant shall obtain an erosion control permit.

2. Limitations on Development Activity

Development activity on the site shall be limited to 7:00 a.m. to 10:00 p.m. Monday through Friday and 8:00 a.m. to 5:00 p.m. Saturday and Sunday, as per MMC Subsection 8.08.070(I).

3. Final Development Plan and Program

   As per the requirements of MMC Subsections 19.311.12 through 19.311.15, no excavation, grading, construction, improvement, or building shall begin, and no permits therefor shall be issued, until the following items must be addressed regarding the final development plan and program:

   a. Prior to the effective date of the ordinance adopting the final development plan and program and accompanying change to the zoning map, file with the City Recorder's office a final development plan and program that includes any modifications that were part of the final plan approved by City Council.

   b. The City shall prepare a notice to acknowledge that the final development plan and program approved by City Council constitutes zoning for the subject property. The notice shall contain a legal description of the property and reference to the certified copy of the final development plan and program filed in the office of the City Recorder. The applicant shall record a copy of this acknowledgment notice in the County Recorder's office.

   c. An application for approval of variations to the recorded final plan and program may be submitted in writing. Such variations may be approved by the City staff provided they do not alter dwelling unit densities, alter dwelling unit type ratios, increase or change the type or location of commercial or residential structures, change the boundaries of the planned development, or change the location and area of public open spaces and recreational areas.

4. Landscaping Maintenance

   As per MMC Subsection 19.402.11.B.9, a minimum of 80% of all required mitigation plantings for WQR or HCA disturbance shall remain alive on the second anniversary of the date the planting is completed.

5. Requirements from Clackamas Fire District #1 (CFD#1)

   a. A Fire Access and Water Supply plan is required for subdivisions. The plan shall show fire apparatus access, fire lanes, fire hydrants, fire lines, available fire flow, FDC location (if applicable), building square footage, and type of construction. The applicant shall provide fire flow tests per NFPA 291, and shall be no older than 12 months. Work to be completed by experienced and responsible persons and coordinated with the local water authority.

   b. Access

      (1) Provide address numbering that is clearly visible from the street.

      (2) The inside turning radius and outside turning radius for a 20-ft-wide road shall not be less than 28 ft and 48 ft respectively, measured from the same center point.

      (3) Provide an approved turnaround for dead end access roads exceeding 150 ft in length.

      (4) Fire Department turnarounds shall meet the dimensions found in the fire code applications guide.

   c. Water Supply

(1) Fire Hydrants, One and Two-Family Dwellings & Accessory Structures: Where a portion of a structure is more than 600 ft from a hydrant on a fire apparatus access road, as measured in an approved route around the exterior of the structure(s), additional fire hydrants and mains shall be provided.

(2) Prior to the start of combustible construction required fire hydrants shall be operational and accessible.

(3) For one and two family dwellings located in areas with reliable municipal fire fighting water supply the following shall apply:

<3,600 sq ft (including attached garage)

(a) 1,000 gpm @ 20 psi with hydrant within 600 ft of furthest portion of new residential construction, (OFC Section B105.2)

>3,600 sq ft (including attached garage)

(a) Shall meet fire flow requirements specified in Appendix B of the current Oregon Fire Code, (OFC, Table B105.1)

(b) Shall meet hydrant coverage as specified in Appendix C of the current Oregon Fire Code, (OFC, Table C105.1)

6. Expiration of Approval

a. As per MMC Subsection 19.311.16, if substantial construction or development in compliance with the approved final development plan and program has not occurred within 6 months of its effective date, the Planning Commission may initiate a review of the PD Zone and hold a public hearing to determine whether its continuation (in whole or in part) is in the public interest. Notification and hearing shall be in accordance with MMC Section 19.1007 Type IV Review. If found not to be, the Planning Commission shall recommend to the City Council that the PD Zone be removed by appropriate amendment to the Zoning Ordinance and the property changed back to original zoning.

b. Beyond the limitations of MMC 19.311.6, proposals requiring any kind of development permit must complete both of the following steps, as per MMC Subsection 19.1001.7.E.1.a:

(1) Obtain and pay for all necessary development permits and start construction within two (2) years of land use approval.

(2) Pass final inspection and/or obtain a certificate of occupancy within four (4) years of land use approval.

ATTACHMENT 3a.1

KELLOGG CREEK
Milwaukie, Oregon

A Land Use Application for:

Planned Development
Type III Variance
Type IV Zone Change

Revised and Submitted:
April 2017

Applicant:
Brownstone Development, Inc.
47 South State Street
Lake Oswego, OR 97934

Prepared by:
DOWL
720 SW Washington Street, Suite 750
Portland, Oregon 97205
(971) 280-8641

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- **B.** Pre-Application Notes
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- **G.** Traffic Impact Study
- **H.** Neighborhood Meeting Materials
- **I.** Arborist Report
- **J.** Natural Resource Review
- **K.** Memo from Johnson Economics

Project team

Applicant	**Brownstone Development, Inc.** 47 South State Street PO Box 2375 Lake Oswego, OR 97934 Contact: Randy Myers 503.358.4460 randy@brownstonehomes.net
Property Owner	**Turning Point Church** 13333 Rusk Road Milwaukie, OR 97222 Contact: Pastor Bob Mihuc 503.305.8704
Planning/Civil Engineering	**DOWL** 720 SW Washington Street, Suite 750 Portland, OR 97221 Contact: Serah Breakstone, AICP 503.280.8661 sbreakstone@dowl.com
Traffic Engineering	**Kittelson & Associates, Inc.** 610 SW Alder Street, Suite 700 Portland, OR 97205 Contact: Chris Brehmer, PE 503.535.7433 cbrehmer@kittelson.com
Natural Resources	**Pacific Habitat Services** 9450 SW Commerce Circle, Suite 180 Wilsonville, OR 97070 Contact: John van Staveren 503.570.0800 jvs@pacifichabitat.com
Arborist	**Morgan Holen & Associates** 3 Monroe Parkway, Suite P220 Lake Oswego, Oregon 97035 Contact: Morgan Holen 971.409.9354 morgan.holen@comcast.net

I. INTRODUCTION

Summary of Proposal

Brownstone Development (the applicant) is proposing a new residential subdivision located at 13333 Rusk Road in the City of Milwaukie (see Figure 1, Vicinity Map). The development site is approximately 13.8 acres and will consist of 92 new lots intended for single-family attached (rowhouse) dwelling units and associated public streets. The attached homes will be in groupings of four units and will be accessed from rear alleys or front-facing driveways. The development will also include new public local streets, private alleys and a soft-surface pedestrian trail to provide connectivity throughout the site. Open spaces and natural areas will surround the homes and connect to the adjacent North Clackamas Park west of the site.

The subject property currently consists of four tax lots all owned by the Turning Point Church, which is located at the corner of Rusk Road and Kellogg Creek Drive. A property line adjustment application has been submitted to the City of Milwaukie in order to consolidate and reconfigure the four tax lots into two lots. One lot (13.8 acres) will be the development site and the other lot (3.7 acres) will be the church lot. The Turning Point Church and its associated parking areas will remain. See the Preliminary Lot Line Adjustment, Sheet C200 in the Exhibit A Plan Set.

Access to the site will be taken from two points along SE Kellogg Creek Drive, as shown on the Preliminary Plat, Sheet C201 in Exhibit A. In order to ensure the Turning Point Church continues to have safe ingress and egress to the church site, a connection between the two sites will be provided to allow church visitors to exit through the development site onto Kellogg Creek Drive (exit from the church site onto Rusk Road is not permitted; that access is entrance only).

Zoning & Land Uses

The subject site currently has split zoning, with the western portion of the site zoned R-3 and the eastern portion of the site zoned R-10. See Figure 2 and the Existing Conditions Plan (Sheet C100) in Exhibit A. The table below describes the uses and zoning on properties surrounding the subject site.

Table 1: Surrounding Uses

Area	Zoning	Land Uses
North	R-10	Single-family residences, Highway 224 right-of-way
East	R-10	Turning Point Church, SE Rusk Road, and single-family residences
South	R-10	SE Kellogg Creek Road, single-family residences, Deerfield Village Assisted Living Center
West	R-10	The Milwaukie Center, North Clackamas Park

Figure 1: Vicinity Map

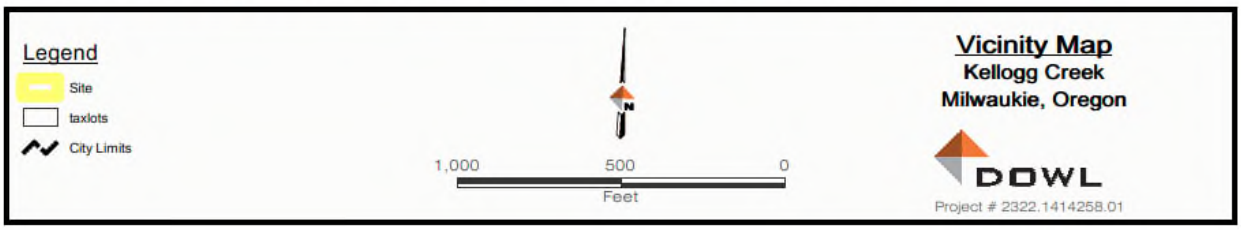
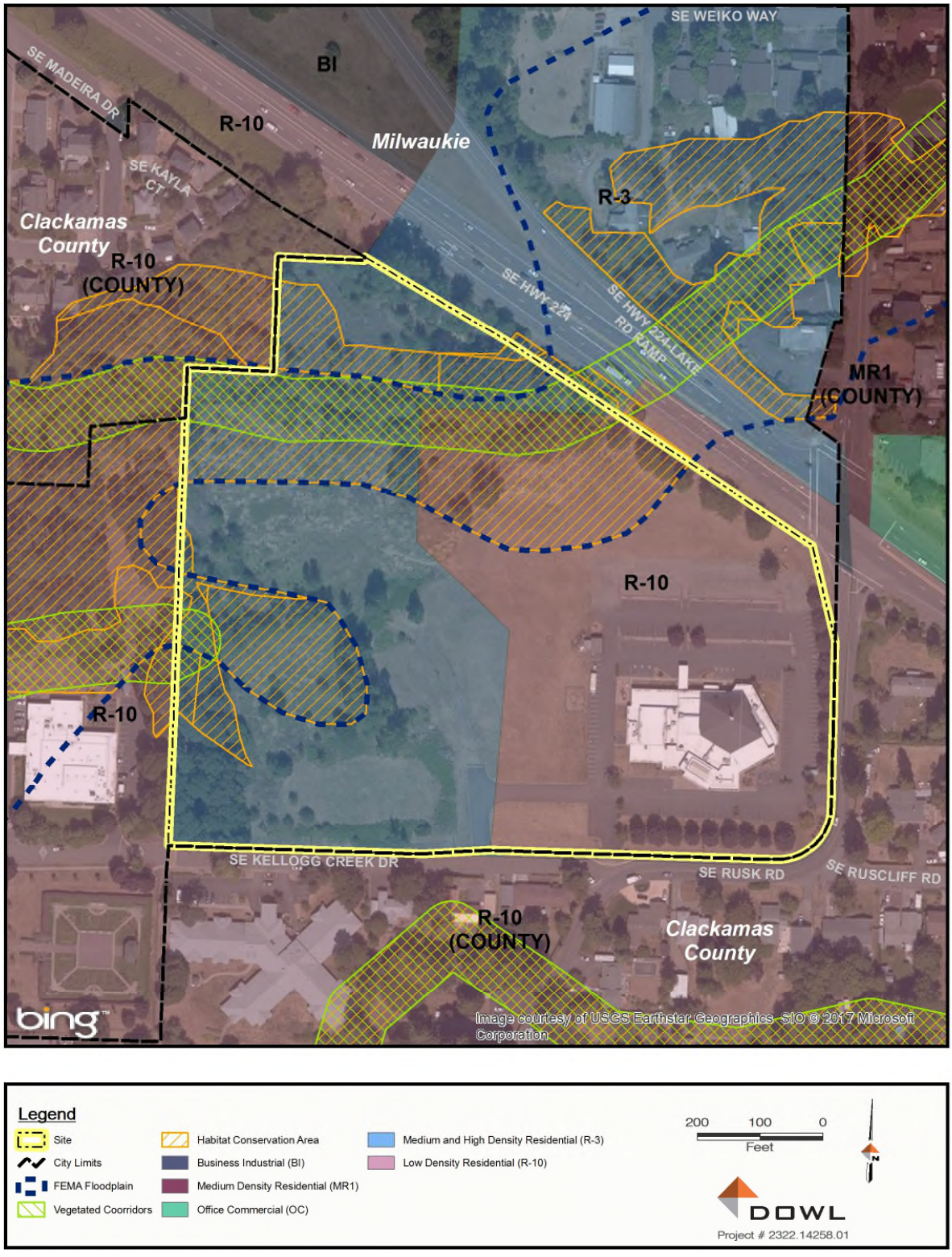


Figure 2: Natural Resources & Zoning



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Planned Development

In order to maximize development potential on the site, preserve natural resources and provide needed housing for Milwaukie, the applicant is proposing to develop this site using the city's Planned Development process. The Planned Development process allows for greater flexibility in design and use of a site to encourage a mix of housing types and creation of a unique environment that would not be possible under strict application of the Zoning Code. The Planned Development process has several steps, including a zone change and a final development plan. The zone change is necessary to apply the Planned Development (PD) zone to the site. To clarify the Planned Development review process and how it relates to the other applications needed for this project, the project team met with Milwaukie Planning staff in August 2016 for a pre-application conference, and again in September 2016 for a follow-up discussion. After the September meeting, city staff drafted a memo presenting two possible options for a review process – standard and streamlined. See Exhibits B and C for a copy of the pre-application notes and the September memo.

The applicant has chosen to utilize the streamlined review process, as outlined in the September memo. As such, two application packages are being submitted concurrently:

1. Zone Change and Development Plan Package – Type IV review
2. Subdivision and related applications – Type III review

As noted below, this narrative is part of the Type IV application package and addresses standards and criteria for Planned Development and Zone Change reviews.

Natural Resources

The site contains approximately 4.5 acres of designated floodplain area, which is regulated by Chapter 18.04 of the Milwaukie Municipal Code. The site also contains approximately 5.6 acres of designated Habitat Conservation Area (HCA) (See Figure 2). HCA lands are natural resources that have been identified by the City for protection and are regulated under Chapter 19.402 of the Milwaukie Zoning Code. Impacts to floodplain and HCA are permitted by the City if certain conditions can be met and mitigation of those impacts is provided. While the bulk of existing natural resources on the subject site will be preserved, some impacts will be necessary to accommodate the proposed development. The separate and concurrent Type III application package provides information about those impacts and how they will be mitigated in accordance with City regulations. A Natural Resource Review report is provided in Exhibit J.

Wetlands

Wetlands have been identified on the site and delineated by Pacific Habitat Services (See Exhibit D, Wetland Delineation Report). Impacts to the wetlands will occur in order to accommodate development on the site. Those impacts require a joint permit from Department of State Lands (DSL) and the US Army Corps of Engineers (USACE). A joint permit application for wetland impacts will be submitted as required.

Request

As part of the overall Planned Development project, this application package contains the following requests for approvals from the City of Milwaukie:

- Planned Development
- Type IV Zoning Map Amendment

The applicant has submitted this application, narrative, and plans in order to demonstrate how this proposal complies with the standards set forth the in the City of Milwaukie's Municipal Code. All applicable standards have been addressed and all required submittal materials have been provided.

The applicant is also submitting a separate application package for associated Type II and III approvals including subdivision and natural resources reviews. The two application packages are related and intended to be reviewed concurrently by the city.

II. COMPLIANCE WITH CITY OF MILWAUKIE DEVELOPMENT CODE

This section contains responses to applicable sections of the Milwaukie Development Code, Title 19 Zoning. Those sections that are not applicable to the proposal are generally not included unless needed for context.

Section 19.311 Planned Development Zone

19.311.1 Purpose

The purpose of a PD Planned Development Zone is:

A. To provide a more desirable environment than is possible through the strict application of Zoning Ordinance requirements;

B. To encourage greater flexibility of design and the application of new techniques in land development;

C. To provide a more efficient, aesthetic, and desirable use of public and private common open space;

D. To promote variety in the physical development pattern of the City; and

E. To encourage a mix of housing types and to allow a mix of residential and other land uses.

Response: The proposed project is well aligned with the purpose of the PD Zone. The flexibility of the PD Zone allows the applicant to protect significant natural resources while maximizing development potential of the site. This balance is critical to the success of the project.

The PD Zone provides the ability to reduce lot sizes and cluster them on the site so that impacts to the Habitat Conservation Area, floodplain area, trees and wetlands are minimized. Those natural resources will be largely protected and remain available as open space for the public and future residents of the development site. Application of the PD Zone will also achieve:

- Development of rowhouses in a planned community. This project represents a relatively new and different type of housing for Milwaukie and will contribute to the overall variety of housing types in the city. This is especially important considering the need for additional affordable housing in Milwaukie. A recent housing needs analysis[1] was prepared for the City to forecast housing needs over the next 20 years. That analysis identifies a need for over 1,000 new housing units. The majority (71 percent) of that housing is projected to be ownership housing, over half of which is projected to be an attached housing type. The proposed development will provide attached housing for ownership, thereby supporting the City's goal to provide more of this type of housing.
- The proposed development will consist of rowhouses on small lots in a relatively compact area with large, integrated open spaces. This arrangement is not one that is typically found in Milwaukie and will support the City's goal of encouraging a greater variety of development patterns.
- Natural and usable open spaces will be available for the public and residents of the development. Approximately seven acres of natural area and open space will be preserved on the site. A soft-surface trail system is proposed throughout the site to allow greater access to the protected natural areas while preserving the overall natural character of the site.

19.311.2 Use

A planned development approved by the City Council and based on a final development plan and program shall constitute the Planned Development Zone. The PD Zone is a superimposed zone applied in combination with regular existing zones. A PD Zone shall be comprised of such combinations of types of dwellings and other

[1] Housing and Residential Land Needs Assessment, prepared by Johnson Economics, August 2016.

structures and uses as shall be authorized by the Council, but the Council shall authorize only those types of dwellings and other structures and uses as will:

A. Conform to the City's Comprehensive Plan;

Response: Consistency with applicable Comprehensive Plan goals and policies is demonstrated in responses in Section III of this narrative.

B. Form a compatible and harmonious group;

Response: The proposed development will consist of single-family attached dwellings (rowhouses) in groups of four units. Some units (48 units) will be alley-loaded with driveways and garages located in the rear of the lot, and the remainder (44 units) will be front-loaded with driveways and garages located in the front. The two housing types will have a different front façade due to the difference in garage locations; however, they will be similar in size, orientation, architecture, color palette, and articulating features (renderings are provided on Sheet A100 in Exhibit A). The dwellings have been designed to provide aesthetic variation while still maintaining a sense of compatibility as a group. The groups of rowhouses will be arranged in a compact pattern around a simple grid of public streets and private alleys. Landscaping will be provided between the front driveways and the rear (alley) driveways to provide some separation between units. The intent of the development is to create a cohesive and compact neighborhood surrounded by natural areas and open space.

C. Be suited to the capacity of existing and proposed community utilities and facilities;

Response: Public utilities and facilities in the vicinity of the site are available to serve the proposed development. Specifically:

- Water – The site is within the Clackamas River Water (CRW) district and will connect to an existing CRW water main located in SE Kellogg Creek Drive. The applicant will construct new water lines within the right-of-way of new public streets on the site to serve the proposed residential units. Proposed utilities are shown on the Composite Utility Plan (Sheet C400) in Exhibit A.
- Sewer – There is a Clackamas County wastewater main located along the western and northern property lines of the site and is available to serve the proposed development. The applicant will construct an 8-inch PVC sewer line within the right-of-way of new public streets on the site and will connect this line to the existing sewer main north of the site. Proposed utilities are shown on the Composite Utility Plan (Sheet C400) in Exhibit A.
- Stormwater – The applicant has submitted a preliminary stormwater report prepared by a qualified professional engineer as part of this application (see Exhibit E). The report explains how stormwater runoff will be managed on the site and demonstrates that post-development runoff will not exceed pre-development runoff. The report also demonstrates consistency with the City's water quality standards.
- Streets – The site will take access from SE Kellogg Creek Drive, which currently has 40 feet of right-of-way. The traffic impact study conducted for this project indicates that traffic volumes from the proposed development will not cause intersections in the study area to fall below acceptable levels of service. Additional right-of-way will be dedicated along the site's frontage on Kellogg Creek Drive to accommodate half-street improvements as required by the City's engineering staff.
- Parks – The site is located adjacent to the North Clackamas Park, which is a 47-acre regional park with a variety of recreational amenities available to serve the proposed development. The site will also have approximately seven acres of additional open space and over two acres of usable open space (the trail system) available for the public and future residents of the development.

D. Be cohesively designed and consistent with the protection of public health, safety, and welfare in general; and

Response: As noted above, the proposed development will consist of rowhouse dwelling units in groups of four, designed to be visually compatible and form a cohesive neighborhood within the site. Public health, safety and welfare will be protected through the following measures:

- A connected system of streets designed to the local street functional classification, which includes sidewalks on both sides of the street and planter strips with street trees. The street system will also provide adequate access and circulation for emergency fire vehicles and service trucks.
- Street connections to the existing street system along Kellogg Creek Drive that meet the City's access spacing and sight distance standards.
- Half-street improvements along the site's frontage with Kellogg Creek Drive that will include a bike path and sidewalks to improve connections to North Clackamas Park.
- Protected natural resource areas, including large mature trees, wetlands, habitat areas and floodplain.
- A soft-surface trail system throughout the development that allows access through the natural resource areas and provides opportunity for recreation while minimizing impacts to the natural area.
- An outdoor community garden with raised planter beds, gravel pathways, and a water source. The community garden will be fenced and gated for security and will be managed by the future homeowners association.

E. Afford reasonable protection to the permissible uses of properties surrounding the site. In addition to residences and their accessory uses, the Council may authorize commercial and nonresidential uses which it finds to be:

1. *Designed to serve primarily the residents of the planned development,*
2. *Limited to those nonresidential uses which do not exist in the vicinity, and*
3. *Fully compatible with, and incorporated into, the design of the planned development.*

Response: No commercial or non-residential uses are being proposed as part of this development. The development will consist of single-family attached dwellings and associated public streets. Properties surrounding the site are zoned for low-density residential uses (R-10). The proposed development will not impact the ability of those surrounding properties to develop or redevelop with permissible uses. The proposed development will not impact access to those properties, change flood elevations, or impose any other physical or conceptual constraints on surrounding properties that will impede their ability to develop as allowed.

19.311.3 Development Standards

All standards and requirements of this chapter and other City ordinances shall apply in a PD Zone unless the Planning Commission grants a variance from said standards in its approval of the PD Zone or accompanying subdivision plat.

A. Minimum Size of a PD Zone

A PD Zone may be established only on land which is suitable for the proposed development and of sufficient size to be planned and developed in a manner consistent with the purposes of this zone. A PD Zone shall not be established on less than 2 acres of contiguous land unless the Planning Commission finds that a smaller site is suitable because of unique character, topography, landscaping features, or constitutes an isolated problem area.

Response: The proposed Planned Development site is approximately 14 acres of contiguous land, a portion of which is suitable for the proposed development. The site has been designed to preserve significant amounts of designated natural resources while maximizing development potential through compact rowhouse development. The site is also suitable for development in terms of access to public streets and utilities, as noted previously.

B. Special Improvements

In its approval of the final plan or subdivision plat within a PD Zone, the City may require the developer to provide special or oversize sewer lines, water lines, roads and streets, or other service facilities. Such approval shall not obligate the City to expend funds for additional construction equipment or for special road, sewer, lighting, water, fire, or police service.

Response: The applicant understands that the City may require special or oversized sewer lines, water lines, roads or other service facilities in its approval of the final plan and subdivision plat.

C. Density Increase and Control

The Council may permit residential densities which exceed those of the underlying zone, if it determines that the planned development is outstanding in planned land use and design and provides exceptional advantages in living conditions and amenities not found in similar developments constructed under regular zoning. In no case shall such density increase be more than 20% greater than the density range prescribed for the primary land use designation indicated in the Comprehensive Plan.

Response: Maximum density for the site was calculated consistent with the density calculation provisions in MMC Section 19.202.4. The allowable density was calculated for each zone (R-3 and R-10) separately and then combined to determine allowable density for the entire site. Per the City's pre-application notes, "the development may effectively blend the densities for the two zones by distributing structures across the site regardless of the specific zoning boundary." Table 2 shows the detailed density calculations. See Figure 3 for a map of areas used for the density calculations.

Table 2A: Net Acres Calculation

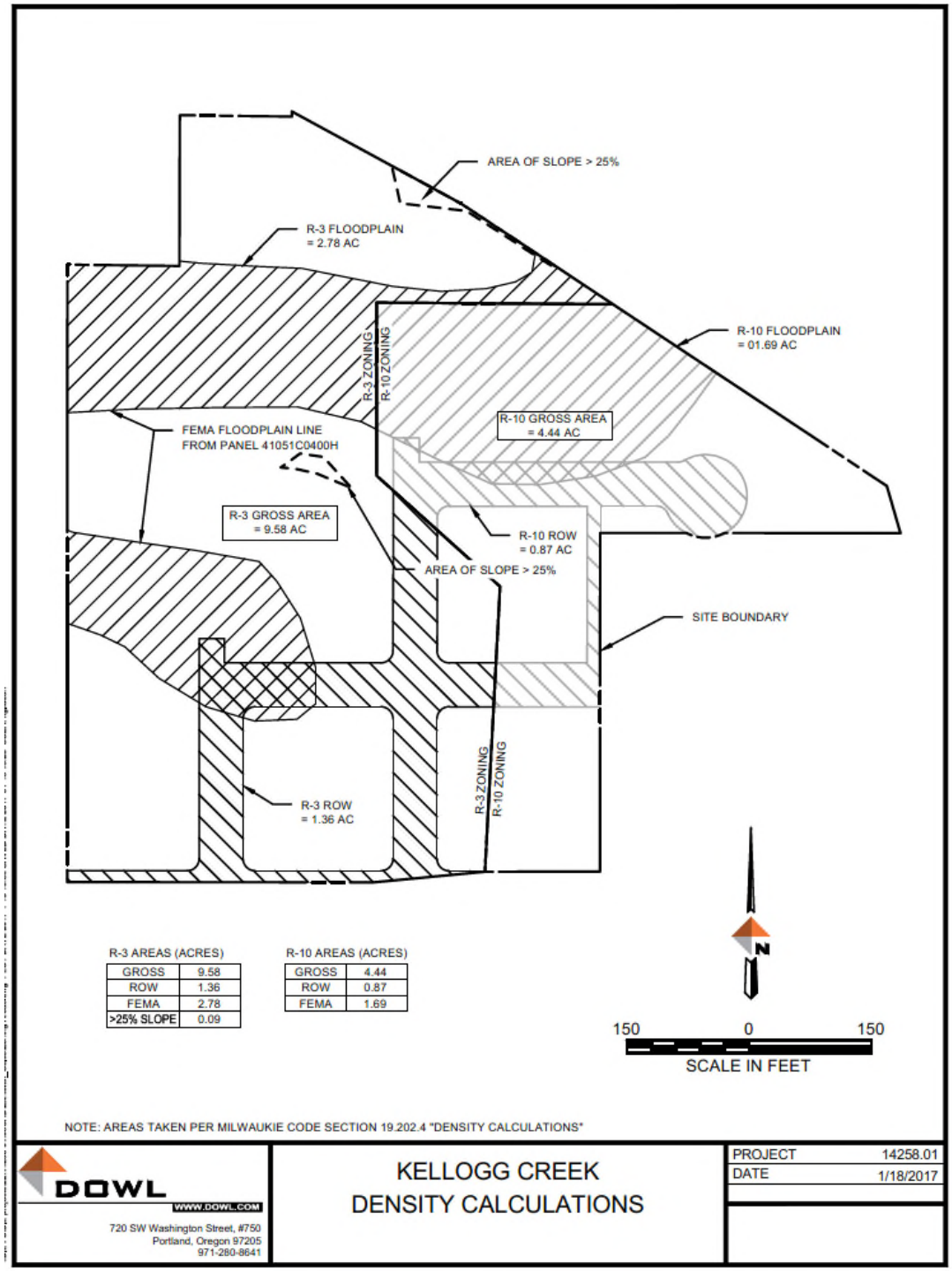
Zoning	Gross Acres	FEMA Mapped Floodplain	Right-of-way	Additional Open Space[1]	Slopes > 25%	Net Acres[2]
R-3	9.58	2.78	1.36	0.41	0.09	4.94
R-10	4.44	1.69	0.87	0	0	1.88
Totals	**14.02**	**4.47**	**2.23**	**0.41**		**6.82**

Table 2B: Maximum Density Calculation

Zoning	Net Acres[2]	Maximum Density (du/net acre)	Maximum Number of Units Allowed (without PD)	PD Increase (20%)[3]	Maximum Number of Units with Rounding (per MMC 19.202.4)
R-3	4.94	14.5	71.58	85.90	86
R-10	1.88	4.4	8.27	9.92	10
Totals	**6.82**	**-**	**79.85 (80 with rounding)**	**-**	**96**

1. Required open space is one-third of the gross acreage (per PD provisions in 19.311.3.E). The above calculations assume a portion of the open space overlaps with floodplain. Additional open space needed to achieve one-third of the gross is indicated here.
2. Net acres = gross acres – (floodplain + right-of-way + open space)
3. Per Section 19.311.3.C, a density increase of up to 20% is allowed in the PD Zone.

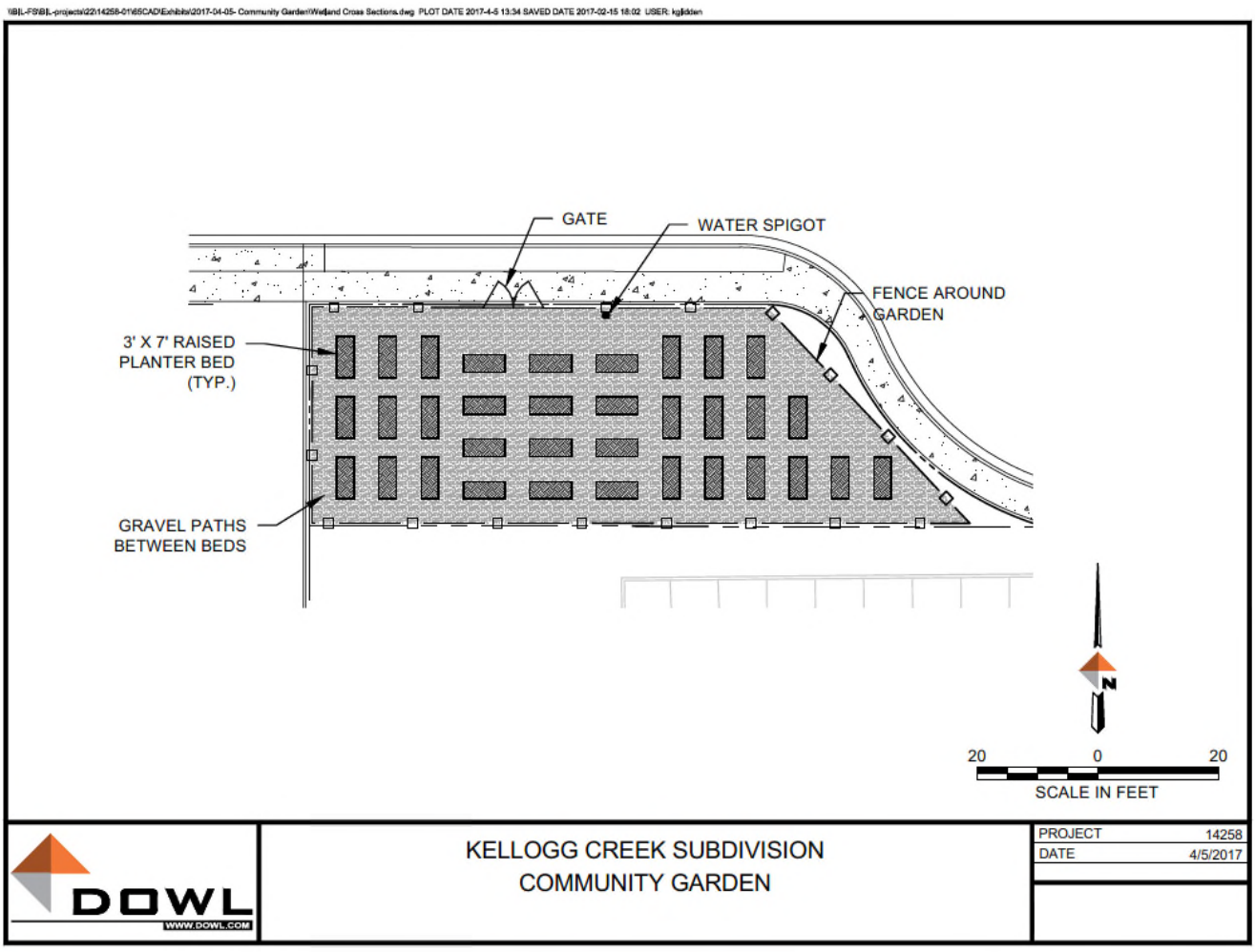
Figure 3: Density Calculation Areas



As shown, the maximum number of units that would be allowed on the site per the underlying zoning is 80 units. The proposed development has 92 units. This represents an approximately 15 percent increase in density, which is less than the 20 percent maximum increase allowed by the PD Zone. There are a number of unique and "outstanding" amenities provided with this proposed development that support the density increase:

- Just over half of the 14-acre site will be preserved as open space to minimize impacts to important natural resources, including habitat conservation area, floodplain, mature trees and wetlands. Residents of the development and the public will have access to these natural open spaces via a soft-surface trail system that will travel throughout the site. The trail will connect to a paved pedestrian/bicycle path at the northeast corner of the site near the intersection of Rusk Road and Highway 224.
- The site has been designed to create a sense of permeability between the natural open spaces and the developed portion of the site. Almost half of the attached homes (44 units) will have backyards located directly adjacent to the open space. The backyards of those lots will have low (4-foot height) fencing made of black cyclone material to provide visibility and a sense of openness to the natural area while providing privacy and security for individual home owners.
- The two large water quality facilities (facilities B and C) have been designed and located in order to provide views into the open space areas beyond them. The water quality facilities will be planted with low-lying grasses and will not be fenced, so they will provide a sense of openness for the nearby homes, as well as vehicles and pedestrians traveling north through the site. Connections to the trail system will also be provided at the water quality facilities.
- A community garden will be provided on the site in Tract D for use by residents of the development (see Figure 4). That garden (approximately 3,100 square feet) will include raised planter beds, gravel pathways and a water source. The garden will be fenced and gated for security and will be managed by the future homeowners association.
- Additional trees will be planted where the site abuts Highway 224 in the northeastern corner to provide some additional screening for those lots that are located closest to that property line. If suitable for the species, planted trees will be white oaks in order to mitigate for some of the white oaks that are being removed from the southwest corner of the site (note that mitigation for removal of the white oaks is not required by the City).

Figure 4: Community Garden Area



- The proposed development will provide 92 units of attached single-family housing. Those rowhouse units will be available for ownership at a price point that is affordable for working people with moderate incomes (referred to as workforce housing). The need for this type of housing at this price point was well-established in the housing needs analysis prepared for the City at the end of 2016. This was further clarified in a memo prepared by Johnson Economics[2] on behalf of the applicant. That memo states (emphasis added):

  "The proposed development is consistent with the observed trends in the residential market, and is expected to deliver a product that is consistent with identified market demand. ***The subject site is particularly well suited for this type of development,*** *with proximate parks and open space to complement the limited yard space provided in a townhome configuration. We would expect the project to have* ***appeal to a cost-sensitive starter family market****, which will value the local amenity mix as well as proximity to employment and commercial services.*

  The development is requesting a Planned Development approval, which would allow for flexibility to deal with the site and natural resources. The site is split zoned, with portions zoned either R-10 or R-3. The R-

[2] Johnson Economics also prepared the 2016 Housing Needs Analysis for the City of Milwaukie.

10 zoning has a minimum lot size of 10,000 square feet, and would yield few units. Even under a duplex scenario, the zoning would require 14,000 square feet per duplex. The R-3 zoning allows for 3,000 square foot lots sizes, but with the level of natural resource on the site, a development would not be able to meet minimum density. ***As zoned, any development on the site would necessarily be at a price point that would not be responsive to the local demand.***

The proposed townhome development would allow for family-oriented units at a price point that meets identified demand, and can provide workforce housing. ***It would help realize and expand the City's housing capacity, increasing housing options for local residents as well as locally-employed households."***

See Exhibit K for the full memo. It's important to note the language about price point above because it directly relates to the density increase. Without the proposed 15 percent density increase to 92 lots, this project would not be economically feasible and would not be able to deliver housing at the needed price point. Simply stated, fewer lots means a higher price point.

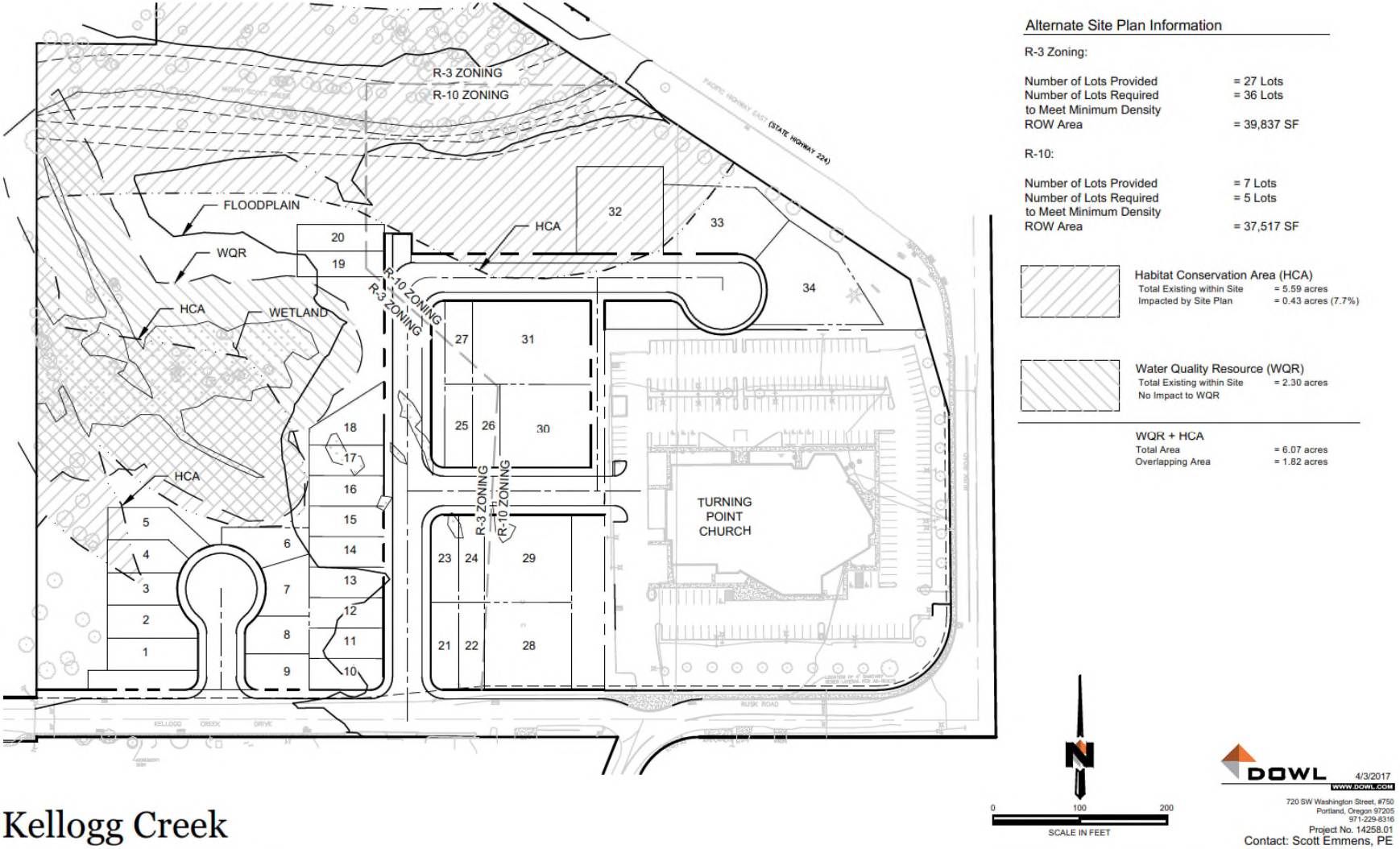
- The proposed development will be compact, with small individual lots on a connected street system in close proximity to a large public park with convenient access to a major arterial (Highway 224). The development is located less than 2.5 miles from downtown Milwaukie. This type of development is consistent with the housing trends that are anticipated to occur in Milwaukie over the next 20 years, as identified in the 2016 housing analysis. Those trends include the need for more dense and efficient development within the city limits, migration to urban areas, the desire for smaller homes in well-planned and safe communities, and the need for workforce housing.
- Under standard zoning (meaning, without using the PD provisions), this site would be very difficult to develop and would likely not produce an economically viable project. The alternative site layout shown in Figure 5 below shows a potential configuration of lots in the context of the standard R-10 and R-3 zoning (blending of zones would not be permitted as it is with the PD) and the natural resource provisions in MMC 19.402. The alternative layout is consistent with the subdivision standard in MMC 19.402.13.I that requires at least 90 percent of the HCA and 100 percent of the WRQ to be located in a separate non-developable tract.

  As shown, 27 lots are provided in the R-3 portion of the site. However, the minimum density required under this scenario is 36 lots (for the R-3). In order to meet minimum density requirements (see Table 3 for calculations) in the R-3 zone, nine additional units would be needed, which would result in impacts to the natural resources on the site. It's likely that the stand of white oaks in the southwest corner of the site (which is not located within the natural resource boundary) would be removed entirely to accommodate additional lots. Furthermore, the lots in this alternative layout are larger (significantly larger in the R-10 portion) which means the price point for housing in this scenario will be much higher. Amenities such as the proposed community garden and soft-surface trail are not required considerations under standard subdivision zoning and would therefore not likely be provided in this scenario.

Table 3: Alternative Layout – Minimum Density

Zone	Gross Acres	Gross SF	Floodway	Proposed ROW	Additional Open Space	Net SF	Net Acres	Min Required Units
R3	9.58	417,305	52,359	39,837	189,922	135,187	3.10	36
R10	4.44	193,406	21,753	37,517	74,488	59,649	1.37	5

Figure 5: Alternative Site Layout – Standard Zoning



Kellogg Creek

Site Plan: April 3, 2017

Milwaukie, Oregon

D. Peripheral Yards

Along the periphery of any PD Zone, additional yard depth, buffering, or screening may be required. Peripheral yards shall be at least as deep as that required by the front yard regulations of underlying zones. Open space may serve as peripheral yard and/or buffer strips to separate one planned area from another, if such dual use of the land is deemed to comply with this section.

Response: The front yard depths in the proposed development range from 10 to 18 feet so it is assumed here that the required periphery buffer is required to be at least 10 feet deep. The proposed development is surrounded by large areas of open space to the north and west, Kellogg Creek Drive to the south, and the existing church parking lot to the east. Where the proposed development abuts open space and Kellogg Creek Drive, additional periphery buffer is not required. The remainder of the development provides a periphery buffer as follows:

- Tracts E and F provide a 20-foot buffer between lots 1 and 17 and the property line.
- The public alley provides a 22-foot buffer between lots 45 and 53 and the property line.
- The bicycle/pedestrian path provides a 15-foot buffer between lot 92 and the property line.

E. Open Space

Open space means the land area to be set aside and used for scenic, landscaping, or open recreational purposes within the development. Open space may also include areas which, because of topographic or other conditions, are deemed by the Council to be suitable for leaving in a natural condition. Open space shall be adequate for the recreational and leisure needs of the occupants of the development, and shall include the preservation of areas designated by the City for open space or scenic preservation in the Comprehensive Plan or other plans adopted by the City.

The development plan and program shall provide for the landscaping and/or preservation of the natural features of the land. To ensure that open space will be permanent, deeds or dedication of easements of development rights to the City may be required. Instruments and documents guaranteeing the maintenance of open space shall be approved as to form by the City Attorney. Failure to maintain open space or any other property in a manner specified in the development plan and program shall empower the City to enter said property in order to bring it up to specified standards. In order to recover such maintenance costs, the City may, at its option, assess the real property and improvements within the planned development.

All planned unit developments will have at least one-third of the gross area devoted to open space and/or outdoor recreational areas. At least half of the required open space and/or recreational areas will be of the same general character as the area containing dwelling units. Open space and/or recreational areas do not include public or private streets.

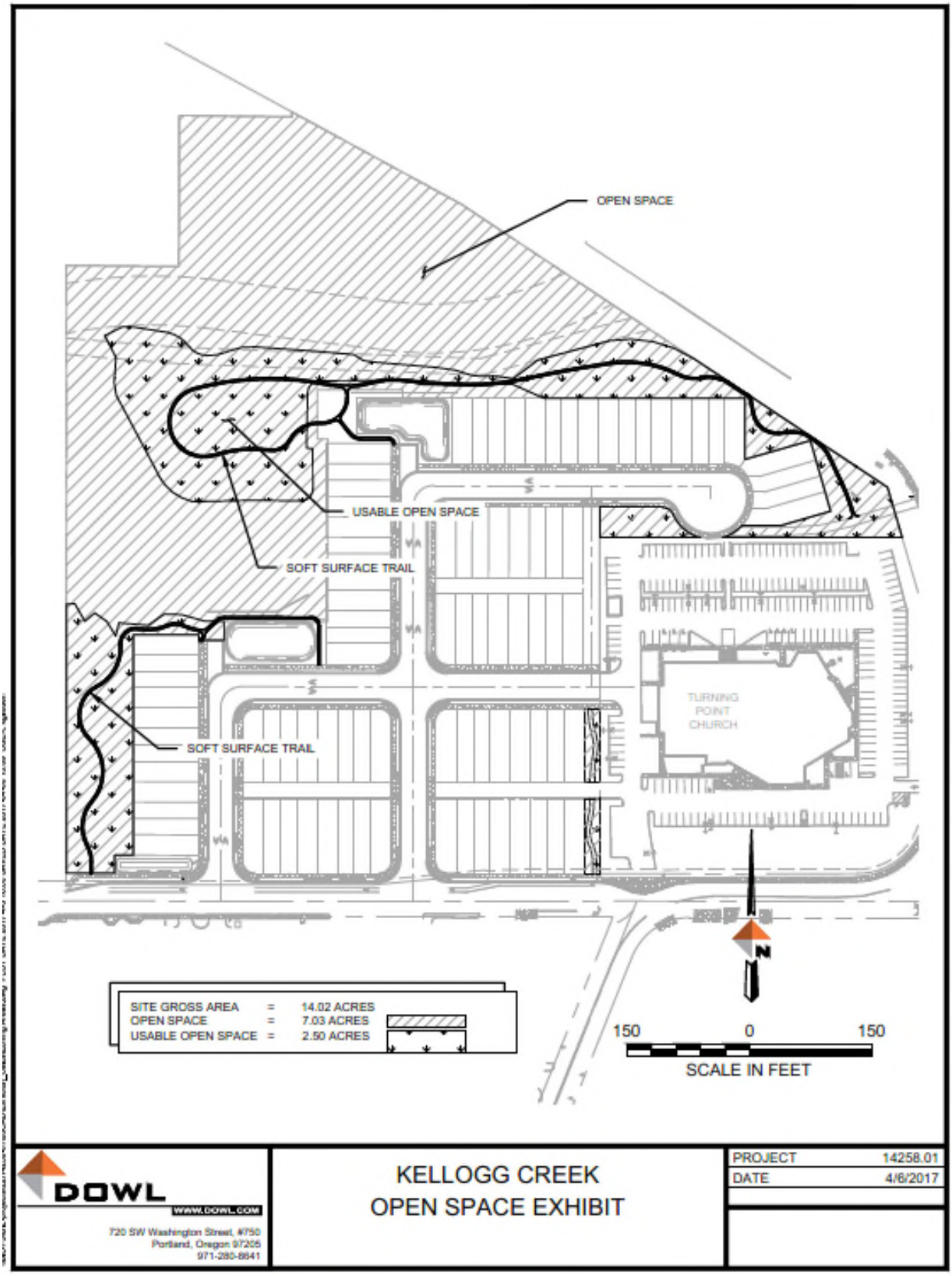
Response: The subject site is approximately 14 acres. One-third of the site is 4.67 acres, which is the amount required for open space per the standard above. One-half of the open space (2.34 acres) must be usable open space of the same general character as the area containing dwelling units.

As shown on Figure 6 below, the proposed development will have 7.07 acres of open space, which exceeds the one-third requirement. Approximately 2.54 acres of that open space will be available for recreational purposes via the proposed soft-surface trail system that travels through the site. The trail system will provide two walking paths; one that travels through the stand of mature trees at the western edge of the site, and another that traverses the northern edge of the development, creates a walking loop through the open space, and connects to Rusk Road. Preservation of natural resources played a significant role in determining how this site was designed. It is appropriate and "in character" to leave those natural resources as intact as possible. The intent of the trails is to provide access to the open spaces that are being preserved on the site, while maintaining the

overall integrity of the natural resources they protect. Users who desire a more landscaped and programmed recreational area have convenient access to North Clackamas Park, which is directly adjacent to the site. Walking distance from the furthest point on the development site to the play structure at North Clackamas Park is less than one-half mile, or about an eight minute walk.

In addition to the open space trail system, a community garden will be provided near the cul-de-sac at the northern end of the development.

Figure 6: Open Space Areas



19.311.4 Subject to Design Review

Any development within a PD Zone shall be subject to the provisions of design review as outlined in a separate ordinance.

Response: The proposed rowhouse development is subject to design standards, which have been addressed in the concurrent application narrative for subdivision and other associated reviews.

Section 19.902 Amendments to Maps and Ordinances

19.902.6 Zoning Map Amendments

Changes to the Zoning Map of Milwaukie, Oregon, shall be called Zoning Map amendments.

B. Approval Criteria

Changes to the Zoning Map shall be evaluated against the following approval criteria. A quasi-judicial map amendment shall be approved if the following criteria are met. A legislative map amendment may be approved if the following criteria are met:

1. *The proposed amendment is compatible with the surrounding area based on the following factors:*
    a. *Site location and character of the area.*
    b. *Predominant land use pattern and density of the area.*
    c. *Expected changes in the development pattern for the area.*

Response: The area surrounding the subject site has two predominate characteristics: parks/open space and low to moderately dense residential development. North Clackamas Park is located directly west of the site and consists of the Milwaukie Center building, ball fields, trails, and both passive and active recreational areas. The proposed development will preserve a significant area (about seven acres) of natural open spaces abutting the park, and will provide a soft-surface trail system throughout those open spaces. These preserved open space areas will be compatible with, and help to maintain, the natural and open space character of the area. The large amount of open space preserved on the site will also help to buffer the impact of denser development.

The proposed project will also consist of 92 single family attached dwelling units (rowhouses) in a compact development pattern. While density on the site will be greater than density in the surrounding residential developments, it will not be out of character with surrounding residential development patterns. The proposed project will have full local streets, with landscaped strips and street trees, arranged in a grid-like pattern (with one cul-de-sac). The site is directly across Kellogg Creek Drive from the Deerfield Village Assisted Living center, which has characteristics similar to an apartment or multi-family development in terms of density and aesthetic.

As noted in the Johnson Economics memo in Exhibit K, "The location of the site provides excellent access and visibility from Highway 224, as well as access to the North Clackamas Park, Alder Creek Middle School, the Clackamas Aquatic Center, and employment concentrations along Highway 224 and I-205 corridors. While proximate to single family residential concentrations…the site is separated by topography and environmental corridors, limiting the impact on these properties from new development."

It's also important to note that a primary purpose of the PD Zone, which is the subject of this zone change request, is to encourage "the application of new techniques in land development…promote variety in the physical development pattern of the City, and…encourage a mix of housing types." Therefore, the PD Zone inherently and intentionally encourages unique development that is intended to adapt to the natural

characteristics of a site. This development proposal implements that intent while maintaining the two prevailing characteristics that define its surroundings: open space and residential development.

In terms of expected changes to the development pattern, the proposed development is consistent with the housing development trends that are anticipated to occur in Milwaukie over the next 20 years, as identified in the 2016 housing analysis. Those trends include the need for more dense and efficient development within the city limits, the desire for smaller homes in well-planned and safe communities, and the need for workforce housing.

2. The need is demonstrated for uses allowed by the proposed amendment.

Response: The proposed development will provide 92 single-family attached dwelling units (rowhouses) on individual lots. The need for this type of housing product has been identified in the housing needs analysis that was prepared for the City in 2016, and summarized previously.

3. The availability is shown of suitable alternative areas with the same or similar zoning designation.

Response: As noted in the 2016 Housing Needs Analysis prepared for the City, only 20 percent of the City's current land capacity is located on vacant parcels, with relatively few larger parcels available for "greenfield" development of single-family homes. The subject site has a particular combination of qualities that make it suitable for this development, including proximity to downtown, employment corridors, parks, schools and other services. The property is under single ownership and is available for purchase.

It's important to note that the PD Zone is a zone that is applied as an overlay at the request of an applicant who needs additional flexibility to develop a site. This criterion does not directly apply to a PD Zone request.

4. The subject property and adjacent properties presently have adequate public transportation facilities, public utilities, and services to support the use(s) allowed by the proposed amendment, or such facilities, utilities, and services are proposed or required as a condition of approval for the proposed amendment.

Response: The applicant has provided a traffic impact study, utility plans and a drainage report to demonstrate that adequate public services (transportation, water, sewer, stormwater) are available, or can be provided, to serve the use proposed by the requested amendment. Specifically:

- Water – The site is within the Clackamas River Water (CRW) district and will connect to an existing CRW water main located in SE Kellogg Creek Drive. The applicant will construct new water lines within the right-of-way of new public streets on the site to serve the proposed residential units. Proposed utilities are shown on the Composite Utility Plan (Sheet C400) in Exhibit A.
- Sewer – There is a Clackamas County wastewater main located along the western and northern property lines of the site and is available to serve the proposed development. The applicant will construct an 8-inch PVC sewer line within the right-of-way of new public streets on the site and will connect this line to the existing sewer main north of the site. Proposed utilities are shown on the Composite Utility Plan (Sheet C400) in Exhibit A.
- Stormwater – The applicant has submitted a preliminary stormwater report prepared by a qualified professional engineer as part of this application (see Exhibit E). The report explains how stormwater runoff will be managed on the site and demonstrates that post-development runoff will not exceed pre-development runoff. The report also demonstrates consistency with the City's water quality standards.
- Streets – The site will take access from SE Kellogg Creek Drive, which currently has 40 feet of right-of-way. The traffic impact study conducted for this project indicates that traffic volumes from the proposed development will not cause intersections in the study area to fall below acceptable levels of service.

Additional right-of-way will be dedicated along the site's frontage on Kellogg Creek Drive to accommodate half-street improvements, including a striped bike lane.

- Parks – The site is located adjacent to the North Clackamas Park, which is a 47-acre regional park with a variety of recreational amenities available to serve the proposed development. The site will also have approximately seven acres of additional open space and over two acres of usable open space (the trail system) available for the public and future residents of the development.

5. The proposed amendment is consistent with the functional classification, capacity, and level of service of the transportation system. A transportation impact study may be required subject to the provisions of Chapter 19.700.

Response: As demonstrated in the traffic impact study provided to the City, the proposed project is (or can be made to be) consistent with the functional classification, capacity and level of service of the surrounding transportation system.

6. The proposed amendment is consistent with the goals and policies of the Comprehensive Plan, including the Land Use Map.

Response: Responses to demonstrate that the proposed Planned Development is consistent with applicable Comprehensive Plan goals and policies are provided in Section III of this narrative.

7. The proposed amendment is consistent with the Metro Urban Growth Management Functional Plan and relevant regional policies.

Response: Relevant sections from the Urban Growth Management Functional Plan are addressed below.

Title 1 Housing Capacity. The proposed subdivision will provide housing in a compact urban form, which directly supports the intent of Metro's Housing Capacity requirements.

Title 3 Water Quality and Flood Management. The proposed development has been designed to preserve water quality resources and floodplain areas to the greatest extent feasible while still allowing development of the site. Consistent with Milwaukie's code, impacts to those areas will be mitigated and floodplain alterations will be done in accordance with local and federal requirements.

Title 7 Housing Choice. The proposed development will support Metro's Housing Choice policies by providing a needed housing type in Milwaukie that will be affordable to workers with moderate incomes.

Title 13 Nature in Neighborhoods. The proposed development supports these Metro policies by providing a large area of natural open space on the site that is contiguous to North Clackamas Park and protects the streamside vegetated corridor along Mount Scott Creek. The development will also comply with Milwaukie's Natural Resources code (Chapter 19.402), which protects habitat conservation and water quality resource areas on the site.

8. The proposed amendment is consistent with relevant State statutes and administrative rules, including the Statewide Planning Goals and Transportation Planning Rule.

Response: There are a number of directly relevant Statewide Planning Goals, which are briefly addressed below.

Goal 2 Citizen Involvement. Prior to submittal of the land use applications for this project, the applicant held a neighborhood meeting to discuss the proposal with surrounding neighbors. As noted previously in this narrative, changes to the overall development plan were made based on input during that meeting. Meeting materials are provided in Exhibit H. In addition, the review process for this application will include at least one hearing before the Planning Commission and one hearing before the City Council. Those hearings are open to the public and public notice will be provided consistent with the City's procedural code. Neighbors will have additional opportunity at those hearings to provide comment to the City prior to decisions.

Goal 5 Natural Resources. As noted previously, there are significant amounts of natural resources on the subject site, including wetlands, habitat conservation area, and mature trees. Impacts to those areas resulting from the proposed development have been minimized and approximately half the site will remain as natural open space. Impacts necessary to accommodate development on the site have been identified, and all applicable local, state and federal regulations have been addressed. Those regulations include the City's Title 19 natural resources provisions, and joint DSL/USACE wetlands permitting.

Goal 7 Areas Subject to Natural Hazards. A significant amount of floodplain exists on the site and alteration of the floodplain will be necessary to accommodate the proposed development. Impacts to the floodplain have been identified and all applicable local floodplain regulations in the City's Title 18 have been addressed. Federal requirements governing floodplain fill and management are being addressed in parallel to the local permitting effort.

Goal 12 Transportation and Transportation Planning Rule. As noted in the traffic impact study provided to the City, the proposed zoning map amendment "will not require changes to the functional classification of existing or planned transportation facilities, will not require a change to the standards implementing the comprehensive plan, and will not significantly affect a transportation facility. Accordingly, the proposed zoning map amendment does not result in a significant effect on the transportation system, and no further review of mitigation for Transportation Planning Rule purposes is necessary."

Section 19.911 Variances

19.911.3 Review Process

C. Type III Variances

Type III variances allow for larger or more complex variations to standards that require additional discretion and warrant a public hearing consistent with the Type III review process. Any variance request that is not specifically listed as a Type II variance per Subsection 19.911.3.B shall be evaluated through a Type III review per Section 19.1006.

Response: The applicant is requesting two variances:

- A variance to reduce the 45-foot driveway spacing standard in MMC 12.16.040.C.4.a for lot 72 of the proposed subdivision.
- A variance to the natural resource standard in MMC 19.402.13.I.2.a that requires all proposed lots to have adequate buildable area outside the WQR and HCA.

Because the variance to the natural resource standard does not fit the definition of a Type I or II variance, a Type III variance is required.

19.911.4 Approval Criteria

B. Type III Variances

An application for a Type III variance shall be approved when all of the criteria in either Subsection 19.911.4.B.1 or 2 have been met. An applicant may choose which set of criteria to meet based upon the nature of the variance request, the nature of the development proposal, and the existing site conditions.

1. Discretionary Relief Criteria

a. The applicant's alternatives analysis provides, at a minimum, an analysis of the impacts and benefits of the variance proposal as compared to the baseline code requirements.

Response: The alternatives analysis provides a discussion of the impacts and benefits of the variance proposal as compared to the baseline code requirements.

b. The proposed variance is determined by the Planning Commission to be both reasonable and appropriate, and it meets one or more of the following criteria:

(1) The proposed variance avoids or minimizes impacts to surrounding properties.

Response: The variance will not have impacts to surrounding properties.

(2) The proposed variance has desirable public benefits.

Response: Desirable public benefits from the variance have been demonstrated.

(3) The proposed variance responds to the existing built or natural environment in a creative and sensitive manner.

Response: No response.

c. Impacts from the proposed variance will be mitigated to the extent practicable.

Response: Impacts will be mitigated as demonstrated in the Natural Resources Report.

III. COMPLIANCE WITH CITY OF MILWAUKIE COMPREHENSIVE PLAN

This section contains responses to applicable Comprehensive Plan goals and policies. Where specific policy language was not particularly relevant to this application, the overall goal statement is addressed instead.

Chapter 1 Citizen Involvement

GOAL STATEMENT: To encourage and provide opportunities for citizens to participate in all phases of the planning process, to keep citizens informed and to open lines of communication for the sharing of questions, problems and suggestions regarding the Comprehensive Plan and land use regulations

Response: Consistent with Citizen Involvement goals, the applicant held a neighborhood meeting on November 3, 2016 to discuss the proposed project with surrounding property owners and the Lake Road Neighborhood District Association (NDA). A letter of invitation to the meeting was mailed to all property owners within a 500-foot radius of the site. The Chair of the Lake Road NDA was also contacted (via email and telephone) to inform the NDA of the meeting and invite them to attend. The meeting was held at the Turning Point Church, which is directly adjacent to the project site. Approximately 30 people attended the meeting. See Exhibit H for meeting materials.

During the meeting, the consultant team presented an overview of the proposed site plan and explained the review process that will be required in order to approve the project. The consultant team included the project civil engineers, traffic engineer, biologist and land use planner. The applicant and property owner (Turning Point Church) were also present at the meeting. Neighbors expressed some concerns during the meeting as noted below.

- Neighbors were concerned that proposed development on the site could exacerbate existing flooding issues that occur in the area. Subsequently, the site plan was revised to significantly reduce impacts to the floodplain area. In addition, the applicant will comply with all Milwaukie Title 18 floodplain alteration provisions and applicable FEMA flood map revision requirements. Those provisions and processes are in place to ensure floodplain alterations do not negatively impact surrounding development.
- Neighbors were concerned that traffic resulting from the development will add congestion, delays and safety issues on surrounding streets and intersections. The applicant has submitted a traffic impact study to the City, which has been reviewed and discussed during the required TIS pre-application meeting. The traffic study identifies anticipated impacts from the proposed development and mitigating improvements that will be constructed as part of the development. Per the study, intersections within the study area are expected to continue to operate at acceptable levels after the proposed development is complete.
- Neighbors were concerned that there are too many lots proposed on the site. Subsequently, the development plan was revised and the total number of lots was reduced from 99 to 92. Compatibility with the surrounding neighborhood has been discussed previously in this narrative and must be balanced with other interests such as protection of natural resources and the need for more housing in Milwaukie.

In addition to the neighborhood meeting, citizens will be notified by the City when the applications are submitted and deemed complete for review. They will have an opportunity to provide written comment on the application during the public comment period prior to the public hearings. Citizens will also have the ability to provide written or oral testimony during the public hearings before the Planning Commission and City Council. The City provides such notice to all property owners within a 300-foot radius of the project site, consistent with City procedural code.

Chapter 2 Plan Review & Amendment Process

GOAL STATEMENT: Establish a Plan review and amendment process as a basis for land use decisions, provide for participation by citizens and affected governmental units, and ensure a factual base for decisions and actions.

Response: Policies under Chapter 2, Objective #2 require that zone changes and other planning actions be consistent with the intent of the Comprehensive Plan. This application supports those policies by providing these findings to demonstrate conformance with applicable Comprehensive Plan goals and policies. As noted in the response to Chapter 1 above, opportunities for participation by citizens and affected governmental units has been, or will be, provided through the neighborhood meeting and the City's public notice and hearings processes.

Chapter 3 Environmental & Natural Resources

NATURAL HAZARDS ELEMENT

Floodplain Policies

1. New construction and development will be regulated so that water flow will not be increased. The capacity of the floodplain shall not be reduced by development activities.

Response: The capacity of the floodplain will not be reduced by the proposed development activities. Balanced cut and fill of the floodplain will be conducted on the site to accommodate the proposed development. Milwaukie's Title 18 floodplain alteration provisions will be met and the applicant has provided this information to the City. In addition, FEMA flood map revision requirements will also be addressed through a separate process.

2. Construction materials which may be inundated will be of such strength and quality that they will not deteriorate, and they must be able to withstand the pressure and velocity of flowing water.

Response: Areas of residential construction will be filled to ensure that the surface of residential foundations is at least one foot above the base flood elevation. Therefore, no residential construction areas will fall within the inundation area of a 100-year flood event.

3. The finished elevations of the lowest floor of buildings and streets will be a minimum of 1.0 foot above the 100 year flood elevation.

Response: Finished elevations of the lowest floor of buildings and streets will be at least one foot above the 100-year flood elevation.

4. Whenever possible, the floodplain will be retained as open space and used for recreation, wildlife areas, or trails. Dedication of lands or public easements within the floodplain is encouraged when indicated by the Recreational Needs Element, and may be required as a condition of development along creeks and rivers or other water bodies or wetlands.

Response: Floodplain on the site will be largely left as natural open space and will be accessible to residents for recreational purposes via a soft-surface trail system, as described and shown previously in this narrative.

OPEN SPACES, SCENIC AREAS, AND NATURAL RESOURCES ELEMENT

Natural Resource Policies

1. Protect designated natural resources and their associated values through preservation, intergovernmental coordination, conservation, mitigation, and acquisition of resources.

Response: The natural resources on the site (habitat conservation area and wetlands) will be protected to the greatest extent possible while allowing the applicant to provide efficient and compact residential development.

All impacts to protected areas will be done in accordance with applicable local and federal regulations, including MMC Chapter 19.402 for Natural Resources and the joint DSL/USACE wetlands permitting process. Impacts will be mitigated as required through those processes.

2. Provide protection to important wetland and water body areas through designation of riparian area buffers between natural resources and other urban development activities. Restrict non-water dependent development within the riparian buffer area.

Response: Chapter 19.402 of the Milwaukie code establishes vegetated corridor width requirements for protected water features, including those found on the subject site, and restricts activity within those corridors. As part of a separate and concurrent application package, the applicant has submitted a Natural Resources review application to demonstrate consistency with Chapter 19.402 regarding habitat conservation area and water quality resources. A Natural Resource Review report is provided in Exhibit J.

3. Maintain and improve water quality of wetlands and water bodies by regulating the placement and design of stormwater drainage facilities.

Response: Placement and design of stormwater facilities has been provided to the City in the Drainage Report in Exhibit E and the plans in Exhibit A. Those facilities have been designed consistent with City standards and requirements.

4. Protect existing upland areas and values related to wildlife habitat, groundwater recharge, and erosion control.

- *Encourage the development of open spaces and increased vegetation for wildlife habitats.*
- *Protect steep slopes from erosion through the use of vegetation.*
- *Provide protection between the resource and other urban development.*

Response: Chapter 19.402 of the Milwaukie code establishes regulations and requirements for habitat conservation areas, including those found on the subject site. As part of a separate and concurrent application package, the applicant has submitted a Natural Resources review application to demonstrate consistency with Chapter 19.402 regarding habitat conservation area and water quality resources.

Chapter 4 Land Use

RESIDENTIAL LAND USE AND HOUSING ELEMENT

Buildable Land Policies

1. Policies and standards found in the Historic Resources, Natural Hazard and Open Spaces, Scenic Areas, and Natural Resources Elements of the Environmental and Natural Resources Chapter apply, where applicable, throughout the City. Through its regular zoning, building and safety enforcement process, the City will implement those policies in Special Policies Classification areas and direct urban development toward more suitable areas through density transfer.

Response: The proposed development supports this policy by transferring available density from the portion of the site with natural resources to the portion of the site more suitable for development.

2. Prior to the approval of any building permit or other development approval, the developer of any vacant land within special policies classification areas must submit a report indicating how the applicable policies in the Environmental and Natural Resources Chapter are to be met. The report will describe the proposed type of site preparation and building techniques, how these techniques meet the applicable policies, and the mitigative measures, if any, proposed to lessen impacts during construction.

Response: Applicable policies from the Environmental and Natural Resources chapter of the Comprehensive Plan are provided in the above section of this narrative.

Residential Land Use Design Policies

2. In all Planned Unit Developments, a density bonus up twenty percent (20%) over the allowable density may be granted in exchange for exceptional design quality or special project amenities.

Response: As noted previously, and reiterated here, the maximum number of units that would be allowed on the site per the underlying zoning is 80 units. The proposed development has 92 units. This represents an approximately 15 percent increase in density, which is less than the 20 percent maximum increase afforded by the PD Zone. There are a number of unique and "outstanding" amenities provided with this proposed development that meet the intent of this standard:

- Just over half of the 14-acre site will be preserved as open space to minimize impacts to important natural resources, including habitat conservation area, floodplain, mature trees and wetlands. Residents of the development and the public will have access to these natural open spaces via a soft-surface trail system that will travel throughout the site. The trail will connect to a paved pedestrian/bicycle path at the northeast corner of the site near the intersection of Rusk Road and Highway 224.
- The site has been designed to create a sense of permeability between the natural open spaces and the developed portion of the site. Almost half of the attached homes (44 units) will have backyards located directly adjacent to the open space. The backyards of those lots will have low (4-foot height) fencing made of black cyclone material to provide visibility and a sense of openness to the natural area while providing privacy and security for individual home owners.
- The two large water quality facilities (facilities B and C) have been designed and located in order to provide views into the open space areas beyond them. The water quality facilities will be planted with low-lying grasses and will not be fenced, so they will provide a sense of openness for the nearby homes, as well as vehicles and pedestrians traveling north through the site. Connections to the trail system will also be provided at the water quality facilities.
- A community garden will be provided on the site in Tract D for use by residents of the development (see Figure 4). That garden (approximately 3,100 square feet) will include raised planter beds, gravel pathways and a water source. The garden will be fenced and gated for security and will be managed by the future homeowners association.
- Additional trees will be planted where the site abuts Highway 224 in the northeastern corner to provide some additional screening for those lots that are located closest to that property line. If suitable for the species, planted trees will be white oaks in order to mitigate for some of the white oaks that are being removed from the southwest corner of the site (note that mitigation for removal of the white oaks is not required by the City).
- The proposed development will provide 92 units of attached single-family housing. Those rowhouse units will be available for ownership at a price point that is affordable for working people with moderate incomes (referred to as workforce housing). The need for this type of housing at this price point was well-established in the housing needs analysis prepared for the City at the end of 2016. This was further clarified in a memo prepared by Johnson Economics[3] on behalf of the applicant. That memo states (emphasis added):

[3] Johnson Economics also prepared the 2016 Housing Needs Analysis for the City of Milwaukie.

"The proposed development is consistent with the observed trends in the residential market, and is expected to deliver a product that is consistent with identified market demand. ***The subject site is particularly well suited for this type of development,*** *with proximate parks and open space to complement the limited yard space provided in a townhome configuration. We would expect the project to have* ***appeal to a cost-sensitive starter family market****, which will value the local amenity mix as well as proximity to employment and commercial services.*

The development is requesting a Planned Development approval, which would allow for flexibility to deal with the site and natural resources. The site is split zoned, with portions zoned either R-10 or R-3. The R-10 zoning has a minimum lot size of 10,000 square feet, and would yield few units. Even under a duplex scenario, the zoning would require 14,000 square feet per duplex. The R-3 zoning allows for 3,000 square foot lots sizes, but with the level of natural resource on the site, a development would not be able to meet minimum density. ***As zoned, any development on the site would necessarily be at a price point that would not be responsive to the local demand.***

The proposed townhome development would allow for family-oriented units at a price point that meets identified demand, and can provide workforce housing. ***It would help realize and expand the City's housing capacity, increasing housing options for local residents as well as locally-employed households.****"*

See Exhibit K for the full memo. It's important to note the language about price point above because it directly relates to the density increase. Without the proposed 15 percent density increase to 92 lots, this project would not be economically feasible and would not be able to deliver housing at the needed price point. Simply stated, fewer lots means a higher price point.

- The proposed development will be compact, with small individual lots on a connected street system in close proximity to a large public park with convenient access to a major arterial (Highway 224). The development is located less than 2.5 miles from downtown Milwaukie. This type of development is consistent with the housing trends that are anticipated to occur in Milwaukie over the next 20 years, as identified in the 2016 housing analysis. Those trends include the need for more dense and efficient development within the city limits, migration to urban areas, the desire for smaller homes in well-planned and safe communities, and the need for workforce housing.

3. All Planned Unit Developments will have area devoted to open space and/or outdoor recreational areas. At least half of the open space and/or recreational areas will be of the same general character as the area containing dwelling units. Open space and/or recreational areas do not include public or private streets.

Response: As demonstrated previously in this narrative, the proposed PD development will provide at least one-third of the site as open space and at least half of that open space will be usable and of the same general character as the area containing dwellings.

4. All projects in Medium Density and High Density areas will have area devoted to open space and/or outdoor recreational areas. At least half of the open space and/or recreational areas will be of the same general character as the area containing dwelling units. Open space and/or recreational areas do not include public or private streets and parking areas, but may include private yards.

Response: As demonstrated previously in this narrative, the proposed PD development will provide at least one-third of the site as open space and at least half of that open space will be usable for recreation (walking paths) and of the same general character as the area containing dwellings.

5. In all cases, existing tree coverage will be preserved whenever possible, and areas of trees and shrubs will remain connected particularly along natural drainage courses.

Response: As shown on the Tree Protection and Removal Plan (Sheet C101) in Exhibit A, the majority of existing trees on the site will be preserved, particularly the stand of predominately white oak trees at the western edge of the site. The Arborist Report in Exhibit I notes that of the existing 218 trees identified on the site, 61 trees (28 percent of the total) will be removed to accommodate development. Of those 61 trees, approximately a third of them were identified as being in poor condition. Trees located along Mt Scott Creek at the northern end of the site will be preserved and protected during development.

6. Specified trees will be protected during construction, in accordance with conditions attached to building permits.

Response: Trees to remain on the site will be protected in accordance with recommendations in the Arborist Report (Exhibit I) and any conditions attached to building permits.

7. Sites within open space, natural hazard or natural resource areas will be protected according to specifications in the Natural Hazard and Natural Resources Elements.

Response: As demonstrated in the responses above, the proposed development will protect natural resources according to applicable policies and Chapter 19.402 of the Milwaukie code.

Housing Choice Policies

2. The City will encourage the development of larger subdivisions and PUDs that use innovative development techniques for the purpose of reducing housing costs as well as creating an attractive living environment. Such techniques to reduce costs may include providing a variety of housing size, type, and amenities. The City may provide density bonuses, additional building height allowances, or other such incentives for the provision of affordable housing in residential development projects. Overall project density may not exceed the allowable density plus ten (10) percent, which may be added to the Planned Unit Development bonus.

Response: The proposed zone change supports this policy by facilitating development of a Planned Development that will provide a housing type that is not commonly found in Milwaukie. Per the housing needs analysis prepared for the City in 2016, single-family attached housing accounts for only 1.6 percent of total housing units in Milwaukie. This proposed development will help the City achieve a greater variety of housing type and a greater number of units that will be affordable to workers with moderate incomes (workforce housing). The proposed development will create an attractive living environment that includes unified building design, large amounts of open space with recreational opportunities, and fully improved streets with landscape strips and street trees.

RECREATIONAL NEEDS ELEMENT

Private Recreation Policies

3. New residential projects not corresponding to areas of deficient park land as identified in the Parks and Recreation Master Plan will ensure adequate space and/or facilities are provided to meet the recreational needs of residents of the project, especially children. New projects may also be subject to a systems development charge for park and recreation improvements. Standards for private playlots will be established in the Parks and Recreation Master Plan. If playlots are required by the Planning Commission, the allowable density on the remaining lands may be increased, so that overall parcel density remains the same.

Response: The site is located directly adjacent to the North Clackamas Park, which is a 47-acre park that provides a wide variety of park amenities. Additional park dedication is not anticipated as part of this proposal. However, the proposed development does provide a large area of open space (approximately 7 acres) that will

be accessible to the public and residents of the development via a soft-surface trail system that travels throughout the site.

Chapter 5 Transportation, Public Facilities and Energy Conservation

TRANSPORTATION ELEMENT

Response: The transportation element of the Comprehensive Plan is the City's Transportation System Plan (TSP). Consistency with the City's TSP is established in the traffic impact study provided to the City. That study concluded that the proposed zoning map amendment will not result in significant impacts to the surrounding transportation system.

PUBLIC FACILITIES AND SERVICES ELEMENT

Response: Generally, the policies contained in this section are intended to ensure orderly and efficient arrangement of public facilities and services to serve new development. As demonstrated in the Composite Utility Plan (Sheet C400) in Exhibit A and the Drainage Report in Exhibit E, public utilities are available and adequate to serve the site. The proposed development will extend those public utilities to serve new homes constructed on the site. Stormwater management will occur on the site, consistent with City regulations. Specifically:

- Water – The site is within the Clackamas River Water (CRW) district and will connect to an existing CRW water main located in SE Kellogg Creek Drive. The applicant will construct new water lines within the right-of-way of new public streets on the site to serve the proposed residential units. Proposed utilities are shown on the Composite Utility Plan (Sheet C400) in Exhibit A.
- Sewer – There is a Clackamas County wastewater main located along the western and northern property lines of the site and is available to serve the proposed development. The applicant will construct an 8-inch PVC sewer line within the right-of-way of new public streets on the site and will connect this line to the existing sewer main north of the site. Proposed utilities are shown on the Composite Utility Plan (Sheet C400) in Exhibit A.
- Stormwater – The applicant has submitted a preliminary stormwater report prepared by a qualified professional engineer as part of this application (see Exhibit E). The report explains how stormwater runoff will be managed on the site and demonstrates that post-development runoff will not exceed pre-development runoff. The report also demonstrates consistency with the City's water quality standards.

ENERGY CONSERVATION ELEMENT

Response: The policies in this section encourage energy efficiency through the use of land use patterns and transportation systems. This proposal supports these policies by providing a dense residential community in close proximity to a large employment corridors located directly across Highway 224 and along I-205.

IV. CONCLUSIONS

As established in the discussion and responses provided in this narrative, the proposed Planned Development and associated zone change and variances are consistent with City standards and criteria. Approval of this application will facilitate development of a project that will preserve and protect natural resources, contribute to the overall variety of housing types and development patterns in Milwaukie, and provide a needed housing type in close proximity to a large employment center.

ATTACHMENT 3a.2

KELLOGG CREEK
Milwaukie, Oregon

A Land Use Application for:

Minor Modification to Community Service Use
Subdivision Preliminary Plat
Transportation Facilities Review
Natural Resources Review

Revised and Submitted:
April 2017

Applicant:
Brownstone Development, Inc.
47 South State Street
Lake Oswego, OR 97934

Prepared by:
DOWL
720 SW Washington Street, Suite 750
Portland, Oregon 97205
(971) 280-8641

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TABLE OF CONTENTS

EXHIBITS

I. PROJECT TEAM

Applicant	**Brownstone Development, Inc.** 47 South State Street PO Box 2375 Lake Oswego, OR 97934 Contact: Randy Myers 503.358.4460 randy@brownstonehomes.net
Property Owner	**Turning Point Church** 13333 Rusk Road Milwaukie, OR 97222 Contact: Pastor Bob Mihuc 503.305.8704 bob@turningpointcares.org
Planning/Civil Engineering	**DOWL** 720 SW Washington Street, Suite 750 Portland, OR 97221 Contact: Serah Breakstone, AICP 503.280.8661 sbreakstone@dowl.com
Traffic Engineering	**Kittelson & Associates, Inc.** 610 SW Alder Street, Suite 700 Portland, OR 97205 Contact: Chris Brehmer, PE 503.535.7433 cbrehmer@kittelson.com
Natural Resources	**Pacific Habitat Services** 9450 SW Commerce Circle, Suite 180 Wilsonville, OR 97070 Contact: John van Staveren 503.570.0800 jvs@pacifichabitat.com
Arborist	**Morgan Holen & Associates** 3 Monroe Parkway, Suite P220 Lake Oswego, Oregon 97035 Contact: Morgan Holen 971.409.9354 morgan.holen@comcast.net

II. INTRODUCTION

Summary of Proposal

Brownstone Development (the applicant) is proposing a new residential subdivision located at 13333 Rusk Road in the City of Milwaukie (see Figure 1, Vicinity Map). The development site is approximately 13.8 acres and will consist of 92 new lots intended for single-family attached (rowhouse) dwelling units and associated public streets. The attached homes will be in groupings of four units and will be accessed from rear alleys or front-facing driveways. The development will also include new public local streets, private alleys and a soft-surface pedestrian trail to provide connectivity throughout the site. Open spaces and natural areas will surround the homes and connect to the adjacent North Clackamas Park west of the site.

The subject property currently consists of four tax lots all owned by the Turning Point Church, which is located at the corner of Rusk Road and Kellogg Creek Drive. A property line adjustment application has been submitted to the City of Milwaukie in order to consolidate and reconfigure the four tax lots into two lots. One lot (13.8 acres) will be the development site and the other lot (3.7 acres) will be established for the church. The Turning Point Church and its associated parking areas will remain. See the Preliminary Lot Line Adjustment, Sheet C200 in the Exhibit A Plan Set.

Access to the development site will be taken from two points along SE Kellogg Creek Drive, as shown on the Preliminary Plat, Sheet C201 in Exhibit A. In order to ensure the Turning Point Church continues to have safe ingress and egress, a connection between the two sites will be provided to allow church visitors to exit through the development site onto Kellogg Creek Drive (exit from the church site onto Rusk Road is not permitted; that access is entrance only).

Zoning & Land Uses

The subject site currently has split zoning, with the western portion of the site zoned R-3 and the eastern portion of the site zoned R-10. See Figure 2 and the Existing Conditions Plan (Sheet C100) in Exhibit A. The table below describes the uses and zoning on properties surrounding the subject site.

Table 1: Surrounding Uses

Area	Zoning	Land Uses
North	R-10	Single-family residences, Highway 224 right-of-way
East	R-10	Turning Point Church, SE Rusk Road, and single-family residences
South	R-10	SE Kellogg Creek Road, single-family residences, Deerfield Village Assisted Living Center
West	R-10	The Milwaukie Center, North Clackamas Park

Figure 1: Vicinity Map

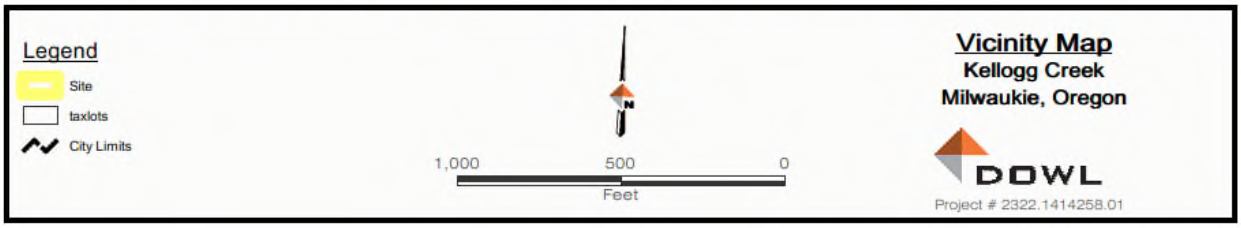
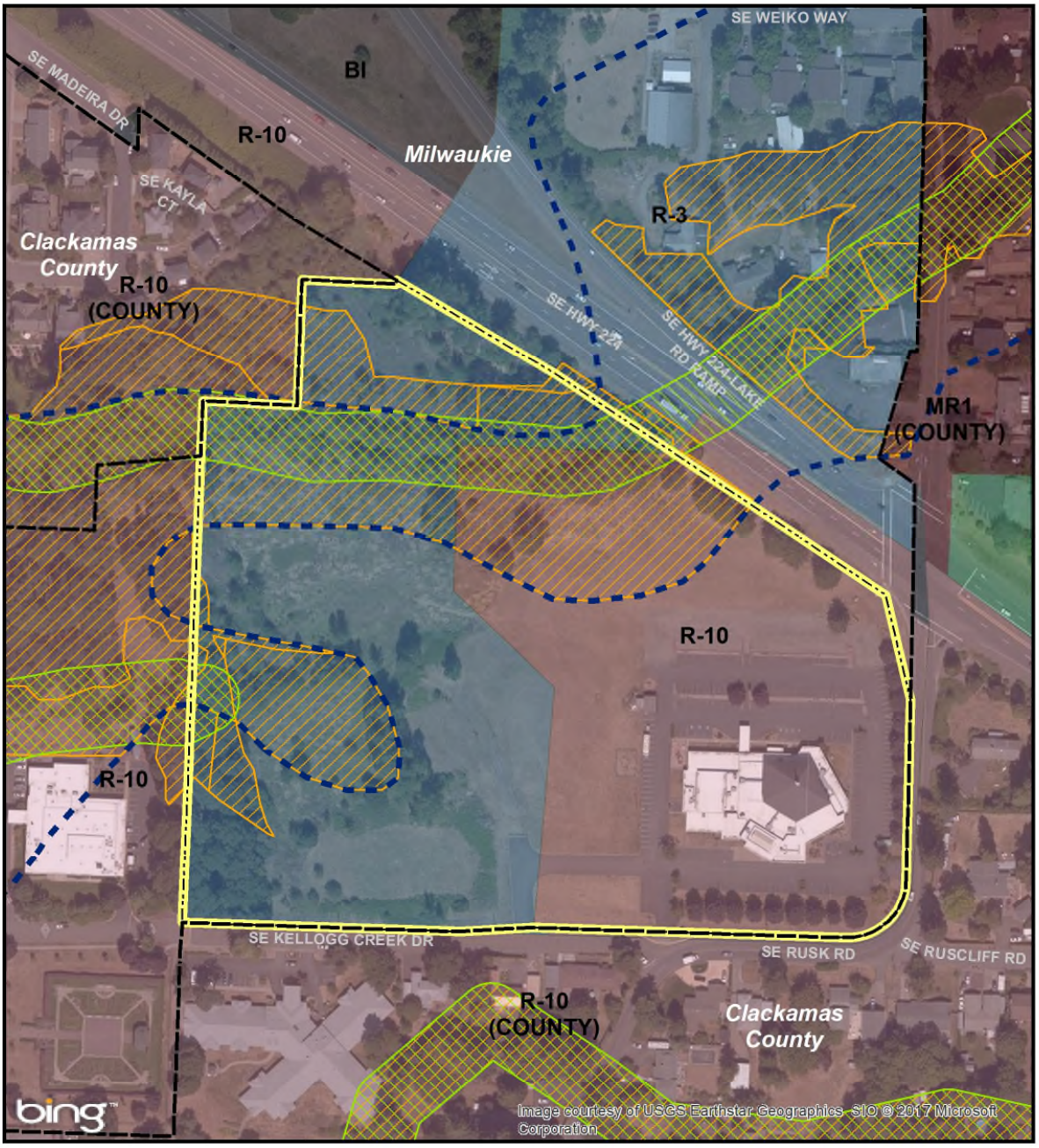
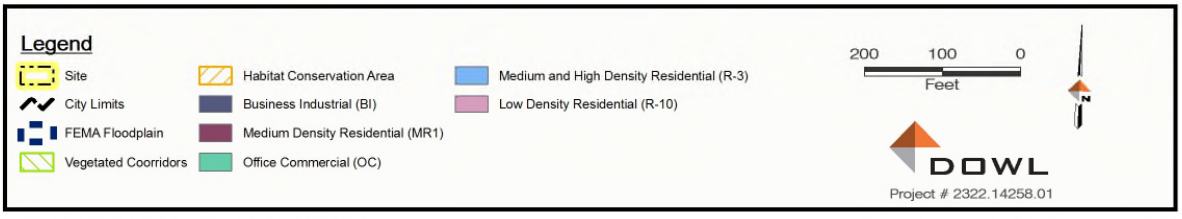


Figure 2: Natural Resources & Zoning





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Planned Development

In order to maximize development potential on the site, preserve natural resources and provide needed housing for Milwaukie, the applicant is proposing to develop this site using the city's Planned Development process. The Planned Development process allows for greater flexibility in design and use of a site to encourage a mix of housing types and creation of a unique environment that would not be possible under strict application of the Zoning Code. The Planned Development process has several steps, including a zone change and a final development plan. To clarify the Planned Development review process and how it relates to the other applications needed for this project, the project team met with Milwaukie Planning staff in August 2016 for a pre-application conference, and again in September 2016 for a follow-up discussion. After the September meeting, city staff drafted a memo presenting two possible options for a review process – standard and streamlined. See Exhibits B and C for a copy of the pre-application notes and the September memo.

The applicant has chosen to utilize the streamlined review process, as outlined in the September memo. As such, two application packages are being submitted concurrently:

1. Zone Change and Preliminary Development Plan Package – Type IV review
2. Subdivision and related applications – Type III review

As noted below, this narrative is part of the Type III application package and addresses standards and requirements for a subdivision preliminary plat and related sections of the Zoning Code.

Natural Resources

The site contains approximately 4.5 acres of designated floodplain area, which is regulated by Chapter 18.04 of the Milwaukie Municipal Code. The site also contains approximately 5.6 acres of designated Habitat Conservation Area (HCA). See Figure 2 Natural Resource Areas. HCA lands are natural resources that have been identified by the City for protection and are regulated under Chapter 19.402 of the Milwaukie Zoning Code. Impacts to floodplain and HCA are permitted by the City if certain conditions can be met and mitigation of those impacts is provided. While the bulk of existing natural resources on the subject site will be preserved, some impacts will be necessary to accommodate the proposed development. This application provides information about those impacts and how they will be mitigated in accordance with City regulations.

Wetlands

Wetlands have been identified on the site and delineated by Pacific Habitat Services. See Exhibit D for the Wetland Delineation Report. Impacts to the wetlands will occur in order to accommodate development on the site. Those impacts require a joint permit from Department of State Lands (DSL) and the US Army Corps of Engineers (US Corps). A joint permit application for wetland impacts will be submitted as required.

Modifications to the Church Property

As noted previously, a property line adjustment request has been submitted to the City to establish a separate tax lot for the existing church and associated parking areas. As part of the proposed subdivision development, minor changes to the church property will occur, including:

- The church entrance from Rusk Road will be reconfigured to enforce that it is for entry only; exit onto Rusk Road from that access point is not permitted due to sight distance issues.
- Some parking spaces along the western edge of the church property will be removed in order to create an access between the church site and the proposed subdivision site. This access will provide a new, safe exit point for the church onto Kellogg Creek Drive. Additional parking spaces will be removed just south of the new access point to create a service and emergency-only access from the alley on the subdivision

site. This access will be gated and will only be accessible for emergency fire and garbage service activities.

Because the church use is an approved Community Service Use (CSU) per Milwaukie's code (Section 19.904), a minor modification to the CSU approval is required by the City.

Request

As part of the overall Planned Development project, this application package contains the following requests for approvals from the City of Milwaukie:

- Type I Minor Modification to a CSU
- Type III Preliminary Plat Subdivision
- Type III Natural Resources Review
- Type II Transportation Facilities Review

The applicant has submitted this application, narrative, and plans in order to demonstrate how this proposal complies with the standards set forth the in the City of Milwaukie's Municipal Code. All applicable standards have been addressed and all required submittal materials have been provided.

The applicant is also submitting a separate application package for Planned Development and Zone Change approvals. The two application packages are related and are intended to be reviewed concurrently by the city.

III. COMPLIANCE WITH CITY OF MILWAUKIE DEVELOPMENT CODE

Section II of this narrative contains sections of the Milwaukie Municipal Code along with responses to demonstrate how the proposed project meets the applicable standards and requirements. Sections of the code that are not applicable are generally not included here unless necessary for context.

Title 17 Land Division

17.12.040 APPROVAL CRITERIA FOR PRELIMINARY PLAT

A. Approval Criteria

The approval authority may approve, approve with conditions, or deny a preliminary plat based on the following approval criteria:

1. The proposed preliminary plat complies with Title 19 of this code and other applicable ordinances, regulations, and design standards.

Response: This narrative provides responses to applicable sections of the Milwaukie Municipal Code to demonstrate how the proposal is consistent with City regulations and design standards.

2. The proposed division will allow reasonable development and will not create the need for a variance of any land division or zoning standard.

Response: The proposed subdivision will allow the applicant reasonable development opportunities on the site and will not create the need for a variance (outside of the concurrent Planned Development request).

3. The proposed subdivision plat name is not duplicative and the plat otherwise satisfies the provisions of ORS 92.090(1).

Response: The proposed subdivision name is Kellogg Creek and is not duplicative. The plat satisfies provisions of ORS 92.090(1), which establishes rules for subdivision plat names and numbering.

4. The streets and roads are laid out so as to conform to the plats of subdivisions already approved for adjoining property as to width, general direction, and in all other respects unless the City determines it is in the public interest to modify the street or road pattern.

Response: There are no previously approved subdivisions on adjoining lots. Therefore, this standard is not applicable.

5. A detailed narrative description demonstrating how the proposal conforms to all applicable code sections and design standards.

Response: This narrative provides a detailed description that demonstrates how the proposed subdivision conforms to applicable code sections and design standards.

B. Conditions of Approval

The approval authority may attach such conditions as are necessary to carry out the applicable ordinances and regulations and may require access control strips be granted to the City for the purpose of controlling access to adjoining undeveloped properties. (Ord. 1965 §§ 6, 7, 2006; Ord. 1907 (Attach. 1), 2002)

Response: The applicant understands that the approval authority may attach conditions of approval as deemed necessary.

17.16.060 PRELIMINARY PLAT FOR PARTITION AND SUBDIVISION

The following shall accompany applications for partition:

A. Completed application form signed by all owners of property included in the proposal;

B. Application fee as adopted by the City Council;

C. Completed and signed "submission requirements" and "partition checklist" or "subdivision checklist" forms as appropriate;

D. All information specified on the "submission requirements" and "partition checklist" or "subdivision checklist" forms as appropriate;

E. Requirements and information specified in Chapter 17.20; and

F. Any additional information as may be needed to demonstrate compliance with approval criteria.

Response: The above items have been provided as part of this application package.

CHAPTER 17.20 PRELIMINARY PLAT

17.20.030 GENERAL INFORMATION TO BE SHOWN ON THE PRELIMINARY PLAT

A. Preliminary plats shall be prepared by an Oregon registered land surveyor.

Response: The Preliminary Plat, Sheet C201 in Exhibit A was prepared by an Oregon registered engineer with DOWL, the applicant's representative.

B. The following general information shall be submitted with the preliminary plat:

1. Proposed name of the subdivision/partition. The name shall not duplicate nor resemble the name of another subdivision in the county. Subdivision names shall be approved by the County Surveyor in accordance with ORS Chapter 92;

2. Date, north point, and scale of drawing;

3. Appropriate identification clearly stating the map is a preliminary plat;

4. Location by section, township, and range; and a legal description sufficient to define the location and boundaries of the area to be divided;

5. Names and addresses of the owner, subdivider, and engineer or surveyor;

6. Acreage;

7. Structures and yard setbacks;

8. The location, width, and purpose of easements;

9. The location, approximate dimensions, and area of all lots;

10. Lot and block numbers; and

11. Other information as maybe specified on application forms and checklists prescribed by the Planning Director.

Response: The Preliminary Plat, Sheet C201 in Exhibit A, includes the above items.

C. Vicinity map shall be drawn at an appropriate scale, showing all existing subdivisions, streets, and unsubdivided land between the proposed subdivision and the nearest existing arterial or collector streets, and

showing how proposed streets may be extended to connect with existing streets. At a minimum, the vicinity map shall depict future street connections for land within 400 feet of the subject property.

Response: The Vicinity Map is provided in Figure 1 above.

17.20.040 BUILDING LINES PROHIBITED

Platted building lines are prohibited. The effect of building lines may be executed through recordation of instruments, which shall be referenced on the recorded plat.

Response: No building lines have been platted.

17.20.050 EXISTING CONDITIONS

The following shall be shown on the preliminary plat:

A. Location, width, and names of all existing or platted streets within or adjacent to the tract, together with easements, railroad right-of-way, and other important features, such as section lines and corners, City boundary lines, and monuments.

B. Contour lines related to an established benchmark or other datum approved by the Engineering Director, with intervals at a minimum of 2 feet for slopes up to 10% and 5 feet for slopes over 10%.

C. Location within the area to be divided, and in the adjoining streets and property, of existing sewers, water mains, culverts, storm drain system, and electric conduits or lines proposed to service the property to be subdivided, and invert elevations of sewer manholes, drain pipes, and culverts.

D. Zoning and existing uses within the tract and 200 feet on all sides, including the location and use of all existing structures indicating those that will remain and those to be removed.

E. Approximate location of areas subject to inundation or stormwater overflow with approximate high-water elevation. Location, width, direction, and flow of all watercourses on or abutting the tract including wetlands and watercourses as shown on City-adopted natural resource and Title 3 maps.

F. Natural features such as rock outcroppings, drainages whether seasonal or perennial, wooded areas, and isolated trees, including type and caliper.

G. Floodway and floodplain boundary.

H. Areas containing slopes of 25% or greater.

Response: The Existing Conditions Plan, Sheet C100 in Exhibit A, includes all of the above required items.

17.20.060 PROPOSED CONDITIONS

A. 12 copies of a preliminary plat shall be submitted to the Planning Director. The plat shall include the following information:

1. Date, north point, scale, address, assessor reference number, and legal description;

2. Name and address of the record owner or owners and of the person who prepared the site plan;

3. Approximate acreage and square feet under a single ownership, or if more than 1 ownership is involved, the total contiguous acreage of all landowners directly involved in the partition;

4. For land adjacent to and within the area to be divided, the locations, names, and existing widths of all streets, driveways, public safety accesses, easements, and rights-of-way; location, width, and purpose of all other existing easements; and location and size of sewer and waterlines, drainage ways, power poles, and other utilities;

5. Location of existing structures, identifying those to remain in place and those to be removed;

6. Lot design and layout, showing proposed setbacks, landscaping, buffers, driveways, lot sizes, and relationship to existing or proposed streets and utility easements;

7. Existing development and natural features for the site and adjacent properties, including those properties within 100 feet of the proposal, showing buildings, mature trees, topography, and other structures;

8. Elevation and location of flood hazard boundaries;

9. The location, width, name, and approximate centerline grade and curve radii of all streets; the relationship of all streets to any projected streets planned by the City; whether roads will continue beyond the plat; and existing and proposed grade profiles. No street name may be used which will duplicate or be confused with the name of an existing street, except for extensions of existing streets. Street names and numbers shall conform to the established pattern in the surrounding area.

Response: The plan set in Exhibit A and Figures 1 and 2 in this narrative include all of the above items.

B. A conceptual plan shall be provided for complete subdivision or partitioning of the property, as well as any adjacent vacant or underutilized properties, so that access issues may be addressed in a comprehensive manner. The concept plan shall include documentation that all options for access have been investigated including shared driveways, pedestrian accessways, and new street development.

Response: The Preliminary Plat provided in Exhibit A shows the conceptual plan for subdivision of the subject site. Areas on the site to remain un-divided are within the floodplain and HCA and contain wetlands; future subdivision of that portion of the site is not anticipated. The Preliminary Plat also shows proposed access to the site, including a new exit point for church visitors (the church site is not permitted to exit onto Rusk Road).

C. A detailed narrative description demonstrating how the proposal meets all applicable provisions of this title, Title 19, and City design standards, including the Public Works Standards.

Response: This narrative provides responses that demonstrate how the proposal complies with applicable City standards.

D. Plans and drawings as necessary to demonstrate compliance with all applicable provisions of chapters of this title, Title 19, and City design standards, including the Public Works Standards.

Response: Plans and drawings are provided in Exhibit A.

E. A drainage summary report and plan prepared in accordance with the applicable Public Works Standards.

Response: A Preliminary Drainage Report is provided in Exhibit E.

F. Proposed deed restrictions, if any, in outline form.

Response: The applicant is not proposing any deed restrictions.

G. Improvements to be made by the developer and the approximate time such improvements are to be completed. Sufficient detail regarding proposed improvements shall be submitted so that they may be checked for compliance with the objectives of this title, State law, and other applicable City ordinances. If the nature of the improvements is such that it is impractical to prepare all necessary details prior to approval of the preliminary plat, the additional details shall be submitted with the request for final plat approval.

Response: The plan set provided in Exhibit A provides detail about proposed improvements , including grading, streets, landscaping, utilities, and frontage improvements. All of these improvements will be completed prior to

occupancy of the proposed homes. Additional details requested by the City will be provided as part of the final plat application.

CHAPTER 17.28 DESIGN STANDARDS

17.28.020 PUBLIC FACILITY IMPROVEMENTS

All land divisions and boundary changes that increase the number of lots shall be subject to the requirements and standards contained in Chapter 19.700 Public Facility Improvements and the Public Works Standards for improvements to streets, sidewalks, bicycle facilities, transit facilities, and public utilities.

Response: Applicable requirements from Chapter 19.700 are addressed later in this narrative.

17.28.030 EASEMENTS

A. Utility Lines

Easements for sewers, water mains, electric lines, or other public utilities shall be dedicated wherever necessary. The easements shall be provided in accordance with applicable design standards in the Public Works Standards.

Response: Easements for sewers, water mains, electric lines and other public utilities will be dedicated where necessary and in accordance with applicable standards.

B. Watercourses

If a subdivision is traversed by a watercourse such as a drainageway, channel, or stream, there shall be provided a stormwater easement or drainage right-of-way conforming substantially with the lines of the watercourse, and such further width as will be adequate for the purpose of construction and maintenance. Streets, parkways, bicycle ways, or pedestrian ways parallel to major watercourses may be required.

Response: Mount Scott Creek runs along the northern edge of the subject site, north of the proposed development area. A 60-foot public drainage easement already exists along the creek, and a 20-foot public sanitary easement exists along the southern edge of the creek. See the Preliminary Plat, Sheet C201 in Exhibit A, for details.

17.28.040 GENERAL LOT DESIGN

This section does not apply to units of land that are created for purposes other than land development including parks, natural areas, right-of-way dedications, or reservations of a similar nature. Lots and tracts created for cottage cluster housing development, per Subsection 19.505.4, are also exempt from the requirements of this section.

A. Size and Shape

Lot size, width, shape, and orientation shall be appropriate for the location and the type of use contemplated. Minimum lot standards shall conform to Title 19.

Response: Single-family attached dwelling units are appropriate on the site given its size, width, shape and orientation of the lots, as well as the presence of a significant amount of natural resources. Lots in the proposed subdivision are compact in order to maximize building potential while protecting natural resources to the greatest extent possible. Proposed lot sizes are smaller than the minimum lot size standards in the underlying base zones (R-3 and R-10). However, the Planned Development process allows for flexibility to alter lot sizes and other dimensional standards as needed to design the site. Approval of the Planned Development proposal will include approval of smaller lot sizes.

B. Rectilinear Lots Required

Lot shape shall be rectilinear, except where not practicable due to location along a street radius, or existing lot shape. The sidelines of lots, as far as practicable, shall run at right angles to the street upon which the lots face. As far as practicable, the rear lot line shall run parallel to the street.

Response: As shown on the Preliminary Plat in Exhibit A, all proposed lots are rectilinear in shape.

C. Limits on Compound Lot Line Segments

Changes in direction along side and rear lot lines shall be avoided. Cumulative lateral changes in direction of a side or rear lot line exceeding 10% of the distance between opposing lot corners along a given lot line is prohibited. Changes in direction shall be measured from a straight line drawn between opposing lot corners.

Response: As shown on the Preliminary Plat in Exhibit A, lots 88 – 92 located at the end of the proposed cul-de-sac have slight changes in direction along their side lot lines. None of those lateral changes exceed the 10 percent limit as measured per the standard above.

D. Adjustments to Lot Shape Standard

Lot shape standards may be adjusted subject to Section 19.911 Variances.

Response: No adjustment to the lot shape standards is being requested.

E. Limits on Double and Reversed Frontage Lots

Double frontage and reversed frontage lots should be avoided, except where essential to provide separations of residential development from railroads, traffic arteries, or adjacent nonresidential uses, or to overcome specific disadvantages of topography and orientation.

Response: As shown on the Preliminary Plat in Exhibit A, no double frontage or reverse frontage lots are proposed as part of this subdivision.

17.28.080 PUBLIC OPEN SPACES

A. Due consideration shall be given to the allocation of suitable areas for schools, parks, and playgrounds to be dedicated for public use.

Response: The applicant does not anticipate dedicating land for public schools, parks or playgrounds as part of this subdivision development.

B. Where a proposed park, playground or other public use shown in the Comprehensive Plan or master plan adopted by the City is located in whole or in part in a subdivision, the Planning Commission may require the dedication or reservation of such area within the subdivision.

Response: There are no proposed parks, playgrounds or other public uses located in whole or in part on the subject site shown in the Comprehensive Plan or other city master plans.

C. Where considered desirable by the Planning Commission, and where the Comprehensive Plan or adopted master plan of the City does not indicate proposed public use area, the Planning Commission may require the dedication or reservation of areas or sites of a character, extent, and location suitable for the development of parks and other public use.

D. If the applicant is required to reserve land area for park, playground, or other public use, such land shall be acquired by the appropriate public agency within 18 months following plat approval, at a price agreed upon prior to approval of the plat, or such reservation shall be released to the applicant.

Response: The applicant understands that the Planning Commission may require dedication or reservation of areas suitable for parks or other public uses. Applicant further understands that any such land will be acquired by the public agency at an agreed upon price.

E. New residential projects will require the dedication of land if the development corresponds to park locations defined in the parks and recreation master plan.

F. In exchange for the dedication of parkland, the allowable density on the remaining lands will be increased, so that the overall parcel density remains the same.

Response: There is not a parks and recreation master plan that includes the proposed subdivision site.

Title 19 Zoning

Section 19.300 Base Zones

*19.301 LOW DENSITY RESIDENTIAL ZONES**

19.301.2 Allowed Uses in Low Density Residential Zones

Response: A portion of the subject site is zoned R-10, which is a low density residential zone. The R-10 does not typically allow rowhouse development, per Table 19.301.2. However, the applicant has submitted a concurrent Planned Development application to apply the PD Zone in combination with the R-10 zone. The PD zone allows "combinations of types of dwellings and other structures and uses" as authorized by the City Council through the PD review process. Approval of the PD zone will allow rowhouse development to occur on the R-10 zoning.

19.301.4 Development Standards

In the low density residential zones, the development standards in Table 19.301.4 apply. Notes and/or cross references to other applicable code sections are listed in the "Standards/Additional Provisions" column. Additional standards are provided in Subsection 19.301.5.

See Sections 19.201 Definitions and 19.202 Measurements for specific descriptions of standards and measurements listed in the table.

Standard	***R-10***	***Response***
Minimum lot size	*10,000 SF*	Proposed lot sizes range from 1,600 SF to 2,452 SF. Using Planned Development provisions - see response below.
Minimum lot width	*70 feet*	Proposed lot widths range from 18 to 31 feet. Using Planned Development provisions - see response below.
Minimum lot depth	*100 feet*	Proposed lot depths range from 80 to 91 feet. Using Planned Development provisions - see response below.
Minimum street frontage	*35 feet*	Proposed street frontages typically range from 20 to 25 feet. Some corner lots have reduced street frontages. Using Planned Development provisions - see response below.
Minimum front yard	*20 feet*	Front loaded lots, front yard = 18 feet Alley loaded lots, front yard = Varies, 10 to 14 feet Using Planned Development provisions - see response below.
Minimum side yard	*10 feet*	Proposed side yard, common wall = 0 feet Proposed side yard, no common wall = 5 feet Using Planned Development provisions - see response below.
Minimum street side yard	*20 feet*	Street side yard = Varies, 5 to 7 feet Using Planned Development provisions - see response below.
Minimum rear yard	*20 feet*	Front loaded lots, rear yard = 15 feet Alley loaded lots, rear yard = 18 feet Using Planned Development provisions - see response below.

Maximum bldg. height	*2.5 stories or 35 feet*	Standard met. As shown on the building elevations provided in Exhibit A, the proposed rowhouses will be two stories and below the maximum building height of 35 feet.
Side yard height plane limit: *Height above ground* *Slope of plane*	 *20 feet* *45 degrees*	Standard will be met on those side yards that do not share a common wall. Using Planned Development provisions - see response below.
Maximum lot coverage	*30 percent*	Proposed lot coverages range from 46 to 59 percent. Using Planned Development provisions - see response below.
Minimum vegetation	*35 percent*	Using Planned Development provisions - see response below.
Minimum density	*3.5 units/acre*	Using Planned Development provisions - see response below.
Maximum density	*4.4 units/acre*	

Response: As noted previously, the applicant is proposing to use the City's Planned Development provisions in Section 19.311. Those provisions allow variation to the development standards as appropriate to be consistent with the purpose of the Planned Development Zone. The purpose of the Planned Development Zone is to encourage flexibility in site design to provide a mix of housing types, variety in development patterns, and preserve natural resources. More discussion regarding how the proposed subdivision meets the intent of the Planned Development Zone is provided in the separate Zone Change and Planned Development application package submitted concurrently with this application package.

As noted in the above table, most of the development standards have been adjusted in order to design the subdivision with small lots for an attached housing type (rowhouses). Due to the small size of lots and the specific housing type planned for this development, dimensional standards such as lot sizes, setbacks, lot coverage and minimum vegetation have all been adjusted accordingly. Approval of the Planned Development will include approval of those adjustments.

Minimum and maximum densities were calculated consistent with the density calculation provisions in MMC Section 19.202.4.

Minimum Density: Table 2 below shows how minimum density was calculated for the site.

Table 2: Net Area and Minimum Density Calculations

Zoning	Gross Acres	FEMA Mapped Floodway	Right-of-way	Additional Open Space[1]	Net Acres[2]	Minimum Density
R-3	9.58	1.20	1.36	1.99	5.03	58 units
R-10	4.44	0.50	0.87	0.98	2.09	7 units
Totals	**14.02**	**1.70**	**2.23**	**2.97**	**7.12**	**66 units**

1. Required open space is one-third of the gross acreage (per PD provisions in 19.311.3.E). The above calculations assume a portion of the open space overlaps with floodway. Additional open space needed to achieve one-third of the gross is indicated here.
2. Net acres = gross acres – (floodway + right-of-way + open space)
3. Minimum density is based on 11.6 units per acre for R-3 and 3.5 units per acre for R-10

Maximum Density: The allowable maximum density was calculated for each zone (R-3 and R-10) separately and then combined to determine allowable density for the entire site. Per the City's pre-application notes, "the development may effectively blend the densities for the two zones by distributing structures across the site regardless of the specific zoning boundary." Table 3 shows the detailed maximum density calculations. See Figure 3 for a map of areas used for the maximum density calculations.

Table 3A: Net Acres Calculation for Maximum Density

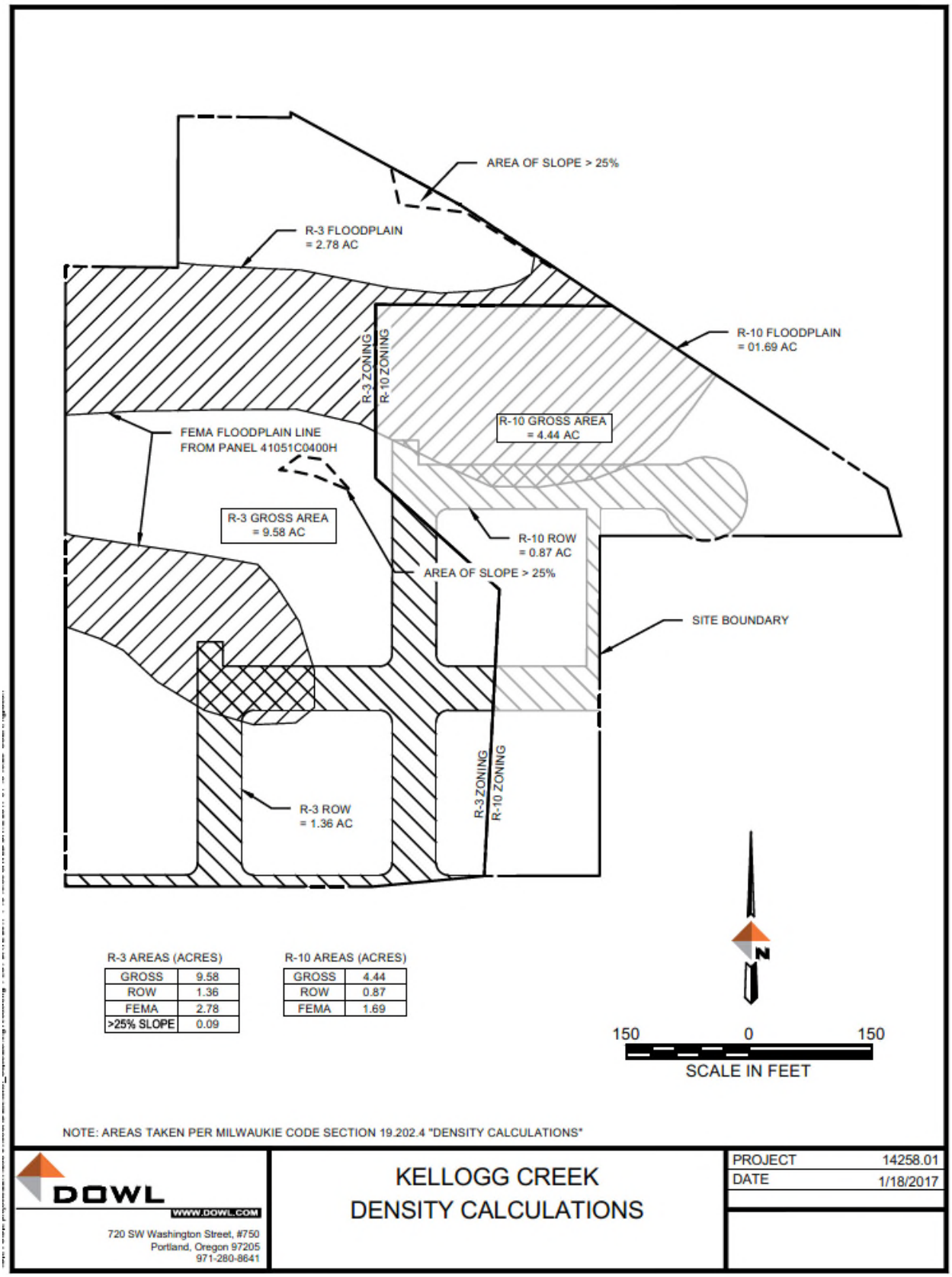
Zoning	Gross Acres	FEMA Mapped Floodplain	Right-of-way	Additional Open Space[1]	Slopes > 25%	Net Acres[2]
R-3	9.58	2.78	1.36	0.41	0.09	4.94
R-10	4.44	1.69	0.87	0	0	1.88
Totals	**14.02**	**4.47**	**2.23**	**0.41**	**0.09**	**6.82**

Table 3B: Maximum Density Calculation

Zoning	Net Acres[2]	Maximum Density (du/net acre)	Maximum Number of Units Allowed (without PD)	PD Increase (20%)[3]	Maximum Number of Units with Rounding (per MMC 19.202.4)
R-3	4.94	14.5	71.58	85.90	86
R-10	1.88	4.4	8.27	9.92	10
Totals	**6.82**	**-**	**79.85 (80 with rounding)**	**-**	**96**

1. Required open space is one-third of the gross acreage (per PD provisions in 19.311.3.E). The above calculations assume a portion of the open space overlaps with floodplain. Additional open space needed to achieve one-third of the gross is indicated here.
2. Net acres = gross acres – (floodplain + right-of-way + open space)
3. Per Section 19.311.3.C, a density increase of up to 20% is allowed in the PD Zone.

Figure 3: Density Calculation Areas



Utilizing the 20 percent density increase allowed by the Planned Development Zone, the maximum allowable number of units on the site is 96 dwellings. The proposed development has 92 units, which represents an approximately 15 percent increase from the base zone standard.

It's important to note that slopes in excess of 25 percent are required to be deducted from the gross acreage when calculating maximum density. As shown on the Existing Conditions (Sheet C100) in Exhibit A, there are several areas on the site with steep slopes. However, the larger elongated area of steep slopes near the center of the site is an area that was created by man-made fill deposited on the site over ten years ago. The geotechnical report prepared by Geo Consultants Northwest on October 7, 2016 (Exhibit F) includes the following information regarding this fill:

- The fill ranges in thickness up to 12 feet thick.
- The ten-foot-tall fill zone in the central portion of the site terminates at its western edge with a steep, constructed slope.
- The fill is man-made material (concrete and asphalt) from a nearby construction project that was likely placed on the site prior to 1995.
- As part of site preparation, man-made fill should be removed from the site.

Because this area of steep slopes is not a naturally occurring condition and will be removed as part of site preparation, it was not deducted from the gross acreage for the purpose of calculating density. Other areas of steep slopes that appear to be naturally occurring were deducted, as shown in Table 3A above.

19.301.5 Additional Development Standards

A. Side Yards

In the R-7 Zone, one side yard shall be at least 5 ft and one side yard shall be at least 10 ft, except on a corner lot the street side yard shall be 20 ft.

Response: Not applicable. The R-7 zoning does not apply to the subject site.

B. Lot Coverage

The lot coverage standards in Subsection 19.301.4.B.4 are modified for specific uses and lot sizes as described below. The reductions and increases are combined for properties that are described by more than one of the situations below.

1. Decreased Lot Coverage for Large Lots

The maximum lot coverage percentage in Subsection 19.301.4.B.4 is reduced by 10 percentage points for a single-family detached dwelling, duplex, or residential home on a lot that is more than 2.5 times larger than the minimum lot size in Subsection 19.301.4.A.1.

Response: Not applicable. This proposal does not include large lots.

2. Increased Lot Coverage for Single-Family Detached Dwellings

Response: Not applicable. This proposal does not include detached single-family dwelling units.

3. Increased Lot Coverage for Duplexes

The maximum lot coverage percentage in Subsection 19.301.4.B.4 is increased by 20 percentage points for a duplex.

Response: Not applicable. This proposal does not include duplexes.

4. Increased Lot Coverage for Detached Accessory Dwelling Units

The maximum lot coverage percentage in Subsection 19.301.4.B.4 is increased by 5 percentage points for the development of a new detached accessory dwelling unit. This allowance applies only to the detached accessory structure and does not allow for the primary structure or other accessory structures to exceed lot coverage standards.

Response: Not applicable. This proposal does not include detached accessory dwelling units.

C. Front Yard Minimum Vegetation

At least 40% of the front yard shall be vegetated. The front yard vegetation area required by this subsection counts toward the minimum required vegetation for the lot. A property may provide less than the 40% of the front yard vegetation requirement if it is necessary to provide a turnaround area so that vehicles can enter a collector or arterial street in a forward motion.

Response: As noted previously, this development is proposing to use the Planned Development provisions in Chapter 19.311, which allows flexibility to adjust development standards. The proposed development consists of small lots with an attached housing type; as such, front yards are relatively small. Those areas of front yards that are not used for driveways and sidewalks will be vegetated.

D. Residential Densities

The minimum and maximum development densities in Subsection 19.301.4.C.1 are applicable for land divisions and replats that change the number of lots.

If a proposal for a replat or land division is not able to meet the minimum density requirement—due to the dimensional requirements for lot width, lot depth, or lot frontage—the minimum density requirement shall instead be equal to the maximum number of lots that can be obtained from the site given its dimensional constraints. The inability of new lot lines to meet required yard dimensions from existing structures shall not be considered as a basis for automatically lowering the minimum density requirement.

Response: Required density is addressed in Table 2 above. The minimum density for the site will be met.

E. Accessory Structure Standards

Standards specific to accessory structures are contained in Section 19.502.

Response: Not applicable. No accessory structures are proposed as part of this application.

F. Number of Dwelling Structures

In the low density residential zones, 1 primary building designed for dwelling purposes shall be permitted per lot. See Subsection 19.504.4.

Response: As shown on the Preliminary Plat in Exhibit A, each lot in the proposed subdivision will have one primary building designed for dwelling purposes.

G. Off-Street Parking and Loading

Off-street parking and loading is required as specified in Chapter 19.600.

Response: Applicable standards from Section 19.600 are addressed later in this narrative.

H. Public Facility Improvements

Transportation requirements and public facility improvements are required as specified in Chapter 19.700.

Response: Applicable standards from Section 19.700 are addressed later in this narrative.

I. Additional Standards

Depending upon the type of use and development proposed, the following sections of Chapter 19.500 Supplementary Development Regulations may apply. These sections are referenced for convenience, and do not limit or determine the applicability of other sections within the Milwaukie Municipal Code.

1. *Subsection 19.504.4 Buildings on the Same Lot*
2. *Subsection 19.504.8 Flag Lot Design and Development Standards*
3. *Subsection 19.505.1 Single-Family Dwellings and Duplexes*
4. *Subsection 19.505.2 Garages and Carports*
5. *Subsection 19.506.4 Manufactured Dwelling Siting and Design Standards, Siting Standards*

Response: Applicable standards from Section 19.500 are addressed later in this narrative.

19.302 MEDIUM AND HIGH DENSITY RESIDENTIAL ZONES

19.302.2 Allowed Uses in Medium and High Density Residential Zones

Response: Part of the subject site is zoned R-3, which is a medium density zone. Rowhouses are an allowed use in the R-3 zone.

19.302.4 Development Standards

In the medium and high density residential zones, the development standards in Table 19.302.4 apply. Notes and/or cross references to other applicable code sections are listed in the "Standards/Additional Provisions" column. Additional standards are provided in Section 19.302.5.

The standards in Subsection 19.302.4 are not applicable to cottage cluster development except where specifically referenced by Subsection 19.505.4.

Standard	***R-3***	***Response***
Minimum lot size, rowhouse	*3,000 SF*	Proposed lot sizes range from 1,600 SF to 2,452 SF. Using Planned Development provisions - see response below.
Minimum lot width, rowhouse	*30 feet*	Proposed lot widths range from 18 to 31 feet. Using Planned Development provisions - see response below.
Minimum lot depth, rowhouse	*80 feet*	Standard met. Proposed lot depths range from 80 to 91 feet.
Minimum street frontage, rowhouse	*30 feet*	Proposed street frontages typically range from 20 to 25 feet. Some corner lots have reduced street frontages. Using Planned Development provisions - see response below.
Minimum front yard	*15 feet*	Standard partially met. Front loaded lots, front yard = 18 feet Alley loaded lots, front yard = Varies, 10 to 14 feet

		Using Planned Development provisions - see response below.
Minimum side yard, common wall	*0 feet*	Standards met. Proposed side yard, common wall = 0 feet
Minimum side yard, no common wall	*5 feet*	Proposed side yard, no common wall = 5 feet Using Planned Development provisions - see response below.
Minimum street side yard	*15 feet*	Street side yard = Varies, 5 to 7 feet Using Planned Development provisions - see response below.
Minimum rear yard	*15 feet*	Standard met. Front loaded lots, rear yard = 15 feet Alley loaded lots, rear yard = 18 feet
Maximum bldg. height	*2.5 stories or 35 feet*	Standard met. As shown on the building elevations provided in Exhibit A, the proposed rowhouses will be two stories and below the maximum building height of 35 feet.
Side yard height plane limit: *Height above ground* *Slope if plane*	 *20 feet* *45 degrees*	Standard will be met on those side yards that do not share a common wall. Using Planned Development provisions - see response below.
Maximum lot coverage	*40 percent*	Standard met. See response to Section 19.302.5.B.2 below regarding increased lot coverage.
Minimum vegetation	*35 percent*	Using Planned Development provisions - see response below.
Minimum density	*11.6 units/acre*	Using Planned Development provisions. See density calculations and discussion provided above.
Maximum density	*14.5 units/acre*	

Response: As noted previously, the applicant is proposing to use the City's Planned Development provisions in Section 19.311. Those provisions allow variation to the development standards as appropriate for consistency with the purpose of the Planned Development Zone. The purpose of the Planned Development Zone is to encourage flexibility in site design to provide a mix of housing types, variety in development patterns, and preserve natural resources. More discussion regarding how the proposed subdivision meets the intent of the Planned Development Zone is provided in the separate Zone Change and Planned Development application package submitted concurrently with this application package.

As noted in the above table, most of the development standards have been adjusted in order to design the subdivision with small lots with an attached housing type (rowhouses). Due to the small size of lots and the specific housing type planned for this development, dimensional standards such as lot sizes, setbacks, lot coverage and minimum vegetation have all been adjusted accordingly. Approval of the Planned Development will include approval of those adjustments.

19.302.5 Additional Development Standards

A. Side Yards

In the medium and high density zones, the required side yard is determined as described below. These measurements apply only to required side yards and do not apply to required street side yards.

1. The side yard for development other than a rowhouse shall be at least 5 ft.

2. There is no required side yard for rowhouses that share 2 common walls. The required side yard for an exterior rowhouse that has only 1 common wall is 0 ft for the common wall and 5 ft for the opposite side yard. An exterior rowhouse on a corner lot shall meet the required street side yard setback in Subsection 19.302.4.B.1.b.

Response: As shown on the Preliminary Plat in Exhibit A, the proposed development will consist of rowhouses in sets of four dwellings. Side yards for the rowhouses not sharing a common wall will be five feet, consistent with this standard. Street side yards will vary from 5 to 7 feet, consistent with the Planned Development provisions as described above.

B. Lot Coverage

The lot coverage standards in Subsection 19.302.4.B.4 are modified for specific uses and lot sizes as described below. The reductions and increases are additive for lots that are described by one or more of the situations below.

1. Increased Lot Coverage for Single-Family Detached Dwellings

Response: Not applicable. The proposal does not include single-family detached dwellings.

2. Increased Lot Coverage for Duplexes and Rowhouses

The maximum lot coverage percentage in Subsection 19.302.4.B.4 is increased by 20 percentage points for a duplex or rowhouse.

Response: The proposed subdivision includes rowhouses, which increases the maximum lot coverage standard to 60 percent. Proposed lot coverage on the site will range from 46 to 59 percent, which is below the maximum coverage standard.

3. Increased Lot Coverage for Detached Accessory Dwelling Units

Response: Not applicable. The proposal does not include detached accessory dwelling units.

C. Minimum Vegetation

At least half of the minimum required vegetation area must be suitable for outdoor recreation by residents, and not have extreme topography or dense vegetation that precludes access.

Response: Vegetated areas on each individual lot will be landscaped and usable and will not have extreme topography or dense vegetation. Residents will also have access to larger areas (approximately seven acres) of natural open space via a soft-surface trail that travels throughout the site. The trail will be approximately 30 inches wide and will not have grades greater than ten percent.

D. Front Yard Minimum Vegetation

At least 40% of the front yard shall be vegetated. The front yard vegetation area required by this subsection counts toward the minimum required vegetation for the lot. A property may provide less than the 40% of the front yard vegetation requirement if it is necessary to provide a turnaround area so that vehicles can enter a collector or arterial street in a forward motion.

Response: As noted previously, this development is proposing to use the Planned Development provisions in Chapter 19.311, which allows flexibility to adjust development standards. The proposed development consists of small lots with an attached housing type; as such, front yards are relatively small. Those areas of front yards that are not used for driveways and sidewalks will be vegetated.

E. Height Exceptions

1 additional story may be permitted in excess of the required maximum standard. For each additional story, an additional 10% of site area beyond the minimum is required to be retained in vegetation.

Response: Not applicable. The proposal does not include buildings that exceed the maximum building height standard.

F. Residential Densities

1. The minimum and maximum development densities in Subsection 19.302.4.C.1 are applicable for land divisions, replats that change the number of lots, and any development that would change the number of dwelling units on a lot. Development of a single-family detached dwelling or an accessory dwelling is exempt from the minimum and maximum density requirements.

If a proposal for a replat or land division is not able to meet the minimum density requirement—due to the dimensional requirements for lot width, lot depth, or lot frontage—the minimum density requirement shall instead be equal to the maximum number of lots that can be obtained from the site given its dimensional constraints. The inability of new lot lines to meet required yard dimensions from existing structures shall not be considered as a basis for automatically lowering the minimum density requirement.

Response: Required minimum and maximum densities are addressed in Tables 2 and 3 above. The allowable density range for the site is 66 to 96 units; the proposed subdivision falls within that range.

2. Multifamily development in the R-2, R-1, and R-1-B Zones is subject to the minimum site size requirements in Table 19.302.5.F.2. In the event that the minimum site size requirements conflict with the development densities in Subsection 19.302.4.C.1, the site size requirements in Table 19.302.F.2 shall prevail.

Response: Not applicable. This project does not propose multifamily development in the R-2, R-1 or R-1-B zones.

G. Accessory Structure Standards

Standards specific to accessory structures are contained in Section 19.502.

Response: Not applicable. The proposal does not include accessory structures.

H. Building Limitations

1. In the R-3 Zone, 1 single-family detached dwelling or 1 duplex is permitted per lot. See Subsection 19.504.4. A detached accessory dwelling may be permitted in addition to a single-family detached dwelling, per Subsection 19.910.1.

Response: As shown on the Preliminary Plat in Exhibit A, the subdivision proposes one single-family attached dwelling per lot. No detached accessory dwellings are proposed.

2. Multifamily buildings shall not have an overall horizontal distance exceeding 150 linear ft as measured from end wall to end wall.

Response: Not applicable. The proposal does not include multifamily buildings.

I. Transition Measures

The following transition measures apply to multifamily development that abuts an R-10-, R-7-, or R-5-zoned property.

Response: Not applicable. The proposal does not include multifamily development.

J. Off-Street Parking and Loading

Off-street parking and loading is required as specified in Chapter 19.600.

Response: Response: Applicable standards from Section 19.600 are addressed later in this narrative.

K. Public Facility Improvements

Transportation requirements and public facility improvements are required as specified in Chapter 19.700.

Response: Applicable standards from Section 19.700 are addressed later in this narrative.

L. Additional Standards

Depending upon the type of use and development proposed, the following sections of Chapter 19.500 Supplementary Development Regulations may apply. These sections are referenced for convenience, and do not limit or determine the applicability of other sections within the Milwaukie Municipal Code.

1. *Subsection 19.504.4 Buildings on the Same Lot*
2. *Subsection 19.504.8 Flag Lot Design and Development Standards*
3. *Subsection 19.504.9 On-Site Walkways and Circulation*
4. *Subsection 19.504.10 Setbacks Adjacent to Transit*
5. *Subsection 19.505.1 Single-Family Dwellings and Duplexes*
6. *Subsection 19.505.2 Garages and Carports*
7. *Subsection 19.505.3 Multifamily Housing*
8. *Subsection 19.505.4 Cottage Cluster Housing*
9. *Subsection 19.505.8 Building Orientation to Transit*
10. *Subsection 19.506.4 Manufactured Dwelling Siting and Design Standards, Siting Standards*

Response: Applicable standards from Section 19.500 are addressed later in this narrative.

Section 19.402 Natural Resources

19.402.3 Applicability

A. The regulations in Section 19.402 apply to all properties that contain, or are within 100 ft of a WQR and/or HCA (including any locally significant Goal 5 wetlands or habitat areas identified by the City of Milwaukie) as shown on the Milwaukie Natural Resource Administrative Map (hereafter "NR Administrative Map").

Response: The subject property contains areas designated as HCA per the NR Administrative Map. Therefore, the regulations of 19.402 apply.

K. Activities that are not exempt per Subsection 19.402.4, or prohibited per Subsection 19.402.5, are subject to the Type I, II, or III review process as outlined in Table 19.402.3.K.

Response: This proposal includes activities that are not exempt or prohibited. Therefore, this proposal is subject to a Type III Natural Resources Review. A Natural Resource Review report was prepared by Pacific Habitat Services, Inc. in January 2017. That report (see Exhibit J) provides a detailed description of impacts to designated natural resources on the site and responses to applicable standards and criteria from Chapter 19.402 to demonstrate how the project will comply with this section of code.

Chapter 500 Supplementary Development Regulations

19.504 SITE DESIGN STANDARDS

19.504.1 Clear Vision Areas

A clear vision area shall be maintained on the corners of all property at the intersection of 2 streets or a street and a railroad according to the provisions of the clear vision ordinance in Chapter 12.24.

Response: Clear vision areas will be maintained as required by Chapter 12.24.

19.504.2 Maintenance of Minimum Ordinance Requirements

No lot area, yard, other open space, or off-street parking or loading area shall be reduced by conveyance or otherwise below the minimum requirements of this title, except by dedication or conveyance for a public use.

Response: Lot area and yards (setbacks) have been reduced in accordance with the Planned Development provisions in 19.311.

19.504.3 Dual Use of Required Open Space

No lot area, yard, or other open space or off-street parking or loading area which is required by this title for one use shall be used to meet the required lot area, yard, or other open space or off-street parking area for another use, except as provided in Subsection 19.605.4.

Response: No lot area, yard or other open space or off-street parking or loading area required by this code will be used to meet a standard for more than one use.

19.504.4 Buildings on the Same Lot

A. In R-10, R-7, and R-5 Zones, 1 primary dwelling shall be permitted per lot. A detached accessory dwelling unit may be permitted per Subsection 19.910.1.

B. In the R-3 Zone, 1 single-family detached dwelling shall be permitted per lot. A detached accessory dwelling unit may be permitted per Subsection 19.910.1. Multifamily housing, with multiple structures designed for dwelling purposes, may be permitted as a conditional use per Section 19.905.

Response: The proposed development consists of lots with one primary dwelling on each lot. No detached accessory dwellings are proposed.

19.504.5 Distance from Property Line

Where a side or rear yard is not required and a structure is not to be erected at the property line, it shall be set back at least 3 ft from the property line.

Response: Not applicable. Side and rear yards are required in the R-3 and R-10 zones.

19.505 BUILDING DESIGN STANDARDS

19.505.1 Single-Family Dwellings and Duplexes

B. Applicability

The design standards in this subsection apply to the types of development listed below when the closest wall of the street-facing façade is within 50 ft of a front or street side lot line.

1. New single-family detached dwellings, residential homes, duplexes, and rowhouses on individual lots. Placement of a new manufactured home on a lot outside of a manufactured home park is subject to the requirements of Section 19.506 and the standards of Subsection 19.505.1.

Response: The proposed development includes rowhouses on individual lots. Therefore, the building design standards in this section apply.

C. Standards

1. Articulation

All buildings shall incorporate design elements that break up all street-facing façades into smaller planes as follows. See Figure 19.505.1.C.1 for illustration of articulation.

c. For buildings with less than 30 ft of street frontage, the building articulation standard is not applicable.

Response: As shown on the Preliminary Plat in Exhibit A, all rowhouses will be constructed on lots that have less than 30 feet of street frontage. Therefore, this building articulation standard does not apply.

2. Eyes on the Street

At least 12% of the area of each street-facing façade must be windows or entrance doors. See Figure 19.505.1.C.2 for illustration of eyes on the street.

Response: As shown on the building elevations in Exhibit A, all street-facing facades will have at least 12 percent glazing (windows or entrance doors), consistent with this requirement.

a. Windows used to meet this standard must be transparent and allow views from the building to the street. Glass blocks and privacy windows in bathrooms do not meet this standard.

Response: Windows used to meet this standard will be transparent and allow views from the building to the street. Glass blocks and privacy windows have not been used to meet this standard.

b. Half of the total window area in the door(s) of an attached garage counts toward the eyes on the street standard. All of the window area in the street-facing wall(s) of an attached garage count toward meeting this standard.

Response: Garage windows were not included in the calculations for the "eyes on the street standard."

c. Window area is considered the entire area within the outer window frame, including any interior window grid.

Response: Window area was calculated consistent with this standard.

d. Doors used to meet this standard must face the street or be at an angle of no greater than 45 degrees from the street.

Response: Doors used to meet this standard face the street.

e. Door area is considered the portion of the door that moves. Door frames do not count toward this standard.

Response: Door frames were not included in the calculations to meet this standard.

3. Main Entrance

At least 1 main entrance must meet both of the following standards. See Figure 19.505.1.C.3 for illustration of main entrances.

a. Be no further than 8 ft behind the longest street-facing wall of the building.

Response: As shown on the floor plans in Exhibit A, the main entrance for each dwelling is located approximately 2 to 6 feet behind the longest street-facing wall of the building depending on the location of the garage (alley loaded or not). In no case is the main entrance located farther than 8 feet behind the longest street-facing wall.

b. Face the street, be at an angle of up to 45 degrees from the street, or open onto a porch. If the entrance opens up onto a porch, the porch must meet all of these additional standards.

(1) Be at least 25 sq ft in area with a minimum 4-ft depth.

(2) Have at least 1 porch entry facing the street.

(3) Have a roof that is no more than 12 ft above the floor of the porch.

(4) Have a roof that covers at least 30% of the porch area.

Response: As shown on the floor plans and elevations in Exhibit A, all main entries face the street and open onto a porch that meets (and exceeds) the standards in (1) through (4) above.

4. Detailed Design

All buildings shall include at least 5 of the following features on any street-facing façade. See Figure 19.505.1.C.4 for illustration of detailed design elements.

a. Covered porch at least 5 ft deep, as measured horizontally from the face of the main building façade to the edge of the deck, and at least 5 ft wide.

b. Recessed entry area at least 2 ft deep, as measured horizontally from the face of the main building façade, and at least 5 ft wide.

c. Offset on the building face of at least 16 in from 1 exterior wall surface to the other.

d. Dormer that is at least 4 ft wide and integrated into the roof form.

e. Roof eaves with a minimum projection of 12 in from the intersection of the roof and the exterior walls.

f. Roof line offsets of at least 2 ft from the top surface of 1 roof to the top surface of the other.

g. Tile or wood shingle roofs.

h. Horizontal lap siding between 3 to 7 in wide (the visible portion once installed). The siding material may be wood, fiber-cement, or vinyl.

i. Brick, cedar shingles, stucco, or other similar decorative materials covering at least 40% of the street-facing façade.

j. Gable roof, hip roof, or gambrel roof design.

k. Window trim around all windows at least 3 in wide and 5/8 in deep.

l. Window recesses, in all windows, of at least 3 in as measured horizontally from the face of the building façade.

m. Balcony that is at least 3 ft deep, 5 ft wide, and accessible from an interior room.

n. One roof pitch of at least 500 sq ft in area that is sloped to face the southern sky and has its eave line oriented within 30 degrees of the true north/south axis.

o. Bay window at least 2 ft deep and 5 ft long.

p. Attached garage width, as measured between the inside of the garage door frame, of 35% or less of the length of the street-facing façade.

Response: As shown on the floor plans and elevations in Exhibit A, buildings will meet or exceed this standard as follows.

For alley loaded homes:

1. Covered porch consistent with item (a) above
2. Offset on the building face consistent with item (c) above
3. Roofline offsets consistent with item (f) above
4. Horizontal lap siding consistent with item (h) above
5. Decorative materials consistent with item (i) above
6. Window trim consistent with item (k) above

For standard (non-alley-loaded) homes:

1. Covered porch consistent with item (a) above
2. Offset on the building face consistent with item (c) above
3. Roofline offsets consistent with item (f) above
4. Horizontal lap siding consistent with item (h) above
5. Window trim consistent with item (k) above

19.505.5 Rowhouses

C. Rowhouse Design Standards

1. Rowhouses are subject to the design standards for single-family housing in Subsection 19.505.1.

Response: The design standards in Subsection 19.505.1 are addressed above.

2. Rowhouses shall include an area of transition between the public realm of the right-of-way and the entry to the private dwelling. The entry may be either vertical or horizontal, as described below.

a. A vertical transition shall be an uncovered flight of stairs that leads to the front door or front porch of the dwelling. The stairs must rise at least 3 ft, and not more than 8 ft, from grade. The flight of stairs may encroach into the required front yard, and the bottom step must be at least 5 ft from the front lot line.

b. A horizontal transition shall be a covered porch with a depth of at least 6 ft. The porch may encroach into the required front yard, but it shall be at least 7 ft from the front lot line.

Response: As shown on the floor plans and elevations in Exhibit A, the proposed rowhouses will meet the horizontal transition standard in (b) above by providing covered porches with depths of at least 6 feet that are located at least 7 feet from the front lot line.

D. Number of Rowhouses Allowed

No more than 4 consecutive rowhouses that share a common wall(s) are allowed. A set of 4 rowhouses with common walls is allowed to be adjacent to a separate set of 4 rowhouses with common walls.

Response: As shown on the floor plans and elevations in Exhibit A, rowhouses are proposed in sets of four units sharing a common wall. No greater than four consecutive rowhouses sharing a common wall are proposed.

E. Rowhouse Lot Standards

1. Rowhouse development is not allowed on lots with a lot width of more than 35 ft.

Response: As shown on the Preliminary Plat in Exhibit A, all proposed rowhouse lots have widths less than 35 feet.

2. Rowhouse development is allowed only where there are at least 2 abutting lots on the same street frontage whose street frontage, lot width, lot depth, and lot area meet or exceed the base zone requirements listed in Table 19.302.2.

Response: The applicant is requesting Planned Development approval as part of this proposal. The Planned Development provisions in 19.311 allow reductions or variances to applicable standards consistent with the Planned Development purpose and criteria. The Planned Development request includes variances to lot area, dimensions and other development standards established in the base zones. For this reason, the proposed subdivision does not include abutting lots on the same street that meet or exceed the base zone requirements. Approval of the Planned Development will include approval of adjustments to those standards, which will effectively make this standard not applicable.

3. Rowhouse development in the R-3 and R-2.5 Zones must meet the minimum lot size standards in Subsection 19.302.4.A.1.

Response: As noted above, the applicant is requesting Planned Development approval as part of this proposal. The Planned Development provisions in 19.311 allow reductions or variances to applicable standards consistent with the Planned Development purpose and criteria. The Planned Development request includes variances to lot area, dimensions and other development standards established in the base zones. Approval of the Planned Development request will include approval of reduced lot sizes.

4. Rowhouse development in the R-2, R-1 and R-1-B Zones must meet the minimum lot size standards in Subsection 19.302.4.A.1. In addition, the rowhouse development must meet the minimum site size requirements in Table 19.505.5.E.4.

Response: Not applicable. The site is not zoned R-2, R-1 or R-1-B.

F. Driveway Access and Parking

1. Garages on the front façade of a rowhouse, off-street parking areas in the front yard, and driveway accesses in front of a rowhouse are prohibited unless the following standards are met. See Figure 19.505.5.F.1.

Response: The proposed development will consist of rowhouses, some of which are alley-loaded and some of which are front-loaded. For the front-loaded dwellings, garages and driveways will be located on the front façade of the dwelling. Therefore, the following standards apply to the front-loaded rowhouses.

a. Each rowhouse lot has a street frontage of at least 30 ft on a street identified as a Neighborhood Route or Local Street in the Transportation System Plan Figure 8-3b.

Response: As noted above, the applicant is requesting Planned Development approval as part of this proposal. The Planned Development provisions in 19.311 allow reductions or variances to applicable standards consistent with the Planned Development purpose and criteria. Approval of the Planned Development request will include approval of reduced street frontages.

b. Development of 2 or 3 rowhouses has at least 1 shared access between the lots, and development of 4 rowhouses has 2 shared accesses.

Response: The proposed development will consist of rowhouses in sets of four dwellings each. Each set of four rowhouses will have two shared accesses.

c. Outdoor on-site parking and maneuvering areas do not exceed 10 ft wide on any lot.

Response: As shown on the floor plans (Sheet 2.0) in Exhibit A, on-site parking and maneuvering area widths will not exceed 10 feet. Parking and maneuvering areas will be approximately eight feet wide.

d. The garage width does not exceed 10 ft, as measured from the inside of the garage door frame.

Response: As shown on the elevations (Sheet 6.0) in Exhibit A, garage door widths will not exceed 10 feet, as measured from the inside frame. Garage doors will be approximately eight feet wide.

2. The following rules apply to driveways and parking areas for rowhouse developments that do not meet all of the standards in Subsection 19.505.5.F.1.

Response: Not applicable. The proposed development meets the standards in Subsection 19.505.5.F.1, as demonstrated in the responses above.

G. Accessory Structure Setbacks

On rowhouse lots with a lot width of 25 ft or less, there is no required side yard between an accessory structure and a side lot line abutting a rowhouse lot. All other accessory structure regulations in Subsection 19.502.2.A apply.

Response: Not applicable. Accessory structures are not proposed as part of this application.

Chapter 19.600 Off-Street Parking and Loading

19.604 GENERAL PARKING STANDARDS

19.604.1 Parking Provided with Development Activity

All required off-street parking areas shall be provided at the time the structure is built; at the time a structure or site is enlarged; or when there is change in use or an increase in density or intensity. All required off-street parking areas shall be provided in conformance with the standards of Chapter 19.600 prior to issuance of a certificate of occupancy, or final development permit approval, or as otherwise specified in any applicable land use decision.

Response: Required off-street parking for the proposed development will be provided at the time the dwellings are built. Off-street parking will be consistent with standards of Chapter 19.600, as demonstrated in the responses in this narrative.

19.604.2 Parking Area Location

Accessory parking shall be located in one or more of the following areas:

A. On the same site as the primary use for which the parking is accessory.

B. On a site owned by the same entity as the site containing the primary use that meets the standards of Subsection 19.605.4.B.2. Accessory parking that is located in this manner shall not be considered a parking facility for purposes of the base zones in Chapter 19.300.

C. Where shared parking is approved in conformance with Subsection 19.605.4.

Response: Parking for each rowhouse unit will be provided in a garage on the same lot as the rowhouse. No shared parking is proposed.

19.604.3 Use of Parking Areas

All required off-street parking areas shall continually be available for the parking of operable vehicles of intended users of the site. Required parking shall not be rented, leased, sold, or otherwise used for parking that is unrelated to the primary or accessory use of the site, except where a shared parking agreement per Subsection 19.605.4 has been recorded. Subsection 19.604.3 does not prohibit charging fees for parking when the parking serves the primary or accessory uses on site.

Response: Parking for the rowhouse units will be continually available for the residents of the rowhouse. Required parking will not be rented, leased, sold or otherwise used for unrelated parking.

19.604.4 Storage Prohibited

No required off-street parking area shall be used for storage of equipment or materials, except as specifically authorized by Subsection 19.607.2 Commercial Vehicle, Pleasure Craft, and Recreational Vehicle Parking. (Ord. 2025 § 2, 2011)

Response: Off-street parking will not be used for storage.

19.605 VEHICLE PARKING QUANTITY REQUIREMENTS

19.605.1 Minimum and Maximum Requirements

A. Development shall provide at least the minimum and not more than the maximum number of parking spaces as listed in Table 19.605.1. Modifications to the standards in Table 19.605.1 may be made as per Section 19.605. Where multiple ratios are listed, the Planning Director shall determine which ratio to apply to the proposed development or use.

Response: Per Table 19.605.1, rowhouses are required to provide a minimum of one space per unit. There is no maximum parking standard for rowhouses. As shown on the Preliminary Plat in Exhibit A, each rowhouse will provide one off-street parking space, located in an attached garage on the same lot as the dwelling.

19.607 OFF-STREET PARKING STANDARDS FOR RESIDENTIAL AREAS

19.607.1 Residential Driveways and Vehicle Parking Areas

Subsection 19.607.1 is intended to preserve residential neighborhood character by establishing off-street parking standards. The provisions of Subsection 19.607.1 apply to passenger vehicles and off-street parking areas for rowhouses, cottage clusters, duplexes, single-family detached dwellings, and residential homes in all zones, unless specifically stated otherwise.

A. Dimensions

Off-street parking space dimensions for required parking spaces are 9 ft wide x 18 ft deep.

Response: The attached garages provided for off-street parking will be approximately 11 x 18.5 feet, which exceeds the above standard.

B. Location

1. Off-street vehicle parking shall be located on the same lot as the associated dwelling, unless shared parking is approved per Subsection 19.605.4.

Response: Parking for each rowhouse dwelling will be provided on the same lot as the rowhouse.

2. No portion of the required parking space is allowed within the following areas. See Figure 19.607.1.B.2. These standards do not apply to off-street parking for cottage clusters, which are subject to the standards in Subsection 19.505.4.

a. Within the required front yard or within 15 ft of the front lot line, whichever is greater.

b. Within a required street side yard.

Response: Off-street parking spaces are provided in attached garages for each rowhouse unit. No parking spaces are proposed within the front or side yards.

C. Parking Surface Materials

Parking of vehicles shall only be allowed on surfaces described in Subsection 19.607.1.C.

1. The following areas are required to have a durable and dust-free hard surface, and shall be maintained for all-weather use. The use of pervious concrete, pervious paving, driveway strips, or an in-ground grid or lattice surface is encouraged to reduce stormwater runoff.

a. Required parking space(s).

b. All vehicle parking spaces and maneuvering areas located within a required front or side yard. Areas for boat or RV parking are exempt from this requirement and may be graveled.

c. All off-street parking and maneuvering areas for a residential home.

2. Maneuvering areas and unrequired parking areas that are outside of a required front or side yard are allowed to have a gravel surface.

Response: All off-street parking and maneuvering areas on the proposed lots will have a durable and dust-free hard surface appropriate for all-weather use. No gravel areas are proposed.

D. Parking Area Limitations

Uncovered parking spaces and maneuvering areas for vehicles, and for recreational vehicles and pleasure craft as described in Subsection 19.607.2.B, have the following area limitations. See Figure 19.607.1.D. The pole portion of a flag lot is not included in these area limitations.

These standards do not apply to off-street parking for cottage clusters, which are subject to the standards in Subsection 19.505.4; nor to rowhouses, which are subject to the standards in Subsection 19.505.5.

a. Uncovered parking spaces and maneuvering areas cannot exceed 50% of the front yard area.

b. Uncovered parking spaces and maneuvering areas cannot exceed 30% of the required street side yard area.

Response: Not applicable. Required parking for the proposed rowhouses will be provided in attached, covered garages on each lot. No uncovered parking areas are proposed.

c. No more than 3 residential parking spaces are allowed within the required front yard. A residential parking space in the required front yard is any 9- x 18-ft rectangle that is entirely within the required front yard that does not overlap with another 9- x 18-ft rectangle within the required front yard.

Response: Not applicable. No parking spaces are proposed within the front yard. Parking spaces will be provided in attached garages for each rowhouse.

E. Additional Driveway Standards

1. Parking areas and driveways on the property shall align with the approved driveway approach and shall not be wider than the approved driveway approach within 10 ft of the right-of-way boundary.

Response: As shown on the Preliminary Plat and floor plans in Exhibit A, parking areas and driveways on each lot will align with the driveway approach and will not be wider than the driveway approach.

2. Properties that take access from streets other than local streets and neighborhood routes shall provide a turnaround area on site that allows vehicles to enter the right-of-way in a forward motion.

Response: Not applicable. Each lot within the proposed development will take access from a private alley or a local street.

Section 19.700 Public Facility Improvements

19.703 REVIEW PROCESS

19.703.1 Preapplication Conference

For all proposed development that requires a land use application and is subject to Chapter 19.700 per Section 19.702, the applicant shall schedule a preapplication conference with the City prior to submittal of the land use application. The Engineering Director may waive this requirement for proposals that are not complex.

Response: A pre-application conference with the City was held on August 11, 2016. Notes from the City are provided in Exhibit B. A second pre-application conference to review the Traffic Impact Study was held on January 19, 2016.

19.703.2 Application Submittal

For all proposed development that is subject to Chapter 19.700 per Section 19.702, one of the following types of applications is required.

B. Transportation Facilities Review (TFR) Land Use Application

If the proposed development triggers a transportation impact study (TIS) per Section 19.704, a TFR land use application shall be required. Compliance with Chapter 19.700 will be reviewed as part of the TFR application submittal and will be subject to a Type II review process as set forth in Section 19.1005. The TFR application shall be consolidated with, and processed concurrently with, any other required land use applications.

Response: The proposed project requires a TIS and therefore also requires a TFR land use application. The TFR application is included with this submittal package and applicable standards and criteria are addressed in this section of the narrative.

19.703.3 Approval Criteria

For all proposed development that is subject to Chapter 19.700 per Section 19.702, the required development permit and/or land use application shall demonstrate compliance with the following approval criteria at the time of submittal.

A. Procedures, Requirements, and Standards

Development and related public facility improvements shall comply with procedures, requirements, and standards of Chapter 19.700 and the Public Works Standards.

Response: All development and related public facility improvements will comply with Chapter 19.700 and the City's Public Works Standards.

B. Transportation Facility Improvements

Development shall provide transportation improvements and mitigation at the time of development in rough proportion to the potential impacts of the development per Section 19.705 Rough Proportionality, except as allowed by Section 19.706 Fee in Lieu of Construction.

Response: The Traffic Impact Study provided to the City (Exhibit G) identifies recommended improvements that will be done as part of the proposed development. Those recommendations include improvements (signage and other) to the existing church access point on Rusk Road to restrict vehicles from exiting at that location. Half-street improvements along the site's frontage with Kellogg Creek Drive, and full-street improvements along proposed new streets are also recommended.

The applicant is not requesting any fee-in-lieu of construction.

C. Safety and Functionality Standards

The City will not issue any development permits unless the proposed development complies with the City's basic safety and functionality standards, the purpose of which is to ensure that development does not occur in areas where the surrounding public facilities are inadequate. Upon submittal of a development permit application, an applicant shall demonstrate that the development property has or will have all of the following:

1. Adequate street drainage, as determined by the Engineering Director.

Response: Adequate street drainage will be provided, as demonstrated in the Preliminary Drainage Report in Exhibit E.

2. Safe access and clear vision at intersections, as determined by the Engineering Director.

Response: Access to the proposed development will be provided at two points along SE Kellogg Creek Drive. As demonstrated in the TIS provided to the City, access points will be safe, adequate to serve the site, and consistent with City standards.

3. Adequate public utilities, as determined by the Engineering Director.

Response: As shown in the Composite Utilities Plan (Sheet C400) in Exhibit A, the development property has or will have adequate public utilities to serve the proposed development. Specifically:

- A Clackamas River Water main is available for connection in SE Kellogg Creek Drive and can provide service for the proposed development. As part of the development, water lines will be constructed within the new public streets to serve the homes in the subdivision. All water improvements will be consistent with Clackamas River Water standards.
- There is an existing sanitary sewer line within SE Kellogg Creek Drive that is available for connection to serve the proposed development. The applicant will construct and eight-inch line within the new public streets to serve homes in the subdivision.
- The applicant has submitted a storm drainage report (Exhibit E) that demonstrates how stormwater will be managed on the site consistent with Milwaukie Public Works Standards and the Portland Stormwater Management Manual for design of water quality facilities.

4. Access onto a public street with the minimum paved widths as stated in Subsection 19.703.3.C.5 below.

Response: The proposed development will have access onto SE Kellogg Creek Drive, which has a local street designation and at least 16 feet of paved width.

5. Adequate frontage improvements as follows:

a. For local streets, a minimum paved width of 16 ft along the site's frontage.

b. For nonlocal streets, a minimum paved width of 20 ft along the site's frontage.

c. For all streets, a minimum horizontal right-of-way clearance of 20 ft along the site's frontage.

Response: As recommended in the TIS provided to the City, and shown on Sheet C202 in Exhibit A, standard half street improvements along the site's frontage with SE Kellogg Creek Drive (including a striped bike lane) will be constructed. In addition, all new streets within the proposed subdivision will be constructed to the full-street cross section as required by the City.

6. Compliance with Level of Service D for all intersections impacted by the development, except those on Oregon Highway 99E that shall be subject to the following:

a. Level of Service F for the first hour of the morning or evening 2-hour peak period.

b. Level of Service E for the second hour of the morning or evening 2-hour peak period.

Response: As demonstrated in the Traffic Impact Study provided to the City (Exhibit G), all intersections within the study area will continue to operate within the City's operational standards upon buildout of the proposed development.

19.708 TRANSPORTATION FACILITY REQUIREMENTS

19.708.1 General Street Requirements and Standards

A. Access Management

All development subject to Chapter 19.700 shall comply with access management standards contained in Chapter 12.16.

Response: The proposed development will take access from SE Kellogg Creek Drive and will comply with all applicable access management standards in Chapter 12.16.

B. Clear Vision

All development subject to Chapter 19.700 shall comply with clear vision standards contained in Chapter 12.24.

Response: The proposed development will comply with the clear vision standards contained in Chapter 12.24.

C. Development in Downtown Zones

Street design standards and right-of-way dedication for the downtown zones are subject to the requirements of the Milwaukie Public Works Standards, which implement the streetscape design of the Milwaukie Downtown and Riverfront Plan: Public Area Requirements (PAR). Unless specifically stated otherwise, the standards in Section 19.708 do not apply to development located in the downtown zones or on street sections shown in the PAR per Subsection 19.304.6.

Response: Not applicable.

D. Development in Non-Downtown Zones

Development in a non-downtown zone that has frontage on a street section shown in the PAR is subject to the requirements of the Milwaukie Public Works Standards, which implements the street design standards and right-of-way dedication requirements contained in the PAR for that street frontage. The following general provisions apply only to street frontages that are not shown in the PAR and for development that is not in any of the downtown zones listed in Subsection 19.708.1.C above:

1. Streets shall be designed and improved in accordance with the standards of this chapter and the Public Works Standards. ODOT facilities shall be designed consistent with State and federal standards. County facilities shall be designed consistent with County standards.

Response: All streets constructed or improved as part of the proposed development will comply with the standards of this chapter and the City's Public Works Standards. No improvements to ODOT facilities are anticipated as part of this project.

2. Streets shall be designed according to their functional classification per Figure 8-3b of the TSP.

Response: As shown on the Preliminary Plat and Typical Street Sections in Exhibit A, all streets will be designed according to their functional classification. New streets within the proposed subdivision will be designed to the standard local street cross section.

3. Street right-of-way shall be dedicated to the public for street purposes in accordance with Subsection 19.708.2. Right-of-way shall be dedicated at the corners of street intersections to accommodate the required turning radii and transportation facilities in accordance with Section 19.708 and the Public Works Standards. Additional dedication may be required at intersections for improvements identified by the TSP or a required transportation impact study.

Response: Right-of-way along the site's frontage with Kellogg Creek Drive will be dedicated in order to accommodate the required half-street improvement. No other right-of-way dedication is proposed.

4. The City shall not approve any development permits for a proposed development unless it has frontage or approved access to a public street.

Response: The proposed development has frontage on, and will take access from, SE Kellogg Creek Drive.

5. Off-site street improvements shall only be required to ensure adequate access to the proposed development and to mitigate for off-site impacts of the proposed development.

Response: The proposed development will include off-site improvements to the church access on Rusk Road. Those improvements will restrict vehicles from exiting onto Rusk Road, which is prohibited due to sight distance issues.

6. The following provisions apply to all new public streets and extensions to existing public streets.

a. All new streets shall be dedicated and improved in accordance with this chapter.

b. Dedication and construction of a half-street is generally not acceptable. However, a half-street may be approved where it is essential to allow reasonable development of a property and when the review authority finds that it will be possible for the property adjoining the half-street to dedicate and improve the remainder of the street when it develops. The minimum paved roadway width for a half-street shall be the minimum width necessary to accommodate 2 travel lanes pursuant to Subsection 19.708.2.

Response: All new streets constructed as part of the proposed development will be improved and dedicated in accordance with this code. Half-streets are not proposed; all new streets will be constructed to the full cross section.

7. Traffic calming may be required for existing or new streets. Traffic calming devices shall be designed in accordance with the Public Works Standards or with the approval of the Engineering Director.

Response: Traffic calming elements are not recommended per the TIS and are not proposed as part of this development.

8. Railroad Crossings

Where anticipated development impacts trigger a need to install or improve a railroad crossing, the cost for such improvements may be a condition of development approval.

Response: The proposed development does not anticipate any need to improve or install a railroad crossing.

9. Street Signs

The City shall install all street signs, relative to traffic control and street names, as specified by the Engineering Director. The applicant shall reimburse the City for the cost of all such signs installed by the City.

Response: The applicant understands the City will install any necessary street signs and the applicant will be required to reimburse the City for such costs.

10. Streetlights

The location of streetlights shall be noted on approved development plans. Streetlights shall be installed in accordance with the Public Works Standards or with the approval of the Engineering Director.

Response: The location of streetlights is noted on the Utility Plan in Exhibit A. All streetlights will be installed in accordance with the Public Works Standards or as required by the Engineering Director.

E. Street Layout and Connectivity

1. The length, width, and shape of blocks shall take lot size standards, access and circulation needs, traffic safety, and topographic limitations into consideration.

2. The street network shall be generally rectilinear but may vary due to topography or other natural conditions.

Response: As shown on the Preliminary Plat in Exhibit A, the proposed street layout to serve the new development is generally a rectilinear pattern and will allow for safe and efficient access and circulation on the site. Due to topographic and access constraints (and the proximity of Highway 224), a cul-de-sac is proposed at the northeast corner of the development where a through street was not feasible.

New streets within the proposed subdivision will have 54 feet of right-of-way with two 10-foot travel lanes, on-street parking, a planter strip and 5-foot sidewalks on both sides.

3. Streets shall be extended to the boundary lines of the developing property where necessary to give access to or allow for future development of adjoining properties.

Response: Due to topography, the presence of natural resources and surrounding land uses, it is not anticipated that street extensions will be necessary to allow for future development of adjoining properties.

4. Permanent turnarounds shall only be provided when no opportunity exists for creating a through street connection. The lack of present ownership or control over abutting property shall not be grounds for construction of a turnaround. For proposed land division sites that are 3 acres or larger, a street ending in a turnaround shall have a maximum length of 200 ft, as measured from the cross street right-of-way to the farthest point of right-of-way containing the turnaround. For proposed land division sites that are less than 3 acres, a street ending in a turnaround shall have a maximum length of 400 ft, measured from the cross street right-of-way to the farthest point of right-of-way containing the turnaround. Turnarounds shall be designed in accordance with the requirements of the Public Works Standards.

Response: The development proposes one permanent turnaround (cul-de-sac) located in the northeast corner of the development where a through street is not possible due to existing constraints (the church building, Highway 224 and natural resource areas). The length of the street ending in the cul-de-sac is approximately 186 feet, as measured from the Alley E right-of-way to the farthest point of right-of-way containing the cul-de-sac. The cul-de-sac will be constructed in accordance with the City's Public Works Standards.

5. Closed-end street systems may serve no more than 20 dwellings.

Response: The proposed cul-de-sac street will serve 11 dwellings.

F. Intersection Design and Spacing

1. Connecting street intersections shall be located to provide for traffic flow, safety, and turning movements, as conditions warrant.

2. Street and intersection alignments for local streets shall facilitate local circulation but avoid alignments that encourage nonlocal through traffic.

Response: Streets and intersections for the proposed development have been designed to provide safe and efficient circulation for the subdivision

3. Streets should generally be aligned to intersect at right angles (90 degrees). Angles of less than 75 degrees will not be permitted unless the Engineering Director has approved a special intersection design.

Response: Streets constructed as part of the proposed development intersect at right angles. Where new streets intersect with SE Kellogg Creek Drive, those intersections will also be at right angles.

4. New streets shall intersect at existing street intersections so that centerlines are not offset. Where existing streets adjacent to a proposed development do not align properly, conditions shall be imposed on the development to provide for proper alignment.

Response: No off-set intersections will be created as part of the proposed development.

5. Minimum and maximum block perimeter standards are provided in Table 19.708.1.

Response: Per Table 19.708.1, maximum block perimeter for local streets is 1,650 feet. As shown on the Preliminary Plat in Exhibit A, perimeters are consistent with this standard. Block perimeters for the full blocks are approximately 950 feet.

6. Minimum and maximum intersection spacing standards are provided in Table 19.708.1.

Response: Per Table 19.708.1, the minimum block length for local streets is 100 feet and the maximum is 530 feet. As shown on the Preliminary Plat in Exhibit A, the longest block length proposed is approximately 370 feet. The shortest block length proposed is approximately 220 feet.

19.708.2 Street Design Standards

Table 19.708.2 contains the street design elements and dimensional standards for street cross sections by functional classification. Dimensions are shown as ranges to allow for flexibility in developing the most appropriate cross section for a given street or portion of street based on existing conditions and the surrounding development pattern. The additional street design standards in Subsection 19.708.2.A augment the dimensional standards contained in Table 19.708.2. The Engineering Director will rely on Table 19.708.2 and Subsection 19.708.2.A to determine the full-width cross section for a specific street segment based on functional classification. The full-width cross section is the sum total of the widest dimension of all individual street elements. If the Engineering Director determines that a full-width cross section is appropriate and feasible, a full-width cross section will be required. If the Engineering Director determines that a full-width cross section is not appropriate or feasible, the Engineering Director will modify the full-width cross section requirement using the guidelines provided in Subsection 19.708.2.B. Standards for design speed, horizontal/vertical curves, grades, and curb return radii are specified in the Public Works Standards.

Response: New streets constructed to serve the proposed development will be built to the local street standard and will have the following elements, consistent with Table 19.708.2:

- 54 feet total right-of-way
- 34 feet of paved width from curb to curb
- Two 10-foot travel lanes
- 7-foot on-street parking on both sides
- 4-foot planter strip on both sides

- 5-foot sidewalk on both sides

A. Additional Street Design Standards

These standards augment the dimensional standards contained in Table 19.708.2 and may increase the width of an individual street element and/or the full-width right-of-way dimension.

1. Minimum 10-ft travel lane width shall be provided on local streets with no on-street parking.

Response: The new local streets will have two 10-foot travel lanes and on-street parking.

2. Where travel lanes are next to a curb line, an additional 1 ft of travel lane width shall be provided. Where a travel lane is located between curbs, an additional 2 ft of travel lane width shall be provided.

Response: Not applicable. Travel lanes will be next to a planter strip.

3. Where shared lanes or bicycle boulevards are planned, up to an additional 6 ft of travel lane width shall be provided.

Response: Shared lanes and bicycle boulevards are not planned as part of this development.

4. Bike lane widths may be reduced to a minimum of 4 ft where unusual circumstances exist, as determined by the Engineering Director, and where such a reduction would not result in a safety hazard.

Response: Bike lanes are not planned on the new streets within the proposed development. A striped bike lane will be included as part of the half-street improvements along the site's frontage with Kellogg Creek Drive.

5. Where a curb is required by the Engineering Director, it shall be designed in accordance with the Public Works Standards.

Response: All curbs will be designed in accordance with Public Works Standards.

6. Center turn lanes are not required for truck and bus routes on street classifications other than arterial roads.

7. On-street parking in industrial zones shall have a minimum width of 8 ft.

8. On-street parking in commercial zones shall have a minimum width of 7 ft.

Response: Items 6-8 above are not applicable.

9. On-street parking in residential zones shall have a minimum width of 6 ft.

Response: On street parking provided on the new local streets will have a width of 7 feet on both sides.

10. Sidewalk widths may be reduced to a minimum of 4 ft for short distances for the purpose of avoiding obstacles within the public right-of-way including, but not limited to, trees and power poles.

Response: Sidewalks provided will be five feet in width throughout the proposed development. The half-street improvements along the site's frontage with Kellogg Creek Drive will also include a five-foot sidewalk.

11. Landscape strip widths shall be measured from back of curb to front of sidewalk.

Response: Landscape strips provided will be four feet wide, as measured in accordance with this standard.

12. Where landscape strips are required, street trees shall be provided a minimum of every 40 ft in accordance with the Public Works Standards and the Milwaukie Street Tree List and Street Tree Planting Guidelines.

Response: As shown on the Planting Plan (Sheet L100) in Exhibit A, street trees will be provided consistent with this standard.

13. Where water quality treatment is provided within the public right-of-way, the landscape strip width may be increased to accommodate the required treatment area.

Response: As shown on the Composite Utility Plan, water quality treatment facilities are proposed within the public right-of-way landscape strips. Those landscape strips are four feet in width .

14. A minimum of 6 in shall be required between a property line and the street element that abuts it; e.g., sidewalk or landscape strip.

Response: As shown on the Typical Street Sections (Sheet C202) in Exhibit A, six inches will be provided between a property line and the street element that abuts it.

19.708.3 Sidewalk Requirements and Standards

B. Sidewalk Requirements

1. Requirements

Sidewalks shall be provided on the public street frontage of all development per the requirements of this chapter. Sidewalks shall generally be constructed within the dedicated public right-of-way, but may be located outside of the right-of-way within a public easement with the approval of the Engineering Director.

Response: As shown on the Preliminary Plat in Exhibit A, sidewalks will be provided along both sides of new streets throughout the proposed development. A sidewalk will also be provided along SE Kellogg Creek Drive along the site's frontage.

2. Design Standards

Sidewalks shall be designed and improved in accordance with the requirements of this chapter and the Public Works Standards.

Response: All sidewalks will be designed and improved in accordance with this chapter and the Public Works Standards.

19.708.5 Pedestrian/Bicycle Path Requirements and Standards

B. Pedestrian/Bicycle Path Requirements

Pedestrian/bicycle paths shall be required in the following situations.

1. In residential and mixed-use districts, a pedestrian/bicycle path shall be required at least every 300 ft when a street connection is not feasible.

Response: As shown on the Preliminary Plat in Exhibit A, street connections are available at least every 300 feet. As such, pedestrian paths are not required.

2. In residential and industrial districts where addition of a path would reduce walking distance, via a sidewalk or other available pedestrian route, by at least 400 ft and by at least 50% to an existing transit stop, planned transit route, school, shopping center, or park.

Response: Not applicable. Addition of a path to reduce walking distances as noted above is not needed.

3. In commercial districts and community service use developments where addition of a path would reduce walking distance, via a sidewalk or other available pedestrian route, by at least 200 ft and by at least 50% to an existing transit stop, planned transit route, school, shopping center, or park.

Response: Not applicable.

4. In all districts where addition of a path would provide a midblock connection between blocks that exceed 800 ft or would link the end of a turnaround with a nearby street or activity center.

Response: There are no blocks that exceed 800 feet in the proposed development. As shown on the Preliminary Plat in Exhibit A, a pedestrian and bicycle connection will be provided between the end of the turnaround and the sidewalk at the Rusk Road/Highway 224 intersection.

C. Design Standards

Pedestrian/bicycle paths shall be designed and improved in accordance with the requirements of this chapter and the Public Works Standards. Paths shall be located to provide a reasonably direct connection between likely pedestrian and bicyclist destinations. A path shall have a minimum right-of-way width of 15 ft and a minimum improved surface of 10 ft. lf a path also provides secondary fire access or a public utility corridor, it shall have a minimum right-of-way width of 20 ft and a minimum improved surface of 15 ft. Additional standards relating to entry points, maximum length, visibility, and path lighting are provided in the Public Works Standards.

Response: There is a proposed pedestrian/bicycle path connecting the end of the cul-de-sac to the intersection of Rusk Road and Highway 224. This path will have a 15-foot public access easement with a 10-foot paved width and will provide bicycle and pedestrian connections from the highway, through the development and down to Kellogg Creek Drive which connects to North Clackamas Park.

Section 19.904 Community Service Uses

19.904.5 Procedures for Reviewing a Community Service Use

C. The Planning Director may approve minor modifications to an approved community service per Section 19.1004 Type I Review, provided that such modification:

Response: The proposed modifications to the church property will include the following elements, all of which represent minor modifications to the approved CSU.

- The church entrance from Rusk Road will be reconfigured to enforce the "entry-only" status; exit onto Rusk Road from that access point is not permitted due to sight distance issues. Improvements to the access point will include narrowing the driveway, striping an entry-only arrow on the pavement, adding signage to indicate "No Exit", and adding some landscaping at the corner to serve as a barrier to exiting the site at that location.
- Some parking spaces along the western edge of the church property will be removed in order to create an access between the church site and the proposed subdivision site. This new access will provide a safe exit point for the church onto Kellogg Creek Drive.
- Additional parking spaces will be removed just south of the new access point to create a service and emergency-only access from the alley on the subdivision site. This access will be gated and will only be accessible for emergency fire and garbage service activities.

1. Does not increase the intensity of any use;

Response: The proposed modifications to the church property will not add square footage to the church use or otherwise result in an increase in activity or use of the site. The overall amount of parking on the site will be reduced by 10 spaces.

2. Meets all requirements of the underlying zone relating to building size and location and off-street parking and the standards of Title 19;

Response: Applicable standards from Title 19 include only those related to off-street parking and access. No other elements regulated by Title 19 (such as building size and location) will be impacted by the proposed modifications.

- Overall parking on the church site will be reduced by 10 spaces to accommodate the new access points described above. Per Table 19.605.1 in the code, the minimum parking standard for a church is 1 space per 4 seats and the maximum is 1 space per 2 seats. The church has 400 seats. Therefore, the parking minimum is 100 spaces and the maximum is 200 spaces. The church currently has 225 parking spaces, which exceeds the allowable maximum. This is due to the fact that no parking maximums were in place when the church was constructed in 1984. Removing 10 parking spaces from the church site will bring the site closer to conformance with the existing code.
- The Public Facility Improvements standards in Chapter 19.703 require that all development has safe access to a public street. The proposed modifications to the church site will facilitate safe access to the site by improving the entry-only access point on Rusk Road. These improvements will help ensure that the entry-only access point is not used as an exit. The proposed improvements will also provide a safe access point for the church to Kellogg Creek Drive. That access point can be used as both an entry and exit for the church site.
- Per MMC 19.606.2.C, perimeter landscape buffers are required where the parking area abuts another property. As shown on Sheet C200, a 6-foot landscape buffer will be provided around the parking lot

along the northern and western edges of the parking lot where it abuts the adjacent property. The buffer will be landscaped consistent with MMC 19.606.2.C.2, including one tree for every 40 lineal feet.

3. Does not result in deterioration or loss of any protected natural feature or open space, and does not negatively affect nearby properties;

Response: The proposed parking lot and access modifications will not have any impact on natural resources or open spaces in the vicinity of the site. All proposed modifications to the church site will occur within the boundaries of the existing parking lot and will not negatively affect nearby properties.

4. Does not alter or contravene any conditions specifically placed on the development by the Planning Commission or City Council; and

Response: The most recent review of the church property was conducted in September 2014 when the Turning Point Church requested a CSU Minor Modification and Natural Resource Review in order to remove a section of off-street parking spaces from the church parking lot and replace them with landscaping (grass and ground cover). That decision (File Nos. CSU-14-06 and NR-14-06) did not include any conditions of approval. In the findings for that decision, prior conditions of approval for the church site were listed as follows:

The property was annexed into the city limits in 1981 (land use file #A-80-07). In 1983, use of the site for pasture land and grazing for horses was approved as a conditional use (file #C-83-08); however, the conditional use application was subsequently withdrawn.

The site was approved as a CSU for church use by the Milwaukie Assembly of God in 1984 (file #CS-84-02). Conditions of approval included requirements to provide plans for landscaping, public facilities, and exterior lighting, as well as a traffic study and right-of-way dedication along Rusk Rd and Kellogg Creek Dr.

In 1987, the City Council approved a zone change for the western portion of the property, from R-10 to R-3, along with a conditional use approval for senior housing and an amendment to the Comprehensive Plan map (file #CPA-87-01, ZC-87-05, CU87-05, with Ordinance #1639). The senior housing project (called Parkside Village) was never developed.

In 1992, the City approved a 5,500-sq-ft addition to the church building (file #CSO-92-03, NR-92-01). Conditions of approval included requirements to install the approved landscaping and to direct lighting away from the designated natural resource area.

In 1997, the Planning Commission denied a sign permit request to locate an electronic reader board sign on the property near the intersection of Highway 224 and Rusk Rd (file #SP-97-01).

The proposed modifications to the church parking lot and access will not contravene or alter any of the conditions of approval from the above-listed decisions.

5. Does not cause any public facility, including transportation, water, sewer and storm drainage, to fail to meet any applicable standards relating to adequacy of the public facility.

Response: No public facility will fail to meet adequacy standards as a result of the proposed modifications to the church property. The only public facility that will be impacted by the proposed modifications is public transportation. The proposed modifications at the entry-only access point on Rusk Road combined with the new access point on Kellogg Creek Drive (through the subdivision site) will provide an overall improvement to safe access for the church property. The “no exit” requirement onto Rusk Road will be reinforced and a safe and convenient exit onto Kellogg Creek Drive will be created. The new access point on Kellogg Creek Drive will be designed consistent with applicable standards.

Section 19.1200 Solar Access Protection

19.1203.3 Design Standard

At least 80% of the lots in a development subject to these provisions shall comply with one or more of the options in this subsection; provided a development may, but is not required to, use the options in Subsections 19.1203.3.B or C below to comply with Section 19.1203.

A. Basic Requirement

A lot complies with Subsection 19.1203.3 if it:

1. Has a north-south dimension of 90 ft or more; and

2. Has a front lot line that is oriented within 30 degrees of a true east-west axis (see Figure 19.1203.3).

C. Performance Option

In the alternative, a lot complies with Subsection 19.1203.3 if:

1. Habitable structures built on that lot will have their long axis oriented within 30 degrees of a true east-west axis, and at least 80% of their ground floor south wall will be protected from shade by structures and nonexempt trees using appropriate deed restrictions; or

Response: There are a total of 92 lots proposed as part of this subdivision. As shown on the Preliminary Plat (Sheet C201 in Exhibit A), 32 of the lots (about 35 percent) will have a north-south dimension of 90 feet or greater, 48 of the lots (about 52 percent) will have a north-south dimension of 86 feet or greater, and 64 lots (about 70 percent) will have a north-south dimension of 80 feet or greater. All of those lots have a front lot line that is oriented within 30 degrees of an east-west axis.

For the remaining 28 lots, structures will have their long axis oriented within 30 degrees of an east-west axis. Because the structures will be attached homes in sets of four units, the south-facing walls of units will be protected by the unit attached to it, or by the four-plex structure directly south of it (there will be 10 feet between four-plexes). The only units without shade protection will be those three units at the southern-most end of the east-west oriented structures (Lots 44, 72 and 92 on the Preliminary Plat in Exhibit A).

Because the proposed subdivision does not quite meet the standard of 19.1203.3 above, an adjustment to the standard is requested, consistent with the criteria established in 19.1203.5 below.

19.1203.5 Adjustment to Design Standard

The Director shall reduce the percentage of lots that must comply with Subsection 19.1203.3, to the minimum extent necessary, if he or she finds the applicant has shown it would cause or is subject to one or more of the following conditions.

A. Adverse Impacts on Density, Cost, or Amenities

1. If the design standard in Subsection 19.1203.3.A is applied, either the resulting density is less than that proposed, or on-site site development costs (e.g., grading, water, storm drainage, sanitary systems, and road) and solar-related off-site site development costs are at least 5% more per lot than if the standard is not applied. The following conditions, among others, could constrain the design of a development in such a way that compliance with Subsection 19.1203.3.A would reduce density or increase costs per lot in this manner. The applicant shall show which, if any, of these or other similar site characteristics apply in an application for a development:

b. There is a significant natural feature on the site, identified as such in the Comprehensive Plan or Development Ordinance, that prevents given streets or lots from being oriented for solar access, and it will exist after the site is developed;

Response: As noted above, 32 of the proposed lots meet the basic requirement in MMC 19.1203.3.A above and 25 lots meet the performance option in MMC 19.1203.3.C above. As such, a total of 57 lots comply with the standard, which is 61 percent of the total proposed lots. Therefore, an adjustment is requested to reduce the percentage of lots required to meet MMC 19.1203 to 61 percent.

If the design standard in 19.1203.3 is applied to the proposed subdivision, the resulting density would be less than what is proposed. The site has numerous physical constraints that limit site design options, including significant natural resources (floodplain, habitat area, Mount Scott Creek and wetlands) and the existing church property. Furthermore, the site has split zoning (R-10 and R-3), which adds more complexity in terms of site design. For all these reasons, the applicant is proposing a Planned Development on the site, which allows greater flexibility to design the site efficiently and economically within the context of the various constraints. The proposed site design minimizes impacts to natural resources while allowing the applicant to develop the site efficiently and in a way that is financially feasible. Reconfiguring the site so that all lots meet the solar access standards would result in significantly fewer lots, and potentially greater impacts to the natural resource areas. For these reasons, an adjustment is appropriate.

IV. CONCLUSIONS

As established in the discussion and responses provided in this narrative, the proposed subdivision is consistent with City standards and criteria. Approval of this application will facilitate development of a project that will preserve and protect natural resources, contribute to the overall variety of housing types and development patterns in Milwaukie, and provide a needed housing type in close proximity to a large employment center.

ATTACHMENT 3a.3

KELLOGG CREEK
Milwaukie, Oregon

Supplemental Information for a Type III Variance Request

April 2017

Applicant:
Brownstone Development, Inc.
47 South State Street
Lake Oswego, OR 97934

Prepared by:
DOWL
720 SW Washington Street, Suite 750
Portland, Oregon 97205
(971) 280-8641

The responses below should be used to replace the variance responses starting on page 23 of the previously submitted Planned Development narrative.

Section 19.911 Variances

19.911.3 Review Process

C. Type III Variances

Type III variances allow for larger or more complex variations to standards that require additional discretion and warrant a public hearing consistent with the Type III review process. Any variance request that is not specifically listed as a Type II variance per Subsection 19.911.3.B shall be evaluated through a Type III review per Section 19.1006.

Response: The applicant is requesting two variances:

- A variance is requested to reduce the 45-foot driveway spacing standard in MMC 12.16.040 for lot 72 of the proposed subdivision. Specifically, MMC 12.16.040.C.4.a states that the distance between the nearest edge of a driveway apron to the nearest intersecting street face of curb must be at least 45 feet. The driveway apron for Lot 72 is approximately 26 feet from the nearest intersecting street face of curb, which falls short of meeting the standard. This type of variance request is not specifically listed as a Type II variance; therefore a Type III variance is required.
- A variance is requested to the natural resource standards in MMC 19.402 pertaining to applications for subdivisions. Specifically, MMC 19.402.13.I.2.a states that, "All proposed lots shall have adequate buildable area outside of the WQR and HCA." As indicated in the Natural Resources Report in Exhibit J (see Figure 5) approximately 31 of the proposed 92 lots do not meet this standard. Those lots are lots 29-32, 33-35, 63-71, and 73-87. This type of variance request is not specifically listed as a Type II variance; therefore a Type III variance is required.

19.911.4 Approval Criteria

B. Type III Variances

An application for a Type III variance shall be approved when all of the criteria in either Subsection 19.911.4.B.1 or 2 have been met. An applicant may choose which set of criteria to meet based upon the nature of the variance request, the nature of the development proposal, and the existing site conditions.

1. Discretionary Relief Criteria

a. The applicant's alternatives analysis provides, at a minimum, an analysis of the impacts and benefits of the variance proposal as compared to the baseline code requirements.

Response:

Lot 72 driveway spacing variance. In order to meet the 45-foot driveway spacing standard, lot 72 (and subsequently, the whole block of lots north of lot 72) would need to shift to the north approximately 20 feet, which would create further impacts to the natural resource area. Allowing the driveway to remain in its current location will help minimize impacts to natural resources. Potential impacts from allowing a driveway that does not meet the spacing standard will be minimal and can be mitigated as described in the response to criterion (c) below.

Adequate buildable area variance. As noted above, the requested variance impacts 31 of the 92 lots in the proposed Planned Development subdivision. Without the variance, those 31 lots could not be retained and the resulting Planned Development would be reduced to approximately 61 lots. That represents a significant reduction in the number of proposed lots, which would have a number of impacts:

- Minimum density for the Planned Development subdivision was calculated per the table below. As shown, the minimum density is 66 units. Loss of 31 lots in the proposed subdivision would result in a project that **does not** meet the minimum density requirement established by the code.

Zoning	Gross Acres	FEMA Mapped Floodway	Right-of-way	Additional Open Space[1]	Net Acres[2]	Minimum Density
R-3	9.58	1.20	1.36	1.99	5.03	58 units
R-10	4.44	0.50	0.87	0.98	2.09	7 units
Totals	**14.02**	**1.70**	**2.23**	**2.97**	**7.12**	**66 units**

1. Required open space is one-third of the gross acreage (per PD provisions in 19.311.3.E). The above calculations assume a portion of the open space overlaps with floodway. Additional open space needed to achieve one-third of the gross is indicated here.
2. Net acres = gross acres – (floodway + right-of-way + open space)
3. Minimum density is based on 11.6 units per acre for R-3 and 3.5 units per acre for R-10

- As proposed, the project proposes 92 lots, which represents an approximately 15 percent increase in the allowed maximum density for the site. The Planned Development provisions in MMC 19.311 allow a density bonus up to 20 percent if the project can demonstrate that it is "outstanding in planned land use and design" and provides amenities that would not otherwise be provided. This project proposes a number of design features and amenities that were included specifically to justify the proposed density increase. However, if the number of lots is reduced, the density bonus is no longer applicable and those amenities would no longer be necessary. In other words, without the proposed variance, project amenities such as the open space trail, additional landscaping, and community garden would not be provided.
- Although the proposed variance will result in impacts to areas of mapped natural resources on the site, those impacts will be minimized and mitigated. The result of the mitigation and enhancement activities will be an overall improvement in the quality of natural resource areas on the site. This is described in more detail in the responses below.
- As discussed in more detail below, the proposed variance will allow the project to provide 92 units of a needed housing type (attached single-family residential) for the City. Without the variance, the ability of the project to provide this type of housing (attached ownership units) at the identified price point (low to mid $300,000 range) will be constrained.

The table below summarizes the impacts and benefits of the proposed project under baseline code requirements (i.e., without the variance) versus the proposed project with the requested variance.

Issue	Project without Variance	Project with Variance
Impacts natural resource areas	Minimal impacts to natural resources	HCA impacts: 1.06 acres WQR impacts: 0.80 acres
Improves and restores natural resource areas	No	Yes
Meets Minimum Density	No	Yes
Provides Community Amenities	No	Yes
Provides Needed Housing	Unlikely to provide needed attached single family housing type	Provides 92 attached single family units - providing a housing type that is identified as needed in the City's HNA

b. The proposed variance is determined by the Planning Commission to be both reasonable and appropriate, and it meets one or more of the following criteria:

(1) The proposed variance avoids or minimizes impacts to surrounding properties.

Response:

Neither variance request will have impacts to surrounding properties. The requested variances are internal to the subdivision site and will not change how the development interacts with, or impacts, surrounding uses. The Traffic Impact Study provided in Exhibit G demonstrates that traffic impacts from the proposed subdivision , with the requested variances, will not negatively impact functionality or safety of the public street system.

(2) The proposed variance has desirable public benefits.

Response:

Lot 72 driveway spacing variance. The proposed variance will help to minimize impacts to the natural resources located on the site.

Adequate buildable area variance. The proposed variance will provide a number of public benefits that would otherwise not be provided.

- As noted above, the variance will allow the proposed Planned Development to achieve 92 lots, which utilizes the density bonus allowed by the Planned Development provisions. In response to the density bonus, the project includes public amenities (open space trail, community garden and additional landscaping). Without the variance, those public amenities would not be provided.
- This project specifically responds to the need for additional single family attached housing in Milwaukie. A recent housing needs analysis[1] was prepared for the City to forecast housing needs over the next 20 years. That analysis identifies a need for over 1,000 new housing units. The majority (71 percent) of that housing is projected to be ownership housing, over half of which is projected to be an attached housing type. The proposed variance will allow the project to provide 92 units of attached housing for ownership, thereby supporting the City's goal to provide more of this type of needed housing. Without the variance, it is likely that the project would shift to a different housing type with larger lots and at a higher price point that would not provide the attached housing type needed in the City.

  A memo prepared by Johnson Economics states the following (emphasis added):

  "The proposed development is consistent with the observed trends in the residential market, and is expected to deliver a product that is consistent with identified market demand. ***The subject site is particularly well suited for this type of development,*** *with proximate parks and open space to complement the limited yard space provided in a townhome configuration. We would expect the project to* ***appeal to a cost-sensitive starter family market****, which will value the local amenity mix as well as proximity to employment and commercial services.*

  The development is requesting a Planned Development approval, which would allow for flexibility to deal with the site and natural resources. The site is split zoned, with portions zoned either R-10 or R-3. The R-10 zoning has a minimum lot size of 10,000 square feet, and would yield few units. Even under a duplex scenario, the zoning would require 14,000 square feet per duplex. The R-3 zoning allows for 3,000 square foot lots sizes, but with the level of natural resource on the site, a development would not be able to meet minimum density. ***As zoned, any development on the site would necessarily be at a price point that would not be responsive to the local demand.***

[1] Housing and Residential Land Needs Assessment, prepared by Johnson Economics, August 2016.

The proposed townhome development would allow for family-oriented units at a price point that meets identified demand, and can provide workforce housing. ***It would help realize and expand the City's housing capacity, increasing housing options for local residents as well as locally-employed households.****"*

Without the requested variance to allow 92 lots, the project would not be able to deliver housing at a price point desired by the community and needed in the region.

(3) The proposed variance responds to the existing built or natural environment in a creative and sensitive manner.

Response:

Lot 72 driveway spacing variance. This criterion is not applicable to the requested driveway spacing variance.

Adequate buildable area variance. The Planned Development site has a large amount of mapped natural resources that significantly limits the developable area. The proposed variance responds to this condition by ensuring that development encroachment areas are limited to areas that provide low habitat/water quality function and value. Mitigation proposed to compensate for encroachment into the mapped areas will result in an overall improvement in the quality and value of natural resource areas on the site.

Although impacts to natural resources will occur, those impacts have been identified and documented in the Natural Resource Report (Exhibit J). The report identifies areas of water quality resource (WQR) on the site and rates their quality according to definitions provided in MMC Chapter 19.402. The following summary describes those WQR areas:

- WQR area south of Mt. Scott Creek is Class A, or "good" quality. That area **is not** being impacted by the proposed variance.
- WQR area west of Wetland A is Class A, or "good" quality. That area **is not** being impacted by the proposed variance.
- WQR areas east and south of Wetland A are Class C, or "poor" quality. Those are the areas that will be impacted by the proposed variance.

In addition, the habitat conservation area (HCA) located at the northern edge of the proposed subdivision (impacted by lots 73-86) is not good quality wildlife habitat. This area is primarily composed of non-native, weedy plant species and lacks vegetation structure and diversity. As such, it provides less wildlife habitat than those areas that are forested and have a more diverse understory. The Natural Resources Report states the following:

"The development has been designed taking into consideration the City's building, design, and development requirements, while avoiding and minimizing resource impacts to the greatest extent practicable, and still allowing the project to be financially feasible. As such development in the WQR and HCA has been limited to the outer potions of each, in areas that are of lowest quality."

The proposed variance responds to the natural environment by limiting impacts to primarily those natural resource areas that have been identified as low or poor quality. Mitigation and enhancement activities on the site (discussed more in the response below) will ensure that the overall quality of natural resource areas will be improved.

c. Impacts from the proposed variance will be mitigated to the extent practicable.

Response:

Lot 72 driveway spacing variance. Possible impacts from the proposed driveway spacing variance include potential conflicts between vehicles accessing the lot 72 driveway and vehicles traveling on Streets A and B. These conflicts will be minimized and mitigated as follows:

- The intersection of Streets A and B will be controlled with stop signs, which are anticipated to be placed on Street A.
- There will be adequate visibility at the lot 72 driveway for drivers to check for oncoming vehicles before backing out of the driveway.
- Traffic volume on Streets A and B is expected to be low, thus minimizing potential for conflicts.
- Due to low traffic volumes and stop signs located on Street A, queuing lengths for vehicles traveling southbound on Street B and turning onto Street A are not anticipated to interfere with the driveway apron for lot 72.

Adequate buildable area variance. As proposed, the subdivision will impact 1.06 acres of habitat conservation area and 0.80 acres of water quality resource. The Natural Resource Report provided in Exhibit J describes in detail how the natural resource impacts from the proposed variance will be minimized and mitigated. Those measures include:

- A construction management plan that describes how erosion and sediment control measures will protect natural resource areas during construction activities.
- A tree protection plan that describes how trees will be protected during construction.
- Natural resource areas that will be temporarily disturbed during construction will be restored and improved through removal of invasive plant species and replanting with native species suitable to the site that will enhance habitat value.
- Natural resource areas that will be permanently disturbed will be mitigated on the site consistent with requirements in MMC Chapter 19.402 and with federal requirements for mitigation of wetland impacts (through the joint DSL and COE permit process). Mitigation areas are shown on Figure 9 and will include:
    - Inventory and removal of man-made debris and noxious materials that are located on the site, as identified in the Geo-Technical Report in Exhibit F.
    - Removal of non-native, invasive plant species from the riparian corridor along Mt. Scott Creek.
    - Installation of tree and shrubs within the remaining natural resource areas and floodplain storage area to restore a diverse, native plant community.
    - Bare or open soil areas will be seeded to 100 percent surface coverage with native grasses and other groundcover species.
    - Woody material will be placed in the mitigation and restoration areas after construction to maximize survival of the plantings.
    - Monitoring of the mitigation and restoration areas will occur in the two years following construction. Annual monitoring reports will be submitted to the City consistent with requirements in MMC 19.402.

In addition to required mitigation, the project will provide further enhancement to two areas on the site. Those areas are shown as Additional Enhancement Areas A and B on the revised Figure 9 from the Natural Resources Report. Enhancement Area A is approximately 0.34 acres and is located north of Mt. Scott Creek. Enhancement Area B is approximately 0.12 acres and is located south of Mt. Scott Creek and Highway 224 in the eastern

corner of the site. Both of those areas will be enhanced through the removal of man-made debris, removal of invasive plant species and planting with native trees, shrubs and seed mix. Those plantings will improve the native plant community, vegetation structure and diversity – all of which will improve the overall quality of wildlife habitat on the site. The planting lists for the mitigation area and the two additional enhancement areas are shown on Figure 9A of the Natural Resources Report.

As a result of mitigation and enhancement activities on the site, the Natural Resource Report describes the overall impacts of the project as follows:

> *"The proposed project is not anticipated to have any adverse impacts to water quality. The use of erosion and sediment controls during construction will prevent sediment-related impacts to water quality. The proposed project is not anticipated to result in additional nutrient inputs to the stream, and the restoration of the floodplain on the south side of Mt. Scott Creek will increase shade on the stream as the riparian plantings mature, helping to reduce water temperatures in the stream."*

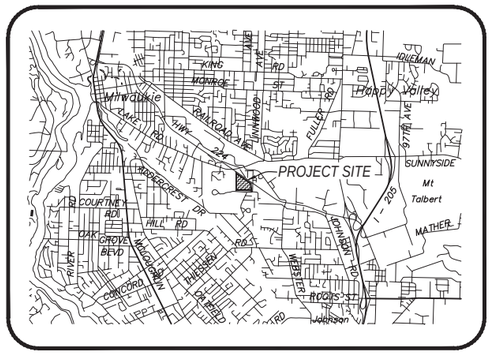
The report further states that (emphasis added),

> *"Implementation of the proposed mitigation will ensure the proposed project minimizes adverse effects to the ecological functions of the WQR and loss of habitat, as follows:*
>
> - *The minimization of areal impacts as well as the proposed plantings to restore native plant communities on the south side of Mt. Scott Creek, along the northeast and south sides of Wetland A, and within the floodplain storage area will ensure that the WQR continues to provide vegetated corridors that separate protected water features from development.*
> - *As the proposed tree and shrub plantings south of Mt. Scott Creek, around Wetland A, and within the floodplain storage area mature, they will increasingly provide microclimate regulation and shade for the stream and wetland, and* ***provide better microclimate regulation and shade as compared to the existing plant communities.***
> - *As the proposed tree and shrub plantings south of Mt. Scott Creek, around Wetland A, and the floodplain storage area mature, they* ***will provide more effective streamflow moderation during high flow events than the herbaceous plant community, predominantly composed of reed canarygrass, that is present under existing conditions.***
> - *The diverse plant community within the WQR, HCA and floodplain storage area will continue to provide water filtration, infiltration, and natural purification functions. The proposed project will not adversely affect these functions.*
> - *The proposed restoration plantings and the resulting diverse plant community within the WQR, HCA and floodplain storage area will continue to provide bank stabilization and sediment and pollution control functions. The proposed project will not adversely affect these functions.*
> - *Trees will remain within the vegetated corridor following construction, and therefore, the WQR will continue to provide the potential for large wood recruitment and retention functions. No impacts are proposed for the creek, and therefore, there will be no adverse impact on channel dynamics.*
> - *Because the WQR will continue to be vegetated with a diverse plant community, the proposed project will not adversely affect the resource's ability to provide organic inputs to the stream and riparian area."*

KELLOGG CREEK

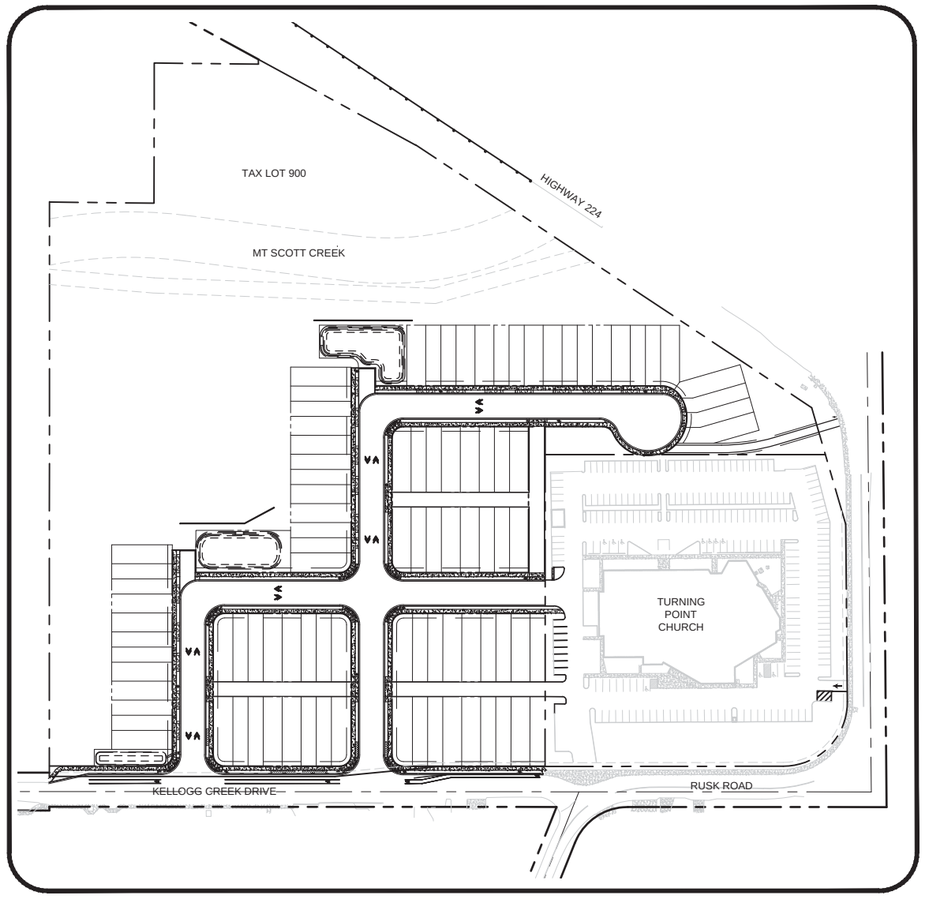
Planned Development Subdivision Application
Milwaukie, Oregon

February, 2017



VICINITY MAP

SCALE: NTS



SITE MAP

SCALE: NTS

SHEET INDEX

PROJECT TEAM

APPLICANT/OWNER
BROWNSTONE DEVELOPMENT, INC.
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(503) 358-4460

CIVIL ENGINEER
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PORTLAND OR 97205
(971) 280-8641

LAND USE PLANNER
DOWL
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LANDSCAPE ARCHITECT
DOWL
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PACIFIC HABITAT SERVICES
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PORTLAND, OR 97214
(503) 616-9425

REGISTERED PROFESSIONAL ENGINEER
OREGON
J. SCOTT EMMENS
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KELLOGG CREEK SUBDIVISION

COVER SHEET

BROWNSTONE DEVELOPMENT
MILWAUKIE, OREGON
SE1/7 NE1/4 SEC. 6 T2S R2E W.M. EXISTING TAXLOTS 600, 700, 900, 901

PROJECT	14258-01
DATE	04/07/2017

SHEET

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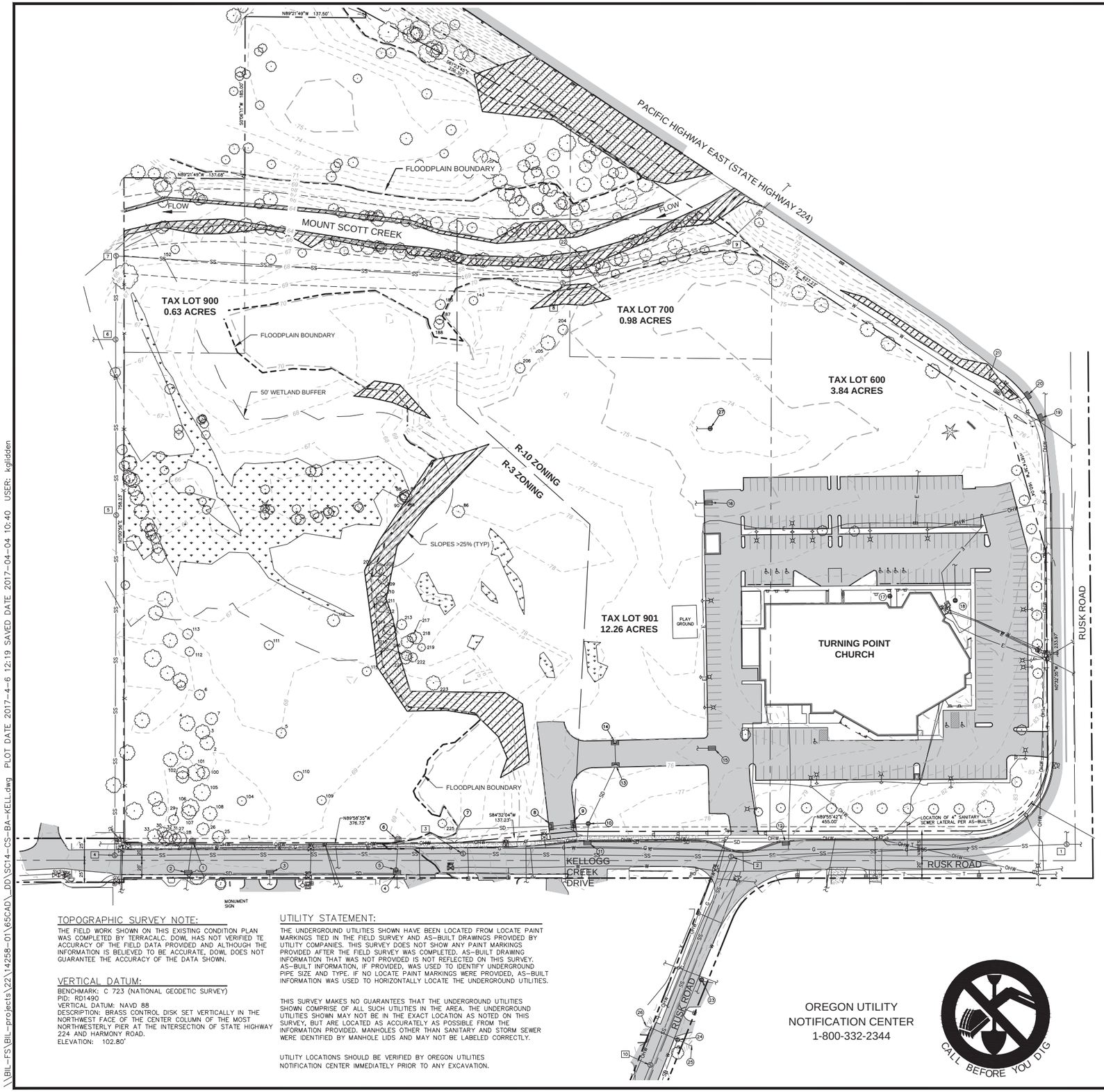

LEGEND:

- EXISTING ASPHALT
- EXISTING CONCRETE
- EXISTING GRAVEL
- EXISTING SLOPES GREATER THAN 25%
- EXISTING EXISTING WETLAND
- SD — STORM DRAINAGE LINE
- SS — SANITARY SEWER LINE
- T — UNDERGROUND TELECOMMUNICATION LINE
- E — UNDERGROUND ELECTRIC LINE
- W — UNDERGROUND WATER LINE
- X — FENCE
- OHW — OVERHEAD POWER LINE
- G — GAS LINE
- DECIDUOUS TREE
- CONIFEROUS TREE
- SIGN
- TRAFFIC SIGNAL POLE
- SANITARY SEWER MANHOLE
- STORM DRAINAGE MANHOLE
- CATCH BASIN
- AREA DRAIN
- DITCH INLET
- ELECTRICAL VAULT
- COMMUNICATIONS VAULT
- WATER VAULT
- ELECTRICAL METER
- ELECTRICAL RISER
- WATER VALVE
- WATER METER
- FIRE HYDRANT
- FIRE DEPARTMENT CONNECTION
- SPRINKLER VALVE
- GAS VALVE
- COMMUNICATIONS RISER
- ELECTRIC JUNCTION BOX
- SIGNAL JUNCTION BOX
- BO — BOLLARD
- LIGHT POLE
- SIGNAL POLE
- PEDESTRIAN SIGNAL POLE
- UTILITY POLE
- GUY ANCHOR
- HANDICAPPED PARKING SPACE
- EXTG MAJOR CONTOUR
- EXTG MINOR CONTOUR
- FLOOD PLAIN (100 YEAR)
- LOT LINE
- BOUNDARY LINE
- RIGHT OF WAY LINE
- CENTERLINE
- ZONING DELINEATION

SANITARY SEWER TABLE:

1. SANITARY SEWER MANHOLE
   RIM=82.78'
   IE 8" CONC (N)=68.77'
   IE 12" CONC (E)=68.54'
   IE 12" CONC (W)=68.50'
2. SANITARY SEWER MANHOLE
   RIM=79.05'
   IE 8" CONC (S)=68.12'
   IE 12" CONC (E)=67.60'
   IE 12" CONC (W)=67.55'
3. SANITARY SEWER MANHOLE
   RIM=71.50'
   IE 12" CONC (E)=63.83'
   IE 12" CONC (W)=63.83'
4. SANITARY SEWER MANHOLE
   RIM=68.97'
   IE 12" CONC (E)=62.99'
   IE 12" CONC (N)=62.54'
5. SANITARY SEWER MANHOLE
   RIM=66.79'
   IE 12" CONC (S)=60.82'
   IE 12" CONC (N)=60.78'
6. SANITARY SEWER MANHOLE
   RIM=66.57'
   IE 12" CONC (S)=53.59'
   IE 42" CONC (N)=51.77'
   IE 42" CONC (W)=51.68'
7. SANITARY SEWER MANHOLE
   RIM=65.51'
   IE 42" CONC (E)='
   IE 42" CONC (S)='
8. SANITARY SEWER MANHOLE
   RIM=69.73'
   IE 42" CONC (E)=52.94'
   IE 42" CONC (W)=52.94'
9. SANITARY SEWER MANHOLE
   RIM=70.91'
   IE 42" CONC (NE)=53.40'
   IE 42" CONC (W)=53.21'

STORM DRAINAGE TABLE:

1. DITCH INLET
   GRATE='
   IE 12" CPP (S)=66.15'
2. CATCH BASIN
   GRATE=67.40'
   IE 6" PVC (S)=65.95'
   IE 12" CPP (N)=65.93'
   IE 12" CONC (E)=65.88'
3. CATCH BASIN
   GRATE=67.79'
   IE 8" PVC (S)=65.72'
   IE 12" CONC (W)=65.62'
   IE 12" CONC (E)=65.62'
4. CATCH BASIN
   GRATE=68.47'
   IE 12" CONC (W)=65.22'
   IE 12" CONC (NW)=65.42'
   IE 12" CONC (S)=65.17'
5. STORM DRAINAGE MANHOLE
   RIM=68.65'
   IE 12" CONC (N)=65.29'
   IE 12" CONC (SE)=65.58'
6. DITCH INLET
   GRATE=67.83'
   IE 12" CONC (S)=65.69'
7. IE 12" CPP (E)=69.69'
8. CATCH BASIN
   GRATE=75.17'
   IE 12" CPP (E)=70.89'
   IE 12" CPP (W)=70.89'
9. CATCH BASIN
   GRATE=75.11'
   IE 12" CPP (E)=71.41'
   IE 12" CPP (W)=71.41'
10. AREA DRAIN
    GRATE=75.57'
    IE 12" CONC (N)=72.36'
    IE 12" CONC (S)=72.23'
    IE 12" CPP (W)=71.86'
11. CATCH BASIN
    GRATE=76.05'
    IE 12" CONC (E)=74.27'
    IE 12" CONC (N)=73.25'
12. CATCH BASIN
    GRATE=79.51'
    IE 12" CONC (W)=76.32'
13. CATCH BASIN
    GRATE=75.01'
    IE 12" CPP (N)=72.42'
    IE 12" CPP (S)=72.59'
14. CATCH BASIN
    GRATE=75.03'
    IE 12" CPP (S)=72.70'
15. CATCH BASIN/OIL TRAP
    GRATE=76.12'
    WATER LEVEL=75.00'
    COULD NOT OPEN TRAP
16. CATCH BASIN/OIL TRAP
    GRATE=73.86'
    WATER LEVEL=73.16'
    COULD NOT OPEN TRAP
17. AREA DRAIN
    GRATE=77.52'
18. AREA DRAIN/OIL TRAP
    GRATE=77.60'
    WATER LEVEL=76.89'
    COULD NOT OPEN TRAP
19. CATCH BASIN
    GRATE=76.41'
    IE 12" CONC (SW)=74.65'
20. CATCH BASIN
    GRATE=76.14'
    IE 12" CONC (SW)=74.09'
21. IE 16" CPP (E)=72.59'
22. IE 12" PVC (SE)=64.71'
23. AREA DRAIN
    GRATE=77.39'
    IE 3" PVC (S)=76.74'
24. AREA DRAIN
    GRATE=76.08'
    IE 24" CONC (E&W)=71.42'
25. IE 24" CONC (W)=71.63'
26. IE 24" CONC (E)=70.95'
27. AREA DRAIN
    GRATE=72.78'
    WATER LEVEL=72.03'
    COULD NOT OPEN TRAP

TOPOGRAPHIC SURVEY NOTE:

THE FIELD WORK SHOWN ON THIS EXISTING CONDITION PLAN WAS COMPLETED BY TERRACALC. DOWL HAS NOT VERIFIED TE ACCURACY OF THE FIELD DATA PROVIDED AND ALTHOUGH THE INFORMATION IS BELIEVED TO BE ACCURATE, DOWL DOES NOT GUARANTEE THE ACCURACY OF THE DATA SHOWN.

VERTICAL DATUM:

BENCHMARK: C 723 (NATIONAL GEODETIC SURVEY)
PID: RD1490
VERTICAL DATUM: NAVD 88
DESCRIPTION: BRASS CONTROL DISK SET VERTICALLY IN THE NORTHWEST FACE OF THE CENTER COLUMN OF THE MOST NORTHWESTERLY PIER AT THE INTERSECTION OF STATE HIGHWAY 224 AND HARMONY ROAD.
ELEVATION: 102.80'

UTILITY STATEMENT:

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM LOCATE PAINT MARKINGS TIED IN THE FIELD SURVEY AND AS-BUILT DRAWINGS PROVIDED BY UTILITY COMPANIES. THIS SURVEY DOES NOT SHOW ANY PAINT MARKINGS PROVIDED AFTER THE FIELD SURVEY WAS COMPLETED. AS-BUILT DRAWING INFORMATION THAT WAS NOT PROVIDED IS NOT REFLECTED ON THIS SURVEY. AS-BUILT INFORMATION, IF PROVIDED, WAS USED TO IDENTIFY UNDERGROUND PIPE SIZE AND TYPE. IF NO LOCATE PAINT MARKINGS WERE PROVIDED, AS-BUILT INFORMATION WAS USED TO HORIZONTALLY LOCATE THE UNDERGROUND UTILITIES.

THIS SURVEY MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE OF ALL SUCH UTILITIES IN THE AREA. THE UNDERGROUND UTILITIES SHOWN MAY NOT BE IN THE EXACT LOCATION AS NOTED ON THIS SURVEY, BUT ARE LOCATED AS ACCURATELY AS POSSIBLE FROM THE INFORMATION PROVIDED. MANHOLES OTHER THAN SANITARY AND STORM SEWER WERE IDENTIFIED BY MANHOLE LIDS AND MAY NOT BE LABELED CORRECTLY.

UTILITY LOCATIONS SHOULD BE VERIFIED BY OREGON UTILITIES NOTIFICATION CENTER IMMEDIATELY PRIOR TO ANY EXCAVATION.

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NOTIFICATION CENTER
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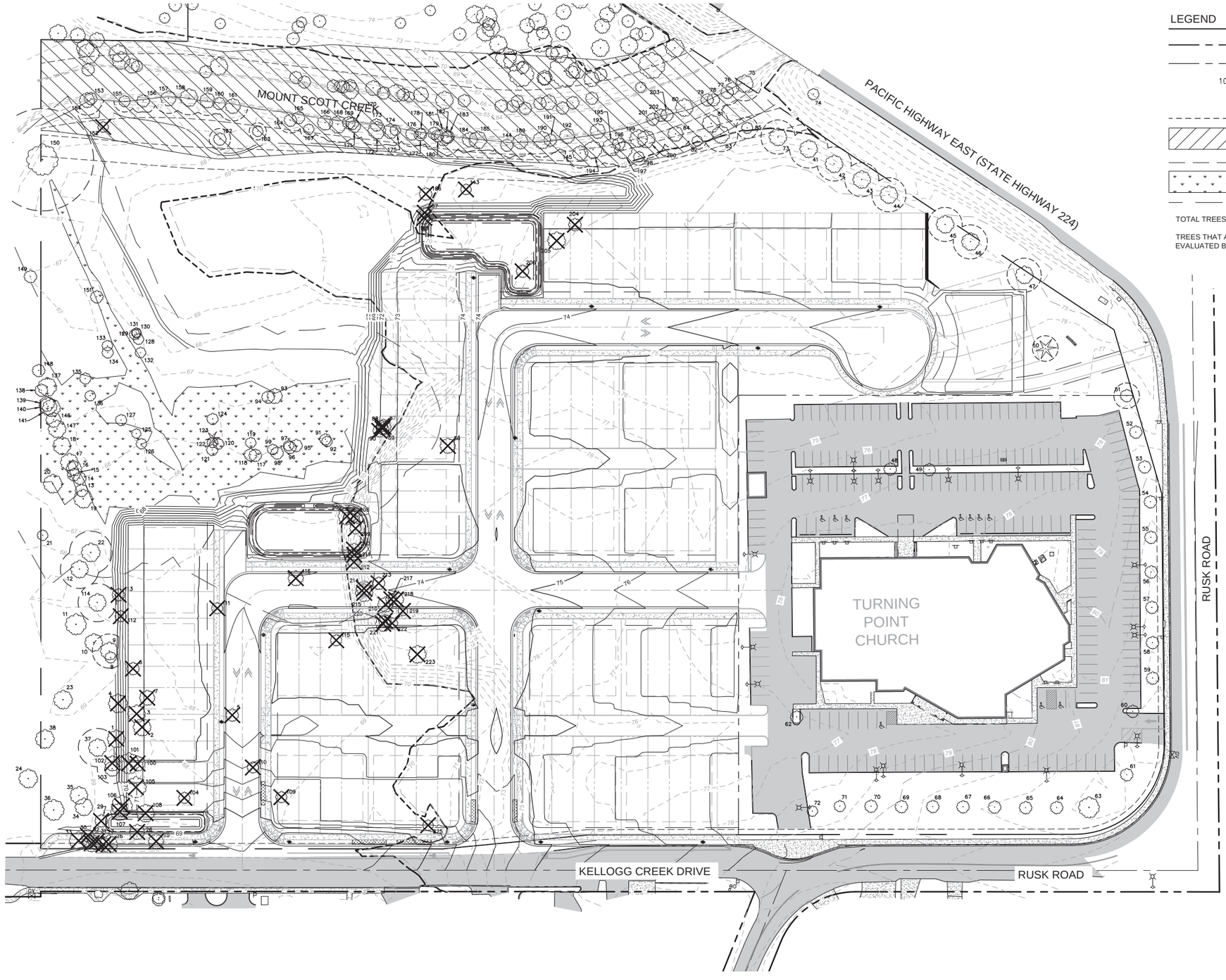
KELLOGG CREEK SUBDIVISION

EXISTING CONDITIONS

BROWNSTONE DEVELOPMENT
MILWAUKIE, OREGON
SEL/7 NE1/4 SEC. 6 T2S R2E W.M. EXISTING TAXLOTS 600, 700, 900, 901

PROJECT	14258-01
DATE	04/07/2017

SHEET
C100



LEGEND

- EXISTING BOUNDARY LINE
- PROPOSED LOT LINE
- 100 — EXISTING TREE TO BE REMOVED
- TREE PROTECTION FENCING
- GIS VEGETATED CORRIDOR
- FLOOD PLAIN BOUNDARY
- WETLAND
- WETLAND BUFFER

TOTAL TREES TO BE REMOVED = 62

TREES THAT ARE NOT NUMBERED HAVE NOT BEEN EVALUATED BEEN BY THE TREE ARBORIST

50 0 50 100
SCALE IN FEET

REGISTERED PROFESSIONAL LANDSCAPE ARCHITECT
OREGON
J. SCOTT EMMENS
EXPIRES: 12/31/2017

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KELLOGG CREEK SUBDIVISION

TREE PROTECTION & REMOVAL PLAN

BROWNSTONE DEVELOPMENT
MILWAUKIE, OREGON
SE1/7 NE1/4 SEC. 6 T2S R2E W.M. EXISTING TAXLOTS 600, 700, 900, 901

PROJECT	14258-01
DATE	04/07/2017

SHEET
C101

Number	Dia (in)	Remove (Y/N)
1	18	Y
2	18	Y
3	18	Y
4	20	N
5	12	Y
6	12	Y
7	14	Y
8	10	N
9	16	N
10	16	N
11	24	N
12	18	N
13	12	N
14	12	N
15	12	N
16	14x2	N
17	16	N
18	18	N
19	20	N
20	20	N
21	8	N
22	20	N
23	20	N
24	20	N
25	14	Y
26	14x2	Y
27	14	Y
28	16	Y
29	12	Y
30	12	Y
31	16	Y
32	16	Y
33	16	Y
34	16	N
35	16x2	N
36	24	N
37	18	N
38	20	N
41	18	N
42	16	N
43	16	N
44	16	N
45	16	N
46	16	N
47	16	N
48	12	N
49	12	N
50	12x2	N
51	12	N
52	12	N
53	12	N
54	12	N
55	14	N
56	12	N
57	12	N
58	12	N
59	12	N
60	12	N
61	12	N
62	10	N
63	24	N
64	12	N
65	12	N
66	12	N
67	12	N
68	12	N
69	12	N
70	12	N
71	12	N
72	8	N
73	16	N
74	10	N
75	16	N
76	12x3	N
77	12	N

Number	Dia (in)	Remove (Y/N)
78	12	N
79	12	N
80	18	N
81	18	Y
82	8	N
83	16	N
84	14	N
85	10	N
86	14	Y
87	14x2	Y
88	10	Y
89	12	Y
90	12	Y
91	10	N
92	8	N
93	14	N
94	12	N
95	12	N
96	12	N
97	8	N
98	12	N
99	8	N
100	14	Y
101	24	Y
102	8x6	Y
103	14	N
104	10	Y
105	24	Y
106	24	Y
107	18	Y
108	16x2	Y
109	10	Y
110	10	Y
111	10x5	Y
112	10	Y
113	12	Y
114	18	N
115	10x8	Y
116	14	Y
117	12	N
118	12	N
119	8x2	N
120	8	N
121	10	N
122	8	N
123	6	N
124	10x2	N
125	6	N
126	8	N
127	10	N
128	8	N
129	8	N
130	6	N
131	6	N
132	8	N
133	8	N
134	10	N
135	10	N
136	8x2	N
137	20	N
138	12	N
139	14	N
140	16	N
141	16	N
143	8	Y
144	12	N
145	14x2	N
146	14	N
147	16x2	N
148	12x3	N
149	12	N
150	48	N
151	12	N
152	8	Y
153	12	N

Number	Dia (in)	Remove (Y/N)
154	14	N
155	10x4	N
156	12x2	N
157	14	N
158	16	N
159	14	N
160	10x3	N
161	14	N
162	10	N
163	8x2	N
164	12	N
165	12	N
166	14	N
167	8	N
168	18	N
169	12	N
170	12	N
171	12	N
172	16x3	N
173	12	N
174	14	N
175	8	N
176	12	N
177	10	N
178	8	N
179	10x2	N
180	12	N
181	16	N
182	12	N
183	12	N
184	14x2	N
185	18x2	N
186	12x3	Y
187	8x2	Y
188	10x2	Y
189	14x2	N
190	16	N
191	12	N
192	14x2	N
193	14	N
194	16	N
195	16	N
196	12	N
197	16	N
198	8	N
199	19	N
200	18	N
201	12	N
202	12	N
203	10x2	N
204	12	Y
205	18x2	Y
206	12x4	Y
207	16	Y
208	12x2	Y
209	10x9	Y
210	12	Y
211	12	Y
212	12	Y
213	12	Y
214	14	Y
215	16	Y
216	14	Y
217	10	Y
218	14	Y
219	6x3	Y
220	12	Y
221	14	Y
222	10	Y
223	16x2	Y
225	8x3	Y

TOTAL TREES TO BE REMOVED = 62

TREES THAT ARE NOT NUMBERED HAVE NOT BEEN EVALUATED BEEN BY THE TREE ARBORIST

REGISTERED PROFESSIONAL ENGINEER
OREGON
J. SCOTT EMMENS
EXPIRES: 12/31/2017

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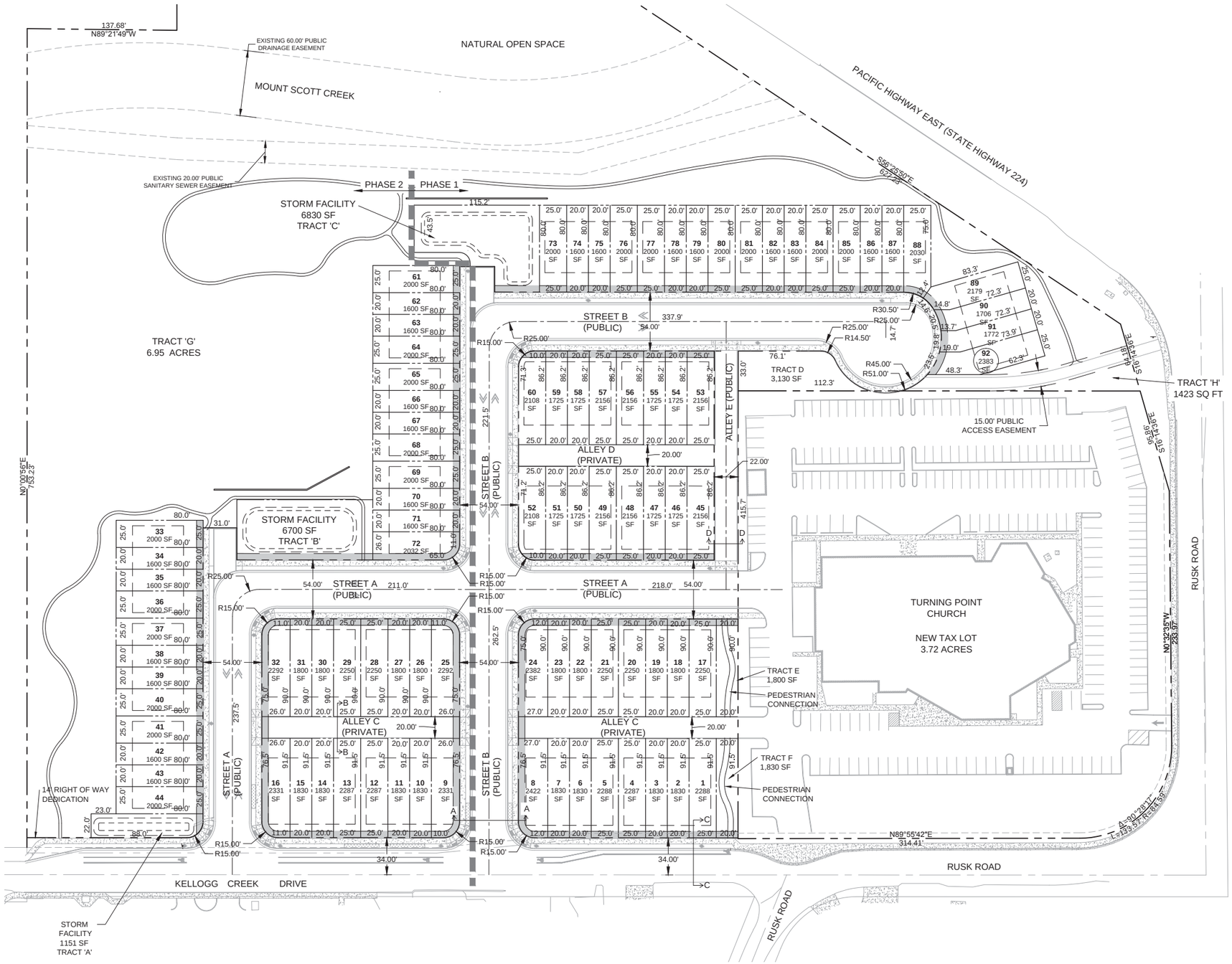
KELLOGG CREEK SUBDIVISION

TREE PROTECTION & REMOVAL TABLE

BROWNSTONE DEVELOPMENT
MILWAUKIE, OREGON
SE1/7 NE1/4 SEC. 6 T2S R2E W.M. EXISTING TAXLOTS 600, 700, 900, 901

PROJECT	14258-01
DATE	04/07/2017

SHEET
C102

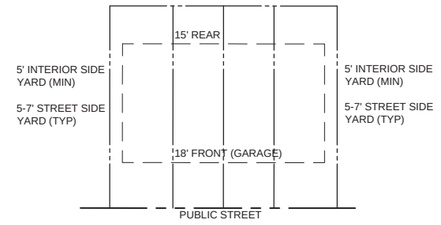


LEGEND:

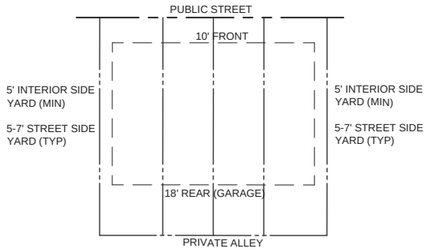
- ZONING BOUNDARY
- EXISTING CENTERLINE
- PROPOSED CENTERLINE
- PROPOSED LOT LINE
- PROPOSED RIGHT OF WAY LINE
- EXISTING RIGHT OF WAY LINE
- EXISTING PROPERTY LINE TO REMAIN
- EXISTING PROPERTY LINE TO REMOVE
- PROPOSED SETBACK LINE
- PROPOSED CURB AND GUTTER
- EXISTING EASEMENT
- PROPOSED 6' PUE

A A

SEE SHEET C202 FOR STREET SECTIONS



FRONT LOAD SETBACKS
1" = 30'



ALLEY LOAD SETBACKS
1" = 30'

50 0 50
SCALE IN FEET

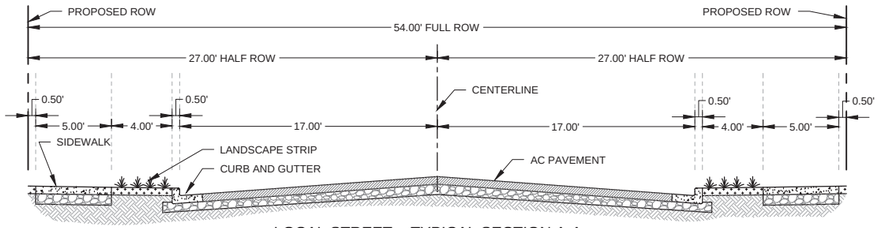
REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 29, 2005
J. SCOTT EMMENS
FOR REVIEW
EXPIRES: 12/31/2017

DOWL
WWW.DOWL.COM

KELLOGG CREEK SUBDIVISION
PRELIMINARY PLAT
BROWNSTONE DEVELOPMENT
MILWAUKIE, OREGON
SE1/7 NE1/4 SEC. 6 T2S R2E W.M. EXISTING TAXLOTS 600, 700, 900, 901

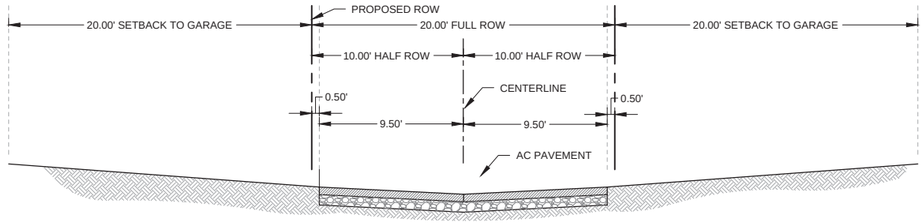
PROJECT	14258-01
DATE	04/07/2017

SHEET
C201



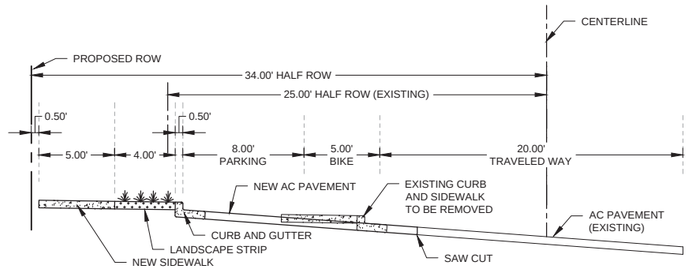
LOCAL STREET - TYPICAL SECTION A-A

HORIZONTAL SCALE: 1" = 5'



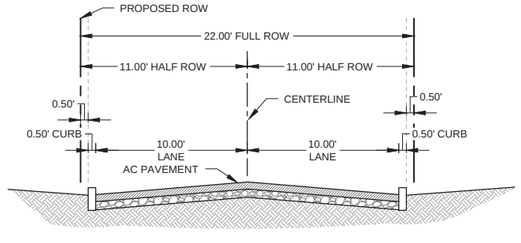
ALLEY - TYPICAL SECTION B-B

HORIZONTAL SCALE: 1" = 5'



KELLOGG CREEK DRIVE - TYPICAL SECTION C-C

HORIZONTAL SCALE: 1" = 5'



PUBLIC ALLEY - TYPICAL SECTION D-D

HORIZONTAL SCALE: 1" = 5'

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 9, 2004
J. SCOTT EMMENS
FOR REVIEW ONLY
EXPIRES: 12/31/2017

DOWL
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KELLOGG CREEK SUBDIVISION

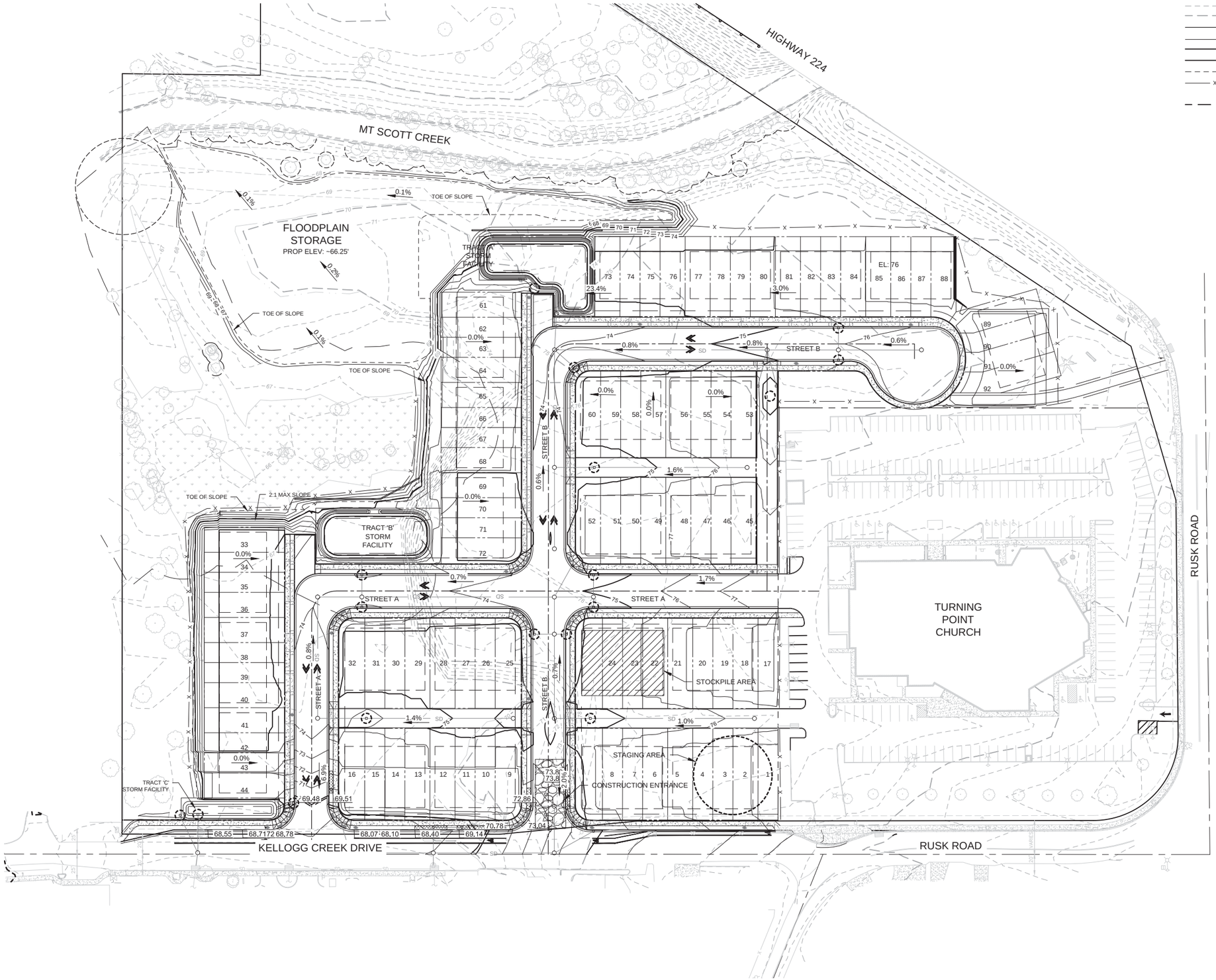
TYPICAL STREET SECTIONS

BROWNSTONE DEVELOPMENT
MILWAUKIE, OREGON
SE1/7 NE1/4 SEC. 6 T2S R2E W.M. EXISTING TAXLOTS 600, 700, 900, 901

PROJECT	14258-01
DATE	04/07/2017

SHEET

C202



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REGISTERED PROFESSIONAL ENGINEER
OREGON
J. SCOTT EMMENS
FOR REVIEW ONLY
EXPIRES: 12/31/2017

DOWL
WWW.DOWL.COM

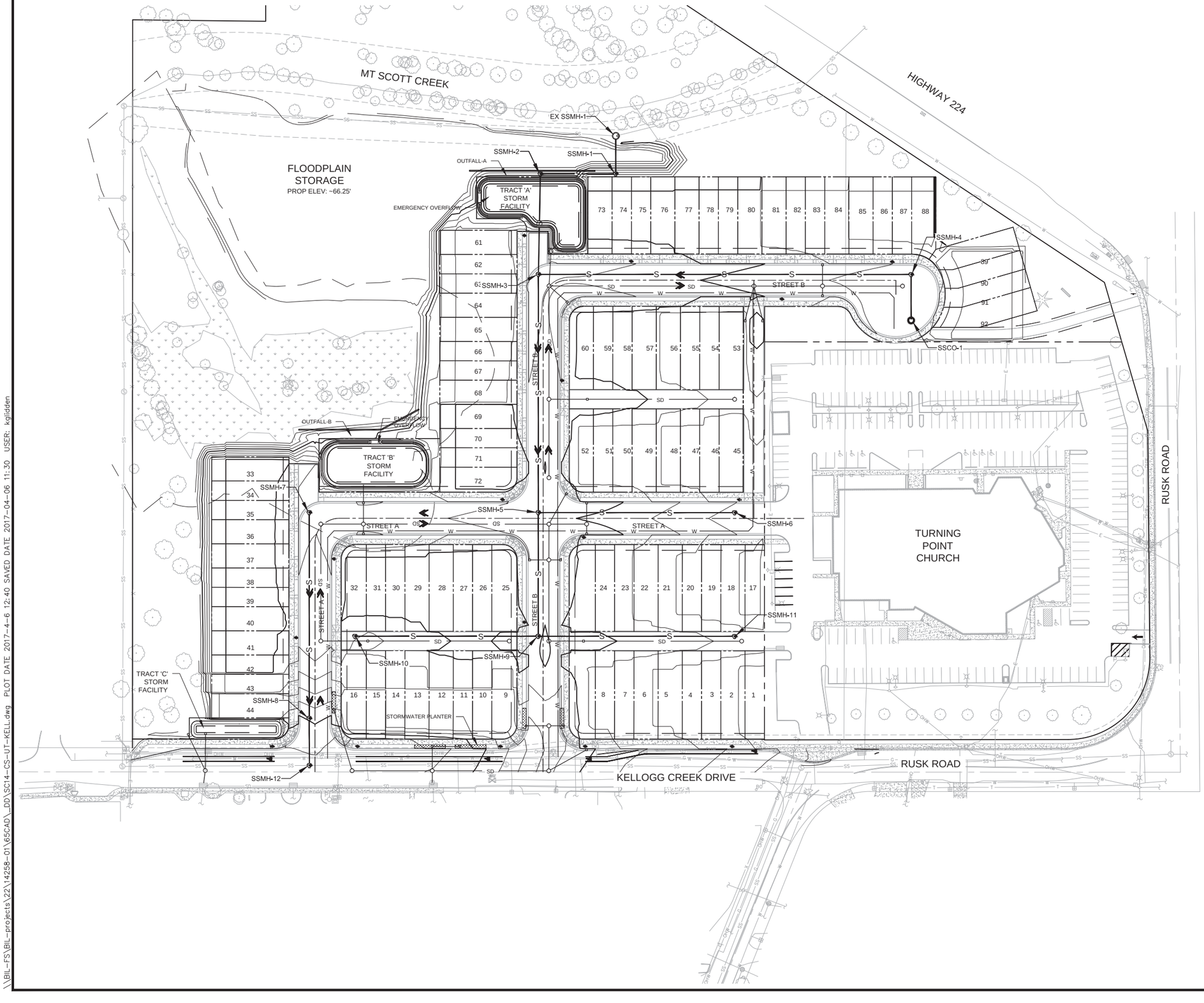
KELLOGG CREEK SUBDIVISION

GRADING PLAN

BROWNSTONE DEVELOPMENT
MILWAUKIE, OREGON
SE1/7 NE1/4 SEC. 6 T2S R2E W.M. EXISTING TAXLOTS 600, 700, 900, 901

PROJECT	14258-01
DATE	04/07/2017

SHEET
C300



LEGEND:

- S - EXISTING SANITARY SEWER LINE
- SD - EXISTING STORM LINE
- W - EXISTING WATER LINE
- EXISTING STORM MAN HOLE
- EXISTING SANITARY MAN HOLE
- EXISTING CATCH BASIN
- EXISTING WATER VALVE
- S - PROPOSED SANITARY SEWER LINE
- SD - PROPOSED STORM LINE
- W - PROPOSED WATER LINE
- PROPOSED SANITARY MAN HOLE
- PROPOSED STORM MAN HOLE
- PROPOSED CATCH BASIN
- PROPOSED STORMWATER PLANTER

NOTES:

1. OUTFALL A AND B: SEE SECTION '6.3 FLOW DISPERSION' OF THE STORM WATER REPORT DATED JANUARY 12, 2017 PREPARED BY DOWL.

MANHOLE DATA

EX SSMH-1
RIM: 69.06
IE IN (8"S) = 55.04
IE IN (42"W) = 52.94
IE OUT (42"E) = 52.94

SSCO-1
RIM: 76.54
IE OUT (8"N) = 67.80

SSMH-1
RIM: 72.64
IE IN (8"W) = 55.28
IE OUT (8"N) = 55.28

SSMH-2
RIM: 69.37
IE IN (8"S) = 55.75
IE OUT (8"E) = 55.75

SSMH-3
RIM: 73.45
IE IN (8"E) = 63.66
IE IN (8"S) = 61.05
IE OUT (8"N) = 56.37

SSMH-4
RIM: 76.46
IE IN (8"S) = 67.52
IE OUT (8"W) = 67.52

SSMH-5
RIM: 75.40
IE IN (8"E) = 66.61
IE IN (8"S) = 63.51
IE OUT (8"N) = 63.51

SSMH-6
RIM: 77.28
IE OUT (8"W) = 68.61

SSMH-7
RIM: 73.52
IE OUT (8"S) = 65.57

SSMH-8
RIM: 70.14
IE IN (8"N) = 64.29
IE OUT (8"S) = 64.09

SSMH-9
RIM: 74.87
IE IN (8"E) = 65.64
IE IN (8"W) = 64.28
IE OUT (8"N) = 64.28

SSMH-10
RIM: 74.10
IE OUT (8"E) = 65.43

SSMH-11
RIM: 76.32
IE OUT (8"W) = 67.65

SSMH-12
RIM: 68.66
IE IN (8"N) = 63.60

50 0 50
SCALE IN FEET

REGISTERED PROFESSIONAL ENGINEER
OREGON JULY 9, 2004
J. SCOTT EMMENS
FOR REVIEW ONLY
EXPIRES: 12/31/2017

DOWL
WWW.DOWL.COM

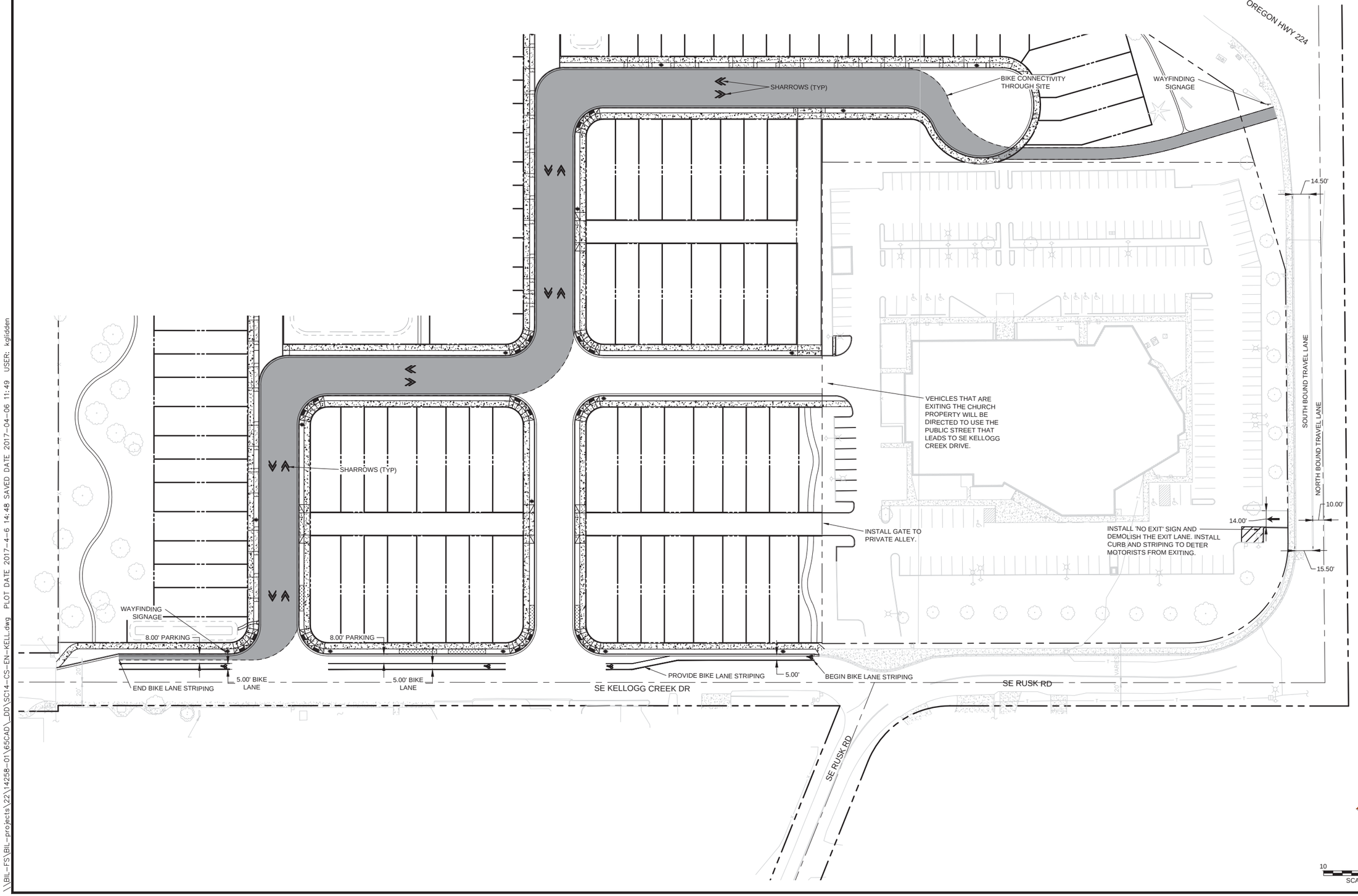
KELLOGG CREEK SUBDIVISION

COMPOSITE UTILITY PLAN

BROWNSTONE DEVELOPMENT
MILWAUKIE, OREGON
SE1/7 NE1/4 SEC. 6 T2S R2E W.M. EXISTING TAXLOTS 600, 700, 900, 901

PROJECT	14258-01
DATE	04/07/2017

SHEET
C400



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REGISTERED PROFESSIONAL ENGINEER
OREGON
J. SCOTT EMMENS
FOR REVIEW ONLY
EXPIRES: 12/31/2017

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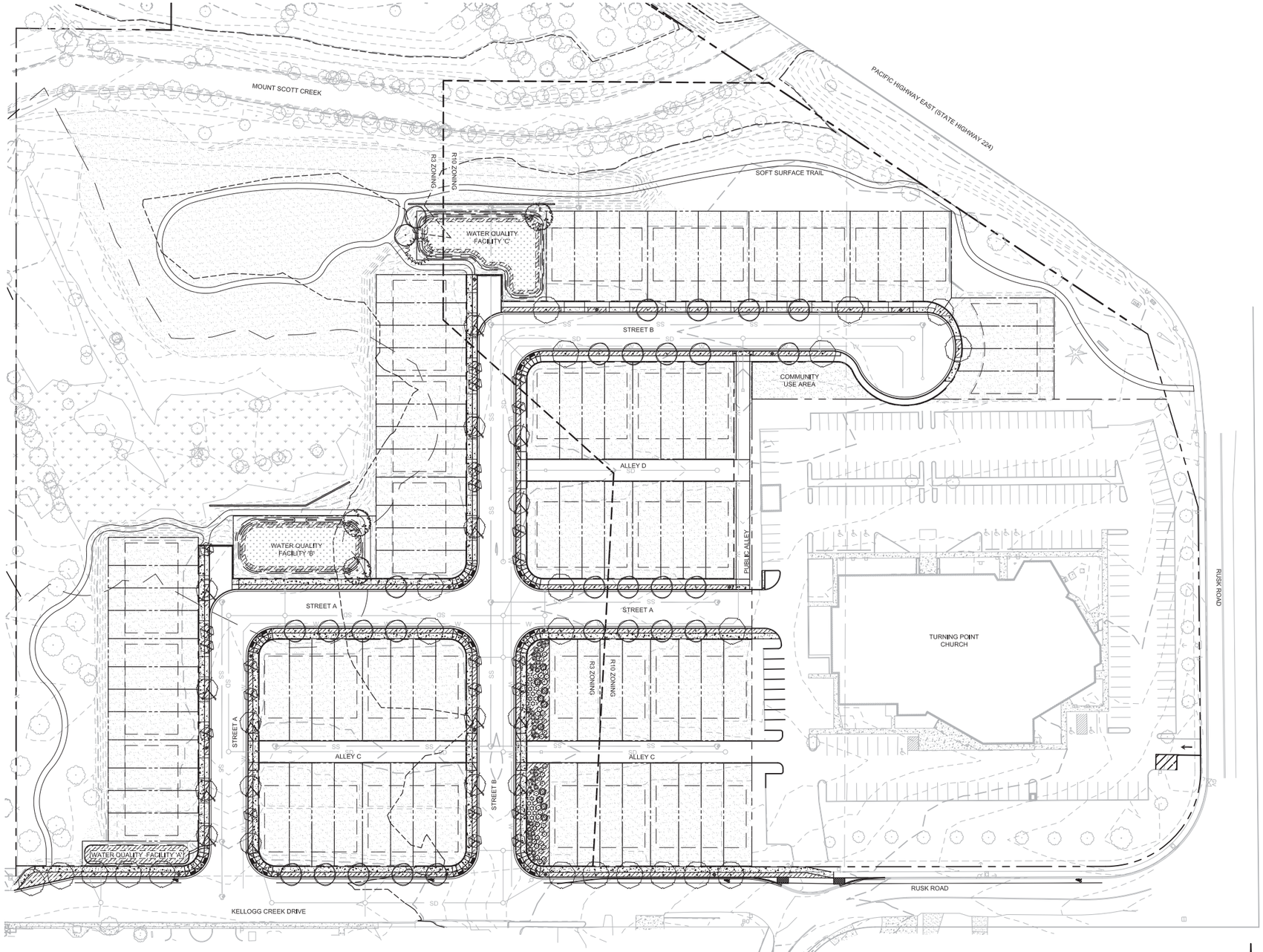
KELLOGG CREEK SUBDIVISION

PUBLIC INTERSECTION

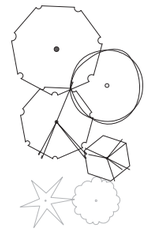
BROWNSTONE DEVELOPMENT
MILWAUKIE, OREGON
SE1/7 NE1/4 SEC. 6 T2S R2E W.M. EXISTING TAXLOTS 600, 700, 900, 901

PROJECT	14258-01
DATE	04/07/2017

SHEET
C500



FRONTAGE AND OPEN SPACE MATERIALS LEGEND



TREES

ITEM	SIZE / SPACING	QUANTITY
A. TRUN. x A. PLAT. 'WARRENRED' PACIFIC SUNSET MAPLE	1.5" CAL. / B&B AS SHOWN	22
ACER GRISEUM PAPERBARK MAPLE	1.5" CAL. / B&B AS SHOWN	27
GINKGO BILOBA 'PRINCETON SENTRY' PRINCETON SENTRY GINKGO	1.5" CAL. / B&B AS SHOWN	16
CARPINUS BETULUS 'FRANS FONTAINE' FRANS FONTAINE HORNBEAM	1.5" CAL. / B&B AS SHOWN	23
EXISTING TREE TO REMAIN	AS NOTED	

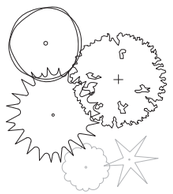
SHRUBS & ACCENTS

ITEM	SIZE / SPACING	QUANTITY
MAHONIA AQUIFOLIUM OREGON GRAPE	1 GAL. AS SHOWN	30
RIBES SANGUINEUM RED-FLOWERING CURRENT	3 GAL. AS SHOWN	10
VACCINIUM OVATUM EVERGREEN HUCKLEBERRY	3 GAL. AS SHOWN	10
ROSMARINUS OFFICINALIS 'ARP' ARP ROSEMARY	1 GAL. AS SHOWN	28
CAL. ACUTIFLORA 'KARL FOERSTER' KARL FOERSTER REED GRASS	1 GAL. AS SHOWN	23

GROUNDCOVERS & MISCELANEOUS

ITEM	SIZE / SPACING	QUANTITY
ARCTO. UVA-URSI 'MASSACHUSETTS' MASSACHUSETTS KINNICKINNICK	1 GALLON 3'-0" O.C.	13,856 SF 1,775 PLANTS
NATIVE EROSION CONTROL GRASS MIX SUNMARK SEEDS - FAIRVIEW, OR	SEED @ 1 LBS. / 1,000 SF	202,000 SF 202 LBS
CROCUS V. 'GIANT DUTCH' & N. TETE-A-TETE GIANT CROCUS & TETE-A-TETE DAFFODIL	BULBS 20 / 100 SF	1,210 SF 242 BULBS
SOFT SURFACE TRAIL	5' WIDTH	

WATER QUALITY FACILITY MATERIALS LEGEND



TREES

ITEM	SIZE / SPACING	QUANTITY
ACER GRISEUM PAPERBARK MAPLE	1.5" CAL. / B&B AS SHOWN	2
ALNUS RUBRA RED ALDER	1.5" CAL. / B&B AS SHOWN	3
PSEUDOTSUGA MENZIESII DOUGLAS FIR	6' HT / B&B AS SHOWN	1
EXISTING TREES TO REMAIN	AS NOTED	

SHRUBS & ACCENTS

ITEM	SIZE / SPACING	QUANTITY
MAHONIA AQUIFOLIUM OREGON GRAPE	2 GALLON 7 PLANTS / 100 SF	69
CORNUS SERICEA RED TWIG DOGWOOD	2 GALLON 7 PLANTS / 100 SF	69
ROSA NOOTKANA NOOTKA ROSE	2 GALLON 7 PLANTS / 100 SF	69

GROUNDCOVERS & MISCELANEOUS

ITEM	SIZE / SPACING	QUANTITY
ARCTO. UVA-URSI 'MASSACHUSETTS' MASSACHUSETTS KINNICKINNICK	1 GALLON 70 / 100 SF	2,946 SF 2,062 PLANTS
SEDGE / RUSH MIX 50% CAREX STIPATA 50% JUNCUS PATENS	1 GALLON 80 PLANTS / 100 SF	7,343 SF 5,874 PLANTS

STORMWATER FACILITY REQUIREMENTS:

ZONE A TOTALS: 7,343 SF
REQUIRES: 80 HERBACEOUS / 100 SF = 5,874 HERBACEOUS
PROPOSED: 5,874 HERBACEOUS

ZONE B TOTALS: 2,946 SF
REQUIRES: 7 SHRUBS / 100 SF = 207 SHRUBS
PROPOSED: 207 SHRUBS (MIX OF SPECIES)

50 0 50
SCALE IN FEET

N

REGISTERED LANDSCAPE ARCHITECT
OREGON
FOR REVIEW ONLY
PATRICK GAYNOR
149
05/13/11
EXPIRES 05/31/17

DOWL
WWW.DOWL.COM

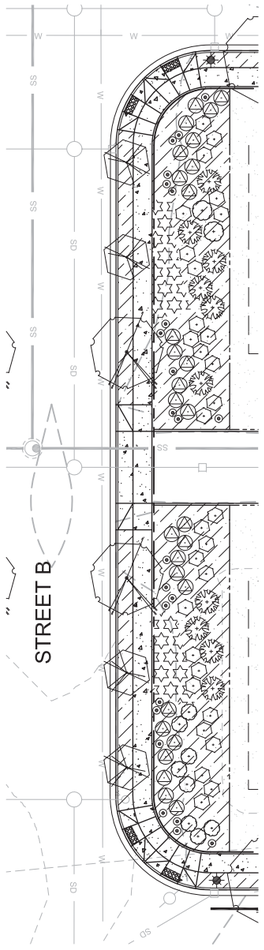
KELLOGG CREEK SUBDIVISION

PLANTING PLAN - OVERALL

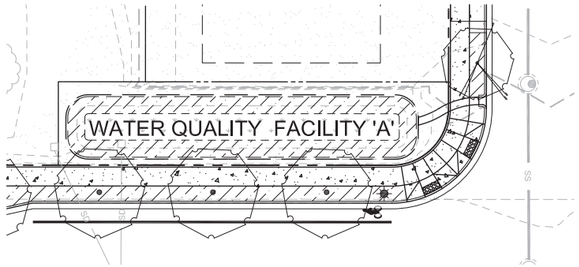
BROWNSTONE DEVELOPMENT
MILWAUKIE, OREGON
SE1/7 NE1/4 SEC. 6 T2S R2E W.M. EXISTING TAXLOTS 600, 700, 900, 901

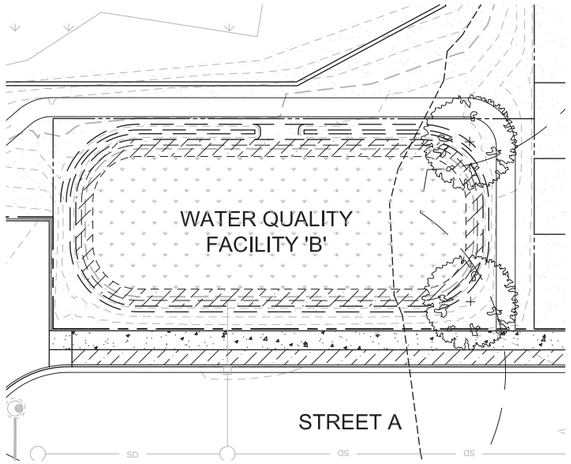
PROJECT	14233-01
DATE	11/28/2016

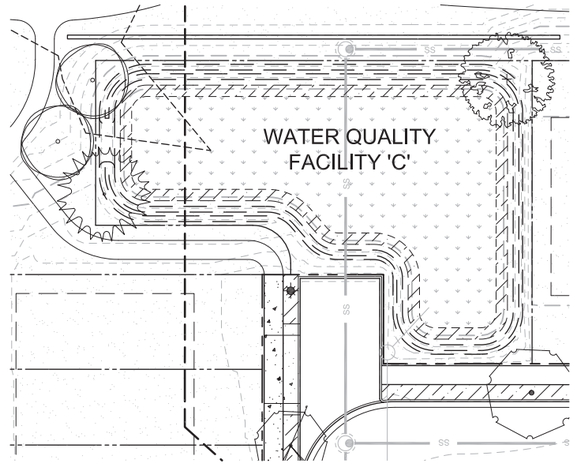
SHEET
L100



A OPEN SPACE TRACTS

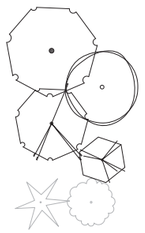






B WATER QUALITY FACILITIES

FRONTAGE AND OPEN SPACE MATERIALS LEGEND



TREES

ITEM	SIZE / SPACING	QUANTITY
A. TRUN. x A. PLAT. 'WARRENRED' PACIFIC SUNSET MAPLE	1.5" CAL. / B&B AS SHOWN	22
ACER GRISEUM PAPERBARK MAPLE	1.5" CAL. / B&B AS SHOWN	27
GINKGO BILOBA 'PRINCETON SENTRY' PRINCETON SENTRY GINKGO	1.5" CAL. / B&B AS SHOWN	16
CARPINUS BETULUS 'FRANS FONTAINE' FRANS FONTAINE HORNBEAM	1.5" CAL. / B&B AS SHOWN	23
EXISTING TREE TO REMAIN	AS NOTED	

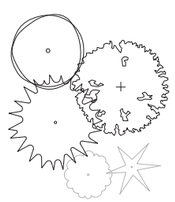
SHRUBS & ACCENTS

ITEM	SIZE / SPACING	QUANTITY
MAHONIA AQUIFOLIUM OREGON GRAPE	1 GAL. AS SHOWN	30
RIBES SANGUINEUM RED-FLOWERING CURRENT	3 GAL. AS SHOWN	10
VACCINIUM OVATUM EVERGREEN HUCKLEBERRY	3 GAL. AS SHOWN	10
ROSMARINUS OFFICINALIS 'ARP' ARP ROSEMARY	1 GAL. AS SHOWN	28
CAL. ACUTIFLORA 'KARL FOERSTER' KARL FOERSTER REED GRASS	1 GAL. AS SHOWN	23

GROUNDCOVERS & MISCELANEOUS

ITEM	SIZE / SPACING	QUANTITY
ARCTO. UVA-URSI 'MASSACHUSETTS' MASSACHUSETTS KINNICKINNICK	1 GALLON 3'-0" O.C.	13,856 SF 1,775 PLANTS
NATIVE EROSION CONTROL GRASS MIX SUNMARK SEEDS - FAIRVIEW, OR	SEED @ 1 LBS. / 1,000 SF	202,000 SF 202 LBS
CROCUS V. 'GIANT DUTCH' & N. TETE-A-TETE GIANT CROCUS & TETE-A-TETE DAFFODIL	BULBS 20 / 100 SF	1,210 SF 242 BULBS
SOFT SURFACE TRAIL	5' WIDTH	

WATER QUALITY FACILITY MATERIALS LEGEND



TREES

ITEM	SIZE / SPACING	QUANTITY
ACER GRISEUM PAPERBARK MAPLE	1.5" CAL. / B&B AS SHOWN	2
ALNUS RUBRA RED ALDER	1.5" CAL. / B&B AS SHOWN	3
PSEUDOTSUGA MENZIESII DOUGLAS FIR	6' HT / B&B AS SHOWN	1
EXISTING TREES TO REMAIN	AS NOTED	

SHRUBS & ACCENTS

ITEM	SIZE / SPACING	QUANTITY
MAHONIA AQUIFOLIUM OREGON GRAPE	2 GALLON 7 PLANTS / 100 SF	69
CORNUS SERICEA RED TWIG DOGWOOD	2 GALLON 7 PLANTS / 100 SF	69
ROSA NOOTKANA NOOTKA ROSE	2 GALLON 7 PLANTS / 100 SF	69

GROUNDCOVERS & MISCELANEOUS

ITEM	SIZE / SPACING	QUANTITY
ARCTO. UVA-URSI 'MASSACHUSETTS' MASSACHUSETTS KINNICKINNICK	1 GALLON 70 / 100 SF	2,946 SF 2,062 PLANTS
SEDGE / RUSH MIX 50% CAREX STIPATA 50% JUNCUS PATENS	1 GALLON 80 PLANTS / 100 SF	7,343 SF 5,874 PLANTS

STORMWATER FACILITY REQUIREMENTS:

ZONE A TOTALS: 7,343 SF
REQUIRES: 80 HERBACEOUS / 100 SF = 5,874 HERBACEOUS
PROPOSED: 5,874 HERBACEOUS

ZONE B TOTALS: 2,946 SF
REQUIRES: 7 SHRUBS / 100 SF = 207 SHRUBS
PROPOSED: 207 SHRUBS (MIX OF SPECIES)

20 0 20
SCALE IN FEET

N

REGISTERED
FOR REVIEW
PATRICK GAYNOR
OREGON
05/13/11
LANDSCAPE ARCHITECT
EXPIRES 05/31/17

DOWL
WWW.DOWL.COM

KELLOGG CREEK SUBDIVISION

PLANTING PLAN - ENLARGEMENTS

BROWNSTONE DEVELOPMENT
MILWAUKIE, OREGON
SE1/7 NE1/4 SEC. 6 T2S R2E W.M. EXISTING TAXLOTS 600, 700, 900, 901

PROJECT	14233-01
DATE	11/28/2016

SHEET
L110

FRONT LOAD UNITS

ALLEY LOAD UNITS

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 9, 2006
J. SCOTT EMMENS
FOR REVIEW ONLY
EXPIRES: 12/31/2017

DOWL
WWW.DOWL.COM

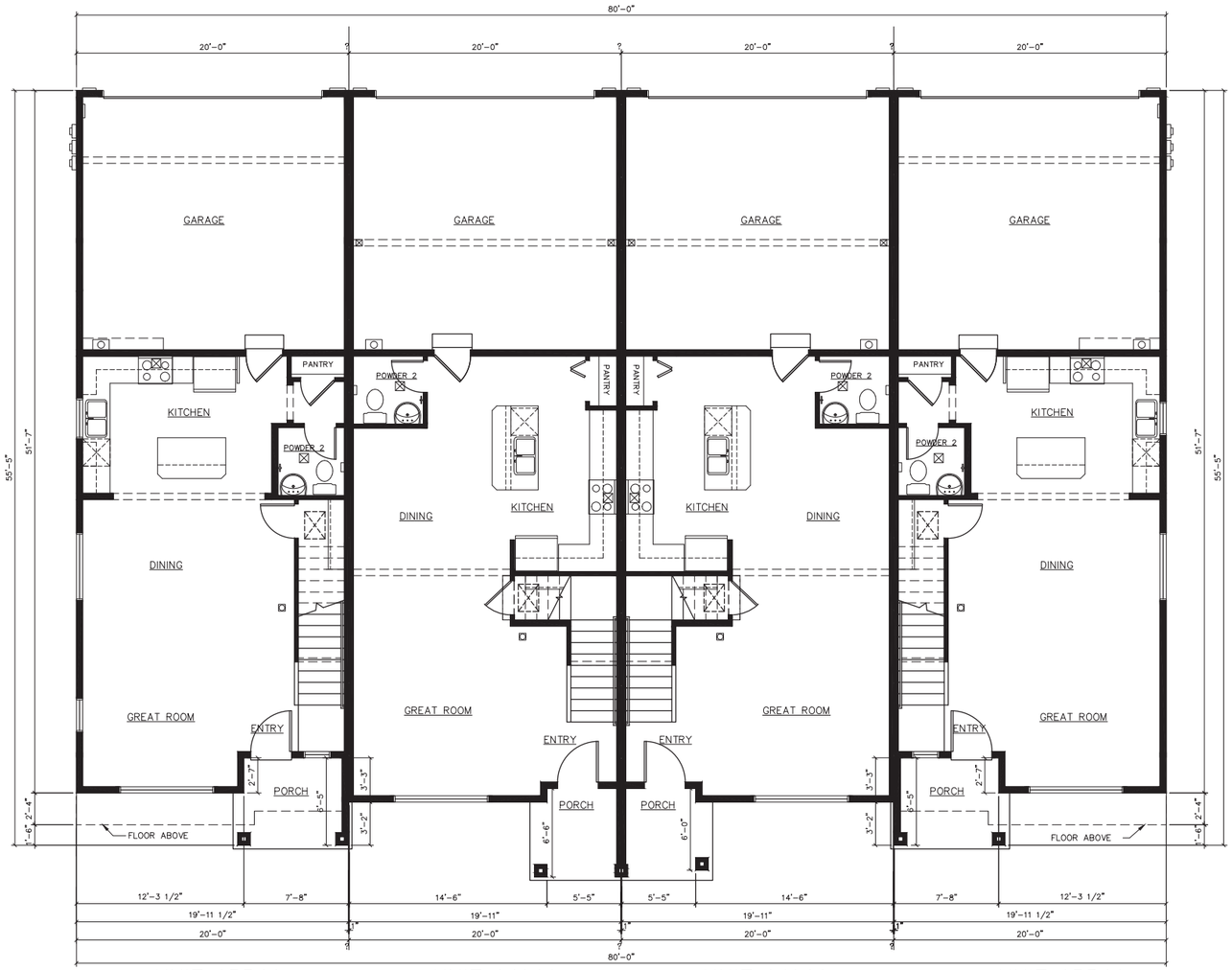
KELLOGG CREEK SUBDIVISION

TOWNHOME RENDERINGS

BROWNSTONE DEVELOPMENT
MILWAUKIE, OREGON
SE1/7 NE1/4 SEC. 6 T2S R2E W.M. EXISTING TAXLOTS 600, 700, 900, 901

PROJECT	14258-01
DATE	02/08/2017

SHEET
A100



MAIN FLOOR PLANS 4-PLEX BUILDING TYPE A1

SCALE 3/16" = 1'-0"

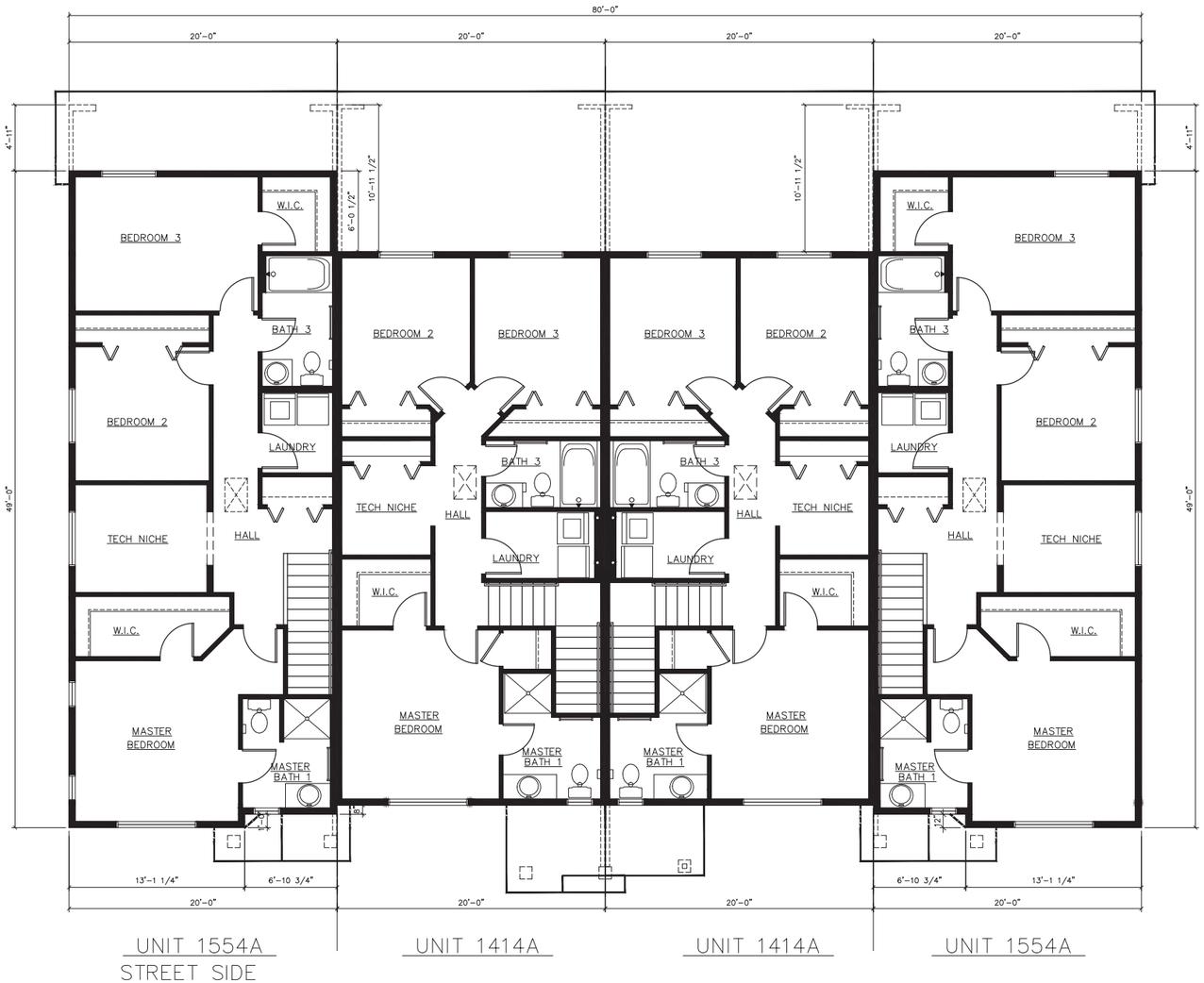
STRUCTURAL DESIGN:
VOELKER ENGINEERING
1911 116th Ave. NE
Bellevue, WA 98004
425-451-4946

BUILDER/DESIGNER:
D.R. HORTON
4380 SW Macadam Ave, Suite 100
Portland, OR 97239
503-222-3719

KELLOGG CREEK ALLEY
MAIN FLOOR

8/05/15

A2



UNIT 1554A
STREET SIDE

UNIT 1414A

UNIT 1414A

UNIT 1554A

UPPER FLOOR PLANS TYPE A1

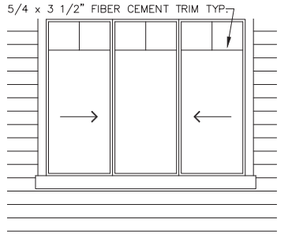
SCALE 3/16" = 1'-0"

STRUCTURAL DESIGN:
VOELKER ENGINEERING
1911 116th Ave. NE
Bellevue, WA 98004
425-451-4946

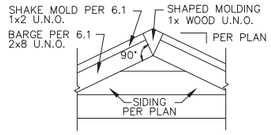
BUILDER/DESIGNER:
D.R. HORTON
4380 SW Macadam Ave, Suite 100
Portland, OR 97239
503-222-3719

KELLOGG CREEK ALLEY
UPPER FLOOR

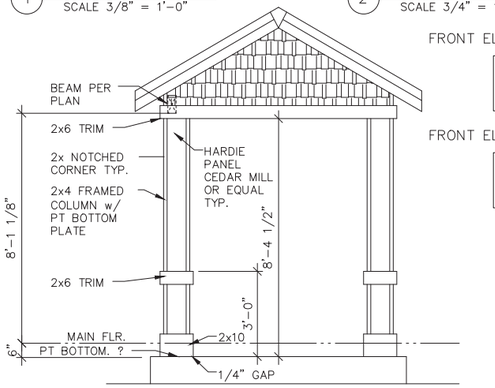
A4



1 TYP. WINDOW TRIM
SCALE 3/8" = 1'-0"



2 GABLE END TRIM
SCALE 3/4" = 1'-0"



3 PORCH DETAIL
SCALE 3/8" = 1'-0"

FRONT ELEVATION GLAZING PERCENTAGE

WALL AREA	=	1,424 SF
GLAZING AREA	=	302 SF
GLAZING %	=	21.2 %

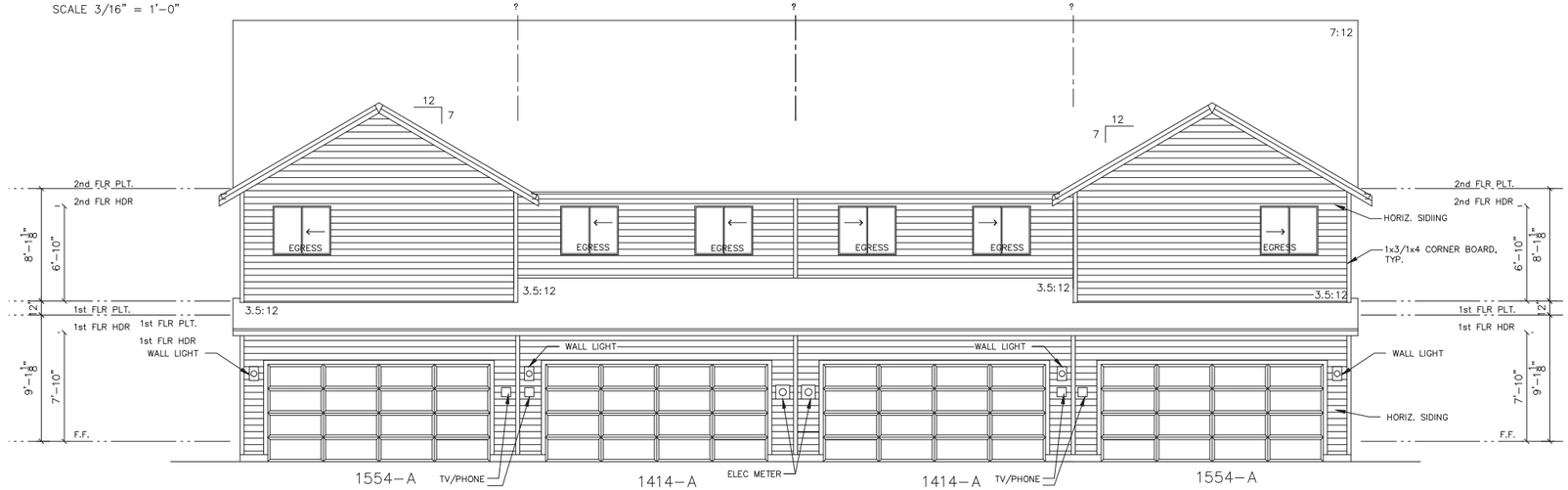
FRONT ELEVATION SIDING PERCENTAGE

WALL AREA	=	1,424 SF
SIDING AREA	=	632 SF
SIDING %	=	44.4 %

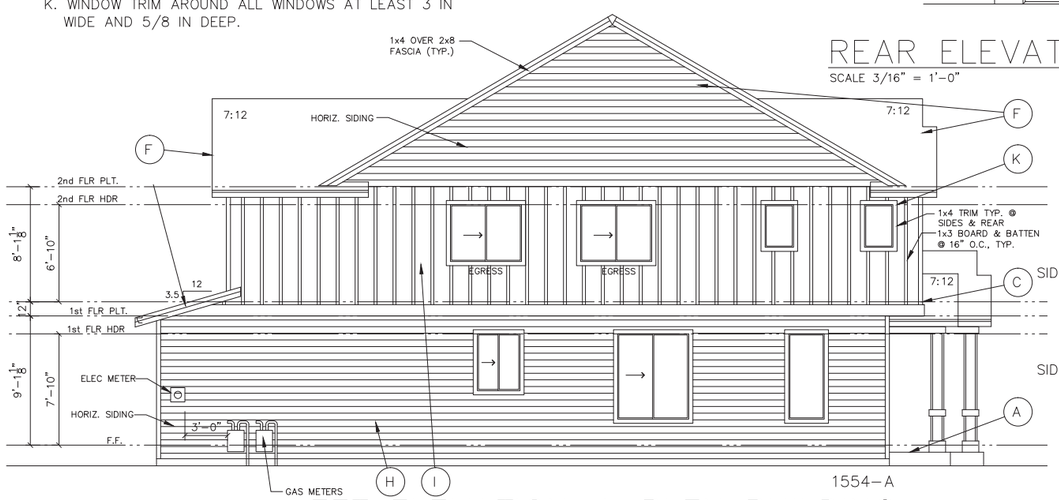
BUILDING DETAILED DESIGN ELEMENTS PER 19.505.1.C.4:

A. COVERED PORCH AT LEAST 5 FT DEEP, AS MEASURED HORIZONTALLY FROM THE FACE OF THE MAIN BUILDING FAÇADE TO THE EDGE OF THE DECK, AND AT LEAST 5 FT WIDE.
C. OFFSET ON THE BUILDING FACE OF AT LEAST 16 IN FROM 1 EXTERIOR WALL SURFACE TO THE OTHER.
F. ROOF LINE OFFSETS OF AT LEAST 2 FT FROM THE TOP SURFACE OF 1 ROOF TO THE TO SURFACE OF THE OTHER.
H. HORIZONTAL LAP SIDING BETWEEN 3 TO 7 IN WIDE (THE VISIBLE PORTION ONCE INSTALLED). THE SIDING MATERIAL MAY BE WOOD, FIBER-CEMENT, OR VINYL.
I. BRICK, CEDAR SHINGLES, STUCCO, OR OTHER SIMILAR DECORATIVE MATERIALS COVERING AT LEAST 40% OF THE STREET-FACING FAÇADE.
K. WINDOW TRIM AROUND ALL WINDOWS AT LEAST 3 IN WIDE AND 5/8 IN DEEP.

FRONT ELEVATION 4-PLEX BUILDING
SCALE 3/16" = 1'-0"



REAR ELEVATION 4-PLEX BUILDING
SCALE 3/16" = 1'-0"



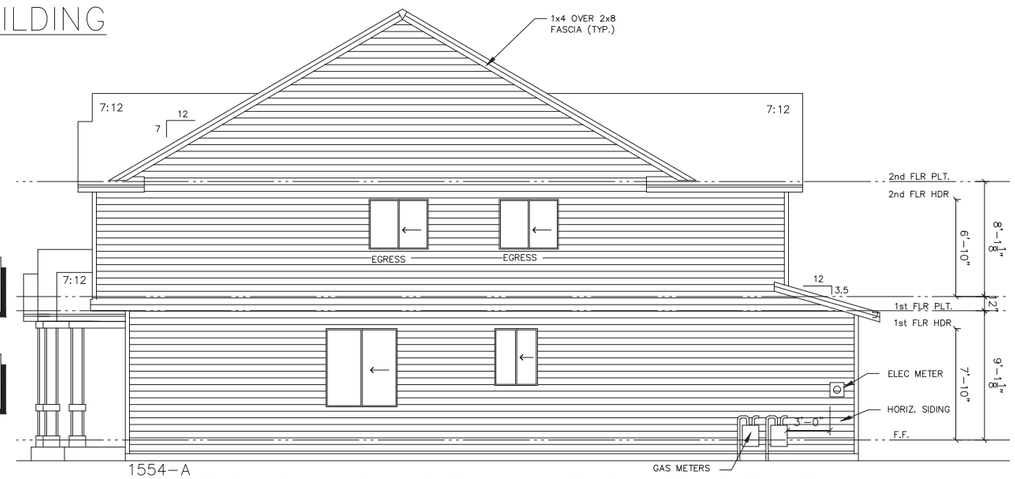
SIDE ELEVATION GLAZING PERCENTAGE

WALL AREA	=	906 SF
GLAZING AREA	=	109 SF
GLAZING %	=	12.0 %

SIDE ELEVATION SIDING PERCENTAGE

WALL AREA	=	906 SF
SIDING AREA	=	435 SF
SIDING %	=	48.0 %

LEFT ELEVATION 4-PLEX BUILDING
STREET SIDE ELEVATION
SCALE 3/16" = 1'-0"
NOTE: THIS ELEVATION TO BE ONLY AT CORNER LOTS w/ STREET EXPOSURE



RIGHT ELEVATION 4-PLEX BUILDING
SCALE 3/16" = 1'-0"

STRUCTURAL DESIGN:
VOELKER ENGINEERING
1911 116th Ave. NE
Bellevue, WA 98004
425-451-4946

BUILDER/DESIGNER:
D.R. HORTON
4380 SW Macadam Ave, Suite 100
Portland, OR 97239
503-222-3719

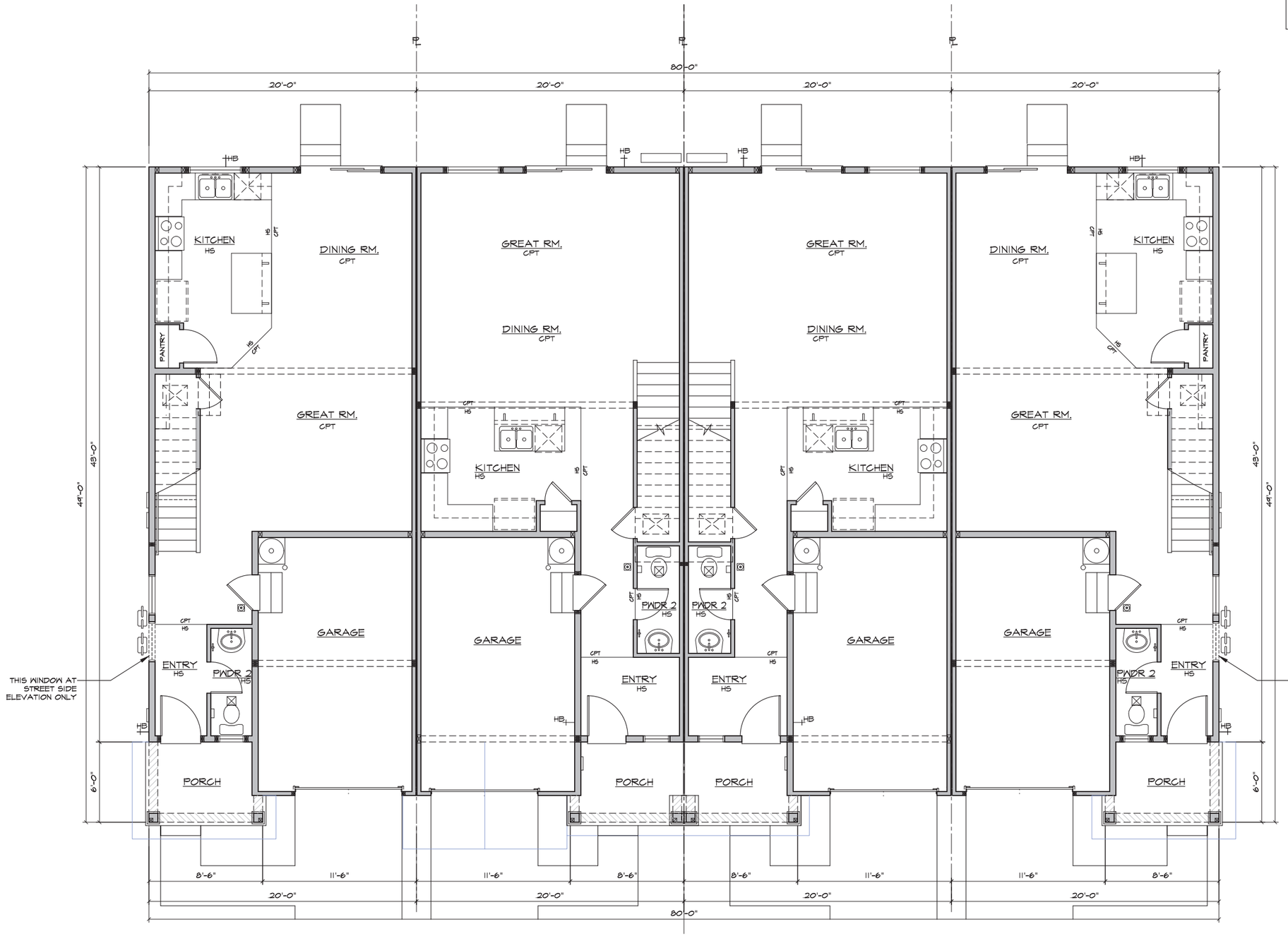
KELLOGG CREEK ALLEY
ALLEY FOUR-PLEX ELEVATIONS

BUILDING
A-1

8/05/15

A6

NOTE:
SEE PAGES 9.0-10.0 FOR UNIT PLANS WITH ADDITIONAL DIMENSIONS AND NOTES.



NOTE:
TYPICAL EXTERIOR WALL TO BE CONSTRUCTED PER SCHEDULE PAGE 3.0 AS P6 SHEARWALLS UNLESS NOTED OTHERWISE

PLAN 1535-D
SEE SHEET 9.0

PLAN 1498-C
SEE SHEET 10.0

PLAN 1498-D
SEE SHEET 10.0

PLAN 1535-C
SEE SHEET 9.0

MAIN FLOOR PLANS

SCALE 1/4" = 1'-0"

STRUCTURAL DESIGN:
VOELKER ENGINEERING
1911 116th Ave. NE
Bellevue, WA 98004
425-451-4946

BUILDER/DESIGNER:
D.R. HORTON
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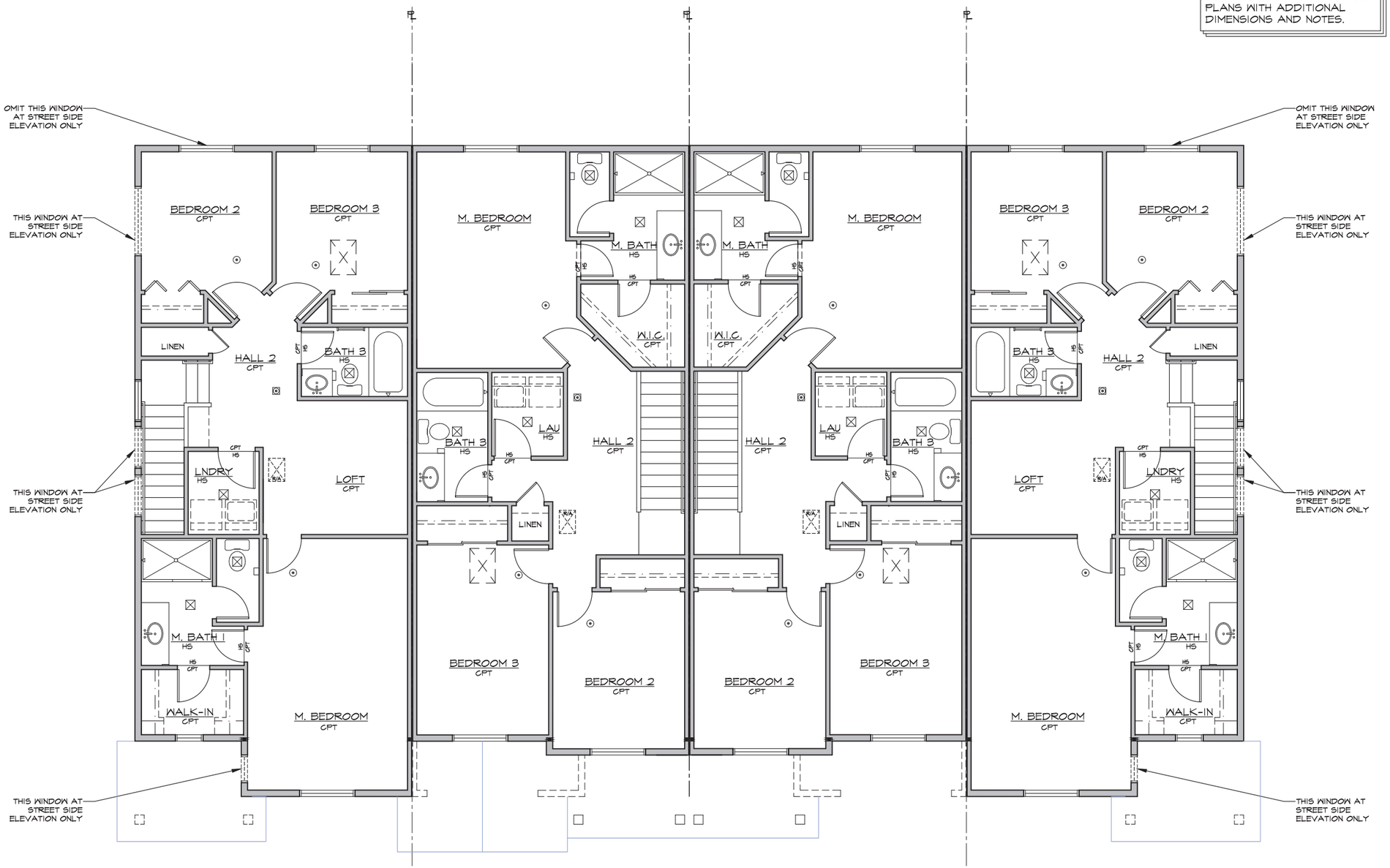
Portland, OR 97239
503-222-3719

KELLOGG CREEK
FOUR-PLEX MAIN FLOOR PLAN

REL 6/04/15

2.0

NOTE:
SEE PAGES 9.0-10.0 FOR UNIT PLANS WITH ADDITIONAL DIMENSIONS AND NOTES.



PLAN 1535-D
SEE SHEET 9.0

PLAN 1498-C
SEE SHEET 10.0

PLAN 1498-D
SEE SHEET 10.0

PLAN 1535-C
SEE SHEET 9.0

NOTE:
TYPICAL EXTERIOR WALL TO BE CONSTRUCTED PER SCHEDULE PAGE 3.0 AS P6 SHEARWALLS UNLESS NOTED OTHERWISE

UPPER FLOOR PLANS

SCALE 1/4" = 1'-0"

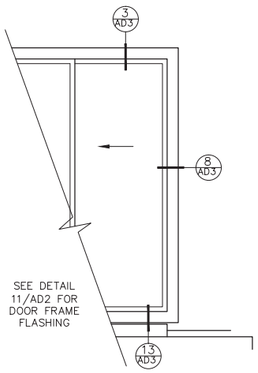
STRUCTURAL DESIGN:
VOELKER ENGINEERING
1911 116th Ave. NE
Bellevue, WA 98004
425-451-4946

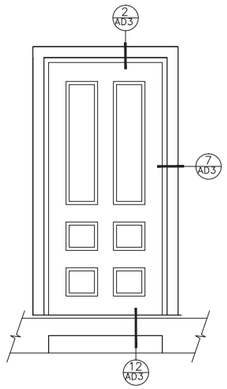
BUILDER/DESIGNER:
D.R. HORTON
4380 SW Macadam Ave, Suite 100
Portland, OR 97239
503-222-3719

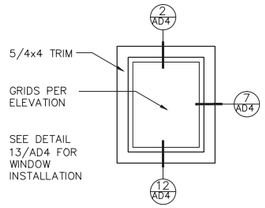
KELLOGG CREEK
FOUR-PLEX UPPER FLOOR PLAN

REL 6/04/15

4.0







DOORS AND WINDOWS

SCALE 1/2" = 1'-0"

1 NOT USED

4 NOT USED

BUILDING DETAILED DESIGN ELEMENTS PER 19.505.1.C.4:

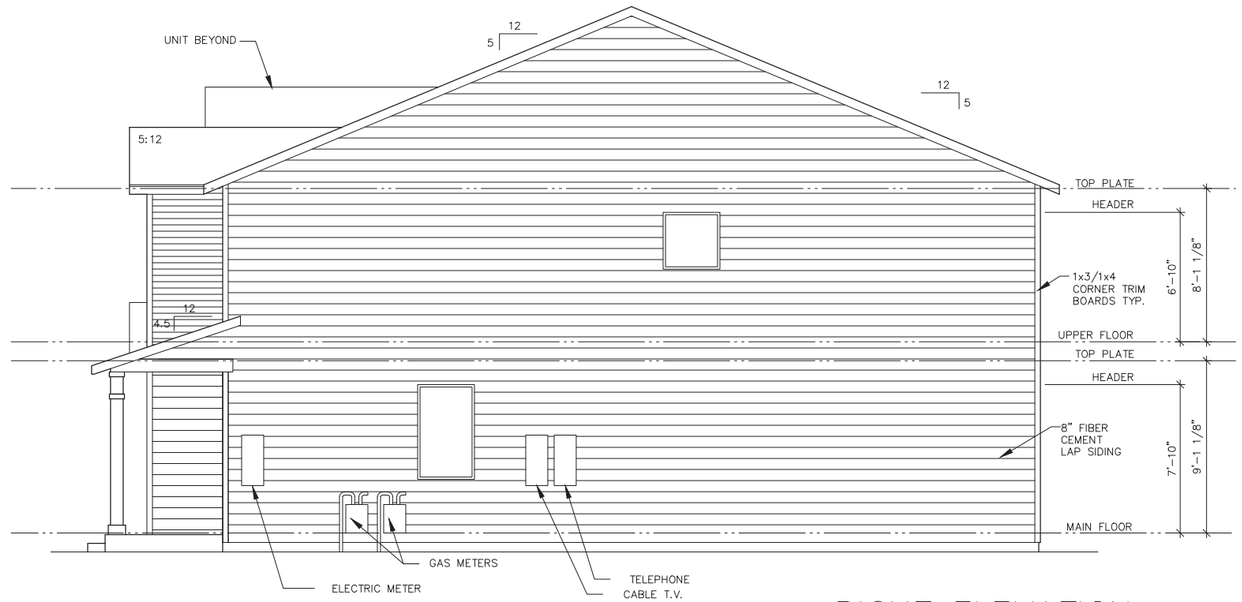
A. COVERED PORCH AT LEAST 5 FT DEEP, AS MEASURED HORIZONTALLY FROM THE FACE OF THE MAIN BUILDING FAÇADE TO THE EDGE OF THE DECK, AND AT LEAST 5 FT WIDE.

C. OFFSET ON THE BUILDING FACE OF AT LEAST 16 IN FROM 1 EXTERIOR WALL SURFACE TO THE OTHER.

F. ROOF LINE OFFSETS OF AT LEAST 2 FT FROM THE TOP SURFACE OF 1 ROOF TO THE TOP SURFACE OF THE OTHER.

H. HORIZONTAL LAP SIDING BETWEEN 3 TO 7 IN WIDE (THE VISIBLE PORTION ONCE INSTALLED). THE SIDING MATERIAL MAY BE WOOD, FIBER-CEMENT, OR VINYL.

K. WINDOW TRIM AROUND ALL WINDOWS AT LEAST 3 IN WIDE AND 5/8 IN DEEP.

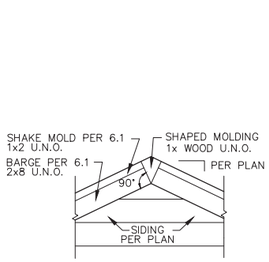


RIGHT ELEVATION

SCALE 1/4" = 1'-0"

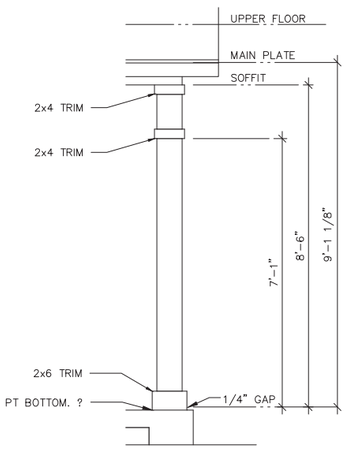
FRONT ELEVATION GLAZING PERCENTAGE

WALL AREA	=	1,424 SF
GLAZING AREA	=	302 SF
GLAZING %	=	21.2 %



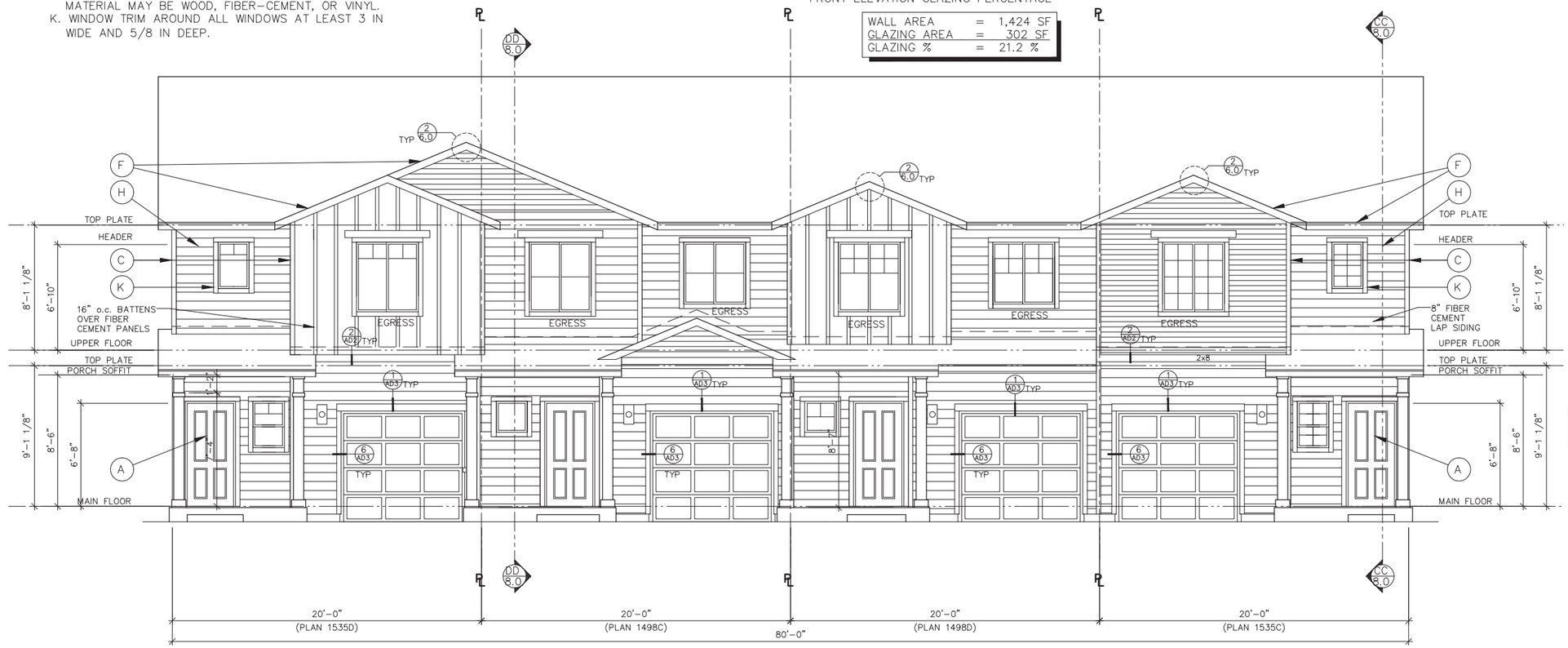
2 GABLE END TRIM

SCALE 3/4" = 1'-0"



3 PORCH COLUMN DETAIL

SCALE 1/2" = 1'-0"



NOTE:
SEE SHEETS AD0 THROUGH AD4 FOR WATER INTRUSION AND FLASHING DETAILS.

FRONT ELEVATION

SCALE 1/4" = 1'-0"

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1911 116th Ave. NE
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425-451-4946

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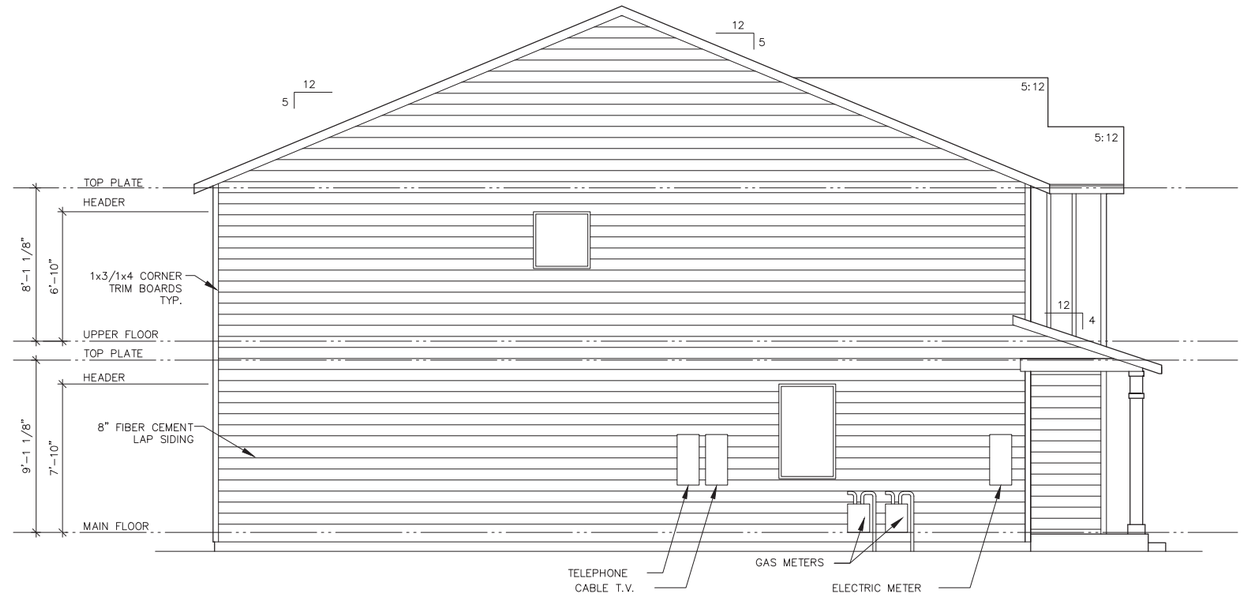
Portland, OR 97239
503-222-3719

KELLOGG CREEK
FOUR-PLEX ELEVATIONS

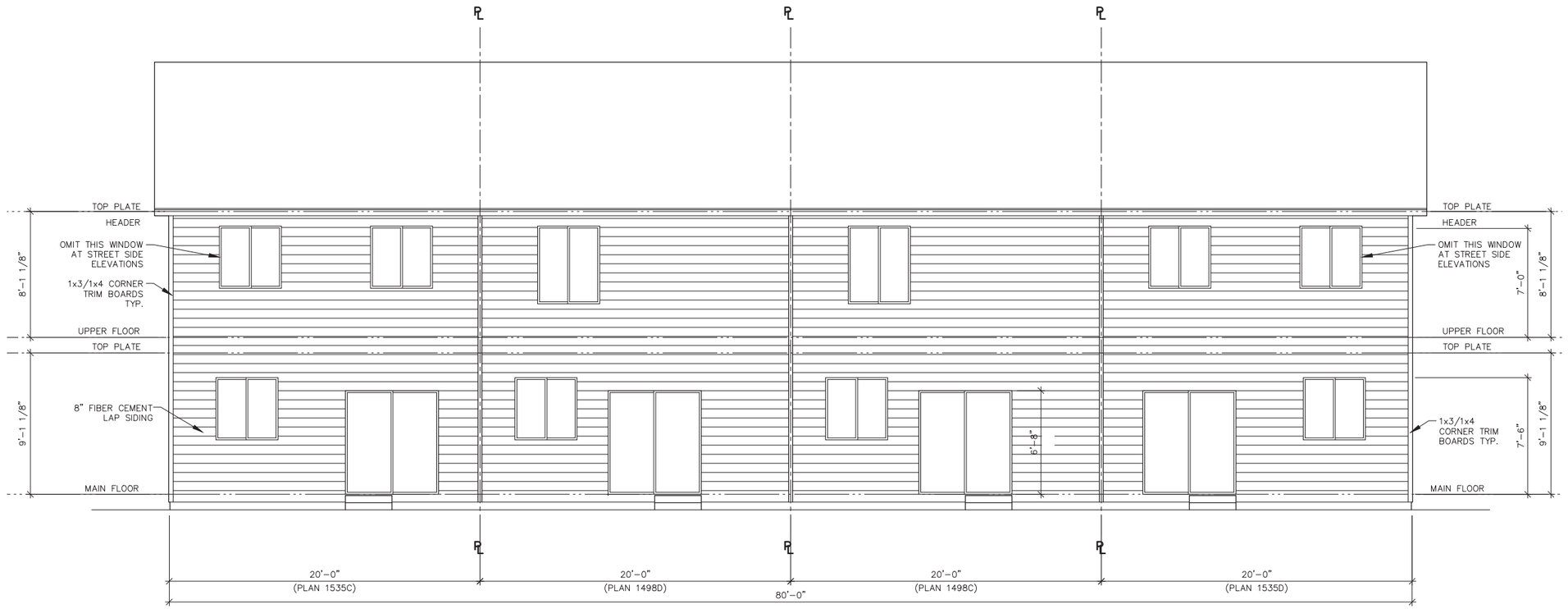
REL 2/22/16

6.0



LEFT ELEVATION

SCALE 1/4" = 1'-0"



REAR ELEVATION

SCALE 1/4" = 1'-0"

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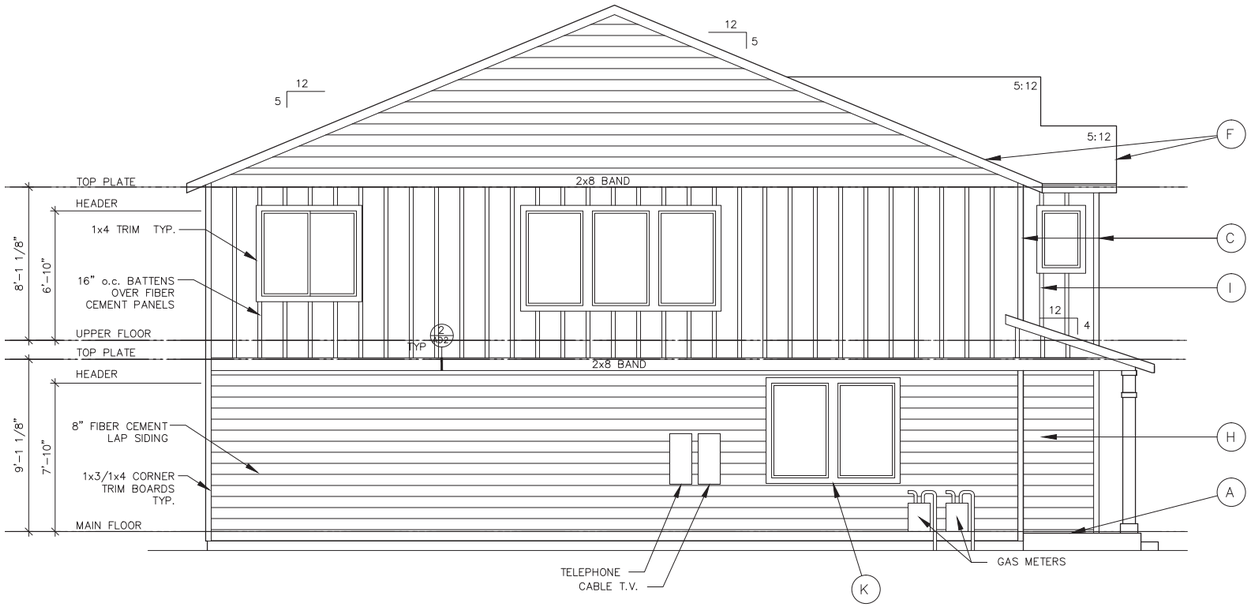
KELLOGG CREEK
FOUR-PLEX ELEVATIONS

REL 2/22/16

7.0



STREET SIDE LEFT ELEVATION

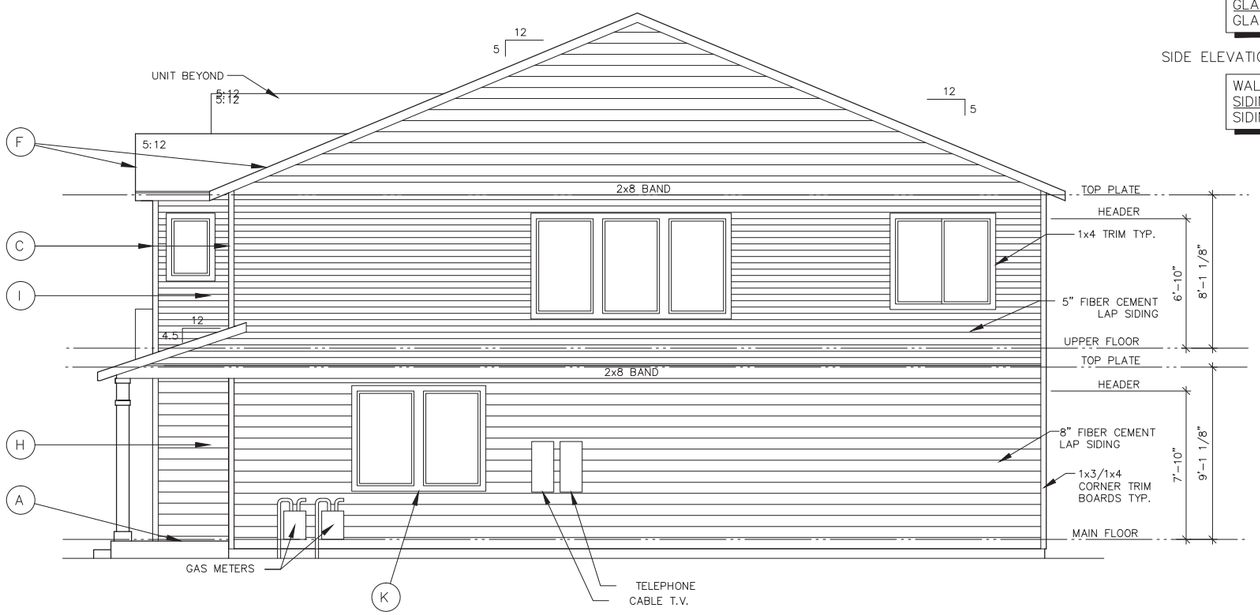
SCALE 1/4" = 1'-0"

SIDE ELEVATION GLAZING PERCENTAGE

WALL AREA	=	858 SF
GLAZING AREA	=	103.5 SF
GLAZING %	=	12.1 %

SIDE ELEVATION SIDING PERCENTAGE

WALL AREA	=	858 SF
SIDING AREA	=	425 SF
SIDING %	=	49.5 %



STREET SIDE RIGHT ELEVATION

SCALE 1/4" = 1'-0"

BUILDING DETAILED DESIGN ELEMENTS PER 19.505.1.C.4:

A. COVERED PORCH AT LEAST 5 FT DEEP, AS MEASURED HORIZONTALLY FROM THE FACE OF THE MAIN BUILDING FAÇADE TO THE EDGE OF THE DECK, AND AT LEAST 5 FT WIDE.

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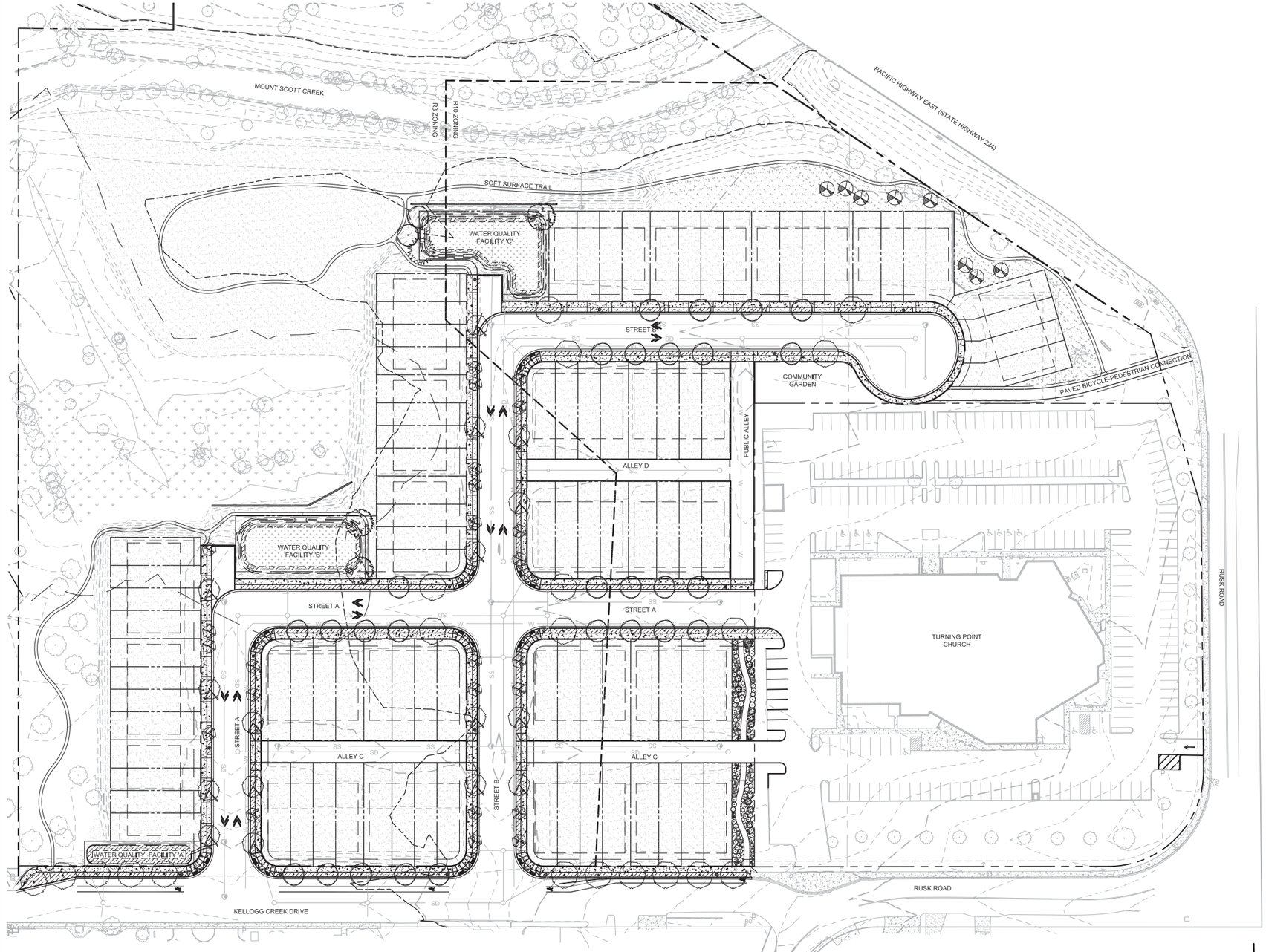
KELLOGG CREEK
FOUR-PLEX STREET SIDE ELEVATIONS

REL 3/16/16

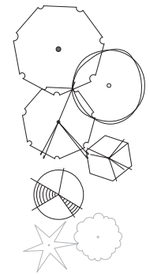
7.1



50 0 50
SCALE IN FEET

N

FRONTAGE AND OPEN SPACE MATERIALS LEGEND



TREES

ITEM	SIZE / SPACING	QUANTITY
A. TRUN. x A. PLAT. 'WARRENRED' PACIFIC SUNSET MAPLE	1.5" CAL. / B&B AS SHOWN	20
ACER GRISEUM PAPERBARK MAPLE	1.5" CAL. / B&B AS SHOWN	29
GINKGO BILOBA 'PRINCETON SENTRY' PRINCETON SENTRY GINKGO	1.5" CAL. / B&B AS SHOWN	16
CARPINUS BETULUS 'FRANS FONTAINE' FRANS FONTAINE HORNBEAM	1.5" CAL. / B&B AS SHOWN	24
THUJA PLICATA WESTERN RED CEDAR	4' HEIGHT MINIMUM	8
EXISTING TREE TO REMAIN	AS NOTED	

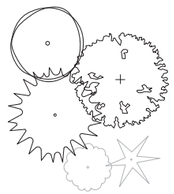
SHRUBS & ACCENTS

ITEM	SIZE / SPACING	QUANTITY
MAHONIA AQUIFOLIUM OREGON GRAPE	1 GAL. AS SHOWN	26
RIBES SANGUINEUM RED-FLOWERING CURRENT	3 GAL. AS SHOWN	17
VACCINIUM OVATUM EVERGREEN HUCKLEBERRY	3 GAL. AS SHOWN	13
ROSMARINUS OFFICINALIS 'ARP' ARP ROSEMARY	1 GAL. AS SHOWN	29
CAL. ACUTIFLORA 'KARL FOERSTER' KARL FOERSTER REED GRASS	1 GAL. AS SHOWN	34

GROUNDCOVERS & MISCELANEOUS

ITEM	SIZE / SPACING	QUANTITY
ARCTO. UVA-URSI 'MASSACHUSETTS' MASSACHUSETTS KINNICKINNICK	1 GALLON 3'-0" O.C.	15,068 SF 1,928 PLANTS
NATIVE EROSION CONTROL GRASS MIX SUNMARK SEEDS - FAIRVIEW, OR	SEED @ 1 LBS. / 1,000 SF	277,682 SF 278 LBS
CROCUS V. 'GIANT DUTCH' & N. TETE-A-TETE GIANT CROCUS & TETE-A-TETE DAFFODIL	BULBS 20 / 100 SF	405 SF 80 BULBS
SOFT SURFACE TRAIL	2'-6" WIDTH	

WATER QUALITY FACILITY MATERIALS LEGEND



TREES

ITEM	SIZE / SPACING	QUANTITY
ACER GRISEUM PAPERBARK MAPLE	1.5" CAL. / B&B AS SHOWN	2
ALNUS RUBRA RED ALDER	1.5" CAL. / B&B AS SHOWN	3
PSEUDOTSUGA MENZIESII DOUGLAS FIR	6' HT / B&B AS SHOWN	1
EXISTING TREES TO REMAIN	AS NOTED	

SHRUBS & ACCENTS

ITEM	SIZE / SPACING	QUANTITY
MAHONIA AQUIFOLIUM OREGON GRAPE	2 GALLON 7 PLANTS / 100 SF	69
CORNUS SERICEA RED TWIG DOGWOOD	2 GALLON 7 PLANTS / 100 SF	69
ROSA NOOTKANA NOOTKA ROSE	2 GALLON 7 PLANTS / 100 SF	69

GROUNDCOVERS & MISCELANEOUS

ITEM	SIZE / SPACING	QUANTITY
ARCTO. UVA-URSI 'MASSACHUSETTS' MASSACHUSETTS KINNICKINNICK	1 GALLON 70 / 100 SF	2,471 SF 1,729 PLANTS
SEDGE / RUSH MIX 50% CAREX STIPATA 50% JUNCUS PATENS	1 GALLON 80 PLANTS / 100 SF	7,343 SF 5,874 PLANTS

STORMWATER FACILITY REQUIREMENTS:

ZONE A TOTALS: 7,343 SF
REQUIRES: 80 HERBACEOUS / 100 SF = 5,874 HERBACEOUS
PROPOSED: 5,874 HERBACEOUS

ZONE B TOTALS: 2,946 SF
REQUIRES: 7 SHRUBS / 100 SF = 207 SHRUBS
PROPOSED: 207 SHRUBS (MIX OF SPECIES)

REGISTERED LANDSCAPE ARCHITECT
749
PATRICK GAYNOR
OREGON
05/13/01
EXPIRES 05/31/17

FOR REVIEW ONLY

DOWL
WWW.DOWL.COM

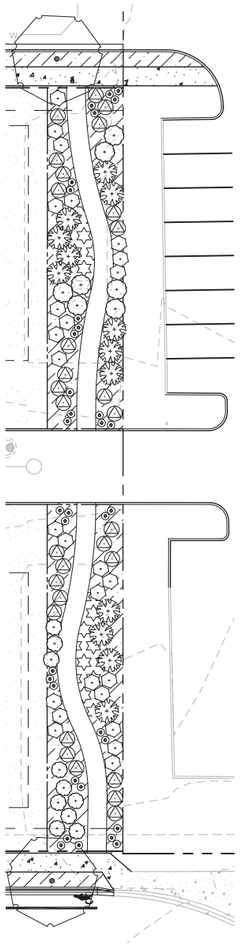
KELLOGG CREEK SUBDIVISION

PLANTING PLAN - OVERALL

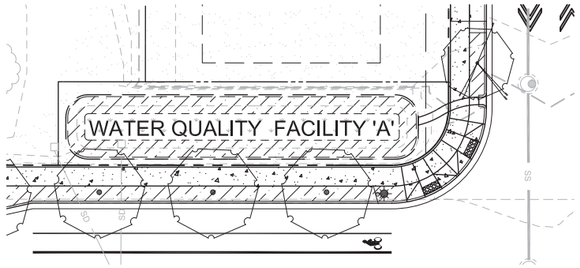
BROWNSTONE DEVELOPMENT
MILWAUKIE, OREGON
SE1/7 NE1/4 SEC. 6 T2S R2E W.M. EXISTING TAXLOTS 600, 700, 900, 901

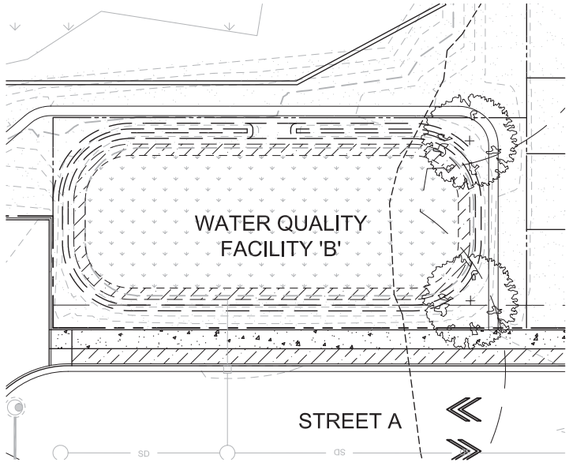
PROJECT	14258-01
DATE	04/07/2017

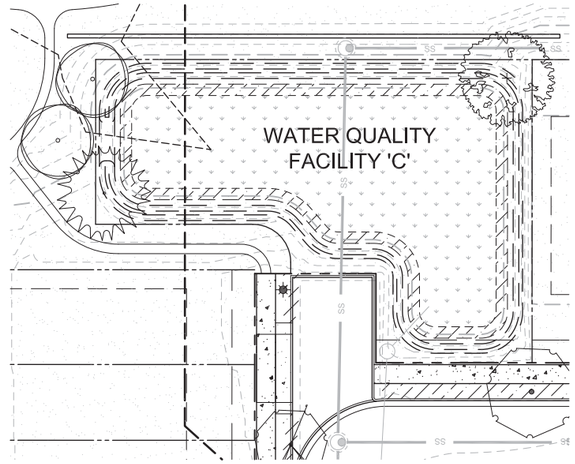
SHEET
L100



A OPEN SPACE TRACTS

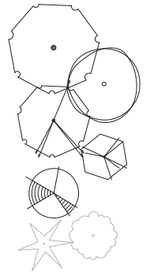






B WATER QUALITY FACILITIES

FRONTAGE AND OPEN SPACE MATERIALS LEGEND



TREES

ITEM	SIZE / SPACING	QUANTITY
A. TRUN. x A. PLAT. 'WARRENRED' PACIFIC SUNSET MAPLE	1.5" CAL. / B&B AS SHOWN	20
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CARPINUS BETULUS 'FRANS FONTAINE' FRANS FONTAINE HORNBEAM	1.5" CAL. / B&B AS SHOWN	24
THUJA PLICATA WESTERN RED CEDAR	4' HEIGHT MINIMUM	8
EXISTING TREE TO REMAIN	AS NOTED	

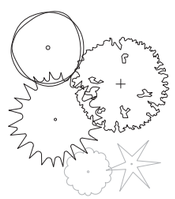
SHRUBS & ACCENTS

ITEM	SIZE / SPACING	QUANTITY
MAHONIA AQUIFOLIUM OREGON GRAPE	1 GAL. AS SHOWN	26
RIBES SANGUINEUM RED-FLOWERING CURRENT	3 GAL. AS SHOWN	17
VACCINIUM OVATUM EVERGREEN HUCKLEBERRY	3 GAL. AS SHOWN	13
ROSMARINUS OFFICINALIS 'ARP' ARP ROSEMARY	1 GAL. AS SHOWN	29
CAL. ACUTIFLORA 'KARL FOERSTER' KARL FOERSTER REED GRASS	1 GAL. AS SHOWN	34

GROUNDCOVERS & MISCELANEOUS

ITEM	SIZE / SPACING	QUANTITY
ARCTO. UVA-URSI 'MASSACHUSETTS' MASSACHUSETTS KINNICKINNICK	1 GALLON 3'-0" O.C.	15,068 SF 1,928 PLANTS
NATIVE EROSION CONTROL GRASS MIX SUNMARK SEEDS - FAIRVIEW, OR	SEED @ 1 LBS. / 1,000 SF	277,682 SF 278 LBS
CROCUS V. 'GIANT DUTCH' & N. TETE-A-TETE GIANT CROCUS & TETE-A-TETE DAFFODIL	BULBS 20 / 100 SF	405 SF 80 BULBS
SOFT SURFACE TRAIL	2'-6" WIDTH	

WATER QUALITY FACILITY MATERIALS LEGEND



TREES

ITEM	SIZE / SPACING	QUANTITY
ACER GRISEUM PAPERBARK MAPLE	1.5" CAL. / B&B AS SHOWN	2
ALNUS RUBRA RED ALDER	1.5" CAL. / B&B AS SHOWN	3
PSEUDOTSUGA MENZIESII DOUGLAS FIR	6' HT / B&B AS SHOWN	1
EXISTING TREES TO REMAIN	AS NOTED	

SHRUBS & ACCENTS

ITEM	SIZE / SPACING	QUANTITY
MAHONIA AQUIFOLIUM OREGON GRAPE	2 GALLON 7 PLANTS / 100 SF	69
CORNUS SERICEA RED TWIG DOGWOOD	2 GALLON 7 PLANTS / 100 SF	69
ROSA NOOTKANA NOOTKA ROSE	2 GALLON 7 PLANTS / 100 SF	69

GROUNDCOVERS & MISCELANEOUS

ITEM	SIZE / SPACING	QUANTITY
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SEDGE / RUSH MIX 50% CAREX STIPATA 50% JUNCUS PATENS	1 GALLON 80 PLANTS / 100 SF	7,343 SF 5,874 PLANTS

STORMWATER FACILITY REQUIREMENTS:

ZONE A TOTALS: 7,343 SF
REQUIRES: 80 HERBACEOUS / 100 SF = 5,874 HERBACEOUS
PROPOSED: 5,874 HERBACEOUS

ZONE B TOTALS: 2,946 SF
REQUIRES: 7 SHRUBS / 100 SF = 207 SHRUBS
PROPOSED: 207 SHRUBS (MIX OF SPECIES)

20 0 20
SCALE IN FEET

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REGISTERED LANDSCAPE ARCHITECT
749
PATRICK GAYNOR
OREGON
05/13/03
EXPIRES 05/31/17
FOR REVIEW ONLY

DOWL
WWW.DOWL.COM

KELLOGG CREEK SUBDIVISION

PLANTING PLAN - ENLARGEMENTS

BROWNSTONE DEVELOPMENT
MILWAUKIE, OREGON
SE1/7 NE1/4 SEC. 6 T2S R2E W.M. EXISTING TAXLOTS 600, 700, 900, 901

PROJECT 14258-01
DATE 04/07/2017

SHEET
L110

Exhibit B

August 30, 2016

Read Stapleton
DOWL
720 SW Washington Street Suite 750
Portland Oregon 97205

Re: Preapplication Report

Dear Read:

Enclosed is the Preapplication Report Summary from your meeting with the City on August 11, 2016, concerning your proposal for action on property located at 13333 SE Rusk Road.

A preapplication conference is required prior to submittal of certain types of land use applications in the City of Milwaukie. Where a preapplication conference is required, please be advised of the following:

- Preapplication conferences are valid for a period of 2 years from the date of the conference. If a land use application or development permit has not been submitted within 2 years of the conference date, the Planning Director may require a new preapplication conference.

- If a development proposal is significantly modified after a preapplication conference occurs, the Planning Director may require a new preapplication conference.

If you have any questions concerning the content of this report, please contact the appropriate City staff.

Sincerely,

Joyce B. Stahly
Administrative Specialist II

Enclosure

cc: Ben Williams
Andy Tiemann
Serah Breakstone
File
Scott Emmens
John Van Steveren
Randy Myers

CITY OF MILWAUKIE

PreApp Project ID #: 16-021PA

PRE-APPLICATION CONFERENCE REPORT

This report is provided as a follow-up to a meeting that was held on 8/11/2016 at 10:00AM

Applicant Name:	**READ STAPLETON**
Company:	**DOWL**
Applicant 'Role':	Architect
Address Line 1:	720 SW WASHINGTON STREET
Address Line 2:	SUITE 750
City, State Zip:	PORTLAND OR 97205
Project Name:	**PROPOSED PLANNED DEVELOPMENT WITH 100 DWELLING UNITS**
Description:	**A PLANNED DEVELOPMENT WITH 100 DEWLLING U NITS (77 IN THE R3 ZONE AND 23 IN THE R10 ZONE) IS PROPOSED.**
ProjectAddress:	**13333 SE RUSK RD**
Zone:	Residential R-3 and R-10
Occupancy Group:	
ConstructionType:	
Use:	Medium Density (MD) and Low Density (LD)
Occupant Load:	
AppsPresent:	Ben Williams, Andy Tiemann, Serah Breakstone, Scott Emmens, John Van Staveren, Randy Myers
Staff Attendance:	Brett Kelver, Alex Roller, Matt Amos

BUILDING ISSUES

ADA:	
Structural:	The habitable space must be 2 feet above the base flood elevation.
Mechanical:	
Plumbing:	
Plumb Site Utilities:	
Electrical:	
Notes:	

Please note all drawings must be individually rolled. If the drawings are small enough to fold they must be individually folded.

FIRE MARSHAL ISSUES

Fire Sprinklers: Any building containing an "R" (residential) mulit family occupancy shall be sprinkled.

Fire Alarms:

Fire Hydrants:

Turn Arounds:

Addressing:

Fire Protection:

Fire Access:

Hazardous Mat.:

Fire Marshal Notes: See attached letter.

PUBLIC WORKS ISSUES

Water: An unknown size Clackamas River Water main on SE Kellogg Creek Drive is available to provide connection to serve the proposed development. The applicant shall construct adequately sized water mainline within the right of way of the new public street to provide residential service, as well as fire service (via hydrants or sprinklers) to all residential units. Mainline construction will conform to Clackamas River Water standards. Betty Johnson (503-723-2571) at CRW will be your contact for construction and SDC requirements. Construction of any main line improvement within the public right-of-way shall be completed prior to final plat approval.

The water System Development Charge (SDC) is based on the demand required by the development. The water SDC will be assessed and collected at the time the building permits are issued.

Sewer: An unknown size Clackamas County wastewater main located on the western property line is available for connection to serve the proposed development. The applicant shall construct an 8” PVC within the right-of-way of the new public street. Currently, the wastewater System Development Charge (SDC) is comprised of two components. The first component is the City’s SDC charge of $1075.00 and the second component is the County’s SDC for treatment of $4,904 that the City collects and forwards to the County. Both SDC charges are per connection unit. The wastewater SDC will be assessed and collected at the time the building permits are issued.

Storm: Submission of a storm water management plan by a qualified professional engineer is required as part of the proposed development. The plan shall conform to Section 2 - Stormwater Design Standards of the City of Milwaukie Pubic Works Standards.
The storm water management plan shall demonstrate that the post-development runoff does not exceed the pre-development, including any existing storm water management facilities serving the development property. Also, the plan shall demonstrate compliance with water quality standards. The City of Milwaukie has adopted the most current version of the City of Portland Stormwater Management Manual for design of water quality facilities.

All new impervious surfaces, including replacement of impervious surface with new impervious surfaces, are subject to the water quality standards. See City of Milwaukie Public Works Standards for design and construction standards and detailed drawings.

The storm SDC is based on the amount of new impervious surface constructed at the site. One storm SDC unit is the equivalent of 2,706 square feet of impervious surface. The storm SDC is currently $844 per unit. The storm SDC will be assessed and collected at the time the building permits are issued.

Street: The proposed development fronts the north side of SE Kellogg Creek Drive. The portion of SE Kellogg Creek Drive fronting the proposed development has a right-of-way width of 40 to 50 feet, has a 5' wide curb tight sidewalk on the north side, and is unimproved on the south side.

Frontage: Chapter 19.700 of the Milwaukie Municipal Code (MMC), hereafter referred to as "Code", applies to partitions, subdivisions, and new construction.

Transportation Facility Requirements, Code Section 19.708, states that all rights-of-way, streets, sidewalks, necessary public improvements, and other public transportation facilities located in the public right-of-way and abutting the development site shall be adequate at the time of development or shall be made adequate in a timely manner.

SE KELLOGG CREEK DRIVE
Improvements required on the Kellogg Creek Drive frontage will be determined by the required traffic impact study.

NEW PRIVATE STREET
The proposed cross section of 5' sidewalk, 5.5' planter, 7' parking, and 10' travel does conform to code requirements.

Per MMC table 19.708.1 – the minimum intersection spacing on local roads is 100' and the maximum distance is 530'. Kellogg Creek Dr has a local street classification. The spacing between the eastern proposed road and Rusk road may create a traffic impact. This will be addressed in the traffic impact study.

Right of Way: The existing right-of-way on SE Kellogg Creek Drive fronting the proposed development is 40 feet, and 55 feet on the Rusk Frontage. The required traffic impact study will determine whether or not dedication will be required.

Driveways: Code Section 12.16.040.A states that access to private property shall be permitted with the use of driveway curb cuts and driveways shall meet all applicable guidelines of the Americans with Disabilities Act (ADA). Driveway approaches shall be improved to meet the requirements of Milwaukie's Public Works Standards.

Erosion Control: Per Code Section 16.28.020(C), an erosion control permit is required prior to placement of fill, site clearing, or land disturbances, including but not limited to grubbing, clearing or removal of ground vegetation, grading, excavation, or other activities, any of which results in the disturbance or exposure of soils exceeding five hundred square feet.

Code Section 16.28.020(E) states that an erosion control permit is required prior to issuance of building permits or approval of construction plans. Also, Section 16.28.020(B) states that an erosion control plan that meets the requirements of Section 16.28.030 is required prior to any approval of an erosion control permit.

Traffic Impact Study: Code Section 19.704.1(A) states that the City will determine whether a transportation impact study (TIS) is required. In the event the proposed development will significantly increase the intensity of use,

a transportation impact study will be required. The City of Milwaukie Engineering Director will make this determination based on proposed preliminary subdivision design and the number of lots created.

If required, the transportation impact study triggers a Transportation Facilities Review (TFR) Land Use Application to be filed concurrent with the land use application. Once the scope of the proposed development is determined and a deposit of $1000.00 is paid, the City of Milwaukie will provide a detailed transportation impact study scope for the traffic study. When the traffic impact study is completed in accordance with the TIS scope, the applicant shall schedule a second pre-application meeting with Milwaukie Engineering Staff. The second pre-application meeting will allow Engineering Staff to review and comment on the applicant's traffic impact study prior to submission of any land use applications. The fee for the second pre-application meeting is $100.00 and a deposit of $2500.00. Upon completion of the second pre-application meeting, the applicant may submit their land use applications.

The City has determined that a Traffic Impact Study will be required.

PW Notes:

TRANSPORTATION SDC
The Transportation SDC will be based on the increase in trips generated by the new use per the Trip Generation Handbook from the Institute of Transportation Engineers. The SDC for transportation is $1,921 per trip generated. Credits will be given for any demolished structures, which shall be based upon the existing use of the structures.

PARKS & RECREATION SDC
The parks & recreation System Development Charge (SDC) is triggered when application for a building permit on a new dwelling is received. Currently, the parks and recreation SDC for each Multi-Family Residence is $3,608.00, and $3,985 for Single-Family Residences. Credit is applied to any demolished structures and is based upon the existing use of the structures. The parks and recreation SDC will be assessed and collected at the time the building permits are issued.

REQUIREMENTS AT FINAL PLAT
- Engineered plans for public improvements (street, sidewalk, and utility) are to be submitted and approved prior to start of construction. Full-engineered design is required along the frontage of the proposed development, as well as the interior streets and utilities.

- The applicant shall pay an inspection fee of 5.5% of the cost of public improvements prior to start of construction.

- The applicant shall provide a payment and performance bond for 100% of the cost of the public improvements prior to the start of construction.

- The applicant shall provide a final approved set of Mylar "As Constructed" drawings to the City of Milwaukie prior to the final inspection.

- The applicant shall provide a maintenance bond for 100% of the cost of the public improvements prior to the final inspection

PLANNING ISSUES

Setbacks:

Front and rear yards in the Residential R-3 zone must be at least 15 ft, side yards at least 5 ft (for interior lots), and street-side yards at least 15 ft (for corner lots), as per Milwaukie Municipal Code (MMC) Subsection 19.302.4. In the R-10 zone, front and rear yards must be at least 20 ft, side yards at

least 10 ft, and street-side yards at least 20 ft, as per MMC Subsection 19.301.4.

For side yards in both the R-3 and R-10 zones, there is a height plane limit of 20 ft at the minimum setback, with a slope of 45 degrees. See the definition of "side yard height plane" in MMC Section 19.201 for an illustration of this principle. MMC Subsection 19.501.3.B establishes some allowable exceptions to the side yard height plane, including limited minor encroachments for roof overhangs or eaves, gable ends of roofs, and dormers.

For a Planned Development (PD), setbacks may be adjusted as needed to accommodate the additional density or alternative housing types that may be allowed. (See the "Notes" section below for more information about circumstances in which a formal variance request may be required). Along the periphery of a PD zone, additional yard depth, buffering, or screening may be required. Peripheral yards shall be at least as deep as the required front yard in the underlying zone(s), as per MMC Subsection 19.311.3.D.

Landscape:

In both the R-3 and R-10 zones, a minimum of 35% of the site must be landscaped. In addition, at least 40% of the front yard area must be vegetated (measured from the front property line to the front face of a house). Vegetated areas may be planted in trees, grass, shrubs, or bark dust for planting beds, with no more than 20% of the landscaped area finished in bark dust (as per MMC Subsection 19.504.7). In the R-3 zone, a maximum of 40% of the site may be covered by structures, including decks or patios over 18 in above grade; in the R-10 zone, the maximum lot coverage allowed is 30%.

All Planned Deveopments must have at least one-third of the gross site area devoted to open space, suitable for scenic, landscaping, or open recreational purposes within the development. MMC Subsection 19.311.3.E outlines the requirements for open space, including that at least half of the required open space be of the same general character as the area containing dwelling units (e.g., at least half of the open space should be developed in such a way as to be usable as yard or recreational space rather than left in a natural state). Floodplain areas, which are subtracted from gross area for purposes of calculating maximum allowed density, may be utilized/designated as required open space areas, subject to the 50% standard for open space character noted above.

Parking:

For rowhouse development, a minimum of 1 off-street parking space per dwelling unit is required (see MMC Table 19.605.1). MMC Subsection 19.605.2 establishes the process for requesting modifications of the parking ratios.

Specific standards for residential parking areas are established in MMC Subsection 19.607.1 and include a provision that required off-street parking spaces must be located somewhere other than the required front or street-side yard. Uncovered parking spaces and maneuvering areas cannot exceed 50% of the front yard area and 30% of the required street-side yard area. No more than 3 residential parking spaces are allowed within the required front yard. Parking areas and driveways on the property shall align with the approved driveway approach and shall not be wider than the approach within 10 ft of the right-of-way boundary.

Transportation Review:

The proposed new development triggers the requirements of MMC Chapter 19.700 Public Facility Improvements, including provisions for evaluating transportation impacts. Please see the Public Works notes or contact the City's Engineering Department for information about the requirements of MMC 19.700, including any required street improvements or right-of-way dedications, as well as whether a Transportation Impact Study (TIS) will be necessary and what process and costs would be involved.

Application Procedures:

The subject property is comprised of four tax lots that appear to represent the boundaries of four legal lots of record. Part of the proposal effectively involves adjusting the current property boundaries to place the existing church facilities (e.g., buildings and parking areas) on one parcel and consolidating the remaining portion of the site into another parcel that will be the focus of the Planned Development

(PD). These boundary adjustments could be processed independently of the PD as a minor land partition; they could also be handled in conjunction with the subdivision plat for the proposed PD. However, unless the church portion of the property is being redeveloped, it would not be considered part of the PD and would not be re-zoned.

PDs are governed by the standards in MMC Section 19.311, which establish a two-step process for approval. First, a preliminary development plan is reviewed by the Planning Commission through the Type III process (MMC Section 19.1006). If any variances are required beyond the types of adjustments that are considered with the PD (such as those related to the density increase allowed by MMC 19.311), a Variance Request application would be required and processed concurrently with the preliminary development plan, with the specific variances subject to the standards of MMC Section 19.911 (see the "Notes" section below for more information). Likewise, due to the designated natural resource areas on the site, a Natural Resource review application will also be required, subject to the applicable standards of MMC Section 19.402 and processed concurrently with the preliminary development plan. Finally, if a Transportation Impact Study (TIS) is required (as per MMC Section 19.704), a Transportation Facilities Review (TFR) application would also be submitted to demonstrate compliance with MMC Chapter 19.700. The TFR application requires Type II review but would be consolidated with the other Type III applications and processed concurrently.

Once the Planning Commission approves the preliminary development plan, the applicant has 6 months to file a final development plan and application for zone change to add the PD designation to the property. If land will be subdivided as part of the PD, a preliminary subdivision plat application is required in conjunction with the final development plan. The final plan, zone change, and subdivision (if applicable) is then processed with Type IV review (MMC Section 19.1007), with initial review by the Planning Commission, which makes a recommendation to City Council for a final decision.

If Council opts to approve the final development plan and program as the standards and requirements for the new PD zone, it will adopt an ordinance to apply the PD zone designation to the property. With the adopting ordinance, Council will also effectively accept or reject all or part of the proposed dedications of public facilities, land, and open space. Alternately, Council may also continue consideration and refer the proposal back to Planning Commission with recommendations for change, or may reject the proposal altogether.

Current application fees for the various applications are the following:
•Planned Development—Preliminary Plan Review (Type III) = $4,400
•Other Type III applications (e.g., Type III Natural Resource review, Type III Variance if needed) = $2,000 each
•Type II applications (e.g., Transportation Facilities Review, Type II Variance if applicable) = $1,000 each
•Planned Development—Final Plan Review (Type IV) = $5,700
•Subdivision preliminary plat = $4,400 plus $100/lot over 4 lots
•No additional fee for Zone Change (cost absorbed in Final Plan Review fee)
•Minor Land Partition preliminary plat (if needed for initial lot reconfiguration) = $2,000
•Type I applications (e.g., Final Plat, Type I Natural Resource Review) = $200 each
•25% discount on fees for multiple applications being reviewed concurrently, after the most expensive application

For the City's initial review, the applicant should submit 5 complete copies of the application (preliminary development plan, natural resource review, and any formally requested variances), including all required forms and checklists. A determination of the application's completeness will be issued within 30 days. If deemed incomplete, additional information will be requested. If deemed complete, additional copies of the application may be required for referral to other departments, the

Lake Road Neighborhood District Association (NDA), and other relevant parties and agencies. City staff will inform the applicant of the total number of copies needed.

For the Type III review stage, once the application submittal has been deemed complete, a public hearing with the Planning Commission will be scheduled. Staff will determine the earliest available date that allows time for preparation of a staff report (including a recommendation regarding approval) as well as provision of the required public notice to property owners and residents within 300 ft of the subject property, at least 20 days prior to the public hearing. A sign giving notice of the application must be posted on the subject property at least 14 days prior to the hearing.

For the Type IV review stage, the completeness review will be repeated for the new submittal (5 copies of the final development plan, zone change request, and subdivision if applicable). As the applicable public hearings are scheduled, public notice will be sent at least 20 days prior to each hearing (Planning Commission first, then City Council), to property owners and residents within 400 ft of the subject property.

Regardless of review level, issuance of a decision starts a 15-day appeal period for the applicant and any party who establishes standing.

A rough estimated timeline for Type III review is approximately 3 to 5 months, from initial submittal through completeness review to the Planning Commission hearing. For Type IV review, one could estimate approximately 3 to 5 additional months from application submittal through completeness review to Planning Commission and City Council hearings. These timelines may vary, depending on the completeness of the initial submittal and the nature of testimony and discussion at any of the public hearings.

Prior to submitting the application, particularly if it will trigger a public hearing, the applicant is encouraged to present the project at a regular meeting of the Lake Road NDA, at 6:30 p.m. on the second Wednesday of every month at Rowe Middle School (3606 SE Lake Rd).

Natural Resource Review: The subject property includes Mt Scott Creek, with a significant area of designated Water Quality Resource (WQR) and Habitat Conservation Area (HCA). In addition, there may be wetlands that have not been formally delineated.

Lot Geography: The subject property is comprised of four tax lots that mirror what appear to be underlying lots of record, established by deed in the 1970s or earlier. With the exception of tax lot 900, none of the lots are strictly rectilinear, though they would be if not for their various frontages along Highway 224 (which runs at an angle northwest to southeast) and/or Rusk Road (which has a curved radius where it turns from a north-south alignment to an east-west alignment at the southeast corner of tax lot 600).

Planning Notes: The materials submitted for the preliminary development plan and program should include whatever information is necessary to demonstrate how the proposed Planned Development would be laid out and the standards and requirements that would apply. Although the language of MMC Section 19.311 does not provide specific guidance, it seems reasonable to include plans showing the layout of proposed lots, structure types, building setbacks, building elevations and basic design elements, description of open space character, detail of proposed street cross-sections, fire access, etc.

Density = The process for calculating maximum allowed density is outlined in MMC Section 19.202.4.E. From the gross area of the site being developed, the following areas are subtracted: 100-year floodplain areas, right-of-way dedications, open spaces that will be publically or commonly owned, and slopes in excess of 25%. Any required right-of-way dedications along Kellogg Creek Drive and/or Rusk Road can be confirmed as part of the TIS review. The area of the church portion of the site is committed to a non-residential use; it is not considered part of the development area and will not be

included in the calculation of allowable residential density.

For purposes of determining the allowable density of the overall site, the density is calculated separately for the square footages of each zone on the property, subtracting the floodplain area and proposed right-of-way dedications for each, as well as the required open space areas proportional to each. Using the combined total allowable density figure, the development may effectively “blend” the densities for the two zones by distributing structures across the site regardless of the specific zoning boundary.

Design = As per MMC Subsection 19.311.3.C, the Planned Development zone allows a residential density up to 20% greater than what would ordinarily be permitted in the underlying zone. However, that allowance is not a given, but rather is predicated on the proposed development being “outstanding in planned land use and design and provid[ing] exceptional advantages in living conditions and amenities not found in similar developments constructed under regular zoning.” Based on the initial site plan submitted, staff has a few observations and/or suggestions for improving the proposed design include the following (note that these are ideas, not requirements):

1) Consider providing access to the northern open space through the northernmost tier of structures by continuing the pattern of the "green alley" shown running north-south through the middle of the 15-unit central blocks.

2) Likewise, consider increasing the width of the gap between the northernmost tier of structures and the perpendicular line of structures on the eastern side of the proposed development, in order to provide greater access to the open space in the northeast portion of the site.

3) Consider revising the number and scale of units proposed along the Kellogg Creek Drive frontage to provide a buffer or transition between the new development and the existing single-story single-family detached dwellings on the south side of the street.

4) Describe or otherwise indicate what exceptional advantages in living conditions and amenities would be provided for residents of the new development, in the context of demonstrating how the proposal is distinguished from similar developments that would be constructed under the regular zoning standards.

Whatever form of residential housing is proposed for the Planned Development must meet the applicable building design standards established in MMC Section 19.505, whether for single-family, multifamily, rowhouse, or other housing types.

Variance Requests = The Planned Development zone designation allows for an increase of up to 20% in allowable density. Proposed adjustments to standards that relate to an allowable increase in density would not require a formal variance request and could include the following examples: housing types that would not otherwise be allowed in the underlying zone(s), reduced lot dimensions and areas, and setbacks reduced as necessary to allow proposed housing types, etc. Where it is unclear whether a proposed adjustment is sufficiently related to an allowed increase in density, a formal variance may be required, subject to the standards and criteria established in MMC Section 19.911. For example, a proposal to reduce a front yard setback would probably be difficult justify as being necessary to achieve the allowed density or an alternative housing type and would most likely require a formal variance request for review and approval.

ADDITIONAL NOTES AND ISSUES

County Health Notes:

Other Notes:

This is only preliminary preapplication conference information based on the applicant's proposal and does not cover all possible development scenarios. Other requirements may be added after an applicant submits land use applications or building permits. City policies and code requirements are subject to change. If you have any questions, please contact the City staff that attended the conference (listed on Page 1). Contact numbers for these staff are City staff listed at the end of the report.

Sincerely,

City of Milwaukie Development Review Team

BUILDING DEPARTMENT
Samantha Vandagriff - Building Official - 503-786-7611
Bonnie Lanz - Permit Specialist - 503-786-7613

ENGINEERING DEPARTMENT
Chuck Eaton - Engineering Director - 503-786-7605
Geoff Nettleton - Civil Engineer - 503-786-760
Chrissy Dawson - Engineering Tech II - 503-786-7610
Alex Roller - Engineering Tech I - 503-786-7695

COMMUNITY DEVELOPMENT DEPARTMENT
Alma Flores - Comm. Dev. Director - 503-786-7652
Shauna Large - Admin Specialist - 503-786-7656
Alicia Martin -Admin Specialist - 503-786-7600
Joyce Stahly -Admin Specialist - 503-786-7600

PLANNING DEPARTMENT
Dennis Egner - Planning Director - 503-786-7654
Vacant - Senior Planner - 503-786-7627
Brett Kelver - Associate Planner - 503-786-7657
Vera Kolias - Associate Planner - 503-786-7653

CLACKAMAS FIRE DISTRICT
Mike Boumann - Lieutenant Deputy Fire Marshal - 503-742-2673
Matt Amos - Fire Inspector - 503-742-2661

Clackamas County Fire District #1
Fire Prevention Office

E-mail Memorandum

To: City of Milwaukie Planning Department

From: Matt Amos, Fire Inspector, Clackamas Fire District #1

Date: 8/30/2016

Re: 100 Dwelling Unit Proposal 13333 SE Rusk Rd. 16-021PA

This review is based upon the current version of the Oregon Fire Code (OFC), as adopted by the Oregon State Fire Marshal's Office. The scope of review is typically limited to fire apparatus access and water supply, although the applicant must comply with all applicable OFC requirements. The following items should be addressed by the applicant:

A Fire Access and Water Supply plan is required for subdivisions and commercial buildings over 1000 square feet in size or when required by Clackamas Fire District #1. The plan shall show fire apparatus access, fire lanes, fire hydrants, fire lines, available fire flow, FDC location (if applicable), building square footage, and type of construction. The applicant shall provide fire flow tests per NFPA 291, and shall be no older than 12 months. Work to be completed by experienced and responsible persons and coordinated with the local water authority.

Access:

1) Provide address numbering that is clearly visible from the street.
2) The inside turning radius and outside turning radius for a 20' wide road shall not be less than 28 feet and 48 feet respectively, measured from the same center point.
3) Buildings exceeding 30 feet in height shall require extra width and proximity provisions for aerial apparatus.
4) Access streets between 26 feet and less than 32 feet in width must have parking restricted to one side of the street. Access streets less than 26 feet in width must have parking restricted on both sides of the street. No parking restrictions for access roads 32 feet wide or more.

Water Supply:

1) Fire Hydrants, Commercial Buildings: Where a portion of the building is more than 400 feet from a hydrant on a fire apparatus access road, as measured in an approved

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route around the exterior of the building, on-site fire hydrants and mains shall be provided.
Note: This distance may be increased to 600 feet for buildings equipped throughout with an approved automatic sprinkler system.

2) All new buildings shall have a firefighting water supply that meets the fire flow requirements of the Fire Code. Maximum spacing between hydrants on street frontage shall not exceed 500 feet. Additional private on-site fire hydrants may be required for larger buildings. Fire sprinklers may reduce the water supply requirements.
3) Prior to the start of combustible construction required fire hydrants shall be operational and accessible.
4) The fire department connection (FDC) for any fire sprinkler system shall be placed as near as possible to the street, and within 100 feet of a fire hydrant.

Exhibit C

Memo to File

To: **Code Interpretations folder**
From: **Denny Egner, Planning Director**
Date: **October 4, 2016**
Re: **Review Process for Planned Development Applications (MMC 19.311)**

The last land use application for a Planned Development in Milwaukie was in 1992, so it is not a process that is exceedingly familiar to the Planning Department. Furthermore, the review process outlined in the zoning code is not as clear as would be useful. The intent of this memo is to clarify the Planned Development review process.

Established in Milwaukie Municipal Code (MMC) Section 19.311, the Planned Development (PD) zone is intended to provide some flexibility in residential development on parcels of 2 acres or greater. The PD standards allow for a mix of housing types and land uses, as well as a 20% increase in maximum density, in exchange for creative design, special or oversized utilities (if needed), peripheral yards, and provision of open space. The PD designation is a type of zone and replaces the original zone designation, so the review process involves an application for zone change. In some cases, a PD proposal may also involve land division.

In essence, there are two steps in the PD review process: (1) conditional approval of the preliminary development plan by the Planning Commission; and (2) adoption of an ordinance to apply the PD zone to the subject property as well as approval of the final development plan by the City Council, based on a recommendation from the Planning Commission.

Preliminary Development Plan
MMC Subsection 19.311.6 makes reference to a "meeting" of the Planning Commission for consideration of the preliminary development plan, after which the Commission shall inform the applicant whether it believes the preliminary plan satisfies the provisions of MMC 19.311 or shall advise the applicant of any perceived deficiencies. Continuances or multiple meetings may be needed before the Commission decides that the preliminary plan (with any needed modifications) is approvable. Once the Commission has approved the preliminary plan and any modifications "in principle," the applicant is free to submit a final development plan and zone change application, and in fact must make that submittal within 6 months.

Although the code does not identify a specific review type for this portion of the process, it seems reasonable to suggest that any related applications should be considered by the Planning Commission as part of the preliminary development plan. For example, if a proposal involves a subdivision and/or an issue such as disturbance of designated natural resources, transportation facilities review, or a variance request beyond the flexibility of the PD standards, those elements of the proposal should be presented for consideration as part of the preliminary development plan. No formal decision on these additional aspects would be issued at this preliminary stage, but the Commission would advise the applicant of any recommended revisions that would make the proposal more approvable "in principle."

Final Development Plan
MMC Subsection 19.311.10 provides a slightly clearer review path for the final development plan. The applicant would submit the final plan with an application for zone change and any needed subdivision. The Type IV review process (MMC Section 19.1007) would be engaged, with an initial public hearing by the Planning Commission (with public notice to properties within 400 ft, provided 20 days in advance). The Commission would determine whether the final proposal is consistent with the "approved-in-principle" preliminary plan and would also make a recommendation regarding the proposed PD zone change for the subject property.

According to MMC Subsection 19.311.10.B, at this point in the process the Commission would make a decision regarding preliminary plat approval of any proposed subdivision. This could be done if the subdivision application was processed using the procedures for Type III review. Ostensibly, any additional applications for

such issues as natural resource review, transportation facilities review, or variance would also be formally included with the submittal for a subdivision (if needed) and could be decided at the same time, with conditions that require approval of the PD (final development plan and zone change) to become effective.

The final development plan and zone change would proceed through the Type IV process, with a public hearing with the City Council scheduled to consider these items (again, with public notice provided 20 days in advance). The Council would decide whether to adopt an ordinance that would approve the zone change and the final development plan, which would provide the standards for the new PD zone. According to MMC Subsection 19.311.11.D, the Council could also refer the application back to Planning Commission with a recommendation for amendment, or it may choose to reject the proposal and abandon further proceedings.

Standard Process Outline

In an attempt to interpret the intent of the current code language with respect to process, see below for what Planning staff believes is a reasonable process outline, with the preliminary development plan being handled through Type III review and the final development plan handled through Type IV review:

1. Required preapplication conference with City staff (including 2 weeks for preparation and 2 weeks for City to complete meeting notes)
2. Application submittal (Type III) = Including preliminary development plan, proposed zone change, any related subdivision, natural resource review, transportation facilities review, variance request, etc.
3. Completeness review (up to 30 days) = Completeness determination starts a 120-day clock for issuing a decision.
4. Public notice for Planning Commission hearing (Type III) = Once the application is deemed complete, it is referred for comment (to other departments & agencies, neighborhood association, etc.) and a public hearing is scheduled with Planning Commission. Public notice is sent according to Type III process (300-ft notice, 20 days in advance of hearing).
5. Planning Commission hearing (Type III process) = Consideration of preliminary development plan and proposed zone change, including any related subdivision, natural resource review, transportation facilities review, and/or variance requests. The Commission determines whether it can approve the preliminary plan in principle—if so, a Notice of Decision is issued and a 6-month clock starts on the requirement to submit the final development plan in the Type IV process. The Commission can also issue a Type III decision for any subdivision, natural resource review, transportation facilities review, variance request, etc., with conditions requiring approval of the PD (final development plan and zone change) by City Council to become effective.
6. Application submittal (Type IV) = Final development plan and proposed zone change.
7. Completeness review (up to 30 days) = Completeness determination starts a new 120-day clock for the Type IV review process.
8. Public notice for Planning Commission hearing (Type IV) = Once the application is deemed complete, it is again referred for comment (to other departments & agencies, neighborhood association, etc.) and a public hearing is scheduled with Planning Commission. Public notice is sent according to Type IV process (400-ft notice, 20 days in advance of hearing).
9. Planning Commission hearing (Type IV) = The Commission evaluates the final proposal and determines whether it is consistent with the preliminary approval and with the intent and requirements of MMC 19.311. If so, it makes a recommendation for approval to the City Council.
10. Public notice for Council hearing (Type IV) = Additional public notice is sent to properties within 400 ft of the site, at least 20 days prior to Council hearing.

11. City Council hearing = Council could either adopt an ordinance to establish the PD zone and establish the final development plan as providing the standards for the new zone, or refer the matter back to Planning Commission for modifications, or reject the proposal.

12. Final Plat submittal (Type I review)

Alternative for Streamlining the Process

In the interest of moving a proposal through the review process without unnecessary delay but without reducing the opportunities for public participation and input, and, given the current code language, see below for an alternative timeline that would merge the Type III process with the Type IV process:

1. Required preapplication conference

2. Application submittal = Two sets of concurrent applications are submitted. One set has the preliminary development plan and proposed zone change. Another set of includes those for any related subdivision, natural resource review, transportation facilities review, and/or variance request.

3. Completeness review (up to 30 days) = Completeness determination starts the 120-day clock. For this alternative process, the City would request that the applicant provide an initial waiver of the 120-day clock by at least 60 additional days, to allow adequate time for the entire process (including a potential appeal).

4. Public notice for initial Planning Commission hearing = Once the application is deemed complete, it is referred for comment and an initial public hearing is scheduled with Planning Commission. Public notice is sent according to Type IV process (400-ft notice, 20 days in advance of first hearing).

5. Planning Commission hearing #1 = Consideration of preliminary development plan and proposed zone change, including any related subdivision, natural resource review, transportation facilities review, and/or variance requests. If the Commission decides the preliminary plan can be recommended for approval, this initial hearing could suffice as the recommendation hearing required by the Type IV process—and the Commission could make a formal recommendation on what becomes considered as the final development plan.

   At this time, the Commission could also issue a Type III decision for any subdivision, natural resource review, transportation facilities review, and/or variance request, with conditions requiring approval of the PD (final development plan and zone change) by City Council to become effective. The standard 15-day appeal period would need to pass before the 20-day public notice would be sent out for the City Council hearing. If an appeal to the Type III decision was filed, the Council hearing could probably serve as the Type III appeal hearing as well as the required Type IV hearing on the final development plan. Note that, in the case of an appeal, the 20-day public notice period may not be adequate time to allow staff sufficient time to prepare the necessary staff report for Council, and additional time between the Commission and Council hearings may be needed.

6. Planning Commission hearing #2 (if needed) = If the Commission recommends modifications to the preliminary development plan, the initial hearing could essentially be continued to a date certain in order to obtain a recommendation for approval on what would be considered the final development plan. No additional 20-day notice would be required, and the second/continued hearing could happen as soon as the next Commission meeting (2-3 weeks, depending on the calendar).

7. City Council hearing (Type IV decision) = Once the Planning Commission recommends approval of the final development plan, a Council hearing could be scheduled and 20-day public notice provided. The Council could either adopt an ordinance to establish the PD zone and establish the final development plan as providing the standards for the new zone, or refer the matter back to Planning Commission for modifications, or reject the proposal.

8. Final Plat submittal (Type I review)

Exhibit D

Wetland Delineation for a Proposed Development Site North of SE Kellogg Creek Drive in Milwaukie, Clackamas County, Oregon

(Township 2 South, Range 2 East, Section 6AD,
TL 600 and Portions of 700, 900 and 901)

Prepared for

Brownstone Development, Inc.
Attn: Randy Myers
PO Box 2375
Lake Oswego, OR 97035

Prepared by

Caroline Rim, Craig Tumer
John van Staveren
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9450 SW Commerce Circle, Suite 180
Wilsonville, Oregon 97070
(503) 570-0800
(503) 570-0855 FAX

PHS Project Number: 5975

January 16, 2017

TABLE OF CONTENTS

I. INTRODUCTION

Pacific Habitat Services, Inc. (PHS) conducted a wetland delineation on a proposed development site located north of SE Kellogg Creek Drive in Milwaukie, Clackamas County, Oregon (Township 2 South, Range 2 East, Section 6AD, Tax Lot 600 and portions of Tax Lots 700, 900, 901). The study area consists of approximately 15.58 acres.

This report presents the results of PHS's field work. Figures, including a map depicting the location of wetlands within the study area, are located in Appendix A. Data sheets documenting on-site conditions are provided in Appendix B. Ground-level photos of the study area are in Appendix C. Historic aerial photographs are in Appendix D. The geotechnical evaluation report for the site is included in Appendix E. A discussion of the methodology is provided in Appendix F for the client.

II. RESULTS AND DISCUSSION

A. Landscape Setting and Land Use

The site is located southwest of Highway 224 (Pacific Highway); north of SE Kellogg Creek Drive, and north and west of SE Rusk Road. Mt. Scott Creek flows to the west along the northern edge of the study area, and the North Clackamas Park Milwaukie Center borders the western edge. The site is located within a residential area; undeveloped woodland is located immediately to the north and northwest of the study area, and the Turning Point Church is located in the southeast corner of the site at 13333 SE Rusk Road. The eastern half of the property, near the church, is relatively level; however, the western half descends abruptly to a lower woodland area. Site elevations range from approximately 80 feet National Geodetic Vertical Datum (NGVD) in the eastern half of the site, to approximately 66 feet NGVD in the lower reaches of the western half of the site.

B. Site Alterations

The site has not been subject to recent construction activities; however, it appears that the substrate throughout much of the central and eastern half of the site consists of fill material, likely associated with the construction of the church, over two decades ago.

C. Precipitation Data and Analysis

Table 1 compares the average monthly precipitation to the observed monthly precipitation at the Portland International Airport National Weather Service Station in the three months prior to PHS's wetland delineation field work. Table 1 also compares the observed precipitation to be within the normal precipitation range, as identified in the NRCS WETS table for the Oregon City station.

As shown in Table 1, observed precipitation was below normal and normal range in August. Observed precipitation was above normal but within normal range in September; however, in October observed precipitation was considerably above normal and normal range. It should be noted that the observed precipitation total for November in Table 1 is the amount of precipitation recorded in the first 20 days of the month, prior to the day of PHS's wetland delineation field work.

Table 1. Comparison of Average and Observed Precipitation for the Three Months Prior to the Wetland Delineation Field Work

Month	Average Precipitation[a] (in.)	30% Chance Will Have		Observed Precipitation[b] (in.)	Percent of Normal
		Less Than Average[a]	More Than Average[a]		
August	1.00	0.21	1.16	0.09	13
September	1.93	0.86	2.41	1.69	115
October	3.48	1.85	4.25	8.31	277
November	6.79	4.43	8.16	2.79[c]	50[d]

Notes:
a. Source: NRCS WETS Table for Oregon City WETS station
b. Observed precipitation is the precipitation recorded at the Portland International Airport weather station. Source: National Weather Service.
c. Observed precipitation is for the period November 1-20, 2016, prior to PHS's November 21, 2016 field work.
d. The percent of normal precipitation is for the first twenty days in November prior to PHS's November 21, 2016 field work. This estimate assumes that precipitation is spread evenly across the month and that the average precipitation in the first twenty days of November is 2.79 inches.

Precipitation in the months preceding PHS's wetland delineation field work fluctuated widely. However, based on this and other observations of hydrologic conditions during the site visit, it is PHS's opinion that the drier than normal conditions in August and the wetter than normal conditions in September and October did not affect the hydrological indicators observed at the time of PHS's wetland delineation field work.

D. Methods

PHS conducted the wetland investigation and data collection on November 21, 2016. PHS identified jurisdictional wetlands in the study area based on the presence of wetland hydrology, hydric soils, and hydrophytic vegetation, in accordance with the Routine On-site Determination, as described in the *Corps of Engineers Wetland Delineation Manual, Wetlands Research Program Technical Report Y-87-1* ("The 1987 Manual") and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region*.

PHS delineated the limits of ordinary high water (OHW) along the south bank of Mt. Scott Creek based on an evaluation of observed physical characteristics, as described in the U.S. Army Corps of Engineers' Regulatory Guidance Letter No. 05-05 (December 7, 2005). PHS flagged the limits of OHW with blue flags placed at the limits of the OHW, as indicated by the point below which woody vegetation is absent and at the break in the slope angle of the bank.

E. Description of All Wetlands and Other Non-Wetland Waters

PHS identified and delineated one potential wetland area (Wetland A) and Mt. Scott Creek (south bank only), as well as six potentially, artificially created wetland areas (Wetlands B through G). Brief descriptions of the on-site wetlands and non-wetland waters are provided below.

Mt. Scott Creek

Mt. Scott Creek, a tributary to Kellogg Creek and the Willamette River, is a perennial stream that generally flows to the west along the northern boundary of the study area. The stream banks are relatively well defined and near vertical at the location of the OHW line. The plant community of the riparian area along the creek includes a deciduous overstory of big-leaf maple (*Acer macrophyllum*, FACU), Oregon white oak (*Quercus garryana*, FACU), Oregon ash (*Fraxinus latifolia*, FACW), and red alder (*Alnus rubra*, FAC); and a shrub and herbaceous understory composed of species such as snowberry (*Symphoricarpos albus*, FACU), Pacific ninebark (*Physocarpus capitatus*, FACW), Scouler's willow (*Salix scouleriana*, FAC), English hawthorn (*Crataegus monogyna*, FAC), Fuller's teasel (*Dipsacus fullonum*, FAC), and spreading bentgrass (*Agrostis stolonifera*, FAC). The Cowardin Classification for Mt. Scott Creek is Riverine Upper Perennial Unconsolidated Bottom Permanently Flooded (R3UBH) and Riverine Unknown Perennial Unconsolidated Bottom Permanently Flooded (R5UBH). The Hydrogeomorphic (HGM) Classification is Riverine Flow-Through. Mt. Scott Creek continues outside the study area to the north, west and east.

Wetland A

Wetland A consists of approximately 30,386 square feet (0.70 acre) located in the western half of the site, south of Mt. Scott Creek. The plant community within Wetland A (characterized by Sample Points 3, 5, 7) is a combination of deciduous woodland bordered by open fields. Dominant species within the woodland include an overstory of Oregon ash and black cottonwood (*Populus balsamifera*, FAC), with a woody understory of Oregon ash, black cottonwood, red-osier dogwood (*Cornus alba*, FACW), snowberry, and Himalayan blackberry (*Rubus armeniacus*, FAC). The open fields include reed canarygrass (*Phalaris arundinacea*, FACW), creeping buttercup (*Ranunculus repens*, FAC), big leaf avens (*Geum macrophyllum*, FAC), slender rush (*Juncus tenuis*, FAC), rough bluegrass (*Poa trivialis*, FAC), bitter dock (*Rumex obtusifolius*, FAC), and common dandelion (*Taraxacum officinale*, FACU).

The adjacent upland areas (characterized by Sample Points 2, 6, 8) include Oregon ash, Himalayan blackberry, snowberry, English hawthorn, reed canarygrass, Fuller's teasel, large leaf avens, bull thistle (*Cirsium vulgare*, FACU), fringed willowherb (*Epilobium ciliatum*, FACW), Dewey sedge (*Carex deweyana*, FAC), common selfheal (*Prunella vulgaris*, FACU), Western swordfern (*Polystichum munitum*, FACU), lentil vetch (*Vicia tetrasperma*, NOL), creeping buttercup, spreading bentgrass, field horsetail (*Equisetum arvense*, FAC), narrow-leaf goosefoot (*Chenopodium leptophyllum*, FACU), spotted cat's ear (*Hypochaeris radicata*, FACU), European centaury (*Centaurium erythraea*, FAC), wild carrot (*Daucus carota*, FACU), tansy ragwort (*Senecio jacobaea*, FACU), and colonial bentgrass (*Agrostis capillaris*, FAC).

Hydrology within Wetland A is likely supported by a seasonally high groundwater table, surface runoff and precipitation. At the time of PHS's wetland delineation field work, the soils in Wetland A were typically saturated to the surface or within twelve inches of the surface, with free water observed at four inches below the soil surface or at the surface; inundation was also commonly present within Wetland A. The low-chroma matrix of the soil with contrasting redox concentrations meets the redox dark surface indicator for hydric soils. The Cowardin Classification for Wetland A is Palustrine Emergent, Persistent, Seasonally Flooded/Saturated (PEM1E). The HGM Classification is Slope. Wetland A continues outside the study area to the west.

<u>Wetlands B – G</u> (Artificially Created Wetlands)

Wetlands B through G generally consist of small, shallow, isolated depressions. Table 2 lists the area of each wetland.

Wetland	Area (square feet / acres)
B	905 / 0.02
C	176 / 0.004
D	172 / 0.004
E	998 / 0.02
F	301 / 0.007
G	666 / 0.02
Total	**3,218 / 0.07**

All six of these wetlands are similar in character, and therefore, a representative pair of wetland/upland sample points (9 and 10, respectively) were taken at Wetland E. These wetlands are located in the central portion of the site, west of the church and several feet above the lower woodland area further to the west. The plant communities in both the wetland and upland areas are primarily composed of weedy grasses and herbs; the wetland areas include reed canarygrass, spreading bentgrass, soft rush (*Juncus effusus*, FACW), spotted cat's ear, and oxeye daisy (*Chrysanthemum vulgare*, FACU), and the adjacent upland areas include wild carrot, curly dock (*Rumex crispus*, FAC), colonial bentgrass, bluegrass (*Poa sp*., FAC), common velvet grass (*Holcus lanatus*, FAC), tall fescue (*Schedonorus arundinaceus*, FAC), yellow glandweed (*Parentucellia viscosa*, FAC), and English plantain (*Plantago lanceolata*, FACU).

Hydrology within Wetlands B through G primarily consists of surface runoff and precipitation. As discussed in the *Subsurface Conditions* section of the geotechnical evaluation report (Appendix E), fill material on the site ranges in thickness up to more than 12 feet, with approximately 10 feet in the central portion of the site, and groundwater was not encountered in the test pits in the vicinity of these wetlands. Therefore, it is reasonable to assume that these artificially created wetlands are not hydrologically connected to the water table. At the time of PHS's wetland delineation field work, the soils within these wetlands were typically saturated to the surface, with free water observed at or near the surface, and included some areas of inundation, which likely was perched on compacted substrate resulting in diminished permeability. The redox dark surface indicator for hydric soils was met with low-chroma matrix soils with contrasting redox concentrations. The Cowardin Classification for Wetlands B through G is Palustrine Emergent, Nonpersistent, Seasonally Flooded/Saturated (PEM2E). The HGM Classification is Slope.

As mentioned previously in Section B, *Site Alterations*, it appears that the substrate throughout much of the central and eastern half of the site consists of fill material, likely associated with the construction of the church. In addition, based on a review of historic aerial photographs (Appendix D), it appears that Wetlands B through G have been artificially created on compacted fill material resulting from activities associated with construction of the church and on-going activities associated with the church property over the years.

F. Deviation from LWI or NWI

With the exception of Mt. Scott Creek, which the US Fish and Wildlife Service's National Wetlands Inventory (NWI) maps as Riverine Upper Perennial Unconsolidated Bottom Permanently Flooded (R3UBH) and Riverine Unknown Perennial Unconsolidated Bottom Permanently Flooded (R5UBH) wetland, it does not indicate the presence of any wetlands on the site. NWI maps are generated primarily through the interpretation of color infrared aerial photographs (scale of 1:58,000), with limited "ground truthing" to confirm the interpretations. The canopy cover over much of Wetland A, the small size of Wetlands B through G, and the scale of the aerial photographs used to prepare the NWI maps are likely reasons for the discrepancy between the wetlands mapping and the existing on-site conditions. In addition, as Wetlands B though G appear to be artificially created, their presence and absence over the years are likely to have been dependent upon the construction and various activities on the church property, which have varied over the period of time in which the aerial photographs were taken.

G. Mapping Method

PHS flagged the wetland boundaries and limits of OHW with blue flagging. Sample points were flagged with lime green surveyor's tape. The wetland boundary and OHW flagging were survey-located by TerraCalc Land Surveying, Inc. Sample points were GPS-located by PHS, which subsequently transferred this information onto a base map provided by TerraCalc Land Surveying. The estimated survey accuracy is sub-centimeter and the sample point accuracy is approximately +/- 3 feet.

H. Additional Information

None

I. Results and Conclusions

Within the study area, PHS identified and delineated a total of approximately 0.70 acres of potentially jurisdictional wetland, approximately 0.07 acres of potentially artificially created wetland, and the OHW line along the south bank of Mt. Scott Creek, as detailed in Table 3.

Table 3: Summary of Potentially Jurisdictional and Artificially Created Wetland, and Other Waters within the Study Area

Resource	Area (square feet/acreage)	Cowardin Class	HGM Class
Wetland A	30,386 / 0.70	PEM1E	Slope
Wetland B (Artificially Created)	905 / 0.02	PEM2E	Slope
Wetland C (Artificially Created)	176 / 0.004	PEM2E	Slope
Wetland D (Artificially Created)	172 / 0.004	PEM2E	Slope

Resource	Area (square feet/acreage)	Cowardin Class	HGM Class
Wetland E (Artificially Created)	998 / 0.02	PEM2E	Slope
Wetland F (Artificially Created)	301 / 0.007	PEM2E	Slope
Wetland G (Artificially Created)	666 / 0.02	PEM2E	Slope
Mt. Scott Creek (OHW line south bank only)	-	R3UBH R5UBH	Riverine Flow-Through
Total (Potentially Jurisdictional Wetland)	**30,386 (0.70 acres)**		
Total (Potentially Artificially Created Wetland)	**3,218 (0.07 acres)**		

J. Required Disclaimer

This report documents the investigation, best professional judgment and conclusions of the investigators. It is correct and complete to the best of our knowledge. It should be considered a Preliminary Jurisdictional Determination of wetlands and other waters and used at your own risk unless it has been reviewed and approved in writing by the Oregon Department of State Lands in accordance with OAR 141-090-0005 through 141-090-0055.

III. REFERENCES

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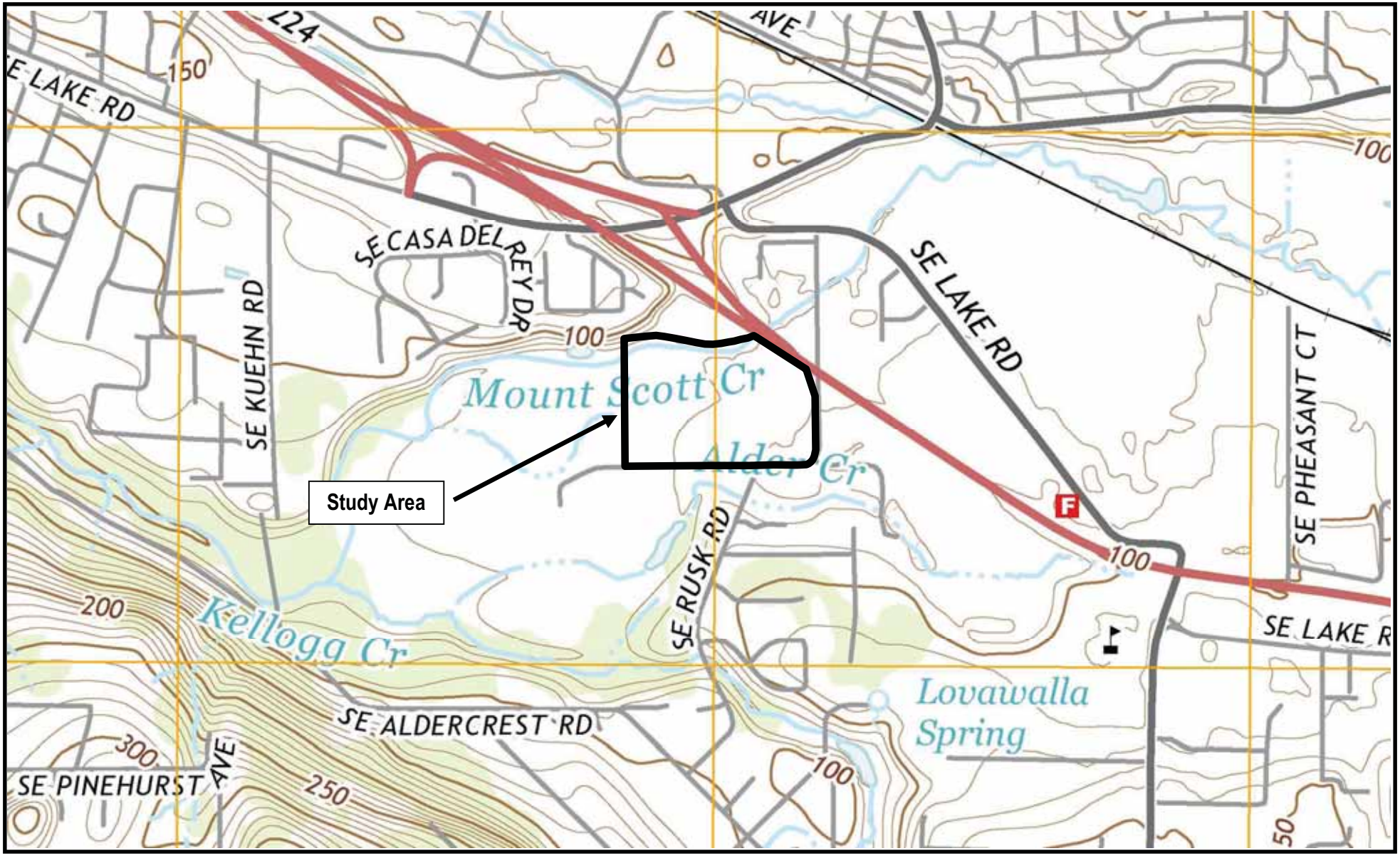
Appendix A

Figures



5975
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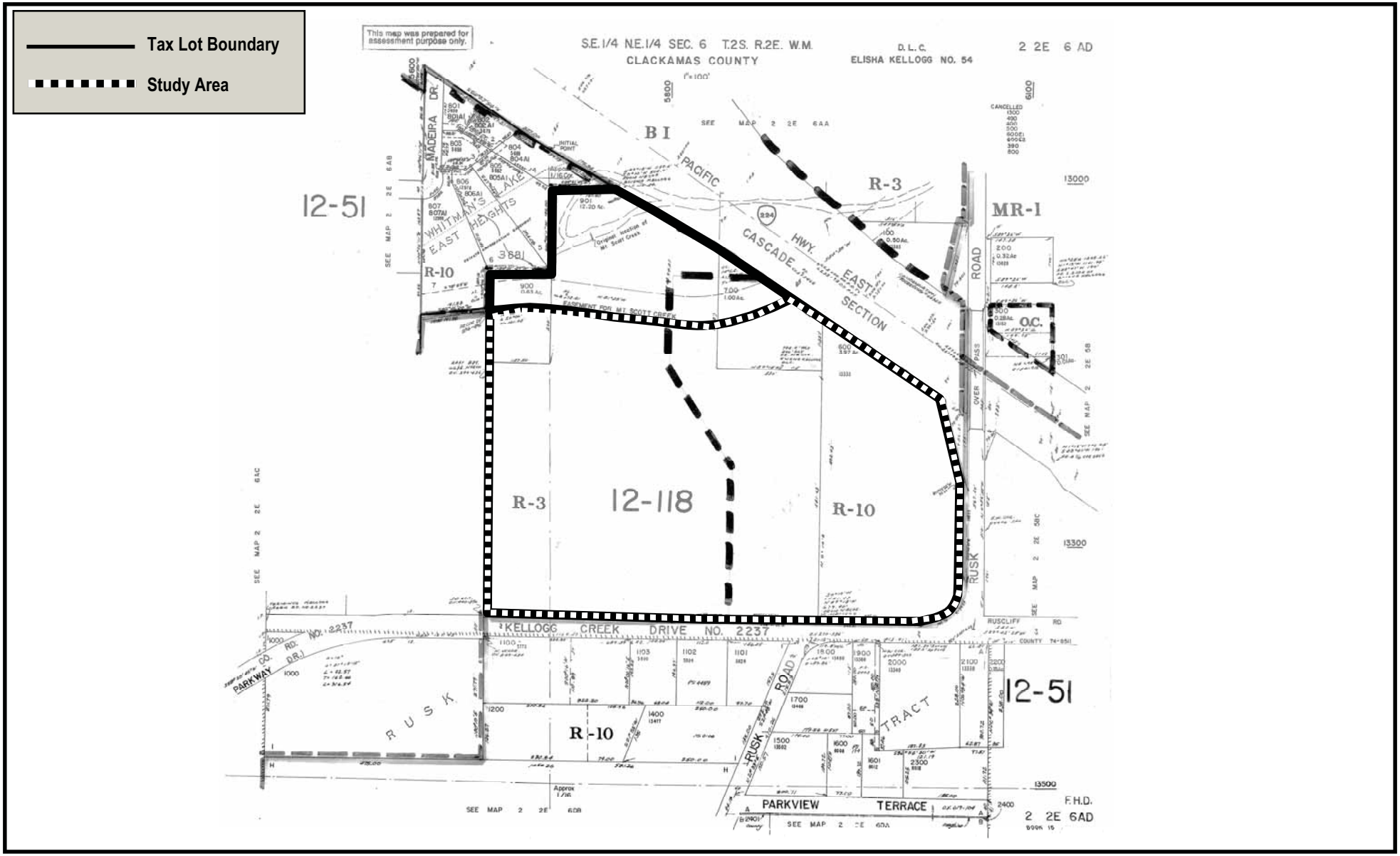
General Location and Topography
SE Kellogg Creek Drive - Milwaukie, Oregon
United States Geological Survey (USGS), Gladstone, Oregon, 7.5 Quadrangle, 2014
(viewer/nationalmap.gov/basic)

FIGURE
1



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12/21/2016

Pacific Habitat Services, Inc.
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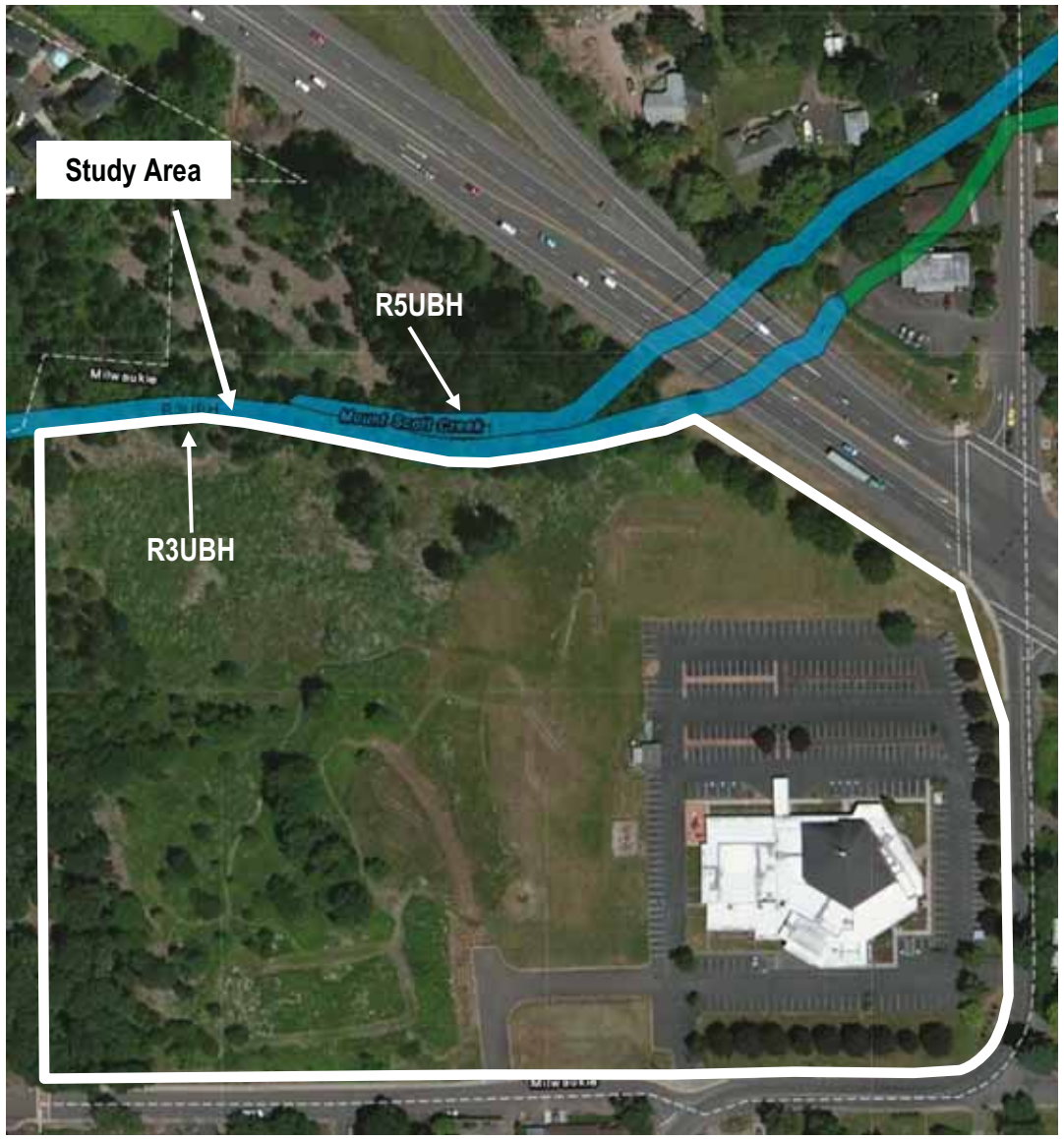
Wilsonville, OR 97070

Tax Lot Map
SE Kellogg Creek Drive - Milwaukie, Oregon
The Oregon Map (ormap.net)

FIGURE
2



LEGEND

Wetlands

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

R3UBH: Riverine Upper Perennial Unconsolidated Bottom Permanently Flooded

R5UBH: Riverine Unknown Perennial Unconsolidated Bottom Permanently Flooded

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National Wetlands Inventory Map
SE Kellogg Creek Drive - Milwaukie, Oregon
U.S. Fish and Wildlife Service, Online Wetland Mapper V2, 2016

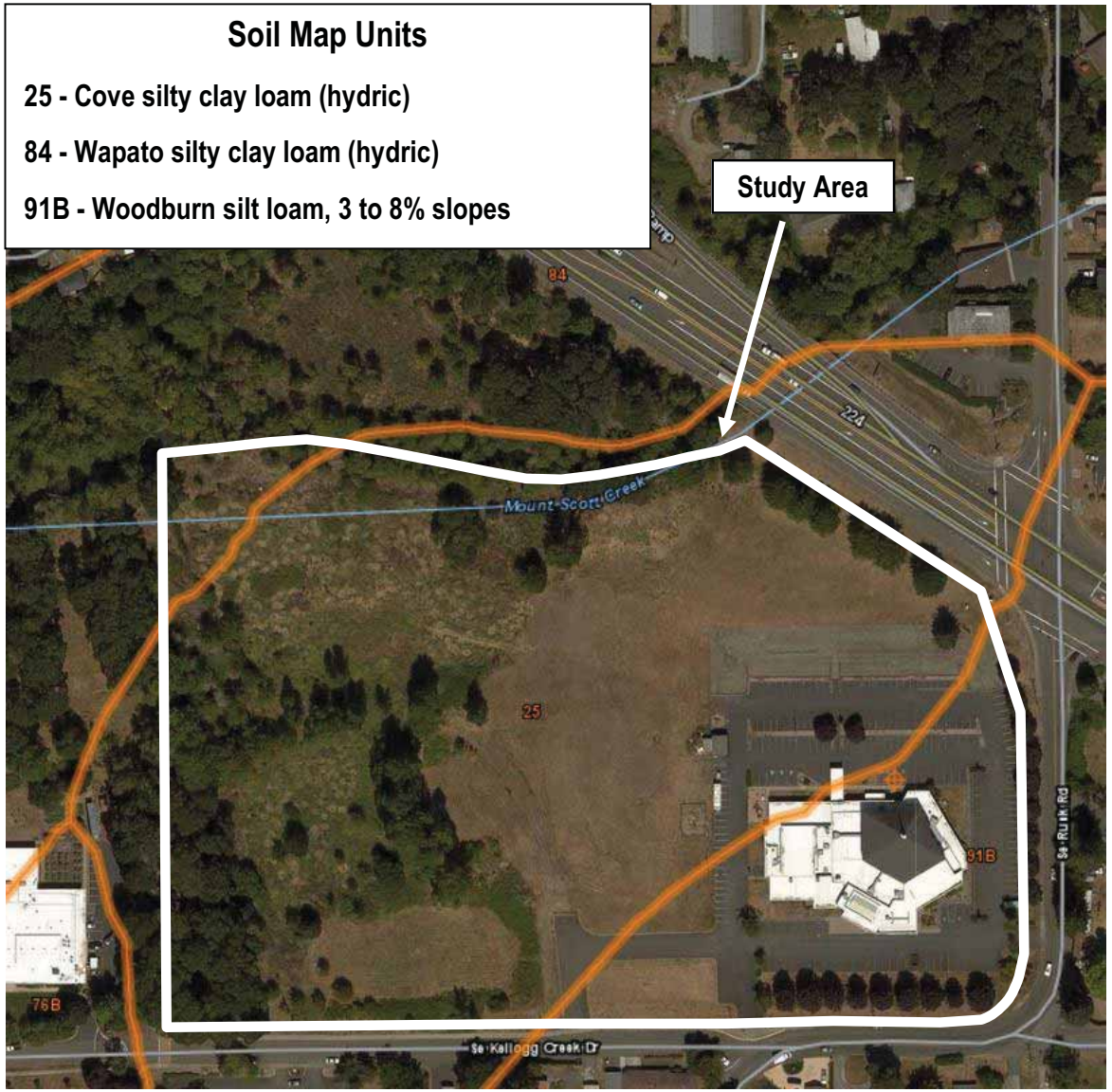
FIGURE
3

Soil Map Units

25 - Cove silty clay loam (hydric)

84 - Wapato silty clay loam (hydric)

91B - Woodburn silt loam, 3 to 8% slopes



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Soils Map
SE Kellogg Creek Drive - Milwaukie, Oregon
Natural Resources Conservation Services, Web Soil Survey, 2016

(websoilsurvey.sc.egov.usda.gov)

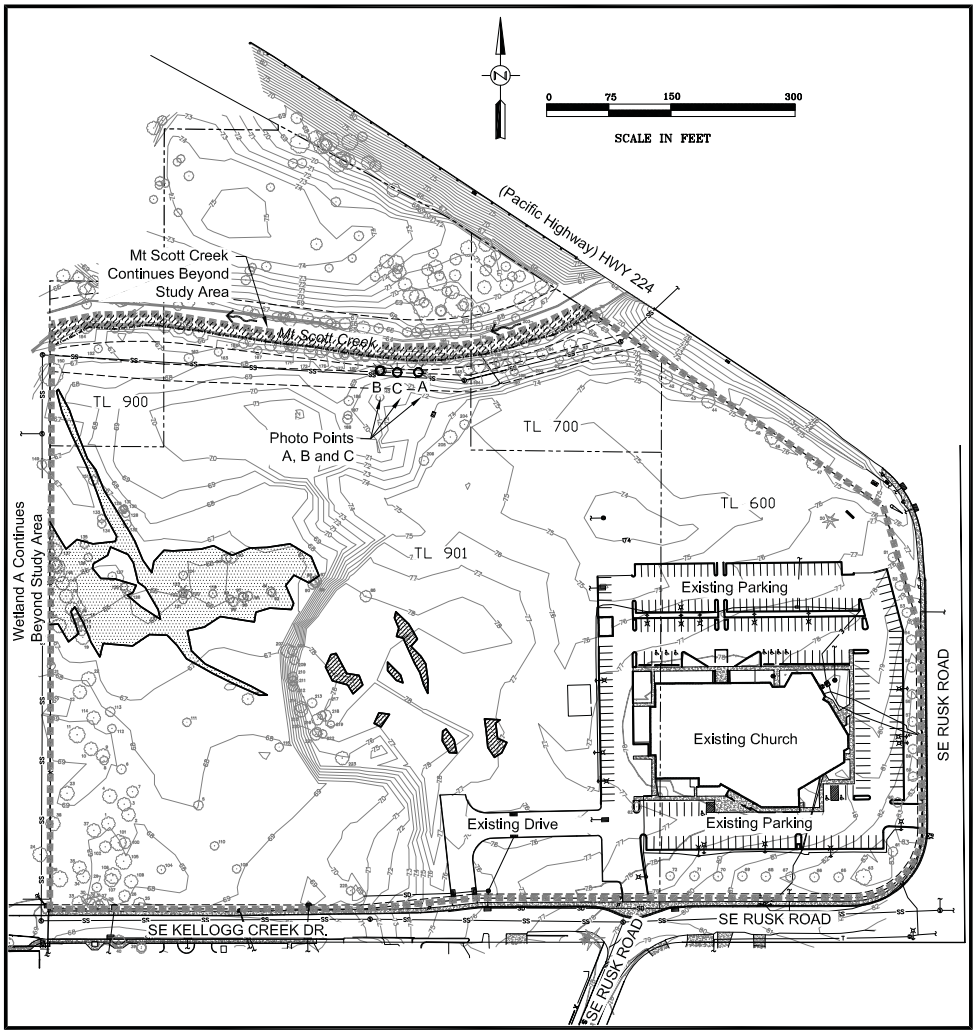
FIGURE
4

5975
12/21/2016

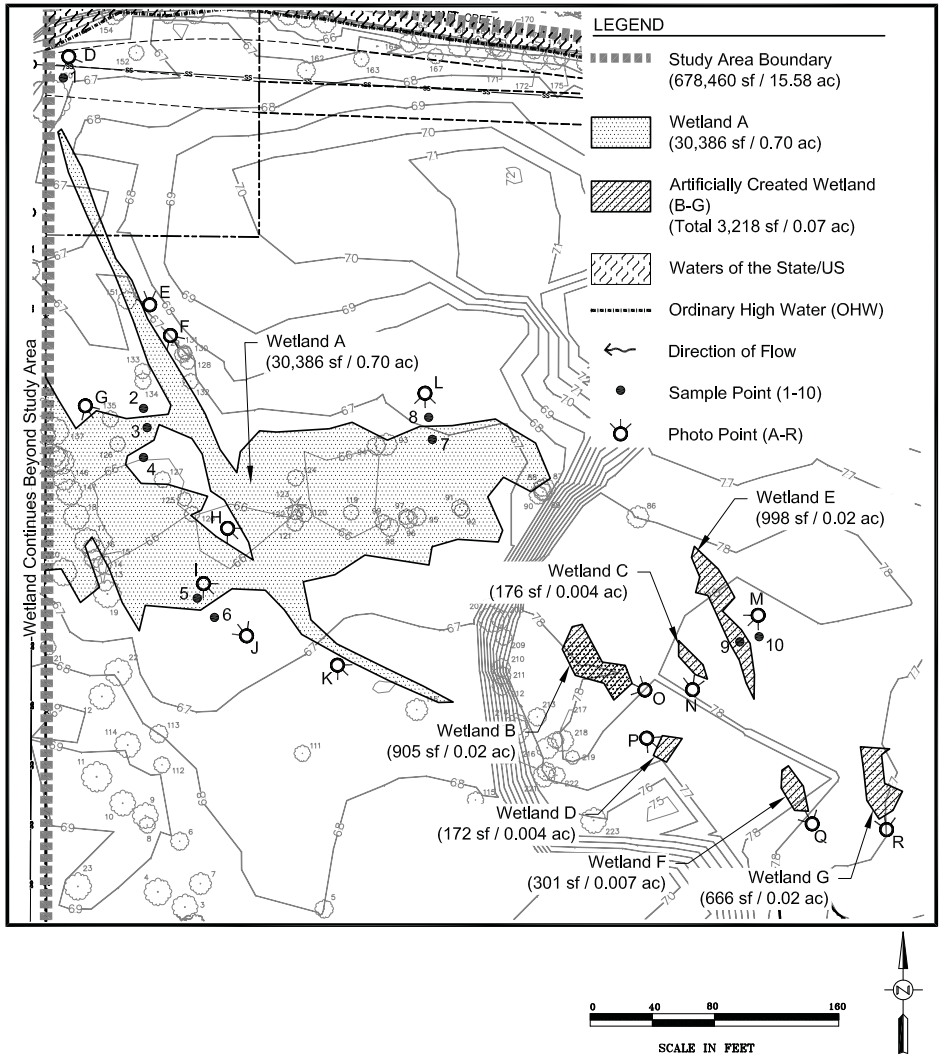
Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Aerial Photo
SE Kellogg Creek Drive - Milwaukie, Oregon
Google Earth, 2016

FIGURE
5



TAX LOT OVERVIEW



Pacific Habitat Services,Inc.
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Phone: (503) 570-0800 Fax (503) 570-0855

Survey provided by
TerraCalc Land Surveying, Inc., 2016
Survey accuracy is sub-centimeter and
Sample Point accuracy is ± 3 feet.

Wetland Delineation
SE Kellogg Creek Drive - Milwaukie, Oregon

FIGURE
6

1-18-2017

X:\Project Directories\5900\5975 SE Rusk Road (Kellogg Creek Drive)\AutoCAD\Plot Dwg\Fig6 WetDel.dwg, 1/18/2017 1:36:34 PM

Appendix B

Wetland Delineation Data Sheets

PHS # 5975

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: **SE Kellogg Creek Drive** City/County: **Milwaukie/Clackamas** Sampling Date: **11/21/2016**

Applicant/Owner: **Brownstone Development, Inc.** State: **OR** Sampling Point: **1**

Investigator(s): **Caroline R./Craig T.** Section, Township, Range: **Section 6AD, T 2S, R 2E**

Landform (hillslope, terrace, etc.:) Local relief (concave, convex, none): Slope (%):

Subregion (LRR): **LRRA** Lat: **45.427379** Long: **-122.603487** Datum: **WGS 84**

Soil Map Unit Name: **Wapato silty clay loam** NWI Classification: **None**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No (if no, explain in Remarks)

Are vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation Soil or Hydrology naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes **X**	No	**Is Sampled Area within a Wetland?**	Yes	No **X**
Hydric Soil Present?	Yes	No **X**			
Wetland Hydrology Present?	Yes **X**	No			

Remarks:
Floodplain adjacent to Mt. Scott Creek.

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: **30**)			
1 ***Quercus garryana***	**30**	**X**	**FACU**
2			
3			
4			
	30	= Total Cover	
Sapling/Shrub Stratum (plot size: **5**)			
1 ***Salix sitchensis***	**15**	**X**	**FACW**
2 ***Fraxinus latifolia***	**5**	**X**	**FACW**
3 ***Rubus armeniacus***	**5**	**X**	**FAC**
4			
5			
	25	= Total Cover	
Herb Stratum (plot size: **5**)			
1 ***Rumex crispus***	**5**		**FAC**
2 ***Carex deweyana***	**5**		**FAC**
3 ***Taraxacum officinale***	**2**		**FACU**
4 ***Dipsacus fullonum***	**6**		**FAC**
5 ***Geum macrophyllum***	**3**		**FAC**
6 ***Agrostis stolonifera***	**15**	**X**	**FAC**
7 ***Lapsana communis***	**10**	**X**	**FACU**
8 ***Leucanthemum vulgare***	**2**		**FACU**
	48	= Total Cover	
Woody Vine Stratum (plot size:)			
1			
2			
	0	= Total Cover	

% Bare Ground in Herb Stratum **40**

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **4** (A)

Total Number of Dominant Species Across All Strata: **6** (B)

Percent of Dominant Species That are OBL, FACW, or FAC: **67%** (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	**0**
FACW species		x 2 =	**0**
FAC Species		x 3 =	**0**
FACU Species		x 4 =	**0**
UPL Species		x 5 =	**0**
Column Totals	**0** (A)		**0** (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

- 1- Rapid Test for Hydrophytic Vegetation
- **X** 2- Dominance Test is >50%
- 3-Prevalence Index is ≤ 3.0[1]
- 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- 5- Wetland Non-Vascular Plants[1]
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes **X** No

Remarks:

SOIL PHS # 5975 Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100					Sandy Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: **Compacted rock/gravel/cobble**

Depth (inches): **12"**

Hydric Soil Present? Yes ___ **No X**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- **X** Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
- **X** Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Fac-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	___	No **X**	Depth (inches):	
Water Table Present?	Yes	___	No **X**	Depth (inches):	**> 12**
Saturation Present? (includes capillary fringe)	Yes	___	No **X**	Depth (inches):	**> 12**

Wetland Hydrology Present?

Yes X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 5975

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: SE Kellogg Creek Drive | City/County: Milwaukie/Clackamas | Sampling Date: 11/21/2016

Applicant/Owner: Brownstone Development, Inc. | State: OR | Sampling Point: 2

Investigator(s): Caroline R./Craig T. | Section, Township, Range: Section 6AD, T 2S, R 2E

Landform (hillslope, terrace, etc.): | Local relief (concave, convex, none): | Slope (%):

Subregion (LRR): LRRA | Lat: 45.427379 | Long: -122.603487 | Datum: WGS 84

Soil Map Unit Name: Cove silty clay loam | NWI Classification: None

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (if no, explain in Remarks)

Are vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y

Are vegetation ____ Soil ____ or Hydrology ____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is Sampled Area within a Wetland?**	Yes	No X
Hydric Soil Present?	Yes	No X			
Wetland Hydrology Present?	Yes	No X			

Remarks:

VEGETATION - Use scientific names of plants.

		absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size:)				
1	***Fraxinus latifolia***	10	X	FACW
2				
3				
4				
		10	= Total Cover	
Sapling/Shrub Stratum (plot size:)				
1	***Fraxinus latifolia***	5	X	FACW
2	***Prunus sp.***	1		(FAC)
3	***Rubus armeniacus***	5	X	FAC
4				
5				
		11	= Total Cover	
Herb Stratum (plot size:)				
1	***Phalaris arundinacea***	70	X	FACW
2	***Dipsacus fullonum***	15		FAC
3	***Geum macrophyllum***	2		FAC
4	***Cirsium vulgare***	1		FACU
5	***Epilobium ciliatum***	1		FACW
6				
7				
8				
		89	= Total Cover	
Woody Vine Stratum (plot size:)				
1				
2				
		0	= Total Cover	

% Bare Ground in Herb Stratum

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	0
FACW species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index =B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

- ____ 1- Rapid Test for Hydrophytic Vegetation
- X 2- Dominance Test is >50%
- ____ 3-Prevalence Index is ≤ 3.0[1]
- ____ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- ____ 5- Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL PHS # 5975 Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 3/2	100					Silty Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1) **(except MLRA 1)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- 2 cm Muck (A10)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes _____ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Surface Soil Cracks (B6)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Plowed Soils (C6)
- Stunted or Stressed Plants (D1) **(LRR A)**
- Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Saturation Visible on Aerial Imagery (C9)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Fac-Neutral Test (D5)
- Raised Ant Mounds (D6) **(LRR A)**
- Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	_____	No X	Depth (inches):	_____
Water Table Present?	Yes	_____	No X	Depth (inches):	> 18
Saturation Present? (includes capillary fringe)	Yes	_____	No X	Depth (inches):	> 18

Wetland Hydrology Present?

Yes _____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 5975

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: **SE Kellogg Creek Drive** City/County: **Milwaukie/Clackamas** Sampling Date: **11/21/2016**

Applicant/Owner: **Brownstone Development, Inc.** State: **OR** Sampling Point: **3**

Investigator(s): **Caroline R./Craig T.** Section, Township, Range: **Section 6AD, T 2S, R 2E**

Landform (hillslope, terrace, etc.:) **Swale** Local relief (concave, convex, none): Slope (%):

Subregion (LRR): **LRRA** Lat: **45.427379** Long: **-122.603487** Datum: **WGS 84**

Soil Map Unit Name: **Cove silty clay loam** NWI Classification: **None**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No (if no, explain in Remarks)

Are vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation Soil or Hydrology naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	**X**	No		
Hydric Soil Present?	Yes	**X**	No	**Is Sampled Area within a Wetland?**	Yes **X** No
Wetland Hydrology Present?	Yes	**X**	No		

Remarks:

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size:)			
1 ***Fraxinus latifolia***	**5**	**X**	**FACW**
2			
3			
4			
	5	= Total Cover	
Sapling/Shrub Stratum (plot size:)			
1 ***Fraxinus latifolia***	**15**	**X**	**FACW**
2 ***Rubus armeniacus***	**5**	**X**	**FAC**
3			
4			
5			
	20	= Total Cover	
Herb Stratum (plot size:)			
1 ***Phalaris arundinacea***	**50**	**X**	**FACW**
2 ***Ranunculus repens***	**30**	**X**	**FAC**
3 ***Geum macrophyllum***	**1**		**FAC**
4			
5			
6			
7			
8			
	81	= Total Cover	
Woody Vine Stratum (plot size:)			
1			
2			
	0	= Total Cover	

% Bare Ground in Herb Stratum

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **5** (A)

Total Number of Dominant Species Across All Strata: **5** (B)

Percent of Dominant Species That are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	**0**
FACW species		x 2 =	**0**
FAC Species		x 3 =	**0**
FACU Species		x 4 =	**0**
UPL Species		x 5 =	**0**
Column Totals	**0** (A)		**0** (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

- 1- Rapid Test for Hydrophytic Vegetation
- **X** 2- Dominance Test is >50%
- 3-Prevalence Index is ≤ 3.0[1]
- 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- 5- Wetland Non-Vascular Plants[1]
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X** **No**

Remarks:

SOIL PHS # 5975 Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/1	100					Silty Clay Loam	
8-18	10YR 2/1	98	10YR 4/4	2	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

	Histosol (A1)		Sandy Redox (S5)
	Histic Epipedon (A2)		Stripped Matrix (S6)
	Black Histic (A3)		Loamy Mucky Mineral (F1) **(except MLRA 1)**
	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)
	Depleted Below Dark Surface (A11)		Depleted Matrix (F3)
	Thick Dark Surface (A12)	X	Redox Dark Surface (F6)
	Sandy Mucky Mineral (S1)		Depleted Dark Surface (F7)
	Sandy Gleyed Matrix (S4)		Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

	2 cm Muck (A10)
	Red Parent Material (TF2)
	Very Shallow Dark Surface (TF12)
	Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes X No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

	Surface Water (A1)		Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
X	High Water Table (A2)		
X	Saturation (A3)		Salt Crust (B11)
	Water Marks (B1)		Aquatic Invertebrates (B13)
	Sediment Deposits (B2)		Hydrogen Sulfide Odor (C1)
	Drift Deposits (B3)		Oxidized Rhizospheres along Living Roots (C3)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)
	Iron Deposits (B5)		Recent Iron Reduction in Plowed Soils (C6)
	Surface Soil Cracks (B6)		Stunted or Stressed Plants (D1) **(LRR A)**
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)
	Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (2 or more required)

	Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
	Drainage Patterns (B10)
	Dry-Season Water Table (C2)
	Saturation Visible on Aerial Imagery (C9)
	Geomorphic Position (D2)
	Shallow Aquitard (D3)
	Fac-Neutral Test (D5)
	Raised Ant Mounds (D6) **(LRR A)**
	Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No X	Depth (inches):	
Water Table Present?	Yes	X	No	Depth (inches):	8
Saturation Present? (includes capillary fringe)	Yes	X	No	Depth (inches):	10

Wetland Hydrology Present? Yes X No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 5975

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: **SE Kellogg Creek Drive** City/County: **Milwaukie/Clackamas** Sampling Date: **11/21/2016**

Applicant/Owner: **Brownstone Development, Inc.** State: **OR** Sampling Point: **4**

Investigator(s): **Caroline R./Craig T.** Section, Township, Range: **Section 6AD, T 2S, R 2E**

Landform (hillslope, terrace, etc.:) Local relief (concave, convex, none): Slope (%):

Subregion (LRR): **LRRA** Lat: **45.427379** Long: **-122.603487** Datum: **WGS 84**

Soil Map Unit Name: **Cove silty clay loam** NWI Classification: **None**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No (if no, explain in Remarks)

Are vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation Soil or Hydrology naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes		No	**X**	**Is Sampled Area within a Wetland?**	Yes No **X**
Hydric Soil Present?	Yes		No	**X**		
Wetland Hydrology Present?	Yes		No	**X**		

Remarks:

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: **30**)			
1 ***Fraxinus latifolia***	**3**		**FACW**
2			
3			
4			
	3	= Total Cover	
Sapling/Shrub Stratum (plot size: **5**)			
1 ***Fraxinus latifolia***	**3**		**FACW**
2 ***Rubus armeniacus***	**20**	**X**	**FAC**
3 ***Crataegus monogyna***	**10**	**X**	**FAC**
4 ***Rubus laciniatus***	**15**	**X**	**FACU**
5			
	48	= Total Cover	
Herb Stratum (plot size: **5**)			
1 ***Geum macrophyllum***	**5**	**X**	**FAC**
2 ***Lapsana communis***	**10**	**X**	**FACU**
3 ***Polystichum munitum***	**5**	**X**	**FACU**
4			
5			
6			
7			
8			
	20	= Total Cover	
Woody Vine Stratum (plot size:)			
1 ***Rubus ursinus***	**60**	**X**	**FACU**
2 ***Solanum dulcamara***	**5**		**FAC**
	65	= Total Cover	

% Bare Ground in Herb Stratum

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **3** (A)

Total Number of Dominant Species Across All Strata: **7** (B)

Percent of Dominant Species That are OBL, FACW, or FAC: **43%** (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	**0**
FACW species		x 2 =	**0**
FAC Species		x 3 =	**0**
FACU Species		x 4 =	**0**
UPL Species		x 5 =	**0**
Column Totals	**0** (A)		**0** (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

1- Rapid Test for Hydrophytic Vegetation

2- Dominance Test is >50%

3-Prevalence Index is ≤ 3.0[1]

4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)

5- Wetland Non-Vascular Plants[1]

Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No **X**

Remarks:

SOIL PHS # 5975 Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	**10YR 3/2**	**100**					**Sandy Loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ____ Loamy Gleyed Matrix (F2)
- ____ Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ____ 2 cm Muck (A10)
- ____ Red Parent Material (TF2)
- ____ Very Shallow Dark Surface (TF12)
- ____ Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soil Present? Yes ____ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres along Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Plowed Soils (C6)
- ____ Stunted or Stressed Plants (D1) **(LRR A)**
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
- ____ Drainage Patterns (B10)
- ____ Dry-Season Water Table (C2)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Fac-Neutral Test (D5)
- ____ Raised Ant Mounds (D6) **(LRR A)**
- ____ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	____	No X	Depth (inches):	____
Water Table Present?	Yes	____	No X	Depth (inches):	**> 16**
Saturation Present? (includes capillary fringe)	Yes	____	No X	Depth (inches):	**> 16**

Wetland Hydrology Present?

Yes ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 5975

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: SE Kellogg Creek Drive | City/County: Milwaukie/Clackamas | Sampling Date: 11/21/2016

Applicant/Owner: Brownstone Development, Inc. | State: OR | Sampling Point: 5

Investigator(s): Caroline R./Craig T. | Section, Township, Range: Section 6AD, T 2S, R 2E

Landform (hillslope, terrace, etc.:) Depression | Local relief (concave, convex, none): | Slope (%):

Subregion (LRR): LRRA | Lat: 45.427379 | Long: -122.603487 | Datum: WGS 84

Soil Map Unit Name: Cove silty clay loam | NWI Classification: None

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No (if no, explain in Remarks)

Are vegetation ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y

Are vegetation ___ Soil ___ or Hydrology ___ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is Sampled Area within a Wetland?**	Yes X No
Hydric Soil Present?	Yes X	No		
Wetland Hydrology Present?	Yes X	No		

Remarks:

VEGETATION - Use scientific names of plants.

		absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size:)				
1	*Fraxinus latifolia*	60	X	FACW
2				
3				
4				
		60	= Total Cover	
Sapling/Shrub Stratum (plot size:)				
1	*Fraxinus latifolia*	5	X	FACW
2	*Cornus alba*	1		FACW
3	*Symphoricarpos albus*	1		FACU
4				
5				
		7	= Total Cover	
Herb Stratum (plot size:)				
1	*Poa trivialis*	30	X	FAC
2	*Juncus tenuis*	2		FAC
3	*Rumex obtusifolius*	1		FAC
4	*Geum macrophyllum*	1		FAC
5	*Taraxacum officinale*	1		FACU
6				
7				
8				
		35	= Total Cover	
Woody Vine Stratum (plot size:)				
1				
2				
		0	= Total Cover	

% Bare Ground in Herb Stratum

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	0
FACW species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index =B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

- ___ 1- Rapid Test for Hydrophytic Vegetation
- X 2- Dominance Test is >50%
- ___ 3-Prevalence Index is ≤ 3.0[1]
- ___ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- ___ 5- Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks:

SOIL PHS # 5975 Sampling Point: 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
1-6	10YR 3/1	100					Silty Clay Loam	
6-8	10YR 2/1	95	10YR 4/4	5	C	M	Clay	
8-18	10YR 2/1	100					Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

	Histosol (A1)		Sandy Redox (S5)
	Histic Epipedon (A2)		Stripped Matrix (S6)
	Black Histic (A3)		Loamy Mucky Mineral (F1) **(except MLRA 1)**
	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)
	Depleted Below Dark Surface (A11)		Depleted Matrix (F3)
	Thick Dark Surface (A12)	X	Redox Dark Surface (F6)
	Sandy Mucky Mineral (S1)		Depleted Dark Surface (F7)
	Sandy Gleyed Matrix (S4)		Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

	2 cm Muck (A10)
	Red Parent Material (TF2)
	Very Shallow Dark Surface (TF12)
	Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes X No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

	Surface Water (A1)		Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
X	High Water Table (A2)		
X	Saturation (A3)		Salt Crust (B11)
	Water Marks (B1)		Aquatic Invertebrates (B13)
	Sediment Deposits (B2)		Hydrogen Sulfide Odor (C1)
	Drift Deposits (B3)		Oxidized Rhizospheres along Living Roots (C3)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)
	Iron Deposits (B5)		Recent Iron Reduction in Plowed Soils (C6)
	Surface Soil Cracks (B6)		Stunted or Stressed Plants (D1) **(LRR A)**
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)
	Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (2 or more required)

	Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
	Drainage Patterns (B10)
	Dry-Season Water Table (C2)
	Saturation Visible on Aerial Imagery (C9)
	Geomorphic Position (D2)
	Shallow Aquitard (D3)
	Fac-Neutral Test (D5)
	Raised Ant Mounds (D6) **(LRR A)**
	Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No X	Depth (inches):	
Water Table Present?	Yes	X	No	Depth (inches):	4
Saturation Present? (includes capillary fringe)	Yes	X	No	Depth (inches):	9

Wetland Hydrology Present? Yes X No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 5975

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: SE Kellogg Creek Drive | City/County: Milwaukie/Clackamas | Sampling Date: 11/21/2016

Applicant/Owner: Brownstone Development, Inc. | State: OR | Sampling Point: 6

Investigator(s): Caroline R./Craig T. | Section, Township, Range: Section 6AD, T 2S, R 2E

Landform (hillslope, terrace, etc.): | Local relief (concave, convex, none): | Slope (%):

Subregion (LRR): LRRA | Lat: 45.427379 | Long: -122.603487 | Datum: WGS 84

Soil Map Unit Name: Cove silty clay loam | NWI Classification: None

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (if no, explain in Remarks)

Are vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y

Are vegetation ____ Soil ____ or Hydrology ____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No		
Hydric Soil Present?	Yes		No	X	**Is Sampled Area within a Wetland?** Yes ____ No X
Wetland Hydrology Present?	Yes		No	X	

Remarks:

VEGETATION - Use scientific names of plants.

		absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: 30)				
1	*Fraxinus latifolia*	50	X	FACW
2				
3				
4				
		50	= Total Cover	
Sapling/Shrub Stratum (plot size: 5)				
1	*Fraxinus latifolia*	20	X	FACW
2	*Symphoricarpos albus*	5		FACU
3	*Crataegus monogyna*	15	X	FAC
4	*Rubus armeniacus*	2		FAC
5				
		42	= Total Cover	
Herb Stratum (plot size: 5)				
1	*Carex deweyana*	70	X	FAC
2	*Prunella vulgaris*	3		FACU
3	*Polystichum munitum*	3		FACU
4	*Vicia tetrasperma*	5		(NOL)
5	*Ranunculus repens*	10		FAC
6	*Dipsacus fullonum*	3		FAC
7	*Agrostis stolonifera*	10		FAC
8	*Equisetum arvense*	1		FAC
		105	= Total Cover	
Woody Vine Stratum (plot size: ____)				
1				
2				
		0	= Total Cover	

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	0
FACW species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index =B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

X 2- Dominance Test is >50%

____ 3-Prevalence Index is ≤ 3.0[1]

____ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)

____ 5- Wetland Non-Vascular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL PHS # 5975 Sampling Point: 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2	100					Sandy Loam	
6-16	10YR 3/2	60					Sandy Clay Loam	
	10YR 3/1	20					Sandy Clay Loam	
	10YR 4/3	20					Sandy Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- _____ Histosol (A1)
- _____ Histic Epipedon (A2)
- _____ Black Histic (A3)
- _____ Hydrogen Sulfide (A4)
- _____ Depleted Below Dark Surface (A11)
- _____ Thick Dark Surface (A12)
- _____ Sandy Mucky Mineral (S1)
- _____ Sandy Gleyed Matrix (S4)
- _____ Sandy Redox (S5)
- _____ Stripped Matrix (S6)
- _____ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- _____ Loamy Gleyed Matrix (F2)
- _____ Depleted Matrix (F3)
- _____ Redox Dark Surface (F6)
- _____ Depleted Dark Surface (F7)
- _____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- _____ 2 cm Muck (A10)
- _____ Red Parent Material (TF2)
- _____ Very Shallow Dark Surface (TF12)
- _____ Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- _____ Surface Water (A1)
- _____ High Water Table (A2)
- _____ Saturation (A3)
- _____ Water Marks (B1)
- _____ Sediment Deposits (B2)
- _____ Drift Deposits (B3)
- _____ Algal Mat or Crust (B4)
- _____ Iron Deposits (B5)
- _____ Surface Soil Cracks (B6)
- _____ Inundation Visible on Aerial Imagery (B7)
- _____ Sparsely Vegetated Concave Surface (B8)
- _____ Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
- _____ Salt Crust (B11)
- _____ Aquatic Invertebrates (B13)
- _____ Hydrogen Sulfide Odor (C1)
- _____ Oxidized Rhizospheres along Living Roots (C3)
- _____ Presence of Reduced Iron (C4)
- _____ Recent Iron Reduction in Plowed Soils (C6)
- _____ Stunted or Stressed Plants (D1) **(LRR A)**
- _____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- _____ Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
- _____ Drainage Patterns (B10)
- _____ Dry-Season Water Table (C2)
- _____ Saturation Visible on Aerial Imagery (C9)
- _____ Geomorphic Position (D2)
- _____ Shallow Aquitard (D3)
- _____ Fac-Neutral Test (D5)
- _____ Raised Ant Mounds (D6) **(LRR A)**
- _____ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	_____	No X	Depth (inches):	_____
Water Table Present?	Yes	_____	No X	Depth (inches):	> 16
Saturation Present? (includes capillary fringe)	Yes	_____	No X	Depth (inches):	> 16

Wetland Hydrology Present?

Yes _____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 5975

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: **SE Kellogg Creek Drive** City/County: **Milwaukie/Clackamas** Sampling Date: **11/21/2016**

Applicant/Owner: **Brownstone Development, Inc.** State: **OR** Sampling Point: **7**

Investigator(s): **Caroline R./Craig T.** Section, Township, Range: **Section 6AD, T 2S, R 2E**

Landform (hillslope, terrace, etc.:) Local relief (concave, convex, none): Slope (%):

Subregion (LRR): **LRRA** Lat: **45.427379** Long: **-122.603487** Datum: **WGS 84**

Soil Map Unit Name: **Cove silty clay loam** NWI Classification: **None**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No (if no, explain in Remarks)

Are vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation Soil or Hydrology naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	**X**	No		
Hydric Soil Present?	Yes	**X**	No	**Is Sampled Area within a Wetland?**	Yes **X** No
Wetland Hydrology Present?	Yes	**X**	No		

Remarks:

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size:)			
1 ***Populus balsamifera***	**10**	**X**	**FAC**
2			
3			
4			
	10	= Total Cover	
Sapling/Shrub Stratum (plot size:)			
1 ***Populus balsamifera***	**15**	**X**	**FAC**
2			
3			
4			
5			
	15	= Total Cover	
Herb Stratum (plot size:)			
1 ***Phalaris arundinacea***	**100**	**X**	**FACW**
2			
3			
4			
5			
6			
7			
8			
	100	= Total Cover	
Woody Vine Stratum (plot size:)			
1			
2			
	0	= Total Cover	

% Bare Ground in Herb Stratum

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **3** (A)

Total Number of Dominant Species Across All Strata: **3** (B)

Percent of Dominant Species That are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	**0**
FACW species		x 2 =	**0**
FAC Species		x 3 =	**0**
FACU Species		x 4 =	**0**
UPL Species		x 5 =	**0**
Column Totals	**0** (A)		**0** (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

- 1- Rapid Test for Hydrophytic Vegetation
- **X** 2- Dominance Test is >50%
- 3-Prevalence Index is ≤ 3.0[1]
- 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- 5- Wetland Non-Vascular Plants[1]
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes **X** No

Remarks:

SOIL PHS # 5975 Sampling Point: 7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2	100					Silty Clay Loam	
4-7	10YR 3/2	95	7.5YR 4/6	5	C	M	Silty Clay Loam	
7-18	10YR 2/2	98	10YR 3/4	2	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Fac-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	X	No ___	Depth (inches):	2
Water Table Present?	Yes	X	No ___	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes	X	No ___	Depth (inches):	0

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Small ponded area in ~5% of plot

PHS # 5975

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: SE Kellogg Creek Drive | City/County: Milwaukie/Clackamas | Sampling Date: 11/21/2016

Applicant/Owner: Brownstone Development, Inc. | State: OR | Sampling Point: 8

Investigator(s): Caroline R./Craig T. | Section, Township, Range: Section 6AD, T 2S, R 2E

Landform (hillslope, terrace, etc.:) Fill | Local relief (concave, convex, none): | Slope (%):

Subregion (LRR): LRRA | Lat: 45.427379 | Long: -122.603487 | Datum: WGS 84

Soil Map Unit Name: Cove silty clay loam | NWI Classification: None

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (if no, explain in Remarks)

Are vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y

Are vegetation ____ Soil ____ or Hydrology ____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes		No	X	**Is Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes		No	X	
Wetland Hydrology Present?	Yes		No	X	

Remarks:

VEGETATION - Use scientific names of plants.

		absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: ____)				
1				
2				
3				
4				
		0	= Total Cover	
Sapling/Shrub Stratum (plot size: ____)				
1				
2				
3				
4				
5				
		0	= Total Cover	
Herb Stratum (plot size: 5)				
1	*Phalaris arundinacea*	20	X	FACW
2	*Chenopodium leptophyllum*	25	X	FACU
3	*Lotus corniculatus*	10		FAC
4	*Ranunculus repens*	5		FAC
5	*Hypochaeris radicata*	10		FACU
6	*Centaurium erythraea*	5		FAC
7	*Daucus carota*	15	X	FACU
8	*Senecio jacobaea*	10		FACU
		105	= Total Cover	
Woody Vine Stratum (plot size: ____)				
1				
2				
		0	= Total Cover	

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	0
FACW species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index =B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

____ 2- Dominance Test is >50%

____ 3-Prevalence Index is ≤ 3.0[1]

____ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)

____ 5- Wetland Non-Vascular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

Herb Stratum also contains: Agrostis capillaris (FAC) 5%

SOIL PHS # 5975 Sampling Point: 8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/3	100					Sandy Loam	
4-8	10YR 4/4	60					Sandy Loam	
	10YR 3/2	40					Sandy Loam	
8-16	10YR 3/1	100					Sandy Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1) **(except MLRA 1)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- 2 cm Muck (A10)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes _____ **No X**

Remarks:

0-16" - a jumble of mixed disturbed fill, rocks and gravel throughout

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Surface Soil Cracks (B6)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Plowed Soils (C6)
- Stunted or Stressed Plants (D1) **(LRR A)**
- Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Saturation Visible on Aerial Imagery (C9)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Fac-Neutral Test (D5)
- Raised Ant Mounds (D6) **(LRR A)**
- Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No X	Depth (inches):	
Water Table Present?	Yes		No X	Depth (inches):	> 16
Saturation Present? (includes capillary fringe)	Yes		No X	Depth (inches):	> 16

Wetland Hydrology Present?

Yes _____ **No X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 5975

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: **SE Kellogg Creek Drive** City/County: **Milwaukie/Clackamas** Sampling Date: **11/21/2016**

Applicant/Owner: **Brownstone Development, Inc.** State: **OR** Sampling Point: **9**

Investigator(s): **Caroline R./Craig T.** Section, Township, Range: **Section 6AD, T 2S, R 2E**

Landform (hillslope, terrace, etc.:) **depression** Local relief (concave, convex, none): Slope (%):

Subregion (LRR): **LRRA** Lat: **45.427379** Long: **-122.603487** Datum: **WGS 84**

Soil Map Unit Name: **Cove silty clay loam** NWI Classification: **None**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No (if no, explain in Remarks)

Are vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation Soil or Hydrology naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	**X**	No		
Hydric Soil Present?	Yes	**X**	No	**Is Sampled Area within a Wetland?**	Yes **X** No
Wetland Hydrology Present?	Yes	**X**	No		

Remarks:

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size:)			
1			
2			
3			
4			
	0	= Total Cover	
Sapling/Shrub Stratum (plot size:)			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb Stratum (plot size:)			
1 ***Phalaris arundinacea***	**25**	**X**	**FACW**
2 ***Agrostis stolonifera***	**40**	**X**	**FAC**
3 ***Juncus effusus***	**10**		**FACW**
4 ***Hypochaeris radicata***	**10**		**FACU**
5 ***Leucanthemum vulgare***	**5**		**FACU**
6			
7			
8			
	90	= Total Cover	
Woody Vine Stratum (plot size:)			
1			
2			
	0	= Total Cover	

% Bare Ground in Herb Stratum

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **2** (A)

Total Number of Dominant Species Across All Strata: **2** (B)

Percent of Dominant Species That are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	**0**
FACW species		x 2 =	**0**
FAC Species		x 3 =	**0**
FACU Species		x 4 =	**0**
UPL Species		x 5 =	**0**
Column Totals	**0** (A)		**0** (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

- 1- Rapid Test for Hydrophytic Vegetation
- **X** 2- Dominance Test is >50%
- 3-Prevalence Index is ≤ 3.0[1]
- 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- 5- Wetland Non-Vascular Plants[1]
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes **X** No

Remarks:

SOIL PHS # 5975 Sampling Point: 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	2.5YR 3/2	90	7.5YR 4/6	10	C	M	Silt Loam	
6-14	2.5YR 5/2	80	7.5YR 4/6	20	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Fac-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	X	No	___	Depth (inches):	2
Water Table Present?	Yes	X	No	___	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes	X	No	___	Depth (inches):	0

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 5975

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: SE Kellogg Creek Drive | City/County: Milwaukie/Clackamas | Sampling Date: 11/21/2016

Applicant/Owner: Brownstone Development, Inc. | State: OR | Sampling Point: 10

Investigator(s): Caroline R./Craig T. | Section, Township, Range: Section 6AD, T 2S, R 2E

Landform (hillslope, terrace, etc.): | Local relief (concave, convex, none): | Slope (%):

Subregion (LRR): LRRA | Lat: 45.427379 | Long: -122.603487 | Datum: WGS 84

Soil Map Unit Name: Cove silty clay loam | NWI Classification: None

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (if no, explain in Remarks)

Are vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y

Are vegetation ____ Soil ____ or Hydrology ____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes		No	X	**Is Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes		No	X	
Wetland Hydrology Present?	Yes		No	X	

Remarks:

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: ____)			
1			
2			
3			
4			
	0	= Total Cover	
Sapling/Shrub Stratum (plot size: ____)			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb Stratum (plot size: 5)			
1 *Daucus carota*	25	X	FACU
2 *Chenopodium leptophyllum*	20	X	FACU
3 *Agrostis capillaris*	20	X	FAC
4 *Hypochaeris radicata*	15		FACU
5 *Holcus lanatus*	10		FAC
6 *Bromus sp.*	20	X	(FAC)
7 *Parentucellia viscosa*	10		FAC
8 *Plantago lanceolata*	15		FACU
	160	= Total Cover	
Woody Vine Stratum (plot size: ____)			
1			
2			
	0	= Total Cover	

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	0
FACW species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index =B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

____ 2- Dominance Test is >50%

____ 3-Prevalence Index is ≤ 3.0[1]

____ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)

____ 5- Wetland Non-Vascular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

Herb Stratum also contains: Poa sp. (FAC) 10%, Rumex crispus (FAC) 5%, Cirsium arvense (FAC) 5%, Schedonorus arundinaceus, FAC 5%

SOIL PHS # 5975 Sampling Point: 10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/3	100					Sandy Loam	
3-16	10YR 4/4	60					Sandy Loam	
	10YR 4/2	40					Sandy Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1) **(except MLRA 1)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- 2 cm Muck (A10)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes _____ **No X**

Remarks:

0-16 - jumble of mixed/disturbed fill

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Surface Soil Cracks (B6)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Plowed Soils (C6)
- Stunted or Stressed Plants (D1) **(LRR A)**
- Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Saturation Visible on Aerial Imagery (C9)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Fac-Neutral Test (D5)
- Raised Ant Mounds (D6) **(LRR A)**
- Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No **X**	Depth (inches):	
Water Table Present?	Yes		No **X**	Depth (inches):	**> 16**
Saturation Present? (includes capillary fringe)	Yes		No **X**	Depth (inches):	**> 16**

Wetland Hydrology Present?

Yes _____ **No X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix C

Site Photos

Photo A

Looking east along south bank of Mt. Scott Creek

Photo B

Looking west along south bank of Mt. Scott Creek

#5975
11/22/2016

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

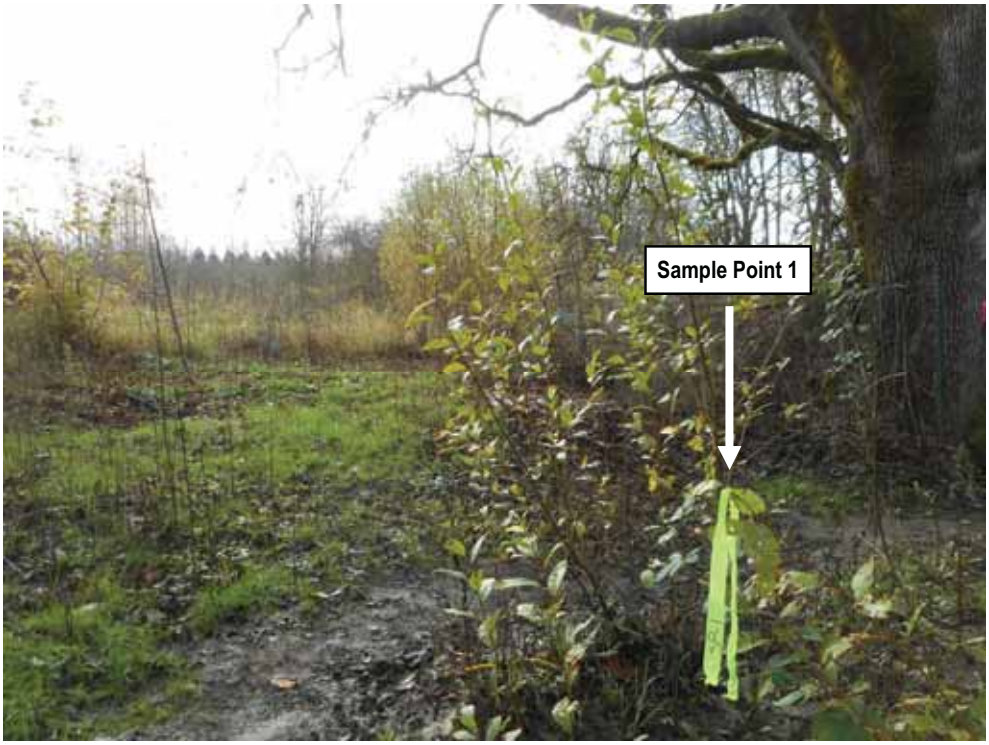
Photodocumentation
SE Kellogg Creek Drive, Milwaukie, Oregon
Both photos taken on October 18, 2016

Photo C

Looking north across
Mt. Scott Creek

Photo D

Looking southeast toward
Wetland A



#57975
711/22/2016

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Photodocumentation
SE Kellogg Creek Drive, Milwaukie, Oregon
Photo C taken on October 18, 2016, Photo D taken on November 21, 2016

Photo E

Looking northwest toward north end of Wetland A

Photo F

Looking southeast toward center of Wetland A

#5975
11/22/2016

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Photodocumentation
SE Kellogg Creek Drive, Milwaukie, Oregon
Both photos taken on November 17, 2016

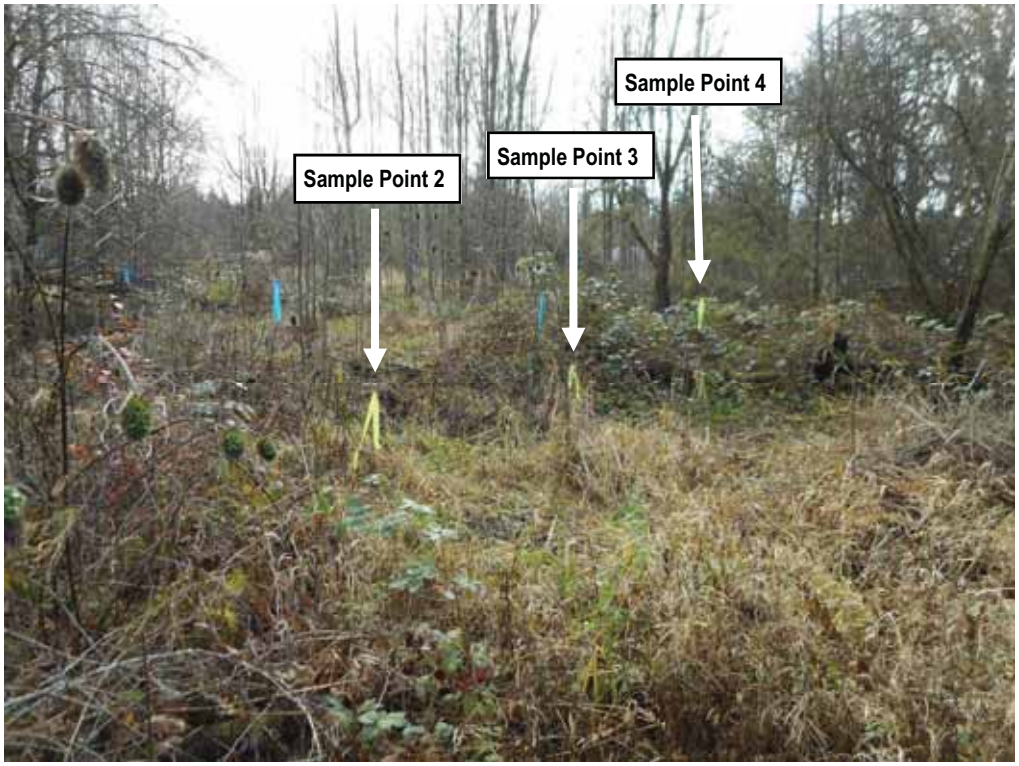


Photo G

Looking southeast toward upland island (Sample Point 4) and center of Wetland A

Photo H

Looking southeast toward southern portion of Wetland A from south end of upland island

#5975
11/22/2016

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Photodocumentation
SE Kellogg Creek Drive, Milwaukie, Oregon
Both photos taken on November 21, 2016

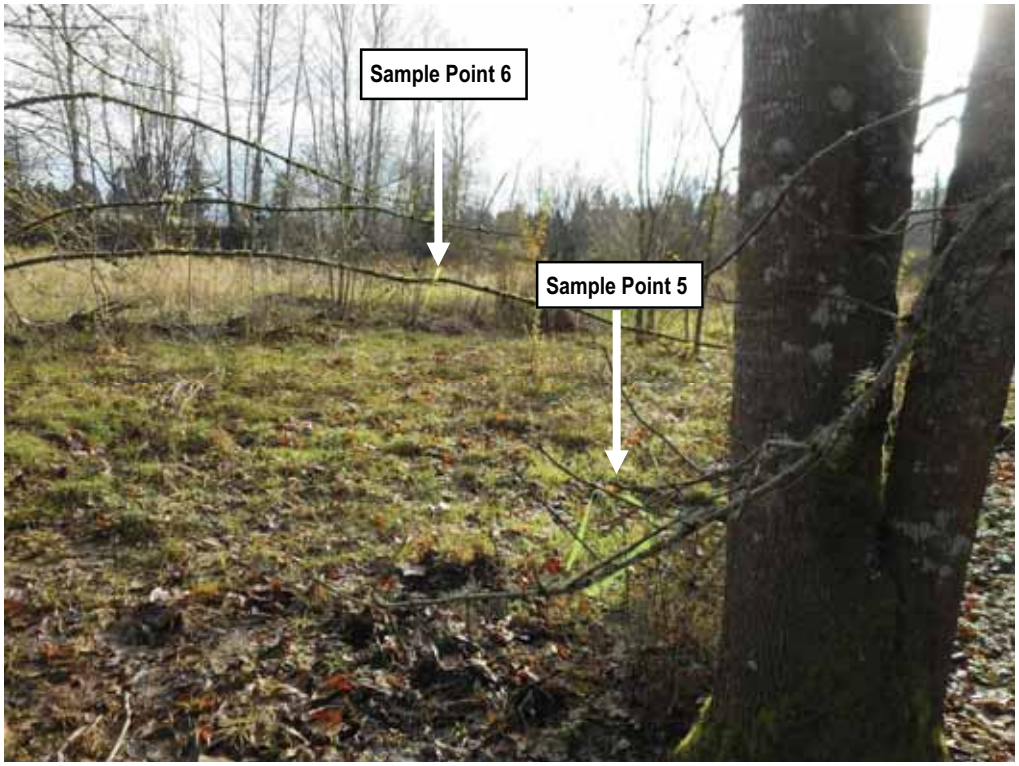
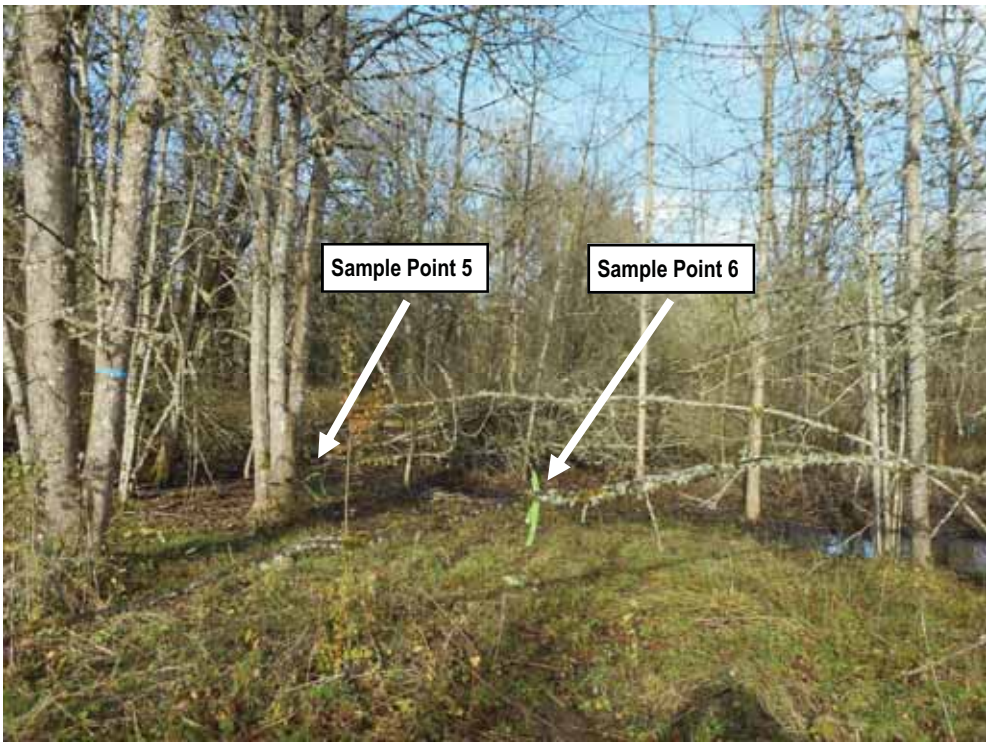


Photo I

Looking southeast toward southern boundary of Wetland A

Photo J

Looking toward the northwest portion of Wetland A from its southern boundary.



#5975
11/22/2016

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

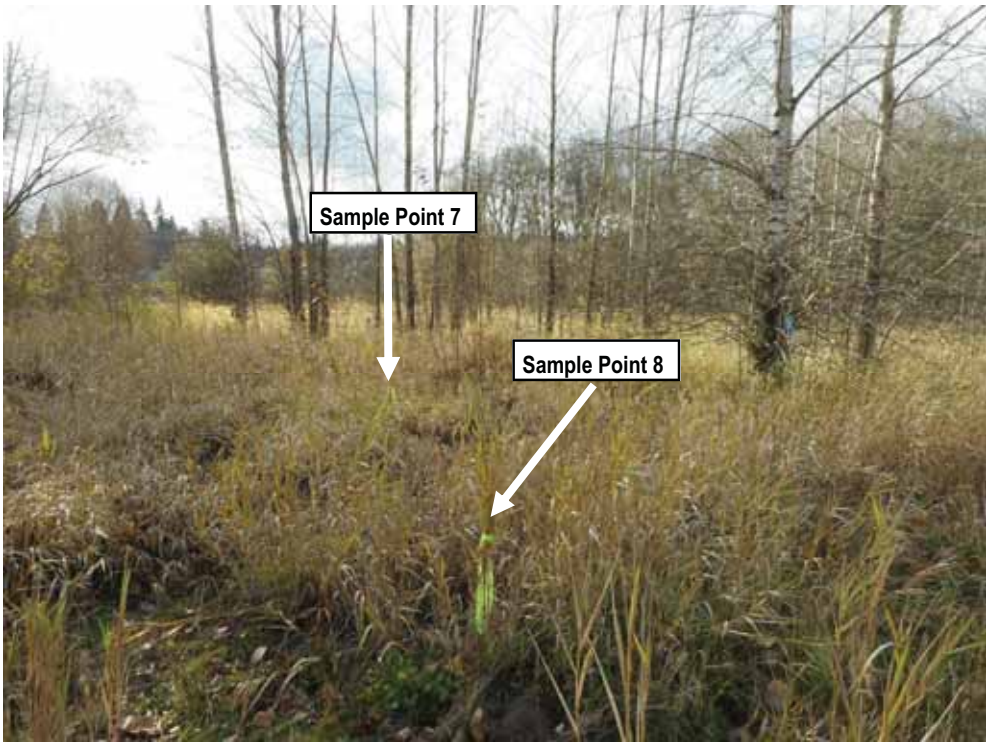
Photodocumentation
SE Kellogg Creek Drive, Milwaukie, Oregon
Both photos taken on November 21, 2016

Photo K

Looking southeast at south end of Wetland A

Photo L

Looking south at eastern portion of Wetland A



#5975
11/22/2016

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Photodocumentation
SE Kellogg Creek Drive, Milwaukie, Oregon
Both photos taken on November 21, 2016

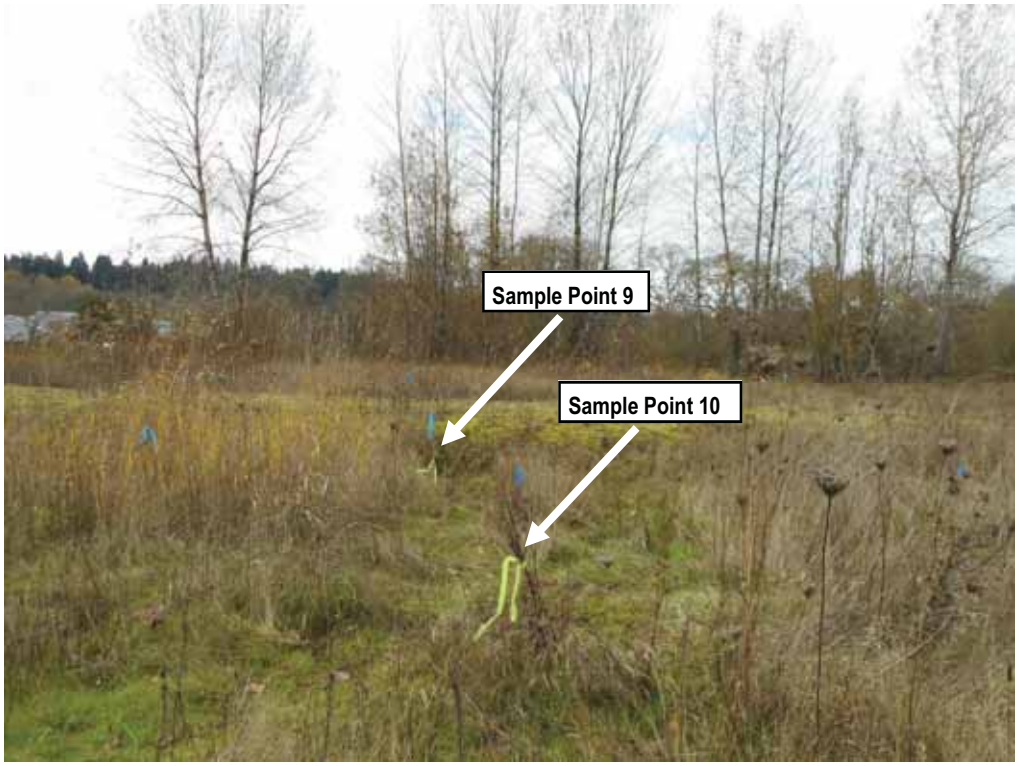


Photo M

Looking southwest across Wetland E

Photo N

Looking north at Wetland C

#5975
11/22/2016

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Photodocumentation
SE Kellogg Creek Drive, Milwaukie, Oregon
Both photos taken on November 21, 2016

Photo O

Looking northwest at Wetland B

Photo P

Looking southeast at Wetland D

#5975
11/22/2016

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Photodocumentation
SE Kellogg Creek Drive, Milwaukie, Oregon
Both photos taken on November 21, 2016

Photo Q

Looking northwest at Wetland F

Photo R

Looking north at Wetland G

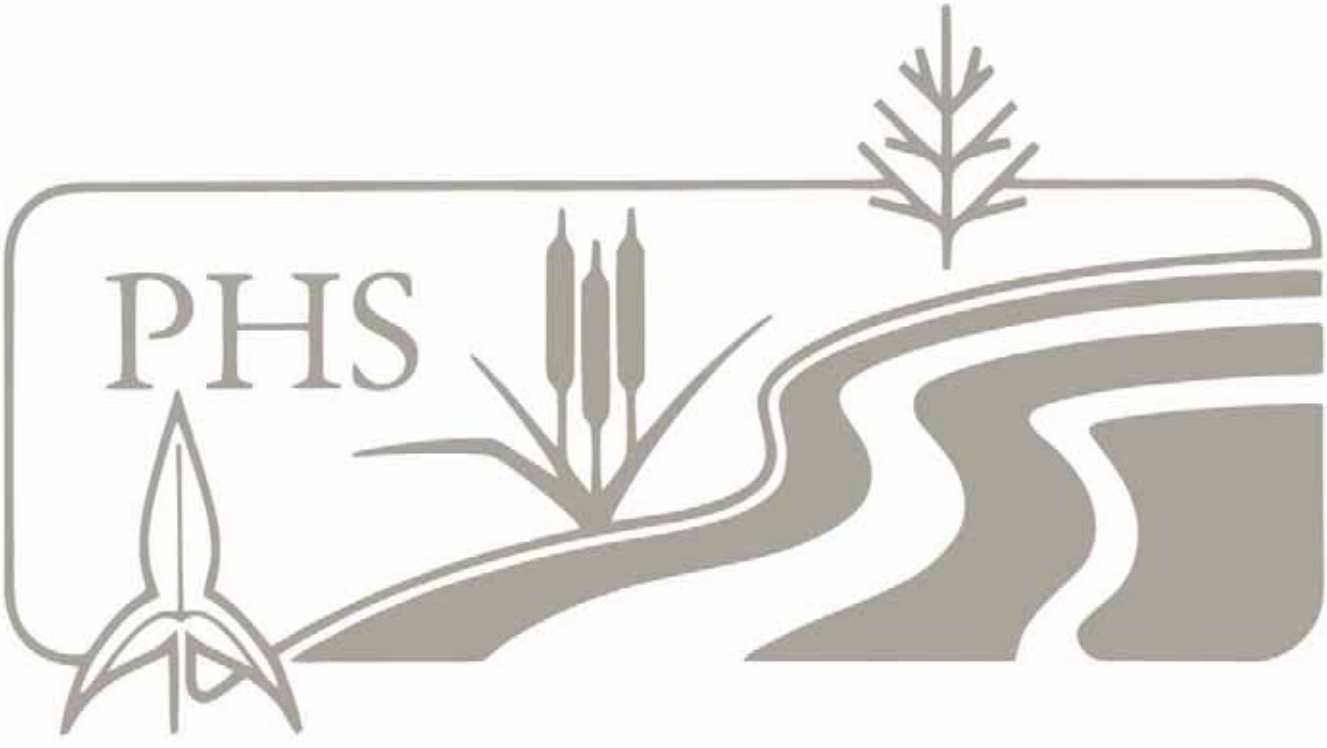
#5975
11/22/2016

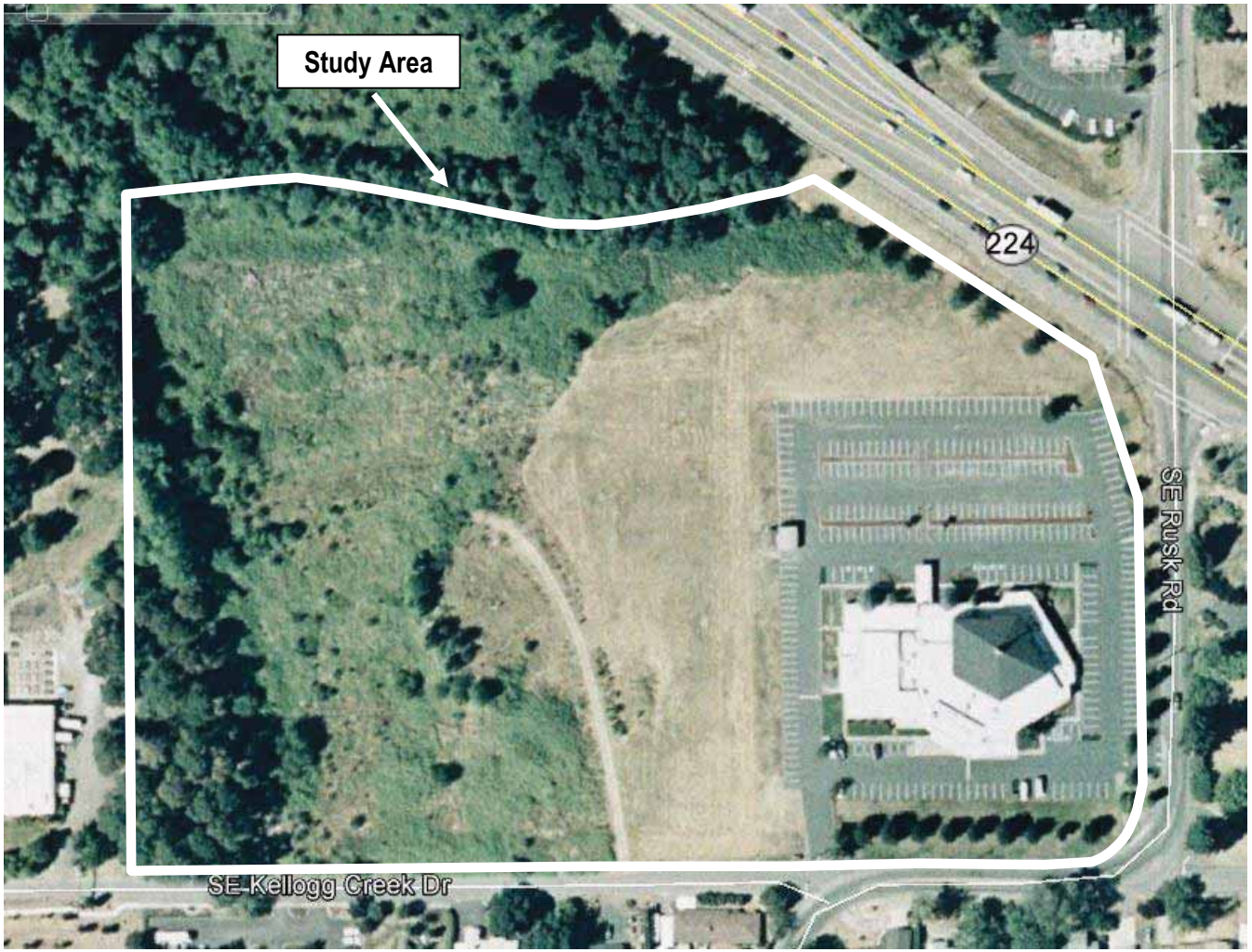
Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Photodocumentation
SE Kellogg Creek Drive, Milwaukie, Oregon
Both photos taken on November 21, 2016

Appendix D

Historic Aerial Photographs

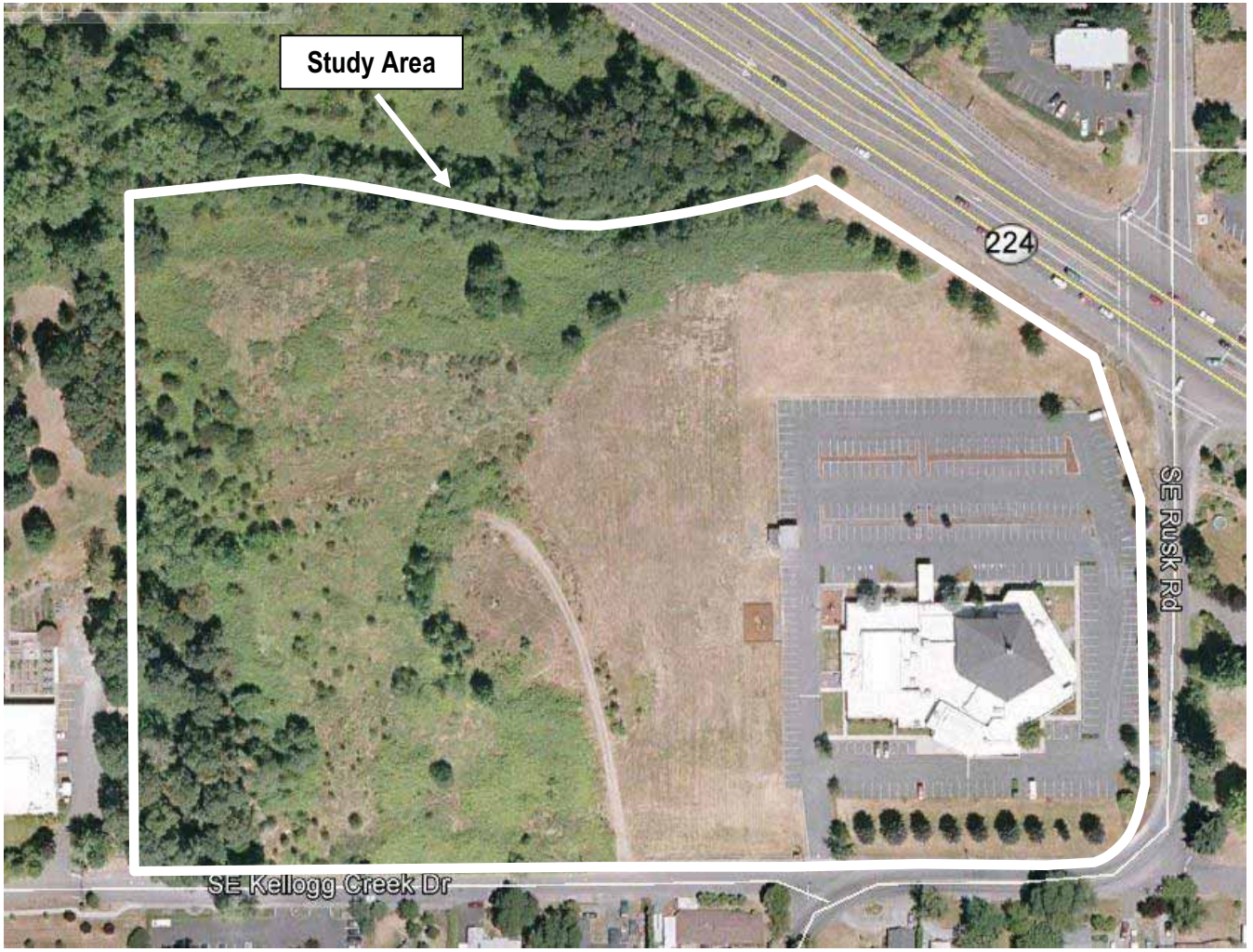




5975
12/21/2016

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

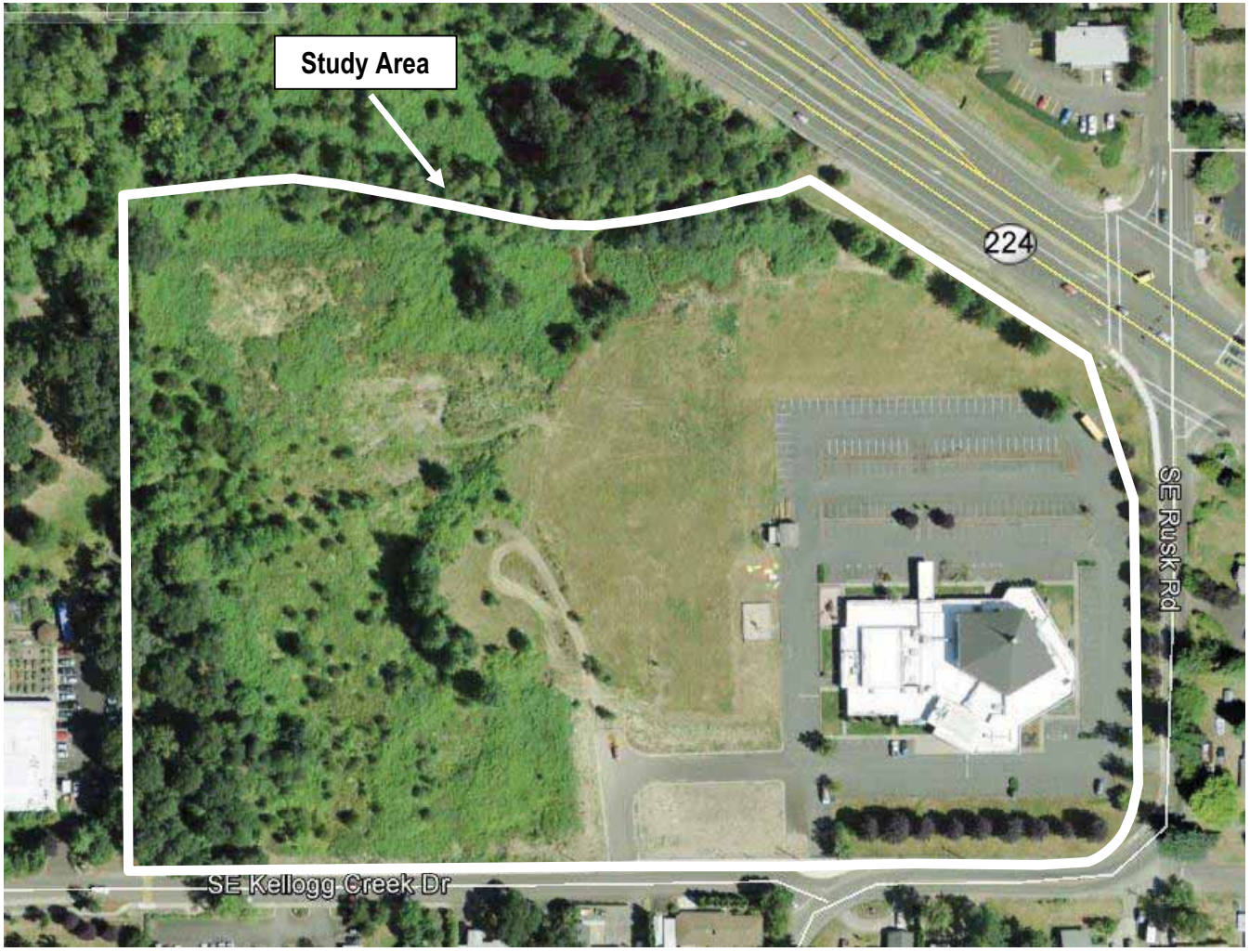
Historic Aerial Photo
SE Kellogg Creek Drive, Milwaukie, Oregon
Google Earth, August 14, 2002



5975
12/21/2016

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Historic Aerial Photo
SE Kellogg Creek Drive, Milwaukie, Oregon
Google Earth, July 2003



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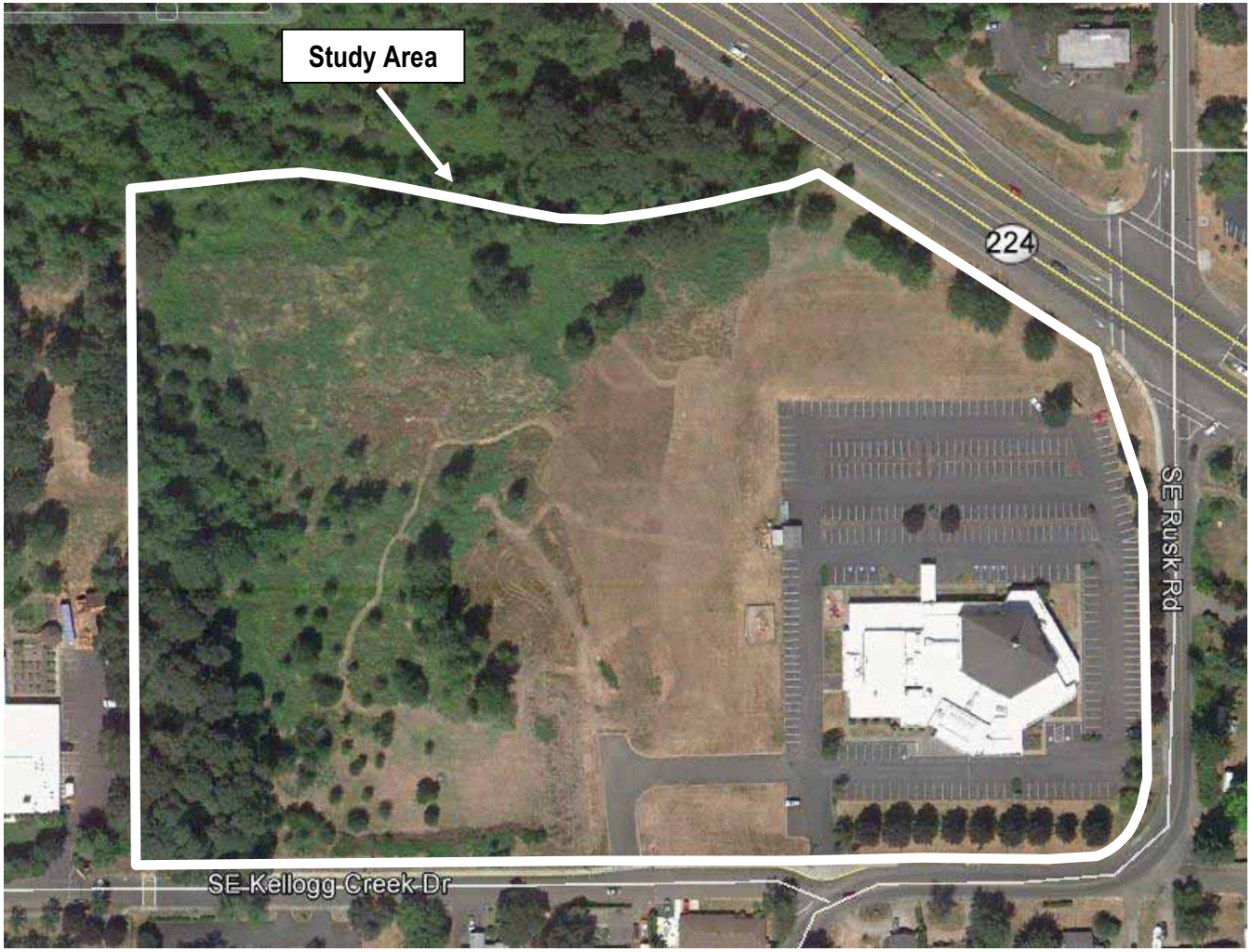
Wilsonville, OR 97070

Historic Aerial Photo
SE Kellogg Creek Drive, Milwaukie, Oregon
Google Earth, July 2007



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Historic Aerial Photo
SE Kellogg Creek Drive, Milwaukie, Oregon
Google Earth, August 2010

Appendix E

Geotechnical Evaluation Report

Appendix F

Wetland Definitions, Methodology, and References

WATERS OF THE STATE AND WETLAND DEFINITION AND CRITERIA

Regulatory Jurisdiction

Wetlands and water resources in Oregon are regulated by the Oregon Department of State Lands (DSL) under the Removal-Fill Law (ORS 196.800-196.990) and by the U.S. Army Corps of Engineers (COE) through Section 404 of the Clean Water Act.

The primary source document for wetland delineations within Oregon is the *Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1* (Environmental Laboratory 1987) which is recognized by both DSL and COE.

Waters of the State and Wetland Definition

Waters of the State are defined as "natural waterways including all tidal and nontidal bays, intermittent streams, constantly flowing streams, lakes, wetlands and other bodies of water in this state, navigable and nonnavigable...". "Natural waterways" is further defined as waterways created naturally by geological and hydrological processes, waterways that would be natural but for human-caused disturbances (e.g. channelized or culverted streams, impounded waters, partially drained wetlands or ponds created in wetlands)..."(DSL, 2001).

Wetland*s* are defined as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (DSL, 2001).

Wetland Criteria

Based on the above definition, three major factors characterize a wetland: hydrology, substrate, and biota.

Wetland Hydrology

Wetland hydrology is related to duration of saturation, frequency of saturation, and critical depth of saturation. The 1987 manual defines wetland hydrology as inundation or saturation within a major portion of the root zone (usually above 12 inches), typically for at least 12.5% of the growing season. The wetland hydrology criterion can be met, however, if saturation within the major portion of the root zone is present for only 5% of the growing season, depending on other evidence.

The growing season is defined as the portion of the year when soil temperatures at 19.7 inches below the soil surface are higher than biological zero (41 degrees Fahrenheit, 5 degrees Celsius), but also allows approximation from frost free days, based on air temperature. The growing season for any given site or location is determined from US Natural Resources Conservation Service, (formerly Soil Conservation Service) data and information.

Wetland hydrologic indicators include the following: visual observation of inundation or saturation, watermarks, drift lines, sediment deposits, drainage pattern, and/or oxidized rhizospheres with living roots. Oxidized rhizospheres are defined as yellowish-red zones around the roots and rhizomes of some plants that grow in frequently saturated soils.

Wetland Substrate (Soils)

Most wetlands are characterized by hydric soils. Hydric soils are those that are ponded, flooded, or saturated for long enough during the growing season to develop anaerobic conditions. Periodic saturation of soils causes alternation of reduced and oxidized conditions, which leads to the formation of redoximorphic features (gleying and mottling). Mineral hydric soils will be either gleyed or will have bright mottles and/or low matrix chroma. The redoximorphic feature known as gley is a result of greatly reduced soil conditions, which result in a characteristic grayish, bluish or greenish soil color. The term mottling is used to describe areas of contrasting color within a soil matrix. The soil matrix is the portion of the soil layer that has the predominant color. Soils that have brightly colored mottles and a low matrix chroma are indicative of a fluctuating water table.

Hydric soil indicators include: organic content of greater than 50% by volume, sulfidic material or “rotten egg” odor, and/or presence of redoximorphic features and dark soil matrix, as determined by the use of a Munsell Soil Color Chart. This chart establishes the chroma, value and hue of soils based on comparison with color chips. Mineral hydric soils usually have a matrix chroma of 2 or less in mottled soils, or a matrix chroma of 1 or less in unmottled soils.

Wetland Biota (Vegetation)

Wetland biota is defined as hydrophytic vegetation. A hydrophyte is a plant species that is capable of growing in substrates that are periodically deficient in oxygen as a result of saturated soil conditions. The U.S. Fish and Wildlife Service, in the *National List of Plant Species that Occur in Wetlands*, has established five basic groups of vegetation based on their frequency of occurrence in wetlands. These categories, referred to as the "wetland indicator status”, are as follows: obligate wetland plants (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU), and obligate upland (UPL). Table 1 gives a definition of the plant indicator codes.

Table 1. Description of Wetland Plant Indicator Status Codes

Indicator Code	Status
OBL	Obligate wetland. Estimated to occur almost exclusively in wetlands (>99%)
FACW	Facultative wetland. Estimated to occur 67-99% of the time in wetlands.
FAC	Facultative. Occur equally in wetlands and non-wetlands (34-66%).
FACU	Facultative upland. Usually occur in non-wetlands (67-99%).
UPL	Obligate upland. Estimated to occur almost exclusively in non-wetlands (>99%). If a species is not assigned to one of the four groups described above it is assumed to be obligate upland.
NI	Has not yet received a wetland indicator status, but is probably not obligate upland.

Observations of hydrology, soils, and vegetation, were made using the "Routine On-site" delineation method as defined in the 1987 manual for areas that were not currently in agricultural production. One-foot diameter soil pits were excavated to 16 inches and soil profiles were examined for hydric soil and wetland hydrology field indicators. In addition, a visual percent-

cover estimate of the dominant species of the plant community was performed using soil pit locations as a center of reference. Dominant plant species are based on estimates of percent cover for herbaceous, woody vine, and shrub species within a 5 foot radius of the sample point, and basal area cover for tree species within a 30 foot radius of the sample point. Plant species in each vegetative layer, which are estimated at less than 20%, are not considered to be dominant. The wetland indicator status is then used to determine if there is an overall dominance (greater than 50%) of wetland or upland plant species.

During data collection, the soil profiles were examined for hydric soil and wetland hydrology field indicators. Plant species and cover were recorded. Data was recorded on standard data sheets which contain the information specified in the 1987 Corps manual.

Exhibit E

Preliminary Drainage Report

Kellogg Creek Planned Development

2322.14258.01

Prepared for

Brownstone Development, Inc.

47 S State Street

PO Box 2375

Lake Oswego, Oregon 97934

February 8, 2017

Prepared for	Brownstone Development, Inc.
Project Name	Preliminary Drainage Report
Job Number	2322.14258.01
Date	February 8, 2017

DOWL
720 SW Washington Street, Suite 750
Portland, Oregon
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Name	Title	Date	Revision	Reviewer
Atalia Raskin	WR Project Manager	2/8/2017	1	Scott Emmens

Executive Summary

The proposed Kellogg Creek residential development is located at 13333 Rusk Road in Milwaukie, Oregon (See Figure 1-1 Vicinity Map. The subdivision is approximately 14 acres and will include the construction of 92 new lots intended for single-family attached homes (rowhouses). Four public streets are proposed, these streets are identified as Street A and B. Frontage improvements to SE Kellogg Creek Drive will also be completed as part of this project.

Stormwater Management Standards

The proposed storm design will meet the requirements of the City of Milwaukie as listed in the *Public Works Standards* dated February 2015. The City of Milwaukie follows the current City of Portland's *Stormwater Management Manual* for water quality facility design.

The proposed project will fill wetlands located on the site. Therefore, the project must comply with the National Marine Fisheries Service (NMFS) criteria as part of the March 2014 Programmatic Biological Opinion and Essential Fish Habitat Consultation for Revisions to Standard Local Operating Procedures for Endangered Species (SLOPES V) as part of the Wetland Fill Permit with the Army Corp of Engineers.

Additionally, the project is located within the 100-year floodplain of Mt. Scott Creek. All fill placed on the site will be balanced with an equal amount of soil removed per City of Milwaukie Municipal Code 18.04.150 F Balanced Cut and Fill. Excavation will occur within the property boundary.

Water Quality

The project will discharge into Mt. Scott Creek, a tributary of Kellogg Creek and the Willamette River. Mt. Scott and Kellogg Creek are not listed as water quality limited and the Willamette River is listed for E. Coli. Typical pollutants from single -family residential projects include: nutrients, pesticides, metals, oil, grease and other petroleum products, and sediment. Dissolved copper, dissolved zinc, and PAHs are generally the primary constituents of concern for stormwater runoff in Oregon streams for their impact on ESA listed species. These pollutants are specially targeted for treatment in the selected stormwater management systems.

Water quality treatment will occur through stormwater bioretention basins, swales and planters. These facilities are landscaped reservoirs that collect and treat stormwater runoff through vegetation and soil media. They provide pollution reduction and flow attenuation to reduce hydraulic impacts from urban developments on downstream rivers. Specific elements are incorporated into the design to increase the effectiveness of this stormwater facility type. Design elements include trapped catch basins to remove coarse sediment, using soil media to provide stormwater filtration, and vegetation to will provide plant uptake.

The basins are designed using the BMP Sizing Tool developed by Clackamas County. This continuous simulation software is a regional tool for the Portland metro area. City of Milwaukie standards were checked using an xpswmm hydraulic model. The stormwater facilities were designed to the standards below:

- Water Quality: 50% of the cumulative rainfall from the 2-year storm event. (Using a continuous rainfall/runoff model).

The calculated peak water quality flow from the 5.58 ac of new impervious area is 1.10 cfs with an approximate 15,787 cf runoff volume.

Water Quantity

Water quantity control will occur within the proposed bioretention facilities. Control structures will be placed within each facility to limit runoff to the SLOPES V criteria listed below. The facilities were reviewed to confirm conformance with City of Milwaukie standards.

- City of Milwaukie = Match existing flow rate to proposed flow from the 2 through 25-year storm event.
- SLOPES V = limit pre-developed discharge rates using a continuous simulation for flows between 42% of the 2-year event and the 10-year flow event.

The calculated water quantity volume is approximate 12,175 cf volume.

Conveyance

The proposed conveyance system will be designed using the 100-year storm event in the final Drainage Report.

Table of Contents

Tables

Figures

1 Project Overview

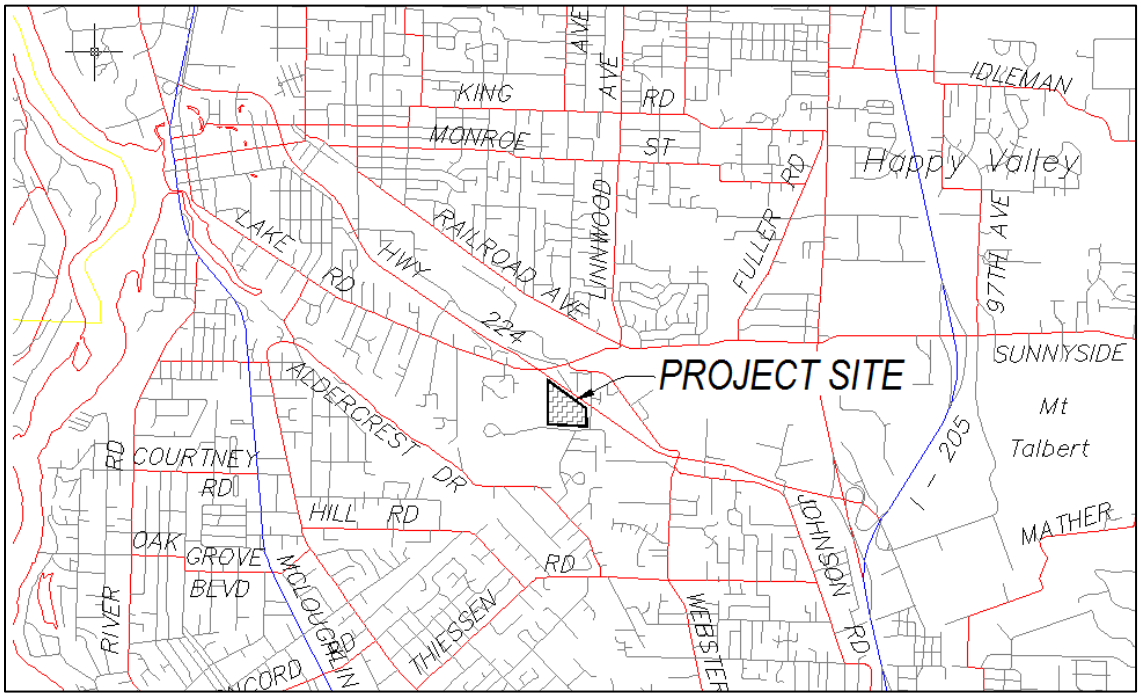
1.1 Project Overview

The Kellogg Creek residential subdivision is approximately 14 acres and will include the construction of 92 new lots intended for single-family attached homes (rowhouses). Four public streets are proposed, these streets are identified as Street A and B. Frontage improvements to SE Kellogg Creek Drive will also be completed as part of this project.

1.2 Location

The proposed project is located at 13333 Rusk Road in Milwaukie, Oregon (See Figure 1-1 Vicinity Map). The property includes the following tax lots: TL 22E 06AD 600, TL 22E 06AD 700, TL 22E 06AD 900, and TL 22E 06AD 901.

Figure 1-1 Vicinity Map



1.3 Methodology

The proposed storm design will meet the requirements of the City of Milwaukie as listed in the *Public Works Standards* dated February 2015. The City of Milwaukie follows the current City of Portland's *Stormwater Management Manual* for water quality facility design.

Additionally, the project must conform to Standard Local Operating Procedures for Endangered Species (SLOPES V) as part of the Wetland Fill Permit with the Army Corp of Engineers.

2 Existing Conditions

2.1 Topography

The existing site contains a driveway entrance for the adjacent Turning Point Church, grass, blackberry bushes and a scattering of trees. Fill material was previously placed at the site adjacent to the church parking lot. Mt. Scott Creek runs through the northern portion of the site. The site has gradual slopes between 0.5 and 5% and generally drains towards the northwest - west. Steeper slopes occur at the end of fill placed at the site and along Mt. Scott Creek. The highest elevation within the project area is 78; located along the southeast property corner. The lowest elevation of 66 is located in the western property boundary.

2.2 Climate

The site is in Milwaukie, Oregon and is located approximately 65 miles inland from the Pacific Ocean. There is a gradual change in seasons with defined seasonal characteristics. Average daily temperatures range from 36°F to 83°F. Record temperatures recorded for this region of the state are -3°F and 107°F. Average annual rainfall recorded in this area is 42-inches. Average annual snowfall is approximately 1-inches between December and February.

2.3 Site Geology

The underlying soil types on the site, as classified by the United States Department of Agriculture Soil Survey of Clackamas County, Oregon are identified in Table 2-1 (See Technical Appendix: Hydrologic Soils Map - Clackamas County).

Table 2-1 Soil Characteristics

Soil Type	Hydrologic Group
Cove Silty Clay Loam	D
Salem Silt Loam	B
Wapato Silty Clay Loam	C/D
Woodburn Silt Loam	C

A majority of the site is classified as Cove Silty Clay Loam. Therefore, the entire site has conservatively been assigned a soil Group D. Group D soils have very slow infiltration rates when thoroughly saturated.

Groundwater was encountered during the geotechnical evaluation completed by GEO Consultants Northwest. Groundwater depths varied across the site from 3 to12 below the ground surface. This variation of groundwater depths is a result of the varying amount of existing fill at the site. The elevation of groundwater is approximately 65 ft across the site.

2.4 Curve Number

The curve number represents runoff potential from the soil. The major factors for determining the curve number values are hydrologic soil group, cover type, hydrologic condition and antecedent runoff condition. The pervious curve numbers of 79 representing Woods-Grass Combination in Good Condition was used at the site. (See Technical Appendix: Table 2-2c – Technical Release 55-Urban Hydrology for Small Watersheds).

2.5 Time of Concentration

The time of concentration (T_C) as described in NEH-4 Chapter 15 is defined in two ways; the time for runoff to travel from the furthermost point of the watershed to the point in question, and the time from the end of excess rainfall to the point of inflection on the trailing limb of the unit hydrograph. Time of concentration can be estimated from the following formulas. The time of concentration was calculated to be 24 minutes (See Technical Appendix: Time of Concentration Calculation).

Sheet Flow

$$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5} s^{0.4}}$$

T_t = Travel Time (hours) n = Manning's "n" of slope
L = Length of flow (ft) P_2 = 2-Year, 24-hour rainfall (in)
s = Slope (ft / ft)

Shallow Concentrated Flow

$$T_t = \frac{L}{3600V}$$

T_t = Travel Time (hours) L = Flow Length (ft)
V = Average Velocity (ft / s) 3600 = seconds / hour

2.6 Hydrology

Stormwater runoff from the site sheet flows north to Mt. Scott Creek with the exception of the church driveway entrance and a small area of pervious area. Catch basins collect this impervious area and the adjacent church and sends runoff south to a public storm sewer in SE Kellogg Creek Dr. The SE Kellogg Creek Dr. storm sewer heads south and outfalls into a tributary of Kellogg Creek. Water quality treatment is not provided at the site.

2.7 Basin Area

Impervious and pervious surface areas for the existing conditions are shown in Table 2-2. The site is 1.4% impervious. Approximately 1.466 acres of the site drains south to Kellogg Creek (See Technical Appendix: Figure 1 – Existing Basin Delineation).

Table 2-2 Existing Basin Areas

Basin	Impervious Area, ac	Pervious Area, ac	Total Area, ac
Site (Mt Scott Creek)	0.201	13.815	14.016
Kellogg Creek Dr.	0.321	0.043	0.364
Total	0.522	13.858	14.380

3 Proposed Conditions

3.1 Curve Number

The pervious curve numbers of 80 representing Open Space in Good Condition was used at the site. (See Technical Appendix: Table 2-2a – Technical Release 55-Urban Hydrology for Small Watersheds).

3.2 Time of Concentration

A time of concentration of 5 minutes was used for the delineated basins.

3.3 Hydrology

Stormwater runoff outside the limits of work will continue to sheet flow to Mt. Scott Creek. Floodplain grading will occur so that floodwaters will recede back into the creek channel. Two new outfalls are proposed as part of this project. These outfalls are included as part of the wetland fill permit. The church entrance will be modified as part of this project.

Water quality treatment and quantity facilities will be added to the site. A summary of each facility is provided below.

- North Pond: Bioretention Pond, Outfall to Mt. Scott Creek
- South Pond: Bioretention Pond, Outfall to Mt. Scott Creek through a flow dispersion trench
- Southwest Pond: Extended Dry Pond to the tributary of Kellogg Creek
- Planters A through D and Swale: Four Bioretention Planters, Outfall to Kellogg Creek. Planters A, B, C will treat proposed onsite streets. Site grading constraints prohibit this portion of the streets from flowing to one of the ponds. Planter D is located along Kellogg Creek Drive.

3.4 Basin Area

Impervious and pervious surface areas for proposed conditions are shown in Table 3-1. The site is 37.2% impervious in proposed conditions. The majority of the project will occur at the site, although some work is being done within church property. Street improvements to SE Kellogg Creek Dr. will also occur as part of this project. The Creek basin will not be developed but includes grading to balance the floodplain. The amount of area draining to the tributary of Kellogg Creek is 1.03 acres, slightly less than in existing conditions (See Technical Appendix: Figure 2 – proposed Basin Delineation).

Table 3-1 Proposed Basin Areas

Basin	Impervious Area, ac	Pervious Area, ac	Total Area, ac
North	2.328	0.973	3.301
South	2.218	0.739	2.957
Southwest	0.156	0.138	0.294
Planter A	0.043	0.015	0.058
Planter B	0.038	0.021	0.059
Planter C	0.037	0.017	0.054
Planter D	0.151	0.126	0.277
Mt. Scott Creek	0.000	6.798	6.798
Kellogg Creek	0.371	0.211	0.582
Total	5.342	9.038	14.380

4 Hydrologic and Hydraulic Analysis

4.1 Design Guidelines

The proposed storm design will meet the requirements of the City of Milwaukie as listed in the *Public Works Standards* dated February 2015. Section 2.0013 describes the allowable flow determination methods including the selected Unity Hydrograph Method.

4.2 Hydrologic Method

The Santa Barbara Urban Hydrograph (SBUH) was used for this analysis. The SBUH method is based on the curve number (CN) approach, and uses the Natural Resources Conservation Service's (NRCS) equations for computing soil absorption and precipitation excess.

The SBUH method converts the incremental runoff depths into instantaneous hydrographs, which are then routed through an imaginary reservoir with a time delay equal to the basin time of concentration.

The runoff function of xpswmm generates surface and subsurface runoff based on design or measured rainfall conditions, land use and topography. xpswmm Version 17.1 was used for our hydrology and hydraulics analysis. xpswmm is based on the public EPA SWMM program. xpswmm is an approved method of analysis by City of Milwaukie.

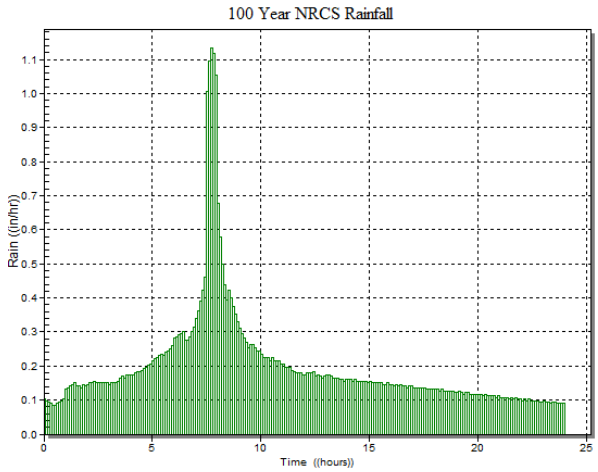
4.3 Design Storm

The rainfall distribution to be used within the City of Milwaukie jurisdiction is the design storm of 24-hour duration based on the standard Type 1A rainfall distribution. Table 4-1 shows total precipitation depths for different storm events. The NRCS Distribution for a type 1A 24-hour rainfall distribution for a 25-year storm event is shown in Figure 4-1.

Table 4-1 Precipitation Depth

Recurrence interval (years)	Total Precipitation Depth (in)
2	2.40
10	3.50
25	4.00
100	4.70

Figure 4-1 100-Year Type 1A Rainfall Ditribution



4.4 Basin Runoff

Table 4-2 lists the runoff rates for existing and proposed conditions for the site during the 2, 10, 25 and 100-year storm events. These values do not include onsite detention. (See Technical Appendix: Existing and Proposed Hydrographs).

Table 4-2 Runoff Rates

Recurrence Interval (years)	Existing Peak Runoff Rate (cfs)	Proposed Peak Runoff Rate (cfs)
2	1.307	4.197
5	2.464	5.982
10	3.562	7.552
25	4.739	9.176
100	6.485	11.521

5 Conveyance Analysis

5.1 Design Guidelines

The analysis and design criteria described in this section will follow the City of Milwaukie's *Public Works Standards.* The manual requires storm drainage system and facilities be designed to convey the 100-year storm event.

5.2 System Capacity

The proposed conveyance system was designed to convey and contain the peak runoff from a 100-year design storm.

5.3 System Performance

A complete conveyance analysis will be completed in the final Drainage Report.

6 Water Quality & Quantity

6.1 Design Guidelines

The proposed water quality and quantity facilities were designed per the City of Milwaukie requirements as listed in the *Public Works Standards* dated February 2015. The City of Milwaukie follows the current City of Portland's *Stormwater Management Manual* for water quality facility design. The City of Milwaukie requires the proposed discharge rate for the 2, 5, 10, and 25-year events to be that of the existing discharge rate.

Detention is also required to meet SLOPES V criteria. SLOPES V limits the proposed discharge rates using a continuous simulation for flows between 42% of the 2-year event and the 10-year flow event of existing flows. Existing conditions are assumed to be forested.

6.2 Water Quality and Quantity Facilities

The project will discharge into Mt. Scott Creek, a tributary of Kellogg Creek and the Willamette River. Mt. Scott and Kellogg Creek are not listed as water quality limited and the Willamette River is listed for

E. Coli. Typical pollutants from single-family residential projects include: nutrients, pesticides, metals, oil, grease and other petroleum products, and sediment. Dissolved copper, dissolved zinc, and PAHs are generally the primary constituents of concern for stormwater runoff in Oregon streams for their impact on ESA listed species. These pollutants are specially targeted for treatment in the selected stormwater management systems.

Water quality treatment will occur through stormwater bioretention basins, swales and planters. These facilities are landscaped reservoirs that collect and treat stormwater runoff through vegetation and soil media. They provide pollution reduction and flow attenuation to reduce hydraulic impacts from urban developments on downstream rivers. Specific elements are incorporated into the design to increase the effectiveness of this stormwater facility type. Design elements include trapped catch basins to remove coarse sediment, using soil media to provide stormwater filtration, and vegetation to will provide plant uptake.

The basins are designed using the BMP Sizing Tool developed by Clackamas County. This continuous simulation software is a regional tool for the Portland metro area. City of Milwaukie standards were checked using an xpswmm hydraulic model and will be included within the final Drainage Report.

Bioretention facilities are designed to incorporate the following criteria:

- Water Depth: 10 to 18 inches
- Drain Rock Depth: 6 to 18 inches
- Growing Medium Depth: 18 inches
- Minimum Freeboard: 2 inches
- Perforated Pipe Under Drain
- Minimum Orifice Size: 1 inch

There are seven (7) proposed bioretention facilities located in the proposed project. Each facility was designed to maximize water contact with vegetation for biological treatment. A control structure with one or two orifices will control the allowable release rate. Appropriate vegetation will be planted in the basin as specified by the City of Portland's *Stormwater Management Manual* (See Technical Appendix: WES BMP Sizing Report). Table 6-1 provides a summary of each facility.

Table 6-1 Bioretention Facility Summary

Basin ID	Facility Type	Minimum Top Area (not including Freeboard) (sf)	Minimum Bottom Area (sf)	Water Depth (in)	Rock Depth (in)	Soil Depth (in)	Total Depth (in)
North	Pond	4,100	2,119	12	6	18	36
South	Pond	3,900	1,976	12	6	18	36
Southwest	Dry Pond	570	-	18	0	0	18
Planter A	Planter	75	-	10	7	18	35
Planter B	Planter	58	-	12	12	18	42
Planter C	Planter	55	-	12	12	18	42
Planter D	Planter	312	-	10	7	18	35

6.3 Flow Dispersion

A flow dispersion trench will be used at the outfall of the South Pond. This flow spreader was designed to disperse flow over a large area in an effort to reduce erosive velocities of the stormwater discharge entering the wetland during the 100-year event. The flow spreader will be a gravel filled trench with a perforation pipe in the bottom of the trench.

Soils in the proposed landscaped slopes were conservatively assumed to consist of silty clay loam with a maximum permissible velocity of 0.5-fps which was used to determine if facility length (See Technical Appendix: Chow – Fig. 7-3 U.S. and U.S.S.R. data on Permissible Velocities for Non-cohesive Soils). The flow spreader was treated as a broad crested weir. A weir coefficient of 2.4 was used in the calculations. The broad crested weir equation is shown below.

$$q = 2.4H^{3/2}$$

Where:

q= Volumetric flow rate per unit length, cfs/ft

H= Depth of flow over weir

Table 6-2 Flow Dispersion Trench

Length (ft)	Discharge (cfs)	Depth (ft)	q (cfs/ft)	Velocity (fps)
130	2.88	0.04	0.02	0.50

7 Floodplain Analysis

FEMA Flood Insurance Rate Maps were used to determine the 10, 25 and 100-year flood stage for Mt. Scott Creek. The site is located on map number FM41005C0036D, with an effective date of June 17, 2008. Elevations are provided in the NAVD 1988 datum, the same as used for this project. The upstream most cross section is C located just downstream of Hwy 224. The 100-year elevation at cross section C is 69.9.

The 25-year elevation was interpolated from the FEMA profile. These elevations were used to balance the floodplain and determine the elevation of the stormwater facilities. FEMA determined elevations are listed in Table 7-1 (See Technical Appendix: Flood Insurance Study, Clackamas County - Mt. Scott Creek Profile).

Table 7-1 Mt. Scott Creek Water Surface Elevations

Recurrence Interval (years)	Water Surface Elevation	
	Upstream Property Boundary	Downstream Property Boundary
10	69.4	67.5
25	69.7	67.3
100	69.9	67.3

8 Operation & Maintenance

Maintenance of water quality and quantity facilities is very important to ensure they operate as designed. Inadequate maintenance can be attributed to premature failures of these facilities. Stormwater facilities for the site will be maintained and operated privately by the homeowners. Prior to creation of an HOA, please contact Randy Myers at 503-358-4460 or Randy@Brownstonehomes.net about inspection and maintenance of the proposed stormwater facilities.

The owners must insure the water quality systems efficiently perform their function of removing petroleum hydrocarbons, sediments, metals, bacteria and nutrients from stormwater runoff and that the water quantity system performs their function of regulating the rate and volume of stormwater runoff leaving the property.

The Operation and Maintenance Plan is provided within the Technical Appendix.

9 Summary

The proposed water quality and quantity facility design follows the City of Milwaukie's *Public Works Standards* dated February 2015. The City of Milwaukie follows the current City of Portland's *Stormwater Management Manual* for water quality facility design.

Additionally, the project must comply with the National Marine Fisheries Service (NMFS) criteria as part of the March 2014 Programmatic Biological Opinion and Essential Fish Habitat Consultation for Revisions to Standard Local Operating Procedures for Endangered Species (SLOPES V) as part of the Wetland Fill Permit with the Army Corp of Engineers.

Bioretention facilities are proposed to provide a high level of treatment and detention.

Technical Appendix

Technical Appendix

- Figure 1 – Existing Basin Delineation
- Figure 2 – Proposed Basin Delineation

- Hydrologic Soil Map – Washington County
- Table 2-2c – Runoff Curve Numbers for Other Agricultural Lands
- Table 2-2a – Runoff Curve Numbers for Urban Areas
- Time of Concentration
- WES BMP Sizing Report
    - Pond
    - Swale and Planters
- Existing & Proposed Hydrographs
- Flood Insurance Study, Clackamas County - Mt. Scott Creek Profile
- Chow – Fig. 7-3 U.S. and U.S.S.R. data on Permissible Velocities for Non-cohesive Soils
- Operation and Maintenance Plan
- Geotechnical Evaluation – Kellogg Creek Development, GEO Consultants Northwest, October 7, 2016.

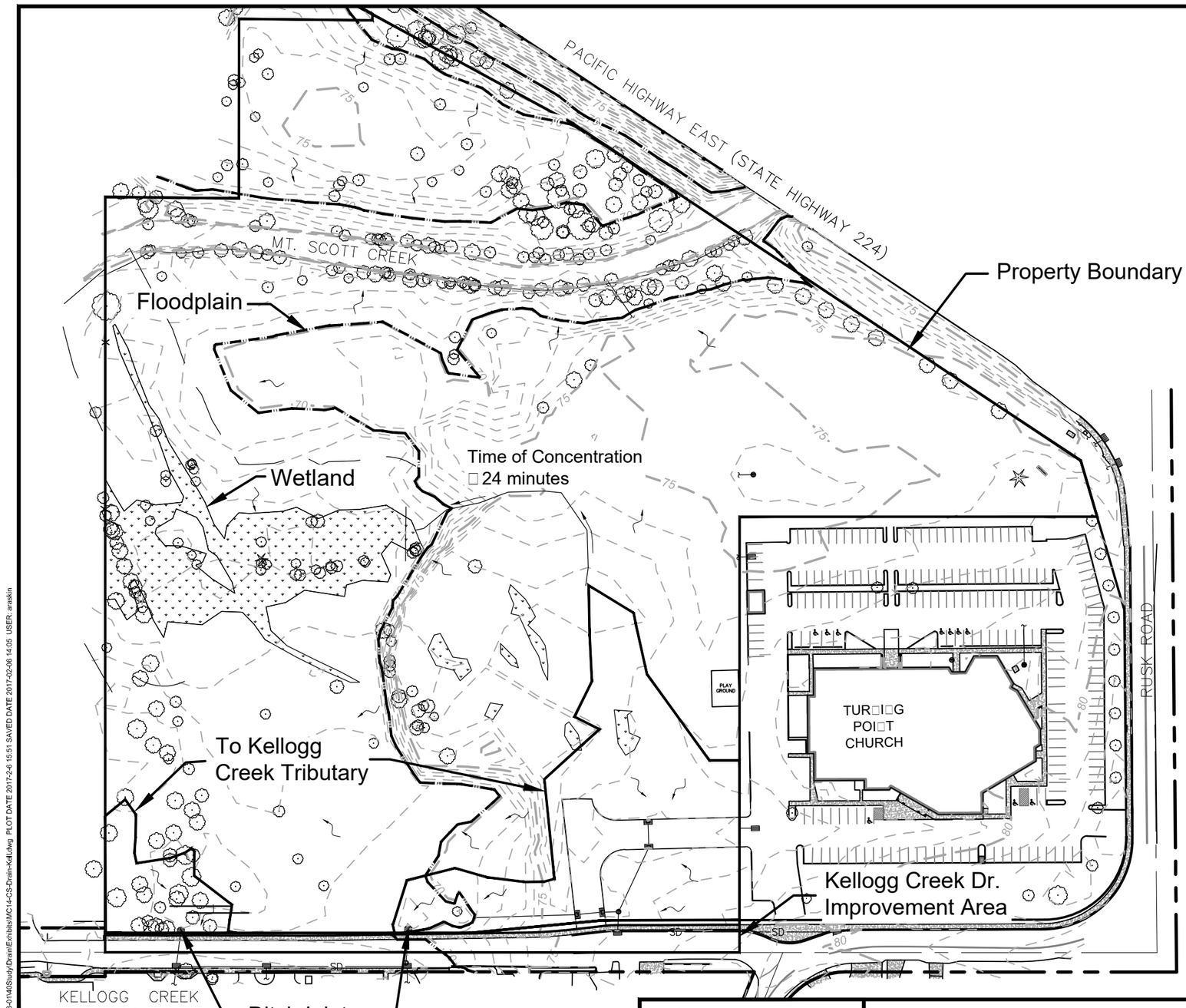
References

Flood Insurance Study (FIS) – Clackamas County, Oregon and Incorporated Areas, FEMA, June 17, 2008.

Public Works Standards, City of Milwaukie, February 2015.

Stormwater Management Manual, City of Portland, August 2016.

Programmatic Biological Opinion and Essential Fish Habitat Consultation for Revisions to Standard Local Operating Procedures for Endangered Species (SLOPES V), National Marine Fisheries Service (NMFS), March 2014.



Existing Basin Area
Impervious Area □ 0.201 acres
Pervious Area □ 13.815 acres
Total Area □ 14.01□ acres

Kellogg Creek Dr. Improvement Area
Impervious Area □ 0.321 acres
Pervious Area □ 0.043 acres
Total Area □ 0.3□4 acres

N

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SCALE I□ FEET

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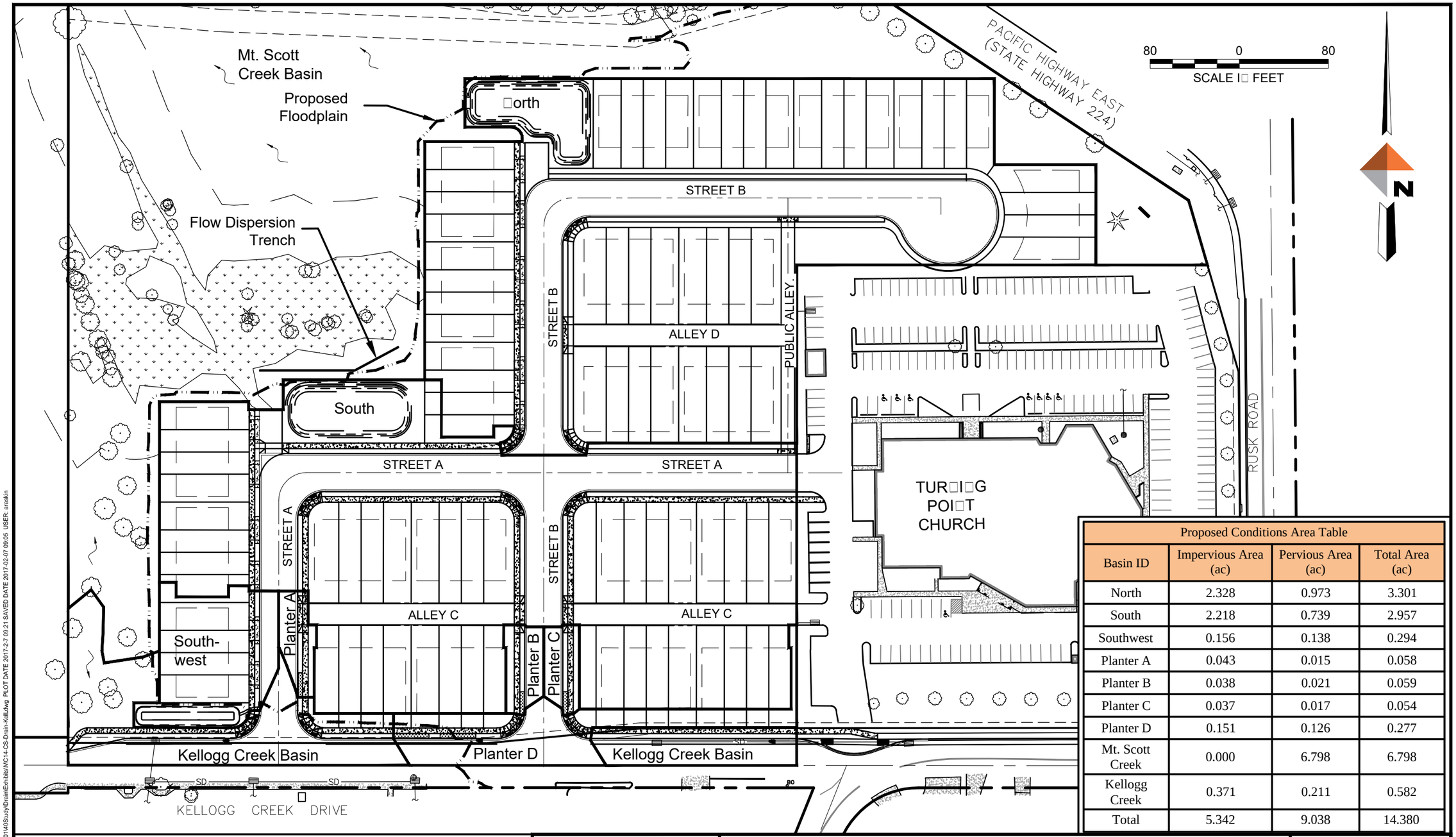
EXISTI□G BASI□ DELI□EATIO□
KELLOGG CREEK SUBDIVISIO□
MILWAUKIE, OREGO□

PRO□ECT	14258.01
DATE	02□08□2017
	ASR

FIGURE 1



Proposed Conditions Area Table			
Basin ID	Impervious Area (ac)	Pervious Area (ac)	Total Area (ac)
North	2.328	0.973	3.301
South	2.218	0.739	2.957
Southwest	0.156	0.138	0.294
Planter A	0.043	0.015	0.058
Planter B	0.038	0.021	0.059
Planter C	0.037	0.017	0.054
Planter D	0.151	0.126	0.277
Mt. Scott Creek	0.000	6.798	6.798
Kellogg Creek	0.371	0.211	0.582
Total	5.342	9.038	14.380

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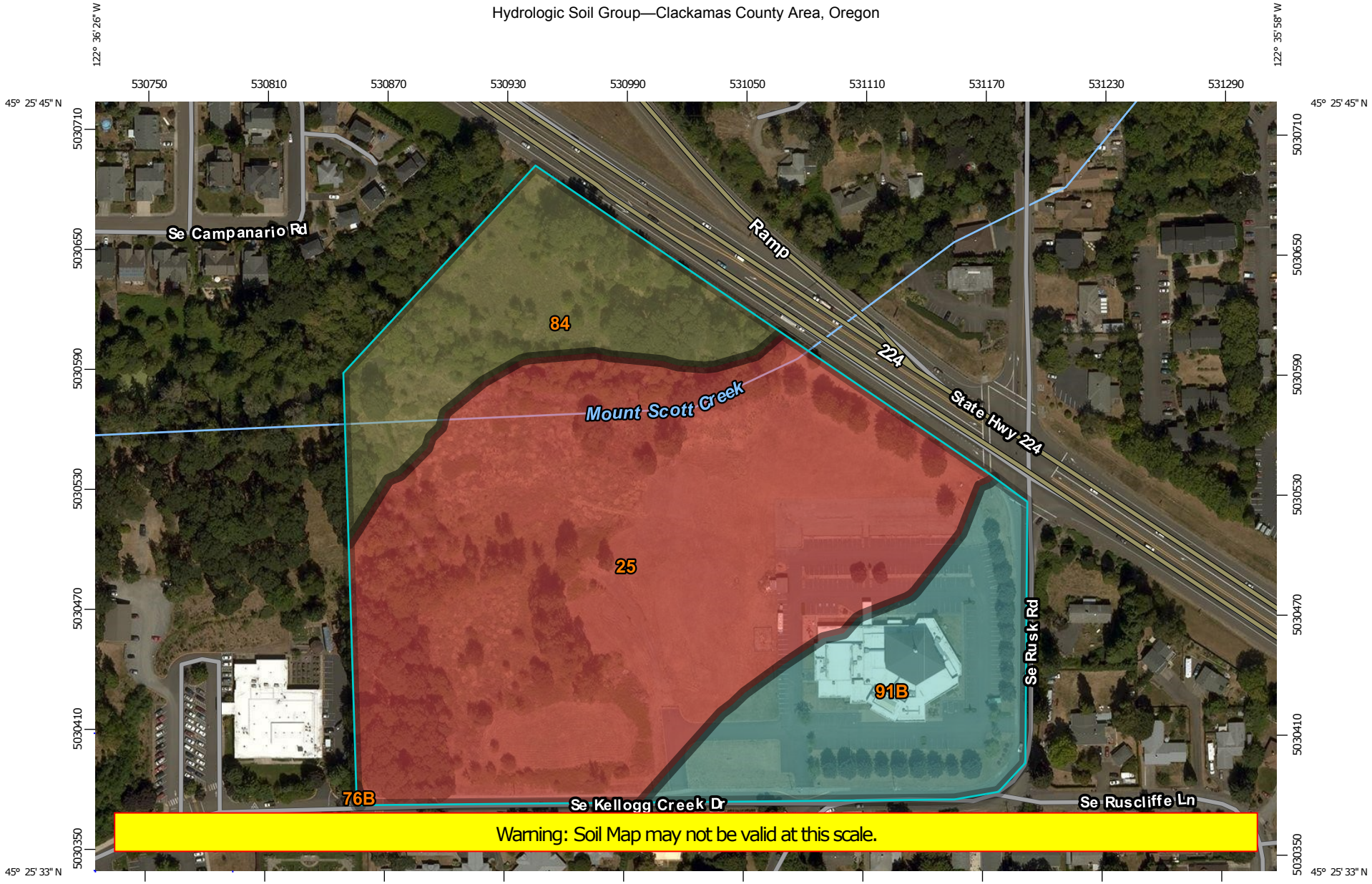
PROPOSED BASI□ DELI□EATIO□
KELLOGG CREEK SUBDIVISIO□
MILWAUKIE, OREGO□

PRO□ECT	14258.01
DATE	02□08□2017
	ASR

FIGURE 2

\\BIL-FS\BIL-projects\22\14258-01\40\Study\Drain\Exhibits\MC14-CS-Drain-Kell.dwg PLOT DATE 2017-2-7 09:21 SAVED DATE 2017-02-07 09:05 USER: anaskin



Map Scale: 1:2,710 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 10, Sep 18, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 26, 2014—Sep 5, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
25	Cove silty clay loam	D	12.9	63.1%
76B	Salem silt loam, 0 to 7 percent slopes	B	0.0	0.0%
84	Wapato silty clay loam	C/D	3.6	17.6%
91B	Woodburn silt loam, 3 to 8 percent slopes	C	4.0	19.3%
Totals for Area of Interest			**20.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Table 2-2c Runoff curve numbers for other agricultural lands [1/]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. [2/]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. [3/]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 [4/]	48	65	73
Woods—grass combination (orchard or tree farm). [5/]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. [6/]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 [4/]	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

1 Average runoff condition, and $I_a = 0.2S$.

2 *Poor:* <50%) ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.

3 *Poor:* <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

4 Actual curve number is less than 30; use CN = 30 for runoff computations.

5 CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

6 *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Table 2-2a Runoff curve numbers for urban areas [1/]

Cover description: Cover type and hydrologic condition	Average percent impervious area [2/]	Curve numbers for hydrologic soil group: A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3/]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4/]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5/]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Time of Concentration

SUBJECT	Time of Concentration				
PROJECT NO.	2322.14258.01	**BY**	ASR	**DATE**	2/8/2017

	Existing	
SHEET FLOW		
INPUT	**VALUE**	
Surface Description	**Type**	**5**
	Grass (short prairie)	
Manning's "n"	**0.15**	
Flow Length, L (<300 ft)	**163**	ft
2-Yr 24 Hour Rainfall, P_2	**2.6**	in
Land Slope, s	**0.01**	ft/ft
OUTPUT		
Travel Time	0.35	hr
SHALLOW CONCENTRATED FLOW		
INPUT	**VALUE**	
Surface Description	**Unpaved**	
Flow Length, L	**100**	ft
Watercourse Slope*, s	**0.615**	ft/ft
OUTPUT		
Average Velocity, V	12.65	ft/s
Travel Time	0.002	hr
SHALLOW CONCENTRATED FLOW		
INPUT	**VALUE**	
Surface Description	**Unpaved**	
Flow Length, L	**219**	ft
Watercourse Slope*, s	**0.01**	ft/ft
OUTPUT		
Average Velocity, V	1.61	ft/s
Travel Time	0.038	hr
Watershed or Subarea T_c =	**0.39**	**hr**
Watershed or Subarea T_c =	**24**	**minutes**

WES BMP Sizing Software Version 1.6.0.1, August 2015

WES BMP Sizing Report

Project Information

Project Name	Kellogg Creek
Project Type	SingleFamily
Location	13333 Rusk Road in Milwaukie, Oregon
Stormwater Management Area	0
Project Applicant	Brownstone Development, Inc.
Jurisdiction	OutofDistrict

Drainage Management Area

Name	Area (sq-ft)	Pre-Project Cover	Post-Project Cover	DMA Soil Type	BMP
North - Imp	101,408	Forested	ConventionalConcrete	D	Bioretention Pond North
North - Perv	42,384	Forested	Grass	D	Bioretention Pond North
South - Imp	96,616	Forested	ConventionalConcrete	D	Bioretention Pond South
South - Perv	32,191	Forested	Grass	D	Bioretention Pond South

LID Facility Sizing Details

Pond Sizing Details

Pond ID	Design Criteria(1)	Facility Soil Type	Max Depth (ft)(2)	Top Area (sq-ft)	Side Slope (1:H)	Facility Vol. (cu-ft)(3)	Water Storage Vol. (cu-ft)(4)	Adequate Size?
Bioretention Pond North	FCWQT	Lined	3.00	6,190.0	3	14,646.1	5,858.4	Yes
Bioretention Pond South	FCWQT	Lined	3.00	5,500.0	3	12,819.0	5,127.6	Yes

1. FCWQT = Flow control and water quality treatment, WQT = Water quality treatment only

2. Depth is measured from the bottom of the facility and includes the three feet of media (drain rock, separation layer and growing media).

3. Maximum volume of the facility. Includes the volume occupied by the media at the bottom of the facility.

4. Maximum water storage volume of the facility. Includes water storage in the three feet of soil media assuming a 40 percent porosity.

Simple Pond Geometry Configuration

Pond ID: Bioretention Pond North
Design: FlowControlAndTreatment

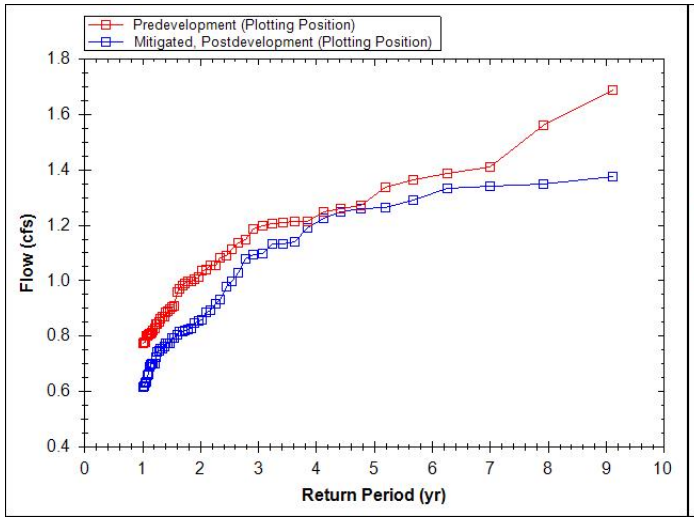
Shape Curve

Depth (ft)	Area (sq ft)
3.0	6,190.0

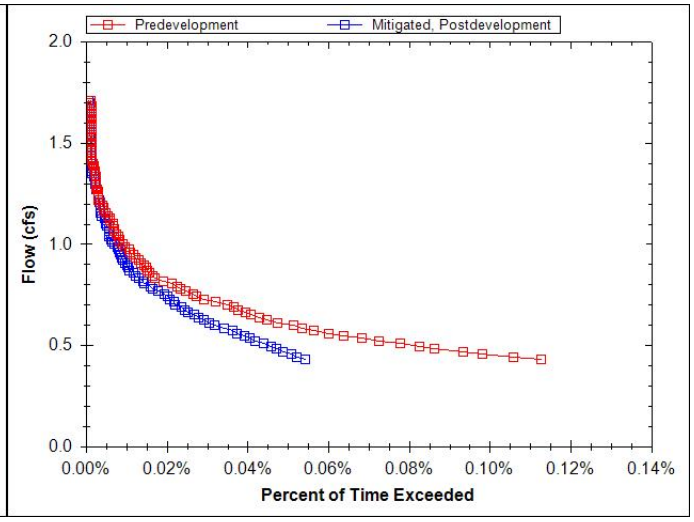
Outlet Structure Details

Lower Orifice Invert (ft)	0.0
Lower Orifice Dia (in)	3.1
Upper Orifice Invert(ft)	2.0
Upper Orifice Dia (in)	7.0
Overflow Weir Invert(ft)	3.0
Overflow Weir Length (ft)	6.3

Flow Frequency Chart



Flow Duration Chart



Simple Pond Geometry Configuration

Pond ID: Bioretention Pond South
Design: FlowControlAndTreatment

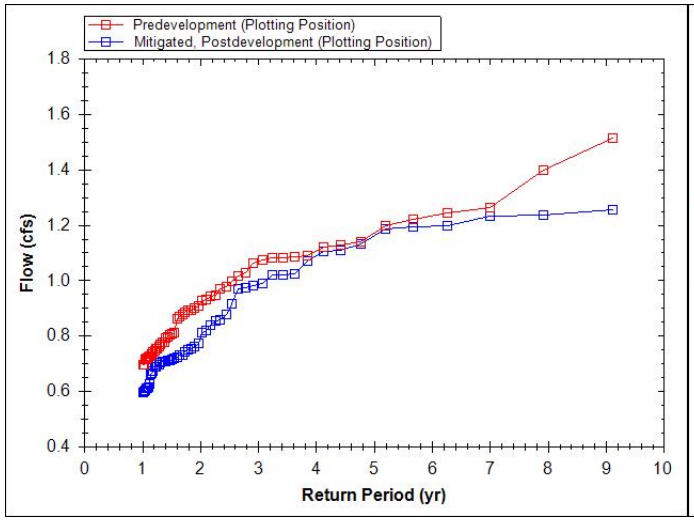
Shape Curve

Depth (ft)	Area (sq ft)
3.0	5,500.0

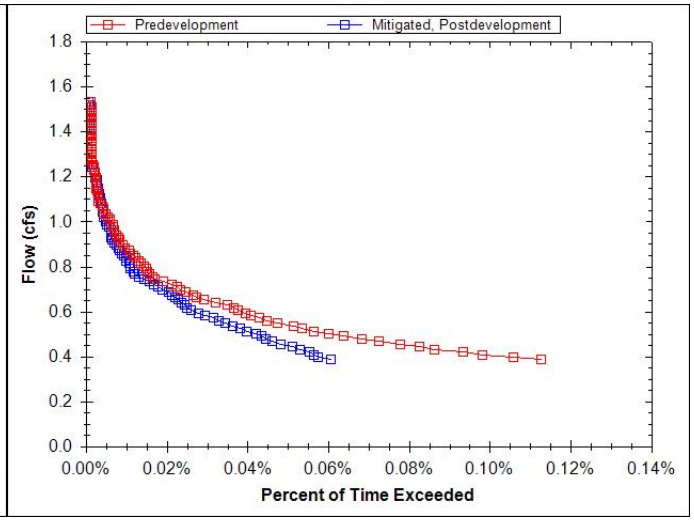
Outlet Structure Details

Lower Orifice Invert (ft)	0.0
Lower Orifice Dia (in)	2.9
Upper Orifice Invert(ft)	2.0
Upper Orifice Dia (in)	6.7
Overflow Weir Invert(ft)	3.0
Overflow Weir Length (ft)	6.3

Flow Frequency Chart



Flow Duration Chart



WES BMP Sizing Software Version 1.6.0.1, August 2015

WES BMP Sizing Report

Project Information

Project Name	Kellogg Creek
Project Type	SingleFamily
Location	13333 Rusk Road in Milwaukie, Oregon
Stormwater Management Area	0
Project Applicant	Brownstone Development, Inc.
Jurisdiction	OutofDistrict

Drainage Management Area

Name	Area (sq-ft)	Pre-Project Cover	Post-Project Cover	DMA Soil Type	BMP
Planter A - Imp	1,873	Forested	ConventionalConcrete	D	Planter A
Planter A - Per	653	Forested	Grass	D	Planter A
Planter B - Imp	1,655	Forested	ConventionalConcrete	D	Planter B
Planter B - Per	915	Forested	Grass	D	Planter B
Planter C - Imp	1,612	Forested	ConventionalConcrete	D	Planter C
Planter C - Per	741	Forested	Grass	D	Planter C
Southwest - Imp	6,795	Forested	ConventionalConcrete	D	Southwest Extended Pond
Southwest - Per	6,011	Forested	Grass	D	Southwest Extended Pond
Planter D - Imp	6,578	Forested	ConventionalConcrete	D	Planter D
Planter D - Per	5,489	Forested	Grass	D	Planter D

LID Facility Sizing Details

LID ID	Design Criteria	BMP Type	Facility Soil Type	Minimum Area (sq-ft)	Planned Areas (sq-ft)	Orifice Diameter (in)
Planter C	FlowControlAndTreatment	Stormwater Planter - Filtration	Lined	54.8	83.0	0.5
Planter A	FlowControlAndTreatment	Stormwater Planter -	Lined	61.9	88.0	0.6

		Filtration				
Planter B	FlowControlAndTreatment	Stormwater Planter - Filtration	Lined	57.6	83.0	0.6
Planter D	FlowControlAndTreatment	Stormwater Planter - Filtration	Lined	245.1	256.0	1.2

Pond Sizing Details

Pond ID	Design Criteria(1)	Facility Soil Type	Max Depth (ft)(2)	Top Area (sq-ft)	Side Slope (1:H)	Facility Vol. (cu-ft)(3)	Water Storage Vol. (cu-ft)(4)	Adequate Size?
Southwest Extended Pond	FCWQT	Lined	3.00	1,446.0	3	2,608.5	1,043.4	Yes

1. FCWQT = Flow control and water quality treatment, WQT = Water quality treatment only

2. Depth is measured from the bottom of the facility and includes the three feet of media (drain rock, separation layer and growing media).

3. Maximum volume of the facility. Includes the volume occupied by the media at the bottom of the facility.

4. Maximum water storage volume of the facility. Includes water storage in the three feet of soil media assuming a 40 percent porosity.

Simple Pond Geometry Configuration

Pond ID: Southwest Extended Pond
Design: FlowControlAndTreatment

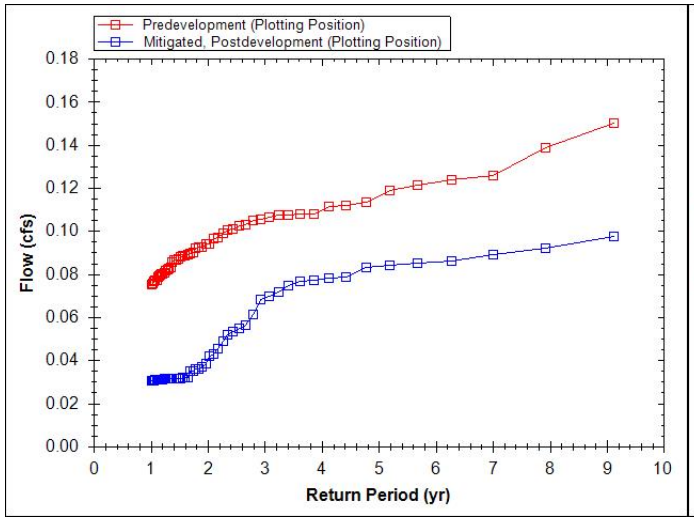
Shape Curve

Depth (ft)	Area (sq ft)
3.0	1,446.0

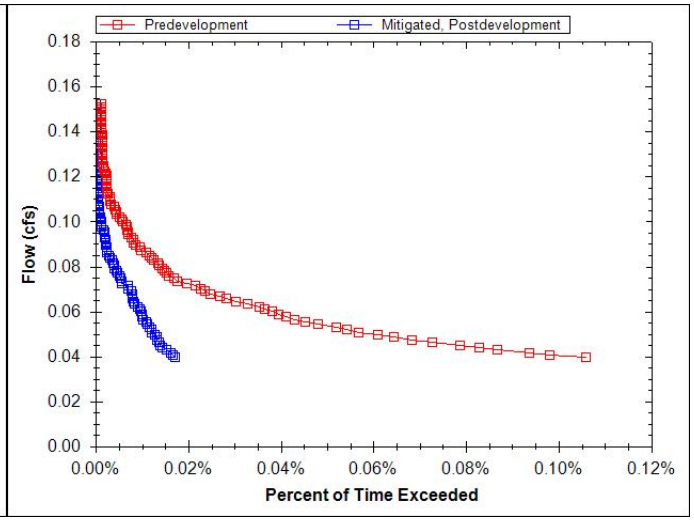
Outlet Structure Details

Lower Orifice Invert (ft)	0.0
Lower Orifice Dia (in)	0.9
Upper Orifice Invert(ft)	2.0
Upper Orifice Dia (in)	2.1
Overflow Weir Invert(ft)	3.0
Overflow Weir Length (ft)	6.3

Flow Frequency Chart

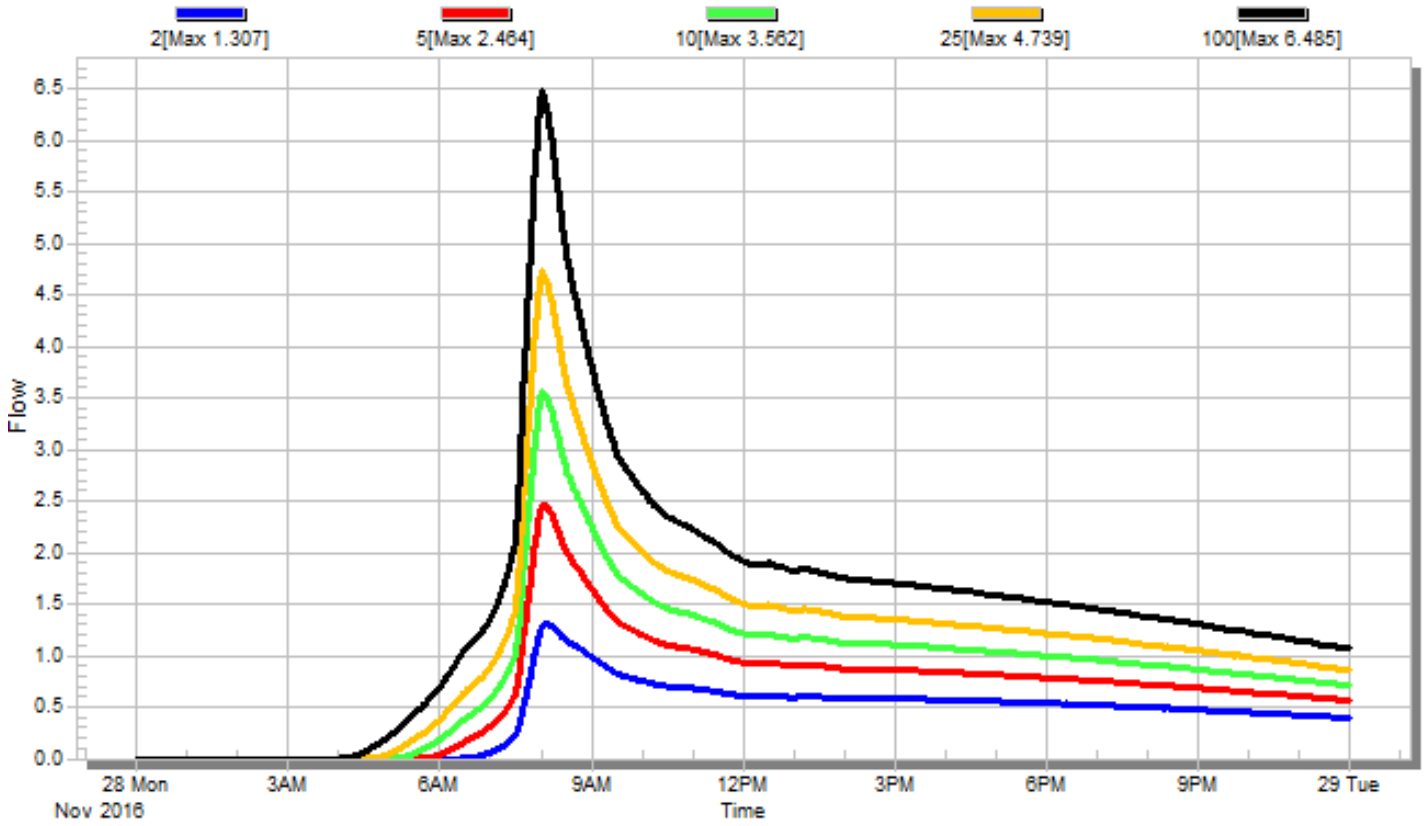


Flow Duration Chart

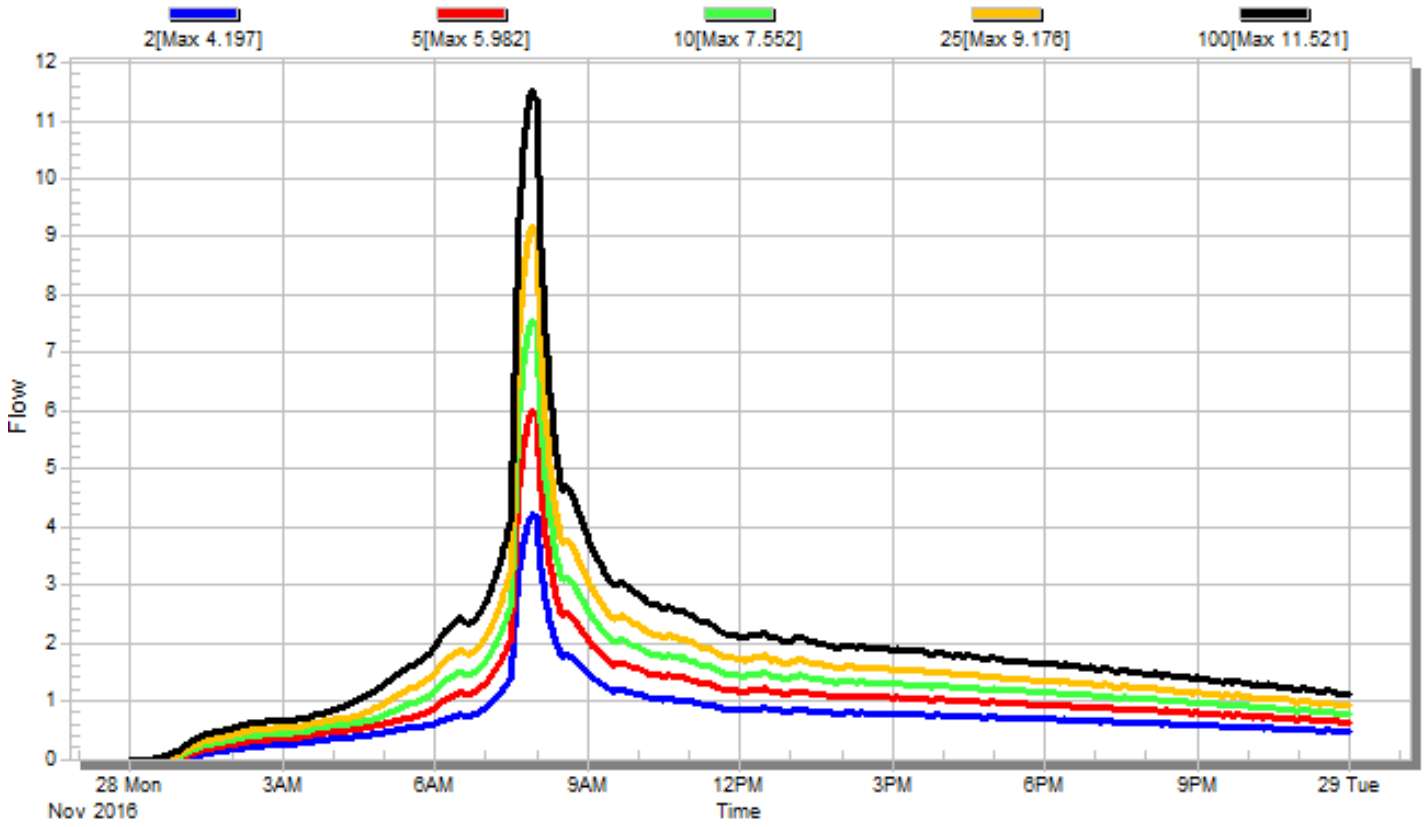


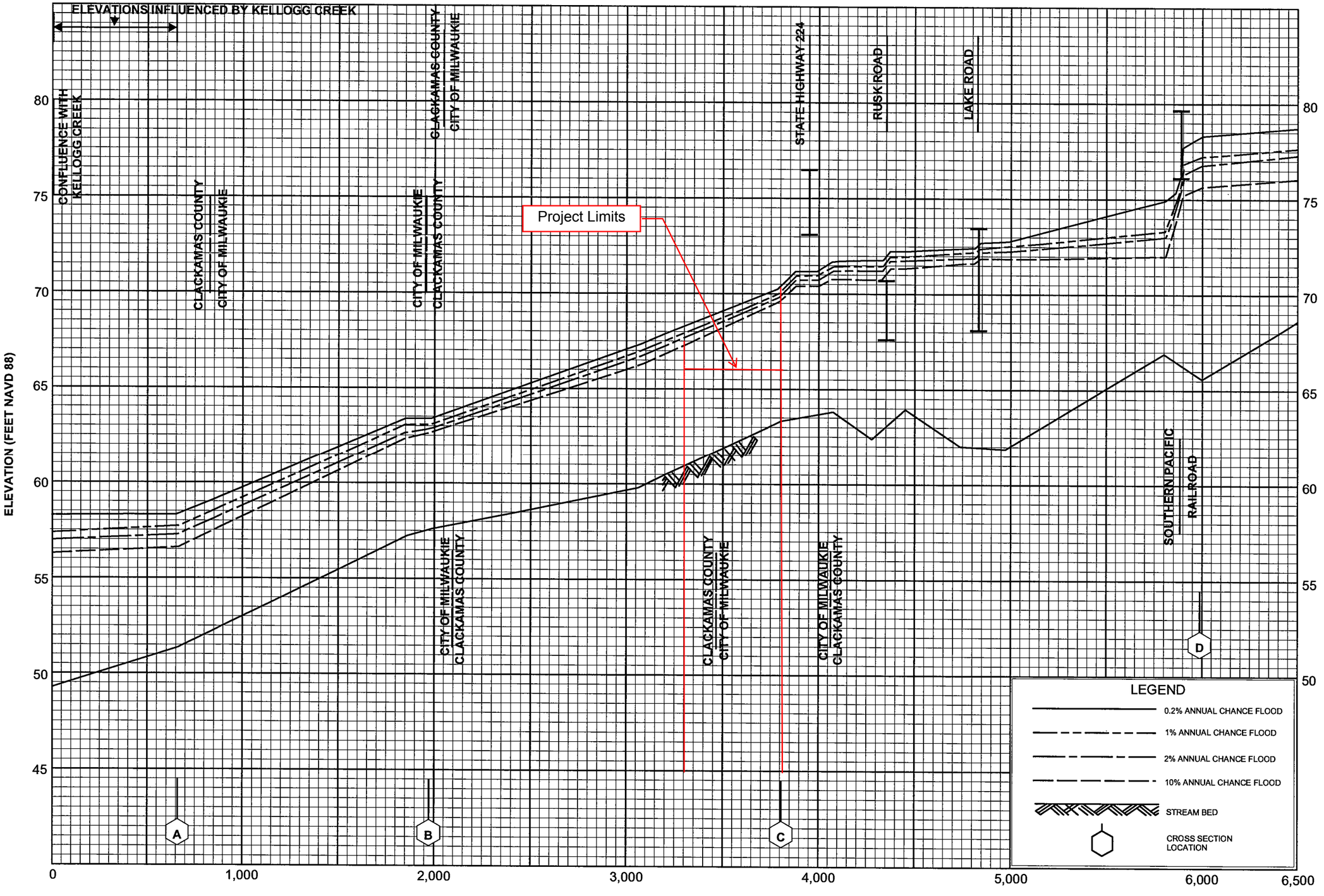
Kellogg Creek Planned Development — Hydrographs

Existing



Proposed





FLOOD PROFILES

MT SCOTT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLACKAMAS COUNTY, OR

AND INCORPORATED AREAS

53P

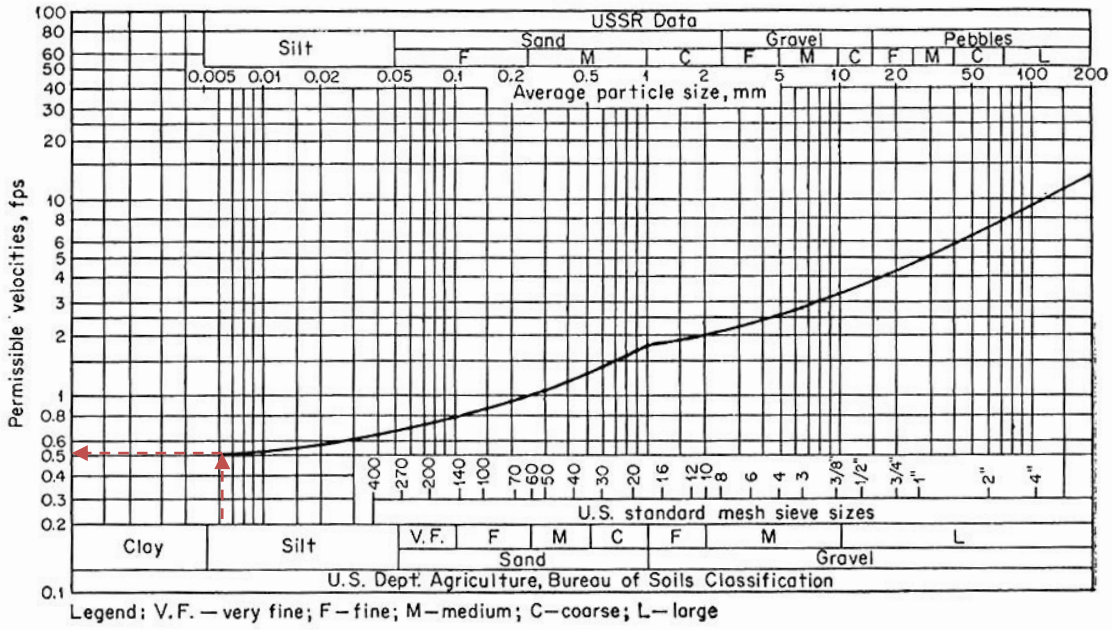


FIG. 7-3. U.S. and U.S.S.R. data on permissible velocities for noncohesive soils.

Source: Chow, V.T., 1959: *Open-channel hydraulics*. New York: McGraw-Hill. Page 166

Operation & Maintenance Plan

Kellogg Creek Planned Development

2322.14258.01

Prepared for

Brownstone Development, Inc.

47 S State Street
PO Box 2375
Lake Oswego, Oregon 97934

January 10, 2017

Prepared for	Brownstone Development, Inc.
Project Name	Operation & Maintenance Plan
Job Number	2322.14258.01
Date	January 10, 2017

DOWL
720 SW Washington Street, Suite 750
Portland, Oregon
97205

Telephone: 971-280-8641
Facsimile: 800-865-9847
araskin@dowl.com

Name	Title	Date	Revision	Reviewer
Atalia Raskin	WR Project Manager	01/10/2017	1	Scott Emmens

EXECUTIVE SUMMARY

Maintenance of water quality facilities is very important to ensure they operate as designed. Inadequate maintenance can be attributed to premature failures of these facilities. This Operation and Maintenance Plan provides guidance on how to maintain your facility, control source pollution, frequency of inspection and maintenance, potential problems with each facility, different conditions to check for, and the actual conditions that should exist. Maintenance guidelines and checklists have been provided in the Technical Appendix of this document.

The purpose of this Operation and Maintenance Plan is to describe the required type and frequency of long-term maintenance of the stormwater facilities and to identify the responsible maintenance organization. Several sources were used for obtaining maintenance information including City of Portland's *Stormwater Management Manual* dated August 2016.

This Plan should be kept onsite or within reasonable access to the site. Maintenance logs must be kept and made available for City inspection.

I. STORMWATER APPROACH DECRIPTION

I.1 Stormwater Approach

Water quality treatment and flow control at Kellogg Creek site will be accomplished through bioretention ponds and planters. All stormwater runoff will be released to Mt. Scott Creek and the public storm sewer in Kellogg Creek Drive. The Technical Appendix of this manual contains stormwater plans showing facility locations.

Table I-1 Stormwater Facility Summary

Facility	Facility Type	Facility Parameters	Stormwater Source	Contributing Impervious Area (ac)	Latitude	Longitude	Discharge Point
North	Pond	Volume: 5,923 cf Depth: 36 inch	Roof & Roadway	2.55	45.42782	-122.60406	Mt. Scott Creek
South	Pond	Volume: 5,161 cf Depth: 36 inch	Roof & Roadway	2.23	45.42713	-122.60453	Mt. Scott Creek
Southwest	Pond	Volume: 860 cf Depth: 12 inch	Roof & Roadway	0.16	45.42629	-122.60488	SE Kellogg Creek Dr.
Planter A	Planter	Area: 75 sf	Roadway	0.04	45.42648	-122.60477	SE Kellogg Creek Dr.
Planter B	Planter	Area: 58 sf	Roadway	0.04	45.42648	-122.60379	SE Kellogg Creek Dr.
Planter C	Planter	Area: 55 sf	Roadway	0.04	45.42649	-122.60368	SE Kellogg Creek Dr.
Planter D	Planter	Area: 312 sf	Roadway	0.15	45.42626	-122.60432	SE Kellogg Creek Dr.

II. INSPECTION

II.1 Inspection Schedule

In accordance with SLOPES V, inspection and maintenance will be required at least

- Quarterly for the first three (3) years.
- Twice a year thereafter.
- Within 48 hours of major rainfall events (defined as more than one inch of rain over a 24-hour period).

A recommended maintenance calendar is provided below.

Recommended Maintenance Schedule													
Purpose of Visit	**Frequency**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Routine inspection	Min. 4/year (first 3 years)			✓		✓					✓		✓
Vegetation	Min. 12/year	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Soil	Min. 8/year	✓	✓	✓	✓	✓					✓	✓	✓
Sediment & Trash	Min. 2/year				✓						✓		
Flow Control Structures	Min. 2/year				✓						✓		

III. MAINTENANCE ACTIVIES AND VISUAL INDICATORS OF DIMINISHED PERFORMANCE

Site Best Management Practices

Onsite maintenance practices can reduce maintenance needs for stormwater facilities. Good housekeeping procedures such as trash or source control practices can reduce spills and prevent pollutants from entering facilities.

Remove trash, debris and sediment from catch basins. Identify sources of visible pollutants or spills and clean up sources to protect the stormwater system. Sweep or vacuum driveways or other ground-level surfaces. Report all spills that threaten or enter the public sanitary or storm system.

Sediment and Oil Removal and Disposal

Stormwater facilities are designed to remove pollutants by capturing sediment, dirt, leaves and litter. Removing sediment and oil helps maintain facility infiltration rates, provide good water quality treatment, and prevent clogging and flooding.

In vegetated facilities, sediment should be removed when it reaches a depth of four inches, when the quantity reaches 30 percent of total capacity (as designed or measured) or when accumulated sediment is impeding facility function. Examples include when sediment is damaging vegetation, preventing the facility from draining, blocking inlets or causing bypass.

Remove sediment by hand unless professionals are needed because of confined space entry requirements or the need for a vactor truck. Dispose of sediment per solid waste disposal requirements. Removing sediment during dry periods is easier because the material weighs substantially less.

Vegetation Management

Healthy plants play important roles: the root systems absorb stormwater, help maintain infiltration rates, prevent erosion, and capture pollutants. If a vegetated stormwater facility has bare soil, or if vegetation is stressed, unhealthy, or dead, replant per the approved planting plan and/or address cause of stress. Remove nuisance and invasive plants.

Healthy vegetation must cover at least 90% of stormwater facility surface area. Grass must be mowed to keep it four to nine inches tall. Prune or trim vegetation or roots to ensure free conveyance of stormwater or improve sight lines. Remove leaves or other debris. Use weed-free mulch to inhibit weeds. Irrigate as needed.

The use of fertilizers and pesticides (including herbicides) is strongly discouraged in stormwater management facilities because of the potential for negative impacts to downstream systems. Integrated Pest Management strategies are encouraged to reduce or eliminate the need for pesticides. If pesticides are required, use the services of a licensed applicator and products approved for aquatic use.

Erosion, Bank Failure, and Channel Formation

Erosion in the flow path, inside or outside a facility, can clog inlets and outlets and reduce both conveyance efficiency and infiltration rates. Forms of erosion include channels, undercutting, scouring, and slumping. Any area with erosion more than two inches deep must be addressed. Install long-term erosion control practices and fill the eroded areas.

Structural Repairs

Structural components control the conveyance of stormwater. Examples include inlets, outlets, trash racks, concrete curbs, retaining walls, manholes and check dams. Repair or replace items when damaged, loose, broken, cracked, or askew. Monitor minor damage such as dents, rust, or minor cracks in concrete for indications of when repair or replacement is required.

Ponding Water

Most stormwater facilities are designed to drain in a certain amount of time. The facilities have an anticipated ponding depth of 10 to 12 inches are designed to have a long-term infiltration rate of 2 inches/hour. The anticipated drawdown time is approximately 24 hours, after the completion of the storm event. When the facility does not drain as anticipated, inspect the facility to determine the cause. Clearly clogged inlets or outlets, remove sediment that may be preventing infiltration, or add vegetation.

Pests

Stormwater facilities are designed to drain quickly enough to avoid providing breeding areas for pests. If mosquitos are found, the stormwater facility may be ponding water longer than the approved design but also search for nearby sources of standing water. If rodents are found, remove plant debris, fruit or nuts that are providing shelter and food and contact the appropriate county vector control office for trapping and removal.

Safety

Stormwater facilities must be maintained to protect workers, visitors, and the general public. Vegetation should be pruned for adequate visual clearance. Avoid maintenance in wet weather to reduce potential injuries from slipping and always use appropriate safety gear. Only personnel approved for confined space entry should enter underground stormwater facilities.

IV. FINANCIAL RESPONSIBILITY

Stormwater facilities for the property site will be maintained and operated privately by the home owners association (HOA). The proposed property is located at 13333 Rusk Road in Milwaukie, Oregon.

The owner must ensure that the water quality systems efficiently perform their function of removing petroleum hydrocarbons, sediments, metals, bacteria and nutrients from stormwater runoff and that detention systems perform their function of detaining runoff onsite.

All appropriate property owners should be knowledgeable regarding stormwater operation and maintenance. They should recognize that protection and successful operation of the stormwater drainage system is essential to the continued successful operation of the system and to protecting the natural environment.

This plan should be reviewed and adjusted as needed. After the first year, evaluate if additional maintenance practices are necessary.

V. INSPECTION AND MAINTENANCE LOG

Maintenance Logs are to be kept for stormwater facilities by the property owner. Maintenance logs should be completed at the time of stormwater facility maintenance, and must be kept onsite.

The checklist included in the Technical Appendix should be used to determine the frequency of inspection/maintenance, the different drainage system feature to be inspected/maintained, the potential problem with the particular drainage feature, different conditions to check for and the actual conditions that should exist for that drainage feature.

The Maintenance Log has been included in this manual that can be used for catch basins, pipes, landscaping and detention facilities. Additionally, manufacture maintenance guidance documents have been included in the Technical Appendix.

VI. TECHNICAL APPENDIX

- *Operations and Maintenance Specifications – Catch Basins* – 2008 City of Portland Stormwater Management Manual
- *Standard O&M Plan and Maintenance Log - Planters* - 2016 City of Portland Stormwater Management Manual
- *Standard O&M Plan and Maintenance Log - Basins* - 2016 City of Portland Stormwater Management Manual

- Civil Plans

Catch Basins

The performance of catch basins for removing sediment and other pollutants depends on routine maintenance to retain the storage available in the sump in order to capture sediment and most floatables.

- Remove debris and sediment every 6 months (or when one-third full of sediment).
- Dewater and dispose of sediment properly. Test sediment that has a heavy oil sheen and/or odors to determine the appropriate disposal.
- Maintain the hooded outlet to prevent floatable materials, such as trash and debris, from entering the storm drain system.
- Maintain the grate as designed for safety reasons and to prevent trash and debris from collecting in the catch basin.
- Repair/seal cracks. Replace when repair is insufficient.
- Keep a log of the amount of sediment collected and the date of removal.

3.1.1.8. Planters

Structural components must be operated and maintained in accordance with the design specifications.		
	MAINTENANCE INDICATOR	**CORRECTIVE ACTION**
	Clogged inlets or outlets	Remove sediment and debris from catch basins, trench drains, curb inlets, and pipes; maintain at least 50% conveyance at all times.
	Broken inlets or outlets	Repair/replace broken downspouts, curb cuts, standpipes, and screens.
	Damaged liners and walls	Extend and secure liner to planter walls above the high water mark. The facility must be water tight to protect abutting foundations from moisture damage.
	Cracked or exposed drain pipes	Repair or seal cracks. Replace when repair is insufficient. Cover with 6 inches of growing medium to prevent freeze/thaw and UV damage
Vegetation must cover at least 90% of the facility at maturity.		
	MAINTENANCE INDICATOR	**CORRECTIVE ACTION**
	Dead or stressed vegetation	Replant per original planting plan, or substitute from the plant list in Section 2.4.1. Irrigate and mulch as needed; prune tall, dry grasses and remove clippings.
	Tall grass and vegetation	Maintain grass height at 6”-9”. Trim to allow sight lines and foot traffic, also to ensure inlets and outlets freely convey stormwater into and/or out of facility.
	Weeds	Manually remove weeds.
Growing medium must sustain healthy plant cover and infiltrate within 48 hours.		
	MAINTENANCE INDICATOR	**CORRECTIVE ACTION**
	Gullies, erosion, exposed soils, sediment accumulations	Fill in and lightly compact areas of erosion with City-approved soil mix (see Section 2.3.6) and replant according to planting plan or substitute from the plant list in Section 2.4.1. Sediment more than 4 inches deep must be removed.
	Scouring at the inlet(s)	Ensure splash blocks or inlet gravel/rock are adequate.
	Ponding	Rake, till, or amend soil surface with City-approved soil mix to restore infiltration rate. Remove and replace sediment at entrances.

Annual Maintenance Schedule

Summer	Make structural repairs; clean gutters and downspouts; remove any build-up of weeds or organic debris.
Fall	Replant exposed soil and replace dead plants. Remove sediment and plant debris.
Winter	Clear gutters and downspouts.
Spring	Remove sediment and plant debris. Replant exposed soil and replace dead plants.
All seasons	Weed as necessary.

Maintenance Records: All facility operators are required to keep an inspection and maintenance log. Record date, description, and contractor (if applicable) for all repairs, landscape maintenance, and facility cleanout activities. Keep work orders and invoices on file and make available upon request of the City inspector.

Fertilizers/Pesticides/Herbicides: Their use is strongly discouraged because of the potential for damage to downstream systems. If pesticides or herbicides are required, use the services of a licensed applicator and products approved for aquatic use.

Access: Maintain ingress/egress per design standards.

Infiltration/Flow Control: All facilities must drain within 48 hours. Record time/date, weather, and conditions when ponding occurs.

Pollution Prevention: All sites must implement Best Management Practices to prevent contamination of stormwater. Call 503-823-7180 to report spills. Never wash spills into a stormwater facility. If contamination occurs, document the circumstances and the corrective action taken; include the time/date, weather, and site conditions.

Vectors (Mosquitoes and Rats): Stormwater facilities must not harbor mosquito larvae or rodents that pose a threat to public health or that undermine facility structures. Record the time/date, weather, and site conditions when vector activity observed. Record when vector abatement started and ended.

Operations and Maintenance Log

Date	Work Performed By	Type of Work Performed					Notes	Initials
		Clean inlets and Outlets	Sediment and Trash Removal	Plant Replacement type, location	Structural Repairs – type, location	Other		

3.1.1.9. Basins

Structural components must be operated and maintained in accordance with the design specifications.		
	MAINTENANCE INDICATOR	**CORRECTIVE ACTION**
	Clogged inlets or outlets	Remove sediment, debris, and blockages from catch basins, trench drains, curb inlets, and pipes to maintain at least 50% conveyance at all times
	Broken inlets or outlets, including grates	Repair or replace broken downspouts, curb cuts, standpipes, and screens as needed.
	Cracked or exposed drain pipes	Repair or seal cracks. Replace when repair is insufficient. Cover with 6 inches of growing medium to prevent freeze/thaw and UV damage.
	Check dams missing/broken	Maintain or replace rock check dams as per design specifications.
	Perforated liner	Replace or repair liner as needed.
Vegetation must cover at least 90% of the facility at maturity.		
	MAINTENANCE INDICATOR	**CORRECTIVE ACTION**
	Dead or stressed vegetation	Replant per original planting plan, or substitute from the plant list in Section 2.4.1. Irrigate and mulch as needed; prune tall, dry grasses and remove clippings.
	Tall grass and vegetation	Maintain grass height at 6”-9”. Trim to allow sight lines and foot traffic, also to ensure inlets and outlets freely convey stormwater into and/or out of facility.
	Weeds	Manually remove weeds.
Growing medium must sustain healthy plant cover and infiltrate within 48 hours.		
	MAINTENANCE INDICATOR	**CORRECTIVE ACTION**
	Gullies, erosion, exposed soil, sediment accumulation	Fill in and lightly compact areas of erosion with City-approved soil mix (see Section 2.3.6) and replant according to planting plan or substitute from the plant list in Section 2.4.1. Erosion more than 2 inches deep must be addressed. Sediment more than 4 inches deep must be removed.
	Scouring at the inlet(s)	Ensure splash blocks or inlet gravel/rock are adequate.
	Slope slippage	Stabilize 3:1 slopes/banks with plantings from the original planting plan or from the plant list in Section 2.4.1.
	Ponding	Rake, till, or amend soil surface with City-approved soil mix to restore infiltration rate. Remove sediment at entrance.

Annual Maintenance Schedule

Summer	Make structural repairs; clean gutters and downspouts; remove any build-up of weeds or organic debris.
Fall	Replant exposed soil and replace dead plants. Remove sediment and plant debris.
Winter	Clear gutters and downspouts.
Spring	Remove sediment and plant debris. Replant exposed soil and replace dead plants.
All seasons	Weed as necessary.

Maintenance Records: All facility operators are required to keep an inspection and maintenance log. Record date, description, and contractor (if applicable) for all repairs, landscape maintenance, and facility cleanout activities. Keep work orders and invoices on file and make available upon request of the City inspector.

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Infiltration/Flow Control: All facilities must drain within 48 hours. Record time/date, weather, and conditions when ponding occurs.

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Vectors (Mosquitoes and Rats): Facilities must not harbor mosquito larvae or rodents. Record the time/date, weather, and site conditions when vector activity is observed. Record when vector abatement started and ended.

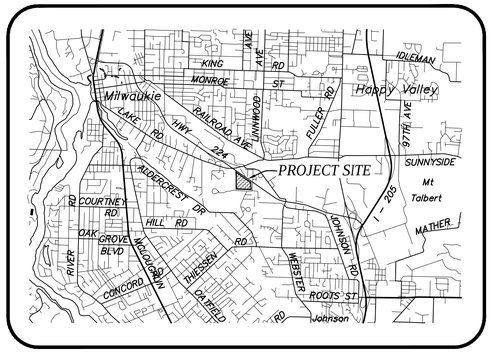
Operations and Maintenance Log

Date	Work Performed By	Type of Work Performed					Notes	Initials
		Clean inlets and Outlets	Sediment and Trash Removal	Plant Replacement type, location	Structural Repairs – type, location	Other		

KELLOGG CREEK

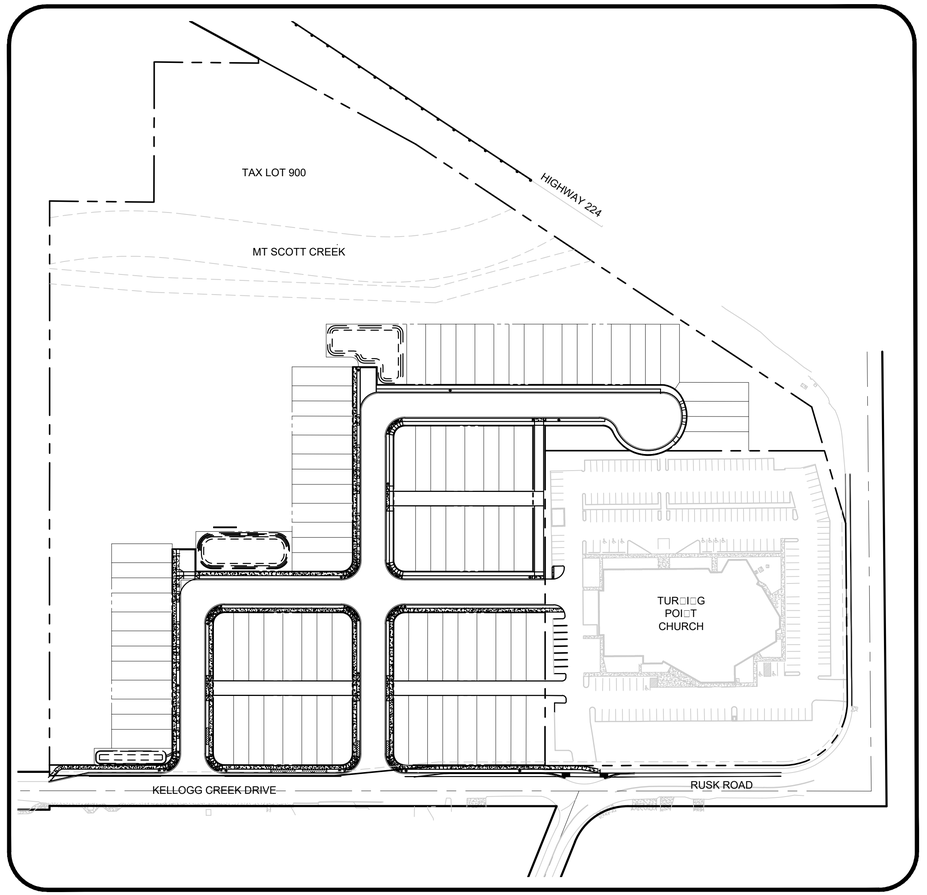
Planned Development Subdivision Application
Milwaukie, Oregon

February, 2017



VICI□ITY MAP

SCALE: □TS



SITE MAP

SCALE: □TS

SHEET I□DEX

PRO□ECT TEAM

APPLICA□T□OW□ER

BROW□STO□E DEVELOPME□T, I□C.
ATT□:RA□DY MYERS
47 S. STATE ST
P.O. BOX 2375
LAKE OSWEGO, OR 97934
(503) 358-44□0

CIVIL E□GI□EER

DOWL
ATT□:SCOTT EMME□S, P.E.
720 SW WASHI□GTO□ AVE SUITE 750
PORTLA□D OR 97205
(971) 280-8□41

LA□D USE PLA□□ER

DOWL
ATT□:SERAH BREAKSTO□E
720 SW WASHI□GTO□ AVE SUITE 750
PORTLA□D OR 97205
(971) 280-8□41

LA□DSCAPE ARCHITECT

DOWL
ATT□:PAT GAY□OR, PLA
720 SW WASHI□GTO□ AVE SUITE 750
PORTLA□D OR 97205
(971) 280-8□41

SURVEYOR

TERRACALC LA□D SURVEYI□G, I□C.
ATT□: DARRE□ HARR, PLS
1□15 □.E. MILLER STREET
MCMI□□VILLE, OR 97128
OFFICE: (503) 857-0935

TRAFFIC E□GI□EER

KITTELSO□ □ ASSOCIATES, I□C.
ATT□: □ACHARY HOROWIT□, P.E.
□10 SW ALDER STREET, SUITE 700
PORTLA□D, OR 97205
503-228-5230

E□VIRO□ME□TAL

PACIFIC HABITAT SERVICES
ATT□:□OH□ VA□ STAVERE□
9450 SW COMMERCE CIRCLE, SUITE 180
WILSO□VILLE, OR 97070
(503) 570-0800

GEOTECH□ICAL E□GI□EER

GEO CO□SULTA□TS □ORTHWEST
ATT□:BRAD HUPY, P.E., G.E.
824 SE 12TH AVE
PORTLA□D, OR 97214
(503) □1□-9425

REGISTERED PROFESSIONAL ENGINEER
OREGON, JULY 30, 2008
J. SCOTT EMMENS
FOR REVIEW
EXPIRES: 12/31/2017

DOWL
WWW.DOWL.COM

KELLOGG CREEK SUBDIVISIO□

COVER SHEET

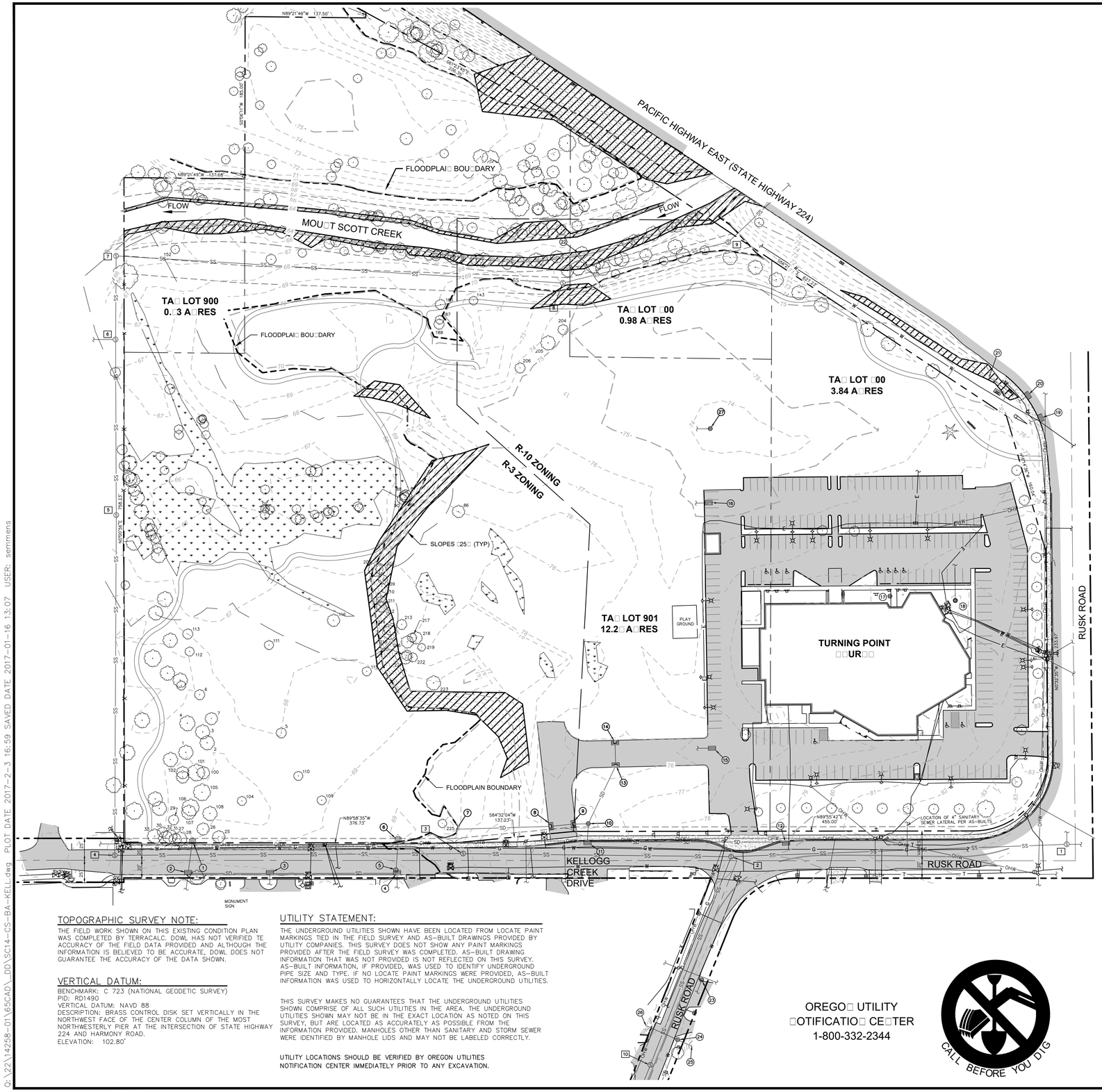
BROW□STO□E DEVELOPME□T
MILWAUKIE, OREGO□
SE1/7 □E1/4 SEC. □T2S R2E W.M. EXISTI□G TAXLOTS □00, 700, 900, 901

PRO□ECT	14258-01
DATE	02□08□2017

SHEET

C000

Q:\22\14258-01\65CAD__DD\SC14-CS-CV-KELL.dwg PLOT DATE 2017-2-3 14:33 SAVED DATE 2017-02-03 13:54 USER: semmens



LEGEND:

- EXISTING ASPHALT
- EXISTING CONCRETE
- EXISTING GRAVEL
- EXISTING SLOPES GREATER THAN 25%
- EXISTING EXISTING WETLAND
- SD — STORM DRAINAGE LINE
- SS — SANITARY SEWER LINE
- T — UNDERGROUND TELECOMMUNICATION LINE
- E — UNDERGROUND ELECTRIC LINE
- W — UNDERGROUND WATER LINE
- X — FENCE
- OHW — OVERHEAD POWER LINE
- G — GAS LINE
- DECIDUOUS TREE
- CONIFEROUS TREE
- SIGN
- TRAFFIC SIGNAL POLE
- SANITARY SEWER MANHOLE
- STORM DRAINAGE MANHOLE
- CATCH BASIN
- AREA DRAIN
- DITCH INLET
- ELECTRICAL VAULT
- COMMUNICATIONS VAULT
- WATER VAULT
- ELECTRICAL METER
- ELECTRICAL RISER
- WATER VALVE
- WATER METER
- FIRE HYDRANT
- FIRE DEPARTMENT CONNECTION
- SPRINKLER VALVE
- GAS VALVE
- COMMUNICATIONS RISER
- ELECTRIC JUNCTION BOX
- SIGNAL JUNCTION BOX
- BOLLARD
- LIGHT POLE
- SIGNAL POLE
- PEDESTRIAN SIGNAL POLE
- UTILITY POLE
- GUY ANCHOR
- HANDICAPPED PARKING SPACE
- EXTG MAJOR CONTOUR
- EXTG MINOR CONTOUR
- FLOOD PLAIN (100 YEAR)
- LOT LINE
- BOUNDARY LINE
- RIGHT OF WAY LINE
- CENTERLINE
- ZONING DELINEATION

SANITARY SEWER TABLE:

1. SANITARY SEWER MANHOLE
RIM=82.78'
IE 8" CONC (N)=68.77'
IE 12" CONC (E)=68.54'
IE 12" CONC (W)=68.50'
2. SANITARY SEWER MANHOLE
RIM=79.05'
IE 8" CONC (S)=68.12'
IE 12" CONC (E)=67.60'
IE 12" CONC (W)=67.55'
3. SANITARY SEWER MANHOLE
RIM=71.50'
IE 12" CONC (E)=63.83'
IE 12" CONC (W)=63.83'
4. SANITARY SEWER MANHOLE
RIM=68.97'
IE 12" CONC (E)=62.99'
IE 12" CONC (N)=62.54'
5. SANITARY SEWER MANHOLE
RIM=66.79'
IE 12" CONC (S)=60.82'
IE 12" CONC (N)=60.78'
6. SANITARY SEWER MANHOLE
RIM=66.57'
IE 12" CONC (S)=53.59'
IE 42" CONC (N)=51.77'
IE 42" CONC (W)=51.68'
7. SANITARY SEWER MANHOLE
RIM=65.51'
IE 42" CONC (E)=',
IE 42" CONC (S)='
8. SANITARY SEWER MANHOLE
RIM=69.73'
IE 42" CONC (E)=52.94'
IE 42" CONC (W)=52.94'
9. SANITARY SEWER MANHOLE
RIM=70.91'
IE 42" CONC (NE)=53.40'
IE 42" CONC (W)=53.21'

STORM DRAINAGE TABLE:

1. DITCH INLET
GRATE=-'
IE 12" CPP (S)=66.15'
2. CATCH BASIN
GRATE=67.40'
IE 6" PVC (S)=65.95'
IE 12" CPP (N)=65.93'
IE 12" CONC (E)=65.88'
3. CATCH BASIN
GRATE=67.79'
IE 8" PVC (S)=65.72'
IE 12" CONC (W)=65.62'
IE 12" CONC (E)=65.62'
4. CATCH BASIN
GRATE=68.47'
IE 12" CONC (W)=65.22'
IE 12" CONC (NW)=65.42'
IE 12" CONC (S)=65.17'
5. STORM DRAINAGE MANHOLE
RIM=68.65'
IE 12" CONC (N)=65.29'
IE 12" CONC (SE)=65.58'
6. DITCH INLET
GRATE=67.83'
IE 12" CONC (S)=65.69'
7. IE 12" CPP (E)=69.69'
8. CATCH BASIN
GRATE=75.17'
IE 12" CPP (E)=70.89'
IE 12" CPP (W)=70.89'
9. CATCH BASIN
GRATE=75.11'
IE 12" CPP (E)=71.41'
IE 12" CPP (W)=71.41'
10. AREA DRAIN
GRATE=75.57'
IE 12" CPP (N)=72.36'
IE 12" CONC (S)=72.23'
IE 12" CPP (W)=71.86'
11. CATCH BASIN
GRATE=76.05'
IE 12" CONC (E)=74.27'
IE 12" CONC (N)=73.25'
12. CATCH BASIN
GRATE=79.51'
IE 12" CONC (W)=76.32'
13. CATCH BASIN
GRATE=75.01'
IE 12" CPP (N)=72.42'
IE 12" CPP (S)=72.59'
14. CATCH BASIN
GRATE=75.03'
IE 12" CPP (S)=72.70'
15. CATCH BASIN/OIL TRAP
GRATE=76.12'
WATER LEVEL=75.00'
COULD NOT OPEN TRAP
16. CATCH BASIN/OIL TRAP
GRATE=73.86'
WATER LEVEL=73.16'
COULD NOT OPEN TRAP
17. AREA DRAIN
GRATE=77.52'
18. AREA DRAIN/OIL TRAP
GRATE=77.60'
WATER LEVEL=76.89'
COULD NOT OPEN TRAP
19. CATCH BASIN
GRATE=76.41'
IE 12" CONC (SW)=74.65'
20. CATCH BASIN
GRATE=76.14'
IE 12" CONC (SW)=74.09'
21. IE 16" CPP (E)=72.59'
22. IE 12" PVC (SE)=64.71'
23. AREA DRAIN
GRATE=77.39'
IE 3" PVC (S)=76.74'
24. AREA DRAIN
GRATE=76.08'
IE 24" CONC (E&W)=71.42'
25. IE 24" CONC (W)=71.63'
26. IE 24" CONC (E)=70.95'
27. AREA DRAIN
GRATE=72.78'
WATER LEVEL=72.03'
COULD NOT OPEN TRAP

TOPOGRAPHIC SURVEY NOTE:

THE FIELD WORK SHOWN ON THIS EXISTING CONDITION PLAN WAS COMPLETED BY TERRACALC. DOWL HAS NOT VERIFIED TE ACCURACY OF THE FIELD DATA PROVIDED AND ALTHOUGH THE INFORMATION IS BELIEVED TO BE ACCURATE, DOWL DOES NOT GUARANTEE THE ACCURACY OF THE DATA SHOWN.

VERTICAL DATUM:

BENCHMARK: C 723 (NATIONAL GEODETIC SURVEY)
PID: RD1490
VERTICAL DATUM: NAVD 88
DESCRIPTION: BRASS CONTROL DISK SET VERTICALLY IN THE NORTHWEST FACE OF THE CENTER COLUMN OF THE MOST NORTHWESTERLY PIER AT THE INTERSECTION OF STATE HIGHWAY 224 AND HARMONY ROAD.
ELEVATION: 102.80'

UTILITY STATEMENT:

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM LOCATE PAINT MARKINGS TIED IN THE FIELD SURVEY AND AS-BUILT DRAWINGS PROVIDED BY UTILITY COMPANIES. THIS SURVEY DOES NOT SHOW ANY PAINT MARKINGS PROVIDED AFTER THE FIELD SURVEY WAS COMPLETED. AS-BUILT DRAWING INFORMATION THAT WAS NOT PROVIDED IS NOT REFLECTED ON THIS SURVEY. AS-BUILT INFORMATION, IF PROVIDED, WAS USED TO IDENTIFY UNDERGROUND PIPE SIZE AND TYPE. IF NO LOCATE PAINT MARKINGS WERE PROVIDED, AS-BUILT INFORMATION WAS USED TO HORIZONTALLY LOCATE THE UNDERGROUND UTILITIES.

THIS SURVEY MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE OF ALL SUCH UTILITIES IN THE AREA. THE UNDERGROUND UTILITIES SHOWN MAY NOT BE IN THE EXACT LOCATION AS NOTED ON THIS SURVEY, BUT ARE LOCATED AS ACCURATELY AS POSSIBLE FROM THE INFORMATION PROVIDED. MANHOLES OTHER THAN SANITARY AND STORM SEWER WERE IDENTIFIED BY MANHOLE LIDS AND MAY NOT BE LABELED CORRECTLY.

UTILITY LOCATIONS SHOULD BE VERIFIED BY OREGON UTILITIES NOTIFICATION CENTER IMMEDIATELY PRIOR TO ANY EXCAVATION.

OREGON UTILITY
NOTIFICATION CENTER
1-800-332-2344

CALL BEFORE YOU DIG

N

0 0 0
SCALE IN FEET

FOR REVIEW ONLY

DOWL
WWW.DOWL.COM

KELLOGG CREEK SUBDIVISION

EXISTING CONDITIONS

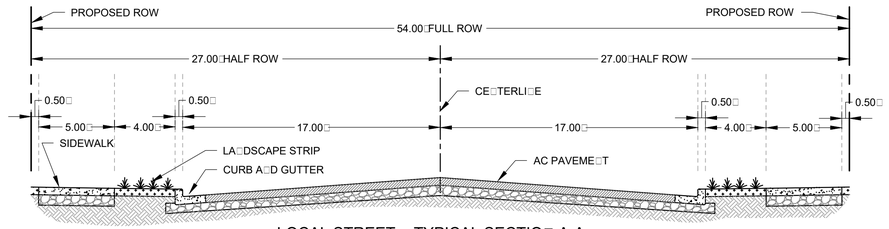
BROWNSTONE DEVELOPMENT

MILWAUKIE, OREGON

SE1/4 SE1/4 SEC. 13 T2S R2E W.M. EXISTING TAXLOTS 100, 700, 900, 901

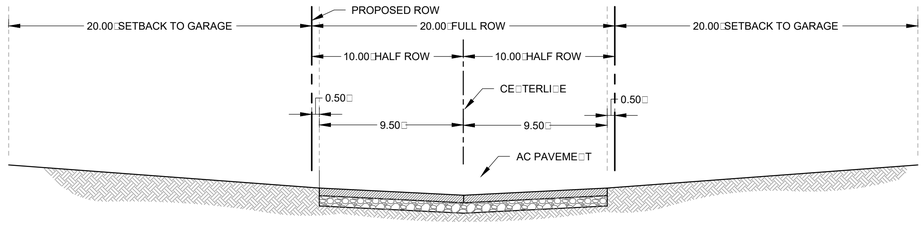
PROJECT	14258-01
DATE	02/08/2017

SHEET
C100



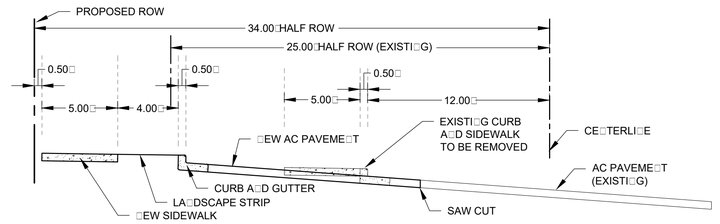
LOCAL STREET - TYPICAL SECTIO□ A-A

HORI□O□TAL SCALE: 1" □5□



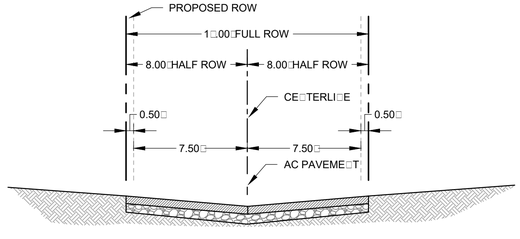
ALLEY - TYPICAL SECTIO□ B-B

HORI□O□TAL SCALE: 1" □5□



KELLOGG CREEK DRIVE - TYPICAL SECTIO□ C-C

HORI□O□TAL SCALE: 1" □5□



PUBLIC ALLEY - TYPICAL SECTIO□ D-D

HORI□O□TAL SCALE: 1" □5□

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KELLOGG CREEK SUBDIVISIO□

TYPICAL STREET SECTIO□S

BROW□STO□E DEVELOPME□T

MILWAUKIE, OREGO□

SE1 7 □E1 4 SEC. □T2S R2E W.M. EXISTI□G TAXLOTS :00, 700, 900, 901

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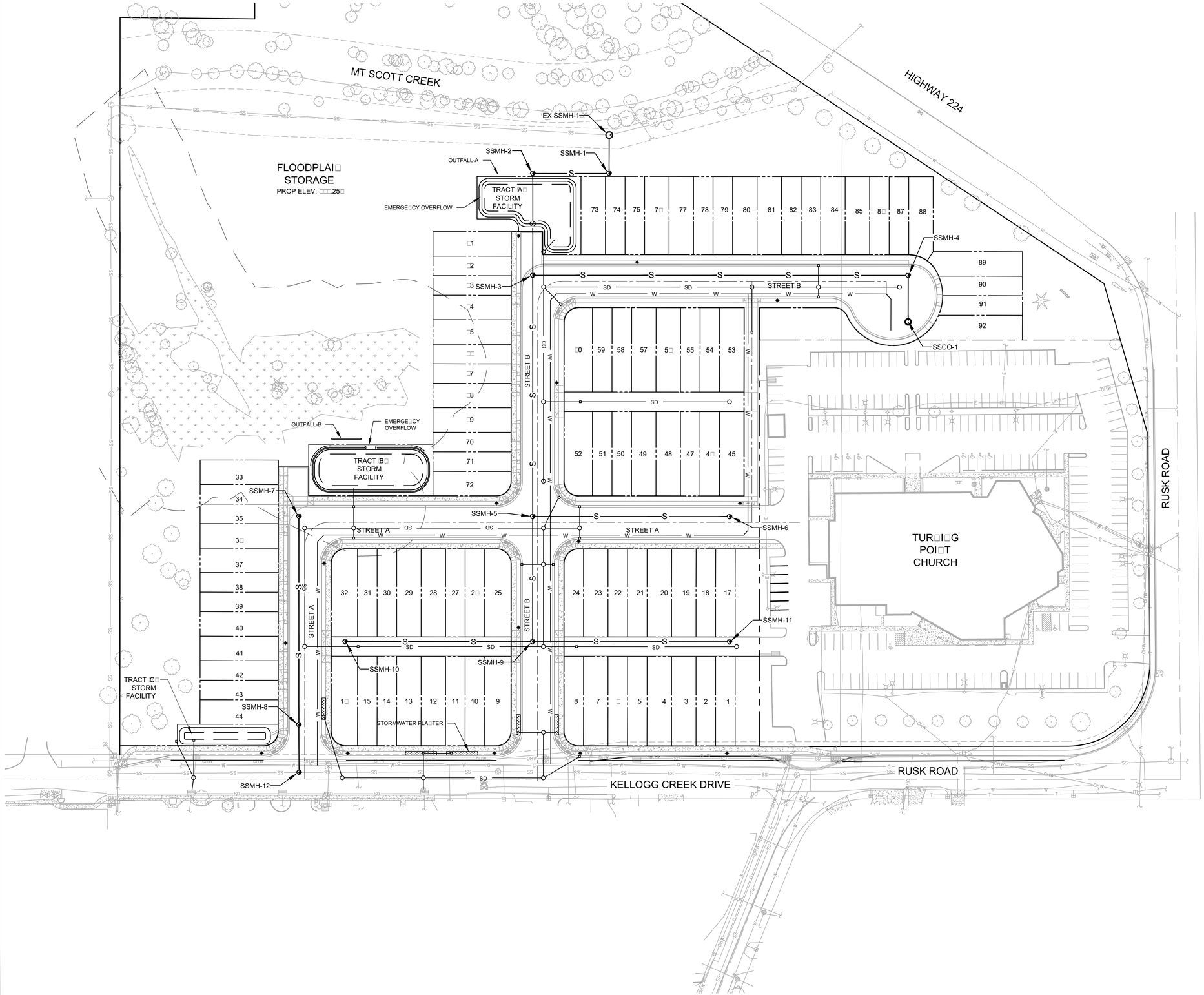

LEGE□D:

- S — EXISTI□G SA□ITARY SEWER LI□E
- SD — EXISTI□G STORM LI□E
- W — EXISTI□G WATER LI□E
- EXISTI□G STORM MA□ HOLE
- EXISTI□G SA□ITARY MA□ HOLE
- EXISTI□G CATCH BASI□
- EXISTI□G WATER VALVE
- S — PROPOSED SA□ITARY SEWER LI□E
- SD — PROPOSED STORM LI□E
- W — PROPOSED WATER LI□E
- PROPOSED SA□ITARY MA□ HOLE
- PROPOSED STORM MA□ HOLE
- PROPOSED CATCH BASI□
- PROPOSED STORMWATER PLA□TER

□OTES:

1. OUTFALL A A□D B: SEE SECTIO□ □□3 FLOW DISPERSIO□□□OF THE STORM WATER REPORT DATED □A□UARY 12, 2017 PREPARED BY DOWL.

MA□HOLE DATA

EX SSMH-1
RIM: □9.0□
IE I□ (8"S) □ 55.04
IE I□ (42"W) □ 52.94
IE OUT (42"E) □ 52.94

SSCO-1
RIM: 7□47
IE OUT (8"□) □ □7.80

SSMH-1
RIM: 72.57
IE I□ (8"W) □ 55.28
IE OUT (8"□) □ 55.28

SSMH-2
RIM: 73.00
IE I□ (8"S) □ 55.75
IE OUT (8"E) □ 55.75

SSMH-3
RIM: 73.□9
IE I□ (8"E) □ □4.□4
IE I□ (8"S) □ 5□.37
IE OUT (8"□) □ 5□.37

SSMH-4
RIM: 7□.49
IE I□ (8"S) □ □7.52
IE OUT (8"W) □ □7.52

SSMH-5
RIM: 74.54
IE I□ (8"E) □ □5.22
IE I□ (8"S) □ □3.51
IE OUT (8"□) □ 57.85

SSMH-□
RIM: 77.28
IE OUT (8"W) □ □8.□1

SSMH-7
RIM: 73.52
IE OUT (8"S) □ □5.57

SSMH-8
RIM: 70.14
IE I□ (8"□) □ □4.29
IE OUT (8"S) □ □4.09

SSMH-9
RIM: 74.93
IE I□ (8"E) □ □5.□4
IE I□ (8"W) □ □4.28
IE OUT (8"□) □ □4.28

SSMH-10
RIM: 74.10
IE OUT (8"E) □ □5.43

SSMH-11
RIM: 7□.32
IE OUT (8"W) □ □7.□5

SSMH-12
RIM: □8.□□
IE I□ (8"□) □ □3.□0

50 0 50
SCALE I□ FEET

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FOR REVIEW
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MILWAUKIE, OREGO□
SE1/7 □E1/4 SEC. □T2S R2E W.M. EXISTI□G TAXLOTS □00, 700, 900, 901

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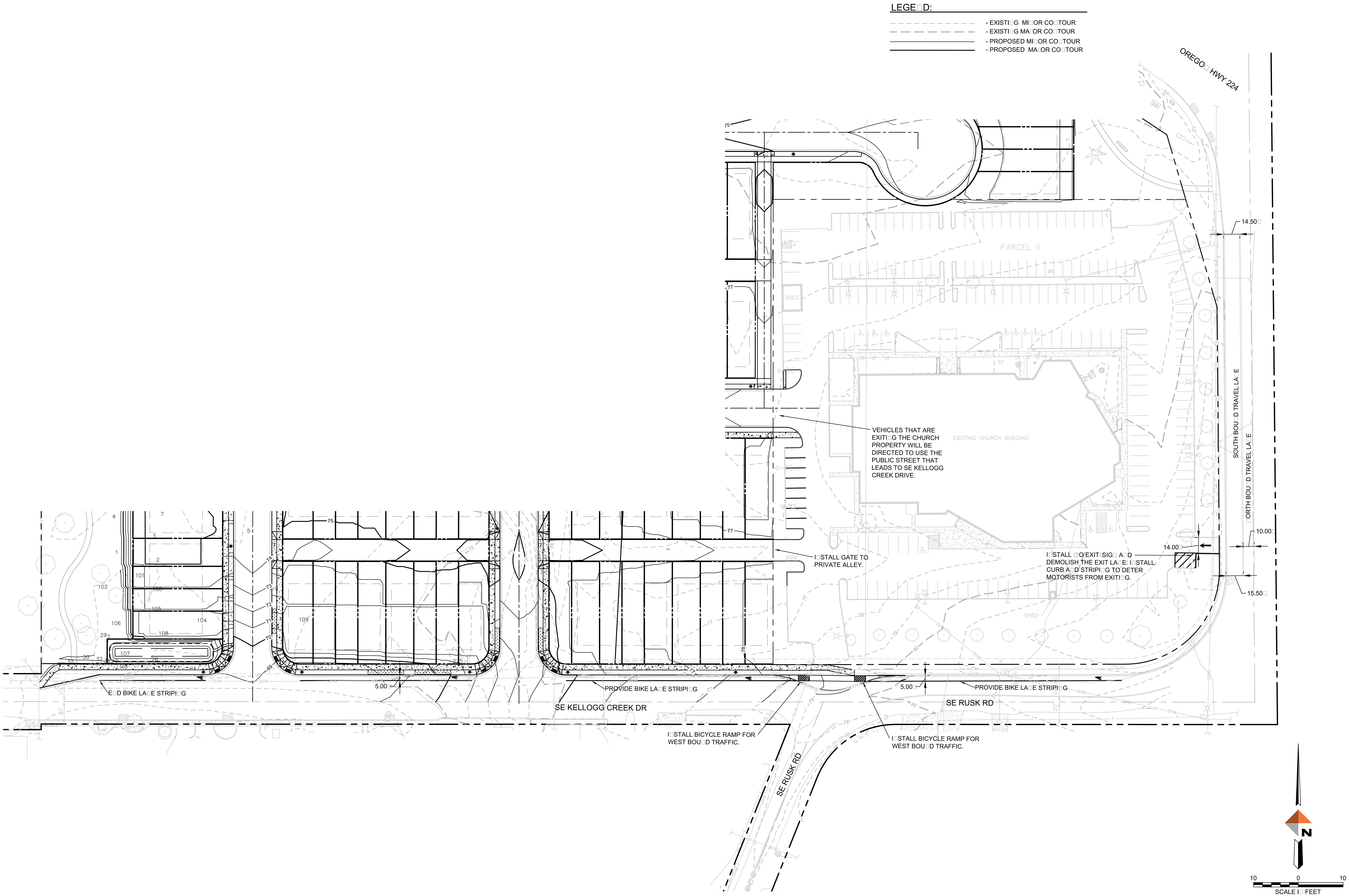
C400



REGISTERED PROFESSIONAL ENGINEER 53060PE OREGON J. SCOTT EMMENS — FOR REVIEW ONLY

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PUBLIC I□TERSECTIO□

BROW□STO□E DEVELOPME□T
MILWAUKIE, OREGO□
SE1/7 □E1/4 SEC. □T2S R2E W.M. EXISTI□G TAXLOTS □00, 700, 900, 901

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MEMORANDUM

To: Brett Kelver, AICP, Associate Planner, City of Milwaukie

From: Atalia Raskin, PE WR Project Manager

Date: March 27, 2017

Subject: Incompleteness Stormwater Comment – Site 13333 SE Rusk Rd.

The preliminary drainage report describes the proposed stormwater management approach that includes the use of bioretention basins and planters. These types of stormwater management facilities are approved by the City of Portland.

The WES Tool was selected for the stormwater facility sizing to meet SLOPES V standards for the wetland fill permit. SLOPES V guidance are more stringent than the City of Portland methodology (hydrograph based).

The water quality storm as defined by the City of Portland is 0.83 inch precipitation depth. This is less than the WES Tool, which uses a water quality storm precipitation depth of 1.0 inch.

SLOPES requires continuous simulation for flows from 50% of the 2-yr through the 10-yr. The WES Tool is the only continuous simulation tool developed for use within Clackamas County. Therefore, by meeting SLOPES V standards we'll also be meeting City of Portland's (and City of Milwaukie's) standards. Additional information on how the proposed facilities meet the City of Milwaukie's standards can be provided during the construction documents submittal.

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MEMORANDUM

TO: Brett Kelver, AICP, City of Milwaukie

FROM: Scott Emmens, PE Senior Project Manager

DATE: January 23, 2017

SUBJECT: Kellogg Creek Subdivision – Floodplain Analysis

This memorandum summarizes the Kellogg Creek Subdivision floodplain impacts. The proposed project will construct an approximately 14 acre subdivision and will include the construction of 92 new lots intended for single-family attached homes (rowhouses). In order to construct the homes, fill is required to be placed on the site to bring the building elevation above the floodplain elevation.

The proposed design follows City of Milwaukie Municipal Code, Chapter 18.04 Flood Hazard Areas. Provided below is a summary of our responses to the relevant code sections.

18.04.150 General Standards

D. Subdivision Proposals

1. All subdivision proposals shall be consistent with the need to minimize flood damage.

Response: The proposed project was designed to minimize flood damage by elevating the site at least one foot above the floodplain. Fill is placed outside the bankfull channel and away from an existing lower elevation area on the western side of the site.

2. All subdivision proposals shall have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize or eliminate flood damage.

Response: All public utilities are located outside the floodplain with the exception of the sanitary sewer connection to the existing sanitary sewer located within the existing floodplain, as well as public utilities to be located in the existing Kellogg Creek Drive, a portion of which lies within the existing floodplain.

3. All subdivision proposals shall have adequate drainage provided to reduce exposure to flood damage.

Response: The site is graded to provide positive drainage to reduce exposure to flood damage. Proposed street grades meet or exceed the minimum grade allowed by the City of Milwaukie Public Works Standards, and street cross sections match typical sections provided by the City of Milwaukie to ensure proper drainage.

4. Base flood elevation data shall be provided for subdivision proposals and other proposed development which contain at least fifty (50) lots or five (5) acres (whichever is less).

Response: The project proposes more than 50 lots. The existing floodplain is shown on Sheet C100 and the proposed grading is shown on Sheet C400 of the land-use application (attached). The base flood

elevation is 69.9 located at cross section C on FEMA map number FM41005C0036D (NAVD 1988 datum).

F. Balanced Cut and Fill

The displacement of flood storage area by the placement of fill or structures (including building foundations) shall conform to the following standards for balanced cut and fill:

1. The placement of fill or structures that displaces ten (10) cubic yards or less of flood storage area is exempt from the requirements of subsection 2 below.

Response: More than 10 cu-yds of fill will be displaced. See response below.

2. The placement of fill or structures that displaces more than ten (10) cubic yards of flood storage area shall comply with the following standards:

a. No net fill in any floodplain is allowed.

Response: All fill added to the floodplain will be balanced with an equal amount of soil removed from the floodplain meeting the "no net fill" requirement. Supporting earthwork exhibits are attached.

b. All fill placed in a floodplain shall be balanced with at least an equal amount of soil material removal.

Response: See response above.

c. Any excavation below bankfull stage shall not count toward compensating for fill.

Response: Excavation will not occur below the bankfull stage.

d. Excavation to balance a fill shall be located on the same parcel as the fill unless it is not reasonable or practicable to do so. In such cases, the excavation may be located in the same drainage basin and as close as possible to the fill site subject to the following:

(1) The proposed excavation and fill will not increase flood impacts for surrounding properties as determined through hydrologic and hydraulic analysis;

(2) The proposed excavation is authorized under applicable municipal code provisions including Section 19.402 Natural Resources; and

(3) Measures to ensure the continued protection and preservation of the excavated area for providing balanced cut and fill shall be approved by the City.

Response: Excavation will occur within the same parcel as the project.

e. Temporary fills permitted during construction shall be removed at the end of construction.

Response: Temporary fill permits will be removed at the end of construction.

f. New culverts, stream crossings, and transportation projects shall be designed as balanced cut and fill projects or designed not to significantly raise the design flood elevation. Such projects shall be designed to minimize the area of fill in flood management areas and to minimize erosive velocities. Stream crossings shall be as close to perpendicular to the stream as practicable. Bridges shall be used instead of culverts wherever practicable.

Response: The project does not include a creek crossing.

g. Excavation and fill required for the construction of detention facilities or structures, and other facilities, shall be designed to reduce or mitigate flood impacts and improve water quality. Levees shall not be used to create vacant buildable lands.

Response: The proposed stormwater ponds are designed to improve water quality and reduce hydromodification of the Mt. Scott Creek. The bottom elevations of the ponds are set above the 25-year creek stage to provide detention and the top of the ponds are set above the floodplain so as to not trap fish when floodwaters recede. The project does not create levees to create buildable land.

18.04.160 SPECIFIC STANDARDS

In all special flood hazard and flood management areas where base flood elevation data has been provided as set forth in Section 18.04.050 and Subsection 18.04.120.B, the following provisions are required:

A. Residential Construction

New construction and substantial improvement of any residential structure shall have the lowest floor, including basement, elevated one (1) foot above base flood elevation.

Response: The proposed residential structure will be located at least one foot above the base flood elevation.

Conclusion

The Kellogg Creek Subdivision is required to balance the cut and fill impacts from the proposed development. In order to offset the volume of fill being placed at the site, area surrounding the wetland will be excavated. Additionally, the site was designed to minimize impacts to the surrounding area and protect proposed property and public utilities.

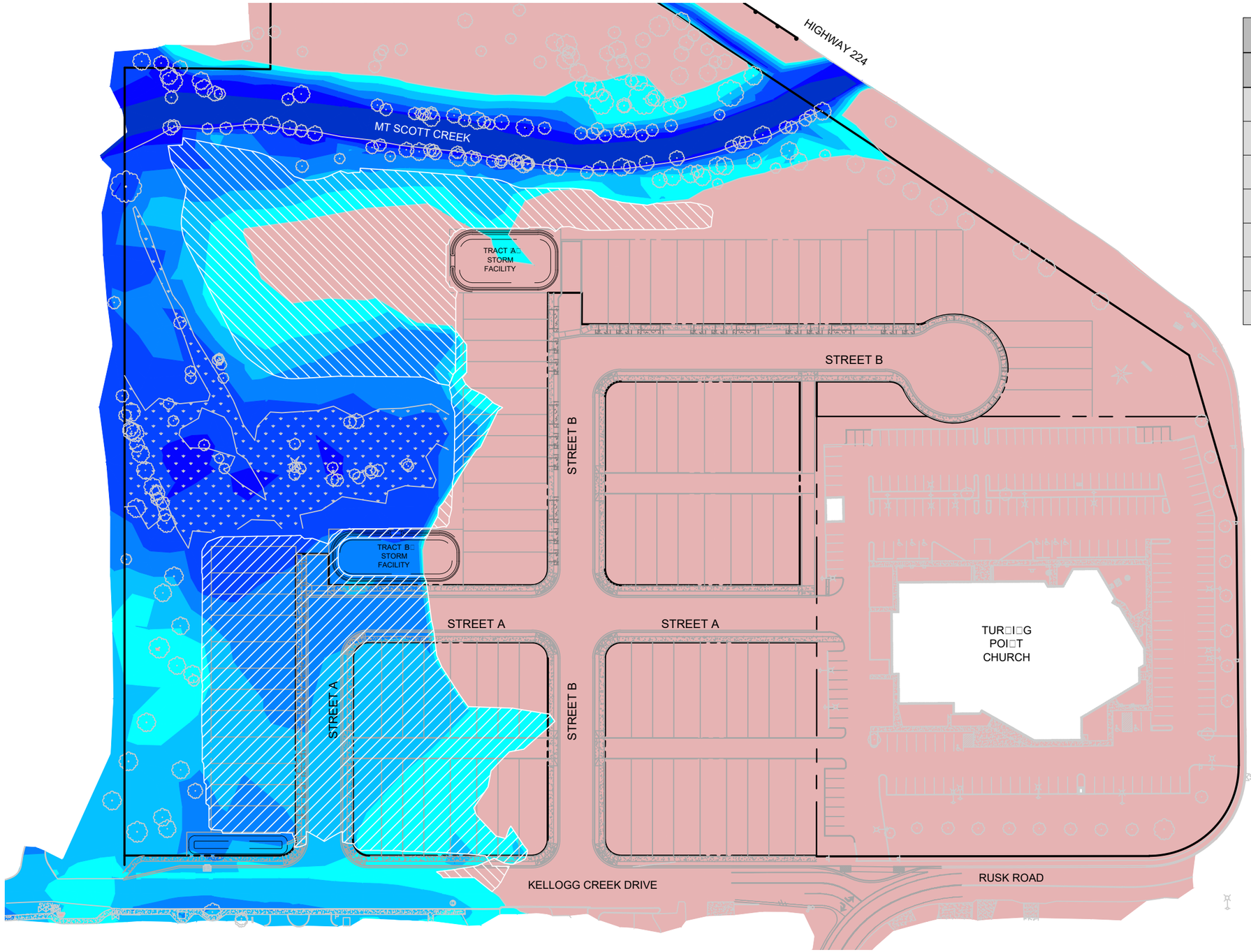
Floodplain Capacity Analysis

The following summarizes the floodplain capacity analysis. In order to determine the net change in floodplain storage, two calculations were made. One calculation determined the existing floodplain storage within a boundary that encompasses the subject property as well as all other disturbed area. The second calculation determined the floodplain storage of the developed site within the same boundary. This data was calculated by comparing the existing/future ground surface within the project limits to the floodplain elevation of 69.9. Volumes registered as a "fill" are floodplain storage, while volumes registered as a "cut" are soil amounts above the floodplain elevation (does not affect floodplain storage). The existing ground surface was determined from a site topographic survey in 2016, while the proposed grades were created in AutoCAD Civil 3D. A final comparison was completed between the two sets of data. A comparison using the proposed grade showing more "fill" volume than the existing grade comparison means an increase in the floodplain volume.

The following capacity analysis data was calculated using AutoCADs Volume analyze tool. The tool completes the comparison at each tin point within the surface.

<u>Volume Comparisons</u>
The Existing Grade Comparison = 24,492 CY Fill
The Proposed Grade Comparison = 25,113 CY Fill
Net Comparison = Net +621 CY Floodplain Storage

Since the net comparison is positive, the project will generate a slight increase in the floodplain storage at the site.



Existing Floodplain Depth Table			
□umber	Minimum Depth	Maximum Depth	Color
1	Above Floodplain		
2	0.000	1.000	
3	1.000	2.000	
4	2.000	3.000	
5	3.000	4.000	
□	4.000	□.000	
7	□.000	8.500	

Floodplain Mitigation □5,375 CY

Floodplain Impact □4,772 CY

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FLOODPLAI□ IMPACTS □ MITIGATIO□

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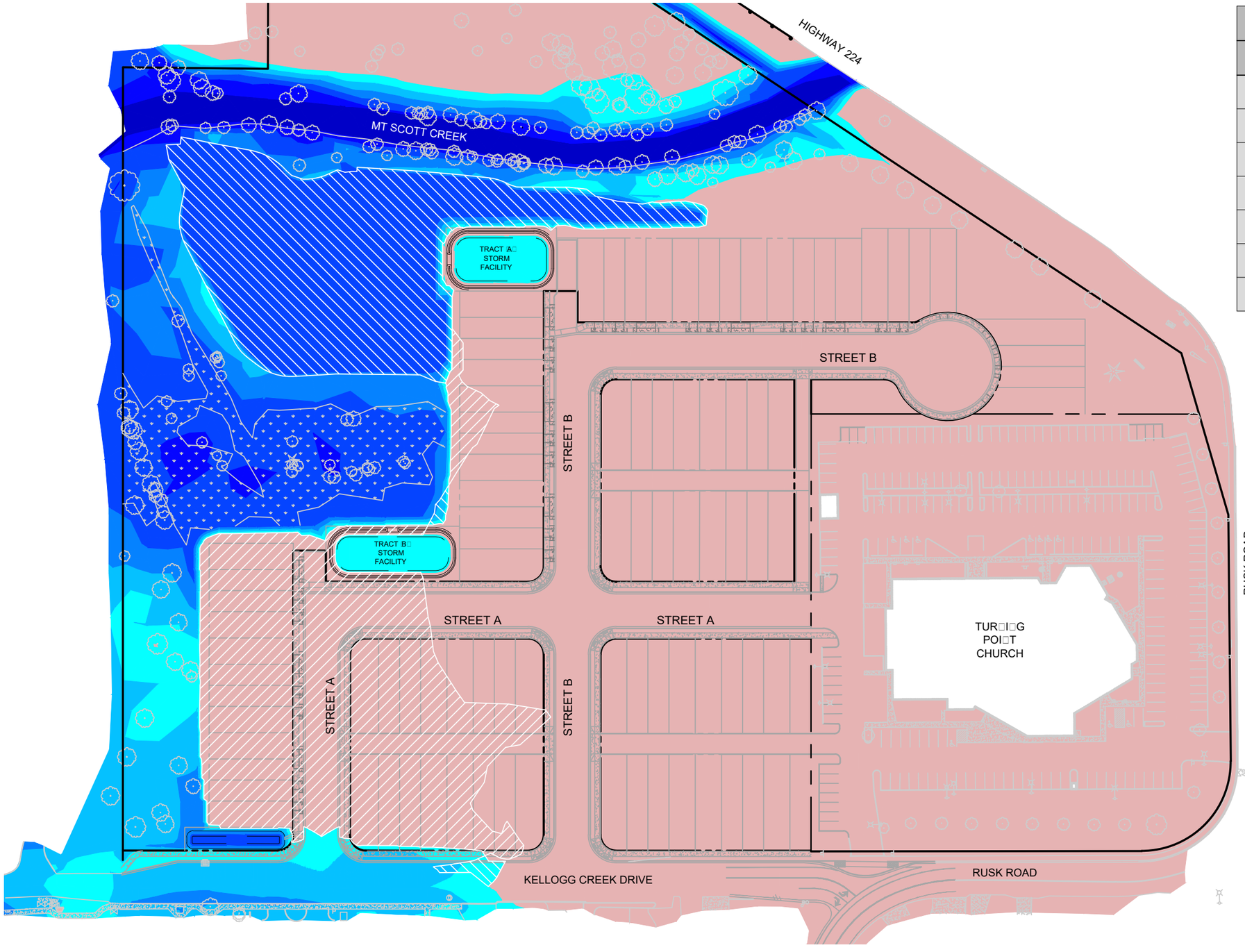
DATE 1□31□2017

FIGURE 1

\\BIL-FS\BIL_projects\22\14258-01\65CAD\Exhibits\2017-01-31 - Floodplain Mitigation Exhibit\Kellogg Floodplain Exhibit.dwg PLOT DATE 2017-1-31 12:04 SAVED DATE 2017-01-25 15:56 USER: kglidden



Proposed Floodplain Depth Table			
Number	Minimum Depth	Maximum Depth	Color
1	Above Floodplain		
2	0.00	1.00	
3	1.00	2.00	
4	2.00	3.00	
5	3.00	4.00	
6	4.00	7.00	
7	7.00	8.50	

Floodplain Mitigation 5,375 CY

Floodplain Impact 4,772 CY

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FLOODPLAIN IMPACTS & MITIGATION

PROJECT 14258.01
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FIGURE **2**

Exhibit F

GEO CONSULTANTS NORTHWEST

October 7, 2016

Brownstone Homes LLC
P.O. Box 2375
Lake Oswego, Oregon 97035

Attn: Randy Myers

Subject: Geotechnical Evaluation
Kellogg Creek Development
GCN Project 1121

This report presents the results of our preliminary geotechnical investigation for the proposed Kellogg Creek Development in Milwaukie, Oregon. This report was prepared in accordance with our proposal letter dated July 27, 2016. The report summarizes the work accomplished and provides our conclusions and recommendations for site development.

PROJECT INFORMATION

Brownstone Homes is considering purchase of the Kellogg Creek site in Milwaukie, Oregon for construction of a residential development. The property is Zoned for R-3 and R-10 residential building construction. The site relative to surrounding features is shown in Figure 1.

Site development plans have not yet been prepared for the project. A site topographic and boundary survey was in progress at the time this report was written. We expect that development will include single-family and multi-family buildings, public and private streets, underground utilities. Storm water will be detained on-site before flowing to Mount Scott Creek. The site layout is shown in Figure 2.

SCOPE OF WORK

The purpose of our services was to explore the site and provide conclusions and recommendations for design and construction. The following describes our specific scope of services:

- Coordinate and manage the field investigation, including utility locates, authorization for site access, access preparation, scheduling of subcontractors and GCN staff.
- Observe excavation of 15 shallow test pits to depths up to 12 feet below the existing ground surface. Maintain a log of soil, rock, and groundwater encountered and obtain soil samples for return to our laboratory for further evaluation and testing. We classify soil in general accordance with the Unified Soil Classification System.
- Determine the moisture content and dry unit weight of select samples obtained from the explorations in general conformance with ASTM D2216 and ASTM D2937 respectively.
- Provide a written Geotechnical Report summarizing our explorations, geotechnical analysis, conclusions, and recommendations that include:
  - A discussion on the regional geology and the seismic setting of the site that includes the general geologic features of the surface and underlying deposits, and provide seismic design criteria in accordance with the Oregon Structural Specialty Code.

- Recommendations for site preparation, grading and drainage, compaction criteria, and wet-weather earthwork procedures.
- Recommendations for excavation, utility trenches, backfill materials, and backfill compaction.
- Recommendations for design and construction of shallow-spread foundations, including allowable design bearing pressures, minimum footing depth and width, lateral resistance to sliding, and estimates of settlement.
- Geotechnical engineering recommendations for the design and construction of concrete floor slabs, including an anticipated value for subgrade modulus.
- Design criteria for cast –in-place embedded building walls including lateral earth pressure, drainage, backfill material, and backfill compaction.
- A discussion of groundwater conditions on the site and recommendations for subsurface drainage of foundations, floor slabs, and pavement.

SITE CONDITIONS

The approximate 18 acre site is bisected Mount Scott Creek, a perennial drainage channel that flows to Kellogg Creek and then to the Willamette River, about 2 miles to the west. The once nearly flat site has been partially filled from off-site sources, creating irregular terrain. The site was The following paragraphs describe the site geology, seismic setting, and both surface and subsurface features of the site.

SITE GEOLOGY

The site is located in the Portland Basin in an area filled with sediment deposited during glacial outburst flooding of the Columbia River and its tributaries[1]. The floods deposited gravel, silt and sand with a total thickness of several hundred feet in some areas. The last of the events is believed to have occurred at the end of the last glacial period 9,000 to 10,000 years ago[2]. The glacial flood deposits are overlain with a thin mantle of younger alluvial sediment deposited over the last 10,000 years.

The near surface flood deposits are underlain by a thick sequence of basalt flows belonging to the Miocene age Columbia River Basalt Group (CRBG). Geologic structure mapping indicates that the basalt lies about 300 feet below the ground surface (Madin, 1990).

SEISMIC SETTING

The Portland area is subject to seismic events stemming from three possible sources: the Cascadia Subduction Zone (CSZ) , intraslab faults within the Juan de Fuca Plate, and crustal faults in the North American Plate.

[1] Madin, I.P., 1990, Earthquake Hazard Geology Maps of the Portland Metropolitan Area, Oregon; Oregon Department of Geology and Mineral Industries, Open File Report O-90-02, map scale 1:24,000.

[2] Waitt, R. B. Jr., 1985, Case for Periodic Colossal Jokulhlaups from Pleistocene Lake Missoula; Geological Society of America Bulletin, v. 96, no. 10, p. 1271-1286.

Maximum magnitude for a CSZ event is expected to be in the range of Moment Magnitude (MW) 9.0. Intraslab events have occurred on a frequent basis in the Puget Sound, contributing small magnitude ground motions in Western Oregon.

Quaternary crustal faults within 8 miles of the site are the East Bank Fault about 3 miles to the northeast, and the Portland Hills and Oatfield Faults about 0.2 and 1.5 miles to the southwest, respectively.

The contribution of potential earthquake-induced ground motion from all known sources, including the faults described above, are included in probabilistic ground motion maps developed by the USGS. Seismic site characterization and design recommendations based on USGS mapping and analysis are implemented in the International Building Code. Seismic design parameters for the project site are provided in Table 1 below.

TABLE 1 – SEISMIC DESIGN PARAMETERS

2012 IBC CODE BASED RESPONSE SPECTRUM MCE_R GROUND MOTION - 5% DAMPING 1% IN 50 YEARS PROBABILITY OF COLLAPSE	
S_S	0.966g
S_1	0.412g
MAPPED MAXIMUM CONSIDERED EARTHQUAKE SPECTRAL RESPONSE ACCELERATION PARAMETER (SITE CLASS C)	
F_a	1.014
F_v	1.388
S_{MS}	0.979g
S_{M1}	0.572g
DESIGN SPECTRAL RESPONSE ACCELERATION PARAMETER	
S_{DS}	0.653g
S_{D1}	0.381g

SURFACE CONDITIONS

The approximate 18 acre Kellogg Creek site is located on relatively flat land that is currently undeveloped. The site is bordered by Highway 224 on the north, Kellogg Creek Drive on the south, North Clackamas City Park on the west and a church property on the east. The site is currently undeveloped, vegetated with open grassland, brush, and clusters of young to moderate age deciduous trees.

The elevation of the property ranges from about 60 to 75 feet above mean sea level. Embankment slopes about 8 feet tall lie adjacent to Mount Scott Creek.

Fill has been placed on the site at some point in the past. Historical USGS topographic maps indicate the fill was likely not present in 1981. Historical aerial photos show the fill was present in 1995.

The fill ranges in thickness up to more than 12 feet as observed in our test pit explorations. An approximate 10-foot-tall fill zone in the central portion of the site terminates at its western extend with steep constructed slope that is inclined at about 2H:1V (horizontal to vertical).

SUBSURFACE CONDITIONS

We explored subsurface conditions at the site by observing the excavation of fifteen shallow test pits (TP-1through TP-15) on August 24, 2016 at the approximate locations shown in Figure 2. The test pits were excavated to depths up to 12 feet below ground surface (bgs).

Soil samples obtained from the test pits were returned to our soil laboratory for additional evaluation. Selected samples were used to determine soil moisture content and dry unit weight. The exploration logs and descriptions of field and laboratory procedures are included in Attachment A.

We encountered fill in thirteen test pits, ranging from 1-1/2 to more than 12 feet thick. Native soil beneath the fill consisted of 2-1/2 to 6 foot thick layer of loose to medium dense fine sand and silty sand, that was in turn underlain by gravel and boulders attributed to the Missoula Floods. Each layer is discussed below.

MAN MADE FILL

We encountered fill in 13 of 15 test pits extending from the ground surface to depths varying from 1-1/2 feet to greater than 12 feet. Subtle differences color and gravel content suggest the fill was paced at two different times using material from at least two sources.

South of the Mt. Scott Creek on the western side of the site, the fill appeared to include just one of the materials source materials. The fill in this area was up 3-1/2 feet thick.

The fill in the remainder of the site, north of Mt. Scott Creek and on the eastern side south of the creek, the fill included the underlying thinner fill with a thicker layer of less gravelly fill.

In general the upper fill material was stiff to very-stiff with trace to some sand, gravel and cobbles. There were isolated zones of soft and medium-stiff fill, particularly near the native/fill interface.

Field strength tests of the fill (pocket penetrometer) and the moisture content of samples returned to our laboratory indicated the fill was likely placed as structural fill. The fill at the fill/native interface that had high moisture and low compacted density. The fill included trace amounts of fine organic material and debris consisting of concrete and asphalt up to 12 inches in diameter. There were a few boulders up to 2 feet in diameter encountered in one test pit and some wire in another.

The moisture content and dry unit weight of seven samples of the fill obtained from thin wall (Shelby) tubes are presented in Table 2.

TABLE 2 – MOISTURE AND DENSITY OF FILL SAMPLES

TEST PIT	DEPTH (FT)	SOIL TYPE	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (PCF)
TP-7	2	SILT WITH TRACE GRAVEL	16	101
TP-8	8	SILT WITH TRACE SAND	26	96
TP-10	8	SILT WITH TRACE GRAVEL	22	96
TP-11	8	SILT WITH TRACE GRAVEL	19	109
TP-12	5	SILT WITH TRACE GRAVEL	15	105
TP-13	5	SILT WITH TRACE SAND	33	86
TP-14	3	SILT WITH TRACE SAND AND GRAVEL	17	85

It is our understanding that the fill was from a nearby construction project. Documentation of the fill placement is not available. Historical aerial photographs spanning the period of 1995 to 2014 show the will was placed prior to 1995.

NATIVE SAND AND SILTY SAND

We encountered native sand and silty sand below the fill that ranged from 2-1/2 to 6 feet thick. There was no fill encountered in test pits TP-4 and TP-15.

The sand and silty sand was loose to medium dense with moisture contents ranging from 20 to 50 percent of the dry soil weight. The dry unit weight of four select samples obtained in this unit varied between 78 and 98 pounds per cubic foot (pcf).

DENSE GRAVEL

We encountered dense sandy gravel beneath the native sand and silty sand. The gravel corresponds to coarse Missoula Flood deposits.

GROUNDWATER

We encountered groundwater in seven of the fifteen test pits at depths of 3 to 12 feet below the ground surface. The test pits were excavated on August 24, 2016 near the end of the dry season.

USGS mapping[3] indicates that regional groundwater in the vicinity of the site is about 65 to 70 feet above mean sea. This corresponds to existing ground surface elevations on the site.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our field explorations and engineering analysis, it is our opinion that the site can be developed as proposed.

[3] USGS Scientific Investigations Report 2008-5059, *Estimated Depth to Groundwater and Configuration of the Water Table in the Portland, Oregon Area*.

The primary geotechnical considerations for the site are the widespread presence of potentially unsuitable fill that could include zones of soft soil. We understand that mass grading will result in movement of much of the existing fill and that low areas will be filled in with the existing soil on the site. We recommend that the ground surface in all areas where old fill will remain that it be reprocessed to a depth of two feet below subgrade elevation.

Soft alluvial soil with shallow groundwater underlies the western portion of the site in the vicinity of TP-3, TP-4 and TP-15. We expect that this area will likely receive structural fill to raise the grade above the FEMA flood plain elevation. It may be necessary to stabilize the ground surface before structural fill can be placed. In very dry conditions the surface could potentially be scarified and compacted. Alternate approaches include placement of a granular blanket as a capillary break and amendment of the area with portland cement.

Subsurface soil includes a layer of loose sand at the ground surface that existed before the fill was placed. This sand will likely be unstable if encountered in utility trenches and will run when beneath water. Underground utility construction in areas that penetrate to the native soil surface may require dewatering.

Our recommendations for project design and construction are provided below.

1. Site Preparation

The existing heavily rooted zone of grass and organics should be stripped and removed from the site in all proposed building and pavement areas and for a 5-foot margin around such areas. Based on our explorations, the depth of stripping will be about 4 inches although greater stripping depths may be required to remove localized zones of loose or organic soil. The actual stripping depth should be based on field observations at the time of construction. Stripped material should be transported off site for disposal or used in landscaped areas.

Existing fill ranging from 3 feet to greater than 12 feet thick underlies about three quarters of the site. In areas that will not otherwise be processed, we recommend removing or scarifying the stripped ground surface to depth of 24 inches. The scarified soil should be compacted as recommended for structural fill.

Trees, shrubs, and brush should be removed from all building and paved areas. Root balls should be grubbed out to a depth such that all roots or parts of roots greater than ½-inch in diameter are removed. The depth of excavation to remove root balls of trees could exceed 5 feet bgs.

The on-site silt can be sensitive to small changes in moisture content and may be difficult to compact adequately during wet weather. Accordingly, scarification and compaction of the subgrade may only be possible during extended dry periods and following moisture conditioning of the soil.

After stripping, scarification and required site cutting have been completed, we recommend proofrolling the subgrade with a fully loaded dump truck or similar size, rubber-tire construction equipment to identify areas of excessive yielding. The proofrolling should be observed by a member of our geotechnical staff, who will evaluate the subgrade. If areas of excessive yielding are identified, the material should be excavated and replaced with compacted materials recommended for structural fill. Areas that appear to be too wet and soft to support proofrolling

equipment should be prepared in accordance with the recommendations for wet weather construction presented in the following section of this report.

The test pits excavations were backfilled using relatively minimal compactive effort. Therefore, soft spots can be expected at these locations. We recommend that these relatively uncompacted soils be removed from the test pits located within the proposed building and paved areas to a depth of 3-feet below finished subgrade. The resulting excavation should be brought back to grade with structural fill.

2. Wet Weather Construction Considerations

Fine-grained soils on the site are easily disturbed during the wet season. If not carefully executed, site preparation, utility trench work, and roadway excavation can create extensive soft areas and significant repair costs can result. Earthwork should be planned and executed to minimize subgrade disturbance.

The base rock thickness for project streets, as described below in the section titled "Pavement Recommendations," are intended to support post construction design traffic loads. The base rock thickness determined for post construction traffic will not support construction traffic or pavement construction when the subgrade soils are wet. Accordingly, if construction is planned for periods when the subgrade soils are not dry and firm, then an increased thickness of base rock or other methods to support construction traffic will be required.

If construction occurs during wet conditions, site preparation activities may need to be accomplished using track-mounted equipment, loading removed material into trucks supported on granular haul roads. The use of granular haul roads or staging areas will be necessary for support of construction traffic during wet conditions.

Wetland areas and forested areas may require prolonged periods of dry weather to moisture condition the underlying soil before fill can be placed and compacted. The project schedule should consider timing of mass grading to coincide with the dry weather months.

We recommend that a minimum of 2-inch thickness of granular material be placed at the base of footing excavations made in wet weather conditions. The granular material reduces water softening of subgrade soils and reduces subgrade disturbance during placement of forms and reinforcement.

3. Excavations

The stability of temporary excavation slopes is a function of many factors, including soil type, soil density, slope inclination, slope height, the presence of groundwater, and the duration of exposure. Generally, the likelihood of slope failure increases as the cut is deepened and as the duration of exposure increases. For this reason, we recommend that the excavation contractor maintain adequate slopes and setbacks.

Temporary slope safety should remain the responsibility of the contractor, who is continually present at the site and is able to monitor the performance of the excavation and modify construction practices to reflect varying conditions.

Regardless of inclination, temporary slopes should be protected from surface runoff of storm water. This can typically be accomplished using berms or swales located along the top of the slope, and by placing plastic tarpaulins over the slope.

Temporary cut slopes for the construction of the embedded foundation walls should be limited to 1H:1V. Permanent cut and fill slopes should be limited to 2H:1V or flatter.

4. Utility Trench Excavations

The sand and silty sand encountered at the original ground surface are susceptible to slumping and running if below the water table. The silt contents of these units decrease with depth and it is likely that clean sands will be encountered. It may be necessary to dewater utility trench excavations that extend below the water table. We recommend that additional explorations be conducted to determine the character of soils at the depths of the utilities and permeability testing should be conducted to determine parameters for dewatering system design.

5. Structural Fill

General. All fill within building, pavement, and sidewalk areas should be placed as compacted structural fill. All structural fill materials should be compacted to at least 95% of the maximum dry density as determined by ASTM D 698.

The earthwork contractor's compactive effort should be evaluated on the basis of field observations, and lift thicknesses should be adjusted accordingly to meet compaction requirements. The moisture content for compaction should be within about 3% of optimum.

No brush, roots, construction debris, or other deleterious material should be placed within the structural fills. Additional information regarding specific types of fill is provided below.

On-Site Soil. The on-site soil is suitable for use as structural fill provided it can be moisture-conditioned, separated from concentrations of organics and other unsuitable material, and compacted to the specified density. The fill should be placed in lifts with a maximum loose thickness of 8 inches and compacted to not less than 92 percent of the maximum dry density as determined by ASTM D 698.

Imported Granular Material. Imported granular fill material may include sand, gravel, or fragmental rock with a maximum size on the order of 4 inches and with not more than about 5% passing the No. 200 sieve (washed analysis). Material satisfying these requirements can usually be placed during periods of wet weather. The first lift of granular fill placed over a fine-grained subgrade should be about 18 in. thick and subsequent lifts about 12 inches thick when using medium- to heavy-weight vibratory rollers. Granular structural fill should be limited to a maximum size of about 1-½ inch when compacted with hand-operated equipment.

Utility Trench Backfill. Utility trench backfill should consist of granular fill limited to a maximum size of about 1 ½ inch. The granular trench backfill should be compacted to at least 95% of the maximum dry density as determined by ASTM D 698 in the upper 3 feet of the trench and to at least 90% of this density below this depth. Lift thicknesses should be evaluated on the basis of field density tests; however, particular care should be taken when operating hoe-mounted compactors to prevent damage to the newly placed conduits. Flooding or jetting to compact the trench backfill should not be permitted. Native materials can be used for trench backfill in unimproved areas where a soft trench and future settlement of the backfill can be tolerated.

Free-Draining Fill. Free-draining material should have less than 2% passing the No. 200 sieve (washed analysis). Examples of materials that would satisfy this requirement include ¾ to ¼ inch, 1½ to ¾ inch, or 3- to 1-in. crushed rock.

6. Cement Amended Fill

Portland cement can be used to stabilize and strengthen soils or to permit use of native soils when moisture contents are above optimum. The amount of cement used to amend the soils generally varies with moisture content and clay content. For planning purposes, we expect acceptable soil strength will be obtained using an amendment rate of 5 pounds portland cement tilled to a depth of 12 inches.

The permeability of amended soil is extremely low. Accordingly, amendment should not be completed in landscape areas or, the amended material should be removed from landscape areas prior to planting.

7. Shallow Foundations

In our opinion, the proposed structures can be supported on continuous or isolated column footings founded on reprocessed and new structural fill.

Continuous wall and spread footings and retaining wall footings should be proportioned for an allowable bearing pressure of 1,500 pounds per square foot (psf). Footing embedment should be as required by the Oregon Structural Specialty Code. For this allowable bearing pressure, foundations should be at least 14 inches wide.

The recommended allowable bearing pressure applies to the total of dead plus long-term live loads. The allowable bearing pressure may be increased by a factor of 3 for short-term wind or seismic loads.

The allowable bearing capacity is provided to limit differential and total settlement to ½ inch and 1inch respectively, for static loading conditions.

8. Slab-on-Grade Floors

Satisfactory subgrade support for lightly-loaded building floor slabs can be obtained on the undisturbed native soil or on engineered structural fill. A subgrade modulus of 100 pounds per cubic inch may be used to design floor slabs.

A minimum 6-inch-thick layer of free draining fill should be placed and compacted over the prepared subgrade to assist as a capillary break and blanket drain. The free draining fill layer may be capped with a 1- to 2-inch-thick layer of clean ¾ inch minus crushed rock that contains no more than 5% fines.

A vapor retarder manufactured for use beneath floor slabs should be installed above the free draining fill in inhabited spaces and spaces that will receive floor coverings. Careful attention should be made during construction to prevent perforating the retarder and to seal edges and utility penetrations. We recommend following ACI 302.1, Chapter 3 with regard to installing a vapor retarder.

9. Retaining Walls & Embedded Building Walls

The following recommendations assume that the walls are less than 12 feet in height, backfill extends a distance behind the wall equal to the wall height, and that the backfill is well drained and meets the requirements detailed above for imported granular material. Reevaluation of our recommendations will be required if retaining walls vary from these assumptions.

In general, cantilever retaining walls yield under lateral loads and should be designed with active lateral earth pressures. Restrained walls, such as embedded building walls and vaults should be designed to withstand at-rest lateral earth pressures. We recommend using the lateral earth pressures shown in Table 3. The loads are provided as equivalent fluid density (G). Diagrams showing use of the lateral earth pressures in design calculations are provided in Figure 3.

TABLE 3 – EQUIVALENT FLUID DENSITY (G) ACTING ON RETAINING WALLS

WALL TYPE	BACKFILL CONDITION	BACKFILL COMPONENT (PCF)	SURCHARGE COMPONENT (PSF)	SEISMIC COMPONENT (PCF)
YIELDING WALL	FLAT	30	80	*
	2H:1V	45		*
NON-YIELDING WALL	FLAT	50	120	*
	2H:1V	70		*

* Seismic components are not necessary for cast in place retaining walls less than 12 feet tall that are designed with a static factor of safety equal to 1.5[4].

Static lateral earth pressures acting on a retaining wall should be increased to account for surcharge loadings resulting from any traffic, construction equipment, material stockpiles, or structures located within a horizontal distance equal to the wall height. We have included lateral earth pressures for surcharge loads up to 250 psf placed as a distributed load within the distance H from the wall face.

Retaining wall drains should consist of a perforated drainpipe embedded in a minimum 1-foot-wide zone of free draining fill that is wrapped 360 degrees around by a geotextile filter that overlaps a minimum of 6 inches. The geotextile filter should be placed between the granular materials and the native soil to prevent movement of fines into the clean granular material. The geotextile filter should be a non-woven fabric with an apparent opening size between the U.S. Standard No. 70 and No. 100 Sieve sizes and a water permittivity of greater than 1.5 sec^{-1}.

Backfill for retaining walls should extend a horizontal distance of H from the back of wall, where H is the embedded height, and compacted as recommended for structural fill, with the exception of backfill placed immediately adjacent to walls. To reduce pressure on walls, backfill located within a horizontal distance of 3 feet from retaining walls should be compacted to approximately 90% of the maximum dry density, as determined by ASTM D698, and should be compacted in lifts less than 6 inches thick using hand-operated tamping equipment.

[4] Sitar, Mikola and Candia, "Seismically Induced Lateral Earth Pressure on Retaining Structures and Basement Walls", GeoCongress 2012.

10. Lateral Resistance

Lateral loads of buildings and retaining walls can be resisted by passive earth pressure on the sides of footings or by friction on the base of the footings but not both. We recommend using the equivalent fluid pressures and coefficients of friction provided in Table 4 for design of foundations.

TABLE 4 – LATERAL RESISTANCE FACTORS

SOIL TYPE	EQUIVALENT FLUID PRESSURE (γ – PCF)	FRICTION COEFFICIENT (μ)
ON-SITE SILT	350	0.4
IMPORTED CRUSHED ROCK	800	0.6

In order to develop the tabulated capacity for passive resistance using on-site silt, concrete must be placed directly against the walls of the footing excavations. When using the value for imported crushed rock, the rock should extend a minimum horizontal distance equal to half of the footing embedment (Embedment/2) and should be compacted to not less than 95% of the dry density as determined by ASTM D698. Adjacent floor slabs, pavements, or the upper 12-inch depth of adjacent, unpaved areas should not be considered when calculating passive resistance.

11. Site Drainage

As a matter of good construction practice, we recommend that perimeter drains be installed for all buildings. Perimeter drains should consist of perforated drainpipe embedded in a zone of free draining fill that is wrapped in a non-woven geotextile filter. The pipe should be connected to a tightline drainpipe leading to storm drain facilities.

Foundation and crawl space drainage should be sloped to drain to a sump or low point drain outlet. Water should not be allowed to pond within crawl spaces.

Roof drains be connected to a tightline drainpipe leading to storm drain outlet facilities. Pavement surfaces and open space areas should be sloped such that surface water runoff is collected and routed to suitable discharge points. Ground surfaces adjacent to buildings should be sloped to drain away from the buildings.

12. French Drains

French drains should be installed if groundwater seepage is encountered during construction. The drains should consist of a 3-inch diameter perforated pipe within an envelope of uniformly graded drain rock with a maximum particle size of 3 inches, and less than 2 percent passing the U.S. Standard No. 200 Sieve. The drain rock should extend at least 6 inches on all sides of the pipe.

The gravel envelope should extend upward to the top of the slope and should be wrapped with filter fabric to reduce the migration of fines from the surrounding soil. The geotextile filter should be a non-woven fabric with an AOS between the U.S. Standard No. 70 and No. 100 Sieve size and a water permittivity of greater than 1.5 sec-1. Details for construction of french drains are provided in Figure 4.

13. On-Site Asphalt Pavement

The pavement subgrade should be prepared in accordance with the previously described recommendations described in the "Site Preparation," "Wet Weather Construction," and "Structural Fill" sections of this report.

Our pavement recommendations are based on a subgrade stiffness using a California Bearing Ratio value of 3. We do not have specific information on the frequency and type of vehicles that will use the area; however, we have assumed that post construction traffic conditions will consist of no more than five heavy trucks per day.

Our analysis shows that a pavement section consisting of a minimum of 4 inches of AC pavement underlain by a minimum of 10.0 inches of crushed rock base will be required to support anticipated traffic loads over a design life of 20 years.

These thicknesses are intended to be the minimum acceptable and are based on the assumption that construction will be completed during an extended period of dry weather. Construction of pavement when subgrade soils are wet will require an increased thickness of crushed rock base or stabilized subgrade as described above in the "Cement Amended Fill" section of this report. If subgrade is stabilized with portland cement, the crushed rock base thickness can be reduced to 6.0 inches in the public roadways of the project and 4.0 inches in the private roadways.

The AC pavement should conform to Section 0074 of the Standard Specification for Highway Construction, Oregon Highway Specifications. We recommend half inch dense graded Hot Mix Asphalt Concrete for Design Level 2 using Performance Grade Asphalt PG-70-22. The aggregate base should conform to Section 02630 of the specifications with the addition that no more than 5 percent of the material by dry weight passes a U.S. Standard No. 200 Sieve.

Aggregate base should be placed in one lift and compacted to not less than 95% of the modified Proctor maximum dry density (ASTM D1557). Aggregate base should be placed in one lift and compacted to not less than 95 percent of the maximum dry density as determined by ASTM D 698. Aggregate base contaminated with soil during construction should be removed and replaced before paving.

ADDITIONAL SERVICES

Because the future performance and integrity of the structural elements will depend largely on proper site preparation, drainage, fill placement, and construction procedures, monitoring and testing (geotechnical special inspection) by experienced geotechnical personnel should be considered an integral part of the design and construction process. Consequently, we recommend that GCN be retained to provide the following post-investigation services:

- Review construction plans and specifications to verify that our design criteria presented in this report have been properly integrated into the design.
- Attend a pre-construction conference with the design team and contractor to discuss geotechnical related construction issues.
- Observe fill areas and footing subgrade both before fill material or base rock is placed and before footings are constructed in order to verify the soil conditions.

- Prepare a post-construction letter-of-compliance summarizing our field observations, inspections, and test results.

LIMITATIONS

This report was prepared for the exclusive use of Brownstone Homes and members of the design team for this specific project. It should be made available to prospective contractors for information on the factual data only, and not as a warranty of subsurface conditions, such as those interpreted from the explorations and discussed in this report.

The recommendations contained in this report are preliminary, and are based on information derived through site reconnaissance, subsurface testing, and knowledge of the site area. Variation of conditions within the area and the presence of unsuitable materials are possible and cannot be determined until exposed during construction. Accordingly, GCN's recommendations can be finalized only through GCN's observation of the project's earthwork construction. GCN accepts no responsibility or liability for any party's reliance on GCN's preliminary recommendations.

Unanticipated soil conditions are commonly encountered and cannot fully be determined by exploratory methods. Such unexpected conditions frequently require that additional expenditures be made to attain properly-constructed projects. Therefore, a contingency fund is recommended to accommodate the potential for extra costs.

Within the limitations of the scope of work, schedule, and budget, the analyses, conclusions, and recommendations presented in this report were prepared in accordance with generally-accepted professional geotechnical engineering principles and practice in this area at the time this report was prepared. We make no warranty, either express or implied.

. . .

We appreciate the opportunity to be of continued service to you. Please call if you have questions concerning this report or if we can provide additional services.

Sincerely,
GEO Consultants Northwest, Inc.

EXPIRES 06/30/2017

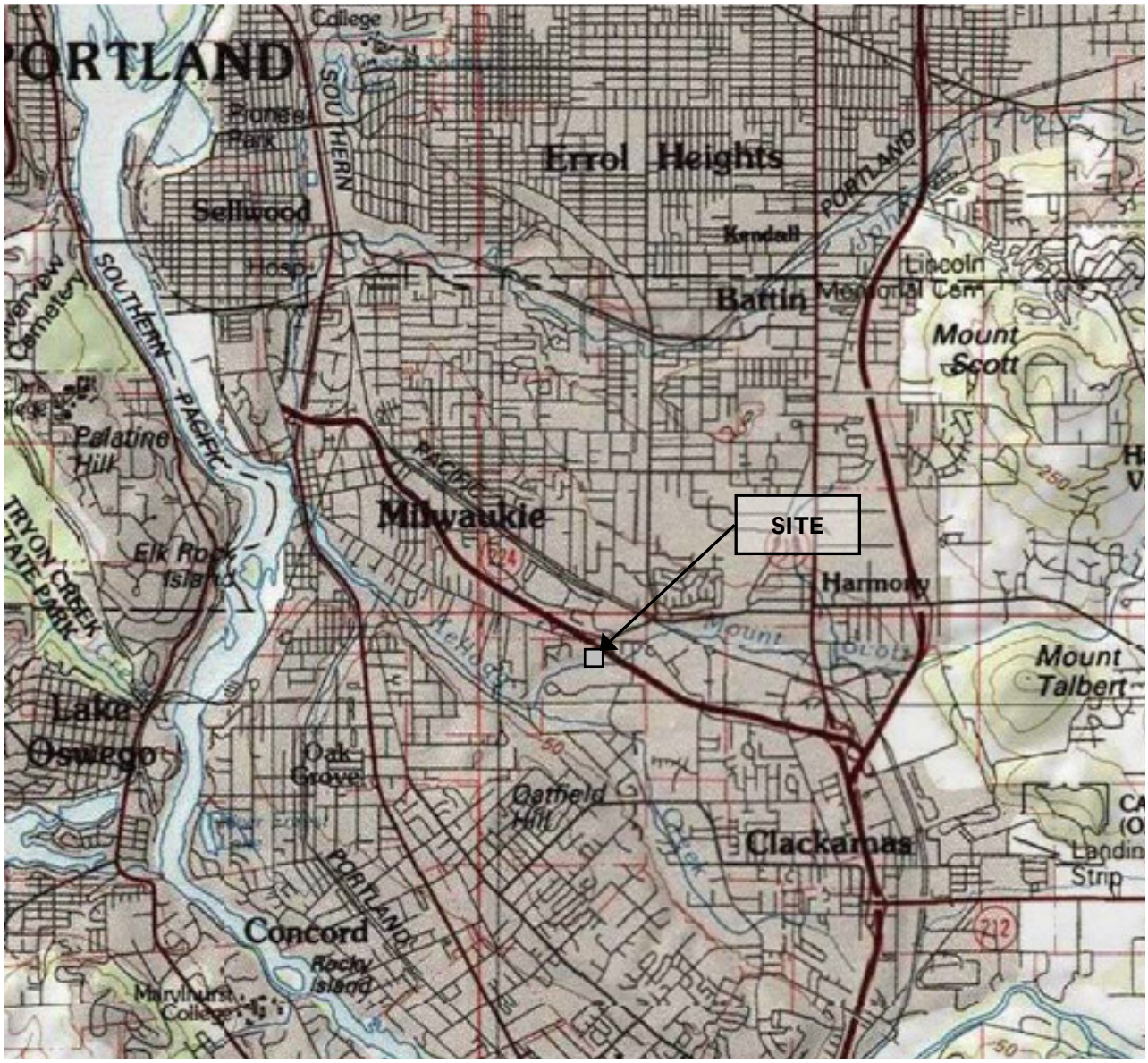
Brad L. Hupy, PE, GE
Principal

Britton W. Gentry, PE, GE
Principal

Brad L. Hupy, PE, GE

Figures: Figure 1 – Site Vicinity
Figure 2 – Preliminary Site Layout with Explorations
Figure 3 – Retaining Wall Pressures
Figure 4 – French Drain Details

Attachments: Attachment A – Field Exploration and Laboratory Testing

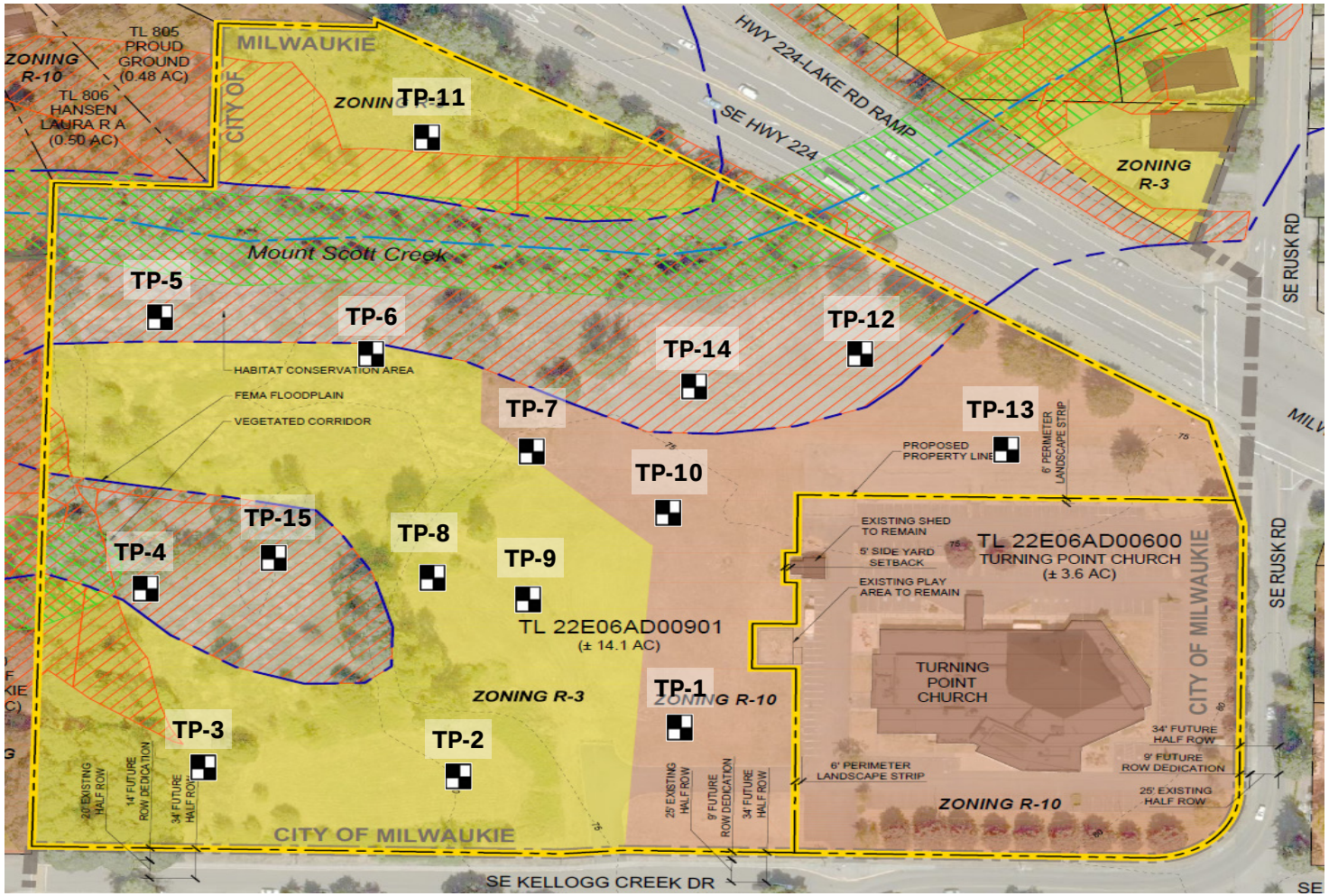


GLADSTONE QUADRANGLE - 2015 PROVIDED BY
ACME MAPPER 2.1

LAT 45.426 N, LON 122.603 W, T2S, R2E, SEC 6

N

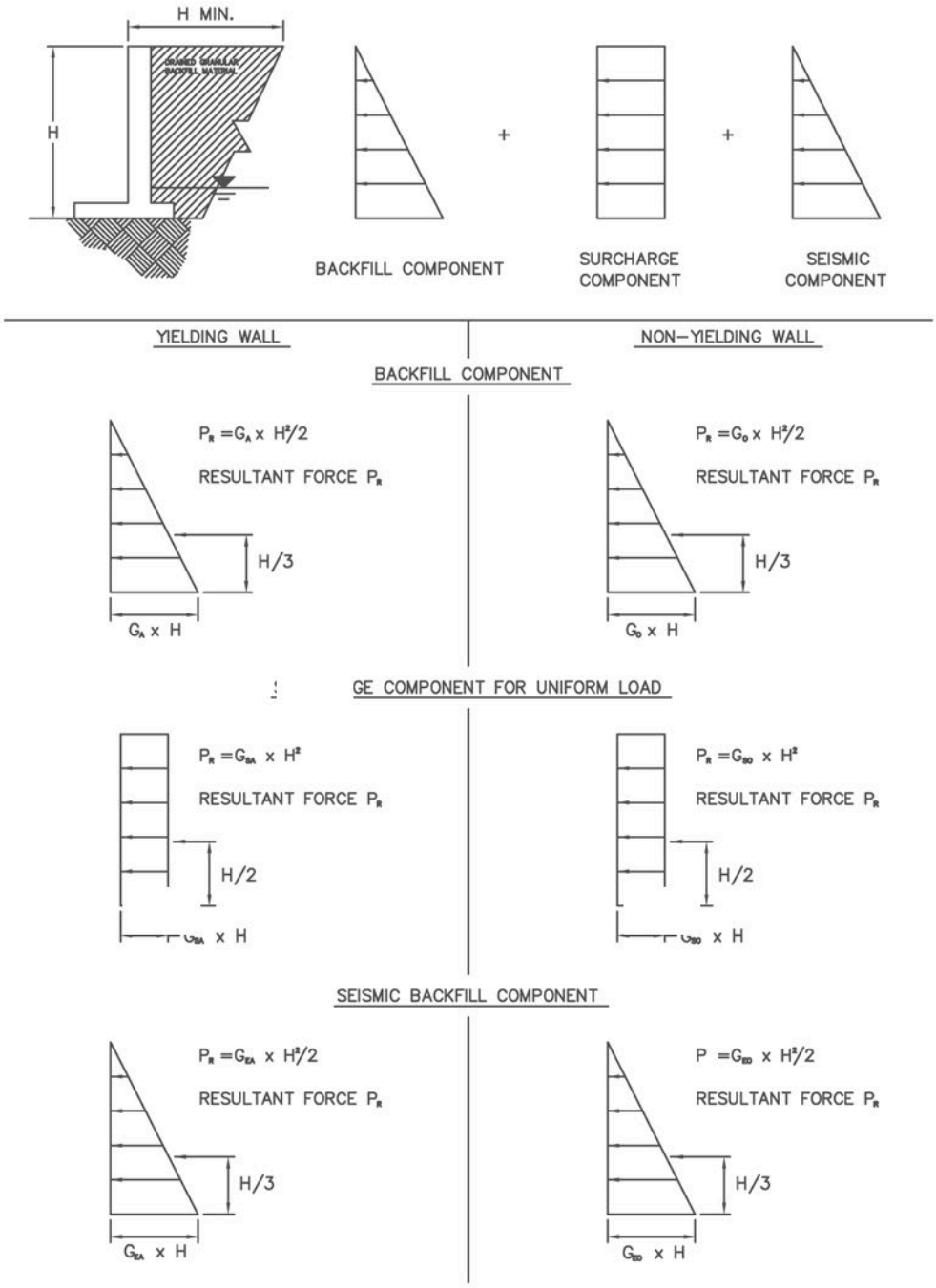
GEO CONSULTANTS NORTHWEST	SEPT 2016	**1121 - BROWNSTONE KELLOGG CREEK**	
824 SE 12th Avenue Portland, OR 97214	Drawn By: TAC	**SITE VICINITY**	**FIGURE 1**



TP-1 TEST PITS EXCAVATED AUGUST 24, 2016 – LOCATIONS APPROXIMATE

BASE DRAWING "CONCEPTUAL SITE PLAN" PREPARED BY DOWL, DATED JULY 6, 2016

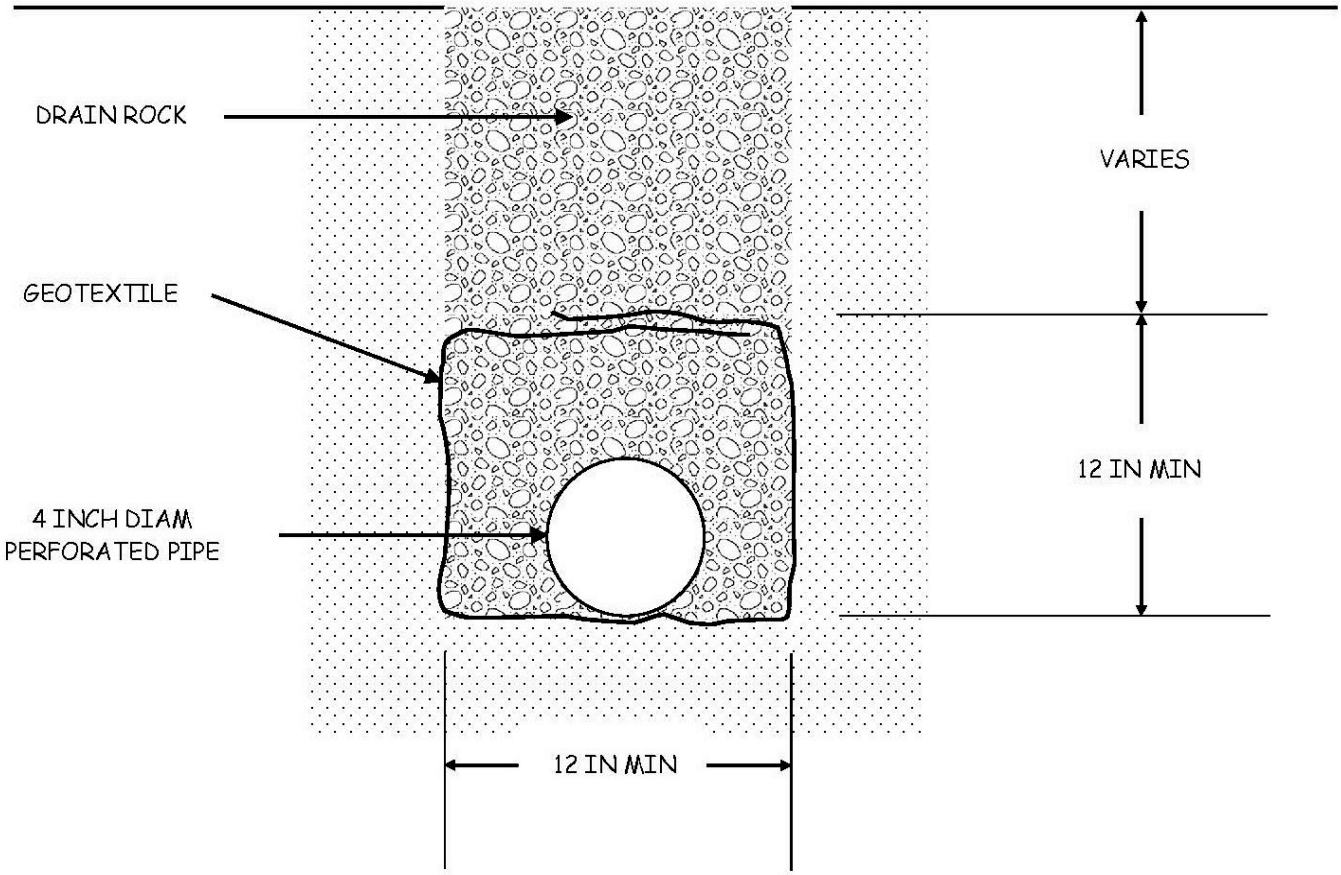
GEO CONSULTANTS NORTHWEST	OCT 2016	**1121 - BROWNSTONE KELLOGG CREEK**	
824 SE 12th Avenue Portland, OR 97214	Drawn By: TAC	**SITE LAYOUT & EXPLORATION**	**FIGURE 2**



NOTE:

1. SEE REPORT TEXT FOR VALUE OF G.
   A: ACTIVE O: AT–REST S: SURCHARGE E: EARTHQUAKE

GEO CONSULTANTS NORTHWEST	OCT 2016	**1121 - BROWNSTONE KELLOGG CREEK**	
824 SE 12th Avenue Portland, OR 97214	Drawn By: BLH	**RETAINING WALL PRESSURES**	**FIGURE 3**



1. INSTALL A GEOTEXTILE FILTER IN TRENCH TO WRAP DRAIN ROCK WITH OVERLAP AT THE TOP AS SHOWN.
2. DRAIN ROCK SHALL BE PEA GRAVEL OR WASHED DRAIN ROCK. EXTEND TO GROUND SURFACE ABOVE GEOTEXTILE FILTER TO DESIGN SUBGRADE ELEVATION.
3. USE A NON-WOVEN GEOTEXTILE FILTER WITH AN APPARENT OPENING SIZE BETWEEN THE U.S. STANDARD NO. 70 AND NO. 100 SIEVES, AND A WATER PERMITTIVITY OF GREATER THAN 1.5 SEC^{-1}.

GEO CONSULTANTS NORTHWEST	OCT 2016	**1121 - BROWNSTONE KELLOGG CREEK**	
824 SE 12th Avenue Portland, OR 97214	Drawn By: BLH	**FRENCH DRAIN DETAIL**	**FIGURE 4**

ATTACHMENT A

FIELD EXPLORATION PROCEDURES

LABORATORY TESTING PROCEDURES

KEY TO BORING AND TEST PIT LOGS

TEST PIT LOGS

FIELD EXPLORATION PROCEDURES

GENERAL

We explored subsurface conditions at the site by excavating fifteen test pits (TP-1 through TP-15) to depths of up to 12 feet below ground surface (bgs) on August 24, 2016. The test pits were excavated with a rubber-tire excavator operated by Fischer Excavating of Banks, Oregon. The approximate test pit locations are shown in Figure 2.

A member of GCN's staff was present during the explorations to record soil, rock, and groundwater conditions encountered in our boring and to obtain soil samples for laboratory testing.

SOIL SAMPLING

Representative grab samples of the soil observed in the explorations were obtained from the test pit walls and/or base using the excavator bucket. Relatively undisturbed soil samples were obtained using a standard Shelby tube in general accordance with guidelines presented in ASTM D 1587, the Standard Practice for Thin-walled Tube Sampling of Soils. Samples obtained in the exploration were sealed in airtight, plastic bags or the Shelby tubes to retain moisture and returned to our laboratory for additional examination and testing. The test pits were loosely backfilled.

FIELD CLASSIFICATION

Soil samples were initially classified visually in the field. Consistency, color, relative moisture, degree of plasticity, peculiar odors, and other distinguishing characteristics of the soil samples were noted. The terminology used is described in the key and glossary that follow.

SUMMARY EXPLORATION LOGS

Results from the test pits are shown in the summary exploration logs. The left-hand portion of a log provides our interpretation of the soil encountered, sample depths, and groundwater information. The right-hand, graphic portion of a log shows the results of pocket penetrometer and laboratory testing. Soil descriptions and interfaces between soil types shown in summary logs are interpretive, and actual transitions may be gradual.

LABORATORY TESTING PROCEDURES

Soil samples obtained during field explorations are examined in our laboratory, and representative samples may be selected for further testing. The testing program included visual-manual classification and natural moisture content.

VISUAL-MANUAL CLASSIFICATION

Soil samples are classified in general accordance with guidelines presented in ASTM D2488, *Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)*. The physical characteristics of the samples are noted and the field classifications are modified, where necessary, in accordance with ASTM terminology, though certain terminology that incorporates current local engineering practice may be used. The term which best described the major portion of the sample is used to describe the soil type.

NATURAL MOISTURE CONTENT

Natural moisture content is determined in general accordance with guidelines presented in ASTM D2216, *Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass*. The natural moisture content is the ratio, expressed as a percentage, of the weight of water in a given amount of soil to the weight of solid particles.

DRY UNIT WEIGHT (IN-PLACE DRY DENSITY)

Dry unit weight (in-place dry density) testing is performed in general accordance with guidelines presented in ASTM D2937, Standard Test Method for Density of Soil in Place by the Drive-Cylinder Method. The dry unit weight is defined as the ratio of the dry weight of the soil sample to the volume of that sample. The dry unit weight typically is expressed in pounds per cubic foot.

BORING AND TEST PIT LOGS

DISTINCTION BETWEEN FIELD LOGS AND FINAL LOGS

A field log is prepared for exploration by our field representative. The log contains information concerning soil and groundwater encountered, sampling depths, sampler types used and identification of samples selected for laboratory analysis. The final logs presented in this report represent our interpretation of subsurface conditions based on the contents of the field logs, observations made during explorations, and the results of laboratory testing. Our recommendations are based on the contents of the final logs and the information contained therein, and not on the field logs.

SOIL CLASSIFICATION SYSTEM

Soil samples are classified in the field in general accordance with the United Soil Classification System (USCS) presented in ASTM D2488 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)." Final logs reflect field soil classifications and laboratory testing results. A summary of the USCS is provided on page 3. Classifications and sampling intervals are shown in the logs.

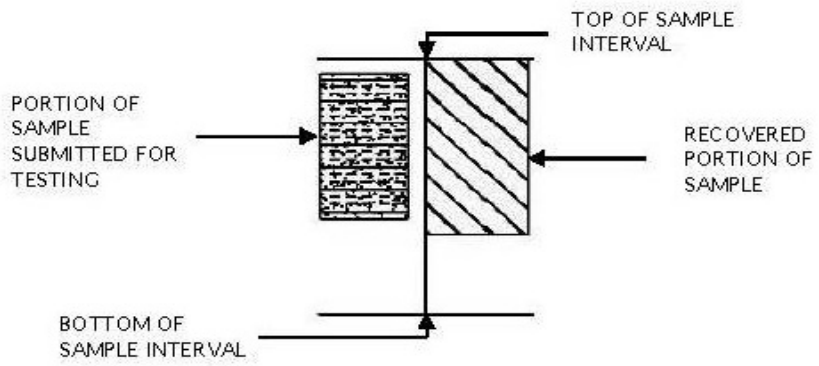
VARIATION OF SOIL BETWEEN EXPLORATIONS

The final logs and related information depict subsurface conditions only at the specific location and on the date(s) indicated. Those using the information contained herein should be aware that soil conditions at other locations or on other dates may differ.

TRANSITION BETWEEN SOIL AND ROCK CLASSIFICATIONS

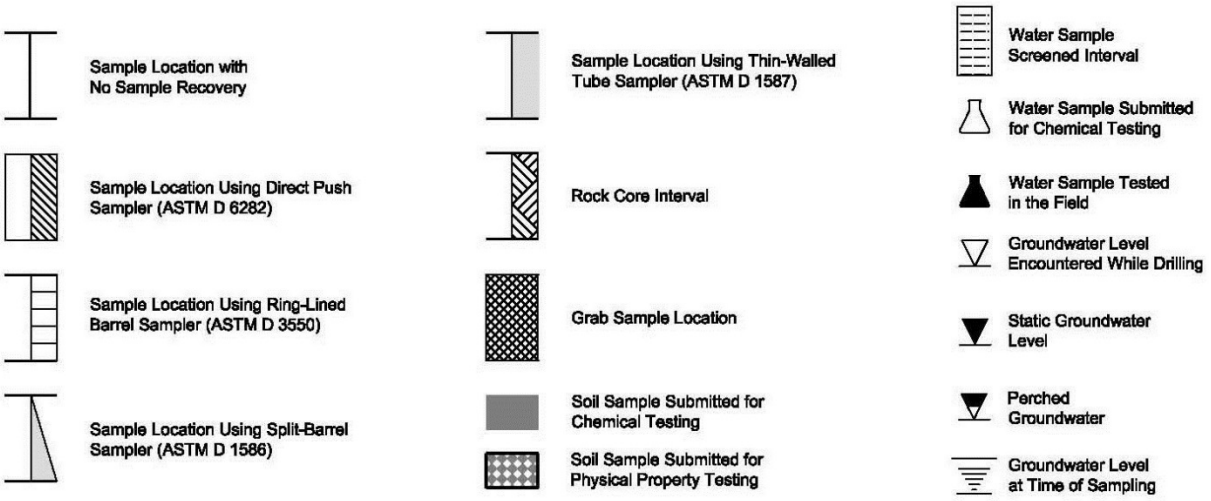
The lines designating the interface between soil, fill, or rock on the final logs and on the subsurface profiles presented in the report are determined by interpolation and are, therefore, approximate. The transition between the materials may be abrupt or gradual. Only at specific exploration locations should profiles be considered as reasonably accurate and then only to the degree implied by the notes.

BORING LOG SAMPLES



GEO CONSULTANTS NORTHWEST	2016	KEY TO BORING AND TEST PIT LOGS	
824 SE 12th Avenue Portland, OR 97214	Drawn By: GCN	GENERAL INFORMATION	1/5

EXPLORATION LOG SYMBOLS



SOIL CHARACTER

Granular Soil		Cohesive Soil		
Density	Standard Penetration Test *	Consistency	Standard Penetration Test*	Unconfined Compressive Strength (tsf)
Very Loose	0 - 4	Very Soft	Less Than 2	Less Than 0.25
Loose	4 - 10	Soft	2 - 4	0.25 - 0.5
Medium Dense	10 - 30	Medium Stiff	4 - 8	0.50 - 1.0
Dense	30 - 50	Stiff	8 - 16	1.0 - 2.0
Very Dense	Greater Than 50	Very Stiff	16 - 32	2.0 - 4.0
Blows Required to Drive a Split-Barrel Sampler 12 inches		Hard	Greater Than 32	Greater Than 4.0

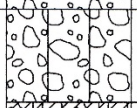
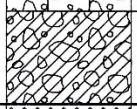
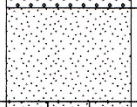
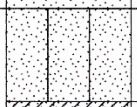
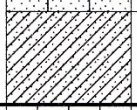
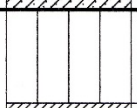
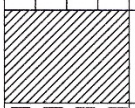
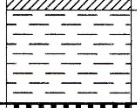
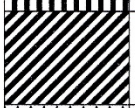
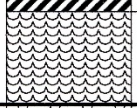
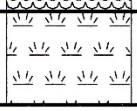
DEFINITIONS AND ABBREVIATIONS

AT	ATTERBERG LIMITS TEST	ND	NON DETECT	PPB	PARTS PER BILLION
BGS	BELOW GROUND SURFACE	NEG	NEGATIVE RESULT	PPM	PARTS PER MILLION
CO	CONSOLIDATION TEST	NS	NO VISIBLE SHEEN	PSF	POUNDS PER SQUARE FOOT
DS	DIRECT SHEAR TEST	OC	ORGANIC CONTENT	RS	SOIL RESISTIVITY TEST
DW	DRY UNIT WEIGHT	P	PUSHED SAMPLE	S4	SUDAN IV SOIL TEST
GS	MECHANICAL GRAIN SIZE TEST	P200	P200 FINES CONTENT TEST	SG	SPECIFIC GRAVITY TEST
HS	HEAVY SHEEN	PCF	POUNDS PER CUBIC FOOT	SPT	STD. PENETRATION TEST
HYD	HYDROMETER TEST	PH	SOIL pH	SS	SLIGHT SHEEN
MC	MOISTURE CONTENT	PID	PHOTOIONIZATION DETECTOR	TO	TOREVANE
MG/KG	MILLIGRAMS PER KILOGRAM	POS	POSITIVE RESULT	TSF	TONS PER SQUARE FOOT
MS	MODERATE SHEEN	PP	POCKET PENETROMETER	UV	ULTRAVIOLET LIGHT TEST

GRAIN SIZE DEFINITIONS			MINOR FRACTIONS IN FINE GRAINED SOIL		GROUNDWATER SEEPAGE	
SAND	FINE	No. 200 to No. 40	No Mention (CLAY, SILT)	< 15 percent	Slow	< 1 gpm
	MEDIUM	No. 40 to No. 10	With Sand, With Gravel	15 to 30 percent	Moderate	1-3 gpm
	COARSE	No. 10 to No. 4	Sandy, Gravelly	30 to 49 percent	Rapid	> 3 gpm
GRAVEL	FINE	No. 4 to 3/4-inch	FIELD MOISTURE OBSERVATION		CAVING	
	COARSE	3/4- to 3-inch	Dry	Absence of moisture, dusty, dry to touch	Minor	
COBBLE		3-inches to 12-inches	Moist	Damp but no visible water.	Moderate	
BOULDER		> 12-inches	Wet	Saturated, below groundwater	Severe	

GEO CONSULTANTS NORTHWEST	2016	KEY TO BORING AND TEST PIT LOGS	
824 SE 12th Avenue Portland, OR 97214	Drawn By: GCN	SYMBOLS AND ABBREVIATIONS	2/5

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	(LITTLE OR NO FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	(LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES		SM	SILTY SANDS, SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

GEO CONSULTANTS NORTHWEST	2016	KEY TO BORING AND TEST PIT LOGS	
824 SE 12th Avenue Portland, OR 97214	Drawn By: GCN	SOIL CLASSIFICATION	3/5

ROCK CLASSIFICATION GUIDELINES

HARDNESS		DESCRIPTION
Very soft	(RH-0)	For plastic material only
Soft	(RH-1)	Carved or gouged with a knife
Moderate	(RH-2)	Scratched with a knife
Hard	(RH-3)	Difficult to scratch with a knife
Very hard	(RH-4)	Rock scratches metal; rock cannot be scratched with a knife

STRENGTH	DESCRIPTION
Plastic	Easily deformable with finger pressure
Friable	Crumbles by rubbing with fingers
Weak	Crumbles only under light hammer blows
Moderately Strong	Few heavy hammer blows before breaking
Strong	Withstands few heavy hammer blows and yields large fragments
Very Strong	Withstands many heavy hammer blows, yields dust and small fragments

WEATHERING	DESCRIPTION
Severe	Rock decomposed; thorough discoloration; all fractures extensively coated with clay, oxides, or carbonates.
Moderate	Intense localized discoloration of rock; fracture surfaces coated with weathering minerals.
Little	Slight and intermittent discoloration of rock; few stains on fracture surfaces.
Fresh	Rock unaffected by weathering

FRACTURING	FRACTURE SPACING
Crushed	Less than 5/8 inch to contains clay
Highly Fractured	5/8 inch to 2 inches
Closely Fractured	2 inches to 6 inches
Moderately fractured	6 inches to 1 foot
Little Fractured	1 foot to 4 feet
Massive	Greater than 4 feet

JOINT SPACING	DESCRIPTION
Papery	Less than 1/8 inch
Shaley or Platey	1/8 inch to 5/8 inch
Very Close	5/8 inch to 3 inches
Close	3 inches to 2 feet
Blocky	2 to 4 feet
Massive	Greater than 4 feet

GLOSSARY

Alluvial – Made up of or found in the materials that are left by the water of rivers, streams, floods, etc.

Bearing pressure – The total stress transferred from the structure to the foundation, then to the soil below the foundation.

Bulk density (Soil density) – The total mass of water and soil particles contained in a unit volume of soil: lb/ft³.

Coefficient of active earth pressure – The ratio of the minimum horizontal effective stress of a soil to the vertical effective stress at a single point in a soil mass retained by a retaining wall as the wall moves away from the soil.

Cohesive soil – Clay type soil with angles of internal friction close to zero. Cohesion is the force that holds together molecules or like-particles within a substance.

Colluvium – A loose accumulation of soil and rock fragments deposited through the action of gravity, such as erosion and soil creep.

Differential settlement – The vertical displacement due to settlement of one point in a foundation with respect to another point of the foundation.

Engineered fill – Soil used as fill, such as retaining wall backfill, foundation support, dams, slopes, etc., that are to be placed in accordance with engineered specifications. These specifications may delineate soil grain-size, plasticity, moisture, compaction, angularity, and many other index properties depending on the application.

Excess pore pressure – That increment of pore water pressures greater than hydro-static values, produced by consolidation stresses in compressible materials or by shear strain; excess pore pressure is dissipated during consolidation.

Factor of safety – The ratio of a limiting value of a quantity to the design value of that quantity.

Fines – Material by weight passing the U.S. Standard No. 200 Sieve by washed analysis.

Fluvial – Produced by the action of rivers or streams.

Homogenous soil – A mass of soil where the soil is of one characteristic having the same engineering and index properties.

In situ – Undisturbed, existing field conditions.

Lacustrine – Of a lake, e.g., the depositional environment of a lake.

Liquefaction – The sudden, large decrease of shear strength of cohesionless soil caused by collapse of the soil structure, produced by small shear strains associated with sudden but temporary increase of pore water pressure. Usually a problem in submerged, poorly graded sands within the upper 50 feet of subgrade in earthquake-prone environments.

Maximum dry density – A soil property obtained in the laboratory from a Proctor test. Density of soil at 100% compaction.

Overbank deposit – Sediment that has been deposited on the floodplain of a river or stream by flood waters that have broken through or overtopped the banks.

Permeability – A measure of continuous voids in a soil. The property which allows the flow of water through a soil. See also coefficient of permeability.

Porosity (Pore space) – The ratio of the volume of voids to the total volume: unitless or expressed as a percentage.

Residual soil – Soil that has been formed in place by rock decay.

Shear strength – The maximum shear stress which a soil can sustain under a given set of conditions. For clay, shear strength = cohesion. For sand, shear strength = the product of effective stress and the tangent of the angle of internal friction.

Surcharge – An additional force applied at the exposed upper surface of a restrained soil.

Tuff – An igneous rock (from molten material) that forms from the debris ejected by an explosive volcanic eruption.

Unit weight – The ratio of the total weight of soil to the total volume of a unit of soil: lb/ft³.

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
		ML	Very stiff, light brown SILT FILL with trace sand and trace subrounded to angular gravel; moist. (2-inch thick heavily rooted zone at the ground surface)	1		14	PP=4.0 PP=4.0	
				2		14	PP=4.0 PP=3.5	
5		ML	Very stiff to stiff, brown SILT FILL with some subrounded gravel, trace sand and trace fine organics; moist.	3		27	PP=3.5 PP=3.5	
			Encountered 6 inch diameter storm drain pipeline at 6 feet.					
		SM	Medium dense, brown-gray and orange mottled gray, fine SILTY SAND; moist.	4		31		
10			**ALLUVIUM**					
		GW	Dense, light brown, subrounded GRAVEL with sand and cobbles to 6 inch diameter; moist.	5		30		
			End at 12 feet in dense native gravel. No caving and no groundwater observed to the depth explored.					
15								

Station: See Figure 2 **Logged By: Paul Crenna, CEG**

Approximate Elevation:

Excavation Started: 8/24/16 **Excavation Completed: 8/24/16**

LOG OF TEST PIT TP-01

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
		ML	Medium stiff, brown SILT FILL with trace sand and some subrounded to subangular gravel and cobbles, trace construction debris (asphalt); moist. (3-inch thick heavily rooted zone at the ground surface)	1		6		
		SM		2		20		DD = 98 pcf
			Medium dense, orange and gray mottled light brown SILTY SAND; moist.				PP=4.0 PP=3.5	
			ALLUVIUM					
5				3	▼ TS			
		GW	Dense, light brown, subrounded GRAVEL with sand and cobbles to 6 inch diameter; moist to wet.	4		27		
			MISSOULA FLOOD DEPOSITS	5		15		
10								
			End at 11 feet in dense native gravel.					
			Minor sidewall caving below 5 feet.					
			Rapid groundwater seepage below 6 feet.					
15								

Station: See Figure 2 **Logged By: Paul Crenna, CEG**

Approximate Elevation:

Excavation Started: 8/24/16 **Excavation Completed: 8/24/16**

LOG OF TEST PIT TP-02

Brownstone - Kellogg Creek **1121**	**GEO Consultants Northwest** **824 SE 12th Avenue** **Portland, Oregon 97214** **Tel 503-616-9425** **Fax**	**LOGS OF TEST PITS**

TESTPIT 2_PER_PAGE REV1 1121 BROWNSTONE - KELLOGG CREEK.GPJ NGC.GDT 10/07/16

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
		GM	Medium dense, brown, silty, subrounded GRAVEL FILL with cobbles and organics (fine rootlets throughout); moist. (3-inch thick heavily rooted zone at the ground surface)	1		19	PP=3.5 PP=3.0	
		ML	Soft, blue-gray SILT with trace fine sand; wet.	2	▼ TS	15		
5			**ALLUVIUM**	3		45	PP=0.25	DD = 78 pcf
		SP	Loose, blue-gray fine SAND with trace silt; wet.	4		42		
			ALLUVIUM					
10		GW	Dense, brown, subrounded GRAVEL with sand and cobbles to 6 inch diameter; wet.					
			MISSOULA FLOOD DEPOSITS					
			End at 12 feet in dense native gravel.					
			Severe sidewall caving.					
			Rapid groundwater seepage below 6 feet.					
15								

Station: See Figure 2 **Logged By: Paul Crenna, CEG**

Approximate Elevation:

Excavation Started: 8/24/16 **Excavation Completed: 8/24/16**

LOG OF TEST PIT TP-03

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
		ML	Medium stiff, dark brown SILT with some fine organics and trace subrounded gravel; moist. (4-inch thick heavily rooted zone at the ground surface)	1		28	PP=1.5 PP=1.0	
		SM	Soft to medium stiff, blue-gray fine SILY SAND with trace fine organics (fragments of carbonized wood); moist to wet.	2	▼ TS	45	PP=0.5	
			ALLUVIUM					
5		SM	Loose to medium dense, blue-gray, fine SILTY SAND; wet.	3		50		
			ALLUVIUM					
		GW	Dense, brown, subrounded GRAVEL with sand and cobbles to 6 inch diameter; wet.					
10			**MISSOULA FLOOD DEPOSITS**					
			End at 12 feet in dense gravel.					
			Moderate sidewall caving.					
			Rapid groundwater seepage below 3 feet.					
15								

Station: See Figure 2 **Logged By: Paul Crenna, CEG**

Approximate Elevation:

Excavation Started: 8/24/16 **Excavation Completed: 8/24/16**

LOG OF TEST PIT TP-04

Brownstone - Kellogg Creek **1121**	**GEO Consultants Northwest** **824 SE 12th Avenue** **Portland, Oregon 97214** **Tel 503-616-9425** **Fax**	**LOGS OF TEST PITS**

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
		ML	Stiff, brown SILT FILL with some subrounded to angular gravel; moist. (4-inch thick heavily rooted zone at the ground surface)	1		16	PP=4.0	
			Encountered trace metal wire at 3 feet.	2		22	PP=3.5 PP=4.0	
5		GW	Dense, brown, subrounded GRAVEL with sand and cobbles to 6 inch diameter; moist.	3		11		
			MISSOULA FLOOD DEPOSIT	4		4		
10			End at 10 feet in dense native gravel.	5		8		
			No caving and no groundwater observed to the depth explored.					
15								

Station: See Figure 2 **Logged By: Paul Crenna, CEG**

Approximate Elevation:

Excavation Started: 8/24/16 **Excavation Completed: 8/24/16**

LOG OF TEST PIT TP-05

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
		ML	Stiff, brown, subrounded gravelly SILT FILL with trace construction debris (metal, asphalt, concrete) up to 8 inch diameter; moist. (3-inch thick heavily rooted zone at the ground surface)	1		13		
			Encountered occasional boulders to 2 feet diameter.	2		14		
5		ML	Stiff, light brown SILT with trace fine sand; moist.				PP=4.0	
			ALLUVIUM	3		21		
		GW	Dense, brown, subrounded GRAVEL with sand and cobbles to 6 inch diameter; wet.	4	▼ TS	11		
10			**MISSOULA FLOOD DEPOSIT**					
			End at 12 feet in dense native gravel.					
			Moderate sidewall caving.					
			Slow goundwater seepage below 8 feet.					
15								

Station: See Figure 2 **Logged By: Paul Crenna, CEG**

Approximate Elevation:

Excavation Started: 8/24/16 **Excavation Completed: 8/24/16**

LOG OF TEST PIT TP-06

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Brownstone - Kellogg Creek

1121

GEO Consultants Northwest
824 SE 12th Avenue
Portland, Oregon 97214
Tel 503-616-9425
Fax

GEO CONSULTANTS NORTHWEST

LOGS OF TEST PITS

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
		ML	Very stiff, light brown SILT FILL with trace angular gravel; moist.	1		12	PP=4.0	
				2		16	PP=4.0	DD = 101 pcf
				3		12	PP=4.0	
							PP=2.0	
5		ML	Medium stiff to stiff, brown SILT FILL with trace subrounded gravel and trace construction debris (metal); moist.	4		32		
			Encountered dark brown layer with trace fine organics from 6 to 7 feet. Becomes blue-gray below 7 feet.	5		38		
10				6		42		
				7		37		
			End at 12 feet in stiff silt fill.					
			No caving and no groundwater observed to the depth explored.					
15								

Station: See Figure 2 **Logged By: Paul Crenna, CEG**

Approximate Elevation:

Excavation Started: 8/24/16 **Excavation Completed: 8/24/16**

LOG OF TEST PIT TP-07

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
		ML	Very stiff, light brown SILT FILL with trace fine sand; moist. (2-inch thick heavily rooted zone at the ground surface)	1		13	PP=4.0	
							PP=4.0	
				2		20	PP=4.0	
							PP=4.0	
5		ML	Stiff, blue-gray and brown-gray SILT FILL with trace fine organics; moist.	3		16		
				4		26		DD = 96 pcf
				5		25		
10								
			Encountered trace construction debris (concrete and asphalt) up to 18 inch diameter at 11 to 12 feet.	6		30		
			End at 12 feet in stiff silt fill. No caving and no groundwater observed to the depth explored.					
15								

Station: See Figure 2 **Logged By: Paul Crenna, CEG**

Approximate Elevation:

Excavation Started: 8/24/16 **Excavation Completed: 8/24/16**

LOG OF TEST PIT TP-08

Brownstone - Kellogg Creek

1121

GEO Consultants Northwest
824 SE 12th Avenue
Portland, Oregon 97214
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Fax

GEO CONSULTANTS NORTHWEST

LOGS OF TEST PITS

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
		ML	Very stiff, light brown SILT FILL with trace sand and angular gravel; moist. (2-inch thick heavily rooted zone at the ground surface)	1		10	PP=4.0 PP=4.0	
				2		12	PP=4.0 PP=4.0	
5		ML	Stiff, blue-gray SILT FILL with trace sand; moist.	3		25		
			Encountered 3-inch thick grass root zone at 6 feet.					
			Encountered some subrounded gravel and cobbles from 6 to 10 feet.	4		18		
10				5		34		
			Encountered dark brown-gray layer with trace fine organics at 11 to 12 feet.	6		48		
			End at 12 feet in stiff silt fill. Minor caving at 6 to 7 feet.					
15			No groundwater observed to the depth explored.					

Station: See Figure 2 **Logged By: Paul Crenna, CEG**

Approximate Elevation:

Excavation Started: 8/24/16 **Excavation Completed: 8/24/16**

LOG OF TEST PIT TP-09

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
		ML	Very stiff, light brown SILT FILL with trace fine sand and angular gravel; moist. (2-inch thick heavily rooted zone at the ground surface)				PP=4.0 PP=4.0	
				1		16	PP=4.0 PP=4.0	
5		ML	Stiff, dark brown-gray SILT FILL with trace subrounded gravel and cobbles, trace fine organics; moist.	2		22		
				3		22		DD = 96 pcf
			Encountered plastic particles at 8 feet.					
10			Encountered dark brown layer with trace fine organics at 11 to 12 feet.	4		42		
			End at 12 feet in stiff silt fill. No caving and no groundwater observed to the depth explored.					
15								

Station: See Figure 2 **Logged By: Paul Crenna, CEG**

Approximate Elevation:

Excavation Started: 8/24/16 **Excavation Completed: 8/24/16**

LOG OF TEST PIT TP-10

TESTPIT 2_PER_PAGE REV1 1121 BROWNSTONE - KELLOGG CREEK.GPJ NGC.GDT 10/07/16

Brownstone - Kellogg Creek

1121

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824 SE 12th Avenue
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Fax

GEO CONSULTANTS NORTHWEST

LOGS OF TEST PITS

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
		ML	Very stiff, dark brown and brown, subrounded gravelly SILT FILL with cobbles to 4 inch diameter; moist. (4-inch thick heavily rooted zone at the ground surface)	1		14		
				2		14		
5				3		23		
		ML	Stiff, blue-gray SILT FILL with trace subrounded gravel and cobbles, trace fine organics; moist.	4		27		
				5		19		DD = 109 pcf
10				6		28		
			End at 12 feet in stiff silt fill.					
			No caving and no groundwater observed to the depth explored.					
15								

Station: See Figure 2 **Logged By: Paul Crenna, CEG**

Approximate Elevation:

Excavation Started: 8/24/16 **Excavation Completed: 8/24/16**

LOG OF TEST PIT TP-11

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
		ML	Stiff, light brown SILT FILL with trace angular gravel; moist. (3-inch thick heavily rooted zone at the ground surface)	1		13	PP=4.0	
				2		16	PP=4.0 PP=4.0	
5				3		15		DD = 105 pcf
		ML	Stiff, blue-gray and brown-gray SILT FILL with trace subrounded gravel and cobbles; moist.	4		8		
10		SP	Loose to medium dense, fine to medium SAND with trace silt; wet.	5	▼ TS	34		
			ALLUVIUM					
			End at 12 feet in medium dense native sand. Minor caving below 10 feet.					
			Slow groundwater seepage below 10 1/2 feet.					
15								

Station: See Figure 2 **Logged By: Paul Crenna, CEG**

Approximate Elevation:

Excavation Started: 8/24/16 **Excavation Completed: 8/24/16**

LOG OF TEST PIT TP-12

Brownstone - Kellogg Creek **1121**	**GEO Consultants Northwest** **824 SE 12th Avenue** **Portland, Oregon 97214** **Tel 503-616-9425** **Fax**	**LOGS OF TEST PITS**

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
		ML	Very stiff, light brown SILT FILL with trace sand and subrounded gravel and cobbles; moist. (3-inch thick heavily rooted zone at the ground surface)	1		27	PP=4.0 PP=4.0	
				2		42	PP=4.0 PP=3.5	
5		ML	Stiff, blue-gray SILT FILL; moist.	3		33		DD = 86 pcf
		SM	Medium dense, light brown fine SILTY SAND grading to fine sand; moist.	4		32		
			ALLUVIUM	5		37		
10		GW	Dense, light brown, subrounded GRAVEL with sand; moist.					
			MISSOULA FLOOD DEPOSIT					
			End at 12 feet in dense native gravel. No caving and no groundwater observed to the depth explored.					
15								

Station: See Figure 2 **Logged By: Paul Crenna, CEG**

Approximate Elevation:

Excavation Started: 8/24/16 **Excavation Completed: 8/24/16**

LOG OF TEST PIT TP-13

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
		ML	Very stiff, light brown and brown SILT FILL with trace sand and angular to subrounded gravel and cobbles; moist. (3-inch thick heavily rooted zone at the ground surface)	1		12	PP=4.0 PP=4.0	
				2		17	PP=4.0 PP=3.5	DD = 85 pcf
			Encountered occasional debris (asphalt to 12 inch diameter) at 4 feet.					
5				3		28		
				4		38		DD = 79 pcf
		ML	Stiff, dark brown-gray to blue-gray SILT with trace fine organics in upper foot; moist to wet.					
				5	▼ TS	37		
10			**ALLUVIUM**					
		GW	Dense, brown, subrounded GRAVEL with sand and cobbles; wet.	6				
			MISSOULA FLOOD DEPOSIT					
			End at 12 feet in dense native gravel. Minor caving below 10 feet.					
			Rapid groundwater seepage below 9 feet.					
15								

Station: See Figure 2 **Logged By: Paul Crenna, CEG**

Approximate Elevation:

Excavation Started: 8/24/16 **Excavation Completed: 8/24/16**

LOG OF TEST PIT TP-14

Brownstone - Kellogg Creek **1121**	**GEO Consultants Northwest** **824 SE 12th Avenue** **Portland, Oregon 97214** **Tel 503-616-9425** **Fax**	**LOGS OF TEST PITS**

TESTPIT 2_PER_PAGE REV1 1121 BROWNSTONE - KELLOGG CREEK.GPJ NGC.GDT 10/07/16

DEPTH (feet bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	GROUND WATER	WATER CONTENT (percent)	FIELD TESTING	TESTING AND LABORATORY DATA
		ML	Medium stiff, dark brown SILT with organics (fine rootlets); moist. (4-inch thick heavily rooted zone at the ground surface)	1		19		
		SM	Medium dense, orange and gray mottled light brown, fine SILTY SAND; moist.	2		43	PP=2.0	DD = 78 pcf
			ALLUVIUM				PP=2.0	
5		GW	Dense, brown, subrounded GRAVEL with sand and cobbles to 6 inch diameter; wet.		▼ TS			
			MISSOULA FLOOD DEPOSIT	3				
10			End at 10 feet in dense gravel.					
			Moderate caving below 6 feet.					
			Rapid groundwater seepage below 5 feet.					
15								

Station: See Figure 2 **Logged By: Paul Crenna, CEG**

Approximate Elevation:

Excavation Started: 8/24/16 **Excavation Completed: 8/24/16**

LOG OF TEST PIT TP-15

GEO Consultants Northwest
824 SE 12th Avenue
Portland, Oregon 97214
Tel 503-616-9425
Fax

GEO CONSULTANTS NORTHWEST

LOGS OF TEST PITS

Exhibit G

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
610 SW Alder Street, Suite 700, Portland, OR 97205 P 503.228.5230 F 503.273.8169

MEMORANDUM

Date: February 7, 2017 Project #: 20703

To: Brett Kelver, AICP, City of Milwaukie
Rick Nys, PE, PTOE and Christian Snuffin, PE, PTOE, Clackamas County
Avi Tayar, PE and Andy Jeffrey, PE, ODOT
Mat Dolata, PE, PTP, DKS

CC: Serah Breakstone and Scott Emmons, PE, DOWL

From: Kristine Connolly, Zachary Horowitz, and Chris Brehmer, PE, Kittelson & Associates, Inc.

Project: Kellogg Creek Townhomes

Subject: Traffic Impact Study

Brownstone Homes, Inc. is proposing to develop property located at 1333 Rusk Road. The site is located within the City of Milwaukie, south of the Milwaukie Expressway (referred to as OR-224 in the remainder of this report), west of SE Rusk Road, and north of SE Kellogg Creek Drive. Today, the site is primarily open space though the southeast corner of the site is occupied by the Turning Point Church. After construction, the site will include 92 townhome units in addition to the church. A zoning map change is required as part of the Planned Development (PD) process being pursued with the project site application because the PD increases the site density, but the Comprehensive Plan designation remains unchanged. This traffic impact study report documents the transportation impacts associated with site redevelopment in the near-term opening year.

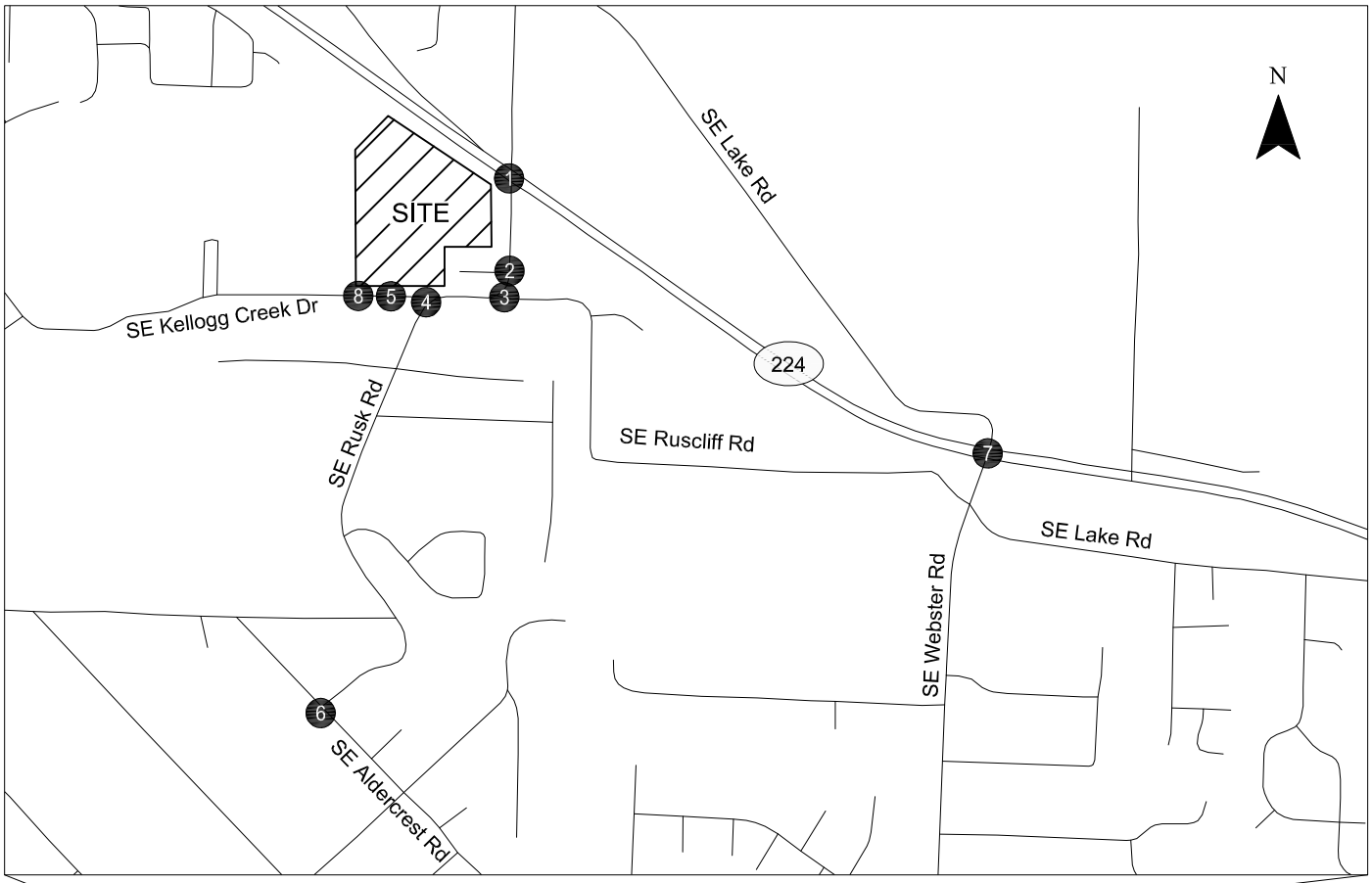
SUMMARY OF FINDINGS

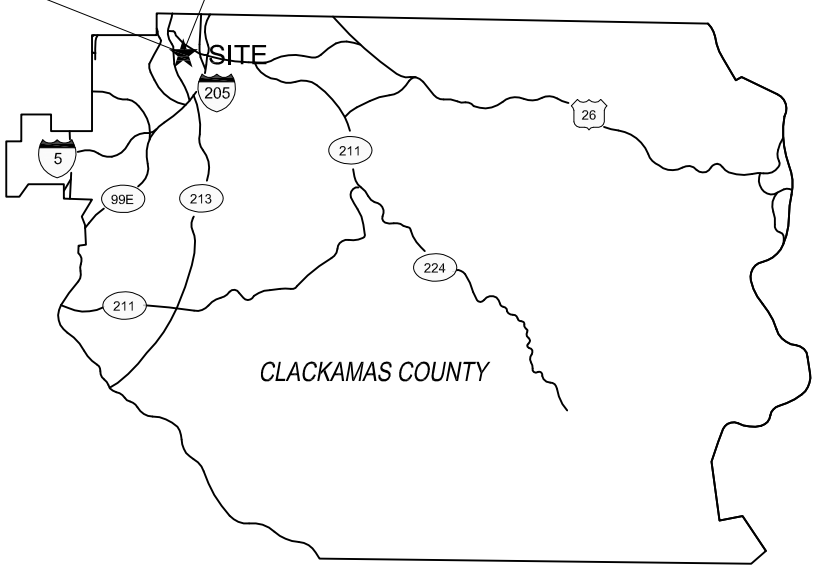
The primary findings of the analysis include:

- All study intersections are forecast to operate within the applicable review agency operational standards under existing and site opening year 2018 scenarios studied during the weekday AM, midday, and PM peak hours.
- Historical crash data for the study area intersections indicate no patterns or trends that require mitigation associated with this project.
- Projected 95th percentile queues can be accommodated within the existing storage areas at the study intersections, with the exception of the intersection of OR-224/SE Webster Road, where existing and background weekday peak hour 95th percentile queues exceed the available storage for the westbound left-turn (weekday PM peak hour) and the northbound left-turn (weekday AM, midday, and PM peak hours).
- Landscaping, signage, and utilities should be located and maintained to ensure adequate intersection sight lines are available.
- The proposed zoning map amendment with site development does not result in a net increase in the overall trip generation potential of the site on a daily or weekday peak hour basis above what is allowed by the City of Milwaukie's Comprehensive Plan.

- The proposed zoning map amendment will not require changes to the functional classification of existing or planned transportation facilities, will not require a change to the standards implementing the comprehensive plan, and will not significantly affect a transportation facility. Accordingly, because the proposed zoning map amendment does not increase the density of the site above what is allowed by the City of Milwaukie's Comprehensive Plan or result in a significant effect on the transportation system, no review of mitigation for Transportation Planning Rule (TPR) purposes is necessary.

The site location and overall vicinity are shown in **Figure 1**, and a conceptual site plan is shown in **Figure 2**.



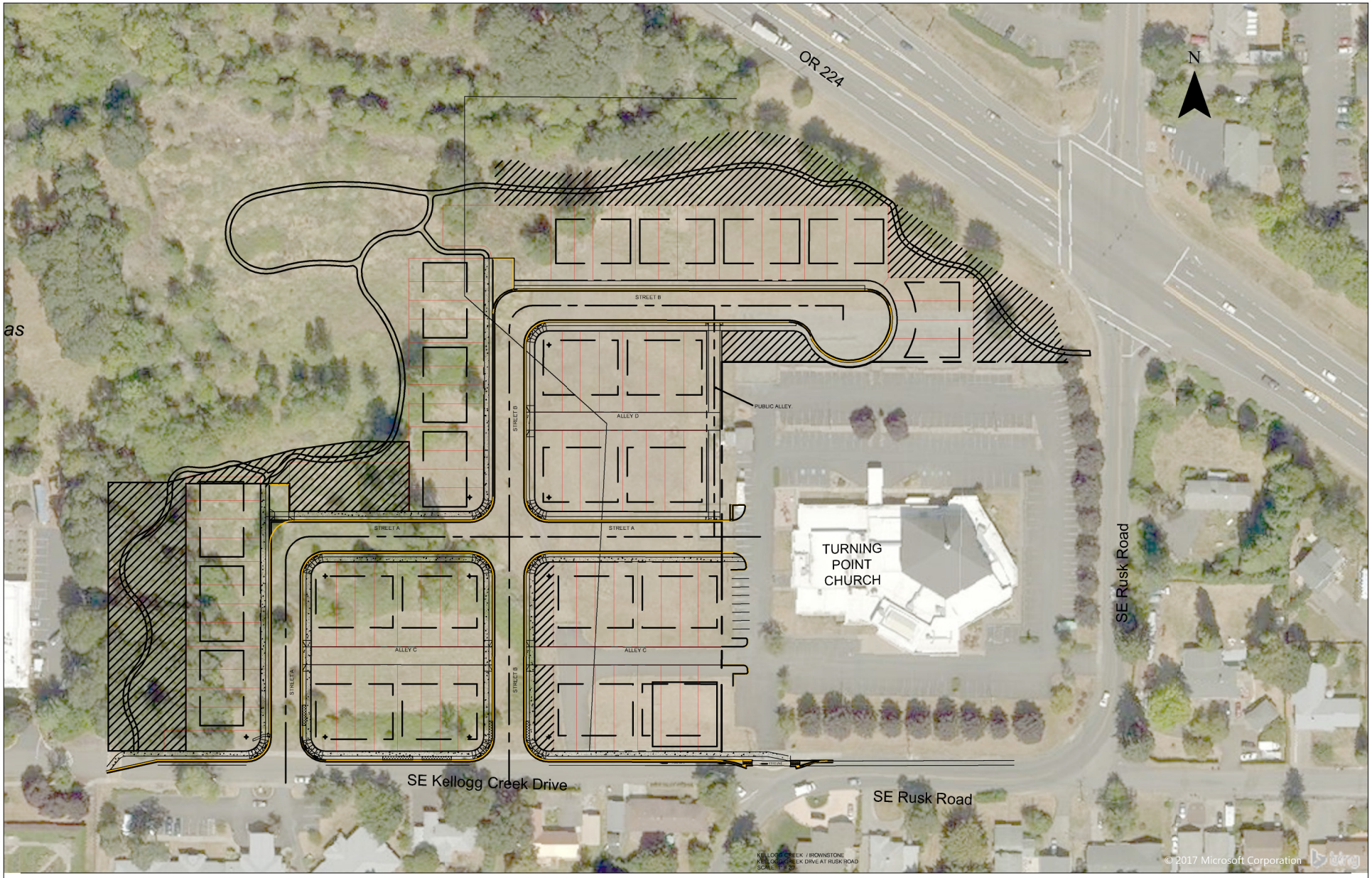


Site Vicinity Map
Milwaukie, Oregon

Figure
1

(##) - Study Intersections

H:\projfile\20703 - Kellogg Creek\dwgs\figs\20703_Figures.dwg Feb 07, 2017 - 5:17pm - kconnolly Layout Tab: Site Vicinity Map



Site Plan Provided By DOWL 2017-02-06

Proposed Site Plan
Milwaukie, Oregon

Figure
2

H:\projfile\20703 - Kellogg Creek\dwgs\figs\20703_Figures.dwg Feb 07, 2017 - 2:00pm - kconnolly Layout Tab: Proposed Site Plan

SCOPE OF THE REPORT

This report identifies the transportation-related impacts associated with the proposed development and was prepared in accordance with the City of Milwaukie, Clackamas County, and ODOT requirements. Per City, County, and ODOT staff direction, operational analyses were performed at the following study intersections during the weekday AM, midday, and PM peak periods:

- SE Rusk Road/OR-224
- SE Kellogg Creek Drive/SE Ruscliff Road
- SE Kellogg Creek Drive/Rusk Road
- SE Rusk Road/SE Aldercrest Road
- SE Kellogg Creek Drive/Church Driveway (this existing driveway become the East Site Driveway access once the development is complete)
- SE Kellogg Creek Drive/West Site Driveway (new)
- SE Rusk Road/Church Driveway
- OR-224/SE Webster Road

This report evaluates the following transportation issues:

- Existing land use and transportation system conditions within the site vicinity during the weekday AM, midday, and PM peak periods;
- Forecast year 2018 background traffic conditions during the weekday AM, midday, and PM peak periods, considering other development and transportation improvements planned in the study area;
- Trip generation and distribution estimates for the proposed development;
- Forecast year 2018 total traffic conditions during the weekday AM, midday and PM peak periods with build-out of the site;
- Review of applicable City of Milwaukie requirements, including sight distance, access standards, and turn-lane warrants; and
- Findings and recommendations.

Analysis Methodology

All level-of-service analyses described in this report were performed in accordance with the procedures stated in the *2000 Highway Capacity Manual* (HCM) (Reference 1). The peak 15-minute flow rates were used in the evaluation of all intersection levels of service (LOS) and volume-to-capacity ratios (v/c). For this reason, the analyses reflect conditions that are only likely to occur for 15 minutes out of each average peak hour (*refer to Attachment A for additional details*). Traffic conditions during typical weekday hours are expected to operate with lower levels of delay than

those described in this report. The operations analysis presented in this report was completed using Synchro 8 software.

Applicable Operating Standards

Chapter 8 of the *City of Milwaukie Transportation System Plan* (Reference 2) defines the minimum acceptable measure of effectiveness for intersections during the peak hour as LOS "D" for both signalized and stop-controlled intersections.

Chapter 5 of the *Clackamas County Comprehensive Plan* (Reference 3) sets performance evaluation standards for the urban area (Table 5-2a). Per these standards, a maximum volume-to-capacity ratio of 0.90 must be maintained during the midday peak hour and a maximum of 0.99 during the weekday PM peak hour.

The *Oregon Highway Plan* (OHP) (Reference 4) requires a maximum volume-to-capacity ratio of 0.99 at ODOT-maintained intersections.

Table 1 lists the study intersections, the responsible jurisdiction, and the corresponding operating standard.

Table 1. Operating Standards at Study Intersections

Study Intersection	Jurisdiction	Intersection Operating Standard
SE Rusk Road/OR-224	ODOT	Intersection V/C ≤ 0.99
SE Kellogg Creek Drive/SE Ruscliff Road	City of Milwaukie & Clackamas County	LOS "D" & Midday V/C ≤ 0.90, PM V/C ≤ 0.99
SE Kellogg Creek Drive/Rusk Road	City of Milwaukie & Clackamas County	LOS "D" & Midday V/C ≤ 0.90, PM V/C ≤ 0.99
SE Rusk Road/SE Aldercrest Road	City of Milwaukie & Clackamas County	LOS "D" & Midday V/C ≤ 0.90, PM V/C ≤ 0.99
SE Kellogg Creek Drive/Church Driveway	City of Milwaukie	LOS "D"
SE Kellogg Creek Drive/West Site Driveway (new)	City of Milwaukie	LOS "D"
SE Rusk Road/Church Driveway	City of Milwaukie & Clackamas County	LOS "D" & Midday V/C ≤ 0.90, PM V/C ≤ 0.99
OR-224/SE Webster Road	ODOT	Intersection V/C ≤ 0.99

EXISTING CONDITIONS

This section summarizes the existing characteristics of the transportation system and adjacent land uses in the vicinity of the proposed development, including an inventory of the existing multimodal transportation facilities and options, an evaluation of existing intersection operations for motor vehicles at the study intersections, and a summary of recent study intersection crash history.

Site Conditions and Adjacent Land Uses

The proposed site is located in the City of Milwaukie, although SE Rusk Road, the adjacent street to the property is one of the dividing lines between the City and unincorporated Clackamas County. The site is mostly open space, but includes the Turning Point Church and its surface parking lot. Today, there are two access points that serve the church: one located at the east end of the property on SE Rusk Road and one located on the south side of the property on SE Kellogg Creek Drive.

Transportation Facilities

Figure 3 illustrates the existing lane configurations and traffic control devices at the study intersections. **Table 2** summarizes the attributes of key roadways in the vicinity.

Table 2. Street Characteristics in Site Vicinity

Street	Classification	Motor Vehicle Travel Lanes	Posted Speed (mph)	Sidewalks	Striped Bicycle Lanes	On-Street Parking
OR-224	Regional Route[1] Principal Expressway[2]	5-6[3]	50	No	No	No
SE Rusk Road	Collector [1,2]	2	30	Partial[4]	No	Yes[5]
SE Kellogg Creek Drive	Local Street[1]	2	25	Yes[6]	No	South side
SE Ruscliff Road	Local Street[2]	2	25	No	No	Yes
SE Aldercrest Road	Local Street[2]	2	30	No	No	Yes[5]

[1]Per *City of Milwaukie Transportation System Plan*, Table 8-1 (Reference 2)

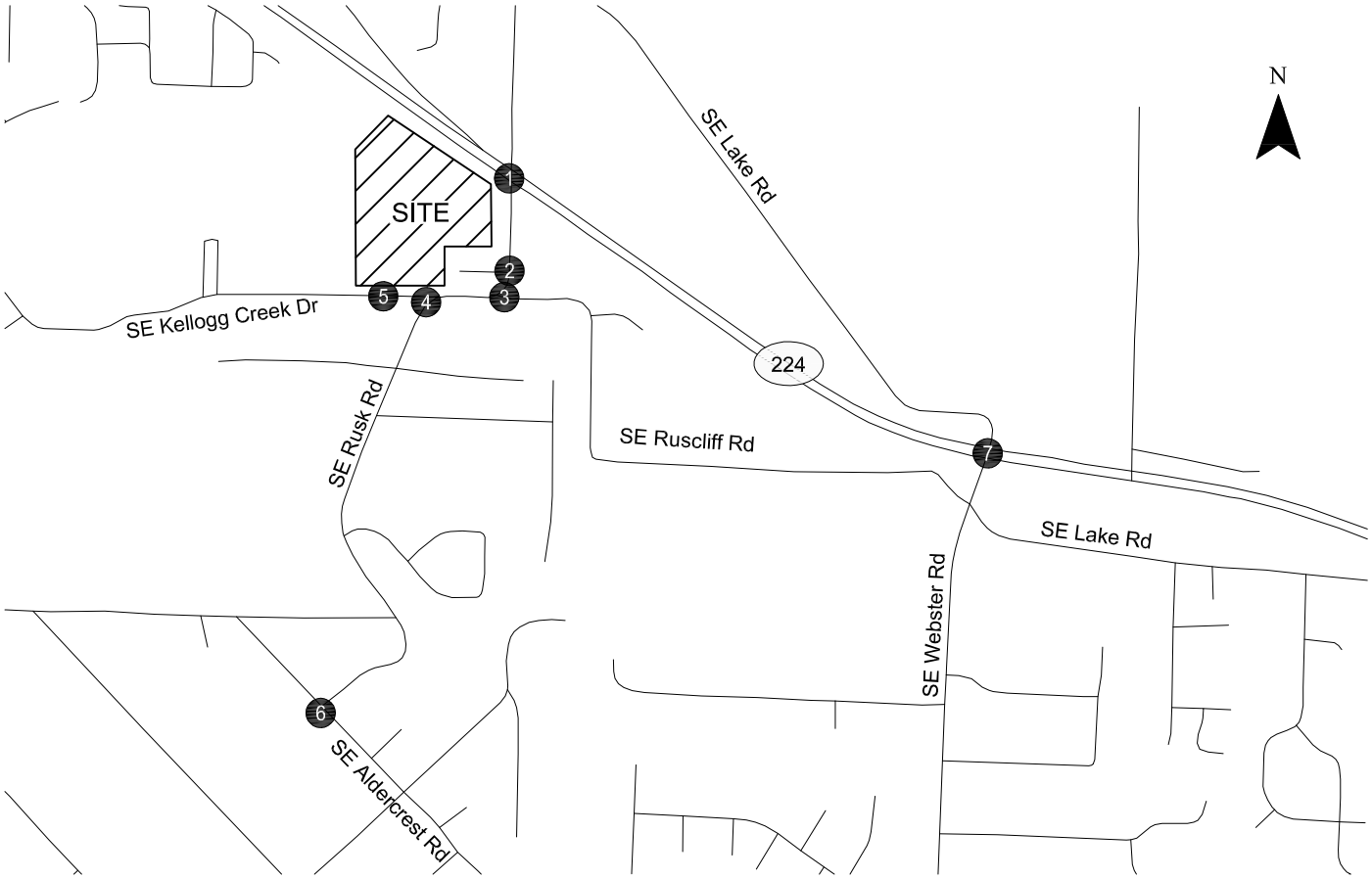
[2]Per *Clackamas County Comprehensive Plan*, Map 5-4a (Reference 3)

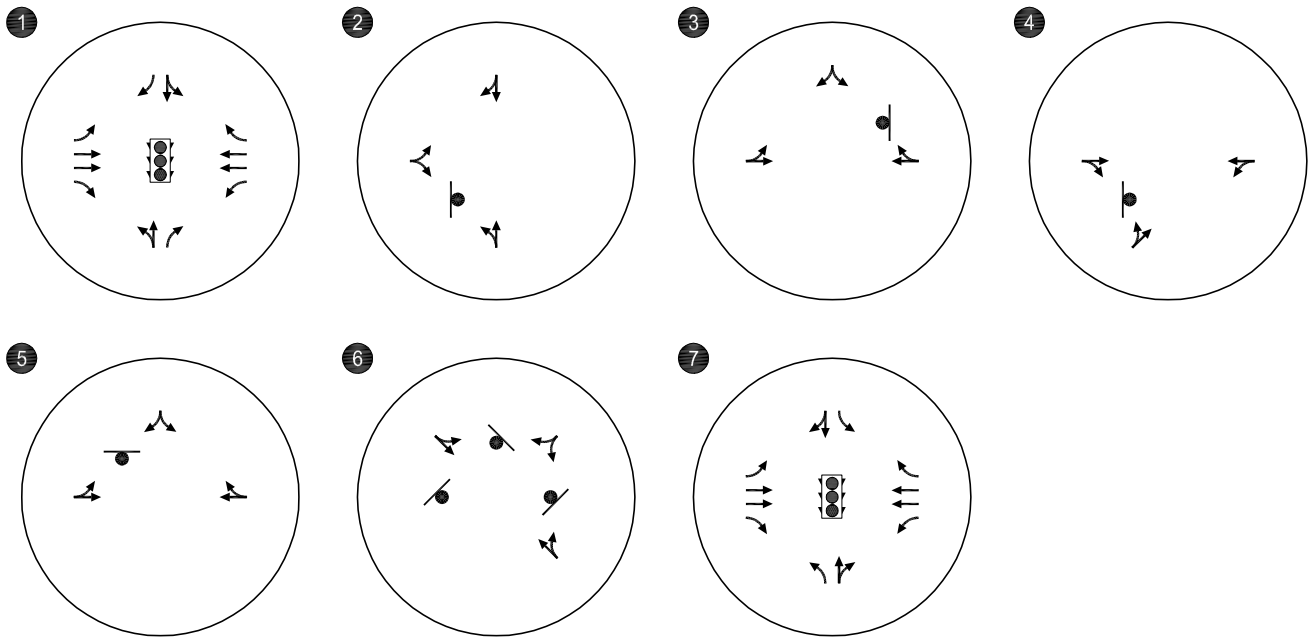
[3]OR-224 widens to a six-lane cross-section at the intersections of SE Rusk Rd and SE Webster to accommodate right-turn lanes.

[4]There is a sidewalk on the east side of SE Rusk Road between SE Eastbrook Drive and SE Robhil Drive. There is a sidewalk on the west side of SE Rusk Road from SE Eric Street north approximately 250'. There is a sidewalk on the north and west sides of SE Rusk Road from SE Kellogg Creek Drive to OR-224.

[5]Some on-street parking is available in front of homes and/or sections of sidewalk.

[6]There is no sidewalk on the south side of SE Kellogg Creek Drive between Deerfield Village Assisted Living and SE Rusk Road.





- STOP SIGN
- TRAFFIC SIGNAL

Existing Lane Configurations
& Traffic Control Devices
Milwaukie, Oregon

Figure
3

Roadway Cross Section Standards

The City of Milwaukie maintains typical cross-sections for roadways based on functional classification, as detailed in the City's *Transportation System Plan* (Reference 2). The typical cross-sections for collectors and local/neighborhood streets such as SE Rusk Road and SE Kellogg Creek Drive are shown in **Figure 4**.

Figure 4. Typical Collector and Local/Neighborhood Street Cross-Sections

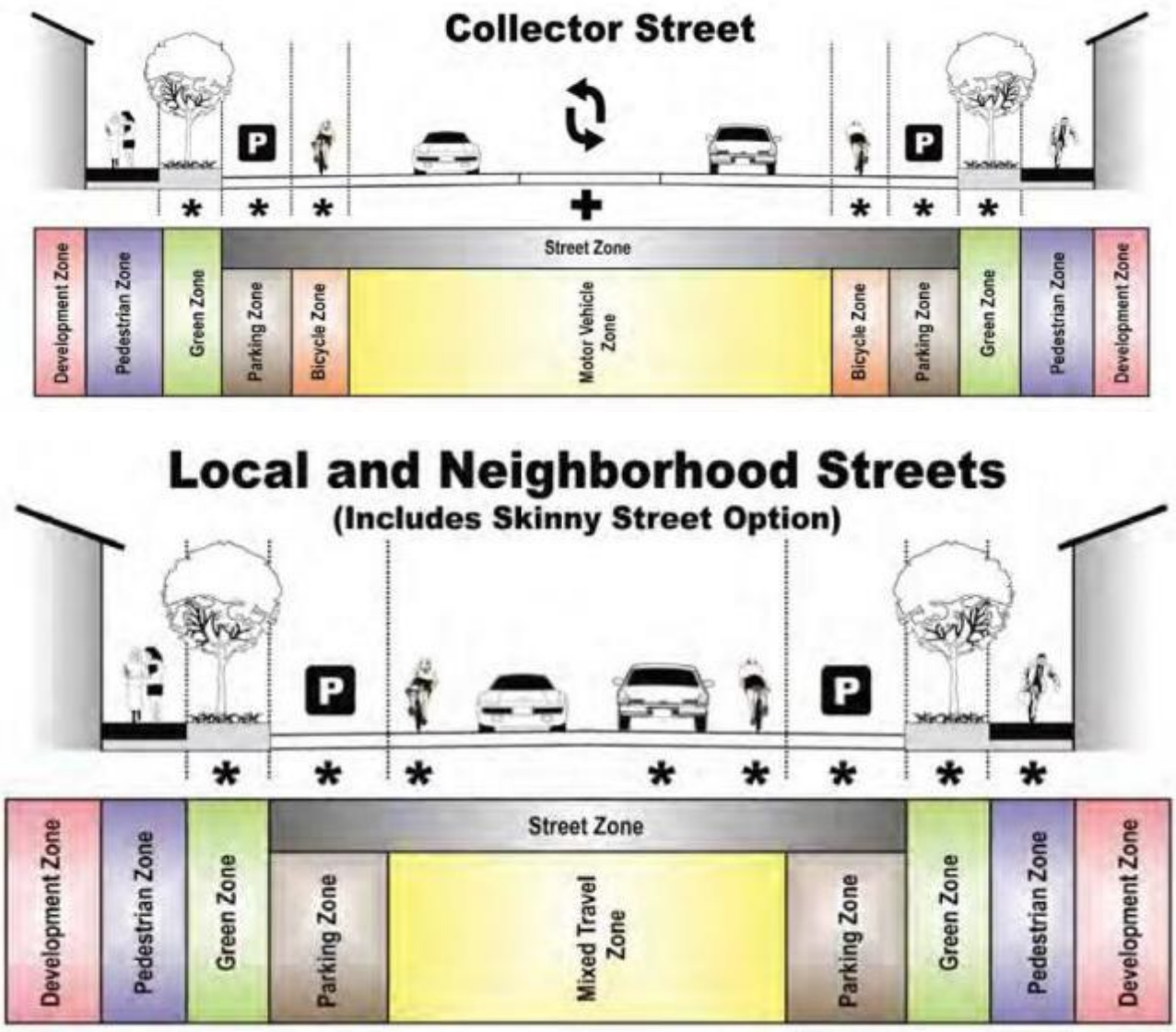


Image Source: City of Milwaukie *Transportation System Plan*, Figure 10-1

The asterisks shown in **Figure 4** indicate optional elements for constrained right-of-ways. The site frontages on SE Rusk Road and SE Kellogg Creek Drive abut a 25-foot existing half-street right-of-way and contain the sidewalk and a single travel lane. Subject to final City and County direction, the Applicant proposes to construct and dedicate an additional nine feet along the site's frontage consistent with this local and neighborhood street cross section. The Applicant's design team will

work closely with City and County staff to develop appropriate frontage improvements to the existing roadway sections along the site frontage.

Pedestrian Facilities

The entire site frontages on both SE Rusk Road and SE Kellogg Creek Drive have sidewalks along their lengths. There are painted crosswalks on three approaches (none on the eastern approach) of the OR-224/SE Rusk Road intersection. The north side of SE Rusk Road at the three-legged intersection with SE Kellogg Creek Drive has a curb bulb-out. The North Clackamas Park and the Milwaukie Community Center can be reached via sidewalk from the site, and there is a marked crosswalk at the entrance to the park. The closest pedestrian crossing of Mt. Scott Creek is via a trail through the park, which provides access to SE Casa Del Rey Drive and then a completed sidewalk access route to SE Lake Road west of OR-224.

Bicycle Facilities

No striped on-street bicycle facilities are provided within the project vicinity.

Transit Facilities

Per TriMet's online schedule, (Reference 5) weekday bus service is provided by TriMet Route 152 (Milwaukie) along SE Kellogg Creek Drive and SE Rusk Road between downtown Milwaukie and Clackamas Town Center from 6:30 AM to 6:30 PM. Headways change throughout the day and range from approximately 30 minutes during the AM, midday, and PM peak periods to 90 minutes during the late morning hours. The closest stop is across SE Kellogg Creek Drive from the site in front of the Deerfield Village Assisted Living facility (south of the study site).

TriMet Route 29 (Lake/Webster Road) operates along SE Lake Road between downtown Milwaukie and Clackamas Town Center approximately every 75 minutes on weekdays from 5:30 AM to 8:00 PM. The closest stop to the site is at the intersection of SE Rusk Road/SE Lake Road on the north side of OR-224, slightly less than ½-mile away.

TriMet Route 30 (Estacada) operates along OR-224 between Estacada and downtown Portland via Clackamas Town Center once per weekday in each direction. The closest stop to the site is at the intersection of SE Webster Road/SE Lake Road.

Safe Walk Paths to Schools

Alder Creek Middle School is the only school in the North Clackamas School District that is located within a one-mile walk of the proposed development. According to the Safe Walk Paths to School area of the North Clackamas School District website (Reference 6), there is no route that been identified as safe from the proposed development to Alder Creek Middle School. The closest point on a route that has been identified begins on SE Eric Street east of the intersection with SE Rusk Road.

From this locations, students can walk east on SE Eric Street, south on SE Briarfield Court, and then east on a combination of off-street dirt paths to reach the west side of the school near the ball fields.

Crash History Analysis

Reported crash history for each study intersection was reviewed in an effort to identify potential intersection safety issues. Reported crash data for the study intersections were obtained from ODOT for the three-year period from January 1, 2012 through December 31, 2014. **Table 3** summarizes the crashes reported at the study intersections. The majority of the reported crashes observed in the site vicinity have occurred at the intersection of OR-224/SE Webster Road. *Attachment "B" contains the ODOT crash data.*

Table 3. Intersection Crash History (January 1, 2012 through December 31, 2014)

Intersection	Collision Type					Severity			Total Crashes
	Rear End	Turning	Sideswipe	Angle	Back	PDO[1]	Injury	Fatality	
OR-224/ SE Rusk Road	2	0	0	1	0	1	2	0	3
OR-224/ SE Webster Road	8	11	6	3	0	12	16	0	28
SE Rusk Road/ SE Ruscliff Road	0	1	0	0	0	1	0	0	1
SE Rusk Road/ SE Kellogg Creek Drive	0	2	0	0	0	2	0	0	2
SE Rusk Road/ SE Aldercrest Road	0	0	0	0	0	0	0	0	0

[1]PDO – Property damage only

Critical crash rates were calculated for each of the study intersections following the analysis methodology presented in ODOT's *SPR 667 Assessment of Statewide Intersection Safety Performance* (Reference 7). SPR 667 provided average crash rates at a variety of intersection configurations in Oregon based on number of approaches and traffic control types. The average crash rate represents the approximate number of crashes that are "expected" at a study intersection. Additionally, this average crash rate was used to calculate the critical crash rate for each study intersection, based on the *Highway Safety Manual* methodology (Reference 8). The critical crash rate is calculated for each intersection based on the average crash rate for each facility and serves as a threshold for further analysis.

Table 4 summarizes the critical crash rate for each intersection and compares those values to the observed crash rate. Per ODOT, if the observed crash rate at the study location exceeds the critical rate, it is a possible indication that the location is exceeding average crash rates. As shown in **Table 4**, the observed crash rate at all intersections is less than the critical crash rates.

Table 4. Intersection Crash Rate Assessment

Location	Total Crashes	Critical Crash Rate by Intersection	Critical Crash Rate by Volume	Observed Crash Rate at Intersection	Observed Crash Rate>Critical Crash Rate?
OR-224/SE Rusk Road	3	0.67	0.58	0.05	No
OR-224/SE Webster Road	28	0.66	0.57	0.37	No
SE Rusk Road /SE Ruscliff Road	1	0.48	0.50	0.11	No
SE Rusk Road/SE Kellogg Creek Drive	2	0.46	0.48	0.20	No
SE Rusk Road/SE Aldercrest Road	0	0.48	0.50	0.00	No

No safety-based mitigations were identified for implementation in conjunction with the proposed Kellogg Creek Townhome development based on review of the historic crash data alone. A review of intersection sight distance is provided below.

Existing Access Point Sight Distance

Section 240 of the *Clackamas County Roadway Design Standards* (Reference 9) establishes the intersection sight distance requirements associated with the existing church/shared site driveway on SE Kellogg Creek Drive and the driveway on SE Rusk Road[1]. Based on the field-measured sight distance, neither existing access point meets the County's sight distance requirements for a side street left-turn from a stop as documented in **Table 5**.

Table 5. Existing Intersection Sight Distances

Intersection	Measured Sight Distance - Facing Right (feet)	Measured Sight Distance - Facing Left (feet)	Speed (MPH)[1]	Desired Minimum Intersection Sight Distance (feet)[2]	Adequate?
SE Rusk Road/Church East Driveway	150	350	35	390[2]	No
SE Kellogg Creek Drive/Church South Driveway	> 500	215	30	335[2]	No

[1] MPH = miles per hour
[2] Desired minimum sight distance based on Clackamas County Roadway Standards, Section 240 and design speed per Section 250.1.2.c.2

The existing SE Rusk Road church driveway is signed for one-way inbound movement and has sufficient sight distance for one-way ingress only. Egress movements were recorded at the driveway despite the one-way signing. Regardless of the proposed site development, it may be appropriate for

[1] Clackamas County Roadway Standards Section 250.1.2.c.2 defines the design speed of roadways as the existing regulatory speed plus five mph. Per Section 240 Table 2-6, a roadway with a design speed of 30 mph (SE Kellogg Creek Drive) shall have an intersection sight distance of 335 feet for a left-turn from a stop while a roadway with a design speed of 35 mph (SE Rusk Road) shall have an intersection sight distance of 390 feet for a left-turn from a stop. Per Section 240.4, intersection sight distance shall typically be measured from a driver's eye height of 3.5 feet and 14.5 feet from the edge of the nearest travel lane to an object height of 3.5 feet above the roadway surface.

the church to provide additional signage or a physical barrier to prevent vehicles from exiting the church driveway onto SE Rusk Road. Signage could include a "DO NOT ENTER" (R5-1) and/or a "ONE WAY" (R6-1) installed as per the MUTCD (Reference 10).

While the existing church access location onto SE Kellogg Creek Drive does not satisfy County sight distance standards per *Clackamas County Roadway Standards* Section 240.4, it is proposed to be vacated and relocated further west as described later in this report.

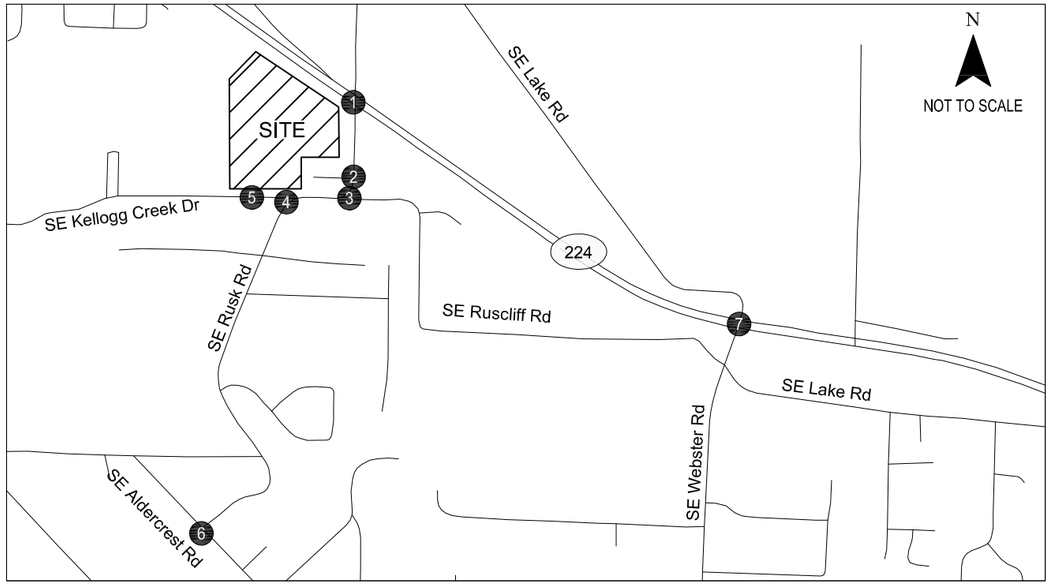
Existing Conditions Operational Analysis

Manual turning movement counts were collected at the study intersections in November 2016. Traffic counts were collected during the weekday morning (7:00 AM to 9:00 AM), midday (11:00 AM to 1:00 PM), and evening (4:00 PM to 6:00 PM) peak periods. ODOT provided traffic signal phasing and timing for the OR-224/SE Rusk Road and OR-224/SE Webster Road intersections.

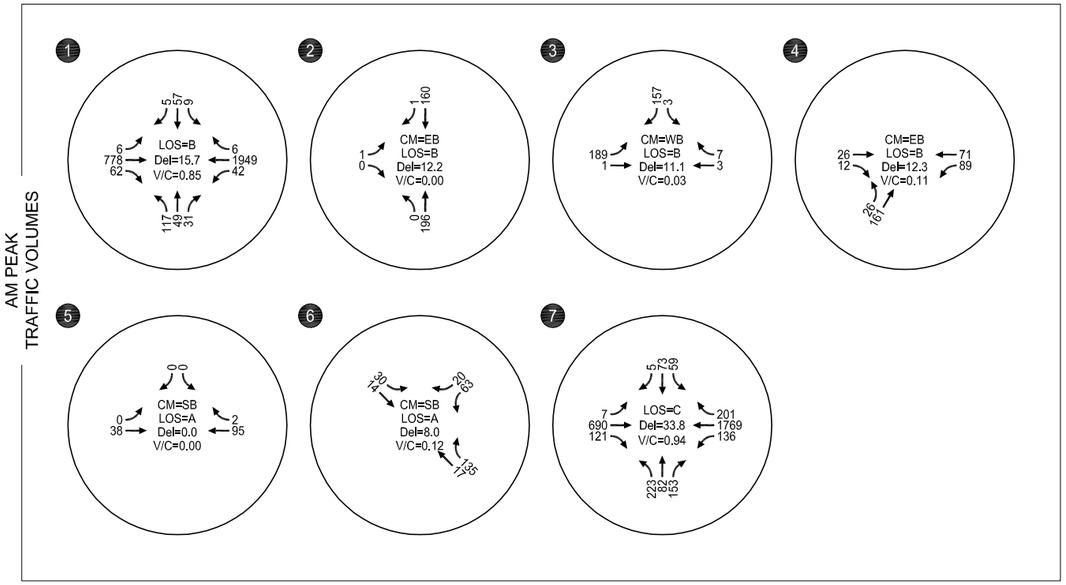
Per the traffic counts collected, weekday morning, midday, and evening operations were evaluated using system-wide peak hours of 7:35 AM to 8:35 AM, 11:55 AM and 12:55 PM, and 4:25 PM to 5:25 PM, respectively. *Attachment C contains the traffic count worksheets.*

Figure 5 summarizes the existing traffic conditions at the study intersections during the weekday AM, midday, and PM peak hours. As shown in **Figure 5**, all intersections operate within applicable City, County, and ODOT standards during all three peak hours. *Attachment D includes the existing operations analysis worksheets.*

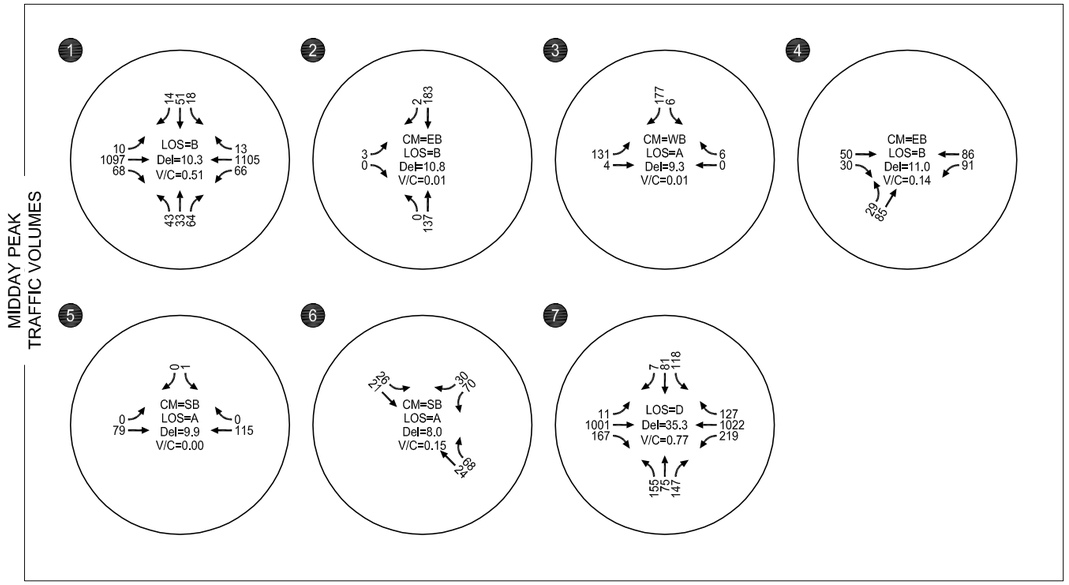
West of the site on SE Kellogg Creek Drive, there is access to North Clackamas Park. The counts conducted in November did not capture peak summer park activity. However, the SE Kellogg Creek Drive/SE Rusk Road intersection operates at LOS "B" during the weekday AM, midday, and PM peak hours. The increased summer park traffic is not expected to degrade peak hour intersection operations below acceptable levels (LOS "D") in part because the typical peak for park users is after the evening (4:00 PM to 6:00 PM) peak for adjacent street traffic.



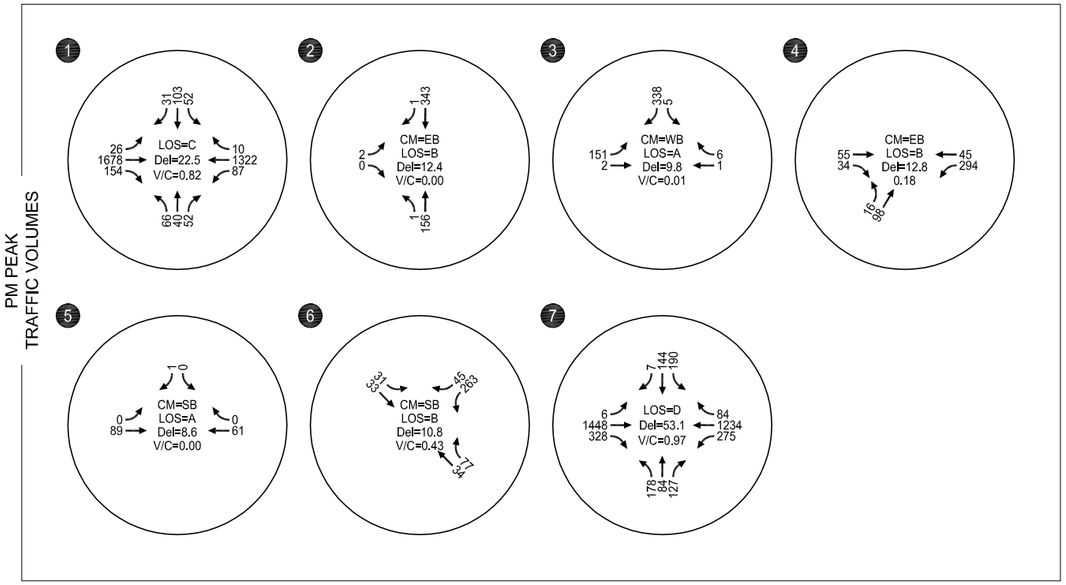
AM PEAK TRAFFIC VOLUMES



MIDDAY PEAK TRAFFIC VOLUMES



PM PEAK TRAFFIC VOLUMES



CM = CRITICAL MOVEMENT (TWSC)
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AWSC= ALL-WAY STOP CONTROL

Existing Traffic Conditions
AM, Midday & PM Peak Hours
Milwaukie, Oregon

Figure 5

TRAFFIC IMPACT ANALYSIS

The traffic impact analysis identifies how the study area's transportation system would operate in the year 2018 upon development of the site. This section of the report includes analysis of 2018 background traffic volumes and operations, an estimate of site-generated trips, and analysis of 2018 total traffic volumes and operations with the proposed development.

2018 Background Operational Analysis

Background traffic volumes include changes in volumes due to added trips from in-process developments in the vicinity of the site as well as general regional growth. Per direction from City of Milwaukie staff, no planned transportation improvements or in-process developments are included in the background traffic analysis and a 0.61 percent compounded annual growth rate[2] was applied to the existing traffic volumes to reflect near-term growth. This results in a background growth rate of 1.22 percent.

Figure 6 illustrates the 2018 background traffic volumes and corresponding operational analysis for the weekday AM, midday, and PM peak hours. As shown, all of the intersections are expected to continue to satisfy applicable City, County, and ODOT standards under background conditions. *Attachment E includes the 2018 background operations analysis worksheets.*

PROPOSED DEVELOPMENT PLAN

The proposed site redevelopment will provide a total of 92 townhomes. The existing access point on SE Kellogg Creek Drive will be vacated and replaced with two new access points farther to the west.

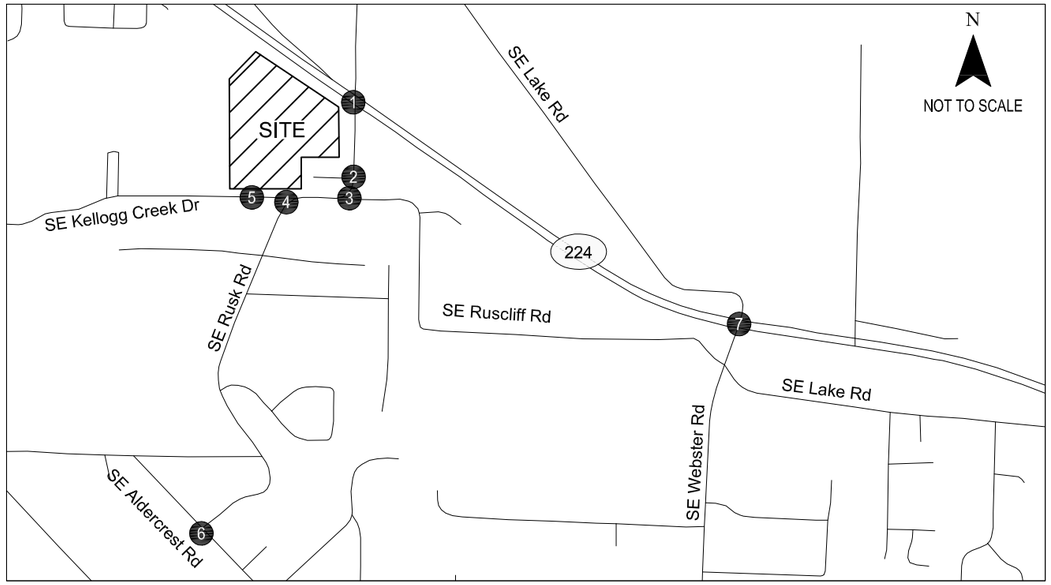
Trip Generation Estimate

Trip generation estimates associated with the proposed townhomes were developed based on townhome trip rates included in the *Trip Generation Manual*, 9th Edition (Institute of Transportation Engineers, 2012) (Reference 11). **Table 6** summarizes the estimated trip generation for the proposed development. Based on direction from Clackamas County, the weekday PM peak hour trip generation rates were used for the weekday midday peak hour estimates as shown in **Table 6.** Midday trip rate data is not available through the *Trip Generation Manual*.

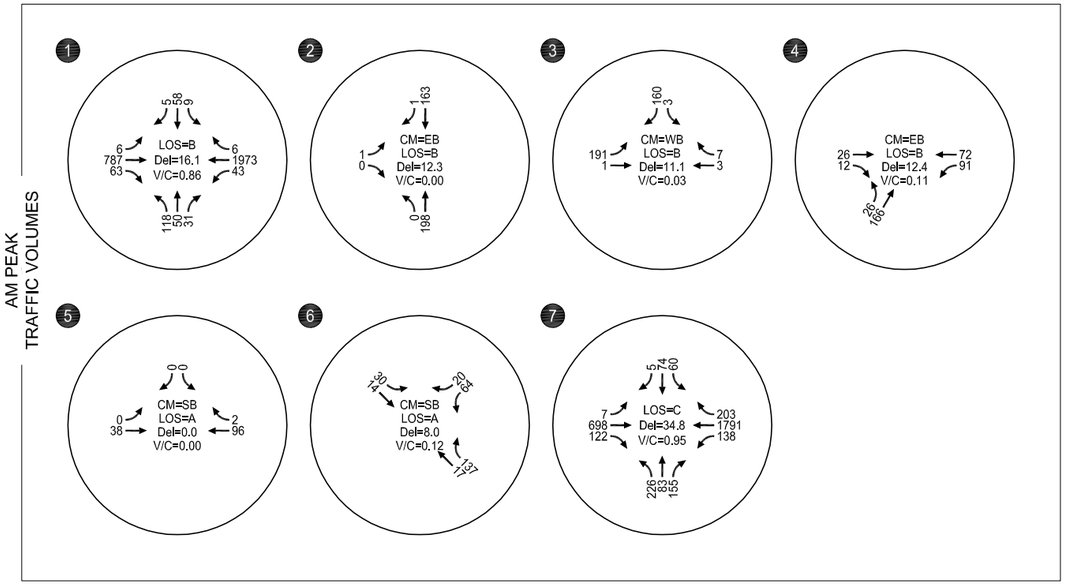
Table 6. Trip Generation with Development

Land Use	ITE Code	Size	Total Daily Trips	Weekday AM Peak Hour			Weekday Midday Peak Hour			Weekday PM Peak Hour		
				Total Trips	In	Out	Total Trips	In	Out	Total Trips	In	Out
Townhome	230	92 units	536	40	7	33	48	32	16	48	32	16

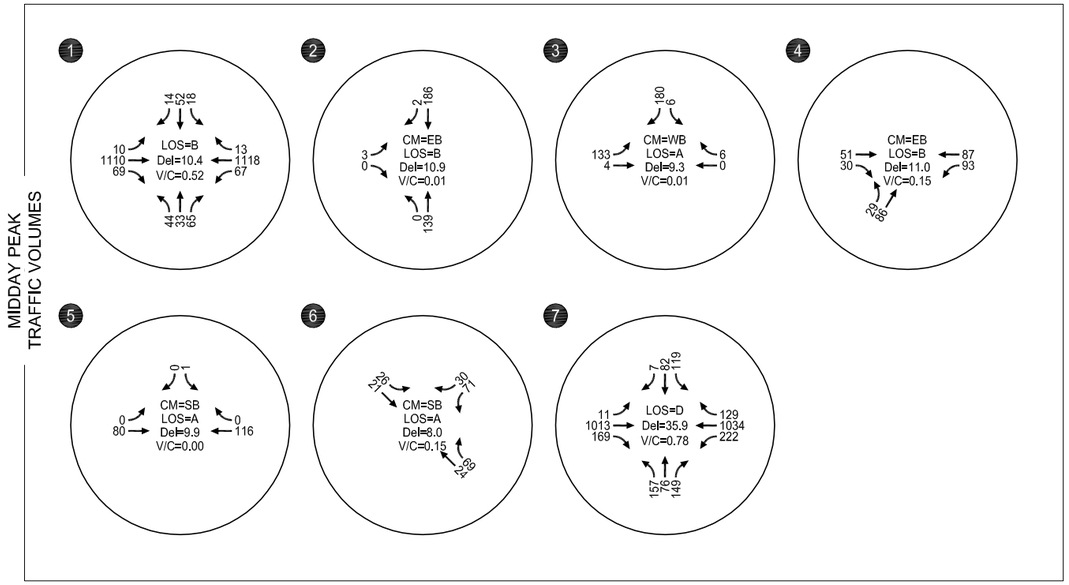
[2] Annual traffic growth rate as described in the City of Milwaukie's *Transportation System Plan*. Chapter 4, page 4-6. November 2013.



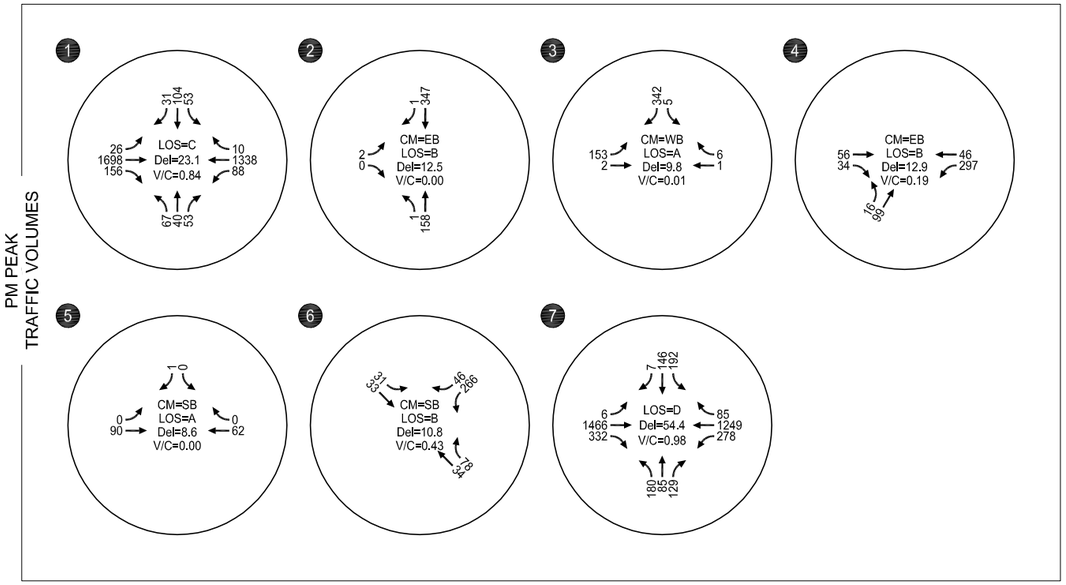
AM PEAK TRAFFIC VOLUMES



MIDDAY PEAK TRAFFIC VOLUMES



PM PEAK TRAFFIC VOLUMES



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2018 Background Traffic Conditions
AM, Midday & PM Peak Hours
Milwaukie, Oregon

Figure
6

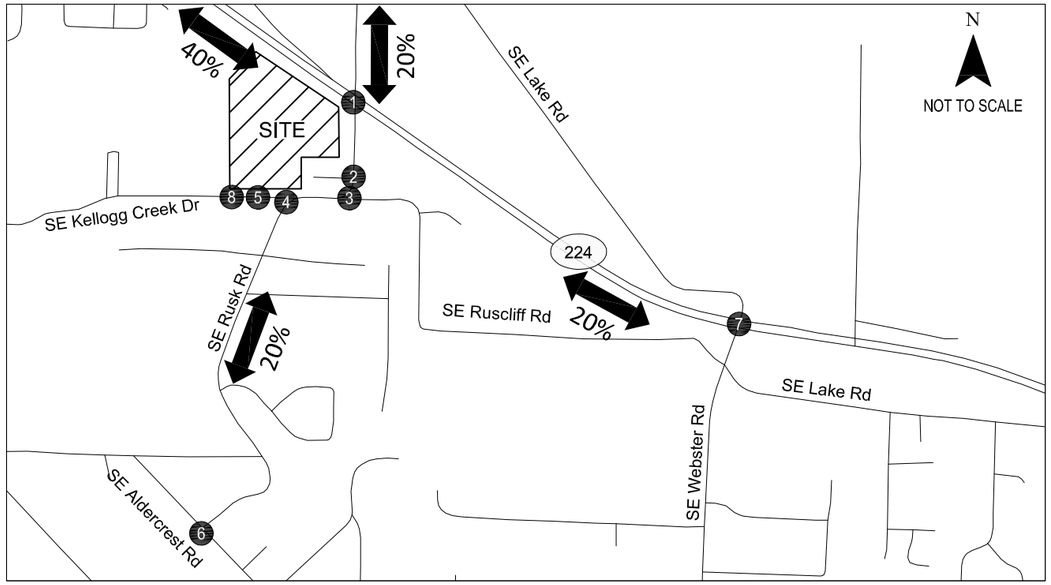
Trip Distribution/Assignment

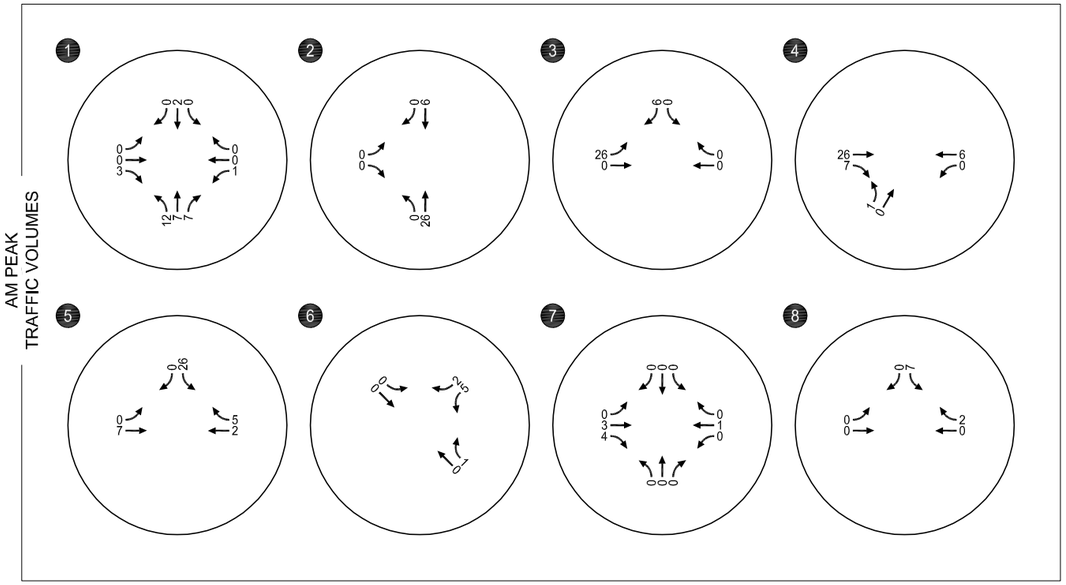
A trip distribution pattern was identified for the site considering existing traffic patterns at the study intersections. The traffic assignment at the intersection of OR-224/SE Rusk Road was determined based on the existing trip distribution shown from the turning movements counts collected for the traffic impact study. Approximately 20 percent of site-generated traffic was assigned to travel south on SE Rusk Road, which is approximately the same percentage of existing trips that turn right onto SE Rusk Road from SE Kellogg Creek Drive. Site-generated traffic was assigned to the study intersections based on the estimated distribution pattern. **Figure 7** shows the proposed trip distribution and the net new site-generated trips at each study intersection for the weekday AM, midday, and PM peak hours.

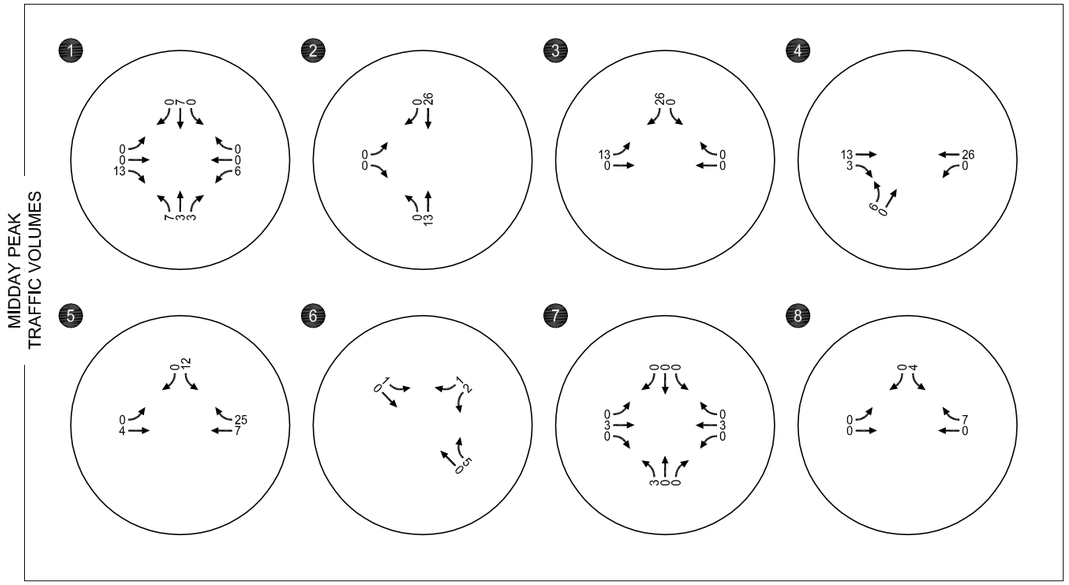
Year 2018 Total Traffic Conditions

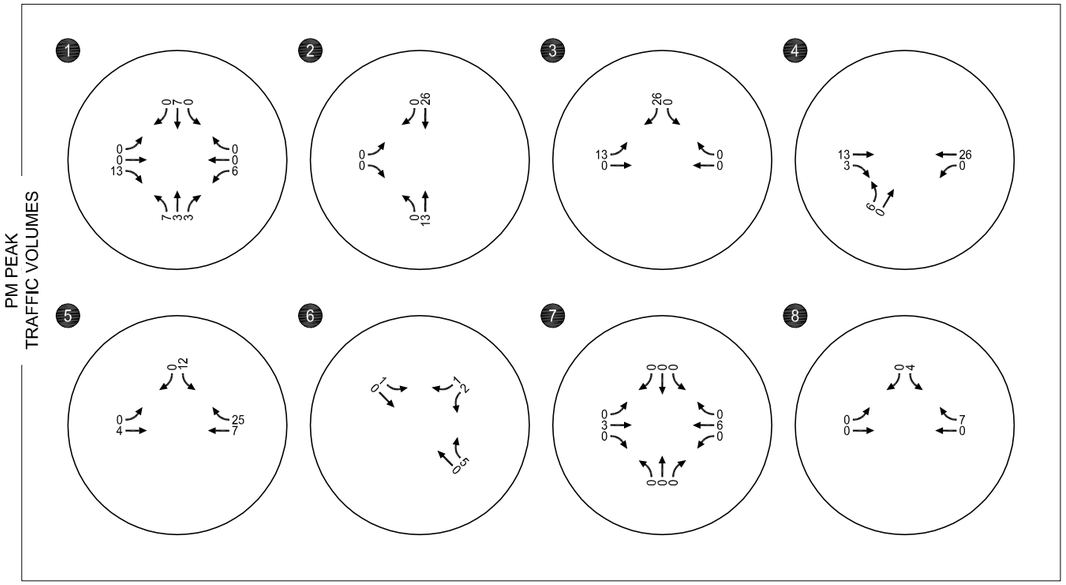
The total traffic conditions analysis forecasts the operation of the study area's transportation system with the inclusion of traffic generated by the proposed site development. Total traffic conditions were determined by adding the estimated site-generated traffic to the year 2018 background volumes for the weekday AM, midday, and PM peak hours. **Figure 8** illustrates the 2018 total traffic conditions and corresponding operational analysis for the weekday AM, midday, and PM peak hours.

As shown, all of the intersections are expected to continue to satisfy applicable City, County, and ODOT standards under background conditions. The intersection of SE Kellogg Creek Drive/SW Rusk Road would operate at LOS "B" during the weekday AM, midday, and PM peak hours, satisfying the operating standard of LOS "D". In addition, the v/c ratio at this location would be well below the Clackamas County operating standard for the weekday midday and PM peak hours. *Attachment F includes the 2018 total traffic operations analysis worksheets.*





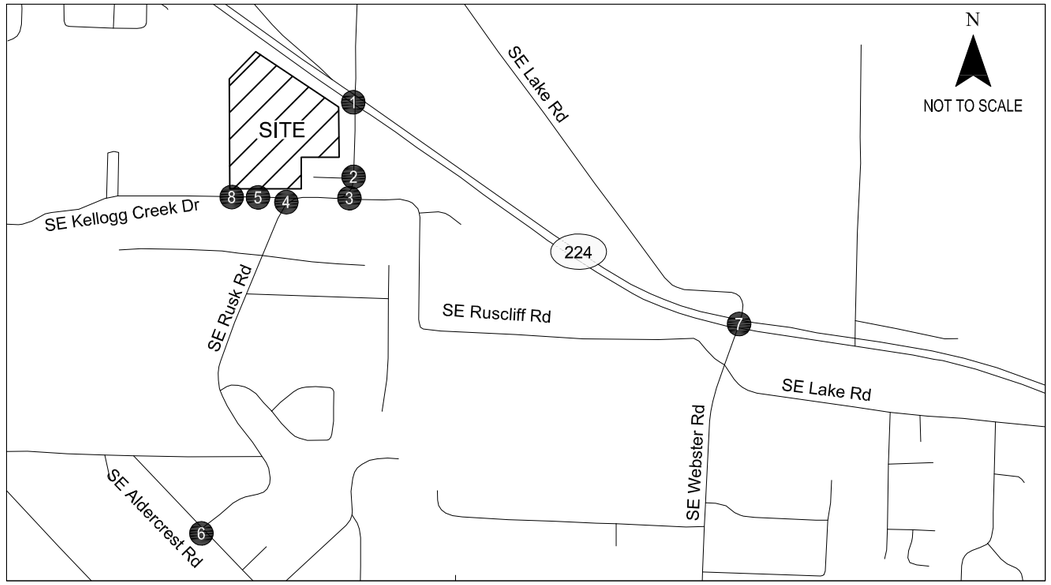




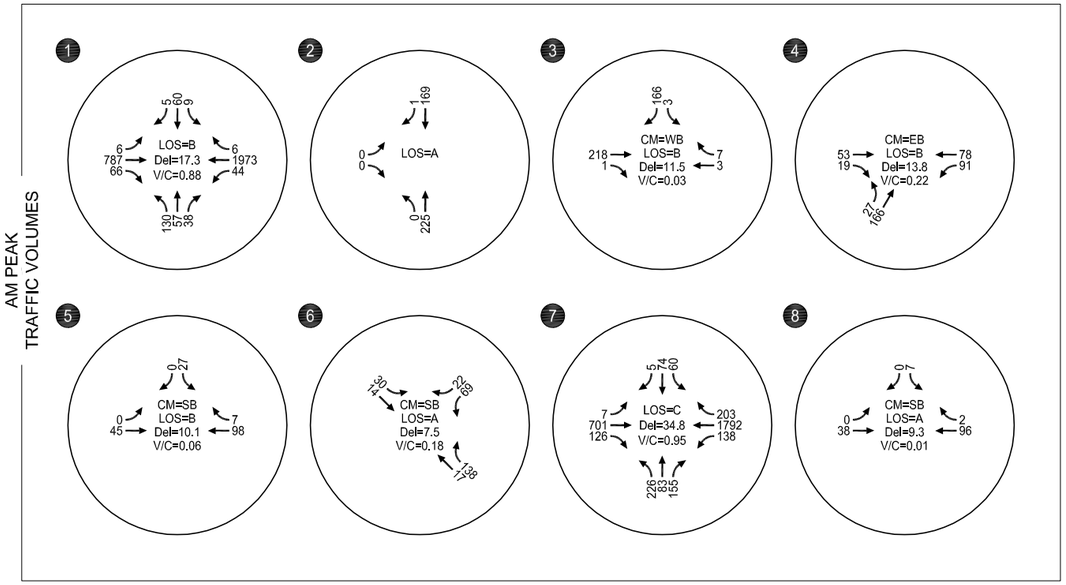
Estimated Trip Distribution Pattern and Site-Generated Trip Assignment
AM, Midday & PM Peak Hours
Milwaukie, Oregon

Figure
7

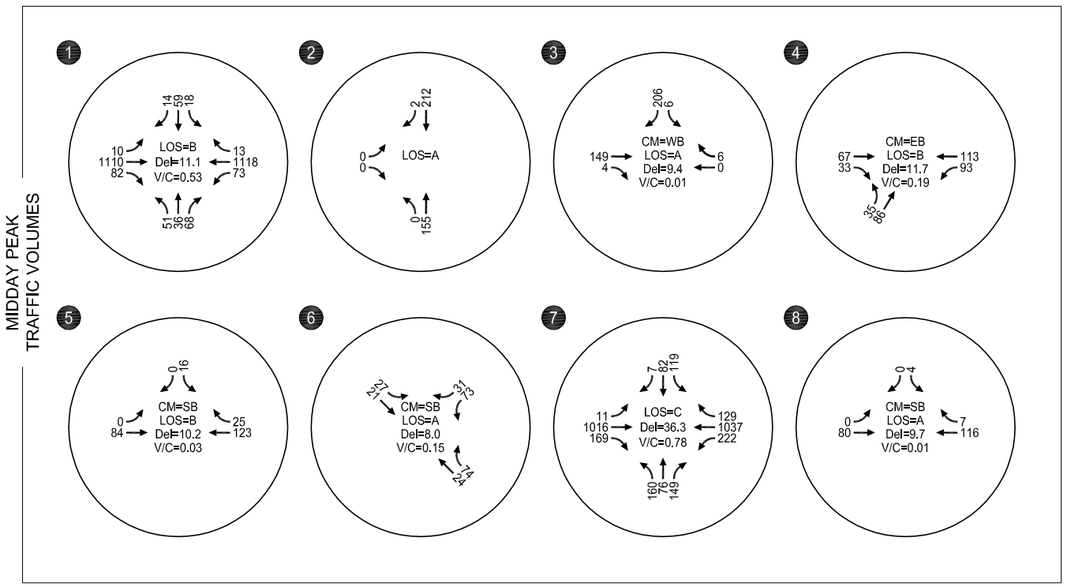
H:\projfile\20703 - Kellogg Creek\dwgs\Figs\20703_Figures.dwg Feb 06, 2017 - 2:29pm - kconnolly Layout Tab: Prop Dist and Site Traff 11x17



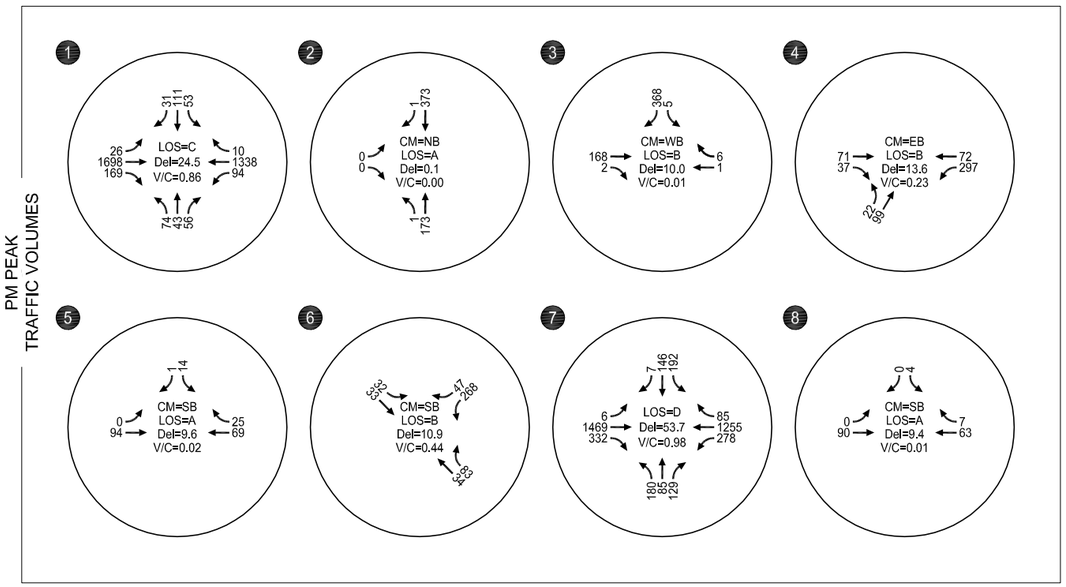
AM PEAK TRAFFIC VOLUMES



MIDDAY PEAK TRAFFIC VOLUMES



PM PEAK TRAFFIC VOLUMES



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2018 Total Traffic Conditions
AM, Midday & PM Peak Hours
Milwaukie, Oregon

Figure
8

Year 2018 Queuing Analysis

Per Section 19.704.3 and Section 295.16 of the *City of Milwaukie Municipal Code* (Reference 12) and the *Clackamas County Roadway Design Standards*, respectively, 95th percentile queuing at the study intersections site were assessed during the weekday AM, midday, and PM peak hours. The results of this 95th percentile queue length analysis are included in **Table 7**. As shown in the table, the all but two of the projected 95th percentile queues can be accommodated at the study intersections.

Table 7. Summary of 95th Percentile Queues, 2018 Total Traffic Conditions

Intersection	Movement	Available Queue Storage (feet)	95th Percentile Queue (feet)			Queue Storage Adequate?
			Weekday AM Peak Hour	Weekday Midday Peak Hour	Weekday PM Peak Hour	
OR-224/ SE Rusk Road	EBL	470	25	25	55	Yes
	EBR	110	25	25	80	Yes
	WBL	455	40	95	130	Yes
	WBR	100	0	0	0	Yes
	NBLT	415	265	100	190	Yes
	NBR	50	0	35	35	Yes
	SBLT	745	95	90	205	Yes
	SBR	75	0	0	25	Yes
SE Rusk Road/ SE Ruscliff Road	WBLR	360	25	25	25	Yes
SE Rusk Road/ SE Kellogg Creek Drive	EBLR	> 100	25	25	25	Yes
SE Rusk Road/ East Site Driveway	SBLR	75	25	25	25	Yes
SE Rusk Road/ West Site Driveway	SBLR	75	25	25	25	Yes
SE Rusk Road/ SE Aldercrest Road	EBLT	Continuous	-	-	-	Yes
	WBTR	Continuous	-	-	-	Yes
	SBLR	Continuous	-	-	-	Yes
OR-224/ SE Webster Road	EBL	500	25	25	25	Yes
	EBR	360	25	115	130	Yes
	WBL	295	175	220	410	No
	WBR	150	70	35	25	Yes
	NBL	155	360	215	290	No
	SBL	330	105	150	315	Yes

Where: EB = eastbound, WB = westbound, NB = northbound, SB = southbound, L = left-turn, T= through, R = right-turn

As shown in **Table 7**, all 95th percentile queues during year 2018 total traffic conditions would be accommodated by the available storage with the exception of the westbound left-turn lane on OR-224 at SE Webster Road during the weekday PM peak hour and the northbound left-turn lane on OR-224 at SE Webster Road during all three weekday peak hours.

The westbound left-turn on OR-224 at SE Webster Road currently exceeds the available storage during existing weekday PM peak hour conditions as well as year 2018 background conditions. The

westbound left-turn 95th percentile queue during the weekday PM peak hour year 2018 background conditions is estimated at approximately 410 feet long. The proposed development would not add any additional vehicles to the westbound left-turn movement during the weekday PM peak hour under year 2018 total traffic conditions and the 95th percentile queue length would not be expected to increase as a function of site development.

The northbound left-turn on OR-224 at SE Webster Road currently exceeds the available storage during all three existing peak hour conditions and extends south of the signalized intersection of SE Webster Road/SE Lake Road. The reported available storage (155 feet) was measured as the distance between the OR-224/SE Webster Road intersection and SE Webster Road/SE Lake Road, the intersection to the south. The 95th percentile queue would continue to exceed the available storage during all three peak hour year 2018 background conditions. The proposed development would add three additional vehicles to the northbound left-turn movement under year 2018 total traffic conditions during the weekday midday peak hour and the 95th percentile queue length would be expected to increase by less than a vehicle length as a function of site development.

Intersection Sight Distance

Section 240 of the *Clackamas County Roadway Design Standards* (Reference 9) establishes the intersection sight distance requirements associated with the proposed driveways along SE Kellogg Creek Drive. Per Table 2-6 of Section 240 of the *Clackamas County Roadway Design Standards,* an intersection sight distance of 335 feet shall be provided for a left turn from a stop on a road with a 30 mile per hour design speed (posted 25 mph speed).

Intersection sight distance was observed at the proposed west site driveway on SE Kellogg Creek Drive and was found to be in excess of 400 feet in both directions, which would satisfy the County standard. Intersection sight distance was observed at the proposed east site driveway on SE Kellogg Creek Drive and was found to be at least 400 feet to the west and at least 400 feet to the east for vehicles traveling west on SE Rusk Road. However, sight distance for a southbound left-turn at the driveway would be approximately 300 feet facing east towards a vehicle northbound on SE Rusk Road turning left onto SE Kellogg Creek Drive. The northbound left-turn vehicles on SE Rusk Road are required to yield to southbound vehicles on SE Rusk Road. Based on a field review of traffic and vehicular speeds entering SE Kellogg Creek Drive from SE Rusk Road, 300 feet is sufficient intersection sight distance for the southbound left-turn at the driveway because vehicles negotiating a left turn onto SE Kellogg Creek Drive would be operating at less than 20 miles per hour. The 25-foot radius of the curve corresponds to a design speed of approximately 11 miles per hour (NCHRP Report 6-72, Reference 15). Furthermore, the required minimum stopping sight distance for a northbound left-turn vehicle traveling at 20 miles per hour is 115 feet per Table 2-10 of Section 240 of the *Clackamas County Roadway Design Standards,* which will be satisfied.

Analysis of Access Standards

Per Section 12.16.040 of the *City of Milwaukie Municipal Code* (Reference 12) driveway access to the nearest intersecting street face shall be a minimum of 45 feet. The nearest proposed driveway on SE

Kellogg Creek Drive is located approximately 275 feet from SE Rusk Road, which satisfies the City standard.

Evaluation of Compliance with Metro RTFP Requirements

Metro's *Regional Transportation Functional Plan* (RTFP) (Reference 13) describes the requirements for developable lots and parcels of five or more acres in Sections 3.08.110.D and 3.08.110.E. In regards to Subsection D, the proposed development identifies a logical and direct connection to the public street system at SE Kellogg Creek Drive. In regards to Subsection E, the proposed development will be providing street connections that are no more than 530 feet between connections, and a cul-de-sac design that is limited to connect to the existing street system because of an existing barrier (OR-224), is less than 200 feet in length, and contains fewer than 25 dwellings.

TRANSPORTATION PLANNING RULE (TPR) COMPLIANCE

The TPR implements Statewide Planning Goal 12, "Transportation." OAR Section 660-012-0060(1) and (2) apply to zoning map changes. OAR 660-012-0060(9) exempts zoning map amendments in cities with acknowledge transportation system plans ("TSPs") that implement the plan map designations. This section addresses both requirements.

OAR 660-012-0060(1) and (2) established a two-step process for evaluating an amendment's impacts on roadway facilities. The first step in assessing an amendment's potential transportation impact is to compare the trip generation potential of the site assuming a "reasonable worst-case" development scenario under the existing and proposed zoning. If the trip generation potential increases under the proposed zoning, additional operational analysis is required to assess whether the rezone will "significantly affect" the transportation system. Conversely, if the trip generation under the proposed zoning is equal to or less than that under the existing zoning, no additional operational analysis is necessary to conclude that the proposal does not "significantly affect" the transportation system.

Zoning Map Amendment

Under the City of Milwaukie's current zoning code, the existing site is allowed to develop 96 units of townhome housing. The Applicant proposes to develop 92 units using a Planned Development (PD) process that increases the site density but retains the existing Comprehensive Plan designation. Therefore, further operations assessment under TPR is not necessary.

FINDINGS AND RECOMMENDATIONS

Based on the results of the traffic impact analysis, the proposed development can be constructed while maintaining acceptable operations at the study intersections. The analysis developed the following findings and recommendations.

Findings

- All study intersections are forecast to operate within the applicable review agency operational standards under existing and site opening year 2018 scenarios studied during the weekday AM, midday, and PM peak hours.
- Historical crash data for the study area intersections indicate no patterns or trends that require mitigation associated with this project.
- Projected 95th percentile queues can be accommodated within the existing storage areas at the study intersections, with the exception of the intersection of OR-224/SE Webster Road, where existing and background weekday peak hour 95th percentile queues exceed the available storage for the westbound left-turn (weekday PM peak hour) and the northbound left-turn (weekday AM, midday, and PM peak hours).
- Landscaping, signage, and utilities should be located and maintained to ensure adequate intersection sight lines are available.
- The proposed zoning map amendment with site development does not result in a net increase in the overall trip generation potential of the site on a daily or weekday peak hour basis above what is allowed by the City of Milwaukie's Comprehensive Plan.
- The proposed zoning map amendment will not require changes to the functional classification of existing or planned transportation facilities, will not require a change to the standards implementing the comprehensive plan, and will not significantly affect a transportation facility. Accordingly, because the proposed zoning map amendment does not increase the density of the site above what is allowed by the City of Milwaukie's Comprehensive Plan or result in a significant effect on the transportation system, no review of mitigation for Transportation Planning Rule (TPR) purposes is necessary.

Recommendations

- Regardless of the proposed development, "DO NOT ENTER" and/or "ONE WAY" signs should be installed per the MUTCD at the SE Rusk Road/Church driveway to restrict vehicles from exiting the church driveway onto SE Rusk Road. In addition, the driveway should be modified so that only one-way ingress is allowed.

Recommended transportation improvements to mitigate the direct impacts of the site development include the following:

- Standard half-street improvements should be constructed along the site frontage on SE Kellogg Creek Drive, and standard full-street improvements along new on-site roadways.
- Intersection sight distance should be provided at the proposed new site accesses per applicable City of Milwaukie, and Clackamas County design requirements. Landscaping, above ground utilities, and signing should be located and maintained in a manner that preserves adequate intersection sight distance.

Please contact us if you need any additional information regarding our analyses.

REFERENCES

1. Transportation Research Board. *2000 Highway Capacity Manual*. 2000.
2. *City of Milwaukie Transportation System Plan*. November 2013.
3. *Clackamas County Comprehensive Plan*. Amended March 1, 2014.
4. Oregon Department of Transportation. *1999 Oregon Highway Plan.* Amended May 2015.
5. TriMet. "Bus Services." Accessed on-line at www.trimet.org. November 2016.
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7. Oregon Department of Transportation Research Section. *SPR 667 Assessment of Statewide Intersection Safety Performance*. June 2011.
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11. Institute of Transportation Engineers. *Trip Generation, 9th Edition.* 2012.
12. *City of Milwaukie Municipal Code*. Last modified in 2009. Accessed November 2016.
13. *Regional Transportation Functional Plan*. Metro. September 2012. Accessed December 2016.

14. Metro Exhibit A to Ordinance No 14-1340, *Technical Appendix for the Regional Transportation Plan,* Adopted July 17, 2014, Appendix 1.1 – 2014 RTP Project List

15. Transportation Research Board of the National Academies. *National Cooperative Highway Research Program (NCHRP) Report 672 Roundabouts: An Informational Guide*. Exhibit 6-52, Speed-Radius Relationship. Page 6-57.

ATTACHMENTS

Attachment A – Description of Level-of-Service and Volume-to-Capacity Methods and Criteria

Attachment B – Crash Data

Attachment C – Traffic Count Data

Attachment D – Existing Traffic Level-of-Service Worksheets

Attachment E – 2018 Background Traffic Level-of-Service Worksheets

Attachment F – 2018 Total Traffic Level-of-Service Worksheets

Attachment A - Description of Level-of-Service and Volume-to-Capacity Methods and Criteria

Attachment A Level-of-Service and Volume-to-Capacity Concepts

LEVEL-OF-SERVICE CONCEPT

Level of service (LOS) is a concept developed to quantify the degree of comfort (including such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles) afforded to drivers as they travel through an intersection or roadway segment. Six grades are used to denote the various level of service from "A" to "F."[3]

Signalized Intersections

The six level-of-service grades are described qualitatively for signalized intersections in Table A1. Additionally, Table A2 identifies the relationship between level of service and average control delay per vehicle. Control delay is defined to include initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Using this definition, Level of Service "D" is generally considered to represent the minimum acceptable design standard.

Table A1 Level-of-Service Definitions (Signalized Intersections)

Level of Service	Average Delay per Vehicle
A	Very low average control delay, less than 10 seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	Average control delay is greater than 10 seconds per vehicle and less than or equal to 20 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for a level of service A, causing higher levels of average delay.
C	Average control delay is greater than 20 seconds per vehicle and less than or equal to 35 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	Average control delay is greater than 35 seconds per vehicle and less than or equal to 55 seconds per vehicle. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle length, or high volume/capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Average control delay is greater than 55 seconds per vehicle and less than or equal to 80 seconds per vehicle. This is usually considered to be the limit of acceptable delay. These high delay values generally (but not always) indicate poor progression, long cycle lengths, and high volume/capacity ratios. Individual cycle failures are frequent occurrences.
F	Average control delay is in excess of 80 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation. It may also occur at high volume/capacity ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such high delay values.

[3]Most of the material in this appendix is adapted from the Transportation Research Board, *Highway Capacity Manual*, 2000.

Table A2 Level-of-Service Criteria for Signalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

Unsignalized Intersections

Unsignalized intersections include two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections. The *2000 Highway Capacity Manual* (HCM) provides models for estimating control delay at both TWSC and AWSC intersections. A qualitative description of the various service levels associated with an unsignalized intersection is presented in Table A3. A quantitative definition of level of service for unsignalized intersections is presented in Table A4. Using this definition, Level of Service "E" is generally considered to represent the minimum acceptable design standard.

Table A3 Level-of-Service Definitions (Unsignalized Intersections)

Level of Service	Average Delay per Vehicle to Minor Street
A	• Nearly all drivers find freedom of operation. • Very seldom is there more than one vehicle in queue.
B	• Some drivers begin to consider the delay an inconvenience. • Occasionally there is more than one vehicle in queue.
C	• Many times, there is more than one vehicle in queue. • Most drivers feel restricted, but not objectionably so.
D	• Often there is more than one vehicle in queue. • Drivers feel quite restricted.
E	• Represents a condition in which the demand is near or equal to the probable maximum number of vehicles that can be accommodated by the movement. • There is almost always more than one vehicle in queue. • Drivers find the delays approaching intolerable levels.
F	• Forced flow. • Represents an intersection failure condition that is caused by geometric and/or operational constraints external to the intersection.

Table A4 Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10.0 and ≤ 15.0
C	>15.0 and ≤ 25.0
D	>25.0 and ≤ 35.0
E	>35.0 and ≤ 50.0
F	>50.0

It should be noted that the level-of-service criteria for unsignalized intersections are somewhat different than the criteria used for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Additionally, there are a number of driver behavior considerations that combine to make delays at signalized intersections less galling than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, while drivers on the minor street approaches to TWSC intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized intersections than signalized intersections. For these reasons, it is considered that the control delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection. While overall intersection level of service is calculated for AWSC intersections, level of service is only calculated for the minor approaches and the major street left turn movements at TWSC intersections. No delay is assumed to the major street through movements. For TWSC intersections, the overall intersection level of service remains undefined: level of service is only calculated for each minor street lane.

In the performance evaluation of TWSC intersections, it is important to consider other measures of effectiveness (MOEs) in addition to delay, such as v/c ratios for individual movements, average queue lengths, and 95^{th}–percentile queue lengths. By focusing on a single MOE for the worst movement only, such as delay for the minor-street left turn, users may make inappropriate traffic control decisions. The potential for making such inappropriate decisions is likely to be particularly pronounced when the HCM level-of-service thresholds are adopted as legal standards, as is the case in many public agencies.

Attachment B - Crash Data

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CRASH SUMMARIES BY YEAR BY COLLISION TYPE

OR 224 Clackamas Highway (171) & Rusk Road

January 1, 2010 through December 31, 2014

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2014														
ANGLE	0	0	1	1	0	0	0	0	1	1	0	1	0	0
REAR-END	0	2	0	2	0	2	0	1	1	2	0	2	0	0
2014 TOTAL	0	2	1	3	0	2	0	1	2	3	0	3	0	0
YEAR: 2011														
REAR-END	0	2	0	2	0	2	0	1	1	2	0	2	0	0
TURNING MOVEMENTS	0	2	0	2	0	2	0	0	2	0	2	2	0	0
2011 TOTAL	0	4	0	4	0	4	0	1	3	2	2	4	0	0
YEAR: 2010														
REAR-END	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2010 TOTAL	0	0	1	1	0	0	0	1	0	1	0	1	0	0
FINAL TOTAL	0	6	2	8	0	6	0	3	5	6	2	8	0	0

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

171 CLACKAMAS

OR 224 Clackamas Highway (171) & Rusk Road
January 1, 2010 through December 31, 2014

SER# / INVEST / UNLOC?	SPEED	ALCOHOL	DRUGS	SCHL BUS	WORK ZONE	DATE / DAY / TIME	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC / CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN EVENT	CAUSE
02340	N	N	N			07/07/2010	CLACKAMAS	1 12		INTER	CROSS	N	N	CLR	S-STRGHT	01	NONE 0	STRGHT										07
NONE						Wed 7P	MILWAUKIE	MN 0	SE RUSK RD	CN		TRF SIGNAL	N	DRY	REAR		PRVTE	NW SE									000	00
							PORTLAND UA	2.69	CLACKAMAS HY	03	2		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	M	UNK		042	000	07
No	*45 25 40.02*	*-122 36 4.56*						017100100S00	1															OR<25				
																02	NONE 0	STRGHT										
																	PRVTE	NW SE									000	00
																	PSNGR CAR		01	DRVR	NONE	49	M	OR-Y		000	000	00
																								OR<25				
00890	N	Y	Y	N	N	03/15/2011	CLACKAMAS	1 12		INTER	CROSS	N	N	RAIN	ANGL-STP	01	NONE 0	TURN-R										08
CITY						Tue 7P		MN 0		N		TRF SIGNAL	N	WET	TURN		PRVTE	SE N									000	00
							PORTLAND UA	2.72		05	0		N	DUSK	INJ		PSNGR CAR		01	DRVR	NONE	22	M	SUSP		001	000	08
No	*45 25 40.02*	*-122 36 4.56*						017100100S00																OR<25				
																02	NONE 0	STOP										
																	PRVTE	S N									011	00
																	PSNGR CAR		01	DRVR	INJC	33	M	OR-Y		000	000	00
																								OR<25				
03308	N	Y	N			09/07/2011	CLACKAMAS	1 12		INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										07,10
CITY						Wed 4P		MN 0		SE		TRF SIGNAL	N	DRY	REAR		PRVTE	NW SE									000	00
							PORTLAND UA	2.72		05	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	62	F	OR-Y		043,026	000	07,10
No	*45 25 40.02*	*-122 36 4.56*						017100100S00																OR<25				
																02	NONE 0	STOP										
																	PRVTE	NW SE									011	00
																	PSNGR CAR		01	DRVR	INJC	53	F	OR-Y		000	000	00
																								OR<25				
04018	Y	N	N	N	N	10/28/2011	CLACKAMAS	1 12		INTER	CROSS	N	N	RAIN	S-1STOP	01	NONE 0	STRGHT										01,07
CITY						Fri 3P		MN 0		NW		TRF SIGNAL	N	WET	REAR		PRVTE	NW SE									000	00
							PORTLAND UA	2.72		06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	59	M	OR-Y		026,047	000	01,07
No	*45 25 40.02*	*-122 36 4.56*						017100100S00																OR<25				
																02	NONE 0	STOP										
																	PRVTE	NW SE									011	00
																	PSNGR CAR		01	DRVR	INJC	37	M	OR-Y		000	000	00
																								OR<25				
04317	N	N	N			11/14/2011	CLACKAMAS	1 12		INTER	CROSS	N	N	CLD	O-1 L-TURN	01	NONE 0	TURN-L										04
CITY						Mon 6P		MN 0		CN		TRF SIGNAL	N	WET	TURN		PRVTE	S W									000	00
							PORTLAND UA	2.72		01	0		N	DLIT	INJ		PSNGR CAR		01	DRVR	NONE	85	M	OR-Y		020,004	000	04
No	*45 25 40.02*	*-122 36 4.56*						017100100S00																OR<25				
																02	NONE 0	STRGHT										
																	PRVTE	N S									000	00
																	PSNGR CAR		01	DRVR	INJC	28	F	OR-Y		000	000	00
																								OR<25				

171 CLACKAMAS

OR 224 Clackamas Highway (171) & Rusk Road
January 1, 2010 through December 31, 2014

SER# / INVEST / UNLOC?	SPEED	ALCHL	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC	CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS (#LANES) / CN	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN EVENT	CAUSE
00765	N	N	N	N	N	02/21/2014	CLACKAMAS	1	12		INTER	CROSS	N	N	CLD	ANGL-OTH	01	NONE 0	STRGHT										04
CITY						Fri 7A		MN 0			CN		TRF SIGNAL	N	WET	ANGL		PRVTE	S N									000	00
							PORTLAND UA	2.72			02	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	53	F	OR-Y		000	000	00
No						*45 25 40.02 -122 36 4.56*		017100100S00																		OR<25				
																	02	NONE 0	STRGHT										
																		PRVTE	E W									000	00
																		PSNGR CAR		01	DRVR	NONE	27	M	OTH-Y		020	000	04
																									N-RES				

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

COUNTY ROAD CRASH LISTING

CLACKAMAS COUNTY

OR 224 Clackamas Highway (171) & Rusk Road

January 1, 2010 through December 31, 2014

SER# / INVEST / UNLOC?	SPEED	ALC	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	MILEPNT / DIST FROM / INTERSECT	COUNTY ROADS FIRST STREET / SECOND STREET / INTERSECTION SEQ #	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFF-RD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
01538	N	N	N			4/22/2014	0.56	SE RUSK RD	INTER	CROSS	N	N	RAIN	S-1STOP	01	NONE 0	STRGHT											07
NONE						Tue 11A			S		UNKNOWN	N	WET	REAR		PRVTE	S N										000		00
No						*45 25 40.02 -122 36 4.56*			06	2		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	69	M	OR-Y OR<25		026	000		07
															02	NONE 0	STOP										011		00
																PSNGR CAR		01	DRVR	INJC	56	M	OR-Y OR<25		000	000		00
01893	N	N	N			5/16/2014	0.56	SE RUSK RD	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											29,27
NONE						Fri 5P			S		TRF SIGNAL	N	DRY	REAR		PRVTE	S N										000		00
No						*45 25 40.02 -122 36 4.56*			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	54	M	OR-Y OR<25		016,026	038		29,27
															02	NONE 0	STOP										011		00
																PSNGR CAR		01	DRVR	INJC	60	M	OR-Y OR<25		000	000		00

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

OR 224 Clackamas Highway (171) & SE Webster Rd / SE Lake Rd
January 1, 2012 through December 31, 2014

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2014														
ANGLE	0	1	0	1	0	1	0	0	1	1	0	1	0	0
REAR-END	0	4	1	5	0	4	1	4	1	5	0	5	0	0
SIDESWIPE - OVERTAKING	0	1	3	4	0	1	3	4	0	1	3	4	0	0
TURNING MOVEMENTS	0	1	1	2	0	1	0	2	0	2	0	2	0	0
2014 TOTAL	0	7	5	12	0	7	4	10	2	9	3	12	0	0
YEAR: 2013														
REAR-END	0	2	0	2	0	2	0	2	0	2	0	2	0	0
SIDESWIPE - OVERTAKING	0	0	2	2	0	0	0	2	0	0	2	2	0	0
TURNING MOVEMENTS	0	1	3	4	0	1	0	1	3	2	1	4	0	0
2013 TOTAL	0	3	5	8	0	3	0	5	3	4	3	8	0	0
YEAR: 2012														
ANGLE	0	1	1	2	0	2	0	2	0	2	0	2	0	0
REAR-END	0	1	0	1	0	1	0	1	0	0	1	1	0	0
TURNING MOVEMENTS	0	4	1	5	0	4	0	2	3	2	3	5	0	0
2012 TOTAL	0	6	2	8	0	7	0	5	3	4	4	8	0	0
FINAL TOTAL	0	16	12	28	0	17	4	20	8	17	10	28	0	0

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

171 CLACKAMAS OR 224 Clackamas Highway (171) & SE Webster Rd / SE Lake Rd
January 1, 2012 through December 31, 2014

SER# / INVEST / UNLOC?	SPEED	ALCOHOL	DRUGS	SCHL ZONE	WORK ZONE	DATE / DAY/TIME	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC / CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN EVENT	CAUSE
01293	N	N	N			04/03/2014	CLACKAMAS	1 12		INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 1	TURN-L										10
NONE						Thu 2P		MN 0		N		TRF SIGNAL	N	DRY	SS-O		PRVTE	N E									000	00
							PORTLAND UA	3.20		06	0		N	DAY	PDO		SEMI TOW		01	DRVR	NONE	00	M	OTH-Y		080	000	10
No						*45 25 27.78*	*-122 35 33.50*	017100100S00																	N-RES				
																02	NONE 0	STOP										
																	PRVTE	N S									011	00
																	PSNGR CAR		01	DRVR	NONE	52	M	OTH-Y		000	000	00
																								N-RES				
02270	N	N	N	N	N	06/24/2012	CLACKAMAS	1 12		INTER	CROSS	N	N	CLD	ANGL-STP	01	NONE 0	TURN-R										08
STATE						Sun 5P		MN 0		E		TRF SIGNAL	N	DRY	TURN		PRVTE	S E									000	00
							PORTLAND UA	3.20		06	0		N	DAY	INJ		MTRCYCLE		01	DRVR	INJB	50	F	OR-Y		001	000	08
No						*45 25 27.78*	*-122 35 33.50*	017100100S00																	OR<25				
																02	NONE 0	STOP										
																	PRVTE	E W									012	00
																	PSNGR CAR		01	DRVR	NONE	39	M	OR-Y		000	000	00
																								OR<25				
																03	NONE 0	STOP										
																	PRVTE	E W									022	00
																	PSNGR CAR		01	DRVR	NONE	52	M	OR-Y		000	000	00
																								OR<25				
03526	N	N	N	N	N	09/22/2012	CLACKAMAS	1 12		INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										07,32
STATE						Sat 11P		MN 0		E		TRF SIGNAL	N	DRY	REAR		PRVTE	E W									000	00
							PORTLAND UA	3.20		06	0		N	DARK	INJ		PSNGR CAR		01	DRVR	INJC	48	M	OR-Y		026,052	000	07,32
No						*45 25 27.78*	*-122 35 33.50*	017100100S00																	OR<25				
																02	NONE 0	STOP										
																	PRVTE	E W									011	00
																	PSNGR CAR		01	DRVR	NONE	23	F	OR-Y		000	000	00
																								OR<25				
																			02	PSNG	NO<5	01	F			000	000	00
00977	N	N	N	N	N	03/10/2014	CLACKAMAS	1 12		INTER	CROSS	N	N	RAIN	S-1STOP	01	NONE 0	STRGHT										32,07,04
STATE						Mon 2P		MN 0		E		TRF SIGNAL	N	WET	REAR		PRVTE	E W									000	00
							PORTLAND UA	3.20		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	22	F	OR-Y		052,026,020	000	32,07,04
No						*45 25 27.78*	*-122 35 33.50*	017100100S00																	OR<25				
																02	NONE 0	STOP										
																	PRVTE	E W									011	00
																	PSNGR CAR		01	DRVR	NONE	34	F	OR-Y		000	000	00
																								OR<25				
04034	Y	N	N	Y	N	10/27/2012	CLACKAMAS	1 12		INTER	CROSS	N	N	RAIN	ANGL-STP	01	NONE 0	TURN-R										01,08
COUNTY						Sat 5P		MN 0		S		TRF SIGNAL	N	WET	TURN		PRVTE	W S									000	00
							PORTLAND UA	3.20		06	0		N	DUSK	INJ		PSNGR CAR		01	DRVR	NONE	23	M	OR-Y		047,001	000	01,08
No						*45 25 27.78*	*-122 35 33.50*	017100100S00																	OR<25				

171 CLACKAMAS OR 224 Clackamas Highway (171) & SE Webster Rd / SE Lake Rd
January 1, 2012 through December 31, 2014

SER# / INVEST / UNLOC?	SPEED	ALCHL	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC / CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
																02	NONE 0 PRVTE	STOP S N									012		00
																	PSNGR CAR		01	DRVR	INJC	36	M	OR-Y OR<25		000	000		00
01541 NONE	Y	N	N			04/26/2012 Thu 1P	CLACKAMAS PORTLAND UA	1 12 MN 0 3.20		INTER SW 06	CROSS 0	N TRF SIGNAL	N N N	CLR DRY DAY	ANGL-STP TURN INJ	01	NONE 0 PRVTE PSNGR CAR	TURN-R E N	01	DRVR	NONE	48	M	OR-Y OR<25		047,001	000 017		01,08 00 01,08
No	*45 25 27.78*					*-122 35 33.50*		017100100S00																					
																02	NONE 0 PRVTE	STOP N S									012		00
																	PSNGR CAR		01	DRVR	INJC	34	M	OR-Y OR<25		000	000		00
																			02	PSNG	NO<5	04	M			000	000		00
01194 NONE	N	N	N			03/27/2014 Thu 7P	CLACKAMAS PORTLAND UA	1 12 MN 0 3.20		INTER W 06	CROSS 0	N TRF SIGNAL	N N N	CLR DRY DUSK	S-1STOP SS-O INJ	01	NONE 0 PRVTE PSNGR CAR	STRGHT W E	01	DRVR	NONE	29	F	OR-Y OR<25		045	000		13 00 13
No	*45 25 27.78*					*-122 35 33.50*		017100100S00																					
																02	NONE 0 PRVTE	STOP W E									011		00
																	PSNGR CAR		01	DRVR	INJB	38	M	OR-Y OR<25		000	000		00
00215 NONE	N	N	N			01/17/2012 Tue 5P	CLACKAMAS PORTLAND UA	1 12 MN 0 3.20		INTER CN 01	CROSS 0	N TRF SIGNAL	N N N	RAIN WET DUSK	O-1 L-TURN TURN PDO	01	NONE 0 PRVTE PSNGR CAR	STRGHT N S	01	DRVR	NONE	19	M	OR-Y OR<25		000	000 000		02 00 00
No	*45 25 27.78*					*-122 35 33.50*		017100100S00																					
																02	NONE 0 PRVTE	TURN-L S W									000		00
																	PSNGR CAR		01	DRVR	NONE	49	F	OR-Y OR<25		028,004	000		02
03468 STATE	N	N	N	N	N	09/18/2012 Tue 6P	CLACKAMAS PORTLAND UA	1 12 MN 0 3.20		INTER CN 01	CROSS 0	N TRF SIGNAL	N N N	CLR DRY DAY	ANGL-OTH ANGL PDO	01	NONE 0 PRVTE PSNGR CAR	STRGHT N S	01	DRVR	NONE	16	F	OR-Y OR<25		000	001 000		04 00 00
No	*45 25 27.78*					*-122 35 33.50*		017100100S00																					
																02	NONE 0 PRVTE	STRGHT E W									001		00
																	PSNGR CAR		01	DRVR	NONE	28	F	OR-Y OR<25		020	000		04
01247 NO RPT	N	N	N			03/31/2014 Mon 10A	CLACKAMAS PORTLAND UA	1 12 MN 0 3.20		INTER CN 02	CROSS 0	N TRF SIGNAL	N N N	CLR DRY DAY	S-OTHER TURN INJ	01	NONE 0 PRVTE PSNGR CAR	TURN-R E N	01	DRVR	INJC	43	F	OR-Y OR<25		000	013 000		06,08 00 00
No	*45 25 27.78*					*-122 35 33.50*		017100100S00																					

171 CLACKAMAS OR 224 Clackamas Highway (171) & SE Webster Rd / SE Lake Rd
January 1, 2012 through December 31, 2014

SER# / INVEST / UNLOC?	SPEED	ALCHL	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC / CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
																02	NONE 0 PRVTE	TURN-R E N									031	013	00
																	PSNGR CAR		01	DRVR	NONE	54	F	OR-Y OR<25		034,006	000		06,08
																03	NONE 0 PRVTE	STOP N S									022		00
																	PSNGR CAR		01	DRVR	NONE	68	M	OR-Y OR<25		000	000		00
02139 STATE	N	N	N	N	N	06/13/2012 Wed 9A	CLACKAMAS PORTLAND UA	1 12 MN 0 3.20		INTER CN 03	CROSS 0	N TRF SIGNAL	N N N	CLD DRY DAY	ANGL-OTH ANGL INJ	01	NONE 0 PRVTE PSNGR CAR	STRGHT N S	01	DRVR	INJB	20	F	OR-Y OR<25		020	000		04 00 04
No	*45 25 27.78*		*-122 35 33.50*					017100100S00											02	PSNG	INJC	13	F			000	000		00
																02	NONE 0 PRVTE	STRGHT W E									000		00
																	PSNGR CAR		01	DRVR	NONE	74	F	OR-Y OR<25		000	000		00
04887 COUNTY	N	N	N			12/17/2012 Mon 7A	CLACKAMAS PORTLAND UA	1 12 MN 0 3.20		INTER CN 04	CROSS 0	N TRF SIGNAL	N N N	RAIN WET DAWN	O-1 L-TURN TURN INJ	01	NONE 0 PRVTE PSNGR CAR	STRGHT S N	01	DRVR	INJC	43	F	OR-Y OR<25		000	000		02 00 00
No	*45 25 27.78*		*-122 35 33.50*					017100100S00																					
																02	NONE 0 UNKN	TURN-L N E									000		00
																	UNKNOWN		01	DRVR	NONE	00	U	UNK UNK		028	000		02
00477 NONE	N	N	N			02/09/2013 Sat 6P	CLACKAMAS PORTLAND UA	1 12 MN 0 3.20		INTER CN 04	CROSS 0	N TRF SIGNAL	N N N	RAIN WET DLIT	O-1 L-TURN TURN PDO	01	NONE 0 PRVTE PSNGR CAR	STRGHT S N	01	DRVR	NONE	36	M	OR-Y OR<25		000	000		02 00 00
No	*45 25 27.78*		*-122 35 33.50*					017100100S00																					
																02	NONE 0 PRVTE	TURN-L N E									000		00
																	PSNGR CAR		01	DRVR	NONE	36	M	OR-Y OR<25		028,004	000		02

CLACKAMAS COUNTY

OR 224 Clackamas Highway (171) & SE Webster Rd / SE Lake Rd

January 1, 2012 through December 31, 2014

SER# / INVEST / UNLOC?	SPEED	ALC	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	MILEPNT / DIST FROM / INTERSECT	COUNTY ROADS FIRST STREET / SECOND STREET / INTERSECTION SEQ #	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFF-RD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
05037	N	N	N			12/26/2013	0.58	SE LAKE RD-OLD 22062	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	TURN-L											10
NONE						Thu 7P			N		TRF SIGNAL	N	DRY	SS-O		UNKN	N E										000		00
No						*45 25 27.78 -122 35 33.50*			06	0		N	DARK	PDO		UNKNOWN		01	DRVR	NONE	00	U	UNK		080	000		10
																								UNK				
															02	NONE 0	STOP											
																PUBLC	N S									011		00
																UNKNOWN		01	DRVR	NONE	34	M	OR-Y		000	000		00
																							OR<25					
00405	N	N	N			1/31/2014	0.58	SE LAKE RD-OLD 22062	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 1	TURN-L											08
COUNTY						Fri 8P			N		L-GRN-SIG	N	DRY	SS-O		PRVTE	N E										000		00
No						*45 25 27.78 -122 35 33.50*			06	0		N	DLIT	PDO		SEMI TOW		01	DRVR	NONE	52	M	OR-Y		001	000		08
																							OR<25					
															02	NONE 0	STOP											
																PRVTE	N S									011		00
																PSNGR CAR		01	DRVR	NONE	68	F	OTH-Y		000	000		00
																							OR<25					
02006	N	N	N	N	N	5/27/2014	0.58	SE LAKE RD-OLD 22062	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										013	07
COUNTY						Tue 11A			N		TRF SIGNAL	N	DRY	REAR		PRVTE	N S										000		00
No						*45 25 27.78 -122 35 33.50*			06	0		N	DAY	INJ		TRUCK		01	DRVR	NONE	28	M	OTH-Y		026	000		07
																							OR<25					
															02	NONE 0	STOP											
																PRVTE	N S									011	013	00
																PSNGR CAR		01	DRVR	NONE	20	F	OR-Y		000	000		00
																							OR<25					
															03	NONE 0	STOP											
																PRVTE	N S									022		00
																PSNGR CAR		01	DRVR	INJC	51	M	OR-Y		000	000		00
																							OR<25					
03944	N	N	N	N	N	10/6/2014	0.58	SE LAKE RD-OLD 22062	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 1	TURN-L											08
COUNTY						Mon 8P			N		TRF SIGNAL	N	DRY	SS-O		PRVTE	N E										000		00
No						*45 25 27.78 -122 35 33.50*			06	0		N	DLIT	PDO		SEMI TOW		01	DRVR	NONE	00	U	UNK		001	000		08
																								UNK				
															02	NONE 0	STOP											
																PRVTE	N S									011		00
																PSNGR CAR		01	DRVR	NONE	35	F	OR-Y		000	000		00
																							OR<25					
04996	N	N	N			12/11/2014	0.58	SE LAKE RD-OLD 22062	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											29
NONE						Thu 11A			SE		TRF SIGNAL	N	DRY	REAR		PRVTE	SE NW										000		00
No						*45 25 50.25 -122 36 12.41*			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	39	F	OR-Y		026	000		29
																							OR<25					

CLACKAMAS COUNTY

OR 224 Clackamas Highway (171) & SE Webster Rd / SE Lake Rd

January 1, 2012 through December 31, 2014

SER# / INVEST / UNLOC?	SPEED	ALC	DRUGS	SCHL	WORK	DATE / DAY/TIME / LAT/LONG	MILEPNT / DIST FROM / INTERSECT	COUNTY ROADS FIRST STREET / SECOND STREET / INTERSECTION SEQ #	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFF-RD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
															02	NONE 0 / PRVTE / PSNGR CAR	STOP / SE NW									011		00
																		01	DRVR	INJC	16	M	OR-Y OR<25		000	000		00
01958	N	N	N			5/22/2014 Thu 3P	0.58	SE LAKE RD-OLD 22062	INTER S	CROSS 0	N TRF SIGNAL	N	CLR DRY DAY	S-1STOP REAR INJ	01	NONE 0 / PRVTE / PSNGR CAR	STRGHT / S N												29
NONE												N														000		00
No						*45 25 21.54 -122 34 55.69*			06	0		N						01	DRVR	NONE	00	M	OR-Y UNK		026	000		29
															02	NONE 0 / PRVTE / PSNGR CAR	STOP / S N									011		00
																		01	DRVR	INJC	51	M	OR-Y OR<25		000	000		00
02332	N	N	N			6/18/2014 Wed 1P	0.00	SE WEBSTER RD	INTER N	3-LEG 1	N L-GRN-SIG	N	CLR DRY DAY	S-1STOP REAR INJ	01	NONE 0 / PRVTE / PSNGR CAR	STRGHT / N S												29
NONE												N														000		00
No						*45 25 25.40 -122 35 34.74*			06	1		N						01	DRVR	NONE	21	M	OR-Y OR<25		026	000		29
															02	NONE 0 / PRVTE / PSNGR CAR	STOP / N S									012		00
																		01	DRVR	INJC	52	F	OR-Y OR<25		000	000		00
01486	N	N	N			5/1/2013 Wed 3P	0.00	SE WEBSTER RD	INTER S	CROSS 0	N TRF SIGNAL	N	CLR DRY DAY	S-1STOP REAR INJ	01	NONE 0 / PRVTE / PSNGR CAR	STRGHT / S N												07
NONE												N														000		00
No						*45 25 27.78 -122 35 33.50*			06	0		N						01	DRVR	NONE	39	M	OR-Y OR<25		026	000		07
															02	NONE 0 / PRVTE / PSNGR CAR	STOP / S N									011		00
																		01	DRVR	INJC	56	F	OR-Y OR<25		000	000		00
01476	N	N	N			4/30/2013 Tue 3P	0.00	SE WEBSTER RD	INTER SW	CROSS 0	N TRF SIGNAL	N	CLR DRY DAY	S-1STOP REAR INJ	01	NONE 0 / PRVTE / PSNGR CAR	STRGHT / SW NE												07
NONE												N														000		00
No						*45 25 27.78 -122 35 33.50*			06	0		N						01	DRVR	NONE	74	F	OR-Y OR<25		026	000		07
															02	NONE 0 / PRVTE / PSNGR CAR	STOP / SW NE									011		00
																		01	DRVR	INJC	36	M	OR-Y OR<25		000	000		00
01116	N	N	N			4/2/2013 Tue 6P	0.00	SE WEBSTER RD	INTER CN	3-LEG 1	N TRF SIGNAL	N	CLR DRY DUSK	S-STRGHT SS-O PDO	01	NONE 0 / PRVTE / PSNGR CAR	STRGHT / S N												13
NO RPT												N														000		00
No						*45 25 25.40 -122 35 34.74*			04	1		N						01	DRVR	NONE	35	M	OR-Y OR<25		045	000		13

CLACKAMAS COUNTY — OR 224 Clackamas Highway (171) & SE Webster Rd / SE Lake Rd

January 1, 2012 through December 31, 2014

SER# / INVEST / UNLOC?	SPEED	ALCHL	DRUGS	SCHL	WORK	DATE / DAY/TIME / LAT/LONG	MILEPNT / DIST FROM / INTERSECT	COUNTY ROADS FIRST STREET / SECOND STREET / INTERSECTION SEQ #	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFF-RD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
															02	NONE 0 PRVTE	STRGHT S N									000	00
																PSNGR CAR		01	DRVR	NONE	30	M	OR-Y OR<25		000	000		00
01273	N	N	N	N	N	4/14/2013	0.00	SE WEBSTER RD	INTER	3-LEG	N		N	RAIN	O-1 L-TURN	01	NONE 0	STRGHT										02
COUNTY						Sun 3P			CN		TRF SIGNAL		N	WET	TURN		PRVTE	S N								000		00
No						*45 25 25.40 -122 35 34.74*			04	1			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	37	M	OR-Y OR<25		000	000		00
															02	NONE 0 PRVTE	TURN-L N E									000	00
																PSNGR CAR		01	DRVR	NONE	44	F	OR-Y OR<25		028,004	000		02
01571	N	N	N			5/7/2013	0.00	SE WEBSTER RD	INTER	3-LEG	N		N	CLR	O-1 L-TURN	01	NONE 0	STRGHT										02
NONE						Tue 4P			CN		TRF SIGNAL		N	DRY	TURN		PRVTE	S N								000		00
No						*45 25 25.40 -122 35 34.74*			04	1			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	65	F	OR-Y OR<25		000	000		00
															02	NONE 0 PRVTE	TURN-L N E									000	00
																PSNGR CAR		01	DRVR	NONE	00	F	OR-Y OR<25		028,004	000		02
03248	N	N	N	N	N	9/3/2013	0.00	SE WEBSTER RD	INTER	3-LEG	N		N	CLD	O-1 L-TURN	01	NONE 0	STRGHT										04
COUNTY						Tue 7A			CN		TRF SIGNAL		N	WET	TURN		PRVTE	S N								000		00
No						*45 25 25.40 -122 35 34.74*			04	1			N	UNK	INJ		PSNGR CAR		01	DRVR	NONE	66	F	OR-Y OR<25		020	000		04
															02	NONE 0 PRVTE	TURN-L N E									000	00
																PSNGR CAR		01	DRVR	INJA	37	F	OR-Y OR<25		000	000		00
01250	N	N	N			3/31/2014	0.00	SE WEBSTER RD	INTER	3-LEG	N		N	CLR	ANGL-OTH	01	NONE 0	TURN-L										02
NONE						Mon 5P			CN		TRF SIGNAL		N	DRY	TURN		PRVTE	W N								018		00
No						*45 25 25.40 -122 35 34.74*			04	0			Y	DAY	PDO		PSNGR CAR		01	DRVR	NONE	45	M	OR-Y OR<25		097	000		00
															02	NONE 0 PRVTE	TURN-L S W									019	00
																PSNGR CAR		01	DRVR	NONE	00	M	OR-Y OR<25		097	000		00
03531	N	N	N	Y	N	7/23/2014	0.00	SE WEBSTER RD	INTER	3-LEG	N		N	RAIN	ANGL-OTH	01	NONE 0	STRGHT										04
COUNTY						Wed 12P			CN		NONE		N	WET	ANGL		PRVTE	S N								000		00
No						*45 25 25.40 -122 35 34.74*			04	1			Y	DAY	INJ		PSNGR CAR		01	DRVR	NONE	00	F	UNK UNK		020	000		04

CLACKAMAS COUNTY

OR 224 Clackamas Highway (171) & SE Webster Rd / SE Lake Rd

January 1, 2012 through December 31, 2014

SER# / INVEST / UNLOC?	SPED	ALC	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	MILEPNT / DIST FROM / INTERSECT	COUNTY ROADS: FIRST STREET / SECOND STREET / INTERSECTION SEQ #	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFF-RD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
															02	NONE 0 PRVTE	STRGHT W E										018		00
																PSNGR CAR		01	DRVR	INJC	58	F	OR-Y OR<25		000	000		00

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Rusk Road & Ruscliffe Rd

January 1, 2010 through December 31, 2014

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2013														
TURNING MOVEMENTS	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2013 TOTAL	0	0	1	1	0	0	0	1	0	1	0	1	0	0
FINAL TOTAL	0	0	1	1	0	0	0	1	0	1	0	1	0	0

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

COUNTY ROAD CRASH LISTING

CLACKAMAS COUNTY

Rusk Road & Ruscliffe Rd

January 1, 2010 through December 31, 2014

SER# / INVEST / UNLOC?	SPEED	ALC	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	MILEPNT / DIST FROM / INTERSECT	COUNTY ROADS FIRST STREET / SECOND STREET / INTERSECTION SEQ #	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFF-RD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
02270	N	N	N			6/26/2013	0.45	SE RUSK RD	INTER	3-LEG	N	N	CLR	ANGL-OTH	01	NONE 0	TURN-L											08
NONE						Wed 7P			CN		STOP SIGN	N	DRY	TURN		PRVTE	N E										000	00
No						*45 25 34.62 -122 36 5.01*			03	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	73	F	OR-Y OR<25		002	000		08
															02	NONE 0	STOP											
																PRVTE	E W										011	00
																PSNGR CAR		01	DRVR	NONE	58	M	OR-Y OR<25		000	000		00

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Rusk Road & Kellogg Creek Drive

January 1, 2010 through December 31, 2014

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2013														
TURNING MOVEMENTS	0	0	2	2	0	0	0	2	0	2	0	2	0	0
2013 TOTAL	0	0	2	2	0	0	0	2	0	2	0	2	0	0
FINAL TOTAL	0	0	2	2	0	0	0	2	0	2	0	2	0	0

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

COUNTY ROAD CRASH LISTING

CLACKAMAS COUNTY

Rusk Road & Kellogg Creek Drive

January 1, 2010 through December 31, 2014

SER# / INVEST / UNLOC?	SPEED	ALC	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	MILEPNT / DIST FROM / INTERSECT	COUNTY ROADS FIRST STREET / SECOND STREET / INTERSECTION SEQ #	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFF-RD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
00069	N	N	N			1/7/2013	0.00	SE KELLOGG CREEK DR	INTER		N	N	CLR	ANGL-OTH	01	NONE 0	TURN-R											02
NONE						Mon 9A			CN		STOP SIGN	N	DRY	TURN		PRVTE	NW SW										015	00
No						*45 25 34.17 -122 36 9.48*			03	2		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	37	F	OR-Y		028	000		02
																							OR<25					
															02	NONE 0	STRGHT											
																PRVTE	NE SW										000	00
																PSNGR CAR		01	DRVR	NONE	75	M	OR-Y		000	000		00
																							OR<25					
02232	N	N	N			6/23/2013	0.40	SE RUSK RD	INTER	3-LEG	N	N	CLR	ANGL-OTH	01	NONE 0	TURN-L											02
NONE						Sun 5P			CN		STOP SIGN	N	DRY	TURN		PRVTE	NW NE										015	00
No						*45 25 34.17 -122 36 9.48*			04	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	U	UNK		028	000		02
																							UNK					
															02	NONE 0	STRGHT											
																PRVTE	SW NE										000	00
																PSNGR CAR		01	DRVR	NONE	48	M	OR-Y		000	000		00
																							OR<25					

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Rusk Road & Aldercrest Rd
January 1, 2010 through December 31, 2014

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR:														
TOTAL														
FINAL TOTAL														

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

ACTION CODE TRANSLATION LIST

ACTION CODE	SHORT DESCRIPTION	LONG DESCRIPTION
000	NONE	NO ACTION OR NON-WARRANTED
001	SKIDDED	SKIDDED
002	ON/OFF V	GETTING ON OR OFF STOPPED OR PARKED VEHICLE
003	LOAD OVR	OVERHANGING LOAD STRUCK ANOTHER VEHICLE, ETC.
006	SLOW DN	SLOWED DOWN
007	AVOIDING	AVOIDING MANEUVER
008	PAR PARK	PARALLEL PARKING
009	ANG PARK	ANGLE PARKING
010	INTERFERE	PASSENGER INTERFERING WITH DRIVER
011	STOPPED	STOPPED IN TRAFFIC NOT WAITING TO MAKE A LEFT TURN
012	STP/L TRN	STOPPED BECAUSE OF LEFT TURN SIGNAL OR WAITING, ETC.
013	STP TURN	STOPPED WHILE EXECUTING A TURN
015	GO A/STOP	PROCEED AFTER STOPPING FOR A STOP SIGN/FLASHING RED.
016	TRN A/RED	TURNED ON RED AFTER STOPPING
017	LOSTCTRL	LOST CONTROL OF VEHICLE
018	EXIT DWY	ENTERING STREET OR HIGHWAY FROM ALLEY OR DRIVEWAY
019	ENTR DWY	ENTERING ALLEY OR DRIVEWAY FROM STREET OR HIGHWAY
020	STR ENTR	BEFORE ENTERING ROADWAY, STRUCK PEDESTRIAN, ETC. ON SIDEWALK OR SHOULDER
021	NO DRVR	CAR RAN AWAY - NO DRIVER
022	PREV COL	STRUCK, OR WAS STRUCK BY, VEHICLE OR PEDESTRIAN IN PRIOR COLLISION BEFORE ACC. STABILIZED
023	STALLED	VEHICLE STALLED OR DISABLED
024	DRVR DEAD	DEAD BY UNASSOCIATED CAUSE
025	FATIGUE	FATIGUED, SLEEPY, ASLEEP
026	SUN	DRIVER BLINDED BY SUN
027	HDLGHTS	DRIVER BLINDED BY HEADLIGHTS
028	ILLNESS	PHYSICALLY ILL
029	THRU MED	VEHICLE CROSSED, PLUNGED OVER, OR THROUGH MEDIAN BARRIER
030	PURSUIT	PURSUING OR ATTEMPTING TO STOP A VEHICLE
031	PASSING	PASSING SITUATION
032	PRKOFFRD	VEHICLE PARKED BEYOND CURB OR SHOULDER
033	CROS MED	VEHICLE CROSSED EARTH OR GRASS MEDIAN
034	X N/SGNL	CROSSING AT INTERSECTION - NO TRAFFIC SIGNAL PRESENT
035	X W/ SGNL	CROSSING AT INTERSECTION - TRAFFIC SIGNAL PRESENT
036	DIAGONAL	CROSSING AT INTERSECTION - DIAGONALLY
037	BTWN INT	CROSSING BETWEEN INTERSECTIONS
038	DISTRACT	DRIVER'S ATTENTION DISTRACTED
039	W/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER WITH TRAFFIC
040	A/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER FACING TRAFFIC
041	W/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT WITH TRAFFIC
042	A/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT FACING TRAFFIC
043	PLAYINRD	PLAYING IN STREET OR ROAD
044	PUSH MV	PUSHING OR WORKING ON VEHICLE IN ROAD OR ON SHOULDER
045	WORK ON	WORKING IN ROADWAY OR ALONG SHOULDER
046	W/ TRAFIC	NON-MOTORIST WALKING, RUNNING, RIDING, ETC. WITH TRAFFIC
047	A/ TRAFIC	NON-MOTORIST WALKING, RUNNING, RIDING, ETC. FACING TRAFFIC
050	LAY ON RD	STANDING OR LYING IN ROADWAY
051	ENT OFFRD	ENTERING / STARTING IN TRAFFIC LANE FROM OFF ROAD
052	MERGING	MERGING
055	SPRAY	BLINDED BY WATER SPRAY
088	OTHER	OTHER ACTION

ACTION CODE TRANSLATION LIST

ACTION CODE	SHORT DESCRIPTION	LONG DESCRIPTION
099	UNK	UNKNOWN ACTION

CAUSE CODE TRANSLATION LIST

CAUSE CODE	SHORT DESCRIPTION	LONG DESCRIPTION
00	NO CODE	NO CAUSE ASSOCIATED AT THIS LEVEL
01	TOO-FAST	TOO FAST FOR CONDITIONS (NOT EXCEED POSTED SPEED
02	NO-YIELD	DID NOT YIELD RIGHT-OF-WAY
03	PAS-STOP	PASSED STOP SIGN OR RED FLASHER
04	DIS SIG	DISREGARDED TRAFFIC SIGNAL
05	LEFT-CTR	DROVE LEFT OF CENTER ON TWO-WAY ROAD; STRADDLING
06	IMP-OVER	IMPROPER OVERTAKING
07	TOO-CLOS	FOLLOWED TOO CLOSELY
08	IMP-TURN	MADE IMPROPER TURN
09	DRINKING	ALCOHOL OR DRUG INVOLVED
10	OTHR-IMP	OTHER IMPROPER DRIVING
11	MECH-DEF	MECHANICAL DEFECT
12	OTHER	OTHER (NOT IMPROPER DRIVING)
13	IMP LN C	IMPROPER CHANGE OF TRAFFIC LANES
14	DIS TCD	DISREGARDED OTHER TRAFFIC CONTROL DEVICE
15	WRNG WAY	WRONG WAY ON ONE-WAY ROAD; WRONG SIDE DIVIDED RO
16	FATIGUE	DRIVER DROWSY/FATIGUED/SLEEPY
17	ILLNESS	PHYSICAL ILLNESS
18	IN RDWY	NON-MOTORIST ILLEGALLY IN ROADWAY
19	NT VISBL	NON-MOTORIST NOT VISIBLE; NON-REFLECTIVE CLOTHIN
20	IMP PKNG	VEHICLE IMPROPERLY PARKED
21	DEF STER	DEFECTIVE STEERING MECHANISM
22	DEF BRKE	INADEQUATE OR NO BRAKES
24	LOADSHFT	VEHICLE LOST LOAD OR LOAD SHIFTED
25	TIREFAIL	TIRE FAILURE
26	PHANTOM	PHANTOM / NON-CONTACT VEHICLE
27	INATTENT	INATTENTION
28	NM INATT	NON-MOTORIST INATTENTION
29	F AVOID	FAILED TO AVOID VEHICLE AHEAD
30	SPEED	DRIVING IN EXCESS OF POSTED SPEED
31	RACING	SPEED RACING (PER PAR)
32	CARELESS	CARELESS DRIVING (PER PAR)
33	RECKLESS	RECKLESS DRIVING (PER PAR)
34	AGGRESV	AGGRESSIVE DRIVING (PER PAR)
35	RD RAGE	ROAD RAGE (PER PAR)
40	VIEW OBS	VIEW OBSCURED
50	USED MDN	IMPROPER USE OF MEDIAN OR SHOULDER

COLLISION TYPE CODE TRANSLATION LIST

COLL CODE	SHORT DESCRIPTION	LONG DESCRIPTION
&	OTH	MISCELLANEOUS
-	BACK	BACKING
0	PED	PEDESTRIAN
1	ANGL	ANGLE
2	HEAD	HEAD-ON
3	REAR	REAR-END
4	SS-M	SIDESWIPE - MEETING
5	SS-O	SIDESWIPE - OVERTAKING
6	TURN	TURNING MOVEMENT
7	PARK	PARKING MANEUVER
8	NCOL	NON-COLLISION
9	FIX	FIXED OBJECT OR OTHER OBJECT

CRASH TYPE CODE TRANSLATION LIST

CRASH TYPE	SHORT DESCRIPTION	LONG DESCRIPTION
&	OVERTURN	OVERTURNED
0	NON-COLL	OTHER NON-COLLISION
1	OTH RDWY	MOTOR VEHICLE ON OTHER ROADWAY
2	PRKD MV	PARKED MOTOR VEHICLE
3	PED	PEDESTRIAN
4	TRAIN	RAILWAY TRAIN
6	BIKE	PEDALCYCLIST
7	ANIMAL	ANIMAL
8	FIX OBJ	FIXED OBJECT
9	OTH OBJ	OTHER OBJECT
A	ANGL-STP	ENTERING AT ANGLE - ONE VEHICLE STOPPED
B	ANGL-OTH	ENTERING AT ANGLE - ALL OTHERS
C	S-STRGHT	FROM SAME DIRECTION - BOTH GOING STRAIGHT
D	S-1TURN	FROM SAME DIRECTION - ONE TURN, ONE STRAIGHT
E	S-1STOP	FROM SAME DIRECTION - ONE STOPPED
F	S-OTHER	FROM SAME DIRECTION-ALL OTHERS, INCLUDING PARKING
G	O-STRGHT	FROM OPPOSITE DIRECTION - BOTH GOING STRAIGHT
H	O-1 L-TURN	FROM OPPOSITE DIRECTION-ONE LEFT TURN,ONE STRAIGHT
I	O-1STOP	FROM OPPOSITE DIRECTION - ONE STOPPED
J	O-OTHER	FROM OPPOSITE DIRECTION-ALL OTHERS INCL. PARKING

DRIVER LICENSE CODE TRANSLATION LIST

LIC CODE	SHORT DESC	LONG DESCRIPTION
0	NONE	NOT LICENSED (HAD NEVER BEEN LICENSED)
1	OR-Y	VALID OREGON LICENSE
2	OTH-Y	VALID LICENSE, OTHER STATE OR COUNTRY
3	SUSP	SUSPENDED/REVOKED

DRIVER RESIDENCE CODE TRANSLATION LIST

RES CODE	SHORT DESC	LONG DESCRIPTION
1	OR<25	OREGON RESIDENT WITHIN 25 MILE OF HOME
2	OR>25	OREGON RESIDENT 25 OR MORE MILES FROM HOME
3	OR-?	OREGON RESIDENT - UNKNOWN DISTANCE FROM HOME
4	N-RES	NON-RESIDENT
9	UNK	UNKNOWN IF OREGON RESIDENT

ERROR CODE TRANSLATION LIST

ERROR CODE	SHORT DESCRIPTION	FULL DESCRIPTION
000	NONE	NO ERROR
001	WIDE TRN	WIDE TURN
002	CUT CORN	CUT CORNER ON TURN
003	FAIL TRN	FAILED TO OBEY MANDATORY TRAFFIC TURN SIGNAL, SIGN OR LANE MARKINGS
004	L IN TRF	LEFT TURN IN FRONT OF ONCOMING TRAFFIC
005	L PROHIB	LEFT TURN WHERE PROHIBITED
006	FRM WRNG	TURNED FROM WRONG LANE
007	TO WRONG	TURNED INTO WRONG LANE
008	ILLEG U	U-TURNED ILLEGALLY
009	IMP STOP	IMPROPERLY STOPPED IN TRAFFIC LANE
010	IMP SIG	IMPROPER SIGNAL OR FAILURE TO SIGNAL
011	IMP BACK	BACKING IMPROPERLY (NOT PARKING)
012	IMP PARK	IMPROPERLY PARKED
013	UNPARK	IMPROPER START LEAVING PARKED POSITION
014	IMP STRT	IMPROPER START FROM STOPPED POSITION
015	IMP LGHT	IMPROPER OR NO LIGHTS (VEHICLE IN TRAFFIC)
016	INATTENT	INATTENTION (FAILURE TO DIM LIGHTS PRIOR TO 4/1/97)
017	UNSF VEH	DRIVING UNSAFE VEHICLE (NO OTHER ERROR APPARENT)
018	OTH PARK	ENTERING/EXITING PARKED POSITION W/ INSUFFICIENT CLEARANCE; OTHER IMPROPER PARKING MANEUVER
019	DIS DRIV	DISREGARDED OTHER DRIVER'S SIGNAL
020	DIS SGNL	DISREGARDED TRAFFIC SIGNAL
021	RAN STOP	DISREGARDED STOP SIGN OR FLASHING RED
022	DIS SIGN	DISREGARDED WARNING SIGN, FLARES OR FLASHING AMBER
023	DIS OFCR	DISREGARDED POLICE OFFICER OR FLAGMAN
024	DIS EMER	DISREGARDED SIREN OR WARNING OF EMERGENCY VEHICLE
025	DIS RR	DISREGARDED RR SIGNAL, RR SIGN, OR RR FLAGMAN
026	REAR-END	FAILED TO AVOID STOPPED OR PARKED VEHICLE AHEAD OTHER THAN SCHOOL BUS
027	BIKE ROW	DID NOT HAVE RIGHT-OF-WAY OVER PEDALCYCLIST
028	NO ROW	DID NOT HAVE RIGHT-OF-WAY
029	PED ROW	FAILED TO YIELD RIGHT-OF-WAY TO PEDESTRIAN
030	PAS CURV	PASSING ON A CURVE
031	PAS WRNG	PASSING ON THE WRONG SIDE
032	PAS TANG	PASSING ON STRAIGHT ROAD UNDER UNSAFE CONDITIONS
033	PAS X-WK	PASSED VEHICLE STOPPED AT CROSSWALK FOR PEDESTRIAN
034	PAS INTR	PASSING AT INTERSECTION
035	PAS HILL	PASSING ON CREST OF HILL
036	N/PAS ZN	PASSING IN "NO PASSING" ZONE
037	PAS TRAF	PASSING IN FRONT OF ONCOMING TRAFFIC
038	CUT-IN	CUTTING IN (TWO LANES - TWO WAY ONLY)
039	WRNGSIDE	DRIVING ON WRONG SIDE OF THE ROAD (2-WAY UNDIVIDED ROADWAYS)
040	THRU MED	DRIVING THROUGH SAFETY ZONE OR OVER ISLAND
041	F/ST BUS	FAILED TO STOP FOR SCHOOL BUS

ERROR CODE TRANSLATION LIST

ERROR CODE	SHORT DESCRIPTION	FULL DESCRIPTION
042	F/SLO MV	FAILED TO DECREASE SPEED FOR SLOWER MOVING VEHICLE
043	TOO CLOSE	FOLLOWING TOO CLOSELY (MUST BE ON OFFICER'S REPORT)
044	STRDL LN	STRADDLING OR DRIVING ON WRONG LANES
045	IMP CHG	IMPROPER CHANGE OF TRAFFIC LANES
046	WRNG WAY	WRONG WAY ON ONE-WAY ROADWAY; WRONG SIDE DIVIDED ROAD
047	BASCRULE	DRIVING TOO FAST FOR CONDITIONS (NOT EXCEEDING POSTED SPEED)
048	OPN DOOR	OPENED DOOR INTO ADJACENT TRAFFIC LANE
049	IMPEDING	IMPEDING TRAFFIC
050	SPEED	DRIVING IN EXCESS OF POSTED SPEED
051	RECKLESS	RECKLESS DRIVING (PER PAR)
052	CARELESS	CARELESS DRIVING (PER PAR)
053	RACING	SPEED RACING (PER PAR)
054	X N/SGNL	CROSSING AT INTERSECTION, NO TRAFFIC SIGNAL PRESENT
055	X W/SGNL	CROSSING AT INTERSECTION, TRAFFIC SIGNAL PRESENT
056	DIAGONAL	CROSSING AT INTERSECTION - DIAGONALLY
057	BTWN INT	CROSSING BETWEEN INTERSECTIONS
059	W/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER WITH TRAFFIC
060	A/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER FACING TRAFFIC
061	W/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT WITH TRAFFIC
062	A/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT FACING TRAFFIC
063	PLAYINRD	PLAYING IN STREET OR ROAD
064	PUSH MV	PUSHING OR WORKING ON VEHICLE IN ROAD OR ON SHOULDER
065	WORK IN RD	WORKING IN ROADWAY OR ALONG SHOULDER
070	LAY ON RD	STANDING OR LYING IN ROADWAY
071	NM IMP USE	IMPROPER USE OF TRAFFIC LANE BY NON-MOTORIST
073	ELUDING	ELUDING / ATTEMPT TO ELUDE
079	F NEG CURV	FAILED TO NEGOTIATE A CURVE
080	FAIL LN	FAILED TO MAINTAIN LANE
081	OFF RD	RAN OFF ROAD
082	NO CLEAR	DRIVER MISJUDGED CLEARANCE
083	OVRSTEER	OVER-CORRECTING
084	NOT USED	CODE NOT IN USE
085	OVRLOAD	OVERLOADING OR IMPROPER LOADING OF VEHICLE WITH CARGO OR PASSENGERS
097	UNA DIS TC	UNABLE TO DETERMINE WHICH DRIVER DISREGARDED TRAFFIC CONTROL DEVICE

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
001	FEL/JUMP	OCCUPANT FELL, JUMPED OR WAS EJECTED FROM MOVING VEHICLE
002	INTERFER	PASSENGER INTERFERED WITH DRIVER
003	BUG INTF	ANIMAL OR INSECT IN VEHICLE INTERFERED WITH DRIVER
004	INDRCT PED	PEDESTRIAN INDIRECTLY INVOLVED (NOT STRUCK)
005	SUB-PED	"SUB-PED": PEDESTRIAN INJURED SUBSEQUENT TO COLLISION, ETC.
006	INDRCT BIK	PEDALCYCLIST INDIRECTLY INVOLVED (NOT STRUCK)
007	HITCHIKR	HITCHHIKER (SOLICITING A RIDE)
008	PSNGR TOW	PASSENGER OR NON-MOTORIST BEING TOWED OR PUSHED ON CONVEYANCE
009	ON/OFF V	GETTING ON/OFF STOPPED/PARKED VEHICLE (OCCUPANTS ONLY; MUST HAVE PHYSICAL CONTACT W/ VEHIC
010	SUB OTRN	OVERTURNED AFTER FIRST HARMFUL EVENT
011	MV PUSHD	VEHICLE BEING PUSHED
012	MV TOWED	VEHICLE TOWED OR HAD BEEN TOWING ANOTHER VEHICLE
013	FORCED	VEHICLE FORCED BY IMPACT INTO ANOTHER VEHICLE, PEDALCYCLIST OR PEDESTRIAN
014	SET MOTN	VEHICLE SET IN MOTION BY NON-DRIVER (CHILD RELEASED BRAKES, ETC.)
015	RR ROW	AT OR ON RAILROAD RIGHT-OF-WAY (NOT LIGHT RAIL)
016	LT RL ROW	AT OR ON LIGHT-RAIL RIGHT-OF-WAY
017	RR HIT V	TRAIN STRUCK VEHICLE
018	V HIT RR	VEHICLE STRUCK TRAIN
019	HIT RR CAR	VEHICLE STRUCK RAILROAD CAR ON ROADWAY
020	JACKNIFE	JACKKNIFE; TRAILER OR TOWED VEHICLE STRUCK TOWING VEHICLE
021	TRL OTRN	TRAILER OR TOWED VEHICLE OVERTURNED
022	CN BROKE	TRAILER CONNECTION BROKE
023	DETACH TRL	DETACHED TRAILING OBJECT STRUCK OTHER VEHICLE, NON-MOTORIST, OR OBJECT
024	V DOOR OPN	VEHICLE DOOR OPENED INTO ADJACENT TRAFFIC LANE
025	WHEELOFF	WHEEL CAME OFF
026	HOOD UP	HOOD FLEW UP
028	LOAD SHIFT	LOST LOAD, LOAD MOVED OR SHIFTED
029	TIREFAIL	TIRE FAILURE
030	PET	PET: CAT, DOG AND SIMILAR
031	LVSTOCK	STOCK: COW, CALF, BULL, STEER, SHEEP, ETC.
032	HORSE	HORSE, MULE, OR DONKEY
033	HRSE&RID	HORSE AND RIDER
034	GAME	WILD ANIMAL, GAME (INCLUDES BIRDS; NOT DEER OR ELK)
035	DEER ELK	DEER OR ELK, WAPITI
036	ANML VEH	ANIMAL-DRAWN VEHICLE
037	CULVERT	CULVERT, OPEN LOW OR HIGH MANHOLE
038	ATENUATN	IMPACT ATTENUATOR
039	PK METER	PARKING METER
040	CURB	CURB (ALSO NARROW SIDEWALKS ON BRIDGES)
041	JIGGLE	JIGGLE BAR OR TRAFFIC SNAKE FOR CHANNELIZATION
042	GDRL END	LEADING EDGE OF GUARDRAIL
043	GARDRAIL	GUARD RAIL (NOT METAL MEDIAN BARRIER)
044	BARRIER	MEDIAN BARRIER (RAISED OR METAL)
045	WALL	RETAINING WALL OR TUNNEL WALL
046	BR RAIL	BRIDGE RAILING OR PARAPET (ON BRIDGE OR APPROACH)
047	BR ABUTMNT	BRIDGE ABUTMENT (INCLUDED "APPROACH END" THRU 2013)
048	BR COLMN	BRIDGE PILLAR OR COLUMN
049	BR GIRDR	BRIDGE GIRDER (HORIZONTAL BRIDGE STRUCTURE OVERHEAD)
050	ISLAND	TRAFFIC RAISED ISLAND
051	GORE	GORE
052	POLE UNK	POLE - TYPE UNKNOWN
053	POLE UTL	POLE - POWER OR TELEPHONE
054	ST LIGHT	POLE - STREET LIGHT ONLY
055	TRF SGNL	POLE - TRAFFIC SIGNAL AND PED SIGNAL ONLY
056	SGN BRDG	POLE - SIGN BRIDGE
057	STOPSIGN	STOP OR YIELD SIGN
058	OTH SIGN	OTHER SIGN, INCLUDING STREET SIGNS
059	HYDRANT	HYDRANT

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
060	MARKER	DELINEATOR OR MARKER (REFLECTOR POSTS)
061	MAILBOX	MAILBOX
062	TREE	TREE, STUMP OR SHRUBS
063	VEG OHED	TREE BRANCH OR OTHER VEGETATION OVERHEAD, ETC.
064	WIRE/CBL	WIRE OR CABLE ACROSS OR OVER THE ROAD
065	TEMP SGN	TEMPORARY SIGN OR BARRICADE IN ROAD, ETC.
066	PERM SGN	PERMANENT SIGN OR BARRICADE IN/OFF ROAD
067	SLIDE	SLIDES, FALLEN OR FALLING ROCKS
068	FRGN OBJ	FOREIGN OBSTRUCTION/DEBRIS IN ROAD (NOT GRAVEL)
069	EQP WORK	EQUIPMENT WORKING IN/OFF ROAD
070	OTH EQP	OTHER EQUIPMENT IN OR OFF ROAD (INCLUDES PARKED TRAILER, BOAT)
071	MAIN EQP	WRECKER, STREET SWEEPER, SNOW PLOW OR SANDING EQUIPMENT
072	OTHER WALL	ROCK, BRICK OR OTHER SOLID WALL
073	IRRGL PVMT	OTHER BUMP (NOT SPEED BUMP), POTHOLE OR PAVEMENT IRREGULARITY (PER PAR)
074	OVERHD OBJ	OTHER OVERHEAD OBJECT (HIGHWAY SIGN, SIGNAL HEAD, ETC.); NOT BRIDGE
075	CAVE IN	BRIDGE OR ROAD CAVE IN
076	HI WATER	HIGH WATER
077	SNO BANK	SNOW BANK
078	LO-HI EDGE	LOW OR HIGH SHOULDER AT PAVEMENT EDGE
079	DITCH	CUT SLOPE OR DITCH EMBANKMENT
080	OBJ FRM MV	STRUCK BY ROCK OR OTHER OBJECT SET IN MOTION BY OTHER VEHICLE (INCL. LOST LOADS)
081	FLY-OBJ	STRUCK BY ROCK OR OTHER MOVING OR FLYING OBJECT (NOT SET IN MOTION BY VEHICLE)
082	VEH HID	VEHICLE OBSCURED VIEW
083	VEG HID	VEGETATION OBSCURED VIEW
084	BLDG HID	VIEW OBSCURED BY FENCE, SIGN, PHONE BOOTH, ETC.
085	WIND GUST	WIND GUST
086	IMMERSED	VEHICLE IMMERSED IN BODY OF WATER
087	FIRE/EXP	FIRE OR EXPLOSION
088	FENC/BLD	FENCE OR BUILDING, ETC.
089	OTHR CRASH	CRASH RELATED TO ANOTHER SEPARATE CRASH
090	TO 1 SIDE	TWO-WAY TRAFFIC ON DIVIDED ROADWAY ALL ROUTED TO ONE SIDE
091	BUILDING	BUILDING OR OTHER STRUCTURE
092	PHANTOM	OTHER (PHANTOM) NON-CONTACT VEHICLE
093	CELL PHONE	CELL PHONE (ON PAR OR DRIVER IN USE)
094	VIOL GDL	TEENAGE DRIVER IN VIOLATION OF GRADUATED LICENSE PGM
095	GUY WIRE	GUY WIRE
096	BERM	BERM (EARTHEN OR GRAVEL MOUND)
097	GRAVEL	GRAVEL IN ROADWAY
098	ABR EDGE	ABRUPT EDGE
099	CELL WTNSD	CELL PHONE USE WITNESSED BY OTHER PARTICIPANT
100	UNK FIXD	FIXED OBJECT, UNKNOWN TYPE.
101	OTHER OBJ	NON-FIXED OBJECT, OTHER OR UNKNOWN TYPE
102	TEXTING	TEXTING
103	WZ WORKER	WORK ZONE WORKER
104	ON VEHICLE	PASSENGER RIDING ON VEHICLE EXTERIOR
105	PEDAL PSGR	PASSENGER RIDING ON PEDALCYCLE
106	MAN WHLCHR	PEDESTRIAN IN NON-MOTORIZED WHEELCHAIR
107	MTR WHLCHR	PEDESTRIAN IN MOTORIZED WHEELCHAIR
108	OFFICER	LAW ENFORCEMENT / POLICE OFFICER
109	SUB-BIKE	"SUB-BIKE": PEDALCYCLIST INJURED SUBSEQUENT TO COLLISION, ETC.
110	N-MTR	NON-MOTORIST STRUCK VEHICLE
111	S CAR VS V	STREET CAR/TROLLEY (ON RAILS OR OVERHEAD WIRE SYSTEM) STRUCK VEHICLE
112	V VS S CAR	VEHICLE STRUCK STREET CAR/TROLLEY (ON RAILS OR OVERHEAD WIRE SYSTEM)
113	S CAR ROW	AT OR ON STREET CAR OR TROLLEY RIGHT-OF-WAY
114	RR EQUIP	VEHICLE STRUCK RAILROAD EQUIPMENT (NOT TRAIN) ON TRACKS
115	DSTRCT GPS	DISTRACTED BY NAVIGATION SYSTEM OR GPS DEVICE
116	DSTRCT OTH	DISTRACTED BY OTHER ELECTRONIC DEVICE
117	RR GATE	RAIL CROSSING DROP-ARM GATE

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
118	EXPNSN JNT	EXPANSION JOINT
119	JERSEY BAR	JERSEY BARRIER
120	WIRE BAR	WIRE OR CABLE MEDIAN BARRIER
121	FENCE	FENCE
123	OBJ IN VEH	LOOSE OBJECT IN VEHICLE STRUCK OCCUPANT
124	SLIPPERY	SLIDING OR SWERVING DUE TO WET, ICY, SLIPPERY OR LOOSE SURFACE (NOT GRAVEL)
125	SHLDR	SHOULDER GAVE WAY
126	BOULDER	ROCK(S), BOULDER (NOT GRAVEL; NOT ROCK SLIDE)
127	LAND SLIDE	ROCK SLIDE OR LAND SLIDE
128	CURVE INV	CURVE PRESENT AT CRASH LOCATION
129	HILL INV	VERTICAL GRADE / HILL PRESENT AT CRASH LOCATION
130	CURVE HID	VIEW OBSCURED BY CURVE
131	HILL HID	VIEW OBSCURED BY VERTICAL GRADE / HILL
132	WINDOW HID	VIEW OBSCURED BY VEHICLE WINDOW CONDITIONS
133	SPRAY HID	VIEW OBSCURED BY WATER SPRAY

FUNCTIONAL CLASSIFICATION TRANSLATION LIST

FUNC CLASS	DESCRIPTION
01	RURAL PRINCIPAL ARTERIAL - INTERSTATE
02	RURAL PRINCIPAL ARTERIAL - OTHER
06	RURAL MINOR ARTERIAL
07	RURAL MAJOR COLLECTOR
08	RURAL MINOR COLLECTOR
09	RURAL LOCAL
11	URBAN PRINCIPAL ARTERIAL - INTERSTATE
12	URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP
14	URBAN PRINCIPAL ARTERIAL - OTHER
16	URBAN MINOR ARTERIAL
17	URBAN MAJOR COLLECTOR
18	URBAN MINOR COLLECTOR
19	URBAN LOCAL
78	UNKNOWN RURAL SYSTEM
79	UNKNOWN RURAL NON-SYSTEM
98	UNKNOWN URBAN SYSTEM
99	UNKNOWN URBAN NON-SYSTEM

HIGHWAY COMPONENT TRANSLATION LIST

CODE	DESCRIPTION
0	MAINLINE STATE HIGHWAY
1	COUPLET
3	FRONTAGE ROAD
6	CONNECTION
8	HIGHWAY - OTHER

INJURY SEVERITY CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
1	KILL	FATAL INJURY
2	INJA	INCAPACITATING INJURY - BLEEDING, BROKEN BONES
3	INJB	NON-INCAPACITATING INJURY
4	INJC	POSSIBLE INJURY - COMPLAINT OF PAIN
5	PRI	DIED PRIOR TO CRASH
7	NO<5	NO INJURY - 0 TO 4 YEARS OF AGE

LIGHT CONDITION CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	DAY	DAYLIGHT
2	DLIT	DARKNESS - WITH STREET LIGHTS
3	DARK	DARKNESS - NO STREET LIGHTS
4	DAWN	DAWN (TWILIGHT)
5	DUSK	DUSK (TWILIGHT)

MEDIAN TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	NONE	NO MEDIAN
1	RSDMD	SOLID MEDIAN BARRIER
2	DIVMD	EARTH, GRASS OR PAVED MEDIAN

MILEAGE TYPE CODE TRANSLATION LIST

CODE	LONG DESCRIPTION
0	REGULAR MILEAGE
T	TEMPORARY
Y	SPUR
Z	OVERLAPPING

MOVEMENT TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	STRGHT	STRAIGHT AHEAD
2	TURN-R	TURNING RIGHT
3	TURN-L	TURNING LEFT
4	U-TURN	MAKING A U-TURN
5	BACK	BACKING
6	STOP	STOPPED IN TRAFFIC
7	PRKD-P	PARKED - PROPERLY
8	PRKD-I	PARKED - IMPROPERLY

PEDESTRIAN LOCATION CODE TRANSLATION LIST

CODE	LONG DESCRIPTION
00	AT INTERSECTION - NOT IN ROADWAY
01	AT INTERSECTION - INSIDE CROSSWALK
02	AT INTERSECTION - IN ROADWAY, OUTSIDE CROSSWALK
03	AT INTERSECTION - IN ROADWAY, XWALK AVAIL UNKNWN
04	NOT AT INTERSECTION - IN ROADWAY
05	NOT AT INTERSECTION - ON SHOULDER
06	NOT AT INTERSECTION - ON MEDIAN
07	NOT AT INTERSECTION - WITHIN TRAFFIC RIGHT-OF-WAY
08	NOT AT INTERSECTION - IN BIKE PATH OR PARKING LANE
09	NOT-AT INTERSECTION - ON SIDEWALK
10	OUTSIDE TRAFFICWAY BOUNDARIES
13	AT INTERSECTION - IN BIKE LANE
14	NOT AT INTERSECTION - IN BIKE LANE
15	NOT AT INTERSECTION - INSIDE MID-BLOCK CROSSWALK
16	NOT AT INTERSECTION - IN PARKING LANE

ROAD CHARACTER CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	INTER	INTERSECTION
2	ALLEY	DRIVEWAY OR ALLEY
3	STRGHT	STRAIGHT ROADWAY
4	TRANS	TRANSITION
5	CURVE	CURVE (HORIZONTAL CURVE)
6	OPENAC	OPEN ACCESS OR TURNOUT
7	GRADE	GRADE (VERTICAL CURVE)
8	BRIDGE	BRIDGE STRUCTURE
9	TUNNEL	TUNNEL

PARTICIPANT TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	OCC	UNKNOWN OCCUPANT TYPE
1	DRVR	DRIVER
2	PSNG	PASSENGER
3	PED	PEDESTRIAN
4	CONV	PEDESTRIAN USING A PEDESTRIAN CONVEYA
5	PTOW	PEDESTRIAN TOWING OR TRAILERING AN OB
6	BIKE	PEDALCYCLIST
7	BTOW	PEDALCYCLIST TOWING OR TRAILERING AN
8	PRKD	OCCUPANT OF A PARKED MOTOR VEHICLE
9	UNK	UNKNOWN TYPE OF NON-MOTORIST

TRAFFIC CONTROL DEVICE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
000	NONE	NO CONTROL
001	TRF SIGNAL	TRAFFIC SIGNALS
002	FLASHBCN-R	FLASHING BEACON - RED (STOP)
003	FLASHBCN-A	FLASHING BEACON - AMBER (SLOW)
004	STOP SIGN	STOP SIGN
005	SLOW SIGN	SLOW SIGN
006	REG-SIGN	REGULATORY SIGN
007	YIELD	YIELD SIGN
008	WARNING	WARNING SIGN
009	CURVE	CURVE SIGN
010	SCHL X-ING	SCHOOL CROSSING SIGN OR SPECIAL SIGNAL
011	OFCR/FLAG	POLICE OFFICER, FLAGMAN - SCHOOL PATROL
012	BRDG-GATE	BRIDGE GATE - BARRIER
013	TEMP-BARR	TEMPORARY BARRIER
014	NO-PASS-ZN	NO PASSING ZONE
015	ONE-WAY	ONE-WAY STREET
016	CHANNEL	CHANNELIZATION
017	MEDIAN BAR	MEDIAN BARRIER
018	PILOT CAR	PILOT CAR
019	SP PED SIG	SPECIAL PEDESTRIAN SIGNAL
020	X-BUCK	CROSSBUCK
021	THR-GN-SIG	THROUGH GREEN ARROW OR SIGNAL
022	L-GRN-SIG	LEFT TURN GREEN ARROW, LANE MARKINGS, OR SIGNAL
023	R-GRN-SIG	RIGHT TURN GREEN ARROW, LANE MARKINGS, OR SIGNAL
024	WIGWAG	WIGWAG OR FLASHING LIGHTS W/O DROP-ARM GATE
025	X-BUCK WRN	CROSSBUCK AND ADVANCE WARNING
026	WW W/ GATE	FLASHING LIGHTS WITH DROP-ARM GATES
027	OVRHD SGNL	SUPPLEMENTAL OVERHEAD SIGNAL (RR XING ONLY)
028	SP RR STOP	SPECIAL RR STOP SIGN
029	ILUM GRD X	ILLUMINATED GRADE CROSSING
037	RAMP METER	METERED RAMPS
038	RUMBLE STR	RUMBLE STRIP
090	L-TURN REF	LEFT TURN REFUGE (WHEN REFUGE IS INVOLVED)
091	R-TURN ALL	RIGHT TURN AT ALL TIMES SIGN, ETC.
092	EMR SGN/FL	EMERGENCY SIGNS OR FLARES
093	ACCEL LANE	ACCELERATION OR DECELERATION LANES
094	R-TURN PRO	RIGHT TURN PROHIBITED ON RED AFTER STOPPING

095	BUS STPSGN	BUS STOP SIGN AND RED LIGHTS
099	UNKNOWN	UNKNOWN OR NOT DEFINITE

VEHICLE TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
01	PSNGR CAR	PASSENGER CAR, PICKUP, LIGHT DELIVERY, ETC.
02	BOBTAIL	TRUCK TRACTOR WITH NO TRAILERS (BOBTAIL)
03	FARM TRCTR	FARM TRACTOR OR SELF-PROPELLED FARM EQUIPMENT
04	SEMI TOW	TRUCK TRACTOR WITH TRAILER/MOBILE HOME IN TOW
05	TRUCK	TRUCK WITH NON-DETACHABLE BED, PANEL, ETC.
06	MOPED	MOPED, MINIBIKE, SEATED MOTOR SCOOTER, MOTOR BIKE
07	SCHL BUS	SCHOOL BUS (INCLUDES VAN)
08	OTH BUS	OTHER BUS
09	MTRCYCLE	MOTORCYCLE, DIRT BIKE
10	OTHER	OTHER: FORKLIFT, BACKHOE, ETC.
11	MOTRHOME	MOTORHOME
12	TROLLEY	MOTORIZED STREET CAR/TROLLEY (NO RAILS/WIRES)
13	ATV	ATV
14	MTRSCTR	MOTORIZED SCOOTER (STANDING)
15	SNOWMOBILE	SNOWMOBILE
99	UNKNOWN	UNKNOWN VEHICLE TYPE

WEATHER CONDITION CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	CLR	CLEAR
2	CLD	CLOUDY
3	RAIN	RAIN
4	SLT	SLEET
5	FOG	FOG
6	SNOW	SNOW
7	DUST	DUST
8	SMOK	SMOKE
9	ASH	ASH

Attachment C - Traffic Count Data

Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

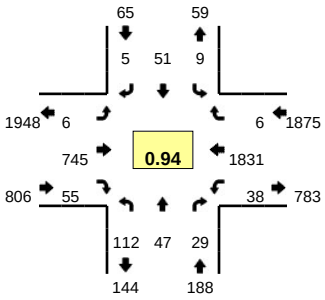
LOCATION: SE Rusk Rd -- Milwaukie Expy

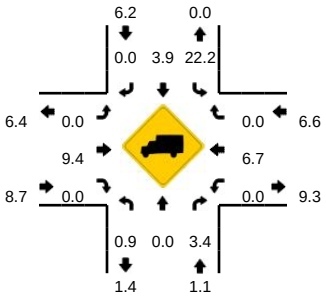
QC JOB #: 13929501

CITY/STATE: Milwaukie, OR

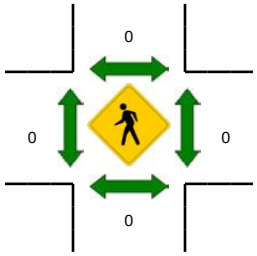
DATE: Wed, Nov 02 2016

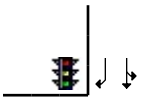
Peak-Hour: 7:35 AM -- 8:35 AM
Peak 15-Min: 8:10 AM -- 8:25 AM

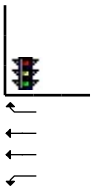


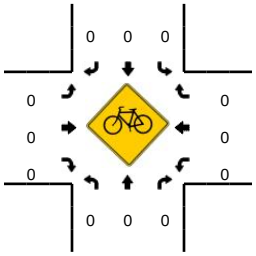


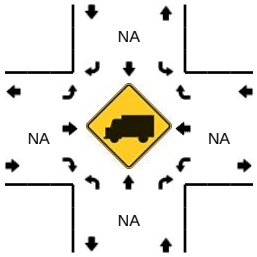
Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

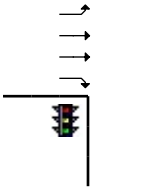


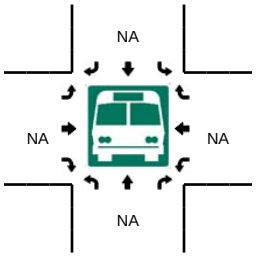












5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				Milwaukie Expy (Eastbound)				Milwaukie Expy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	6	3	1	0	3	4	1	0	0	37	0	0	0	222	0	0	277	
7:05 AM	13	1	2	0	3	0	0	0	0	31	0	0	0	140	1	0	191	
7:10 AM	6	0	1	0	0	0	0	0	0	62	0	0	1	183	1	0	254	
7:15 AM	9	0	6	0	0	0	0	0	0	63	0	0	2	172	2	0	254	
7:20 AM	5	1	3	0	0	2	0	0	0	63	2	0	1	148	1	0	226	
7:25 AM	9	2	5	0	1	3	1	0	0	69	1	0	0	152	1	0	244	
7:30 AM	7	0	2	0	1	0	0	0	0	64	3	0	1	140	1	0	219	
7:35 AM	14	6	1	0	2	1	0	0	0	56	1	0	2	166	0	0	249	
7:40 AM	12	1	1	0	1	6	1	0	0	84	1	0	3	146	1	0	257	
7:45 AM	10	3	1	0	0	1	0	0	0	58	4	0	4	147	0	0	228	
7:50 AM	6	3	5	0	1	8	0	0	0	82	2	0	2	173	2	0	284	
7:55 AM	7	5	1	0	2	3	0	0	2	46	3	0	2	144	0	0	215	2898
8:00 AM	5	2	2	0	0	2	1	0	0	57	3	0	1	164	0	0	237	2858
8:05 AM	9	2	2	0	0	4	0	0	0	54	4	0	3	141	1	0	220	2887
8:10 AM	3	2	2	0	0	1	0	0	2	84	2	0	3	168	1	0	268	2901
8:15 AM	11	9	4	0	0	10	1	0	0	46	6	0	5	140	0	0	232	2879
8:20 AM	10	4	1	0	2	7	0	0	2	72	12	0	4	164	0	0	278	2931
8:25 AM	13	8	4	0	0	5	0	0	0	41	10	0	5	131	0	0	217	2904
8:30 AM	12	2	5	0	1	3	2	0	0	65	7	0	4	147	1	0	249	2934
8:35 AM	14	5	6	0	1	5	0	0	1	51	1	0	2	115	1	0	202	2887
8:40 AM	10	2	2	0	1	4	0	0	0	79	5	0	3	143	0	0	249	2879
8:45 AM	7	8	5	0	2	2	1	0	0	48	6	0	1	119	1	0	200	2851
8:50 AM	7	3	2	0	2	4	0	0	2	74	3	0	1	138	1	0	237	2804
8:55 AM	9	5	2	0	3	3	0	0	1	52	6	0	6	126	2	0	215	2804

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	96	60	28	0	8	72	4	0	16	808	80	0	48	1888	4	0	3112
Heavy Trucks	0	0	4		4	0	0		0	92	0		0	160	0		260
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/8/2016 9:32 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

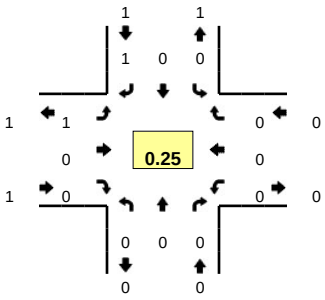
LOCATION: SE Rusk Rd -- Church Driveway

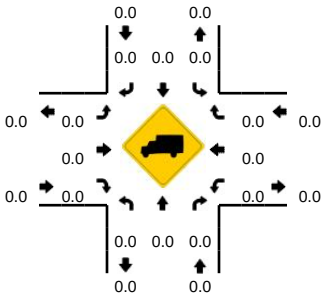
QC JOB #: 13929511

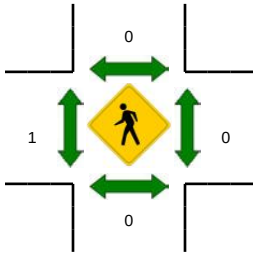
CITY/STATE: Milwaukie, OR

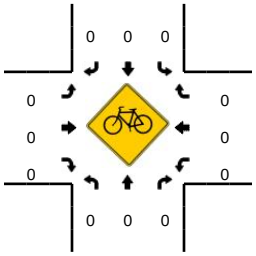
DATE: Wed, Nov 02 2016

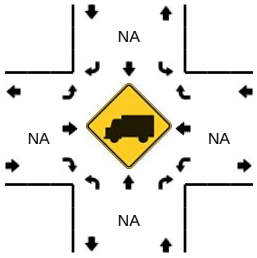
Peak-Hour: 7:35 AM -- 8:35 AM
Peak 15-Min: 7:40 AM -- 7:55 AM

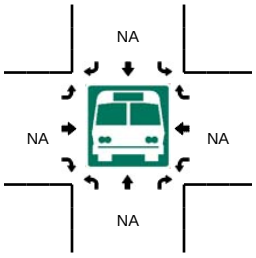












5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				Church Driveway (Eastbound)				Church Driveway (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:10 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:15 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	
7:20 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:35 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:45 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	
7:50 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	
7:55 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
8:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
8:10 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:20 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:35 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:55 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	4	0	4	0	0	0	0	0	0	0	8
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/8/2016 9:32 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

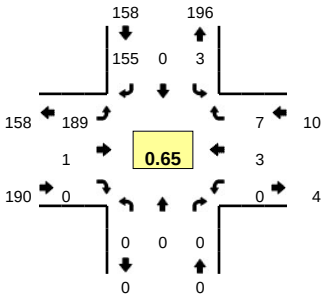
LOCATION: SE Ruscliffe Ln -- SE Rusk Rd

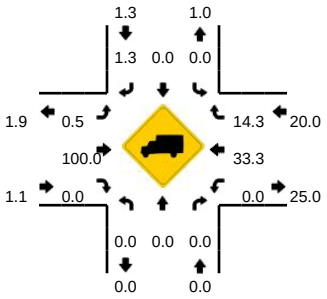
QC JOB #: 13929503

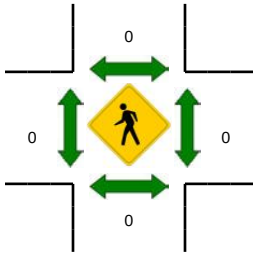
CITY/STATE: Milwaukie, OR

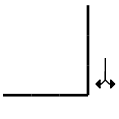
DATE: Wed, Nov 02 2016

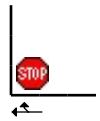
Peak-Hour: 7:35 AM -- 8:35 AM
Peak 15-Min: 8:20 AM -- 8:35 AM

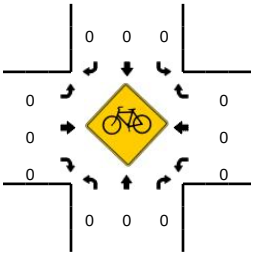


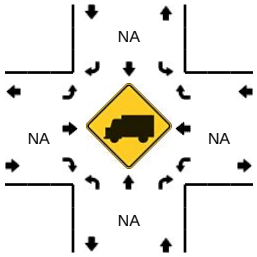


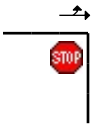


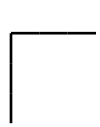


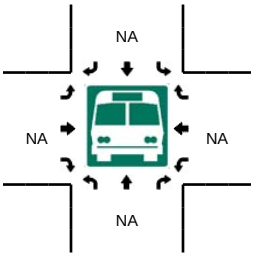












5-Min Count Period Beginning At	SE Ruscliffe Ln (Northbound)				SE Ruscliffe Ln (Southbound)				SE Rusk Rd (Eastbound)				SE Rusk Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	1	0	3	0	11	1	0	0	0	0	1	0	17	
7:05 AM	0	0	0	0	0	0	1	0	15	0	0	0	0	0	0	0	16	
7:10 AM	0	0	0	0	0	0	1	0	10	0	0	0	0	1	0	0	12	
7:15 AM	0	0	0	0	1	0	2	0	14	1	0	0	0	0	0	0	18	
7:20 AM	0	0	0	0	0	0	7	0	15	0	0	0	0	1	1	0	24	
7:25 AM	0	0	0	0	0	0	5	0	10	0	0	0	0	0	1	0	16	
7:30 AM	0	0	0	0	0	0	3	0	20	0	0	0	0	1	0	0	24	
7:35 AM	0	0	0	0	0	0	7	0	15	0	0	0	0	0	0	0	22	
7:40 AM	0	0	0	0	0	0	11	0	18	0	0	0	0	0	0	0	29	
7:45 AM	0	0	0	0	2	0	6	0	12	0	0	0	0	1	0	0	21	
7:50 AM	0	0	0	0	0	0	13	0	14	0	0	0	0	0	2	0	29	
7:55 AM	0	0	0	0	0	0	8	0	12	0	0	0	0	1	0	0	21	249
8:00 AM	0	0	0	0	0	0	6	0	10	0	0	0	0	0	1	0	17	249
8:05 AM	0	0	0	0	0	0	10	0	11	0	0	0	0	0	1	0	22	255
8:10 AM	0	0	0	0	0	0	8	0	10	0	0	0	0	1	1	0	20	263
8:15 AM	0	0	0	0	0	0	18	0	20	0	0	0	0	0	2	0	40	285
8:20 AM	0	0	0	0	0	0	28	0	21	0	0	0	0	0	0	0	49	310
8:25 AM	0	0	0	0	0	0	24	0	21	0	0	0	0	0	0	0	45	339
8:30 AM	0	0	0	0	1	0	16	0	25	1	0	0	0	0	0	0	43	358
8:35 AM	0	0	0	0	0	0	7	0	20	0	0	0	0	0	1	0	28	364
8:40 AM	0	0	0	0	0	0	14	0	18	0	0	0	0	0	0	0	32	367
8:45 AM	0	0	0	0	0	0	8	0	19	0	0	0	0	0	0	0	27	373
8:50 AM	0	0	0	0	0	0	10	0	17	0	0	0	0	3	2	0	32	376
8:55 AM	0	0	0	0	1	0	12	0	15	0	0	0	0	0	0	0	28	383

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	4	0	272	0	268	4	0	0	0	0	0	0	548
Heavy Trucks	0	0	0		0	0	0		0	4	0		0	0	0		4
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/8/2016 9:32 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

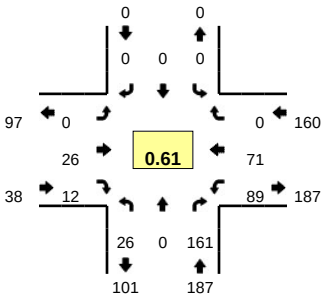
LOCATION: SE Rusk Rd -- SE Kellogg Creek Dr

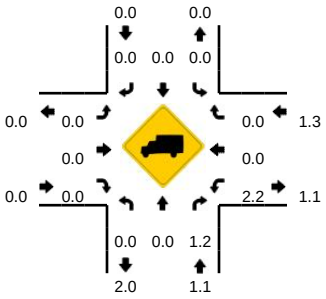
QC JOB #: 13929505

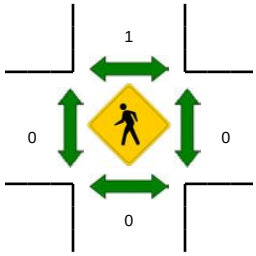
CITY/STATE: Milwaukie, OR

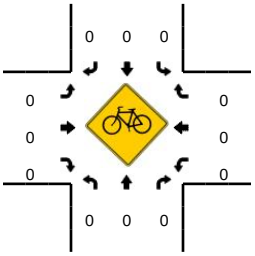
DATE: Wed, Nov 02 2016

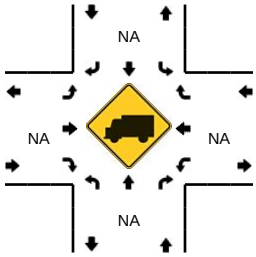
Peak-Hour: 7:35 AM -- 8:35 AM
Peak 15-Min: 8:20 AM -- 8:35 AM

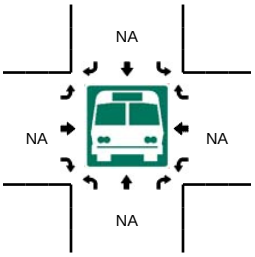












5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				SE Kellogg Creek Dr (Eastbound)				SE Kellogg Creek Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	12	0	0	0	0	0	0	0	0	0	2	1	0	0	15	
7:05 AM	0	0	15	0	0	0	0	0	0	0	1	0	0	0	0	0	16	
7:10 AM	1	0	10	0	0	0	0	0	0	0	0	0	3	0	0	0	14	
7:15 AM	1	0	15	0	0	0	0	0	0	0	0	0	1	1	0	0	18	
7:20 AM	1	0	14	0	0	0	0	0	0	0	0	0	6	2	0	0	23	
7:25 AM	2	0	10	0	0	0	0	0	0	1	0	0	3	0	0	0	16	
7:30 AM	0	0	18	0	0	0	0	0	0	2	0	0	3	3	0	0	26	
7:35 AM	1	0	15	0	0	0	0	0	0	0	0	0	6	0	0	0	22	
7:40 AM	1	0	18	0	0	0	0	0	0	0	0	0	11	1	0	0	31	
7:45 AM	2	0	11	0	0	0	0	0	0	1	0	0	4	2	0	0	20	
7:50 AM	1	0	13	0	0	0	0	0	0	1	0	0	10	3	0	0	28	
7:55 AM	0	0	12	0	0	0	0	0	0	0	1	0	7	2	0	0	22	251
8:00 AM	1	0	9	0	0	0	0	0	0	1	0	0	4	3	0	0	18	254
8:05 AM	1	0	11	0	0	0	0	0	0	0	0	0	5	3	0	0	20	258
8:10 AM	0	0	10	0	0	0	0	0	0	0	0	0	5	7	0	0	22	266
8:15 AM	6	0	17	0	0	0	0	0	0	1	1	0	6	12	0	0	43	291
8:20 AM	5	0	15	0	0	0	0	0	0	6	2	0	15	13	0	0	56	324
8:25 AM	3	0	15	0	0	0	0	0	0	6	4	0	11	14	0	0	53	361
8:30 AM	5	0	15	0	0	0	0	0	0	10	4	0	5	11	0	0	50	385
8:35 AM	0	0	11	0	0	0	0	0	0	10	3	0	3	2	0	0	29	392
8:40 AM	1	0	16	0	0	0	0	0	0	2	0	0	10	6	0	0	35	396
8:45 AM	2	0	15	0	0	0	0	0	0	3	0	0	7	2	0	0	29	405
8:50 AM	2	0	16	0	0	0	0	0	0	2	1	0	8	2	0	0	31	408
8:55 AM	0	0	13	0	0	0	0	0	0	2	1	0	7	7	0	0	30	416

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	52	0	180	0	0	0	0	0	0	88	40	0	124	152	0	0	636
Heavy Trucks	0	0	4		0	0	0		0	0	0		0	0	0		4
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/8/2016 9:32 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

LOCATION: Church Driveway -- SE Kellogg Creek Dr

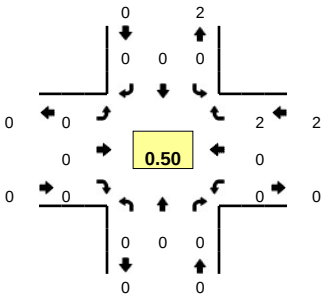
CITY/STATE: Milwaukie, OR

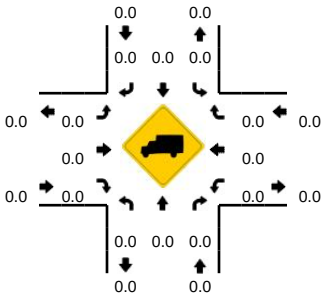
QC JOB #: 13929509

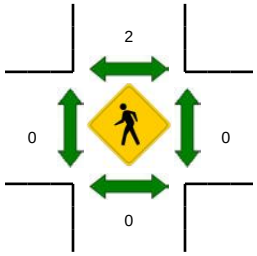
DATE: Wed, Nov 02 2016

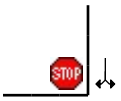
Peak-Hour: 7:35 AM -- 8:35 AM

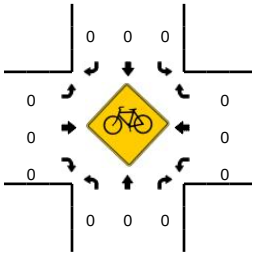
Peak 15-Min: 8:05 AM -- 8:20 AM

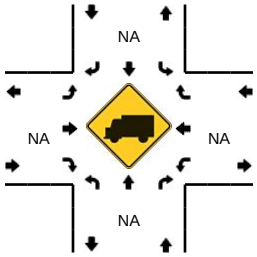


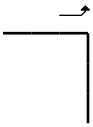


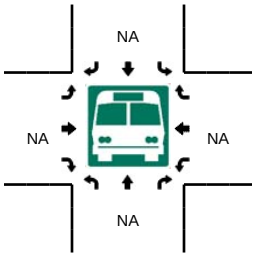












5-Min Count Period Beginning At	Church Driveway (Northbound)				Church Driveway (Southbound)				SE Kellogg Creek Dr (Eastbound)				SE Kellogg Creek Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:10 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:20 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:35 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:55 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:10 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
8:20 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2
8:35 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	3
8:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
8:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
8:55 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				4				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/8/2016 9:32 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

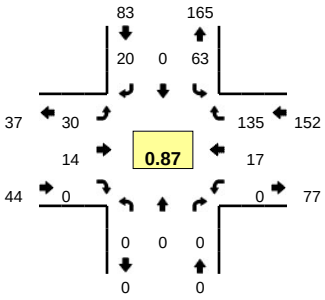
Method for determining peak hour: Total Entering Volume

LOCATION: SE Rusk Rd -- SE Aldercrest Rd

QC JOB #: 13929507

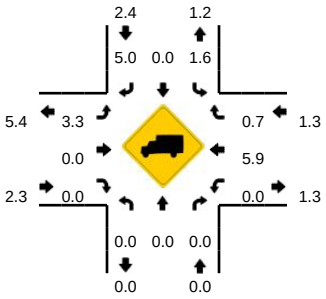
CITY/STATE: Milwaukie, OR

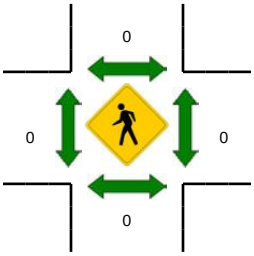
DATE: Wed, Nov 02 2016

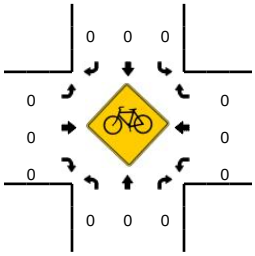


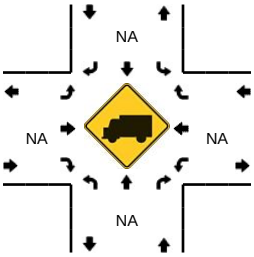
Peak-Hour: 7:35 AM -- 8:35 AM

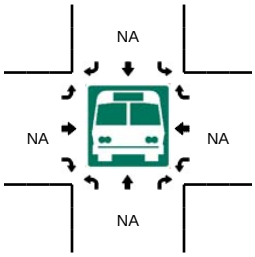
Peak 15-Min: 8:15 AM -- 8:30 AM











5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				SE Aldercrest Rd (Eastbound)				SE Aldercrest Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	2	7	0	10	
7:05 AM	0	0	0	0	2	0	1	0	2	1	0	0	0	2	12	0	20	
7:10 AM	0	0	0	0	2	0	1	0	2	3	0	0	0	1	8	0	17	
7:15 AM	0	0	0	0	0	0	1	0	3	1	0	0	0	1	8	0	14	
7:20 AM	0	0	0	0	4	0	0	0	5	0	0	0	0	1	8	0	18	
7:25 AM	0	0	0	0	4	0	1	0	2	2	0	0	0	2	9	0	20	
7:30 AM	0	0	0	0	4	0	1	0	2	0	0	0	0	3	12	0	22	
7:35 AM	0	0	0	0	6	0	0	0	4	0	0	0	0	0	14	0	24	
7:40 AM	0	0	0	0	6	0	2	0	1	2	0	0	0	1	15	0	27	
7:45 AM	0	0	0	0	2	0	0	0	1	0	0	0	0	3	11	0	17	
7:50 AM	0	0	0	0	6	0	2	0	0	1	0	0	0	2	11	0	22	
7:55 AM	0	0	0	0	7	0	3	0	1	3	0	0	0	1	8	0	23	234
8:00 AM	0	0	0	0	4	0	0	0	1	0	0	0	0	1	8	0	14	238
8:05 AM	0	0	0	0	6	0	1	0	4	6	0	0	0	2	8	0	27	245
8:10 AM	0	0	0	0	3	0	2	0	4	0	0	0	0	3	9	0	21	249
8:15 AM	0	0	0	0	3	0	2	0	4	1	0	0	0	2	18	0	30	265
8:20 AM	0	0	0	0	8	0	1	0	3	0	0	0	0	1	12	0	25	272
8:25 AM	0	0	0	0	4	0	4	0	4	1	0	0	0	0	12	0	25	277
8:30 AM	0	0	0	0	8	0	3	0	3	0	0	0	0	1	9	0	24	279
8:35 AM	0	0	0	0	3	0	1	0	0	2	0	0	0	0	7	0	13	268
8:40 AM	0	0	0	0	8	0	3	0	3	1	0	0	0	2	11	0	28	269
8:45 AM	0	0	0	0	5	0	3	0	7	1	0	0	0	3	10	0	29	281
8:50 AM	0	0	0	0	4	0	3	0	4	2	0	0	0	1	9	0	23	282
8:55 AM	0	0	0	0	2	0	6	0	5	2	0	0	0	3	7	0	25	284

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	60	0	28	0	44	8	0	0	0	12	168	0	320
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/8/2016 9:32 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

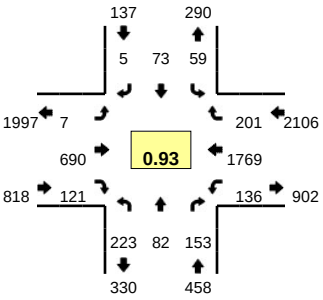
LOCATION: SE Lake Rd/SE Webster Rd -- Milwaukie Expy

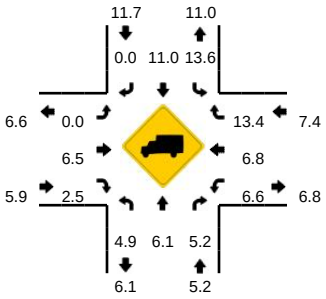
QC JOB #: 13929519

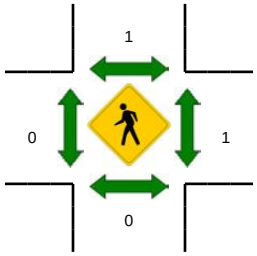
CITY/STATE: Portland, OR

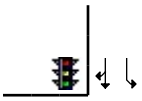
DATE: Thu, Nov 17 2016

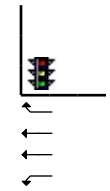
Peak-Hour: 7:35 AM -- 8:35 AM
Peak 15-Min: 7:50 AM -- 8:05 AM

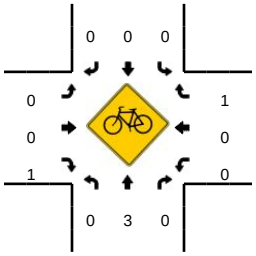


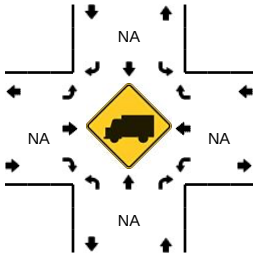


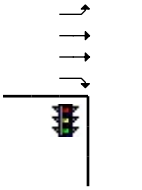


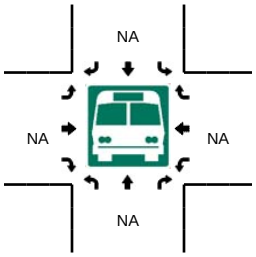












5-Min Count Period Beginning At	SE Lake Rd/SE Webster Rd (Northbound)				SE Lake Rd/SE Webster Rd (Southbound)				Milwaukie Expy (Eastbound)				Milwaukie Expy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	24	4	6	0	4	0	0	0	0	47	5	0	13	182	17	0	302	
7:05 AM	37	14	7	0	5	0	0	0	0	52	6	0	9	136	9	0	275	
7:10 AM	21	6	8	0	1	1	0	0	2	42	3	0	10	165	10	0	269	
7:15 AM	24	11	9	0	4	8	0	0	0	49	6	0	8	155	13	0	287	
7:20 AM	19	8	8	0	1	6	0	0	0	37	5	0	8	126	12	0	230	
7:25 AM	29	10	17	0	5	5	0	0	0	67	7	0	9	136	12	0	297	
7:30 AM	19	6	6	0	3	7	0	0	0	63	8	0	6	157	9	0	284	
7:35 AM	17	9	18	0	9	7	0	0	0	41	18	0	15	122	8	0	264	
7:40 AM	17	3	15	0	8	5	0	0	0	55	7	0	6	171	19	0	306	
7:45 AM	25	10	17	0	4	6	0	0	1	67	9	0	12	117	19	0	287	
7:50 AM	14	6	14	0	4	6	1	0	1	90	8	0	5	175	22	0	346	
7:55 AM	19	9	15	0	2	6	0	0	1	63	10	0	9	152	14	0	300	3447
8:00 AM	14	7	12	0	1	6	1	0	1	54	9	0	10	165	22	0	302	3447
8:05 AM	19	8	11	0	2	6	0	0	0	43	10	0	5	144	17	0	265	3437
8:10 AM	17	3	7	0	5	4	0	0	1	62	10	0	12	166	20	0	307	3475
8:15 AM	26	10	18	0	6	11	0	0	0	37	11	0	13	121	13	0	266	3454
8:20 AM	18	6	6	0	5	6	2	0	2	71	8	0	16	149	15	0	304	3528
8:25 AM	29	6	11	0	5	7	0	0	0	47	12	0	16	140	14	0	287	3518
8:30 AM	8	5	9	0	8	3	1	0	0	60	9	0	17	147	18	0	285	3519
8:35 AM	18	4	13	0	7	6	0	0	0	57	12	0	21	116	7	0	261	3516
8:40 AM	17	6	11	0	4	2	0	0	1	63	12	0	22	152	14	0	304	3514
8:45 AM	23	9	13	0	6	6	1	0	0	54	4	0	24	105	15	0	260	3487
8:50 AM	17	3	4	0	4	4	0	0	1	62	12	0	22	152	23	0	304	3445
8:55 AM	18	4	10	0	10	8	0	0	2	52	4	0	24	97	9	0	238	3383

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	188	88	164	0	28	72	8	0	12	828	108	0	96	1968	232	0	3792
Heavy Trucks	16	16	8		8	12	0		0	60	0		0	124	32		276
Pedestrians		0				0				0				4			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/8/2016 9:32 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

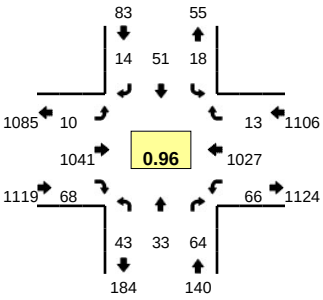
Type of peak hour being reported: User-Defined

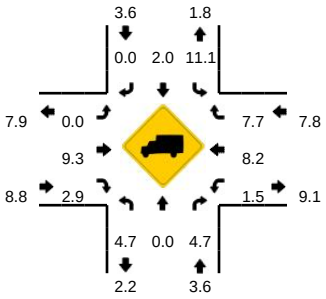
Method for determining peak hour: Total Entering Volume

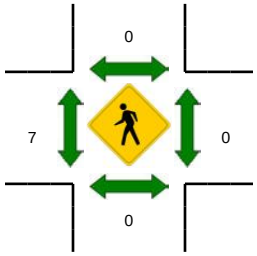
LOCATION: SE Rusk Rd -- Milwaukie Expy
CITY/STATE: Milwaukie, OR

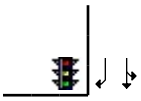
QC JOB #: 13929513
DATE: Wed, Nov 02 2016

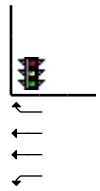
Peak-Hour: 11:55 AM -- 12:55 PM
Peak 15-Min: 12:40 PM -- 12:55 PM

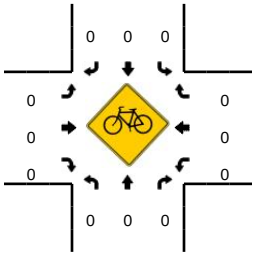


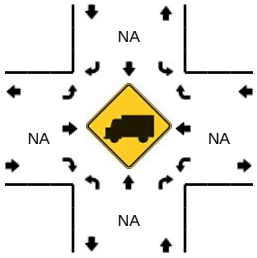


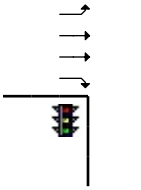


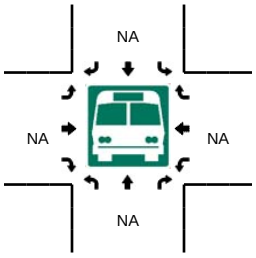












5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				Milwaukie Expy (Eastbound)				Milwaukie Expy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:00 AM	7	3	4	0	0	5	0	0	1	55	2	0	4	100	0	0	181	
11:05 AM	2	1	3	0	2	4	0	0	0	69	3	0	3	79	5	0	171	
11:10 AM	6	5	7	0	1	4	1	0	0	73	4	0	3	69	0	0	173	
11:15 AM	5	4	8	0	1	1	0	0	0	93	3	0	5	99	2	0	221	
11:20 AM	1	7	5	0	1	2	0	0	0	84	0	1	2	81	0	0	184	
11:25 AM	11	5	7	0	3	1	0	0	0	78	2	0	5	95	0	0	207	
11:30 AM	2	1	2	0	3	4	0	0	0	75	7	0	3	93	0	0	190	
11:35 AM	5	1	7	0	0	1	0	0	0	88	5	0	2	95	0	0	204	
11:40 AM	10	5	6	0	0	4	1	0	1	72	3	0	1	102	0	0	205	
11:45 AM	9	2	0	0	3	4	0	0	2	82	1	1	3	91	1	0	199	
11:50 AM	4	1	7	0	1	2	2	0	0	77	6	0	5	88	2	0	195	
11:55 AM	3	5	5	0	2	6	2	0	0	98	10	0	4	78	1	0	214	2344
12:00 PM	6	1	5	0	2	4	2	0	0	69	4	0	5	70	0	0	168	2331
12:05 PM	3	1	10	0	2	1	1	0	0	95	8	1	5	98	0	0	225	2385
12:10 PM	5	2	2	0	1	6	1	0	0	82	3	0	7	88	0	0	197	2409
12:15 PM	5	1	2	0	2	6	2	0	2	103	1	0	8	78	3	0	213	2401
12:20 PM	2	1	6	0	0	2	0	0	1	93	6	0	7	85	1	0	204	2421
12:25 PM	1	2	5	0	1	4	2	0	2	82	11	0	7	74	2	0	193	2407
12:30 PM	4	3	6	0	2	5	0	0	0	81	3	0	3	91	3	0	201	2418
12:35 PM	1	5	7	0	0	7	1	0	1	89	6	0	7	69	0	1	194	2408
12:40 PM	3	6	9	0	3	4	0	0	2	97	8	0	3	97	1	0	233	2436
12:45 PM	7	2	5	0	0	3	2	0	1	84	3	0	7	85	1	0	200	2437
12:50 PM	3	4	2	0	3	3	1	0	0	68	5	0	2	114	1	0	206	2448
12:55 PM	5	2	12	0	1	4	0	0	0	93	5	0	6	78	0	0	206	2440

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	52	48	64	0	24	40	12	0	12	996	64	0	48	1184	12	0	2556
Heavy Trucks	0	0	4		0	0	0		0	108	8		0	108	0		228
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/8/2016 9:36 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

LOCATION: SE Rusk Rd -- Church Driveway

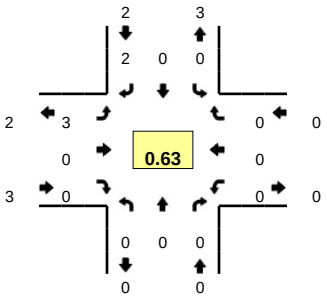
CITY/STATE: Milwaukie, OR

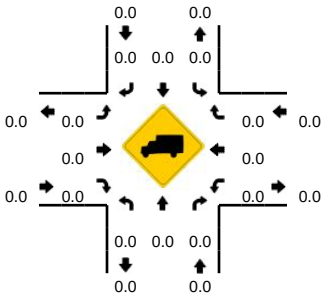
QC JOB #: 13929518

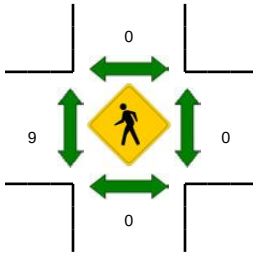
DATE: Wed, Nov 02 2016

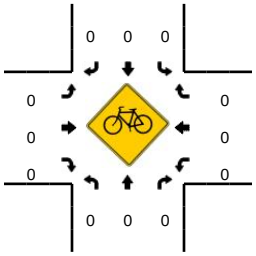
Peak-Hour: 11:55 AM -- 12:55 PM

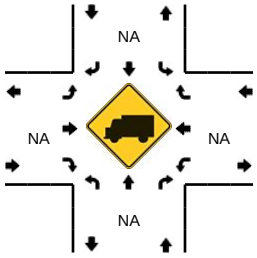
Peak 15-Min: 11:55 AM -- 12:10 PM

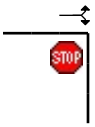


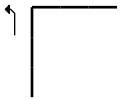


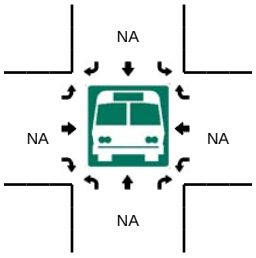












5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				Church Driveway (Eastbound)				Church Driveway (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:10 AM	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
11:15 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	
11:20 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	
11:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:35 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	
11:50 AM	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2	
11:55 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
12:05 PM	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2	9
12:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
12:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
12:25 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	6
12:30 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	7
12:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
12:40 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	8
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
12:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
12:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	4	0	4	0	0	0	0	0	0	0	8
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				4				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/8/2016 9:36 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

LOCATION: SE Ruscliffe Ln -- SE Rusk Rd

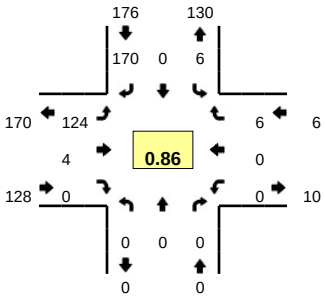
QC JOB #: 13929514

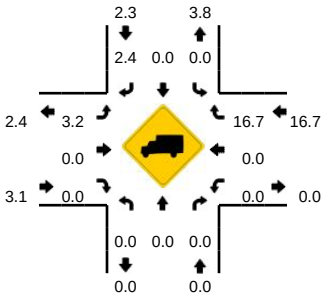
CITY/STATE: Milwaukie, OR

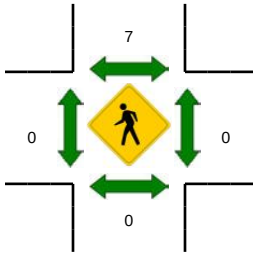
DATE: Wed, Nov 02 2016

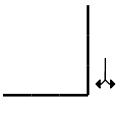
Peak-Hour: 11:55 AM -- 12:55 PM

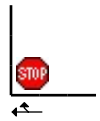
Peak 15-Min: 12:35 PM -- 12:50 PM

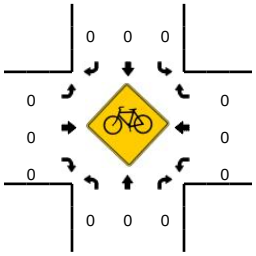


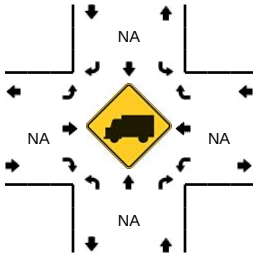


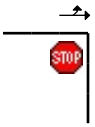


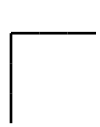


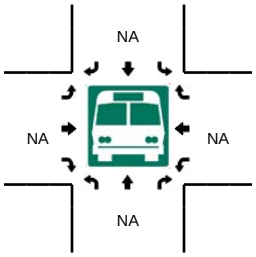












5-Min Count Period Beginning At	SE Ruscliffe Ln (Northbound)				SE Ruscliffe Ln (Southbound)				SE Rusk Rd (Eastbound)				SE Rusk Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:00 AM	0	0	0	0	0	0	10	0	14	0	0	0	0	0	0	0	24	
11:05 AM	0	0	0	0	0	0	7	0	18	0	0	0	0	0	0	0	25	
11:10 AM	0	0	0	0	0	0	12	0	9	0	0	0	0	0	0	0	21	
11:15 AM	0	0	0	0	0	0	12	0	13	0	0	0	0	0	0	0	25	
11:20 AM	0	0	0	0	0	0	5	0	14	0	0	0	0	0	0	0	19	
11:25 AM	0	0	0	0	2	0	6	0	20	0	0	0	0	0	2	0	30	
11:30 AM	0	0	0	0	0	0	15	0	5	0	0	0	0	0	0	0	20	
11:35 AM	0	0	0	0	0	0	8	0	16	0	0	0	0	0	0	0	24	
11:40 AM	0	0	0	0	2	0	6	0	18	0	0	0	0	0	2	0	28	
11:45 AM	0	0	0	0	0	0	7	0	10	0	0	0	0	0	0	0	17	
11:50 AM	0	0	0	0	0	0	13	0	10	0	0	0	0	0	2	0	25	
11:55 AM	0	0	0	0	0	0	18	0	12	0	0	0	0	0	0	0	30	288
12:00 PM	0	0	0	0	1	0	9	0	12	0	0	0	0	0	1	0	23	287
12:05 PM	0	0	0	0	0	0	11	0	10	0	0	0	0	0	0	0	21	283
12:10 PM	0	0	0	0	0	0	12	0	9	1	0	0	0	0	0	0	22	284
12:15 PM	0	0	0	0	1	0	18	0	7	1	0	0	0	0	0	0	27	286
12:20 PM	0	0	0	0	0	0	16	0	9	0	0	0	0	0	0	0	25	292
12:25 PM	0	0	0	0	2	0	20	0	7	0	0	0	0	0	2	0	31	293
12:30 PM	0	0	0	0	1	0	11	0	11	0	0	0	0	0	0	0	23	296
12:35 PM	0	0	0	0	0	0	16	0	11	1	0	0	0	0	2	0	30	302
12:40 PM	0	0	0	0	0	0	18	0	15	0	0	0	0	0	1	0	34	308
12:45 PM	0	0	0	0	0	0	12	0	14	0	0	0	0	0	0	0	26	317
12:50 PM	0	0	0	0	1	0	9	0	7	1	0	0	0	0	0	0	18	310
12:55 PM	0	0	0	0	0	0	14	0	16	1	0	0	0	0	1	0	32	312

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	184	0	160	4	0	0	0	0	12	0	360
Heavy Trucks	0	0	0		0	0	8		4	0	0		0	0	0		12
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/8/2016 9:36 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

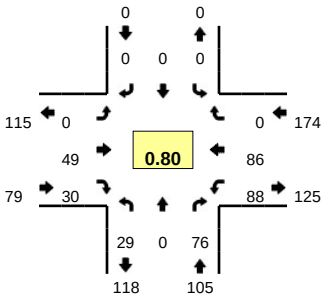
LOCATION: SE Rusk Rd -- SE Kellog Creek Dr

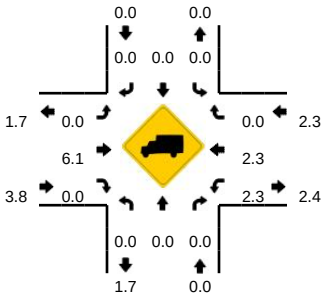
QC JOB #: 13929515

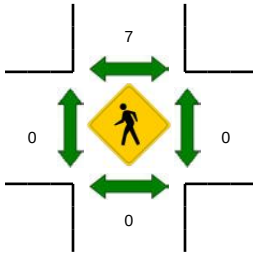
CITY/STATE: Milwaukie, OR

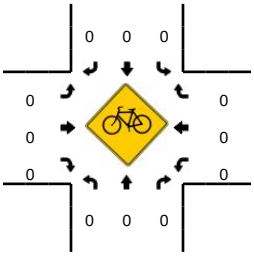
DATE: Wed, Nov 02 2016

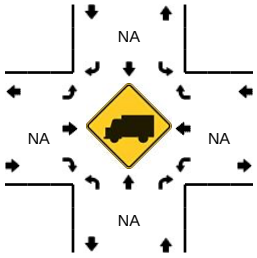
Peak-Hour: 11:55 AM -- 12:55 PM
Peak 15-Min: 12:30 PM -- 12:45 PM

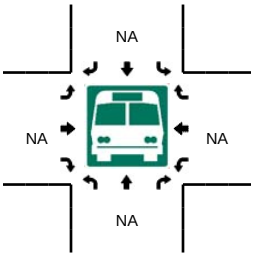












5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				SE Kellog Creek Dr (Eastbound)				SE Kellog Creek Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:00 AM	2	0	1	0	0	0	0	0	0	13	2	0	7	4	0	0	29	
11:05 AM	0	0	5	0	0	0	0	0	0	13	2	0	2	4	0	0	26	
11:10 AM	0	0	8	0	0	0	0	0	0	3	2	0	8	4	0	0	25	
11:15 AM	3	0	5	0	0	0	0	0	0	7	3	0	7	5	0	0	30	
11:20 AM	0	0	9	0	0	0	0	0	0	6	3	0	3	4	0	0	25	
11:25 AM	1	0	8	0	0	0	0	0	0	11	4	0	5	1	0	0	30	
11:30 AM	1	0	4	0	0	0	0	0	0	2	1	0	9	6	0	0	23	
11:35 AM	0	0	12	0	0	0	0	0	0	4	4	0	7	1	0	0	28	
11:40 AM	0	0	11	0	0	0	0	0	0	8	1	0	4	2	0	0	26	
11:45 AM	4	0	8	0	0	0	0	0	0	1	1	0	4	2	0	0	20	
11:50 AM	1	0	7	0	0	0	0	0	0	4	0	0	8	4	0	0	24	
11:55 AM	2	0	3	0	0	0	0	0	0	7	2	0	10	9	0	0	33	319
12:00 PM	2	0	8	0	0	0	0	0	0	3	3	0	6	5	0	0	27	317
12:05 PM	1	0	8	0	0	0	0	0	0	2	7	0	9	3	0	0	30	321
12:10 PM	1	0	7	0	0	0	0	0	0	3	1	0	6	6	0	0	24	320
12:15 PM	3	0	8	0	0	0	0	0	0	2	2	0	8	10	0	0	33	323
12:20 PM	1	0	3	0	0	0	0	0	0	4	2	0	3	10	0	0	23	321
12:25 PM	3	0	4	0	0	0	0	0	0	3	2	0	8	10	0	0	30	321
12:30 PM	3	0	4	0	0	0	0	0	0	6	8	0	8	8	0	0	37	335
12:35 PM	5	0	10	0	0	0	0	0	0	3	1	0	8	7	0	0	34	341
12:40 PM	6	0	12	0	0	0	0	0	0	4	0	0	10	9	0	0	41	356
12:45 PM	1	0	4	0	0	0	0	0	0	9	2	0	3	8	0	0	27	363
12:50 PM	1	0	5	0	0	0	0	0	0	3	0	0	9	1	0	0	19	358
12:55 PM	2	0	11	0	0	0	0	0	0	5	0	0	7	3	0	0	28	353

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	56	0	104	0	0	0	0	0	0	52	36	0	104	96	0	0	448
Heavy Trucks	0	0	0		0	0	0		0	4	0		0	4	0		8
Pedestrians		0				12				0				0			12
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/8/2016 9:36 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

LOCATION: Church Driveway -- SE Kellog Creek Dr

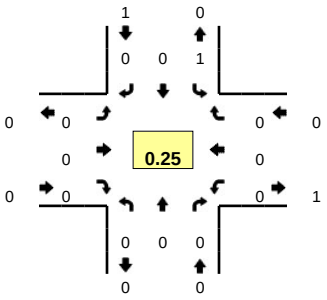
CITY/STATE: Milwaukie, OR

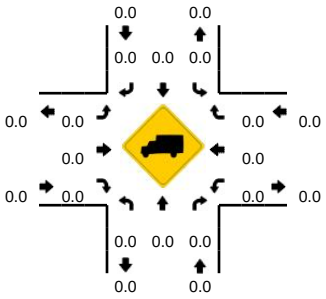
QC JOB #: 13929517

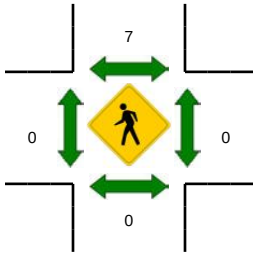
DATE: Wed, Nov 02 2016

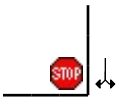
Peak-Hour: 11:55 AM -- 12:55 PM

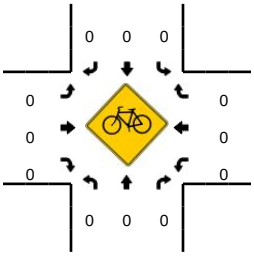
Peak 15-Min: 11:55 AM -- 12:10 PM

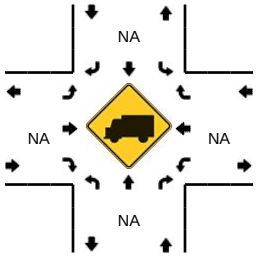


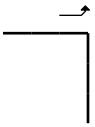


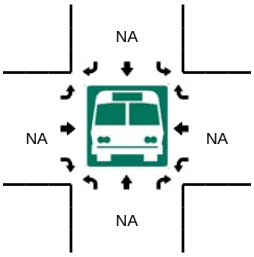












5-Min Count Period Beginning At	Church Driveway (Northbound)				Church Driveway (Southbound)				SE Kellog Creek Dr (Eastbound)				SE Kellog Creek Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
11:05 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	
11:10 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:15 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	
11:20 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:35 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
11:50 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	
11:55 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	6
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
12:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
12:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
12:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
12:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
12:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
12:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
12:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	4
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/8/2016 9:36 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

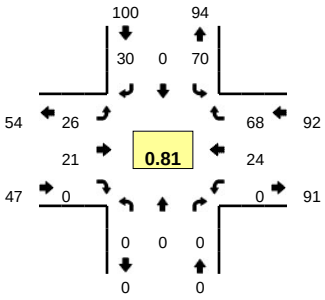
LOCATION: SE Rusk Rd -- SE Aldercrest Rd

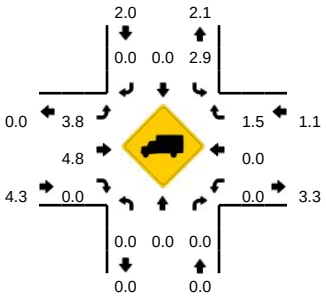
QC JOB #: 13929516

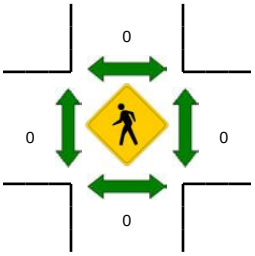
CITY/STATE: Milwaukie, OR

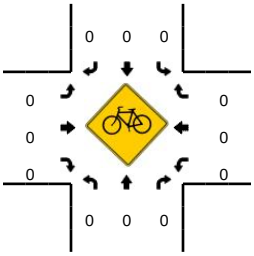
DATE: Wed, Nov 02 2016

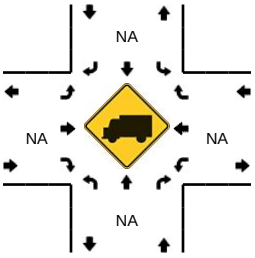
Peak-Hour: 11:55 AM -- 12:55 PM
Peak 15-Min: 12:05 PM -- 12:20 PM

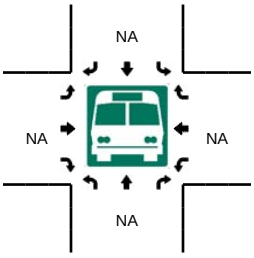












5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				SE Aldercrest Rd (Eastbound)				SE Aldercrest Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:00 AM	0	0	0	0	8	0	2	0	0	0	0	0	0	3	0	0	13	
11:05 AM	0	0	0	0	3	0	1	0	0	1	0	0	0	1	9	0	15	
11:10 AM	0	0	0	0	6	0	0	0	1	1	0	0	0	2	4	0	14	
11:15 AM	0	0	0	0	4	0	5	0	1	2	0	0	0	0	9	0	21	
11:20 AM	0	0	0	0	3	0	2	0	1	0	0	0	0	3	7	0	16	
11:25 AM	0	0	0	0	6	0	1	0	4	0	0	0	0	4	3	0	18	
11:30 AM	0	0	0	0	8	0	3	0	1	4	0	0	0	2	5	0	23	
11:35 AM	0	0	0	0	6	0	3	0	2	2	0	0	0	1	9	0	23	
11:40 AM	0	0	0	0	5	0	1	0	1	1	0	0	0	1	6	0	15	
11:45 AM	0	0	0	0	4	0	2	0	2	1	0	0	0	1	11	0	21	
11:50 AM	0	0	0	0	2	0	3	0	1	1	0	0	0	2	4	0	13	
11:55 AM	0	0	0	0	8	0	0	0	0	1	0	0	0	2	6	0	17	209
12:00 PM	0	0	0	0	2	0	3	0	4	1	0	0	0	2	4	0	16	212
12:05 PM	0	0	0	0	10	0	6	0	3	5	0	0	0	2	4	0	30	227
12:10 PM	0	0	0	0	4	0	2	0	1	0	0	0	0	6	6	0	19	232
12:15 PM	0	0	0	0	5	0	3	0	3	2	0	0	0	3	9	0	25	236
12:20 PM	0	0	0	0	6	0	0	0	2	0	0	0	0	3	1	0	12	232
12:25 PM	0	0	0	0	9	0	1	0	3	3	0	0	0	2	4	0	22	236
12:30 PM	0	0	0	0	7	0	4	0	3	0	0	0	0	0	6	0	20	233
12:35 PM	0	0	0	0	4	0	3	0	1	3	0	0	0	0	8	0	19	229
12:40 PM	0	0	0	0	6	0	4	0	2	2	0	0	0	1	13	0	28	242
12:45 PM	0	0	0	0	6	0	0	0	1	2	0	0	0	1	2	0	12	233
12:50 PM	0	0	0	0	3	0	4	0	3	2	0	0	0	2	5	0	19	239
12:55 PM	0	0	0	0	1	0	8	0	6	1	0	0	0	2	4	0	22	244

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	76	0	44	0	28	28	0	0	0	44	76	0	296
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	4		4
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/8/2016 9:36 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

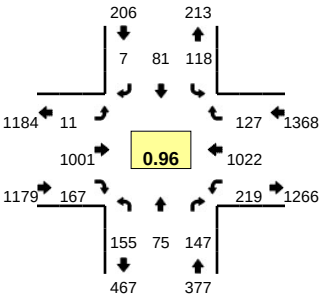
LOCATION: SE Lake Rd/SE Webster Rd -- Milwaukie Expy

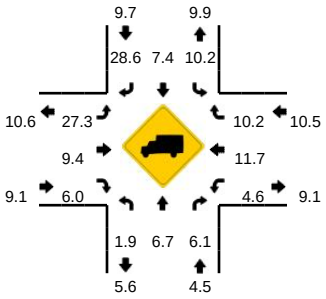
QC JOB #: 13929520

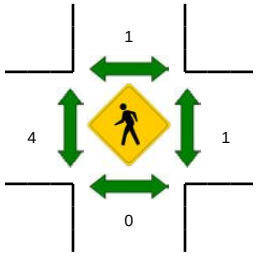
CITY/STATE: Portland, OR

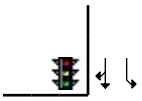
DATE: Thu, Nov 17 2016

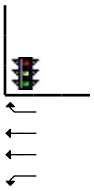
Peak-Hour: 11:55 AM -- 12:55 PM
Peak 15-Min: 12:15 PM -- 12:30 PM

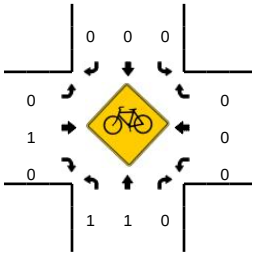


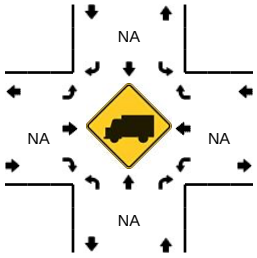


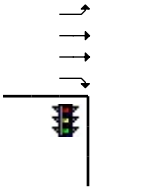


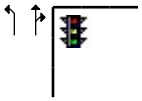


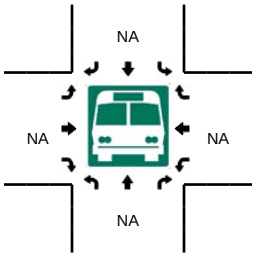












5-Min Count Period Beginning At	SE Lake Rd/SE Webster Rd (Northbound)				SE Lake Rd/SE Webster Rd (Southbound)				Milwaukie Expy (Eastbound)				Milwaukie Expy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:00 AM	11	3	12	0	8	7	0	0	0	53	9	0	16	63	8	0	190	
11:05 AM	19	5	18	0	8	7	1	0	0	82	13	0	22	74	4	0	253	
11:10 AM	12	6	12	0	10	8	0	0	0	70	10	0	10	78	6	0	222	
11:15 AM	8	4	12	0	14	6	1	0	1	88	15	0	12	68	5	0	234	
11:20 AM	12	8	13	0	6	4	2	0	1	85	15	0	12	96	6	0	260	
11:25 AM	9	6	15	0	13	10	2	0	3	71	14	0	19	73	7	0	242	
11:30 AM	11	2	10	0	3	7	2	0	0	53	13	0	18	91	22	0	232	
11:35 AM	14	7	19	0	9	8	0	0	0	70	17	0	16	66	2	0	228	
11:40 AM	20	7	14	0	11	10	0	0	1	76	7	0	12	67	9	0	234	
11:45 AM	17	2	19	0	11	12	0	0	2	81	11	0	18	90	3	0	266	
11:50 AM	14	1	19	0	12	11	0	0	0	87	17	0	8	60	5	0	234	
11:55 AM	14	7	9	0	7	7	1	0	0	75	11	0	15	108	5	0	259	2854
12:00 PM	19	7	11	0	6	2	0	0	1	75	14	0	15	87	6	0	243	2907
12:05 PM	14	9	13	0	15	6	1	0	4	86	16	0	16	68	7	0	255	2909
12:10 PM	9	5	17	0	12	9	0	0	2	82	12	0	14	65	3	0	230	2917
12:15 PM	17	5	12	0	5	7	0	0	1	93	25	0	21	86	9	0	281	2964
12:20 PM	11	7	12	0	14	7	1	0	0	86	15	0	12	81	21	0	267	2971
12:25 PM	9	6	8	0	9	7	0	0	0	97	16	0	23	83	10	0	268	2997
12:30 PM	10	5	20	0	9	8	1	0	2	69	8	0	21	86	13	0	252	3017
12:35 PM	18	8	10	0	13	9	1	0	1	104	2	0	14	88	10	0	278	3067
12:40 PM	7	7	10	0	8	5	1	0	0	82	16	0	21	93	15	0	265	3098
12:45 PM	14	5	16	0	10	6	0	0	0	81	17	0	19	84	15	0	267	3099
12:50 PM	13	4	9	0	10	8	1	0	0	71	15	0	28	93	13	0	265	3130
12:55 PM	14	4	13	0	8	11	0	0	3	59	10	0	20	92	7	0	241	3112

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	148	72	128	0	112	84	4	0	4	1104	224	0	224	1000	160	0	3264
Heavy Trucks	4	8	8		24	4	0		0	120	8		12	124	24		336
Pedestrians		0				0				4				0			4
Bicycles	1	0	0		0	0	0		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/8/2016 9:36 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

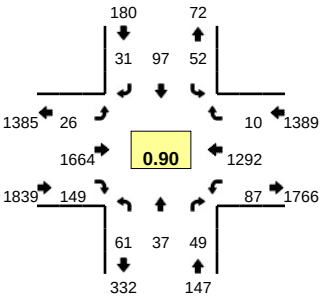
LOCATION: SE Rusk Rd -- Milwaukie Expy

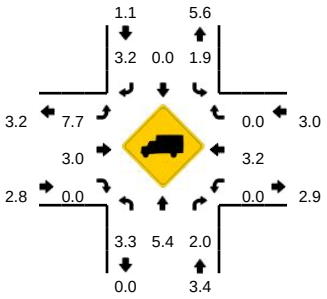
QC JOB #: 13929502

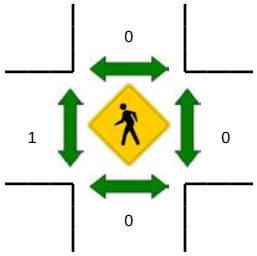
CITY/STATE: Milwaukie, OR

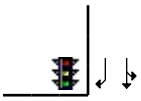
DATE: Wed, Nov 02 2016

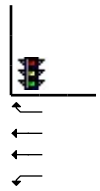
Peak-Hour: 4:25 PM -- 5:25 PM
Peak 15-Min: 5:05 PM -- 5:20 PM

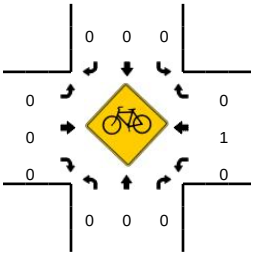


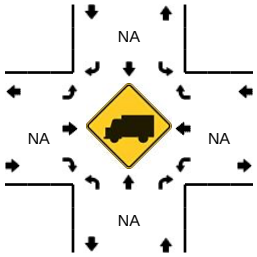


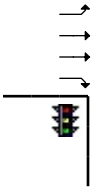


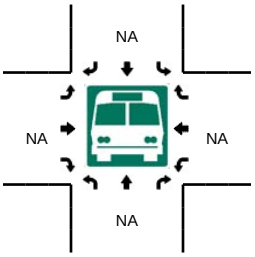












5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				Milwaukie Expy (Eastbound)				Milwaukie Expy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	7	3	3	0	4	3	3	0	3	118	3	0	0	82	1	0	230	
4:05 PM	10	3	3	0	8	6	4	0	2	136	14	0	3	92	0	0	281	
4:10 PM	7	2	2	0	7	16	1	0	2	141	11	0	11	79	1	0	280	
4:15 PM	3	3	2	0	1	3	2	0	1	149	11	0	4	117	1	0	297	
4:20 PM	9	4	3	0	0	6	3	0	0	114	14	0	7	98	1	0	259	
4:25 PM	4	4	0	0	5	10	2	0	0	162	14	0	9	122	1	0	333	
4:30 PM	2	5	10	0	4	8	3	0	9	111	14	0	5	72	1	0	244	
4:35 PM	2	3	2	0	4	7	1	0	2	142	16	1	7	127	0	0	314	
4:40 PM	7	3	0	0	2	10	2	0	2	116	11	0	9	96	2	0	260	
4:45 PM	2	2	3	0	1	4	0	0	2	154	16	0	6	117	0	0	307	
4:50 PM	4	3	5	0	2	9	0	0	2	128	13	0	3	99	2	0	270	
4:55 PM	3	1	2	0	3	5	1	0	1	150	11	0	9	100	1	0	287	3362
5:00 PM	9	5	6	0	4	6	4	0	2	120	2	0	3	89	0	0	250	3382
5:05 PM	6	6	4	0	9	7	6	0	0	166	9	0	9	132	0	0	354	3455
5:10 PM	5	0	6	0	9	9	7	0	4	133	13	0	8	110	1	1	306	3481
5:15 PM	8	2	3	0	4	11	1	0	0	143	14	0	8	131	0	0	325	3509
5:20 PM	9	3	8	0	5	11	4	0	1	139	16	0	10	97	2	0	305	3555
5:25 PM	4	2	4	0	4	4	1	0	0	160	16	0	5	105	1	0	306	3528
5:30 PM	4	6	2	0	2	4	4	0	4	137	12	0	10	98	1	0	284	3568
5:35 PM	4	1	2	0	3	2	1	0	4	125	7	0	4	87	0	0	240	3494
5:40 PM	5	0	8	0	3	4	2	0	2	126	5	0	3	111	2	0	271	3505
5:45 PM	2	2	4	0	0	2	1	0	0	140	16	0	5	113	2	0	287	3485
5:50 PM	1	1	3	0	5	7	1	0	2	130	10	0	8	64	0	0	232	3447
5:55 PM	3	2	2	0	1	5	0	0	1	136	9	0	1	93	2	0	255	3415

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	76	32	52	0	88	108	56	0	16	1768	144	0	100	1492	4	4	3940
Heavy Trucks	0	8	0		4	0	0		4	56	0		0	36	0		108
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/8/2016 9:35 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

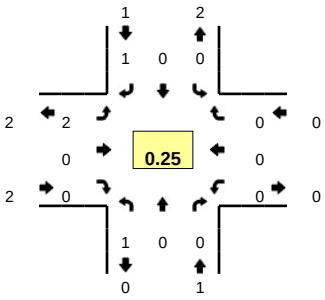
LOCATION: SE Rusk Rd -- Church Driveway

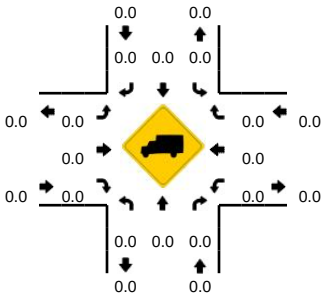
QC JOB #: 13929512

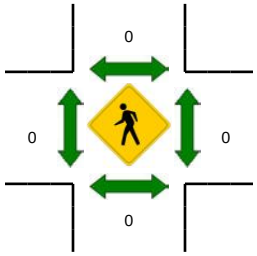
CITY/STATE: Milwaukie, OR

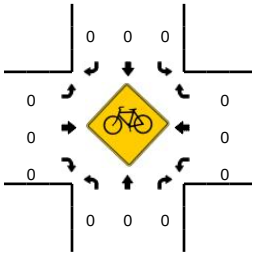
DATE: Wed, Nov 02 2016

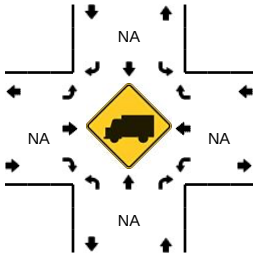
Peak-Hour: 4:25 PM -- 5:25 PM
Peak 15-Min: 4:25 PM -- 4:40 PM

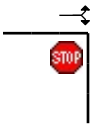


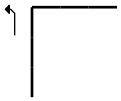


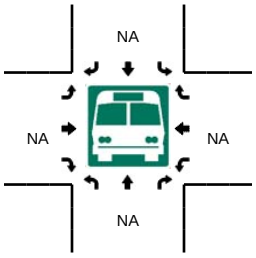












5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				Church Driveway (Eastbound)				Church Driveway (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:20 PM	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2	
4:25 PM	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2	
4:30 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
4:35 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	
4:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
5:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
5:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
5:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
5:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:30 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
5:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:55 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	0	0	0	0	0	4	0	8	0	0	0	0	0	0	0	16
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/8/2016 9:35 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

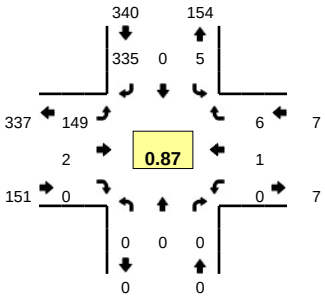
LOCATION: SE Ruscliffe Ln -- SE Rusk Rd

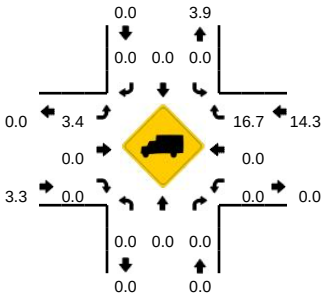
QC JOB #: 13929504

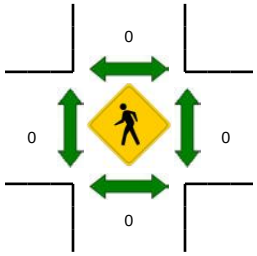
CITY/STATE: Milwaukie, OR

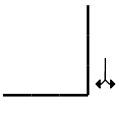
DATE: Wed, Nov 02 2016

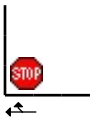
Peak-Hour: 4:25 PM -- 5:25 PM
Peak 15-Min: 5:10 PM -- 5:25 PM

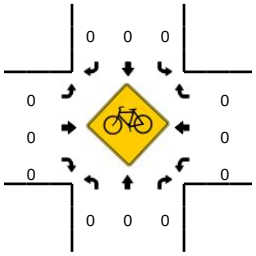


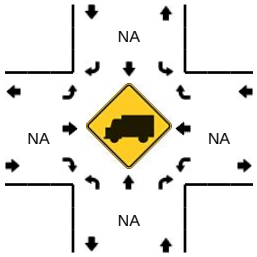


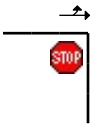


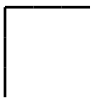


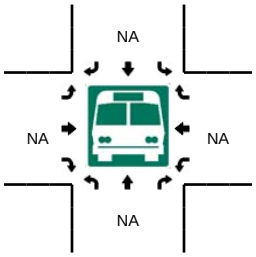












5-Min Count Period Beginning At	SE Ruscliffe Ln (Northbound)				SE Ruscliffe Ln (Southbound)				SE Rusk Rd (Eastbound)				SE Rusk Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	1	0	6	0	9	0	0	0	0	0	1	0	17	
4:05 PM	0	0	0	0	0	0	23	0	18	0	0	0	0	0	0	0	41	
4:10 PM	0	0	0	0	2	0	31	0	8	0	0	0	0	0	1	0	42	
4:15 PM	0	0	0	0	0	0	28	0	8	0	0	0	0	0	0	0	36	
4:20 PM	0	0	0	0	0	0	24	0	13	0	0	0	0	0	0	0	37	
4:25 PM	0	0	0	0	1	0	36	0	12	0	0	1	0	0	0	0	50	
4:30 PM	0	0	0	0	0	0	24	0	11	2	0	0	0	0	1	0	38	
4:35 PM	0	0	0	0	1	0	35	0	8	0	0	0	0	0	0	0	44	
4:40 PM	0	0	0	0	0	0	24	0	10	0	0	0	0	1	0	0	35	
4:45 PM	0	0	0	0	0	0	27	0	9	0	0	0	0	0	0	0	36	
4:50 PM	0	0	0	0	0	0	27	0	11	0	0	0	0	0	0	0	38	
4:55 PM	0	0	0	0	0	0	28	0	10	0	0	0	0	0	0	0	38	452
5:00 PM	0	0	0	0	0	0	11	0	17	0	0	0	0	0	2	0	30	465
5:05 PM	0	0	0	0	1	0	25	0	20	0	0	0	0	0	0	0	46	470
5:10 PM	0	0	0	0	0	0	32	0	6	0	0	0	0	0	1	0	39	467
5:15 PM	0	0	0	0	1	0	30	0	22	0	0	0	0	0	1	0	54	485
5:20 PM	0	0	0	0	1	0	36	0	12	0	0	0	0	0	1	0	50	498
5:25 PM	0	0	0	0	1	0	29	0	13	0	0	0	0	0	0	0	43	491
5:30 PM	0	0	0	0	0	0	19	0	8	0	0	0	0	0	1	0	28	481
5:35 PM	0	0	0	0	0	0	18	0	6	0	0	0	0	0	1	0	25	462
5:40 PM	0	0	0	0	0	0	11	0	10	0	0	0	0	0	1	0	22	449
5:45 PM	0	0	0	0	1	0	26	0	8	0	0	0	0	0	0	0	35	448
5:50 PM	0	0	0	0	0	0	22	0	4	0	0	0	0	0	0	0	26	436
5:55 PM	0	0	0	0	0	0	18	0	10	1	0	0	0	0	0	0	29	427

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	8	0	392	0	160	0	0	0	0	0	12	0	572
Heavy Trucks	0	0	0		0	0	0		4	0	0		0	0	0		4
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/8/2016 9:35 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

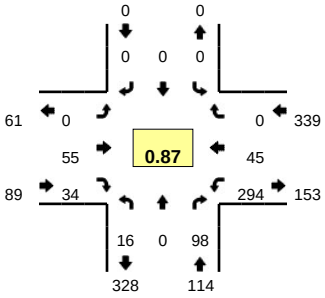
LOCATION: SE Rusk Rd -- SE Kellogg Creek Dr

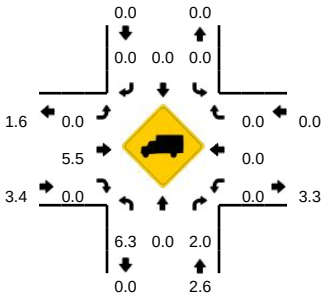
QC JOB #: 13929506

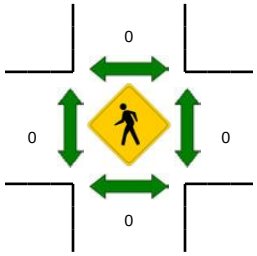
CITY/STATE: Milwaukie, OR

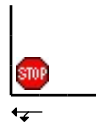
DATE: Wed, Nov 02 2016

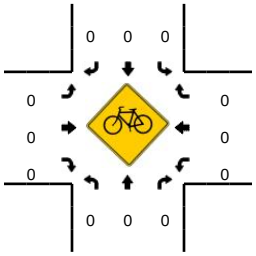
Peak-Hour: 4:25 PM -- 5:25 PM
Peak 15-Min: 5:10 PM -- 5:25 PM

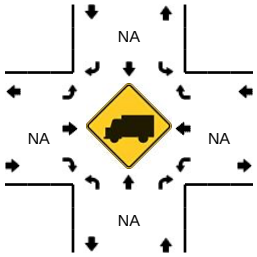


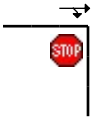


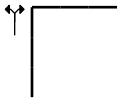


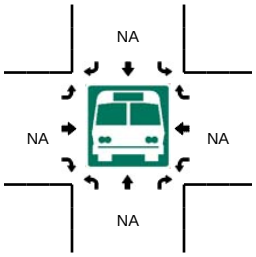












5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				SE Kellogg Creek Dr (Eastbound)				SE Kellogg Creek Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	3	0	4	0	0	0	0	0	0	5	3	0	4	1	0	0	20	
4:05 PM	0	0	10	0	0	0	0	0	0	9	3	0	22	1	0	0	45	
4:10 PM	1	0	7	0	0	0	0	0	0	1	2	0	23	5	0	0	39	
4:15 PM	2	0	6	0	0	0	0	0	0	2	2	0	30	2	0	0	44	
4:20 PM	0	0	12	0	0	0	0	0	0	1	1	0	17	2	0	0	33	
4:25 PM	0	0	8	0	0	0	0	0	0	5	1	0	34	7	0	0	55	
4:30 PM	0	0	10	0	0	0	0	0	0	3	1	0	20	4	0	0	38	
4:35 PM	3	0	5	0	0	0	0	0	0	3	2	0	28	7	0	0	48	
4:40 PM	1	0	7	0	0	0	0	0	0	3	2	0	20	4	0	0	37	
4:45 PM	3	0	6	0	0	0	0	0	0	3	1	0	23	5	0	0	41	
4:50 PM	0	0	11	0	0	0	0	0	0	1	1	0	20	3	0	0	36	
4:55 PM	1	0	7	0	0	0	0	0	0	3	3	0	31	1	0	0	46	482
5:00 PM	2	0	6	0	0	0	0	0	0	12	5	0	9	1	0	0	35	497
5:05 PM	1	0	11	0	0	0	0	0	0	9	3	0	24	2	0	0	50	502
5:10 PM	3	0	4	0	0	0	0	0	0	2	0	0	27	3	0	0	39	502
5:15 PM	1	0	13	0	0	0	0	0	0	7	6	0	28	3	0	0	58	516
5:20 PM	1	0	10	0	0	0	0	0	0	4	9	0	30	5	0	0	59	542
5:25 PM	1	0	11	0	0	0	0	0	0	2	1	0	25	4	0	0	44	531
5:30 PM	3	0	6	0	0	0	0	0	0	2	1	0	19	1	0	0	32	525
5:35 PM	0	0	2	0	0	0	0	0	0	2	3	0	14	3	0	0	24	501
5:40 PM	2	0	9	0	0	0	0	0	0	1	2	0	6	2	0	0	22	486
5:45 PM	1	0	8	0	0	0	0	0	0	0	1	0	24	5	0	0	39	484
5:50 PM	1	0	1	0	0	0	0	0	0	3	2	0	14	5	0	0	26	474
5:55 PM	0	0	8	0	0	0	0	0	0	2	0	0	19	2	0	0	31	459

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	20	0	108	0	0	0	0	0	0	52	60	0	340	44	0	0	624
Heavy Trucks	0	0	4		0	0	0		0	0	0		0	0	0		4
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/8/2016 9:35 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

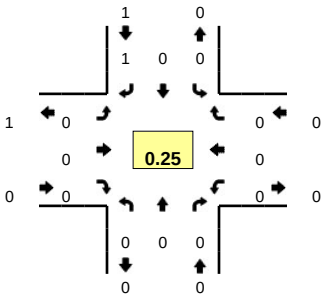
LOCATION: Church Driveway -- SE Kellogg Creek Dr

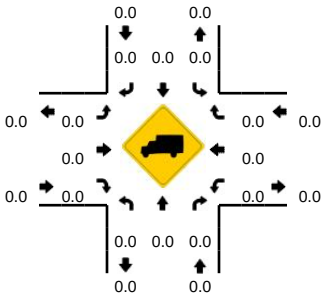
QC JOB #: 13929510

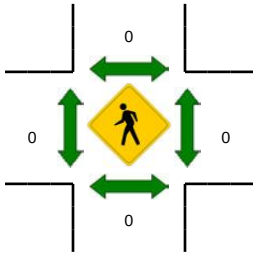
CITY/STATE: Milwaukie, OR

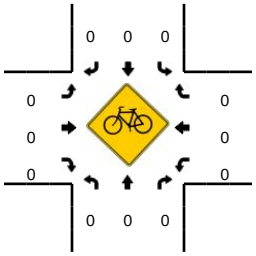
DATE: Wed, Nov 02 2016

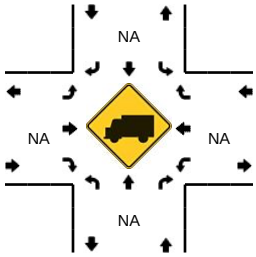
Peak-Hour: 4:25 PM -- 5:25 PM
Peak 15-Min: 4:55 PM -- 5:10 PM

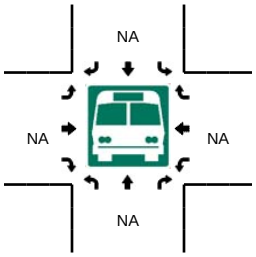












5-Min Count Period Beginning At	Church Driveway (Northbound)				Church Driveway (Southbound)				SE Kellogg Creek Dr (Eastbound)				SE Kellogg Creek Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	
4:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:05 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
5:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/8/2016 9:35 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

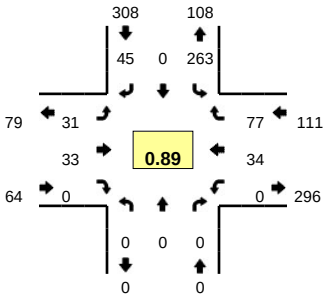
Method for determining peak hour: Total Entering Volume

LOCATION: SE Rusk Rd -- SE Aldercrest Rd

QC JOB #: 13929508

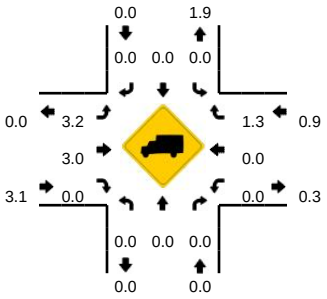
CITY/STATE: Milwaukie, OR

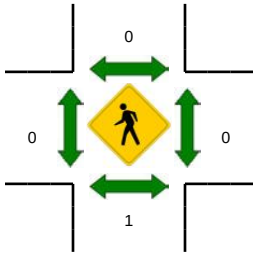
DATE: Wed, Nov 02 2016

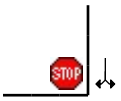


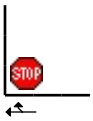
Peak-Hour: 4:25 PM -- 5:25 PM

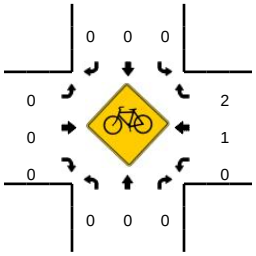
Peak 15-Min: 5:10 PM -- 5:25 PM

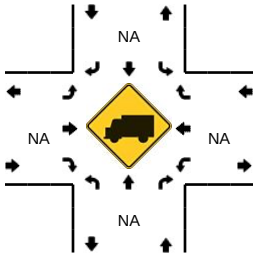


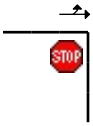


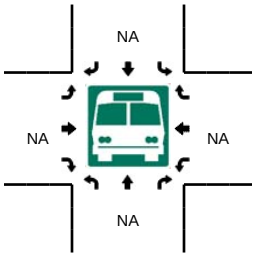












5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				SE Aldercrest Rd (Eastbound)				SE Aldercrest Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	8	0	3	0	1	1	0	0	0	0	8	0	21	
4:05 PM	0	0	0	0	21	0	3	0	2	3	0	0	0	3	8	0	40	
4:10 PM	0	0	0	0	17	0	3	0	5	4	0	0	0	4	7	0	40	
4:15 PM	0	0	0	0	32	0	4	0	1	3	0	0	0	2	4	0	46	
4:20 PM	0	0	0	0	16	0	2	0	3	4	0	0	0	2	11	0	38	
4:25 PM	0	0	0	0	26	0	1	0	0	2	0	0	0	3	8	0	40	
4:30 PM	0	0	0	0	21	0	4	0	3	3	0	0	0	3	7	0	41	
4:35 PM	0	0	0	0	26	0	3	0	2	3	0	0	0	4	5	0	43	
4:40 PM	0	0	0	0	16	0	7	0	2	3	0	0	0	4	8	0	40	
4:45 PM	0	0	0	0	20	0	0	0	3	3	0	0	0	3	6	0	35	
4:50 PM	0	0	0	0	21	0	1	0	3	5	0	0	0	3	3	0	36	
4:55 PM	0	0	0	0	22	0	4	0	5	1	0	0	0	2	7	0	41	461
5:00 PM	0	0	0	0	12	0	8	0	2	4	0	0	0	3	6	0	35	475
5:05 PM	0	0	0	0	15	0	5	0	1	3	0	0	0	3	10	0	37	472
5:10 PM	0	0	0	0	23	0	6	0	1	2	0	0	0	2	4	0	38	470
5:15 PM	0	0	0	0	29	0	3	0	5	3	0	0	0	1	10	0	51	475
5:20 PM	0	0	0	0	32	0	3	0	4	1	0	0	0	3	3	0	46	483
5:25 PM	0	0	0	0	22	0	1	0	1	5	0	0	0	0	9	0	38	481
5:30 PM	0	0	0	0	15	0	2	0	2	5	0	0	0	3	3	0	30	470
5:35 PM	0	0	0	0	17	0	1	0	0	2	0	0	0	3	3	0	26	453
5:40 PM	0	0	0	0	4	0	3	0	3	1	0	0	0	3	10	0	24	437
5:45 PM	0	0	0	0	15	0	5	0	2	2	0	0	0	2	6	0	32	434
5:50 PM	0	0	0	0	13	0	3	0	2	5	0	0	0	4	2	0	29	427
5:55 PM	0	0	0	0	17	0	2	0	1	1	0	0	0	0	7	0	28	414

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	336	0	48	0	40	24	0	0	0	24	68	0	540
Heavy Trucks	0	0	0		0	0	0		4	4	0		0	0	0		8
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/8/2016 9:35 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

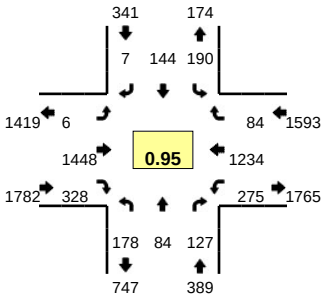
LOCATION: SE Lake Rd/SE Webster Rd -- Milwaukie Expy

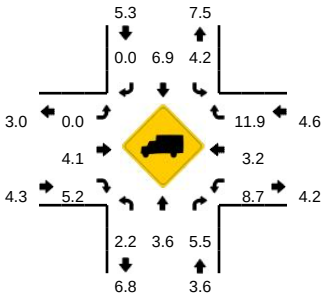
QC JOB #: 13929521

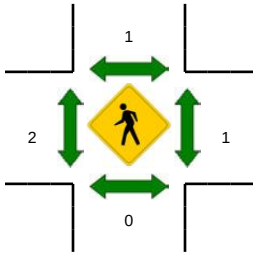
CITY/STATE: Portland, OR

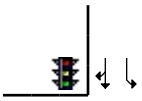
DATE: Thu, Nov 17 2016

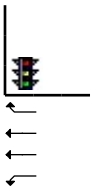
Peak-Hour: 4:25 PM -- 5:25 PM
Peak 15-Min: 4:40 PM -- 4:55 PM

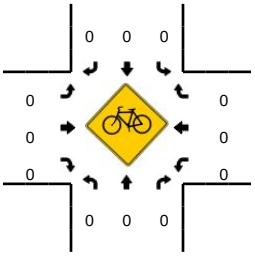


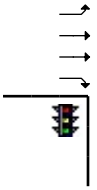


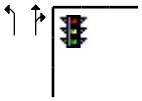


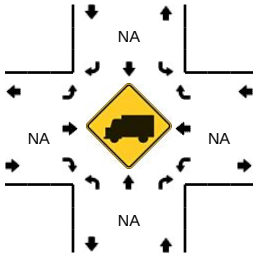


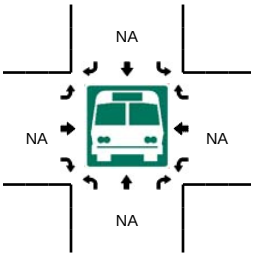












5-Min Count Period Beginning At	SE Lake Rd/SE Webster Rd (Northbound)				SE Lake Rd/SE Webster Rd (Southbound)				Milwaukie Expy (Eastbound)				Milwaukie Expy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	16	8	9	0	9	7	0	0	0	142	25	0	12	120	8	0	356	
4:05 PM	15	7	17	0	18	15	1	0	0	109	21	0	26	81	4	0	314	
4:10 PM	12	4	15	0	11	13	0	0	1	152	25	0	20	105	8	0	366	
4:15 PM	24	5	21	0	17	19	0	0	1	104	30	0	24	102	6	0	353	
4:20 PM	11	5	9	0	15	11	1	0	0	152	37	0	21	131	7	0	400	
4:25 PM	20	6	13	0	20	13	2	0	0	103	17	0	30	77	10	0	311	
4:30 PM	10	3	8	0	13	8	1	0	3	150	23	0	14	128	10	0	371	
4:35 PM	26	4	11	0	31	22	1	0	0	99	21	0	17	76	6	0	314	
4:40 PM	13	6	8	0	14	9	0	0	0	148	32	0	22	116	6	0	374	
4:45 PM	16	12	9	0	19	13	0	0	1	96	40	0	27	91	8	0	332	
4:50 PM	13	4	10	0	10	8	0	0	1	132	47	0	13	127	12	0	377	
4:55 PM	14	5	12	0	13	12	0	0	0	98	26	0	34	90	8	0	312	4180
5:00 PM	8	5	8	0	11	10	1	0	0	152	26	0	15	117	3	0	356	4180
5:05 PM	21	11	14	0	16	11	1	0	0	101	17	0	32	82	5	0	311	4177
5:10 PM	6	7	11	0	22	19	1	0	0	126	28	0	20	109	7	0	356	4167
5:15 PM	18	11	15	0	10	7	0	0	0	101	31	0	27	92	4	0	316	4130
5:20 PM	13	10	8	0	11	12	0	0	1	142	20	0	24	129	5	0	375	4105
5:25 PM	16	7	13	0	19	11	1	0	0	97	31	0	32	92	6	0	325	4119
5:30 PM	9	2	7	0	11	10	1	0	1	153	26	0	22	119	3	0	364	4112
5:35 PM	16	8	15	0	12	14	3	0	1	106	36	0	35	90	3	0	339	4137
5:40 PM	7	5	5	0	6	6	0	0	0	141	41	0	20	107	5	0	343	4106
5:45 PM	16	9	16	0	11	12	1	0	1	75	25	0	33	89	4	0	292	4066
5:50 PM	14	8	6	0	5	9	0	0	0	114	38	0	24	108	4	0	330	4019
5:55 PM	11	9	14	0	9	14	0	0	0	98	20	0	34	73	7	0	289	3996

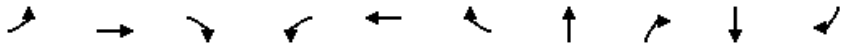
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	168	88	108	0	172	120	0	0	8	1504	476	0	248	1336	104	0	4332
Heavy Trucks	8	0	0		8	8	0		0	64	32		32	36	12		200
Pedestrians		0				0				4				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/8/2016 9:35 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Attachment D - Existing Traffic Level-of-Service Worksheets



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	6	828	66	45	2073	6	176	33	71	5
v/c Ratio	0.07	0.37	0.06	0.36	0.83	0.00	0.80	0.10	0.27	0.01
Control Delay	55.5	10.3	1.5	51.1	11.3	0.0	74.6	0.6	45.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.5	10.3	1.5	51.1	11.3	0.0	74.6	0.6	45.9	0.0
Queue Length 50th (ft)	5	148	0	36	264	0	131	0	48	0
Queue Length 95th (ft)	19	210	13	m40	m#482	m0	#222	0	91	0
Internal Link Dist (ft)		263			2471		389		744	
Turn Bay Length (ft)	470		110	455		100		50		75
Base Capacity (vph)	165	2225	1112	315	2501	1209	255	369	311	377
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.37	0.06	0.14	0.83	0.00	0.69	0.09	0.23	0.01

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	778	62	42	1949	6	117	49	31	9	57	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00		0.99	1.00
Satd. Flow (prot)	1805	3312	1615	1805	3374	1615		1823	1568		1771	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.74	1.00		0.95	1.00
Satd. Flow (perm)	1805	3312	1615	1805	3374	1615		1396	1568		1699	1615
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	6	828	66	45	2073	6	124	52	33	10	61	5
RTOR Reduction (vph)	0	0	22	0	0	2	0	0	28	0	0	4
Lane Group Flow (vph)	6	828	44	45	2073	4	0	176	5	0	71	1
Heavy Vehicles (%)	0%	9%	0%	0%	7%	0%	1%	0%	3%	22%	4%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	1.4	79.8	79.8	7.3	85.7	85.7		18.9	18.9		18.9	18.9
Effective Green, g (s)	1.4	79.8	79.8	7.3	85.7	85.7		18.9	18.9		18.9	18.9
Actuated g/C Ratio	0.01	0.66	0.66	0.06	0.71	0.71		0.16	0.16		0.16	0.16
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	21	2202	1073	109	2409	1153		219	246		267	254
v/s Ratio Prot	0.00	0.25		c0.02	c0.61							
v/s Ratio Perm			0.03			0.00		c0.13	0.00		0.04	0.00
v/c Ratio	0.29	0.38	0.04	0.41	0.86	0.00		0.80	0.02		0.27	0.00
Uniform Delay, d1	58.8	9.0	6.9	54.3	12.7	4.9		48.8	42.7		44.5	42.6
Progression Factor	1.00	1.00	1.00	0.91	0.76	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	7.4	0.5	0.1	1.2	2.0	0.0		18.9	0.0		0.5	0.0
Delay (s)	66.2	9.5	7.0	50.3	11.6	4.9		67.6	42.8		45.0	42.6
Level of Service	E	A	A	D	B	A		E	D		D	D
Approach Delay (s)		9.7			12.4			63.7			44.8	
Approach LOS		A			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	1	0	0	196	160	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	2	0	0	302	246	2
Pedestrians	1					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					469	
pX, platoon unblocked	0.99	0.99	0.99			
vC, conflicting volume	549	248	249			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	544	241	242			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	500	798	1328			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	2	302	248
Volume Left	2	0	0
Volume Right	0	0	2
cSH	500	1328	1700
Volume to Capacity	0.00	0.00	0.15
Queue Length 95th (ft)	0	0	0
Control Delay (s)	12.2	0.0	0.0
Lane LOS	B		
Approach Delay (s)	12.2	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	20.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Volume (veh/h)	189	1	3	157	3	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	291	2	5	242	5	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				553		
pX, platoon unblocked						
vC, conflicting volume			292		542	292
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			292		542	292
tC, single (s)			4.1		6.7	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.8	3.4
p0 queue free %			100		99	99
cM capacity (veh/h)			1281		450	720

Direction, Lane #	EB 1	WB 1	NW 1
Volume Total	292	246	15
Volume Left	0	5	5
Volume Right	2	0	11
cSH	1700	1281	610
Volume to Capacity	0.17	0.00	0.03
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.2	11.1
Lane LOS		A	B
Approach Delay (s)	0.0	0.2	11.1
Approach LOS			B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	20.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	26	12	26	161	89	71
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.61	0.61	0.61	0.61	0.61	0.61
Hourly flow rate (vph)	43	20	43	264	146	116
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					923	
pX, platoon unblocked						
vC, conflicting volume	553	204	262			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	553	204	262			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	98	97			
cM capacity (veh/h)	481	842	1314			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	62	307	262
Volume Left	43	43	0
Volume Right	20	0	116
cSH	556	1314	1700
Volume to Capacity	0.11	0.03	0.15
Queue Length 95th (ft)	9	3	0
Control Delay (s)	12.3	1.3	0.0
Lane LOS	B	A	
Approach Delay (s)	12.3	1.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	32.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	38	95	2	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.61	0.61	0.61	0.61	0.61	0.61
Hourly flow rate (vph)	0	62	156	3	0	0
Pedestrians					2	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	161				222	159
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	161				222	159
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1428				770	890

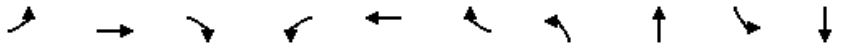
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	62	159	0
Volume Left	0	0	0
Volume Right	0	3	0
cSH	1428	1700	1700
Volume to Capacity	0.00	0.09	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	9.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	30	14	17	135	63	20
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	34	16	20	155	72	23

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	51	175	95
Volume Left (vph)	34	0	72
Volume Right (vph)	0	155	23
Hadj (s)	0.17	-0.51	0.05
Departure Headway (s)	4.5	3.7	4.4
Degree Utilization, x	0.06	0.18	0.12
Capacity (veh/h)	781	953	774
Control Delay (s)	7.7	7.5	8.0
Approach Delay (s)	7.7	7.5	8.0
Approach LOS	A	A	A

Intersection Summary			
Delay	7.7		
Level of Service	A		
Intersection Capacity Utilization	27.3%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	8	742	130	146	1902	216	240	253	63	83
v/c Ratio	0.09	0.43	0.15	0.67	0.87	0.23	0.98	0.84	0.58	0.66
Control Delay	50.4	16.2	1.0	63.8	22.9	4.7	105.8	61.3	75.1	77.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.4	16.2	1.0	63.8	22.9	4.7	105.8	61.3	75.1	77.5
Queue Length 50th (ft)	6	118	0	109	542	23	188	148	48	62
Queue Length 95th (ft)	m0	143	12	171	#933	70	#354	#309	#101	#132
Internal Link Dist (ft)		2471			585			201		465
Turn Bay Length (ft)	500		360	295		150			330	
Base Capacity (vph)	180	1710	882	323	2198	954	244	302	118	132
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.43	0.15	0.45	0.87	0.23	0.98	0.84	0.53	0.63

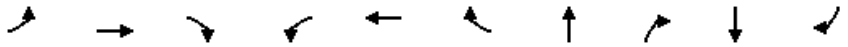
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	690	121	136	1769	201	223	82	153	59	73	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	2000	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	3.8	4.8		4.0	4.8	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.90		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3374	1583	1687	3374	1397	1810	1609		1583	1706	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	3374	1583	1687	3374	1397	1810	1609		1583	1706	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	8	742	130	146	1902	216	240	88	165	63	78	5
RTOR Reduction (vph)	0	0	65	0	0	48	0	55	0	0	2	0
Lane Group Flow (vph)	8	742	65	146	1902	168	240	198	0	63	81	0
Confl. Peds. (#/hr)	1					1			1	1		
Confl. Bikes (#/hr)									3			
Heavy Vehicles (%)	0%	7%	2%	7%	7%	13%	5%	6%	5%	14%	11%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	1.5	60.0	60.0	15.6	74.1	74.1	16.0	18.5		7.1	9.6	
Effective Green, g (s)	1.5	60.0	60.0	15.6	74.1	74.1	16.2	18.5		7.1	9.6	
Actuated g/C Ratio	0.01	0.50	0.50	0.13	0.62	0.62	0.13	0.15		0.06	0.08	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.8		4.0	4.8	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	22	1687	791	219	2083	862	244	248		93	136	
v/s Ratio Prot	0.00	0.22		c0.09	c0.56		c0.13	c0.12		0.04	0.05	
v/s Ratio Perm			0.04			0.12						
v/c Ratio	0.36	0.44	0.08	0.67	0.91	0.20	0.98	0.80		0.68	0.60	
Uniform Delay, d1	58.8	19.2	15.6	49.7	20.1	10.0	51.8	49.0		55.3	53.3	
Progression Factor	0.90	0.78	0.49	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.5	0.8	0.2	7.5	7.6	0.5	52.7	16.2		17.8	6.9	
Delay (s)	62.5	15.9	7.9	57.2	27.7	10.5	104.4	65.2		73.1	60.2	
Level of Service	E	B	A	E	C	B	F	E		E	E	
Approach Delay (s)		15.1			28.0			84.3			65.8	
Approach LOS		B			C			F			E	

Intersection Summary			
HCM 2000 Control Delay	33.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.8
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	10	1143	71	69	1151	14	79	67	72	15
v/c Ratio	0.09	0.48	0.06	0.42	0.43	0.01	0.52	0.29	0.42	0.06
Control Delay	45.6	9.8	3.3	53.4	2.7	0.0	53.5	11.2	48.0	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.6	9.8	3.3	53.4	2.7	0.0	53.5	11.2	48.0	0.5
Queue Length 50th (ft)	6	177	3	42	56	0	48	0	44	0
Queue Length 95th (ft)	23	290	22	m85	69	m0	92	32	84	0
Internal Link Dist (ft)		263			2471		389		741	
Turn Bay Length (ft)	470		110	455		100		50		75
Base Capacity (vph)	198	2363	1134	200	2687	1212	259	339	294	348
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.48	0.06	0.34	0.43	0.01	0.31	0.20	0.24	0.04

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	1097	68	66	1105	13	43	33	64	18	51	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00		0.99	1.00
Satd. Flow (prot)	1805	3312	1568	1770	3343	1495		1792	1538		1797	1588
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.78	1.00		0.90	1.00
Satd. Flow (perm)	1805	3312	1568	1770	3343	1495		1444	1538		1638	1588
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	10	1143	71	69	1151	14	45	34	67	19	53	15
RTOR Reduction (vph)	0	0	17	0	0	3	0	0	61	0	0	14
Lane Group Flow (vph)	10	1143	54	69	1151	11	0	79	6	0	72	1
Confl. Peds. (#/hr)							7					7
Heavy Vehicles (%)	0%	9%	3%	2%	8%	8%	5%	0%	5%	11%	2%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	1.5	68.5	68.5	8.1	75.1	75.1		9.4	9.4		9.4	9.4
Effective Green, g (s)	1.5	68.5	68.5	8.1	75.1	75.1		9.4	9.4		9.4	9.4
Actuated g/C Ratio	0.02	0.68	0.68	0.08	0.75	0.75		0.09	0.09		0.09	0.09
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	27	2268	1074	143	2510	1122		135	144		153	149
v/s Ratio Prot	0.01	c0.35		c0.04	0.34							
v/s Ratio Perm			0.03			0.01		c0.05	0.00		0.04	0.00
v/c Ratio	0.37	0.50	0.05	0.48	0.46	0.01		0.59	0.04		0.47	0.01
Uniform Delay, d1	48.8	7.6	5.1	43.9	4.7	3.1		43.4	41.2		42.9	41.1
Progression Factor	1.00	1.00	1.00	1.11	0.48	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	8.4	0.8	0.1	2.1	0.5	0.0		6.3	0.1		2.3	0.0
Delay (s)	57.2	8.4	5.2	51.0	2.8	3.1		49.8	41.3		45.2	41.1
Level of Service	E	A	A	D	A	A		D	D		D	D
Approach Delay (s)		8.6			5.5			45.9			44.5	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	10.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	3	0	0	137	183	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	3	0	0	159	213	2
Pedestrians	9					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					469	
pX, platoon unblocked						
vC, conflicting volume	382	223	224			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	382	223	224			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	619	815	1346			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	3	159	215
Volume Left	3	0	0
Volume Right	0	0	2
cSH	619	1346	1700
Volume to Capacity	0.01	0.00	0.13
Queue Length 95th (ft)	0	0	0
Control Delay (s)	10.8	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.8	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	20.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	6	131	4	6	177
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	7	152	5	7	206
Pedestrians						7
Lane Width (ft)						12.0
Walking Speed (ft/s)						4.0
Percent Blockage						1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						553
pX, platoon unblocked						
vC, conflicting volume	374	162			157	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	374	162			157	
tC, single (s)	6.4	6.4			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	628	841			1435	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	7	157	213
Volume Left	0	0	7
Volume Right	7	5	0
cSH	841	1700	1435
Volume to Capacity	0.01	0.09	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	9.3	0.0	0.3
Lane LOS	A		A
Approach Delay (s)	9.3	0.0	0.3
Approach LOS	A		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	26.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	50	30	29	85	91	86
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	62	38	36	106	114	108
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					922	
pX, platoon unblocked						
vC, conflicting volume	346	168	221			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	346	168	221			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	90	96	97			
cM capacity (veh/h)	625	882	1360			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	100	142	221
Volume Left	62	36	0
Volume Right	38	0	108
cSH	702	1360	1700
Volume to Capacity	0.14	0.03	0.13
Queue Length 95th (ft)	12	2	0
Control Delay (s)	11.0	2.1	0.0
Lane LOS	B	A	
Approach Delay (s)	11.0	2.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	30.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	79	115	0	1	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	0	99	144	0	1	0
Pedestrians					7	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	151				250	151
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	151				250	151
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1434				739	896

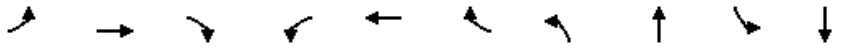
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	99	144	1
Volume Left	0	0	1
Volume Right	0	0	0
cSH	1434	1700	739
Volume to Capacity	0.00	0.08	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	9.9
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.9
Approach LOS			A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	17.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	26	21	24	68	70	30
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	32	26	30	84	86	37

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	58	114	123
Volume Left (vph)	32	0	86
Volume Right (vph)	0	84	37
Hadj (s)	0.19	-0.43	0.00
Departure Headway (s)	4.5	3.8	4.3
Degree Utilization, x	0.07	0.12	0.15
Capacity (veh/h)	775	911	810
Control Delay (s)	7.8	7.3	8.0
Approach Delay (s)	7.8	7.3	8.0
Approach LOS	A	A	A

Intersection Summary			
Delay	7.7		
Level of Service	A		
Intersection Capacity Utilization	21.6%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	11	1043	174	228	1065	132	161	231	123	91
v/c Ratio	0.12	0.78	0.24	0.77	0.56	0.15	0.59	0.87	0.68	0.51
Control Delay	36.0	38.1	13.1	57.1	14.5	3.3	51.5	59.8	61.4	51.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.0	38.1	13.1	57.1	14.5	3.3	51.5	59.8	61.4	51.3
Queue Length 50th (ft)	7	253	0	138	186	5	99	99	75	54
Queue Length 95th (ft)	m13	446	115	217	320	35	#201	#256	#147	106
Internal Link Dist (ft)		2471			585			201		465
Turn Bay Length (ft)	500		360	295		150			330	
Base Capacity (vph)	170	1345	714	343	1908	896	274	267	199	193
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.78	0.24	0.66	0.56	0.15	0.59	0.87	0.62	0.47

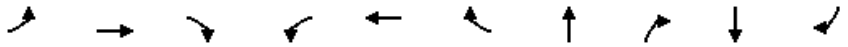
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	1001	167	219	1022	127	155	75	147	118	81	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.8		4.0	4.8	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.90		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1421	3312	1504	1719	3223	1436	1770	1594		1641	1726	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1421	3312	1504	1719	3223	1436	1770	1594		1641	1726	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	11	1043	174	228	1065	132	161	78	153	123	84	7
RTOR Reduction (vph)	0	0	105	0	0	50	0	68	0	0	3	0
Lane Group Flow (vph)	11	1043	69	228	1065	82	161	163	0	123	88	0
Confl. Peds. (#/hr)	1					1	4		1	1		4
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	27%	9%	6%	5%	12%	10%	2%	7%	6%	10%	7%	29%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	1.6	39.5	39.5	17.2	55.1	55.1	15.5	13.4		11.1	9.0	
Effective Green, g (s)	1.6	39.5	39.5	17.2	55.1	55.1	15.5	13.4		11.1	9.0	
Actuated g/C Ratio	0.02	0.40	0.40	0.17	0.55	0.55	0.16	0.13		0.11	0.09	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.8		4.0	4.8	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	22	1308	594	295	1775	791	274	213		182	155	
v/s Ratio Prot	0.01	c0.31		c0.13	0.33		c0.09	c0.10		c0.07	0.05	
v/s Ratio Perm			0.05			0.06						
v/c Ratio	0.50	0.80	0.12	0.77	0.60	0.10	0.59	0.76		0.68	0.57	
Uniform Delay, d1	48.8	26.7	19.2	39.5	15.1	10.7	39.3	41.8		42.7	43.6	
Progression Factor	0.77	1.27	3.77	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.2	4.6	0.4	11.9	1.5	0.3	3.2	14.9		9.5	4.7	
Delay (s)	52.6	38.5	72.7	51.4	16.6	11.0	42.5	56.7		52.2	48.4	
Level of Service	D	D	E	D	B	B	D	E		D	D	
Approach Delay (s)		43.5			21.6			50.9			50.6	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	35.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.8
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	29	1864	171	97	1469	11	117	58	172	34
v/c Ratio	0.28	0.83	0.16	0.58	0.60	0.01	0.95	0.20	0.81	0.12
Control Delay	59.4	22.3	6.8	64.9	10.7	0.5	119.4	10.1	75.9	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.4	22.3	6.8	64.9	10.7	0.5	119.4	10.1	75.9	3.2
Queue Length 50th (ft)	22	551	30	61	406	0	91	0	131	0
Queue Length 95th (ft)	53	#877	71	m113	m570	m0	#173	32	198	9
Internal Link Dist (ft)		263			2471		389		767	
Turn Bay Length (ft)	470		110	455		100		50		75
Base Capacity (vph)	153	2244	1057	181	2462	1125	184	405	318	397
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.83	0.16	0.54	0.60	0.01	0.64	0.14	0.54	0.09

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	1678	154	87	1322	10	66	40	52	52	103	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98		1.00	1.00		1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00		0.98	1.00
Satd. Flow (prot)	1671	3505	1615	1805	3505	1582		1775	1583		1856	1548
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.45	1.00		0.75	1.00
Satd. Flow (perm)	1671	3505	1615	1805	3505	1582		818	1583		1414	1548
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	29	1864	171	97	1469	11	73	44	58	58	114	34
RTOR Reduction (vph)	0	0	23	0	0	3	0	0	49	0	0	29
Lane Group Flow (vph)	29	1864	148	97	1469	8	0	117	9	0	172	5
Confl. Peds. (#/hr)							1					1
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	8%	3%	0%	0%	3%	0%	3%	5%	2%	2%	0%	3%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	5.2	76.8	76.8	11.1	82.7	82.7		18.1	18.1		18.1	18.1
Effective Green, g (s)	5.2	76.8	76.8	11.1	82.7	82.7		18.1	18.1		18.1	18.1
Actuated g/C Ratio	0.04	0.64	0.64	0.09	0.69	0.69		0.15	0.15		0.15	0.15
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	72	2243	1033	166	2415	1090		123	238		213	233
v/s Ratio Prot	0.02	c0.53		c0.05	0.42							
v/s Ratio Perm			0.09			0.00		c0.14	0.01		0.12	0.00
v/c Ratio	0.40	0.83	0.14	0.58	0.61	0.01		0.95	0.04		0.81	0.02
Uniform Delay, d1	55.9	16.6	8.6	52.2	10.0	5.8		50.5	43.5		49.3	43.4
Progression Factor	1.00	1.00	1.00	1.03	0.87	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	3.7	3.8	0.3	4.2	0.9	0.0		65.7	0.1		19.6	0.0
Delay (s)	59.5	20.4	8.8	57.8	9.7	5.8		116.2	43.6		68.9	43.4
Level of Service	E	C	A	E	A	A		F	D		E	D
Approach Delay (s)		20.0			12.6			92.2			64.7	
Approach LOS		B			B			F			E	

Intersection Summary			
HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	2	0	1	156	343	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	0	1	179	394	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					469	
pX, platoon unblocked	0.96	0.96	0.96			
vC, conflicting volume	576	395	395			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	536	346	347			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	487	672	1172			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	2	180	395
Volume Left	2	1	0
Volume Right	0	0	1
cSH	487	1172	1700
Volume to Capacity	0.00	0.00	0.23
Queue Length 95th (ft)	0	0	0
Control Delay (s)	12.4	0.1	0.0
Lane LOS	B	A	
Approach Delay (s)	12.4	0.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	28.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	1	6	151	2	5	338
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	1	7	174	2	6	389
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						553
pX, platoon unblocked	0.97					
vC, conflicting volume	575	175			176	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	542	175			176	
tC, single (s)	6.4	6.4			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	486	831			1413	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	8	176	394
Volume Left	1	0	6
Volume Right	7	2	0
cSH	755	1700	1413
Volume to Capacity	0.01	0.10	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	9.8	0.0	0.1
Lane LOS	A		A
Approach Delay (s)	9.8	0.0	0.1
Approach LOS	A		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	31.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	55	34	16	98	294	45
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	63	39	18	113	338	52
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					920	
pX, platoon unblocked						
vC, conflicting volume	513	364	390			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	513	364	390			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	88	94	98			
cM capacity (veh/h)	508	686	1147			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	102	131	390
Volume Left	63	18	0
Volume Right	39	0	52
cSH	563	1147	1700
Volume to Capacity	0.18	0.02	0.23
Queue Length 95th (ft)	16	1	0
Control Delay (s)	12.8	1.3	0.0
Lane LOS	B	A	
Approach Delay (s)	12.8	1.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	30.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	89	61	0	0	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	102	70	0	0	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	70				172	70
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	70				172	70
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1543				822	998

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	102	70	1
Volume Left	0	0	0
Volume Right	0	0	1
cSH	1543	1700	998
Volume to Capacity	0.00	0.04	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	8.6
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.6
Approach LOS			A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	14.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	31	33	34	77	263	45
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	35	37	38	87	296	51

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	72	125	346
Volume Left (vph)	35	0	296
Volume Right (vph)	0	87	51
Hadj (s)	0.15	-0.40	0.08
Departure Headway (s)	5.0	4.4	4.5
Degree Utilization, x	0.10	0.15	0.43
Capacity (veh/h)	657	748	782
Control Delay (s)	8.6	8.2	10.8
Approach Delay (s)	8.6	8.2	10.8
Approach LOS	A	A	B

Intersection Summary			
Delay	9.9		
Level of Service	A		
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	6	1524	345	289	1299	88	187	222	200	159
v/c Ratio	0.07	0.98	0.39	0.99	0.58	0.09	0.91	0.84	0.99	0.88
Control Delay	64.3	52.2	10.0	99.3	14.2	2.4	95.4	65.1	114.5	94.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.3	52.2	10.0	99.3	14.2	2.4	95.4	65.1	114.5	94.7
Queue Length 50th (ft)	4	666	104	226	264	0	145	130	157	122
Queue Length 95th (ft)	m5	#792	m140	#406	421	22	#283	#265	#311	#251
Internal Link Dist (ft)		2471			585			201		465
Turn Bay Length (ft)	500		360	295		150			330	
Base Capacity (vph)	180	1561	881	293	2245	934	206	265	202	181
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.98	0.39	0.99	0.58	0.09	0.91	0.84	0.99	0.88

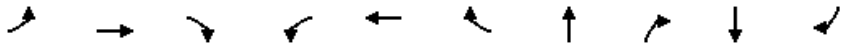
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	1448	328	275	1234	84	178	84	127	190	144	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	2000	1900	1900
Total Lost time (s)	4.0	6.0	6.0	3.8	6.0	6.0	4.0	4.8		0.7	4.8	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3471	1538	1656	3505	1410	1770	1630		1827	1768	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	3471	1538	1656	3505	1410	1770	1630		1827	1768	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	1524	345	289	1299	88	187	88	134	200	152	7
RTOR Reduction (vph)	0	0	190	0	0	34	0	46	0	0	2	0
Lane Group Flow (vph)	6	1524	155	289	1299	54	187	176	0	200	157	0
Confl. Peds. (#/hr)	1					1	2		1	1		2
Heavy Vehicles (%)	0%	4%	5%	9%	3%	12%	2%	4%	6%	4%	7%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	1.4	54.0	54.0	21.0	73.6	73.6	14.0	16.2		10.0	12.2	
Effective Green, g (s)	1.4	54.0	54.0	21.2	73.6	73.6	14.0	16.2		13.3	12.2	
Actuated g/C Ratio	0.01	0.45	0.45	0.18	0.61	0.61	0.12	0.13		0.11	0.10	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.8		4.0	4.8	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	21	1561	692	292	2149	864	206	220		202	179	
v/s Ratio Prot	0.00	c0.44		c0.17	0.37		0.11	c0.11		c0.11	0.09	
v/s Ratio Perm			0.10			0.04						
v/c Ratio	0.29	0.98	0.22	0.99	0.60	0.06	0.91	0.80		0.99	0.88	
Uniform Delay, d1	58.8	32.4	20.2	49.3	14.3	9.3	52.4	50.3		53.3	53.2	
Progression Factor	1.17	1.23	4.39	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.2	12.5	0.4	49.3	1.3	0.1	37.8	18.5		60.3	35.0	
Delay (s)	73.3	52.2	89.1	98.6	15.5	9.5	90.2	68.9		113.6	88.2	
Level of Service	E	D	F	F	B	A	F	E		F	F	
Approach Delay (s)		59.1			29.5			78.6			102.4	
Approach LOS		E			C			E			F	

Intersection Summary			
HCM 2000 Control Delay	53.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.8
Intersection Capacity Utilization	93.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

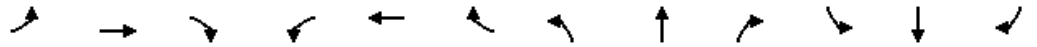
Attachment E – 2018 Background Traffic Level-of-Service Worksheets



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	6	837	67	46	2099	6	179	33	72	5
v/c Ratio	0.07	0.38	0.06	0.36	0.84	0.00	0.81	0.10	0.27	0.01
Control Delay	55.5	10.5	1.6	51.1	11.7	0.0	75.1	0.6	45.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.5	10.5	1.6	51.1	11.7	0.0	75.1	0.6	45.8	0.0
Queue Length 50th (ft)	5	152	0	37	286	0	133	0	49	0
Queue Length 95th (ft)	19	214	13	m40	m#966	m0	#230	0	92	0
Internal Link Dist (ft)		263			2471		389		744	
Turn Bay Length (ft)	470		110	500		100		50		75
Base Capacity (vph)	165	2218	1108	315	2495	1206	255	369	311	377
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.38	0.06	0.15	0.84	0.00	0.70	0.09	0.23	0.01

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	787	63	43	1973	6	118	50	31	9	58	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00		0.99	1.00
Satd. Flow (prot)	1805	3312	1615	1805	3374	1615		1823	1568		1772	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.74	1.00		0.95	1.00
Satd. Flow (perm)	1805	3312	1615	1805	3374	1615		1391	1568		1700	1615
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	6	837	67	46	2099	6	126	53	33	10	62	5
RTOR Reduction (vph)	0	0	23	0	0	2	0	0	28	0	0	4
Lane Group Flow (vph)	6	837	44	46	2099	4	0	179	5	0	72	1
Heavy Vehicles (%)	0%	9%	0%	0%	7%	0%	1%	0%	3%	22%	4%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	1.4	79.5	79.5	7.4	85.5	85.5		19.1	19.1		19.1	19.1
Effective Green, g (s)	1.4	79.5	79.5	7.4	85.5	85.5		19.1	19.1		19.1	19.1
Actuated g/C Ratio	0.01	0.66	0.66	0.06	0.71	0.71		0.16	0.16		0.16	0.16
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	21	2194	1069	111	2403	1150		221	249		270	257
v/s Ratio Prot	0.00	0.25		c0.03	c0.62							
v/s Ratio Perm			0.03			0.00		c0.13	0.00		0.04	0.00
v/c Ratio	0.29	0.38	0.04	0.41	0.87	0.00		0.81	0.02		0.27	0.00
Uniform Delay, d1	58.8	9.1	7.0	54.2	13.1	5.0		48.7	42.6		44.3	42.4
Progression Factor	1.00	1.00	1.00	0.91	0.76	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	7.4	0.5	0.1	1.1	2.2	0.0		19.3	0.0		0.5	0.0
Delay (s)	66.2	9.7	7.1	50.3	12.1	5.0		68.0	42.6		44.8	42.4
Level of Service	E	A	A	D	B	A		E	D		D	D
Approach Delay (s)		9.8			12.9			64.0			44.7	
Approach LOS		A			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	1	0	0	198	163	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	2	0	0	305	251	2
Pedestrians	1					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					469	
pX, platoon unblocked	0.99	0.99	0.99			
vC, conflicting volume	557	253	253			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	551	245	245			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	495	793	1323			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	2	305	252
Volume Left	2	0	0
Volume Right	0	0	2
cSH	495	1323	1700
Volume to Capacity	0.00	0.00	0.15
Queue Length 95th (ft)	0	0	0
Control Delay (s)	12.3	0.0	0.0
Lane LOS	B		
Approach Delay (s)	12.3	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	20.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	3	7	191	1	3	160
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	5	11	294	2	5	246
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						553
pX, platoon unblocked						
vC, conflicting volume	550	295			295	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	550	295			295	
tC, single (s)	6.7	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.8	3.4			2.2	
p0 queue free %	99	98			100	
cM capacity (veh/h)	445	717			1278	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	15	295	251
Volume Left	5	0	5
Volume Right	11	2	0
cSH	606	1700	1278
Volume to Capacity	0.03	0.17	0.00
Queue Length 95th (ft)	2	0	0
Control Delay (s)	11.1	0.0	0.2
Lane LOS	B		A
Approach Delay (s)	11.1	0.0	0.2
Approach LOS	B		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	20.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	26	12	26	166	91	72
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.61	0.61	0.61	0.61	0.61	0.61
Hourly flow rate (vph)	43	20	43	272	149	118
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					920	
pX, platoon unblocked						
vC, conflicting volume	566	208	267			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	566	208	267			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	98	97			
cM capacity (veh/h)	473	837	1308			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	62	315	267
Volume Left	43	43	0
Volume Right	20	0	118
cSH	549	1308	1700
Volume to Capacity	0.11	0.03	0.16
Queue Length 95th (ft)	10	3	0
Control Delay (s)	12.4	1.3	0.0
Lane LOS	B	A	
Approach Delay (s)	12.4	1.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	32.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	38	96	2	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.61	0.61	0.61	0.61	0.61	0.61
Hourly flow rate (vph)	0	62	157	3	0	0
Pedestrians					2	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	163				223	161
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	163				223	161
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1426				768	888

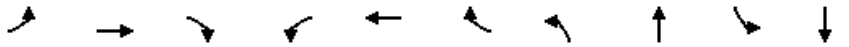
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	62	161	0
Volume Left	0	0	0
Volume Right	0	3	0
cSH	1426	1700	1700
Volume to Capacity	0.00	0.09	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	9.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	30	14	17	137	64	20
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	34	16	20	157	74	23

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	51	177	97
Volume Left (vph)	34	0	74
Volume Right (vph)	0	157	23
Hadj (s)	0.17	-0.51	0.06
Departure Headway (s)	4.5	3.7	4.4
Degree Utilization, x	0.06	0.18	0.12
Capacity (veh/h)	780	952	772
Control Delay (s)	7.8	7.5	8.0
Approach Delay (s)	7.8	7.5	8.0
Approach LOS	A	A	A

Intersection Summary			
Delay	7.7		
Level of Service	A		
Intersection Capacity Utilization	27.5%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	8	751	131	148	1926	218	243	255	65	85
v/c Ratio	0.09	0.44	0.15	0.67	0.88	0.23	1.00	0.84	0.60	0.67
Control Delay	50.1	16.3	1.0	63.8	23.6	4.8	108.8	62.3	76.0	78.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.1	16.3	1.0	63.8	23.6	4.8	108.8	62.3	76.0	78.7
Queue Length 50th (ft)	6	120	0	111	558	24	191	150	50	64
Queue Length 95th (ft)	m0	144	12	173	#952	71	#359	#314	#104	#135
Internal Link Dist (ft)		2471			585			201		465
Turn Bay Length (ft)	500		360	295		150			330	
Base Capacity (vph)	180	1706	880	323	2198	954	244	302	118	132
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.44	0.15	0.46	0.88	0.23	1.00	0.84	0.55	0.64

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	698	122	138	1791	203	226	83	154	60	74	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	2000	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	3.8	4.8		4.0	4.8	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.90		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3374	1583	1687	3374	1397	1810	1609		1583	1707	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	3374	1583	1687	3374	1397	1810	1609		1583	1707	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	8	751	131	148	1926	218	243	89	166	65	80	5
RTOR Reduction (vph)	0	0	66	0	0	48	0	55	0	0	2	0
Lane Group Flow (vph)	8	751	65	148	1926	170	243	200	0	65	83	0
Confl. Peds. (#/hr)	1					1			1	1		
Confl. Bikes (#/hr)									3			
Heavy Vehicles (%)	0%	7%	2%	7%	7%	13%	5%	6%	5%	14%	11%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	1.5	59.9	59.9	15.8	74.2	74.2	16.0	18.4		7.1	9.5	
Effective Green, g (s)	1.5	59.9	59.9	15.8	74.2	74.2	16.2	18.4		7.1	9.5	
Actuated g/C Ratio	0.01	0.50	0.50	0.13	0.62	0.62	0.13	0.15		0.06	0.08	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.8		4.0	4.8	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	22	1684	790	222	2086	863	244	246		93	135	
v/s Ratio Prot	0.00	0.22		c0.09	c0.57		c0.13	c0.12		0.04	0.05	
v/s Ratio Perm			0.04			0.12						
v/c Ratio	0.36	0.45	0.08	0.67	0.92	0.20	1.00	0.81		0.70	0.62	
Uniform Delay, d1	58.8	19.4	15.7	49.6	20.4	10.0	51.9	49.1		55.4	53.5	
Progression Factor	0.90	0.78	0.49	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.5	0.8	0.2	7.4	8.4	0.5	56.1	18.2		20.5	8.1	
Delay (s)	62.2	16.0	7.9	57.0	28.7	10.5	108.0	67.3		75.9	61.6	
Level of Service	E	B	A	E	C	B	F	E		E	E	
Approach Delay (s)		15.2			28.8			87.2			67.8	
Approach LOS		B			C			F			E	

Intersection Summary			
HCM 2000 Control Delay	34.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.8
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	10	1156	72	70	1165	14	80	68	73	15
v/c Ratio	0.09	0.49	0.06	0.43	0.43	0.01	0.52	0.29	0.42	0.06
Control Delay	45.6	10.0	2.3	54.2	2.7	0.0	53.6	11.3	48.0	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.6	10.0	2.3	54.2	2.7	0.0	53.6	11.3	48.0	0.5
Queue Length 50th (ft)	6	182	0	42	57	0	49	0	44	0
Queue Length 95th (ft)	23	296	18	m86	67	m0	92	33	85	0
Internal Link Dist (ft)		263			2471		389		741	
Turn Bay Length (ft)	470		455	500		100		50		75
Base Capacity (vph)	198	2359	1137	200	2685	1211	259	339	295	348
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.49	0.06	0.35	0.43	0.01	0.31	0.20	0.25	0.04

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	1110	69	67	1118	13	44	33	65	18	52	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00		0.99	1.00
Satd. Flow (prot)	1805	3312	1568	1770	3343	1495		1791	1538		1798	1588
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.78	1.00		0.90	1.00
Satd. Flow (perm)	1805	3312	1568	1770	3343	1495		1440	1538		1641	1588
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	10	1156	72	70	1165	14	46	34	68	19	54	15
RTOR Reduction (vph)	0	0	23	0	0	3	0	0	62	0	0	14
Lane Group Flow (vph)	10	1156	49	70	1165	11	0	80	6	0	73	1
Confl. Peds. (#/hr)							7					7
Heavy Vehicles (%)	0%	9%	3%	2%	8%	8%	5%	0%	5%	11%	2%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	1.5	68.5	68.5	8.1	75.1	75.1		9.4	9.4		9.4	9.4
Effective Green, g (s)	1.5	68.5	68.5	8.1	75.1	75.1		9.4	9.4		9.4	9.4
Actuated g/C Ratio	0.02	0.68	0.68	0.08	0.75	0.75		0.09	0.09		0.09	0.09
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	27	2268	1074	143	2510	1122		135	144		154	149
v/s Ratio Prot	0.01	c0.35		c0.04	0.35							
v/s Ratio Perm			0.03			0.01		c0.06	0.00		0.04	0.00
v/c Ratio	0.37	0.51	0.05	0.49	0.46	0.01		0.59	0.04		0.47	0.01
Uniform Delay, d1	48.8	7.6	5.1	44.0	4.8	3.1		43.5	41.2		43.0	41.1
Progression Factor	1.00	1.00	1.00	1.13	0.47	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	8.4	0.8	0.1	2.2	0.5	0.0		6.8	0.1		2.3	0.0
Delay (s)	57.2	8.4	5.2	51.9	2.7	3.1		50.3	41.3		45.3	41.1
Level of Service	E	A	A	D	A	A		D	D		D	D
Approach Delay (s)		8.6			5.5			46.2			44.5	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	3	0	0	139	186	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	3	0	0	162	216	2
Pedestrians	9					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					469	
pX, platoon unblocked						
vC, conflicting volume	388	226	228			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	388	226	228			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	615	812	1342			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	3	162	219
Volume Left	3	0	0
Volume Right	0	0	2
cSH	615	1342	1700
Volume to Capacity	0.01	0.00	0.13
Queue Length 95th (ft)	0	0	0
Control Delay (s)	10.9	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.9	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	20.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	6	133	4	6	180
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	7	155	5	7	209
Pedestrians						7
Lane Width (ft)						12.0
Walking Speed (ft/s)						4.0
Percent Blockage						1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						553
pX, platoon unblocked						
vC, conflicting volume	380	164			159	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	380	164			159	
tC, single (s)	6.4	6.4			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	623	838			1432	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	7	159	216
Volume Left	0	0	7
Volume Right	7	5	0
cSH	838	1700	1432
Volume to Capacity	0.01	0.09	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	9.3	0.0	0.3
Lane LOS	A		A
Approach Delay (s)	9.3	0.0	0.3
Approach LOS	A		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	26.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	51	30	29	86	93	87
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	64	38	36	108	116	109
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					923	
pX, platoon unblocked						
vC, conflicting volume	351	171	225			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	351	171	225			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	90	96	97			
cM capacity (veh/h)	622	878	1356			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	101	144	225
Volume Left	64	36	0
Volume Right	38	0	109
cSH	697	1356	1700
Volume to Capacity	0.15	0.03	0.13
Queue Length 95th (ft)	13	2	0
Control Delay (s)	11.0	2.1	0.0
Lane LOS	B	A	
Approach Delay (s)	11.0	2.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	31.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	80	116	0	1	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	0	100	145	0	1	0
Pedestrians					7	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	152				252	152
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	152				252	152
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1433				737	894

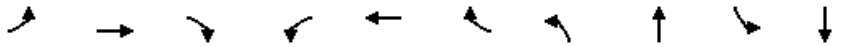
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	100	145	1
Volume Left	0	0	1
Volume Right	0	0	0
cSH	1433	1700	737
Volume to Capacity	0.00	0.09	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	9.9
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.9
Approach LOS			A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	17.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	26	21	24	69	71	30
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	32	26	30	85	88	37

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	58	115	125
Volume Left (vph)	32	0	88
Volume Right (vph)	0	85	37
Hadj (s)	0.19	-0.43	0.00
Departure Headway (s)	4.5	3.8	4.3
Degree Utilization, x	0.07	0.12	0.15
Capacity (veh/h)	774	910	809
Control Delay (s)	7.8	7.3	8.0
Approach Delay (s)	7.8	7.3	8.0
Approach LOS	A	A	A

Intersection Summary			
Delay	7.7		
Level of Service	A		
Intersection Capacity Utilization	21.6%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	11	1055	176	231	1077	134	164	234	124	92
v/c Ratio	0.12	0.79	0.25	0.78	0.56	0.15	0.59	0.87	0.69	0.52
Control Delay	35.3	38.8	13.3	57.4	14.5	3.4	51.7	61.3	62.3	52.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.3	38.8	13.3	57.4	14.5	3.4	51.7	61.3	62.3	52.1
Queue Length 50th (ft)	7	257	1	140	186	5	102	~102	76	55
Queue Length 95th (ft)	m13	451	115	220	325	36	#207	#261	#150	106
Internal Link Dist (ft)		2471			585			201		465
Turn Bay Length (ft)	500		360	295		150			330	
Base Capacity (vph)	170	1339	712	343	1909	896	276	268	198	190
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.79	0.25	0.67	0.56	0.15	0.59	0.87	0.63	0.48

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	1013	169	222	1034	129	157	76	149	119	82	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.8		4.0	4.8	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.90		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1421	3312	1504	1719	3223	1436	1770	1594		1641	1726	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1421	3312	1504	1719	3223	1436	1770	1594		1641	1726	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	11	1055	176	231	1077	134	164	79	155	124	85	7
RTOR Reduction (vph)	0	0	107	0	0	50	0	68	0	0	3	0
Lane Group Flow (vph)	11	1055	69	231	1077	84	164	166	0	124	89	0
Confl. Peds. (#/hr)	1					1	4		1	1		4
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	27%	9%	6%	5%	12%	10%	2%	7%	6%	10%	7%	29%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	1.6	39.4	39.4	17.3	55.1	55.1	15.6	13.4		11.1	8.9	
Effective Green, g (s)	1.6	39.4	39.4	17.3	55.1	55.1	15.6	13.4		11.1	8.9	
Actuated g/C Ratio	0.02	0.39	0.39	0.17	0.55	0.55	0.16	0.13		0.11	0.09	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.8		4.0	4.8	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	22	1304	592	297	1775	791	276	213		182	153	
v/s Ratio Prot	0.01	c0.32		c0.13	0.33		c0.09	c0.10		c0.08	0.05	
v/s Ratio Perm			0.05			0.06						
v/c Ratio	0.50	0.81	0.12	0.78	0.61	0.11	0.59	0.78		0.68	0.58	
Uniform Delay, d1	48.8	27.0	19.3	39.5	15.1	10.7	39.3	41.9		42.7	43.8	
Progression Factor	0.75	1.28	3.85	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.1	5.0	0.4	12.1	1.6	0.3	3.4	16.2		10.0	5.6	
Delay (s)	51.8	39.4	74.5	51.6	16.7	11.0	42.7	58.1		52.8	49.3	
Level of Service	D	D	E	D	B	B	D	E		D	D	
Approach Delay (s)		44.5			21.8			51.7			51.3	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	35.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.8
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Queues
1: SE Rusk Rd & Milwaukie Expy

12/6/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	29	1887	173	98	1487	11	118	59	175	34
v/c Ratio	0.28	0.84	0.16	0.59	0.61	0.01	0.97	0.20	0.82	0.12
Control Delay	59.4	23.1	6.9	64.8	10.9	0.5	122.7	10.3	76.7	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.4	23.1	6.9	64.8	10.9	0.5	122.7	10.3	76.7	3.2
Queue Length 50th (ft)	22	569	31	62	417	0	92	0	133	0
Queue Length 95th (ft)	53	#896	73	m114	m583	m0	#175	32	201	9
Internal Link Dist (ft)		263			2471		389		767	
Turn Bay Length (ft)	470		110	455		100		50		75
Base Capacity (vph)	153	2238	1055	181	2457	1122	181	405	317	397
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.84	0.16	0.54	0.61	0.01	0.65	0.15	0.55	0.09

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	1698	156	88	1338	10	67	40	53	53	104	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98		1.00	1.00		1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00		0.98	1.00
Satd. Flow (prot)	1671	3505	1615	1805	3505	1582		1775	1583		1856	1548
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.44	1.00		0.75	1.00
Satd. Flow (perm)	1671	3505	1615	1805	3505	1582		806	1583		1410	1548
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	29	1887	173	98	1487	11	74	44	59	59	116	34
RTOR Reduction (vph)	0	0	24	0	0	3	0	0	50	0	0	29
Lane Group Flow (vph)	29	1887	149	98	1487	8	0	118	9	0	175	5
Confl. Peds. (#/hr)							1					1
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	8%	3%	0%	0%	3%	0%	3%	5%	2%	2%	0%	3%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	5.2	76.6	76.6	11.1	82.5	82.5		18.3	18.3		18.3	18.3
Effective Green, g (s)	5.2	76.6	76.6	11.1	82.5	82.5		18.3	18.3		18.3	18.3
Actuated g/C Ratio	0.04	0.64	0.64	0.09	0.69	0.69		0.15	0.15		0.15	0.15
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	72	2237	1030	166	2409	1087		122	241		215	236
v/s Ratio Prot	0.02	c0.54		c0.05	0.42							
v/s Ratio Perm			0.09			0.00		c0.15	0.01		0.12	0.00
v/c Ratio	0.40	0.84	0.15	0.59	0.62	0.01		0.97	0.04		0.81	0.02
Uniform Delay, d1	55.9	17.0	8.6	52.3	10.2	5.9		50.6	43.3		49.2	43.2
Progression Factor	1.00	1.00	1.00	1.02	0.87	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	3.7	4.1	0.3	4.5	1.0	0.0		70.5	0.1		20.5	0.0
Delay (s)	59.5	21.1	8.9	57.8	9.8	5.9		121.1	43.4		69.7	43.3
Level of Service	E	C	A	E	A	A		F	D		E	D
Approach Delay (s)		20.6			12.7			95.2			65.4	
Approach LOS		C			B			F			E	

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	2	0	1	158	347	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	0	1	182	399	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					469	
pX, platoon unblocked	0.96	0.96	0.96			
vC, conflicting volume	583	399	400			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	541	349	349			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	483	668	1167			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	2	183	400
Volume Left	2	1	0
Volume Right	0	0	1
cSH	483	1167	1700
Volume to Capacity	0.00	0.00	0.24
Queue Length 95th (ft)	0	0	0
Control Delay (s)	12.5	0.1	0.0
Lane LOS	B	A	
Approach Delay (s)	12.5	0.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	28.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	1	6	153	2	5	342
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	1	7	176	2	6	393
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						553
pX, platoon unblocked	0.96					
vC, conflicting volume	582	177			178	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	548	177			178	
tC, single (s)	6.4	6.4			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	481	829			1410	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	8	178	399
Volume Left	1	0	6
Volume Right	7	2	0
cSH	751	1700	1410
Volume to Capacity	0.01	0.10	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	9.8	0.0	0.1
Lane LOS	A		A
Approach Delay (s)	9.8	0.0	0.1
Approach LOS	A		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	32.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	56	34	16	99	297	46
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	64	39	18	114	341	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					937	
pX, platoon unblocked						
vC, conflicting volume	518	368	394			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	518	368	394			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	87	94	98			
cM capacity (veh/h)	504	682	1143			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	103	132	394
Volume Left	64	18	0
Volume Right	39	0	53
cSH	559	1143	1700
Volume to Capacity	0.19	0.02	0.23
Queue Length 95th (ft)	17	1	0
Control Delay (s)	12.9	1.3	0.0
Lane LOS	B	A	
Approach Delay (s)	12.9	1.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	30.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	90	62	0	0	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	103	71	0	0	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	71				175	71
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	71				175	71
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1542				820	997

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	103	71	1
Volume Left	0	0	0
Volume Right	0	0	1
cSH	1542	1700	997
Volume to Capacity	0.00	0.04	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	8.6
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.6
Approach LOS			A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	14.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	31	33	34	78	266	46
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	35	37	38	88	299	52

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	72	126	351
Volume Left (vph)	35	0	299
Volume Right (vph)	0	88	52
Hadj (s)	0.15	-0.41	0.08
Departure Headway (s)	5.1	4.4	4.5
Degree Utilization, x	0.10	0.16	0.43
Capacity (veh/h)	655	746	782
Control Delay (s)	8.6	8.3	10.8
Approach Delay (s)	8.6	8.3	10.8
Approach LOS	A	A	B

Intersection Summary			
Delay	10.0		
Level of Service	A		
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	6	1543	349	293	1315	89	189	225	202	161
v/c Ratio	0.07	0.99	0.39	1.00	0.59	0.10	0.92	0.85	1.00	0.89
Control Delay	63.7	54.0	9.8	103.2	14.3	2.4	97.3	66.5	117.1	96.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.7	54.0	9.8	103.2	14.3	2.4	97.3	66.5	117.1	96.1
Queue Length 50th (ft)	4	675	106	~230	269	0	147	133	159	124
Queue Length 95th (ft)	m5	#807	m137	#412	429	23	#288	#272	#316	#254
Internal Link Dist (ft)		2471			585			201		465
Turn Bay Length (ft)	500		360	295		150			330	
Base Capacity (vph)	180	1561	884	292	2243	934	206	265	202	181
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.99	0.39	1.00	0.59	0.10	0.92	0.85	1.00	0.89

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	1466	332	278	1249	85	180	85	129	192	146	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	2000	1900	1900
Total Lost time (s)	4.0	6.0	6.0	3.8	6.0	6.0	4.0	4.8		0.7	4.8	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3471	1538	1656	3505	1410	1770	1629		1827	1768	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	3471	1538	1656	3505	1410	1770	1629		1827	1768	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	1543	349	293	1315	89	189	89	136	202	154	7
RTOR Reduction (vph)	0	0	192	0	0	34	0	46	0	0	2	0
Lane Group Flow (vph)	6	1543	157	293	1315	55	189	179	0	202	159	0
Confl. Peds. (#/hr)	1					1	2		1	1		2
Heavy Vehicles (%)	0%	4%	5%	9%	3%	12%	2%	4%	6%	4%	7%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	1.4	54.0	54.0	21.0	73.6	73.6	14.0	16.2		10.0	12.2	
Effective Green, g (s)	1.4	54.0	54.0	21.2	73.6	73.6	14.0	16.2		13.3	12.2	
Actuated g/C Ratio	0.01	0.45	0.45	0.18	0.61	0.61	0.12	0.13		0.11	0.10	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.8		4.0	4.8	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	21	1561	692	292	2149	864	206	219		202	179	
v/s Ratio Prot	0.00	c0.44		c0.18	0.38		0.11	c0.11		c0.11	0.09	
v/s Ratio Perm			0.10			0.04						
v/c Ratio	0.29	0.99	0.23	1.00	0.61	0.06	0.92	0.82		1.00	0.89	
Uniform Delay, d1	58.8	32.7	20.2	49.4	14.4	9.3	52.4	50.5		53.4	53.2	
Progression Factor	1.16	1.22	4.29	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.1	14.4	0.4	53.5	1.3	0.1	40.0	20.6		63.3	37.3	
Delay (s)	72.4	54.2	87.2	102.9	15.7	9.5	92.5	71.0		116.7	90.6	
Level of Service	E	D	F	F	B	A	F	E		F	F	
Approach Delay (s)		60.3			30.4			80.8			105.1	
Approach LOS		E			C			F			F	

Intersection Summary			
HCM 2000 Control Delay	54.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.8
Intersection Capacity Utilization	94.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Attachment F – 2018 Total Traffic Level-of-Service Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	6	837	70	47	2099	6	199	40	74	5
v/c Ratio	0.07	0.38	0.06	0.37	0.85	0.01	0.85	0.12	0.26	0.01
Control Delay	55.5	10.9	1.7	51.1	12.2	0.0	79.5	0.7	45.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.5	10.9	1.7	51.1	12.2	0.0	79.5	0.7	45.1	0.0
Queue Length 50th (ft)	5	157	0	37	298	0	148	0	49	0
Queue Length 95th (ft)	19	214	15	m41	m#966	m0	#267	0	95	0
Internal Link Dist (ft)		263			2471		389		744	
Turn Bay Length (ft)	470		110	455		100		50		75
Base Capacity (vph)	165	2188	1094	315	2466	1192	255	369	311	377
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.38	0.06	0.15	0.85	0.01	0.78	0.11	0.24	0.01

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	787	66	44	1973	6	130	57	38	9	60	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00		0.99	1.00
Satd. Flow (prot)	1805	3312	1615	1805	3374	1615		1824	1568		1773	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.74	1.00		0.95	1.00
Satd. Flow (perm)	1805	3312	1615	1805	3374	1615		1390	1568		1701	1615
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	6	837	70	47	2099	6	138	61	40	10	64	5
RTOR Reduction (vph)	0	0	24	0	0	2	0	0	33	0	0	4
Lane Group Flow (vph)	6	837	46	47	2099	4	0	199	7	0	74	1
Heavy Vehicles (%)	0%	9%	0%	0%	7%	0%	1%	0%	3%	22%	4%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	1.4	78.5	78.5	7.4	84.5	84.5		20.1	20.1		20.1	20.1
Effective Green, g (s)	1.4	78.5	78.5	7.4	84.5	84.5		20.1	20.1		20.1	20.1
Actuated g/C Ratio	0.01	0.65	0.65	0.06	0.70	0.70		0.17	0.17		0.17	0.17
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	21	2166	1056	111	2375	1137		232	262		284	270
v/s Ratio Prot	0.00	0.25		c0.03	c0.62							
v/s Ratio Perm			0.03			0.00		c0.14	0.00		0.04	0.00
v/c Ratio	0.29	0.39	0.04	0.42	0.88	0.00		0.86	0.03		0.26	0.00
Uniform Delay, d1	58.8	9.6	7.4	54.2	13.9	5.3		48.6	41.8		43.5	41.6
Progression Factor	1.00	1.00	1.00	0.91	0.75	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	7.4	0.5	0.1	1.1	2.4	0.0		25.4	0.0		0.5	0.0
Delay (s)	66.2	10.1	7.5	50.3	12.8	5.3		74.0	41.8		44.0	41.6
Level of Service	E	B	A	D	B	A		E	D		D	D
Approach Delay (s)		10.3			13.6			68.6			43.8	
Approach LOS		B			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	17.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	225	169	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	0	0	0	346	260	2
Pedestrians	1					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					469	
pX, platoon unblocked	0.99	0.99	0.99			
vC, conflicting volume	608	262	263			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	601	252	253			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	463	785	1313			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	346	262
Volume Left	0	0	0
Volume Right	0	0	2
cSH	1700	1313	1700
Volume to Capacity	0.00	0.00	0.15
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	15.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Volume (veh/h)	218	1	3	166	3	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	335	2	5	255	5	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				553		
pX, platoon unblocked						
vC, conflicting volume			337		601	336
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			337		601	336
tC, single (s)			4.1		6.7	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.8	3.4
p0 queue free %			100		99	98
cM capacity (veh/h)			1234		415	679

Direction, Lane #	EB 1	WB 1	NW 1
Volume Total	337	260	15
Volume Left	0	5	5
Volume Right	2	0	11
cSH	1700	1234	570
Volume to Capacity	0.20	0.00	0.03
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.2	11.5
Lane LOS		A	B
Approach Delay (s)	0.0	0.2	11.5
Approach LOS			B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	21.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	53	19	27	166	91	78
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.61	0.61	0.61	0.61	0.61	0.61
Hourly flow rate (vph)	87	31	44	272	149	128
Pedestrians					1	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					923	
pX, platoon unblocked						
vC, conflicting volume	575	213	277			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	575	213	277			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	81	96	97			
cM capacity (veh/h)	466	832	1297			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	118	316	277
Volume Left	87	44	0
Volume Right	31	0	128
cSH	528	1297	1700
Volume to Capacity	0.22	0.03	0.16
Queue Length 95th (ft)	21	3	0
Control Delay (s)	13.8	1.4	0.0
Lane LOS	B	A	
Approach Delay (s)	13.8	1.4	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	45	98	7	27	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.61	0.61	0.61	0.61	0.61	0.61
Hourly flow rate (vph)	0	74	161	11	44	0
Pedestrians					2	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	174				242	168
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	174				242	168
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				94	100
cM capacity (veh/h)	1412				749	879

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	74	172	44
Volume Left	0	0	44
Volume Right	0	11	0
cSH	1412	1700	749
Volume to Capacity	0.00	0.10	0.06
Queue Length 95th (ft)	0	0	5
Control Delay (s)	0.0	0.0	10.1
Lane LOS			B
Approach Delay (s)	0.0	0.0	10.1
Approach LOS			B

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	16.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	30	14	17	138	69	22
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	34	16	20	159	79	25

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	51	178	105
Volume Left (vph)	34	0	79
Volume Right (vph)	0	159	25
Hadj (s)	0.17	-0.51	0.05
Departure Headway (s)	4.5	3.7	4.4
Degree Utilization, x	0.06	0.18	0.13
Capacity (veh/h)	775	946	772
Control Delay (s)	7.8	7.5	8.1
Approach Delay (s)	7.8	7.5	8.1
Approach LOS	A	A	A

Intersection Summary			
Delay	7.7		
Level of Service	A		
Intersection Capacity Utilization	27.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	8	754	135	148	1927	218	243	256	65	85
v/c Ratio	0.09	0.44	0.15	0.67	0.88	0.23	1.00	0.85	0.60	0.67
Control Delay	49.6	16.4	1.2	63.8	23.7	4.8	108.8	62.7	76.0	78.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.6	16.4	1.2	63.8	23.7	4.8	108.8	62.7	76.0	78.7
Queue Length 50th (ft)	6	121	0	111	558	24	191	151	50	64
Queue Length 95th (ft)	m0	146	13	173	#954	71	#359	#316	#104	#135
Internal Link Dist (ft)		2471			585			201		465
Turn Bay Length (ft)	500		360	295		150			330	
Base Capacity (vph)	180	1706	880	323	2198	954	244	302	118	132
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.44	0.15	0.46	0.88	0.23	1.00	0.85	0.55	0.64

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	701	126	138	1792	203	226	83	155	60	74	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	2000	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	3.8	4.8		4.0	4.8	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.90		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3374	1583	1687	3374	1397	1810	1609		1583	1707	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	3374	1583	1687	3374	1397	1810	1609		1583	1707	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	8	754	135	148	1927	218	243	89	167	65	80	5
RTOR Reduction (vph)	0	0	68	0	0	48	0	55	0	0	2	0
Lane Group Flow (vph)	8	754	67	148	1927	170	243	201	0	65	83	0
Confl. Peds. (#/hr)	1					1			1	1		
Confl. Bikes (#/hr)									3			
Heavy Vehicles (%)	0%	7%	2%	7%	7%	13%	5%	6%	5%	14%	11%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	1.5	59.9	59.9	15.8	74.2	74.2	16.0	18.4		7.1	9.5	
Effective Green, g (s)	1.5	59.9	59.9	15.8	74.2	74.2	16.2	18.4		7.1	9.5	
Actuated g/C Ratio	0.01	0.50	0.50	0.13	0.62	0.62	0.13	0.15		0.06	0.08	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.8		4.0	4.8	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	22	1684	790	222	2086	863	244	246		93	135	
v/s Ratio Prot	0.00	0.22		c0.09	c0.57		c0.13	c0.12		0.04	0.05	
v/s Ratio Perm			0.04			0.12						
v/c Ratio	0.36	0.45	0.09	0.67	0.92	0.20	1.00	0.82		0.70	0.62	
Uniform Delay, d1	58.8	19.4	15.7	49.6	20.4	10.0	51.9	49.2		55.4	53.5	
Progression Factor	0.89	0.78	0.50	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.4	0.8	0.2	7.4	8.4	0.5	56.1	18.5		20.5	8.1	
Delay (s)	61.5	16.0	8.1	57.0	28.8	10.5	108.0	67.7		75.9	61.6	
Level of Service	E	B	A	E	C	B	F	E		E	E	
Approach Delay (s)		15.2			28.9			87.3			67.8	
Approach LOS		B			C			F			E	

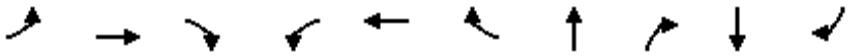
Intersection Summary			
HCM 2000 Control Delay	34.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.8
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	38	96	2	7	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	41	104	2	8	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	107				147	105
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	107				147	105
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1484				846	949

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	41	107	8
Volume Left	0	0	8
Volume Right	0	2	0
cSH	1484	1700	846
Volume to Capacity	0.00	0.06	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.0	9.3
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.3
Approach LOS			A

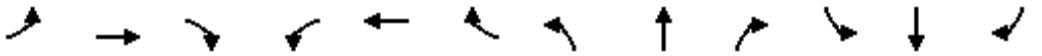
Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	15.2%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	10	1156	85	76	1165	14	91	71	80	15
v/c Ratio	0.09	0.50	0.08	0.45	0.44	0.01	0.57	0.29	0.43	0.06
Control Delay	45.6	10.7	3.6	56.0	2.9	0.0	54.7	11.5	46.9	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.6	10.7	3.6	56.0	2.9	0.0	54.7	11.5	46.9	0.5
Queue Length 50th (ft)	6	188	5	46	55	0	56	0	48	0
Queue Length 95th (ft)	23	311	26	m93	67	m0	102	35	90	0
Internal Link Dist (ft)		263			2471		389		741	
Turn Bay Length (ft)	470		110	455		100		50		75
Base Capacity (vph)	198	2329	1121	203	2660	1201	252	339	298	348
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.50	0.08	0.37	0.44	0.01	0.36	0.21	0.27	0.04

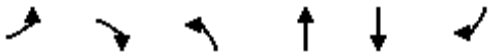
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	1110	82	73	1118	13	51	36	68	18	59	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00		0.99	1.00
Satd. Flow (prot)	1805	3312	1568	1770	3343	1495		1790	1538		1803	1588
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.76	1.00		0.91	1.00
Satd. Flow (perm)	1805	3312	1568	1770	3343	1495		1403	1538		1659	1588
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	10	1156	85	76	1165	14	53	38	71	19	61	15
RTOR Reduction (vph)	0	0	21	0	0	4	0	0	64	0	0	13
Lane Group Flow (vph)	10	1156	64	76	1165	10	0	91	7	0	80	2
Confl. Peds. (#/hr)							7					7
Heavy Vehicles (%)	0%	9%	3%	2%	8%	8%	5%	0%	5%	11%	2%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	1.5	67.4	67.4	8.4	74.3	74.3		10.2	10.2		10.2	10.2
Effective Green, g (s)	1.5	67.4	67.4	8.4	74.3	74.3		10.2	10.2		10.2	10.2
Actuated g/C Ratio	0.02	0.67	0.67	0.08	0.74	0.74		0.10	0.10		0.10	0.10
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	27	2232	1056	148	2483	1110		143	156		169	161
v/s Ratio Prot	0.01	c0.35		c0.04	0.35							
v/s Ratio Perm			0.04			0.01		c0.06	0.00		0.05	0.00
v/c Ratio	0.37	0.52	0.06	0.51	0.47	0.01		0.64	0.05		0.47	0.01
Uniform Delay, d1	48.8	8.2	5.5	43.8	5.1	3.3		43.1	40.5		42.4	40.4
Progression Factor	1.00	1.00	1.00	1.17	0.47	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	8.4	0.9	0.1	2.5	0.5	0.0		8.9	0.1		2.1	0.0
Delay (s)	57.2	9.0	5.7	53.7	2.9	3.3		52.1	40.6		44.5	40.4
Level of Service	E	A	A	D	A	A		D	D		D	D
Approach Delay (s)		9.2			6.0			47.1			43.8	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	155	212	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	0	0	180	247	2
Pedestrians	9					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					469	
pX, platoon unblocked						
vC, conflicting volume	437	257	258			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	437	257	258			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	576	781	1309			

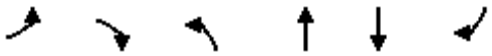
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	180	249
Volume Left	0	0	0
Volume Right	0	0	2
cSH	1700	1309	1700
Volume to Capacity	0.00	0.00	0.15
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	15.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	6	149	4	6	206
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	7	173	5	7	240
Pedestrians						7
Lane Width (ft)						12.0
Walking Speed (ft/s)						4.0
Percent Blockage						1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						553
pX, platoon unblocked						
vC, conflicting volume	429	183			178	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	429	183			178	
tC, single (s)	6.4	6.4			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	584	818			1410	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	7	178	247
Volume Left	0	0	7
Volume Right	7	5	0
cSH	818	1700	1410
Volume to Capacity	0.01	0.10	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	9.4	0.0	0.3
Lane LOS	A		A
Approach Delay (s)	9.4	0.0	0.3
Approach LOS	A		

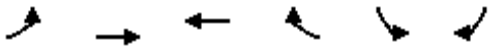
Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	27.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	67	33	35	86	93	113
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	84	41	44	108	116	141
Pedestrians					7	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					922	
pX, platoon unblocked						
vC, conflicting volume	389	187	258			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	389	187	258			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	95	97			
cM capacity (veh/h)	595	860	1319			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	125	151	258
Volume Left	84	44	0
Volume Right	41	0	141
cSH	662	1319	1700
Volume to Capacity	0.19	0.03	0.15
Queue Length 95th (ft)	17	3	0
Control Delay (s)	11.7	2.5	0.0
Lane LOS	B	A	
Approach Delay (s)	11.7	2.5	0.0
Approach LOS	B		

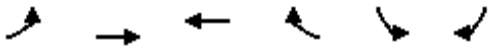
Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	34.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	84	123	25	16	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	0	105	154	31	20	0
Pedestrians					7	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	192				281	176
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	192				281	176
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				97	100
cM capacity (veh/h)	1385				709	867

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	105	185	20
Volume Left	0	0	20
Volume Right	0	31	0
cSH	1385	1700	709
Volume to Capacity	0.00	0.11	0.03
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.0	10.2
Lane LOS			B
Approach Delay (s)	0.0	0.0	10.2
Approach LOS			B

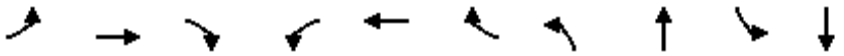
Intersection Summary			
Average Delay		0.7	
Intersection Capacity Utilization		19.2%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	27	21	24	74	73	31
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	33	26	30	91	90	38

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	59	121	128
Volume Left (vph)	33	0	90
Volume Right (vph)	0	91	38
Hadj (s)	0.19	-0.44	0.00
Departure Headway (s)	4.5	3.8	4.3
Degree Utilization, x	0.07	0.13	0.15
Capacity (veh/h)	771	909	805
Control Delay (s)	7.9	7.4	8.0
Approach Delay (s)	7.9	7.4	8.0
Approach LOS	A	A	A

Intersection Summary			
Delay	7.7		
Level of Service	A		
Intersection Capacity Utilization	21.9%	ICU Level of Service	A
Analysis Period (min)	15		



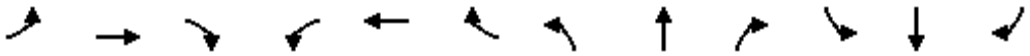
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	11	1058	176	231	1080	134	167	234	124	92
v/c Ratio	0.12	0.79	0.25	0.78	0.57	0.15	0.60	0.88	0.69	0.52
Control Delay	36.1	39.6	13.7	57.4	14.5	3.4	52.1	61.6	62.5	52.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.1	39.6	13.7	57.4	14.5	3.4	52.1	61.6	62.5	52.3
Queue Length 50th (ft)	7	274	6	140	186	5	105	~102	76	55
Queue Length 95th (ft)	m12	452	116	220	327	36	#213	#261	#150	106
Internal Link Dist (ft)		2471			585			201		465
Turn Bay Length (ft)	500		360	295		150			330	
Base Capacity (vph)	170	1340	713	343	1910	896	277	267	197	189
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.79	0.25	0.67	0.57	0.15	0.60	0.88	0.63	0.49

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

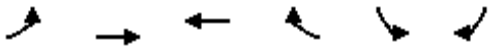
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	1016	169	222	1037	129	160	76	149	119	82	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.8		4.0	4.8	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.90		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1421	3312	1504	1719	3223	1436	1770	1594		1641	1726	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1421	3312	1504	1719	3223	1436	1770	1594		1641	1726	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	11	1058	176	231	1080	134	167	79	155	124	85	7
RTOR Reduction (vph)	0	0	107	0	0	50	0	68	0	0	3	0
Lane Group Flow (vph)	11	1058	69	231	1080	84	167	166	0	124	89	0
Confl. Peds. (#/hr)	1					1	4		1	1		4
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	27%	9%	6%	5%	12%	10%	2%	7%	6%	10%	7%	29%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	1.6	39.4	39.4	17.3	55.1	55.1	15.7	13.5		11.0	8.8	
Effective Green, g (s)	1.6	39.4	39.4	17.3	55.1	55.1	15.7	13.5		11.0	8.8	
Actuated g/C Ratio	0.02	0.39	0.39	0.17	0.55	0.55	0.16	0.14		0.11	0.09	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.8		4.0	4.8	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	22	1304	592	297	1775	791	277	215		180	151	
v/s Ratio Prot	0.01	c0.32		c0.13	0.34		c0.09	c0.10		c0.08	0.05	
v/s Ratio Perm			0.05			0.06						
v/c Ratio	0.50	0.81	0.12	0.78	0.61	0.11	0.60	0.77		0.69	0.59	
Uniform Delay, d1	48.8	27.0	19.3	39.5	15.2	10.7	39.2	41.8		42.9	43.9	
Progression Factor	0.77	1.31	3.99	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.1	5.0	0.4	12.1	1.6	0.3	3.7	15.6		10.5	6.1	
Delay (s)	52.7	40.3	77.3	51.6	16.7	11.0	42.9	57.3		53.3	49.9	
Level of Service	D	D	E	D	B	B	D	E		D	D	
Approach Delay (s)		45.6			21.8			51.3			51.9	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	36.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.8
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

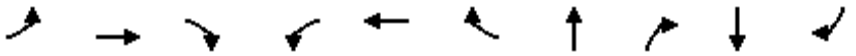
c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	80	116	7	4	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	87	126	8	4	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	134				217	130
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	134				217	130
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1451				771	920

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	87	134	4
Volume Left	0	0	4
Volume Right	0	8	0
cSH	1451	1700	771
Volume to Capacity	0.00	0.08	0.01
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	9.7
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.7
Approach LOS			A

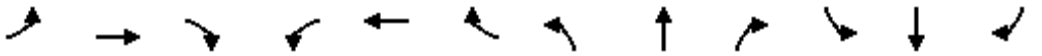
Intersection Summary			
Average Delay		0.2	
Intersection Capacity Utilization		16.5%	ICU Level of Service A
Analysis Period (min)		15	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	29	1887	188	104	1487	11	130	62	182	34
v/c Ratio	0.28	0.86	0.18	0.62	0.62	0.01	0.98	0.20	0.79	0.11
Control Delay	59.4	24.9	7.3	65.2	12.1	0.6	123.8	10.5	71.4	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.4	24.9	7.3	65.2	12.1	0.6	123.8	10.5	71.4	3.0
Queue Length 50th (ft)	22	600	35	65	429	0	101	0	137	0
Queue Length 95th (ft)	53	#896	78	m#128	m597	m0	#192	35	206	9
Internal Link Dist (ft)		263			2471		389		767	
Turn Bay Length (ft)	470		110	455		100		50		75
Base Capacity (vph)	153	2196	1038	179	2416	1104	182	405	315	397
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.86	0.18	0.58	0.62	0.01	0.71	0.15	0.58	0.09

Intersection Summary

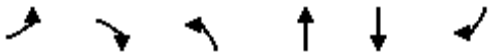
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	1698	169	94	1338	10	74	43	56	53	111	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98		1.00	1.00		1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00		0.98	1.00
Satd. Flow (prot)	1671	3505	1615	1805	3505	1582		1775	1583		1858	1548
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.44	1.00		0.74	1.00
Satd. Flow (perm)	1671	3505	1615	1805	3505	1582		809	1583		1401	1548
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	29	1887	188	104	1487	11	82	48	62	59	123	34
RTOR Reduction (vph)	0	0	27	0	0	4	0	0	52	0	0	28
Lane Group Flow (vph)	29	1887	161	104	1487	7	0	130	10	0	182	6
Confl. Peds. (#/hr)							1					1
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	8%	3%	0%	0%	3%	0%	3%	5%	2%	2%	0%	3%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	5.2	75.2	75.2	11.2	81.2	81.2		19.6	19.6		19.6	19.6
Effective Green, g (s)	5.2	75.2	75.2	11.2	81.2	81.2		19.6	19.6		19.6	19.6
Actuated g/C Ratio	0.04	0.63	0.63	0.09	0.68	0.68		0.16	0.16		0.16	0.16
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	72	2196	1012	168	2371	1070		132	258		228	252
v/s Ratio Prot	0.02	c0.54		c0.06	0.42							
v/s Ratio Perm			0.10			0.00		c0.16	0.01		0.13	0.00
v/c Ratio	0.40	0.86	0.16	0.62	0.63	0.01		0.98	0.04		0.80	0.02
Uniform Delay, d1	55.9	18.1	9.3	52.3	10.9	6.3		50.1	42.3		48.3	42.2
Progression Factor	1.00	1.00	1.00	0.99	0.89	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	3.7	4.7	0.3	5.4	1.0	0.0		73.2	0.1		17.4	0.0
Delay (s)	59.5	22.8	9.6	57.2	10.8	6.3		123.2	42.3		65.7	42.2
Level of Service	E	C	A	E	B	A		F	D		E	D
Approach Delay (s)		22.1			13.8			97.1			62.0	
Approach LOS		C			B			F			E	

Intersection Summary			
HCM 2000 Control Delay	24.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	1	173	373	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	0	1	199	429	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					469	
pX, platoon unblocked	0.95	0.95	0.95			
vC, conflicting volume	630	429	430			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	585	373	374			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	453	644	1136			

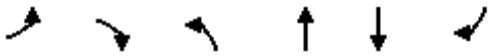
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	200	430
Volume Left	0	1	0
Volume Right	0	0	1
cSH	1700	1136	1700
Volume to Capacity	0.00	0.00	0.25
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.1	0.0
Lane LOS	A	A	
Approach Delay (s)	0.0	0.1	0.0
Approach LOS	A		

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		23.0%	ICU Level of Service A
Analysis Period (min)		15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	1	6	168	2	5	368
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	1	7	193	2	6	423
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						553
pX, platoon unblocked	0.96					
vC, conflicting volume	629	194			195	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	590	194			195	
tC, single (s)	6.4	6.4			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	451	810			1390	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	8	195	429
Volume Left	1	0	6
Volume Right	7	2	0
cSH	728	1700	1390
Volume to Capacity	0.01	0.11	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	10.0	0.0	0.1
Lane LOS	B		A
Approach Delay (s)	10.0	0.0	0.1
Approach LOS	B		

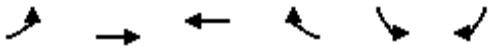
Intersection Summary			
Average Delay		0.2	
Intersection Capacity Utilization		33.4%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	71	37	22	99	297	72
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	82	43	25	114	341	83
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					920	
pX, platoon unblocked	1.00	1.00	1.00			
vC, conflicting volume	547	383	424			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	545	380	422			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	83	94	98			
cM capacity (veh/h)	490	670	1114			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	124	139	424
Volume Left	82	25	0
Volume Right	43	0	83
cSH	540	1114	1700
Volume to Capacity	0.23	0.02	0.25
Queue Length 95th (ft)	22	2	0
Control Delay (s)	13.6	1.7	0.0
Lane LOS	B	A	
Approach Delay (s)	13.6	1.7	0.0
Approach LOS	B		

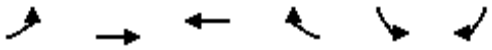
Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	37.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	94	69	25	14	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	108	79	29	16	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	108				202	94
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	108				202	94
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	1495				791	969

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	108	108	17
Volume Left	0	0	16
Volume Right	0	29	1
cSH	1495	1700	801
Volume to Capacity	0.00	0.06	0.02
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.0	9.6
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.6
Approach LOS			A

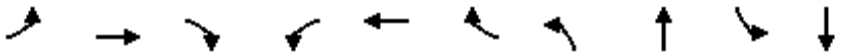
Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	15.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	32	33	34	83	268	47
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	36	37	38	93	301	53

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	73	131	354
Volume Left (vph)	36	0	301
Volume Right (vph)	0	93	53
Hadj (s)	0.15	-0.41	0.08
Departure Headway (s)	5.1	4.4	4.5
Degree Utilization, x	0.10	0.16	0.44
Capacity (veh/h)	652	745	779
Control Delay (s)	8.7	8.3	10.9
Approach Delay (s)	8.7	8.3	10.9
Approach LOS	A	A	B

Intersection Summary			
Delay	10.0		
Level of Service	B		
Intersection Capacity Utilization	34.6%	ICU Level of Service	A
Analysis Period (min)	15		



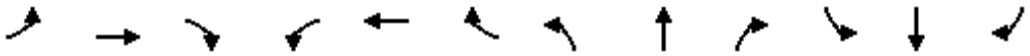
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	6	1546	349	293	1321	89	189	225	202	161
v/c Ratio	0.07	0.99	0.39	1.00	0.59	0.10	0.92	0.85	1.00	0.89
Control Delay	64.2	53.2	9.4	103.2	14.4	2.4	97.3	66.5	117.1	96.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.2	53.2	9.4	103.2	14.4	2.4	97.3	66.5	117.1	96.1
Queue Length 50th (ft)	4	676	109	~230	271	0	147	133	159	124
Queue Length 95th (ft)	m5	#811	m128	#412	431	23	#288	#272	#316	#254
Internal Link Dist (ft)		2471			585			201		465
Turn Bay Length (ft)	500		360	295		150			330	
Base Capacity (vph)	180	1561	884	292	2243	934	206	265	202	181
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.99	0.39	1.00	0.59	0.10	0.92	0.85	1.00	0.89

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

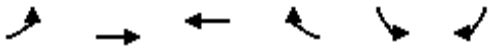
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	1469	332	278	1255	85	180	85	129	192	146	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	2000	1900	1900
Total Lost time (s)	4.0	6.0	6.0	3.8	6.0	6.0	4.0	4.8		0.7	4.8	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3471	1538	1656	3505	1410	1770	1629		1827	1768	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	3471	1538	1656	3505	1410	1770	1629		1827	1768	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	1546	349	293	1321	89	189	89	136	202	154	7
RTOR Reduction (vph)	0	0	192	0	0	34	0	46	0	0	2	0
Lane Group Flow (vph)	6	1546	157	293	1321	55	189	179	0	202	159	0
Confl. Peds. (#/hr)	1					1	2		1	1		2
Heavy Vehicles (%)	0%	4%	5%	9%	3%	12%	2%	4%	6%	4%	7%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	1.4	54.0	54.0	21.0	73.6	73.6	14.0	16.2		10.0	12.2	
Effective Green, g (s)	1.4	54.0	54.0	21.2	73.6	73.6	14.0	16.2		13.3	12.2	
Actuated g/C Ratio	0.01	0.45	0.45	0.18	0.61	0.61	0.12	0.13		0.11	0.10	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.8		4.0	4.8	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	21	1561	692	292	2149	864	206	219		202	179	
v/s Ratio Prot	0.00	c0.45		c0.18	0.38		0.11	c0.11		c0.11	0.09	
v/s Ratio Perm			0.10			0.04						
v/c Ratio	0.29	0.99	0.23	1.00	0.61	0.06	0.92	0.82		1.00	0.89	
Uniform Delay, d1	58.8	32.7	20.2	49.4	14.4	9.3	52.4	50.5		53.4	53.2	
Progression Factor	1.17	1.19	4.10	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.9	14.5	0.4	53.5	1.3	0.1	40.0	20.6		63.3	37.3	
Delay (s)	72.8	53.3	83.3	102.9	15.7	9.5	92.5	71.0		116.7	90.6	
Level of Service	E	D	F	F	B	A	F	E		F	F	
Approach Delay (s)		58.9			30.4			80.8			105.1	
Approach LOS		E			C			F			F	

Intersection Summary			
HCM 2000 Control Delay	53.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.8
Intersection Capacity Utilization	94.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	90	63	7	4	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	98	68	8	4	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	76				170	72
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	76				170	72
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1523				820	990

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	98	76	4
Volume Left	0	0	4
Volume Right	0	8	0
cSH	1523	1700	820
Volume to Capacity	0.00	0.04	0.01
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	9.4
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.4
Approach LOS			A

Intersection Summary			
Average Delay		0.2	
Intersection Capacity Utilization		14.7%	ICU Level of Service A
Analysis Period (min)		15	

Exhibit H

October 24, 2016

Subject: Notice of a proposed subdivision at 13333 Rusk Road

Dear Property Owner:

You are cordially invited to attend a neighborhood meeting on **Thursday, November 3 at 6:00 PM**.

The purpose of this meeting is to discuss a proposed subdivision located at 13333 SE Rusk Road adjacent to the Turning Point Church. The subject tax lots are: 22E 06AD 600, 700, 900 and 901. The site is approximately 18 acres and is zoned R-3 and R-10 by the City of Milwaukie. A vicinity map showing the site location is attached to this letter.

The proposed subdivision will include single-family attached (row house) lots. The applicant is proposing to use the City's Planned Development provisions, which allow flexibility to preserve natural resources on the site while maximizing development potential.

The Turning Point Church will remain in place, and natural resources that exist on the site will be preserved.

A preliminary site plan is attached to this letter.

The purpose of this meeting is to provide an opportunity for the applicant and surrounding property owners to meet and discuss the proposal, including any potential concerns.

The meeting is scheduled for:

Thursday, November 3, 2016
6:00 – 7:30 PM
Turning Point Church
13333 SE Rusk Road
Portland, OR 97222

Please note that this is an informational meeting on preliminary plans. These plans may change slightly before the application is submitted to the City. We look forward to discussing this proposal with you. Please feel free to contact me if you have questions.

Sincerely,

Scott Emmens
DOWL Senior Project Manager

Attachment(s): Vicinity Map and Preliminary Site Plan

Legend

- Site
- taxlots
- City Limits

1,000 500 0

Feet

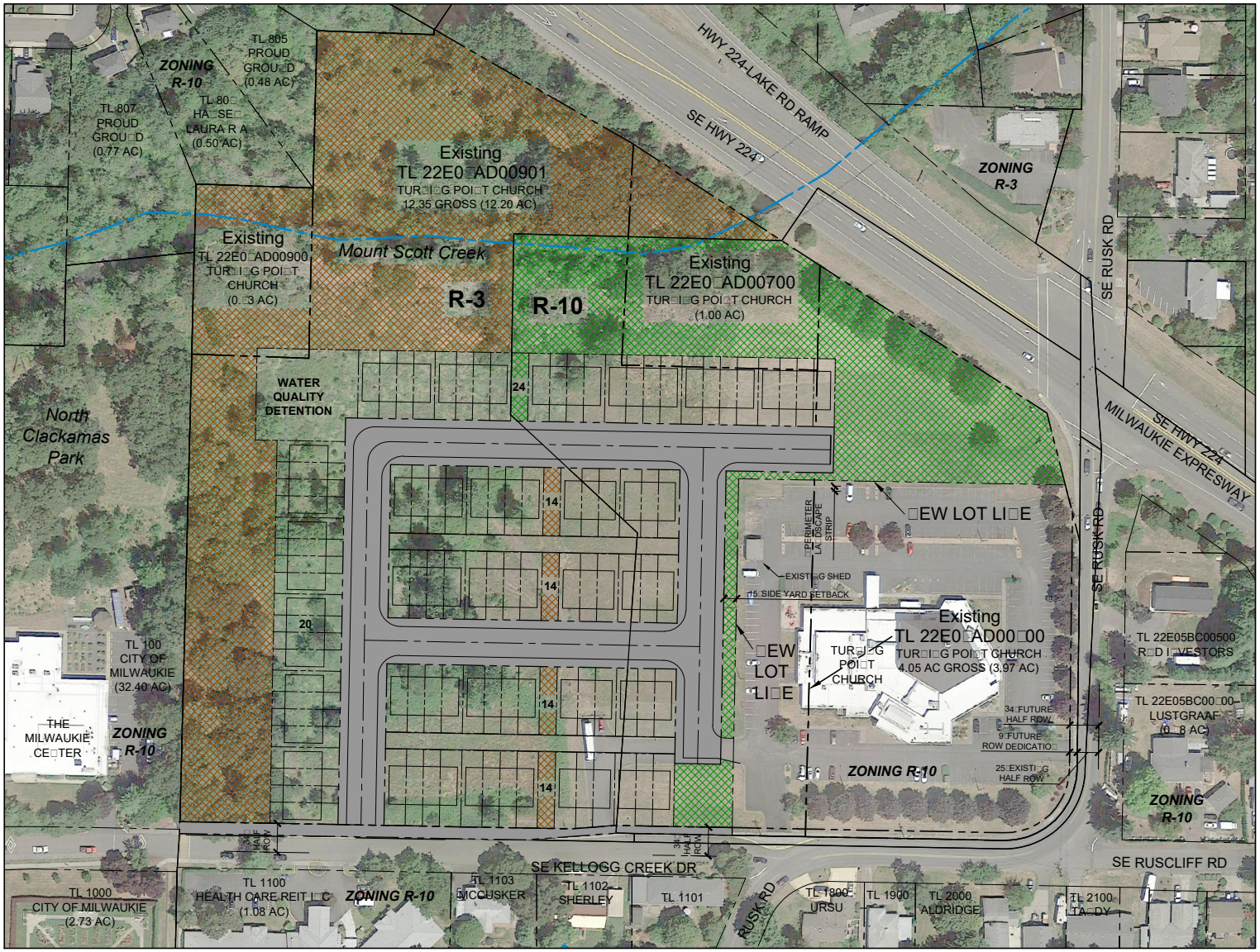
Vicinity Map

Kellogg Creek
Milwaukie, Oregon

DOWL

Project # 2322.1414258.01

\\BIL-FS\BIL-projects\22\14258-01\60GIS\MXD\8x11_Vicinity_Map.mxd
Date Saved: 10/21/2016 1:36:41 PM



Kellogg Creek

Conceptual Site Plan

Development Information

Total Gross Area	**= 14.22 ac**
Total Dwelling Units Proposed	**= 99 du**
Zoning R-3:	□ 9.□3 ac
Open Space (1□3 Total Gross Area) (Floodplain 2.8 ac □Open Space 0.41 ac)	□- 3.21 ac (Providing 4.51 ac)
ROW (Kellogg □On-site)	□- 1.32 ac
□et Area	□ 5.10 ac
Max Dwelling Units (14.5 du□ac)	□ 74 du
PUD Density Increase (20 □)	□ 89 du
Zoning R-10:	□ 4.59 ac
Open Space (1□3 Total Gross Area) (Floodplain 1.73 ac □Open Space 1.07 ac)	□- 1.53 ac (Providing 2.87 ac)
ROW (Kellogg □Rusk □on-site)	□- 0.91 ac
□et Area	□ 2.15 ac
Max Dwelling Units (4.4 du□ac)	□9 du
PUD Density Increase (20□)	□11 du
Density Total:	
Max Dwelling Units Total	□ **83 du**
Max PUD Density Increase Total	□**100 du**

Development Standards - City of Milwaukie

Notes:

1. Base map information based on data from a variety of sources including Metro GIS, City of Milwaukie GIS, and Microsoft Bing Aerials. □o survey information was used to create this map and all areas shall be considered approximate.
2. This drawing originated as imported GIS coverages from RLIS Metro data dated May 201□. The original pro□ection was maintained: □AD 1983 Harn State Plane OR □orth 3□01 □2913 Intl Feet.
3. GIS coverages for Habitat Conservation Area and Vegetated Corridors were imported from City of Milwaukie data dated □une 201□. Vegetated Corridors were modified at west property line per PHS on-site evaluation 7.7.201□.
4. Future ROW dedication re□uirements along SE HWY 224 were unknown at time of plan preparation and may impact total allowed Maximum Dwelling Units.

Legend

- Existing Property Lines
- Proposed Property Lines
- City of Milwaukie Boundary
- 500 Existing Contours - 5□Interval
- Existing Stream
- Existing FEMA 100 Year Floodplain
- TUR□I□G Existing Buildings

□oning

- Low Density Residential R-10
- Medium Density Residential R-3
- Open Space R-3
- Open Space R-10

10□5□201□

0 30 □0 120

DOWL
WWW.DOWL.COM
720 SW Washington Street, □750
Portland, Oregon 97205
971-280-8□41
Pro□ect □o. 2322.14258.01
Contact: Ben Williams, PE

Milwaukie, Oregon

22E05B 01000
SECHAN NEIL TRUSTEE
101 SCENIC DR
ASHLAND, OR 97520-2619

22E05B 01100
RANDALL INVESTMENT GROUP LLC
2 CENTERPOINTE DR STE 210
LAKE OSWEGO, OR 97035-8627

22E05B 01200
RANDALL INVESTMENT GROUP LLC
2 CENTERPOINTE DR STE 210
LAKE OSWEGO, OR 97035-8627

22E05B 01603
LAKE ROAD MEDICAL BUILDING LLC
6542 SE LAKE RD STE 104
MILWAUKIE, OR 97222-2245

22E05B 02600
ROBERTSON RANDALL W
12972 SE RUSK RD
MILWAUKIE, OR 97222-2106

22E05B 02602
SMITH CRAIG S
13012 SE RUSK RD
MILWAUKIE, OR 97222-2108

22E05B 02603
ENG JOHN
12992 SE RUSK RD
MILWAUKIE, OR 97222-2106

22E05B 02700
NBL PROPERTIES LIMITED PARTNERSHIP
PO BOX 1741
LAKE OSWEGO, OR 97035-0578

22E05BC00100
HOVIS REBECCA M
13440 SE RUSCLIFF RD
MILWAUKIE, OR 97222-2143

22E05BC00101
MCDONALD BRIAN SCOTT
13398 SE RUSCLIFF RD
MILWAUKIE, OR 97222-2142

22E05BC00102
CLIFFORD ROBERT C & MARTHA L
13436 SE RUSCLIFF RD
MILWAUKIE, OR 97222-2143

22E05BC00103
HOWARD TIMOTHY C & HOLLY M
13444 SE RUSCLIFF RD
MILWAUKIE, OR 97222-2143

22E05BC00104
GERTON JUDITH A & RONALD E
13446 SE RUSCLIFF RD
MILWAUKIE, OR 97222-2143

22E05BC00200
JACKSON RICHARD L & SHERI R
13420 SE RUSCLIFF RD
MILWAUKIE, OR 97222-2143

22E05BC00300
CASTRO DOMINGO RAY JR
13410 SE RUSCLIFF RD
MILWAUKIE, OR 97222-2143

22E05BC00400
STATE OF OREGON
TRANSPORTATION BLDG
SALEM, OR 97310-0001

22E05BC00500
RND INVESTORS INC
6486 SE VERNELDA ST
MILWAUKIE, OR 97267-3269

22E05BC00600
LUSTGRAAF JOY E & DARELL A
13312 SE RUSK RD
MILWAUKIE, OR 97222-3209

22E05BC00700
PASTOR JOAQUIN P & GABRIELA N
13400 SE RUSCLIFF RD
MILWAUKIE, OR 97222-2143

22E05BC00800
MARKWART KEITH A & A K LAUTT-MARKWART
13430 SE RUSCLIFF RD
MILWAUKIE, OR 97222-2143

22E05BC01000
GUNNARSON CHRIS
13387 SE RUSCLIFF RD
MILWAUKIE, OR 97222-2104

22E05BC01100
LUCAS JUDITH M
13114 SE NIXON AVE
MILWAUKIE, OR 97222-6137

22E05BC01200
VAN BOCKEL DOROTHEA A & JEBEDIAH
13391 SE RUSCLIFF RD
MILWAUKIE, OR 97222-2104

22E05BC01300
BLACKBURN GLORIA R CO-TRUSTEE
13465 SE RUSCLIFF RD
MILWAUKIE, OR 97222-2148

22E05BC01400
MILLWARD G RICHARD A
13485 SE RUSCLIFF RD
MILWAUKIE, OR 97222-2148

22E05BC01500
GREEN-HITE JOHN & TERESA
13575 SE BRIARFIELD CT
MILWAUKIE, OR 97222-3201

22E05BC01600
JOHNS LANA S TRUSTEE
7222 SE 29TH
PORTLAND, OR 97202-8732

22E05BC01700
ANDRUS SONIA L & STEVEN R
16897 SE TONG RD
DAMASCUS, OR 97089-8879

22E05BC01800
BRINKMAN SHARON M & GARRY D
6041 SE PARKVIEW TER
MILWAUKIE, OR 97222-3207

22E05BC01900
KILER KURTIS LEE
13555 SE BRIARFIELD CT
MILWAUKIE, OR 97222-3201

22E05BC02100
HALL LUREL DEAN & MARALYN S
6109 SE ERIC
MILWAUKIE, OR 97222-3206

22E05CB00303
HENNEBECK CAITLIN
13450 SE RUSCLIFF RD
MILWAUKIE, OR 97222-2143

22E06AA00300
MILLER SUSAN & PHIL
5800 SE WEIKO WAY
MILWAUKIE, OR 97222-2145

22E06AA00400
MASSEY LEROYCE J
13021 SE WEIKO WAY
MILWAUKIE, OR 97222-2145

22E06AA00401
MILLER SUSAN & PHIL
5800 SE WEIKO WAY
MILWAUKIE, OR 97222-2145

22E06AA00402
MILLER SUSAN & PHIL
5800 SE WEIKO WAY
MILWAUKIE, OR 97222-2145

22E06AA00501
TIEN FRANK & KAREN
9249 SE HUNTERS BLUFF AVE
HAPPY VALLEY, OR 97086-9131

22E06AA00502
SATIS PROPERTIES LLC
5939 SE IRIS CT
MILWAUKIE, OR 97267-1852

22E06AA00504
TIEN FRANK & KAREN
9249 SE HUNTERS BLUFF AVE
HAPPY VALLEY, OR 97086-9131

22E06AA00600
MASSEY TERRY
8625 SE JENNINGS AVE
MILWAUKIE, OR 97267-5458

22E06AA00601
OFFICE OF OVERSEER & HIS SUCCESSORS
800 NE TENNEY RD STE 110-318
VANCOUVER, WA 98685-2831

22E06AA00700
KING TONY C
12951 SE RUSK RD
MILWAUKIE, OR 97222-2105

22E06AA00800
JOHNSON LORI C
13001 SE RUSK RD
MILWAUKIE, OR 97222-2107

22E06AA00900
BRUNEAU CAROLINE J TRUSTEE
12942 SE RUSK RD
MILWAUKIE, OR 97222-2106

22E06AB00610
OLEARY MICHAEL J & MARY JEAN
5440 SE CAMPANARIO RD
MILWAUKIE, OR 97222-2115

22E06AB00616
SILVERLEAF HOMEOWNERS ASSOCIATION
5246 CAMPANARIO RD
MILWAUKIE, OR 97222

22E06AB00617
NORTH CLACKAMAS PARK & REC DIST
150 BEAVERCREEK RD
OREGON CITY, OR 97045-4302

22E06AB00703
NOREN JOHN A & DONNA
12935 SE CARRIE LYN LN
MILWAUKIE, OR 97222-2166

22E06AB00704
BRUNNING VINCENT C & GEORGIANNE
12963 SE CARRIE LYN LN
MILWAUKIE, OR 97222-2166

22E06AB00705
MCKEE GEORGE A TRUSTEE
5535 SE CAMPANARIO RD
MILWAUKIE, OR 97222-2114

22E06AB00706
PERRY MICHAEL A
5455 SE CAMPANARIO RD
MILWAUKIE, OR 97222-2116

22E06AB00707
ROGERS SALLY M
5454 SE CAMPANARIO RD
MILWAUKIE, OR 97222-2115

22E06AB00708
HEINICHEN RICHARD J & CINDY I
5502 SE CAMPANARIO RD
MILWAUKIE, OR 97222-2167

22E06AB00709
SAENZ SAMUEL & ROSIE
5550 SE CAMPANARIO RD
MILWAUKIE, OR 97222-2167

22E06AB00710
LEFRANC YVES & GINA MCMENAMIN
5606 SE CAMPANARIO RD
MILWAUKIE, OR 97222-2117

22E06AB00711
JONES SCOTT & TIFFANY
5648 SE CAMPANARIO RD
MILWAUKIE, OR 97222-2117

22E06AB00712
CHANEY DALE S & T BOATWRIGHT-CHANEY
5649 SE CAMPANARIO RD
MILWAUKIE, OR 97222-2180

22E06AB00713
SLOBODA VASILY & TAMARA
12988 SE CARRIE LYN LN
MILWAUKIE, OR 97222-2176

22E06AB00714
BAILEY ARLENE F
12936 SE CARRIE LYN LN
MILWAUKIE, OR 97222-2176

22E06AB00715
CHRISTIANSON JOHN W & LOU ANN
5586 SE LAKE RD
MILWAUKIE, OR 97222-2169

22E06AB00716
NORTH CLACKAMAS PARKS & REC DIST
150 BEAVERCREEK RD
OREGON CITY, OR 97045-4302

22E06AC00100
CITY OF MILWAUKIE
10722 SE MAIN ST
MILWAUKIE, OR 97222-7606

22E06AD00100
HACMAC PROPERTIES LLC
6026 SE EASTBROOK DR
MILWAUKIE, OR 97222-3237

22E06AD00200
THORPE JAMES STEVEN
13020 SE RUSK RD
MILWAUKIE, OR 97222-2108

22E06AD00300
GOFF DONALD EUGENE CO-TRUSTEE
14980 SE RIVER FOREST DR
MILWAUKIE, OR 97267-2508

22E06AD00301
STATE OF OREGON
TRANSPORTATION BLDG
SALEM, OR 97310-0001

22E06AD00600
TURNING POINT CHURCH
13333 SE RUSK RD
MILWAUKIE, OR 97222-3208

22E06AD00700
TURNING POINT CHURCH
13333 SE RUSK RD
MILWAUKIE, OR 97222-3208

22E06AD00801
PROUD GROUND
5288 N INTERSTATE
PORTLAND, OR 97217-3767

22E06AD00802
PROUD GROUND
5288 N INTERSTATE
PORTLAND, OR 97217-3767

22E06AD00803
GESIK CHARLIE
5650 SE KAYLA CT
MILWAUKIE, OR 97222-6662

22E06AD00804
PROUD GROUND
5288 N INTERSTATE
PORTLAND, OR 97217-3767

22E06AD00805
PROUD GROUND
5288 N INTERSTATE
PORTLAND, OR 97217-3767

22E06AD00806
HANSEN LAURA R A
12978 SE MADEIRA DR
MILWAUKIE, OR 97222-6633

22E06AD00807
PROUD GROUND
5288 N INTERSTATE
PORTLAND, OR 97217-3767

22E06AD00900
TURNING POINT CHURCH
13333 SE RUSK RD
MILWAUKIE, OR 97222-3208

22E06AD00901
TURNING POINT CHURCH
13333 SE RUSK RD
MILWAUKIE, OR 97222-3208

22E06AD01000
CITY OF MILWAUKIE
10722 SE MAIN ST
MILWAUKIE, OR 97222-7606

22E06AD01100
HEALTH CARE REIT INC
4500 DORR ST
TOLEDO, OH 43615-4040

22E06AD01101
SUPPRESSED NAME
5824 SE KELLOGG CREEK DR
MILWAUKIE, OR 97222-2103

22E06AD01102
SHERLEY JUDY E
5804 SE KELLOGG CREEK DR
MILWAUKIE, OR 97222-2103

22E06AD01103
MCCUSKER JAMES P
5800 SE KELLOGG CREEK DR
MILWAUKIE, OR 97222-2103

22E06AD01200
HEALTH CARE REIT INC
4500 DORR ST
TOLEDO, OH 43615-4040

22E06AD01400
JOHNSON GARY C & SHERRIE L
13477 SE RUSK RD
MILWAUKIE, OR 97222-3210

22E06AD01500
BERESFORD TERRY
13502 SE RUSK RD
MILWAUKIE, OR 97222-3230

22E06AD01600
RIVELLI JOSEPH P & SUSAN M
6008 SE PARKVIEW TER
MILWAUKIE, OR 97222-3207

22E06AD01601
KEAGBINE ANTHONY TRUSTEE
6012 SE PARKVIEW TER
MILWAUKIE, OR 97222-3207

22E06AD01700
PIPER RONALD D & LINDA L
13468 SE RUSK RD
MILWAUKIE, OR 97222-3211

22E06AD01800
URSU IOAN
13460 SE RUSK RD
MILWAUKIE, OR 97222-3211

22E06AD01900
NEALEIGH DOUGLAS E
13360 SE RUSK RD
MILWAUKIE, OR 97222-3229

22E06AD02000
ALDRIDGE FAMILY TRUST
13340 SE RUSK RD
MILWAUKIE, OR 97222-3229

22E06AD02100
TANDY STEPHEN DOUGLAS &
KAREN LYNN
13330 SE RUSK RD
MILWAUKIE, OR 97222-3229

22E06AD02200
TANDY STEPHEN DOUGLAS &
KAREN LYNN
13330 SE RUSK RD
MILWAUKIE, OR 97222-3229

22E06AD02300
BRINKMAN GARRY D
6041 SE PARKVIEW TER
MILWAUKIE, OR 97222-3207

22E06AD02400
KEAGBINE ANTHONY TRUSTEE
6012 SE PARKVIEW TER
MILWAUKIE, OR 97222-3207

22E06AD02401
CLACKAMAS COUNTY
902 ABERNETHY RD
OREGON CITY, OR 97045-1165

22E06DA00100
HALL LUREL DEAN & MARALYN S
6109 SE ERIC ST
MILWAUKIE, OR 97222-3206

22E06DA00200
ELLS RICHARD H
6037 SE ERIC ST
MILWAUKIE, OR 97222-3205

22E06DA00300
WINTER JILL J TRUSTEE
6025 SE ERIC ST
MILWAUKIE, OR 97222-3205

22E06DA00400
SANDERS KELLI
6011 SE ERIC ST
MILWAUKIE, OR 97222-3205

22E06DA00500
BARNES SUSAN P & ABEDNEGO
5959 SE ERIC ST
MILWAUKIE, OR 97222-3204

22E06DA00600
PEREIRA MICHELLE M & JARROD A
5915 SE ERIC ST
MILWAUKIE, OR 97222-3204

22E06DA03601
PROVOST ERIC J & HOLLY M
6135 SE ERIC ST
MILWAUKIE, OR 97222-3206

22E06DB00400
EASTERN ORTHDX CH ANNUNCTN
PO BOX 22048
MILWAUKIE, OR 97269-2048

KELLOGG CREEK PROJECT NEIGHBORHOOD MEETING

THURSDAY, NOVEMBER 3

WELCOME!

PROJECT TEAM

- Scott Emmens, Senior Project Manager, DOWL
- Serah Breakstone, Senior Planner, DOWL
- Kyle Glidden, Senior Civil Project Designer, DOWL
- John Van Staveren, Senior Scientist, PHS
- Zachary Horowitz, Senior Engineer, Kittelson & Assoc.

Property owner:	**Turning Point Church**
Developer:	**Brownstone Development, Inc.**
Home Builder:	**DR Horton**

PROJECT SITE

PROJECT OVERVIEW

- Subdivision with 99 lots
- Compact development to preserve natural areas
- Property line adjustment
- Church will remain
- Public open spaces and a greenway
- On-site stormwater treatment
- One primary access on Kellogg Creek Drive

CITY LAND USE APPROVALS

Package 1

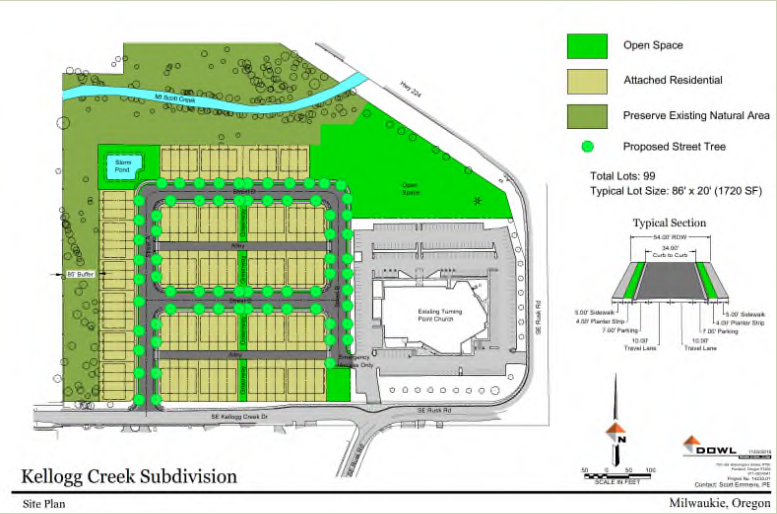
- Planned Development
- Zone Change

Package 2

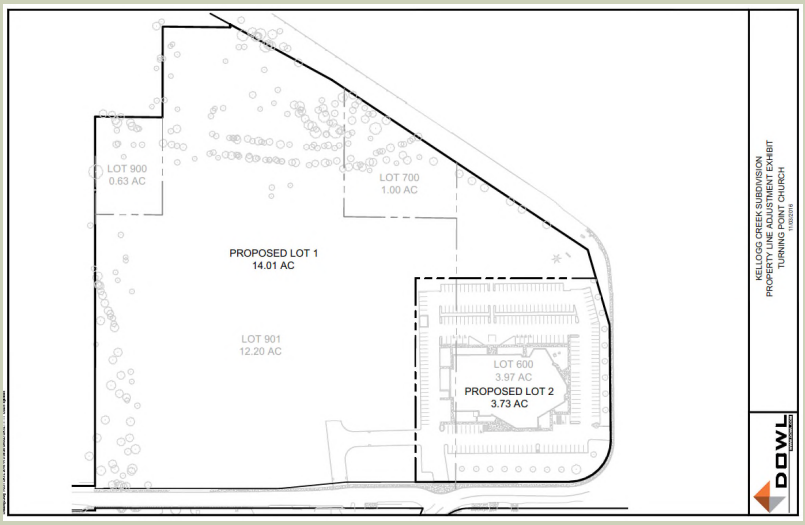
- Subdivision
- Natural Resources Review
- Transportation Facilities Review

Applications to be reviewed concurrently
One or two Planning Commission Hearings
One City Council hearing

PRELIMINARY SITE PLAN



LOT LINE ADJUSTMENT



EXAMPLE HOME TYPES

Sample: Front Loaded 4-Plex

Sample: Front Loaded 3-Plex

Sample: Alley Loaded

Kellogg Creek Subdivision

DR Horton Home Types

Milwaukie, Oregon

PROJECT TIMELINE

- Submit application by November 30
- 30-days for completeness review
- About 5 months for review process
- Public hearings early spring (March)
- Construction August – November 2017

QUESTIONS & FEEDBACK

SBREAKSTONE@DOWL.COM
971.280.8661

Exhibit I

Morgan Holen & Associates, LLC
Consulting Arborists and Urban Forest Management
971.409.9354
3 Monroe Parkway, Suite P 220
Lake Oswego, Oregon 97035
morgan.holen@comcast.net

Kellogg Creek Subdivision – Milwaukie, Oregon
Arborist Report
January 4, 2017

MHA16090

Purpose

This arborist report for the Kellogg Creek subdivision project located in Milwaukie, Oregon, describes the existing trees located on and directly adjacent to the project site, as well as recommendations for tree removal, retention, and protection.

Scope of Work and Limitations

Morgan Holen & Associates, LLC, was contracted by DOWL to visually assess existing trees measuring six inches in diameter and larger in terms of general condition and suitability for preservation with development, coordinate with the design team to develop a Tree Protection and Removal Plan for the project, and prepare a written arborist report to correlate with the Tree Plan.

On behalf of Morgan Holen & Associates, LLC, International Society of Arboriculture (ISA) Certified Arborist (PN-0497A) and Qualified Tree Risk Assessor Walter Knapp visited the site on November 18, 2016. Trees located north of Mount Scott Creek are not subject to this scope of work and are therefore not included in the inventory, otherwise Visual Tree Assessment (VTA[1]) was performed on individual trees located across the site. Trees were evaluated in terms species, size, general condition, and potential construction impacts, and treatment recommendations include retain or remove. Following the inventory fieldwork, we coordinated with DOWL to discuss and finalize treatment recommendations based on the proposed site plan and grading.

The client may choose to accept or disregard the recommendations contained herein, or seek additional advice. Neither this author nor Morgan Holen & Associates, LLC, have assumed any responsibility for liability associated with the trees on or adjacent to this site.

General Description

The Kellogg Creek Subdivision project site is located south of State Highway 224 and north of the intersection between SE Rusk Road and SE Kellogg Creek Drive. A site plan was provided by DOWL illustrating the location of trees and tree survey point numbers, and potential construction impacts. Turning Point Church is located on the eastern portion of the project site and the church and parking lot will remain. West of the church, a 92-lot residential subdivision is proposed, along with new streets and water quality facilities. The project also includes right of way improvements along SE Kellogg Creek Drive.

In all, 218 trees measuring 6-inches and larger in diameter were inventoried including 15 different species. Four of the species, accounting for 31 (14%) of the inventoried trees, are on the City's nuisance tree list. Table 1 provides a summary of the quantity of inventoried trees by species. A complete description of individual trees is provided in the enclosed tree data.

[1] Visual Tree Assessment (VTA): The standard process of visual tree inspection whereby the inspector visually assesses the tree from a distance and up close, looking for defect symptoms and evaluating overall condition and vitality.

Table 1. Quantity of Trees by Species – Kellogg Creek Subdivision.

Common Name	Species Name	Total	Percent*
bigleaf maple	*Acer macrophyllum*	2	1%
black cottonwood	*Populus trichocarpa*	39	18%
deciduous	unknown	1	0.5%
Douglas-fir	*Pseudotsuga menziesii*	1	0.5%
English hawthorn^	*Crataegus monogyna*	9	4%
European white birch^	*Betula pendula*	3	1%
Japanese maple	*Acer palmatum*	1	0.5%
Norway maple^	*Acer platanoides*	18	8%
Oregon ash	*Fraxinus latifolia*	32	15%
Oregon white oak	*Quercus garryana*	46	21%
pin oak	*Quercus palustris*	10	5%
red alder	*Alnus rubra*	41	19%
Scots pine	*Pinus sylvestris*	1	0.5%
Scouler's willow	*Salix scouleriana*	13	6%
sweet cherry^	*Prunus avium*	1	0.5%
Total		**218**	**100%**

^Identifies nuisance tree species.
*Percent total may not sum to 100% due to rounding.

Tree Plan Recommendations

The enclosed tree data includes a condition rating for each individual tree to generally describe the overall condition as either: dead; poor; fair; good; or excellent. Note that none of the trees received an excellent condition rating. In all, 157 (71%) trees are planned for retention with the proposed development and 61 (28%) are planned for removal. Table 2 provides a summary of the quantity of trees by treatment recommendation and general condition rating.

Table 2. Count of Trees by Treatment Recommendation and General Condition Rating.

Treatment Recommendation	General Condition Rating				Total	Percent
	Dead	Poor	Fair	Good		
Retain	9	33	39	76	157	72%
Remove		21	26	14	61	28%
Total	**9**	**54**	**65**	**90**	**218**	**100%**
Percent	**4%**	**25%**	**30%**	**41%**		

Trees planned for retention that are dead or in poor condition are located within wetlands or the vegetated riparian corridor, or are otherwise not within striking distance of proposed development if they were to fail; these trees are suitable for retention in order to provide wildlife habitat and other environmental benefits.

Protection fencing should be installed at the dripline of trees planned for retention, except a minor encroachment is needed for lot grading adjacent to trees 8, 9, and 103. Protection fencing should

initially be installed at the dripline of all trees and adjusted where needed in coordination with a Qualified Arborist who should monitor and document work beneath protected tree driplines.

Of the 61 trees planned for removal, removal is necessary to accommodate site development, including grading, building and other site improvements and adequate protection is not possible. The only exception is the proposed removal of tree 29, which could be protected with construction however it is recommended for removal because it is in poor condition and at increased risk for failure without the protection of adjacent trees to the south and west that need to be removed for site development.

Tree Protection Standards
Trees designated for retention will need special consideration to assure their protection during construction. We recommend a preconstruction meeting with the owner, contractors, and project arborist to review tree protection measures and address questions or concerns on site. Tree protection measures include:

1. **Fencing.** Trees to remain on site shall be protected by installation of tree protection fencing to prevent injury to tree trunks or roots, or soil compaction within the root protection area, which generally coincides with tree driplines. Fences shall be chain link fencing on concrete blocks or orange plastic construction fencing on metal stakes. The project arborist shall determine the exact location and type of tree protection fencing. Trees located more than 30-feet from construction activity shall not require fencing.

2. **Tree Protection Zone.** Without authorization from the Project Arborist, none of the following shall occur beneath the dripline of any protected tree:
    a. Grade change or cut and fill;
    b. New impervious surfaces;
    c. Utility or drainage field placement;
    d. Staging or storage of materials and equipment; or
    e. Vehicle maneuvering.

    Root protection zones may be entered for tasks like surveying, measuring, and, sampling. Fences must be closed upon completion of these tasks.

3. **Pruning.** Pruning may be needed to provide for overhead clearance, improve crown structure, and to remove dead and defective branches for safety. The project arborist can help identify where pruning is necessary once trees recommended for removal have been removed and the site is staked and prepared for construction. Tree removal and pruning shall be performed by a Qualified Tree Service.

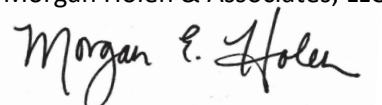
4. **Grading.** Filling and excavating beneath the dripline of protected trees shall be avoided if alternatives are available. Where soil grade changes affect the root protection area, the grade line should be meandered wherever practicable. This will require on-site coordination to ensure a reasonable balance between engineering, construction, and the need for tree protection. The project arborist shall provide on-site consultation during all grading activities beneath the dripline of protected trees.
    a. If the grade must be raised by filling beneath protected tree driplines, the contractor shall coordinate with the project arborist to obtain specific recommendations depending on the depth of fill required and proximity to the tree trunk.

b. Excavation immediately adjacent to roots larger than 2-inches in diameter beneath protected tree driplines shall be by hand or other non-invasive techniques to ensure that roots are not damaged. Where feasible, major roots shall be protected by tunneling or other means to avoid destruction or damage. Exceptions can be made if, in the opinion of the project arborist, unacceptable damage will not occur to the tree.

5. **Landscaping.** Following construction and where landscaping is desired, apply approximately 3-inches of mulch beneath the dripline of protected trees, but not directly against tree trunks. Shrubs and ground covers may be planted within tree protection areas. If irrigation is needed, use drip irrigation installed above ground only beneath the driplines of protected trees.
6. **Quality Assurance.** The project arborist should supervise proper execution of this plan during construction activities that could encroach on retained trees. Tree protection site inspection monitoring reports should be provided to the Client and City following site visits performed throughout construction.

Thank you for choosing Morgan Holen & Associates, LLC, to provide consulting arborist services for the Kellogg Creek Subdivision project. Please contact us if you have questions or need any additional information.

Thank you,
Morgan Holen & Associates, LLC



Morgan E. Holen, Owner/Member
ISA Board Certified Master Arborist, PN-6145B
ISA Tree Risk Assessment Qualified
Forest Biologist

Enclosures: MHA16090 Kellogg Creek Subdivision – Tree Data 11-18-16

No.	Common Name	Species Name	DBH[1]	C-Rad[2]	Cond[3]	Comments	Treatment
1	Oregon white oak	*Quercus garryana*	18		G		Remove
2	Oregon white oak	*Quercus garryana*	18		F		Remove
3	Oregon white oak	*Quercus garryana*	22		F		Remove
4	Oregon white oak	*Quercus garryana*	28		G		Remove
5	Scouler's willow	*Salix scouleriana*	12		P		Remove
6	Oregon white oak	*Quercus garryana*	12		P		Remove
7	Oregon white oak	*Quercus garryana*	14		F		Remove
8	Oregon white oak	*Quercus garryana*	10	12	P		Retain
9	Oregon white oak	*Quercus garryana*	28	23	G		Retain
10	Oregon white oak	*Quercus garryana*	20	28	F		Retain
11	Oregon white oak	*Quercus garryana*	38	32	G		Retain
12	Oregon white oak	*Quercus garryana*	24	24	G		Retain
13	Oregon ash	*Fraxinus latifolia*	12	16	P		Retain
14	Oregon ash	*Fraxinus latifolia*	15	14	G		Retain
15	Oregon ash	*Fraxinus latifolia*	12	12	P		Retain
16	Oregon ash	*Fraxinus latifolia*	2x14	12	P		Retain
17	Oregon ash	*Fraxinus latifolia*	16	16	F		Retain
18	Oregon ash	*Fraxinus latifolia*	2x16	18	G		Retain
19	Oregon ash	*Fraxinus latifolia*	24	26	G		Retain
20	Oregon ash	*Fraxinus latifolia*	24	28	P		Retain
21	Oregon ash	*Fraxinus latifolia*	8	8	F		Retain
22	Oregon white oak	*Quercus garryana*	23	18	P		Retain
23	Oregon white oak	*Quercus garryana*	22	21	G		Retain
24	Oregon white oak	*Quercus garryana*	28	26	G	off-site	Retain
25	Oregon white oak	*Quercus garryana*	22		G		Remove
26	Oregon white oak	*Quercus garryana*	2x16		F		Remove
27	Oregon white oak	*Quercus garryana*	14		P		Remove
28	Oregon white oak	*Quercus garryana*	22		G		Remove
29	Oregon ash	*Fraxinus latifolia*	18		P		Remove
30	Oregon white oak	*Quercus garryana*	12		P		Remove
31	Oregon white oak	*Quercus garryana*	22		G		Remove
32	Oregon white oak	*Quercus garryana*	21		G		Remove
33	Oregon white oak	*Quercus garryana*	18		G		Remove
34	Oregon white oak	*Quercus garryana*	18	15	G		Retain
35	Oregon white oak	*Quercus garryana*	2x20	32	G		Retain
36	Oregon white oak	*Quercus garryana*	36	30	G		Retain
37	Oregon white oak	*Quercus garryana*	26	21	G		Retain
38	Oregon white oak	*Quercus garryana*	29	24	G		Retain
41	pin oak	*Quercus palustris*	18	19	F		Retain

No.	Common Name	Species Name	DBH[1]	C-Rad[2]	Cond[3]	Comments	Treatment
42	pin oak	*Quercus palustris*	22	20	G		Retain
43	pin oak	*Quercus palustris*	21	23	G		Retain
44	pin oak	*Quercus palustris*	18	18	G		Retain
45	pin oak	*Quercus palustris*	18	19	G		Retain
46	pin oak	*Quercus palustris*	18	24	G		Retain
47	pin oak	*Quercus palustris*	21	18	G		Retain
50	Douglas-fir	*Pseudotsuga menziesii*	2x16	14	G		Retain
51	Norway maple	*Acer platanoides*	14	12	G	nuisance species	Retain
52	Norway maple	*Acer platanoides*	14	14	G	nuisance species	Retain
53	Norway maple	*Acer platanoides*	16	12	G	nuisance species	Retain
54	Norway maple	*Acer platanoides*	13	14	G	nuisance species	Retain
55	Norway maple	*Acer platanoides*	19	13	G	nuisance species	Retain
56	Norway maple	*Acer platanoides*	12	12	G	nuisance species	Retain
57	Norway maple	*Acer platanoides*	14	12	G	nuisance species	Retain
58	Norway maple	*Acer platanoides*	15	12	G	nuisance species	Retain
59	Norway maple	*Acer platanoides*	14	13	G	nuisance species	Retain
60	European white birch	*Betula pendula*	12	8	F	nuisance species	Retain
61	Japanese maple	*Acer palmatum*	12	12	G		Retain
62	European white birch	*Betula pendula*	14	14	F	nuisance species	Retain
63	Norway maple	*Acer platanoides*	19	16	G	nuisance species	Retain
64	Norway maple	*Acer platanoides*	12	11	G	nuisance species	Retain
65	Norway maple	*Acer platanoides*	15	15	G	nuisance species	Retain
66	Norway maple	*Acer platanoides*	20	16	G	nuisance species	Retain
67	Norway maple	*Acer platanoides*	17	14	G	nuisance species	Retain
68	Norway maple	*Acer platanoides*	15	13	G	nuisance species	Retain
69	Norway maple	*Acer platanoides*	14	14	G	nuisance species	Retain
70	Norway maple	*Acer platanoides*	17	15	G	nuisance species	Retain
71	Norway maple	*Acer platanoides*	14	15	G	nuisance species	Retain
72	European white birch	*Betula pendula*	10	10	G	nuisance species	Retain
73	pin oak	*Quercus palustris*	18	20	F		Retain
74	English hawthorn	*Crataegus monogyna*	10	8	F	nuisance species	Retain
75	red alder	*Alnus rubra*	16	15	F		Retain
76	red alder	*Alnus rubra*	3x12	18	F		Retain
77	Oregon ash	*Fraxinus latifolia*	12	15	G		Retain
78	red alder	*Alnus rubra*	12	15	G		Retain
79	red alder	*Alnus rubra*	12	13	P		Retain
80	red alder	*Alnus rubra*	20	4	D	nesting cavities	Retain
81	black cottonwood	*Populus trichocarpa*	21	14	G		Retain
82	Oregon ash	*Fraxinus latifolia*	8	10	P		Retain

No.	Common Name	Species Name	DBH[1]	C-Rad[2]	Cond[3]	Comments	Treatment
83	pin oak	*Quercus palustris*	18	12	F		Retain
84	Scouler's willow	*Salix scouleriana*	14	14	P		Retain
85	pin oak	*Quercus palustris*	8	8	P		Retain
86	Scouler's willow	*Salix scouleriana*	14		G		Remove
87	black cottonwood	*Populus trichocarpa*	2x14		G		Remove
88	black cottonwood	*Populus trichocarpa*	10		G		Remove
89	black cottonwood	*Populus trichocarpa*	12		G		Remove
90	Scouler's willow	*Salix scouleriana*	12		P		Remove
91	black cottonwood	*Populus trichocarpa*	10	11	F		Retain
92	black cottonwood	*Populus trichocarpa*	8	10	F		Retain
93	black cottonwood	*Populus trichocarpa*	14	13	G		Retain
94	black cottonwood	*Populus trichocarpa*	12	12	F		Retain
95	black cottonwood	*Populus trichocarpa*	12	12	G		Retain
96	black cottonwood	*Populus trichocarpa*	12	12	G		Retain
97	black cottonwood	*Populus trichocarpa*	8	10	P		Retain
98	black cottonwood	*Populus trichocarpa*	12	12	G		Retain
99	black cottonwood	*Populus trichocarpa*	12	12	G		Retain
100	Oregon white oak	*Quercus garryana*	17		F		Remove
101	Oregon white oak	*Quercus garryana*	28		F		Remove
102	Oregon ash	*Fraxinus latifolia*	6x8		P		Remove
103	Oregon white oak	*Quercus garryana*	16	13	G		Retain
104	English hawthorn	*Crataegus monogyna*	10		P	nuisance species	Remove
105	Oregon white oak	*Quercus garryana*	26		G		Remove
106	Oregon white oak	*Quercus garryana*	24		P	decay	Remove
107	Scouler's willow	*Salix scouleriana*	18		P	decay	Remove
108	Scouler's willow	*Salix scouleriana*	2x16		F		Remove
109	English hawthorn	*Crataegus monogyna*	10		P	nuisance species	Remove
110	English hawthorn	*Crataegus monogyna*	10		F	nuisance species	Remove
111	Scouler's willow	*Salix scouleriana*	5x10		P		Remove
112	Oregon white oak	*Quercus garryana*	10		P		Remove
113	Oregon white oak	*Quercus garryana*	12		P		Remove
114	Oregon white oak	*Quercus garryana*	24	24	G		Retain
115	Scouler's willow	*Salix scouleriana*	8x10		P		Remove
116	English hawthorn	*Crataegus monogyna*	14		F	nuisance species	Remove
117	black cottonwood	*Populus trichocarpa*	12	10	G		Retain
118	black cottonwood	*Populus trichocarpa*	12	10	G		Retain
119	black cottonwood	*Populus trichocarpa*	2x8	12	G		Retain
120	black cottonwood	*Populus trichocarpa*	8	10	G		Retain
121	black cottonwood	*Populus trichocarpa*	10	11	G		Retain

No.	Common Name	Species Name	DBH[1]	C-Rad[2]	Cond[3]	Comments	Treatment
122	black cottonwood	*Populus trichocarpa*	8	10	F		Retain
123	Scots pine	*Pinus sylvestris*	6	10	P		Retain
124	black cottonwood	*Populus trichocarpa*	2x10	10	G		Retain
125	Oregon ash	*Fraxinus latifolia*	6	10	G		Retain
126	Oregon ash	*Fraxinus latifolia*	8	10	G		Retain
127	sweet cherry	*Prunus avium*	10	14	D	nuisance species	Retain
128	Oregon ash	*Fraxinus latifolia*	8	8	G		Retain
129	Oregon ash	*Fraxinus latifolia*	8	8	G		Retain
130	Oregon ash	*Fraxinus latifolia*	6	8	G		Retain
131	Oregon ash	*Fraxinus latifolia*	6	8	G		Retain
132	Oregon ash	*Fraxinus latifolia*	8	8	F		Retain
133	Oregon ash	*Fraxinus latifolia*	8	10	F		Retain
134	Oregon ash	*Fraxinus latifolia*	10	10	F		Retain
135	English hawthorn	*Crataegus monogyna*	10	10	P	nuisance species	Retain
136	Oregon ash	*Fraxinus latifolia*	2x8	8	G		Retain
137	Oregon white oak	*Quercus garryana*	20	25	G		Retain
138	Oregon ash	*Fraxinus latifolia*	14	16	P		Retain
139	Oregon ash	*Fraxinus latifolia*	14	18	F		Retain
140	Oregon ash	*Fraxinus latifolia*	18	20	G		Retain
141	Oregon white oak	*Quercus garryana*	16	30	F		Retain
143	bigleaf maple	*Acer macrophyllum*	8		P		Remove
144	bigleaf maple	*Acer macrophyllum*	12	12	P	split trunk	Retain
145	Oregon white oak	*Quercus garryana*	2x14	22	G		Retain
146	Oregon ash	*Fraxinus latifolia*	14	12	G		Retain
147	Oregon ash	*Fraxinus latifolia*	16	12	P		Retain
148	Oregon ash	*Fraxinus latifolia*	10	12	G	off-site	Retain
149	Oregon ash	*Fraxinus latifolia*	10	12	F	off-site	Retain
150	Oregon white oak	*Quercus garryana*	48	27	G		Retain
151	deciduous	unknown	12	10	D		Retain
152	English hawthorn	*Crataegus monogyna*	8		P	nuisance species	Remove
153	red alder	*Alnus rubra*	12	10	D		Retain
154	red alder	*Alnus rubra*	14	12	D		Retain
155	red alder	*Alnus rubra*	2x10	8	P		Retain
156	red alder	*Alnus rubra*	12	12	P		Retain
157	red alder	*Alnus rubra*	14	12	F		Retain
158	red alder	*Alnus rubra*	16	12	P		Retain
159	red alder	*Alnus rubra*	14	10	P		Retain
160	red alder	*Alnus rubra*	3x8	12	F		Retain
161	Scouler's willow	*Salix scouleriana*	14	4	D		Retain

No.	Common Name	Species Name	DBH[1]	C-Rad[2]	Cond[3]	Comments	Treatment
162	Oregon ash	*Fraxinus latifolia*	10	10	F		Retain
163	English hawthorn	*Crataegus monogyna*	2x8	10	P	nuisance species	Retain
164	red alder	*Alnus rubra*	12	4	D		Retain
165	red alder	*Alnus rubra*	12	12	F		Retain
166	red alder	*Alnus rubra*	12	10	P		Retain
167	English hawthorn	*Crataegus monogyna*	8	8	G	nuisance species	Retain
168	red alder	*Alnus rubra*	18	20	P		Retain
169	red alder	*Alnus rubra*	12	4	D		Retain
170	red alder	*Alnus rubra*	12	12	P	decay	Retain
171	red alder	*Alnus rubra*	12	20	P	decay	Retain
172	red alder	*Alnus rubra*	10	8	P		Retain
173	red alder	*Alnus rubra*	12	4	D		Retain
174	red alder	*Alnus rubra*	11	12	F		Retain
175	Oregon ash	*Fraxinus latifolia*	8	10	F		Retain
176	red alder	*Alnus rubra*	12	14	F		Retain
177	red alder	*Alnus rubra*	10	10	F		Retain
178	red alder	*Alnus rubra*	8	8	P		Retain
179	red alder	*Alnus rubra*	2x10	8	P		Retain
180	red alder	*Alnus rubra*	10	12	P		Retain
181	red alder	*Alnus rubra*	14	14	F		Retain
182	red alder	*Alnus rubra*	10	12	F		Retain
183	red alder	*Alnus rubra*	10	12	P		Retain
184	red alder	*Alnus rubra*	2X14	18	F		Retain
185	red alder	*Alnus rubra*	18	18	P		Retain
186	Scouler's willow	*Salix scouleriana*	3x12		P		Remove
187	Scouler's willow	*Salix scouleriana*	2x8		P		Remove
188	Scouler's willow	*Salix scouleriana*	2x10		P		Remove
189	red alder	*Alnus rubra*	2x14	17	G		Retain
190	red alder	*Alnus rubra*	14	16	F		Retain
191	red alder	*Alnus rubra*	12	10	F		Retain
192	red alder	*Alnus rubra*	2x12	15	F		Retain
193	red alder	*Alnus rubra*	14	12	F		Retain
194	Oregon white oak	*Quercus garryana*	20	16	G		Retain
195	Oregon white oak	*Quercus garryana*	20	18	G		Retain
196	Oregon white oak	*Quercus garryana*	12	12	G		Retain
197	Oregon white oak	*Quercus garryana*	16	21	F		Retain
198	Oregon white oak	*Quercus garryana*	8	12	P		Retain
199	Oregon white oak	*Quercus garryana*	23	35	G		Retain
200	Oregon white oak	*Quercus garryana*	23	31	G		Retain

No.	Common Name	Species Name	DBH[1]	C-Rad[2]	Cond[3]	Comments	Treatment
201	red alder	*Alnus rubra*	12	10	P		Retain
202	red alder	*Alnus rubra*	12	10	F		Retain
203	red alder	*Alnus rubra*	2x10	10	F		Retain
204	black cottonwood	*Populus trichocarpa*	16		G		Remove
205	black cottonwood	*Populus trichocarpa*	2x18		G		Remove
206	Scouler's willow	*Salix scouleriana*	4x12		P		Remove
207	black cottonwood	*Populus trichocarpa*	16		F		Remove
208	black cottonwood	*Populus trichocarpa*	2x12		F		Remove
209	black cottonwood	*Populus trichocarpa*	9x10		F		Remove
210	black cottonwood	*Populus trichocarpa*	12		F		Remove
211	black cottonwood	*Populus trichocarpa*	12		F		Remove
212	black cottonwood	*Populus trichocarpa*	12		F		Remove
213	black cottonwood	*Populus trichocarpa*	12		F		Remove
214	black cottonwood	*Populus trichocarpa*	14		F		Remove
215	black cottonwood	*Populus trichocarpa*	16		F		Remove
216	black cottonwood	*Populus trichocarpa*	14		F		Remove
217	black cottonwood	*Populus trichocarpa*	10		F		Remove
218	black cottonwood	*Populus trichocarpa*	14		F		Remove
219	black cottonwood	*Populus trichocarpa*	3x6		F		Remove
220	black cottonwood	*Populus trichocarpa*	12		F		Remove
221	black cottonwood	*Populus trichocarpa*	14		F		Remove
222	black cottonwood	*Populus trichocarpa*	10		F		Remove
223	black cottonwood	*Populus trichocarpa*	2x16		F		Remove

[1]**DBH** is tree diameter measured at 4.5-feet above ground level in inches; diameter for trees with codominant stems originating below 4.5-feet is reported as quantity of stems x size.

[2]**C-Rad** is the average crown radius measured in feet for trees planned for preservation.

[3]**Cond** is an arborist assigned rating to generally describe the condition of individual trees as follows-

D: Dead
P: Poor Condition
F: Fair Condition
G: Good Condition
E: Excellent Condition

GENERAL COMMENTS:

STEM DECAY IN MOST RED ALDER

ALDER BORDERING STREAM - UNDERMINED ROOTS ON STREAM SIDE

Natural Resource Review for the Proposed Kellogg Creek Subdivision in Milwaukie, Oregon

(Township 2 South, Range 2 East, Section 6AD,
Clackamas County, TL 600 and Portions of 700, 900, 901)

Prepared for

Brownstone Development, Inc.
Attn: Randy Myers
PO Box 2375
Lake Oswego, Oregon 97035

Prepared by

Caroline Rim
Craig Tumer
John van Staveren
Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, Oregon 97070
(503) 570-0800
(503) 570-0855 FAX

PHS Project Number: 5975

April 6, 2017

TABLE OF CONTENTS

1.0 INTRODUCTION

The City of Milwaukie (the "City") has mapped Water Quality Resource (WQR) and Habitat Conservation Area (HCA) within the proposed Kellogg Creek Subdivision project site. Brownstone Development, Inc. (the "Applicant") seeks approval for the proposed development through a Type III General Discretionary Review. The following document demonstrates how the proposed project will be in compliance with the applicable development standards that are listed in the Natural Resources (NR) Zoning Code Section 19.402 of the City of Milwaukie Municipal Code (MMC). Pacific Habitat Services, Inc. (PHS) has prepared a Natural Resource Review in accordance with MMC Section 19.402 to support the land use application. The information necessary to process the application is provided in the following sections. Supporting information is included in Attachment A (Figures) and Attachment B (Wetland Delineation Report).

2.0 APPLICANT INFORMATION

2.1 Applicant

Brownstone Development, Inc.
Attn: Randy Myers
PO Box 2375
Lake Oswego, OR 97035
Phone: 503-358-4460
Email: Randy@brownstonehomes.net

2.2 Applicant's Agent

Pacific Habitat Services, Inc.
Attn: Caroline Rim
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070
Phone: 503-570-0800
Email: cr@pacifichabitat.com

3.0 SITE INFORMATION

The following information is for the parcel which is the subject of this natural resource review.

Site Address: 13333 SE Rusk Road, Milwaukie, OR 97222

Zoning: Residential R-3 and R-10

Legal Description: Tax Lot (TL) 600 and portions of TL 700, 900, 901, Section 6AD 2S 2E (15.58 acres), Clackamas County

3.1 Site Description

The site is located southwest of Highway 224 (Pacific Highway), north of SE Kellogg Creek Drive, and north and west of SE Rusk Road. Mt. Scott Creek flows to the west along the northern edge of the study area, and the North Clackamas Park Milwaukie Center borders the western edge. The site is located within a residential area; undeveloped woodland is located immediately to the north and northwest of the study area, and the Turning Point Church is located in the southeast corner of the site at 13333 SE Rusk Road (Figures 1 and 2). The eastern half of the property, near the church, is relatively level; however, the western half descends abruptly to a lower woodland area. Site elevations range from approximately 80 feet National Geodetic Vertical Datum (NGVD) in the eastern half of the site, to approximately 66 feet NGVD in the lower reaches of the western half of the site. The site has not been subject to recent construction activities; however, it appears that the substrate throughout much of the central and eastern half of the site consists of fill material, up to more than 12 feet thick, likely associated with the construction of the church, over two decades ago.

On November 21, 2016, PHS identified and delineated one potential wetland area (Wetland A) and Mt. Scott Creek (south bank only), as well as six potentially artificially created wetland areas (Wetlands B through G). Descriptions of the on-site wetlands and non-wetland waters are provided below, and are further detailed in the Wetland Delineation Report (Attachment B). Figure 3 shows the existing site conditions.

Mt. Scott Creek, a tributary to Kellogg Creek and the Willamette River, is a perennial stream that generally flows to the west along the northern boundary of the study area. The stream banks are well defined and near vertical at the location of the OHW line. The plant community of the riparian area along the creek includes a deciduous overstory of big-leaf maple (*Acer macrophyllum*), Oregon white oak (*Quercus garryana*), Oregon ash (*Fraxinus latifolia*), and red alder (*Alnus rubra*); and a shrub and herbaceous understory composed of species such as snowberry (*Symphoricarpos albus*), Pacific ninebark (*Physocarpus capitatus*), Scouler's willow (*Salix scouleriana*), English hawthorn (*Crataegus monogyna*), Fuller's teasel (*Dipsacus fullonum*), and spreading bentgrass (*Agrostis stolonifera*). Mt. Scott Creek continues outside the project area to the north, west and east.

An approximately 0.70-acre (30,386 square feet) wetland (Wetland A) is located in the low-lying woodland area in the western half of the site, south of Mt. Scott Creek. The plant community within Wetland A is a combination of deciduous woodland bordered by open fields. Dominant species within the woodland include an overstory of Oregon ash and black cottonwood (*Populus balsamifera*), with a woody understory of Oregon ash, black cottonwood, red-osier dogwood (*Cornus alba*), snowberry, and Himalayan blackberry (*Rubus armeniacus*). The open fields include reed canarygrass (*Phalaris arundinacea*), creeping buttercup (*Ranunculus repens*), large-leaf avens (*Geum macrophyllum*), slender rush (*Juncus tenuis*), rough bluegrass (*Poa trivialis*), bitter dock (*Rumex obtusifolius*), and common dandelion (*Taraxacum officinale*).

The adjacent upland areas include Oregon ash, Himalayan blackberry, snowberry, English hawthorn, reed canarygrass, Fuller's teasel, large-leaf avens, bull thistle (*Cirsium vulgare*), fringed willowherb (*Epilobium ciliatum*), Dewey sedge (*Carex deweyana*), common selfheal (*Prunella vulgaris*), Western swordfern (*Polystichum munitum*), lentil vetch (*Vicia tetrasperma*), creeping buttercup, spreading bentgrass, field horsetail (*Equisetum arvense*), narrow-leaf goosefoot (*Chenopodium leptophyllum*), spotted cat's ear (*Hypochaeris radicata*), European centaury (*Centaurium erythraea*), wild carrot (*Daucus carota*), tansy ragwort (*Senecio jacobaea*), and colonial bentgrass (*Agrostis capillaris*).

In addition to Wetland A, six potentially artificially created wetlands (Wetlands B –G) are located in the central portion of the site. These wetlands generally consist of small, shallow, isolated depressions. Table 2 lists the area of each wetland.

Wetland	Area (square feet / acres)
B	905 / 0.02
C	176 / 0.004
D	172 / 0.004
E	998 / 0.02
F	301 / 0.007
G	666 / 0.02
Total	**3,218 / 0.07**

All six of these wetlands are similar in character. The plant communities in both the wetland and upland areas are primarily composed of weedy grasses and herbs; the wetland areas include reed canarygrass, spreading bentgrass, soft rush (*Juncus effusus*), spotted cat's ear, and oxeye daisy (*Chrysanthemum vulgare*); the adjacent upland areas include wild carrot, curly dock (*Rumex crispus*), colonial bentgrass, bluegrass (*Poa sp*.), common velvet grass (*Holcus lanatus*), tall fescue (*Schedonorus arundinaceus*), yellow glandweed (*Parentucellia viscosa*), and English plantain (*Plantago lanceolata*).

Hydrology within Wetlands B through G primarily consists of surface runoff and precipitation. As discussed in the *Subsurface Conditions* section of the geotechnical evaluation report (Appendix E of the Wetland Delineation Report), fill material in the central portion of the site was observed to be approximately 10 feet thick, and groundwater was not encountered in the test pits in the vicinity of these wetlands. Therefore, it is reasonable to assume that these wetlands are not hydrologically connected to the water table, and as such, are considered to be non-jurisdictional artificially created wetlands.

The wetland delineation report (Attachment B) has been submitted to the Oregon Department of State Lands (DSL) for review and approval. Upon receipt of the concurrence letter from DSL, the Applicant will provide a copy to the City for its files.

4.0 PROJECT DESCRIPTION

The Kellogg Creek Subdivision will consist of the construction of a planned residential development with 92 dwelling units, associated parking, roads, utilities, landscaping, and three stormwater treatment facilities. Mt. Scott Creek (a perennial stream) and Wetland A (a Title 3 wetland) are both Primary Protected Water Features, as defined in the City's Natural Resources Code (MMC 19.402). As such, the proposed project is subject to discretionary review under MMC Subsections 19.402.8, 19.402.9, 19.402.11, 19.402.12, and 19.402.13I – J. This Natural Resource Review describes the existing Water Quality Resource (WQR) and Habitat Conservation Area (HCA) on the site and demonstrates project compliance with the applicable sections of the municipal code.

This Natural Resource review includes an evaluation of the condition of the WQR on the site, an analysis of potential impacts from the proposed development on the WQR and the HCA, a mitigation plan to compensate for those impacts, and an HCA boundary verification and updated map.

5.0 EXISTING WQR AND HCA ON THE PROJECT SITE

Mt. Scott Creek and Wetland A are primary protected water features, and as described in Table 19.402.15, Determination of WQR Location in MMC Subsection 19.402.15, primary protected water features have an associated vegetated corridor of 50 to 200 feet wide depending on the slopes adjacent to the resource. The slopes adjacent to the south side of Mt. Scott Creek are less than 25 percent, and therefore, the associated vegetated corridor in this area is 50 feet wide. For the same reason, the vegetated corridor along the north, south and west side of Wetland A are also 50 feet wide. However, the slopes along a short segment of vegetated corridor adjacent to the eastern edge of Wetland A, vary in steepness from less than to greater than 25 percent near the fill slope; therefore, in this area, the width of the vegetated corridor ranges from 50 to 130 feet. The extent of the vegetated corridor on the project site, based on the surveyed boundaries of the wetland and waterway is depicted on Figure 4. The total area of WQR on the site (not including the stream and wetland) is approximately 103,187 sf (2.37 acre). Section 6.3 MMC19.402.11.C describes the condition of the vegetated corridor.

Mt. Scott Creek and Wetland A also have associated HCAs. The Milwaukie Interactive Zoning Map (http://milwaukie.maps.arcgis.com/apps/webappviewer/index.html?id=48bfb9fc517446f9af954d4d1c4413af) shows HCAs extending onto the northern and western portions of the site. The City's GIS-mapped HCA is depicted on Figure 4. The total area of HCA on the project site is approximately 175,791 sf (4.04 acre). This HCA, and the WQR noted above, are used in the impact evaluation and alternatives analysis below.

6.0 COMPLIANCE WITH MILWAUKIE MUNICIPAL CODE

6.1 MMC 19.402.8 – Activities Requiring Type III Review

Within either WQRs or HCAs, the following activities are subject to Type III review and approval by the Planning Commission under Section 19.1006, unless they are otherwise exempt or permitted as a Type I or II activity.

B. The activities listed below shall be subject to the review criteria for partitions and subdivisions provided in Subsections 19.402.13.H and I, respectively:

2. The subdividing of land containing a WQR or HCA.

The proposed project site contains both WQR and HCA, and the project will require the subdividing of land.

6.2 MMC 19.402.9 – Construction Management Plans

B. Construction management plans shall provide the following information:

1. ***Description of work to be done.***
2. ***Scaled site plan showing a demarcation of WQRs and HCAs and the location of excavation areas for building foundations, utilities, stormwater facilities, etc.***
3. ***Location of site access and egress that construction equipment will use.***
4. ***Equipment and material stockpile areas.***
5. ***Erosion and sediment control measures.***

As stated above in Section 4, the project is the construction of a planned residential development with 92 dwelling units, associated parking, roads, utilities, landscaping, three stormwater treatment facilities, and balanced cut/fill in the floodplain. Site preparation will include grubbing and grading. A demarcation of WQRs and HCAs and the location of excavation areas for building foundations, utilities, stormwater facilities, etc. are shown on Figure 5. Figures 5A and 5B show alternative site plans, which are discussed below in Section 6.4. The site access and egress locations that construction equipment will use, as well as equipment and material stockpile/staging areas, are shown on the Construction Management Plan (Figure 6). As shown on Figure 6, erosion control fencing will be placed at the limits of disturbance. This fencing will act as a physical barrier and prevent the encroachment of machinery into portions of the WQR and HCA areas that are to remain undisturbed.

The following components of the erosion control plan will protect against erosion, prevent the transport of sediments offsite and into the remaining WQR and HCA areas, and ensure that impacts are minimized. The proposed project will have no detrimental impact on resources or functional values of WQR and HCA areas designated to be left undisturbed. The use of construction fencing and erosion and sediment control barriers at the limits of work, as well as other methods described below will prevent direct physical impacts to nearby areas of WQR and HCA to remain undisturbed.

- Prior to the start of any earth-moving activities, construction fencing will be installed at the limits of the work area, which in this case will be along the outer edge of the proposed development. Sediment fence will be installed inside the construction fencing.
- All base erosion and sediment prevention control measures (including inlet protection, perimeter sediment control, gravel construction entrances, etc.) will be in place, functional, and approved in an initial inspection prior to the start of any construction activities.
- Construction entrances will be installed prior to construction and maintained for the duration of the project.
- Active inlets to stormwater systems will be protected with approved inlet protection measures. All inlet protection measures will be regularly inspected and maintained as necessary. These inlet protection measures will prevent runoff from reaching discharge points.
- Exposed cut and fill areas will be stabilized through the use of temporary seeding and mulching or other appropriate measures.
- Seed used for temporary or permanent seeding will be per specifications.

- Slopes receiving temporary or permanent seeding will have the surface roughened to improve seed bedding and reduce run-off velocities.
- Stockpiled soil or strippings will be placed in an approved, stable location and configuration. During "wet weather" periods, stockpiles will be covered with straw mulch. Sediment fence will be placed around the perimeter of all stockpiles.
- Appropriate dust control measures, including the application of a fine spray of water, straw mulching or other approved measures, will be used in areas subject to wind erosion. Any saturated materials hauled off site will be transported in watertight trucks to prevent the spillage of sediment or sediment-laden water.

The proposed project will have no detrimental impact on resources or functional values of WQR and HCA areas designated to be left undisturbed. The use of construction fencing and erosion and sediment control barriers at the limits of work, as well as other methods described in the Construction Management Plan will prevent direct physical impacts to nearby areas of WQR and HCA to remain undisturbed.

6. Measures to protect trees and other vegetation located within the potentially affected WQR and/or HCA. A root protection zone shall be established around each tree in the WRQ or HCA that is adjacent to any approved work area. The root protection zone shall extend from the trunk to the outer edge of the tree's canopy, or as close to the outer edge of the canopy as is practicable for the approved project. The perimeter of the root protection zone shall be flagged, fenced, or otherwise marked and shall remain undisturbed. Material storage and construction access is prohibited within the perimeter. The root protection zone shall be maintained until construction is complete.

The Tree Removal and Protection Plan is shown on Figure 7 and the accompanying Tree Survey and Removal Table is shown on Figure 7A. Tree protection will be as recommended by a qualified arborist or, at minimum, will include the following protective measures:

- All trees to be protected on the project site and adjacent to the site shall be clearly identified and protective fencing will be installed at the perimeter of the dripline (to avoid soil compaction, removal of vegetation, and/or tree branches) prior to any grubbing, clearing, grading, parking, preparation or storage of materials or machinery, or other construction activity on the site. The fencing will be secured and consist of a material that cannot be easily moved, removed, or broken during construction activities
- No machinery repair, cleaning or fueling will be performed within 10 feet of the dripline of any of trees identified for protection;
- There will be no digging of trenches for placement of public or private utilities or other structure within the critical root zones of trees to be protected;
- If required by the City, a consulting arborist or other qualified biologist will be present during construction or grading activities that may affect the dripline of the trees to be protected.

6.3 MMC 19.402.11 – Development Standards

A. Protection of Natural Resources During Site Development

During development of any site containing a designated natural resource, the following standards shall apply:

1. Work areas shall be marked to reduce potential damage to the WQR and/orHCA.

In addition to erosion and sediment control measures, previously discussed in the Construction Management section, work areas shall be marked to reduce potential damage to the WQR and/or HCA.

2. Trees in WQRs or HCAs shall not be used as anchors for stabilizing construction equipment.

No trees within the WQR or HCA will be used as anchors for stabilizing construction equipment.

3. Native soils disturbed during the development shall be conserved on the property.

Native soils disturbed during development will be conserved on the property.

4. An erosion and sediment control plan is required and shall be prepared in compliance with requirements set forth in the City's Public Works Standards.

The erosion and sediment control plan is shown on the Construction Management Plan (Figure 6), was discussed in the previous section, Construction Management Plan, and was prepared in compliance with requirements set forth in the City's Public Works Standards.

5. Site preparation and construction practices shall be followed that prevent drainage of hazardous materials or erosion, pollution, or sedimentation to any WQR adjacent to the project area.

As discussed above in the Construction Management Plans section, Best Management Practices (BMPs) will be implemented during site preparation and construction in order to prevent drainage of hazardous materials or erosion, pollution, or sedimentation to any WQR adjacent to the project area.

6. Stormwater flows that result from proposed development within and to natural drainage courses shall not exceed predevelopment flows.

The primary purpose of the stormwater management plan (Figure 8) is to effectively treat the stormwater runoff from the new development while maintaining the same hydrologic input as is currently present at pre-development/pre-Lewis and Clark conditions. Key components of the stormwater management plan will include treating and detaining stormwater in three vegetated stormwater treatment facilities/ponds (A – C). Treated stormwater from facilities A and B will be discharged with the use of flow spreaders; storm facility C will connect back into the existing storm sewer system in SE Kellogg Creek Drive.

7. Prior to construction, the WQR and/or HCA that is to remain undeveloped shall be flagged, fenced, or otherwise marked and shall remain undisturbed. Such markings shall be maintained until construction is complete.

As discussed above in the Construction Management Plans section, prior to construction, construction fencing, sediment fencing, and other erosion and sediment control barriers will be installed at the limits of work, in order to prevent impacts to nearby areas of WQR and HCA to remain undisturbed.

8. The construction phase of the development shall be done in such a manner as to safeguard the resource portions of the site that have not been approved for development.

As discussed above in the Construction Management Plans section, BMPs will be implemented and erosion and sediment control methods will be in place prior to construction in such a manner as to safeguard the resource portions of the site that have not been approved for development.

9. Where practicable, lights shall be placed so that they do not shine directly into any WQR and/or HCA location. The type, size, and intensity of lighting shall be selected so that impacts to habitat functions are minimized.

Where practicable, lights will be placed so that they do not shine directly into the WQR and/or HCA. The type, size, and intensity of lighting will be selected so that impacts to habitat functions are minimized.

10. All work on the property shall conform to a construction management plan prepared according to Subsection 19.402.9.

All work on the property will conform to a construction management plan, as previously discussed, prepared according to Subsection 19.402.9.

B. General Standards for Required Mitigation

Where mitigation is required by Section 19.402 for disturbance to WQRs and/or HCAs, the following general standards apply:

1. Disturbance

a. Designated natural resources that are affected by temporary disturbances shall be restored, and those affected by permanent disturbances shall be mitigated, in accordance with the standards provided in Subsection 19.402.11.C for WQRs and Subsection 19.402.D.2 for HCAs, as applicable.

Designated natural resources that are affected by temporary disturbances will be restored. The proposed site plan will unavoidable result in permanent disturbances to both WQR and HCA areas, and as such, the areas of permanent disturbances will be mitigated in accordance with the standards provided in Subsections 19.402.11.C and 19.402.D.2, respectively. See Figure 9 - Mitigation Plan.

2. Required Plants

Unless specified elsewhere in Section 19.402, all trees, shrubs, and ground cover planted as mitigation shall be native plants, as identified on the Milwaukie Native Plant List. Applicants are encouraged to choose particular native species that are appropriately suited for the specific conditions of the planting site; e.g., shade, soil type, moisture, topography, etc.

All proposed mitigation plants will consist of native species as identified on the Milwaukie Native Plant List. Plants will be chosen for: 1) their suitability to the soils and hydrology of the site, 2) their natural occurrence in the area, 3) their wildlife habitat enhancement value, and 4) their local availability. The table on Figure 9 shows selected species to be planted.

3. Plant Size

Replacement trees shall average at least a ½-in caliper – measured at 6 in above the ground level for field-grown trees or above the soil line for container-grown trees – unless they are oak or madrone, which may be 1-gallon size. Shrubs shall be at least 1-gallon size and 12 in high.

4. Plant Spacing

Trees shall be planted between 8 and 12 ft on center. Shrubs shall be planted between 4 and 5 ft on center or clustered in single-species groups of no more than 4 plants, with each cluster planted between 8 and 10 ft on center. When planting near existing trees, the dripline of the existing tree shall be the starting point for plant spacing measurements.

5. Plant Diversity

Shrubs shall consist of at least 2 different species, If 10 trees or more are planted, then no more than 50% of the trees shall be of the same genus.

Mitigation plant size, spacing and diversity will be in accordance with the requirements stated in items 3 – 5, above (See table on Figure 9).

6. Location of Mitigation Area

a. On-Site Mitigation

All mitigation vegetation shall be planted on the applicant's site within the designated natural resource that is disturbed, or in an area contiguous to the resource area; however, if the vegetation is planted outside of the resource area, the applicant shall preserve the contiguous planting area by executing a deed restriction such as a restrictive covenant.

All mitigation vegetation will be planted on-site and within the designated natural resource that is disturbed or in an area contiguous to the resource area. The mitigation areas proposed for planting are shown in Figure 9 Mitigation Plan.

7. Invasive Vegetation

Invasive nonnative or noxious vegetation shall be removed within the mitigation area prior to planting, including, but not limited to, species identified as nuisance plants on the Milwaukie Native Plant List.

Invasive nonnative or noxious vegetation, and nuisance plants will be removed from the mitigation area prior to planting.

8. Ground Cover

Bare or open soil areas remaining after the required tree and shrub plantings shall be planted or seeded to 10% surface coverage with grasses or other ground cover species identified as native on the Milwaukie Native Plant List. Revegetation shall occur during the next planting season following the site disturbance.

Following the installation of the required tree and shrub plantings, remaining bare/open soil areas will be planted or seeded to 100% surface coverage with an native grass seed mix or other ground cover species during the next planting season following the site disturbance.

9. Tree and Shrub Survival

A minimum of 80% of the trees and shrubs planted shall remain alive on the second anniversary of the date that the mitigation planting is completed.

a. Required Practices

To enhance survival of the mitigation plantings, the following practices are required:

(1) Mulch new plantings to a minimum of 3-in depth and 18-in diameter to retain moisture and discourage weed growth.

(2) Remove or control nonnative or noxious vegetation throughout the maintenance period.

b. Recommended Practices

To enhance survival of tree replacement and vegetation plantings, the following practiced are recommended:

(1) Plant bare root trees between December 1 and April 15; plant potted plants between October 15 and April 30.

(2) Use plant sleeves or fencing to protect trees and shrubs against wildlife browsing and the resulting damage to plants.

(3) Water new plantings at a rate of 1 in per week between June 15 and October 15 for the first two years following planting.

In order to meet the minimum of 80% tree and shrub survival of the mitigation plantings on the second anniversary of the date that the mitigation planting is completed, the applicant will following the "Required" and "Recommended" planting and maintenance practices, as described above in Items a and b.

c. Monitoring and Reporting

Monitoring of the mitigation site is the ongoing responsibility of the property owner. Plants that die shall be replaced in kind as needed to ensure the minimum 80% survival rate. The Planning Director may require a maintenance bond to cover the continued heath and survival of all plantings. A maintenance bond shall not be required for land use applications related to owner-occupied single-family residential projects. An annual report on the survival rate of all plantings shall be submitted for 2 years.

An annual monitoring site visit will be conducted and a report will be prepared and submitted to the City for two years after planting. The report will allow an analysis of the survival rate of the mitigation plantings and what corrective measures, if any, are needed to ensure the minimum 80% required survival rate for woody plantings at the end of the second monitoring season.

10. Light Impacts

Where practicable, lights shall be placed so that they do not shine directly into any WQR and/or HCA location. The type, size, and intensity of lighting shall be selected so that impacts to habitat functions are minimized.

Where practicable, lights will be placed so that they do not shine directly into the WQR and/or HCA. The type, size, and intensity of lighting will be selected so that impacts to habitat functions are minimized.

C. Mitigation Requirements for Disturbance within WQRs

1. The requirements for mitigation vary depending on the existing condition of the WQR on the project site at the time of application. The existing condition of the WQR shall be assessed in accordance with the categories established in Table 19.402.11.C.

Plant communities within the vegetated corridor include a mixture of wooded and non-wooded communities. PHS identified two separate plant communities within the on-site vegetated corridor based on the predominance of woody species in the community. South of Mt. Scott Creek, and along the western property boundary to the north and south of the west end of Wetland A, the vegetated corridor has a well-developed forest canopy; while along the eastern and southern edges of Wetland A, the vegetated corridor has only a few scattered trees. PHS took seven sample points to characterize the plant communities; two along the south side of the creek, two along the northeast side of Wetland A, one along the south side of Wetland A, and two near the western property boundary to the north and south of Wetland A. A brief description and an evaluation of the condition of each of the communities are provided below (See Figure 4 for location of sample points).

South of Mt. Scott Creek

The WQR south of Mt. Scott Creek contains a moderately dense canopy predominantly composed of red alder (*Alnus rubra*), Oregon white oak (*Quercus garryana*), black cotton wood *(Populus balsamifera*), and big-leaf maple (*Acer macrophyllum*). Common species in the understory include English hawthorn (*Crataegus monogyna*), snowberry (*Symphoricarpos alba*), Pacific willow (*Salix lasiandra*), Scouler's willow (*Salix scouleriana*), Pacific ninebark (*Physocarpus capitatus*), red-osier dogwood (*Cornus alba*), clustered rose (*Rosa pisocarpa*), twinberry honeysuckle (*Lonicera involucrata*), Himalayan blackberry (*Rubus armenicacus*), and beaked hazel (*Corylus cornuta*). The groundcover contains a diverse mixture of native and non-native species, including Pacific dewberry (*Rubus ursinus*), Fuller's teasel (*Dipsacus sylvestris*), Waton's willow-herb (*Epilobium watsonii*), nipplewort (*Lapsana communis*), common velvetgrass (*Holcus lanatus*), colonial bentgrass (*Agrostis capillaris*), fringecup (*Tellima grandiflora*), brome (*Bromus sp*.), and Western swordfern (*Polystichum munitum*). Tables 1 and 2 summarize the species composition at two sample points within the plant community.

Table 1. Plant Community South of Mt. Scott, Characterized by Sample Point 1

Botanical Name	Common Name	♦Cover (%)
Trees		**50**
Alnus rubra	Red alder	30
Fraxinus latifolia	Oregon ash	5
Salix scouleriana	Scouler's willow	7
Salix lasiandra	Pacific willow	2
Acer macrophyllum	Big-leaf maple	1
Crataegus monogyna	English hawthorn	10
Shrubs and Saplings		**60**
Populus balsamifera	Black cottonwood	5
Symporicarpos albus	Common snowberry	5
Rosa pisocarpa	Clustered rose	13
Oregon white oak	Quercus garryana	10
*Rubus armeniacus**,***	Himalayan blackberry	2
Physocarpus capitatus	Pacific ninebark	15
Crataegus monogyna	English hawthorn	5
Corylus cornuta	Beaked hazelnut	3
Cornus alba	Red-osier dogwood	2
Groundcover		**55**
Rubus ursinus	California dewberry	5
*Dipsacus sylvestris***	Fuller's teasel	25
Epilobium watsonii	Watson's willow-herb	30
*Lapsana communis***	Nipplewort	10
Holcus lanatus	Common velvetgrass	5
Agrostis capillaris	Colonial bentgrass	20
Tellima grandiflora	Fringecup	2
Bromus sp.	Common brome	3

Invasive species or noxious weed (Oregon Dept. of Agriculture (ODA))
****Nuisance Plant List (Milwaukie Plant List/Portland Plant List)***
♦***Absolute Percent Cover***

Table 2. Plant Community South of Mt. Scott, Characterized by Sample Point 2

Botanical Name	Common Name	♦Cover (%)
Trees		**60**
Alnus rubra	Red alder	20
Quercus garyana	Oregon white oak	40
Salix scouleriana	Scouler's willow	5
Populus balsamifera	Black cottonwood	10
Acer macrophyllum	Big-leaf maple	5
Shrubs and Saplings		**80**
Lonicera involucrate	Twinberry honeysuckle	2
Symporicarpos albus	Common snowberry	30
Rosa pisocarpa	Clustered rose	5
Oregon white oak	Quercus garryana	5
Populus balsamifera	Black cottonwood	5
Physocarpus capitatus	Pacific ninebark	10
Crataegus monogyna	English hawthorn	5
Corylus cornuta	Beaked hazelnut	3
Cornus alba	Red-osier dogwood	2
Groundcover		**35**
Rubus ursinus	California dewberry	5
*Dipsacus sylvestris***	Fuller's teasel	2
Polystichum munitum	Western swordfern	3
*Lapsana communis***	Nipplewort	3
Holcus lanatus	Common velvetgrass	3
Agrostis capillaris	Colonial bentgrass	10
Tellima grandiflora	Fringecup	5
Bromus sp.	Common brome	22

Invasive species or noxious weed (Oregon Dept. of Agriculture (ODA))
****Nuisance Plant List (Milwaukie Plant List/Portland Plant List)*** ***♦Absolute Percent Cover***

The plant community south of Mt. Scott Creek has a moderately dense tree canopy with coverage that varies from 50 to 60 percent. Canopy coverage across the entire plant community exceeds 50 percent. The combined tree, shrub and groundcover layers provide coverage that exceeds 80 percent. As such, the existing condition of the WQR south of Mt. Scott Creek meets the definition of a Class A ("Good") WQR, as defined in Table 19.402.11.C of the municipal code.

Northeast of Wetland A

A few scattered trees are present within the vegetated corridor northeast of Wetland A; however, the plant community is this area generally lacks a canopy layer and is predominantly composed of reed canarygrass (*Phalaris arundinacea*) and other grasses and various groundcover. Tables 3 and 4 summarize the species composition within the plant community east of Wetland A.

Table 3. Plant Community Northeast of Wetland A, Characterized by Sample Point 3

Botanical Name	Common Name	♦Cover (%)
Trees		**20**
Salix scouleriana	Scouler's willow	20
Crataegus monogyna	English hawthorn	20
Fraxinus latifolia	Oregon ash	5
Populus balsamifera	Black cottonwood	5
Shrubs and Saplings		**40**
Salix scouleriana	Scouler's willow	20
Rosa pisocarpa	Clustered rose	10
Crataegus monogyna	English hawthorn	20
Corylus cornuta	Beaked hazelnut	5
*Rubus armeniacus**,***	Himalayan blackberry	5
Groundcover		**90**
*Phalaris arundinacea***	Reed canarygrass	60
*Dipsacus sylvestris***	Fuller's teasel	40
*Tanacetum vulgare***	Common tansy	15
Epilobium watsonii	Watson's willow-herb	15
Cirsium arvense	Canada thistle	5

Invasive species or noxious weed (Oregon Dept. of Agriculture (ODA))
****Nuisance Plant List (Milwaukie Plant List/Portland Plant List)*** ***♦Absolute Percent Cover***

Table 4. Plant Community Northeast of Wetland A, Characterized by Sample Point 4

Botanical Name	Common Name	♦Cover (%)
Trees		**5**
Acer macrophyllum	Big-leaf maple	5
Shrubs and Saplings		**10**
Acer macrophyllum	Big-leaf maple	10
Rosa pisocarpa	Clustered rose	10
*Rubus armeniacus**,***	Himalayan blackberry	5
Groundcover		**100**
*Phalaris arundinacea***	Reed canarygrass	100
*Dipsacus sylvestris***	Fuller's teasel	15

Invasive species or noxious weed (Oregon Dept. of Agriculture (ODA))
****Nuisance Plant List (Milwaukie Plant List/Portland Plant List)*** ***♦Absolute Percent Cover***

As described above and shown by Sample Points 3 and 4, the plant community northeast of Wetland A has little to no tree canopy coverage. The combined tree, shrub and groundcover layers provide coverage that exceeds 80 percent; however, tree canopy coverage is less than 25 percent. Therefore, the existing condition of the WQR east of Wetland A meets the definition of a Class C ("Poor") WQR, as defined in Table 19.402.11.C of the municipal code.

South of Wetland A

Similar to the vegetated corridor along the northeast side of Wetland A, the area to the south of Wetland A also has a few scattered trees present. The plant community south of Wetland A also generally lacks a canopy layer and is primarily composed of reed canarygrass and a few other species of grasses and various groundcover. Table 5 summarizes the species composition within the plant community south of Wetland A.

Table 5. Plant Community South of Wetland A, Characterized by Sample Point5

Botanical Name	Common Name	♦Cover (%)
Trees		**5**
Crataegus monogyna	English hawthorn	5
Shrubs and Saplings		**10**
Quercus garyana	Oregon white oak	10
*Rubus laciniatus***	Cut-leaf blackberry	5
*Rubus armeniacus**,***	Himalayan blackberry	10
Groundcover		**100**
*Phalaris arundinacea***	Reed canarygrass	90
*Dipsacus sylvestris***	Fuller's teasel	40
Epilobium watsonii	Watson's willow-herb	10
*Cirsium arvense**,***	Canada thistle	10

Invasive species or noxious weed (Oregon Dept. of Agriculture (ODA))
****Nuisance Plant List (Milwaukie Plant List/Portland Plant List)*** ♦***Absolute Percent Cover***

As described above and shown by Sample Point 5, the plant community south of Wetland A has almost no tree canopy coverage. The combined tree, shrub and groundcover layers provide coverage that exceeds 80 percent; however, tree canopy coverage is less than 25 percent. Therefore, the existing condition of the WQR south of Wetland A meets the definition of a Class C ("Poor") WQR, as defined in Table 19.402.11.C of the municipal code.

West of Wetland A

The WQR west of Wetland A contains a dense canopy predominantly composed of Oregon ash and Oregon white oak. Common species in the understory include English hawthorn, snowberry, Himalayan blackberry, bald-hip rose (*Rosa gymnocarpa*), and clustered rose. The groundcover contains a diverse mixture of native and non-native species, including Pacific dewberry, English ivy (*Hedera helix*), Fuller's teasel, Waton's willow-herb, nipplewort, Western swordfern, big-leaf avens (*Geum macrophyllum*), and common dandelion (*Taraxacum officinale*). Tables 6 and 7 summarize the species composition at two sample points within the plant community.

Table 6. Plant Community West of Wetland A. Characterized by Sample Point 6

Botanical Name	Common Name	♦Cover (%)
Trees		**90**
Fraxinus latifolia	Oregon ash	25
Quercus garyana	Oregon white oak	30

Botanical Name	Common Name	♦Cover (%)
Shrubs and Saplings		**40**
Symporicarpos albus	Common snowberry	50
Rubus armeniacus ***	Himalayan blackberry	10
Crataegus monogyna	English hawthorn	15
Groundcover		**55**
Rubus ursinus	California dewberry	15
Geum macrophyllum	Big-leaf avens	20
Epilobium watsonii	Watson's willow-herb	5
*Lapsana communis***	Nipplewort	35
Taraxacum officinale	Common dandelion	15
Polystichum munitum	Western swordfern	5
*Hedera helix***	English ivy	5

Invasive species or noxious weed (Oregon Dept. of Agriculture (ODA))
****Nuisance Plant List (Milwaukie Plant List/Portland Plant List)*** ***♦Absolute Percent Cover***

Table 7. Plant Community West of Wetland A, Characterized by Sample 7

Botanical Name	Common Name	♦Cover (%)
Trees		**90**
Fraxinus latifolia	Oregon ash	10
Quercus garyana	Oregon white oak	5
Shrubs and Saplings		**50**
Symporicarpos albus	Common snowberry	50
Rosa gymnocarpa	Bald-hip rose	10
Rosa pisocarpa	Clustered rose	10
Crataegus monogyna	English hawthorn	40
Groundcover		**60**
Rubus ursinus	California dewberry	60
Geum macrophyllum	Big-leaf avens	40
Epilobium watsonii	Watson's willow-herb	10
*Dipsacus sylvestris***	Fuller's teasel	20
Polystichum munitum	Western swordfern	15

Invasive species or noxious weed (Oregon Dept. of Agriculture (ODA))
****Nuisance Plant List (Milwaukie Plant List/Portland Plant List)*** ***♦Absolute Percent Cover***

The plant community west of Wetland A has a dense tree canopy averaging 90 percent. Canopy coverage across the entire plant community exceeds 50 percent. The combined tree, shrub and groundcover layers provide coverage that exceeds 80 percent. As such, the existing condition of the WQR west of Wetland A meets the definition of a Class A ("Good") WQR, as defined in Table 19.402.11.C of the municipal code.

6.4 MMC 19.402.12 - General Discretionary Review

A. Impact Evaluation and Alternatives Analysis

An impact evaluation and alternatives analysis is required to determine compliance with the approval criteria for general discretionary review and to evaluate development alternatives for a particular property. A report presenting this evaluation and analysis shall be prepared and signed by a knowledgeable and qualified natural resource professional, such as a wildlife biologist, botanist, or hydrologist. At the Planning Director's discretion, the requirement to provide such a report may be waived for small projects that trigger discretionary review but can be evaluated without professional assistance.

The alternatives shall be evaluated on the basis of their impact on WQRs and HCAs, the ecological functions provided by the resource on the property, and off-site impacts within the subwatershed (6th Field Hydrologic Unit Code) where the property is located. The evaluation and analysis shall include the following:

1. Identification of the ecological functions of riparian habitat found on the property, as described in Subsection 19.402.1.C.2.

Subsection 19.402.1.C.2 of the MMC identifies seven functions and values that contribute to water quality and to fish and wildlife habitat in urban streamside areas. Descriptions of the functions and values provided by the riparian habitat on the project site are provided below.

Vegetated corridors to separate protected water features from development – With exception of the southeast corner of the site, at the location of the church, the site is undeveloped. The vegetated buffer south of Mt. Scott Creek provides a buffer that separates this existing development in the southeast corner of the site from the primary protected water features. The moderately dense tree cover and the dense shrub and herbaceous vegetation along the south side of the creek provide wildlife habitat and water quality benefits to the stream.

Microclimate and shade – Trees within the WQR provide shade to the stream and help to regulate the microclimate within the riparian corridor.

Streamflow moderation and water storage – The floodplain on the south side of Mt. Scott Creek is vegetated with a mixture of trees, shrubs and herbaceous vegetation. During high flow events, vegetation within the floodplain helps to slow floodwaters and reduce downstream flooding. Although much of the floodplain south of the creek predominantly consists of non-woody vegetation, the stream gradient within the site is relatively gradual, and therefore, the riparian corridor within the project area provides limited streamflow moderation and water storage functions.

Water filtration, infiltration, and natural purification – Vegetation within the riparian corridor along Mt. Scott Creek slows runoff from adjacent areas and filters sediments and other pollutants from the runoff before it reaches the stream. By slowing the runoff, the vegetation also increases the potential for water to infiltrate into the soil before reaching the stream. However, the predominantly clay loam soils within the project area reduce the ability of the water to infiltrate into the soil.

Bank stabilization and sediment and pollution control – Streambanks within the project area are generally well-vegetated with trees, shrubs and herbaceous vegetation. This vegetation helps to stabilize the banks, and no evidence of active bank erosion within the project site was observed.

Large wood recruitment and retention and natural channel dynamics – Within the project area, trees occur on both the north and south sides of Mt. Scott Creek. These trees have the potential to become large woody material. When these trees fall into the stream, they have the potential to affect the natural channel dynamics. However, because of the relatively small size of the stream, any large woody material that falls into the stream is likely to remain on the project site rather than be carried downstream.

Organic material resources –Vegetation within the riparian corridor provides organic material that serves as the basis for the aquatic food web. Under the existing conditions, the riparian corridor within the project site is vegetated with a mixture of trees, shrubs, and herbaceous species, which contribute organic materials to the stream.

2. An inventory of vegetation, sufficient to categorize the existing condition of the WQR per Table 19.402.11.C, including the percentage of ground and canopy coverage materials within the WQR.

An inventory of vegetation, sufficient to categorize the existing condition of the WQR per Table 19.402.11.C, including the percentage of ground and canopy coverage materials within the WQR, was provided earlier in this document in Subsection 19.402.11.C "Mitigation Requirements for Disturbance within WQRs" of the Development Standards.

3. An assessment of the water quality impacts related to the development, including sediments, temperature and nutrients, sediment control, and temperature control, or any other condition with the potential to cause the protected water feature to be listed on DEQ's 303(d) list.

The proposed project will result in impacts to WQR and HCA associated with Mt. Scott Creek and Wetland A. A 92-unit residential subdivision will be constructed in the central portion of the site. Construction of the subdivision will include two stormwater facilities and grading in the northwest corner of the site for floodplain storage; these features will result in impacts to 53,915 sf (1.24 acre) of WQR and approximately 61,776 sf (1.42 acre) of HCA beyond the limits of the WQR. The WQR impact also includes approximately 3,527 sf (0.08 acre) of wetland impact. The wetlands proposed for impact are of low quality, lacking vegetated structure, and primarily composed of a monoculture of reed canarygrass. Required permits from the State (Department of State Lands (DSL)) and Federal (U.S. Army Corps of Engineers (COE)) agencies for the proposed wetland impacts, and associated wetland mitigation plan, will be obtained, and upon receipt, the Applicant will provide a copy to the City for its files. The areas of permanent and temporary disturbance within the HCA and WQR are summarized in Table 8, below and shown on Figure 5.

It should be noted that the proposed soft-surface paths within the WQR and / or HCA are unpaved and no wider than 30 inches, and therefore, are exempt trails, and as such, meet the standards established in MMC Subsection 19.402.4.A.17, and are not considered to be permanent disturbance within the WQR and HCA.

Table 8. Summary of Permanent and Temporary Disturbance in the WQR and HCA

Activity	Permanent Disturbance (sq.ft./ac.)		Temporary Disturbance (sq.ft./ac.)	
	WQR	HCA	WQR	HCA
92-Unit Subdivision	34,732 / 0.80	46,355 / 1.06	0 / 0	0 / 0
Floodplain storage	0/0	0/0	19,183 / 0.44	15,421 / 0.35
Total	**34,732 / 0.80**	**46,355 / 1.06**	**19,183 / 0.44**	**15,421 / 0.35**

The proposed project is not anticipated to have any adverse impacts to water quality. The use of erosion and sediment controls during construction will prevent sediment-related impacts to water quality. The proposed project is not anticipated to result in additional nutrient inputs to the stream, and the restoration of the floodplain/ on the south side of Mt. Scott Creek will increase shade on the stream as the riparian plantings mature, helping to reduce water temperatures in the stream. The stormwater outfalls will discharge treated stormwater to the WQR, and the flow-spreaders at the outfalls will dissipate flows preventing erosion and sedimentation downslope of the outfalls and prevent impacts to water quality.

4. An alternatives analysis, providing an explanation of the rationale behind choosing the alternative selected, listing measures that will be taken to avoid and/or minimize adverse impacts to designated natural resources, and demonstrating that:

a. No practicable alternatives to the requested development exist that will not disturb the WQR or HCA.

Because of the location, size and orientation of the resources within the site, and the existing development/church, and limited access points from SE Kellogg Creek Drive, impacts to the WQR and HCA are unavoidable. The alternative site plan (Figure 5A) would have resulted in approximately 34% more permanent impacts to the WQR, with a total of 46,666 sf / 1.07 ac of WQR impacts; permanent impacts to the HCA (42,823 sf / 0.98 acre) resulting from the alternative site plan would have been approximately 8% less impact than the proposed site plan; however, impacts to the wetland (17,592 sf / 0.40 acre) resulting from the alternative site plan would have been significantly greater (5 times greater) than the proposed site plan. In order to avoid and minimize impacts to the resources, while still allowing the project to be practicable, the Applicant conducted an alternatives analysis, which resulted in the proposed plan as having less adverse effects to the water resources than the alternative design.

An additional alternative site plan was analyzed in order to investigate whether the natural resource impacts could be further minimized. Figure 5B illustrates the additional alternative site plan. However, due to the complexities associated with the combination of the R-10 and R-3 zones transecting the central portion of the site, this alternative would not have allowed the development to meet the City's minimum density requirements, and therefore, is not a practicable option. This site layout generally shows how the site could be designed under standard R-10 and R-3 zoning without using the Planned Development provisions and within the context of the Natural Resource standards in MMC 19.402.13.I related to subdivisions. The language in that section provides two options for lot layout:

> *1. At least 90% of the property's HCA and 100% of the property's WQR shall be located in a separate tract. Applications that meet this standard are not subject to the discretionary review requirements of Subsection 19.402.12.*

or

2. If a subdivision cannot comply with the standards in Subsection 19.402.13.I.1, the application shall comply with the following standards:

a. All proposed lots shall have adequate buildable area outside of the WQR and HCA…

The alternative site layout complies with subsection (1) above and indicates that 100 percent of the WQR and 90 percent of the HCA will remain intact in a separate tract. Lots have been laid out on the site consistent with that standard and consistent with the existing split zoning (10,000 square foot lots in R-10 and 3,000 square foot lots in R-3). As shown, the alternative site plan provides 34 lots (27 R-3 lots and 7 R-10 lots). However, this is not a sufficient number of lots to meet the City's required minimum density for the R-3 zone. The table below shows how minimum density was calculated for the site.

Zone	Gross Acres	Deduct Gross SF	Deduct Floodway	Deduct Proposed ROW	Deduct Open Space	Net SF	Net Acres	Min Required Units
R3	9.58	417,305	52,359	39,837	189,922	135,187	3.10	36
R10	4.44	193,406	21,753	37,517	74,488	59,649	1.37	5

These calculations assume the entire WQR area and more than 90 percent of the HCA will remain in a separate tract owned in common by the future residents of the subdivision. Once floodway, right-of-way and common open space are deducted from the gross R-3 acreage, the net buildable area is 3.10 acres. With a minimum density requirement of 11.6 units per acre, the total amount of units required for the R-3 zone is 36 units. As shown on the alternative site plan, only 27 units fit within the R-3 portion of the site. In order to meet minimum density requirements in the R-3 zone, nine additional units would be needed, which would result in substantial impacts to the WQR and HCA.

b. Development in the WQR and/or HCA has been limited to the area necessary to allow for the proposed use.

Development within the WQR and HCA has been limited to the area necessary to allow for the proposed use. The development has been designed taking into consideration the City's building, design, and development requirements, while avoiding and minimizing resource impacts to the greatest extent practicable, and still allowing the project to be financially feasible. As such development in the WQR and HCA has been limited to the outer potions of each, in areas that are of lowest quality.

c. If disturbed, the WQR can be restored to an equal or better condition in accordance with Table 19.402.11.C; and the HCA can be restored consistent with the mitigation requirements of Subsection 19.402.11.D.2.

Restoration and mitigation for impacts to the WQR and HCA will be done in accordance with Table 19.402.11.C and Subsection 19.402.11.D.2, respectively. Details of the restoration and mitigation are described in more detail below in Subsection 19.402.12.A.6.b.

It should be noted that the DSL and COE requirement for mitigation for the wetland impact will be met and details will be discussed in the permit, which upon receipt, the Applicant will provide to the City.

d. Road crossings will be minimized as much as possible.

Road crossings are located along the inside edge of the development, which will eliminate the need for side slopes, and thereby, minimize the area of impact to the WQR and HCA.

5. Evidence that the applicant has done the following, for applications proposing routine repair and maintenance, alteration, and/or total replacement of existing structures located within the WQR:

a. Demonstrated that no practicable alternative design or method of development exists that would have a lesser impact on the WQR than the one proposed. If no such practicable alternative design or method of development exists, the project shall be conditioned to limit its disturbance and impact on the WQR to the minimum extent necessary to achieve the proposed repair/maintenance, alteration, and/or replacement.

b. Provided mitigation to ensure that impacts to the functions and values of the WQR will be mitigated or restored to the extent practicable.

Not applicable. The proposed project does not include routine repair and maintenance, alteration, and/or total replacement of existing structures within the WQR.

6. A mitigation plan for the designated natural resource that contains the following information:

a. A description of adverse impacts that will be caused as a result of development.

The proposed project will result in impacts to WQR and HCA associated with Mt. Scott Creek and Wetland A. A 92-unit residential subdivision will be constructed in the central portion of the site. Construction of the subdivision will include three stormwater facilities and grading in the northwest corner of the site for floodplain storage; these features will result in impacts to a total of 53,915 sf (1.24 acre) of WQR and approximately 61,776 sf (1.42 acre) of HCA beyond the limits of the WQR. The WQR impact also includes approximately 3,527 sf (0.08 acre) of wetland impact. The areas proposed for grading for floodplain storage will be restored with native vegetation plantings. The areas of permanent and temporary disturbance within the HCA and WQR are summarized in Table 8, above.

b. An explanation of measures that will be taken to avoid, minimize, and/or mitigate adverse impacts to the designated natural resource; in accordance with, but not limited to, Table 19.402.11.C for WQRs and Subsection 19.402.11.D.2 for HCAs.

As discussed above, impacts to the WQR and HCA are unavoidable. Adverse effects to the resources have been minimized by reducing the number of dwelling units (from 100 to 92) and redesigning the development layout, thereby, limiting impacts to the outer edges of the resources to the greatest extent practicable.

Mitigation for the unavoidable impacts will be provided through the inventory of man-made debris and noxious materials that might be present within the WQR and the removal of any such material present; the implementation of a stormwater plan that meets City requirements for runoff rates and water quality; the removal of non-native, invasive plants from the riparian corridor along the south side of Mt. Scott Creek; and the installation of tree and shrub plantings within the remaining WQR and HCA areas, and floodplain storage area to restore a diverse, native plant community. Compliance with the mitigation requirements outlined in Table 19.402.11.C and Subsection 19.402.11.D.2 to compensate for proposed impacts to the WQR and HCA are described below.

As depicted on Figure 4, the existing condition of WQR along the south side of Mt. Scott Creek and the west edge of the property, north and south of Wetland A, is Class A (“Good”); the existing

condition of the WQR along the northeast and south sides of Wetland A is Class C ("Poor"). Mitigation requirements for disturbance in a Class A and Class C WQR, as listed in Table 19.402.11.C, are listed below, as are the components of the project design that have been incorporated to insure compliance with the mitigation requirements.

- ***Submit a plan for mitigating water quality impacts related to the development, including: sediments, temperature, nutrients, or any other condition that may have caused the protected water feature to be listed on DEQ's 303(d) list.***

  Dowl will be submitting a Preliminary Drainage Report (dated January 12, 2017) demonstrating that the proposed stormwater management facilities treat runoff to meet the City of Milwaukie's water quality requirements and detain post-development runoff at or below pre-development release rates.

- ***Inventory and remove debris and noxious materials.***

  At the time of site construction, the Applicant will identify man-made debris and noxious materials that may be present within the WQR. Any such debris or materials will be removed from the WQR. This will occur within mitigation and restoration areas, as shown on Figure 9.

Mitigation requirements for disturbance in a Class C WQR, as listed in Table 19.402.11.C, are listed below, as are the components of the project design that have been incorporated to insure compliance with the mitigation requirements.

- ***Restore and mitigate disturbed areas with native species from the Milwaukie Native Plant List, using a City-approved plan developed to represent the vegetative composition that would naturally occur on the site.***

  All disturbed areas within the WQR and HCA will be restored with native trees and shrubs and reseeded with a native seed mix. Trees and shrubs will be planted within the mitigation and restoration areas on the south side of Mt. Scott Creek to restore a native plant community within the WQR and HCA areas.

  The number of trees and shrubs to be planted was determined in accordance with MMC Subsection 19.402.11.D.2. Sixteen trees will be removed from the WQR, as shown on Figure 7. As prescribed by Table 19.402.11.D.2.a, 53 trees and 114 shrubs would be required under Mitigation Option 1 to mitigate for the trees to be removed. Under Mitigation Option 2, 1,160 trees (115,691 sf impact area x 5 trees per 500 sf of impact area = 1,160 trees) and 5,790 shrubs (115,691 sf impact area x 25 shrubs per 500 sf of impact area = 5,790 shrubs) would be planted to mitigate for the 115,691 sf of impacts to the WQR and HCA. Because Mitigation Option 2 results in more tree plantings, Mitigation Option 2 was used to determine the number of trees and shrubs to be planted in accordance with MMC Subsection 19.402.11.D.2. A list of trees and shrubs proposed for planting is provided in Table 9, below and on Figure 9 - Mitigation Plan.

  These mitigation plantings meet the requirements of MMC Subsection 19.402.11.D, as follows:

  - All areas temporarily disturbed will be restored and permanent impacts will be mitigated by the tree and shrub plantings, as described above.

- All species proposed for planting are native species, as identified on the Milwaukie Native Plant List.
- Trees to be planted will average at least a ½-in caliper (measured at 6 inches above the ground level for field-grown trees or above the soil line for container-grown trees). Shrubs shall be at least 1-gallon size and 12 inches high.
- Trees will be planted between 8 and 12 feet on center. Shrubs will be planted between 4 and 5 feet on center or clustered in single-species groups of no more than 4 plants, with each cluster planted between 8 and 10 feet on center. When planting near existing trees, the dripline of the existing tree shall be the starting point for plant spacing measurements.
- More than two species of shrubs are proposed, and not more than 50 percent of the trees to be planted are of the same genus.
- All mitigation will occur on site.
- Invasive non-native or noxious vegetation will be removed within the mitigation area prior to planting, including, but not limited to, species identified as nuisance plants on the Milwaukie Native Plant List.
- Bare or open soil areas remaining after the required tree and shrub plantings will be seeded to 100% surface coverage with grasses or other groundcover species identified as native on the Milwaukie Native Plant List. Revegetation will occur during the next planting season following the site disturbance.

Table 9. Mitigation Area A Planting List

Species	Common Name	Quantity	Stock Type	Plant Size
Trees				
Alnus rubra	Red alder	232	Container or field-grown	½ in caliper
Crataegus suksdorfii	Black hawthorn	232	Container or field grown	½ in caliper
Fraxinus latifolia	Oregon ash	232	Container or field grown	½ in caliper
Populus balsamifera	Black cottonwood	232	Container or field-grown	½ in caliper
Salix scouleriana	Scouler's willow	232	Container or field-grown	½ in caliper
Shrubs				
Cornus alba	Red-osier dogwood	965	1 gal.	12 in
Rosa pisocarpa	Clustered rose	965	1 gal.	12 in
Malus fusca	Western crabapple	965	1 gal	12 in
Physocarpus capitatus	Pacific ninebark	965	1 gal.	12 in
Sambucus racemosa	Red elderberry	965	1 gal.	12 in
Symphoricarpos albus	Snowberry	965	1 gal.	12 in
Herbaceous seed mix				
Agrostis exarata	Spike bentgrass	2.0 lbs/ac	Seed	n/a
Bromus carinatus	California brome	2.0 lbs/ac	Seed	n/a
Deschampsia cespitosa	Tufted hairgrass	3.0 lbs/ac	Seed	n/a
Elymus glaucus	Blue wildrye	3.0 lbs/ac	Seed	n/a

Species	Common Name	Quantity	Stock Type	Plant Size
Hordeum brachyantherum	Meadow barley	2.0 lbs/ac	Seed	n/a
Lupinus rivularis	Riverbank lupine	3.5 lbs/ac	Seed	n/a

The types of plants to be installed were chosen from the Milwaukie Native Plant List and by the suitability to site conditions and the types of native species that were observed on the site. The tree and shrub plantings will improve vegetation structure and diversity, and thereby, enhance wildlife habitat, in areas that presently consist of a monoculture of reed canarygrass.

- ***Plant and/or seed all bare areas to provide 100% surface coverage.***

  All disturbed soil surfaces will be seeded with a native seed mix, as described in Table 9, above. Areas temporarily disturbed for the construction of stormwater outfalls and due to the removal of invasive plant species will be seeded with this seed mix.

- ***Inventory and remove debris and noxious materials.***

  At the time of site construction, the Applicant will identify man-made debris and noxious materials that may be present within the WQR. Any such debris or materials will be removed from the WQR. This will occur within mitigation and restoration areas, as shown on Figure 9.

c. Sufficient description to demonstrate how the following standards will be achieved:

(1) Where existing vegetation has been removed, the site shall be revegetated as soon as practicable.

Following the completion of the construction of the proposed stormwater outfalls, disturbed soils will be reseeded with the native seed mix described in Table 9, above. Within the mitigation and restoration areas, soils disturbed as a result of the removal of non-native invasive plants will be seeded with the native seed mix described in Table 9 as soon as practicable following the removal of the invasive plants. Woody material will be planted in the mitigation and restoration areas in the fall/winter immediately following construction to maximize the survival of the plantings.

(2) Where practicable, lights shall be placed so that they do not shine directly into any WQR and/or HCA location. The type, size, and intensity of lighting shall be selected so that impacts to habitat functions are minimized.

Lights will be placed so that they do not shine directly into the WQR and/or HCA. The type, size, and intensity of lighting will be selected so that impacts to habitat functions are minimized.

(3) Areas of standing trees, shrubs, and natural vegetation will remain connected or contiguous; particularly along natural drainage courses, except where mitigation is approved; so as to provide a transition between the proposed development and the designated natural resource and to provide opportunity for food, water, and cover for animals located within the WQR.

With the exception of the removal of invasive plants from the proposed mitigation and restoration areas, existing trees, shrubs, and natural vegetation within the WQR will remain undisturbed during the proposed construction.

d. A map showing where the specific mitigation activities will occur. Off-site mitigation related to WQRs shall not be used to meet the mitigation requirements of Section 19.402.

Figure 9 depicts the location of proposed mitigation activities. No mitigation is proposed to occur off-site.

e. An implementation schedule; including a timeline for construction, mitigation, mitigation maintenance, monitoring, and reporting; as well as a contingency plan. All in-stream work in fish-bearing streams shall be done in accordance with the allowable windows for in-water work as designated by ODFW.

Construction of the proposed project is anticipated to begin in the late summer of 2017. Activities associated with the WQR/HCA mitigation are anticipated to begin in summer 2017. Removal of any existing man-made debris and noxious materials from the WQR will occur in summer 2017, as will the removal of invasive plants from the mitigation and restoration areas (Figure 9). Restoration plantings will be installed in the mitigation areas in late fall of 2017.

Monitoring of the restoration area will be conducted in the summer of 2018 and again in the summer of 2019. An annual monitoring report documenting the survival of the restoration plantings will be submitted to the City of Milwaukie by December 31 of each monitoring year. Plants that die shall be replaced in kind as needed to ensure the minimum 80% survival rate.

No in-stream work is proposed to occur as part of this project.

B. Approval Criteria

1. Unless specified elsewhere in Section 19.402, applications subject to the discretionary review process shall demonstrate how the proposed activity complies with the following criteria:

a. Avoid

The proposed activity avoids the intrusion of development into the WQR and/or HCA to the extent practicable. The proposed activity shall have less detrimental impact to the designated natural resource than other practicable alternatives, including significantly different practicable alternatives that propose less development within the resource area.

The proposed project avoids development within the WQR and HCA to the extent practicable. As discussed earlier in this document, the alternative site designs (Figures 5A and 5B) have varying degrees of impacts to the WQR, HCA and wetlands; however, limitations due to zoning constraints and minimum density requirements resulted in choosing the optimal alternative for site development which would meet the City's minimum density requirements while also avoiding and minimizing impacts to natural resources on the site to the extent practicable.

b. Minimize

If the applicant demonstrates that there is no practicable alternative that will avoid disturbance of the designated natural resource, then the proposed activity within the resource area shall minimize detrimental impacts to the extent practicable.

(1) The proposed activity shall minimize detrimental impacts to ecological functions and loss of habitat, consistent with uses allowed by right under the base zone, to the extent practicable.

Implementation of the proposed mitigation will ensure the proposed project minimizes adverse effects to the ecological functions of the WQR and loss of habitat, as follows:

- The minimization of areal impacts as well as the proposed plantings to restore native plant communities on the south side of Mt. Scott Creek, along the northeast and south sides of Wetland A, and within the floodplain storage area will ensure that the WQR continues to provide vegetated corridors that separate protected water features from development.
- As the proposed tree and shrub plantings south of Mt. Scott Creek, around Wetland A, and within the floodplain storage area mature, they will increasingly provide microclimate

regulation and shade for the stream and wetland, and provide better microclimate regulation and shade as compared to the existing plant communities.

- As the proposed tree and shrub plantings south of Mt. Scott Creek, around Wetland A, and the floodplain storage area mature, they will provide more effective streamflow moderation during high flow events than the herbaceous plant community, predominantly composed of reed canarygrass, that is present under existing conditions.
- The diverse plant community within the WQR, HCA and floodplain storage area will continue to provide water filtration, infiltration, and natural purification functions. The proposed project will not adversely affect these functions.
- The proposed restoration plantings and the resulting diverse plant community within the WQR, HCA and floodplain storage area will continue to provide bank stabilization and sediment and pollution control functions. The proposed project will not adversely affect these functions.
- Trees will remain within the vegetated corridor following construction, and therefore, the WQR will continue to provide the potential for large wood recruitment and retention functions. No impacts are proposed for the creek, and therefore, there will be no adverse impact on channel dynamics.
- Because the WQR will continue to be vegetated with a diverse plant community, the proposed project will not adversely affect the resource's ability to provide organic inputs to the stream and riparian area.

(2) To the extent practicable within the designated natural resource, the proposed activity shall be designed, located, and constructed to:

(a) Minimize grading, removal of native vegetation, and disturbance and removal of native soils; by using the approaches described in Subsection 19.402.11.A, reducing building footprints, and using minimal excavation foundation systems (e.g., pier, post, or piling foundation).

In accordance with MMC Subsection 19.402.11.A, the following measures will be implemented to minimize impacts to the WQR on the site:

- Work areas will be marked to reduce potential damage to the WQR.
- Trees in the WQR will not be used as anchors for stabilizing construction equipment.
- Native soils disturbed during development shall be conserved on the property.
- The Applicant has prepared a preliminary grading and erosion control plan. Prior to the start of any construction activities, the applicant will apply for a grading and erosion control permit, consistent with the standards required by the City's Public Works Department.
- The Applicant will implement best management practices on site to prevent the drainage of hazardous materials, erosion, pollution or sedimentation within the resources and the vegetative corridors.
- The Applicant has prepared a preliminary stormwater detention and water quality plan for the project which has been designed to prevent flows within and to natural drainage courses which might exceed pre-developed conditions.

- Prior to construction, the WQR and HCA that are to remain undeveloped will be flagged, fenced, or otherwise marked and shall remain undisturbed. Such markings will be maintained until construction is complete.
- The construction phase of the development shall be done in such a manner as to safeguard the resource portions of the site that have not been approved for development.
- Lights will be placed so that they do not shine directly into the WQR and/or HCA.
- The Applicant has prepared a construction management plan which will conform to the requirements of 19.402.9. The Final Construction management plan will be provided to the City's Engineering Department prior to the commencement of construction activities.

(b) Minimize adverse hydrological impacts on water resources.

The implementation of the proposed stormwater management plan, which detains post-development runoff at or below pre-development release rates will ensure that hydrologic impacts to the water resources are minimized. Since no work is proposed in the stream, this will ensure the project avoids hydraulic impacts to the stream channel.

(c) Minimize impacts on wildlife corridors and fish passage.

No work is proposed in the stream, which will ensure the project avoids impacts to fish passage along this reach of Mt. Scott Creek. Restoration with a diverse native plant community within the riparian corridor will ensure that impacts to wildlife habitat are minimized.

(d) Allow for use of other techniques to further minimize the impacts of development in the resource area; such as using native plants throughout the site (not just in the resource area), locating other required landscaping adjacent to the resource area, reducing light spill-off into the resource area from development, preserving and maintaining existing trees and tree canopy coverage, and/or planting trees where appropriate to maximize future tree canopy coverage.

Impacts to the on-site resources have been minimized to the extent practicable.

c. Mitigate

If the applicant demonstrates that there is no practicable alternative that will avoid disturbance of the designated natural resource, then the proposed activity shall mitigate for adverse impacts to the resource area. All proposed mitigation plans shall meet the following standards:

(1) The mitigation plan shall demonstrate that it compensates for detrimental impacts to the ecological functions of resource areas, after taking into consideration the applicant's efforts to minimize such detrimental impacts.

As described above, implementation of the proposed mitigation will ensure the proposed project minimizes adverse effects to the ecological functions of the WQR and loss of habitat, as follows:

- The minimization of areal impacts as well as the proposed plantings to restore a native plant community on the south side of Mt. Scott Creek, around Wetland A, and within the floodplain storage area will ensure that the WQR continues to provide a vegetated corridor that separates protected water features from development.
- As the proposed tree and shrub plantings south of Mt. Scott Creek mature, around Wetland A, and within the floodplain storage area, they will increasingly provide microclimate regulation

and shade for the stream, and provide better microclimate regulation and shade as compared to the existing plant community on the south side of the creek.

- As the proposed tree and shrub plantings south of Mt. Scott Creek, around Wetland A, and within the floodplain storage area mature, they will provide more effective streamflow moderation during high flow events than the predominantly reed canarygrass herbaceous plant community that is present under existing conditions.
- The diverse plant community within the WQR, HCA and floodplain storage area will continue to provide water filtration, infiltration, and natural purification functions. The proposed project will not adversely affect these functions.
- The proposed restoration plantings and the resulting diverse plant community within the WQR, HCA and floodplain storage area will continue to provide bank stabilization and sediment and pollution control functions. The proposed project will not adversely affect these functions.
- Trees will remain within the vegetated corridor following construction, and therefore, the WQR will continue to provide the potential for large wood recruitment and retention functions. No impacts are proposed for the creek, and therefore, there will be no adverse impact on channel dynamics.
- Because the WQR will continue to be vegetated with a diverse plant community, the proposed project will not adversely affect the resource's ability to provide organic inputs to the stream and riparian area.

(2) Mitigation shall occur on the site of the disturbance, to the extent practicable. Off-site mitigation for disturbance of WQRs shall not be approved. Off-site mitigation for disturbance of HCAs shall be approved if the applicant has demonstrated that it is not practicable to complete the mitigation on-site and if the applicant has documented that they can carry out and ensure the success of the off-site mitigation as outlined in Subsection 19.402.11.B.5.

In addition, if the off-site mitigation area is not within the same subwatershed (6th Field Hydrologic Unit Code) as the related disturbed HCA, the applicant shall demonstrate that it is not practicable to complete the mitigation within the same subwatershed and that, considering the purpose of the mitigation, the mitigation will provide more ecological functional value if implemented outside of the subwatershed.

All mitigation will occur on site.

(3) All revegetation plantings shall use native plants listed on the Milwaukie Native Plant List.

Only native species will be installed in the revegetation plantings. A list of species to be planted is provided in Table 9, above and on Figure 9.

(4) All in-stream work in fish-bearing streams shall be done in accordance with the allowable windows for in-water work as designated by ODFW.

No in-stream work is proposed to occur with this project.

(5) A mitigation maintenance plan shall be included and shall be sufficient to ensure the success of the planting. Compliance with the plan shall be a condition of development approval.

The Applicant will undertake the following mitigation maintenance measures to ensure a minimum of 80 percent of the trees and shrubs planted remain alive two years after the mitigation planting is completed.

- New plantings will be mulched to a minimum of 3-inch depth and 18-inch diameter to retain moisture and discourage weed growth.
- Non-native or noxious vegetation will be removed or controlled throughout the maintenance period.
- Plant sleeves or fencing will be used to protect trees and shrubs against wildlife browsing and the resulting damage to plants.
- New plantings will be watered at a rate of 1 inch per week between June 15 and October 15 for the first two years following planting.

It should be noted that as described in the sections above, mitigation for proposed impacts to the HCA and WQR are primarily in the form of restoration and enhancement plantings. Due to the size, shape and location of the wetland areas and associated WQR and HCA within the site, options for other mitigation measures, such as grading with gradual slopes, while avoiding further impacts to natural resources, is quite limited. As such, grading with gradual slopes, 3:1 or less, were limited to areas along the south and east sides of the existing wetland.

6.5 MMC 19.402.13 – Land Division and Property Line Adjustments

I. Subdivisions

Applications for subdivisions are subject to Type III review and shall comply with one of the following two standards:

1. At least 90% of the property's HCA and 100% of the property's WQR shall be located in a separate tract. Applications that meet this standard are not subject to the discretionary review requirements of Subsection 19.402.12.

This standard is not met. As such the application is subject to the discretionary review provided in Section 6.4, above.

2. If a subdivision cannot comply with the standards in Subsection 9.402.13.I.1, the application shall comply with the following standards:

a. All proposed lots shall have adequate buildable area outside of the WQR and HCA.

b. To the extent practicable, the lot and access configurations shall mitigate the potential future impacts to the WQR and HCA from access and development.

c. An Impact Evaluation and Alternatives Analysis shall be prepared in accordance with the relevant portions of Subsection 19.402.12.A.

d. For properties where the HCA covers more than 85% of the total lot area, the Impact Evaluation and Alternatives Analysis shall address how the applicant's proposal retains the greatest practicable degree of contiguity of the HCA across the new lots.

Standards b, c and d are being met, and have been discussed above in Section 6.4. Standard a cannot be met, however, mitigation for impacts to WQR and HCA has been provided. Some of the developable lots within the proposed development will not provide adequate buildable area outside of WQR and HCA areas on the site, and therefore, will remain with a WQR and/or HCA. As such, a formal variance request will be made by the Applicant, and will be subject to a Type III review.

J. Resource Area as a Separate Tract

Where required by Section 19.402, the new subdivision or partition plat shall delineate and show all WQRs and HCAs as being located in a separate unbuildable tract(s) according to the following process:

1. ***Prior to preliminary plat approval, the designated natural resource (whether WQR, HCA, or both) shall be shown as a separate tract(s), which shall not be part of any lot or parcel used for construction of any structures.***

Prior to preliminary plat approval, the WQR and HCA will be shown as separate tracts, which will not be part of any lot or parcel used for construction of any structures. Figure 10 shows the locations of the revised WQR and HCA boundaries upon completion of the proposed development.

2. ***Prior to final plat approval, ownership of the separate natural resource tract(s) shall be identified to distinguish it from lots or parcels intended for sale. Ownership in common or by a homeowners association is strongly discouraged. The tract(s) may be identified as any of the following:***
   a. ***Private natural area held by the owner with a restrictive covenant and/or conservation easement.***
   b. ***For residential subdivisions, private natural area subject to an easement conveying storm and surface water management rights to the City of Milwaukie, Clackamas County Water Environment Services, and/or any other relevant jurisdiction, and preventing the owner of the tract from activities and uses inconsistent with the purposes of Section 19.402.***
   c. ***Public natural area where the tract has been dedicated to the City of Milwaukie or a private nonprofit with the mission of land conservation.***

As the proposed development is a residential subdivision, prior to final plat approval, the ownership of the separate natural resource tract(s) will be identified to distinguish it from lots or parcels intended for sale by identifying it as a private natural area subject to an easement conveying storm and surface water management rights to the City of Milwaukie, Clackamas County Water Environment Services, and/or any other relevant jurisdiction, and preventing the owner of the tract from activities and uses inconsistent with the purposes of Section 19.402.

3. ***The boundaries of all such tracts shall be demarcated with stakes, flags, or some similar means so that the boundaries between tracts and adjacent properties are defined in perpetuity. Fences that prevent the unfettered passage of wildlife shall not be installed along the boundary of any tract.***

The boundaries of all such tracts will be demarcated with stakes, flags, or some similar means so that the boundaries between tracts and adjacent properties are visibly defined in perpetuity. The exact means that will be used will be determined at the time of construction; however, fences that prevent the unfettered passage of wildlife will not be installed along the boundary of any tract.

6.6 MMC 19.402.15 – Boundary Verification and Map Administration

A. Boundary Verification

To determine whether the standards of Section 19.402 apply to a proposed activity at any given location, the boundaries of any designated natural resource(s) on or near the site shall be verified.

Agreement with the accuracy of the NR Administrative Map does not constitute or require a land use decision. However, for activities proposed within 100 feet of a wetland or its associated vegetated corridor, the boundary verification process outlined in Subsection 19.402.15.A.2.a(1)(b) shall be followed to identify the specific location of wetlands on the subject property. The Planning Director may waive the requirement for official wetland delineation, depending on the specific circumstances of the site and the proposed activity. Such circumstances may include, but are not limited to, the scale and potential impacts of the proposed activity, the proximity of the proposed activity to the mapped resource, and the Director's confidence in the accuracy of the NR Administrative Map relative to the resource in question. An applicant may challenge the accuracy of the NR Administrative Map through either of the boundary verification processes outlined in Subsections 19.402.15.A.1 and 2.

1. Type I Boundary Verification

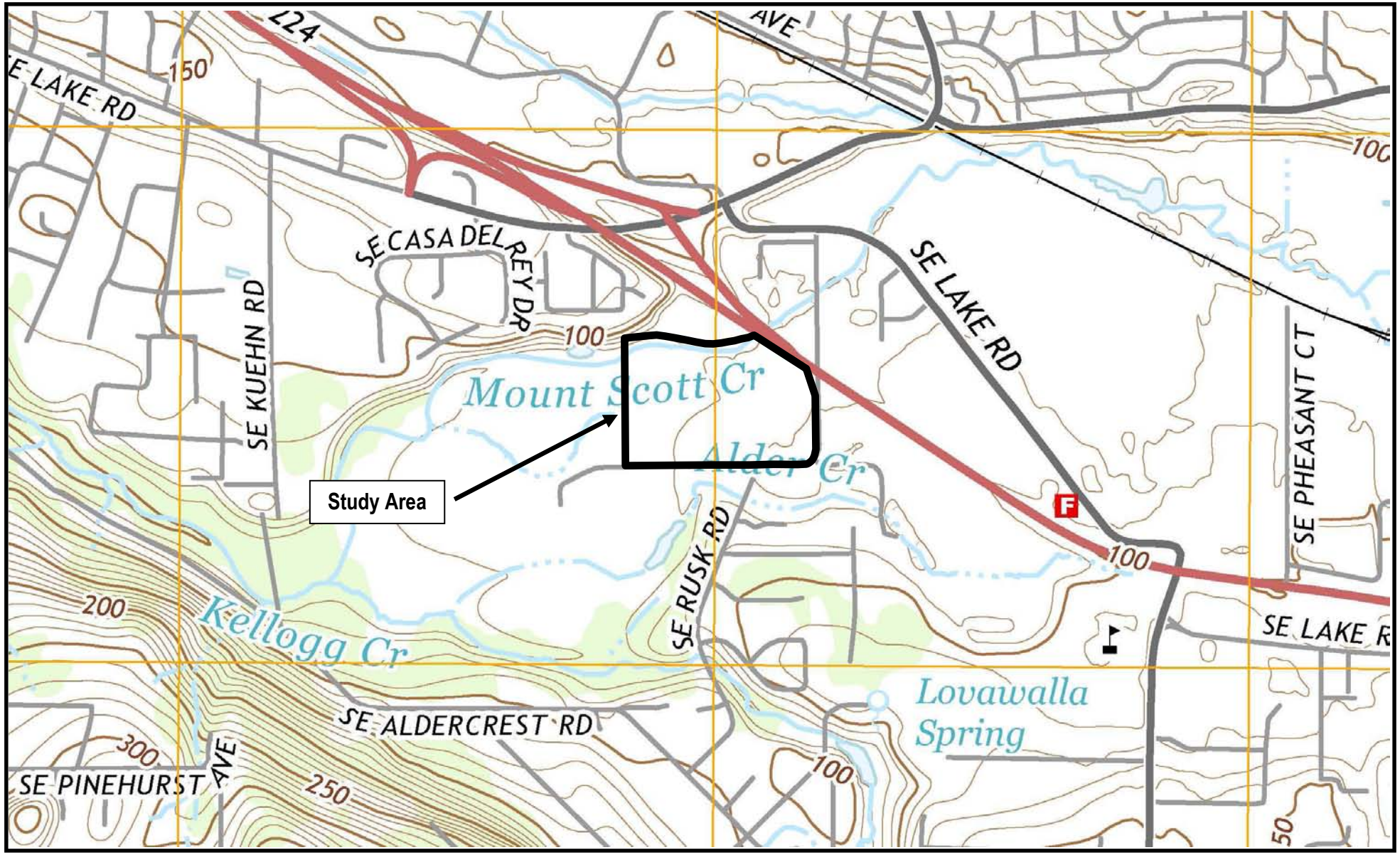
The following minor corrections to mapped HCAs may be proposed according to one of the following procedures, and are subject to Type I review per Section 19.1004:

a. Simple Incongruities

The proposed site plan per approval will result in a revised HCA boundary resulting from simple incongruities associated with the development of the subject site. The proposed updated HCA boundary verification map is presented on Figure 10.

Attachment A

Figures



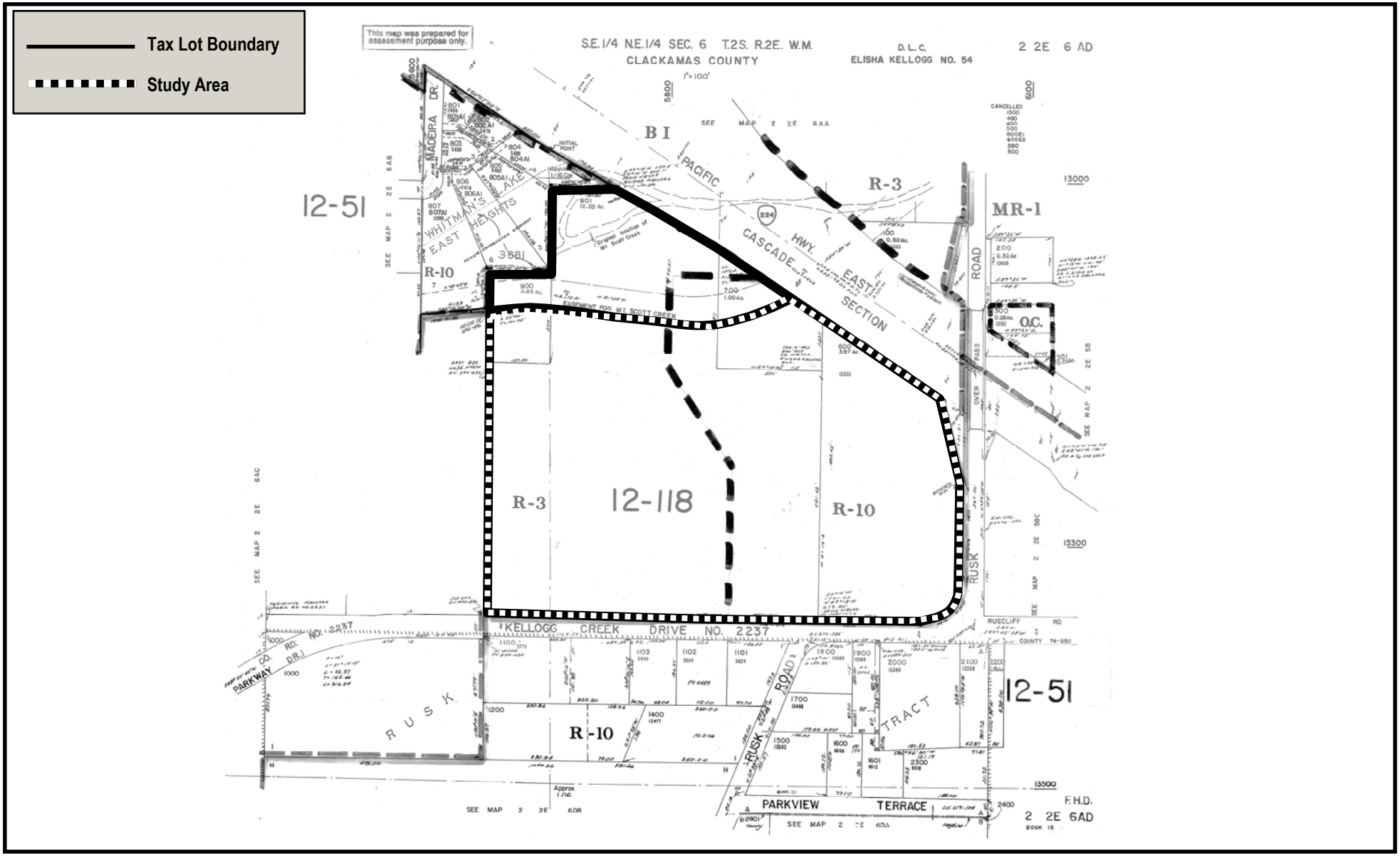
5975
1/29/2017

PHS

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

General Location and Topography
Kellogg Creek Subdivision - Milwaukie, Oregon
United States Geological Survey (USGS), Gladstone, Oregon, 7.5 Quadrangle, 2014
(viewer/nationalmap.gov/basic)

FIGURE
1



5975
1/29/2017

PHS

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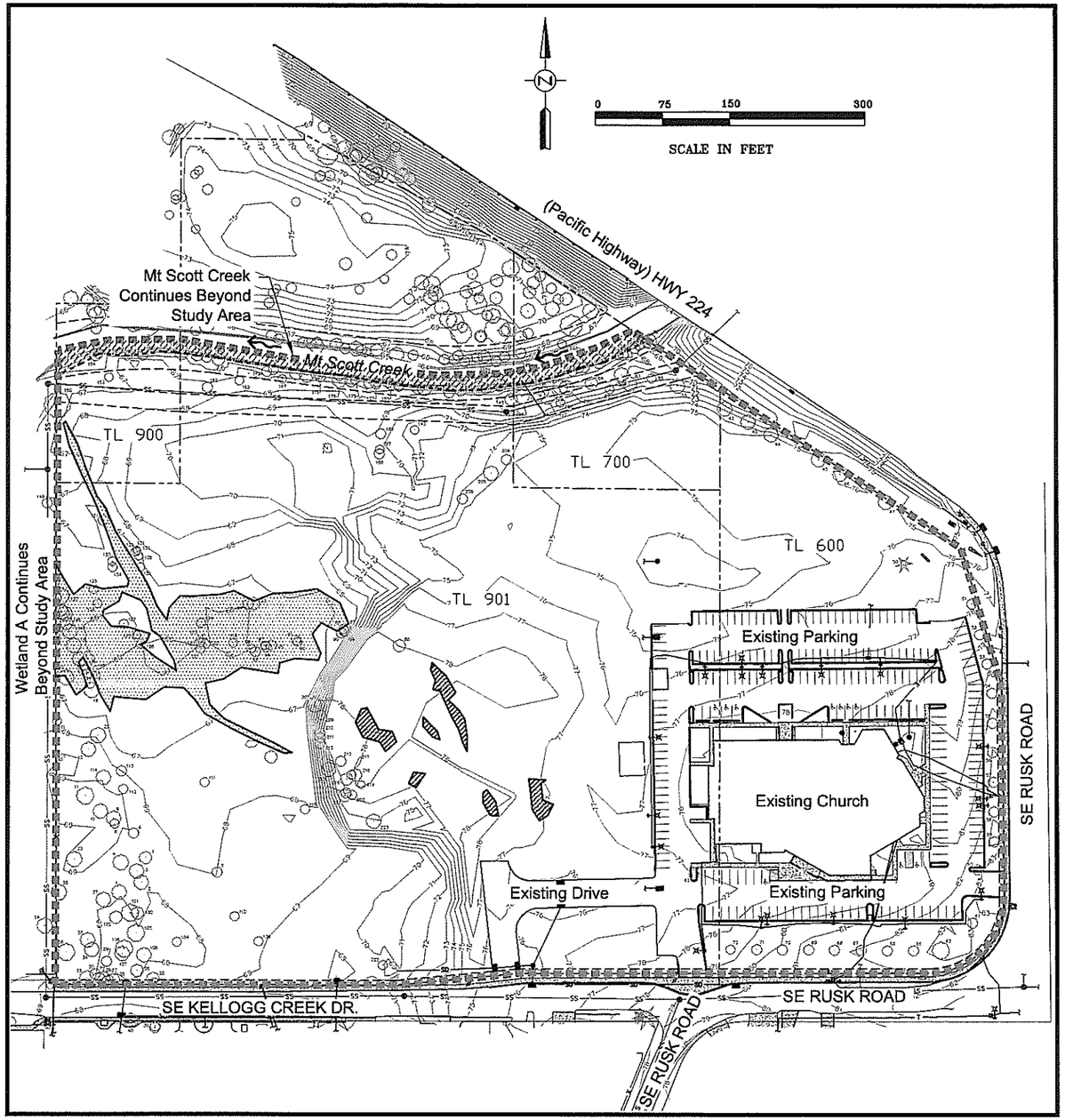
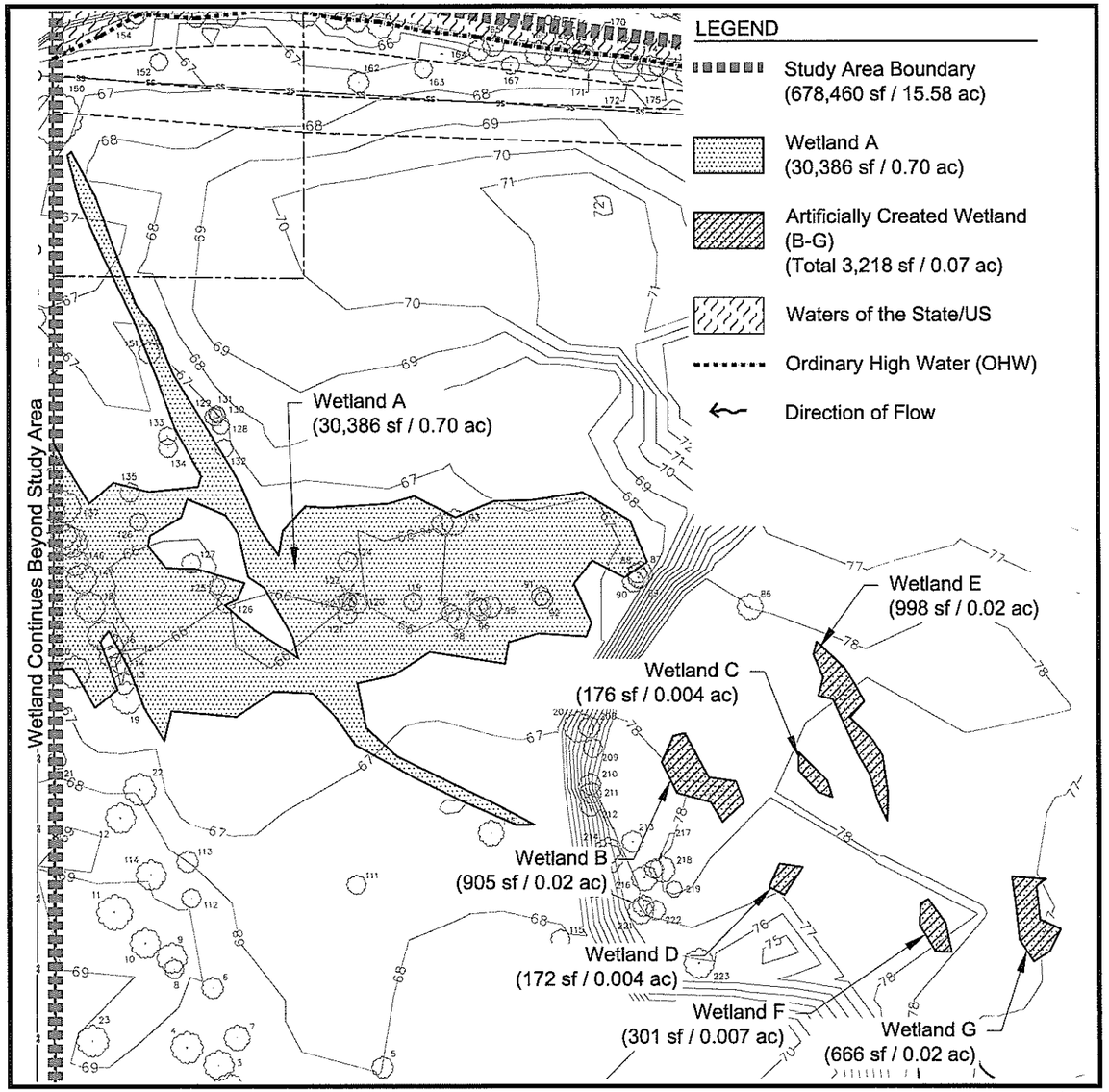
Wilsonville, OR 97070

Tax Lot Map
Kellogg Creek Subdivision - Milwaukie, Oregon
The Oregon Map (ormap.net)

FIGURE
2



TAX LOT OVERVIEW



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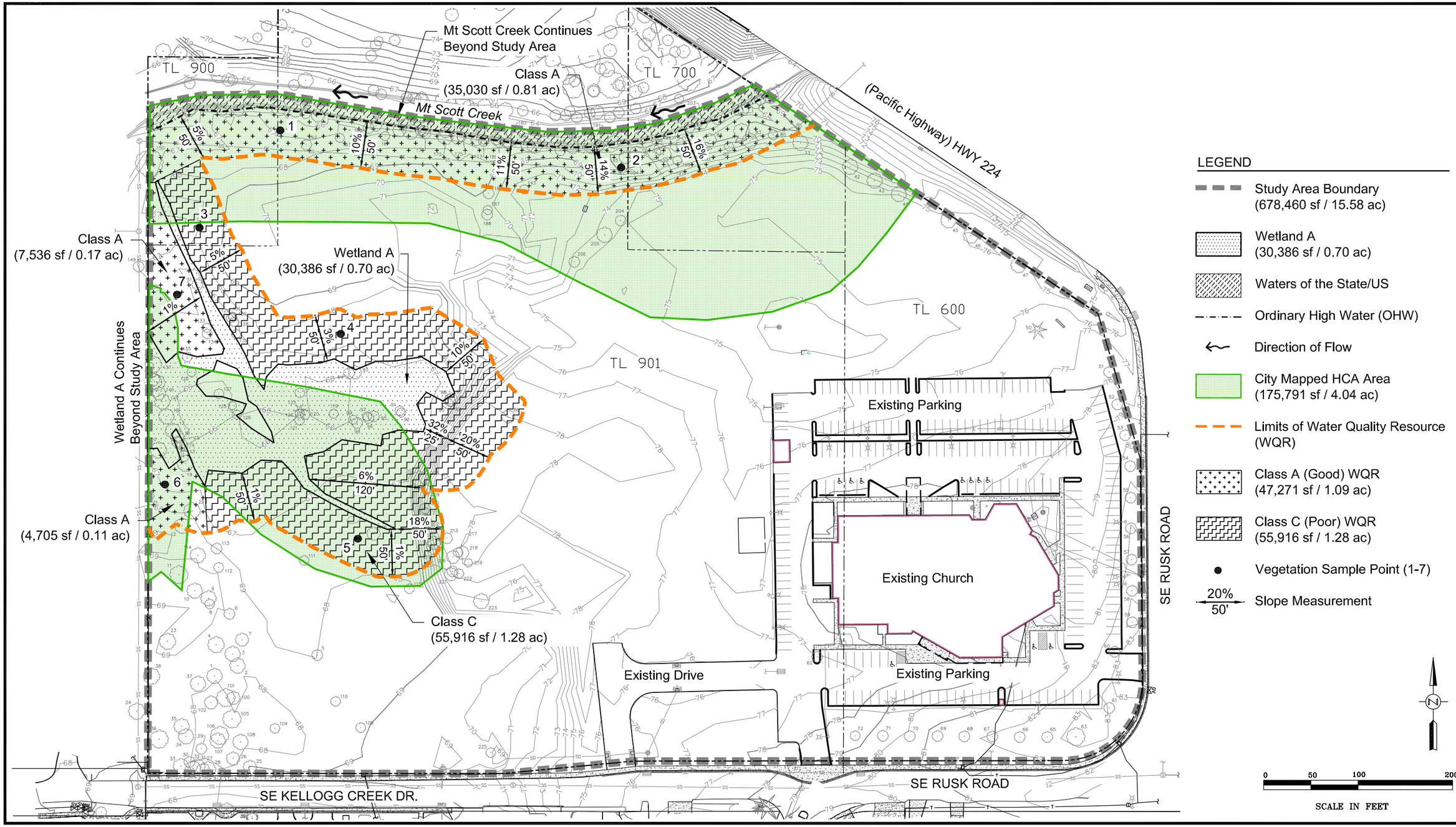
Survey provided by
TerraCalc Land Surveying, Inc., 2016
Survey accuracy is sub-centimeter and
Sample Point accuracy is ± 3 feet.

Existing Conditions
Kellogg Creek Subdivision - Milwaukie, Oregon

FIGURE
3

1-31-2017



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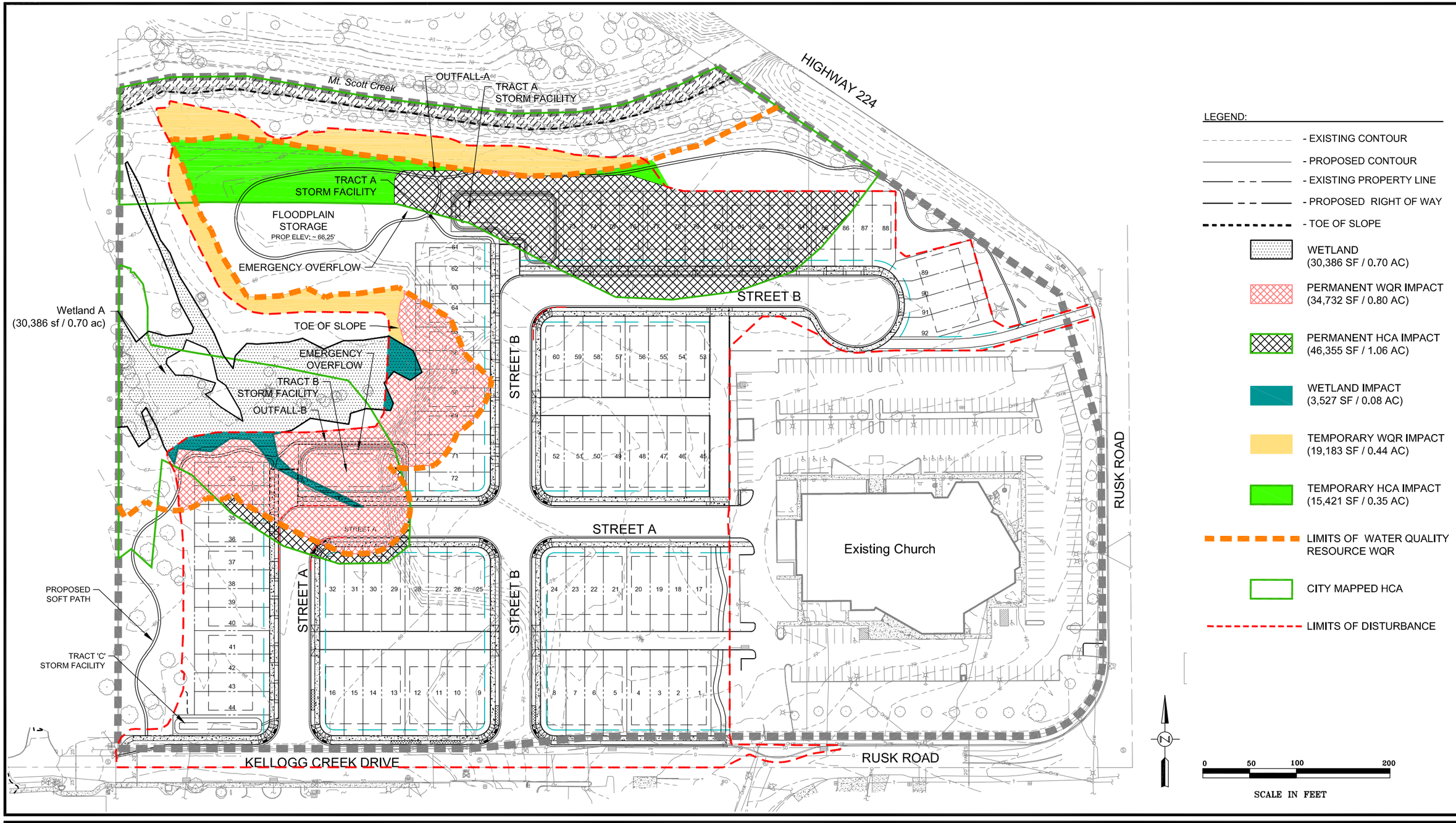
Survey provided by
TerraCalc Land Surveying, Inc., 2016.

Water Quality Resource and Habitat Conservation Area Map
SE Kellogg Creek Drive - Milwaukie, Oregon

FIGURE
4

2-1-2017



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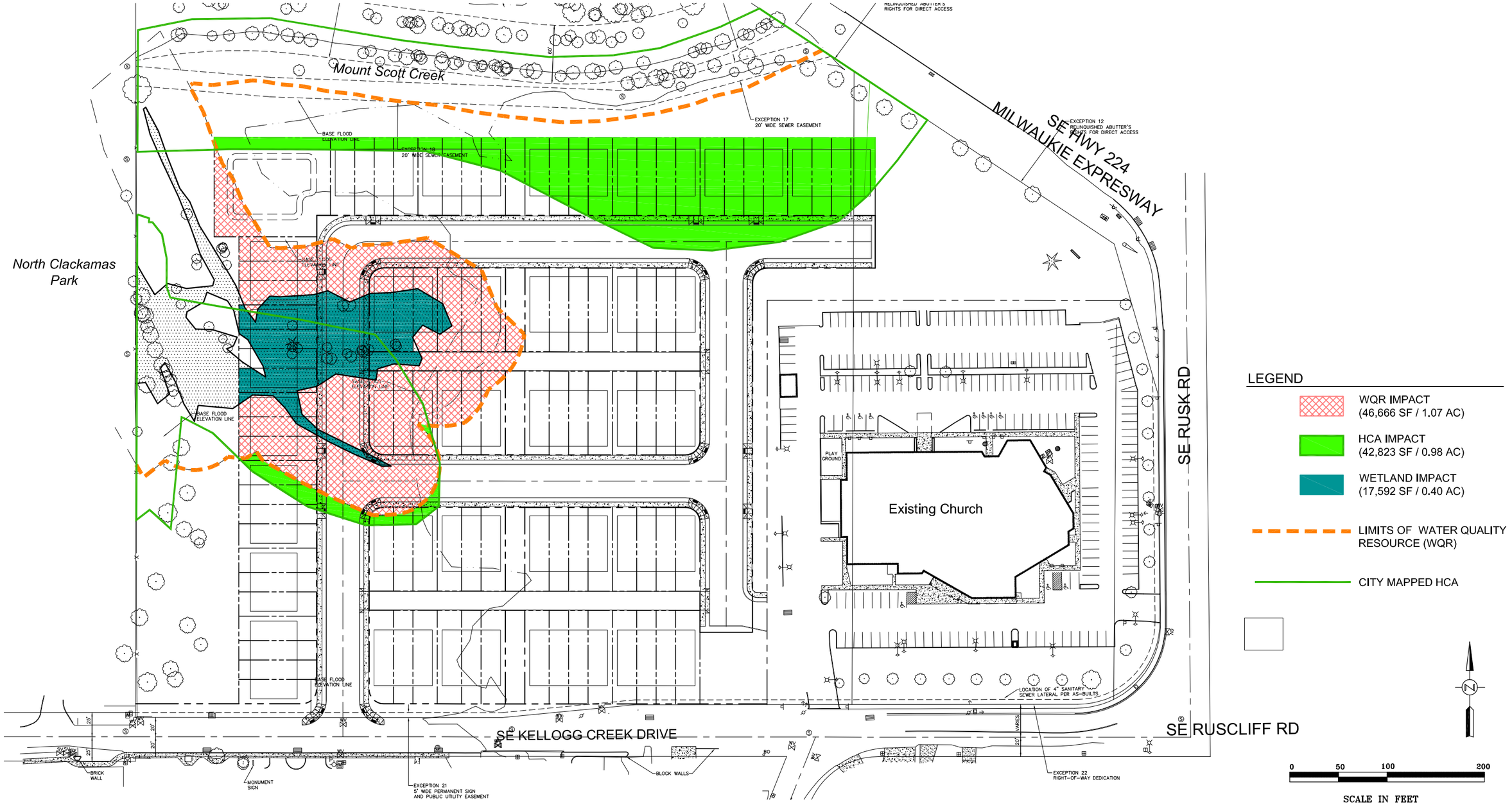
Plans provided by DOWL.

Site Plan and WQR, HCA and Wetland Impacts
Kellogg Creek Subdivision - Milwaukie, Oregon

FIGURE
5

4-6-2017

X:\Project Directories\5900\5975 SE Rusk Road (Kellogg Creek Drive)\AutoCAD\Plot Dwg\HCA\Fig5 Site Plan.dwg, 4/6/2017 5:49:36 PM, CutePDF Writer



Plans provided by DOWL.

Alternative Site Plan and WQR, HCA and Wetland Impacts
Kellogg Creek Subdivision - Milwaukie, Oregon

FIGURE 5A

2-1-2017

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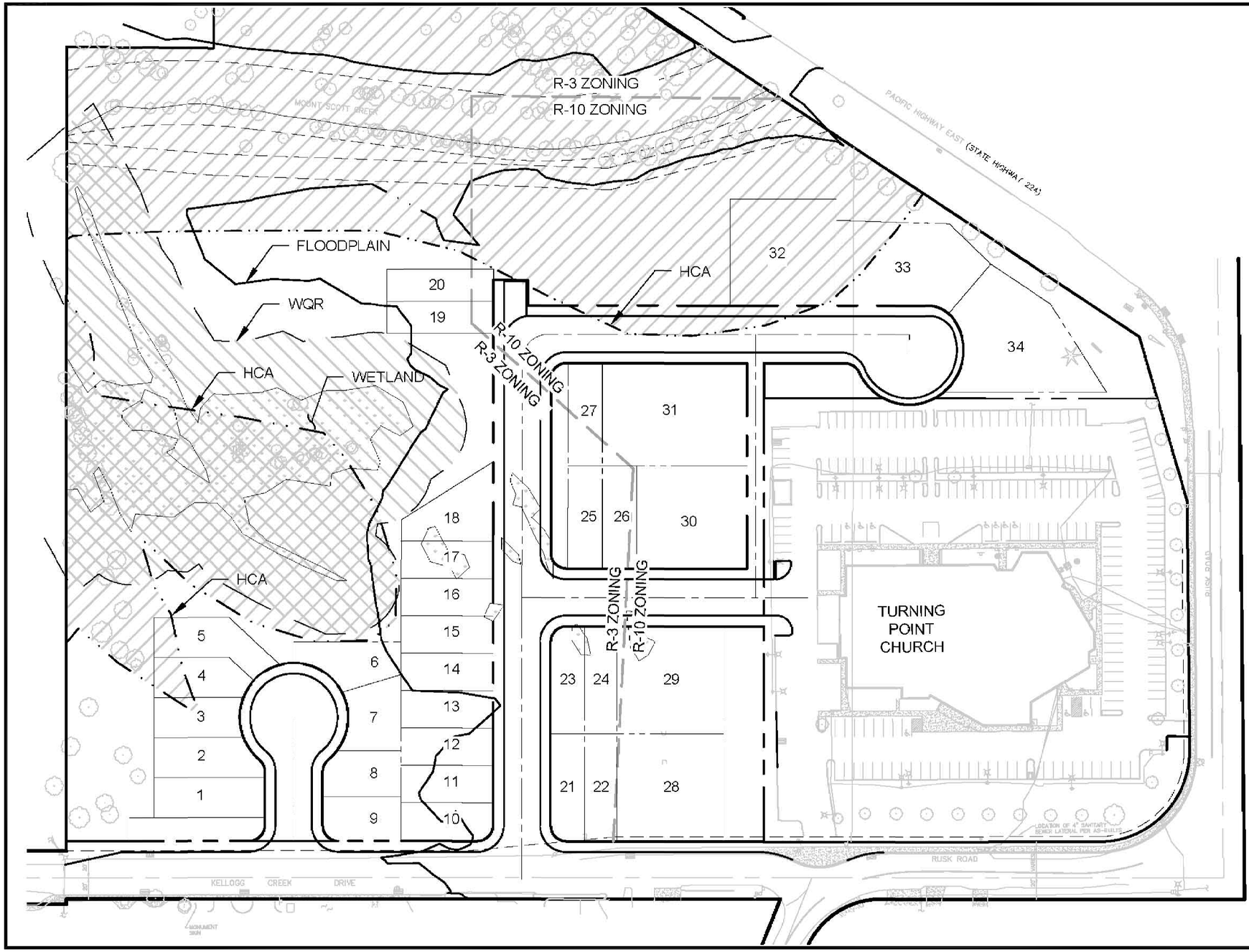
Phone: (503) 570-0800 Fax (503) 570-0855



Alternate Site Plan Information

R-3 Zoning:

Number of Lots Provided	= 27 Lots
Number of Lots Required to Meet Minimum Density	= 36 Lots
ROW Area	= 39,837 SF

R-10:

Number of Lots Provided	= 7 Lots
Number of Lots Required to Meet Minimum Density	= 5 Lots
ROW Area	= 37,517 SF

Habitat Conservation Area (HCA)

Total Existing within Site	= 5.59 acres
Impacted by Site Plan	= 0.43 acres (7.7%)

Water Quality Resource (WQR)

Total Existing within Site	= 2.30 acres
No Impact to WQR	

WQR + HCA

Total Area	= 6.07 acres
Overlapping Area	= 1.82 acres

0 50 100 200

SCALE IN FEET

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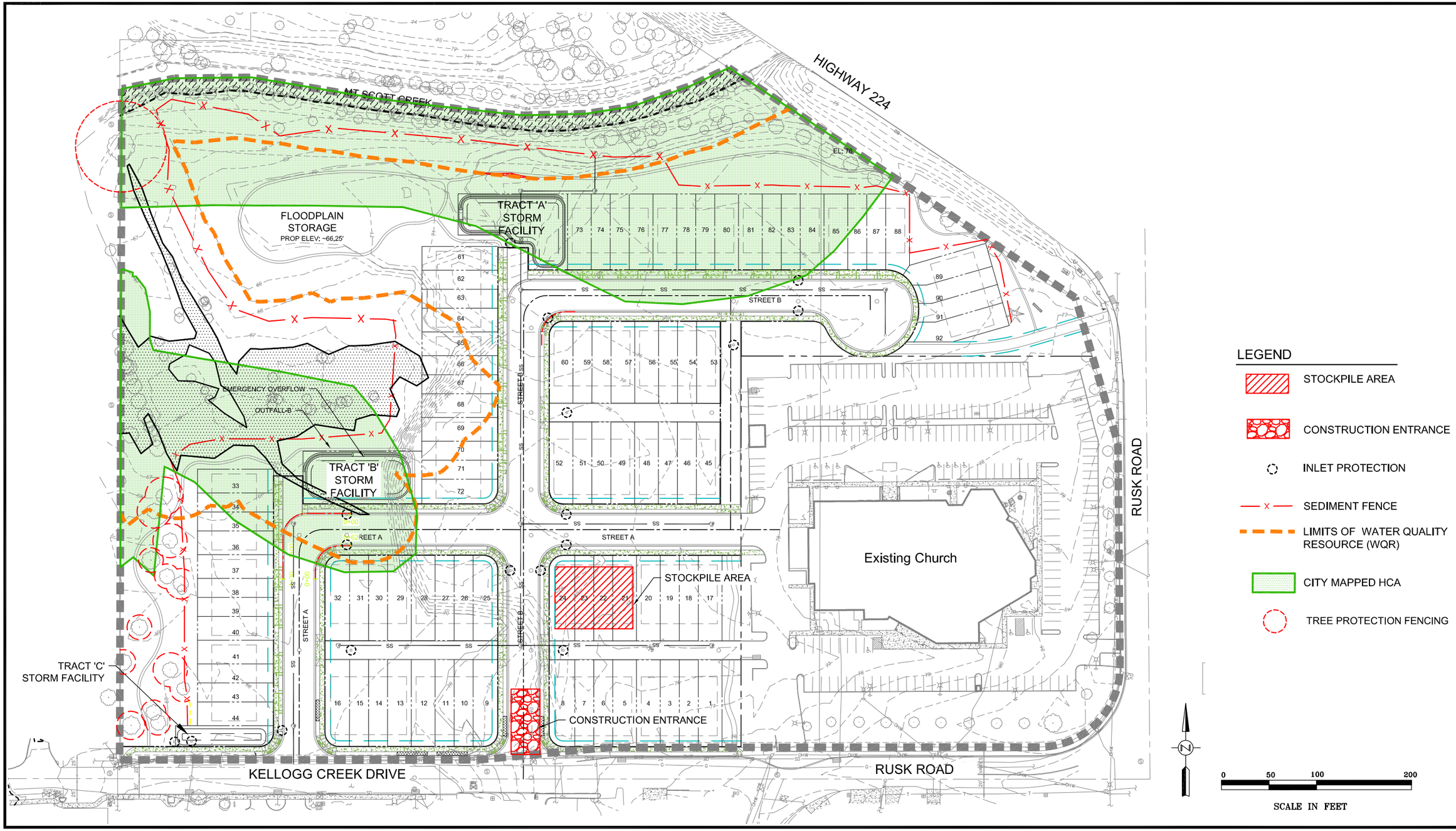
Phone: (503) 570-0800 Fax (503) 570-0855

Site Plan (April 3, 2017) provided by DOWL.

Additional Alternative Site Plan
Kellogg Creek Subdivision - Milwaukie, Oregon

FIGURE 5B

4-6-2017



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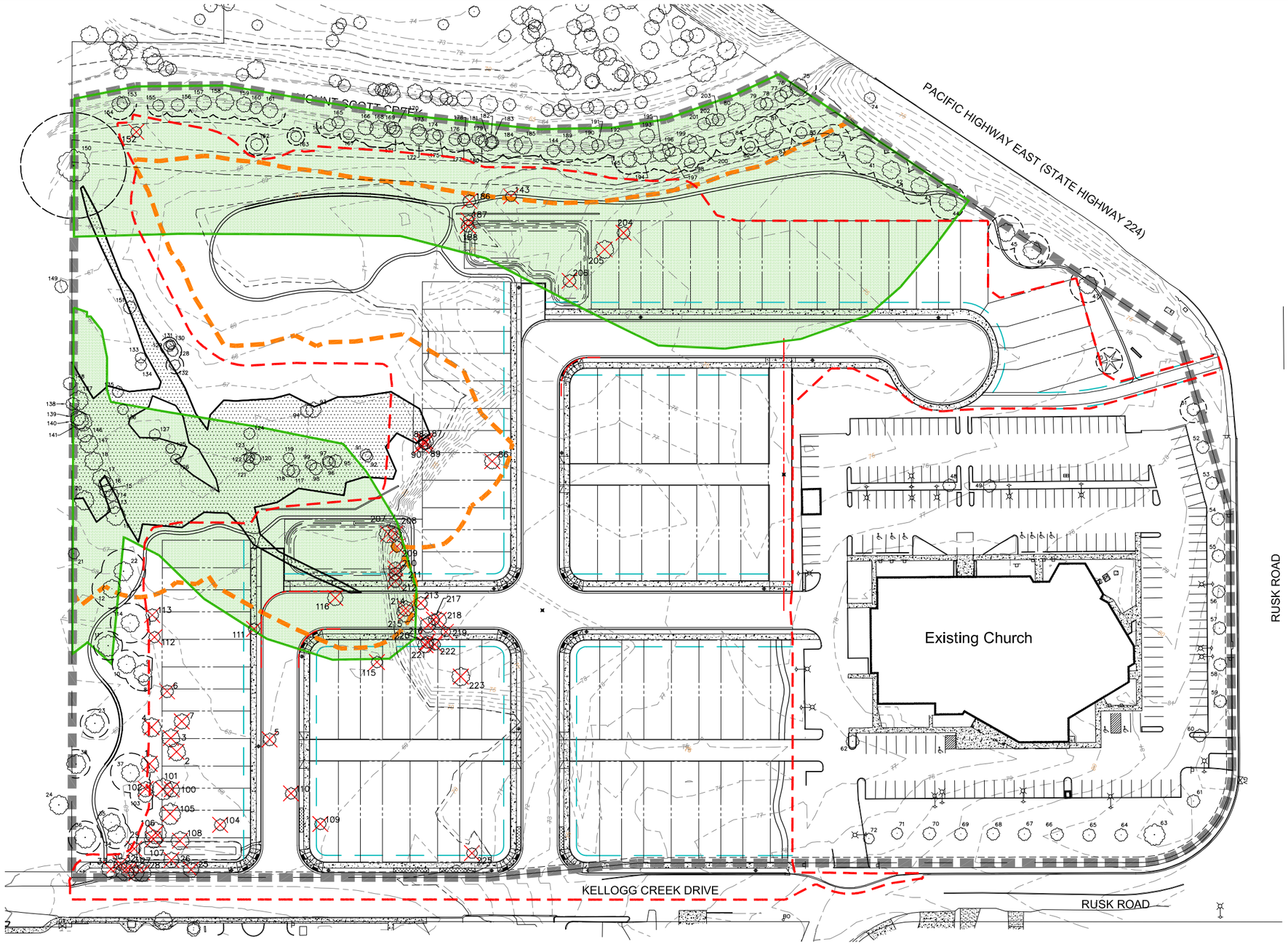
Plans provided by DOWL.

Construction Management / Erosion and Sediment Control Plan
Kellogg Creek Subdivision - Milwaukie, Oregon

FIGURE 6

4-6-2017



LEGEND

- EXISTING BOUNDARY LINE
- PROPOSED LOT LINE
- 100 EXISTING TREE TO BE REMOVED
- TREE PROTECTION FENCING
- FLOOD PLAIN BOUNDARY
- WETLAND
- LIMITS OF WATER QUALITY RESOURCE (WQR)
- CITY MAPPED HCA
- LIMITS OF DISTURBANCE

NOTE

TOTAL TREES TO BE REMOVED = 62

TREES THAT ARE NOT NUMBERED HAVE NOT BEEN EVALUATED BY THE TREE ARBORIST

Pacific Habitat Services,Inc.
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Plans provided by DOWL.

Tree Removal and Protection Plan
Kellogg Creek Subdivision - Milwaukie, Oregon

FIGURE 7

4-6-2017

X:\Project Directories\5900\5975 SE Rusk Road (Kellogg Creek Drive)\AutoCAD\Plot Dwg\HCA\Fig7 TreeProtect.dwg, 4/6/2017 4:37:43 PM, CutePDF Writer

Number	Dia (in)	Remove (Y/N)
1	18	Y
2	18	Y
3	18	Y
4	20	N
5	12	Y
6	12	Y
7	14	Y
8	10	N
9	16	N
10	16	N
11	24	N
12	18	N
13	12	N
14	12	N
15	12	N
16	14x2	N
17	16	N
18	18	N
19	20	N
20	20	N
21	8	N
22	20	N
23	20	N
24	20	N
25	14	Y
26	14x2	Y
27	14	Y
28	16	Y
29	12	Y
30	12	Y
31	16	Y
32	16	Y
33	16	Y
34	16	N
35	16x2	N
36	24	N
37	18	N
38	20	N
41	18	N
42	16	N
43	16	N
44	16	N
45	16	N
46	16	N
47	16	N
48	12	N
49	12	N
50	12x2	N
51	12	N
52	12	N
53	12	N
54	12	N
55	14	N
56	12	N
57	12	N
58	12	N
59	12	N
60	12	N

Number	Dia (in)	Remove (Y/N)
61	12	N
62	10	N
63	24	N
64	12	N
65	12	N
66	12	N
67	12	N
68	12	N
69	12	N
70	12	N
71	12	N
72	8	N
73	16	N
74	10	N
75	16	N
76	12x3	N
77	12	N
78	12	N
79	12	N
80	18	N
81	18	Y
82	8	N
83	16	N
84	14	N
85	10	N
86	14	Y
87	14x2	Y
88	10	Y
89	12	Y
90	12	Y
91	10	N
92	8	N
93	14	N
94	12	N
95	12	N
96	12	N
97	8	N
98	12	N
99	8	N
100	14	Y
101	24	Y
102	8x6	Y
103	14	N
104	10	Y
105	24	Y
106	24	Y
107	18	Y
108	16x2	Y
109	10	Y
110	10	Y
111	10x5	Y
112	10	Y
113	12	Y
114	18	N
115	10x8	Y
116	14	Y
117	12	N
118	12	N

Number	Dia (in)	Remove (Y/N)
119	8x2	N
120	8	N
121	10	N
122	8	N
123	6	N
124	10x2	N
125	6	N
126	8	N
127	10	N
128	8	N
129	8	N
130	6	N
131	6	N
132	8	N
133	8	N
134	10	N
135	10	N
136	8x2	N
137	20	N
138	12	N
139	14	N
140	16	N
141	16	N
143	8	Y
144	12	N
145	14x2	N
146	14	N
147	16x2	N
148	12x3	N
149	12	N
150	48	N
151	12	N
152	8	Y
153	12	N
154	14	N
155	10x4	N
156	12x2	N
157	14	N
158	16	N
159	14	N
160	10x3	N
161	14	N
162	10	N
163	8x2	N
164	12	N
165	12	N
166	14	N
167	8	N
168	18	N
169	12	N
170	12	N
171	12	N
172	16x3	N
173	12	N
174	14	N
175	8	N
176	12	N
177	10	N

Number	Dia (in)	Remove (Y/N)
178	8	N
179	10x2	N
180	12	N
181	16	N
182	12	N
183	12	N
184	14x2	N
185	18x2	N
186	12x3	Y
187	8x2	Y
188	10x2	Y
189	14x2	N
190	16	N
191	12	N
192	14x2	N
193	14	N
194	16	N
195	16	N
196	12	N
197	16	N
198	8	N
199	19	N
200	18	N
201	12	N
202	12	N
203	10x2	N
204	12	Y
205	18x2	Y
206	12x4	Y
207	16	Y
208	12x2	Y
209	10x9	Y
210	12	Y
211	12	Y
212	12	Y
213	12	Y
214	14	Y
215	16	Y
216	14	Y
217	10	Y
218	14	Y
219	6x3	Y
220	12	Y
221	14	Y
222	10	Y
223	16x2	Y
225	8x3	Y

TOTAL TREES TO BE REMOVED = 62

TREES THAT ARE NOT NUMBERED HAVE NOT BEEN EVALUATED BEEN BY THE TREE ARBORIST

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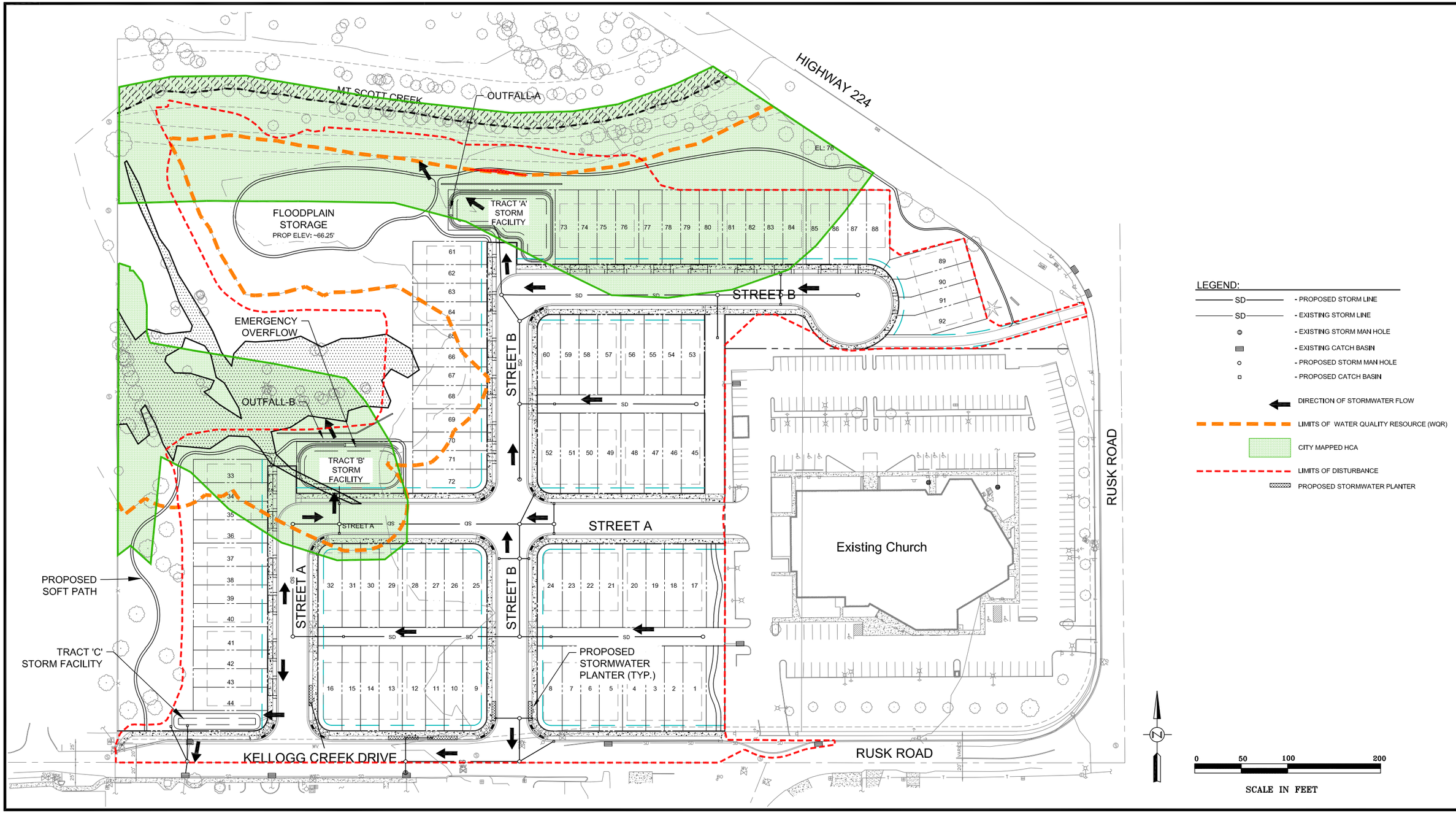
Plans provided by DOWL.

Tree Protection and Removal Table
Kellogg Creek Subdivision - Milwaukie, Oregon

FIGURE 7A

1-18-2017



Pacific Habitat Services,Inc.
9450 SW Commerce Circle, Suite 180 Wilsonville, Oregon 97070
Phone: (503) 570-0800 Fax (503) 570-0855

Plans provided by DOWL.

Stormwater Management Plan
SE Kellogg Creek Drive - Milwaukie, Oregon

FIGURE 8

4-6-2017

LEGEND:

- STUDY AREA BOUNDARY
- ORDINARY HIGH WATER
- REMAINING WETLAND (26,859 SF / 0.62 AC)
- REMAINING WQR
- REMAINING HCA
- MITIGATION AREA A (70,491 SF/ 1.62 AC)
  - Restore native plant community
  - Seed bare soils with native seed mix
  - Inventory and remove debris and noxious weeds.
- MITIGATION AREA B (33,731 SF / 0.77 AC)
  - Inventory and remove debris and noxious weeds

Mitigation Area A Planting List

Species	Common Name	Quantity	Stock Type	Plant Size
Trees				
Alnus rubra	Red alder	232	Container or field-grown	½ in caliper
Crataegus suksdorfii	Black hawthorn	232	Container or field grown	½ in caliper
Fraxinus latifolia	Oregon ash	232	Container or field grown	½ in caliper
Populus balsamifera	Black cottonwood	232	Container or field-grown	½ in caliper
Salix scouleriana	Scouler's willow	232	Container or field-grown	½ in caliper
Shrubs				
Cornus alba	Red-osier dogwood	965	1 gal	12 in
Rosa pisocarpa	Clustered rose	965	1 gal	12 in
Malus fusca	Western crabapple	965	1 gal	12 in
Physocarpus capitatus	Pacific ninebark	965	1 gal	12 in
Sambucus racemosa	Red elderberry	965	1 gal	12 in
Symphoricarpos albus	Snowberry	965	1 gal	12 in
Herbaceous seed mix				
Agrostis exarata	Spike bentgrass	2.0 lbs ac	Seed	n/a
Bromus carinatus	California brome	2.0 lbs ac	Seed	n/a
Deschampsia cespitosa	Tufted hairgrass	3.0 lbs ac	Seed	n/a
Elymus glaucus	Blue wildrye	3.0 lbs ac	Seed	n/a
Hordeum brachyantherum	Meadow barley	2.0 lbs ac	Seed	n/a
Lupinus rivularis	Riverbank lupine	3.5 lbs ac	Seed	n/a

N

0 50 100 200

SCALE IN FEET

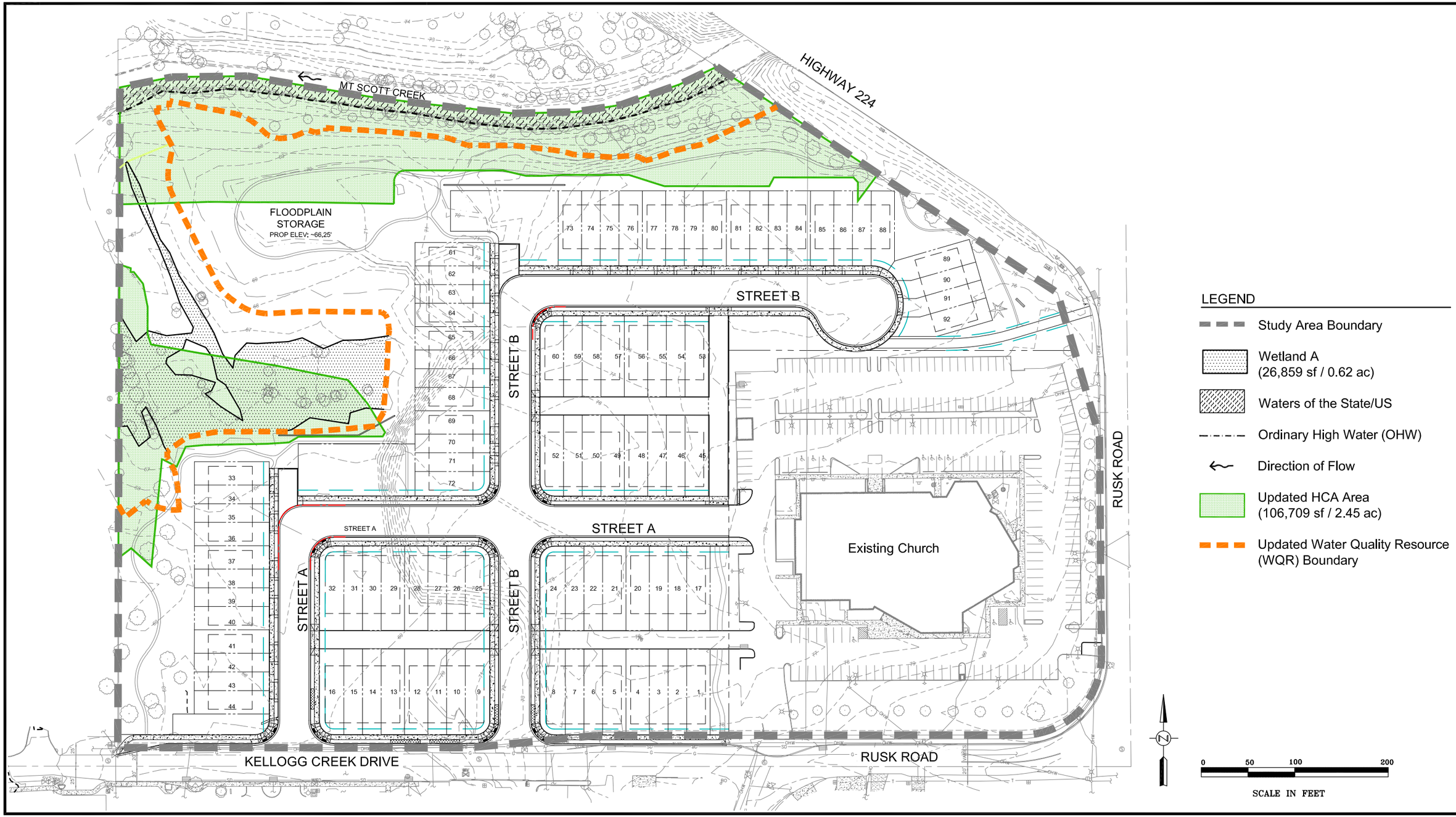
Pacific Habitat Services,Inc.
9450 SW Commerce Circle, Suite 180 Wilsonville, Oregon 97070
Phone: (503) 570-0800 Fax (503) 570-0855

Plans provided by DOWL.

Mitigation Plan
Kellogg Creek Subdivision - Milwaukie, Oregon

FIGURE 9

4-6-2017



PHS
Pacific Habitat Services,Inc.
9450 SW Commerce Circle, Suite 180 Wilsonville, Oregon 97070
Phone: (503) 570-0800 Fax (503) 570-0855

Plans provided by DOWL.

HCA Boundary Verification Map
Kellogg Creek Subdivision - Milwaukie, Oregon

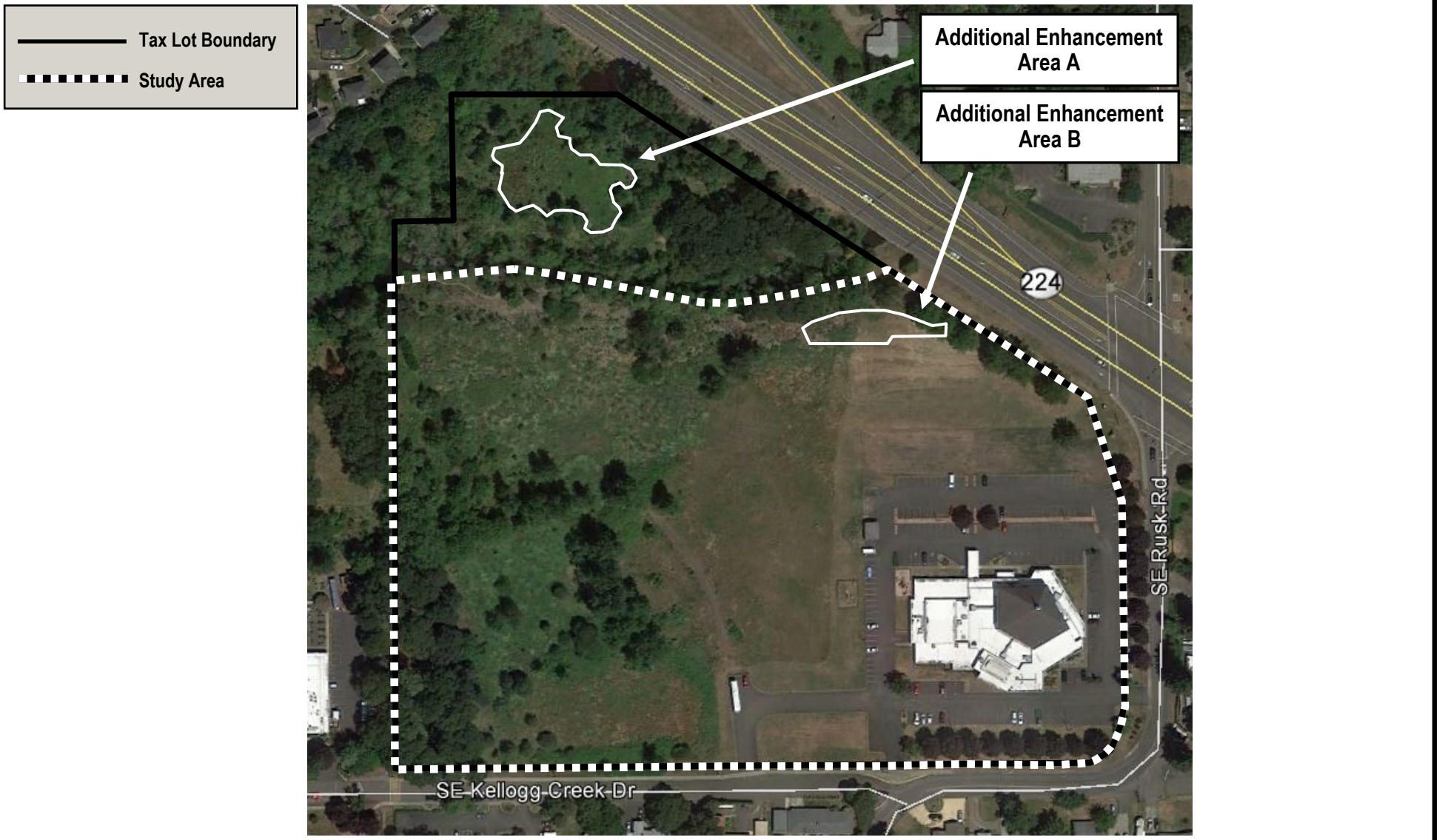
FIGURE
10

4-6-2017

Attachment B

Wetland Delineation Report

Note from City Planning staff (5/11/17): Attachment B is the Wetland Delineation Report prepared by Pacific Habitat Services (dated January 16, 2017), available as Exhibit D on the City's project webpage for this application (file #PD-2017-001). To reduce unnecessary repetition and limit file size for downloading, it is not duplicated with this document (Exhibit J).

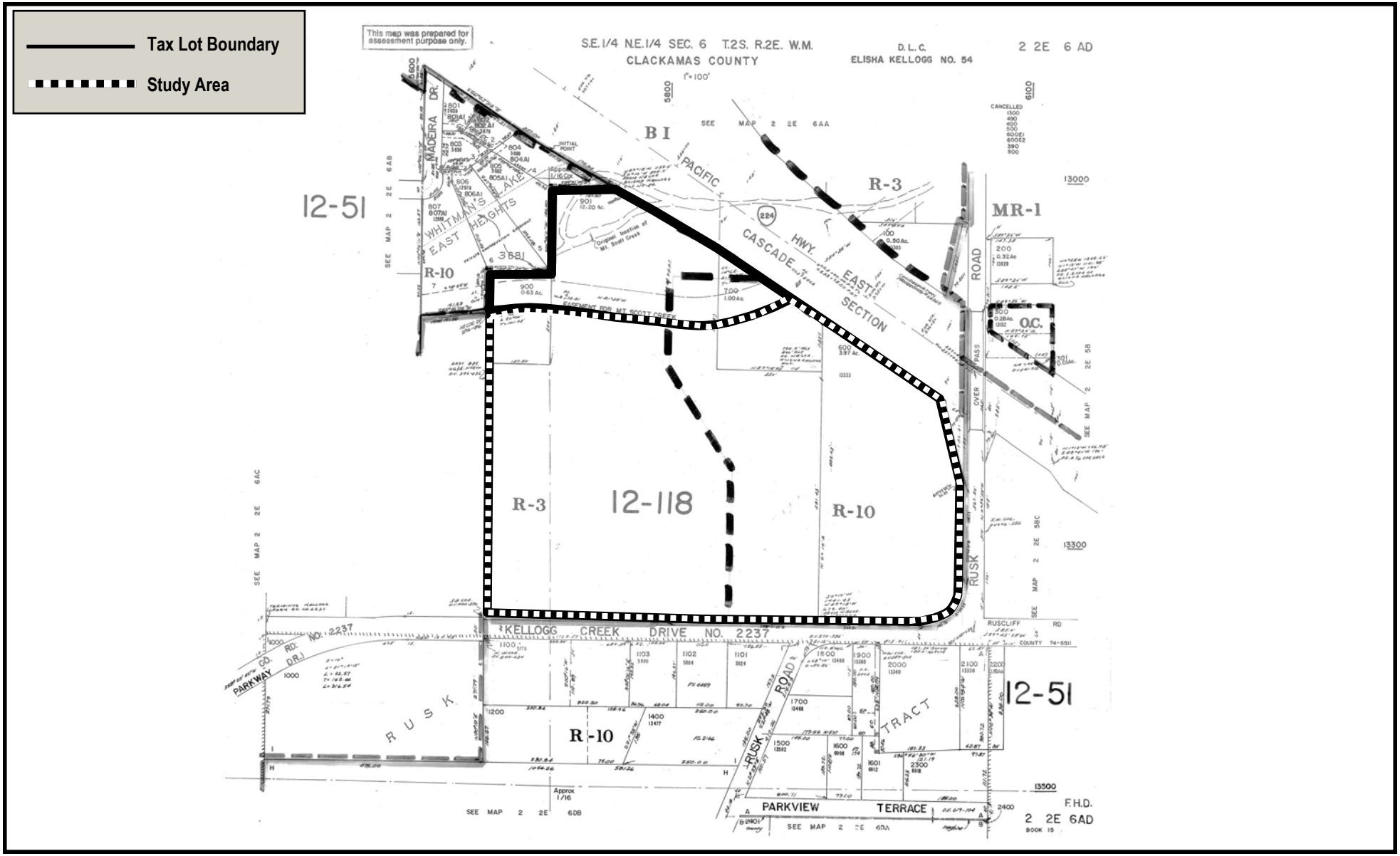


5975
4/19/2017

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Additional Enhancement Areas A & B
SE Kellogg Creek Drive - Milwaukie, Oregon
Aerial Photo - Google Earth, 2016

FIGURE
1A

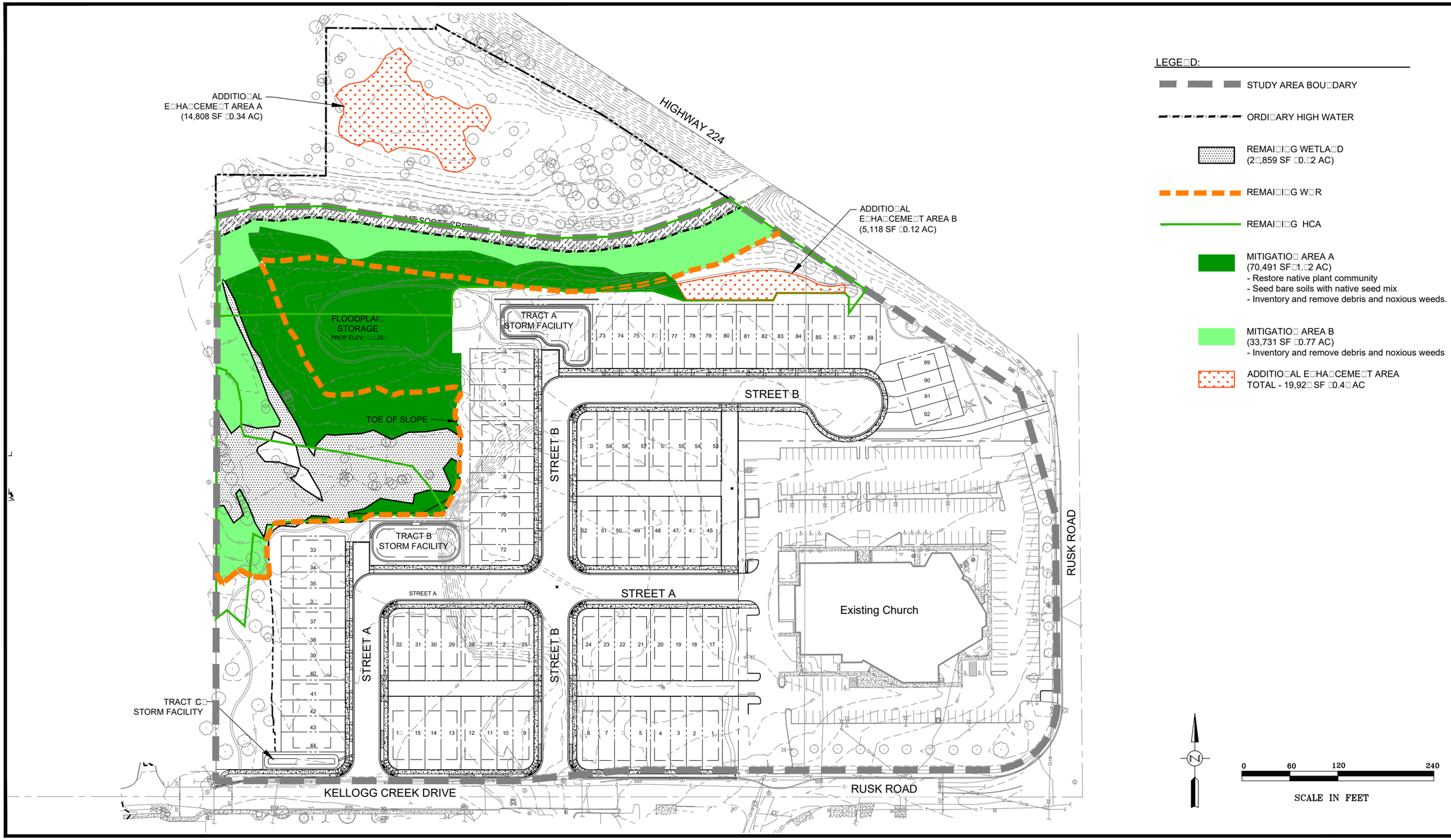


5975
12/21/2016

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Tax Lot Map
SE Kellogg Creek Drive - Milwaukie, Oregon
The Oregon Map (ormap.net)

FIGURE
2



Pacific Habitat Services,Inc.
9450 SW Commerce Circle, Suite 180 Wilsonville, Oregon 97070
Phone: (503) 570-0800 Fax (503) 570-0855

Plans provided by DOWL.

Updated Mitigation Plan
Kellogg Creek Subdivision - Milwaukie, Oregon

FIGURE
9

4-19-2017

X:\Project Directories\5900\5975 SE Rusk Road (Kellogg Creek Drive)\AutoCAD\Plot Dwg\HCA\Fig9 Mitigation.dwg, 4/19/2017 10:44:27 AM

Mitigation Area A Planting List

Species	Common Name	Quantity	Stock Type	Plant Size
Trees				
Alnus rubra	Red alder	232	Container or field-grown	½ in caliper
Crataegus douglasii	Douglas hawthorn	232	Container or field grown	½ in caliper
Fraxinus latifolia	Oregon ash	232	Container or field grown	½ in caliper
Populus balsamifera	Black cottonwood	232	Container or field-grown	½ in caliper
Salix scouleriana	Scouler's willow	232	Container or field-grown	½ in caliper
Shrubs				
Cornus alba	Red-osier dogwood	965	1 gal.	12 in
Rosa pisocarpa	Clustered rose	965	1 gal.	12 in
Malus fusca	Western crabapple	965	1 gal	12 in
Physocarpus capitatus	Pacific ninebark	965	1 gal.	12 in
Sambucus racemosa	Red elderberry	965	1 gal.	12 in
Symphoricarpos albus	Snowberry	965	1 gal.	12 in
Herbaceous seed mix				
Agrostis exarata	Spike bentgrass	2.0 lbs/ac	Seed	n/a
Bromus carinatus	California brome	2.0 lbs/ac	Seed	n/a
Deschampsia cespitosa	Tufted hairgrass	3.0 lbs/ac	Seed	n/a
Elymus glaucus	Blue wildrye	3.0 lbs/ac	Seed	n/a
Hordeum brachyantherum	Meadow barley	2.0 lbs/ac	Seed	n/a
Lupinus rivularis	Riverbank lupine	3.5 lbs/ac	Seed	n/a

Additional Enhancement Area A Planting List

Species	Common Name	Quantity	Stock Type	Plant Size
Trees				
Crataegus douglasii	Douglas hawthorn	81	Container or field grown	½ in caliper
Fraxinus latifolia	Oregon ash	81	Container or field grown	½ in caliper
Populus balsamifera	Black cottonwood	81	Container or field-grown	½ in caliper
Shrubs				
Rosa pisocarpa	Clustered rose	243	1 gal.	12 in
Malus fusca	Western crabapple	243	1 gal	12 in
Physocarpus capitatus	Pacific ninebark	243	1 gal.	12 in
Sambucus racemosa	Red elderberry	243	1 gal.	12 in
Symphoricarpos albus	Snowberry	243	1 gal.	12 in
Herbaceous seed mix				
Agrostis exarata	Spike bentgrass	2.0 lbs/ac	Seed	n/a
Bromus carinatus	California brome	2.0 lbs/ac	Seed	n/a
Deschampsia cespitosa	Tufted hairgrass	3.0 lbs/ac	Seed	n/a
Elymus glaucus	Blue wildrye	3.0 lbs/ac	Seed	n/a
Hordeum brachyantherum	Meadow barley	2.0 lbs/ac	Seed	n/a

Additional Enhancement Area B Planting List

Species	Common Name	Quantity	Stock Type	Plant Size
Trees				
Acer macrophyllum	Big-leaf maple	27	Container or field-grown	½ in caliper
Populus balsamifera	Black cottonwood	27	Container or field grown	½ in caliper
Quercus garryana	Oregon white oak	27	Container or field grown	½ in caliper
Shrubs				
Mahonia aquifoluim	Tall Oregon grape	143	1 gal.	12 in
Rosa gymnocarpa	Baldhip rose	143	1 gal.	12 in
Symphoricarpos albus	Snowberry	143	1 gal	12 in
Herbaceous seed mix				
Achillea millefolium	Yarrow	3.0 lbs/ac	Seed	n/a
Bromus carinatus	California brome	2.0 lbs/ac	Seed	n/a
Elymus glaucus	Blue wildrye	3.0 lbs/ac	Seed	n/a

Pacific Habitat Services,Inc.
9450 SW Commerce Circle, Suite 180 Wilsonville, Oregon 97070
Phone: (503) 570-0800 Fax (503) 570-0855

Plans provided by DOWL.

Planting Lists
Kellogg Creek Subdivision - Milwaukie, Oregon

FIGURE 9A

4-19-2017

Exhibit K

JOHNSON ECONOMICS

MEMORANDUM

DATE: April 4, 2017

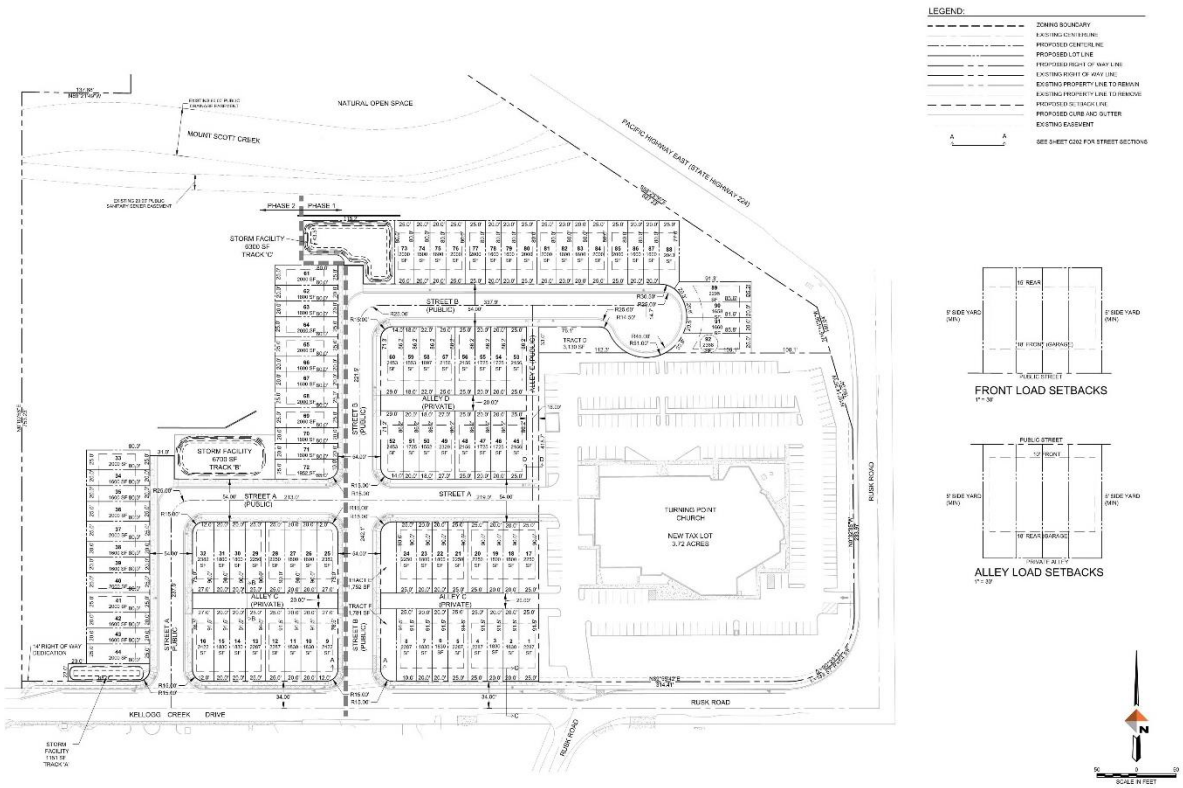
TO: Serah Breakstone
DOWL

FROM: Jerry Johnson
JOHNSON ECONOMICS, LLC

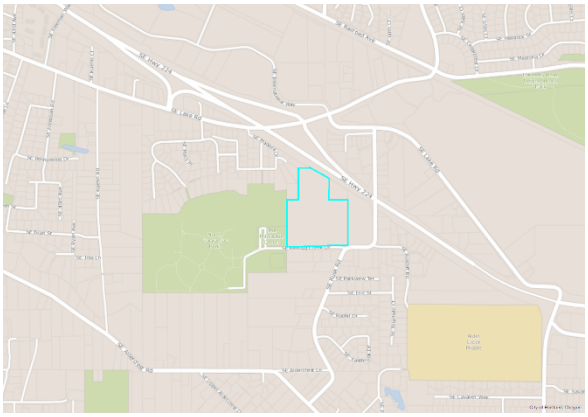
SUBJECT: Review of Proposed Development in Context of Milwaukie's Housing Needs Analysis

Johnson Economics has been asked to review a proposed 92-unit residential development program in Milwaukie, Oregon. This review addresses the program and the degree to which it is consistent with the findings of the City's Housing Needs Analysis and Strategies reports (August 2016).

The development site is at the intersection of SE Rusk Road and SE Kellogg Creek. Zoning on the site is currently R-10 and R-3.



The location of the site provides excellent access and visibility from Highway 224, as well as access to the North Clackamas Park, Alder Creek Middle School, the Clackamas Aquatic Center, and employment concentrations along Highway 224 and I-205 Corridors. While proximate to single family residential concentrations to the south and west, the site is separated by topography and environmental corridors, limiting the impact on these properties from new development.



The proposed development program would include approximately 92 units, which would be delivered in four rowhouse building modules. The development would include alleys for access into attached garages for approximately half of the units, with the remainder front-loaded. The units are expected to offer three bedrooms and two and a half baths with one car garages. The townhome configuration of the project will allow the development to provide these family friendly units at a price point that would be unobtainable with a lower density detached single family development.

Demographic and Housing Trends

The Housing Needs Analysis (HNA) discussed future housing types, and the increasing role that attached residential forms are expected to play in the metropolitan area's housing market. The region has adopted policies to encourage increased density of land uses within the UGB, as well as to encourage infill and redevelopment over time. As noted in the City's HNA:

> *The continuing constraints of the UGB, along with the region's planning framework and policies, create an atmosphere in which individual jurisdictions are likely to see an increasing share of attached housing types (from townhomes to large complexes) in order to accommodate projected demand.*

In the Portland Metro area, there is evidence that growth and rising housing costs in central Portland is causing spillover effects across the region. Adjacent cities such as Milwaukie now provide an attractive lower-cost alternative for younger households. Milwaukie is an attractive established community, with good transportation connections to other parts of the Metro area.

The millennial generation is emerging as the dominant demographic group impacting entry-level residential housing, similar to what is being proposed. This generation grew up in a time of generally rising economic prosperity in the 1980s and 1990s, but many find themselves at a disadvantage in the current economy. Quality entry-level jobs have been scarce since the recession, while average student debt has risen sharply. Incomes for people younger than 35 have fallen over the last decade, meaning that this generation is starting from behind.

While many millenials currently reside in rental housing in the urban core, they will be less well-positioned to afford central city housing as they change life-stages and seek ownership opportunities and room for families. In the urban core, where many prefer to live, single-family homes will be scarce and expensive. While childless millennials may continue to accept smaller multi-family units in order to remain in their preferred neighborhoods, many will find many urban options either too constrained or too expensive. This is expected to create opportunities for close-

in suburbs. Based on observed trends, this generation appears to be more accepting of living in denser types of housing, such as attached single-family, even with children. Townhomes will likely represent a larger share of for-sale starter homes, as an attached product allows for a lower price point.

The City of Milwaukie has a significant employment base, and is a net-importer of labor from the remainder of the metropolitan area. There are an estimated 12,400 jobs in the city of Milwaukie, and an estimated 9,100 Milwaukie residents in the labor force. As of 2014, the Census estimates that over 11,700 employees commute into the city from elsewhere. This significant commute pattern indicates that locally-employed workers are not finding appropriate housing options within the City.

The general trends identified in the HNA for the City of Milwaukie include:

- As demand increases, prices rise, and remaining land within the UGB is developed, denser forms of development and creative reuse of parcels through infill and redevelopment become more economically viable. This is increasingly the case for developed parts of the Metro area such as Milwaukie, which offer few opportunities for large-scale development of single-family subdivisions.

- Milwaukie is likely to be attractive to 20-something residents seeking relatively affordable living near transportation options and employment centers. Some in this generation are already starting young families and will be well into middle age during the 20-year planning period. More of these households may move from areas like central Portland to communities like Milwaukie for affordable housing, more space, and schools.

Housing Needs Analysis Findings

The HNA provided a projected profile of future housing demand through 2036. That profile indicated that 68.8% of the projected demand for ownership housing units would be for units priced below $380,000. This is a price point that is increasingly difficult for developers to hit with a detached residential product, and building for that market will require an expanding role for middle housing products such as townhomes. While the HNA found a significant existing stock of detached single family homes in that price range, recent escalation trends have significantly diminished that stock. Over time, we expect that the City will have very limited opportunities to purchase detached single family housing at affordable price ranges.

As noted in the HNA, the types of housing that Milwaukie and other Metro communities should expect to see going forward will include more attached housing types and increased density overall. This is due to the developed nature of Milwaukie within its current city boundary and limited ability to expand into undeveloped areas. This trend also reflects the region-wide policy to house most future growth within the current UGB.

While the City of Milwaukie has an estimated remaining residential capacity of 2,919 units, only 17.5% of this capacity is on vacant land. The remainder is theoretical redevelopment capacity.

The HNA includes strategies related to realizing the potential of infill and redevelopment site in lower medium density residential zones which are scattered throughout the city. The subject site was identified in the HNA as likely to redevelop. This type of development, often called “infill” development is key to the City of Milwaukie’s ability to meet the housing needs of future residents – people who work and/or want to live in Milwaukie in the future.

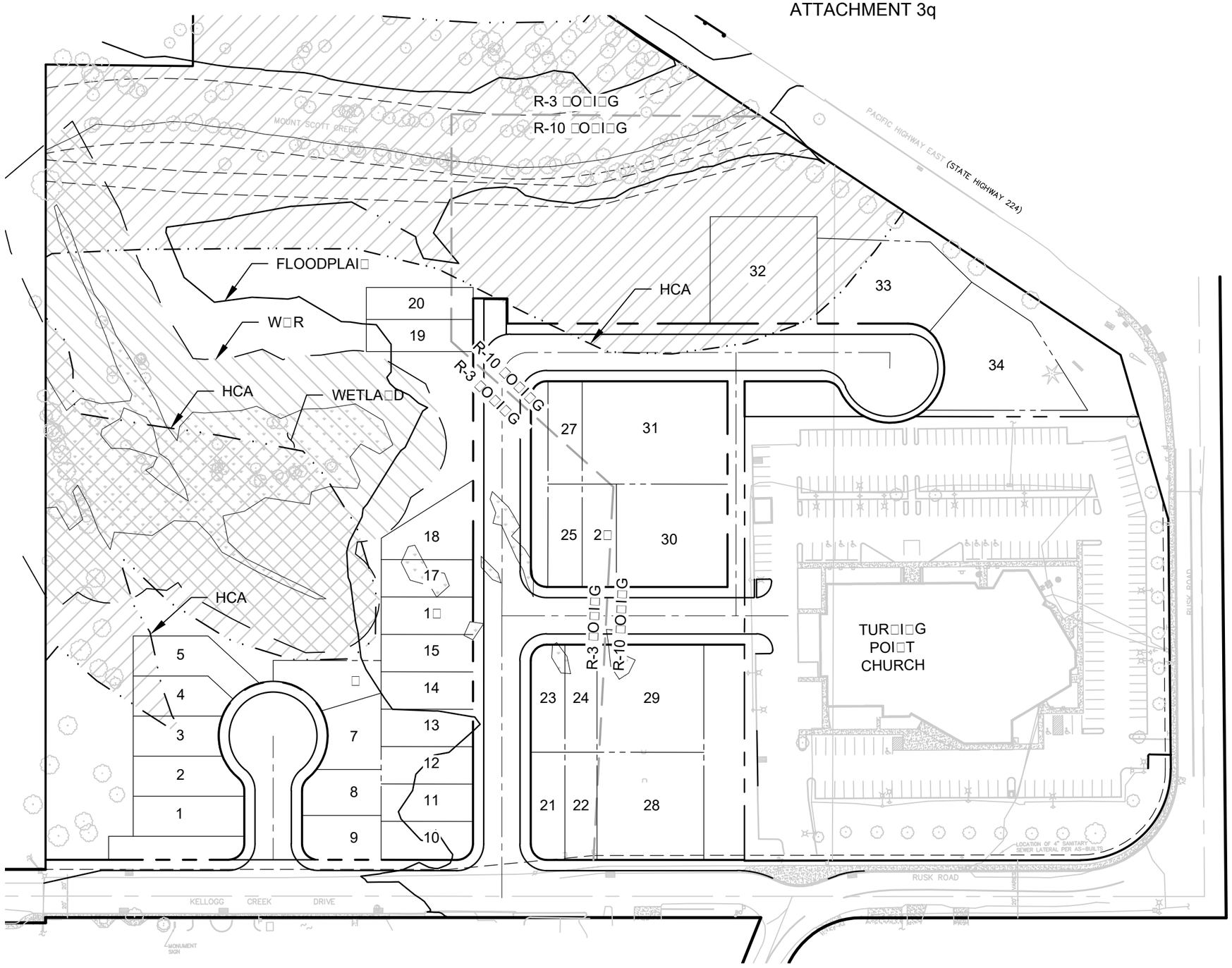
SUMMARY

The proposed development is consistent with the observed trends in the residential market, and is expected to deliver a product that is consistent with identified market demand. The subject site is particularly well suited for this type of development, with proximate parks and open space to complement the limited yard space provided in a townhome configuration. We would expect the project to have appeal to a cost-sensitive starter family market, which will value the local amenity mix as well as proximity to employment and commercial services.

The development is requesting a Planned Development approval, which would allow for flexibility to deal with the site and natural resources. The site is split zoned, with portions zoned either R-10 or R-3. The R-10 zoning has a minimum lot size of 10,000 square feet, and would yield few units. Even under a duplex scenario, the zoning would require 14,000 square feet per duplex. The R-3 zoning allows for 3,000 square foot lots sizes, but with the level of natural resource on the site a development would not be able to meet minimum density. As zoned, any development on the site would necessarily be at a price point that would not be responsive to the local demand.

The proposed townhome development would allow for family-oriented unit at a price point that meets identified demand, and can provide workforce housing. It would help realize and expand the City's housing capacity, increasing housing options for local residents as well as locally-employed households.

ATTACHMENT 3q



Alternate Site Plan Information

R-3 □oning:

□umber of Lots Provided	□27 Lots
□umber of Lots Re□uired to Meet Minimum Density	□3□ Lots
ROW Area	□39,837 SF

R-10:

□umber of Lots Provided	□7 Lots
□umber of Lots Re□uired to Meet Minimum Density	□5 Lots
ROW Area	□37,517 SF

Habitat Conservation Area (HCA)

Total Existing within Site	□5.59 acres
Impacted by Site Plan	□0.43 acres (7.7□)

Water □uality Resource (W□R)

Total Existing within Site	□2.30 acres
□o Impact to W□R	

W□R □ HCA

Total Area	□ □.07 acres
Overlapping Area	□ 1.82 acres

0 100 200

SCALE I□ FEET

DOWL 4□3□2017

WWW.DOWL.COM

720 SW Washington Street, □750
Portland, Oregon 97205
971-229-831□
Pro□ect □o. 14258.01
Contact: Scott Emmens, PE

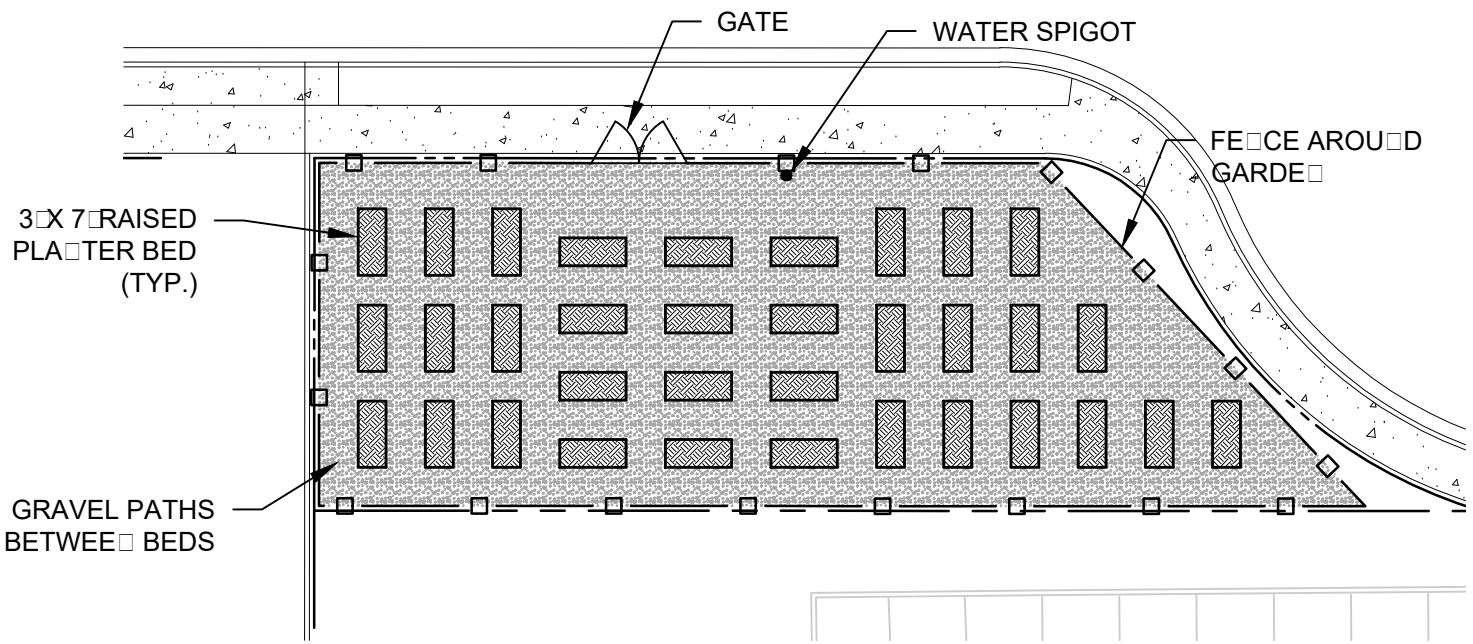
Kellogg Creek

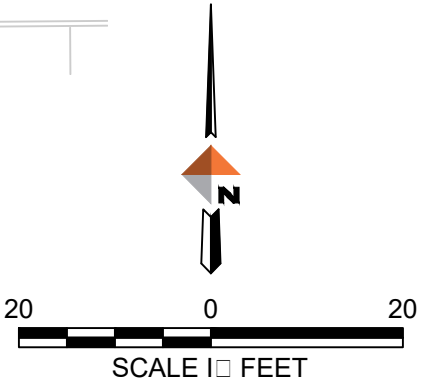
Site Plan: April 3, 2017

Milwaukie, Oregon

ATTACHMENT 3r

\\BIL-FS\BIL-projects\22\14258-01\65CAD\Exhibits\2017-04-05- Community Garden\Wetland Cross Sections.dwg PLOT DATE 2017-4-5 13:34 SAVED DATE 2017-02-15 18:02 USER: kglidden





DOWL
WWW.DOWL.COM

KELLOGG CREEK SUBDIVISIO□
COMMU□ITY GARDE□

PRO□ECT	14258
DATE	4□5□2017

KELLOGG PARKING

STREET PARKING: 75
20' min each space

FRONT GARAGE: 88
1 in GARAGE
1 in Dr. WAY
44 Units

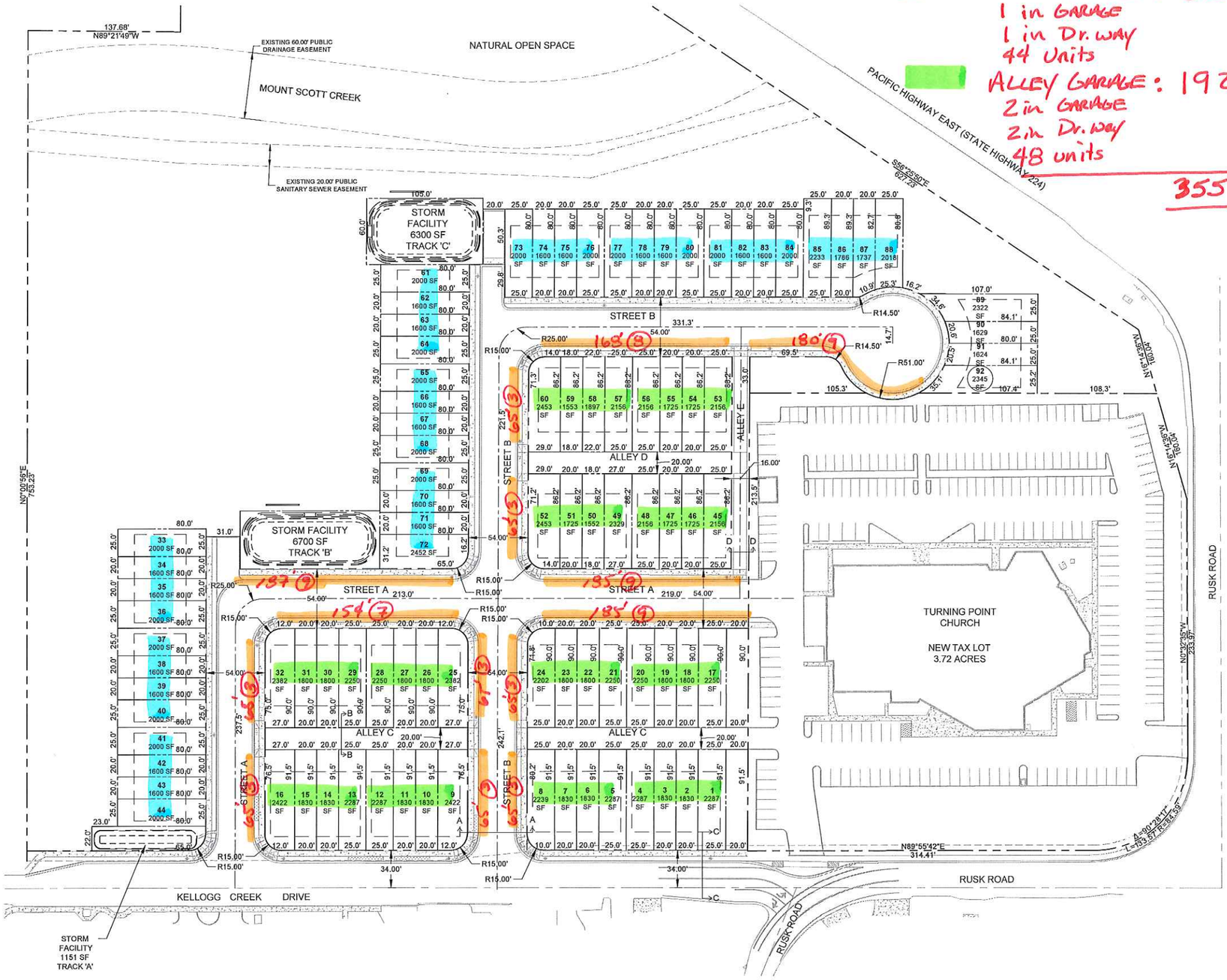
ALLEY GARAGE: 192
2 in GARAGE
2 in Dr. WAY
48 units

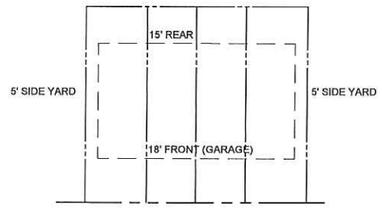
355 SPACES

LEGEND:

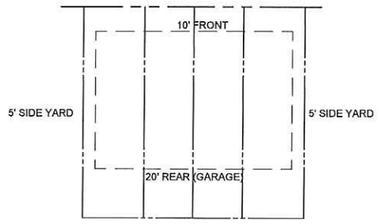
- ZONING BOUNDARY
- EXISTING CENTERLINE
- PROPOSED CENTERLINE
- PROPOSED LOT LINE LINE
- PROPOSED RIGHT OF WAY LINE LINE
- EXISTING RIGHT OF WAY LINE LINE
- EXISTING PROPERTY LINE TO REMAIN
- EXISTING PROPERTY LINE TO REMOVE
- PROPOSED SETBACK LINE
- PROPOSED CURB AND GUTTER
- EXISTING EASEMENT

A A — SEE SHEET C202 FOR STREET SECTIONS

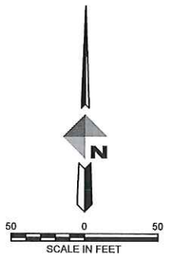




FRONT LOAD SETBACKS
1" = 30'



ALLEY LOAD SETBACKS
1" = 30'



REGISTERED PROFESSIONAL ENGINEER
OREGON
JANUARY 9, 2007
J. SCOTT EMMENS
EXPIRES: 12/31/2017

DOWL
WWW.DOWL.COM

KELLOGG CREEK SUBDIVISION

PRELIMINARY PLAT

BROWNSTONE DEVELOPMENT
MILWAUKIE, OREGON
SE1/7 NE1/4 SEC. 6 T2S R2E W.M. EXISTING TAXLOTS 600, 700, 900, 901

PROJECT	14233-01
DATE	01/11/2017

SHEET
C201

Kelver, Brett

From: Wyffels, Michelle <WyffelsM@trimet.org>
Sent: Thursday, April 20, 2017 2:07 PM
To: Kelver, Brett
Subject: RE: Development of 13333 SE Rusk Rd

Thank you for poking me again. It's been a hectic few days.

Thank you for catching the Line 152 route change- it hasn't yet hit my desk and I didn't catch the pending change. Please remove my comment, it won't be applicable once the development is done.

Thank you,

Michelle

From: Kelver, Brett [mailto:KelverB@milwaukieoregon.gov]
Sent: Thursday, April 20, 2017 1:17 PM
To: Wyffels, Michelle
Subject: RE: Development of 13333 SE Rusk Rd

Michelle,

Checking back to see if you had a response to my earlier questions below. Keep me posted—I just didn't want to have this fall through the cracks on my end. Thanks!

Brett Kelver, AICP
Associate Planner
City of Milwaukie

From: Kelver, Brett
Sent: Tuesday, April 18, 2017 4:38 PM
To: Wyffels, Michelle <WyffelsM@trimet.org>
Subject: RE: Development of 13333 SE Rusk Rd

Michelle,

Thanks for the note back. I will pass along the contact info (regarding you and not Grant being the TriMet contact) to our administrative staff to update our forms.

Shall I consider this e-mail to be your official comment from TriMet? A few clarifications:

- **When you mention TriMet's interest in "maintaining sidewalks along the frontage," am I correct in assuming that you mean along the project's Kellogg Creek Drive frontage, as opposed to the Hwy 224 and Rusk Rd frontages? And that by "maintaining" you mean something like "ensuring that sidewalks are in place" instead of "TriMet actually providing the upkeep of sidewalks"? (I'm getting into my technical writing brain of the land use findings, which sometimes wants to use the word "maintain" as "to keep up or service.")**

- **Would a bus stop be on Kellogg Creek Drive? Also, I thought I had heard that TriMet was going to be discontinuing its regular bus service in this particular area (the 152 route)--would a bus stop potentially be one for shuttle service rather than regular buses?**

Thanks again for responding in such timely fashion. Let me know if you need more information or have questions about the project. We'll certainly update our TriMet contact info to pull you into the loop.

-Brett Kelver
Associate Planner

From: Wyffels, Michelle [WyffelsM@trimet.org]
Sent: Tuesday, April 18, 2017 1:08 PM
To: Kelver, Brett
Subject: Development of 13333 SE Rusk Rd

Brett-

TriMet may be interested in installing a bus stop for deboarding customers adjacent to this new development if residents request it. With this in mind, we are interested in maintaining sidewalks along the frontage and promoting safe crossings.

Also, Grant O'Connell is no longer with my department. Can you replace his name with mine for future correspondence from the City? I would eventually get stuff routed to him, but it risks getting lost.

Thank you,

MICHELLE WYFFELS
Planner II
TriMet
1800 SW 1st Ave., Suite 300, Portland, OR 97201
Office: 503-962-2180 **Email:** wyffelsm@trimet.org

Clackamas County Fire District #1
Fire Prevention Office

E-mail Memorandum

To: City of Milwaukie Planning Department

From: Matt Amos, Fire Inspector, Clackamas Fire District #1

Date: 4/25/2017

Re: Kellogg Creek Subdivision PD-2017-001

This review is based upon the current version of the Oregon Fire Code (OFC), as adopted by the Oregon State Fire Marshal's Office. The scope of review is typically limited to fire apparatus access and water supply, although the applicant must comply with all applicable OFC requirements. When buildings are completely protected with an approved automatic fire sprinkler system, the requirements for fire apparatus access and water supply may be modified as approved by the fire code official. The following items should be addressed by the applicant:

COMMENTS:

A Fire Access and Water Supply plan is required for subdivisions and commercial buildings over 1000 square feet in size or when required by Clackamas Fire District #1. The plan shall show fire apparatus access, fire lanes, fire hydrants, fire lines, available fire flow, FDC location (if applicable), building square footage, and type of construction. The applicant shall provide fire flow tests per NFPA 291, and shall be no older than 12 months. Work to be completed by experienced and responsible persons and coordinated with the local water authority.

Access:

1) Provide address numbering that is clearly visible from the street.
2) The inside turning radius and outside turning radius for a 20' wide road shall not be less than 28 feet and 48 feet respectively, measured from the same center point.
3) Provide an approved turnaround for dead end access roads exceeding 150 feet in length.
4) Fire Department turnarounds shall meet the dimensions found in the fire code applications guide.

2930 S.E. Oak Grove Blvd. • Milwaukie, OR 97267 • 503-742-2660

Water Supply

1) Fire Hydrants, One and Two-Family Dwellings & Accessory Structures: Where a portion of a structure is more than 600 feet from a hydrant on a fire apparatus access road, as measured in an approved route around the exterior of the structure(s), additional fire hydrants and mains shall be provided.
2) Prior to the start of combustible construction required fire hydrants shall be operational and accessible.
3) For one and two family dwellings located in areas with reliable municipal fire fighting water supply the following shall apply:
    <3,600 square feet (including attached garage)
        a) 1,000 gpm @ 20 psi with hydrant within 600 feet of furthest portion of new residential construction, (OFC Section B105.2)
    >3,600 square feet (including attached garage)
        a) Shall meet fire flow requirements specified in Appendix B of the current Oregon Fire Code, (OFC, Table B105.1)
        b) Shall meet hydrant coverage as specified in Appendix C of the current Oregon Fire Code, (OFC, Table C105.1)

Kelver, Brett

From: Amos, Matt <Matt.Amos@clackamasfire.com>
Sent: Thursday, May 04, 2017 3:46 PM
To: Kelver, Brett
Subject: 13333 SE Rusk Rd. PD-2017-001
Attachments: PD-2017-001 Kellogg Creek Subdivision.doc

Good afternoon Brett,

I have no additional comments based on the additional plans. I am going to keep my original comments and continue to send them as a response.

Thank you,

Matt Amos
Fire Inspector | Fire Prevention
direct: 503.742.2661
main: 503.742.2600

To Safely Protect & Preserve Life & Property

CLACKAMAS FIRE DISTRICT #1
www.clackamasfire.com

Kelver, Brett

From: Livingston, Robert
Sent: Tuesday, April 25, 2017 9:30 AM
To: Kelver, Brett
Subject: Kellogg Creek subdivision

Brett,

Thanks for the opportunity to comment on this project. I have reviewed the plans proposed by the developer and I'm suggesting the following comments:

1. Because of the size of the development is over five (5) acres, a 1200C Construction stormwater permit will be required. The applicant will be required to apply to Oregon DEQ for this permit. They will need to insert Milwaukie's standard erosion control notes into their erosion control plan using the templates that DEQ require. They will need to submit the same erosion control plans to the City of Milwaukie at the same time they submit to DEQ. The City of Milwaukie will also issue an erosion control permit due to their disturbing >500 ft^2 per Milwaukie code and the applicant will have to pay the appropriate fee for this permit. The City of Milwaukie will provide comments on the erosion control plan during the 14 day public comment period as provided in the 1200C permit process.
2. The applicant will need to enter into a maintenance agreement with the City of Milwaukie for the operation and maintenance of the privately owned stormwater facilities on the property. This agreement will need to be completed by the applicant completely and recorded at the appropriate county records department.
3. As much of the project will be constructed on/in an area currently a wetland, I did not see how they anticipated to manage the hydric soils they will be excavating from the wetland area. Perhaps this is a comment more for the erosion control plan.
4. With the addition of 92 new households, we could reasonably expect the addition of at least 50-75 pets that residents would walk around the proposed natural area to the north of the project. The developers should be required to install some sort of pet waste bag dispensing device similar to what is available in public parks and establish a pet waste management plan for dealing with pet waste and disposal. I also anticipate pets recreating in Mt. Scott Creek, damaging the water quality for aquatic life in the creek and degrading fish habitat.
5. The private stormwater facilities on the property are described as detaining stormwater runoff prior to discharging into Mt. Scott Creek, but do not elaborate on how or where this discharge will be mitigated.
6. The planting plan for the development shows most of the planting to occur near the buildings and sidewalks. With the addition of 92 new units and the impact the development and new residents will have on the area, can we require tree plantings near the creek? I'm thinking specifically tree plantings that will ultimately facilitate shade on Mt. Scott Creek in order to reduce stream temperatures and mitigate some of the impact of the development and the residents plus the removal of many large mature trees already on the property.

Thanks,

ROB LIVINGSTON
Environmental Services Coordinator
503.786.7691
6101 SE Johnson Creek Blvd • Milwaukie, OR 97206

CITY OF MILWAUKIE

Kelver, Brett

From: Livingston, Robert
Sent: Thursday, April 27, 2017 2:02 PM
To: Kelver, Brett
Subject: Brownstone Development variances

Brett,

Thanks for the opportunity to comment on the additional materials submitted on the Kellogg subdivision project. I read through the applicants request for both variances and while the first variance concerning driveway specifications didn't concern me, the second relating to wetland mitigation did. Brownstone's proposal of Additional Enhancement Areas "A" and "B" are fine, but *in addition* to this proposal I had the following thoughts:

The applicant's proposal will impact 1.06 acres of habitat conservation area but is only proposing to mitigate 0.46 acres. Additional Enhancement Areas "A" and "B" in my opinion don't offer real streambank enhancement nor vegetative shading of Mt. Scott Creek, which is my biggest concern. Neither areas "A" and "B" are not in close proximity to the creek, Area "A" is north of the creek and any tree planting there wouldn't offer any beneficial shading to Mt. Scott Creek and Area "B" is too far away from the creek for shade to reach the creek if trees are planted for years, or decades.

My suggestion (if a variance is approved) would be for the developer to plant trees along the southern bank of Mt. Scott Creek that will appreciably shade the creek as they mature. Areas "A" and "B" total 0.46 acres and the difference in impact would be 0.6 acres. I think the developer should be responsible for planting the difference in area impacted (0.6 acres) with native trees on the southern bank of the creek with some sort of plan for maintenance & protection to ensure successful forestation.

ROB LIVINGSTON
Environmental Services Coordinator
503.786.7691
6101 SE Johnson Creek Blvd • Milwaukie, OR 97206

CITY OF MILWAUKIE

Kelver, Brett

From: paul.hawkins@daimler.com
Sent: Friday, April 28, 2017 11:23 AM
To: Kelver, Brett
Subject: RE: comments on Rusk Rd project?

Mr. Kelver,

I have examined the application thoroughly. Knowing that the FEMA flood data from that location is dated, I hope the three proposed catch basins are adequate.

In addition to a less than ideal "Y" intersection with Kellogg Creek Drive, traffic presently backs up on Rusk Road @ 224 during work commuting hours; M-F.

I will be attending the meeting on May 23d.

Enjoy your weekend,
Paul Hawkins
Lake Road Neighborhood Assoc.

From: Kelver, Brett [mailto:KelverB@milwaukieoregon.gov]
Sent: Friday, April 28, 2017 10:41 AM
To: 'Vincent.Alvarez@BURROUGHS.COM' <Vincent.Alvarez@BURROUGHS.COM>; Hawkins, Paul (164) <paul.hawkins@daimler.com>
Subject: comments on Rusk Rd project?

Vince and Paul,

Checking in to see if you had a chance to review the Planned Development materials for the Rusk Road project and whether you were planning to send me any comments on the application.

The initial deadline for comments was yesterday (4/27), but I know it is a lot of material to get through, and I am still working on my draft documents. If you need until early next week to send me any comments, that would be fine—is there a chance you could get me something by the end of the day Monday (5/01)?

Thanks for taking time to look things over. I'm guessing there will be a lot of public interest in this project, and I'd like to make sure that whatever comments the NDA has are included in the staff report and analysis in advance of the first hearing on May 23.

-Brett Kelver
Associate Planner

Kelver, Brett

From: Rebecca Hamilton <Rebecca.Hamilton@oregonmetro.gov>
Sent: Monday, May 01, 2017 3:59 PM
To: Kelver, Brett
Subject: RE: comments on Rusk Rd project (Milwaukie)?

Hello Brett,

Thank you for the opportunity to comment on this application. Metro notes that the application would require a Type III variance in order to allow impacts to designated natural areas for the purpose of construction of 31 of the 92 proposed lots. The City of Milwaukie's Municipal Code is consistent with Metro's Functional Plan. If the City of Milwaukie is satisfied that the application has met its requirements for a Type III Variance, and if there is no request for an amendment to the City's comprehensive plan or zoning code, then Metro has no comment on this application.

Please feel free to contact me with any questions or comments. Best,

Rebecca Hamilton
Regional Planner
Metro
600 NE Grand Ave., Portland, OR 97232
(503) 797-1721
rebecca.hamilton@oregonmetro.gov

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From: Kelver, Brett [mailto:KelverB@milwaukieoregon.gov]
Sent: Friday, April 28, 2017 1:37 PM
To: Rebecca Hamilton
Subject: comments on Rusk Rd project (Milwaukie)?

Rebecca,

I'm checking in to see if you had a chance to review the Planned Development materials for the Rusk Road project and whether you were planning to send me any comments on the application. You should have received a hard copy of the materials in the mail, but they are also available online here: https://www.milwaukieoregon.gov/planning/pd-2017-001

The initial deadline for comments was yesterday (4/27), but I know it is a lot of material to get through, and I am still working on my draft documents. If you need until early next week to send me any comments, that would be fine—is there a chance you could get me something by the end of the day Monday (5/01)?

Thanks for taking time to look things over. I'm guessing there will be a lot of public interest in this project, and I'd like to make sure that whatever comments Metro has are included in the staff report and analysis in advance of the first hearing on May 23.

-Brett Kelver
Associate Planner

Kelver, Brett

From: Joseph Edge <joseph.edge@gmail.com>
Sent: Monday, May 01, 2017 1:21 PM
To: Kelver, Brett
Cc: Baldwin van der Bijl; Mike Schmeer
Subject: OGCC Comments for PD-2017-001 (13333 SE Rusk Rd)

Brett,

Here are the comments approved by the Oak Grove Community Council Board of Directors regarding the proposed Planned Development Subdivision at 13333 SE Rusk Road.

I. Traffic impact study
II. Stormwater calculations
III. Mitigation for impacts to WQR/HCA

I. Traffic impact study
We are concerned that using the ITE Trip Generation Rate estimates for "Townhouses" from the ITE Trip Generation Manual will under-represent the number of vehicular trips beginning or ending at the subject site during the peak periods. The subject site is not well-served by transit or well-connected regional trails nor is is part of a connected, walkable grid of streets shared with employment uses. Additionally, the proposed housing is intended as "workforce housing," which suggests that it's residents will be employed, not retired, and are intended to be owner-occupied, which has been shown empirically to result in a higher number of trips by motor vehicle compared to rental units. Since this is not a mixed-use development and no on site employment uses are programmed, a very low proportion of these residents will remain on-site to work as opposed to commuting off-site to work. Almost all of these trips will be made using a motor vehicle. Lastly, at a price point above $300,000, these dwellings will be affordable to families earning 100-120% or more of area median income (up to $76,620). For a lot of families, it will require two wage-earners to combine to afford this price point, which translates to two trips per peak period for many of these proposed dwelling units. We believe that the designation for "single family detached dwelling" more accurately reflects the trip generation rate for these owner-occupied, single-family dwellings.

II. Stormwater calculations
The applicant estimated pre-development ("*Lewis and Clark*") conditions for the site as a combination of woods/grass which, with the current soil type in the site, aligns with a "curve number" of 79. Wooded areas in "D" type soils are rated 77, but would be rated 70 if a more absorbent soil type were assumed. The site does have a high water table and the presence of less absorbent soils, so runoff under current conditions is relatively high, but under densely forested *Lewis and Clark* conditions (exemplified by the dense wooded riparian areas along Mount Scott Creek near the Highway 224 right-of-way) the presence of additional large trees on the site would consume much of that groundwater, making room for more infiltration of surface water. Also, much of the current soil on the site is fill dumped on the site sometime between 1981 and 1995, which does not resemble *Lewis and Clark* conditions. The applicant uses a "conservative" estimate for calculating the required runoff storage, but we find that a conservative estimate should err on the side of caution with respect to runoff storage and the resulting risk to life and property. This site floods frequently in routine rain events, and is located downstream from properties that are being bought out by Clackamas County and FEMA because of the repeat flood risk. A "conservative" estimate should "conservatively" estimate the volume of water that can safely be conveyed to Kellogg and Mount Scott Creeks during a rain event without exacerbating flooding. We believe a curve number of 70 should be used to better reflect the intent of the ordinance.

III. Mitigation for impacts to WQR/HCA
The loss of large White Oak trees and their associated vegetation (Camas etc) along the western edge of this proposed project is unacceptable. New trees will not mitigate for this increasingly rare Old-growth White Oak forest. The proposal includes permanent disturbances to portions of the protected resource areas on the site. This is allowed if the alternatives are not feasible to permit development of the same number of dwelling units; however, the ordinance seeks first to protect, then to mitigate if protection is not feasible. We find that an alternative where the 12 dwelling units in the three buildings proposed for the southwesterly portion of the site are combined with some other dwelling units into a multi-family building outside of the protected resource area should be feasible and protect the applicant's right to construct the same number of dwelling units as in their preferred alternative.

Please do not hesitate to contact us with any questions.

Thank you,

Joseph P Edge
Director, Oak Grove Community Council

CC: Baldwin van der Bijl, Chair, Oak Grove Community Council
CC: Mike Schmeer, Chair, Oak Grove Community Council Land Use Application Review Team

--
Joseph

ESA

819 SE Morrison Street
Suite 310
Portland, OR 97214
503.274.2010 phone
503.274.2024 fax

www.esassoc.com

memorandum

date May 1, 2017

to Brett Kelver, AICP

from Sarah Hartung, Senior Biologist; Beth Copeland, P.E.; Luci Hise-Fisher, Senior Planner

subject Natural Resource Review for the Kellogg Creek Drive Planned Development

This memorandum summarizes our technical review of land use application materials relating to site natural resources regulated by Milwaukie's Municipal Code, including floodplains, Habitat Conservation Areas (HCAs) and Water Quality Resources (WQRs). Our responses to specific technical review tasks are identified in *italics*.

1. Visit the site to assess existing conditions and verify that the applicant's presentation of existing conditions in the Natural Resource Review report is accurate and thorough.

Response: ESA personnel (Sarah Hartung and Beth Copeland) visited the project site on April 18, 2017, traversing the natural areas with the applicant's land use application materials in hand.

The HCA boundaries shown in the application materials match the City's natural resource map, although the mapping is coarse and does not precisely line-up with the tree canopy cover that occurs on site. Any map adjustments proposed by the applicant should consider incorporating areas that may have been overlooked during initial mapping, namely the oak woodland in the southwest portion of the site.

There are some inconsistencies when comparing WQR sample plots 1 and 7 with current conditions. Sample plots 3, 4, 5 and 6 seemed reasonable and accurate, but the tree canopy for both sample plot 1 and 7 seemed over-estimated/inaccurate. It didn't appear as though this was due entirely to a seasonal effect (i.e. ESA's site visit was in early spring versus the applicant's visit in November 2016). Instead of a "good" condition for the buffer in the areas near sample plots 1 and 7, a marginal or poor category might be more appropriate. The tree canopy near sample plot 1 is relatively open, and seemed less than the reported 50 or 55% (depending how the canopy cover is derived according to the tables), in part because of a few dead red alders along the stream bank. This area is also planted with Oregon white oak saplings (~4-6 ft. high), which is an important consideration for the proposed mitigation. Questions

arise include: were the oak plantings part of a voluntary effort or are they part of a compensatory mitigation plan? What is the overall vegetation community goal for this area? If the goal is to establish oak woodlands, consider adjusting the mitigation plan to improve the understory and groundcover, instead of planting a high density of trees that would eventually shade-out the oaks.

It's not clear how the applicant tallied the total cover for each vegetation layer. For example, in Table 7 on page 15 of the natural resource report – the cover percentage for Oregon ash is 10%, and Oregon white oak is 5%, but the total cover for the tree category is reported at 90% instead of 15 (10+5%). The 15% total cover appeared to be more representative based on ESA's field visit than the 90% cover. This type of inconsistency is throughout all of the tables and warrants clarification.

2. Comment on the following aspects of the applicant's Natural Resources Review report:

a. Confirm the applicant's demarcation of the WQR boundary, particularly with respect to steep slopes and the measurement of the vegetated corridor (see Figure 4 in the report).

<u>Response</u>: The demarcation of the WQR boundaries generally seems accurate and in accordance with Table 19.402.15, with the exception of the buffer adjacent to the southeast extension of Wetland A. A conservative interpretation of the setback guidelines would have the buffer begin at the top of the embankment that runs along the eastern boundary of the wetland. In the vicinity of the southeast wetland extension, the first 25-foot increment is < 25%, but the second 25-foot increment is > 25% because of the steep embankment apparently created by historic fill. This adjustment would shift the buffer to the southeast and would include the black cottonwood trees growing at the top of the slope. However, it's understood that the city advised the applicant to establish a 50-foot setback from the wetland boundary based on the slopes in the first 25-foot increment, which does not seem unreasonable for the southeast portion of Wetland A.

b. Figure 5 in the report shows the limits of disturbance and the areas of temporary and permanent impacts to the WQR and HCA. Does the estimation of temporary impact area realistic where shown tightly along the toe of the slope, given the proposed amount of grading and the steepness of some of the proposed slopes? Would more detailed information about the applicant's proposed grading methods be necessary for an adequate assessment of this aspect?

<u>Response</u>: The estimation of the temporary impact area may be realistic if mass grading is undertaken during dry weather and with regular oversight from the geotechnical engineer of record (GEO Consultants Northwest). The limits of disturbance may require revision due to the high groundwater table in the western portion of the site (3 to 12 feet below ground surface, recorded during the dry-season), native sand soils underlying structural silt fill, and potential soft areas of fill that will require overexcavation and re-compaction. The limit of disturbance adjacent to lots 65-69, Tract B Storm Facility, and lots 33-44 may be particularly difficult to maintain, as GEO Consultants Northwest has indicated that the existing ground surface in these areas may need to be stabilized prior to the

placement of fill. Re-compaction of these areas may not be possible during wet-weather or will require alternative methods, such as cement treatment.

It may be advantageous for the City of Milwaukie to outline with the contractor expectations for:

1. *A dry-weather only construction schedule*
2. *Temporary erosion control measures*
3. *Dewatering procedures*
4. *A schedule of erosion control or grading inspections by a qualified inspector*
5. *Permanent erosion control measures, particularly on 2H:1V slopes*
6. *Site closure or stabilization methods if mass grading cannot occur during a single dry weather season or construction work is halted temporarily*

A conservative approach would be to assume a zone of temporary disturbance beyond the areas of permanent fill.

c. Consider and comment on the proposal to fill portions of Wetland A—how will the fill affect the wetland's ecological function? In addition, how will the proposed steep slopes along the edges of Wetland A and elsewhere within the WQR and HCA affect the ecological function and value of the natural resource areas?

Response: Wetland A covers 0.7 acre on-site and extends off-site to the west. The total size of Wetland A (on and off-site) was not provided in the application. The project proposes to fill 0.08 acre, or 11%, of wetland along the eastern edges and avoid permanent fill in 89% of the on-site wetland. From a state and federal perspective, 0.08 acre of fill is considered a relatively minor amount. According to DSL guidelines, if wetland fill is less than 0.2 acre, the applicant is not required to conduct a formal wetland functional assessment using the current accepted tool, the Oregon Rapid Wetland Assessment Protocol. A consideration of proposing permanent fill in a wetland is to determine if the fill has the potential to adversely modify hydrology of the wetland. The source of hydrology for Wetland A is a seasonally high groundwater table. The narrative contends that the project will not adversely affect wetland functions, which seems reasonable given the minor amount of fill along the edge.

Steep slopes are currently located along the eastern edge of Wetland A. From a buffering or wetland protection standpoint, the proposed steep slopes may act as a barrier to prevent human intrusion, and thus disturbance to wildlife habitat in Wetland A. Recommended methods for demarcating wetlands and associated buffers include installing permanent signage and fencing along the perimeter. An example of an appropriate message is as follows: "Protected Wetland and Buffer Area; Do Not Disturb; Contact the City of Milwaukie Regarding Uses, Restrictions, and Opportunities for Stewardship." ***[Note to City staff: ESA ran out of time to consider the pros and cons of different fencing types and can provide input on that topic at a later date.]***

d. The proposal includes excavation that increases the depth of some portions of the floodplain to balance the fill proposed elsewhere within the floodplain. Considering the potential impacts to infiltration, are there significant negative impacts involved with this method of floodplain

mitigation, given that there will be fewer square feet of floodplain area, even if the cubic area of floodplain storage is maintained?

Response: A significant amount of fine-grained structural fill has been placed on the site prior to 1995. The silt fill was placed on top of coarse-grained Missoula Flood Deposits. The fill decreased the floodplain area and infiltration capacity of the site. In the area of proposed floodplain storage GEO Consultants Northwest (2016) found four to five feet of fill in test pits (TP-5, TP-6). The excavation of the proposed floodplain storage will remove up to four feet of fill and is likely to reveal native Missoula Flood Deposits in some areas of the floodplain storage area and increase the infiltration capacity of the remaining floodplain.

The floodplain boundary shown on Sheet C100 is based on the base flood elevation of FEMA cross-section C (69.9 feet NAVD 1988). Sheet C100 shows the floodplain boundary parallel to the 70 foot topographic contour. The floodplain boundary on FEMA FIRM Panel 41051C0400H (July 17, 2008) does not match Sheet C100. The interpolation of the floodplain boundary using the base flood elevation and current topographic information, as shown on Sheet C100, may be appropriate for the site. FEMA floodplain maps were constructed using older topographic information and typically have not been updated to account for the cumulative impacts of increases in impervious area and fill. However, the City's use of a floodplain boundary that is different than the floodplain boundary shown on the FEMA FIRM, without the benefit of FEMA Conditional Letter of Map Revision (CLOMR), could risk the City's Community Rating System (CRS) valuation during a subsequent FEMA audit. It may also result in homeowners misunderstanding their flood risks or their requirement to purchase flood insurance. These risks should be evaluated by City staff with respect to Milwaukie Municipal Code 18.04.

e. Provide a simple assessment of how the ecological function and value of the WQR and HCA in their current states will be affected by the proposed project (including the proposed mitigation) by choosing one of the three following responses:
   i. Improved
   ii. Unchanged
   iii. Degraded

Response: The WQR areas and HCA range from poor to good quality based on vegetative cover. The groundcover in the natural areas has been significantly disturbed from past land-use activities and nuisance species (read canarygrass, teasel, nipplewort, and Canada thistle) are abundant. If the proposed mitigation can effectively establish native groundcover and control nuisance plants in the herbaceous layer, conditions would be improved. Controlling weed species during establishment of the mitigation areas would likely require multiple visits throughout the year and a combination of manual, mechanical, and chemical control. Prior to project approval, it would be beneficial to learn more details about how the applicant proposes to successfully establish a native herbaceous layer and control weeds.

f. Does the proposed development do as much as possible or practicable to avoid and/or minimize impacts to the WQR and HCA, given the general goal of establishing at least the minimum required density of housing on the site?

Response: The natural resources are located primarily on the western and northern portions of the site. The project proposes a clustered development on the eastern portion of the site, which generally serves to protect the natural resources and provide more than the minimum required density. The proposed development would result in some permanent impacts at the edges of mapped resources.

The proposed project would place a large portion of the resources in an open space area. The project would provide 7.07 acres, or about half of the approximately 14 acre site as open space.[1] *The open space area provides protection to some of the natural resources on the site. However, even with this amount of open space some of the residences would be located within the mapped HCA. Most of the residences on the north side of Street B and about 7 lots in the western portion of the site would be within the mapped HCA. In addition, about 8 lots in the central portion of the site would be within the limits of water quality resource. With the proposed housing type, a greater avoidance of natural resources could only be achieved through a reduction in the number of proposed units.*

Under the current R-3 and R-10 zoning, the minimum density on the property on the property is 66 units and the maximum density is 80 units (Tables 2 and 3B of the application). The applicant is requesting an increase in the density in accordance with Section 19.311.3.C of the City's code. Section 19.311.3.C allows an increase in density of up to 20 percent in the PD zone. Due to the configuration of the resources on the site, it is difficult to avoid the resources entirely without reducing the density of the development. The clustered development at the proposed maximum density is configured so as to minimize the impacts to the WQR and HCA.

Because the project would exceed the minimum density and is requesting an increase in density based on Section 19.311.3.C, it is important to consider if "…the planned development is outstanding in planned land use and design and provides exceptional advantages in living conditions and amenities not found in similar developments constructed under regular zoning." The project would include amenities for future residents, including open space, soft surface trails, and a community garden. In addition, the project would add residential units to the City's housing stock and would provide a different type of housing than is typically available in the City. The rowhouses would be in pods of four and would offer a more dense type of development for future residents. The project would include about 7 acres of open space, including a trail system. However, there are two separate trails and the trail on the southwestern portion of the site terminates at the rear of lots on the western side of Street B. This could force users to

[1] The introduction in the application indicates the site is 13.8 acres and the tables calculating allowable density indicate 14.02 acres.

walk behind the residences in the wetland area. ***[Note to City staff: Could the trail be located through the western edge of the wetland in the vicinity of current public access to connect with the trail on the northern portion of the site?]*** *The project would include a community garden with about 30 plots. This would allow about 1/3 of the lots to have a plot in the community garden. Aside from any improvements offered in the open space areas, which is essentially the natural resources, the community garden is the primary amenity with the exception of housing opportunities that are perhaps at a price that is affordable.*

Generally, with the proposed density, the project appears to avoid and/or minimize impacts to the WQR and HCA to the extent practicable. In addition, the proposed project would provide housing opportunities within proximity to services and utilities, and would provide on-site amenities to the future residents.

g. Is the proposed mitigation sufficient to restore the disturbed WQR to an equal or better condition? Does it adequately address any anticipated impacts related to alkalinity, E. Coli, nutrients, sedimentation, and temperature (the pollutants that appear to be listed for Mount Scott Creek on the Department of Environmental Quality's 303(d) list)?

Response: See response to 2e. The proposed mitigation appears to adequately address temperature and sedimentation issues by proposing to increase the woody structure within the floodplain. The mitigation plan does not directly address E. coli or nutrients (Nitrogen, Phosphorus), which are commonly introduced into the landscape through animal waste (or human sewage) and chemical fertilizers applied to cropland. Run-off from residential lawns may also be a source of chemical fertilizers, but on a smaller scale compared to agricultural input.

h. Is the proposed mitigation sufficient to reestablish forested canopy within the HCA in a way that meets the ecological functions and values outlined in MMC Subsection 19.402.1?

Response: The proposed mitigation in Area A technically meets the City's requirements, but would result in an overly dense planting of trees and shrubs. The proposed number of trees and shrubs does not appear to account for existing woody vegetation, including several Oregon white oak saplings that have been planted on-site in the floodplain and along the stream bank. An appropriate alternate approach would be to reduce the density of trees and shrubs in Area A, protect existing oak saplings, and focus effort on replacing existing nuisance plants with native groundcover species in certain areas. Furthermore, appropriate mitigation measures for the proposed project also includes enhancing the understory of the existing oak woodland in the southwest portion of the site by replacing nuisance plants (English ivy and shiny geranium) with native forbs and grasses compatible with Oregon white oaks.

i. Are the numbers and species of proposed mitigation plantings sufficient and appropriate for the proposed impacts to the WQR and HCA?

Response: See the response to "h" above regarding the number of proposed plantings. The species proposed as part of mitigation plantings are generally appropriate and include a reasonable mix of native tree and shrub species. The proposed herbaceous layer is predominately a grass seed mix with the exception of lupine. The proposed species list for the herbaceous layer could be significantly improved by including forbs or non-grass species such as yarrow and camas, or other native wildflowers as appropriate.

j. Consider the applicant's presentation of alternatives to the proposed development. Are there additional obvious alternatives that should be considered? Are the applicant's estimates of the various alternatives' impacts to the WQR and HCA reasonable?

Response: The applicant evaluated an alternative that is consistent with the current zoning of the site (i.e., R-3 and R-10 zoning districts). The alternative would provide larger lots on the eastern portion of the site and smaller lots on the western portion of the site. The applicant indicates that absent the increase in density that can be achieved from the requested Planned Development the project would not be economically viable.

It appears that the alternative presented in Figure 5 would result in a reduction in impacts to the natural resources compared with the project. In other words, the alternative presented does not provide a direct comparison of development with the same amount of impacts. An alternative that could be explored is working from Figure 5, Alternative Site Layout – Standard Zoning, and identifying areas to avoid and then apply a similar cluster development of small lots to determine the density that could be achieved. In visually comparing the proposed project to the areas considered for development in the alternative site plan, the proposed project could possibly achieve the minimum density but would not provide the increase in housing opportunities that would result from the proposed project.

The Planned Development requested allows for a clustered development and a higher density than the density that could be obtained under the current zoning. If the City determines that greater protection of natural resources is necessary, the likely solution would be a reduction in the number of units.

k. In the context of alternatives, would it be feasible to utilize the floodplain storage area for stormwater management, in place of one or more of the proposed detention ponds?

Response: If treated stormwater could be released into the floodplain storage area at a volume and rate that would not cause erosion, it would be feasible to incorporate the floodplain storage area into the overall stormwater management plan. Release of stormwater into the HCA or WQR without prior pollution reduction or flow mitigation could degrade those areas.

l. Comment on the ecological impacts of the proposed removal of Oregon white oak trees in the southwest corner of the site, particularly where beyond the WQR and HCA boundaries. What ecological role or contribution do those trees provide for the nearby designated natural resource areas?

Response: Approximately 25 mature Oregon white oaks ranging in size from 16 to over 24 inches in diameter at breast height (dbh) are located in the southwest portion of the site. [Side note: ESA double-checked the diameter of a subset of the oaks proposed for removal using a Forester's tape with mixed results. Trees 3, 6 and 7 are accurate as presented on Figure 7a, but the diameters of Trees 27, 28, 30 to 33, 101 and 106 were a couple to several inches larger in the field compared with Figure 7a. For example, Trees 31 and 32 are presented as 16 inches DBH, but ESA measured these as 21 inches. This difference could be due to variation in sampling technique; DBH is typically measured at 4.5 feet above the ground.] Fifteen oaks are proposed for removal to accommodate Units 33-44 and a stormwater treatment facility. The Oregon Department of Fish and Wildlife (ODFW) identifies oak woodlands as a "Strategy Habitat" in the Willamette Valley ecoregion, which is a vegetation cover type of high conservation value. Large diameter oaks in particular are valued for providing diverse wildlife habitat. Approximately 5 percent of the historic white oak habitat in the Willamette Valley is remaining (ODFW, 2005).

The stand of trees in the southwest corner appears to be a remnant oak woodland as it has open-grown oaks, and a relatively open understory with native groundcover including camas (Camassia sp.) at the south end of the stand. Ground cover in a majority of the woodlot consists of shiny (or shining) geranium (Geranium lucidum), a nuisance plant. Several hundred Oregon white oak trees (~ 300) are growing on adjoining parcels, including nearby park land. Removal of the 15 oaks trees represents an approximate 5% reduction of oak trees in the vicinity, and would contribute to the incremental loss of Oregon white oak habitat in the city and the larger ecoregion. Although the stand of oak trees on site is relatively small, it adds structural diversity and complexity that is lacking in the adjacent wetland.

If your report notes any deficiencies in the application, please indicate whether you believe the deficiency (1) needs to be resolved with revised application materials prior to issuance of a decision, (2) can be resolved through adding a condition of approval, or (3) does not impact the overall review of the proposal.

Thank you for the opportunity to review the Kellogg Creek Drive plan development project. Please let me know if you have any questions or would like to discuss any of the information presented in this memorandum.

Oregon
Kate Brown, Governor

Department of Transportation
Region 1 Headquarters
123 NW Flanders Street
Portland, Oregon 97209
(503) 731.8200
FAX (503) 731.8259

May 3, 2017 ODOT #7689

ODOT Response

Project Name: 13333 SE Rusk - Zone Change w/ PUD and Subdivision	**Applicant:** Brownstone Development
Jurisdiction: City of Milwaukie	**Jurisdiction Case #:** PD-2017-001, ZA-2017-001, S-2017-001, NR-2027-001, TFR-2017-001, VR-2017-001, CSU-2017-001
Site Address: 13333 SE Rusk Rd, Milwaukie, OR 90367	**State Highway:** OR 224

The site of this proposed land use action is adjacent to OR 224. ODOT has permitting authority for this facility and an interest in ensuring that this proposed land use is compatible with its safe and efficient operation. **Please direct the applicant to the District Contact indicated below to determine permit requirements and obtain application information.**

ZONE CHANGE/PD COMMENTS

☒ ODOT has determined there will be no significant impacts to state highway facilities for the zoning amendment to apply the Planned Development overlay due to a small increase in additional trips to the state highway.

SUBDIVSION

COMMENTS/FINDINGS

The Traffic Impact Analysis (TIA) prepared by Kittelson and Associates dated Feb 7, 2017, shows a high number of crashes at Webster St/OR 224 where the majority of crashes are injury related. Additionally, the Rusk Rd and Webster St intersections with OR 224 are listed on the top 10% SPIS sites. This means that they are in the top 10% of crashes on the state highway system.

The TIA analyzed the northbound right turn movement at the Rusk Rd/OR 224 intersection as a right turn lane. Currently, there is a flare for a turn lane that is limited to storage for only one vehicle to make the right turn. ODOT recommends that the applicant be conditioned to install a northbound right turn lane at the Rusk Rd/OR 224 intersection.

All improvements (access, frontage, roadway etc.) within the State highway right of way are subject to the ODOT Highway Design Manual (HDM) standards; otherwise, a Design Exception by a licensed engineer is required to be submitted for review, and approval must be obtained or an alternative design that meets Highway Design Manual standards must be used. Until more detailed plans have been reviewed, ODOT cannot make a determination whether design elements will require a Design Exception.

Note: If a Design Exception is required, it may take up to 3 months to process.

All ODOT permits and approvals must reach 100% plans before the District Contact will sign-off on a local jurisdiction building permit, or other necessary requirement prior to construction.

ODOT RECOMMENDED LOCAL CONDITIONS OF APPROVAL

Traffic Impacts

☒ The applicant shall construct a northbound right turn lane at the intersection of Rusk Rd and OR 224.

Frontage Improvements and Right of Way

☒ Cross walk ramp(s) shall be constructed as necessary to be consistent with local, ODOT and ADA standards.

Permits and Agreements to Work in State Right of Way

☒ An ODOT Miscellaneous Permit must be obtained for all work in the highway right of way. When the total value of improvements within the ODOT right of way is estimated to be $100,000 or more, an agreement with ODOT is required to address the transfer of ownership of the improvement to ODOT. An Intergovernmental Agreement (IGA) is required for agreements involving local governments and a Cooperative Improvement Agreement (CIA) is required for private sector agreements. The agreement shall address the work standards that must be followed, maintenance responsibilities, and compliance with ORS 276.071, which includes State of Oregon prevailing wage requirements.

Note: If a CIA is required, it may take up to **6 months** to process.

☒ An ODOT Miscellaneous Permit is required for connection to state highway drainage facilities. Connection will only be considered if the site's drainage naturally enters ODOT right of way. The applicant must provide ODOT District with a preliminary drainage plan showing impacts to the highway right of way.

A drainage study prepared by an Oregon Registered Professional Engineer is usually required by ODOT if:

1. Total peak runoff entering the highway right of way is greater than 1.77 cubic feet per second; or
2. The improvements create an increase of the impervious surface area greater than 10,758 square feet.

ADVISORY INFORMATION

Noise

☒ The applicant is advised that a residential development on the proposed site adjacent to the expressway may be exposed to traffic noise levels that exceed federal noise guidelines. Builders should take appropriate measures to mitigate this impact. It is generally not the State's responsibility to provide mitigation for receptors that are built after the noise source is in place.

Please send a copy of the Notice of Decision including conditions of approval to:

ODOT Region 1 Planning
Development Review
123 NW Flanders St
Portland, OR 97209

Region1_DEVREV_Applications@odot.state.or.us

Development Review Planner: Marah Danielson	503.731.8258, marah.b.danielson@odot.state.or.us
Traffic Contact: Avi Tayar, P.E.	503.731.8221
District Contact: Jim Nelson	971.673.12682942

MEMORANDUM

TO: Community Development Department

THROUGH: Chuck Eaton, Director of Engineering

FROM: Alex Roller, Engineering Technician II

RE: 92-Lot Planned Development – 13333 SE Rusk Road
PD-2017-001

DATE: May 5, 2017

Subdivide 3 existing parcels into 92 lots.

1. Per 19.709.5 The public improvement process will conform to conditions laid out in MMC 12.08.020.MMC Chapter 12.08. This will apply to all construction that is completed in the right-of-way that is eventually dedicated to the City.
2. MMC Chapter 12.02 – Public Works Standards

   The Planning Commission finds that the following complies with applicable criteria of MMC Chapter 12.02.

   A. 12.02.010 – Establishes standards that all new public works, including streets, sanitary sewer, storm sewers, and water lines constructed shall be constructed in conformance with the applicable public works standards.

      Proposed driveways will conform to 12.02.010 through Condition of Approval C.
3. MMC Chapter 12.08 – Street and Sidewalk Excavations, Construction and Repair

   The Planning Commission finds that the following complies with applicable criteria of MMC Chapter 12.08.

   Construction process will conform to all sections of MMC 12.08.
4. MMC Chapter 12.16 – Access Management

The Planning Commission finds that the following complies with applicable criteria of MMC Chapter 12.16.

A. MMC Chapter 12.16.040 establishes standards for access (driveway) requirements.
   i. 12.16.040A: requires that all properties be provided street access with the use of an accessway.

      The proposed development is consistent with MMC 12.16.040A.

   ii. 12.16.040B: Access spacing onto arterial and collector streets.

      The proposed development, is consistent with MMC 12.16.040B.

   iii. 12.16.040C: Accessway Locations

      a. Double Frontage

The proposed development is consistent with MMC 12.16.040.C.1 as no double frontage lot accessways are proposed.

b. Limiting driveway access from arterials and collectors.

The proposed development is consistent with 12.16.040C.2, as no accessways are proposed on a collector or arterial.

c. Distance from property line

Proposed driveways will conform to 12.16.040.C.3 through Condition of Approval L.

d. Distance from Intersection

Proposed lot layout allows for the siting of houses that will facilitate the required 45 ft accessway spacing on all lots except for lot 72. Applicant must have an approved variance to this requirement to construct an accessway for lot 72, which will conform to Condition of Approval A.

The proposed development, as conditioned is consistent with MMC 12.16.040.C.4.a.

iv. 12.16.040D: Number of Accessway Locations

a. Safe access

Applicant has proposed the minimum number of accessway locations.

The proposed development is consistent with MMC 12.16.040.D.1.

b. 12.16.040.D.2-3 Does not apply to this development, as no accessways are on arterials or collectors are proposed. Also only 1 accessway per property is proposed.

v. 12.16.040E & 12.16.040F: Accessway Design - ADA standards & Width

Proposed driveways will conform to 12.16.040.E & 12.16.040.F through Condition of Approval L.

5. MMC Chapter 12.24 – Clear Vision at Intersections

The Planning Commission finds that the following complies with applicable criteria of MMC Chapter 12.24.

A. 12.24.030: clear vision requirements

Proposed driveways, accessways and intersections will conform to 12.24.030 through Condition of Approval M.

6. MMC Chapter 13.14 – Stormwater Management

The Planning Commission finds that the following complies with applicable criteria of MMC Chapter 13.14.

A. 13.14.020 - Definitions

"Public Works Standards" mean the City of Milwaukie Public Works Standards and the referenced City of Portland Stormwater Management Manual that the City requires be complied with for the design and construction of on-site mitigation facilities including stormwater detention, retention, and water quality treatment facilities.

Preliminary stormwater report indicates a pre-development curve number of 79. The number that will be used for the final report will be 72 (Lewis & Clark era). This alteration will increase the size of the facilities slightly. Also, the City is unable to verify the preliminary stormwater report County BMP calculation for facility sizing. Final stormwater report will include PAC calculations for City to officially approve the stormwater facility sizing and configuration. The City feels that the discrepancy in curve number and unknown sizing calculations does not pose a problem because the project site has a much larger area of land that is already being graded and replanted. This land can accommodate the additional stormwater treatment area.

Final stormwater design may include treatment facilities in the newly constructed floodplain/wetlands. Final design will conform to a design that satisfies Portland's Stormwater Manual as well as Milwaukie's requirements for maintenance.

7. MMC Chapter 18 – Flood Hazard Regulations

The Planning Commission finds that the following complies with applicable criteria of MMC Chapter 18.

MMC Chapter 18 applies to all special flood hazard areas and all flood management areas within the jurisdiction of the City.

A. 18.040.100 – Development Permit Required

Applicant is proposing a map revision. New lots will not be in the modified floodplain. Although no buildings will be built below the floodplain elevation, application is proposing to cut and fill within the floodplain.

B. 18.04.150 General Standards

i. 18.04.150.A-B Anchoring and Construction Materials and Methods

Does not apply, application does not propose to construct any building in the floodplain once map revision has been approved by FEMA.

ii. 18.04.150.C – Utilities

Utilities shall conform to requirements set forth in 18.04.150.C through Condition of Approval I.

iii. 18.04.150.F – Balanced Cut and Fill

Two submittals have been submitted that indicate that there will not be a net fill in the floodplain. Grading permit will be required to accurately show that changes will conform to MC 18.04.150.F.

iv. 18.040.150.G – Crawlspace Construction

If crawlspaces are constructed within the floodplain elevation, they must follow conditions per MMC 18.040.150.G.

8. MMC Chapter 19.700 – Public Facility Improvements

The Planning Commission finds that the following complies with applicable criteria of MMC Chapter 19.700.

MMC Chapter 19.700 applies to partitions, subdivisions, new construction, and modification or expansion of an existing structure or a change or intensification in use that result in any projected increase in vehicle trips or any increase in gross floor area on the site. The applicant proposes to subdivide the existing 3 parcels into 92 new lots. The subdivision triggers the requirements of MMC Chapter 19.700.

A. MMC Section 19.703 Approval Criteria

i. 19.703.1 Preapplication Conference

Requirement for a preapplication conference was satisfied on August 11th 2016.

ii. 19.703.2 Application Submittal

Development will require a Transportation Impact Study, and a Transportation Facilities Review application has been submitted.

The proposed development is consistent with MMC 19.703.2

iii. 19.703.3 Approval Criteria

Applicant will provide transportation improvements and mitigation in rough proportion to the potential impacts of the development.

The proposed development is consistent with MMC 19.703.3.

B. MMC Section 19.704 requires submission of a transportation impact study documenting the development impacts on the surrounding transportation system.

Transportation impact study has been provided and reviewed.

The proposed development is consistent with MMC 19.704.

C. MMC Section 19.705 requires that transportation impacts of the proposed development be mitigated.

Per the TIS submitted February 7, 2017 from Kittelson & Associates, Inc. the proposed development does not trigger mitigation of impacts beyond the required frontage improvements and bike lane requirements. The surrounding transportation system will continue to operate at the level of service before the proposed development.

The proposed development is consistent with MMC 19.705.

D. MMC Section 19.708 – Transportation Facility Requirements

i. 19.708.1 – General Street Requirements and Standards

19.708.1.A – Access Management

Access requirements shall comply with access management standards contained in Chapter 12.16.

19.708.1.B – Clear Vision

Clear vision requirements shall comply with clear vision requirements contained in Chapter 12.24.

19.708.1.C – Development in downtown zones

Does not apply to this development

19.708.1.D – Development in Non-Downtown Zones

The proposed development is consistent with MMC 19.708.1.D.

19.708.1.E – Street Layout & Connectivity

MMC 19.708.1.E.1-2

Proposed development is consistent with MMC 19.708.1.E.1-2

MMC 19.708.1.E.3

Does not apply to proposed development as no streets are going to be extended to adjacent properties.

MMC 19.708.1.E.4

Proposed development is consistent with MMC.19.708.1.E.4

19.708.1.F – Intersection Design and Spacing

Proposed development is consistent with MMC 19.708.1.F

ii. MMC Section 19.708.2 establishes standards for street design and improvement.

The street to the east of lots 45 & 53 does not comply with minimum City standards. The sidewalk and planter strips are not proposed. The City has allowed this reduced cross section because of the pending adoption of a low volume residential standard cross section with pedestrian routes on the street surface. The 22-foot right-of-way width accommodates the minimum 10-foot travel lanes, curb and separation from the private property.

The proposed cross sections for Kellogg Creek Drive and all remaining internal streets conform to requirements are consistent with MMC Section 19.708.2.

19.708.2.A.12 – Street Trees

Landscape strips are present on application. Street trees will be required at an average 40’ spacing.

iii. MMC Section 19.708.3 requires sidewalks to be provided on the public street frontage of all development.

The construction of sidewalks along the proposed development property abutting all public rights-of-way is included in the street frontage requirements.

19.708.3.A.3 requires that public sidewalks shall conform to ADA standards. Current proposal includes ADA ramps at all corners.

The proposed development is consistent with MMC Section 19.708.3.

iv. MMC Section 19.708.4 establishes standards for bicycle facilities.

Per Milwaukie's Transportation Plan, a bike lane is required connecting the northeast corner of the property to the southwest corner of the property. Applicant has proposed to construct an on-street bike route through the development. The north-east turnaround will connect to Rusk/224 intersection through the construction of a multi-use path.

Proposed development is consistent with MMC 19.708.4.

v. MMC Section 19.708.5 establishes standards for pedestrian and bicycle paths. Pedestrian access is required at the end of the cul-de-sac, which has been satisfied through a 15-foot multi-use path extended to Rusk Road. Pedestrian access is also required from the east end of "Street A" to Kellogg Creek Drive, which has been satisfied through a pedestrian connection in tracts E & F.

Proposed development is consistent with MMC 19.708.5

vi. MMC Section 19.708.6 establishes standards for transit facilities.

The portion of SE Kellogg Creek Drive fronting the proposed development is classified as a transit route in the Milwaukie Transportation System Plan, however, transit facilities are already in place. As a result, transit facility improvements are not required for the proposed development.

vii. MMC 19.708.6 does not apply to the proposed development.

Recommended Conditions of Approval

1. Prior to approval of the final plat, the following shall be resolved:
   A. Obtain a variance to MMC 12.16.040.C.4.a for accessway spacing for lot 72.
   B. Submit a final stormwater management plan to the City of Milwaukie Engineering Department for review and approval. The plan shall be prepared in accordance with Section 2 – Stormwater Design Standards of the City of Milwaukie Public Works Standards. Submit full-engineered plans for construction of all required public improvements, reviewed and approved by the City of Milwaukie Engineering Department. All utilities shall conform to the Milwaukie Public Works Standards.
   C. Obtain a right-of-way permit for construction of all required public improvements listed in these recommended conditions of approval.

D. Pay an inspection fee equal to 5.5% of the cost of the public improvements.

E. Provide a payment and performance bond for 100 percent of the cost of the required public improvements.

F. Provide an erosion control plan and obtain an erosion control permit.

G. Dedicate 14 feet of right-of-way on SE Kellogg Creek Drive fronting the proposed development property to accommodate the parking and bike facilities.

H. Install all underground utilities, including stubs for utility service prior to surfacing any streets. Utilities shall be designed to minimize or eliminate infiltration of floodwaters into the system. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of floodwaters into the system and discharge from the systems into floodwaters. Relocate or provide a private utility easement for all utilities encroaching onto adjacent properties.

I. Construct a 5-foot set-back sidewalk, 4' planter strip and curb & gutter on entire frontage of SE Kellogg Creek Drive.

J. Construct all sidewalks, ramps and driveways on "SE Street A" and "Street B".

K. Construct a driveway approach to meet all guidelines of the Americans with Disabilities Act (ADA) to each new lot. The driveway approach aprons shall be between 9 feet and 20 feet in width and least 7.5 feet from the side property line.

L. Clear vision areas shall be maintained at all driveways and accessways and on the corners of all property adjacent to an intersection Remove all signs, structures, or vegetation more than three feet in height located in "vision clearance areas" at intersections of streets, driveways, and alleys fronting the proposed development.

M. Provide a 12-month Maintenance Bond upon completion of the construction.

N. Provide a final approved set of Mylar and electronic PDF "As Constructed" drawings to the City of Milwaukie prior to final inspection.

2. Prior to issuance of any building permit:

   A. Obtain approval of FEMA map revision for lots that are currently in the floodplain.

3. Prior to final inspection for any building on the proposed development, the following shall be resolved:

   A. Connect all residential roof drains to private drywell or other approved structure. Private properties may only connect to public storm system if percolation tests show that infiltration cannot be obtained on site or if the water table is too shallow. In the event the storm management system contains underground injection control devices, submit proof of acceptance of the storm system design from the Department of Environmental Quality.

CLACKAMAS COUNTY

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
DEVELOPMENT SERVICES BUILDING
150 BEAVERCREEK ROAD | OREGON CITY, OR 97045

MEMORANDUM

TO: Brett Kelver, City of Milwaukie
FROM: Kenneth Kent, Senior Planner, Clackamas County Engineering
DATE: May 8, 2017
RE: PD-2017-001 Kellogg Creek Subdivision

This office has the following comments pertaining to this proposal:

FACTS AND FINDINGS

1. The proposed land use application for a 92-lot subdivision is located within the City of Milwaukie, with frontage on SE Kellogg Creek Drive which is a county roadway. The development site includes the Turning Point Church in the southeast portion of the site frontage on SE Rusk Road, which is also a county roadway. As discussed in the project narrative, a property line adjustment is proposed to modify the existing lots of record and separate the church from the subdivision site. A minor modification of the Community Service Use approval for the church is proposed to address changes to the church site. Access and improvements along the frontage of SE Kellogg Creek Drive for the subdivision requires approval by Clackamas County. In addition access or improvements along the SE Rusk Road frontage of the church require approval by Clackamas County.

2. The proposed subdivision has approximately 654 feet of frontage on the northerly side of SE Kellogg Creek Drive. Clackamas County has designated SE Kellogg Creek Drive a local roadway. Clackamas County has adopted roadway standards that pertain to the structural section, right-of-way width, construction characteristics, and access standards for local roadways. The standard improvement for a local roadway includes a right-of-way width of 54 feet, with a 32-foot wide curb to curb roadway, 5-foot wide landscape strip with street trees, and a 5-foot wide sidewalk. The existing improvements include curb-tight sidewalk and a total road width of 28-32 feet. The existing right-of-way width appears to be 40 to 50 feet. There is existing sidewalk on the south side of SE Kellogg Creek Drive toward the westerly end of the project site that extends for approximately 325 feet. The remainder of the south frontage does not have curb or sidewalk. Based on the zoning of the remaining parcels on the south side of SE Kellogg Creek Drive, redevelopment is not likely. The applicant should be required to provide a minimum total road width of 32 feet along the entire site frontage, allowing for parking on both sides of the roadway.

3. The preliminary plans identify a striped bike lane along the frontage of SE Kellogg Creek Drive. The county does not provide bike lanes on local roads.

4. Clackamas County requires that roadways and intersections serving subdivisions have adequate capacity to handle the additional traffic generated by the development and will continue to operate during the mid-day one hour peak and first and second hours of the PM peaks at acceptable volume to capacity (v/c) ratios, below the maximums which are 0.90 and 0.99 respectively. The applicant has submitted a traffic impact study prepared by Kittelson & Associates, Inc. dated February 7, 2017 evaluating the roadways and intersections within the influence area of the proposed development. The proposed subdivision is projected to generate 536 total daily vehicle trips, with 40 AM peak trips, 48 mid-day peak trips and 48 evening peak trips. The study concludes that capacity of the roadways and intersections serving the project site will operate within the volume to capacity ratios. Therefore, the county's intersection capacity requirements as they relate to the transportation system are met by the applicant's proposal.

5. The traffic impact study conducted counts for the study intersections during the month of November. The study notes that the counts do not capture traffic from the North Clackamas Park during peak summer activity, and concludes that the additional traffic will not degrade the intersection below acceptable levels. The county recommends that the applicant's traffic engineer evaluate the study intersections including estimated summer traffic volumes from the park to verify adequate capacity and safety.

6. The traffic impact study recommends modification of the Turning Point Church driveway onto SE Rusk Road to emphasize that it is an entrance only. The recommendation includes signage and narrowing of the driveway throat to a single lane width. The functional classification of SE Rusk Road is a collector roadway, which generally has limited access when access to a lower functional class roadway is available. The church has an existing full access to SE Kellogg Creek Driveway and will continue to have access with the proposed subdivision. The location of the driveway onto SE Rusk Road does not meet county standards. As noted in the traffic impact study, the driveway does not provide adequate sight distance to allow vehicles to use the driveway to enter SE Rusk Road. Although the proposal recommends signage and narrowing of the driveway throat to discourage exiting from the driveway, the county's practice is to only allow a driveway with one-way restrictions when controlled by a median. Based on increased traffic from the proposed subdivision, and modification of the church site, the county recommends closure of the driveway. The traffic impact study should be updated to include the impacts of the church driveway closure.

7. The traffic impact study indicates that the northbound right turn lane at the Highway 224 and SE Rusk Road intersection has adequate queue storage. Although a queue storage of 50 feet is noted, based on the existing asphalt width, the queue storage appears to be 25 to 30 feet. County staff has observed that the right turn lane is not available with the typical queues for the northbound through/left movement because of available asphalt width. The use of the Synchro program may not adequately capture operation of the intersection in this case. It is recommended that the applicant's traffic engineering re-evaluate the queuing using the SimTraffic program. If the need for additional queue length is identified, the applicant should be required to construct the additional storage if right-of-way is available.

8. The traffic impact study does not evaluate the need for a northbound left turn lane at the SE Rusk/SE Kellogg Creek Drive intersection. The study should be updated to include that analysis.

9. The proposed application does not provide a discussion of overall parking availability. Although, the use of alley access for a number of the lots will provide on-street parking, close to half of the development will have driveways onto the public road. With 20 to 25-foot wide lots and driveway approaches, there will be little if any parking along those frontages. Some analysis or evaluation should be completed that addresses the availability of driveway/garage/on-street parking to better understand any overflow parking that may occur in the existing neighborhood.
10. Prior to commencement of site work, a Development Permit and a Utility Placement Permit are required and must be obtained from Clackamas County for all work performed in the SE Kellogg Creek Drive right-of-way.

CONCLUSION

Although the County does not have land use jurisdiction over the proposed subdivision, the County does have jurisdiction over access and improvements along SE Kellogg Creek Drive and SE Rusk Road.

If the City of Milwaukie approves the request, the following conditions of approval are recommended. If the applicant is advised to or chooses to modify the proposal in terms of access location and/or design following the preparation of these comments this office requests an opportunity to review and comment on such changes prior to a decision being made.

1. All frontage improvements in, or adjacent to Clackamas County right-of-way, shall be in compliance with *Clackamas County Roadway Standards*.
2. The applicant shall dedicate a minimum of approximately 7 feet of additional right-of-way along the entire site frontage of SE Kellogg Creek Drive as necessary to accommodate the public improvements, and shall verify by survey that there is a minimum 27-foot wide one-half right-of-way width.
3. The applicant shall grant an 8-foot wide public utility easement adjacent to the public right-of-way along the entire site frontage of SE Kellogg Creek Drive.
4. The applicant shall design and construct improvements along the entire site frontage of SE Kellogg Creek Drive in accordance with the *Clackamas County Roadway Standards*.

   These improvements shall consist of:

   a. A minimum 16-foot wide one half-street improvement for a local roadway. The applicant shall widen SE Kellogg Creek Drive so that the minimum total road width along the site frontage is 32 feet. The structural section for SE Kellogg Creek Drive improvements shall consist of 4 inches of asphalt concrete, per Clackamas County Roadway Standards Standard Drawing C100.

   b. Standard curb, or curb and gutter if curbline slope is less than one percent.

   c. Adjacent to the curb, a 5-foot landscape strip, including street trees shall be constructed along the entire site frontage.

d. A minimum 5-foot wide unobstructed sidewalk shall be constructed along the entire site frontage, per Standard Drawing S960. Where sidewalk does not connect to sidewalk on adjacent property, the end of the sidewalk include a concrete ADA accessible ramp, providing a transition from the new sidewalk to the edge of the pavement.

e. Inbound and outbound tapers shall be provided per Section 250.6.4 of the Clackamas County Roadway Standards. The full road improvement shall extend to the westerly project property line, with the outbound taper beginning at that point.

f. The applicant shall remove bike lane striping from the proposed frontage improvements.

g. Dual curb ramps shall be constructed at proposed intersections with SE Kellogg Creek Drive, per Standard Drawing S910. A perpendicular curb ramp shall be constructed at the westerly project boundary, per Standard Drawing S940. Crosswalk striping shall be modified as necessary based on required road widening. The designer shall complete the county ADA Assessment Checklist and provide a copy with the improvement plans. The county has adopted the following curb ramp design and construction standards:

Feature	Design Standard	Construction Standard
Ramp Slope	7.5%	8.33%
Ramp Cross Slope	1.5%	2.0%
Landing (turning space) Cross Slope	1.5%	2.0%

h. Drainage facilities in conformance Water Environment Services regulations and Clackamas County Roadway Standards, Chapter 4. Storm water detention facilities shall not be located within the public right-of-way.

5. The Turning Point Church driveway on SE Rusk Road shall be closed. The driveway approach shall be removed and replaced with curb and sidewalk to match existing.
6. If an updated traffic impact study identifies the need for additional queue storage for the northbound right turn land at the SE Rusk Road/Highway 224 intersection, the applicant shall construct the improvements to provide the right turn lane storage.
7. Prior to commencement of site work the applicant shall obtain a Development Permit from the Clackamas County Engineering Division for design and construction of required improvements to SE Kellogg Creek Drive. To obtain the Permit, the applicant shall submit plans prepared and stamped by an Engineer registered in the State of Oregon, provide a Performance Guarantee, and pay an Inspection Fee. The Performance Guarantee is 125% of the approved Engineer's cost estimate for the required improvements.
8. Prior to commencement of utility work within the SE Kellogg Creek Drive or SE Rusk Road rights-of-way, a Utility Placement Permit shall be obtained from the Clackamas County Engineering Division.

NORTH CLACKAMAS
PARKS & RECREATION DISTRICT

MEMO

TO: Mr. Brett Kelver, Associate Planner, City of Milwaukie

FROM: Kathryn Krygier, Planning and Development Manager
Tonia Williamson, Natural Resource Coordinator

Copy: Scott Archer, Director

DATE: May 10, 2017

RE: Brownstone Development, Inc.
File Nos.: PD-2017-001, ZA-2017-001, S-2017-001, NR-2017, TFR-2017-001, VR-2017-003, CSU-2017-001

Application Types: Planned Development, Zoning Map Amendment, Subdivision (preliminary plat), Natural Resource Review, Transportation Facilities Review, Variance, Community Service Use (minor modification)

Thank you for the opportunity to comment on the proposed Brownstone Development (Project). The Project has the opportunity to take advantage of many nearby community services and amenities including the adjacent North Clackamas Park and the Milwaukie Center, which North Clackamas Parks and Recreation District (NCPRD) operates and maintains. NCPRD facilities host a variety of public activities and amenities, including such things as walking paths, picnic areas, organized sports, passive recreation, fitness classes, nutrition programs, natural areas, and protection of essential wetlands.

The Project has many positive attributes. It fulfills Milwaukie's stated goal to provide workforce housing as described in the 2016 Housing Needs Analysis and Strategies Report. The development would also result in many bicycle and pedestrian improvements that would be used by the community including NCPRD's staff and customers. The proposed street frontage on Kellogg Creek Drive includes parking, street trees, sidewalks, and private entries fronting Kellogg Creek Drive, which promote a safer and livelier entrance to North Clackamas Park and the Milwaukie Center. A significant proposed amenity for the community is the bicycle and pedestrian path created through the development between Kellogg Creek Drive and Hwy 224. The proposed connectivity is admirable.

NCPRD has concerns, however, about information which is missing from the application and about impacts the Project will have on transportation and natural resources. These comments are noted below.

Vehicle, Pedestrian, and Bicycle Safety

Increased traffic will have significant impacts on access to and from the NCPRD facilities and to the community. The transportation study has a significant omission—it was not conducted during peak usage of the ball field complex and park which is April through July, in the early evening, during the weekday. In addition, traffic on the weekend is significant in the summer and should be considered in conjunction with the Turning Point Church use.

Safety is a particular concern at the intersection of SE Rusk Road and SE Kellogg Creek Drive. This intersection is confusing for all transportation modes and needs further study. If access to the Turning Point Church is denied access directly from SE Rusk Road, as has been suggested by Clackamas County Transportation and Development staff, this change needs to be taken into consideration. NCPRD requests alternate designs be explored at this intersection to improve traffic clarity and calming to mitigate the Project impacts. Some characteristics of this intersection, which will be exacerbated with increased volume, are noted here:

- East/west traffic at this location is confusing; the bulb-out pushes vehicles out of their travel lane.
- Even though SE Rusk Road is a collector street, during peak use of North Clackamas Park, equal or more traffic is travelling east/west (SE Kellogg Creek Drive/SE Rusk Road) as is traveling north/south on SE Rusk Rd.
- The left turn lane traveling north on SE Rusk Road onto SE Kellogg Creek Drive is not clearly defined.
- North/south and east/west pedestrian crossings need to be improved, even though there are no sidewalks south of this intersection on SE Rusk Road.

Parking

NCPRD requests a parking study to understand where visitors of homeowners will park.

Pedestrian Connections

The application does not appear to provide continuous sidewalks and/or curb cuts at all intersections. A drawing to illustrate pedestrian paths should be included in the application for further review. Specific comments are:

- Provide consistent treatment of the pedestrian path to connect north/south from SE Kellogg Creek Drive to Street B. The proposed soft surface trail and (assumed) path in the public alley is not safe and not suitable to accommodate people with disabilities, wheel chairs and strollers. It is however, a desirable and essential pedestrian connection.
- Sidewalks fronting storm facilities need to be continuous and provide curb cuts for cross street access.
- A curb cut is needed at the bike path from Hwy 224 to Street B.
- A curb cut at Street A should align with a sidewalk not with the existing Deerfield Village Assisted Living driveway.

Bicycle Connections

The bike lane between Street B and Rusk Road “dead ends” at the bulb-out. This needs resolution.

Soft Surface Trails

It is not clear if the soft surface trails are to be a public amenity. If they are, an approach to ownership and maintenance should be addressed. Because the trails are short and discontinuous, the value to the public is not clear. In addition, the impact to the natural resources need to be assessed.

Phasing

A phasing plan is requested, if the project is proposed to be phased.

Natural Resources

NCPRD has concerns about a Type III Variance to the natural resources standards that would allow 31 lots to be built in the Natural Resources Area. Our primary concern is about the potential for increased flooding within NCPRD property that already experiences annual flood events. The flooding results in damage to our infrastructure, which is expensive to repair and replace. If additional Habitat Conservation Area (HCA) and

Water Quality Resource (WQR) capacity is decreased upstream, NCPRD property will have increased flooding and increased expenses. The proposal does include constructive improvements for grading of floodplain storage, but in doing so creates impacts to the HCA and WQR Area wetlands, which also function as great water storage.

The natural resources review states wetlands are "low quality," but these wetlands (with reed canary grass) still function to help mitigate stormwater impacts and flooding. This attribute should not be overlooked just because the current landowner is not weeding their wetlands.

The application notes the Project will not have any impacts to water quality and will decrease stream temperatures. But, it does not note that because the development is so close to Mt. Scott Creek, the large shade trees will not be able to grow sufficiently to provide a wide riparian buffer to the creek. It is generally agreed upon in the ecological community that the proposed development impacts on the riparian buffer will have a negative impact on water temperature, resulting in increased water temperature and decreased water quality.

Minimize impacts

NCPRD requests additional information on how the applicant will minimize the impacts of development in the HCA and WQR areas (as opposed to only proposing mitigation measures). Specifically, the applicant is proposing significant grading and adverse hydrologic impacts to water resources, habitat, and wildlife corridors. The applicant does not provide proposals to minimize these impacts as required in the approval criteria.

Kelver, Brett

From: Laura Hickman <lhickman@pdx.edu>
Sent: Thursday, May 11, 2017 2:27 PM
To: Kelver, Brett
Subject: Rusk Road Proposal: School Calendars
Attachments: 2016_17 Elementary Student Calendar.pdf; 2016_17 Middle School Student Calendar.pdf; 2016_17 High School Student Calendar.pdf

Hi Mr. Keiver,

Thank you for spending time on the phone with me this morning to discuss some of my questions about the proposed planned development on Rusk Road.

Traffic Study Methodology:

Per our conversation about the traffic study, I have attached the North Clackamas School District calendars showing the dates school was in session in November. While Alder Creek Middle School is right in our neighborhood, the high school and elementary calendars are also relevant to traffic with buses and cars transporting kids from and through our neighborhood.

As you can see from the attached calendars, NC School District was not in session Nov 2, 3, 4, 10, 24 and 24 for the middle schools. The elementary
schools were closed these dates, plus Nov 23. Related specifically to the
middle school, Wednesdays are a "late start day" so morning traffic on Wednesdays is less representative of the usual weekday morning trips on Rusk Road.

The additional school omitted from the traffic study on Rusk Road that I mentioned is: http://www.micha-elschool.org/about-micha-el-school/ This is that school's calendar, showing its closed days in November: http://www.micha-elschool.org/events-activities/

Moreover, the NC School District has a large bus barn located in the lot adjacent to Alder Creek Middle School. The number of buses traveling to/from there can be very clearly seen with the satellite view on Google maps. The transportation hub was not mentioned in the traffic study, including the number of trips due to the buses traveling through our neighborhood as a result.

If the traffic study was conducted on a no-school day or on any Wednesday, there are reasons to question whether it is truly representative of the typical traffic on most weekdays.

Pedestrian and Cyclist Safety:

Another issue I wanted to learn more about is the matter of pedestrian and bike safety. The traffic study acknowledges that there is currently no safe way to walk from the planned development to the middle school, despite it being within a mile of the location.

Rusk is narrow, almost entirely without sidewalks. There are several completely blind corners and a hill, right at the entrance to Eric, where children who currently walk from the West side of Rusk need to cross to walk over to the middle school. These conditions create presently a real hazard to cyclists and pedestrians - given the absence of sidewalks and bike lanes and the current level of traffic coming over the blind hill.

In other words, the existing walk and bike ride to and from the existing North Clackamas Park or to the Middle School pass-through along Briarfield Ct. is already hazardous. Parents often drive their children, rather than walk as it is, given the hazards of walking on Rusk Road. This alone increases the number of vehicle trips than you might otherwise expect (with a generic traffic model) with middle school and major park right in an otherwise easily walkable distance.

The proposed development of additional 92 homes only makes the current situation worse for walkers and bike riders. Not only will there be many more cars heading towards 224 on Rusk, there will be many more heading to the South on Rusk to Aldercrest. That latter stretch of Rusk (to
Aldercrest) is particularly narrow and hazardous for anyone not inside a car.

I wanted to raise these general concerns because it is not clear to me how the traffic study or other parts of the developer's plan considers these issues. If so, I would be very interested in learning how this considerably increased danger of adding 92 homes (with considerably more cars than 92) to Rusk Road can be successfully mitigated.

I will likely follow up with more questions after more consideration and discussion with my neighbors.

Thank you again for all your assistance with understanding the process.

Laura Hickman
Rusk Road area resident

-----Original Message-----
From: North Clackamas SD 12 [mailto:notifications@schoolconnectsweb.com]
Sent: Friday, February 24, 2017 3:28 PM
To: LHickman@pdx.edu
Subject: 2016-17 Calendar Updates

February 24, 2017

Dear North Clackamas Families,

On February 3, the District closed schools for a 10th day this year as a result of inclement weather. Prior to this, you had been notified of some changes in our school year calendar. This notice will hopefully, be our final adjustment to any of our student calendars for the 2016-17 school year. All changes are as follows:

Elementary Schools
April 14 will change from teacher in-service/work day to a student school day.
Four student instruction days will be added to the end of the school year.
The last day for elementary students is June 21.

Middle Schools
April 14 will change from teacher in-service/work day to a student school day.
Four student instruction days will be added to the end of the school year.
The last day for middle school students is June 22.

High Schools
The high school student contact day for our schools on block schedule will end at 3:15 pm beginning Monday, April 3, 2017. Adding 5 minutes within the daily instructional time schedule at Milwaukie/MAA, Clackamas, Rex Putnam will add the necessary time to meet state instructional hour requirements.
Sabin-Schellenberg will adjust their times to coordinate with the home high schools.
April 14 will change from teacher in-service/work day to an instructional day.
Four student instruction days will be added to the end of the school year.

The last day for high school students is June 22.

These changes will not affect graduating seniors, with the exception of the added instructional day on April 14 and the added instructional minutes during the school day. Graduation dates will remain the same. There are some changes in the Day 1/Day 2 sequence for middle and high school calendars. Please check the dates carefully.

Updated calendars are attached and published on our district website along with further explanation to answer some common questions at www.nclack.k12.or.us/studentcalendars.

Vietnamese

Ngày 24 tháng Hai, 2017

Kính thưa Quý Gia Đình thuộc North Clackamas,

Tới ngày 3 tháng Hai, Khu Học Chánh đã đóng cửa mười ngày trong năm nay do kết quả của thời tiết khắc nghiệt. Trước lá thư này, quý vị đã được thông báo sẽ có một vài thay đổi trong lịch trình của nhà trường. Thư thông báo này hy vọng sẽ là sự điều chỉnh sau cùng về lịch trình của học sinh trong niên khoá 2016-17. Sau đây là tất cả những sự thay đổi:

Trường Tiểu Học
Ngày 14 tháng Tư sẽ được đổi từ ngày ngày giáo viên làm hồ sơ/tu bổ thành ngày học sinh đi học.
Bốn ngày đi học sẽ được thêm vào cuối niên học. Ngày bãi trường của học sinh tiểu học là 21 tháng Sáu.

Trường Trung Học Đệ Nhứt Cấp
Ngày 14 tháng Tư sẽ được đổi từ ngày ngày giáo viên làm hồ sơ/tu bổ thành ngày học sinh đi học.
Bốn ngày đi học sẽ được thêm vào cuối niên học. Ngày bãi trường của học sinh tiểu học là 22 tháng Sáu.

Trường Trung Học Đệ Nhị Cấp
Học sinh các trường trung học có thời khoá biểu từng khối thời gian sẽ tan trường lúc 3:15 chiều, bắt đầu từ Thứ Hai, ngày 3 tháng Tư, 2017. Thêm 5 phút trong phạm vi thời khoá biểu giờ học hàng ngày tại trường Milwaukie/MAA, trường Clackamas, Rex Putnam sẽ thêm thời gian cần thiết để hội đủ số giờ học do tiểu bang bắt buộc. Sabin-Schellenberg sẽ điều chỉnh thời giờ để thích nghi với trường nhà.
Ngày 14 tháng Tư sẽ được đổi từ ngày ngày giáo viên làm hồ sơ/tu bổ thành ngày học sinh đi học.
Bốn ngày đi học sẽ được thêm vào cuối niên học. Ngày bãi trường của học sinh tiểu học là 22 tháng Sáu.

Những sự thay đổi này sẽ không ảnh hưởng tới sự tốt nghiệp của học sinh lớp
12 ngoại trừ thêm ngày học vào 14 tháng Tư và thêm số phút trong những ngày đi học. Ngày lễ tốt nghiệp không thay đổi. Có một số thay đổi trong thứ tự Ngày 1/Ngày 2 cho học sinh trung học đệ nhứt và đệ nhị cấp. Xin xem lại các ngày cẩn thận.

Lịch cập nhựt được đính kèm theo đây và được phổ biến trên trang mạng của khu học chánh cùng với lời giải thích thêm những câu hỏi thông thường tại www.nclack.k12.or.us/studentcalendars.

Spanish

Elementary Student Significant Dates

September 2016

M	T	W	T	F
			1	2
5	6	7	8	9
12 k	13	14	15	16
19	20	21	22	23
26	27	28	29	30

October 2016

M	T	W	T	F
3	4	5	6	7
10	11	12	13	14
17	18	19	20	21
24	25	26	27	28
31				

November 2016

M	T	W	T	F
	1	2	3	4
7	8	9	10	11
14	15	16	17	18
21	22	23	24	25
28	29	30		

December 2016

M	T	W	T	F
			1	2
5	6	7	8	9
12	13	14	15	16
19	20	21	22	23
26	27	28	29	30

January 2017

M	T	W	T	F
2	3	4	5	6
9	10	11	12	13
16	17	18	19	20
23	24	25	26	27
30	31			

September 5 ..... Labor Day
September 6 ..... First Day of School for Grades 1-5
September 12 .... First Day of School for Kindergarten
September 30 ..... Work Day/Inservice Day

October 14 ..... School Not in Session

November 2 ..... Work Day/Inservice Day
November 3-4 ..... Parent Conference Day
November 10 ..... Work Day/Inservice Day
November 11 ..... Veterans Day
November 23 ..... Grade Report Preparation
November 24 ..... Thanksgiving Holiday
November 25 ..... School Not in Session

December 19-January 2 ..... Winter Break
January 16 ..... Martin Luther King, Jr. Day
January 17 ..... Work Day/Inservice Day

February 3 ..... Work Day/Inservice Day
February 20 ..... Presidents' Day

March 9 ..... Work Day/Inservice Day
March 10 ..... Grade Report Preparation
March 27-31 ..... Spring Break

April 28 ..... Work Day/Inservice Day

May 29 ..... Memorial Day

June 21 ..... Last Day of School for Elementary

February 2017

M	T	W	T	F
		1	2	3
6	7	8	9	10
13	14	15	16	17
20	21	22	23	24
27	28			

March 2017

M	T	W	T	F
		1	2	3
6	7	8	9	10
13	14	15	16	17
20	21	22	23	24
27	28	29	30	31

April 2017

M	T	W	T	F
3	4	5	6	7
10	11	12	13	14
17	18	19	20	21
24	25	26	27	28

May 2017

M	T	W	T	F
1	2	3	4	5
8	9	10	11	12
15	16	17	18	19
22	23	24	25	26
29	30	31		

June 2017

M	T	W	T	F
			1	2
5	6	7	8	9
12	13	14	15	16
19	20	21	22	23
26	27	28	29	30

End of Grading Periods

Trimester 1: November 22, 2016

Trimester 2: March 8, 2017

Trimester 3: June 21, 2017

2016-17 School Year Calendar

LEGEND

- First/Last Day of School
- k — First Full Day of Kindergarten
- End of Trimester
- School Not In Session
- Parent Conference Day

NORTH Clackamas Schools

Final calendar is subject to bargained agreements with employee groups

Board Adopted 1.26.2017

Middle School Student Significant Dates

September 5 ..... Labor Day
September 6 ..... First Day of School

October 14 ..... School Not in Session

November 2 ..... Work Day/Inservice Day
November 3-4 ..... Parent Conference Days
November 10 ..... Grade Report Preparation
November 11 ..... Veterans Day
November 24 ..... Thanksgiving Holiday
November 25 ..... School Not in Session

December 19-January 2 ..... Winter Break
January 16 ..... Martin Luther King, Jr. Day
January 17 ..... Work Day/Inservice Day

February 10 ..... Grade Report Preparation
February 20 ..... Presidents' Day

March 27-31 ..... Spring Break

April 28 ..... Work Day/Inservice Day

May 29 ..... Memorial Day

June 22 ..... Last Day of School for Middle School

End of Grading Periods

Quarter 1: November 9, 2016

Quarter 2: February 9, 2017

Quarter 3: April 14, 2017

Quarter 4: June 22, 2017

September 2016

M	T	W	T	F
			1	2
5	6	7 1	8 2	9 1
12 2	13 1	14 2	15 1	16 2
19 1	20 2	21 1	22 2	23 1
26 2	27 1	28 2	29 1	30 2

October 2016

M	T	W	T	F
3 1	4 2	5 1	6 2	7 1
10 2	11 1	12 2	13 1	14
17 2	18 1	19	20 2	21 1
24 2	25 1	26 2	27 1	28 2
31 1				

November 2016

M	T	W	T	F
	1 2	2	3	4
7 1	8 2	9 1	10	11
14 2	15 1	16 2	17 1	18 2
21 1	22 2	23 1	24	25
28 2	29 1	30 2		

December 2016

M	T	W	T	F
			1 1	2 2
5 1	6 2	7 1	8 2	9 1
12 2	13 1	14 2	15 1	16 2
19	20	21	22	23
26	27	28	29	30

January 2017

M	T	W	T	F
2	3 1	4 2	5 1	6 2
9 1	10 2	11 1	12 2	13 1
16	17	18 2	19 1	20 2
23 1	24 2	25 1	26 2	27 1
30 2	31 1			

February 2017

M	T	W	T	F
		1 2	2 1	3 2
6 1	7 2	8 1	9 2	10
13 2	14 1	15 2	16 1	17 2
20	21 1	22 2	23 1	24 2
27 1	28 2			

March 2017

M	T	W	T	F
		1 1	2 2	3 1
6 2	7 1	8 2	9 1	10 2
13 1	14 2	15 1	16 2	17 1
20 2	21 1	22 2	23 1	24 2
27	28	29	30	31

April 2017

M	T	W	T	F
3 1	4 2	5 1	6 2	7 1
10 2	11 1	12 2	13 1	14 1
17 2	18 1	19 2	20 1	21 2
24 1	25 2	26 1	27 2	28

May 2017

M	T	W	T	F
1 2	2 1	3 2	4 1	5 2
8 1	9 2	10 1	11 2	12 1
15 2	16 1	17 2	18 1	19 2
22 1	23 2	24 1	25 2	26 1
29	30 2	31 1		

June 2017

M	T	W	T	F
			1 2	2 1
5 2	6 1	7 2	8 1	9 2
12 1	13 2	14 1	15 2	16 1
19 2	20 1	21 2	22 1	23
26	27	28	29	30

2016-17 School Year Calendar

LEGEND

First/Last Day of School

End of Quarter

Late Start

Parent Conference Day

School Not In Session

NORTH Clackamas Schools

Final calendar is subject to bargained agreements with employee groups

Board Adopted 1.26.2017

High School Student Significant Dates

September 2016

M	T	W	T	F
			1	2
5	6	7 1	8 2	9 1
12 2	13 1	14 2	15 1	16 2
19 1	20 2	21 1	22 2	23 1
26 2	27 1	28 2	29 1	30 2

October 2016

M	T	W	T	F
3 1	4 2	5 1	6 2	7 1
10 2	11 1	12 2	13 1	14
17 2	18 1	19	20 2	21 1
24 2	25 1	26 2	27 1	28 2
31 1				

November 2016

M	T	W	T	F
	1 2	2	3	4
7 1	8 2	9 1	10	11
14 2	15 1	16 2	17 1	18 2
21 1	22 2	23 1	24	25
28 2	29 1	30 2		

December 2016

M	T	W	T	F
			1 1	2 2
5 1	6 2	7 1	8 2	9 1
12 2	13 1	14 2	15 1	16 2
19	20	21	22	23
26	27	28	29	30

January 2017

M	T	W	T	F
2	3 1	4 2	5 1	6 2
9 1	10 2	11 1	12 2	13 1
16	17	18 2	19 1	20 2
23 1	24 2	25 1	26 2	27 1
30 2	31 1			

September 5 ..... Labor Day
September 6 ..... First Day of School

October 14 ..... School Not in Session
October 19 ..... PSAT Day

November 2 ..... Work Day/Inservice Day
November 3 ..... Parent Conference Day
November 4 ..... Work Day/Inservice Day
November 10 ..... Grade Report Preparation
November 11 ..... Veterans Day
November 24 ..... Thanksgiving Holiday
November 25 ..... School Not in Session

December 19-January 2 ..... Winter Break
January 16 ..... Martin Luther King, Jr. Day
January 17 ..... Work Day/Inservice Day

February 10 ..... Grade Report Preparation
February 20 ..... Presidents' Day

March 27-31 ..... Spring Break

May 29 ..... Memorial Day

June 22 ..... Last Day of School for High School

End of Grading Periods

Quarter 1: November 9, 2016
Quarter 2: February 9, 2017
Quarter 3: April 14, 2017
Quarter 4: June 22, 2017

Finals Schedule

February 6/June 19 ..... Periods 1 & 2
February 7/June 20 ..... Periods 5 & 6
February 8/June 21 ..... Periods 3 & 4
February 9/June 22 ..... Periods 7 & 8
(The above dates will be half days for students)

February 2017

M	T	W	T	F
		1 2	2 1	3 2
6 F	7 F	8 F	9 F	10
13 2	14 1	15 2	16 1	17 2
20	21 1	22 2	23 1	24 2
27 1	28 2			

March 2017

M	T	W	T	F
		1 1	2 2	3 1
6 2	7 1	8 2	9 1	10 2
13 1	14 2	15 1	16 2	17 1
20 2	21 1	22 2	23 1	24 2
27	28	29	30	31

April 2017

M	T	W	T	F
3 1	4 2	5 1	6 2	7 1
10 2	11 1	12 2	13 1	14 1
17 2	18 1	19 2	20 1	21 2
24 1	25 2	26 1	27 2	28 1

May 2017

M	T	W	T	F
1 2	2 1	3 2	4 1	5 2
8 1	9 2	10 1	11 2	12 1
15 2	16 1	17 2	18 1	19 2
22 1	23 2	24 1	25 2	26 1
29	30 2	31 1		

June 2017

M	T	W	T	F
			1 2	2 1
5 2	6 1	7 2	8 1	9 2
12 1	13 2	14 1	15 2	16 1
19 F	20 F	21 F	22 F	23
26	27	28	29	30

2016-17 School Year Calendar

LEGEND

First/Last Day of School
End of Quarter
Parent Conference Day
PSAT Day
School Not In Session

North Clackamas Schools

Final calendar is subject to bargained agreements with employee groups

Board Adopted 1.26.2017

Kelver, Brett

From: Ray Olma <rayolma@yahoo.com>
Sent: Saturday, May 13, 2017 9:45 AM
To: Kelver, Brett
Subject: comment on the planned development

I saw that this is the place to send comments about the subdivision the developer wants to build off of Rusk Road by the Turning Point Church. I live in this neighborhood, in a cul-de-sac off Rusk Road. It is completely unreasonable to build that many townhouses in a location that funnels all the the traffic onto Rusk. Anyone who lives on/near Rusk can tell you, this road is not equipped for that much traffic, even with a few improvements. It's just a slab of asphalt. There aren't even any shoulders in some parts of the road.

I don't know how the developer decided it would be fine to add that many cars here but it is already very hard to walk on Rusk Road from street over to North Clackamas Park with my kids and dog. There is no where to walk along Rusk and cars can't see people crossing the street on foot in front of Eric. This is where lots of people try to cross to get to and from the park - the place where the development will be- and over of the middle school.

With this many new houses (92 homes means twice that many cars), it is only a matter of time before a kid is going to be run over trying to walk up or across Rusk, as it is. There is no public transportation in this area and since it's not safe to walk or ride your bike around here, it is guaranteed that the traffic is going wreck this neighborhood - not just by the big increase caused by the people living in the new subdivision, but also by making more people who already live here get into cars instead of walking to one the schools in our area or to the park. My neighbor and I were talking yesterday - she said she almost got hit by a car trying to cross Rusk to walk up Eric. Drivers can't see coming over that hill on Rusk and there is a bus stop right there at the bottom of the hill.

North Clackamas Park already creates a big influx of traffic when there are softball tournaments. When people going and coming from the huge subdivision are added to the mix, this neighborhood will be a mess.

This is all made worse because Hwy 224 is a completely packed every weekday in the afternoons starting about 3:30, all the way to 6-6:30. Every weekday, cars are lined up and moving at a crawl all the way from the 205 past the Lake Road overpass. Lots of GPS units tell people to cut through on Rusk Road to get around the 224 traffic. Lots of cars are coming up Rusk that don't even live here to get around that afternoon parking lot. The middle school has about 1000 kids, plus employees and it lets out at 4:05. That dumps an additional mess of traffic onto 224 and all the surrounding roads, right at the worst time, including all the routes that lead to and from Rusk Rd.

Regardless of whatever that developer put in the application about traffic, I have lived here for years and I can tell you - traffic is not going to be "acceptable" by any standard because I can't imagine the developer could have possibly taken all this into account.

If you approve this huge subdivision, our neighborhood will be destroyed. There is no way to make Rusk Road safe or passable with that many more cars. I know Milwaukie is looking for ways to add housing. Destroying the quality of life in existing neighorhoods is NOT the way to do it.

Please share my comments about this subdivision with the Planning Commission.
Ray Olma

Kelver, Brett

From: Jamie Marshall <jamie454@gmail.com>
Sent: Sunday, May 14, 2017 8:27 AM
To: Kelver, Brett
Subject: Catch-22 isn't it?

I just learned about a proposed large subdivision at Rusk Road. Is our already substandard infrastructure able to cope? I'm sure the City thinks that without the additional property tax revenue we can't make ends meet. It's pretty complicated. However, don't you think we should be properly prepared prior to allowing more families to live and work in our area? I recently read an article about how inadequate our water treatment facilities are. I also know that I-205, which was meant to open things up, is now a parking lot on more occasions than we want. If the state and Feds had plans to widen 205 then the property tax dollars might be able to address the other issues. But let's face it, there's no joy on the horizon there. Can't we just say no?

I lived in California for over forty years and I am a witness to what developers do to an area. When I arrived there, Coit Tower was the SF landmark and horses with riders were still seen trotting down the streets of the smaller towns. Now, even with multiple freeway overhauls, the traffic chokes off any movement. So where is the progress when small businesses can't get their trucks from point A to point B to earn a decent living?

If there were plans to overhaul I-205 and plans to upgrade surface streets and plans to increase water treatment capacity then go for it. But as usual City Planners have grand "pie in the sky" visions that turn to "you know what" but by then, they are retired. All the people involved have left behind a big stinking pile of problems for future generations to cope with.

Please! Just once say no to these developers who dangle the promises of revenue in front of your noses like a carrot on a stick in front of a jack ass.

Jamie Marshall
Gladstone, OR
510-908-3692 (cell)

Kelver, Brett

From: Melanie Frisch <melfrisch48@gmail.com>
Sent: Sunday, May 14, 2017 8:52 PM
To: Kelver, Brett
Subject: Re: 92 unit sub division on 224 & Rusk Rd

My name is Melanie Frisch. I live on Oatfield Rd not far from the proposed sight. I am concerned about the building of so many units without the inter structure to support so much traffic. Our streets are all ready degraded and way to busy. Not to mention more pollution and damage to our limited natural resources.
Sincerely,
Melanie Frisch

Sent from my iPhone

MEMORANDUM

TO: Community Development Department

THROUGH: Chuck Eaton, Director of Engineering

FROM: Alex Roller, Engineering Technician II

RE: 92-Lot Planned Development – 13333 SE Rusk Road
PD-2017-001 *(revised comments)*

DATE: May 16, 2017

Subdivide 3 existing parcels into 92 lots.

1. Per MMC 19.709.5 The public improvement process will conform to conditions laid out in MMC 12.08.020. This will apply to all construction that is completed in the right-of-way that is eventually dedicated to the City.
2. MMC Chapter 12.02 – Public Works Standards

   The Planning Commission finds that the following complies with applicable criteria of MMC 12.02.

   A. MMC 12.02.010 – Establishes standards that all new public works, including streets, sanitary sewer, storm sewers, and water lines constructed shall be constructed in conformance with the applicable public works standards.

      Proposed driveways will conform to 12.02.010 through Condition of Approval C.
3. MMC Chapter 12.08 – Street and Sidewalk Excavations, Construction and Repair

   The Planning Commission finds that the following complies with applicable criteria of MMC 12.08.

   Construction process will conform to all sections of MMC 12.08.
4. MMC Chapter 12.16 – Access Management

   The Planning Commission finds that the following complies with applicable criteria of MMC 12.16.

   A. MMC Section 12.16.040 establishes standards for access (driveway) requirements.

      i. MMC 12.16.040.A: requires that all properties be provided street access with the use of an accessway.

         The proposed development is consistent with MMC 12.16.040A.

      ii. MMC 12.16.040.B: Access spacing onto arterial and collector streets.

         The proposed development, is consistent with MMC 12.16.040B.

      iii. MMC 12.16.040.C: Accessway Locations

         a. Double Frontage

The proposed development is consistent with MMC 12.16.040.C.1 as no double frontage lot accessways are proposed.

b. Limiting driveway access from arterials and collectors.

The proposed development is consistent with MMC 12.16.040C.2, as no accessways are proposed on a collector or arterial.

c. Distance from property line

Proposed driveways will conform to MMC 12.16.040.C.3 through Condition of Approval M.

d. Distance from Intersection

Proposed lot layout allows for the siting of houses that will facilitate the required 45 ft accessway spacing on all lots except for lot 72. Applicant must have an approved variance to this requirement to construct an accessway for lot 72, which will conform to Condition of Approval A.

The proposed development, as conditioned is consistent with MMC 12.16.040.C.4.a.

iv. MMC 12.16.040.D: Number of Accessway Locations

a. Safe access

Applicant has proposed the minimum number of accessway locations.

The proposed development is consistent with MMC 12.16.040.D.1.

b. MMC 12.16.040.D.2-3 Does not apply to this development, as no accessways are on arterials or collectors are proposed. Also only 1 accessway per property is proposed.

v. MMC 12.16.040.E & MMC 12.16.040.F: Accessway Design - ADA standards & Width

Proposed driveways will conform to MMC 12.16.040.E & MMC 12.16.040.F through Condition of Approval M.

5. MMC Chapter 12.24 – Clear Vision at Intersections

The Planning Commission finds that the following complies with applicable criteria of MMC 12.24.

A. MMC Section 12.24.030: clear vision requirements

Proposed driveways, accessways and intersections will conform to MMC 12.24.030 through Condition of Approval M.

6. MMC Chapter 13.14 – Stormwater Management

The Planning Commission finds that the following complies with applicable criteria of MMC 13.14.

A. MMC Section 13.14.020 - Definitions

"Public Works Standards" mean the City of Milwaukie Public Works Standards and the referenced City of Portland Stormwater Management Manual that the City requires be complied with for the design and construction of on-site mitigation facilities including stormwater detention, retention, and water quality treatment facilities.

Preliminary stormwater report indicates a pre-development curve number of 79. The number that will be used for the final report will be 72 (Lewis & Clark era). This alteration will increase the size of the facilities slightly. Also, the City is unable to verify the preliminary stormwater report WES's BMP calculation for facility sizing. Final stormwater report will include PAC calculations for City to officially approve the stormwater facility sizing and configuration. The City feels that the discrepancy in curve number and unverified sizing calculations does not pose a problem because the project site has a much larger area of land that is already being graded and replanted. Even if this altered floodplain is not used for water treatment facilities, there is sufficient area on site to construct facilities, including constructing additional roadside planters.

Final stormwater design may include treatment facilities in the newly constructed floodplain/wetlands. Final design will conform to a design that satisfies Portland's Stormwater Manual as well as Milwaukie's requirements for city maintenance of systems treating stormwater from public streets.

7. MMC Title 18 – Flood Hazard Regulations

The Planning Commission finds that the following complies with applicable criteria of MMC Title 18.

MMC Title 18 applies to all special flood hazard areas and all flood management areas within the jurisdiction of the City.

A. MMC Section 18.040.100 – Development Permit Required

Applicant is proposing a map revision. New lots will not be in the modified floodplain. Although no buildings will be built below the floodplain elevation, application is proposing to cut and fill within the floodplain.

B. MMC Section 18.04.150 General Standards

i. MMC 18.04.150.A-B Anchoring and Construction Materials and Methods

Does not apply, application does not propose to construct any building in the floodplain once map revision has been approved by FEMA.

ii. MMC 18.04.150.C – Utilities

Utilities shall conform to requirements set forth in 18.04.150.C through Condition of Approval H.

iii. MMC 18.04.150.F – Balanced Cut and Fill

Two submittals have been submitted that indicate that there will not be a net fill in the floodplain. Grading permit will be required to accurately show that changes will conform to MC 18.04.150.F.

iv. MMC 18.04.150.G – Crawlspace Construction

If crawlspaces are constructed within the floodplain elevation, they must follow conditions per MMC 18.040.150.G.

8. MMC Chapter 19.700 – Public Facility Improvements

The Planning Commission finds that the following complies with applicable criteria of MMC 19.700.

MMC 19.700 applies to partitions, subdivisions, new construction, and modification or expansion of an existing structure or a change or intensification in use that result in any projected increase in vehicle trips or any increase in gross floor area on the site. The applicant proposes to subdivide the existing 3 parcels into 92 new lots. The subdivision triggers the requirements of MMC Title 19.700.

A. MMC Section 19.703 Approval Criteria

i. MMC 19.703.1 Preapplication Conference

Requirement for a preapplication conference was satisfied on August 11th 2016.

ii. MMC 19.703.2 Application Submittal

Development will require a Transportation Impact Study, and a Transportation Facilities Review application has been submitted.

The proposed development is consistent with MMC 19.703.2

iii. MMC 19.703.3 Approval Criteria

Applicant will provide transportation improvements and mitigation in rough proportion to the potential impacts of the development.

The proposed development is consistent with MMC 19.703.3.

B. MMC Section 19.704 requires submission of a transportation impact study documenting the development impacts on the surrounding transportation system.

Transportation impact study has been provided and reviewed.

The proposed development is consistent with MMC 19.704.

C. MMC Section 19.705 requires that transportation impacts of the proposed development be mitigated.

Per the TIS submitted February 7, 2017 from Kittelson & Associates, Inc. the proposed development does not trigger mitigation of impacts beyond the required frontage improvements and bike lane requirements. The surrounding transportation system will continue to operate at the level of service before the proposed development.

ODOT and Clackamas County have expressed concern regarding the analysis performed for the right turn lane for northbound traffic at Rusk/OR 224 intersection. TIS indicates a turn lane with a queueing length of 50 ft. The City agrees that this value may be overestimated. The TIS also indicates that right turn on red allowance is 50 vehicles per hour, which likely is not how this intersection functions where one through vehicle can block the entire turn lane. City's consultant has analyzed this intersection with left turn, through and right turn as a single lane. Also, the right turn on red has reduced to zero vehicles which is a more accurate representation of how the intersection currently functions. The resulting v/c is great than 1.0, indicating in mitigation requirements.

Traffic impact mitigation will conform to 19.705 through Condition of Approval L.

D. MMC Section 19.708 – Transportation Facility Requirements

i. MMC Subsection 19.708.1 – General Street Requirements and Standards

MMC 19.708.1.A – Access Management

Access requirements shall comply with access management standards contained in Title 12.16.

MMC 19.708.1.B – Clear Vision

Clear vision requirements shall comply with clear vision requirements contained in Title 12.24.

MMC 19.708.1.C – Development in downtown zones

Does not apply to this development

MMC 19.708.1.D – Development in Non-Downtown Zones

The proposed development is consistent with MMC 19.708.1.D.

MMC 19.708.1.E – Street Layout & Connectivity

MMC 19.708.1.E.1-2

Proposed development is consistent with MMC 19.708.1.E.1-2

MMC 19.708.1.E.3

Does not apply to proposed development as no streets are going to be extended to adjacent properties.

MMC 19.708.1.E.4

Proposed development is consistent with MMC.19.708.1.E.4

MMC 19.708.1.F – Intersection Design and Spacing

Proposed development is consistent with MMC 19.708.1.F

ii. MMC Subsection 19.708.2 establishes standards for street design and improvement.

The street to the east of lots 45 & 53 does not comply with minimum City standards. The sidewalk and planter strips are not proposed. The City has allowed this reduced cross section because of the pending adoption of a low volume residential standard cross section with pedestrian routes on the street surface. The 22-foot right-of-way width accommodates the minimum 10-foot travel lanes, curb and separation from the private property.

The proposed cross sections for Kellogg Creek Drive and all remaining internal streets conform to requirements are consistent with MMC 19.708.2.

MMC 19.708.2.A.12 – Street Trees

Landscape strips are present on application. Street trees will be required at an average 40' spacing.

iii. MMC Subsection 19.708.3 requires sidewalks to be provided on the public street frontage of all development.

The construction of sidewalks along the proposed development property abutting all public rights-of-way is included in the street frontage requirements.

MMC 19.708.3.A.3 requires that public sidewalks shall conform to ADA standards. Current proposal includes ADA ramps at all corners.

The proposed development is consistent with MMC 19.708.3.

iv. MMC Subsection 19.708.4 establishes standards for bicycle facilities.

Per Milwaukie's Transportation System Plan, a bike lane is required connecting the northeast corner of the property to the southwest corner of the property. Applicant has proposed to construct an on-street bike route through the development. The north-east turnaround will connect to Rusk/224 intersection through the construction of a multi-use path.

Proposed development is consistent with MMC 19.708.4.

v. MMC Subsection 19.708.5 establishes standards for pedestrian and bicycle paths. Pedestrian access is required at the end of the cul-de-sac, which has been satisfied through a 15-foot multi-use path extended to Rusk Road. Pedestrian access is also required from the east end of "Street A" to Kellogg Creek Drive, which has been satisfied through a pedestrian connection in tracts E & F.

Proposed development is consistent with MMC 19.708.5

vi. MMC Subsection 19.708.6 establishes standards for transit facilities.

The portion of SE Kellogg Creek Drive fronting the proposed development is classified as a transit route in the Milwaukie Transportation System Plan, however, transit facilities are already in

place. As a result, transit facility improvements are not required for the proposed development.

vii. MMC 19.708.6 does not apply to the proposed development.

Recommended Conditions of Approval

1. Prior to approval of the final plat, the following shall be resolved:
   A. Obtain a variance to MMC 12.16.040.C.4.a for accessway spacing for lot 72.
   B. Submit a final stormwater management plan to the City of Milwaukie Engineering Department for review and approval. The plan shall be prepared in accordance with Section 2 – Stormwater Design Standards of the City of Milwaukie Public Works Standards. Submit full-engineered plans for construction of all required public improvements, reviewed and approved by the City of Milwaukie Engineering Department. All utilities shall conform to the Milwaukie Public Works Standards.
   C. Obtain a right-of-way permit for construction of all required public improvements listed in these recommended conditions of approval.
   D. Pay an inspection fee equal to 5.5% of the cost of the public improvements.
   E. Provide a payment and performance bond for 100 percent of the cost of the required public improvements.
   F. Provide an erosion control plan and obtain an erosion control permit.
   G. Dedicate 14 feet of right-of-way on SE Kellogg Creek Drive fronting the proposed development property to accommodate the parking and bike facilities to the intersection of Rusk and Kellogg Creek Drive.
   H. Install all underground utilities, including stubs for utility service prior to surfacing any streets. Utilities shall be designed to minimize or eliminate infiltration of floodwaters into the system. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of floodwaters into the system and discharge from the systems into floodwaters. Relocate or provide a private utility easement for all utilities encroaching onto adjacent properties.
   I. Construct a 5-foot set-back sidewalk, 4-foot planter strip and curb & gutter on entire frontage of SE Kellogg Creek Drive.
   J. <u>Construct 5-foot set-back sidewalk, 4-ft planter strip, curb and gutter, 7-foot parking, and 10-foot travel lane (for each half of right-of-way), on “SE Street A” and “SE Street B”.</u>
   K. Construct all sidewalks, ramps and driveways on “SE Street A” and “Street B”.
   L. <u>Extend right turn lane for northbound traffic at Rusk/OR 224 intersection.</u>
   M. Construct a driveway approach to meet all guidelines of the Americans with Disabilities Act (ADA) to each new lot. The driveway approach aprons shall be between 9 feet and 20 feet in width and least 7.5 feet from the side property line.

N. Clear vision areas shall be maintained at all driveways and accessways and on the corners of all property adjacent to an intersection Remove all signs, structures, or vegetation more than three feet in height located in “vision clearance areas” at intersections of streets, driveways, and alleys fronting the proposed development.

O. Provide a 12-month Maintenance Bond upon completion of the construction.

P. Provide a final approved set of Mylar and electronic PDF “As Constructed” drawings to the City of Milwaukie prior to final inspection.

2. Prior to issuance of any building permit:

   A. Obtain approval of FEMA map revision for lots that are currently in the floodplain.

3. Prior to final inspection for any building on the proposed development, the following shall be resolved:

   A. Connect all residential roof drains to private drywell or other approved structure. Private properties may only connect to public storm system if percolation tests show that infiltration cannot be obtained on site or if the water table is too shallow. In the event the storm management system contains underground injection control devices, submit proof of acceptance of the storm system design from the Department of Environmental Quality.

Kelver, Brett

From: Dan Sweet <sweet@global-support.us>
Sent: Thursday, May 18, 2017 1:47 PM
To: Kelver, Brett
Cc: Daniel L Sweet; joecec@cyberiad.com; Pam Sweet
Subject: PD-2017-001 Hwy 224 & Rusk Road

Good Morning Mr. Kelver,

We wanted to take a minute to express my extreme opposition to the proposed 92 unit complex scheduled for a variance hearing on May 23rd.

We have several reasons for opposing this development in no particular order:

1 – Traffic is already a major issue at the intersection of Rusk/Lake and 224.
Adding to this just going to exacerbate the issue. The fact that they completed their "traffic study" during the summer clearly shows the developers are trying to avoid and minimize this issue. Summer break takes a huge load off both Rusk and Aldercrest roads and an even larger load off of the intersection due to both North Clackamas School Buses and general day to day summer traffic

2 – The propose building site is on and near both delineated wetland and areas prone to flooding. Their report tries to minimize this fact by stating that Wetlands "B –G are artificially created" Artificial or not it has been a wetland for some time and should remain so. Their plan indicates "minimal" disturbance but there should be NO disturbance of the wetland and habitat areas.

3- Storm water runoff and flood water storage. 90+ units will require covering a large amount of exposed land with hard surfaces.
We do not need additional pollution from landscape maintenance, parking lots, and the 100 plus vehicles that will be on that parking long running into the streams and habit area after every rain storm. The additional loss of storm runoff storage on the open ground there will have a significant negative effect on the surrounding area. I am sure you are well aware that just across 224 that homes and business have to sandbag their properties during the winter rainfalls. This will only be exacerbated by paving/covering the surrounding lowland areas. A few runoff basins may help with the pollution generated by the parking lot but not much else.

Sincerely,

The Sweet Family
Joe & Cecile
Dan & Lucy
Pam

Dan Sweet
6176 SE Parmenter Ct
Milwaukie, OR 97267-1822
503-653-0574 (office and cell)

sweet@dansweet.com (personal)
sweet@global-support.us (work)

Kelver, Brett

From: Milwaukie Planning
Sent: Thursday, May 18, 2017 12:42 PM
To: Egner, Dennis; Kelver, Brett; Roller, Alex; Eaton, Chuck
Subject: FW: Lake Road NDA objections to the Turning Point development
Attachments: NDA letter to Planning Dept. questioning the wisdom of the Turning Point developement.docx

FYI.

David

From: Vincent Alvarez [mailto:heavytech77@gmail.com]
Sent: Thursday, May 18, 2017 12:34 PM
To: Milwaukie Planning <Planning@milwaukieoregon.gov>
Subject: Lake Road NDA objections to the Turning Point development

We have been discussing this proposed project and have several concerns about the project in its current form.

Chair of Lake Road NDA

Vincent Alvarez

To whom it may concern:

I write as the Chairman of the Lake Road Neighborhood Association, and our approximately 3000 residents. Our association has been discussing the Turning Point Church Development Project on Rusk Road and we have several concerns with the proposed plan as it currently stands.

Our main concern is destruction of the existing Wetlands/Lowlands by filling to allow for the most westerly proposed building, which is identified as consisting of units 33 – 44.
This area contains the greatest concentration of large healthy Oregon White Oaks. These are mature trees having diameters of well beyond a foot and a half. Also a healthy under-story of Camas, and other native plants. This is not a, "low quality," wetland as indicated in some of the documentation. Some mitigation of invasive species should be carried out here, but, predominately, healthy native species make up the bulk of the vegetation.

The Willamette Valley is down to less than 3% of the original Native White Oak habitat in existence. The only acceptable loss of more of this habitat is none! The area planned for the 12 units also provide important flood control benefits. This area has already experienced several flooding occurrences. Loss of more of the wetlands will only exacerbate this problem. Directly across Hwy. 224 on Mt. Scott creek, FEMA is buying out several home owners and returning those lots to function as wetlands and to help reduce the severity of high water events. It makes no sense to bulldoze and fill land that acts as water containment, while at the same time razing homes to create more.

Additionally there are issues with what will certainly be worsening traffic concerns at the intersection of Rusk Rd. and Hwy. 224. This crossing is already very congested and sometimes dangerous. The addition of at least another hundred vehicles transiting it, will not improve the existing problems, and will only increase the backups that are occurring. We have questions as to the correctness of the traffic studies that have been performed.

A decision was moved and passed by Lake Road NDA to speak as one voice to our opposition of this development as currently planned. We would like to see the plans modified so that no White Oaks are lost and further impact on the lowlands surrounding Mt. Scott Creek are eliminated. There has been sustained and continuing improvements to the water shed to aid in the return of native fish species. This development with the proposed impact on native species and wetlands bordering Mt. Scott Creek would be counter productive to our stated goals as a community.

Lastly, we are concerned about cross purposes in the removal of 20 or so Oregon White Oaks, when our city has recently received the honor of the designation as a Tree City USA.

In closing. Our NDA recognizes the need for more housing in Milwaukie.
But, these projects must work within certain parameters and this development is counterintuitive to efforts made to reconstruct healthy watersheds. We must not lose any more White Oak habitat, we must be careful to not make flooding worse by destroying existing wetlands/lowlands, and we need to continue to work towards the reintroduction of native salmon to their ancestral waters.

Sincerely,

Vincent Alvarez, Chairman/Treasurer
Lake Road Neighborhood Association
May 12, 2017

Kelver, Brett

From: Bruce Reiter <breiter@pps.net>
Sent: Saturday, May 20, 2017 2:43 PM
To: Kelver, Brett
Subject: RE: proposed building of subdivision on 224 and Rusk Road

The two considerations should be impact to the land and negative change to traffic flow. This location, adding 92 plus vehicles into the existing streets would clog up the already heavy traffic, especially on weekday, school day, traffic. Lines of cars need two and three or more light changes to get through the intersections. How would adding almost one hundred more people help this situation?

This land location is necessary for the impounding of water during high rate rain showers to prevent flooding in the area. Wetland mitigate flooding by acting as a "weigh station" for this water slowing the flow into the streams and and rivers of the area, that eventually enter the Willamette River.

Has there been an environmental impact study and a traffic study during multiple seasons and weather conditions been performed?

Please look before you leap into this project. Consider all aspects, and not just monetary gains.

Thank you

Bruce Eric Reiter, RG

Sent from my Verizon, Samsung Galaxy smartphone

Kelver, Brett

From: John Green-Hite <jgreenhite@gmail.com>
Sent: Sunday, May 21, 2017 9:20 PM
To: Kelver, Brett
Subject: RE: PD 2017-001

John Green-Hite
13575 SE Briarfield Ct.
Milwaukie, OR 97222

Brett Keiver
City of Milwaukie Planner

RE: PD 2017-001

Dear Mr. Keiver:

As a local neighbor of the proposed 92-townhome subdivision, I am concerned that such a proposed subdivision would create a hazard to people, vehicles, and homes.

Any building, as you know, would affect not only the watershed directly on the said property, but would also affect Mt. Scott Creek and any tributaries, such as Cedar Creek, Alder Creek, and Kellogg Creek, and ultimately the Willamette River in which all of the creeks ultimately flow into. This would impact the City of Milwaukie at the Willamette River docks. The impact of the vehicles from a 92-townhouse development (not including 1, 2 or 3 or more cars per family inhabiting each townhouse) would detrimentally impact all the waterways and not just the water wetlands on said property. The backup of water would cause overflow in the sewer system and cause flooding of those creeks that depend on water flow and wetlands to handle overflow. Oils and other impurities, from the vehicles themselves (both construction and later the personal vehicles), would magnify the pollution already present in waterways. During flooding stages, which has closed Rusk Road just across the Milwaukie Expressway several times in recent times, those impurities are particularly worrisome.

Of great concern, as well, is the traffic impact. Unfortunately, the magnitude of this problem cannot be stressed enough. Currently, Rusk emptying into the Milwaukie Expressway is already clustered up, especially during school days when the buses come out of the bus garage. Delaying the buses even more due to traffic coming out of a 92-townhome subdivision than they presently are will result in bus drivers unconsciously rushing to get to their charges thereby increasing the risk of collisions. Meanwhile, children having to wait in areas for late buses, would increase the chances of them being hit and killed at unprotected bus stops. Furthermore, increasing the time for buses to leave the bus garage and getting back to the bus garage will result in increased pay hours affecting the cost to North Clackamas School District. How imperative is it that children's lives would be put at risk for the sake of an unnecessary subdevelopment?

The area, furthermore, has no supporting safety net for pedestrians, bicycles, or cars. There is no Trimet bus support to get pedestrians to any mass transit in the locale. Pedestrian sidewalks are practically nonexistent to the south, east and west of the location and access to any sort of mass transit would have to come from crossing the Milwaukie Expressway. By the very statement of fact that heavy traffic would ensue from a 92-townhouse subdivision, so it is logical that more pedestrian injuries and fatalities would ensue from the crossing of a major highway in the area to try to obtain public transportation. There is a charter school on the property of the Eastern Orthodox Church that has children who are subject to the traffic and the safety that would be compromised by approving of this subdivision. Children from Alder Creek Middle School also use Eric St. to Rusk Rd. that also would be put at risk. Would the City of Milwaukie be willing to put in a pedestrian

sky bridge costing “Overpasses (excluding bridges) have a range from **$150** to **$250** per square foot or **$1,073,000** to **$5,366,000** per complete installation, depending on site conditions. Wooden bridges are approximately**$125,000** on average, and pre-fabricated steel bridges approximately **$200,000**.
Overpasses/Underpasses - Pedestrian & Bicycle Information Center
www.pedbikeinfo.org/planning/facilities_crossings_over-underpasses.cfm”

North Clackamas Park would also be affected. During times of baseball (remembering baseball clubs run all year round}, weddings at the Sara Hite Rose Garden, Senior Citizens at the Senior Center, picnics at the park, the dog runs, and a myriad amount of other activities, the stream of cars is significant.

Three churches also affect the traffic on the weekends and during the week. The three churches within a half a mile of this proposed subdivision would clog up the minor and major arterials of the area. The Church of Jesus Christ of Latter Day Saints, Eastern Orthodox Church of the Annunciation, and the non denominational church next door to the property all contribute to the traffic flow which, as it stands, is already congested at all times.

The roadway of Rusk is also a problem where it funnels into the curves. Traffic from Robhil Dr. and Eastbrook Dr. already have limited visibility. Leaving Eric Street can be a major issue due to line of sight restrictions. When the traffic backs up on Eric Street, as it will with a 92-townhouse subdivision, the resultant collisions from cars coming down the hill from Aldercrest, with limited line of sight, will be an eventuality.

My house was directly impacted when Robhil Dr. was put in; construction trucks came down Eric Street and turned around in the cul de sac of Briarfield Ct. in which the street was damaged and neither the county or city has done anything about it. The damage that resulted is major to us and since any decision by the City of Milwaukie, the approval of such a subdivision, would directly affect all the streets in the area due to heavy construction vehicles which really has not been addressed. The City of Milwaukie can come down our street to verify this statement.

I am not saying that a development should not be approved. Such a large development as proposed would create a liability for both the City of Milwaukie and the residents in the area. A reduced number of townhouses to perhaps a quarter of the number proposed might be more understandable.

Respectfully Submitted,
John Green-Hite

Kelver, Brett

From: Joan Young <joan.s.young@gmail.com>
Sent: Sunday, May 21, 2017 10:17 PM
To: Kelver, Brett
Subject: PD-2017-001 92 unit proposed subdivision

Attention: Brett Kelver, Planner
FOR THE CITY OF MILWAUKIE PLANNING COMMISSION MEMBERS

The development of a parcel of land located just east of North Clackamas Park and Milwaukie Center, is of great concern for me for several reasons:

COMMUNITY FOCUS, NOT JUST CITY OF MILWAUKIE
*The parcel is JUST inside the City of Milwaukie boundaries but development will affect everyone who lives close by outside the City of Milwaukie in unincorporated Clackamas County, also. The wetlands and environmentally sensitive areas within the parcel are closely linked to similar issues and areas outside of the purview of the City of Milwaukie. Wildlife corridors and areas of environmental concern do not follow political boundaries. Clackamas County and unincorporated Clackamas County local residents should be involved in this decision making also.

TRANSPORTATION AND ACCESS
*Transportation is a huge concern for a development on that parcel due to the following:
>The latest transportation study seems less than valid because it is 2-years old and was completed during a low use time (when schools were not in session). I urge you to complete another study, in conjunction with Clackamas County, with appropriate timing in mind, to get a full picture of the area's traffic issues currently.
>The only entrance and exit for this development is Kellogg Creek Drive onto Rusk Road. Traffic piles up on both Rusk Rd. and Kellogg Creek Drive during peak transit times, waiting for the light at Hwy 224. That could be morning commutes or post-events in North Clackamas Park or the Milwaukie Center. Putting more traffic on Kellogg Creek Drive seems ridiculous at best since it dumps onto Rusk Rd.
>The pressure that would be put onto Rusk Road with more traffic is a huge potential issue. More and more, people are attempting to skirt traffic during peak travel times at Aldercrest and Thiessen Rds by utilizing Rusk Road. They often come onto Rusk Rd, off of driving east on Hwy 224, to avoid the traffic slow downs on Hwy 224. This also puts more pressure on Aldercrest Road between Rusk Rd and Thiessen Road. Neither Aldercrest or Rusk Roads have ROAD IMPROVEMENTS to provide for pedestrian and bicycle safety. They are dangerous at best in several areas.
>The development applicant states that there is only one school nearby, Alder Creek Middle School. Micha-el Waldorf School is right off Rusk Road. Because it is private, there is no bus transportation, so parents - multiple cars - pick up and drop off their kids both through the Rusk Rd. access to the school and via the North Clackamas Park back access to the school. During these time frames, traffic is frequently backed up on Rusk Rd. In addition, North Clackamas School District Bus Facility is accessed off Russcliff Drive. The buses come and go from there, putting more pressure on Rusk Road and the light at Hwy 224.
>The Milwaukie Center, located just inside North Clackamas Park, has between 200-500 people visiting on a daily basis, M-F, to participate in activities and receive services. The majority of these people are older adults. The Milwaukie Center also operates four ~16-passenger buses on a daily basis to transport people who do not drive.
>North Clackamas Park is a heavily used park, with literally hundreds to thousands of people visiting on any given day, depending upon weather and activities (picnics, weddings, ball tournaments, etc). Milwaukie Center is rented on evenings and weekends, with often several hundred people attending special events.

> Access to Hwy 224 from south on Rusk Road is inadequate. I personally have waited through four or five lights during peak transit times to get onto Hwy 224. There is no left turn only light or lane, and no right turn only lane, just one light and one lane. People try to illegally make a right turn lane, but there are huge pot holes and no pavement where cars often try to go. It is only a matter of time before we have a tragic accident at that intersection due to people trying to go either straight, left and right through a short time frame, while dealing with oncoming traffic from the north side of Rusk Rd.

ENVIRONMENT
*The environmentally sensitive areas are a large part of the parcel requested to be developed and of significant issue:
>Soon after the church facility was built, they started having dump trucks of dirt dumped in the environmentally sensitive area ILLEGALLY and, after many dump trucks, and notification by concerned neighbors, the authorities finally made them halt that activity. Now, decades later, is that area that was filled in illegally suddenly no longer an issue?
>Much of the Turning Point Church property in question has been deemed, by Metro's Title 13 program, as a high habitat conservation area with endangered Oregon White Oak habitat, wetlands and flood plains. Sensitive native fish species and threatened salmon species have been documented in this area. A lot of work has been done to improve the area in very recent years, with plantings and removal of non-native plant species. I question the applicants suggestion that they can safely save and protect enough of the environmentally sensitive area. AND THEN, WHAT IMPACT WILL THE INFLUX OF PEOPLE LIVING IN 92 UNITS HAVE ON THAT AREA?
>The White Oak stand between The Milwaukie Center and the Turning Point property is one of very few oak habitats left in the area and, as such, is highly endangered. It helps slow the water flow to prevent worse flooding down stream from that area.
>There is significant effort going into removal of the dam at Kellogg Lake. Not if, but when that happens, how will a development in this area negatively affect the salmonoid and native fish populations for the year-around water accesses?
>We already have flooding issues very close by (North on Rusk Rd). Paving more of this sensitive area will only prevent the natural absorption of water into the ground, resulting in faster and higher water accumulations....ie, more flooding.
>Say the development goes through....they will hire landscape crews to keep their new and beautiful plantings weed-free. What chemicals are they going to use that will then leach into the wetlands and streams so very close by, destroying natural habitats and killing our wildlife? How is the City of Milwaukie going to monitor that?

DO WHAT IS RIGHT
Yes, more and more people are moving into the metropolitan area. Due to this reason especially, it is important for the livability of the area to retain open spaces and protect environmentally sensitive areas. This is one of those areas and this is one of those tough considerations. North Clackamas Parks and Recreation District made an offer on the property recently. Pastor Bob Mihue of Turning Point Church wrote a letter of support for North Clackamas Parks and Recreation District to access grant money to purchase the property. The offer made by North Clackamas Parks and Recreation District to purchase the land was turned down by the church when the church found out it could get much more money from a developer. Turning Point Church has the opportunity to sell the land to a public steward of the land, North Clackamas Parks and Recreation District. This development does not need to happen and especially does not need to put such incredible pressure on the area.

Thank you.

Joan Young
14210 SE Parmenter Drive
Milwaukie, Oregon
97267

Kelver, Brett

From: Howard Lanoff <howardlanoff@yahoo.com>
Sent: Monday, May 22, 2017 8:09 AM
To: Kelver, Brett
Subject: Prroposed subdivision on 224 and Rusk Rd.

Hi Kevin,

I am concerned about the urban density that we have already I feel that Milwaukie needs more parks and open spaces for people to feel free connected to this earth that we live upon. Livability in Milwaukie is pretty good, and I would rather we improve upon that than consider future development.

Please do not allow the urban density and teraffic in Milwaukie to incrase with the addition of a new subdivision.

Thank You,

Howard Lanoff

Kelver, Brett

From: georgia bogner <ghbogner@yahoo.com>
Sent: Monday, May 22, 2017 10:42 AM
To: Kelver, Brett
Subject: MORE TO CONSIDER WITH 92-Townhome subdivision Hwy224 & Rusk Road

Most homes have more that one vehicle. That means way more than 92 additional vehicle during busy times.

From: georgia bogner <ghbogner@yahoo.com>
To: "kelverb@milwaukieoregon.gov" <kelverb@milwaukieoregon.gov>
Sent: Monday, May 22, 2017 10:24 AM
Subject: 92-Townhime subdivision Hwy224 & Rusk Road

I have exited onto to Hwy 224 via Rusk Road for thirty years and have experience additional traffic with the additions two housing developments off of Rusk Road--nowhere near a 92-housing unit. I have waited through 3-4 traffic lights at Hwy 224, sometimes sitting behind multiply school buses during the busy commute times of the day. I can't just dash off somewhere I need to be without considering the delay just to get onto Rusk Road and Hwy 224 a short distance from my house.

I think the residents of the 92-housing unit would be very frustrated as everyone else with the additional traffic. Just take a look at the size and distance of the road that is to accommodate this during the busy commute times of the day.

Georgia Bogner
503-653-5221

Kelver, Brett

From: Chris Runyard <crunyard@msn.com>
Sent: Monday, May 22, 2017 1:12 PM
To: Kelver, Brett
Subject: Turning Point Church Comments

https://vimeo.com/217941859

Turning Point

vimeo.com

This is "Turning Point" by People for Trees on Vimeo, the home for high quality videos and the people who love them.

Hello Brett. Please accept this short video submission into the discussion about the Turning Point Church property that will be discussed at the 5/23/17 Planning Commission meeting. Please forward this to the Planning Commission and others for the official record.

Thank You,
Chris Runyard

Kelver, Brett

From: Rodger/Linda Huntley <rhuntley18@comcast.net>
Sent: Monday, May 22, 2017 1:41 PM
To: Kelver, Brett
Subject: 92 Unit Planned Dev.

Mr. Kelver,

I am writing to oppose the 92 Unit Planned Development Subdivision at 13333 SE Rusk Road Milwaukie, OR.

I am a homeowner that lives on Briarfield Court off of Rusk Road, the traffic on Rusk Road is very busy as it is. If 92 Units go in, that could be a possible of 184 more vehicles using Rusk Road. The intersection at 224 & Rusk is a very, very busy Intersection now. Thursday, May 11th I left my home at 9:05am on my way to a class, I sat in a line of 25 vehicles to get thru the traffic light. There were no school buses in the line, there was one Tri-Met Lift Bus and the rest were cars. There have been several accidents at the corner of Rusk & 224. We have three churches on or off of Rusk Road, that brings traffic on the weekends and some week nights. Trying to get out of our street (Eric St. No Outlet) we have to wait for 5 to 10 vehicles to pass going either direction before we can pull out onto Rusk Road. This is our neighborhood and 92 units would be way to many to put on the land that is in consideration.
Please be considerate in making your review & choice on this matter of the neighbors in the surrounding area who pay a great deal in taxes and have chosen to live in an area with a Natural Resource Area that we hope you will protect. We love our neighborhood and adding 92 homes is a drastic increase to this area.

Thank you for your consideration on this matter.

Linda Huntley
13845 SE Briarfield Court
Milwaukie, Oregon 97222
503-659-4773

Kelver, Brett

From: jennifer <jenstipetic@yahoo.com>
Sent: Monday, May 22, 2017 4:03 PM
To: Kelver, Brett
Subject: 92 unit subdivision proposal for SE Rusk & Hwy 224

Dear Mr. Brett Kelver,

I want to take this opportunity to express my concerns about the proposed 92 unit subdivision at SE Rusk & Hwy 224.

I am currently a resident of Milwaukie residing off of Molt & Webster and my main means of transportation are walking or using trimet; choices I very much appreciate. In general, it is pretty safe to walk around the area because we have a lot of sidewalks, however, the traffic is heavy on our neighborhood roads, including 224 most of the day. Unfortunately, there is a lot of speeding through the neighborhoods and drivers texting, creating very unsafe roads.

I frequently walk to the North Clackamas Park and walk on SE Rusk Road, portions of which have no paved shoulder or actual ground including a sharp blind bend which makes it unsafe with the current traffic flow. Increasing the estimated number of cars at least 92, one per unit, or 184 for 2 per unit, plus school buses, delivery, ect. is a lot of extra traffic on that little road. I want to also point out that the most likey grocery store is Safeway on Webster Road and SE Rusk is a cut through to avoid 224.

My other concern is the destruction of the wetland area and the removal of the two hundred year old growth Oak Trees that will displace wildlife, cause flooding and hurt the restoration of the wetland area. I understand the need for housing, a robust economy and a sustainable future that includes a high quality life and preservation of the uniqueness that is Milwaukie Oregon, but the proposal of 92 units crowded on this parcel only takes into account profits earned while ignoring everthing else. I would challenge the developers to create a better design that leaves all the Old Oak Trees and doesn't fill in any wetlands.

In conclusion, I am asking that you evaluate this proposal with extreme due dilegence and require the developers to step up to the challenge and submit more appropriate plans condusive to the area so that there can be a positive outcome for all us, including the proposed "new neighbors". All of Milwaukie's citizens deserve to live in a safe and healthy neighborhood.

Thank you for your expertise.
Jennifer Stipetic

Kelver, Brett

From: Coordinator Account <coordinator@ncuwc.org>
Sent: Monday, May 22, 2017 4:18 PM
To: Kelver, Brett; Milwaukie Planning
Cc: Terry Gibson; Joseph Edge
Subject: NCUWC comments for PD-2017-001 Kellogg Creek Subdivision
Attachments: NCUWC comments Kellogg Creek Drive Planned Development 5.16.17signed.pdf

Dear Brett Kelver,
Please find attached the North Clackamas Urban Watershed Council's comments on the proposed Kellogg Creek Subdivision, PD-2017-001. Please contact me if you have any questions.

Thank you,

Andrew Collins-Anderson
Executive Director
North Clackamas Urban Watersheds Council
503-550-9282
2416 SE Lake Rd. Milwaukie, OR 97222

North Clackamas Urban Watersheds Council

2416 SE Lake Rd. • Milwaukie, OR 97222
coordinator@ncuwc.org • www.ncuwc.org

May 16, 2017

To: Brett Kelver, AICP
City of Milwaukie Planning Department
6101 SE Johnson Creek Blvd.
Milwaukie, OR 97206

RE: PD-2017-001 Kellogg Creek Subdivision

As the watershed council representing Mt. Scott Creek, the North Clackamas Urban Watersheds Council (NCUWC) would like to provide the following comments in regards to the proposed Kellogg Creek Drive Planned Development, PD-2017-001.

1.) The applicant is requesting to waive the City's requirement that all new lots must provide adequate buildable area outside the WQR and/or HCA (31 of the 92 proposed lots do not meet this requirement), and therefore is asking for a Variance. Under 19.911.4.B.1, Approval Criteria for Type III Variances, Discretionary Relief Criteria, the applicant has failed to show that the proposed variance avoids or minimizes impacts to surrounding properties, has desirable public benefits, or responds to the existing built or natural environment in a creative or sensitive manner.
    a. Under 19.911.4.B.1.b.(1) the application does not address or analyze the potential for increased flooding of the adjacent North Clackamas Park and Milwaukie Center due to the filling of wetlands and damage to HCA and WQR. The headwaters of Camas Creek flows from the wetlands on the proposed property through North Clackamas Park, yet there is no analysis of the impacts the application will have on the adjacent properties. This is further shown by Milwaukie's environmental consultant, ESA, in their comment "Wetland A covers 0.7 acre on-site and extends off-site to the west. The total size of Wetland A (on and off-site) was not provided in the application." The application has not shown that the project will not impact surrounding properties. There is a potential for impacts and the applicant should be required to address this potential.
    b. Under 19.911.4.B.1.b.(2), the application has shown the public benefit of the project to reaching the goals in Milwaukie's Housing Needs Analysis. However, the application does not address the public benefit that the property's natural resources currently provide, and are at risk of losing. The property has 46 mature White Oak trees with 20 of those planned to be removed. According to Milwaukie's environmental consultant, ESA, "The Oregon Department of Fish and Wildlife (ODFW) identifies oak woodlands as a "Strategy Habitat" in the Willamette Valley ecoregion, which is a vegetation cover type of high conservation value. Large diameter oaks in particular are valued for providing diverse wildlife habitat. Approximately 5 percent of the historic white oak habitat in the Willamette Valley is remaining (ODFW, 2005)." This example shows that the application does not analyze the full range of potential public benefits the project could provide to the residents of Milwaukie (which is a Tree City USA) or the State of Oregon's natural resource priorities through the protection of these trees. Mt. Scott Creek has also been surveyed and shown to provide habitat for threatened species of salmon and steelhead by ODFW. Riparian and wetland habitats are essential for the viability of these fish, and the site currently provides a public benefit in the protection and recovery of these listed fish. Further, destruction of the HCA and WQR will have a negative impact on the public benefit of the recovery of Oregon native salmon and steelhead.
    c. Under 19.911.4.B.1.b.(3), the application does not respond to the existing built or natural environment in a creative and sensitive manner. The application provides three alternatives for

the project: one with current zoning and no impacts to HCA or WQR, one with the maximum allowable density, and the preferred alternative with impacts to the HCA and WQR. The application does not offer alternatives that are creative or sensitive to the existing natural environment by showing alternative site plans and building types that avoid disturbance of the HCA and WQR.

2.) NCUWC is concerned and recommends the City take very seriously the comments provided by ESA regarding flooding: "... the City's use of a floodplain boundary that is different than the floodplain boundary shown on the FEMA FIRM, without the benefit of FEMA Conditional Letter of Map Revision (CLOMR), could risk the City's Community Rating System (CRS) valuation during a subsequent FEMA audit. It may also result in homeowners misunderstanding their flood risks or their requirement to purchase flood insurance. These risks should be evaluated by City staff with respect to Milwaukie Municipal Code 18.04." With properties just upstream of this site being purchased by FEMA because of repeat loss due to flooding, and with Milwaukie and Clackamas County resources being used to remove these properties from the floodplain, it is unreasonable to propose developing so close to the 100 –year floodplain. Flood maps are outdated, and the risk is real for property damage and threats to public safety as the project is proposed.

3.) NCUWC has also invested in the restoration and maintenance of the natural areas on the proposed property through invasive plant removal and native plantings. In the spring of 2010, the Turning Point Church property was enrolled in NCUWC's Streamside Stewards Program (SSP). Through this collaboration, NCUWC has planted over 5,000 native plants (which includes some 600 Oregon White Oak trees) and removed invasive plants through several grants funded by Metro and the Oregon Watershed Enhancement Board. The application proposes to mitigate disturbance of the HCA and WQR areas through invasive plant removal and native plantings. NCUWC feels that this mitigation is inadequate considering that this work has already been started through the SSP, and therefore would be redundant and a waste of local and state resources. NCUWC also finds the City's requirements for maintenance of mitigation through invasive plant management and native plantings to be inadequate. Two years is not enough to control invasive plants to allow for the establishment of the planted natives, and generally this type of restoration takes sustained management from a landowner, the HOA in this case. Through the SSP, NCUWC has found that many HOAs that manage natural areas along Kellogg and Mt. Scott Creeks do not have the resources needed to maintain these properties for the improved habitat and conservation values they are protected for. How does this application address that issue?

Recommendations:

NCUWC recommends that the Milwaukie Planning Commission not approve the application as proposed and require further review of alternative site plans in order to protect the unique and irreplaceable natural resources on the property and to protect public health and safety for future Milwaukie citizens and their neighbors.

Sincerely,

Terry Gibson, Board Chair