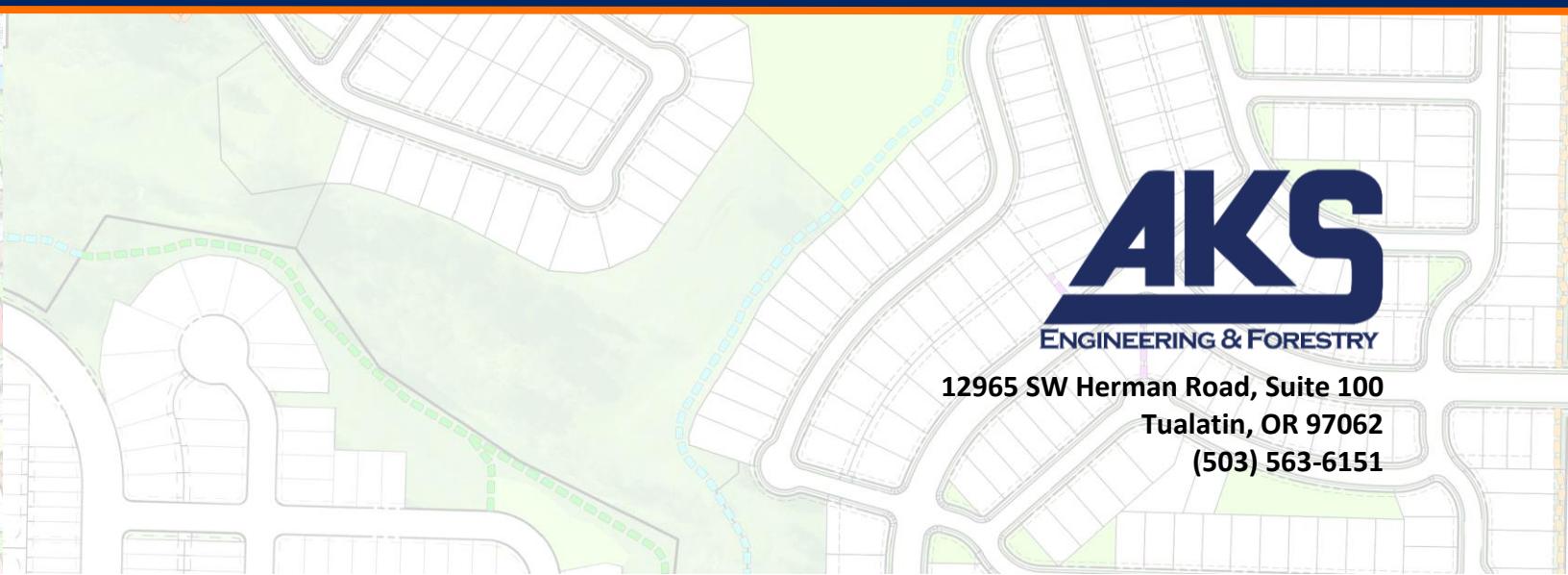
Land Use Application For Lindsay Anne Estates Too

Date: August 2017

Submitted to:
City of Oregon City
Planning Division
221 Molalla Avenue, Suite 200
Oregon City, OR 97045

Property Owners:
Bruce Raymond Miller and Shelly Alane Miller
Trustees of the Bruce and Shelly Miller Revocable Living Trust
19701 S Leland Road
Oregon City, OR 97045

Applicant:
PDX Development, Inc.
PO Box 2559
Oregon City, OR 97045



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Exhibits

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Applicant:	PDX Development, Inc. PO Box 2559 Oregon City, OR 97045
Applicant's Consultant:	AKS Engineering & Forestry, LLC 12965 SW Herman Road, Suite 100 Tualatin, OR 97062 Contact(s): Monty Hurley (monty@aks-eng.com) Chris Goodell (chrisg@aks-eng.com) Phone: (503) 563-6151 Fax: (503) 563-6152
Site Location:	19701 S Leland Road, Oregon City, OR 97045
Clackamas County Assessor's Information:	Tax Map: 32E18, Tax Lot 1400
Site Size:	±6.33 Acres
Comprehensive Plan Designation:	LR – Low Density Residential
Land Use District:	R-6 – Single-Family Dwelling District

I. Executive Summary

On behalf of the property owners and applicant, AKS Engineering & Forestry, LLC is submitting this application for a 28-lot subdivision (Lindsay Anne Estates Too) in the City of Oregon City for the future construction of single-family detached residential homes. The project includes the necessary streets, sidewalks, services, utilities, and other needed public improvements to support the project.

The essential components of this subdivision application are:

- 28 lots for the future construction of single-family detached homes consistent with the adjoining community to the south
- An interconnected pedestrian and vehicular circulation system
- Creation of a cohesive neighborhood with the continuation of Cedarwood Way and Cherrywood Way from the adjoining Lindsay Anne Estates Subdivision to the southeast, through the project site connecting to the project's new east/west local street extending from S Leland Road
- An integrated on-site stormwater management system including street side vegetated filtration swales and flow control

II. Site Description/Setting

The project includes one tax lot that is approximately ±6.33 acres. It is in process of being annexed into the City of Oregon City, and rezoned from Clackamas County's zoning of Future Urban 10-Acre (FU-10) to the City of Oregon City's R-6 zone through a separate land use application, to provide a community consistent with several other residential projects to the southeast. The project site is generally located northwest of the Lindsay Anne Estates Subdivision and southwest of S Leland Road. The project site is also northeast of the abutting Urban Growth Boundary (UGB). The subject property has been historically associated with residential/farming practices. There are no designated or identified natural resources located on the project site.

III. Applicable Review Criteria

OREGON CITY MUNICIPAL CODE

Title 10 - VEHICLES AND TRAFFIC

Chapter 10.32 TRAFFIC SIGHT OBSTRUCTIONS

10.32.020 Definitions.

"Clear vision area" means a triangular area at the intersection of two streets or a street and a railroad, the area of which is to be determined by the city engineer or his designee, using the following criteria:

1. Type of intersection;
2. Site characteristics;
3. Types of vehicle controls;
4. Vehicle speed;
5. Traffic volume;
6. Suggested intersection sight distances prescribed in the Transportation and Traffic Engineering Handbook published by the Institute of Traffic Engineers, 1976 Edition, as follows:

Corner Sight Distance						
Speed Limit:	20	25	30	35	40	45
Sight Distance:	200	250	300	350	400	450

Corner sight distance is measured from a point on the center line of the minor road at least fifteen feet from the edge of the major road pavement and measured from a height of eye of three and seventy-five hundredths feet on the minor road to a height of object of four and five-tenths feet on the major road. The clear vision area is in the form of a triangle, two sides of which are lot lines measured from the corner intersection of the street lines. Where the lot lines have rounded corners, the lot lines are extended in a straight line to a point of intersection. The third side of the clear vision area is a line across the corner of the lot joining the nonintersecting ends of the other two sides.

Response: Clear vision areas are planned to be maintained at intersections in accordance with the applicable standards. This standard is met.

10.32.030 Sight line requirements

A clear vision area shall contain no vegetation or fences or other artificial obstruction exceeding three feet in height measured from the top of the curb or, where no curb exists, from the established street center line grade, except that trees exceeding this height may be located in this area provided all branches and foliage are removed to a height of eight feet above the grade.

Response: Clear vision areas are not planned to contain vegetation, fences, or other obstructions exceeding 3 feet in height, except for allowed trees branched up to 8 feet in height. This standard is met.

Title 12 - STREETS SIDEWALKS AND PUBLIC PLACES

Chapter 12.04 - STREETS, SIDEWALKS AND PUBLIC PLACES

12.04.003 Applicability.

A. Compliance with this chapter is required for all land divisions, site plan and design review, master plan, detailed development plan and conditional use applications and all public improvements.

B. Compliance with this chapter is also required for new construction or additions which exceed fifty percent of the existing square footage, of all single and two-family dwellings. All applicable single and two-family dwellings shall provide any necessary dedications, easements or agreements as identified in the transportation system plan and this chapter. In addition, the frontage of the site shall comply with the following prioritized standards identified in this chapter:

1. Improve street pavement, construct curbs, gutters, sidewalks and planter strips; and

2. Plant street trees.

The cost of compliance with the standards identified in 12.04.003.B.1 and 12.04.003.B.2 is limited to ten percent of the total construction costs. The value of the alterations and improvements as determined by the community development director is based on the entire project and not individual building permits. It is the responsibility of the applicant to submit to the community development director the value of the required improvements. Additional costs may be required to comply with other applicable requirements associated with the proposal such as access or landscaping requirements.

Response: The project is planned to comply with the provisions of this chapter, as shown in the responses to the approval criteria in this narrative. Street improvements and street trees are planned to comply with the standards of the Oregon City Municipal Code, addressed later in this narrative.

12.04.005 Jurisdiction and management of the public rights-of-way.

A. The city has jurisdiction and exercises regulatory management over all public rights-of-way within the city under authority of the City Charter and state law by issuing separate public works right-of-way permits or permits as part of issued public infrastructure construction plans. No work in the public right-of-way shall be done without the proper permit. Some public rights-of-way within the city are regulated by the State of Oregon Department of Transportation (ODOT) or Clackamas County and as such, any work in these streets shall conform to their respective permitting requirements.

B. Public rights-of-way include, but are not limited to, streets, roads, highways, bridges, alleys, sidewalks, trails, paths, public easements and all other public ways or areas, including the subsurface under and air space over these areas.

C. The city has jurisdiction and exercises regulatory management over each public right-of-way whether the city has a fee, easement, or other legal interest in the right-of-way. The city has jurisdiction and regulatory management of each right-of-way whether the legal interest in the right-of-way was obtained by grant, dedication, prescription, reservation, condemnation, annexation, foreclosure or other means.

D. No person may occupy or encroach on a public right-of-way without the permission of the city. The city grants permission to use rights-of-way by franchises, licenses and permits.

E. The exercise of jurisdiction and regulatory management of a public right-of-way by the city is not official acceptance of the right-of-way, and does not obligate the city to maintain or repair any part of the right-of-way.

Response: The applicant understands that the City has jurisdictional management over the future public rights-of-way within the project. However, Clackamas County has jurisdictional management over S Leland Road. Therefore, planned improvements to S Leland Road will be coordinated with Clackamas County staff.

12.04.007 Modifications.

The review body may consider modification of this standard resulting from constitutional limitations restricting the city's ability to require the dedication of property or for any other reason, based upon the criteria listed below and other criteria identified in the standard to be modified. All modifications shall be processed through a Type II Land Use application and may require additional evidence from a transportation engineer or others to verify compliance. Compliance with the following criteria is required:

Response: Modifications are not necessary with this application. This standard does not apply.

12.04.010 Construction specifications—Improved streets.

All sidewalks hereafter constructed in the city on improved streets shall be constructed to city standards and widths required in the Oregon City Transportation System Plan. The curb shall be constructed at the same time as the construction of the sidewalk and shall be located as provided in the ordinance authorizing the improvement of said street next proceeding unless otherwise ordered by the city commission. Both sidewalks and curbs are to be constructed according to plans and specifications provided by the city engineer.

Response: Future sidewalks within the project are planned to comply with City construction specifications. This standard is met.

12.04.020 Construction specifications—Unimproved streets.

Sidewalks constructed on unimproved streets shall be constructed of concrete according to lines and grades established by the city engineer and approved by the city commission. On unimproved streets curbs do not have to be constructed at the same time as the sidewalk.

Response: No unimproved streets are associated with this project. Therefore, this standard is not applicable.

12.04.025 Street design—Driveway curb cuts.

A. One driveway shall be allowed per frontage. In no case shall more than two driveways be allowed on any single or two-family residential property with multiple frontages.

B. With the exception of the limitations identified in 12.04.025.C, all driveway curb cuts shall be limited to the following dimensions.

Property Use	Minimum Driveway Width at sidewalk or property line	Maximum Driveway Width at sidewalk or property line
Single or two-family dwelling with one car garage/parking space	10 feet	12 feet
Single or two-family dwelling with two car garage/parking space	12 feet	24 feet
Single or two-family dwelling with three or more car garages/parking space	18 feet	30 feet

The driveway width abutting the street pavement may be extended three feet on either side of the driveway to accommodate turn movements. Driveways may be widened onsite in locations other than where the driveway meets sidewalk or property line (for example between the property line and the entrance to a garage).

E. Exceptions. The public works director reserves the right to waive this standard, if it is determined through a Type II decision including written findings that it is in the best interest of the public to do so.

Response: Future homes within the project are planned to be constructed with one driveway per home. Driveway widths can comply with the above-listed requirements in relation to the sizes of garages or parking spaces. This standard is met.

12.04.030 Maintenance and repair.

The owner of land abutting the street where a sidewalk has been constructed shall be responsible for maintaining said sidewalk and abutting curb, if any, in good repair.

Response: Future home owners within the project are planned to be responsible for maintaining sidewalks and abutting curbs along their frontage. This standard is understood.

12.04.031 Liability for sidewalk injuries.

A. The owner or occupant of real property responsible for maintaining the adjacent sidewalk shall be liable to any person injured because of negligence of such owner or occupant in failing to maintain the sidewalk in good condition.

B. If the city is required to pay damages for an injury to persons or property caused by the failure of a person to perform the duty that this ordinance imposes, the person shall compensate the city for the amount of the damages paid. The city may maintain an action in a court of competent jurisdiction to enforce this section.

Response: Future home owners within the project are planned to be responsible for maintaining sidewalks and abutting curbs along their frontage. This standard is understood.

12.04.032 Required sidewalk repair.

A. When the public works director determines that repair of a sidewalk is necessary he or she shall Issue a notice to the owner of property adjacent to the sidewalk.

B. The notice shall require the owner of the property adjacent to the defective sidewalk to complete the repair of the sidewalk within ninety days after the service of notice. The notice shall also state that if the repair is not made by the owner, the city may do the work and the cost of the work shall be assessed against the property adjacent to the sidewalk.

C. The public works director shall cause a copy of the notice to be served personally upon the owner of the property adjacent to the defective sidewalk, or the notice may be served by registered or certified mail, return receipt requested. If after diligent search the owner is not discovered, the public works director shall cause a copy of the notice to be posted in a conspicuous place on the property, and such posting shall have the same effect as service of notice by mail or by personal service upon the owner of the property.

D. The person serving the notice shall file with the city recorder a statement stating the time, place and manner of service or notice.

Response: Future home owners within the project are planned to be responsible for maintaining sidewalks along their frontage. This standard is understood.

12.04.033 City may do work.

If repair of the sidewalk is not completed within ninety days after the service of notice, the public works director shall carry out the needed work on the sidewalk. Upon completion of the work, the public works director shall submit an itemized statement of the cost of the work to the finance director. The city may, at its discretion, construct, repair or maintain sidewalks deemed to be in disrepair by the public works director for the health, safety and general welfare of the residents of the city.

Response: Future home owners within the project are planned be responsible for maintaining sidewalks and abutting curbs along their frontage. It is understood that if repairs are not completed within 90 days of a "Service of Notice," the Public Works Director shall carry out the needed work and bill the property owner. This standard is met.

12.04.034 Assessment of costs.

Upon receipt of the report, the finance director shall assess the cost of the sidewalk work against the property adjacent to the sidewalk. The assessment shall be a lien against the property and may be collected in the same manner as is provided for in the collection of street improvement assessment.

Response: It is understood that a lien against any property may be collected for any necessary repairs to sidewalks by the City. This standard is met.

12.04.040 Streets – Enforcement.

Any person whose duty it is to maintain and repair any sidewalk, as provided by this chapter, and who fails to do so shall be subject to the enforcement procedures of Chapters 1.16, 1.20 and 1.24. Failure to comply with the provisions of this chapter shall be deemed a nuisance. Violation of any provision of this chapter is subject to the code enforcement procedures of Chapters 1.16, 1.20 and 1.24.

Response: It is understood that failure of future home owners to comply with a request to maintain sidewalks can subject to code enforcement procedures. This standard is met.

12.04.050 Retaining walls— Required.

Every owner of a lot within the city, abutting upon an improved street, where the surface of the lot or tract of land is above the surface of the improved street and where the soil or earth from the lot, or tract of land is liable to, or does slide or fall into the street or upon the sidewalk, or both, shall build a retaining wall, the outer side of which shall be on the line separating the lot, or tract of land from the improved street, and the wall shall be so constructed as to prevent the soil or earth from the lot or tract of land from falling or sliding into the street or upon the sidewalk, or both, and the owner of any such property shall keep the wall in good repair.

Response: Future retaining walls associated with the project are planned to be maintained by future property owners. If, for any reason, retaining walls should fail, they are to be repaired to their original state. This standard is met.

> **12.04.060 Retaining walls— Maintenance.**
>
> When a retaining wall is necessary to keep the earth from falling or sliding onto the sidewalk or into a public street and the property owner or person in charge of that property fails or refuses to build such a wall, such shall be deemed a nuisance. The violation of any provision of this chapter is subject to the code enforcement procedures of Chapters 1.16, 1.20 and 1.24.

Response: Future retaining walls associated with the project are planned to be maintained by future property owners. If, for any reason, retaining walls should fail, they are to be repaired to their original state. This standard is met.

> **12.04.070 Removal of sliding dirt.**
>
> It shall be the duty of the owner of any property as mentioned in Section 12.04.050, and in case the owner is a nonresident, then the agent or other person in charge of the same, to remove from the street or sidewalk or both as the case may be, any and all earth or dirt falling on or sliding into or upon the same from the property, and to build and maintain in order at all times, the retaining wall as herein required; and upon the failure, neglect or refusal of the land owner, the agent or person in charge of the same to clean away such earth or dirt, falling or sliding from the property into the street or upon the sidewalk, or both, or to build the retaining wall, shall be deemed guilty of a misdemeanor.

Response: The project is not planned to cause dirt to slide onto future internal streets or sidewalks of the subdivision. Future property owners within the project are planned to be responsible for compliance with City codes and subject to enforcement action by the City for such codes, including removing dirt falling on or sliding into streets or sidewalks. This standard is understood.

> **12.04.080 Excavations – Permit required.**
>
> It shall be unlawful for any person to dig up, break, excavate, disturb, dig under or undermine any public street or alley, or any part thereof or any macadam, gravel, or other street pavement or improvement without first applying for and obtaining from the engineer a written permit so to do.

Response: Appropriate permits are planned to be obtained prior to any excavation activities within the boundaries of the project. This standard is met.

> **12.04.090 Excavations – Permit restrictions.**
>
> The permit shall designate the portion of the street to be so taken up or disturbed, together with the purpose for making the excavation, the number of days in which the work shall be done, and the trench or excavation to be refilled and such other restrictions as may be deemed of public necessity or benefit.

Response: Work, as specified within issued permits, to be performed within the public right-of-way is planned to be conducted within the approved timelines indicated in the permit. If a

violation of this standard occurs, the appropriate party may be cited in accordance with the penalties carried by said permit. This standard is met.

12.04.100 Excavations – Restoration of Pavement.

Whenever any excavation shall have been made in any pavement or other street improvement on any street or alley in the city for any purpose whatsoever under the permit granted by the engineer, it shall be the duty of the person making the excavation to restore the pavement in accordance with the City of Oregon City Public Works Pavement Cut Standard in effect at the time a right-of-way permit application is filed. The city commission may adopt and modify the City of Oregon City Public Works Pavement Cut Standards by resolution as necessary to implement the requirements of this chapter.

Response: It is understood that any street on which excavation activities are performed are to be repaired to their original condition. This standard is met.

12.04.110 Excavations – Nuisance – Penalty.

Any excavation in violation of this chapter shall be deemed a nuisance. Violation of any provision of this chapter is subject to the code enforcement procedures of Chapters 1.16, 1.20 and 1.24.

Response: Excavations that violate this chapter are not planned. It is understood that any party in violation of any provision of this chapter can be subject to the enforcement procedures of Chapters 1.16, 1.20, and 1.24 of the Oregon City Municipal Code. This standard is met.

12.04.120 Obstructions – Permit required.

A. Permanent Obstructions. It is unlawful for any person to place, put or maintain any obstruction, other than a temporary obstruction, as defined in subsection B. of this section, in any public street or alley in the city, without obtaining approval for a right-of-way permit from the commission by passage of a resolution.

B. Temporary Obstructions.

C. Fees. The fee for obtaining a right-of-way permit for either a permanent obstruction or a temporary obstruction shall be set by resolution of the commission.

Response: Permanent obstructions are not planned with this application. If a temporary obstruction is required as part of the construction of the subdivision, a right-of-way permit application and appropriate fees are to be submitted to the City for review and approval. This standard is met.

12.04.130 Obstructions – Sidewalk sales.

A. It is unlawful for any person to use the public sidewalks of the city for the purpose of packing, unpacking or storage of goods or merchandise or for the display of goods or merchandise for sale. It is permissible to use the public sidewalks for the process of expeditiously loading and unloading goods and merchandise.

B. The city commission may, in its discretion, designate certain areas of the city to permit the display and sale of goods or merchandise on the public sidewalks under such conditions as may be provided.

Response: Sidewalk sales are not associated with this subdivision application. This standard does not apply.

12.04.140 Obstructions – Nuisance – Penalty.

Any act or omission in violation of this chapter shall be deemed a nuisance. Violation of any provision of this chapter is subject to the code enforcement procedures of Chapters 1.16, 1.20 and 1.24.

Response: Violating acts or omissions are not associated with this subdivision application. This standard does not apply.

12.04.150 Street and alley vacations – Cost.

At the time of filing a petition for vacation of a street, alley or any part thereof, a fee as established by city commission resolution shall be paid to the city.

Response: No street or alley vacations are associated with this subdivision application. This standard does not apply.

12.04.160 Street vacations – Restrictions.

The commission, upon hearing such petition, may grant the same in whole or in part, or may deny the same in whole or in part, or may grant the same with such reservations as would appear to be for the public interest, including reservations pertaining to the maintenance and use of underground public utilities in the portion vacated.

Response: No street or alley vacations are associated with the application. Therefore, this standard does not apply.

12.04.170 Street design – Purpose and general provisions.

All development shall be in conformance with the policies and design standards established by this chapter and with applicable standards in the city's public facility master plan and city design standards and specifications. In reviewing applications for development, the city engineer shall take into consideration any approved development and the remaining development potential of adjacent properties. All street, water, sanitary sewer, storm drainage and utility plans associated with any development must be reviewed and approved by the city engineer prior to construction. All streets, driveways or storm drainage connections to another jurisdiction's facility or right-of-way must be reviewed by the appropriate jurisdiction as a condition of the preliminary plat and when required by law or intergovernmental agreement shall be approved by the appropriate jurisdiction.

Response: Street and utility stubs to adjoining properties to the northwest and southwest of the project are planned to accommodate potential future development. However, the property to the southwest is located outside of the UGB. There are no other opportunities to extend services to adjoining properties. This standard is met.

12.04.175 Street design—Generally.

The location, width and grade of street shall be considered in relation to: existing and planned streets, topographical conditions, public convenience and safety for all modes of travel, existing and identified future transit routes and pedestrian/bicycle accessways, overlay

districts, and the proposed use of land to be served by the streets. The street system shall assure an adequate traffic circulation system with intersection angles, grades, tangents and curves appropriate for the traffic to be carried considering the terrain. To the extent possible, proposed streets shall connect to all existing or approved stub streets that abut the development site. The arrangement of streets shall either:

A. Provide for the continuation or appropriate projection of existing principal streets in the surrounding area and on adjacent parcels or conform to a plan for the area approved or adopted by the city to meet a particular situation where topographical or other conditions make continuance or conformance to existing streets impractical;

B. Where necessary to give access to or permit a satisfactory future development of adjoining land, streets shall be extended to the boundary of the development and the resulting dead-end street (stub) may be approved with a temporary turnaround as approved by the city engineer. Notification that the street is planned for future extension shall be posted on the stub street until the street is extended and shall inform the public that the dead-end street may be extended in the future. Access control in accordance with [Chapter] 12.04 shall be required to preserve the objectives of street extensions.

Response: Public streets are planned in the project to provide access to lots/future homes and provide for neighborhood connectivity/circulation. The preliminary plans show the locations and arrangement of these improvements. The project plans to extend Cedarwood Way and Cherrywood Way from the adjoining Lindsay Anne Estates Subdivision to the southeast to the adjoining property to the northwest. The planned east/west local street extending though the project from S Leland Road is planned to stub to the adjoining property to the southwest. Streets stubbed within the project are planned to facilitate potential future development of adjacent properties. This standard is met.

12.04.180 Street design.

All development regulated by this chapter shall provide street improvements in compliance with the standards in Figure 12.04.180 depending on the street classification set forth in the Transportation System Plan and the Comprehensive Plan designation of the adjacent property, unless an alternative plan has been adopted. The standards provided below are maximum design standards and may be reduced with an alternative street design which may be approved based on the modification criteria in [Section] 12.04.007. The steps for reducing the maximum design below are found in the Transportation System Plan.

Table 12.04.180 Street Design

Road Classification	Comprehensive Plan Designation	Right-of-Way Width	Pavement Width	Public Access	Sidewalk	Landscape Strip	Bike Lane	Street Parking	Travel Lanes	Median
Local	Residential	54 ft.	32 ft.	0.5 ft.	5 ft.	5.5 ft.	(2) 16 ft. Shared Space			N/A

1. Pavement width includes, bike lane, street parking, travel lanes and median.

2. Public access, sidewalks, landscape strips, bike lanes and on-street parking are required on both sides of the street in all designations. The right-of-way width and pavement widths identified above include the total street section.

3. A 0.5-foot curb is included in landscape strip or sidewalk width.

4. Travel lanes may be through lanes or turn lanes.

5. The 0.5-foot public access provides access to adjacent public improvements.

6. Alleys shall have a minimum right-of-way width of twenty feet and a minimum pavement width of sixteen feet. If alleys are provided, garage access shall be provided from the alley.

Response: As shown on the preliminary plans, the planned extension of adjoining residential streets (Cedarwood Way and Cherrywood Way) and the new internal east/west local street from S Leland Road have been designed to meet the minimum requirements outlined in the above table. The planned design is consistent with the guidance provided by City staff at the pre-application conference and in the updated City Pre-Application Conference Summary (PA 17-07) dated 03/10/17. This standard is met.

12.04.185 Street design—Access control.

A. A street which is dedicated to end at the boundary of the development or in the case of half-streets dedicated along a boundary shall have an access control granted to the city as a city controlled plat restriction for the purposes of controlling ingress and egress to the property adjacent to the end of the dedicated street. The access control restriction shall exist until such time as a public street is created, by dedication and accepted, extending the street to the adjacent property.

B. The city may grant a permit for the adjoining owner to access through the access control.

C. The plat shall contain the following access control language or similar on the face of the map at the end of each street for which access control is required: "Access Control (See plat restrictions)."

D. Said plats shall also contain the following plat restriction note(s): "Access to (name of street or tract) from adjoining tracts (name of deed document number[s]) shall be controlled by the City of Oregon City by the recording of this plat, as shown. These access controls shall be automatically terminated upon the acceptance of a public road dedication or the recording of a plat extending the street to adjacent property that would access through those Access Controls."

Response: Appropriate plat restrictions allowing access to adjoining properties, where the project's streets stub, are planned to be placed on the final plat prior to recording. This standard is met.

12.04.190 Street design—Alignment.

The centerline of streets shall be:

A. Aligned with existing streets by continuation of the centerlines; or

B. Offset from the centerline by no more than five (5) feet, provided appropriate mitigation, in the judgment of the city engineer, is provided to ensure that the offset intersection will not pose a safety hazard.

Response: The extension of Cedarwood Way and Cherrywood Way through the project are planned to align with the centerline of the existing stubs for these streets located in the adjacent Lindsay Anne Estates Subdivision to the southeast. This standard is met.

12.04.194 Traffic sight obstructions.

All new streets shall comply with the Traffic Sight Obstructions in Chapter 10.32.

Response: Traffic sight obstructions in Chapter 10.32 have been addressed in this narrative. This standard is met.

12.04.195 Spacing standards.

A. All new streets shall be designed as local streets unless otherwise designated as arterials and collectors in Figure 8 in the transportation system plan. The maximum block spacing between streets is five hundred thirty feet and the minimum block spacing between streets is one hundred fifty feet as measured between the right-of-way centerlines. If the maximum block size is exceeded, pedestrian accessways must be provided every three hundred thirty feet. The spacing standards within this section do not apply to alleys.

Response: As shown on the preliminary plans, planned streets within the project have been designed as local streets. No blocks created by this project exceed the maximum block length spacing standard of 530 feet requiring a midblock pedestrian accessway. This standard is met.

B. All new development and redevelopment shall meet the minimum driveway spacing standards identified in Table 12.04.195.B.

Table 12.04.195.B Minimum Driveway Spacing Standards		
Street Functional Classification	Minimum Driveway Spacing Standards	Distance
Local Streets	Minimum distance from a street corner to a driveway for all uses and Minimum distance between driveways for uses other than single and two-family dwellings	25 ft.

The distance from a street corner to a driveway is measured along the right-of-way from the edge of the intersection right-of-way to the nearest portion of the driveway and the distance between driveways is measured at the nearest portions of the driveway at the right-of-way.

Response: Driveways for the future homes within the project accessing the new local streets, and the joint driveway planned for Lots 1 and 2 accessing S Leland Road, are planned to be a minimum of 25 feet from the right-of-way line of intersections. This standard is met.

12.04.199 Pedestrian and bicycle accessways.

Pedestrian/bicycle accessways are intended to provide direct, safe and convenient connections between residential areas, retail and office areas, institutional facilities, industrial parks, transit streets, neighborhood activity centers, rights-of-way, and pedestrian/bicycle accessways which minimize out-of-direction travel, and transit-orientated developments where public street connections for automobiles, bicycles and pedestrians are unavailable. Pedestrian/bicycle accessways are appropriate in areas where public street options are unavailable, impractical or inappropriate. Pedestrian and bicycle accessways are required through private property or as right-of-way connecting development to the right-of-way at intervals not exceeding three hundred thirty feet of frontage; or where the lack of street continuity creates inconvenient or out of direction travel patterns for local pedestrian or bicycle trips.

Response: As demonstrated on the preliminary plans, the planned street system includes public sidewalks on both sides of the project's interior streets. The project's sidewalks provide convenient pedestrian and bicycle access and connectivity for residents in the area. As indicated in the response to Section 12.04.195, the project does not create blocks that exceed 530 feet. Therefore, no pedestrian and bicycle accessways are included in the project. This standard does not apply.

12.04.205 Mobility standards.

Development shall demonstrate compliance with intersection mobility standards. When evaluating the performance of the transportation system, the City of Oregon City requires all intersections, except for the facilities identified in subsection D below, to be maintained at or below the following mobility standards during the two-hour peak operating conditions. The first hour has the highest weekday traffic volumes and the second hour is the next highest hour before or after the first hour. Except as provided otherwise below, this may require the installation of mobility improvements as set forth in the transportation system plan or as otherwise identified by the city transportation engineer.

Response: Findings within the project's Traffic Impact Study (TIS), prepared by Lancaster Engineering, demonstrate that Level of Service (LOS) requirements are satisfied. Please refer to the TIS for further information regarding LOS. This standard is met.

12.04.210 Street design—Intersection angles.

Except where topography requires a lesser angle, streets shall be laid out to intersect at angles as near as possible to right angles. In no case shall the acute angles be less than eighty degrees unless there is a special intersection design. An arterial or collector street intersecting with another street shall have at least one hundred feet of tangent adjacent to the intersection unless topography requires a lesser distance. Other streets, except alleys, shall have at least fifty feet of tangent adjacent to the intersection unless topography requires a lesser distance. All street intersections shall be provided

with a minimum curb return radius of twenty-five feet for local streets. Larger radii shall be required for higher street classifications as determined by the city engineer. Additional right-of-way shall be required to accommodate curb returns and sidewalks at intersections. Ordinarily, intersections should not have more than two streets at any one point.

Response: As shown on the preliminary plans, intersection angles are planned to be laid out at right angles, including at least 50 feet of tangent adjacent to the intersection, and have curb return radii of 25 feet. Necessary rights-of-way are planned to accommodate these street improvements. This standard is met.

12.04.215 Street design—Off-site street improvements.

During consideration of the preliminary plan for a development, the decision maker shall determine whether existing streets impacted by, adjacent to, or abutting the development meet the city's applicable planned minimum design or dimensional requirements. Where such streets fail to meet these requirements, the decision-maker shall require the applicant to make proportional improvements sufficient to achieve conformance with minimum applicable design standards required to serve the proposed development.

Response: Appropriate street improvements are planned along the project's frontage on S Leland Road and at connection points of other abutting streets planned to be extended through the project. This requirement is met.

12.04.220 Street design—Half street.

Half streets, while generally not acceptable, may be approved where essential to the development, when in conformance with all other applicable requirements, and where it will not create a safety hazard. When approving half streets, the decision maker must first determine that it will be practical to require the dedication of the other half of the street when the adjoining property is divided or developed. Where the decision maker approves a half street, the applicant must construct an additional ten feet of pavement width so as to make the half street safe and usable until such time as the other half is constructed. Whenever a half street is adjacent to property capable of being divided or developed, the other half of the street shall be provided and improved when that adjacent property divides or develops. Access control may be required to preserve the objectives of half streets.

When the remainder of an existing half-street improvement is made it shall include the following items: dedication of required right-of-way, construction of the remaining portion of the street including pavement, curb and gutter, landscape strip, sidewalk, street trees, lighting and other improvements as required for that particular street. It shall also include at a minimum the pavement replacement to the centerline of the street. Any damage to the existing street shall be repaired in accordance with the city's "Moratorium Pavement Cut Standard" or as approved by the city engineer.

Response: As shown on the preliminary plans, no half streets exist or are planned within or adjacent to the project. This standard does not apply.

12.04.225 Street design—Cul-de-sacs and dead-end streets.

The city discourages the use of cul-de-sacs and permanent dead-end streets except where construction of a through street is found by the decision maker to be impracticable due to topography or some significant physical constraint such as geologic hazards, wetland, natural or historic resource areas, dedicated open space, existing development patterns, arterial access restrictions or similar situation as determined by the community development director. When permitted, access from new cul-de-sacs and permanent dead-end streets shall be limited to a maximum of twenty-five dwelling units and a maximum street length of two hundred feet, as measured from the right-of-way line of the nearest intersecting street to the back of the cul-de-sac curb face. In addition, cul-de-sacs and dead end roads shall include pedestrian/bicycle accessways as required in this chapter. This section is not intended to preclude the use of curvilinear eyebrow widening of a street where needed.

Where approved, cul-de-sacs shall have sufficient radius to provide adequate turn-around for emergency vehicles in accordance with fire district and city adopted street standards. Permanent dead-end streets other than cul-de-sacs shall provide public street right-of-way/easements sufficient to provide turn-around space with appropriate no-parking signs or markings for waste disposal, sweepers, and other long vehicles in the form of a hammerhead or other design to be approved by the decision maker. Driveways shall be encouraged off the turnaround to provide for additional on-street parking space.

Response: As shown on the preliminary plans, cul-de-sacs and permanent dead-end streets are not included in the application. Temporary turnarounds for emergency vehicles are not required due to the short distances involved with the planned stub streets. This standard does not apply.

12.04.230 Street design—Street names.

Except for extensions of existing streets, no street name shall be used which will duplicate or be confused with the name of an existing street. Street names shall conform to the established standards in the city and shall be subject to the approval of the city.

Response: This project includes the extension of two existing streets (Cedarwood Way and Cherrywood Way) from the adjacent Lindsay Anne Estates Subdivision to the southeast. The new east/west local street planned to extend through the project from S Leland Road is planned to be named in accordance to this subsection and submitted to the City and Clackamas County for approval. This standard is met.

12.04.235 Street design—Grades and curves.

Grades and center line radii shall conform to the standards in the city's street design standards and specifications.

Response: As shown on the preliminary plans, grade lines and center line radii are planned to comply with the City's street design standards and specifications. This standard is met.

12.04.240 Street design—Development abutting arterial or collector street.

Where development abuts or contains an existing or proposed arterial or collector street, the decision maker may require: access control; screen planting or wall contained in an easement or otherwise protected by a restrictive covenant in a form acceptable to the decision maker along the rear or side property line; or such other treatment it deems necessary to adequately protect residential properties or afford separation of through and local traffic. Reverse frontage lots with suitable depth may also be considered an option for residential property that has arterial frontage. Where access for development abuts and connects for vehicular access to another jurisdiction's facility then authorization by that jurisdiction may be required.

Response: The project site abuts S Leland Road, which is classified as a minor arterial. Lots 1, 2, are planned to take access from S Leland Road by way of joint access, as allowed by Section 16.12.070.D addressed further in this narrative. The use of a joint access for said lots meets the intent of this section in that "joint access" is type of access control. Additionally, Lot 28 also has frontage on S Leland Road. However, due to the existing 125-foot PGE transmission line easement running through Lot 28, any future building on Lot 28 is limited to the southeast portion of the lot, which is planned to access the project's new east/west local street. An access covenant, screening, or similar treatment can be provided for Lot 28, should the City require it. This standard is met.

12.04.245 Street design—Pedestrian and bicycle safety.

Where deemed necessary to ensure public safety, reduce traffic hazards and promote the welfare of pedestrians, bicyclists and residents of the subject area, the decision maker may require that local streets be so designed as to discourage their use by nonlocal automobile traffic.

All crosswalks shall include a large vegetative or sidewalk area which extends into the street pavement as far as practicable to provide safer pedestrian crossing opportunities. These curb extensions can increase the visibility of pedestrians and provide a shorter crosswalk distance as well as encourage motorists to drive slower. The decision maker may approve an alternative design that achieves the same standard for constrained sites or where deemed unnecessary by the city engineer.

Response: As shown on the preliminary plans, and as previously described in this narrative, the public streets within the subdivision are designed to City standards. The overall street pattern is generally designed to discourage non-local through traffic. This standard is met.

12.04.255 Street design—Alleys.

Public alleys shall be provided in the following districts R-5, R-3.5, R-2, MUC-1, MUC-2 and NC zones unless other permanent provisions for private access to off-street parking and loading facilities are approved by the decision maker. The corners of alley intersections shall have a radius of not less than ten feet.

Response: This project is not located within any of the zoning districts listed in this standard. Public alleys are not required or included in this application. This standard is not relevant to the application.

12.04.260 Street design—Transit.

Streets shall be designed and laid out in a manner that promotes pedestrian and bicycle circulation. The applicant shall coordinate with transit agencies where the application impacts transit streets as identified in [Section] 17.04.1310. Pedestrian/bicycle access ways shall be provided as necessary in Chapter 12.04 to minimize the travel distance to transit streets and stops and neighborhood activity centers. The decision maker may require provisions, including easements, for transit facilities along transit streets where a need for bus stops, bus pullouts or other transit facilities within or adjacent to the development has been identified.

Response: Public streets and sidewalks are planned to provide access to the project's future homes and for neighborhood connectivity/circulation. The preliminary plans show the location and arrangement of planned improvements, which promote pedestrian and bicycle circulation. Planned streets and sidewalks, together with off-site connections, minimize the travel distance to transit streets and other off-site destinations. The need for additional transit facilities and bus stops have not been identified and are not warranted. This standard is met.

12.04.265 Street design—Planter strips.

All development shall include vegetative planter strips that are five feet in width or larger and located adjacent to the curb. This requirement may be waived or modified if the decision maker finds it is not practicable. The decision maker may permit constrained sites to place street trees on the abutting private property within ten feet of the public right-of-way if a covenant is recorded on the title of the property identifying the tree as a city street tree which is maintained by the property owner. Development proposed along a collector, minor arterial, or major arterial street may use tree wells with root barriers located near the curb within a wider sidewalk in lieu of a planter strip, in which case each tree shall have a protected area to ensure proper root growth and reduce potential damage to sidewalks, curbs and gutters.

To promote and maintain the community tree canopy adjacent to public streets, trees shall be selected and planted in planter strips in accordance with Chapter 12.08, Street Trees. Individual abutting lot owners shall be legally responsible for maintaining healthy and attractive trees and vegetation in the planter strip. If a homeowners' association is created as part of the development, the association may assume the maintenance obligation through a legally binding mechanism, e.g., deed restrictions, maintenance agreement, etc., which shall be reviewed and approved by the city attorney. Failure to properly maintain trees and vegetation in a planter strip shall be a violation of this code and enforceable as a civil infraction.

Response: As shown on the preliminary plans, planter strips constructed to City standards are planned along public streets within and/or adjacent to the project. These areas are planned to be improved and planted with street trees when new homes are built. This standard is met.

12.04.270 Standard construction specifications.

The workmanship and materials for any work performed under permits issued per this chapter shall be in accordance with the edition of the "Oregon Standard Specifications for Construction" as prepared by the Oregon Department of Transportation (ODOT) and the Oregon Chapter of American Public Works Association (APWA) and as modified and adopted by the city in accordance with this ordinance, in effect at the time of application. The exception to this requirement is where this chapter and the Public Works Street Design Drawings provide other design details, in which case the requirements of this chapter and the Public Works Street Design Drawings shall be complied with. In the case of work within ODOT or Clackamas County rights-of-way, work shall be in conformance with their respective construction standards.

Response: Public improvements have been designed by a professional engineer licensed in the State of Oregon. Construction plans for these improvements are planned to be submitted to the applicable review agency and reviewed for consistency with applicable requirements. After the appropriate construction permits are obtained, the improvements are planned to be constructed by a licensed general contractor in accordance with the approved plans. The improvements are to be inspected for consistency with the approved final plans prior to acceptance. This standard is met.

12.04.280 Violation—Penalty.

Any act or omission in violation of this chapter shall be deemed a nuisance. Violation of any provision of this chapter is subject to the code enforcement procedures of Chapters 1.16, 1.20 and 1.24.

Response: It is understood that any act in violation of this Chapter is to be deemed a nuisance and could be subject to code enforcement procedures. This standard is met.

Chapter 12.08 - PUBLIC AND STREET TREES

12.08.015 Street tree planting and maintenance requirements.

All new construction or major redevelopment shall provide street trees adjacent to all street frontages. Species of trees shall be selected based upon vision clearance requirements, but shall in all cases be selected from the Oregon City Street Tree List or be approved by a certified arborist. If a setback sidewalk has already been constructed or the Development Services determines that the forthcoming street design shall include a setback sidewalk, then all street trees shall be installed with a planting strip. If existing street design includes a curb-tight sidewalk, then all street trees shall be placed within the front yard setback, exclusive of any utility easement.

A. One street tree shall be planted for every thirty-five feet of property frontage. The tree spacing shall be evenly distributed throughout the total development frontage. The community development director may approve an alternative street tree plan if site or other constraints prevent meeting the placement of one street tree per thirty-five feet of property frontage.

B. The following clearance distances shall be maintained when planting trees:

1. Fifteen feet from streetlights;

2. Five feet from fire hydrants;

3. Twenty feet from intersections;

4. A minimum of five feet (at mature height) below power lines.

C. All trees shall be a minimum of two inches in caliper at six inches above the root crown and installed to city specifications.

D. All established trees shall be pruned tight to the trunk to a height that provides adequate clearance for street cleaning equipment and ensures ADA complaint clearance for pedestrians.

Response: Street trees are shown on the preliminary plans. Precise street tree placement is planned to be addressed at time of building permit issuance and planted in accordance to the planting standards of this chapter. This standard is met.

12.08.020 Street tree species selection.

The community development director may specify the species of street trees required to be planted if there is an established planting scheme adjacent to a lot frontage, if there are obstructions in the planting strip, or if overhead power lines are present.

Response: Street trees from the Oregon City Street Tree List (or approved by a certified arborist) are planned to be planted in conformance with this section, as shown on the preliminary plans. Precise street tree placement is to be addressed at the time building permits are reviewed. This standard is met.

12.08.025 General tree maintenance.

Abutting property owners shall be responsible for the maintenance of street trees and planting strips. Topping of trees is permitted only under recommendation of a certified arborist, or other qualified professional, if required by city staff. Trees shall be trimmed appropriately. Maintenance shall include trimming to remove dead branches, dangerous limbs and to maintain a minimum seven-foot clearance above all sidewalks and ten-foot clearance above the street. Planter strips shall be kept clear of weeds, obstructing vegetation and trash.

Response: General tree and planter strip maintenance is planned to be the responsibility of future home owners, as indicated in this standard. This standard is met.

12.08.030 Public property tree maintenance

The city shall have the right to plant, prune, maintain and remove trees, plants and shrubs in all public rights-of-way and public grounds, as may be necessary to ensure public safety or to preserve and enhance the symmetry or other desirable characteristics of such public areas. The natural resources committee may recommend to the community development director the removal of any tree or part thereof which is in an unsafe condition, or which by reason of its nature is injurious to above or below-ground public utilities or other public improvements.

Response: It is understood that the City has the right to maintain trees in the public right-of-way as mentioned in this standard. This standard is met.

12.08.035 **Public tree removal.**

Existing street trees shall be retained and protected during construction unless removal is specified as part of a land use approval or in conjunction with a public facilities construction project, as approved by the community development director. A diseased or hazardous street tree, as determined by a registered arborist and verified by the City, may be removed if replaced. A non-diseased, non-hazardous street tree that is removed shall be replaced in accordance with the Table 12.08.035.

All new street trees will have a minimum two-inch caliper trunk measured six inches above the root crown. The community development director may approve off-site installation of replacement trees where necessary due to planting constraints. The community development director may additionally allow a fee in-lieu of planting the tree(s) to be placed into a city fund dedicated to planting trees in Oregon City in accordance with Oregon City Municipal Code 12.08.

Replacement Schedule for Trees Determined to be Dead, Diseased or Hazardous by a Certified Arborist		Replacement Schedule for Trees Not Determined to be Dead, Diseased or Hazardous by a Certified Arborist	
Diameter of tree to be Removed (Inches of diameter at 4-ft height)	Number of Replacement Trees to be Planted	Diameter of tree to be Removed (Inches of diameter at 4-ft height)	Number of Replacement Trees to be Planted
Any Diameter	1 Tree	Less than 6"	1 Tree
		6" to 12"	2 Trees
		13" to 18"	3 Trees
		19" to 24"	4 Trees
		25" to 30"	5 Trees
		31" and over	8 Trees

Response: There are no existing street trees associated with the parent property. Existing street trees within the right-of-way along abutting properties are planned to be retained and protected during project construction. This standard is met.

Title 13 – PUBLIC SERVICES

Chapter 13.12 Stormwater Management

13.12.050 **Applicability and exemptions.**

This chapter establishes performance standards for stormwater conveyance, quantity and quality. Additional performance standards for erosion prevention and sediment control are established in OCMC 17.47.

A. Stormwater Conveyance. The stormwater conveyance requirements of this chapter shall apply to all stormwater systems constructed with any development activity, except as follows:

1. The conveyance facilities are located entirely on one privately owned parcel;

2. The conveyance facilities are privately maintained; and

3. The conveyance facilities receive no stormwater runoff from outside the parcel's property limits.

Those facilities exempted from the stormwater conveyance requirements by the above subsection will remain subject to the requirements of the Oregon Uniform Plumbing Code. Those exempted facilities shall be reviewed by the building official.

Response: The project is subject to applicable City stormwater conveyance requirements. Please refer to the Preliminary Stormwater Report included in the application materials for additional information regarding the project's planned stormwater conveyance system. This standard is met.

B. Water Quality and Flow Control. The water quality and flow control requirements of this chapter shall apply to the following proposed uses or developments, unless exempted under subsection C:

1. Activities located wholly or partially within water quality resource areas pursuant to Chapter 17.49 that will result in the creation of more than five hundred square feet of impervious surface within the WQRA or will disturb more than one thousand square feet of existing impervious surface within the WQRA as part of a commercial or industrial redevelopment project. These square footage measurements will be considered cumulative for any given five-year period; or

2. Activities that create or replace more than five thousand square feet of impervious surface per parcel or lot, cumulated over any given five-year period.

Response: This project is subject to applicable City stormwater quantity control requirements. Please refer to the Preliminary Stormwater Report included in the application materials for additional information regarding the project's planned stormwater system. This standard is met.

13.12.080 Submittal requirements.

A. Applications subject to stormwater conveyance, water quality, and/or flow control requirements of this chapter shall prepare engineered drainage plans, drainage reports, and design flow calculation reports in compliance with the submittal requirements of the Public Works Stormwater and Grading Design Standards.

B. Each project site, which may be composed of one or more contiguous parcels of land, shall have a separate valid city approved plan and report before proceeding with construction.

Response: A Preliminary Stormwater Report is included in the application materials, in accordance with the Oregon City Municipal Code (OCMC). The Preliminary Stormwater Report includes additional details. These standards are met.

13.12.090 Approval criteria for engineered drainage plans and drainage report.

An engineered drainage plan and/or drainage report shall be approved only upon making the following findings:

A. **The plan and report demonstrate how the proposed development and stormwater facilities will accomplish the purpose statements of this chapter.**

Response: The purpose statements, found in Section 13.12.010, discuss minimizing increases to stormwater runoff, preventing runoff from exceeding downstream capacities, preventing irresponsible discharge of stormwater onto adjacent property, and similar goals. These purpose criteria are reflected in the approval criteria found in this section. As shown on the preliminary plans, the project's stormwater is planned to be collected and conveyed to new stormwater planters within the project's internal streets, and Tract A, which is planned to contain a public stormwater facility. Stormwater detained and treated in the project's stormwater facilities is planned to be conveyed to the existing stormwater conveyance system abutting the project to the south (Lindsay Anne Estates), and the existing stormwater line located in S Leland Road. For additional information, please refer to the preliminary plans and Preliminary Stormwater Report included in the application materials. This standard is met.

B. **The plan and report meet the requirements of the Public Works Stormwater and Grading Design Standards adopted by resolution under Section 13.12.020.**

Response: The Preliminary Stormwater Report and preliminary plans included in the application materials meet the requirements of the City's Public Works Stormwater and Grading Design Standards adopted under Section 13.12.020. This standard is met.

C. **The storm drainage design within the proposed development includes provisions to adequately control runoff from all public and private streets and roof, footing, and area drains and ensures future extension of the current drainage system.**

Response: The Preliminary Stormwater Report included in the application materials demonstrates that the City's existing stormwater conveyance system and the project's planned stormwater system has adequate capacity to receive runoff from streets, roof, footing, and area drains within the project. Please refer to the Preliminary Stormwater Report for additional information. This standard is met.

D. **Unless otherwise exempted by Section 13.12.050(C), the proposed development includes:**

Response: The Preliminary Stormwater Report included in the application materials demonstrates that the potential for streambank erosion is not increased as a result of this project through stormwater detention and protection of outfall locations. This standard is met.

E. **Specific operation and maintenance measures are proposed that ensure that the proposed stormwater quantity control facilities will be properly operated and maintained.**

Response: Specific operation and maintenance measures are planned to be provided to ensure that the project's stormwater facility is properly operated and maintained. For further information, please refer to the Preliminary Stormwater Report included in the application materials. This standard is met.

Title 16 - LAND DIVISIONS

Chapter 16.08 - SUBDIVISIONS—PROCESS AND STANDARDS

16.08.015 Preapplication conference required.

Before the city will accept a subdivision application, the applicant must schedule and attend a preapplication conference in accordance with Section 17.50.050. At a minimum, an applicant should bring to the preapplication conference a tax map of the subject tax lot(s) and surrounding tax lots, scale drawings of the proposed subdivision lotting pattern, streets, utilities and important site features and improvements, and a topographic map of the property.

Response: A pre-application conference was held for this project on March 8, 2017. A copy of the Pre-Application Conference Summaries is included in the application materials. This standard is met.

16.08.020 Preliminary subdivision plat application.

Within six months of the preapplication conference, an applicant may apply for preliminary subdivision plat approval. The applicant's submittal must provide a complete description of existing conditions, the proposed subdivision and an explanation of how the application meets all applicable approval standards. The following sections describe the specific submittal requirements for a preliminary subdivision plat, which include plan drawings, a narrative statement and certain tabular information. Once the application is deemed to be complete, the community development director shall provide notice of the application and an invitation to comment for a minimum of fourteen days to surrounding property owners in accordance with Section 17.50.090(A). At the conclusion of the comment period, the community development director will evaluate the application, taking into consideration all relevant, timely filed comments, and render a written decision in accordance with Chapter 17.50. The community development director's decision may be appealed to the city commission with notification to the planning commission.

Response: A pre-application conference was held for this project on March 8, 2017. This application contains the necessary submittal requirements identified in the pre-application summaries included in the application materials. This standard is met.

16.08.025 Preliminary subdivision plat—Required plans.

The preliminary subdivision plat shall specifically and clearly show the following features and information on the maps, drawings, application form or attachments. All maps and site drawings shall be at a minimum scale of one inch to fifty feet.

A. Site Plan. A detailed site development plan showing the location and dimensions of lots, streets, pedestrian ways, transit stops, common areas, building envelopes and setbacks, all existing and proposed utilities and improvements including sanitary sewer, stormwater and water facilities, total impervious surface created (including streets, sidewalks, etc.) and an indication of existing and proposed land uses for the site. If required by staff at the pre-application conference, a subdivision connectivity analysis shall be prepared by a transportation engineer licensed by the state of Oregon that

describes the existing and future vehicular, bicycle and pedestrian connections between the proposed subdivision and existing or planned land uses on adjacent properties. The subdivision connectivity analysis shall include shadow plats of adjacent properties demonstrating how lot and street patterns within the proposed subdivision will extend to and/or from such adjacent properties and can be developed meeting the existing Oregon City Municipal Code design standards and adopted Transportation System Plan, street design standards, and adopted concept plans, corridor and access management studies, engineering standards and infrastructure analyses.

Response: The preliminary plans include the above listed information, as applicable. This submittal requirement is met.

A. Traffic/Transportation Plan. The applicant's traffic/transportation information shall include two elements: (1) A detailed site circulation plan showing proposed vehicular, bicycle, transit and pedestrian access points and connections to the existing system, circulation patterns and connectivity to existing rights-of-way or adjacent tracts, parking and loading areas and any other transportation facilities in relation to the features illustrated on the site plan; and (2) a traffic impact study prepared by a qualified professional transportation engineer, licensed in the state of Oregon, that assesses the traffic impacts of the proposed development on the existing transportation system and analyzes the adequacy of the proposed internal transportation network to handle the anticipated traffic and the adequacy of the existing system to accommodate the traffic from the proposed development. In the preparation of the Traffic/Transportation Plan, the applicant shall reference the adopted Transportation System Plan. The city engineer may waive any of the foregoing requirements if determined that the requirement is unnecessary in the particular case.

Response: The preliminary plans included in the application materials include a Preliminary Conceptual Connectivity Analysis, Traffic/Transportation, Circulation, and Conceptual Redevelopment Plan, which shows the planned connections between the project and adjacent residential projects. A TIS, prepared in accordance with City requirements, is also included in the submittal materials. This requirement is met.

C. Natural Features Plan and Topography, Preliminary Grading and Drainage Plan. The applicant shall submit a map illustrating all of the natural features and hazards on the subject property and, where practicable, within two hundred fifty feet of the property's boundary. The map shall also illustrate the approximate grade of the site before and after development. Illustrated features must include all proposed streets and cul-de-sacs, the location and estimated volume of all cuts and fills, and all stormwater management features. This plan shall identify the location of drainage patterns and courses on the site and within two hundred fifty feet of the property boundaries where practicable. Features that must be illustrated shall include the following:

1. Proposed and existing street rights-of-way and all other transportation facilities;

2. All proposed lots and tracts;

3. All trees proposed to be removed prior to final plat with a diameter six inches or greater diameter at breast height (d.b.h);

4. All natural resource areas pursuant to Chapter 17.49, including all jurisdictional wetlands shown in a delineation according to the Corps of Engineers Wetlands Delineation Manual, January 1987 edition, and approved by the Division of State Lands and wetlands identified in the city of Oregon [City] Local Wetlands Inventory, adopted by reference in the city of Oregon City comprehensive plan;

5. All known geologic and flood hazards, landslides or faults, areas with a water table within one foot of the surface and all flood management areas pursuant to Chapter 17.42;

6. The location of any known state or federal threatened or endangered species;

7. All historic areas or cultural features acknowledged as such on any federal, state or city inventory;

8. All wildlife habitat or other natural features listed on any of the city's official inventories.

Response: The preliminary plans illustrate that natural features do not exist on the project site or within 250 feet of the project's boundary. This standard is met.

D. Archeological Monitoring Recommendation. For all projects that will involve ground disturbance, the applicant shall provide,

1. A letter or email from the Oregon State Historic Preservation Office Archaeological Division indicating the level of recommended archeological monitoring on-site, or demonstrate that the applicant had notified the Oregon State Historic Preservation Office and that the Oregon State Historic Preservation Office had not commented within forty-five days of notification by the applicant; and

2. A letter or email from the applicable tribal cultural resource representative of the Confederated Tribes of the Grand Ronde, Confederated Tribes of the Siletz, Confederated Tribes of the Umatilla, Confederated Tribes of the Warm Springs and the Confederated Tribes of the Yakama Nation indicating the level of recommended archeological monitoring on-site, or demonstrate that the applicant had notified the applicable tribal cultural resource representative and that the applicable tribal cultural resource representative had not commented within forty-five days of notification by the applicant.

If, after forty-five days notice from the applicant, the Oregon State Historic Preservation Office or the applicable tribal cultural resource representative fails to provide comment, the city will not require the letter or email as part of the completeness review. For the purpose of

this section, ground disturbance is defined as the movement of native soils.

The community development director may waive any of the foregoing requirements if the community development director determines that the requirement is unnecessary in the particular case and that the intent of this chapter has been met.

Response: City staff provided notice of the project to the Oregon State Historic Preservation Office (OSHPO) following the March 8, 2017 pre-application conference. A letter from OSHPO was sent to City staff indicating that no additional information will be provided unless archaeological and/or cultural resources are discovered during the project. A copy of the OSHPO letter is included in the pre-application section of the application materials. This standard is met.

16.08.030 Preliminary subdivision plat—Narrative statement.

In addition to the plans required in the previous section, the applicant shall also prepare and submit a narrative statement that addresses the following issues:

A. Subdivision Description. A detailed description of the proposed development, including a description of proposed uses, number and type of residential units, allocation and ownership of all lots, tracts, streets, and public improvements, the structure of any homeowner's association, and each instance where the proposed subdivision will vary from some dimensional or other requirement of the underlying zoning district. For each such variance, a separate application will be required pursuant to Chapter 17.60, Variances;

Response: A detailed description of the project, including the above listed information, as applicable, is included in Section I and II of this narrative. Variances are not required. This submittal requirement is met.

B. Timely Provision of Public Services and Facilities. The applicant shall explain in detail how and when each of the following public services or facilities is, or will be, adequate to serve the proposed development by the time construction begins:

1. Water,

Response: The subject property is currently located within the Clackamas River Water (CRW) District and served by CRW's 6-inch water main located in the S Leland Road right-of-way. A separate 12-inch City water main is also located within the S Leland Road right-of-way southeast of the subject property. As part of this application, the applicant plans to abandon the existing connection to the CRW water main and extend the City's 12-inch water main along the subject property's S Leland Road frontage. In addition, a new 8-inch water main extended from in S Leland Road and the extension of the existing 8-inch water mains in both Cedarwood Way and Cherrywood Way abutting the project site to the southeast are planned to be extended through the project to create a looped system. Individual water connections for each of the new lots within the project are planned to connect to the extended water mains. If required by CRW and/or the City, additional service laterals can be provided to off-site properties along the project site fronting on S Leland Road to the extent the costs associated with these improvements are reimbursed to the applicant by the City or CRW.

2. Sanitary sewer,

Response: The existing residence is served by a private septic system (to be removed). Sanitary sewer service is available to the subject property from the existing 8-inch sewer mains located in Cedarwood Way and Cherrywood Way from the adjoining Lindsay Anne Estate Subdivision to the southeast. An existing 8-inch sanitary sewer main is also located within the S Leland Road right-of-way, which is planned to be extended along the subject property's S Leland Road frontage as part of this application. Appropriate extension of sanitary sewer mains through the project is planned. Each of the lots within the project is planned to be provided an individual service lateral from the extended sanitary sewer mains. The property is planned to annex to the Tri-City Service District for these services.

3. Storm sewer and stormwater drainage,

Response: On-site stormwater is planned to be collected and routed to new stormwater facilities located within the project's future rights-of-way, and Tract A prior to being conveyed to the existing stormwater conveyance system abutting the project in S Leland Road, Cedarwood Way and Cherrywood Way. For additional information, please refer to the Preliminary Stormwater Report and preliminary plans included in the application materials.

4. Parks and recreation,

Response: Park System Development Charges for future park development in the area is planned to be assessed and paid at the time building permits are issued. This ensures the required funding for parks.

5. Traffic and transportation,

Response: This application includes ±9 feet of right-of-way dedication along the project's frontage on S Leland Road. Planned improvements to S Leland Road include a ±39-foot half-width right-of-way, ±26 feet of half-width asphalt pavement (plus ±10 feet on the other side), curb and gutter, 5-foot-wide planter strip, and 7-foot wide sidewalk. Extension of the project's new east/west local street from S Leland Road, Cedarwood Way, and Cherrywood Way through the project include a ±54-foot right-of-way, ±32 feet of asphalt pavement, curb and gutter, 5-foot wide planter strips, and 5-foot wide sidewalks on both sides of the streets.

The application materials include a TIS prepared by Lancaster Engineering. Appropriate street improvements connecting to existing transportation facilities are shown on the preliminary plans. The TIS found that the existing streets, and those planned, adequately accommodate the amount of additional traffic created by this project. Transportation Systems Development Charges are planned to be paid for each new home prior to issuing a building permit. These fees fund future City and County public works street improvement projects. Please refer to the TIS for additional information.

6. Schools,

Response: The Oregon City School District provides educational services for the children of future residents. School funding comes from a variety of sources including construction excise taxes assessed with the issuance of future building permits, and future property taxes.

7. Fire and police services;

Response: Clackamas Fire District No. 1 provides fire services. Property taxes are to be paid by future property owners to fund fire protection services, thereby ensuring funding for fire protection services.

The City of Oregon City Police Department provides police services. Property taxes are to be paid by future property owners to fund police protection services, thereby ensuring funding for police protection services.

Where adequate capacity for any of these public facilities and services is not demonstrated to be currently available, the applicant shall describe how adequate capacity in these services and facilities will be financed and constructed before recording of the plat;

Response: Public facilities and services are, or are planned to be available to accommodate this project. No additional description of financing and construction of adequate capacity is required.

C. Approval Criteria and Justification for Variances. The applicant shall explain how the proposed subdivision is consistent with the standards set forth in Chapter 16.12, 12.04 and any other applicable approval standards identified in the municipal code. For each instance where the applicant proposes a variance from some applicable dimensional or other numeric requirement, the applicant shall address the approval criteria from Chapter 17.60.

Response: This application does not include requests for variances. This standard does not apply.

D. Drafts of the proposed covenants, conditions and restrictions (CC&Rs), maintenance agreements, homeowner association agreements, dedications, deeds easements, or reservations of public open spaces not dedicated to the city, and related documents for the subdivision;

Response: A draft copy of CC&R's are included in the application materials. This standard is met.

E. A description of any proposed phasing, including for each phase the time, acreage, number of residential units, amount of area for nonresidential use, open space, development of utilities and public facilities;

Response: Project phasing is not planned. This standard does not apply.

F. Overall density of the subdivision and the density by dwelling type for each.

Response: The subject property totals approximately ±6.33 acres of land. As stated previously, the site is subject to a separate application that, upon approval, designates the site with the City's R-6 zoning district. The Lindsay Anne Estates Too Subdivision is planned to include 28 lots for the future construction of single-family detached homes spread over the majority of the subject site (±6.33 acres).

On a gross acreage basis, the 28-lot subdivision (on ±6.33 acres) equates to ±4.4 dwelling units per acre. Based on the site's net developable area (±4.16 acres – after deduction

of public facilities/right-of-way), the density included in the subdivision is equal to ±6.7 dwelling units per acre.

Lot sizes in new subdivisions are permitted to be within 80% of the minimum size required in the underlying zone provided the average lot size (for the entire subdivision) is as large or larger than the minimum required lot size in the underlying zone. In the R-6 zone, the minimum average lot size is greater than 6,000 square feet. Based on the site's net developable area (±4.16 acres or ±181,644 square feet), the maximum number of lots that can be included in the subdivision is 30. Based on the site's net developable area, the minimum number of lots that are required is 24.

Based upon the above, the 28-lot subdivision does not exceed the maximum number of lots permitted and provides in excess of the minimum number of required lots. Thus, density requirements for the project are satisfied.

16.08.035 Notice and invitation to comment.

Upon the city's determination that an application for a preliminary subdivision plat is complete, pursuant to Chapter 17.50, the city shall provide notice of the application in accordance with requirements of Chapter 17.50 applicable to Type II decisions.

Response: Upon the City's review and completeness determination for this application, the City can provide notice in accordance with Section 17.50 of the OCMC. This standard is met.

16.08.040 Preliminary subdivision plat—Approval standards and decision.

The minimum approval standards that must be met by all preliminary subdivision plats are set forth in Chapter 16.12, and in the dimensional and use requirements set forth in the chapter of this code that corresponds to the underlying zone. The community development director shall evaluate the application to determine that the proposal does, or can through the imposition of conditions of approval, meet these approval standards. The community development director's decision shall be issued in accordance with the requirements of Section 17.50.

Response: This narrative includes responses demonstrating how the application complies with the applicable approval criteria. This narrative is supported by substantial evidence, including preliminary plans, a TIS, and other written documentation. This information, which is included in the application package, provides the basis for the City to approve the application. This standard is met.

16.08.045 Building site—Frontage width requirement.

Each lot in a subdivision shall abut upon a cul-de-sac or street other than an alley for a width of at least twenty feet.

Response: As shown on the preliminary plans, each planned lot has more than 20 feet of frontage on a public street. This standard is met.

16.08.050 Flag lots in subdivisions.

Flag lots shall not be permitted within subdivisions except as approved by the community development director and in compliance with the following standards.

Response: Flag lots are not part of this application. These standards have been omitted from this written response.

16.08.055 Final subdivision plat—Application requirements and approval standards.

The applicant shall apply for final subdivision plat approval within twenty-four months following approval of a preliminary subdivision plat. The applicant shall apply for final plat approval to the city and shall pay the applicable fees as set forth on the city's adopted fee schedule. The final subdivision plat is processed as an administrative decision by the city so long as the final subdivision plat is consistent with the approved preliminary subdivision plat as conditioned by the decision-maker.

A. If the community development director determines that the final subdivision plat submitted by the applicant is not consistent with the approved preliminary subdivision plat, the modified subdivision shall be subject to the same Type II process and review standards as were applicable to the preliminary subdivision plat. However, if such a review is necessary, the review shall be limited only to those aspects of the final subdivision plat that deviate from the approved preliminary subdivision plat. The decision-maker's original approval of all other aspects of the subdivision may be relied upon as a conclusive determination of compliance with the applicable standards.

B. The community development director shall approve a final subdivision plat that is consistent with the approved preliminary subdivision plat, including any conditions attached thereto and required permits for access to facilities owned by another jurisdiction.

Response: A final subdivision plat, consistent with the approved preliminary plat, is planned to be submitted to the City prior to recordation. This standard is met.

Chapter 16.12 - MINIMUM IMPROVEMENTS AND DESIGN STANDARDS FOR LAND DIVISIONS

16.12.015 Street design—Generally.

Development shall demonstrate compliance with Chapter 12.04—Streets, Sidewalks and Public Places.

Response: Please refer to the written response provided to Chapter 12.04 for appropriate findings demonstrating compliance with the street design standards. This standard is met.

16.12.020 Blocks—Generally.

The length, width and shape of blocks shall take into account the need for adequate building site size, convenient motor vehicle, pedestrian, bicycle and transit access, control of traffic circulation, and limitations imposed by topography and other natural features.

Response: The planned lengths, widths, and shapes of blocks are largely determined by the continuation of existing streets, the development pattern abutting the subject property, and the zoning and configuration of the subject property itself. Public streets with sidewalks are planned to extend through the project to provide access to lots and future homes, and enhance neighborhood connectivity and circulation. Blocks created by this project do not exceed the maximum block length spacing standard of 530 feet, as addressed under Subsection 12.04.195 Spacing Standards. This standard is met.

16.12.030 Blocks—Width.

The width of blocks shall ordinarily be sufficient to allow for two tiers of lots with depths consistent with the type of land use proposed.

Response: The widths of the planned blocks within the project are planned to generally allow for two tiers of lots. New lots within the subdivision are planned to average, at a minimum, 6,000 square feet in area pursuant to the requirements of the R-6 zone, and they are planned to be suitable for single-family detached homes. This standard is met.

16.12.040 Building sites.

The size, width, shape and orientation of building sites shall be appropriate for the primary use of the land division, and shall be consistent with the residential lot size provisions of the zoning ordinance with the following exceptions:

Response: The size, width, depth, shape, and orientation of the planned lots comply with the requirements for the R-6 zoning district, as illustrated on the preliminary plans. This standard is met.

16.12.045 Building sites – Minimum density.

All subdivision layouts shall achieve at least eighty percent of the maximum density of the base zone for the net developable area as defined in Chapter 17.04.

Response: Density has been addressed in response to Section 16.08.030.F. This standard has been met.

16.12.050 Calculations of lot area.

A subdivision in the R-10, R-8, R-6, R-5, or R-3.5 dwelling district may include lots that are up to twenty percent less than the required minimum lot area of the applicable zoning designation provided the entire subdivision on average meets the minimum site area requirement of the underlying zone. The average lot area is determined by calculating the total site area devoted to dwelling units and dividing that figure by the proposed number of dwelling lots.

Accessory dwelling units are not included in this determination nor are tracts created for non-dwelling unit purposes such as open space, stormwater tracts, or access ways.

A lot that was created pursuant to this section may not be further divided unless the average lot size requirements are still met for the entire subdivision.

When a lot abuts a public alley, an area equal to the length of the alley frontage along the lot times the width of the alley right-of-way

measured from the alley centerline may be added to the area of the abutting lot in order to satisfy the lot area requirement for the abutting lot. It may also be used in calculating the average lot area.

Response: The project includes 28 lots intended for the future construction of single-family detached homes in the R-6 zoning district. As permitted above, a number of the planned lots are less than 6,000 square feet. The smallest of the future lots is approximately ±4,860 square feet, which is within the maximum 20% reduction allowed by this standard. A number of the planned lots are also larger than 6,000 square feet, with the largest lot being ±29,075 square feet. The average lot area exceeds the minimum average lot size of 6,000 square feet required in the R-6 zoning district. This standard is met.

16.12.055 Building site—Through lots.

Through lots and parcels shall be avoided except where they are essential to provide separation of residential development from major arterials or to overcome specific disadvantages of topography of existing development patterns. A reserve strip may be required. A planting screen restrictive covenant may be required to separate residential development from major arterial streets, adjacent nonresidential development, or other incompatible use, where practicable. Where practicable, alleys or shared driveways shall be used for access for lots that have frontage on a collector or minor arterial street, eliminating through lots.

Response: Through lots are not planned within the project. This standard does not apply.

16.12.060 Building site—Lot and parcel side lines.

The lines of lots and parcels, as far as is practicable, shall run at right angles to the street upon which they face, except that on curved streets they shall be radial to the curve.

Response: Lot lines, as far as is practicable, run at right angles to the street they face. Please refer to the preliminary plans for additional information. This standard is met.

16.12.065 Building site—Grading.

Grading of building sites shall conform to the State of Oregon Structural Specialty Code, Chapter 18, any approved grading plan and any approved residential lot grading plan in accordance with the requirements of Chapter 15.48, 16.12 and the Public Works Stormwater and Grading Design Standards, and the erosion control requirements of Chapter 17.47.

Response: The preliminary plans show project grading, including building site grading (where appropriate). The preliminary plans demonstrate that Chapter 15.48, Chapter 16.12, the Public Works Stormwater and Grading Design Standards, and the erosion control requirements of Chapter 17.47 are met. Please refer to the preliminary plans for additional information.

16.12.070 Building site—Setbacks and building location.

This standard ensures that lots are configured in a way that development can be oriented toward streets to provide a safe, convenient and aesthetically pleasing environment for pedestrians and bicyclists. The objective is for lots located on a neighborhood

collector, collector or minor arterial street locate the front yard setback on and design the most architecturally significant elevation of the primary structure to face the neighborhood collector, collector or minor arterial street.

A. The front setback of all lots located on a neighborhood collector, collector or minor arterial shall be orientated toward the neighborhood collector, collector or minor arterial street.

Response: As shown on the preliminary plans, three of the planned lots (Lots 1, 2, and 28) have frontage on S Leland Road, a minor arterial. The future building orientation of Lots 1 and 2 are planned toward S Leland Road. The portion of Lot 28 located along S Leland Road falls within the 125-foot wide PGE transmission line easement running through the property. The PGE transmission line easement limits any future building to the southwest portion of Lot 28, away from S Leland Road, which is addressed in greater detail in the response to Subsection 16.12.070.E. This standard is met.

B. The most architecturally significant elevation of the house shall face the neighborhood collector, collector or minor arterial street.

Response: Lots 1, 2, and 28 have frontage on S Leland Road, a minor arterial. Because no construction of homes is included with this application, architectural elements are planned to be reviewed at time of building permit submittal. This standard is met.

C. On corner lots located on the corner of two local streets, the main façade of the dwelling may be oriented towards either street.

Response: Other than Lot 2, which is planned to have its main façade facing S Leland Road, future homes located on the project's internal corner lots are planned to have their main façades oriented toward one of the project's abutting internal streets. This standard is met.

D. All lots proposed with a driveway and lot orientation on a collector or minor arterial shall combine driveways into one joint access per two or more lots unless the city engineer determines that:

1. No driveway access may be allowed since the driveway(s) would cause a significant traffic safety hazard; or

2. Allowing a single driveway access per lot will not cause a significant traffic safety hazard.

Response: Of the three lots required to be oriented toward S Leland Road (Lots 1, 2, and 28), Lots 1 and 2 are planned to be accessed by way of a joint driveway extending from S Leland Road (a minor arterial). Lot 28 is planned to take access from the project's east/west local street. This standard is met.

E. The community development director may approve an alternative design, consistent with the intent of this section, where the applicant can show that existing development patterns preclude the ability to practically meet this standard.

Response: As mentioned above, Lot 28 has frontage on S Leland Road, which is a minor arterial and is subject to the above criteria. However, Lot 28 is encumbered by the existing 125-foot wide PGE transmission line easement, which does not allow single-family homes within its boundary. Based on the configuration of Lot 28 and its portion within the existing PGE easement, the future home on this lot will be unable to be oriented towards S Leland

Road. As an alternative, the future home of Lot 28 is planned to be located on the southwest portion of the lot, which is planned to be oriented toward the project's east/west local street. This necessary alternative will not jeopardize the aesthetics of the neighborhood or safety of future pedestrians or bicyclists. This standard is met.

16.12.075 Building site—Division of lots.

Where a tract of land is to be divided into lots or parcels capable of redivision in accordance with this chapter, the community development director shall require an arrangement of lots, parcels and streets which facilitates future redivision. In such a case, building setback lines may be required in order to preserve future right-of-way or building sites.

Response: As shown on the preliminary plans, Lot 3 is large enough to be re-divided, however, the majority of Lot 3 is located within the 125-foot wide PGE transmission line easement running through the property. The PGE easement limits future building placement to area outside of the easement. Based on the size on the PGE easement, Lot 3 is not planned to be divided for the construction of additional single-family homes. This standard is met.

16.12.080 Protection of trees.

Protection of trees shall comply with the provisions of Chapter 17.41—Tree Protection.

Response: Please refer to responses to individual criteria of Chapter 17.41 later in this narrative.

16.12.085 - Easements.

The following shall govern the location, improvement and layout of easements:

A. Utilities. Utility easements shall be required where necessary as determined by the city engineer. Insofar as practicable, easements shall be continuous and aligned from block-to-block within the land division and with adjoining subdivisions or partitions. Specific utility easements for water, sanitary or storm drainage shall be provided based on approved final engineering plans.

B. Unusual Facilities. Easements for unusual facilities such as high voltage electric transmission lines, drainage channels and stormwater detention facilities shall be adequately sized for their intended purpose, including any necessary maintenance roads. These easements shall be shown to scale on the preliminary and final plats or maps. If the easement is for drainage channels, stormwater detention facilities or related purposes, the easement shall comply with the requirements of the Public Works Stormwater and Grading Design Standards.

C. Watercourses. Where a land division is traversed or bounded by a watercourse, drainageway, channel or stream, a stormwater easement or drainage right-of-way shall be provided which conforms substantially to the line of such watercourse, drainageway, channel or stream and is of a sufficient width to allow construction, maintenance and control for the purpose as required by the responsible agency. For those subdivisions or partitions which are bounded by a stream of established recreational value, setbacks or

easements may be required to prevent impacts to the water resource or to accommodate pedestrian or bicycle paths.

D. Access. When easements are used to provide vehicular access to lots within a land division, the construction standards, but not necessarily width standards, for the easement shall meet city specifications. The minimum width of the easement shall be twenty feet. The easements shall be improved and recorded by the applicant and inspected by the city engineer. Access easements may also provide for utility placement.

E. Resource Protection. Easements or other protective measures may also be required as the community development director deems necessary to ensure compliance with applicable review criteria protecting any unusual significant natural feature or features of historic significance.

Response: Existing and new utility easements are planned to be provided on the final subdivision plat. This standard is satisfied.

16.12.090 Minimum improvements—Procedures.

In addition to other requirements, improvements installed by the applicant either as a requirement of these or other regulations, or at the applicant's option, shall conform to the requirements of this title and be designed to city specifications and standards as set out in the city's facility master plan and Public Works Stormwater and Grading Design Standards. The improvements shall be installed in accordance with the following procedure:

A. Improvement work shall not commence until construction plans have been reviewed and approved by the city engineer and to the extent that improvements are in county or state right-of-way, they shall be approved by the responsible authority. To the extent necessary for evaluation of the proposal, the plans may be required before approval of the preliminary plat of a subdivision or partition. Expenses incurred thereby shall be borne by the applicant and paid for prior to final plan review.

B. Improvements shall be constructed under the inspection and approval of the city engineer. Expenses incurred thereby shall be borne by the applicant and paid prior to final approval. Where required by the city engineer or other city decision-maker, the applicant's project engineer also shall inspect construction.

C. Erosion control or resource protection facilities or measures are required to be installed in accordance with the requirements of Chapter 17.49 and the Public Works Erosion and Sediment Control Standards. Underground utilities, waterlines, sanitary sewers and storm drains installed in streets shall be constructed prior to the surfacing of the streets. Stubs for service connections for underground utilities and sanitary sewers shall be placed beyond the public utility easement behind to the lot lines.

D. As-built construction plans and digital copies of as-built drawings shall be filed with the city engineer upon completion of the improvements.

E. The city engineer may regulate the hours of construction and access routes for construction equipment to minimize impacts on adjoining residences or neighborhoods.

Response: The preliminary plans show the public improvements for this project. Work is planned to commence when construction plans have been reviewed and approved by the City Engineer. Inspections of the planned improvements, including erosion control measures, are required. Upon completion of the improvements, as-built drawings are planned to be filed with the City Engineer. This standard is met.

16.12.095 Minimum improvements—Public facilities and services.

The following minimum improvements shall be required of all applicants for a land division under Title 16, unless the decision-maker determines that any such improvement is not proportional to the impact imposed on the city's public systems and facilities:

A. Transportation System. Applicants and all subsequent lot owners shall be responsible for improving the city's planned level of service on all public streets, including alleys within the land division and those portions of public streets adjacent to but only partially within the land division. All applicants shall execute a binding agreement to not remonstrate against the formation of a local improvement district for street improvements that benefit the applicant's property. Applicants are responsible for designing and providing adequate vehicular, bicycle and pedestrian access to their developments and for accommodating future access to neighboring undeveloped properties that are suitably zoned for future development. Storm drainage facilities shall be installed and connected to off-site natural or man-made drainageways. Upon completion of the street improvement survey, the applicant shall reestablish and protect monuments of the type required by ORS 92.060 in monument boxes with covers at every public street intersection and all points or curvature and points of tangency of their center line, and at such other points as directed by the city engineer.

Response: Public streets with sidewalks are planned within the project to provide access to lots/future homes and provide neighborhood connectivity/circulation. As shown on the preliminary plans, this project is planned to result in fully-improved streets extending from adjoining residential projects and S Leland Road to accommodate different modes of travel. Monument boxes at street centerline intersections and other required locations are planned to be installed and/or protected. This standard is met.

B. Stormwater Drainage System. Applicants shall design and install drainage facilities within land divisions and shall connect the development's drainage system to the appropriate downstream storm drainage system as a minimum requirement for providing services to the applicant's development. The applicant shall obtain county or state approval when appropriate. All applicants shall execute a binding agreement to not remonstrate against the formation of a local improvement district for stormwater drainage improvements that benefit the applicant's property. Applicants are responsible for extending the appropriate storm drainage system to the development site and for providing for the connection of upgradient properties to that system. The applicant shall design the drainage facilities in accordance with city drainage master plan requirements, Chapter

13.12 and the Public Works Stormwater and Grading Design Standards.

Response: The preliminary plans and the Preliminary Stormwater Report illustrate how on-site stormwater is planned to be collected and conveyed to stormwater facilities planned within the project's rights-of-way and Tract A prior to being conveyed to the existing stormwater conveyance system located in S Leland Road, Cedarwood Way and Cherrywood Way abutting the project. For additional information, please refer to the preliminary plans and Preliminary Stormwater Report included in the application materials. This standard is met.

C. Sanitary Sewer System. The applicant shall design and install a sanitary sewer system to serve all lots or parcels within a land division in accordance with the city's sanitary sewer design standards, and shall connect those lots or parcels to the city's sanitary sewer system, except where connection is required to the county sanitary sewer system as approved by the county. All applicants shall execute a binding agreement to not remonstrate against the formation of a local improvement district for sanitary sewer improvements that benefit the applicant's property. Applicants are responsible for extending the city's sanitary sewer system to the development site and through the applicant's property to allow for the future connection of neighboring undeveloped properties that are suitably zoned for future development. The applicant shall obtain all required permits and approvals from all affected jurisdictions prior to final approval and prior to commencement of construction. Design shall be approved by the city engineer before construction begins.

Response: Sanitary sewer service is available to the subject property by way of existing 8-inch sewer mains located in Cedarwood Way and Cherrywood Way, part of the adjoining Lindsay Anne Estates Subdivision to the southeast. An existing 8-inch sanitary sewer main is also located within the S Leland Road right-of-way, which is planned to be extended a distance equal to the subject property's S Leland Road frontage. A new 8-inch sanitary sewer main is also planned to extend into the project from S Leland Road. This standard is met.

D. Water System. The applicant shall design and install a water system to serve all lots or parcels within a land division in accordance with the city public works water system design standards, and shall connect those lots or parcels to the city's water system. All applicants shall execute a binding agreement to not remonstrate against the formation of a local improvement district for water improvements that benefit the applicant's property. Applicants are responsible for extending the city's water system to the development site and through the applicant's property to allow for the future connection of neighboring undeveloped properties that are suitably zoned for future development.

Response: The project site is currently within the Clackamas River Water (CRW) District and served by CRW's 6-inch water main located in the S Leland Road right-of-way. A separate 12-inch City water main is also located within the S Leland Road right-of-way southeast of the subject property. As part of this application, the applicant plans to abandon the existing connection to the CRW water main and extend the City's 12-inch water main along the subject property's S Leland Road frontage. In addition, a new 8-inch water main extending from S Leland Road and the extension of the existing 8-inch water mains in both

Cedarwood Way and Cherrywood Way abutting the project site to the southeast are planned to be extended through the project to create a looped system. Individual water connections for each of the new lots within the project are planned to connect to the extended water mains. If required by CRW and/or the City, additional service laterals can be provided to off-site properties along the project site fronting on S Leland Road to the extent the costs associated with these improvements are reimbursed to the applicant by the City or CRW.

> **E. Sidewalks. The applicant shall provide for sidewalks on both sides of all public streets, on any private street if so required by the decision-maker, and in any special pedestrian way within the land division. Exceptions to this requirement may be allowed in order to accommodate topography, trees or some similar site constraint. In the case of major or minor arterials, the decision-maker may approve a land division without sidewalks where sidewalks are found to be dangerous or otherwise impractical to construct or are not reasonably related to the applicant's development. The decision-maker may require the applicant to provide sidewalks concurrent with the issuance of the initial building permit within the area that is the subject of the land division application. Applicants for partitions may be allowed to meet this requirement by executing a binding agreement to not remonstrate against the formation of a local improvement district for sidewalk improvements that benefit the applicant's property.**

Response: As shown on the preliminary plans, the planned street system includes public sidewalks on both sides of the project's interior streets. This provides convenient pedestrian and bicycle access, as well as connectivity between neighborhoods and other pedestrian destinations for existing and future residents. This standard is met.

> **F. Bicycle Routes. If appropriate to the extension of a system of bicycle routes, existing or planned, the decision-maker may require the installation of separate bicycle lanes within streets and separate bicycle paths.**

Response: The planned street system, which includes public sidewalks, provides convenient pedestrian and bicycle access and connectivity. Pedestrian/bicycle specific connections, other than as shown, are not necessary. This standard is met.

> **G. Street Name Signs and Traffic Control Devices. The applicant shall install street signs and traffic control devices as directed by the city engineer. Street name signs and traffic control devices shall be in conformance with all applicable city regulations and standards.**

Response: Street name signs and stop signs are planned to be installed for new and continued streets, as required by City Engineering staff in compliance with applicable regulations and standards. This standard is met.

> **H. Street Lights. The applicant shall install street lights which shall be served from an underground source of supply. Street lights shall be in conformance with all city regulations.**

Response: Street lights are planned to be installed along new and continued streets to conform with applicable regulations, as required. This standard is met.

I. Street Trees. Refer to Chapter 12.08, Street Trees.

Response: Street trees are addressed in the responses to Section 12.08. This standard is met.

J. Bench Marks. At least one bench mark shall be located within the subdivision boundaries using datum plane specified by the city engineer.

Response: The final subdivision plat is planned to reference a benchmark using the datum plane specified by the City Engineer, if required. This standard is met.

K. Other. The applicant shall make all necessary arrangements with utility companies or other affected parties for the installation of underground lines and facilities. Electrical lines and other wires, including but not limited to communication, street lighting and cable television, shall be placed underground.

Response: Appropriate easements are planned to be provided for public and private utility providers. Arrangements with utility providers for the installation of these facilities is planned. This standard is met.

L. Oversizing of Facilities. All facilities and improvements shall be designed to city standards as set out in the city's facility master plan, public works design standards, or other city ordinances or regulations. Compliance with facility design standards shall be addressed during final engineering. The city may require oversizing of facilities to meet standards in the city's facility master plan or to allow for orderly and efficient development. Where oversizing is required, the applicant may request reimbursement from the city for oversizing based on the city's reimbursement policy and funds available, or provide for recovery of costs from intervening properties as they develop.

Response: Properly sized public facilities are planned to be provided throughout the project to serve future homes. Public improvements have been designed by a registered professional engineer and are planned to be reviewed and approved by City engineering staff. This standard is met.

M. Erosion Control Plan—Mitigation. The applicant shall be responsible for complying with all applicable provisions of Chapter 17.47 with regard to erosion control.

Response: Erosion control is addressed in the response to Chapter 17.47. This standard is met.

Title 17 - ZONING

Chapter 17.12 - R-6 SINGLE-FAMILY DWELLING DISTRICT

17.12.020 Permitted uses.

Permitted uses in the R-6 district are:

A. Single-family detached residential units;

Response: This application includes 28 lots in the City's R-6 zoning district for the future construction of single-family detached homes. This is recognized as a permitted use in the zone. This standard is met.

17.12.040 Dimensional standards.

Dimensional standards in the R-6 district are:

A. Minimum lot areas, six thousand square feet;

Response: The preliminary plans show that the minimum average lot area in this project exceeds 6,000 square feet. In the responses to Section 16.12.050, several of the planned lots are shown to be less than 6,000 square feet, but the average lot area across the project exceeds 6,000 square feet. This standard is met.

B. Minimum lot width, fifty feet;

Response: As shown on the preliminary plans, lots are planned to be at least 50 feet in width. This standard is met.

C. Minimum lot depth, seventy feet;

Response: As shown on the preliminary plans, lots are planned to be at least 70 feet in depth. This standard is met.

D. Maximum building height, two and one-half stories, not to exceed thirty-five feet;

E. Minimum required setbacks:

1. Front yard, ten feet minimum setback,

2. Front porch, five feet minimum setback,

3. Attached and detached garage, twenty feet minimum setback from the public right-of-way where access is taken, except for alleys. Detached garages on an alley shall be setback a minimum of five feet in residential areas.

4. Interior side yard, nine feet minimum setback for at least one side yard; five feet minimum setback for the other side yard,

5. Corner side yard, fifteen feet minimum setback,

6. Rear yard, twenty feet minimum setback,

7. Rear porch, fifteen feet minimum setback.

F. Garage standards: See Chapter 17.20—Residential Design and Landscaping Standards.

G. Maximum lot coverage: The footprint of all structures two hundred square feet or greater shall cover a maximum of forty percent of the lot area.

Response: Future homes within the project are planned to comply with the above-listed maximum height, setback, and lot coverage requirements. The preliminary plans show required setbacks for future dwellings, which are planned to be reviewed for compliance at the time of building permit issuance. These standards are met.

17.20.015 Street trees.

All new single or two-family dwellings or additions of twenty-five percent or more of the existing square footage of the home (including the living space and garage(s)) shall install a street tree along the frontage of the site, within the abutting developed right-of-way. Existing trees may be used to meet this requirement. A picture of the planted tree shall be submitted to the planning division prior to issuance of occupancy. Upon approval by the community development director, when a planter strip is not present, a tree may be placed within an easement on the abutting private property within ten feet of the public right-of-way if a covenant is recorded for the property with the Clackamas County Recorders Office identifying the tree as a city street tree, subject to the standards in Chapter 12.08 of the Oregon City Municipal Code. The street tree shall be a minimum of two-inches in caliper and either selected from the Oregon City Street Tree List or approved by a certified arborist for the planting location.

Response: Street trees are planned along streets within the project at such time as a building permit is issued and a home is approved for final inspection and occupancy. This standard is met.

17.20.020 Applicability.

The standards in Sections 17.20.030 through 17.20.050 apply to the street-facing facades of all single and two-family dwellings. New dwellings, new garages or expansions of an existing garage require compliance with one of the residential design options in [Section] 17.20.030 or Chapter 17.21.

For the purpose of this chapter, garages are defined as structures, or portions thereof used or designed to be used for the parking of vehicles, including carports. The garage width shall be measured based on the foremost interior garage walls or carport cover. The community development director may approve an alternative measurement location if the exterior facade screens a section of the garage or better accomplishes the goals of this chapter.

Response: This project includes 28 residential lots for the future construction of detached single-family homes. Therefore, the standards of Sections 17.20.030 through 17.20.050 are addressed below. This standard is met.

17.20.030 Residential design options.

A. A dwelling with no garage or a detached garage shall comply with five of the residential design elements in [Section] 17.20.040.A on the front facade of the structure.

Response: Attached garages are planned for each of the future homes constructed on the lots within the project. This standard does not apply.

B. A dwelling without a garage on the primary street-facing facade may be permitted if shall include five of the residential design elements in [Section] 17.20.040A. on the front facade of the structure.

Response: Garages for future homes are planned to be provided on the primary street-facing façade of each future home. This standard does not apply.

C. A dwelling with a front garage where the building is less than twenty-four feet wide may be permitted if:

1. The garage is no more than twelve feet wide and;

2. The garage does not extend closer to the street than the furthest forward living space on the street-facing facade; and

3. Six of the residential design elements in [Section] 17.20.040A. are included on the front facade of the structure; and

4. One of the following is provided:

a. Interior living area above the garage is provided. The living area must be set back no more than four feet from the street-facing garage wall; or

b. A covered balcony above the garage is provided. The covered balcony must be at least the same length as the street-facing garage wall, at least six feet deep and accessible from the interior living area of the dwelling unit; or

c. The garage is rear loaded.

Response: Future homes associated with this project are not planned to be less than 24 feet wide. This standard does not apply.

D. A dwelling with a garage that extends up to fifty percent of the length of the street-facing facade and is not closer to the street than the furthest forward living space on the street-facing facade may be permitted if:

Six of the residential design elements in [Section] 17.20.040A. are included on the front facade of the structure.

Response: Individual single-family home designs have not been identified for individual lots. These standards are planned to be satisfied at time of building permit issuance. This standard is met.

17.20.035 Corner lots and through lots.

A. Homes on corner lots and through lots shall comply with one of the options in [Section] 17.20.030 for the front of the home.

B. The other street-facing side of the home shall include the following:

1. Windows and doors for a minimum of fifteen percent of the lineal length of the ground floor facade; and

2. Minimum four-inch window trim; and

3. Three additional residential design elements selected from [Section] 17.20.040A.

Response: Individual single-family home designs have not been identified for individual lots within the project. These standards can be satisfied at time of building permit issuance.

17.20.040 Residential design elements.

Response: Individual single-family home designs have not been identified for individual lots within the project. The design elements indicated in this standard can be satisfied at time of building permit issuance.

17.20.050 Main entrances.

The main entrance for each structure shall:

A. Face the street; or

B. Be at an angle up to forty-five degrees from the street;

C. Open onto a covered porch that is at least sixty square feet with a minimum depth of five feet on the front or, in the case of a corner lot, the side of the home.

Response: Individual single-family home designs have not been identified for individual lots within the project. The design elements indicated in this standard can be satisfied at time of building permit issuance.

17.20.060 Residential yard landscaping.

The intent of this section is to ensure that residential lots are landscaped and to encourage the retention of trees, minimize the impact of tree loss during development and ensure a sustainable tree canopy in Oregon City. Though not required, the use of native species and low water use vegetation is recommended, but in no case may materials identified on the Oregon City Nuisance Plant list be used.

A. Tree Requirement. This requirement may be met using one or any combination of the three options below (Tree Preservation, Tree Planting, or Tree Fund). Table 17.20.060(A) identifies the minimum number of inches of tree diameter per lot that shall be preserved, planted or paid into the Tree Fund. Adjustments from this section are prohibited. The applicant shall submit a residential yard landscaping plan for Options (1) and (2) demonstrating compliance with the requirements of this section.

TABLE 17.20.060(A) - Tree Requirements	
Lot Size (square feet)	Tree Diameter Inches Required to be Protected, Planted or Paid into Tree Fund
0—4,999	4"
5,000—7,999	6"
8,000—9,999	8"
10,000—14,999	10"
15,000 +	12"

1. Tree preservation. The size of existing trees to be preserved shall be measured as Diameter at Breast Height (DBH).

   a. This standard shall be met using trees that are located on the lot and trees that are located within public and private right-of-way shall not be used to meet this standard. When this option is used, a tree preservation plan is required.

   b. Trees to be preserved may be located anywhere on the lot, and shall be a minimum of two inches caliper DBH.

   c. Large Native or Heritage Tree Incentive. If a tree is preserved that is selected from the list in Table 17.20.060(A)(2)(c), the diameter of the tree may be doubled when demonstrating compliance with the minimum tree requirements indicated in Table 17.20.060(A) above. For example, an Oregon White Oak with a two-inch caliper at DBH may count as a tree diameter of four inches.

2. Tree planting. All planted trees shall measure a minimum two-inch caliper at six inches above the root crown. When this option is used, a tree planting plan is required.

   a. Trees planted pursuant to this section on R-6, R-8 and R-10 zoned lots shall include at least one tree in the front yard setback, unless it is demonstrated that it is not feasible due to site constraints.

   b. Trees planted pursuant to this section on R-5 and R-3.5 zoned lots may be planted anywhere on the lot as space permits.

   c. Large Native or Heritage Tree Incentive. If a tree is planted that is selected from the list in Table 17.20.060(A)(2)(c), the diameter of the tree may be doubled when demonstrating compliance with the minimum tree requirements indicated in Table 17.20.060(A) above. For example, an Oregon White Oak with a two-inch caliper at six inches above the root crown may count as a tree diameter of four inches.

TABLE 17.20.060(A)(2)(c) - Large Native and Heritage Tree List	
Common Name	Scientific Name
Oregon White Oak	*Quercus garryana*
Pacific willow	*Salix lucida spp. lasiandra*
Western red cedar	*Thuja plicata*
Western hemlock	*Tsuga heterophylla*
Northern Red Oak	*Quercus rubra*
Bur Oak	*Quercus macrocarpa*
Bigleaf Maple	*Acer macrophyllum*
Grand Fir	*Abies grandis*
Douglas Fir	*Pseudotsuga menziesii*
American Elm hybrids (disease resistant)	*Ulmus spp.*
Western yew	*Taxus brevifolia*

3. Tree Fund. This option may be used where site characteristics or construction preferences do not support the preservation or planting options identified above. The community development director may approve this option in-lieu-of or in addition to requirements 1. and/or 2. above. In this case, the community development director may approve the payment of cash-in-lieu into a dedicated fund for the remainder of trees that cannot be replanted in the manner described above. The large native or heritage tree incentive does not apply when using this option to calculate the number of required inches.

   a. The cash-in-lieu payment per tree shall utilize the adopted fee schedule when calculating the total tree fund payment.

   b. The amount to be paid to the tree fund shall be calculated by subtracting the total inches of trees preserved and planted per subsection 2. and 3. above from the minimum tree diameter inches required in Table 17.20.060(A), dividing the sum by two inches and multiplying the remainder by the adopted fee from the Oregon City fee schedule. For example:

Lot Size	a. Tree Requirement per Table 17.20.060(A) (inches)	b. Trees Preserved (inches)	c. Trees Planted (inches)	d. To be mitigated (inches) a.—b.—c.	Number of trees owed to tree fund. d./2" minimum caliper tree
10,000—14,999	10"	2"	4"	4"	2

Response: The Applicant plans to use a combination of the "Tree Planting" option and/or the "Tree Fund" option to meet the residential yard landscaping requirements. Individual home designs for the planned lots have not yet been identified. A residential yard landscaping plan is planned to be developed based off future home design and placement, and submitted prior to building permit issuance. This standard is met.

> **B.** **Residential front yard landscaping requirements. The following minimum landscaping standards shall apply to residential uses in residential zones:**
>
> 1. **At a minimum, a three-gallon shrub or three-gallon accent plant shall be planted between the front property line and the front building line for every four linear feet of foundation.**
> 2. **On lots zoned R-5, R-6, R-8 and R-10, fifty percent of the area between the front lot line and the front building line shall be landscaped.**
> 3. **On lots zoned R-3.5, at least forty percent of the area between the front lot line and the front building line shall be landscaped.**
> 4. **At a minimum, the required landscaped area shall be planted with ground cover. Up to one-third of the required landscaped area may be for recreational use or for use by pedestrians, such as walkways, play areas or patios.**
> 5. **A landscaping plan is required.**

Response: Individual home designs for the planned lots have not yet been identified. A residential yard landscaping plan is planned to be created based off future home design and placement, and submitted prior to building permit issuance. This standard is met.

Chapter 17.41 - TREE PROTECTION STANDARDS

> **17.41.050** **Same—Compliance options.**
>
> **Applicants for review shall comply with these requirements through one or a combination of the following procedures:**
>
> **A.** **Option 1—Mitigation. Retention and removal of trees, with subsequent mitigation by replanting pursuant to Sections 17.41.060 or 17.41.070. All replanted and saved trees shall be protected by a permanent restrictive covenant or easement approved in form by the city.**
>
> **D.** **Option 4—Cash-in-lieu of planting pursuant to Section 17.41.130.**
>
> **A regulated tree that has been designated for protection pursuant to this section must be retained or permanently protected unless it has been determined by a certified arborist to be diseased or hazardous, pursuant to the following applicable provisions.**
>
> **The community development director, pursuant to a Type II procedure, may allow a property owner to cut a specific number of trees within a regulated grove if preserving those trees would:**

1. Preclude achieving eighty percent of minimum density with reduction of lot size; or

2. Preclude meeting minimum connectivity requirements for subdivisions.

Response: As shown on the preliminary plans, there are a total of 40 trees located on the project site requiring removal. Based on the health of the trees identified in the "Detailed Tree Inventory" included in the preliminary plans, 13 of the 40 on-site trees planned to be removed are subject to mitigation. Using Table 17.41.060-1 (Tree Replacement Requirements) to calculate the number of trees required for mitigation, a total of 74 mitigation trees are required. This application chooses to use a combination of Option 1 and Option 4 to satisfy this requirement. A final tree mitigation plan is planned to be submitted based on the City's final decision. This standard is met.

17.41.060 Tree removal and replanting—Mitigation (Option 1).

A. Applicants for development who select this option shall ensure that all healthy trees shall be preserved outside the construction area as defined in Chapter 17.04 to the extent practicable. Compliance with these standards shall be demonstrated in a tree mitigation plan report prepared by a certified arborist, horticulturalist or forester or other environmental professional with experience and academic credentials in forestry or arborculture. At the applicant's expense, the city may require the report to be reviewed by a consulting arborist. The number of replacement trees required on a development site shall be calculated separately from, and in addition to, any public or street trees in the public right-of-way required under section 12.08—Community Forest and Street Trees.

B. The applicant shall determine the number of trees to be mitigated on the site by counting all of the trees six inch DBH (minimum four and one-half feet from the ground) or larger on the entire site and either:

1. Trees that are removed outside of the construction area, shall be replanted with the number of trees specified in Column 1 of Table 17.41.060-1. Trees that are removed within the construction area shall be replanted with the number of replacement trees required in Column 2; or

2. Diseased or hazardous trees, when the condition is verified by a certified arborist to be consistent with the definition in Section 17.04.1360, may be removed from the tree replacement calculation. Regulated healthy trees that are removed outside of the construction area, shall be replanted with the number of trees specified in Column 1 of Table 17.41.060-1. Regulated healthy trees that are removed within the construction area shall be replanted with the number of replacement trees required in Column 2.

Response: As mentioned previously, of the 13 on-site trees required for mitigation, a total of 8 trees are located inside the construction area for project improvements. A total of 5 trees are located outside of the project's construction area. Tree mitigation is further discussed below.

Table 17.41.060-1 Tree Replacement Requirements All replacement trees shall be either: Two-inch caliper deciduous, or Six-foot high conifer		
Size of tree removed (DBH)	Column 1 Number of trees to be planted. (If removed Outside of construction area)	Column 2 Number of trees to be planted. (If removed Within the construction area)
6 to 12"	3	1
13 to 18"	6	2
19 to 24"	9	3
25 to 30"	12	4
31 and over"	15	5

Steps for calculating the number of replacement trees:

1. Count all trees measuring six inches DBH (minimum four and one-half feet from the ground) or larger on the entire development site.
2. Designate (in certified arborists report) the condition and size (DBH) of all trees pursuant to accepted industry standards.
3. Document any trees that are currently diseased or hazardous.
4. Subtract the number of diseased or hazardous trees in step 3. from the total number of trees on the development site in step 1. The remaining number is the number of healthy trees on the site. Use this number to determine the number of replacement trees in steps 5. through 8.
5. Define the construction area (as defined in Chapter 17.04).
6. Determine the number and diameter of trees to be removed within the construction area. Based on the size of each tree, use Column 2 to determine the number of replacement trees required.
7. Determine the number and diameter of trees to be removed outside of the construction area. Based on the size of each tree, use Column 1 to determine the number of replacement trees required.
8. Determine the total number of replacement trees from steps 6. and 7.

Response: As shown on the preliminary plans, a total of 40 trees are located on the project site. Of the 40 trees located on-site, a total of 27 trees have been deemed diseased, hazardous, or invasive by the project's arborist. Therefore, 13 trees are subject to the mitigation standards of Table 17.41.060-1 above and discussed below:

Of the 13 trees subject to mitigation, a total of 8 trees are located within the construction area. Of the 8 trees, 4 trees have a DBH between 13 inches and 18 inches, 1 tree has a DBH between 19 inches and 24 inches, and 3 trees have a DBH of 31 inches and over.

Of the remaining 5 trees located outside the construction area, 2 trees have a DBH between 13 inches and 18 inches, 1 tree has a DBH between 19 inches and 24 inches, 1 tree has a DBH between 25 inches and 30 inches, and 1 tree has a DBH of 31 inches and over. Therefore, 74 mitigation trees are required. These trees are planned to be planted per Option 1, or in lieu of planting, be paid per Option 4. The preliminary tree removal plan has been prepared and reviewed by a certified arborist. This standard is met.

17.41.070 Planting area priority for mitigation (Option 1).

Development applications which opt for removal of trees with subsequent replanting pursuant to section 17.41.050A. shall be required to mitigate for tree cutting by complying with the following priority for replanting standards below:

A. First Priority. Replanting on the development site.

B. Second Priority. Off-site replacement tree planting locations. If the community development director determines that it is not practicable to plant the total number of replacement trees on-site, a suitable off-site planting location for the remainder of the trees may be approved that will reasonably satisfy the objectives of this section. Such locations may include either publicly owned or private land and must be approved by the community development director.

Response: Mitigation trees are planned to be planted on or off-site and/or cash-in-lieu of planting is to be paid in accordance with this chapter. This standard is met.

17.41.125 Cash-in-lieu of planting (tree bank/fund) (Option 4).

The applicant may choose this option in-lieu-of or in addition to Compliance Options 1 through 3. In this case, the community development director may approve the payment of cash-in-lieu into a dedicated fund for the remainder of trees that cannot be replanted in the manner described above.

A. The cash-in-lieu payment per tree shall be as listed on the adopted fee schedule and shall be adjusted annually based on the Consumer Price Index (Index). The price shall include the cost of materials, transportation and planting.

B. The amount of the cash-in-lieu payment into the tree bank shall be calculated as the difference between the value of the total number of trees an applicant is required to plant, including cost of installation and adjusted for Consumer Price Index, minus the value of the trees actually planted. The value of the trees shall be based on the adopted fee schedule.

Response: Mitigation trees are planned to be planted on or off-site and/or cash-in-lieu of planting is to be paid in accordance with this Chapter. This standard is met.

17.41.130 Regulated tree protection procedures during construction.

A. No permit for any grading or construction of public or private improvements may be released prior to verification by the community development director that regulated trees designated for protection or conservation have been protected according to the following standards. No trees designated for removal shall be removed without prior written approval from the community development director.

Response: No trees are planned to be removed without prior written approval from the City of Oregon City. This standard is met.

B. Tree protection shall be as recommended by a qualified arborist or, as a minimum, to include the following protective measures:

Response: Other than the project's perimeter fencing, no tree protection measures have been recommended by the project's arborist. This standard does not apply.

C. Changes in soil hydrology due to soil compaction and site drainage within tree protection areas shall be avoided. Drainage and grading plans shall include provision to ensure that drainage of the site does not conflict with the standards of this section. Excessive site run-off shall be directed to appropriate storm drainage facilities and away from trees designated for conservation or protection.

Response: No on-site tree protection areas are included with this project. Excessive site run-off shall be directed to appropriate storm drainage facilities as required. This standard is met.

Chapter 17.47 - EROSION AND SEDIMENT CONTROL

17.47.070 Erosion and sediment control plans.

A. An application for an erosion and sediment control permit shall include an erosion and sediment control plan, which contains methods and interim measures to be used during and following construction to prevent or control erosion prepared in compliance with City of Oregon City public works standards for erosion and sediment control. These standards are incorporated herein and made a part of this title and are on file in the office of the city recorder.

B. Approval Standards. An erosion and sediment control plan shall be approved only upon making the following findings:

1. The erosion and sediment control plan meets the requirements of the City of Oregon City public works standards for erosion and sediment control incorporated by reference as part of this chapter;

2. The erosion and sediment control plan indicates that erosion and sediment control measures will be managed and maintained during and following development. The erosion and sediment control plan indicates that erosion and sediment control measures will remain in place until disturbed soil areas are permanently stabilized by landscaping, grass, approved mulch or other permanent soil stabilizing measures.

C. The erosion and sediment control plan shall be reviewed in conjunction with the requested development approval. If the development does not require additional review, the manager may approve or deny the permit with notice of the decision to the applicant.

D. The city may inspect the development site to determine compliance with the erosion and sediment control plan and permit.

E. Erosion that occurs on a development site that does not have an erosion and sediment control permit, or that results from a failure to comply with the terms of such a permit, constitutes a violation of this chapter.

F. If the manager finds that the facilities and techniques approved in an erosion and sediment control plan and permit are not sufficient to prevent erosion, the manager

shall notify the owner or his/her designated representative. Upon receiving notice, the owner or his/her designated representative shall immediately install interim erosion and sediment control measures as specified in the City of Oregon City public works standards for erosion and sediment control. Within three days from the date of notice, the owner or his/her designated representative shall submit a revised erosion and sediment control plan to the city. Upon approval of the revised plan and issuance of an amended permit, the owner or his/her designated representative shall immediately implement the revised plan.

G. Approval of an erosion and sediment control plan does not constitute an approval of permanent road or drainage design (e.g., size and location of roads, pipes, restrictors, channels, retention facilities, utilities, etc.).

Response: A Preliminary Grading and Erosion and Sediment Control Plan is included in the preliminary plans. The plan includes measures to ensure that sediment laden waters do not leave the site. A Final Grading and Erosion and Sediment Control Plan is planned to be submitted and approved before any construction activities commence. Please refer to the preliminary plans for further information. This standard is met.

Chapter 17.50 - ADMINISTRATION

17.50.050 Preapplication conference.

A. Preapplication Conference. Prior to submitting an application for any form of permit, the applicant shall schedule and attend a preapplication conference with City staff to discuss the proposal. To schedule a preapplication conference, the applicant shall contact the Planning Division, submit the required materials, and pay the appropriate conference fee. At a minimum, an applicant should submit a short narrative describing the proposal and a proposed site plan, drawn to a scale acceptable to the City, which identifies the proposed land uses, traffic circulation, and public rights-of-way and all other required plans. The purpose of the preapplication conference is to provide an opportunity for staff to provide the applicant with information on the likely impacts, limitations, requirements, approval standards, fees and other information that may affect the proposal. The Planning Division shall provide the applicant(s) with the identity and contact persons for all affected neighborhood associations as well as a written summary of the preapplication conference. Notwithstanding any representations by City staff at a preapplication conference, staff is not authorized to waive any requirements of this code, and any omission or failure by staff to recite to an applicant all relevant applicable land use requirements shall not constitute a waiver by the City of any standard or requirement.

B. A preapplication conference shall be valid for a period of six months from the date it is held. If no application is filed within six months of the conference or meeting, the applicant must schedule and attend another conference before the city will accept a permit application. The community development director may waive the preapplication requirement if, in the Director's opinion, the development does not warrant this step. In no case shall a preapplication conference be valid for more than one year.

Response: On February 15, 2017, the Applicant's consultant submitted a request for a pre-application conference on the required form, and included a short explanatory narrative, preliminary site plan, and the appropriate fee. The pre-application conference was held on March 8, 2017. The pre-application conference summary, provided by Oregon City Planning and Development Services, is included in the application materials. This subdivision application was filed with the City within six months of the pre-application conference. This standard is met.

17.50.55 Neighborhood association meeting.

A. Neighborhood Association Meeting. The purpose of the meeting with the recognized neighborhood association is to inform the affected neighborhood association about the proposed development and to receive the preliminary responses and suggestions from the neighborhood association and the member residents.

1. Applicants applying for annexations, zone change, comprehensive plan amendments, conditional use, planning commission variances, subdivision, or site plan and design review (excluding minor site plan and design review), general development master plans or detailed development plans applications shall schedule and attend a meeting with the city-recognized neighborhood association in whose territory the application is proposed. Although not required for other projects than those identified above, a meeting with the neighborhood association is highly recommended.

2. The applicant shall send, by certified mail, return receipt requested letter to the chairperson of the neighborhood association and the citizen involvement committee describing the proposed project. Other communication methods may be used if approved by the neighborhood association.

3. A meeting shall be scheduled within thirty days of the notice. A meeting may be scheduled later than thirty days if by mutual agreement of the applicant and the neighborhood association. If the neighborhood association does not want to, or cannot meet within thirty days, the applicant shall hold their own meeting after six p.m. or on the weekend, with notice to the neighborhood association, citizen involvement committee, and all property owners within three hundred feet. If the applicant holds their own meeting, a copy of the certified letter requesting a neighborhood association meeting shall be required for a complete application. The meeting held by the applicant shall be held within the boundaries of the neighborhood association or in a city facility.

4. If the neighborhood association is not currently recognized by the city, is inactive, or does not exist, the applicant shall request a meeting with the citizen involvement committee.

5. **To show compliance with this section, the applicant shall submit a sign-in sheet of meeting attendees, a summary of issues discussed, and letter from the neighborhood association or citizen involvement committee indicating that a neighborhood meeting was held. If the applicant held a separately noticed meeting, the applicant shall submit a copy of the meeting flyer, a sign in sheet of attendees and a summary of issues discussed.**

Response: Upon receiving approval to communicate with the Hillendale/Tower Vista Neighborhood Associations via email, the Applicant's consultant sent an email to the Hillendale Chair Roy Harris on May 5, 2017, describing the planned project. Mr. Harris responded on May 8, 2017 indicating that the applicant would be included on the June 6, 2017 meeting agenda. The Applicant's consultant attended the Hillendale/Tower Vista neighborhood meeting, presented the project, and answered questions from the neighbors in attendance.

To show compliance with the applicable criteria, as required by 17.50.055.A.5, the required neighborhood meeting submittal items have been included in the application materials. This standard has been met.

IV. Conclusion

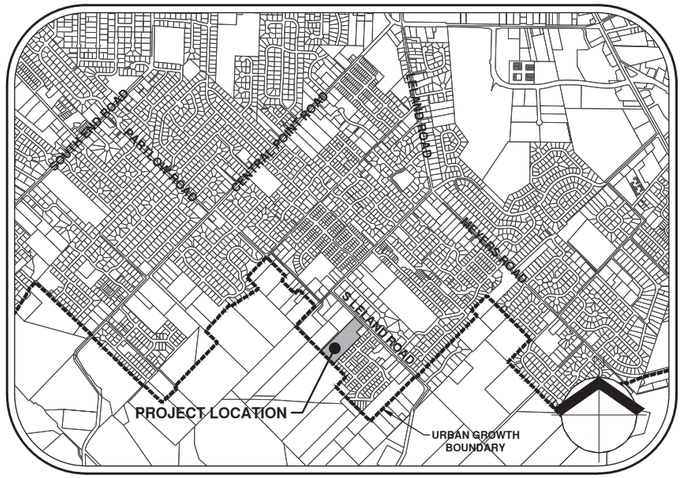
The planned subdivision provides for future detached single-family homes, which is expressly defined in ORS 197.303 as "needed housing" on buildable land. Therefore, the application is subject to ORS 197.307(4) (needed housing). The Applicant reserves the right to object to the application of subjective criteria, standards, or conditions, and does not waive their right to assert that the needed housing statutes apply.

Pursuant to Municipal Code Section 16.08.010.B, this subdivision application in the R-6 zoning district is subject to review by the City through a Type II procedure. This narrative is supported by substantial evidence presented in the application materials, including preliminary plans and other written documentation. Considered together and with respect to the discussion provided above, this information provides the necessary basis for the City of Oregon City to approve the application.

Exhibit A: Preliminary Plans

LINDSAY ANNE ESTATES TOO

PRELIMINARY SUBDIVISION PLANS



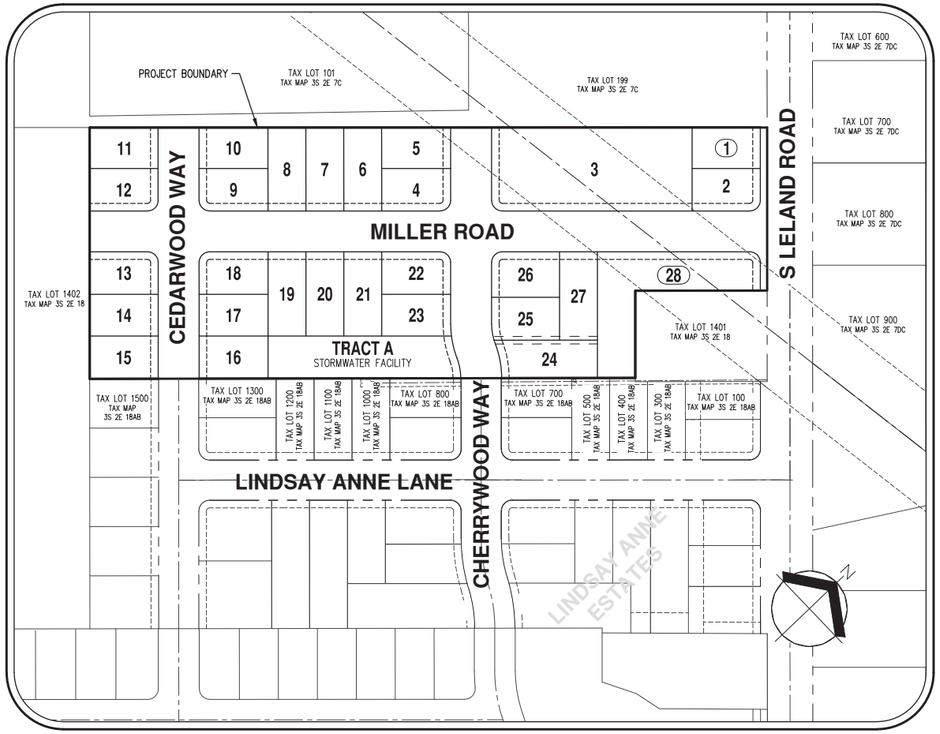
VICINITY MAP

NOT TO SCALE

LEGEND

	EXISTING	PROPOSED		EXISTING	PROPOSED
DECIDUOUS TREE			STORM SEWER CLEAN OUT		
CONIFEROUS TREE			STORM SEWER CATCH BASIN		
			STORM SEWER AREA DRAIN		
FIRE HYDRANT			STORM SEWER MANHOLE		
WATER BLOWOFF			GAS METER		
WATER METER			GAS VALVE		
WATER VALVE			GUY WIRE ANCHOR		
DOUBLE CHECK VALVE			UTILITY POLE		
AIR RELEASE VALVE			POWER VAULT	P	P
SANITARY SEWER CLEAN OUT			POWER JUNCTION BOX		
SANITARY SEWER MANHOLE			POWER PEDESTAL		
SIGN			COMMUNICATIONS VAULT	C	C
STREET LIGHT			COMMUNICATIONS JUNCTION BOX		
MAILBOX	MB	MB	COMMUNICATIONS RISER		

	EXISTING	PROPOSED
RIGHT-OF-WAY LINE		
BOUNDARY LINE		
PROPERTY LINE		
CENTERLINE		
DITCH		
CURB		
EDGE OF PAVEMENT		
EASEMENT		
FENCE LINE		
GRAVEL EDGE		
POWER LINE	PWR	PWR
OVERHEAD WIRE	OHW	OHW
COMMUNICATIONS LINE	COM	COM
FIBER OPTIC LINE	CFO	CFO
GAS LINE	GAS	GAS
STORM SEWER LINE	STM	STM
SANITARY SEWER LINE	SAN	SAN
WATER LINE	WAT	WAT



SITE MAP

SCALE: 1"=100'

SHEET INDEX

APPLICANT:
PDX DEVELOPMENT, INC
PO BOX 2559
OREGON CITY, OREGON 97045

PLANNING/ENGINEERING/ SURVEYING FIRM:
AKS ENGINEERING & FORESTRY, LLC
CONTACT: MONTY HURLEY
12965 SW HERMAN ROAD, SUITE 100
TUALATIN, OR 97062
PH: 503-563-6151
FAX: 503-563-6152

PROJECT LOCATION:
19701 S LELAND ROAD
OREGON CITY, OREGON 97045

PROPERTY DESCRIPTION:
TAX LOT 1400 CLACKAMAS COUNTY ASSESSOR'S MAP NUMBER 3-2E-18 WILLAMETTE MERIDIAN, CITY OF OREGON CITY, CLACKAMAS COUNTY, OREGON.

EXISTING LAND USE:
EXISTING HOME AND OUTBUILDINGS/ FARM LAND

PROJECT PURPOSE:
RESIDENTIAL SUBDIVISION ZONED FOR FUTURE SINGLE-FAMILY DETACHED RESIDENTIAL HOMES.

VERTICAL DATUM:
ELEVATIONS ARE BASED ON THE ELEVATION OF THE SOUTHWEST INVERT OF THE SANITARY SEWER MANHOLE ON JESSIE AVENUE PER CITY OF OREGON CITY AS-BUILT CONSTRUCTION PLANS. AS-BUILT PLANS BY SISUL ENGINEERING, SANITARY PLAN AND PROFILE (LINE 'C') SHEET, MAY 2004. RIM ELEVATION 437.01', SW INVERT ELEVATION 419.96'.

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD STE 100
TUALATIN, OR 97062
P: 503.563.6151
F: 503.563.6152
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FORESTRY · PLANNING · LANDSCAPE ARCHITECTURE

LINDSAY ANNE ESTATES TOO
OREGON CITY OREGON
TAX LOT 1400 CLACKAMAS COUNTY TAX MAP 3-2E-18

COVER SHEET WITH SITE & VICINITY MAPS & LEGEND

DESIGNED BY:	VHN
DRAWN BY:	NMC
CHECKED BY:	MBH
SCALE:	AS NOTED

DATE: 08/07/2017

REGISTERED PROFESSIONAL ENGINEER
OREGON
JANUARY 9, 2002
MONTGOMERY B. HURLEY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWAL DATE: 6/30/19

REVISIONS

JOB NUMBER
5837

SHEET
P1-01

AKS DRAWING FILE: 5837 COVERSLDWG | LAYOUT: P1-01

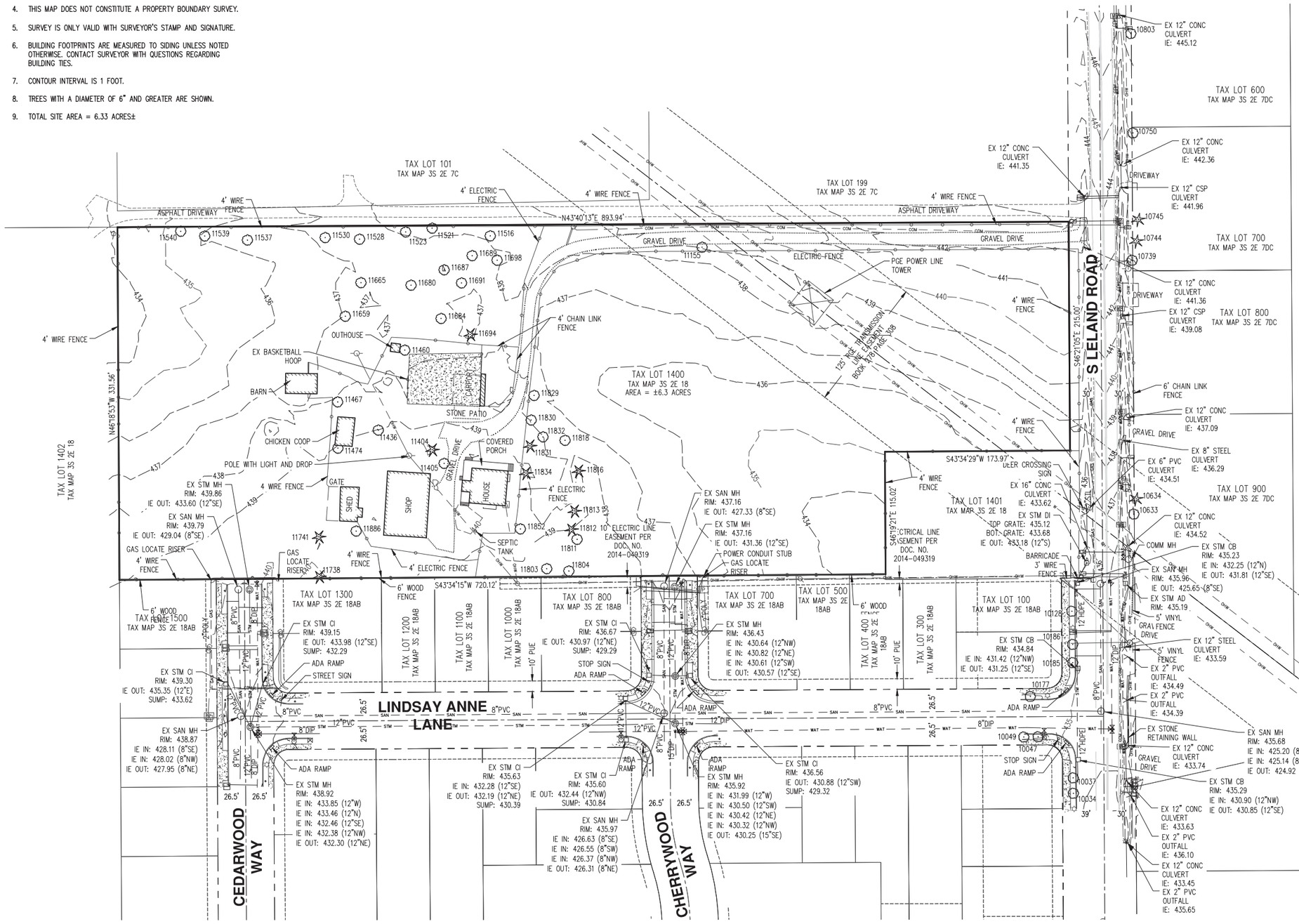
NOTES:

1. UTILITIES SHOWN ARE BASED ON UNDERGROUND UTILITY LOCATE MARKINGS AS PROVIDED BY OTHERS, PER UTILITY LOCATE TICKET NUMBERS 17084633, 17084644, 17084717, AND 17094430. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND LOCATES REPRESENT THE ONLY UTILITIES IN THE AREA. CONTRACTORS ARE RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS PRIOR TO BEGINNING CONSTRUCTION.
2. FIELD WORK WAS CONDUCTED APRIL 19-27, 2017.
3. VERTICAL DATUM: ELEVATIONS ARE BASED ON THE ELEVATION OF THE SOUTHWEST INVERT OF THE SANITARY SEWER MANHOLE ON JESSIE AVENUE PER CITY OF OREGON CITY AS-BUILT CONSTRUCTION PLANS. AS-BUILT PLANS BY SISUL ENGINEERING, SANITARY PLAN AND PROFILE (LINE 'C') SHEET, MAY 2004. RIM ELEVATION 437.01', SW INVERT ELEVATION 419.96'.
4. THIS MAP DOES NOT CONSTITUTE A PROPERTY BOUNDARY SURVEY.
5. SURVEY IS ONLY VALID WITH SURVEYOR'S STAMP AND SIGNATURE.
6. BUILDING FOOTPRINTS ARE MEASURED TO SIDING UNLESS NOTED OTHERWISE. CONTACT SURVEYOR WITH QUESTIONS REGARDING BUILDING TIES.
7. CONTOUR INTERVAL IS 1 FOOT.
8. TREES WITH A DIAMETER OF 6" AND GREATER ARE SHOWN.
9. TOTAL SITE AREA = 6.33 ACRES±

SCALE: 1"=50 FEET

50 0 20 30 40 50

SEE SHEET P1-11 FOR ADDITIONAL TREE INFORMATION



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LINDSAY ANNE ESTATES TOO

OREGON CITY OREGON
CLACKAMAS COUNTY TAX MAP 3-2E-18
TAX LOT 1400

PRELIMINARY EXISTING CONDITIONS PLAN

DESIGNED BY:	
DRAWN BY:	BJA
CHECKED BY:	RDR
SCALE:	AS NOTED
DATE: 08/07/2017	

REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
JANUARY 11, 2005
ROBERT D. RETTIG
60124LS
RENEWS: 12/31/18

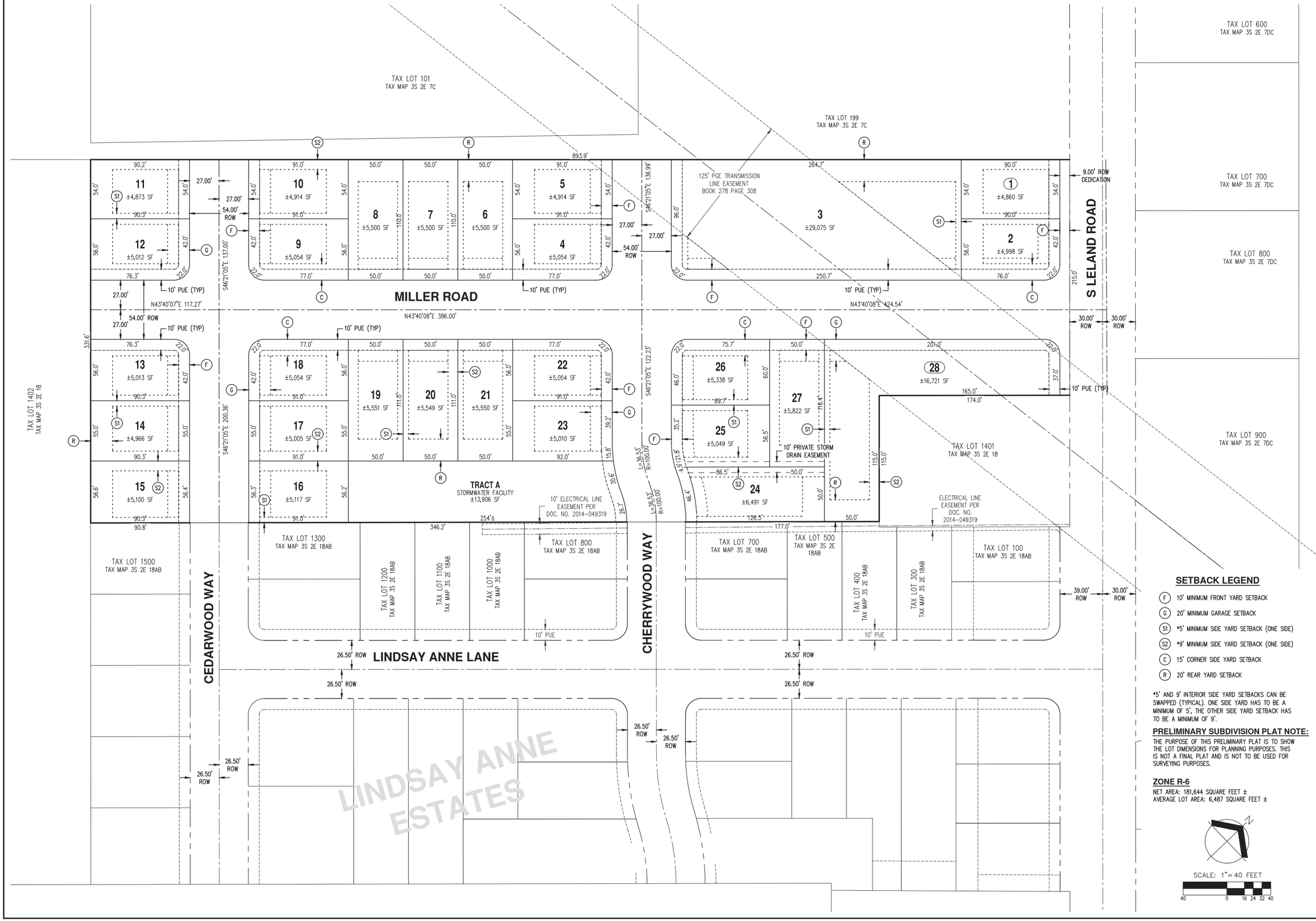
PRELIMINARY NOT FOR CONSTRUCTION

REVISIONS

JOB NUMBER 5837

SHEET P1-02

AKS DRAWING FILE: 5837 EXCOND.DWG | LAYOUT: P1-02



SETBACK LEGEND

- (F) 10' MINIMUM FRONT YARD SETBACK
- (G) 20' MINIMUM GARAGE SETBACK
- (S1) *5' MINIMUM SIDE YARD SETBACK (ONE SIDE)
- (S2) *9' MINIMUM SIDE YARD SETBACK (ONE SIDE)
- (C) 15' CORNER SIDE YARD SETBACK
- (R) 20' REAR YARD SETBACK

*5' AND 9' INTERIOR SIDE YARD SETBACKS CAN BE SWAPPED (TYPICAL). ONE SIDE YARD HAS TO BE A MINIMUM OF 5', THE OTHER SIDE YARD SETBACK HAS TO BE A MINIMUM OF 9'.

PRELIMINARY SUBDIVISION PLAT NOTE:

THE PURPOSE OF THIS PRELIMINARY PLAT IS TO SHOW THE LOT DIMENSIONS FOR PLANNING PURPOSES. THIS IS NOT A FINAL PLAT AND IS NOT TO BE USED FOR SURVEYING PURPOSES.

ZONE R-6

NET AREA: 181,644 SQUARE FEET ±
AVERAGE LOT AREA: 6,487 SQUARE FEET ±

SCALE: 1"= 40 FEET

40 0 16 24 32 40

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LINDSAY ANNE ESTATES TOO

OREGON CITY, OREGON
CLACKAMAS COUNTY TAX MAP 3-2E-18
TAX LOT 1400

PRELIMINARY SUBDIVISION PLAT WITH BUILDING SETBACKS

DESIGNED BY:	VHN
DRAWN BY:	NMC
CHECKED BY:	MBH
SCALE:	AS NOTED
DATE:	08/07/2017

REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
JULY 13, 2004
MONTGOMERY B. HURLEY
NOT FOR CONSTRUCTION
MAY 9, 2017
RENEWAL DATE: 6/30/19

REVISIONS

JOB NUMBER
5837

SHEET
P1-03

AKS DRAWING FILE: 5837 PLAT.DWG | LAYOUT: P1-03

LEGEND

- EXISTING GROUND CONTOUR (1 FT) — 347
- EXISTING GROUND CONTOUR (5 FT) — 350
- FINISHED GRADE CONTOUR (1 FT) — 343
- FINISHED GRADE CONTOUR (5 FT) — 345
- SEDIMENT FENCE (TO BE INSTALLED PRIOR TO GRADING)
- INLET PROTECTION
- CONCRETE WASHOUT AREA
- GRAVEL CONSTRUCTION ENTRANCE

SCALE: 1" = 40 FEET

40 0 16 24 32 40

TAX LOT 101
TAX MAP 3S 2E 7C

125' PGE TRANSMISSION LINE EASEMENT BOOK 278 PAGE 308

TAX LOT 199
TAX MAP 3S 2E 7C

ASPHALT DRIVEWAY

ASPHALT DRIVEWAY

TAX LOT 600
TAX MAP 3S 2E 7DC

TAX LOT 700
TAX MAP 3S 2E 7DC

TAX LOT 800
TAX MAP 3S 2E 7DC

TAX LOT 900
TAX MAP 3S 2E 7DC

10803

10750

DRIVEWAY

10745

10744

10739

DRIVEWAY

S LELAND ROAD

GRAVEL CONSTRUCTION ENTRANCE

MILLER ROAD

TAX LOT 1402
TAX MAP 3S 2E 18

TRACT A
STORMWATER FACILITY

6' CHAIN LINK FENCE

CONCRETE WASHOUT

4' WIRE FENCE

DEER CROSSING SIGN

4' WIRE FENCE

GRAVEL DRIVE

TAX LOT 1401
TAX MAP 3S 2E 18

10634

10633

COMM MH

ELECTRICAL LINE EASEMENT PER DOC. NO. 2014-049319

BARRICADE
3' WIRE FENCE

5' VINYL FENCE

GRAVEL DRIVE

5' VINYL FENCE

10' ELECTRIC LINE EASEMENT PER DOC. NO. 2014-049319

TAX LOT 1500
TAX MAP 3S 2E 18AB

TAX LOT 1300
TAX MAP 3S 2E 18AB

TAX LOT 1200
TAX MAP 3S 2E 18AB

TAX LOT 1100
TAX MAP 3S 2E 18AB

TAX LOT 1000
TAX MAP 3S 2E 18AB

TAX LOT 800
TAX MAP 3S 2E 18AB

TAX LOT 700
TAX MAP 3S 2E 18AB

TAX LOT 500
TAX MAP 3S 2E 18AB

TAX LOT 400
TAX MAP 3S 2E 18AB

TAX LOT 300
TAX MAP 3S 2E 18AB

TAX LOT 100
TAX MAP 3S 2E 18AB

CEDARWOOD WAY

CHERRYWOOD WAY

ADA RAMP

STREET SIGN

STOP SIGN

ADA RAMP

10' PUE

10' PUE

LINDSAY ANNE LANE

ADA RAMP

ADA RAMP

ADA RAMP

ADA RAMP

10126

10186

10185

10177

10049

1 ADA RAMP

STOP SIGN

EX STONE RETAINING WALL

GRAVEL DRIVE

10037

10034

8"DIP

8"DIP

12"DIP

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LINDSAY ANNE ESTATES TOO

OREGON
CLACKAMAS COUNTY TAX MAP 3-2E-18
OREGON CITY
TAX LOT 1400

PRELIMINARY GRADING & EROSION AND SEDIMENT CONTROL PLAN

DESIGNED BY:	VHN
DRAWN BY:	NMC
CHECKED BY:	MBH
SCALE:	AS NOTED

DATE: 08/07/2017

REGISTERED PROFESSIONAL ENGINEER
OREGON
JANUARY 9, 2007
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/19

PRELIMINARY NOT FOR CONSTRUCTION

REVISIONS

JOB NUMBER
5837

SHEET
P1-04

AKS DRAWING FILE: 5837 ESC.DWG | LAYOUT: P1-04

SCALE: 1"= 40 FEET

40 0 16 24 32 40

TAX LOT 101
TAX MAP 3S 2E 7C

125' PGE TRANSMISSION LINE EASEMENT BOOK 278 PAGE 308

TAX LOT 199
TAX MAP 3S 2E 7C

TAX LOT 600
TAX MAP 3S 2E 7DC

TAX LOT 700
TAX MAP 3S 2E 7DC

TAX LOT 800
TAX MAP 3S 2E 7DC

TAX LOT 900
TAX MAP 3S 2E 7DC

TAX LOT 1402
TAX MAP 3S 2E 18

TAX LOT 1401
TAX MAP 3S 2E 18

TAX LOT 1500
TAX MAP 3S 2E 18AB

TAX LOT 1300
TAX MAP 3S 2E 18AB

TAX LOT 1200
TAX MAP 3S 2E 18AB

TAX LOT 1100
TAX MAP 3S 2E 18AB

TAX LOT 1000
TAX MAP 3S 2E 18AB

TAX LOT 800
TAX MAP 3S 2E 18AB

TAX LOT 700
TAX MAP 3S 2E 18AB

TAX LOT 500
TAX MAP 3S 2E 18AB

TAX LOT 400
TAX MAP 3S 2E 18AB

TAX LOT 300
TAX MAP 3S 2E 18AB

TAX LOT 100
TAX MAP 3S 2E 18AB

MILLER ROAD

S LELAND ROAD

LINDSAY ANNE LANE

CEDARWOOD WAY

CHERRYWOOD WAY

TRACT A
STORMWATER FACILITY
STM OUTFALL: 435.00

SAN MH
RIM: 438.50
IE OUT: 430.56(8"SE)

STM MH
RIM: 438.50
IE OUT: 434.89(12"SE)

WATER BLOWOFF VALVE (TYP)

SAN MH
RIM: 439.69
IE OUT: 428.96(8"SE)

STM MH
RIM: 439.69
IE OUT: 436.19(12"SE)

STORMWATER MANHOLE (TYP)

STORM WATER DITCH INLET, REGRADE DITCH AS REQUIRED

STM CB
RIM: 442.9±
IE OUT: 433.61(12"SE)

SAN MH
RIM: 443.51
IE OUT: 437.33(8"SE)

PGE POWER LINE TOWER

WATER SERVICE (TYP)

SAN MH
RIM: 439.08
IE IN: 428.47(8"NW)
IE IN: 428.57(8"SW)
IE OUT: 428.37(8"SE)

SAN MH
RIM: 439.09
IE OUT: 429.57(8"NE)

STORM DRAIN LATERAL FOR STORMWATER PLANTER (TYP)

SAN MH
RIM: 437.56
IE OUT: 430.56(8"NE)

SAN MH
RIM: 437.94
IE IN: 430.08(8"NW)
IE IN: 430.18(8"SW)
IE OUT: 429.98(8"SE)

STM MH
RIM: 437.22
IE OUT: 434.73(12"SW)

SANITARY SEWER MANHOLE (TYP)

STM MH
RIM: 439.60
IE OUT: 436.60(12"NE)

STM MH
RIM: 441.29
IE IN: 433.15(12"NW)
IE OUT: 433.05(12"SE)

SAN MH
RIM: 439.79
IE OUT: 431.77(8"NE)

STM MH
RIM: 437.28
IE OUT: 434.77(12"NE)

FIRE HYDRANT (TYP)

CURB INLET (TYP)

STORM WATER PLANTER (TYP)

SANITARY SEWER LATERAL (TYP)

STM MH
RIM: 437.94
IE IN: 434.50(12"NW)
IE IN: 434.60(12"SW)
IE IN: 434.60(12"NE)
IE OUT: 434.40(12"SE)

STM MH
RIM: 439.29
IE OUT: 436.63(12"NE)

STORM DRAIN LATERAL (TYP)

STM MH
RIM: 439.01
IE IN: 435.79(12"NW)
IE IN: 435.89(12"N)
IE IN: 435.89(12"SW)
IE OUT: 435.69(12"SE)

STM MH
RIM: 437.77
IE IN: 432.45(12"NW)
IE OUT: 432.35(12"SE)

4' WIRE FENCE

DEER CROSSING SIGN

SAN MH
RIM: 437.75
IE IN: 427.79(8"NW)
IE OUT: 427.69(8"SE)

STM MH
RIM: 437.81
IE IN: 435.27(12"SE)
IE OUT: 435.17(12"SW)

STM MH
RIM: 438.64
IE IN: 434.86(12"SW)
IE OUT: 434.66(12"E)

GAS LOCATE RISER

GAS LOCATE RISER

POWER CONDUIT STUB
GAS LOCATE RISER

ELECTRICAL LINE EASEMENT PER DOC. NO. 2014-049319

10' ELECTRIC LINE EASEMENT PER DOC. NO. 2014-049319

EX SAN MH
RIM: 439.79
IE IN: 429.14(8"NW)
IE OUT: 429.04(8"SE)

EX STM MH
RIM: 439.86
IE IN: 433.70(12"NW)
IE OUT: 433.60(12"SE)

EX STM CI
RIM: 439.15
IE OUT: 433.98(12"SE)
SUMP: 432.29

EX STM CI
RIM: 439.30
IE OUT: 435.35(12"E)
SUMP: 433.62

ADA RAMP

STREET SIGN

EX SAN MH
RIM: 438.87
IE IN: 428.11(8"SE)
IE IN: 428.02(8"NW)
IE OUT: 427.95(8"NE)

ADA RAMP

EX STM MH
RIM: 438.92
IE IN: 433.85(12"W)
IE IN: 433.46(12"N)
IE IN: 432.46(12"SE)
IE IN: 432.38(12"NW)
IE OUT: 432.30(12"NE)

EX SAN MH
RIM: 437.16
IE OUT: 427.33(8"SE)

EX STM MH
RIM: 437.16
IE IN: 434.16(12"W)
IE OUT: 431.36(12"SE)

EX STM CI
RIM: 436.67
IE OUT: 430.97(12"NE)
SUMP: 429.29

STOP SIGN

ADA RAMP

EX STM MH
RIM: 436.43
IE IN: 430.64(12"NW)
IE IN: 430.82(12"NE)
IE IN: 430.61(12"SW)
IE OUT: 430.57(12"SE)

EX STM CB
RIM: 434.84
IE IN: 431.42 (12"NW)
IE OUT: 431.25 (12"SE)

EX STM CI
RIM: 435.63
IE IN: 432.28(12"SE)
IE OUT: 432.19(12"NE)
SUMP: 430.39

EX STM CI
RIM: 436.56
IE OUT: 430.88(12"SW)
SUMP: 429.32

ADA RAMP

EX STM CI
RIM: 435.60
IE OUT: 432.44(12"NW)
SUMP: 430.84

ADA RAMP

EX SAN MH
RIM: 435.97
IE IN: 426.63(8"SE)
IE IN: 426.55(8"SW)
IE IN: 426.37(8"NW)
IE OUT: 426.31(8"NE)

EX STM MH
RIM: 435.92
IE IN: 431.99(12"W)
IE IN: 430.50(12"SW)
IE IN: 430.42(12"NE)
IE IN: 430.32(12"NW)
IE OUT: 430.25(15"SE)

ADA RAMP

STOP SIGN

1 ADA RAMP

EX STONE RETAINING WALL

EX SAN MH
RIM: 435.68
IE IN: 425.29 (8"SW)
IE IN: 425.14 (8"NW)
IE OUT: 424.92 (8"

EX STM CB
RIM: 435.29
IE IN: 430.90 (12"NW)
IE OUT: 430.85 (12"SE)

10750

EX 12" CONC CULVERT
IE: 442.36

DRIVEWAY

EX 12" CSP CULVERT
IE: 441.96

10745

10744

10739

DRIVEWAY

EX 12" CSP CULVERT
IE: 439.08

SAN MH
RIM: 440.78
IE IN: 432.37(8"NW)
IE IN: 430.57(8"SW)
IE OUT: 430.37(8"SE)

STM MH
RIM: 439.92
IE IN: 432.80(12"NW)
IE IN: 432.90(12"SW)
IE OUT: 432.70(12"SE)

6' CHAIN LINK FENCE

EX 12" CONC CULVERT
IE: 437.09

GRAVEL DRIVE

EX 8" STEEL CULVERT
IE: 436.29

EX 6" PVC CULVERT
IE: 434.51

10634

10633

EX 12" CONC CULVERT
IE: 434.52

COMM MH

EX STM CB
RIM: 435.23
IE IN: 432.25 (12"N)
IE OUT: 431.81 (12"SE)
IE IN: 431.91 (12"NW)

EX SAN MH
RIM: 435.96
IE OUT: 425.65 (8"SE)
IE IN: 425.75 (8"NW)

EX STM AD
RIM: 435.19

5' VINYL FENCE

GRAVEL DRIVE

10128

10186

10185

EX 12" STEEL CULVERT
IE: 433.59

5' VINYL FENCE

EX 2" PVC OUTFALL
IE: 434.49

10177

EX 2" PVC OUTFALL
IE: 434.39

10049

40037

10034

EX 12" CONC CULVERT
IE: 433.63

EX 2" PVC OUTFALL
IE: 436.10

EX 12" CONC CULVERT
IE: 433.45

EX 2" PVC OUTFALL
IE: 435.65

BARRICADE
3' WIRE FENCE

EX 16" CONC CULVERT
IE: 433.62

EX STM DI
TOP GRATE: 435.12
BOT. GRATE: 433.68
IE OUT: 433.18 (12"S)

4' WIRE FENCE

AKS DRAWING FILE: 5837 UTILITIES.DWG | LAYOUT: P1-05

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FORESTRY - PLANNING - LANDSCAPE ARCHITECTURE

LINDSAY ANNE ESTATES TOO

OREGON CITY, OREGON
CLACKAMAS COUNTY TAX MAP 3-2E-18
TAX LOT 1400

PRELIMINARY COMPOSITE UTILITY PLAN

DESIGNED BY: VHN
DRAWN BY: NMC
CHECKED BY: MBH
SCALE: AS NOTED
DATE: 08/07/2017

PRELIMINARY NOT FOR CONSTRUCTION
REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 9, 2002
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/19

REVISIONS

JOB NUMBER
5837

SHEET
P1-05

SCALE: 1" = 40 FEET

40 0 16 24 32 40

TAX LOT 101
TAX MAP 3S 2E 7C

125' PGE TRANSMISSION LINE EASEMENT BOOK 278 PAGE 308

TAX LOT 199
TAX MAP 3S 2E 7C

TAX LOT 600
TAX MAP 3S 2E 7DC

TAX LOT 700
TAX MAP 3S 2E 7DC

TAX LOT 800
TAX MAP 3S 2E 7DC

TAX LOT 900
TAX MAP 3S 2E 7DC

TAX LOT 1402
TAX MAP 3S 2E 18

TAX LOT 1401
TAX MAP 3S 2E 18

TAX LOT 1500
TAX MAP 3S 2E 18AB

TAX LOT 1300
TAX MAP 3S 2E 18AB

TAX LOT 1200
TAX MAP 3S 2E 18AB

TAX LOT 1100
TAX MAP 3S 2E 18AB

TAX LOT 1000
TAX MAP 3S 2E 18AB

TAX LOT 800
TAX MAP 3S 2E 18AB

TAX LOT 700
TAX MAP 3S 2E 18AB

TAX LOT 500
TAX MAP 3S 2E 18AB

TAX LOT 400
TAX MAP 3S 2E 18AB

TAX LOT 300
TAX MAP 3S 2E 18AB

TAX LOT 100
TAX MAP 3S 2E 18AB

BEGIN FULL STREET IMPROVEMENTS
STA 37+22.31 CEDARWOOD WAY

BEGIN FULL STREET IMPROVEMENTS
STA 27+18.00 CHERRYWOOD WAY

BEGIN FULL STREET IMPROVEMENTS
STA 8+94.44 MILLER ROAD

BEGIN HALF STREET IMPROVEMENTS
STA 49+63.01 LELAND ROAD

END FULL STREET IMPROVEMENTS
STA 40+49.43 CEDARWOOD WAY

END FULL STREET IMPROVEMENTS
STA 30+50.23 CHERRYWOOD WAY

END HALF STREET IMPROVEMENTS
STA 51+78.01 LELAND ROAD

℄–℄ INTERSECTION
STA 38+50.00 CEDARWOOD WAY
= STA 10+00.00 MILLER ROAD

℄–℄ INTERSECTION
STA 28+50.00 CHERRYWOOD WAY
= STA 13+86.00 MILLER ROAD

℄–℄ INTERSECTION
END FULL STREET IMPROVEMENTS
STA 51+00.00 LELAND ROAD
= STA 18+10.44 MILLER ROAD

MILLER ROAD

S LELAND ROAD

LINDSAY ANNE LANE

CEDARWOOD WAY

CHERRYWOOD WAY

TRACT A
STORMWATER FACILITY
10' POND INTERIOR MAINTENANCE ACCESS

10' ELECTRIC LINE EASEMENT PER DOC. NO. 2014-049319

ELECTRICAL LINE EASEMENT PER DOC. NO. 2014-049319

ASPHALT DRIVEWAY

DRIVEWAY

GRAVEL DRIVE

EXISTING CONSTRUCTION ℄

4' WIRE FENCE

DEER CROSSING SIGN

BARRICADE
3' WIRE FENCE

5' VINYL FENCE

EX STONE RETAINING WALL

COMM MH

ADA RAMP

STREET SIGN

STOP SIGN

10' PUE

8" DIP

6" DIP

12" DIP

10750 10745 10744 10739 10634 10633 10128 10186 10185 10177 10049 10037 10034

SIDEWALK/STREET LEGEND

- SIDEWALK TO BE CONSTRUCTED BY HOMEBUILDER
- SIDEWALK AND ASSOCIATED PLANTER TO BE CONSTRUCTED BY CONTRACTOR
- RAMPS AND ASSOCIATED SIDEWALK AND PLANTER TO BE CONSTRUCTED BY CONTRACTOR
- NEW AC PAVEMENT, PER TYPICAL SECTION

NOTES:
1. DRIVEWAYS SHOWN ARE CONCEPTUAL.

AKS ENGINEERING & FORESTRY, LLC
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FORESTRY - PLANNING - LANDSCAPE ARCHITECTURE

LINDSAY ANNE ESTATES TOO

OREGON CITY OREGON
CLACKAMAS COUNTY TAX MAP 3-2E-18
TAX LOT 1400

PRELIMINARY STREET PLAN

DESIGNED BY:	VHN
DRAWN BY:	NMC
CHECKED BY:	MBH
SCALE:	AS NOTED

DATE: 08/07/2017

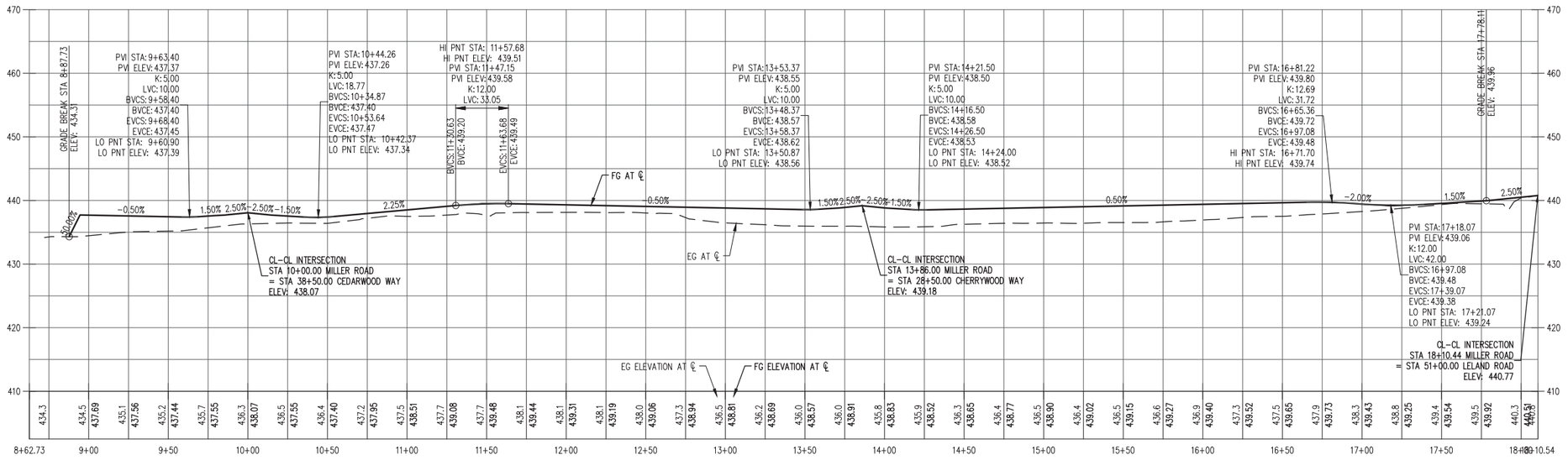
REGISTERED PROFESSIONAL ENGINEER
OREGON
JANUARY 9, 2001
MONTGOMERY B. HURLEY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWAL DATE: 6/30/19

REVISIONS

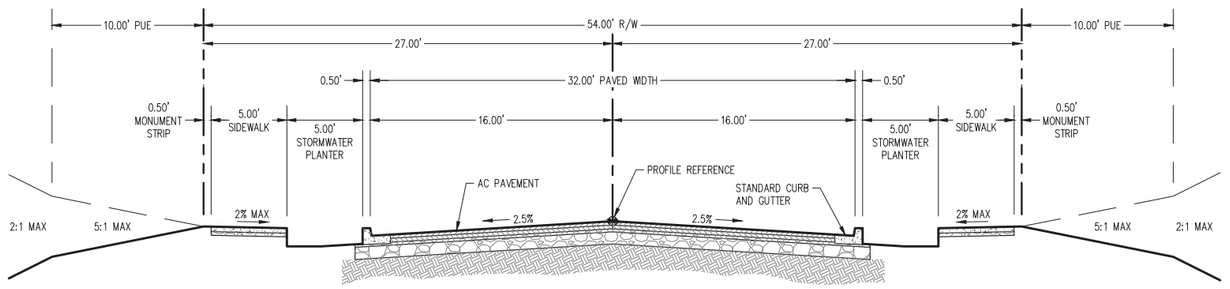
JOB NUMBER
5837

SHEET
P1-06

AKS DRAWING FILE: 5837 STREETS.DWG | LAYOUT: P1-06



MILLER ROAD
Hor. Scale: 1"= 40'
Vert. Scale: 1"= 10'



MILLER ROAD (8+94.44 TO 18+10.44)
CEDARWOOD WAY (37+22.31 TO 40+49.43)
CHERRYWOOD WAY (27+18.00 TO 30+50.23)
ROAD CROSS-SECTION
NOT TO SCALE

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LINDSAY ANNE ESTATES TOO

OREGON
CLACKAMAS COUNTY TAX MAP 3-2E-18
OREGON CITY
TAX LOT 1400

PRELIMINARY STREET PROFILE AND CROSS-SECTION

DESIGNED BY:	VHN
DRAWN BY:	NMC
CHECKED BY:	MBH
SCALE:	AS NOTED

DATE: 08/07/2017

REGISTERED PROFESSIONAL ENGINEER
OREGON
JANUARY 9, 2001
MONTGOMERY B. HURLEY
PRELIMINARY - NOT FOR CONSTRUCTION

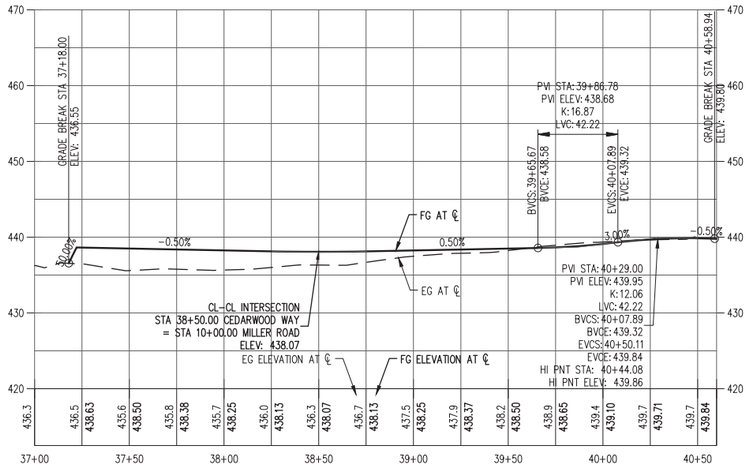
RENEWAL DATE: 6/30/19

REVISIONS

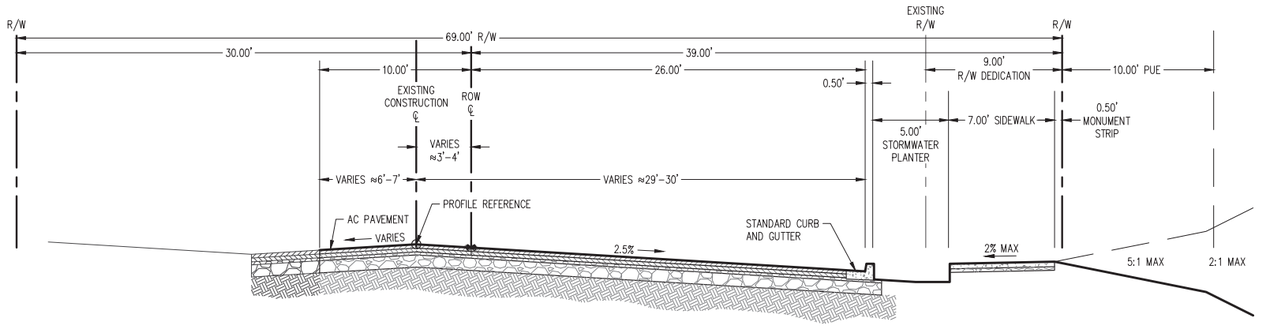
JOB NUMBER
5837

SHEET
P1-07

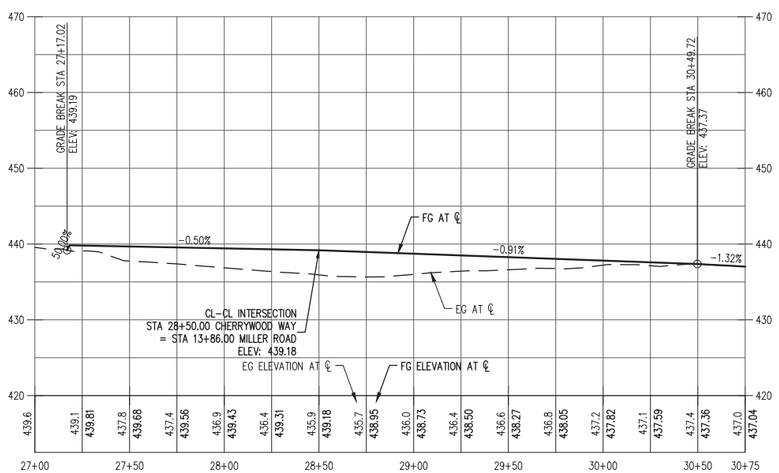
AKS DRAWING FILE: 5837 STREETS.DWG | LAYOUT: P1-07



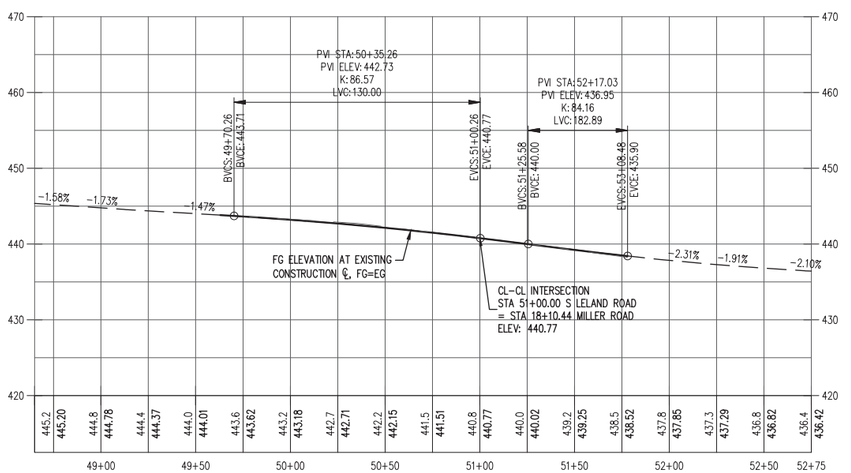
CEDARWOOD WAY
Hor. Scale: 1"= 40'
Vert. Scale: 1"= 10'



S LELAND ROAD (49+63.01 TO 51+78.01)
HALF ROAD CROSS-SECTION
NOT TO SCALE



CHERRYWOOD WAY
Hor. Scale: 1"= 40'
Vert. Scale: 1"= 10'



S LELAND ROAD
Hor. Scale: 1"= 40'
Vert. Scale: 1"= 10'

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LINDSAY ANNE ESTATES TOO

OREGON
CLACKAMAS COUNTY TAX MAP 3-2E-18
OREGON CITY
TAX LOT 1400

PRELIMINARY STREET PROFILES

DESIGNED BY:	VHN
DRAWN BY:	NMC
CHECKED BY:	MBH
SCALE:	AS NOTED

DATE: 08/07/2017

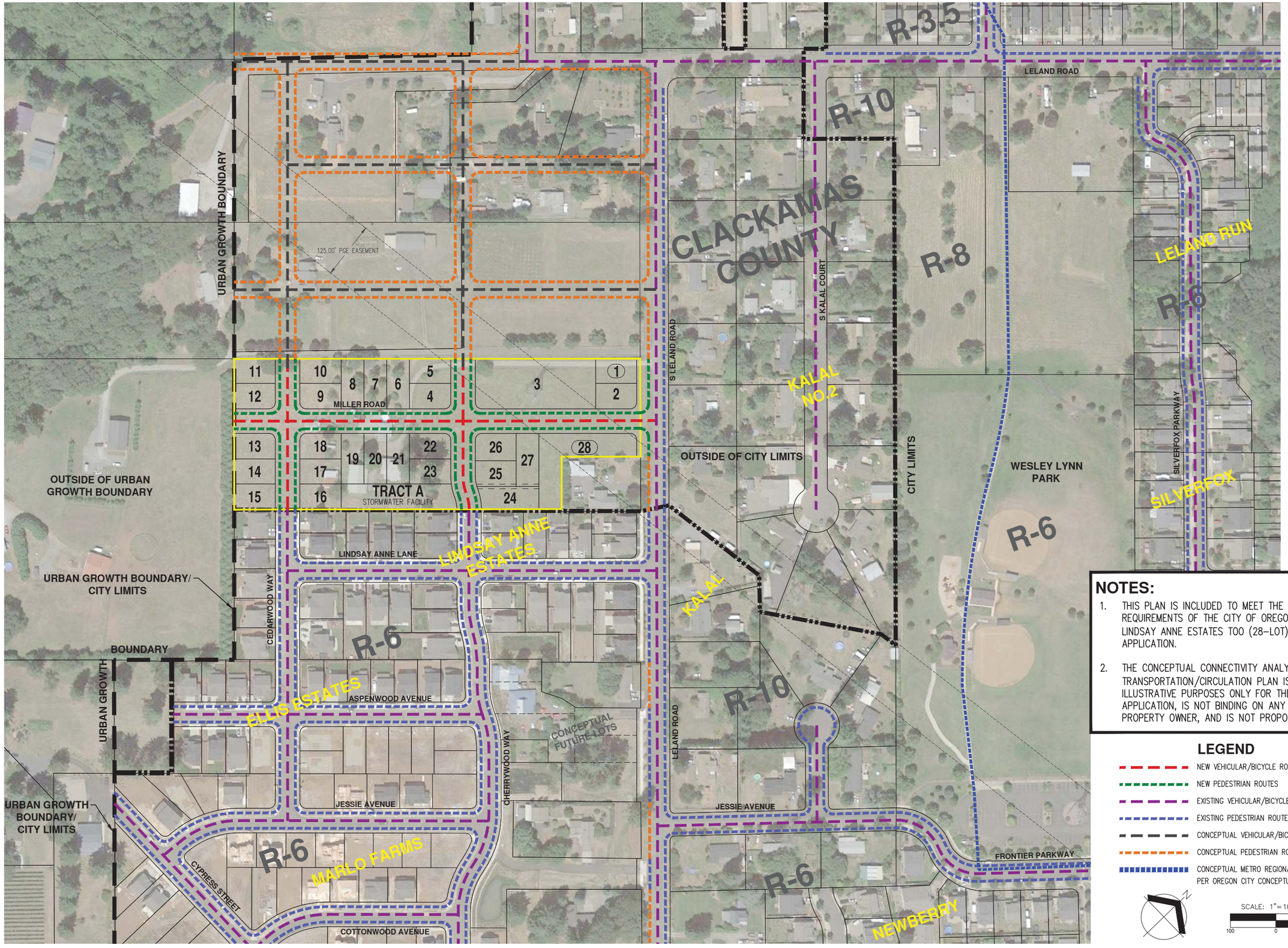
REGISTERED PROFESSIONAL ENGINEER
OREGON
JANUARY 9, 2007
MONTGOMERY B. HURLEY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWAL DATE: 6/30/19

REVISIONS

JOB NUMBER
5837

SHEET
P1-08

AKS DRAWING FILE: 5837 STREETS.DWG | LAYOUT: P1-08



NOTES:

1. THIS PLAN IS INCLUDED TO MEET THE SUBMITTAL REQUIREMENTS OF THE CITY OF OREGON CITY FOR LINDSAY ANNE ESTATES TOO (28-LOT) SUBDIVISION APPLICATION.
2. THE CONCEPTUAL CONNECTIVITY ANALYSIS AND TRANSPORTATION/CIRCULATION PLAN IS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY FOR THE LAND USE APPLICATION, IS NOT BINDING ON ANY ADJACENT PROPERTY OWNER, AND IS NOT PROPOSED.

LEGEND

- NEW VEHICULAR/BICYCLE ROUTES
- NEW PEDESTRIAN ROUTES
- EXISTING VEHICULAR/BICYCLE ROUTES
- EXISTING PEDESTRIAN ROUTES
- CONCEPTUAL VEHICULAR/BICYCLE ROUTES
- CONCEPTUAL PEDESTRIAN ROUTES
- CONCEPTUAL METRO REGIONAL TRAIL PER OREGON CITY CONCEPTUAL TRAILS MAP

SCALE: 1"=100 FEET

100 0 40 60 80 100

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LINDSAY ANNE ESTATES TOO

OREGON CITY, OREGON
TAX LOT 1400
CLACKAMAS COUNTY TAX MAP 3-2E-18

PRELIMINARY CONCEPTUAL CONNECTIVITY ANALYSIS, TRAFFIC/TRANSPORTATION, CIRCULATION, AND CONCEPTUAL REDEVELOPMENT PLAN

DESIGNED BY:	VHN
DRAWN BY:	NMC
CHECKED BY:	MBH
SCALE:	AS NOTED

DATE: 08/07/2017

REGISTERED PROFESSIONAL ENGINEER
OREGON
JANUARY 9, 2001
MONTGOMERY B. HURLEY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWAL DATE: 6/30/19

REVISIONS

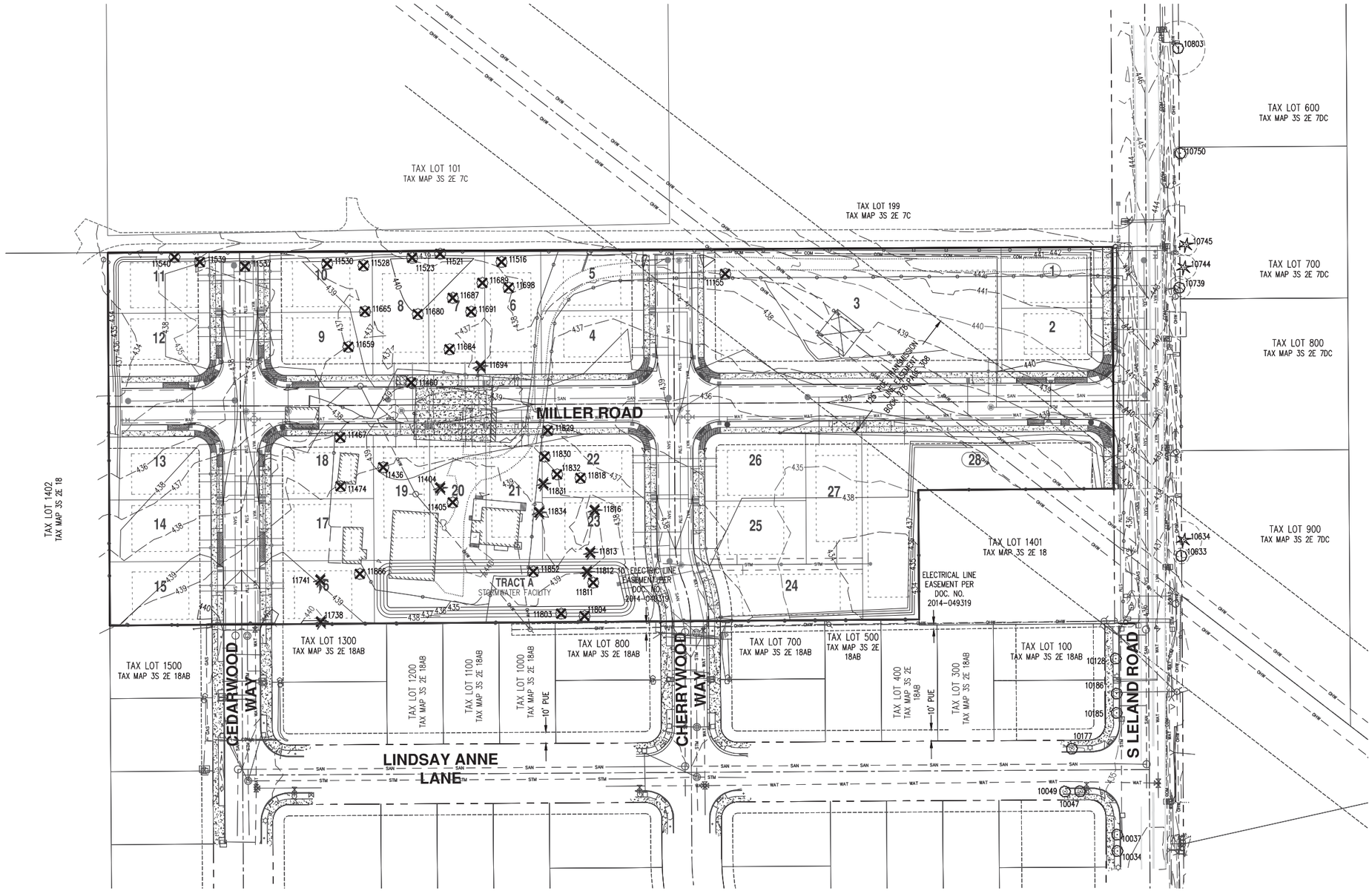
JOB NUMBER 5837

SHEET P1-09

AKS DRAWING FILE: 5837 CIRC.DWG | LAYOUT: P1-09

SCALE: 1"= 50 FEET

50 0 20 30 40 50



LEGEND

- FINISH GRADE CONTOUR (1 FT)
- FINISH GRADE CONTOUR (5 FT) — 450
- EXISTING GROUND CONTOUR (1 FT)
- EXISTING GROUND CONTOUR (5 FT) — 450
- EXISTING TREE TO BE REMOVED
- EXISTING TREE TO REMAIN
- TREE PROTECTION FENCE (4' HIGH ORANGE PLASTIC MESH BARRIER FENCING)
- OPTIMAL TREE ROOT PROTECTION ZONE (1-FOOT RADIUS PER 1-INCH DBH)

SEE SHEET P1-11 FOR TREE RESERVATION, REMOVAL, AND MITIGATION TABLE

PRELIMINARY

CERTIFIED ARBORIST

BRUCE R. BALDWIN
CERTIFICATE NUMBER: PN-6566A
EXPIRATION DATE: 12/31/17

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LINDSAY ANNE ESTATES TOO

OREGON CITY, OREGON
TAX LOT 1400
CLACKAMAS COUNTY TAX MAP 3-2E-18

PRELIMINARY TREE PRESERVATION & REMOVAL PLAN

DESIGNED BY: VHN
DRAWN BY: NMC
CHECKED BY: MBH
SCALE: AS NOTED
DATE: 08/07/2017

REGISTERED PROFESSIONAL ENGINEER
OREGON
JANUARY 9, 2001
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/19

PRELIMINARY - NOT FOR CONSTRUCTION

REVISIONS

JOB NUMBER
5837

SHEET
P1-10

AKS DRAWING FILE: 5837 TREE.DWG | LAYOUT: P1-10

Detailed Tree Inventory for 19701 S Leland Road

AKS Job No. 5621 - Tree Evaluation: 4/13/2017

Tree #	DBH (in.)	Equivalent DBH (in.)[1]	Tree Species Common Name (*Scientific name*)	Comments	Health Rating*	Structure Rating**	Remove/ Preserve	Within Construction Area[2]	Mitigation Required	Mitigation Trees Required[3]
10034	3	3	Chancellor Linden (*Tilia cordata*)	**OFFSITE**	1	1	Preserve	Yes	No	0
10037	3	3	Chancellor Linden (*Tilia cordata*)	**OFFSITE**	1	1	Preserve	Yes	No	0
10047	2	2	Chanticleer Pear (*Pyrus calleryana*)	**OFFSITE**	1	1	Preserve	Yes	No	0
10049	2	2	Chanticleer Pear (*Pyrus calleryana*)	**OFFSITE**	1	1	Preserve	Yes	No	0
10128	3	3	Chancellor Linden (*Tilia cordata*)	**OFFSITE**	1	1	Preserve	Yes	No	0
10177	2	2	Chanticleer Pear (*Pyrus calleryana*)	**OFFSITE**	1	1	Preserve	Yes	No	0
10185	3	3	Chancellor Linden (*Tilia cordata*)	**OFFSITE**	1	1	Preserve	Yes	No	0
10186	3	3	Chancellor Linden (*Tilia cordata*)	**OFFSITE**	1	1	Preserve	Yes	No	0
10633	7	7	Cherry (*Prunus sp.*)	**OFFSITE;** Topped for overhead wires	2	2	Preserve	Yes	No	0
10634	16	16	Pine (*Pinus sp.*)	**OFFSITE;** Topped for overhead wires	2	2	Preserve	No	No	0
10739	10	10	Cherry (*Prunus sp.*)	**OFFSITE;** Topped for overhead wires	2	3	Preserve	Yes	No	0
10744	11	11	Blue Spruce (*Picea pungens*)	**OFFSITE**	1	1	Preserve	No	No	0
10745	6,6,6,8,10	16	Cedar (*Cedrus sp.*)	**OFFSITE**	1	1	Preserve	No	No	0
10750	6	6	Cherry (*Prunus sp.*)	**OFFSITE;** Pruned for overhead wires	2	2	Preserve	No	No	0
10803	24	24	Maple (*Acer sp.*)	**OFFSITE;** Topped for overhead wires	2	3	Preserve	Yes	No	0
11155	18	18	Pear (*Pyrus sp.*)	Bulge on bole; Broken branches; Decay; Bore holes	2	3	Remove	No	No	0
11404	61	61	Giant Sequoia (*Sequoiadendron giganteum*)		1	1	Remove	Yes	Yes	5
11405	14	14	Black Locust (*Robinia pseudoacacia*)	Scars; Decay; Invasive species	1	2	Remove	Yes	No	0
11436	14	14	Pear (*Pyrus sp.*)	Bulges; Cracks; Cavity; Decay	2	3	Remove	Yes	No	0
11460	12, 14	18	Walnut (*Juglans sp.*)	Dead	3	3	Remove	Yes	No	0
11467	15	15	Maple (*Acer sp.*)	Some dead branches	2	1	Remove	Yes	Yes	2
11474	16	16	Apple (*Malus sp.*)	Many bore holes; cavity; Decay; Broken branches	2	3	Remove	Yes	No	0
11516	6	6	Cherry (*Prunus sp.*)	Sparse foliage; Cavity; Decay; Cracks; Crooked	3	3	Remove	No	No	0
11521	25	25	Oregon Oak	Codominant 7' from ground with included bark; Sparse foliage	2	2	Remove	No	Yes	12
11523	18	18	Oregon Oak (*Quercus garryana*)	Sparse foliage	2	1	Remove	No	Yes	6
11528	12, 13, 13	22	Cherry (*Prunus sp.*)	Scars; Decay; Bore holes; Decay; Broken branches	2	3	Remove	No	No	0
11530	6, 6	8	Cherry (*Prunus sp.*)	Cavity; Decay; Bore holes; Sparse foliage	3	3	Remove	Yes	No	0
11537	16	16	Oregon Oak (*Quercus garryana*)	Very sparse foliage; Dead and broken branches; Declining	3	2	Remove	Yes	No	0
11539	20, 25	32	Oregon Oak (*Quercus garryana*)	Codominant; Some dead and broken branches	2	2	Remove	Yes	Yes	5
11540	13	13	Cherry (*Prunus sp.*)	Broken branches; Cracks; Bulges on bole; Decay	2	3	Remove	No	No	0
11659	12	12	Walnut (*Juglans sp.*)	Large 10' long & 6" wide scar with decay; Cracks; Sparse foliage	3	3	Remove	Yes	No	0
11665	6, 8	10	Cherry (*Prunus sp.*)	Codominant; Cavity; Decay; Cracks	2	3	Remove	No	No	0
11680	22	22	Cherry (*Prunus sp.*)	Many bore holes; Dead and broken branches; Cavities; Declining	2	3	Remove	Yes	No	0
11684	22	22	Walnut (*Juglans sp.*)	Large scars; Decay; Cracks; Dead and broken branches	3	3	Remove	Yes	No	0
11687	17	17	Mesquite (*Prosopis sp.*)	Sparse foliage; Dead and broken branches; Declining	3	3	Remove	Yes	No	0
11689	8	8	Cherry (*Prunus sp.*)	Crooked; Dead branches; Sweep; Cracks	2	3	Remove	No	No	0
11691	6, 7	9	Cherry (*Prunus sp.*)	Crooked; Dead branches; Sweep; Cracks	2	3	Remove	Yes	No	0
11694	22	22	Cedar (*Cedrus sp.*)		1	1	Remove	Yes	Yes	3
11698	15	15	Yellow Poplar (*Liriodendron tulipifera*)	Crooked; Bulges on bole	1	2	Remove	Yes	Yes	2
11738	13	13	Cedar (*Cedrus sp.*)		1	1	Remove	No	Yes	6
11741	18	18	Cedar (*Cedrus sp.*)	Sparse foliage; Dead branches; Declining	3	2	Remove	Yes	No	0
11803	12	12	Cherry (*Prunus sp.*)	Very crooked; Decay; Cracks; Sparse foliage	3	3	Remove	Yes	No	0
11804	9, 19	21	English Holly (*Ilex aquifolium*)	Bore holes; Crooked; Invasive species	2	2	Remove	Yes	No	0
11811	13	13	Cherry (*Prunus sp.*)	Crooked; Bulges on bole	2	2	Remove	Yes	Yes	2
11812	13	13	Spruce (*Picea sp.*)	Sparse foliage; Codominant top	2	2	Remove	Yes	Yes	2
11813	31	31	Douglas-fir (Pseudotsuga menziesii)	Large bore holes; Broken codominant stem; Cracks; Decay	3	3	Remove	No	No	0
11816	40	40	Douglas-fir (Pseudotsuga menziesii)		1	1	Remove	Yes	Yes	5
11818	11, 16	19	Cherry (*Prunus sp.*)	Twisted; Decay; Cracks	2	3	Remove	Yes	No	0
11829	7, 7, 11	15	Cherry (*Prunus sp.*)	Very sparse foliage; Broken branches; Decay; Broken top	3	3	Remove	Yes	No	0
11830	8, 10	13	Cherry (*Prunus sp.*)	Very sparse foliage; Broken branches; Decay	3	3	Remove	No	No	0
11831	24	24	Pine (*Pinus sp.*)	Some dead foliage	2	1	Remove	No	Yes	9
11832	6	6	Cherry (*Prunus sp.*)	Significant lean (W); Scars; Decay; Cracks	2	3	Remove	No	No	0
11834	41	41	Pine (*Pinus sp.*)		1	1	Remove	No	Yes	15
11852	6, 6, 6, 7, 7	14	English Holly (*Ilex aquifolium*)	Bore holes; Invasive species	2	2	Remove	Yes	No	0
11886	9, 9, 11, 22	28	Cherry (*Prunus sp.*)	Sparse foliage; Broken branches; Bulges; Cracks	3	3	Remove	No	No	0

Total # of Existing Trees Inventoried = 55
Total # of Trees to be Removed Requiring Mitigation = 13
Total # of Mitigation Trees Required = 74

Total # of Onsite Trees = 40
Total # of Onsite Trees to be Preserved = 0
Total # of Onsite Trees to be Removed = 40

Total # of Offsite Trees = 15
Total # of Offsite Trees to be Preserved = 15
Total # of Offsite Trees to be Removed = 0

[1]Equivalent DBH (in.):
Equivalent DBH (in.) Based on Basal Area.

[2]Within Construction Area:
Construction area is defined as right-of-way, public utility easements, and within the building footprint of a building site for any mixed-use, commercial or industrial development, or if a residential development, within the allowable building footprint permitted by the setback requirements of the zone district. (Per OCMC 17.04.230)

[3]Mitigation Trees Required:
Per Tree Replacement Requirements Table 17.41.060-1 OCMC

***Health Rating:**
1 = Good Health - A tree that exhibits typical foliage, bark, and root characteristics, for its respective species, shows no signs of infection or infestation, and has a high level of vigor and vitality.
2 = Fair Health - A tree that exhibits some abnormal health characteristics and/or shows some signs of infection or infestation, but may be reversed or abated with supplemental treatment.
3 = Poor Health - A tree that is in significant decline, to the extent that supplemental treatment would not likely result in reversing or abating its decline.

****Structure Rating:**
1 = Good Structure - A tree that exhibits typical physical form characteristics, for its respective species, shows no signs of structural defects of the canopy, trunk, and/or root system.
2 = Fair Structure - A tree that exhibits some abnormal physical form characteristics and/or some signs of structural defects, which reduce the structural integrity of the tree, but are not indicative of imminent physical failure, and may be corrected using arboricultural abatement methods.
3 = Poor Structure - A tree that exhibits extensively abnormal physical form characteristics and/or significant structural defects that substantially reduces the structural viability of the tree, cannot feasibly be abated, and are indicative of imminent physical failure.

Arborist Disclosure Statement:
Arborists are tree specialists who use their education, knowledge, training, and experience to examine trees, recommend measures to enhance the health of trees, and attempt to reduce the risk of living near trees. The Client and Jurisdiction may choose to accept or disregard the recommendations of the arborist, or seek additional advice. Arborists cannot detect every condition that could possibly lead to the structural failure of a tree. Trees are living organisms that fail in ways we do not fully understand. Conditions are often hidden within trees and below ground. Arborists cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Likewise, remedial treatments, like medicine, cannot be guaranteed. Trees can be managed, but they cannot be controlled. To live near trees is to accept some degree of risk. The only way to eliminate all risk associated with trees is to eliminate all trees. Neither this author nor AKS Engineering & Forestry, LLC have assumed any responsibility for liability associated with the trees on or adjacent to this site.

At the completion of construction, all trees should once again be reviewed. Land clearing and removal of adjacent trees can expose previously unseen defects and otherwise healthy trees can be damaged during construction.

PRELIMINARY
ISA CERTIFIED ARBORIST
BRUCE R. BALDWIN
CERTIFICATE NUMBER: PN-6666A
EXPIRATION DATE: 12/31/17

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LINDSAY ANNE ESTATES TOO

OREGON CITY
TAX LOT 1400

OREGON
CLACKAMAS COUNTY TAX MAP 3-2E-18

PRELIMINARY TREE PRESERVATION AND REMOVAL TABLE

DESIGNED BY: VHN
DRAWN BY: NMC
CHECKED BY: MBH
SCALE: AS NOTED
DATE: 08/07/2017

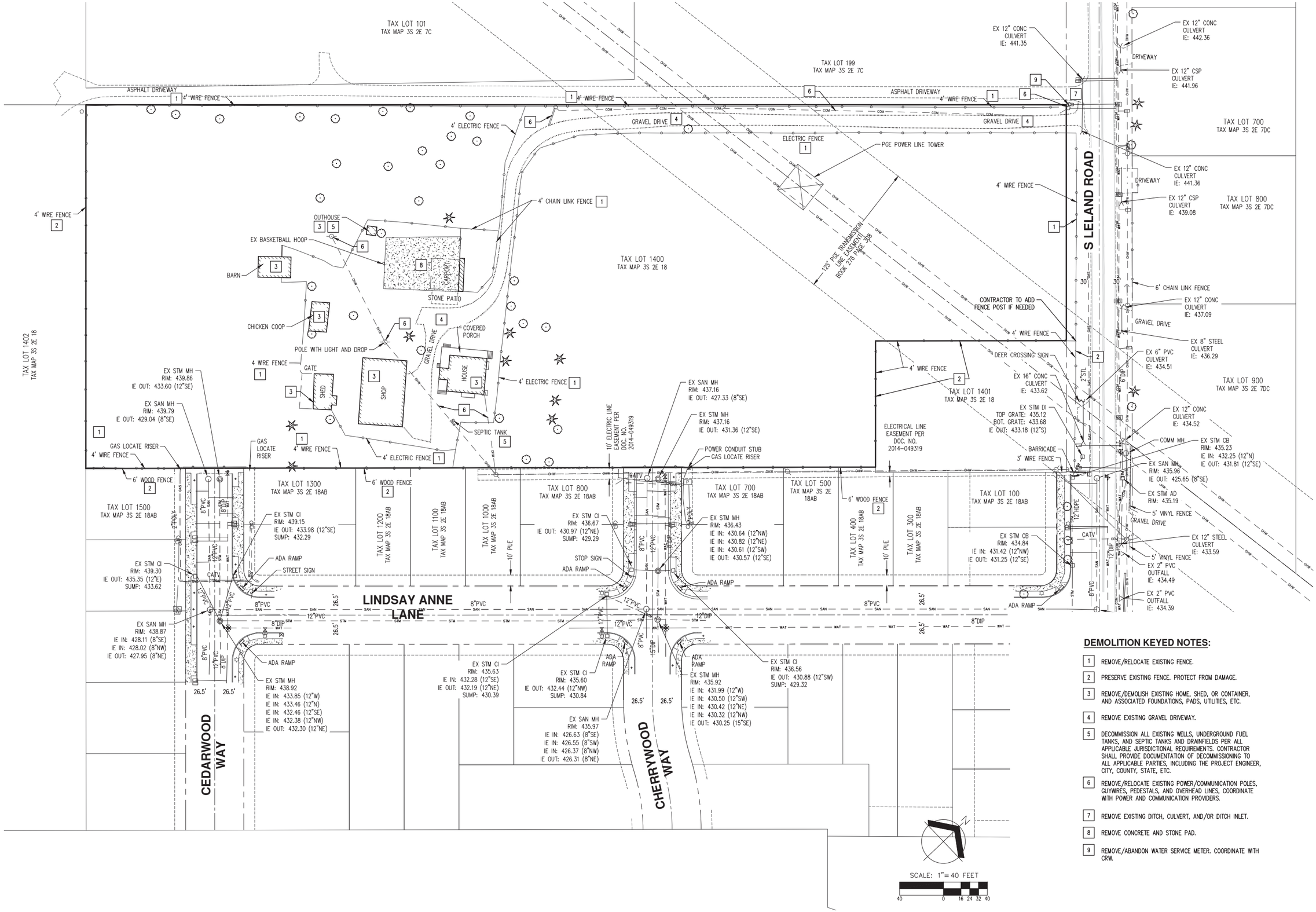
REGISTERED PROFESSIONAL LANDSCAPE ARCHITECT
OREGON
JANUARY 9, 2015
MONTGOMERY B. HURLEY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWAL DATE: 6/30/19

REVISIONS

JOB NUMBER 5837

SHEET P1-11

AKS DRAWING FILE: 5837 TREE.DWG | LAYOUT: P1-11



DEMOLITION KEYED NOTES:

1. REMOVE/RELOCATE EXISTING FENCE.
2. PRESERVE EXISTING FENCE. PROTECT FROM DAMAGE.
3. REMOVE/DEMOLISH EXISTING HOME, SHED, OR CONTAINER, AND ASSOCIATED FOUNDATIONS, PADS, UTILITIES, ETC.
4. REMOVE EXISTING GRAVEL DRIVEWAY.
5. DECOMMISSION ALL EXISTING WELLS, UNDERGROUND FUEL TANKS, AND SEPTIC TANKS AND DRAINFIELDS PER ALL APPLICABLE JURISDICTIONAL REQUIREMENTS. CONTRACTOR SHALL PROVIDE DOCUMENTATION OF DECOMMISSIONING TO ALL APPLICABLE PARTIES, INCLUDING THE PROJECT ENGINEER, CITY, COUNTY, STATE, ETC.
6. REMOVE/RELOCATE EXISTING POWER/COMMUNICATION POLES, GUYWIRES, PEDESTALS, AND OVERHEAD LINES, COORDINATE WITH POWER AND COMMUNICATION PROVIDERS.
7. REMOVE EXISTING DITCH, CULVERT, AND/OR DITCH INLET.
8. REMOVE CONCRETE AND STONE PAD.
9. REMOVE/ABANDON WATER SERVICE METER. COORDINATE WITH CRW.

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LINDSAY ANNE ESTATES TOO

OREGON
CLACKAMAS COUNTY TAX MAP 3-2E-18

OREGON CITY
TAX LOT 1400

PRELIMINARY DEMOLITION PLAN

DESIGNED BY:	VHN
DRAWN BY:	NMC
CHECKED BY:	MBH
SCALE:	AS NOTED

DATE: 08/07/2017

REGISTERED PROFESSIONAL ENGINEER
OREGON
JANUARY 13, 2006
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/19

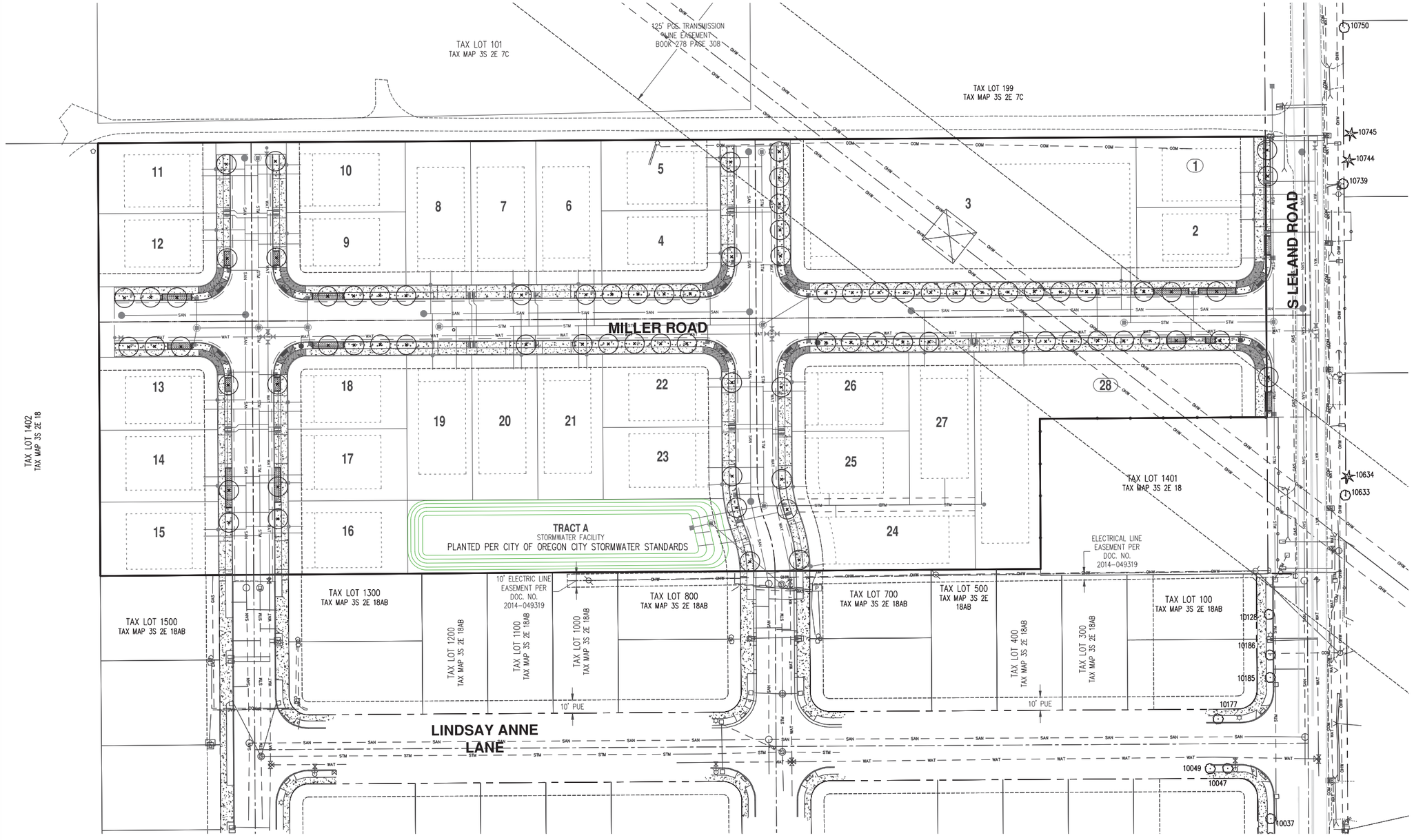
PRELIMINARY NOT FOR CONSTRUCTION
MAY 9, 2017

REVISIONS

JOB NUMBER
5837

SHEET
P1-12

AKS DRAWING FILE: 5837 DEMO.DWG | LAYOUT: P1-12



SCALE: 1" = 40 FEET

40 0 16 24 32 40

TREE MITIGATION AND STREET TREE NOTES:

1. MITIGATION PLANTING WILL BE PROVIDED ON OR OFF SITE (OPTION 1) AND/OR CASH-IN-LIEU OF PLANTING (OPTION 4) PER OCMC 17.41.060.
2. ON AND OFF SITE PLANTINGS WILL BE EITHER 2" CALIPER DECIDUOUS TREES OR 6' TALL CONIFER TREES PER OCMC TABLE 17.41.060-1.
3. SPECIES WILL BE SPECIFIED BY PROJECT LANDSCAPE ARCHITECT OR ARBORIST DURING FINAL DESIGN AND WILL BE FROM THE CITY'S APPROVED TREE LIST.
4. STREET TREES WITHIN THE STORMWATER PLANTERS WILL BE SELECTED FROM TABLE A-1 IN THE OREGON CITY STORMWATER AND GRADING DESIGN STANDARDS MANUAL.
5. ALL PLANTER STRIPS ALONG THE STREET NOT PLANTED AS A STORMWATER PLANTER SHALL HAVE STREET TREES AND DROUGHT TOLERANT VEGETATIVE GROUNDCOVER, SUCH AS KINNIKINNICK, INSTALLED BY THE ADJACENT HOMEOWNER/HOME BUILDER AT THE TIME OF HOME CONSTRUCTION. CONTRACTOR SHALL INSTALL STREET TREES AND PLANTINGS IN STREET FRONTAGE ADJACENT TO TRACT A STORMWATER FACILITY.

TOTAL STREET TREES: 81

REQUIRED STREET TREES (1 FOR EVERY 35' PROP. FRONTAGE) = 81

NO FEE IN-LIEU OF STREET TREES IS NECESSARY IN ORDER TO MEET THE MINIMUM STREET TREE REQUIREMENT.

LEGEND:

81 - STREET TREE, 2" CAL. (MIN.)

EXISTING TREE TO REMAIN

SEE SHEET P1-11 FOR TREE PRESERVATION, REMOVAL, AND MITIGATION TABLE

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LINDSAY ANNE ESTATES TOO

OREGON CITY, OREGON
CLACKAMAS COUNTY TAX MAP 3-2E-18
TAX LOT 1400

PRELIMINARY STREET TREE PLAN

DESIGNED BY:	NKP
DRAWN BY:	NKP
CHECKED BY:	KAH
SCALE:	AS NOTED

DATE: 08/07/2017

REGISTERED PROFESSIONAL LANDSCAPE ARCHITECT
NOT FOR CONSTRUCTION
OREGON
06/06/13

REVISIONS

JOB NUMBER 5837

SHEET P1-13

AKS DRAWING FILE: 5837 STREET TREE.DWG | LAYOUT: P1-13

Exhibit B: Clackamas County Assessor's Map

3 2 E 18

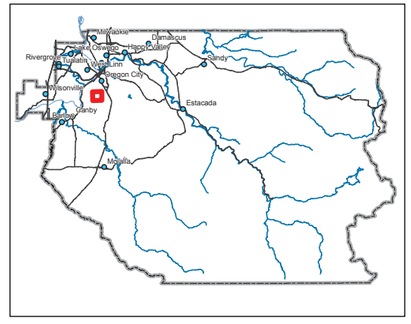
SECTION 18 T.3S. R.2E. W.M.
CLACKAMAS COUNTY
1" = 400'

D. L. C.'S
JOHN S. HOWLAND NO. 45
BENJAMIN MAILS NO. 50

Cancelled Taxlots

2700
2790
1201
1204
1205
1202
202
203
501
800
992
1090
1291
1292
1490
1690
2290
1282
1300
1206

- Parcel Boundary
- Private Road ROW
- Historical Boundary
- Railroad Centerline
- TaxCodeLines
- Map Index
- WaterLines
- Land Use Zoning
- Plats
- Water
- Corner
- Section Corner
- 1/16th Line
- Govt Lot Line
- DLC Line
- Meander Line
- PLSS Section Line
- Historic Corridor 40'
- Historic Corridor 20'



THIS MAP IS FOR ASSESSMENT PURPOSES ONLY

8/4/2016

3 2 E 18

Exhibit C: City Land Use Application Form and Checklist

OREGON CITY

Community Development – Planning

221 Molalla Ave. Suite 200 | Oregon City OR 97045
Ph (503) 722-3789 | Fax (503) 722-3880

LAND USE APPLICATION FORM

Type I (OCMC 17.50.030.A)	Type II (OCMC 17.50.030.B)	Type III / IV (OCMC 17.50.030.C)
❑ Compatibility Review	❑ Extension	❑ Annexation
❑ Lot Line Adjustment	❑ Detailed Development Review	❑ Code Interpretation / Similar Use
❑ Non-Conforming Use Review	❑ Geotechnical Hazards	❑ Concept Development Plan
❑ Natural Resource (NROD) Verification	❑ Minor Partition (<4 lots)	❑ Conditional Use
❑ Site Plan and Design Review	❑ Minor Site Plan & Design Review	❑ Comprehensive Plan Amendment (Text/Map)
	❑ Non-Conforming Use Review	❑ Detailed Development Plan
	❑ Site Plan and Design Review	❑ Historic Review
	☑ Subdivision (4+ lots)	❑ Municipal Code Amendment
	❑ Minor Variance	❑ Variance
	❑ Natural Resource (NROD) Review	❑ Zone Change

File Number(s): PA 17-07 (Pre-Application Conference)

Proposed Land Use or Activity: A new subdivision for future construction of single-family detached residential homes.

Project Name: 19701 S. Leland Road Number of Lots Proposed (If Applicable): 28

Physical Address of Site: 19701 S. Leland Road

Clackamas County Map and Tax Lot Number(s): Map: 32E18 Tax Lot: 1400

Applicant(s):

Applicant(s) Signature:

Applicant(s) Name Printed: PDX Development, Inc. Date: 7/17/17

Mailing Address: P.O. Box 2559, Oregon City, OR 97045

Phone: Contact Applicant's Consultant Fax: Contact Applicant's Consultant Email: Contact Applicant's Consultant

Property Owner(s):

Property Owner(s) Signature:

Property Owner(s) Name Printed: Bruce Raymond Miller and Shelly Alane Miller (Trustee) Date:

Mailing Address: 19701 S. Leland Road, Oregon City, OR 97045

Phone: Contact Applicant's Consultant Fax: Contact Applicant's Consultant Email: Contact Applicant's Consultant

Representative(s):

Representative(s) Signature: Monty B Hurley

Representative (s) Name Printed: AKS Engineering & Forestry, LLC (Monty Hurley) Date: July 2017

Mailing Address: 12965 SW Herman Road, Suite 100

Phone: 503-563-6151 Fax: 503-563-6152 Email: monty@aks-eng.com

All signatures represented must have the full legal capacity and hereby authorize the filing of this application and certify that the information and exhibits herewith are correct and indicate the parties willingness to comply with all code requirements.

OREGON CITY

Community Development – Planning

221 Molalla Ave. Suite 200 | Oregon City OR 97045
Ph (503) 722-3789 | Fax (503) 722-3880

LAND USE APPLICATION FORM

Type I (OCMC 17.50.030.A)	Type II (OCMC 17.50.030.B)	Type III / IV (OCMC 17.50.030.C)
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❑ Natural Resource (NROD) Verification	❑ Minor Partition (<4 lots)	❑ Conditional Use
❑ Site Plan and Design Review	❑ Minor Site Plan & Design Review	❑ Comprehensive Plan Amendment (Text/Map)
	❑ Non-Conforming Use Review	❑ Detailed Development Plan
	❑ Site Plan and Design Review	❑ Historic Review
	☑ Subdivision (4+ lots)	❑ Municipal Code Amendment
	❑ Minor Variance	❑ Variance
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Applicant(s) Signature: _____

Applicant(s) Name Printed: PDX Development, Inc. Date: _____

Mailing Address: P.O. Box 2559, Oregon City, OR 97045

Phone: Contact Applicant's Consultant Fax: Contact Applicant's Consultant Email: Contact Applicant's Consultant

Property Owner(s):

Property Owner(s) Signature: Bruce Raymond Miller (TTEE) Shelly Alane Miller Trustee

Property Owner(s) Name Printed: Bruce Raymond Miller and Shelly Alane Miller (Trustee) Date: 7/25/17

Mailing Address: 19701 S. Leland Road, Oregon City, OR 97045

Phone: Contact Applicant's Consultant Fax: Contact Applicant's Consultant Email: Contact Applicant's Consultant

Representative(s):

Representative(s) Signature: Montgomery B Hurley

Representative (s) Name Printed: AKS Engineering & Forestry, LLC (Monty Hurley) Date: July 2017

Mailing Address: 12965 SW Herman Road, Suite 100

Phone: 503-563-6151 Fax: 503-563-6152 Email: monty@aks-eng.com

All signatures represented must have the full legal capacity and hereby authorize the filing of this application and certify that the information and exhibits herewith are correct and indicate the parties willingness to comply with all code requirements.

OREGON CITY

Community Development – Planning

221 Molalla Ave. Suite 200 | Oregon City OR 97045
Ph (503) 722-3789 | Fax (503) 722-3880

Subdivision Checklist

1. ☑ **Signed Land Use Application Form**

2. ☑ **A List of All Permit Approvals Sought by the Applicant**

3. ☑ **Narrative**
A complete and detailed narrative description of the proposed development describing:
   - ☑ The proposed development that describes existing site conditions, existing buildings, public facilities and services, presence of wetlands, steep slopes and other natural features
   - ☑ A detailed description of the proposed development, including a description of any phasing (including the time, acreage, number of residential units, amount of area for nonresidential use, open space, and development of utilities and public facilities for each phase), proposed uses, number and type of residential units, allocation and ownership of all lots, tracts, streets, and public improvements and the structure of any homeowner's association.
   - ☑ Timely Provision of Public Services and Facilities. The applicant shall explain in detail how and when each of the following public services or facilities is, or will be, adequate to serve the proposed development by the time construction begins:
     - ☑ Water
     - ☑ Sanitary sewer
     - ☑ Storm sewer and stormwater drainage
     - ☑ Parks and recreation
     - ☑ Traffic and transportation
     - ☑ Schools
     - ☑ Fire and police services

     Where adequate capacity for any of these public facilities and services is not demonstrated to be currently available, the applicant shall describe how adequate capacity in these services and facilities will be financed and constructed before recording of the plat
   - ☑ Overall density of the subdivision and the density by dwelling type for each

4. ☑ **Review Criteria**
A response addressing each section of Chapters 16.08, 16.12, 12.04, 12.08, 13.12, and any other applicable chapter identified in the Oregon City Municipal Code.

5. ☑ **Site Plan**
A detailed site development plan showing:
   - ☑ The location and dimensions of lots, streets, pedestrian ways, transit stops, common areas, building envelopes and setbacks
   - ☑ All existing and proposed utilities and improvements including sanitary sewer, stormwater and water facilities
   - ☑ Total impervious surface created (including streets, sidewalks, etc.)
   - ☑ An indication of existing and proposed land uses for the site

6. ☑ **A Subdivision Connectivity Analysis**
Prepared by a transportation engineer, licensed by the State of Oregon, that describes the existing and future vehicular; bicycle and pedestrian connections between the proposed subdivision and existing or

planned land uses on adjacent properties. The subdivision connectivity analysis shall include shadow plats of adjacent properties demonstrating how lot and street patterns within the proposed subdivision will extend to and/or from such adjacent properties and can be developed meeting the existing Oregon City Municipal Code design standards.

7. ✓ **Traffic/Transportation Plan**

The applicant's traffic/transportation information shall include two elements:

- ☑ A detailed site circulation plan showing proposed vehicular, bicycle, transit and pedestrian access points and connections to the existing system, circulation patterns and connectivity to existing rights-of-way or adjacent tracts, parking and loading areas and any other transportation facilities in relation to the features illustrated on the site plan.
- ☑ A traffic impact study prepared by a qualified professional transportation engineer, licensed in the state of Oregon, that assesses the traffic impacts of the proposed development on the existing transportation system and analyzes the adequacy of the proposed internal transportation network to handle the anticipated traffic and the adequacy of the existing system to accommodate the traffic from the proposed development. The city engineer may waive any of the foregoing requirements if the city engineer determines that the requirement is unnecessary in the particular case.

8. ✓ **Natural Features Plan, Topography and Preliminary Grading and Drainage Plan**

The applicant shall submit a map illustrating all of the natural features and hazards on the subject property and, where practicable, within two hundred fifty feet of the property's boundary. The map shall also illustrate the approximate grade of the site before and after development. Illustrated features must include all proposed streets and cul-de-sacs, the location and estimated volume of all cuts and fills, and all stormwater management features. This plan shall identify the location of drainage patterns and courses on the site and within two hundred fifty feet of the property boundaries where practicable. Features that must be illustrated shall include the following:

- ☑ Proposed and existing street rights-of-way and all other transportation facilities
- ☑ All proposed lots and tracts
- ☑ All trees with a diameter six inches or greater measured four feet from the ground
- N/A ☐ All water quality resource areas pursuant to Chapter 17.49, including all jurisdictional wetlands shown in a delineation according to the Corps of Engineers Wetlands Delineation Manual, January, 1987 edition, and approved by the Division of State Lands and wetlands identified in the City of Oregon Local Wetlands inventory, adopted by reference in the City of Oregon City comprehensive plan
- N/A ☐ All known geologic and flood hazards, landslides or faults, areas with a water table within one foot of the surface and all flood management areas pursuant to Chapter 17.42
- N/A ☐ The location of any known state or federal threatened or endangered species
- N/A ☐ All historic areas or cultural features acknowledged as such on any federal, state or city inventory
- N/A ☐ All wildlife habitat or other natural features listed on any of the city's official inventories

9. ✓ **Additional Information or Reports** *(If Required in Pre-Application Conference)*

The principal planner may require additional information to ensure that the proposed development does not adversely affect the surrounding community, identified natural resource areas or create hazardous conditions for persons or improvements on the site.

- ☑ Geologic Hazards. For property subject to Chapter 17.44, the applicant shall submit a report prepared by a qualified professional engineer, certified in geology or geotechnical engineering, describing how construction of the proposed subdivision is feasible and meets the applicable requirements of Chapter 17.44.
- ☐ Water Resources. For property subject to Chapter 17.49, the applicant shall submit a report prepared by a qualified professional describing the location and quality of any water quality

resource area subject to regulation under Chapter 17.49. This report shall also explain how the proposed subdivision is feasible and meets the applicable requirements of Chapter 17.49.

10. ✓ **Tree Removal and Mitigation Plan** *(In Accordance with OCMC Chapter 17.41)*

11. ✓ **Pre-Application Conference Summary Sheet**

12. ✓ **Summary of the Meeting with the Applicable Neighborhood Association**

13. ✓ **Preliminary Storm Calculations** *(If Water Quality Detention is Required)*

14. N/A **Erosion and Sediment Control Permit**
The applicant shall submit an application for an erosion and sediment control permit pursuant to Chapter 17.47 concurrently with the preliminary subdivision plat application, including the measures that will be implemented throughout construction of the subdivision to control erosion and sedimentation, unless waived by the city engineer. This plan must be consistent with all applicable erosion control requirements in Chapter 17.47.

15. ✓ **CC & R's**
Drafts of the proposed covenants, conditions and restrictions (CC&Rs), maintenance agreements, homeowner association agreements, dedications, deeds easements, or reservations of public open spaces not dedicated to the city, and related documents for the subdivision.

16. ✓ **A Current Preliminary Title Report for the Subject Property(ies)**

17. ✓ **Mailing Labels for Owners Within 300 Feet of the Subject Site or $15 for City-provided labels**
The names and addresses of property owners within 300 feet of the site indicated on the most recent property tax rolls.

18. ✓ **Copies**
Two (2) copies of all information, reports, and drawings (full-sized and 8.5" by 11") pertaining to this application.

19. ✓ **Electronic Version of All Application Materials**

20. ✓ **All Required Application Fees**

Incomplete Applications will not be processed

Exhibit D: Property Ownership Information

Fidelity National Title
Company of Oregon

PRELIMINARY REPORT

In response to the application for a policy of title insurance referenced herein Fidelity National Title Company of Oregon hereby reports that it is prepared to issue, or cause to be issued, as of the specified date, a policy or policies of title insurance describing the land and the estate or interest hereinafter set forth, insuring against loss which may be sustained by reason of any defect, lien or encumbrance not shown or referred to as an exception herein or not excluded from coverage pursuant to the printed Schedules, Conditions and Stipulations or Conditions of said policy forms.

The printed Exceptions and Exclusions from the coverage of said policy or policies are set forth in Exhibit One. The policy to be issued may contain an arbitration clause. When the Amount of Insurance is less than that set forth in the arbitration clause, all arbitrable matters shall be arbitrated at the option of either the Company or the Insured as the exclusive remedy of the parties. Copies of the policy forms should be read. They are available from the office which issued this report.

This report (and any supplements or amendments hereto) is issued solely for the purpose of facilitating the issuance of a policy of title insurance and no liability is assumed hereby.

The policy(s) of title insurance to be issued hereunder will be policy(s) of Fidelity National Title Insurance Company, a/an California corporation.

Please read the exceptions shown or referred to herein and the Exceptions and Exclusions set forth in Exhibit One of this report carefully. The Exceptions and Exclusions are meant to provide you with notice of matters which are not covered under the terms of the title insurance policy and should be carefully considered.

It is important to note that this preliminary report is not a written representation as to the condition of title and may not list all liens, defects and encumbrances affecting title to the land.

This preliminary report is for the exclusive use of the parties to the contemplated transaction, and the Company does not have any liability to any third parties nor any liability until the full premium is paid and a policy is issued. Until all necessary documents are placed of record, the Company reserves the right to amend or supplement this preliminary report.

Countersigned

Fidelity National Title
Company of Oregon

12809 SE 93rd Avenue, Clackamas, OR 97015
(503)786-0340 FAX (503)786-0424

PRELIMINARY REPORT

ESCROW OFFICER: Melissa McSperitt
melissa.mcsperitt@fnf.com
TITLE OFFICER: David Boutin

ORDER NO.: 45141703211
Supplement 2nd - removing #'s 6, 7 and 9

TO: Fidelity National Title Company of Oregon
12809 SE 93rd Avenue
Clackamas, OR 97015

ESCROW LICENSE NO.: 900400383

OWNER/SELLER: Bruce Raymond Miller Trustee and Shelly Alane Miller Trustee

BUYER/BORROWER: PDX Development, Inc., an Oregon Corporation

PROPERTY ADDRESS: 19701 S Leland Road, Oregon City, OR 97045

EFFECTIVE DATE: March 3, 2017, 08:00 AM

1. THE POLICY AND ENDORSEMENTS TO BE ISSUED AND THE RELATED CHARGES ARE:

	AMOUNT	PREMIUM
ALTA Owner's Policy 2006 **Owner's Standard (Builder's Rate)**	$ 1,000,000.00	$ 1,365.00

2. THE ESTATE OR INTEREST IN THE LAND HEREINAFTER DESCRIBED OR REFERRED TO COVERED BY THIS REPORT IS:

   A Fee

3. TITLE TO SAID ESTATE OR INTEREST AT THE DATE HEREOF IS VESTED IN:

   Bruce Raymond Miller and Shelly Alane Miller, Trustees of the Bruce and Shelly Miller Revocable Living Trust dated the 4th day of February, 1997

4. THE LAND REFERRED TO IN THIS REPORT IS SITUATED IN THE COUNTY OF CLACKAMAS, STATE OF OREGON, AND IS DESCRIBED AS FOLLOWS:

   SEE EXHIBIT "A" ATTACHED HERETO AND MADE A PART HEREOF

EXHIBIT "A"

Legal Description

Parcel 1, PARTITION PLAT NO. 1992-78, County of Clackamas and State of Oregon.

AS OF THE DATE OF THIS REPORT, ITEMS TO BE CONSIDERED AND EXCEPTIONS TO COVERAGE IN ADDITION TO THE PRINTED EXCEPTIONS AND EXCLUSIONS IN THE POLICY FORM WOULD BE AS FOLLOWS:

GENERAL EXCEPTIONS:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records; proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the public records.

2. Facts, rights, interests or claims which are not shown by the public records but which could be ascertained by an inspection of the land or by making inquiry of persons in possession thereof.

3. Easements, or claims of easement, not shown by the public records; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.

4. Any encroachment (of existing improvements located on the subject land onto adjoining land or of existing improvements located on adjoining land onto the subject land), encumbrance, violation, variation or adverse circumstance affecting the title that would be disclosed by an accurate and complete land survey of the subject land.

5. Any lien or right to a lien for services, labor, material, equipment rental or workers compensation heretofore or hereafter furnished, imposed by law and not shown by the public records.

SPECIFIC ITEMS AND EXCEPTIONS

6. [Intentionally Deleted]

7. [Intentionally Deleted]

8. Easement(s) for the purpose(s) shown below and rights incidental thereto as set forth in a document:

In favor of:	Portland General Electric Company, an Oregon Corporation
Purpose:	Electric transmission line
Recording Date:	March 21, 1963
Recording No.:	Book 619, Page 42
Affects:	Reference is hereby made to said document for full particulars

9. [Intentionally Deleted]

10. The search did not disclose any open mortgages or deeds of trust of record, therefore the Company reserves the right to require further evidence to confirm that the property is unencumbered, and further reserves the right to make additional requirements or add additional items or exceptions upon receipt of the requested evidence.

11. Any invalidity or defect in the title of the vestees in the event that the trust referred to herein is invalid or fails to grant sufficient powers to the trustee(s) or in the event there is a lack of compliance with the terms and provisions of the trust instrument.

    If title is to be insured in the trustee(s) of a trust (or if their act is to be insured), this Company will require a copy of said Trust Agreement or a Trust Certification pursuant to ORS Chapter 130.860.

    The Company reserves the right to make additional requirements or add additional items or exceptions after review of the requested documentation.

12. If requested to issue an extended coverage ALTA loan policy, the following matters must be addressed:

    a) The rights of tenants holding under unrecorded leases or tenancies
    b) Matters disclosed by a statement as to parties in possession and as to any construction, alterations or repairs to the Land within the last 75 days. The Company must be notified in the event that any funds are to be used for construction, alterations or repairs.
    c) Any facts which would be disclosed by an accurate survey of the Land

ADDITIONAL REQUIREMENTS/NOTES:

A. Property taxes for the fiscal year shown below are paid in full.

Fiscal Year:	2016-2017
Amount:	$2,413.48
Levy Code:	062-084
Account No.:	00885625
Map No.:	32E18 01400

Prior to close of escrow, please contact the Tax Collector's Office to confirm all amounts owing, including current fiscal year taxes, supplemental taxes, escaped assessments and any delinquencies.

B. In addition to the standard policy exceptions, the exceptions enumerated above shall appear on the final 2006 ALTA policy unless removed prior to issuance.

C. The Company will require the following documents for review prior to the issuance of any title insurance predicated upon a conveyance or encumbrance by the corporation named below.

Name of Corporation: PDX Development, Inc.

a) A Copy of the corporation By-laws and Articles of Incorporation

b) An original or certified copy of a resolution authorizing the transaction contemplated herein.

c) If the Articles and/or By-laws require approval by a "parent" organization, a copy of the Articles and By-laws of the parent.

The Company reserves the right to add additional items or make further requirements after review of the requested documentation.

D. Note: There are no matters against the party(ies) shown below which would appear as exceptions to coverage in a title insurance product:

Parties: PDX Development, Inc., an Oregon Corporation

E. Note: There are NO conveyances affecting said Land recorded within 24 months of the date of this report.

F. Note: No search has been made or will be made for water, sewer, or storm drainage charges unless the city/service district claims them as liens (i.e., foreclosable) and reflects them on its lien docket at the date of closing. Buyers should check with the appropriate city bureau or water/service district and obtain a billing cutoff. Such charges must be adjusted outside of escrow.

G. THE FOLLOWING NOTICE IS REQUIRED BY STATE LAW: YOU WILL BE REVIEWING, APPROVING AND SIGNING IMPORTANT DOCUMENTS AT CLOSING. LEGAL CONSEQUENCES FOLLOW FROM THE SELECTION AND USE OF THESE DOCUMENTS. YOU MAY CONSULT AN ATTORNEY ABOUT THESE DOCUMENTS. YOU SHOULD CONSULT AN ATTORNEY IF YOU HAVE QUESTIONS OR CONCERNS ABOUT THE TRANSACTION OR ABOUT THE DOCUMENTS. IF YOU WISH TO REVIEW TRANSACTION DOCUMENTS THAT YOU HAVE NOT SEEN, PLEASE CONTACT THE ESCROW AGENT.

H. Recording Charge (Per Document) is the following:

County	First Page	Each Additional Page
Multnomah	$42.00	$5.00
Washington	$41.00	$5.00
Clackamas	$53.00	$5.00

Note: When possible the company will record electronically. An additional charge of $5.00 applies to each document that is recorded electronically.

I. Note: Effective January 1, 2008, Oregon law (ORS 314.258) mandates withholding of Oregon income taxes from sellers who do not continue to be Oregon residents or qualify for an exemption. Please contact your Escrow Closer for further information.

J. Note: This map/plat is being furnished as an aid in locating the herein described Land in relation to adjoining streets, natural boundaries and other land. Except to the extent a policy of title insurance is expressly modified by endorsement, if any, the Company does not insure dimensions, distances or acreage shown thereon.

EXHIBIT ONE

2006 AMERICAN LAND TITLE ASSOCIATION LOAN POLICY (06-17-06)
EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses that arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning) restricting, regulating, prohibiting or relating to
   (i) the occupancy, use, or enjoyment of the Land;
   (ii) the character, dimensions or location of any improvement erected on the land;
   (iii) the subdivision of land; or
   (iv) environmental protection;
   or the effect of any violation of these laws, ordinances or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
   (a) created, suffered, assumed or agreed to by the Insured Claimant;
   (b) not known to the Company, not recorded in the Public Records at Date of Policy, but known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 13, or 14); or
   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with the applicable doing-business laws of the state where the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury or any consumer credit protection or truth-in-lending law.
6. Any claim, by reason of the operation of federal bankruptcy, state insolvency or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is
   (a) a fraudulent conveyance or fraudulent transfer, or
   (b) a preferential transfer for any reason not stated in the Covered Risk 13(b) of this policy.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the Insured Mortgage in the Public Records. This Exclusion does not modify or limit the coverage provided under Covered Risk 11(b).

The above policy form may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage.

SCHEDULE B - GENERAL EXCEPTIONS FROM COVERAGE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Facts, rights, interests or claims which are not shown by the Public Records but which could be ascertained by an inspection of the Land or by making inquiry of persons in possession thereof.
3. Easements, or claims of easement, not shown by the Public Records; reservations or exceptions in patents or in Acts authorizing the issuance thereof, water rights, claims or title to water.
4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land. The term "encroachment" includes encroachments of existing improvements located on the Land onto adjoining land, and encroachments onto the Land of existing improvements located on adjoining land.
5. Any lien for services, labor or material heretofore or hereafter furnished, or for contributions due to the State of Oregon for unemployment compensation or worker's compensation, imposed by law and not shown by the Public Records.

2006 AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY (06-17-06)
EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses that arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning) restricting, regulating, prohibiting or relating to
   (i) the occupancy, use, or enjoyment of the Land;
   (ii) the character, dimensions or location of any improvement erected on the land;
   (iii) the subdivision of land; or
   (iv) environmental protection;
   or the effect of any violation of these laws, ordinances or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
   (a) created, suffered, assumed or agreed to by the Insured Claimant;
   (b) not known to the Company, not recorded in the Public Records at Date of Policy, but known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 9 and 10); or
   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Title.
4. Any claim, by reason of the operation of federal bankruptcy, state insolvency or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is
   (a) a fraudulent conveyance or fraudulent transfer, or
   (b) a preferential transfer for any reason not stated in the Covered Risk 9 of this policy.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the deed or other instrument of transfer in the Public Records that vests Title as shown in Schedule A.

The above policy form may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage.

SCHEDULE B - GENERAL EXCEPTIONS FROM COVERAGE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Facts, rights, interests or claims which are not shown by the Public Records but which could be ascertained by an inspection of the Land or by making inquiry of persons in possession thereof.
3. Easements, or claims of easement, not shown by the Public Records; reservations or exceptions in patents or in Acts authorizing the issuance thereof, water rights, claims or title to water.
4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land. The term "encroachment" includes encroachments of existing improvements located on the Land onto adjoining land, and encroachments onto the Land of existing improvements located on adjoining land.
5. Any lien for services, labor or material heretofore or hereafter furnished, or for contributions due to the State of Oregon for unemployment compensation or worker's compensation, imposed by law and not shown by the Public Records.

FIDELITY NATIONAL FINANCIAL
PRIVACY NOTICE
Effective: May 1, 2015; Last Updated: March 1, 2017

At Fidelity National Financial, Inc., we respect and believe it is important to protect the privacy of consumers and our customers. This Privacy Notice explains how we collect, use, and protect any information that we collect from you, when and to whom we disclose such information, and the choices you have about the use of that information. A summary of the Privacy Notice is below, and we encourage you to review the entirety of the Privacy Notice following this summary. You can opt-out of certain disclosures by following our opt-out procedure set forth at the end of this Privacy Notice.

Types of Information Collected. You may provide us with certain personal information about you, like your contact information, address demographic information, social security number (SSN), driver's license, passport, other government ID numbers and/or financial information. We may also receive browsing information from your Internet browser, computer and/or mobile device if you visit or use our websites or applications.	**How Information is Collected**. We may collect personal information from you via applications, forms, and correspondence we receive from you and others related to our transactions with you. When you visit our websites from your computer or mobile device, we automatically collect and store certain information available to us through your Internet browser or computer equipment to optimize your website experience.
Use of Collected Information. We request and use your personal information to provide products and services to you, to improve our products and services, and to communicate with you about these products and services. We may also share your contact information with our affiliates for marketing purposes.	**When Information Is Disclosed**. We may disclose your information to our affiliates and/or nonaffiliated parties providing services for you or us, to law enforcement agencies or governmental authorities, as required by law, and to parties whose interest in title must be determined.
Choices With Your Information. Your decision to submit information to us is entirely up to you. You can opt-out of certain disclosure or use of your information or choose to not provide any personal information to us.	**Information From Children**. We do not knowingly collect information from children who are under the age of 13, and our website is not intended to attract children.
Privacy Outside the Website. We are not responsible for the privacy practices of third parties, even if our website links to those parties' websites.	**International Users**. By providing us with you information, you consent to its transfer, processing and storage outside of your country of residence, as well as the fact that we will handle such information consistent with this Privacy Notice.
The California Online Privacy Protection Act. Some FNF companies provide services to mortgage loan servicers and, in some cases, their websites collect information on behalf of mortgage loan servicers. The mortgage loan servicer is responsible for taking action or making changes to any consumer information submitted through those websites.	
Your Consent To This Privacy Notice. By submitting information to us or by using our website, you are accepting and agreeing to the terms of this Privacy Notice.	**Access and Correction; Contact Us**. If you desire to contact us regarding this notice or your information, please contact us at privacy@fnf.com or as directed at the end of this Privacy Notice.

FIDELITY NATIONAL FINANCIAL
PRIVACY NOTICE
Effective: May 1, 2015; Last Updated: March 1, 2017

Fidelity National Financial, Inc. and its majority-owned subsidiary companies providing title insurance, real estate- and loan-related services (collectively, "FNF", "our" or "we") respect and are committed to protecting your privacy. We will take reasonable steps to ensure that your Personal Information and Browsing Information will only be used in compliance with this Privacy Notice and applicable laws. This Privacy Notice is only in effect for Personal Information and Browsing Information collected and/or owned by or on behalf of FNF, including Personal Information and Browsing Information collected through any FNF website, online service or application (collectively, the "Website").

Types of Information Collected

We may collect two types of information from you: Personal Information and Browsing Information.

Personal Information. FNF may collect the following categories of Personal Information:

- contact information (*e.g.*, name, address, phone number, email address);
- demographic information (*e.g.*, date of birth, gender, marital status);
- social security number (SSN), driver's license, passport, and other government ID numbers;
- financial account information; and
- other personal information needed from you to provide title insurance, real estate- and loan-related services to you.

Browsing Information. FNF may collect the following categories of Browsing Information:

- Internet Protocol (or IP) address or device ID/UDID, protocol and sequence information;
- browser language and type;
- domain name system requests;
- browsing history, such as time spent at a domain, time and date of your visit and number of clicks;
- http headers, application client and server banners; and
- operating system and fingerprinting data.

How Information is Collected

In the course of our business, we may collect *Personal Information* about you from the following sources:

- applications or other forms we receive from you or your authorized representative;
- the correspondence you and others send to us;
- information we receive through the Website;
- information about your transactions with, or services performed by, us, our affiliates or nonaffiliated third parties; and
- information from consumer or other reporting agencies and public records maintained by governmental entities that we obtain directly from those entities, our affiliates or others.

If you visit or use our Website, we may collect *Browsing Information* from you as follows:

- Browser Log Files. Our servers automatically log each visitor to the Website and collect and record certain browsing information about each visitor. The Browsing Information includes generic information and reveals nothing personal about the user.
- Cookies. When you visit our Website, a "cookie" may be sent to your computer. A cookie is a small piece of data that is sent to your Internet browser from a web server and stored on your computer's hard drive. When you visit a website again, the cookie allows the website to recognize your computer. Cookies may store user preferences and other information. You can choose whether or not to accept cookies by changing your Internet browser settings, which may impair or limit some functionality of the Website.

Use of Collected Information

Information collected by FNF is used for three main purposes:

- To provide products and services to you or any affiliate or third party who is obtaining services on your behalf or in connection with a transaction involving you.
- To improve our products and services.
- To communicate with you and to inform you about our, our affiliates' and third parties' products and services, jointly or independently.

When Information Is Disclosed

We may provide your Personal Information (excluding information we receive from consumer or other credit reporting agencies) and Browsing Information to various individuals and companies, as permitted by law, without obtaining your prior authorization. Such laws do not allow consumers to restrict these disclosures. Please see the section "Choices With Your Personal Information" to learn how to limit the discretionary disclosure of your Personal Information and Browsing Information.

Disclosures of your Personal Information may be made to the following categories of affiliates and nonaffiliated third parties:

- to third parties to provide you with services you have requested, and to enable us to detect or prevent criminal activity, fraud, material misrepresentation, or nondisclosure;
- to our affiliate financial service providers for their use to market their products or services to you;
- to nonaffiliated third party service providers who provide or perform services on our behalf and use the disclosed information only in connection with such services;
- to nonaffiliated third party service providers with whom we perform joint marketing, pursuant to an agreement with them to market financial products or services to you;
- to law enforcement or other governmental authority in connection with an investigation, or civil or criminal subpoena or court order;
- to lenders, lien holders, judgment creditors, or other parties claiming an interest in title whose claim or interest must be determined, settled, paid, or released prior to closing; and
- other third parties for whom you have given us written authorization to disclose your Personal Information.

We may disclose Personal Information and/or Browsing Information when required by law or in the good-faith belief that such disclosure is necessary to:

- comply with a legal process or applicable laws;
- enforce this Privacy Notice;
- investigate or respond to claims that any material, document, image, graphic, logo, design, audio, video or any other information provided by you violates the rights of a third party; or
- protect the rights, property or personal safety of FNF, its users or the public.

We maintain reasonable safeguards to keep your Personal Information secure. When we provide Personal Information to our affiliates or third party service providers as discussed in this Privacy Notice, we expect that these parties process such information in compliance with our Privacy Notice or in a manner that is in compliance with applicable privacy laws. The use of your information by a business partner may be subject to that party's own Privacy Notice. Unless permitted by law, we do not disclose information we collect from consumer or credit reporting agencies with our affiliates or others without your consent.

We reserve the right to transfer your Personal Information, Browsing Information, and any other information, in connection with the sale or other disposition of all or part of the FNF business and/or assets, or in the event of our bankruptcy, reorganization, insolvency, receivership or an assignment for the benefit of creditors. You expressly agree and consent to the use and/or transfer of the foregoing information in connection with any of the above described proceedings. We cannot and will not be responsible for any breach of security by a third party or for any actions of any third party that receives any of the information that is disclosed to us.

Choices With Your Information

Whether you submit Personal Information or Browsing Information to FNF is entirely up to you. If you decide not to submit Personal Information or Browsing Information, FNF may not be able to provide certain services or products to you. The uses of your Personal Information and/or Browsing Information that, by law, you cannot limit, include:

- for our everyday business purposes – to process your transactions, maintain your account(s), to respond to law enforcement or other governmental authority in connection with an investigation, or civil or criminal subpoenas or court orders, or report to credit bureaus;
- for our own marketing purposes;
- for joint marketing with financial companies; and
- for our affiliates' everyday business purposes – information about your transactions and experiences.

You may choose to prevent FNF from disclosing or using your Personal Information and/or Browsing Information under the following circumstances ("opt-out"):

- for our affiliates' everyday business purposes – information about your creditworthiness; and
- for our affiliates to market to you.

To the extent permitted above, you may opt-out of disclosure or use of your Personal Information and Browsing Information by notifying us by one of the methods at the end of this Privacy Notice. We do not share your personal information with non-affiliates for their direct marketing purposes.

For California Residents: We will not share your Personal Information and Browsing Information with nonaffiliated third parties, except as permitted by California law. Currently, our policy is that we do not recognize "do not track" requests from Internet browsers and similar devices.

For Nevada Residents: You may be placed on our internal Do Not Call List by calling (888) 934-3354 or by contacting us via the information set forth at the end of this Privacy Notice. Nevada law requires that we also provide you with the following contact information: Bureau of Consumer Protection, Office of the Nevada Attorney General, 555 E. Washington St., Suite 3900, Las Vegas, NV 89101; Phone number: (702) 486-3132; email: BCPINFO@ag.state.nv.us.

For Oregon Residents: We will not share your Personal Information and Browsing Information with nonaffiliated third parties for marketing purposes, except after you have been informed by us of such sharing and had an opportunity to indicate that you do not want a disclosure made for marketing purposes.

For Vermont Residents: We will not share your Personal Information and Browsing Information with nonaffiliated third parties, except as permitted by Vermont law, such as to process your transactions or to maintain your account. In addition, we will not share information about your creditworthiness with our affiliates except with your authorization. For joint marketing in Vermont, we will only disclose your name, contact information and information about your transactions.

Information From Children

The Website is meant for adults and is not intended or designed to attract children under the age of thirteen (13).We do not collect Personal Information from any person that we know to be under the age of thirteen (13) without permission from a parent or guardian. By using the Website, you affirm that you are over the age of 13 and will abide by the terms of this Privacy Notice.

Privacy Outside the Website

The Website may contain links to other websites. FNF is not and cannot be responsible for the privacy practices or the content of any of those other websites.

International Users

FNF's headquarters is located within the United States. If you reside outside the United States or are a citizen of the European Union, please note that we may transfer your Personal Information and/or Browsing Information outside of your country of residence or the European Union for any of the purposes described in this Privacy Notice. By providing FNF with your Personal Information and/or Browsing Information, you consent to our collection and transfer of such information in accordance with this Privacy Notice.

The California Online Privacy Protection Act

For some FNF websites, such as the Customer CareNet ("CCN"), FNF is acting as a third party service provider to a mortgage loan servicer. In those instances, we may collect certain information on behalf of that mortgage loan servicer via the website. The information which we may collect on behalf of the mortgage loan servicer is as follows:

- first and last name;
- property address;
- user name and password;
- loan number;
- social security number - masked upon entry;
- email address;
- three security questions and answers; and
- IP address.

The information you submit through the website is then transferred to your mortgage loan servicer by way of CCN.

The mortgage loan servicer is responsible for taking action or making changes to any consumer information submitted through this website. For example, if you believe that your payment or user information is incorrect, you must contact your mortgage loan servicer.

CCN does not share consumer information with third parties, other than (1) those with which the mortgage loan servicer has contracted to interface with the CCN application, or (2) law enforcement or other governmental authority in connection with an investigation, or civil or criminal subpoenas or court orders. All sections of this Privacy Notice apply to your interaction with CCN, except for the sections titled "Choices with Your Information" and "Access and Correction." If you have questions regarding the choices you have with regard to your personal information or how to access or correct your personal information, you should contact your mortgage loan servicer.

Your Consent To This Privacy Notice

By submitting Personal Information and/or Browsing Information to FNF, you consent to the collection and use of the information by us in compliance with this Privacy Notice. Amendments to the Privacy Notice will be posted on the Website. Each time you provide information to us, or we receive information about you, following any amendment of this Privacy Notice will signify your assent to and acceptance of its revised terms for all previously collected information and information collected from you in the future. We may use comments, information or feedback that you submit to us in any manner that we may choose without notice or compensation to you.

Accessing and Correcting Information; Contact Us

If you have questions, would like to access or correct your Personal Information, or want to opt-out of information sharing with our affiliates for their marketing purposes, please send your requests to privacy@fnf.com or by mail or phone to:

Fidelity National Financial, Inc.
601 Riverside Avenue
Jacksonville, Florida 32204
Attn: Chief Privacy Officer
(888) 934-3354

Exhibit E: Approved Subdivision Name

REQUEST TO RESERVE SUBDIVISION / CONDOMINIUM NAME

Clackamas County Surveyor's Office
150 Beavercreek Road #325
Oregon City, OR 97045
(503) 742-4475 / FAX (503) 742-4481
E-mail address: surveyor@clackamas.us

PLAT NAME REQUESTED:
Lindsay Anne Estates Too

	TWP/RANGE:	SECTION#:	TAX LOT#(s):
Location of Plat:	32E	18	1400

I understand that if the above name plat is not pending or recorded within two years, the name will be removed from the reserved list.

RESERVED BY:

DATE:	TELEPHONE:	FAX:
07/10/2017	(503) 563 - 6151	(503) 563 - 6152

EMAIL ADDRESS: scheideggerm@aks-eng.com

PLAT SURVEYOR: #

NAME OF DEVELOPER:

ADDRESS:

DATE:	TELEPHONE:	FAX:
	( ) -	( ) -

EMAIL ADDRESS:

APPROVED BY:	APPROVAL DATE:

Matt Scheidegger

From: Fuller, Debbie <DebbieFul@co.clackamas.or.us>
Sent: Monday, July 10, 2017 10:21 AM
To: Matt Scheidegger
Subject: RE: Subdivision Name
Attachments: 4412-P1.tif

Matt,
Your request to approve the name of "Lindsay Anne Estates Too" is approved.

Something is wrong with the section # in Lindsay Anne Estates-Plat 4412. Please see the attached plat of Lindsay Anne Estates. I am checking into it.

Debbie Fuller
Department of Transportation & Development
County Surveyor & Engineering
Phone: 503.742.4492 | Email: debbieful@clackamas.us
My office hours 7:30-4:30 Monday – Thursday and Friday 7:30-3:00

Exhibit F: Draft CC&R's

DRAFT

AFTER RECORDING, RETURN TO:

DECLARATION OF COVENANTS, CONDITIONS AND RESTRICTIONS

This Declaration of Protective Covenants, Conditions and Restrictions ("Declaration") is made and effective the ____, day of _____, 2017. This Declaration affects that certain real property (the "Property") located in the City of Oregon City, Clackamas County, Oregon and more particularly described as Lots 1 through 28 , inclusive, as shown on Subdivision Plat Lindsay Anne Estates Too (the "Plat) recorded in the official records of Clackamas County on _____, and all improvements now existing or to be constructed on Property, which Property and improvements are collectively known and referred to as Lindsay Anne Estates Too.

RECITALS, INTENT AND PURPOSE

A. _____ is the owner in fee simple of the Property and the Declarant herein.

NOW, THEREFORE, for such purposes, Declarant makes this Declaration for governance of the Property:

DECLARATION

Declarant hereby declares on behalf of itself, its successors, grantees and assigns, as well as any and all persons having, acquiring or seeking to have or acquire any interest of any nature whatsoever in and to any part of the Property, as follows:

1. Definitions. Except as otherwise provided or modified by this Section 1, the terms contained herein shall have the meaning set forth in the Oregon Planned Community Act, ORS 94.550 et seq. As used in this Declaration, the following terms shall have the following meanings:

1.1 Mortgage. Mortgage means a recorded first mortgage, first trust deed or first contract of sale that creates a first lien against a Lot, and "Mortgagee" means the holder,

beneficiary or vendor of such a mortgage, trust deed or contract of sale, but only when such holder, beneficiary or vendor notifies the Association in writing of the existence of such mortgage and gives the Association a current name and mailing address.

1.2 Owner. Owner means the sole, or all joint, owners of one or more Lots.

1.3 Plat. Plat has the meaning provided in the initial paragraph of this Declaration.

2. Name Description

2.1. Name. The name by which the Property shall be known is Lindsay Anne Estates Too.

2.2. Lot Designation. The Property is comprised of twenty-eight (28) Lots, each suitable for construction of one residential building, and easements as described in the Plat. The boundaries, designation, location and dimensions of each Lot are shown on the Plat.

3. Easements. Easements are reserved as shown on the Plat. Within these easements no structure, planting or other materials shall be placed or permitted to remain which may damage or interfere with the purpose of the easement.

4. Building Materials and Size Limitations. All building materials to be incorporated into and visible as a part of the external structure of any building or other structure in the Property conform to the following criteria:

4.1. Roofing material. In particular, all roofing material for any building or structure shall be of wood (shake or shingle), tile, or a 25-year or better composition architectural shake with ridge caps.

4.2. Siding material. All siding materials shall be natural wood, or man-made lap siding materials provided.

4.3. Minimum House Size. Each residence constructed on a Lot shall have a minimum floor area of 1,000 square feet, exclusive of garages.

5. Landscape, Hedges and Fences. All front and side yards must be completely landscaped within six (6) months of initial occupancy. All grounds and related structures shall be maintained in harmony with surrounding landscaping. No weeds, noxious plants, or unsightly vegetation shall be planted or allowed to grow. Fences shall comply with applicable City regulations but shall not exceed six(6) feet in height. Fences shall be well constructed of suitable materials and shall not detract from the appearance of the adjacent structures or buildings. No high output exterior lighting, including but not limited to mercury vapor and halide lights, shall be installed. No tree shall be removed except in accordance with City of Oregon City permit standards.

6. No Rezoning or Redivision. No property within the Property may be rezoned or

redivided, nor may a Lot line or boundary line of a Lot be altered, without the written consent of the City of Oregon City and a majority of Owners.

7. Restrictions on Animals. No animals of any kind shall be raised, bred or kept in the Property, except that dogs, cats and other commonly maintained household pets may be kept so long as they are not bred, maintained or kept for commercial purposes. No animal of any kind, including dogs and cats, shall be allowed to interfere with the quiet enjoyment of the other residents in the Property, or permitted untended upon the streets, or upon premises of other occupants of the Property.

8. No Commercial Use. No portion of property in the Property shall be used for business or commercial purposes. No occupant of property within the Property shall park, nor permit to be parked, any commercial vehicle such as log trucks, dump trucks, tractor trailer rigs, or any other vehicles except passenger automobiles (including pickups) upon property, including streets, in the Property. No owner or occupant shall permit, initiate, or carry on activities in the Property that are obnoxious or offensive, nor allow conditions on any Lot to become a nuisance or annoyance to the neighborhood. No commercial signs shall be erected on the property, except real estate sales signs of not more than five (5) square feet advertising property within the Property for sale or rent.

9. Screening. Trash, garbage and other waste shall not be kept except in sanitary containers, screened from public view. No Lot or Tract shall be used as a dumping ground for trash, garbage, waste or debris. All heat pumps and condensers on Lots (or other utilities and devices commonly placed out of doors) shall receive special consideration to provide visual screening and noise attenuation. All boats, trailers, recreational vehicles, equipment, campers and the like must be parked off streets of the Property in a garage or on a concrete pad beside a garage built specifically for the purpose.

10. No Interference. Owners or occupants within the Property shall not engage in nor continue uses which unreasonably interfere with use of other property within the Property. The following activities shall conclusively be deemed to unreasonably interfere with other property in the Property: (1) construction and maintenance of communications transmission and reception towers and antenna; and (2) construction and maintenance of exterior radio and television antennae and other receptors except for satellite dish type antennae not larger than 36 inches in diameter.

11. Completion of Improvements. All structures (including flat work and landscaping) constructed within the Property shall be erected and completed within one year after the commencement of construction. All remodeling, reconstruction, or enhancement of structures shall be completed within one year of the commencement of construction. Commencement of construction shall be deemed to be the date upon which a building permit was first issued for the construction, or, if no building permit was obtained, the date on which Lot clearing, demolition or remodeling commenced.

12. No Further Subdivision. No Lot may be subdivided or partitioned into divisions of any nature without City approval.

13. Mandatory Mediation Prior to Litigation. All Lot owners agree that all claims, controversies or disputes, whether they be statutory, contract and/or tort claims between or among the parties hereto which arise out of or are related to this Agreement, or which relate to the formation, interpretation, breach or invalidity of this Agreement, whether arising before, during or after termination (hereinafter collectively referred to as "Claims"), shall be resolved in accordance with the mediation and litigation procedures specified herein.

13.1 Mediation. All "Claims" defined in the foregoing paragraph shall be submitted to mediation. The parties shall agree to a mediator. If the parties cannot agree as to the selection of a mediator, then either party may request appointment of a mediator from the American Arbitration Association or the Arbitration Service of Portland, Inc., whichever organization is selected by the party which first initiates mediation by filing a claim in accordance with the filing rules of the organization selected. The parties shall share equally the cost of the mediation process.

13.2 Litigation and Attorney's Fees. Any "Claims" that have not been resolved by mediation may be the subject of litigation in which the parties shall have all rights and remedies available at law and in equity, and the prevailing party in such litigation shall be entitled to an award of attorneys' fees and costs of action at trial and on appeal and review.

13.3 Judgment. Judgment upon the award rendered pursuant to such arbitration may be entered in any court having jurisdiction thereof. The parties shall share equally the fees and costs charged by the arbitration entity. The parties knowingly and voluntarily waive their rights to have their dispute tried and adjudicated by a judge or jury. In the event a party fails to proceed with arbitration, unsuccessfully challenges the arbitrator's award, or fails to comply with the arbitrator's award, the other party is entitled to costs, including reasonable attorney's fees, for having to compel arbitration or defend or enforce the award.

13.4 Venue. The venue for any litigation to interpret or enforce the provisions hereof shall be Oregon City, Oregon. The parties expressly consent to the jurisdiction of such court.

14. Section and Paragraph Captions. Section and paragraph captions shall not be deemed to be a part of this Declaration unless the context otherwise requires. In construing this Declaration, if the context so requires, the singular shall be taken to mean and to include the plural, the masculine shall be taken to mean and to include the feminine and the neuter and, generally, all grammatical changes shall be made, assumed and implied to make the provisions hereof apply equally to individuals, trusts, estates, personal representative, trustees and corporations.

The undersigned Owner of the subject property has caused this Declaration to be executed this

_____ day of _____, 2017.

DECLARANT:

_____

Exhibit G: Traffic Impact Study

Lindsay Anne Estates Too
Annexation and Zone Change

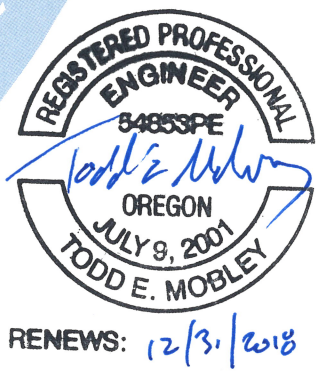
Traffic Impact Study

Oregon City, Oregon

Date:
August 3, 2017

Prepared for:
PDX Development, Inc.

Prepared by:
Todd Mobley, PE
Richard Martin, EI



LANCASTER
ENGINEERING

321 SW 4th Ave., Suite 400 | Portland, OR 97204 | 503.248.0313 | lancasterengineering.com

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Executive Summary

1. A 6.32-acre property south and west of S Leland Road between S McCord Road and S Jessie Avenue is proposed for annexation into the City of Oregon City. Upon annexation, the property will be rezoned from FU-10 to R-6 zoning. A subdivision is proposed under the R-6 zoning that would accommodate 28 lots for construction of single-family homes.
2. Based on trip generation for the proposed development, the new subdivision could result in up to 20 additional trips during the morning peak hour, with 5 entering and 15 exiting the site. During the evening peak hour, 27 additional site trips are projected, with 17 entering and 10 exiting the site.
3. The operational analysis shows that the study area intersections are projected to meet the relevant operational standards of Oregon City under year 2019 (build out) and 2037 (planning horizon) traffic conditions either with or without the addition of site trips from the proposed subdivision.
4. Since all study area intersections will operate acceptably through the planning horizon either with or without the proposed rezone and development, the Transportation Planning Rule is satisfied, and the proposed zone change does not significantly affect the transportation system.

Introduction

A 6.32-acre property south and west of S Leland Road between S McCord Road and S Jessie Avenue is proposed for annexation into the City of Oregon City. Upon annexation, the property will be rezoned to R-6 zoning for the purpose of developing a subdivision, in conformance with the city's Comprehensive Plan.

The purpose of this study is to assess the potential impacts of the proposed annexation and address the transportation analysis requirements of Oregon City, the Oregon Department of Transportation (ODOT), and Oregon's Transportation Planning Rule. The report will identify the potential net increase in traffic and examine the transportation impacts of the added trips at the planning horizon. The report will include level of service calculations and volume-to-capacity calculations for existing conditions as well as year 2037 traffic conditions both with and without the proposed annexation. The analysis will also include a detailed examination of crash history at the study intersections.

This report addresses the impacts of the proposed project on the traffic and transportation conditions in the vicinity of the project site. The report includes safety and capacity analyses at three intersections:

- Leland Road at S McCord Road
- Leland Road at Lindsay Anne Lane
- Leland Road at the proposed site access

The purpose of the study is to determine whether the transportation system in the vicinity of the site is capable of safely and efficiently supporting the existing and proposed uses, and to determine any mitigations that might be necessary to do so.

Detailed information on traffic counts, crash data, and level of service calculations are included in the appendix to this report.

Location Description

The proposed development is in the southern part of Oregon City on the southwest side of Leland Road. Access to Leland Road will be available via a planned new roadway to be named Miller Road that intersects Leland Road approximately 330 feet northwest of its intersection with Lindsay Anne Lane. Further access will be provided by extensions to Cherrywood Way and Cedarwood Way. The configuration of these new streets is shown in the site plan in the appendix. In addition, lots 1 & 2 on the proposed site plan are proposed to take access directly to Leland Road. Based on preliminary conversations with the City of Oregon City, it is understood that these two driveways may need to share a common curb cut and be coordinated with Clackamas County. The final configuration of these driveways will be examined in further detail at the time of subdivision plan review.

Leland Road is classified as a Minor Arterial in the Oregon City Transportation System Plan. It is a two-lane facility with a posted speed limit of 35 mph. There are no bike lanes or sidewalks along Leland Road in the

vicinity of the site, although sidewalks and bike lanes exist on the more developed parts of Leland Road north of the project site.

A vicinity map showing the project site and the study area intersections is shown in Figure 1 on page 4.

Study Intersections

McCord Road, which is classified as a collector, intersects Leland Road northwest of the subject site. The intersection is three-legged, and controlled with a stop sign along McCord Road, which approaches the intersection from the southwest. Leland Road bends 90 degrees at the intersection, and so approaches the intersection from the southeast and northeast. There are no sidewalks or marked crosswalks, and each approach has one lane for all movements.

Lindsay Anne Lane, which is classified as a Local Road, creates a three-legged intersection with Leland Road. The northeast bound approach of Lindsay Anne Lane is stop controlled at the through road of Leland Road running southeast. There is an unmarked intersection available at the intersection across the Lindsay Anne Lane approach. Along this section of Leland Road there is on-street parking available on the southwest side of the road.

The proposed primary site access at Leland Road will occur along the new Miller Road. Miller Road will be classified as a Local Road and will create a three-legged intersection with Leland Road. The northeast bound approach of Miller Road will be stop controlled, while Leland Road will be a through movement in both directions. Each leg of the intersection will have one lane for all turning movements. Sidewalks and unmarked pedestrian crossings will be available along the length of Miller Road in the site vicinity.

Existing Traffic Volumes

To determine existing traffic volumes at the study intersections, traffic counts were conducted on Tuesday, April 18, 2017. Traffic was counted from 7:00 to 9:00 AM to obtain data for the morning peak hour and from 4:00 to 6:00 PM to obtain data for the evening peak hour. These existing volumes are shown in Figure 2 on page 5. The raw data is provided in the technical appendix.

Transit

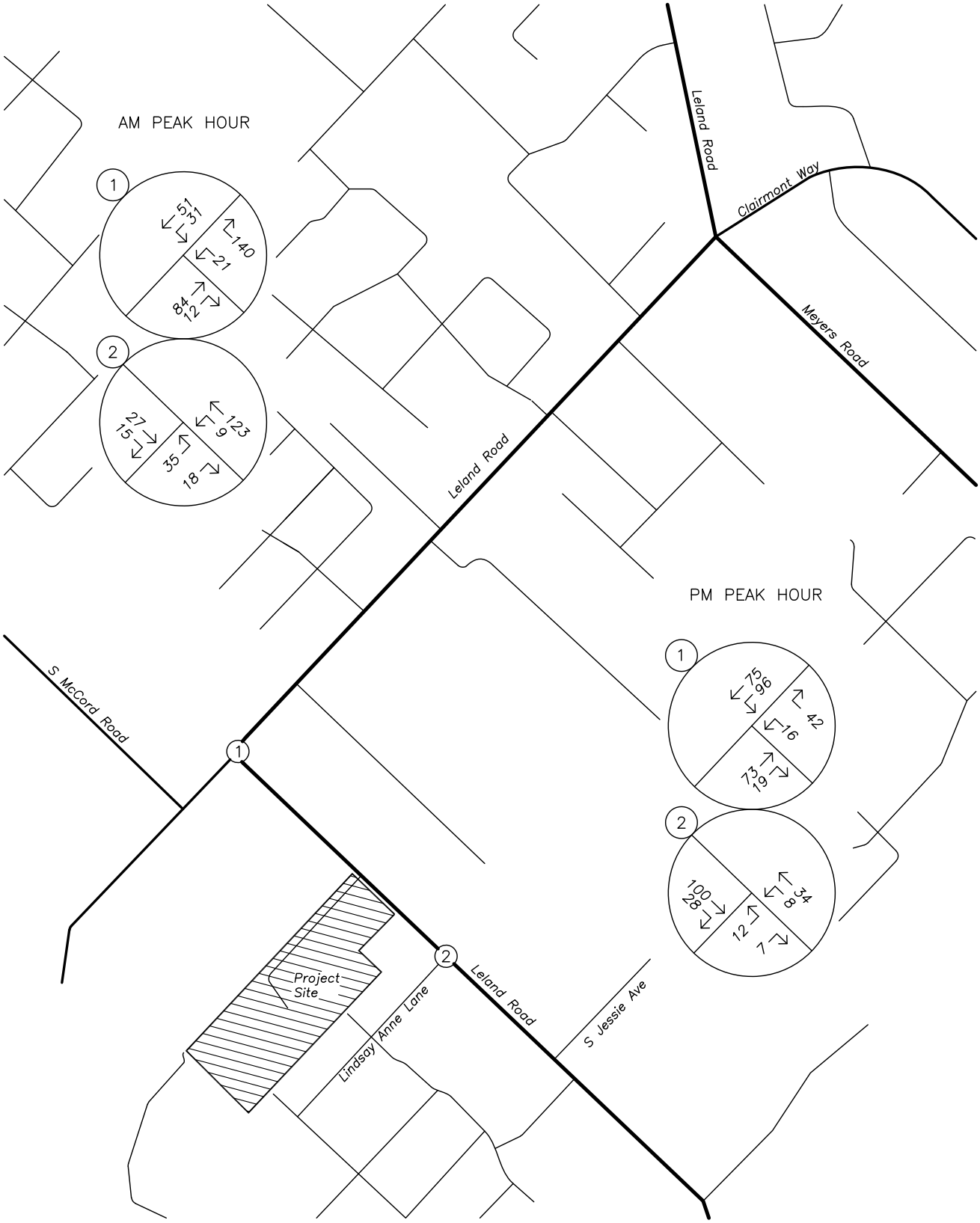
There are no public transit facilities in the site vicinity. The nearest bus facilities run along Warner Milne Road, Molalla Avenue, and Highway 99E.

VICINITY MAP

no scale

FIGURE 1

PAGE 4



TRAFFIC VOLUMES
Existing Conditions
AM & PM Peak Hours

no scale

FIGURE 2

PAGE 5

Site Trips

Trip Generation

To estimate the number of trips that will be generated by the proposed development, trip rates from the manual *TRIP GENERATION*[1] were used. The data utilized are for *Single-Family Detached Housing,* which is based on the number of dwelling units. The trip generation was calculated for the 28 single-family homes.

The trip generation calculations show that the proposed development is projected to result in a total of 20 additional trips during the morning peak hour and 27 additional trips during the evening peak hour. The development will generate 256 new trips each weekday. The trip generation estimates are summarized in Table 1 and detailed trip generation calculations are included in the technical appendix to this report.

Table 1: Trip Generation Calculations: Proposed Subdivision

	ITE Code	Size	Morning Peak Hour In	Morning Peak Hour Out	Morning Peak Hour Total	Evening Peak Hour In	Evening Peak Hour Out	Evening Peak Hour Total	Weekday Total
Single-Family Detached Housing									
Proposed Development	210	28 units	5	16	21	18	10	28	266
Existing House	210	1 unit	0	1	1	1	0	1	10
Potential Net Increase in Trips		**27 units**	**5**	**15**	**20**	**17**	**10**	**27**	**256**

Because a change in zoning is proposed for the site, a comparison of the reasonable worst-case development potential under both the R-10 zoning currently proposed for future development in the Oregon City TSP and the proposed R-6 zoning. Under the R-10 zoning, a total of 17 single-family dwelling units could be constructed. Under the proposed R-6 zoning, a total of 28 dwelling units are possible, for a net increase of 11 homes. The comparative trip generation analysis for the zone change is shown in Table 2 below.

Table 2: Trip Generation Comparison: Worst-Case Development

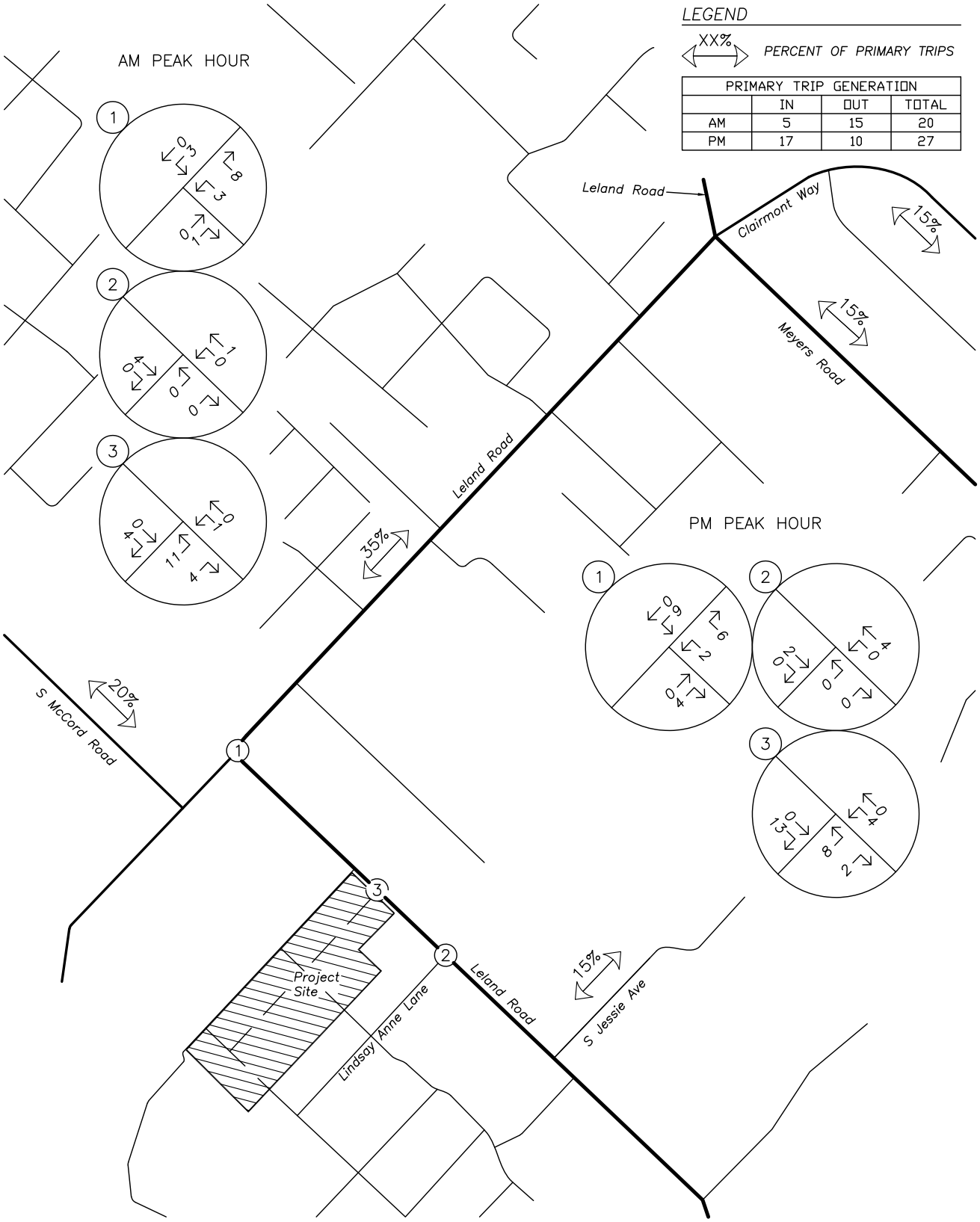
	ITE Code	Size	Morning Peak Hour In	Morning Peak Hour Out	Morning Peak Hour Total	Evening Peak Hour In	Evening Peak Hour Out	Evening Peak Hour Total	Weekday Total
Single-Family Detached Housing									
R-6 Zoning Potential	210	28 units	5	16	21	18	10	28	266
R-10 Zoning Potential	210	17 units	3	10	13	11	6	17	162
Potential Net Increase in Trips		**11 units**	**2**	**6**	**8**	**7**	**4**	**11**	**104**

[1] Institute of Transportation Engineers (ITE), *TRIP GENERATION, 9th Edition,* 2012.

Trip Distribution and Assignment

It is expected that 20% of site trips will utilize McCord Road to access Central Point Road and other connections and destinations to the west of the site. It is expected that 35% of all site trips will arrive from and depart toward the north along Leland Road in the direction of downtown Oregon City, 15% will arrive from and depart toward the northeast along Clairmont Way, and 15% will arrive from and depart toward the northeast along Meyers Road. Another 15% of all site trips will arrive from and depart toward the southeast along Meyers Road by utilizing Jessie Avenue/Frontier Way.

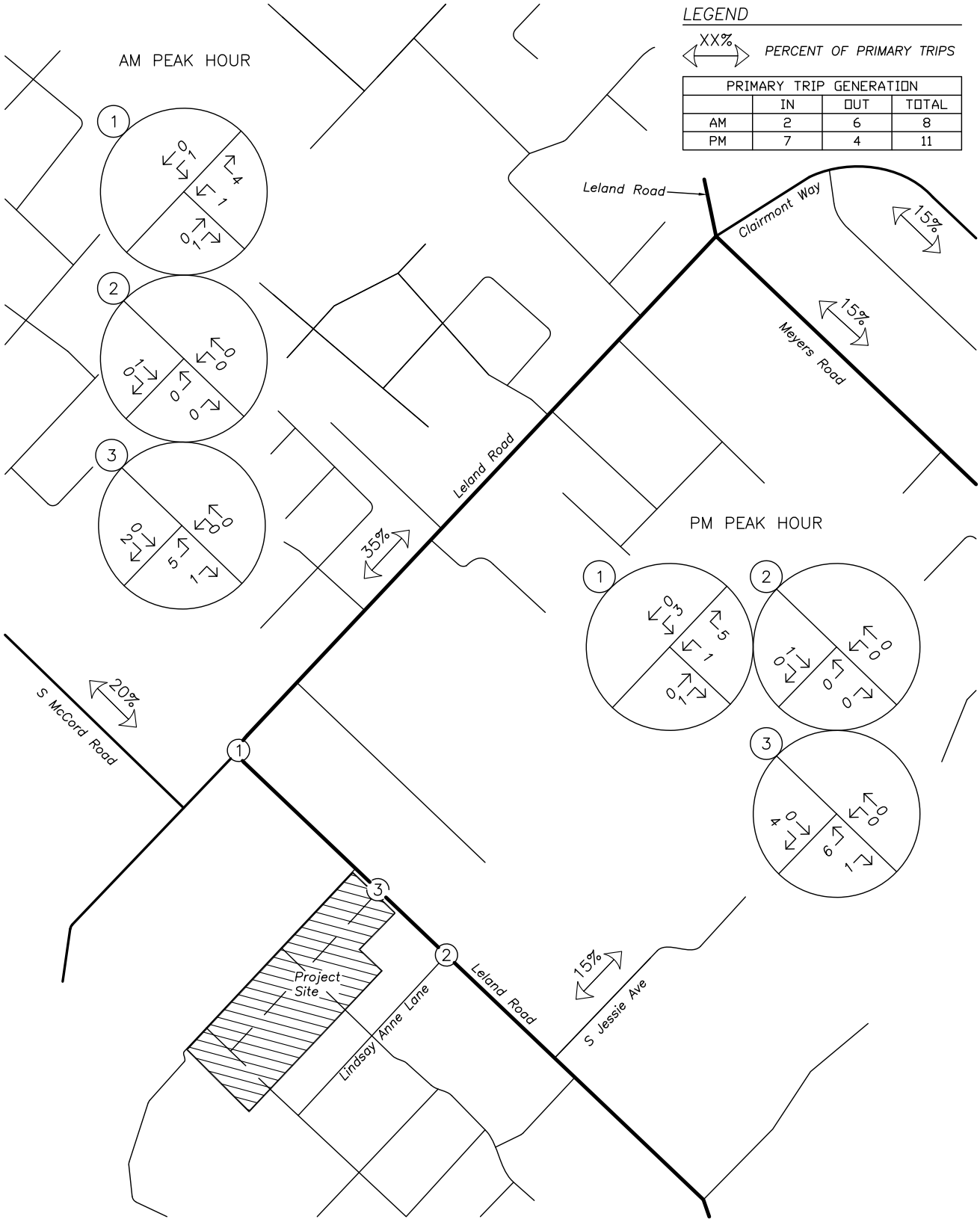
Figure 3 on page 8 shows the trip assignment for site trips generated by the proposed 28-lot development along with the trip distribution assumptions. Figure 4 on page 9 shows the net increase in trips from the zone change.



SITE TRIP DISTRIBUTION & ASSIGNMENT
Proposed Development Plan – Site Trips
AM & PM Peak Hours

no scale

FIGURE 3



SITE TRIP DISTRIBUTION & ASSIGNMENT
Net Increase in Trips from Zone Change
AM & PM Peak Hour

no scale

FIGURE 4

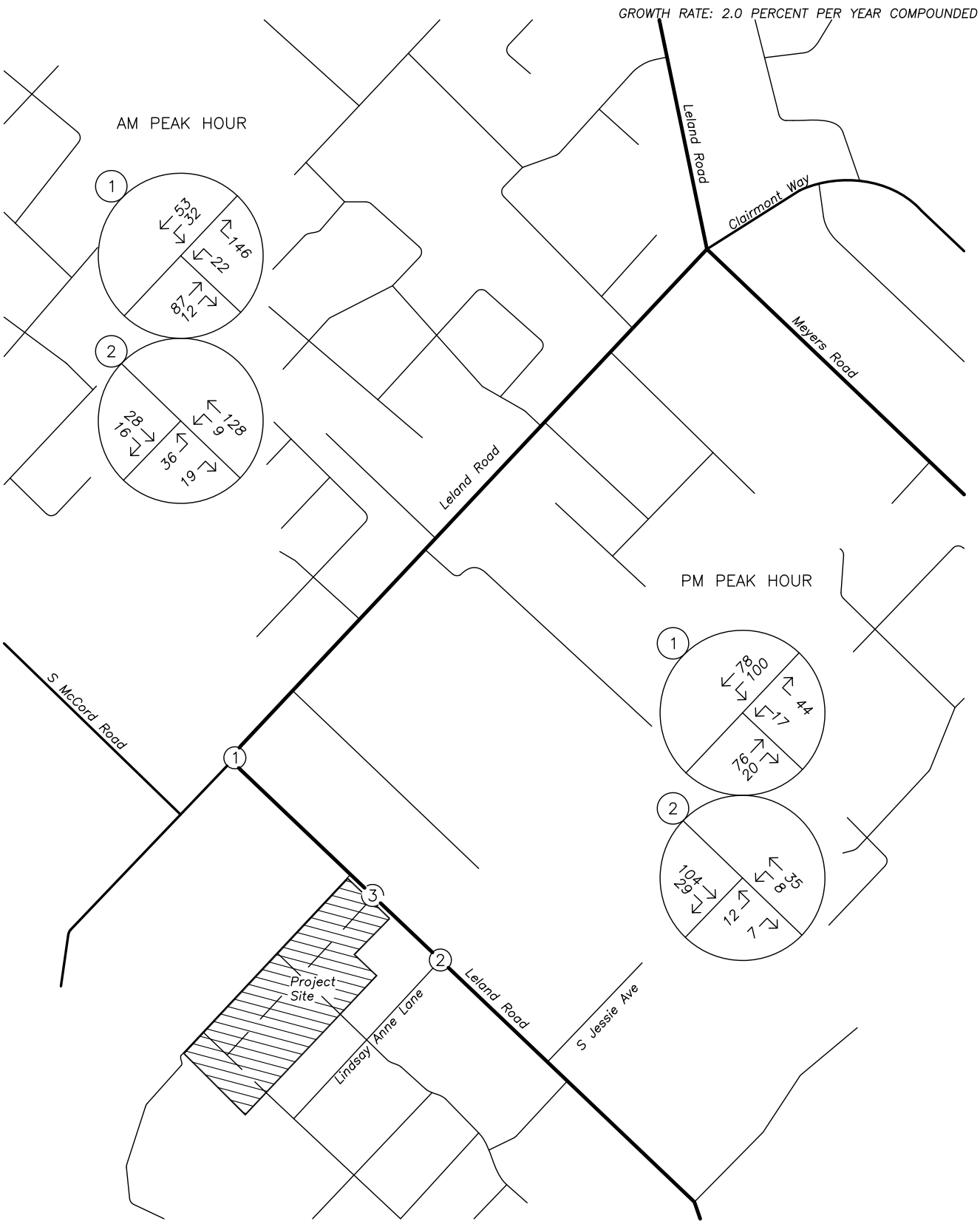
PAGE 9

Operational Analysis

Background Traffic Volumes

To gauge the effect on the proposed development relative to a *no-build* scenario, background volumes were calculated assuming a two-year build-out period and a 2% year-over-year growth in traffic volumes. The 2019 background conditions are represented in Figure 6 on page 12, while the 2019 background plus site trips conditions are represented in Figure 6 on page 12.

Since the proposed project includes a change in zoning, an analysis of conditions at the planning horizon is also required. To estimate growth during the 20-year planning period, the same 2% year-over-year growth assumption was used to estimate 2037 conditions. The 2037 background conditions are represented in Figure 7 on page 13, and the 2037 background plus the net increase in trips conditions are represented in Figure 8 on page 14.

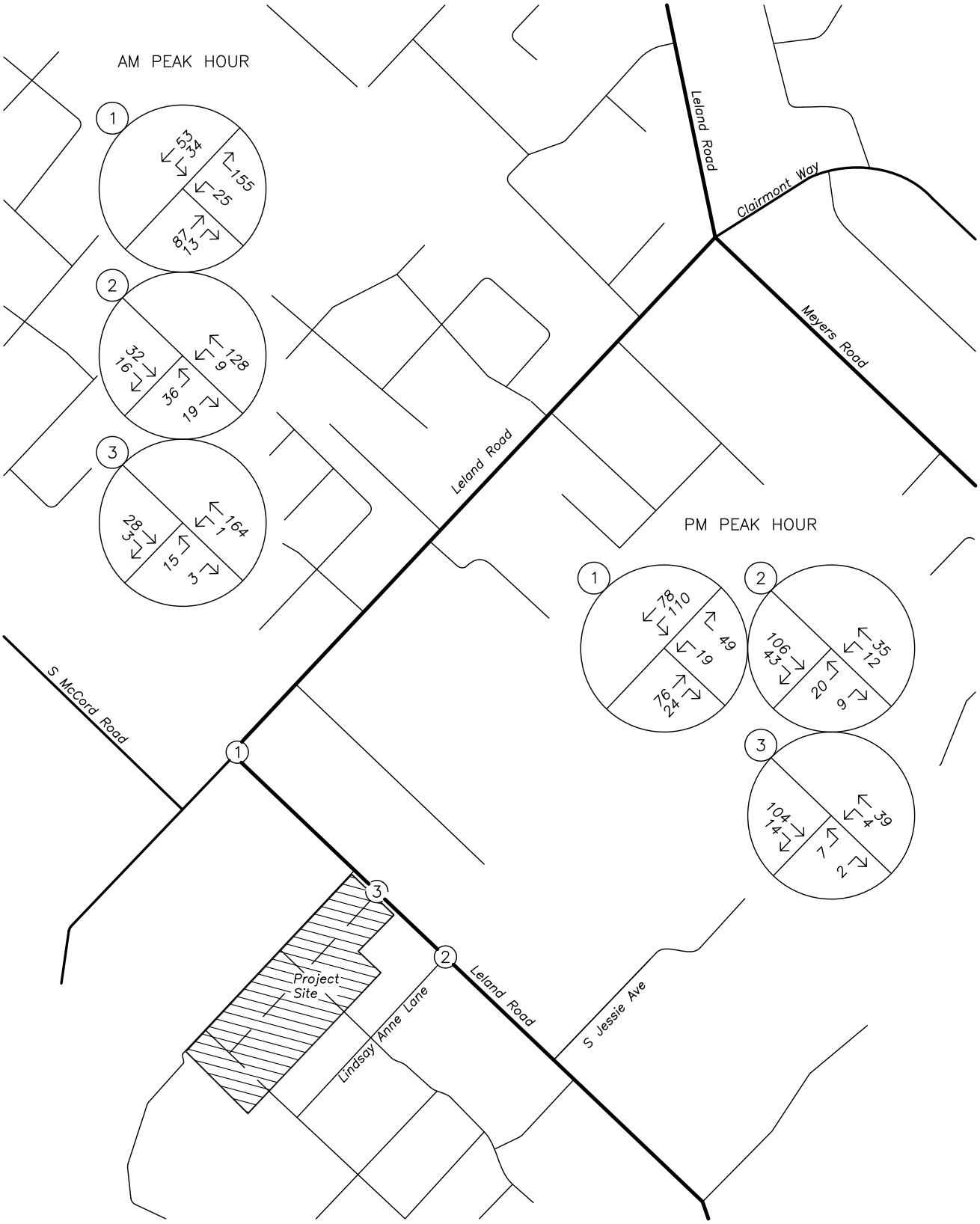


TRAFFIC VOLUMES
Year 2019 Background Conditions
AM & PM Peak Hours

no scale

FIGURE 5

PAGE 11

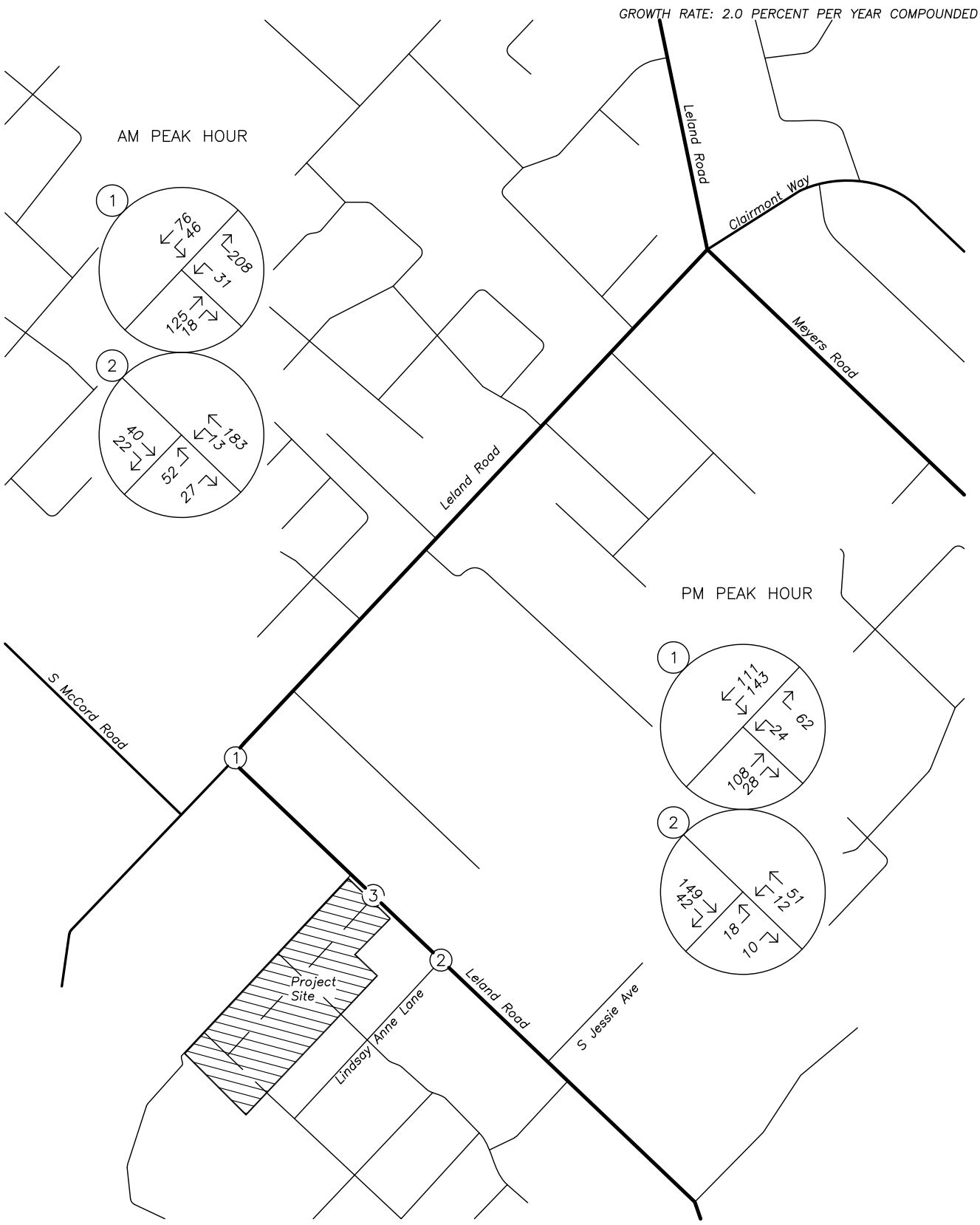


TRAFFIC VOLUMES
Year 2019 Background plus Site Trips
AM & PM Peak Hours

no scale

FIGURE 6

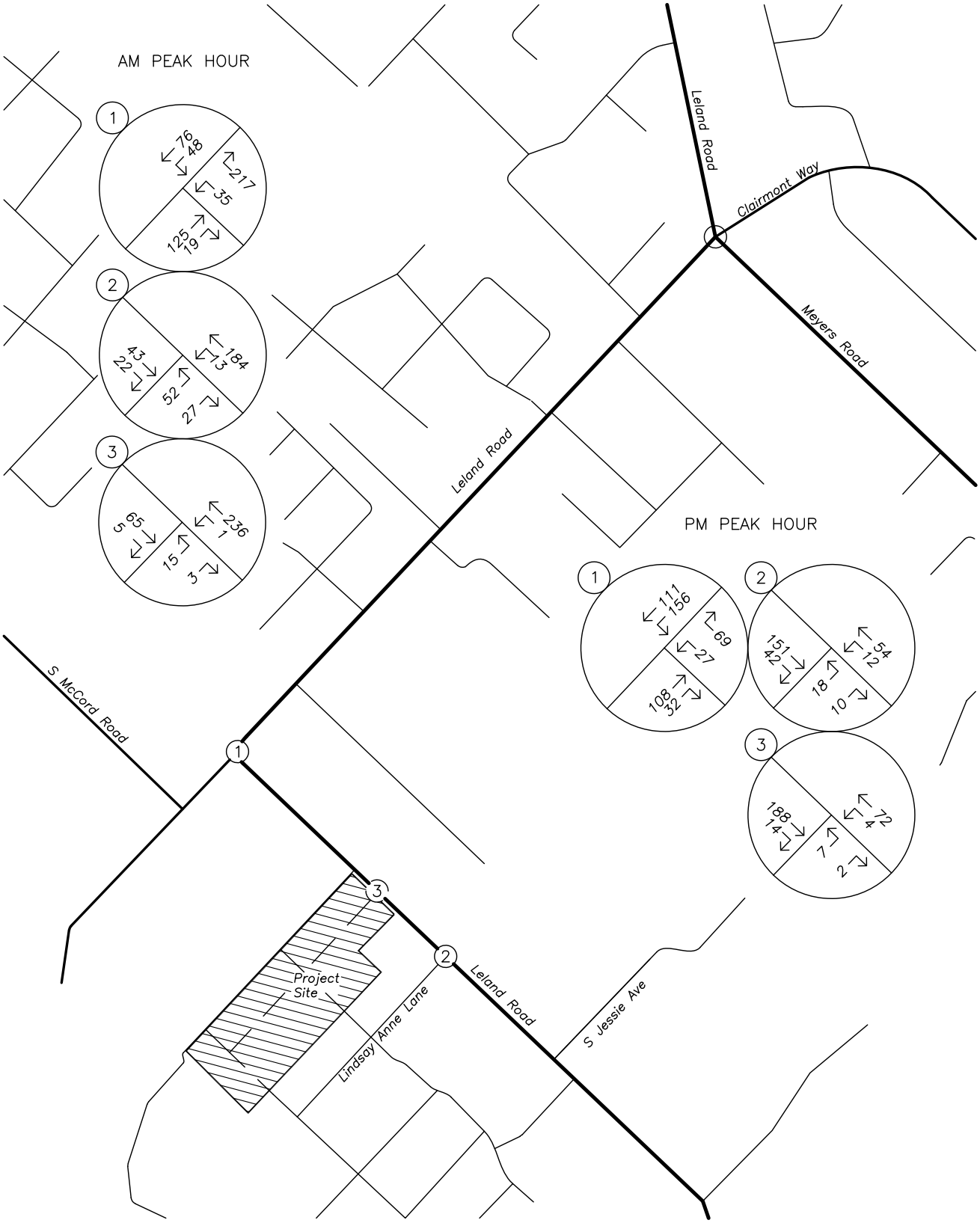
PAGE 12



TRAFFIC VOLUMES
Year 2037 Background Conditions
AM & PM Peak Hour

no scale

FIGURE 7



TRAFFIC VOLUMES
Year 2037 Existing plus Site Trips
AM & PM Peak Hours

no scale

FIGURE 8

Capacity Analysis

To determine the capacity and level-of-service at the study intersections, a capacity analysis was conducted. The analysis was conducted using the intersection analysis methodologies in the *Highway Capacity Manual (HCM)*[2]. Level-of-service (LOS) can range from A, which indicates little or no delay, to F, which indicates a significant amount of congestion and delay. Oregon City's operational standards require LOS D or better at both signalized and unsignalized intersections. Detailed LOS descriptions are included in the appendix to this report.

The results of the capacity analysis show that the intersection of Leland Road at McCord Road is currently operating at LOS A during both the morning and evening peak hours. Following the background growth and the addition of new trips from the proposed development, the intersection will continue to operate at LOS A during both peak hours.

The results of the capacity analysis show that the intersection of Leland Road at Lindsay Anne Lane is currently operating at LOS A during the morning and evening peak hours. Following the background growth and the addition of new trips from the proposed development, the intersection will continue to operate at LOS A during both peak hours.

The addition of site trips will not change the level of service of any study area intersection, which conforms to the operational standards outlined in the Oregon City TSP. As such, no mitigations are recommended.

Table 3 shows a summary of the capacity and level-of-service calculations at the study intersections under each of the scenarios examined. Detailed capacity analysis results are included in the appendix to this report.

[2] Transportation Research Board, *Highway Capacity Manual,* 4th Edition, 2000.

Table 3: Intersection Capacity and LOS Summary

	Morning Peak Hour		Evening Peak Hour	
	LOS	Delay (s)	LOS	Delay (s)
Leland Road at McCord Road				
Existing Conditions	A	9	A	9
2019 Background Conditions	A	9	A	9
2019 Background + Site Conditions	A	9	A	9
2037 Background Conditions	A	9	A	10
2037 Background + Site Conditions	A	9	A	10
Leland Road at Lindsay Anne Lane				
Existing Conditions	A	10	A	9
2019 Background Conditions	A	10	A	9
2019 Background + Site Conditions	A	10	A	10
2037 Background Conditions	B	10	A	10
2037 Background + Site Conditions	B	10	B	10
Leland Road at Site Access				
2019 Background + Site Conditions	A	9	A	9
2037 Background + Site Conditions	B	10	B	10

Safety Analysis

Sight Distance

The planned development will take access to the existing street system via the intersection of Leland Road at Miller Road, a new public intersection. To ensure that this intersection can operate safely and efficiently, sight distance measurements were taken according to guidelines specified in *A Policy on Geometric Design of Highways and Streets*[3]. The measurements use driver's eye heights of 3.5 feet above the road for both vehicles exiting the driveway and vehicles on the main roadway, with the driver's eye 14.5 feet behind the edge of the near-side travel lane. The intersection sight distance necessary (ISD) at the driveways is based on the speed of traffic on Leland Road, and represents the sight distance needed such that traffic would not have to slow down excessively on Leland Road to accommodate vehicles entering the roadway from the driveways.

The proposed development will also have two lots taking direct access to Leland Road. During review of the application for the development that includes the access road, Clackamas County identified a necessary ISD of 445 feet at any site access to, and based upon the travel speeds along, Leland Road. Following construction of the site access as planned, the line of site available will exceed the required 445 feet. Exhibits showing the available lines of site at the access along with the grade of Leland Road in both directions are shown in the appendix.

Crash History

Using data obtained from ODOT's Crash Data System, a review of the most recent available five years of crash history (2011-2015) at the study intersections was performed. Crash rates were calculated under the common assumption that traffic counted during the PM peak period represents 10% of annual average daily traffic (AADT) at the intersection.

There were no reported crashes at the intersections of Leland Road at McCord Road and Leland Road at Lindsay Anne Lane during the analysis period.

Crash rates greater than 1.0 CMEV are generally indicative of a need for further investigation and possible mitigation. Since both study intersections have a crash rate well below this threshold, with one of the study intersections having no reported crashes during the analysis period, there are no apparent safety deficiencies at any study intersection, and on-site observations and available data suggest that all intersections will continue to operate safely in the future.

Detailed crash reports for the study intersections are included in the appendix to this report.

[3] American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets*, 6th Edition, 2011.

Jessie Avenue & Frontier Parkway Traffic

The 15% of all site trips expected to arrive from and depart to the southeast along Meyers Road can do so by utilizing either of two routes: connecting directly to Meyers Road via Leland Road, or utilizing Jessie Avenue / Frontier Parkway. Jessie Avenue intersects Leland Road southeast of the site access, and becomes Frontier Parkway before intersecting with Meyers Road northeast of the intersection of Leland Road at Jessie Avenue. Both Jessie Avenue and Frontier Parkway are classified as Local Streets by Oregon City's Transportation System Plan.

The Jessie Avenue/Frontier Parkway route provides a more direct connection to traffic arriving from and departing to the southeast along Meyers, reducing the total travel distance by approximately 2,200 feet. However, the slower speed limits, culture, geometry and traffic-calming features of Jessie Avenue and Frontier Parkway serve to increase travel times and reduce cut-through traffic to Meyers Road along this route. Assuming that drivers travel at the legal speed limits on each road (except when slowing and stopping), the route utilizing Jessie Avenue and Frontier Parkway would result in a negligible difference in travel time. However, Jessie Avenue and Frontier Parkway have traffic calming measures including several horizontal curves and two speed humps, likely limiting average speeds to below the legal speed limit. While the average total travel time is expected to be similar along both routes, the Jessie Avenue/Frontier Parkway route will have a greater variation in control delay due to the fact that it is controlled by two-way (rather than four way) stop signs. Thus, travel times are likely to be more reliable along the Leland Road route.

Based on the geometry and travel speeds, it is anticipated that three site trips will utilize Jessie Avenue/Frontier Parkway during the morning peak hour, and four site trips will utilize this route during the evening peak hour.

As described above, Jessie Avenue and Frontier Way feature traffic calming, so the small number of new trips added to these roads would be expected to travel at safe and reasonable streets. Further, since the subject site is very close to these roads, these trips are local trips which is consistent with the classification of the streets.

The proposed development is not projected to adversely affect the safety, culture, or operation of Jessie Avenue or Frontier Parkway, and no mitigations are needed or recommended.

Transportation Planning Rule

The Transportation Planning Rule (TPR) is in place to ensure that the transportation system is capable of supporting possible increases in traffic intensity that could result from changes to adopted plans and land-use regulations. Because the proposed project includes a change in zoning, the TPR must be addressed. The applicable elements of the TPR are each quoted directly in *italics* below, with a response directly following.

Oregon Administrative Rule 660-12-0600

(1) If an amendment to a functional plan, an acknowledge comprehensive plan, or a land use regulation (including a zoning map) would significantly affect an existing or planned transportation facility, then the local government must put in place measures as provided in section (2) of the rule, unless the amendment is allowed under section (3), (9), or (10) of this rule. A plan or land use regulation amendment significantly affects a transportation facility if it would:

(a) Change the functional classification of an existing or planned transportation facility (exclusive of correction of map errors in an adopted plan;

(b) Change standards implementing a functional classification system; or

(c) Result in any of the effects listed in paragraphs (A) through (C) of this subsection based on projected conditions measured at the end of the planning period identified in the TSP. As part of evaluating projected conditions, the amount of traffic projected to be generated within the area of the amendment may be reduced if the amendment includes an enforceable, ongoing requirement that would demonstrably limit traffic generation, including, but not limited to, transportation demand management. This reduction may diminish or completely eliminate the significant effect of the amendment.

(A) Types or levels of travel or access that are inconsistent with the functional classification of an existing or planned transportation facility;

(B) Degrade the performance of an existing or planned transportation facility such that it would not meet the performance standards identified in the TSP or comprehensive plan; or

(C) Degrade the performance of an existing or planned transportation facility that is otherwise projected to not meet performance standards identified in the TSP or comprehensive plan.

In the case of this report, subsections (a) and (b) are not triggered, since the proposed zone change will not impact or alter the functional classification of any existing or planned facility and the proposal does not include a change to any functional classification standards.

Subsection (c) is also not triggered since even with the addition of the net increase in trips from the zone change, all study area intersections will operate acceptably through the planning horizon.

The TPR is satisfied, since the proposed zone change does not significantly affect the transportation system.

Conclusions

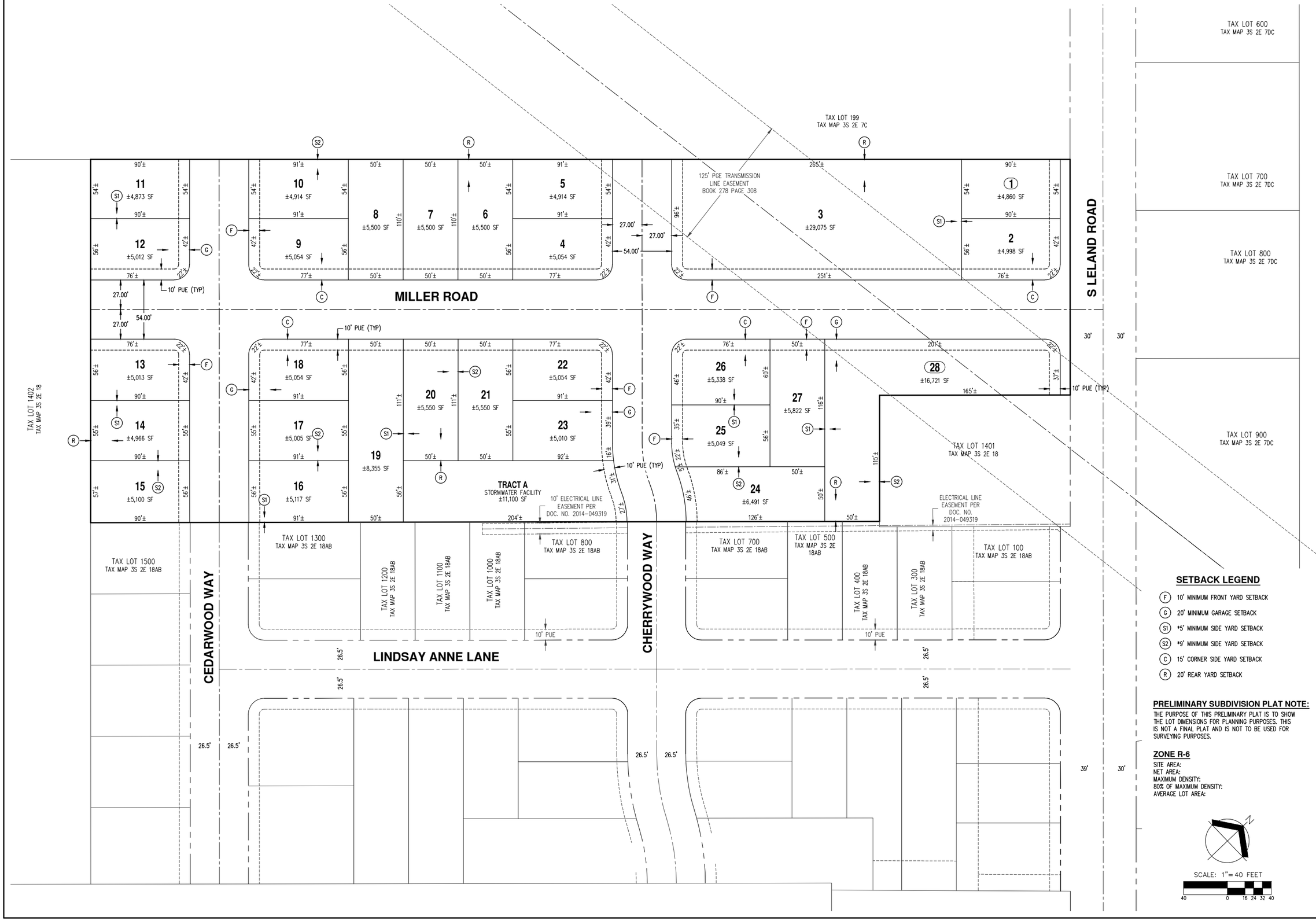
A 28-lot development is proposed at tax lot #1400, on the south side of Leland Road between the intersections with McCord Road and Lindsay Anne Lane in Oregon City, Oregon. When fully built-out, the development will generate 20 new trips during the morning peak hour, and 27 new trips during the evening peak hour.

The intersections of Leland Road at McCord Road, Leland Road at Lindsay Anne Lane, and the planned intersection of Leland Road at the proposed site access between Lindsay Anne Lane and McCord Road, and other facilities in the vicinity were found to have ample capacity to support the proposed development. No safety deficiencies were identified within the nearby transportation system, and none arise as a result of the proposed development.

The Transportation Planning Rule was analyzed and found to be satisfied, as the proposed zone change does not significantly affect the transportation system. The Oregon City Transportation System Plan accounts for growth as developments zoned FU-10 are rezoned for development.

The transportation system in the vicinity of the subject site can safely and efficiently accommodate the proposed development. No mitigations are needed or recommended.

Appendix



SETBACK LEGEND

- (F) 10' MINIMUM FRONT YARD SETBACK
- (G) 20' MINIMUM GARAGE SETBACK
- (S1) *5' MINIMUM SIDE YARD SETBACK
- (S2) *9' MINIMUM SIDE YARD SETBACK
- (C) 15' CORNER SIDE YARD SETBACK
- (R) 20' REAR YARD SETBACK

PRELIMINARY SUBDIVISION PLAT NOTE:

THE PURPOSE OF THIS PRELIMINARY PLAT IS TO SHOW THE LOT DIMENSIONS FOR PLANNING PURPOSES. THIS IS NOT A FINAL PLAT AND IS NOT TO BE USED FOR SURVEYING PURPOSES.

ZONE R-6

SITE AREA:
NET AREA:
MAXIMUM DENSITY:
80% OF MAXIMUM DENSITY:
AVERAGE LOT AREA:

SCALE: 1"= 40 FEET

40 0 16 24 32 40

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD STE 100
TUALATIN, OR 97062
P: 503.563.6151
F: 503.563.6152
aks-eng.com

ENGINEERING · SURVEYING · NATURAL RESOURCES
FORESTRY · PLANNING · LANDSCAPE ARCHITECTURE

LELAND ROAD SUBDIVISION
OREGON CITY OREGON

PRELIMINARY SUBDIVISION PLAT

DESIGNED BY:	VHN
DRAWN BY:	NMC
CHECKED BY:	
SCALE:	AS NOTED
DATE: 07/11/2017	

REVISIONS

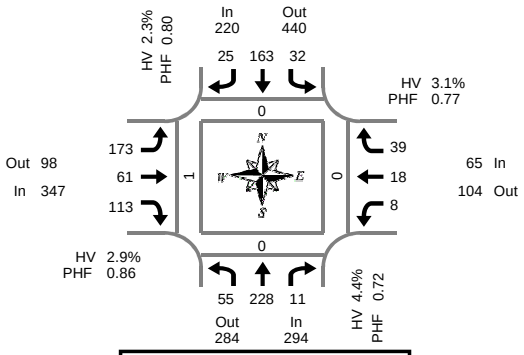
JOB NUMBER
5837

SHEET
####

AKS DRAWING FILE: 5837 PLAT.DWG | LAYOUT: P1-03

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Leland Rd & Clairmont Way

Tuesday, April 18, 2017
7:00 AM to 9:00 AM

Peak Hour Summary
7:05 AM to 8:05 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound Clairmont Way				Westbound Clairmont Way				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	1	10	1	0	0	4	2	0	4	5	8	0	0	2	2	0	39	0	0	0	0
7:05 AM	4	8	0	0	4	10	0	0	10	7	9	0	2	2	6	0	62	0	0	0	0
7:10 AM	3	10	1	0	2	12	2	0	16	3	11	0	2	1	1	0	64	0	0	0	0
7:15 AM	3	12	0	0	1	14	0	0	10	6	13	0	1	1	5	0	66	0	0	0	0
7:20 AM	1	21	0	0	1	14	3	0	19	4	7	0	1	3	4	0	78	0	0	0	0
7:25 AM	6	14	0	0	3	18	0	0	17	2	12	0	0	0	1	0	73	0	0	0	0
7:30 AM	3	22	0	0	2	21	2	0	9	2	11	0	0	4	2	0	78	0	0	0	0
7:35 AM	5	22	1	0	2	13	7	0	25	6	11	0	0	0	3	0	95	0	0	0	1
7:40 AM	3	25	1	0	5	14	3	0	18	4	12	0	0	1	4	0	90	0	0	0	0
7:45 AM	9	21	4	0	6	9	1	0	17	2	6	0	1	1	6	0	83	0	0	0	0
7:50 AM	5	25	1	0	4	15	3	0	11	6	5	0	0	1	1	0	77	0	0	0	0
7:55 AM	8	27	2	0	1	14	2	0	10	11	9	0	0	2	1	0	87	0	0	0	0
8:00 AM	5	21	1	0	1	9	2	0	11	8	7	0	1	2	5	0	73	0	0	0	0
8:05 AM	2	25	0	0	2	9	0	0	7	5	5	0	0	3	2	0	60	0	0	0	0
8:10 AM	6	28	0	0	0	4	1	0	4	3	3	0	0	1	4	0	54	0	0	0	0
8:15 AM	2	17	0	0	5	11	3	0	13	5	3	0	0	1	2	0	62	0	0	0	0
8:20 AM	3	21	1	0	1	9	3	0	6	3	3	0	0	3	4	1	57	0	0	0	0
8:25 AM	3	18	0	0	3	7	1	0	7	2	2	0	0	3	3	0	49	0	0	0	0
8:30 AM	2	9	1	0	2	18	3	0	10	5	5	0	0	3	2	0	60	0	0	0	0
8:35 AM	4	11	0	0	0	13	1	0	9	3	2	0	0	4	3	0	50	0	0	0	0
8:40 AM	1	23	0	0	0	9	3	0	6	3	6	0	1	4	0	0	56	0	0	0	0
8:45 AM	3	18	1	0	0	15	4	0	3	2	6	0	0	4	5	0	61	0	0	0	0
8:50 AM	1	18	0	0	5	8	2	0	7	4	3	0	0	3	1	0	52	0	0	0	0
8:55 AM	4	9	0	0	2	8	2	0	4	2	4	0	0	6	3	0	44	0	0	0	0
Total Survey	87	435	15	0	52	278	50	0	253	103	163	0	9	55	70	1	1,570	0	0	0	1

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound Clairmont Way				Westbound Clairmont Way				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	8	28	2	0	6	26	4	0	30	15	28	0	4	5	9	0	165	0	0	0	0
7:15 AM	10	47	0	0	5	46	3	0	46	12	32	0	2	4	10	0	217	0	0	0	0
7:30 AM	11	69	2	0	9	48	12	0	52	12	34	0	0	5	9	0	263	0	0	0	1
7:45 AM	22	73	7	0	11	38	6	0	38	19	20	0	1	4	8	0	247	0	0	0	0
8:00 AM	13	74	1	0	3	22	3	0	22	16	15	0	1	6	11	0	187	0	0	0	0
8:15 AM	8	56	1	0	9	27	7	0	26	10	8	0	0	7	9	1	168	0	0	0	0
8:30 AM	7	43	1	0	2	40	7	0	25	11	13	0	1	11	5	0	166	0	0	0	0
8:45 AM	8	45	1	0	7	31	8	0	14	8	13	0	0	13	9	0	157	0	0	0	0
Total Survey	87	435	15	0	52	278	50	0	253	103	163	0	9	55	70	1	1,570	0	0	0	1

Peak Hour Summary
7:05 AM to 8:05 AM

By Approach	Northbound Leland Rd				Southbound Leland Rd				Eastbound Clairmont Way				Westbound Clairmont Way				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	294	284	578	0	220	440	660	0	347	98	445	0	65	104	169	0	926	0	0	0	1
%HV	4.4%				2.3%				2.9%				3.1%				3.2%				
PHF	0.72				0.80				0.86				0.77				0.86				

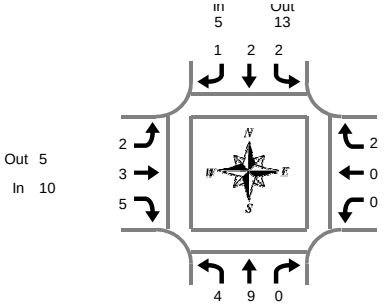
By Movement	Northbound Leland Rd				Southbound Leland Rd				Eastbound Clairmont Way				Westbound Clairmont Way				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	55	228	11	294	32	163	25	220	173	61	113	347	8	18	39	65	926
%HV	7.3%	3.9%	0.0%	4.4%	6.3%	1.2%	4.0%	2.3%	1.2%	4.9%	4.4%	2.9%	0.0%	0.0%	5.1%	3.1%	3.2%
PHF	0.63	0.78	0.39	0.72	0.53	0.77	0.52	0.80	0.72	0.61	0.83	0.86	0.40	0.64	0.75	0.77	0.86

Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound Clairmont Way				Westbound Clairmont Way				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	51	217	11	0	31	158	25	0	166	58	114	0	7	18	36	0	892	0	0	0	1
7:15 AM	56	263	10	0	28	154	24	0	158	59	101	0	4	19	38	0	914	0	0	0	1
7:30 AM	54	272	11	0	32	135	28	0	138	57	77	0	2	22	37	1	865	0	0	0	1
7:45 AM	50	246	10	0	25	127	23	0	111	56	56	0	3	28	33	1	768	0	0	0	0
8:00 AM	36	218	4	0	21	120	25	0	87	45	49	0	2	37	34	1	678	0	0	0	0

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Leland Rd & Clairmont Way

Tuesday, April 18, 2017
7:00 AM to 9:00 AM

Peak Hour Summary
7:05 AM to 8:05 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound Clairmont Way				Westbound Clairmont Way				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	2
7:05 AM	1	0	0	1	1	0	0	1	0	1	0	1	0	0	0	0	3
7:10 AM	0	3	0	3	0	0	0	0	1	0	0	1	0	0	0	0	4
7:15 AM	0	1	0	1	0	0	0	0	0	0	1	1	0	0	0	0	2
7:20 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
7:25 AM	1	1	0	2	1	0	0	1	0	0	1	1	0	0	0	0	4
7:30 AM	0	1	0	1	0	1	0	1	1	0	2	3	0	0	0	0	5
7:35 AM	0	0	0	0	0	0	1	1	0	1	1	2	0	0	1	1	4
7:40 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	2
7:45 AM	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
7:50 AM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
7:55 AM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:05 AM	0	2	0	2	0	1	0	1	0	0	0	0	0	1	0	1	4
8:10 AM	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
8:15 AM	1	1	0	2	0	0	1	1	0	1	1	2	0	0	0	0	5
8:20 AM	1	2	0	3	0	1	0	1	0	0	0	0	0	0	1	1	5
8:25 AM	1	1	0	2	0	1	0	1	1	0	0	1	0	0	1	1	5
8:30 AM	0	0	0	0	0	2	0	2	0	1	0	1	0	0	0	0	3
8:35 AM	0	0	0	0	0	5	0	5	1	0	1	2	0	0	0	0	7
8:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	1	1	2	0	2	1	3	0	0	0	0	0	0	0	0	5
8:50 AM	0	2	0	2	0	1	1	2	0	0	0	0	0	0	0	0	4
8:55 AM	0	0	0	0	0	1	0	1	0	0	1	1	0	0	0	0	2
Total Survey	9	19	1	29	2	16	4	22	4	5	8	17	0	2	4	6	74

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound Clairmont Way				Westbound Clairmont Way				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	1	4	0	5	1	0	0	1	1	1	0	2	0	1	0	1	9
7:15 AM	1	3	0	4	1	0	0	1	0	0	2	2	0	0	0	0	7
7:30 AM	0	1	0	1	0	1	1	2	1	2	3	6	0	0	2	2	11
7:45 AM	2	2	0	4	0	1	0	1	0	0	0	0	0	0	0	0	5
8:00 AM	2	2	0	4	0	1	0	1	0	0	0	0	0	1	0	1	6
8:15 AM	3	4	0	7	0	2	1	3	1	1	1	3	0	0	2	2	15
8:30 AM	0	0	0	0	0	7	0	7	1	1	1	3	0	0	0	0	10
8:45 AM	0	3	1	4	0	4	2	6	0	0	1	1	0	0	0	0	11
Total Survey	9	19	1	29	2	16	4	22	4	5	8	17	0	2	4	6	74

Heavy Vehicle Peak Hour Summary
7:05 AM to 8:05 AM

By Approach	Northbound Leland Rd			Southbound Leland Rd			Eastbound Clairmont Way			Westbound Clairmont Way			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	13	7	20	5	13	18	10	5	15	2	5	7	30
PHF	0.65			0.42			0.42			0.25			0.58

By Movement	Northbound Leland Rd				Southbound Leland Rd				Eastbound Clairmont Way				Westbound Clairmont Way				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	4	9	0	13	2	2	1	5	2	3	5	10	0	0	2	2	30
PHF	0.50	0.45	0.00	0.65	0.50	0.50	0.25	0.42	0.50	0.38	0.31	0.42	0.00	0.00	0.25	0.25	0.58

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

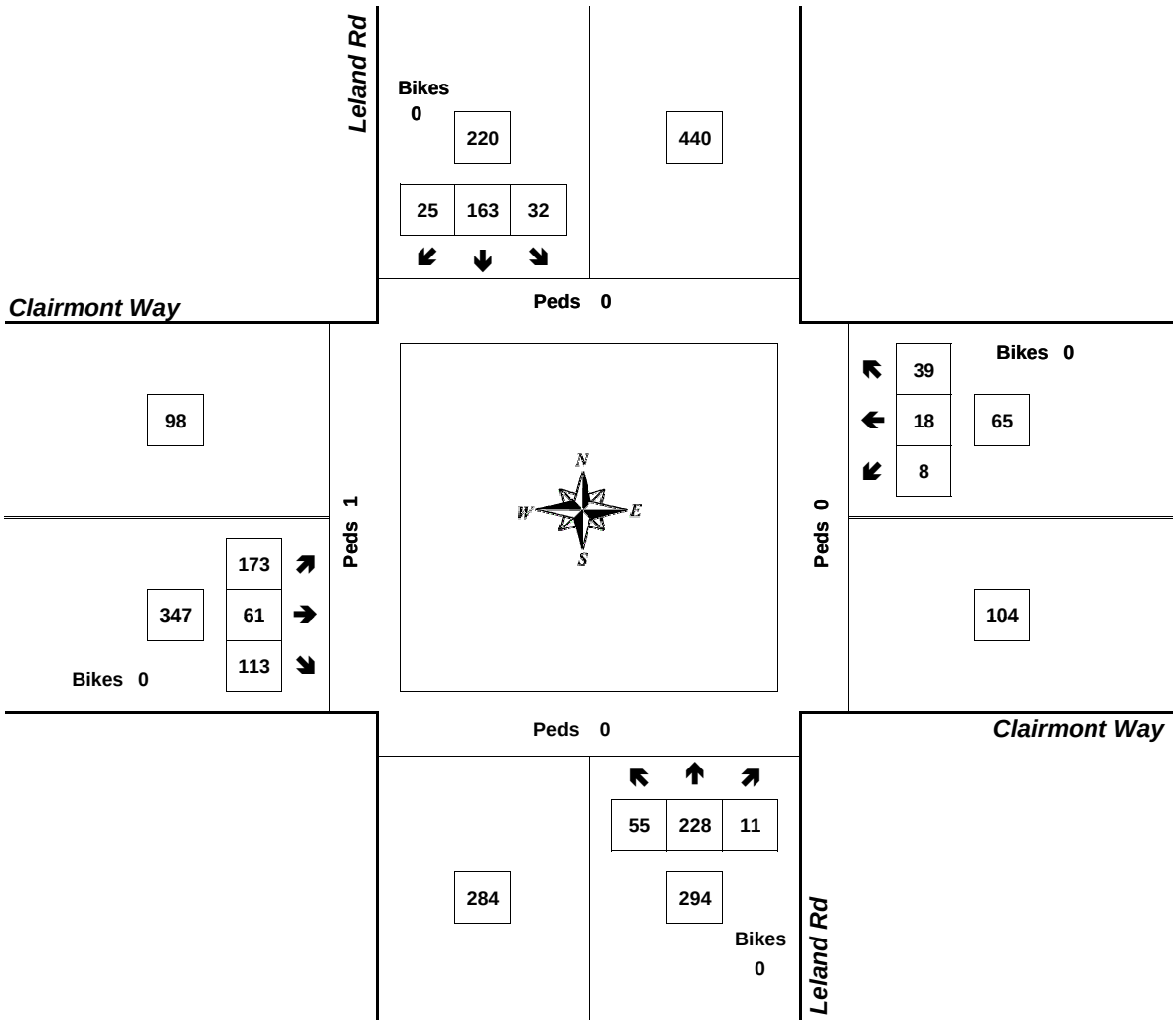
Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound Clairmont Way				Westbound Clairmont Way				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	4	10	0	14	2	2	1	5	2	3	5	10	0	1	2	3	32
7:15 AM	5	8	0	13	1	3	1	5	1	2	5	8	0	1	2	3	29
7:30 AM	7	9	0	16	0	5	2	7	2	3	4	9	0	1	4	5	37
7:45 AM	7	8	0	15	0	11	1	12	2	2	2	6	0	1	2	3	36
8:00 AM	5	9	1	15	0	14	3	17	2	2	3	7	0	1	2	3	42

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

Leland Rd & Clairmont Way

7:05 AM to 8:05 AM
Tuesday, April 18, 2017

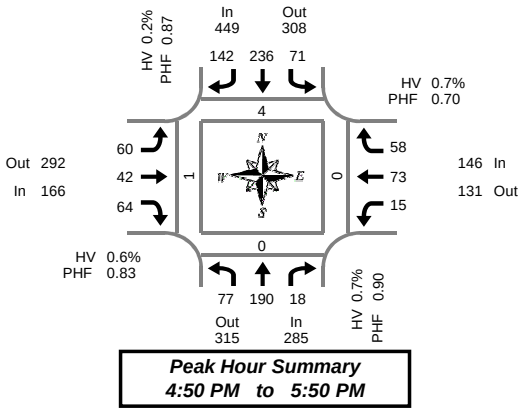


Approach	PHF	HV%	Volume
EB	0.86	2.9%	347
WB	0.77	3.1%	65
NB	0.72	4.4%	294
SB	0.80	2.3%	220
Intersection	0.86	3.2%	926

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:50 PM to 5:50 PM

Leland Rd & Clairmont Way

Tuesday, April 18, 2017
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound Clairmont Way				Westbound Clairmont Way				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	5	11	1	0	4	19	5	0	1	5	2	0	2	6	3	0	64	0	0	0	0
4:05 PM	16	10	1	0	6	18	6	0	3	4	2	0	0	6	3	0	75	0	0	0	0
4:10 PM	2	10	1	0	6	16	2	0	9	10	4	0	1	8	6	0	75	0	0	0	0
4:15 PM	3	14	3	0	7	14	6	0	3	6	3	0	1	12	3	1	75	0	0	0	0
4:20 PM	6	14	0	0	2	18	14	0	5	7	9	0	1	3	4	0	83	0	0	0	0
4:25 PM	4	15	0	0	7	15	4	0	3	3	7	0	1	6	3	0	68	2	0	0	0
4:30 PM	9	12	1	0	3	21	7	0	4	3	6	0	0	12	5	0	83	0	0	0	0
4:35 PM	7	17	1	0	6	23	14	0	4	5	14	0	1	5	5	0	102	0	0	0	0
4:40 PM	5	9	2	0	7	13	10	0	1	6	1	0	0	3	6	0	63	0	0	0	0
4:45 PM	3	18	0	0	7	17	14	0	6	5	6	0	0	10	6	0	92	0	0	0	0
4:50 PM	7	15	1	0	5	14	9	0	6	3	6	0	2	8	2	0	78	0	0	0	0
4:55 PM	6	21	2	0	6	16	17	0	4	4	3	0	2	3	11	0	95	0	0	0	1
5:00 PM	9	16	0	0	3	15	12	0	3	2	5	0	2	4	9	0	80	0	0	0	0
5:05 PM	4	17	0	0	6	15	8	0	6	3	4	0	1	12	8	0	84	0	0	0	0
5:10 PM	6	21	2	0	4	25	9	0	3	2	12	0	0	7	3	0	94	0	0	0	0
5:15 PM	15	11	3	0	11	23	11	0	4	5	6	0	0	1	6	0	96	1	0	0	0
5:20 PM	3	14	2	0	5	28	13	0	8	3	4	0	1	3	4	0	88	0	0	0	0
5:25 PM	6	15	0	0	5	17	12	0	8	2	1	0	1	4	3	0	74	0	0	0	0
5:30 PM	5	11	3	0	8	21	11	0	3	1	5	0	2	10	1	0	81	0	0	0	0
5:35 PM	4	14	2	0	4	17	19	0	3	4	3	0	2	6	1	0	79	0	0	0	0
5:40 PM	8	17	1	0	3	28	10	0	3	5	10	0	0	8	5	0	98	0	0	0	0
5:45 PM	4	18	2	0	11	17	11	0	9	8	5	0	2	7	5	0	99	3	0	0	0
5:50 PM	2	12	1	0	4	22	7	0	6	4	3	0	0	7	3	0	71	0	1	0	0
5:55 PM	11	16	4	0	5	18	4	0	5	3	9	0	1	6	7	0	89	0	0	0	0
Total Survey	150	348	33	0	135	450	235	0	110	103	130	0	23	157	112	1	1,986	6	1	0	1

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound Clairmont Way				Westbound Clairmont Way				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	23	31	3	0	16	53	13	0	13	19	8	0	3	20	12	0	214	0	0	0	0
4:15 PM	13	43	3	0	16	47	24	0	11	16	19	0	3	21	10	1	226	2	0	0	0
4:30 PM	21	38	4	0	16	57	31	0	9	14	21	0	1	20	16	0	248	0	0	0	0
4:45 PM	16	54	3	0	18	47	40	0	16	12	15	0	4	21	19	0	265	0	0	0	1
5:00 PM	19	54	2	0	13	55	29	0	12	7	21	0	3	23	20	0	258	0	0	0	0
5:15 PM	24	40	5	0	21	68	36	0	20	10	11	0	2	8	13	0	258	1	0	0	0
5:30 PM	17	42	6	0	15	66	40	0	9	10	18	0	4	24	7	0	258	0	0	0	0
5:45 PM	17	46	7	0	20	57	22	0	20	15	17	0	3	20	15	0	259	3	1	0	0
Total Survey	150	348	33	0	135	450	235	0	110	103	130	0	23	157	112	1	1,986	6	1	0	1

Peak Hour Summary
4:50 PM to 5:50 PM

By Approach	Northbound Leland Rd				Southbound Leland Rd				Eastbound Clairmont Way				Westbound Clairmont Way				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	285	315	600	0	449	308	757	0	166	292	458	0	146	131	277	0	1,046	4	0	0	1
%HV	0.7%				0.2%				0.6%				0.7%				0.5%				
PHF	0.90				0.87				0.83				0.70				0.94				

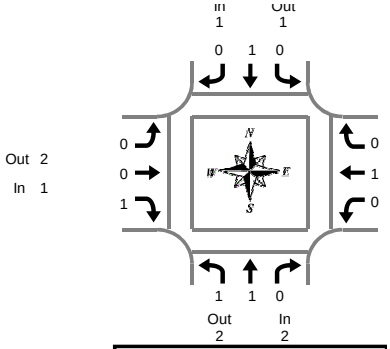
By Movement	Northbound Leland Rd				Southbound Leland Rd				Eastbound Clairmont Way				Westbound Clairmont Way				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	77	190	18	285	71	236	142	449	60	42	64	166	15	73	58	146	1,046
%HV	1.3%	0.5%	0.0%	0.7%	0.0%	0.4%	0.0%	0.2%	0.0%	0.0%	1.6%	0.6%	0.0%	1.4%	0.0%	0.7%	0.5%
PHF	0.77	0.88	0.64	0.90	0.85	0.78	0.85	0.87	0.75	0.62	0.73	0.83	0.63	0.76	0.52	0.70	0.94

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound Clairmont Way				Westbound Clairmont Way				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	73	166	13	0	66	204	108	0	49	61	63	0	11	82	57	1	953	2	0	0	1
4:15 PM	69	189	12	0	63	206	124	0	48	49	76	0	11	85	65	1	997	2	0	0	1
4:30 PM	80	186	14	0	68	227	136	0	57	43	68	0	10	72	68	0	1,029	1	0	0	1
4:45 PM	76	190	16	0	67	236	145	0	57	39	65	0	13	76	59	0	1,039	1	0	0	1
5:00 PM	77	182	20	0	69	246	127	0	61	42	67	0	12	75	55	0	1,033	4	1	0	0

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Leland Rd & Clairmont Way

Tuesday, April 18, 2017
4:00 PM to 6:00 PM

Peak Hour Summary
4:50 PM to 5:50 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound Clairmont Way				Westbound Clairmont Way				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
4:05 PM	1	0	0	1	0	1	0	1	0	1	1	2	0	0	0	0	4
4:10 PM	0	0	0	0	0	0	0	0	1	0	1	2	0	0	0	0	2
4:15 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:25 PM	0	1	0	1	1	1	0	2	0	0	1	1	0	0	0	0	4
4:30 PM	0	0	0	0	0	0	0	0	0	1	2	3	0	0	0	0	3
4:35 PM	0	0	0	0	0	2	1	3	0	0	0	0	0	0	0	0	3
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	1	1	0	0	0	0	1
4:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:55 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:00 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:25 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:40 PM	0	0	0	0	0	0	0	0	0	0	1	1	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
5:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:55 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
Total Survey	2	3	0	5	1	8	1	10	1	2	7	10	0	1	0	1	26

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound Clairmont Way				Westbound Clairmont Way				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	1	0	0	1	0	3	0	3	1	1	2	4	0	0	0	0	8
4:15 PM	0	2	0	2	1	1	0	2	0	0	1	1	0	0	0	0	5
4:30 PM	0	0	0	0	0	2	1	3	0	1	2	3	0	0	0	0	6
4:45 PM	0	1	0	1	0	0	0	0	0	0	1	1	0	0	0	0	2
5:00 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
5:45 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
Total Survey	2	3	0	5	1	8	1	10	1	2	7	10	0	1	0	1	26

Heavy Vehicle Peak Hour Summary
4:50 PM to 5:50 PM

By Approach	Northbound Leland Rd			Southbound Leland Rd			Eastbound Clairmont Way			Westbound Clairmont Way			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	2	2	4	1	1	2	1	2	3	1	0	1	5
PHF	0.25			0.25			0.25			0.25			0.63

By Movement	Northbound Leland Rd				Southbound Leland Rd				Eastbound Clairmont Way				Westbound Clairmont Way				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	1	0	2	0	1	0	1	0	0	1	1	0	1	0	1	5
PHF	0.25	0.25	0.00	0.25	0.00	0.25	0.00	0.25	0.00	0.00	0.25	0.25	0.00	0.25	0.00	0.25	0.63

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

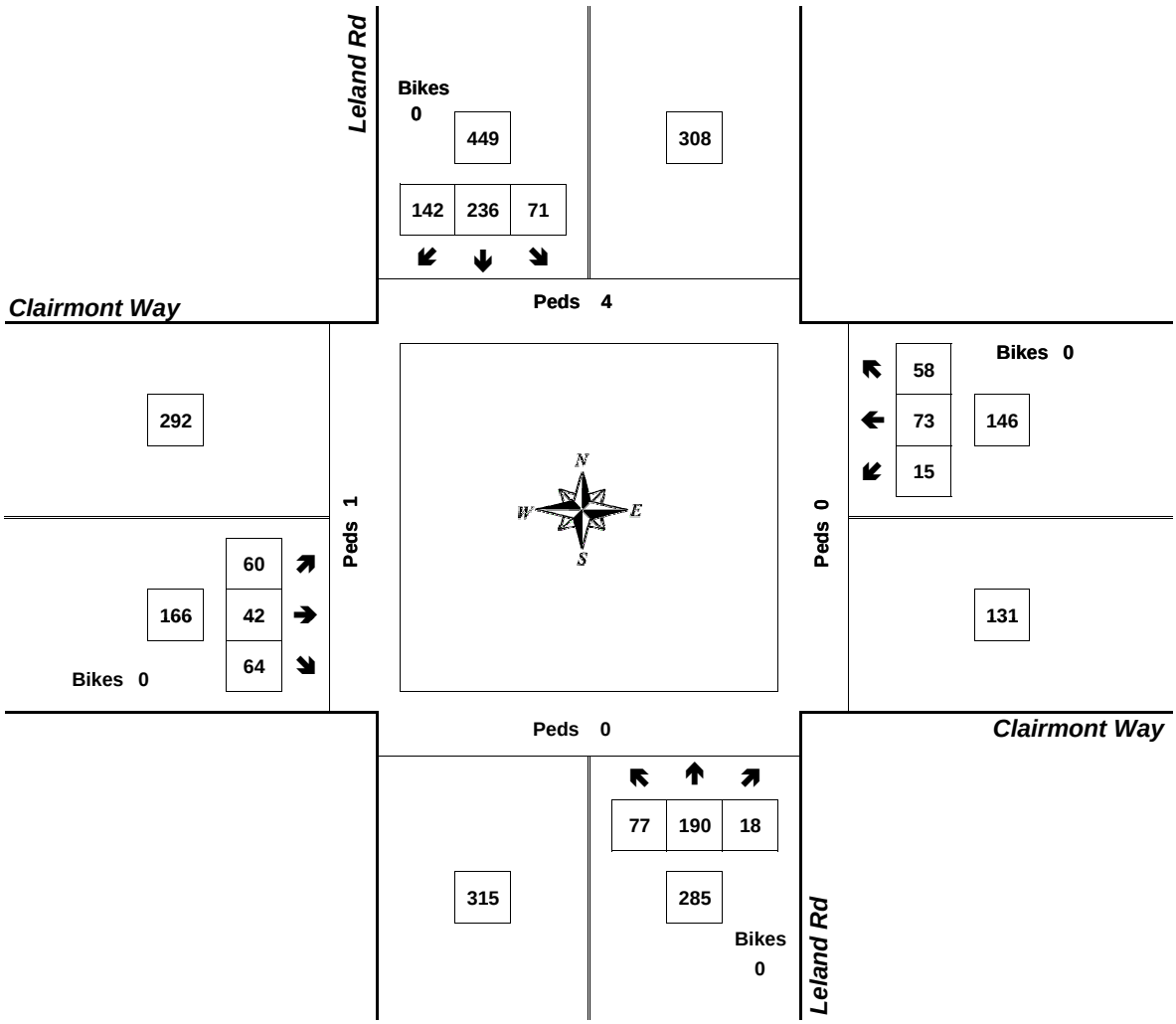
Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound Clairmont Way				Westbound Clairmont Way				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	1	3	0	4	1	6	1	8	1	2	6	9	0	0	0	0	21
4:15 PM	1	3	0	4	1	3	1	5	0	1	4	5	0	0	0	0	14
4:30 PM	1	1	0	2	0	3	1	4	0	1	3	4	0	1	0	1	11
4:45 PM	1	1	0	2	0	1	0	1	0	0	2	2	0	1	0	1	6
5:00 PM	1	0	0	1	0	2	0	2	0	0	1	1	0	1	0	1	5

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

Leland Rd & Clairmont Way

4:50 PM to 5:50 PM
Tuesday, April 18, 2017

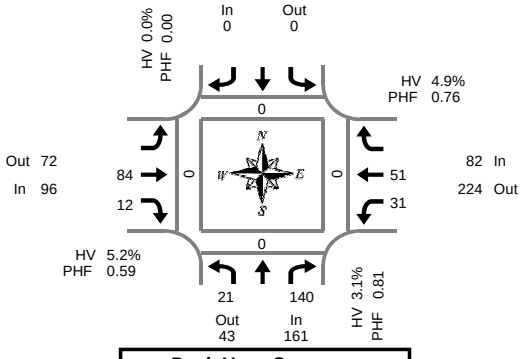


Approach	PHF	HV%	Volume
EB	0.83	0.6%	166
WB	0.70	0.7%	146
NB	0.90	0.7%	285
SB	0.87	0.2%	449
Intersection	0.94	0.5%	1,046

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
7:00 AM to 8:00 AM

Leland Rd & S Mccord Rd

Tuesday, April 18, 2017
7:00 AM to 9:00 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound S Mccord Rd				Westbound S Mccord Rd				Interval Total	Pedestrians Crosswalk			
	L		R	Bikes				Bikes	T	R	Bikes	L	T		Bikes			North	South	East	West
7:00 AM	2		6	1				0	6	1	0	3	1		0	19		0	0	0	0
7:05 AM	2		8	0				0	11	0	0	0	4		0	25		0	0	0	0
7:10 AM	0		8	0				0	10	1	0	4	4		0	27		0	0	0	0
7:15 AM	3		11	0				0	16	3	0	1	2		0	36		0	0	0	0
7:20 AM	3		17	0				0	11	0	0	4	2		1	37		0	0	0	0
7:25 AM	2		11	0				0	5	1	0	1	7		0	27		0	0	0	0
7:30 AM	1		10	0				0	2	0	0	3	6		0	22		0	0	0	0
7:35 AM	3		16	0				0	6	2	0	2	3		0	32		0	0	0	0
7:40 AM	0		12	0				0	3	0	0	5	6		0	26		0	0	0	0
7:45 AM	5		14	0				0	3	3	0	1	10		0	36		0	0	0	0
7:50 AM	0		10	0				0	5	0	0	1	4		0	20		0	0	0	0
7:55 AM	0		17	0				0	6	1	0	6	2		0	32		0	0	0	0
8:00 AM	1		6	0				0	4	0	0	3	4		0	18		0	0	0	0
8:05 AM	0		7	0				0	3	0	0	0	3		0	13		0	0	0	0
8:10 AM	1		6	0				0	2	1	0	2	6		0	18		0	0	0	0
8:15 AM	0		9	0				0	0	1	0	2	0		0	12		0	0	0	0
8:20 AM	1		7	0				0	4	0	0	3	5		1	20		0	0	0	0
8:25 AM	2		2	0				0	2	2	0	2	2		0	12		0	0	0	0
8:30 AM	1		3	0				0	3	0	0	7	2		0	16		0	0	0	0
8:35 AM	1		6	0				0	4	1	0	1	4		0	17		0	0	0	0
8:40 AM	0		4	0				0	3	2	0	0	5		0	14		0	0	0	0
8:45 AM	1		2	0				0	5	1	0	7	3		0	19		0	0	0	0
8:50 AM	0		8	0				0	2	2	0	1	3		0	16		0	0	0	0
8:55 AM	0		3	0				0	3	1	0	3	4		0	14		0	0	0	0
Total Survey	29		203	1				0	119	23	0	62	92		2	528		0	0	0	0

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound S Mccord Rd				Westbound S Mccord Rd				Interval Total	Pedestrians Crosswalk			
	L		R	Bikes				Bikes	T	R	Bikes	L	T		Bikes			North	South	East	West
7:00 AM	4		22	1				0	27	2	0	7	9		0	71		0	0	0	0
7:15 AM	8		39	0				0	32	4	0	6	11		1	100		0	0	0	0
7:30 AM	4		38	0				0	11	2	0	10	15		0	80		0	0	0	0
7:45 AM	5		41	0				0	14	4	0	8	16		0	88		0	0	0	0
8:00 AM	2		19	0				0	9	1	0	5	13		0	49		0	0	0	0
8:15 AM	3		18	0				0	6	3	0	7	7		1	44		0	0	0	0
8:30 AM	2		13	0				0	10	3	0	8	11		0	47		0	0	0	0
8:45 AM	1		13	0				0	10	4	0	11	10		0	49		0	0	0	0
Total Survey	29		203	1				0	119	23	0	62	92		2	528		0	0	0	0

Peak Hour Summary
7:00 AM to 8:00 AM

By Approach	Northbound Leland Rd				Southbound Leland Rd				Eastbound S Mccord Rd				Westbound S Mccord Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	161	43	204	1	0	0	0	0	96	72	168	0	82	224	306	1	339	0	0	0	0
%HV	3.1%				0.0%				5.2%				4.9%				4.1%				
PHF	0.81				0.00				0.59				0.76				0.85				

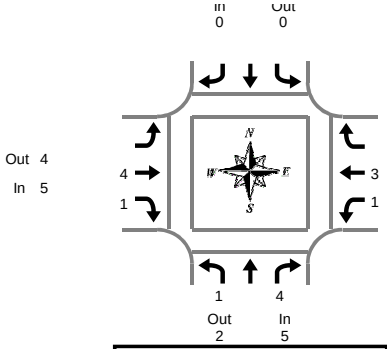
By Movement	Northbound Leland Rd				Southbound Leland Rd				Eastbound S Mccord Rd				Westbound S Mccord Rd				Total
	L		R	Total				Total		T	R	Total	L	T		Total	
Volume	21		140	161				0		84	12	96	31	51		82	339
%HV	4.8%	NA	2.9%	3.1%	NA	NA	NA	0.0%	NA	4.8%	8.3%	5.2%	3.2%	5.9%	NA	4.9%	4.1%
PHF	0.66		0.83	0.81				0.00		0.57	0.60	0.59	0.78	0.64		0.76	0.85

Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound S Mccord Rd				Westbound S Mccord Rd				Interval Total	Pedestrians Crosswalk			
	L		R	Bikes				Bikes	T	R	Bikes	L	T		Bikes			North	South	East	West
7:00 AM	21		140	1				0	84	12	0	31	51		1	339		0	0	0	0
7:15 AM	19		137	0				0	66	11	0	29	55		1	317		0	0	0	0
7:30 AM	14		116	0				0	40	10	0	30	51		1	261		0	0	0	0
7:45 AM	12		91	0				0	39	11	0	28	47		1	228		0	0	0	0
8:00 AM	8		63	0				0	35	11	0	31	41		1	189		0	0	0	0

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Leland Rd & S Mccord Rd

Tuesday, April 18, 2017
7:00 AM to 9:00 AM

Peak Hour Summary
7:00 AM to 8:00 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound S Mccord Rd				Westbound S Mccord Rd				Interval Total
	L		R	Total				Total	T	R	Total		L	T		Total	
7:00 AM	0		1	1				0	1	0	1		0	0		0	2
7:05 AM	0		0	0				0	0	0	0		0	0		0	0
7:10 AM	0		0	0				0	1	0	1		0	0		0	1
7:15 AM	0		0	0				0	0	0	0		0	1		1	1
7:20 AM	0		0	0				0	0	0	0		0	0		0	0
7:25 AM	1		1	2				0	0	1	1		0	1		1	4
7:30 AM	0		2	2				0	0	0	0		0	1		1	3
7:35 AM	0		0	0				0	1	0	1		0	0		0	1
7:40 AM	0		0	0				0	0	0	0		1	0		1	1
7:45 AM	0		0	0				0	0	0	0		0	0		0	0
7:50 AM	0		0	0				0	1	0	1		0	0		0	1
7:55 AM	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
8:05 AM	0		0	0				0	0	0	0		0	0		0	0
8:10 AM	0		0	0				0	0	0	0		1	1		2	2
8:15 AM	0		1	1				0	0	1	1		0	0		0	2
8:20 AM	0		1	1				0	0	0	0		0	1		1	2
8:25 AM	0		0	0				0	0	0	0		0	0		0	0
8:30 AM	0		0	0				0	0	0	0		2	0		2	2
8:35 AM	1		2	3				0	0	0	0		0	0		0	3
8:40 AM	0		0	0				0	0	0	0		0	0		0	0
8:45 AM	1		0	1				0	0	0	0		0	0		0	1
8:50 AM	0		0	0				0	0	0	0		0	0		0	0
8:55 AM	0		1	1				0	1	0	1		0	0		0	2
Total Survey	3		9	12				0	5	2	7		4	5		9	28

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound S Mccord Rd				Westbound S Mccord Rd				Interval Total
	L		R	Total				Total	T	R	Total		L	T		Total	
7:00 AM	0		1	1				0	2	0	2		0	0		0	3
7:15 AM	1		1	2				0	0	1	1		0	2		2	5
7:30 AM	0		2	2				0	1	0	1		1	1		2	5
7:45 AM	0		0	0				0	1	0	1		0	0		0	1
8:00 AM	0		0	0				0	0	0	0		1	1		2	2
8:15 AM	0		2	2				0	0	1	1		0	1		1	4
8:30 AM	1		2	3				0	0	0	0		2	0		2	5
8:45 AM	1		1	2				0	1	0	1		0	0		0	3
Total Survey	3		9	12				0	5	2	7		4	5		9	28

Heavy Vehicle Peak Hour Summary
7:00 AM to 8:00 AM

By Approach	Northbound Leland Rd			Southbound Leland Rd			Eastbound S Mccord Rd			Westbound S Mccord Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	5	2	7	0	0	0	5	4	9	4	8	12	14
PHF	0.31			0.00			0.63			0.50			0.44

By Movement	Northbound Leland Rd				Southbound Leland Rd				Eastbound S Mccord Rd				Westbound S Mccord Rd				Total
	L		R	Total				Total	T	R	Total		L	T		Total	
Volume	1		4	5				0	4	1	5		1	3		4	14
PHF	0.25		0.33	0.31				0.00	0.50	0.25	0.63		0.25	0.38		0.50	0.44

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

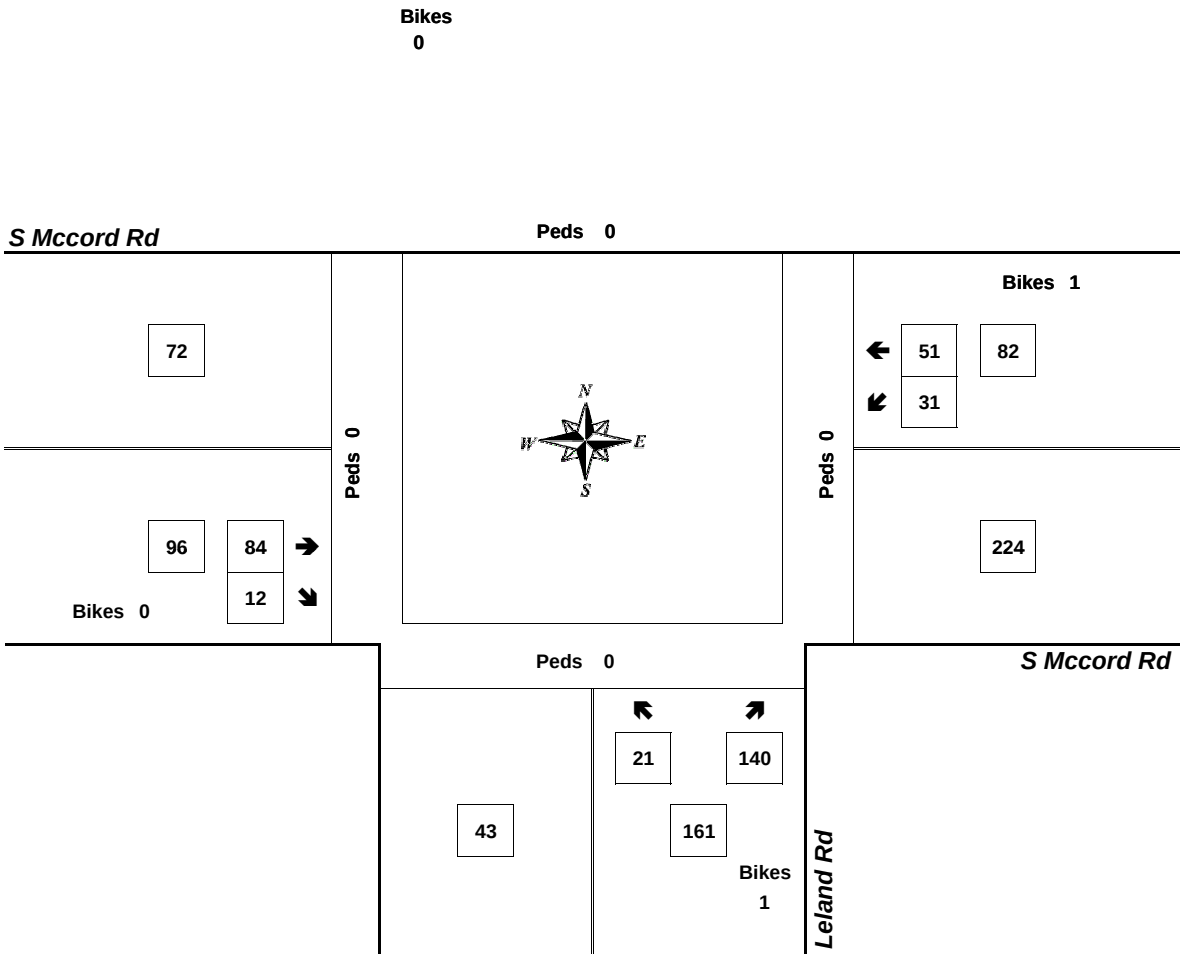
Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound S Mccord Rd				Westbound S Mccord Rd				Interval Total
	L		R	Total				Total	T	R	Total		L	T		Total	
7:00 AM	1		4	5				0	4	1	5		1	3		4	14
7:15 AM	1		3	4				0	2	1	3		2	4		6	13
7:30 AM	0		4	4				0	2	1	3		2	3		5	12
7:45 AM	1		4	5				0	1	1	2		3	2		5	12
8:00 AM	2		5	7				0	1	1	2		3	2		5	14

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

Leland Rd & S Mccord Rd

7:00 AM to 8:00 AM
Tuesday, April 18, 2017

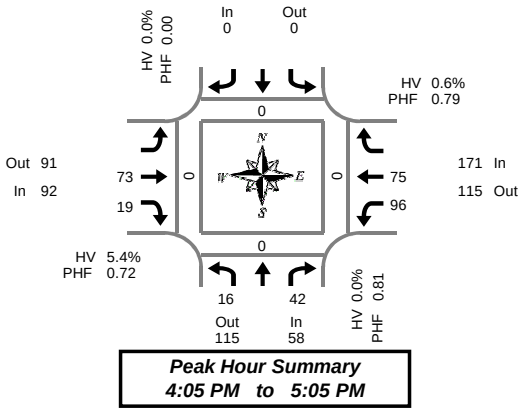


Approach	PHF	HV%	Volume
EB	0.59	5.2%	96
WB	0.76	4.9%	82
NB	0.81	3.1%	161
SB	0.00	0.0%	0
Intersection	0.85	4.1%	339

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

Clay Carney
(503) 833-2740



Leland Rd & S Mccord Rd

Tuesday, April 18, 2017
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound S Mccord Rd				Westbound S Mccord Rd				Interval Total	Pedestrians Crosswalk			
	L		R	Bikes				Bikes	T	R	Bikes	L	T		Bikes			North	South	East	West
4:00 PM	0		2	0				0	5	0	0	6	5		0	18		0	0	0	0
4:05 PM	2		6	0				0	4	1	0	8	9		0	30		0	0	0	0
4:10 PM	2		5	1				0	8	0	0	4	10		0	29		0	0	0	0
4:15 PM	1		2	0				0	6	2	0	6	5		0	22		0	0	0	0
4:20 PM	1		6	0				0	12	4	0	8	7		0	38		0	0	0	0
4:25 PM	2		2	0				0	5	0	0	3	4		0	16		0	0	0	0
4:30 PM	1		3	0				0	6	2	0	6	5		0	23		0	0	0	0
4:35 PM	0		2	0				0	8	2	0	14	7		0	33		0	0	0	0
4:40 PM	1		1	0				0	5	2	0	11	6		0	26		0	0	0	0
4:45 PM	2		9	0				0	5	2	0	13	3		0	34		0	0	0	0
4:50 PM	1		1	0				0	3	2	0	7	7		0	21		0	0	0	0
4:55 PM	1		2	0				0	6	1	0	10	6		1	26		0	0	0	0
5:00 PM	2		3	0				0	5	1	0	6	6		0	23		0	0	0	0
5:05 PM	2		3	0				0	4	1	0	9	7		0	26		0	0	0	0
5:10 PM	0		2	0				0	8	1	0	5	6		0	22		0	0	0	0
5:15 PM	1		3	0				0	7	4	0	8	8		0	31		0	0	0	0
5:20 PM	1		3	0				0	2	3	0	7	3		1	19		0	0	0	0
5:25 PM	1		3	0				0	1	1	0	12	7		0	25		0	0	0	0
5:30 PM	0		2	0				0	3	3	0	4	10		0	22		0	0	0	0
5:35 PM	1		4	0				0	5	1	0	8	7		1	26		0	0	0	0
5:40 PM	1		5	0				0	8	3	0	15	6		0	38		0	0	0	0
5:45 PM	2		6	0				0	6	0	0	10	3		0	27		0	0	0	0
5:50 PM	2		1	0				0	6	1	0	9	2		0	21		0	0	0	0
5:55 PM	0		3	0				0	9	1	0	7	9		0	29		0	0	0	0
Total Survey	27		79	1				0	137	38	0	196	148		3	625		0	0	0	0

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound S Mccord Rd				Westbound S Mccord Rd				Interval Total	Pedestrians Crosswalk			
	L		R	Bikes				Bikes	T	R	Bikes	L	T		Bikes			North	South	East	West
4:00 PM	4		13	1				0	17	1	0	18	24		0	77		0	0	0	0
4:15 PM	4		10	0				0	23	6	0	17	16		0	76		0	0	0	0
4:30 PM	2		6	0				0	19	6	0	31	18		0	82		0	0	0	0
4:45 PM	4		12	0				0	14	5	0	30	16		1	81		0	0	0	0
5:00 PM	4		8	0				0	17	3	0	20	19		0	71		0	0	0	0
5:15 PM	3		9	0				0	10	8	0	27	18		1	75		0	0	0	0
5:30 PM	2		11	0				0	16	7	0	27	23		1	86		0	0	0	0
5:45 PM	4		10	0				0	21	2	0	26	14		0	77		0	0	0	0
Total Survey	27		79	1				0	137	38	0	196	148		3	625		0	0	0	0

Peak Hour Summary
4:05 PM to 5:05 PM

By Approach	Northbound Leland Rd				Southbound Leland Rd				Eastbound S Mccord Rd				Westbound S Mccord Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	58	115	173	1	0	0	0	0	92	91	183	0	171	115	286	1	321	0	0	0	0
%HV	0.0%				0.0%				5.4%				0.6%				1.9%				
PHF	0.81				0.00				0.72				0.79				0.86				

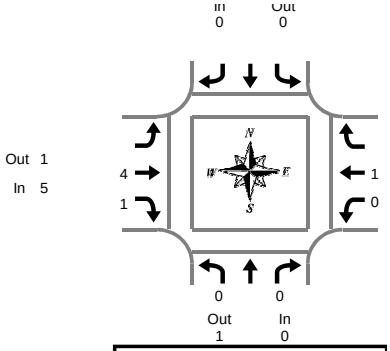
By Movement	Northbound Leland Rd				Southbound Leland Rd				Eastbound S Mccord Rd				Westbound S Mccord Rd				Total
	L		R	Total				Total		T	R	Total	L	T		Total	
Volume	16		42	58				0		73	19	92	96	75		171	321
%HV	0.0%	NA	0.0%	0.0%	NA	NA	NA	0.0%	NA	5.5%	5.3%	5.4%	0.0%	1.3%	NA	0.6%	1.9%
PHF	0.80		0.81	0.81				0.00		0.70	0.79	0.72	0.63	0.78		0.79	0.86

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound S Mccord Rd				Westbound S Mccord Rd				Interval Total	Pedestrians Crosswalk			
	L		R	Bikes				Bikes	T	R	Bikes	L	T		Bikes			North	South	East	West
4:00 PM	14		41	1				0	73	18	0	96	74		1	316		0	0	0	0
4:15 PM	14		36	0				0	73	20	0	98	69		1	310		0	0	0	0
4:30 PM	13		35	0				0	60	22	0	108	71		2	309		0	0	0	0
4:45 PM	13		40	0				0	57	23	0	104	76		3	313		0	0	0	0
5:00 PM	13		38	0				0	64	20	0	100	74		2	309		0	0	0	0

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Leland Rd & S Mccord Rd

Tuesday, April 18, 2017
4:00 PM to 6:00 PM

Peak Hour Summary
4:05 PM to 5:05 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound S Mccord Rd				Westbound S Mccord Rd				Interval Total
	L		R	Total				Total	T	R	Total	L	T		Total	
4:00 PM	0		0	0				0	0	0	0	0	0		0	0
4:05 PM	0		0	0				0	1	0	1	0	0		0	1
4:10 PM	0		0	0				0	1	0	1	0	1		1	2
4:15 PM	0		0	0				0	0	0	0	0	0		0	0
4:20 PM	0		0	0				0	0	1	1	0	0		0	1
4:25 PM	0		0	0				0	0	0	0	0	0		0	0
4:30 PM	0		0	0				0	1	0	1	0	0		0	1
4:35 PM	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
4:45 PM	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
4:55 PM	0		0	0				0	0	0	0	0	0		0	0
5:00 PM	0		0	0				0	1	0	1	0	0		0	1
5:05 PM	0		0	0				0	0	0	0	0	0		0	0
5:10 PM	0		0	0				0	0	0	0	0	0		0	0
5:15 PM	0		0	0				0	0	0	0	0	0		0	0
5:20 PM	0		0	0				0	0	0	0	0	0		0	0
5:25 PM	0		0	0				0	0	0	0	0	1		1	1
5:30 PM	0		0	0				0	0	0	0	0	0		0	0
5:35 PM	0		1	1				0	0	0	0	1	0		1	2
5:40 PM	0		0	0				0	0	0	0	0	0		0	0
5:45 PM	0		0	0				0	0	0	0	0	0		0	0
5:50 PM	0		0	0				0	0	0	0	0	0		0	0
5:55 PM	0		0	0				0	0	0	0	0	0		0	0
Total Survey	0		1	1				0	4	1	5	1	2		3	9

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound S Mccord Rd				Westbound S Mccord Rd				Interval Total
	L		R	Total				Total	T	R	Total	L	T		Total	
4:00 PM	0		0	0				0	2	0	2	0	1		1	3
4:15 PM	0		0	0				0	0	1	1	0	0		0	1
4:30 PM	0		0	0				0	1	0	1	0	0		0	1
4:45 PM	0		0	0				0	0	0	0	0	0		0	0
5:00 PM	0		0	0				0	1	0	1	0	0		0	1
5:15 PM	0		0	0				0	0	0	0	0	1		1	1
5:30 PM	0		1	1				0	0	0	0	1	0		1	2
5:45 PM	0		0	0				0	0	0	0	0	0		0	0
Total Survey	0		1	1				0	4	1	5	1	2		3	9

Heavy Vehicle Peak Hour Summary
4:05 PM to 5:05 PM

By Approach	Northbound Leland Rd			Southbound Leland Rd			Eastbound S Mccord Rd			Westbound S Mccord Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	1	1	0	0	0	5	1	6	1	4	5	6
PHF	0.00			0.00			0.63			0.25			0.50

By Movement	Northbound Leland Rd				Southbound Leland Rd				Eastbound S Mccord Rd				Westbound S Mccord Rd				Total
	L		R	Total				Total	T	R	Total	L	T		Total	
Volume	0		0	0				0	4	1	5	0	1		1	6
PHF	0.00		0.00	0.00				0.00	0.50	0.25	0.63	0.00	0.25		0.25	0.50

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

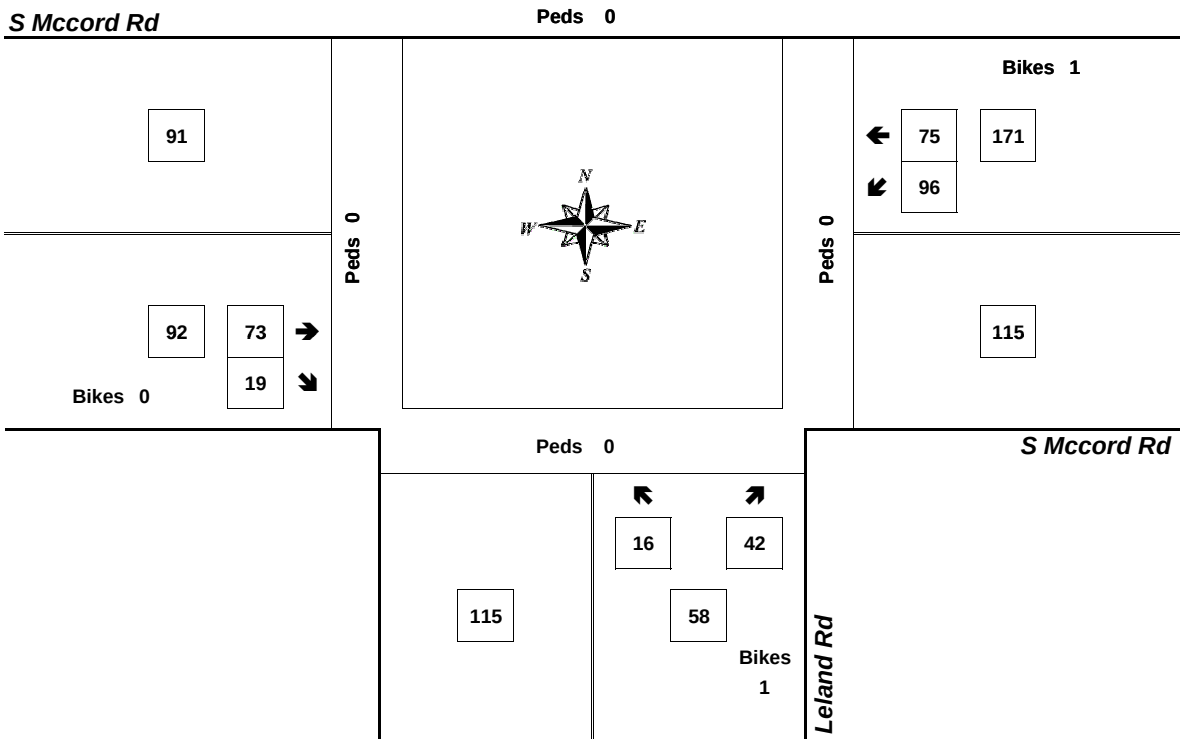
Interval Start Time	Northbound Leland Rd				Southbound Leland Rd				Eastbound S Mccord Rd				Westbound S Mccord Rd				Interval Total
	L		R	Total				Total	T	R	Total	L	T		Total	
4:00 PM	0		0	0				0	3	1	4	0	1		1	5
4:15 PM	0		0	0				0	2	1	3	0	0		0	3
4:30 PM	0		0	0				0	2	0	2	0	1		1	3
4:45 PM	0		1	1				0	1	0	1	1	1		2	4
5:00 PM	0		1	1				0	1	0	1	1	1		2	4

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

Leland Rd & S Mccord Rd

4:05 PM to 5:05 PM
Tuesday, April 18, 2017

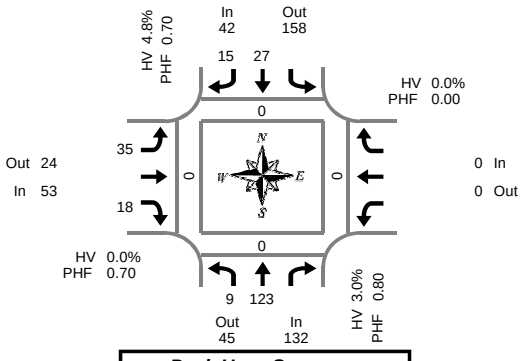


Approach	PHF	HV%	Volume
EB	0.72	5.4%	92
WB	0.79	0.6%	171
NB	0.81	0.0%	58
SB	0.00	0.0%	0
Intersection	0.86	1.9%	321

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
7:05 AM to 8:05 AM

Leland Rd & Lindsay Anne Ln

Tuesday, April 18, 2017
7:00 AM to 9:00 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd			Eastbound Lindsay Anne Ln				Westbound Lindsay Anne Ln				Interval Total	Pedestrians Crosswalk			
	L	T		Bikes	T	R	Bikes	L		R	Bikes				Bikes		North	South	East	West
7:00 AM	0	6		0	2	1	0	0		0	0				0	9	0	0	0	0
7:05 AM	1	7		0	0	1	0	3		2	0				0	14	0	0	0	0
7:10 AM	1	3		0	5	0	0	4		5	0				0	18	0	0	0	0
7:15 AM	0	12		0	3	0	0	3		1	0				0	19	0	0	0	0
7:20 AM	2	14		0	2	2	0	5		1	0				0	26	0	0	0	0
7:25 AM	0	13		0	2	1	0	0		0	0				0	16	0	0	0	0
7:30 AM	1	9		0	1	0	0	2		0	0				0	13	0	0	0	0
7:35 AM	0	13		0	3	1	0	4		2	0				0	23	0	0	0	0
7:40 AM	0	11		0	2	5	0	3		1	0				0	22	0	0	0	0
7:45 AM	1	16		0	3	1	0	3		3	0				0	27	0	0	0	0
7:50 AM	1	9		0	1	0	0	2		2	0				0	15	0	0	0	0
7:55 AM	1	11		0	2	3	0	3		1	0				0	21	0	0	0	0
8:00 AM	1	5		0	3	1	0	3		0	0				0	13	0	0	0	0
8:05 AM	2	6		0	0	0	0	1		1	0				0	10	0	0	0	0
8:10 AM	1	3		0	1	1	0	2		1	0				0	9	0	0	0	0
8:15 AM	0	7		0	0	1	0	3		0	0				0	11	0	0	0	0
8:20 AM	0	3		0	2	1	0	3		1	0				0	10	0	0	0	0
8:25 AM	1	5		0	3	3	0	1		0	0				0	13	0	0	0	0
8:30 AM	2	2		0	5	0	0	2		1	0				0	12	0	0	0	0
8:35 AM	0	2		0	2	0	0	2		0	0				0	6	0	0	0	0
8:40 AM	0	3		0	2	0	0	3		1	0				0	9	0	0	0	0
8:45 AM	0	3		0	5	2	0	0		1	0				0	11	0	0	0	0
8:50 AM	0	4		0	2	0	0	3		0	0				0	9	0	0	0	0
8:55 AM	1	2		0	2	2	0	0		1	0				0	8	0	0	0	0
Total Survey	16	169		0	53	26	0	55		25	0				0	344	0	0	0	0

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd			Eastbound Lindsay Anne Ln				Westbound Lindsay Anne Ln				Interval Total	Pedestrians Crosswalk			
	L	T		Bikes	T	R	Bikes	L		R	Bikes				Bikes		North	South	East	West
7:00 AM	2	16		0	7	2	0	7		7	0				0	41	0	0	0	0
7:15 AM	2	39		0	7	3	0	8		2	0				0	61	0	0	0	0
7:30 AM	1	33		0	6	6	0	9		3	0				0	58	0	0	0	0
7:45 AM	3	36		0	6	4	0	8		6	0				0	63	0	0	0	0
8:00 AM	4	14		0	4	2	0	6		2	0				0	32	0	0	0	0
8:15 AM	1	15		0	5	5	0	7		1	0				0	34	0	0	0	0
8:30 AM	2	7		0	9	0	0	7		2	0				0	27	0	0	0	0
8:45 AM	1	9		0	9	4	0	3		2	0				0	28	0	0	0	0
Total Survey	16	169		0	53	26	0	55		25	0				0	344	0	0	0	0

Peak Hour Summary
7:05 AM to 8:05 AM

By Approach	Northbound Leland Rd				Southbound Leland Rd				Eastbound Lindsay Anne Ln				Westbound Lindsay Anne Ln				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	132	45	177	0	42	158	200	0	53	24	77	0	0	0	0	0	227	0	0	0	0
%HV	3.0%				4.8%				0.0%				0.0%				2.6%				
PHF	0.80				0.70				0.70				0.00				0.79				

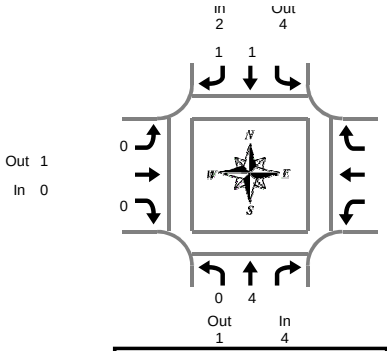
By Movement	Northbound Leland Rd				Southbound Leland Rd				Eastbound Lindsay Anne Ln				Westbound Lindsay Anne Ln				Total
	L	T		Total		T	R	Total	L		R	Total				Total	
Volume	9	123		132		27	15	42	35		18	53				0	227
%HV	0.0%	3.3%	NA	3.0%	NA	3.7%	6.7%	4.8%	0.0%	NA	0.0%	0.0%	NA	NA	NA	0.0%	2.6%
PHF	0.75	0.77		0.80		0.68	0.54	0.70	0.73		0.56	0.70				0.00	0.79

Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd			Eastbound Lindsay Anne Ln				Westbound Lindsay Anne Ln				Interval Total	Pedestrians Crosswalk			
	L	T		Bikes	T	R	Bikes	L		R	Bikes				Bikes		North	South	East	West
7:00 AM	8	124		0	26	15	0	32		18	0				0	223	0	0	0	0
7:15 AM	10	122		0	23	15	0	31		13	0				0	214	0	0	0	0
7:30 AM	9	98		0	21	17	0	30		12	0				0	187	0	0	0	0
7:45 AM	10	72		0	24	11	0	28		11	0				0	156	0	0	0	0
8:00 AM	8	45		0	27	11	0	23		7	0				0	121	0	0	0	0

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Leland Rd & Lindsay Anne Ln

Tuesday, April 18, 2017
7:00 AM to 9:00 AM

Peak Hour Summary
7:05 AM to 8:05 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd			Eastbound Lindsay Anne Ln				Westbound Lindsay Anne Ln				Interval Total
	L	T		Total	T	R	Total	L		R	Total				Total	
7:00 AM	0	1		1	0	0	0	0		0	0				0	1
7:05 AM	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
7:15 AM	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
7:25 AM	0	2		2	1	0	1	0		0	0				0	3
7:30 AM	0	2		2	0	0	0	0		0	0				0	2
7:35 AM	0	0		0	0	0	0	0		0	0				0	0
7:40 AM	0	0		0	0	1	1	0		0	0				0	1
7:45 AM	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
7:55 AM	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
8:05 AM	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
8:15 AM	0	0		0	0	0	0	1		0	1				0	1
8:20 AM	0	0		0	0	1	1	0		0	0				0	1
8:25 AM	0	0		0	0	0	0	0		0	0				0	0
8:30 AM	0	0		0	0	0	0	0		0	0				0	0
8:35 AM	0	0		0	0	0	0	1		0	1				0	1
8:40 AM	0	1		1	0	0	0	0		0	0				0	1
8:45 AM	0	1		1	1	0	1	0		0	0				0	2
8:50 AM	0	0		0	0	0	0	0		0	0				0	0
8:55 AM	0	1		1	0	0	0	0		1	1				0	2
Total Survey	0	8		8	2	2	4	2		1	3				0	15

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd			Eastbound Lindsay Anne Ln				Westbound Lindsay Anne Ln				Interval Total
	L	T		Total	T	R	Total	L		R	Total				Total	
7:00 AM	0	1		1	0	0	0	0		0	0				0	1
7:15 AM	0	2		2	1	0	1	0		0	0				0	3
7:30 AM	0	2		2	0	1	1	0		0	0				0	3
7:45 AM	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
8:15 AM	0	0		0	0	1	1	1		0	1				0	2
8:30 AM	0	1		1	0	0	0	1		0	1				0	2
8:45 AM	0	2		2	1	0	1	0		1	1				0	4
Total Survey	0	8		8	2	2	4	2		1	3				0	15

Heavy Vehicle Peak Hour Summary
7:05 AM to 8:05 AM

By Approach	Northbound Leland Rd			Southbound Leland Rd			Eastbound Lindsay Anne Ln			Westbound Lindsay Anne Ln			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	4	1	5	2	4	6	0	1	1	0	0	0	6
PHF	0.25			0.50			0.00			0.00			0.30

By Movement	Northbound Leland Rd				Southbound Leland Rd			Eastbound Lindsay Anne Ln				Westbound Lindsay Anne Ln				Total
	L	T		Total	T	R	Total	L		R	Total				Total	
Volume	0	4		4	1	1	2	0		0	0				0	6
PHF	0.00	0.25		0.25	0.25	0.25	0.50	0.00		0.00	0.00				0.00	0.30

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

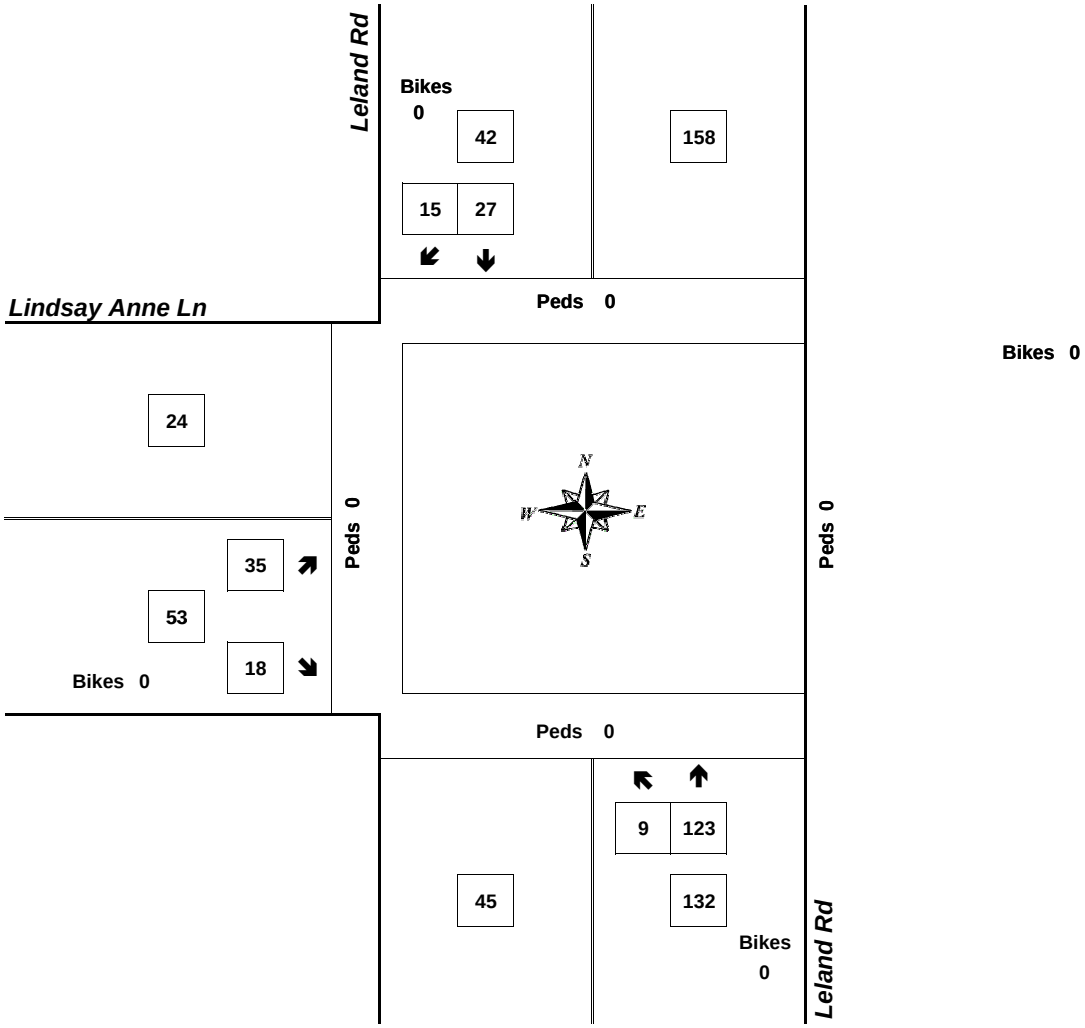
Interval Start Time	Northbound Leland Rd				Southbound Leland Rd			Eastbound Lindsay Anne Ln				Westbound Lindsay Anne Ln				Interval Total
	L	T		Total	T	R	Total	L		R	Total				Total	
7:00 AM	0	5		5	1	1	2	0		0	0				0	7
7:15 AM	0	4		4	1	1	2	0		0	0				0	6
7:30 AM	0	2		2	0	2	2	1		0	1				0	5
7:45 AM	0	1		1	0	1	1	2		0	2				0	4
8:00 AM	0	3		3	1	1	2	2		1	3				0	8

Peak Hour Summary

Clay Carney
(503) 833-2740

Leland Rd & Lindsay Anne Ln

7:05 AM to 8:05 AM
Tuesday, April 18, 2017

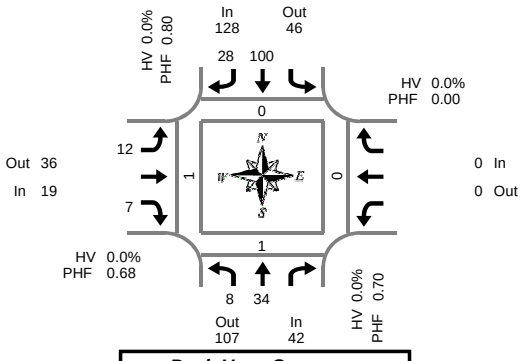


Approach	PHF	HV%	Volume
EB	0.70	0.0%	53
WB	0.00	0.0%	0
NB	0.80	3.0%	132
SB	0.70	4.8%	42
Intersection	0.79	2.6%	227

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:35 PM to 5:35 PM

Leland Rd & Lindsay Anne Ln

Tuesday, April 18, 2017
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd			Eastbound Lindsay Anne Ln			Westbound Lindsay Anne Ln			Interval Total	Pedestrians Crosswalk			
	L	T		Bikes	T	R	Bikes	L		R	Bikes			Bikes		North	South	East	West
4:00 PM	0	2		0	7	2	0	0		2	0			0	13	0	0	0	0
4:05 PM	1	4		0	3	3	0	3		0	0			0	14	0	0	0	0
4:10 PM	0	5		0	4	2	0	1		1	0			0	13	0	0	0	0
4:15 PM	1	1		0	3	1	0	2		0	0			0	8	0	0	0	0
4:20 PM	2	4		0	10	3	0	2		0	0			0	21	0	0	0	0
4:25 PM	1	2		0	0	2	0	2		2	0			0	9	0	0	0	0
4:30 PM	0	2		0	6	1	0	2		0	0			0	11	0	0	0	0
4:35 PM	0	1		0	13	1	0	0		0	0			0	15	0	0	0	0
4:40 PM	1	2		0	11	2	0	1		1	0			0	18	0	0	0	0
4:45 PM	1	7		0	10	3	0	2		1	0			0	24	0	0	0	0
4:50 PM	1	2		0	8	3	0	1		1	0			0	16	0	0	0	0
4:55 PM	0	4		0	10	1	0	0		0	0			0	15	0	0	0	0
5:00 PM	0	2		0	7	3	0	2		0	0			0	14	0	0	0	0
5:05 PM	2	4		0	8	3	0	1		1	0			0	19	0	0	0	0
5:10 PM	0	1		0	2	1	0	1		1	0			0	6	0	0	0	0
5:15 PM	1	2		0	11	3	0	3		0	0			0	20	0	0	0	1
5:20 PM	0	2		0	9	1	0	1		1	0			0	14	0	0	0	0
5:25 PM	0	3		0	8	2	0	0		0	0			0	13	0	1	0	0
5:30 PM	2	4		0	3	5	0	0		1	1			0	15	0	0	0	0
5:35 PM	1	4		0	7	1	1	1		0	0			0	14	0	0	0	0
5:40 PM	0	4		0	10	2	0	2		0	0			0	18	0	0	0	0
5:45 PM	0	6		0	12	1	0	2		0	0			0	21	0	0	0	0
5:50 PM	3	2		0	8	4	0	1		1	0			0	19	0	0	0	0
5:55 PM	1	1		0	5	2	0	2		0	0			0	11	0	0	0	0
Total Survey	18	71		0	175	52	1	32		13	1			0	361	0	1	0	1

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd			Eastbound Lindsay Anne Ln			Westbound Lindsay Anne Ln			Interval Total	Pedestrians Crosswalk			
	L	T		Bikes	T	R	Bikes	L		R	Bikes			Bikes		North	South	East	West
4:00 PM	1	11		0	14	7	0	4		3	0			0	40	0	0	0	0
4:15 PM	4	7		0	13	6	0	6		2	0			0	38	0	0	0	0
4:30 PM	1	5		0	30	4	0	3		1	0			0	44	0	0	0	0
4:45 PM	2	13		0	28	7	0	3		2	0			0	55	0	0	0	0
5:00 PM	2	7		0	17	7	0	4		2	0			0	39	0	0	0	0
5:15 PM	1	7		0	28	6	0	4		1	0			0	47	0	1	0	1
5:30 PM	3	12		0	20	8	1	3		1	1			0	47	0	0	0	0
5:45 PM	4	9		0	25	7	0	5		1	0			0	51	0	0	0	0
Total Survey	18	71		0	175	52	1	32		13	1			0	361	0	1	0	1

Peak Hour Summary
4:35 PM to 5:35 PM

By Approach	Northbound Leland Rd				Southbound Leland Rd				Eastbound Lindsay Anne Ln				Westbound Lindsay Anne Ln				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	42	107	149	0	128	46	174	0	19	36	55	1	0	0	0	0	189	0	1	0	1
%HV	0.0%				0.0%				0.0%				0.0%				0.0%				
PHF	0.70				0.80				0.68				0.00				0.81				

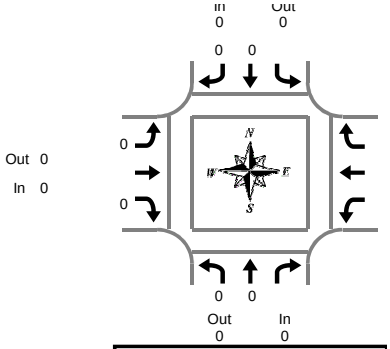
By Movement	Northbound Leland Rd				Southbound Leland Rd			Eastbound Lindsay Anne Ln				Westbound Lindsay Anne Ln				Total
	L	T		Total	T	R	Total	L		R	Total				Total	
Volume	8	34		42	100	28	128	12		7	19				0	189
%HV	0.0%	0.0%	NA	0.0%	NA	0.0%	0.0%	0.0%	NA	0.0%	0.0%	NA	NA	NA	0.0%	0.0%
PHF	0.67	0.65		0.70		0.74	0.88	0.80	0.60		0.58	0.68			0.00	0.81

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd			Eastbound Lindsay Anne Ln				Westbound Lindsay Anne Ln				Interval Total	Pedestrians Crosswalk			
	L	T		Bikes	T	R	Bikes	L		R	Bikes				Bikes		North	South	East	West
4:00 PM	8	36		0	85	24	0	16		8	0				0	177	0	0	0	0
4:15 PM	9	32		0	88	24	0	16		7	0				0	176	0	0	0	0
4:30 PM	6	32		0	103	24	0	14		6	0				0	185	0	1	0	1
4:45 PM	8	39		0	93	28	1	14		6	1				0	188	0	1	0	1
5:00 PM	10	35		0	90	28	1	16		5	1				0	184	0	1	0	1

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Leland Rd & Lindsay Anne Ln

Tuesday, April 18, 2017
4:00 PM to 6:00 PM

Peak Hour Summary
4:35 PM to 5:35 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd			Eastbound Lindsay Anne Ln				Westbound Lindsay Anne Ln				Interval Total
	L	T		Total	T	R	Total	L		R	Total				Total	
4:00 PM	0	0		0	1	0	1	0		0	0				0	1
4:05 PM	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
4:15 PM	0	0		0	0	0	0	0		0	0				0	0
4:20 PM	0	0		0	1	0	1	0		0	0				0	1
4:25 PM	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
4:35 PM	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
4:45 PM	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
4:55 PM	0	0		0	0	0	0	0		0	0				0	0
5:00 PM	0	0		0	0	0	0	0		0	0				0	0
5:05 PM	0	0		0	0	0	0	0		0	0				0	0
5:10 PM	0	0		0	0	0	0	0		0	0				0	0
5:15 PM	0	0		0	0	0	0	0		0	0				0	0
5:20 PM	0	0		0	0	0	0	0		0	0				0	0
5:25 PM	0	0		0	0	0	0	0		0	0				0	0
5:30 PM	0	0		0	0	0	0	0		0	0				0	0
5:35 PM	0	1		1	0	0	0	1		0	1				0	2
5:40 PM	0	0		0	0	0	0	0		0	0				0	0
5:45 PM	0	0		0	0	0	0	0		0	0				0	0
5:50 PM	0	0		0	0	0	0	0		0	0				0	0
5:55 PM	0	0		0	0	0	0	0		0	0				0	0
Total Survey	0	1		1	2	0	2	1		0	1				0	4

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Leland Rd				Southbound Leland Rd			Eastbound Lindsay Anne Ln				Westbound Lindsay Anne Ln				Interval Total
	L	T		Total	T	R	Total	L		R	Total				Total	
4:00 PM	0	0		0	1	0	1	0		0	0				0	1
4:15 PM	0	0		0	1	0	1	0		0	0				0	1
4:30 PM	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
5:00 PM	0	0		0	0	0	0	0		0	0				0	0
5:15 PM	0	0		0	0	0	0	0		0	0				0	0
5:30 PM	0	1		1	0	0	0	1		0	1				0	2
5:45 PM	0	0		0	0	0	0	0		0	0				0	0
Total Survey	0	1		1	2	0	2	1		0	1				0	4

Heavy Vehicle Peak Hour Summary
4:35 PM to 5:35 PM

By Approach	Northbound Leland Rd			Southbound Leland Rd			Eastbound Lindsay Anne Ln			Westbound Lindsay Anne Ln			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.00			0.00			0.00			0.00			0.00

By Movement	Northbound Leland Rd				Southbound Leland Rd			Eastbound Lindsay Anne Ln				Westbound Lindsay Anne Ln				Total
	L	T		Total	T	R	Total	L		R	Total				Total	
Volume	0	0		0	0	0	0	0		0	0				0	0
PHF	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00				0.00	0.00

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

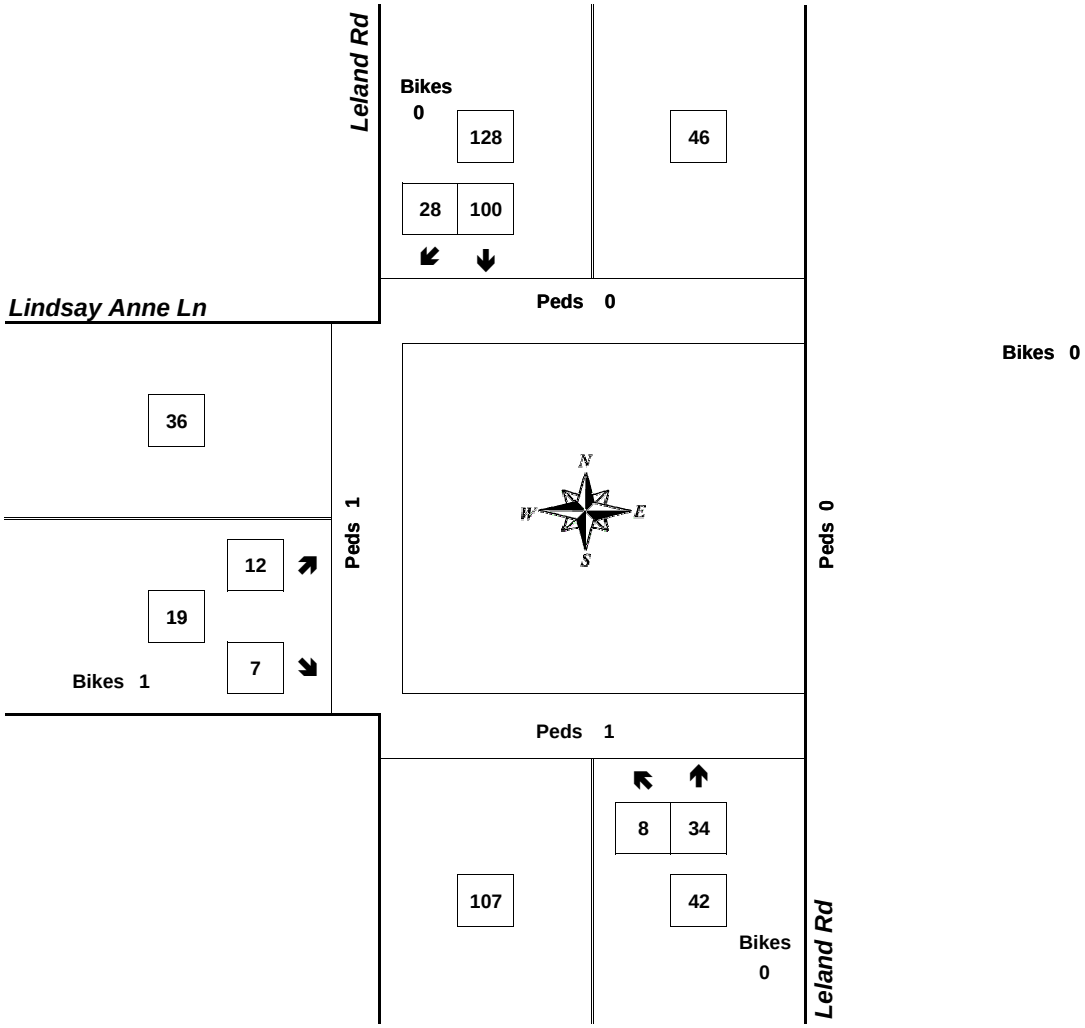
Interval Start Time	Northbound Leland Rd				Southbound Leland Rd			Eastbound Lindsay Anne Ln				Westbound Lindsay Anne Ln				Interval Total
	L	T		Total	T	R	Total	L		R	Total				Total	
4:00 PM	0	0		0	2	0	2	0		0	0				0	2
4:15 PM	0	0		0	1	0	1	0		0	0				0	1
4:30 PM	0	0		0	0	0	0	0		0	0				0	0
4:45 PM	0	1		1	0	0	0	1		0	1				0	2
5:00 PM	0	1		1	0	0	0	1		0	1				0	2

Peak Hour Summary

Clay Carney
(503) 833-2740

Leland Rd & Lindsay Anne Ln

4:35 PM to 5:35 PM
Tuesday, April 18, 2017



Approach	PHF	HV%	Volume
EB	0.68	0.0%	19
WB	0.00	0.0%	0
NB	0.70	0.0%	42
SB	0.80	0.0%	128
Intersection	0.81	0.0%	189

Count Period: 4:00 PM to 6:00 PM

TRIP GENERATION CALCULATIONS

Land Use:	**Single-Family Detached Housing**
Land Use Code:	210
Variable:	Dwelling Units
Variable Value:	28

AM PEAK HOUR

Trip Rate: 0.75

	Enter	Exit	Total
Directional Distribution	25%	75%	
Trip Ends	**5**	**16**	**21**

PM PEAK HOUR

Trip Rate: 1.00

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	**18**	**10**	**28**

WEEKDAY

Trip Rate: 9.52

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**133**	**133**	**266**

SATURDAY

Trip Rate: 9.91

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**139**	**139**	**278**

Source: TRIP GENERATION, Ninth Edition

LEVEL OF SERVICE

Level of service is used to describe the quality of traffic flow. Levels of service A to C are considered good, and rural roads are usually designed for level of service C. Urban streets and signalized intersections are typically designed for level of service D. Level of service E is considered to be the limit of acceptable delay. For unsignalized intersections, level of service E is generally considered acceptable. Here is a more complete description of levels of service:

Level of service A: Very low delay at intersections, with all traffic signal cycles clearing and no vehicles waiting through more than one signal cycle. On highways, low volume and high speeds, with speeds not restricted by other vehicles.

Level of service B: Operating speeds beginning to be affected by other traffic; short traffic delays at intersections. Higher average intersection delay than for level of service A resulting from more vehicles stopping.

Level of service C: Operating speeds and maneuverability closely controlled by other traffic; higher delays at intersections than for level of service B due to a significant number of vehicles stopping. Not all signal cycles clear the waiting vehicles. This is the recommended design standard for rural highways.

Level of service D: Tolerable operating speeds; long traffic delays occur at intersections. The influence of congestion is noticeable. At traffic signals many vehicles stop, and the proportion of vehicles not stopping declines. The number of signal cycle failures, for which vehicles must wait through more than one signal cycle, are noticeable. This is typically the design level for urban signalized intersections.

Level of service E: Restricted speeds, very long traffic delays at traffic signals, and traffic volumes near capacity. Flow is unstable so that any interruption, no matter how minor, will cause queues to form and service to deteriorate to level of service F. Traffic signal cycle failures are frequent occurrences. For unsignalized intersections, level of service E or better is generally considered acceptable.

Level of service F: Extreme delays, resulting in long queues which may interfere with other traffic movements. There may be stoppages of long duration, and speeds may drop to zero. There may be frequent signal cycle failures. Level of service F will typically result when vehicle arrival rates are greater than capacity. It is considered unacceptable by most drivers.

LEVEL OF SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-20
C	20-35
D	35-55
E	55-80
F	>80

LEVEL OF SERVICE CRITERIA
FOR UNSIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-15
C	15-25
D	25-35
E	35-50
F	>50

Intersection	
Int Delay, s/veh	3.7

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	21	140	84	12	31	51
Future Vol, veh/h	21	140	84	12	31	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	152	91	13	34	55

Major/Minor	Major1		Minor2		Major2	
Conflicting Flow All	55	0	321	55	152	0
Stage 1	-	-	123	-	-	-
Stage 2	-	-	198	-	-	-
Critical Hdwy	4.12	-	6.52	6.22	4.12	-
Critical Hdwy Stg 1	-	-	5.52	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.218	-	4.018	3.318	2.218	-
Pot Cap-1 Maneuver	1550	-	596	1012	1429	-
Stage 1	-	-	794	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-				-
Mov Cap-1 Maneuver	1550	-	0	1012	1429	-
Mov Cap-2 Maneuver	-	-	0	-	-	-
Stage 1	-	-	0	-	-	-
Stage 2	-	-	0	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	1	9	2.9
HCM LOS		A	

Minor Lane/Major Mvmt	NELn1	NWL	NWR	SWL	SWT
Capacity (veh/h)	1012	1550	-	1429	-
HCM Lane V/C Ratio	0.103	0.015	-	0.024	-
HCM Control Delay (s)	9	7.4	-	7.6	0
HCM Lane LOS	A	A	-	A	A
HCM 95th %tile Q(veh)	0.3	0	-	0.1	-

Intersection	
Int Delay, s/veh	2.5

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	27	15	9	123	35	18
Future Vol, veh/h	27	15	9	123	35	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	16	10	134	38	20

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	46	0	191	38
Stage 1	-	-	-	-	38	-
Stage 2	-	-	-	-	153	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1562	-	798	1034
Stage 1	-	-	-	-	984	-
Stage 2	-	-	-	-	875	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1562	-	792	1034
Mov Cap-2 Maneuver	-	-	-	-	792	-
Stage 1	-	-	-	-	984	-
Stage 2	-	-	-	-	869	-

Approach	SE	NW	NE
HCM Control Delay, s	0	0.5	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER
Capacity (veh/h)	860	1562	-	-	-
HCM Lane V/C Ratio	0.067	0.006	-	-	-
HCM Control Delay (s)	9.5	7.3	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.2	0	-	-	-

Intersection	
Int Delay, s/veh	5.2

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	16	42	73	17	96	75
Future Vol, veh/h	16	42	73	17	96	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	46	79	18	104	82

Major/Minor	Major1		Minor2		Major2	
Conflicting Flow All	82	0	370	82	46	0
Stage 1	-	-	290	-	-	-
Stage 2	-	-	80	-	-	-
Critical Hdwy	4.12	-	6.52	6.22	4.12	-
Critical Hdwy Stg 1	-	-	5.52	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.218	-	4.018	3.318	2.218	-
Pot Cap-1 Maneuver	1515	-	560	978	1562	-
Stage 1	-	-	672	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-				-
Mov Cap-1 Maneuver	1515	-	0	978	1562	-
Mov Cap-2 Maneuver	-	-	0	-	-	-
Stage 1	-	-	0	-	-	-
Stage 2	-	-	0	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	2	9.1	4.2
HCM LOS		A	

Minor Lane/Major Mvmt	NELn1	NWL	NWR	SWL	SWT
Capacity (veh/h)	978	1515	-	1562	-
HCM Lane V/C Ratio	0.1	0.011	-	0.067	-
HCM Control Delay (s)	9.1	7.4	-	7.5	0
HCM Lane LOS	A	A	-	A	A
HCM 95th %tile Q(veh)	0.3	0	-	0.2	-

Intersection	
Int Delay, s/veh	1.3

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	100	28	8	34	12	7
Future Vol, veh/h	100	28	8	34	12	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	109	30	9	37	13	8

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	139	0	178	124
Stage 1	-	-	-	-	124	-
Stage 2	-	-	-	-	54	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1445	-	812	927
Stage 1	-	-	-	-	902	-
Stage 2	-	-	-	-	969	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1445	-	807	927
Mov Cap-2 Maneuver	-	-	-	-	807	-
Stage 1	-	-	-	-	902	-
Stage 2	-	-	-	-	963	-

Approach	SE	NW	NE
HCM Control Delay, s	0	1.4	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER
Capacity (veh/h)	847	1445	-	-	-
HCM Lane V/C Ratio	0.024	0.006	-	-	-
HCM Control Delay (s)	9.4	7.5	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	0	-	-	-

Intersection	
Int Delay, s/veh	3.7

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	22	146	87	12	32	53
Future Vol, veh/h	22	146	87	12	32	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	159	95	13	35	58

Major/Minor	Major1		Minor2		Major2	
Conflicting Flow All	58	0	334	58	159	0
Stage 1	-	-	127	-	-	-
Stage 2	-	-	207	-	-	-
Critical Hdwy	4.12	-	6.52	6.22	4.12	-
Critical Hdwy Stg 1	-	-	5.52	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.218	-	4.018	3.318	2.218	-
Pot Cap-1 Maneuver	1546	-	586	1008	1420	-
Stage 1	-	-	791	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-				-
Mov Cap-1 Maneuver	1546	-	0	1008	1420	-
Mov Cap-2 Maneuver	-	-	0	-	-	-
Stage 1	-	-	0	-	-	-
Stage 2	-	-	0	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	1	9	2.9
HCM LOS		A	

Minor Lane/Major Mvmt	NELn1	NWL	NWR	SWL	SWT
Capacity (veh/h)	1008	1546	-	1420	-
HCM Lane V/C Ratio	0.107	0.015	-	0.024	-
HCM Control Delay (s)	9	7.4	-	7.6	0
HCM Lane LOS	A	A	-	A	A
HCM 95th %tile Q(veh)	0.4	0	-	0.1	-

Intersection	
Int Delay, s/veh	2.5

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	28	16	9	128	36	19
Future Vol, veh/h	28	16	9	128	36	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	17	10	139	39	21

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	48	0	198	39
Stage 1	-	-	-	-	39	-
Stage 2	-	-	-	-	159	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1559	-	791	1033
Stage 1	-	-	-	-	983	-
Stage 2	-	-	-	-	870	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1559	-	785	1033
Mov Cap-2 Maneuver	-	-	-	-	785	-
Stage 1	-	-	-	-	983	-
Stage 2	-	-	-	-	864	-

Approach	SE	NW	NE
HCM Control Delay, s	0	0.5	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER
Capacity (veh/h)	856	1559	-	-	-
HCM Lane V/C Ratio	0.07	0.006	-	-	-
HCM Control Delay (s)	9.5	7.3	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.2	0	-	-	-

Intersection	
Int Delay, s/veh	5.2

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	17	44	76	20	100	78
Future Vol, veh/h	17	44	76	20	100	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	18	48	83	22	109	85

Major/Minor	Major1		Minor2		Major2	
Conflicting Flow All	85	0	387	85	48	0
Stage 1	-	-	302	-	-	-
Stage 2	-	-	85	-	-	-
Critical Hdwy	4.12	-	6.52	6.22	4.12	-
Critical Hdwy Stg 1	-	-	5.52	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.218	-	4.018	3.318	2.218	-
Pot Cap-1 Maneuver	1512	-	547	974	1559	-
Stage 1	-	-	664	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-				-
Mov Cap-1 Maneuver	1512	-	0	974	1559	-
Mov Cap-2 Maneuver	-	-	0	-	-	-
Stage 1	-	-	0	-	-	-
Stage 2	-	-	0	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	2.1	9.1	4.2
HCM LOS		A	

Minor Lane/Major Mvmt	NELn1	NWL	NWR	SWL	SWT
Capacity (veh/h)	974	1512	-	1559	-
HCM Lane V/C Ratio	0.107	0.012	-	0.07	-
HCM Control Delay (s)	9.1	7.4	-	7.5	0
HCM Lane LOS	A	A	-	A	A
HCM 95th %tile Q(veh)	0.4	0	-	0.2	-

Intersection	
Int Delay, s/veh	1.2

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	104	29	8	35	12	7
Future Vol, veh/h	104	29	8	35	12	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	113	32	9	38	13	8

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	145	0	184	129
Stage 1	-	-	-	-	129	-
Stage 2	-	-	-	-	55	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1437	-	805	921
Stage 1	-	-	-	-	897	-
Stage 2	-	-	-	-	968	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1437	-	800	921
Mov Cap-2 Maneuver	-	-	-	-	800	-
Stage 1	-	-	-	-	897	-
Stage 2	-	-	-	-	962	-

Approach	SE	NW	NE
HCM Control Delay, s	0	1.4	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER
Capacity (veh/h)	841	1437	-	-	-
HCM Lane V/C Ratio	0.025	0.006	-	-	-
HCM Control Delay (s)	9.4	7.5	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	0	-	-	-

Intersection	
Int Delay, s/veh	4.7

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	25	155	87	13	35	53
Future Vol, veh/h	25	155	87	13	35	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	168	95	14	38	58

Major/Minor	Major1		Minor2		Major2	
Conflicting Flow All	58	0	357	58	168	0
Stage 1	-	-	134	-	-	-
Stage 2	-	-	223	-	-	-
Critical Hdwy	4.12	-	6.52	6.22	4.12	-
Critical Hdwy Stg 1	-	-	5.52	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.218	-	4.018	3.318	2.218	-
Pot Cap-1 Maneuver	1546	-	569	1008	1410	-
Stage 1	-	-	785	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-				-
Mov Cap-1 Maneuver	1546	-	543	1008	1410	-
Mov Cap-2 Maneuver	-	-	543	-	-	-
Stage 1	-	-	763	-	-	-
Stage 2	-	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	1	12.7	3
HCM LOS		B	

Minor Lane/Major Mvmt	NELn1	NWL	NWR	SWL	SWT
Capacity (veh/h)	578	1546	-	1410	-
HCM Lane V/C Ratio	0.188	0.018	-	0.027	-
HCM Control Delay (s)	12.7	7.4	-	7.6	0
HCM Lane LOS	B	A	-	A	A
HCM 95th %tile Q(veh)	0.7	0.1	-	0.1	-

Intersection	
Int Delay, s/veh	2.5

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	32	16	9	128	36	19
Future Vol, veh/h	32	16	9	128	36	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	35	17	10	139	39	21

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	52	0	202	43
Stage 1	-	-	-	-	43	-
Stage 2	-	-	-	-	159	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1554	-	787	1027
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	870	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1554	-	781	1027
Mov Cap-2 Maneuver	-	-	-	-	781	-
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	864	-

Approach	SE	NW	NE
HCM Control Delay, s	0	0.5	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER
Capacity (veh/h)	851	1554	-	-	-
HCM Lane V/C Ratio	0.07	0.006	-	-	-
HCM Control Delay (s)	9.6	7.3	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.2	0	-	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	28	4	1	164	12	4
Future Vol, veh/h	28	4	1	164	12	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	4	1	178	13	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	35	0	213	33
Stage 1	-	-	-	-	33	-
Stage 2	-	-	-	-	180	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1576	-	775	1041
Stage 1	-	-	-	-	989	-
Stage 2	-	-	-	-	851	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1576	-	774	1041
Mov Cap-2 Maneuver	-	-	-	-	774	-
Stage 1	-	-	-	-	989	-
Stage 2	-	-	-	-	850	-

Approach	SE	NW	NE
HCM Control Delay, s	0	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER
Capacity (veh/h)	827	1576	-	-	-
HCM Lane V/C Ratio	0.021	0.001	-	-	-
HCM Control Delay (s)	9.4	7.3	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	0	-	-	-

Intersection	
Int Delay, s/veh	5.3

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	19	50	76	24	110	78
Future Vol, veh/h	19	50	76	24	110	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	54	83	26	120	85

Major/Minor	Major1		Minor2		Major2	
Conflicting Flow All	85	0	420	85	54	0
Stage 1	-	-	324	-	-	-
Stage 2	-	-	96	-	-	-
Critical Hdwy	4.12	-	6.52	6.22	4.12	-
Critical Hdwy Stg 1	-	-	5.52	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.218	-	4.018	3.318	2.218	-
Pot Cap-1 Maneuver	1512	-	525	974	1551	-
Stage 1	-	-	650	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-				-
Mov Cap-1 Maneuver	1512	-	0	974	1551	-
Mov Cap-2 Maneuver	-	-	0	-	-	-
Stage 1	-	-	0	-	-	-
Stage 2	-	-	0	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	2	9.2	4.4
HCM LOS		A	

Minor Lane/Major Mvmt	NELn1	NWL	NWR	SWL	SWT
Capacity (veh/h)	974	1512	-	1551	-
HCM Lane V/C Ratio	0.112	0.014	-	0.077	-
HCM Control Delay (s)	9.2	7.4	-	7.5	0
HCM Lane LOS	A	A	-	A	A
HCM 95th %tile Q(veh)	0.4	0	-	0.2	-

Intersection	
Int Delay, s/veh	1.6

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	106	43	12	35	20	9
Future Vol, veh/h	106	43	12	35	20	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	115	47	13	38	22	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	162	0	203	139
Stage 1	-	-	-	-	139	-
Stage 2	-	-	-	-	64	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1417	-	786	909
Stage 1	-	-	-	-	888	-
Stage 2	-	-	-	-	959	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1417	-	779	909
Mov Cap-2 Maneuver	-	-	-	-	779	-
Stage 1	-	-	-	-	888	-
Stage 2	-	-	-	-	950	-

Approach	SE	NW	NE
HCM Control Delay, s	0	1.9	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER
Capacity (veh/h)	815	1417	-	-	-
HCM Lane V/C Ratio	0.039	0.009	-	-	-
HCM Control Delay (s)	9.6	7.6	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	0	-	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	104	14	4	39	8	2
Future Vol, veh/h	104	14	4	39	8	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	113	15	4	42	9	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	128	0	172	121
Stage 1	-	-	-	-	121	-
Stage 2	-	-	-	-	51	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1458	-	818	930
Stage 1	-	-	-	-	904	-
Stage 2	-	-	-	-	971	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1458	-	816	930
Mov Cap-2 Maneuver	-	-	-	-	816	-
Stage 1	-	-	-	-	904	-
Stage 2	-	-	-	-	968	-

Approach	SE	NW	NE
HCM Control Delay, s	0	0.7	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER
Capacity (veh/h)	837	1458	-	-	-
HCM Lane V/C Ratio	0.013	0.003	-	-	-
HCM Control Delay (s)	9.4	7.5	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	0	-	-	-

Intersection	
Int Delay, s/veh	3.8

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	31	208	125	18	46	76
Future Vol, veh/h	31	208	125	18	46	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	226	136	20	50	83

Major/Minor	Major1		Minor2		Major2	
Conflicting Flow All	83	0	476	83	226	0
Stage 1	-	-	183	-	-	-
Stage 2	-	-	293	-	-	-
Critical Hdwy	4.12	-	6.52	6.22	4.12	-
Critical Hdwy Stg 1	-	-	5.52	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.218	-	4.018	3.318	2.218	-
Pot Cap-1 Maneuver	1514	-	488	976	1342	-
Stage 1	-	-	748	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-				-
Mov Cap-1 Maneuver	1514	-	0	976	1342	-
Mov Cap-2 Maneuver	-	-	0	-	-	-
Stage 1	-	-	0	-	-	-
Stage 2	-	-	0	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	1	9.4	2.9
HCM LOS		A	

Minor Lane/Major Mvmt	NELn1	NWL	NWR	SWL	SWT
Capacity (veh/h)	976	1514	-	1342	-
HCM Lane V/C Ratio	0.159	0.022	-	0.037	-
HCM Control Delay (s)	9.4	7.4	-	7.8	0
HCM Lane LOS	A	A	-	A	A
HCM 95th %tile Q(veh)	0.6	0.1	-	0.1	-

Intersection	
Int Delay, s/veh	2.7

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	40	22	13	183	52	27
Future Vol, veh/h	40	22	13	183	52	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	43	24	14	199	57	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	67	0	282	55
Stage 1	-	-	-	-	55	-
Stage 2	-	-	-	-	227	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1535	-	708	1012
Stage 1	-	-	-	-	968	-
Stage 2	-	-	-	-	811	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1535	-	701	1012
Mov Cap-2 Maneuver	-	-	-	-	701	-
Stage 1	-	-	-	-	968	-
Stage 2	-	-	-	-	803	-

Approach	SE	NW	NE
HCM Control Delay, s	0	0.5	10.2
HCM LOS			B

Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER
Capacity (veh/h)	783	1535	-	-	-
HCM Lane V/C Ratio	0.11	0.009	-	-	-
HCM Control Delay (s)	10.2	7.4	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0.4	0	-	-	-

Intersection	
Int Delay, s/veh	5.4

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	24	62	108	28	143	111
Future Vol, veh/h	24	62	108	28	143	111
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	67	117	30	155	121

Major/Minor	Major1		Minor2		Major2	
Conflicting Flow All	121	0	552	121	67	0
Stage 1	-	-	432	-	-	-
Stage 2	-	-	120	-	-	-
Critical Hdwy	4.12	-	6.52	6.22	4.12	-
Critical Hdwy Stg 1	-	-	5.52	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.218	-	4.018	3.318	2.218	-
Pot Cap-1 Maneuver	1467	-	442	930	1535	-
Stage 1	-	-	582	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-				-
Mov Cap-1 Maneuver	1467	-	0	930	1535	-
Mov Cap-2 Maneuver	-	-	0	-	-	-
Stage 1	-	-	0	-	-	-
Stage 2	-	-	0	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	2.1	9.6	4.3
HCM LOS		A	

Minor Lane/Major Mvmt	NELn1	NWL	NWR	SWL	SWT
Capacity (veh/h)	930	1467	-	1535	-
HCM Lane V/C Ratio	0.159	0.018	-	0.101	-
HCM Control Delay (s)	9.6	7.5	-	7.6	0
HCM Lane LOS	A	A	-	A	A
HCM 95th %tile Q(veh)	0.6	0.1	-	0.3	-

Intersection	
Int Delay, s/veh	1.3

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	149	42	12	51	18	10
Future Vol, veh/h	149	42	12	51	18	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	162	46	13	55	20	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	208	0	267	185
Stage 1	-	-	-	-	185	-
Stage 2	-	-	-	-	82	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1363	-	722	857
Stage 1	-	-	-	-	847	-
Stage 2	-	-	-	-	941	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1363	-	715	857
Mov Cap-2 Maneuver	-	-	-	-	715	-
Stage 1	-	-	-	-	847	-
Stage 2	-	-	-	-	932	-

Approach	SE	NW	NE
HCM Control Delay, s	0	1.5	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER
Capacity (veh/h)	760	1363	-	-	-
HCM Lane V/C Ratio	0.04	0.01	-	-	-
HCM Control Delay (s)	9.9	7.7	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	0	-	-	-

Intersection	
Int Delay, s/veh	3.8

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	35	217	125	19	49	76
Future Vol, veh/h	35	217	125	19	49	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	236	136	21	53	83

Major/Minor	Major1		Minor2		Major2	
Conflicting Flow All	83	0	501	83	236	0
Stage 1	-	-	189	-	-	-
Stage 2	-	-	312	-	-	-
Critical Hdwy	4.12	-	6.52	6.22	4.12	-
Critical Hdwy Stg 1	-	-	5.52	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.218	-	4.018	3.318	2.218	-
Pot Cap-1 Maneuver	1514	-	472	976	1331	-
Stage 1	-	-	744	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-				-
Mov Cap-1 Maneuver	1514	-	0	976	1331	-
Mov Cap-2 Maneuver	-	-	0	-	-	-
Stage 1	-	-	0	-	-	-
Stage 2	-	-	0	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	1	9.4	3.1
HCM LOS		A	

Minor Lane/Major Mvmt	NELn1	NWL	NWR	SWL	SWT
Capacity (veh/h)	976	1514	-	1331	-
HCM Lane V/C Ratio	0.16	0.025	-	0.04	-
HCM Control Delay (s)	9.4	7.4	-	7.8	0
HCM Lane LOS	A	A	-	A	A
HCM 95th %tile Q(veh)	0.6	0.1	-	0.1	-

Intersection	
Int Delay, s/veh	2.7

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	43	22	13	184	52	27
Future Vol, veh/h	43	22	13	184	52	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	47	24	14	200	57	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	71	0	287	59
Stage 1	-	-	-	-	59	-
Stage 2	-	-	-	-	228	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1529	-	703	1007
Stage 1	-	-	-	-	964	-
Stage 2	-	-	-	-	810	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1529	-	696	1007
Mov Cap-2 Maneuver	-	-	-	-	696	-
Stage 1	-	-	-	-	964	-
Stage 2	-	-	-	-	802	-

Approach	SE	NW	NE
HCM Control Delay, s	0	0.5	10.2
HCM LOS			B

Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER
Capacity (veh/h)	778	1529	-	-	-
HCM Lane V/C Ratio	0.11	0.009	-	-	-
HCM Control Delay (s)	10.2	7.4	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0.4	0	-	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	65	6	1	236	15	3
Future Vol, veh/h	65	6	1	236	15	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	71	7	1	257	16	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	77	0	333	74
Stage 1	-	-	-	-	74	-
Stage 2	-	-	-	-	259	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1522	-	662	988
Stage 1	-	-	-	-	949	-
Stage 2	-	-	-	-	784	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1522	-	661	988
Mov Cap-2 Maneuver	-	-	-	-	661	-
Stage 1	-	-	-	-	949	-
Stage 2	-	-	-	-	783	-

Approach	SE	NW	NE
HCM Control Delay, s	0	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER
Capacity (veh/h)	700	1522	-	-	-
HCM Lane V/C Ratio	0.028	0.001	-	-	-
HCM Control Delay (s)	10.3	7.4	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0.1	0	-	-	-

Intersection	
Int Delay, s/veh	5.5

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	27	70	108	32	156	111
Future Vol, veh/h	27	70	108	32	156	111
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	76	117	35	170	121

Major/Minor	Major1		Minor2		Major2	
Conflicting Flow All	121	0	595	121	76	0
Stage 1	-	-	460	-	-	-
Stage 2	-	-	135	-	-	-
Critical Hdwy	4.12	-	6.52	6.22	4.12	-
Critical Hdwy Stg 1	-	-	5.52	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.218	-	4.018	3.318	2.218	-
Pot Cap-1 Maneuver	1467	-	417	930	1523	-
Stage 1	-	-	566	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-				-
Mov Cap-1 Maneuver	1467	-	0	930	1523	-
Mov Cap-2 Maneuver	-	-	0	-	-	-
Stage 1	-	-	0	-	-	-
Stage 2	-	-	0	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	2.1	9.6	4.5
HCM LOS		A	

Minor Lane/Major Mvmt	NELn1	NWL	NWR	SWL	SWT
Capacity (veh/h)	930	1467	-	1523	-
HCM Lane V/C Ratio	0.164	0.02	-	0.111	-
HCM Control Delay (s)	9.6	7.5	-	7.7	0
HCM Lane LOS	A	A	-	A	A
HCM 95th %tile Q(veh)	0.6	0.1	-	0.4	-

Intersection	
Int Delay, s/veh	1.3

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	151	42	12	54	18	10
Future Vol, veh/h	151	42	12	54	18	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	164	46	13	59	20	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	210	0	272	187
Stage 1	-	-	-	-	187	-
Stage 2	-	-	-	-	85	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1361	-	717	855
Stage 1	-	-	-	-	845	-
Stage 2	-	-	-	-	938	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1361	-	710	855
Mov Cap-2 Maneuver	-	-	-	-	710	-
Stage 1	-	-	-	-	845	-
Stage 2	-	-	-	-	929	-

Approach	SE	NW	NE
HCM Control Delay, s	0	1.4	10
HCM LOS			B

Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER
Capacity (veh/h)	756	1361	-	-	-
HCM Lane V/C Ratio	0.04	0.01	-	-	-
HCM Control Delay (s)	10	7.7	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0.1	0	-	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	188	14	4	72	8	2
Future Vol, veh/h	188	14	4	72	8	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	204	15	4	78	9	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	220	0	299	212
Stage 1	-	-	-	-	212	-
Stage 2	-	-	-	-	87	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1349	-	692	828
Stage 1	-	-	-	-	823	-
Stage 2	-	-	-	-	936	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1349	-	690	828
Mov Cap-2 Maneuver	-	-	-	-	690	-
Stage 1	-	-	-	-	823	-
Stage 2	-	-	-	-	933	-

Approach	SE	NW	NE
HCM Control Delay, s	0	0.4	10.1
HCM LOS			B

Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER
Capacity (veh/h)	714	1349	-	-	-
HCM Lane V/C Ratio	0.015	0.003	-	-	-
HCM Control Delay (s)	10.1	7.7	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0	0	-	-	-

CRASH SUMMARIES BY YEAR BY COLLISION TYPE

LELAND RD and Intersectional Crashes at LELAND RD, City of Oregon City, Clackamas County, 01/01/2011 to 12/31/2015

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: 2015														
BACKING	0	0	1	1	0	0	0	1	0	1	0	0	0	0
REAR-END	0	2	0	2	0	2	0	1	1	1	1	2	0	0
TURNING MOVEMENTS	0	0	1	1	0	0	0	1	0	1	0	0	0	0
YEAR 2015 TOTAL	**0**	**2**	**2**	**4**	**0**	**2**	**0**	**3**	**1**	**3**	**1**	**2**	**0**	**0**
YEAR: 2014														
FIXED / OTHER OBJECT	0	0	1	1	0	0	0	0	1	0	1	1	0	1
REAR-END	0	2	0	2	0	2	0	2	0	2	0	0	0	0
TURNING MOVEMENTS	0	0	1	1	0	0	0	1	0	1	0	1	0	0
YEAR 2014 TOTAL	**0**	**2**	**2**	**4**	**0**	**2**	**0**	**3**	**1**	**3**	**1**	**2**	**0**	**1**
YEAR: 2013														
ANGLE	0	0	1	1	0	0	0	1	0	1	0	1	0	0
PEDESTRIAN	0	1	0	1	0	1	0	0	1	0	1	1	0	0
REAR-END	0	0	1	1	0	0	0	1	0	1	0	1	0	0
YEAR 2013 TOTAL	**0**	**1**	**2**	**3**	**0**	**1**	**0**	**2**	**1**	**2**	**1**	**3**	**0**	**0**
YEAR: 2012														
ANGLE	0	1	1	2	0	2	0	1	1	0	2	2	0	0
FIXED / OTHER OBJECT	0	1	0	1	0	1	0	0	1	0	1	0	0	1
REAR-END	0	1	1	2	0	1	0	1	0	1	1	1	0	0
TURNING MOVEMENTS	0	1	0	1	0	1	0	1	0	1	0	0	0	0
YEAR 2012 TOTAL	**0**	**4**	**2**	**6**	**0**	**5**	**0**	**3**	**2**	**2**	**4**	**3**	**0**	**1**

CRASH SUMMARIES BY YEAR BY COLLISION TYPE

LELAND RD and Intersectional Crashes at LELAND RD, City of Oregon City, Clackamas County, 01/01/2011 to 12/31/2015

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: 2011														
FIXED / OTHER OBJECT	0	2	1	3	0	3	0	1	2	1	2	0	0	3
REAR-END	0	1	0	1	0	1	0	1	0	1	0	1	0	0
TURNING MOVEMENTS	0	2	0	2	0	3	0	1	1	1	1	2	0	0
YEAR 2011 TOTAL	**0**	**5**	**1**	**6**	**0**	**7**	**0**	**3**	**3**	**3**	**3**	**3**	**0**	**3**
FINAL TOTAL	**0**	**14**	**9**	**23**	**0**	**17**	**0**	**14**	**8**	**13**	**10**	**13**	**0**	**5**

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING

CITY OF OREGON CITY, CLACKAMAS COUNTY

LELAND RD and Intersectional Crashes at LELAND RD, City of Oregon City, Clackamas County, 01/01/2011 to 12/31/2015

Total crash records: 23

SER# / INVEST	S P E D	A L C	U G S	C H L	O R K	SW DAY / TIME	CLASS / DIST FROM	CITY STREET / FIRST STREET / SECOND STREET	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
04286	Y	Y	N			11/13/2011	16	LELAND RD	STRGHT		N	Y	RAIN	FIX OBJ	01	NONE 0	STRGHT											062,010,088	01
CITY						SU	160	LOT WHITCOMB DR	NW	(NONE)	NONE	N	WET	FIX		PRVTE	SE-NW									001	062,010,088	00
						3A			08			N	DLIT	INJ		PSNGR CAR		01	DRVR	INJB	25	M	OR-Y		047,080	000		01
										(02)													OR<25					
															01	NONE 0	STRGHT											
																PRVTE	SE-NW									001	062,010,088	00
																PSNGR CAR		02	PSNG	INJB	27	M			000	000		00
04741	Y	N	N	N	N	12/09/2011	16	LELAND RD	STRGHT		N	Y	FOG	FIX OBJ	01	NONE 0	STRGHT										124,053	01,05
CITY						FR	150	JESSIE AVE	SE	(NONE)	UNKNOWN	N	ICE	FIX		PRVTE	NW-SE									000	124,053	00
						8A			08			N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	61	F	OR-Y		047,083,081	017		01,05
										(02)													OR<25					
03336	N	N	N			09/07/2012	16	DALLAS ST	INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											07
NONE						FR	0	LELAND RD	S		UNKNOWN	N	UNK	REAR		PRVTE	SE-NW									000		00
						11P			06	0		N	DARK	PDO		PSNGR CAR		01	DRVR	NONE	00	M	OR-Y		026	000		07
																							UNK					
															02	NONE 0	STOP											
																PRVTE	SE-NW									012		00
																PSNGR CAR		01	DRVR	NONE	22	F	OR-Y		000	000		00
																							OR<25					
03079	N	N	N			08/19/2012	16	LELAND RD	ALLEY		N	N	CLR	O-1 L-TURN	01	NONE 0	STRGHT											02
CITY						SU	110	REDDAWAY AVE	SW	(NONE)	UNKNOWN	N	DRY	TURN		PRVTE	SW-NE									000		00
						4P			08			N	DAY	INJ		MTRCYCLE		01	DRVR	INJB	29	M	OR-Y		000	000		00
										(02)													OR<25					
															02	NONE 0	TURN-L											
																PRVTE	NE-SE									019		00
																PSNGR CAR		01	DRVR	NONE	67	F	OR-Y		028,004	000		02
																							OR<25					
01898	N	N	N			05/17/2014	16	MARYSVILLE LN	INTER	3-LEG	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											02
NO RPT						SA	0	LELAND RD	CN		UNKNOWN	N	DRY	TURN		PRVTE	N -S									000		00
						10A			01	0		Y	DAY	PDO		PSNGR CAR		01	DRVR	NONE	39	F	OR-Y		000	000		00
																							OR<25					
															02	NONE 0	TURN-L											
																PRVTE	W -N									018		00
																PSNGR CAR		01	DRVR	NONE	38	F	OR-Y		028	000		02
																							OR<25					
															02	NONE 0	TURN-L											
																PRVTE	W -N									018		00
																PSNGR CAR		02	PSNG	NO<5	02	M			000	000		00
04856	N	N	N			12/17/2011	16	CARMELITA DR	INTER	CROSS	N	N	FOG	ANGL-OTH	01	NONE 0	STRGHT											02
CITY						SA	0	LELAND RD	CN		STOP SIGN	N	WET	TURN		PRVTE	NE-SW									007		00
						5P			04	0		N	DARK	INJ		PSNGR CAR		01	DRVR	NONE	25	F	OR-Y		000	000		00
																							OR<25					
															02	NONE 0	TURN-L											
																PRVTE	NW-NE									000		00
																PSNGR CAR		01	DRVR	INJC	19	M	OTH-Y		028	000		02
																							N-RES					
															02	NONE 0	TURN-L											
																PRVTE	NW-NE									000		00
																PSNGR CAR		02	PSNG	INJC	18	M			000	000		00

CITY OF OREGON CITY, CLACKAMAS COUNTY

LELAND RD and Intersectional Crashes at LELAND RD, City of Oregon City, Clackamas County, 01/01/2011 to 12/31/2015

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04254	N	N	N			10/24/2014	16	LELAND RD	INTER	4-LEG	N	Y	RAIN	FIX OBJ	01	NONE 0	TURN-R											100	03,08
NONE						FR	0	S MEYERS RD	SE		STOP SIGN	N	WET	FIX		PRVTE	SW-SE									000	100	00
						11P			06	0		N	DARK	PDO		PSNGR CAR		01	DRVR	NONE	16	M	OR-Y OR<25		021,001	017		03,08
00238	N	N	N			01/20/2011	16	LELAND RD	INTER	4-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT												07
NO RPT						TH	0	S MEYERS RD	SW		STOP SIGN	N	DRY	REAR		PRVTE	SW-NE									000		00
						7A			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	16	F	OR-Y OR<25		026	000		07
															02	NONE 0	STOP											
																PRVTE	SW-NE									011		00
																PSNGR CAR		01	DRVR	INJC	18	F	OR-Y OR<25		000	000		00
03638	N	N	N			10/01/2012	16	LELAND RD	INTER	4-LEG	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT												02
NONE						MO	0	S MEYERS RD	CN		STOP SIGN	N	DRY	ANGL		PRVTE	SW-NE									015		00
						8P			01	0		N	DLIT	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK UNK		028	000		02
															02	NONE 0	STRGHT											
																PRVTE	N -S									000		00
																PSNGR CAR		01	DRVR	NONE	36	M	OR-Y OR<25		000	000		00
04648	Y	Y	N	N	N	12/03/2011	16	LELAND RD	STRGHT		N	Y	CLR	FIX OBJ	01	NONE 0	TURN-R											040,062,088	33,01,10
CITY						SA	300	S MEYERS RD	N	(NONE)	UNKNOWN	N	DRY	FIX		PRVTE	SE-N									000	040,062,088	00
						12A			08			N	DARK	PDO		PSNGR CAR		01	DRVR	NONE	30	M	OR-Y OR<25		051,047,081	017		33,01,10
										(02)																		
05208	N	N	N			12/07/2015	16	LELAND RD	INTER	3-LEG	N	N	RAIN	S-1STOP	01	NONE 0	STRGHT												29
NONE						MO	0	PEASE RD	SW		STOP SIGN	N	WET	REAR		PRVTE	SW-NE									000		00
						7A			06	0		N	DAWN	INJ		PSNGR CAR		01	DRVR	NONE	57	F	OR-Y OR<25		026	000		29
															02	NONE 0	STOP											
																PRVTE	SW-NE									011		00
																PSNGR CAR		01	DRVR	INJC	39	M	OR-Y OR<25		000	000		00
00787	N	N	N	N	Y	03/05/2011	16	LELAND RD	INTER	3-LEG	N	N	CLR	ANGL-OTH	01	NONE 0	TURN-L												02
NO RPT						SA	0	PEASE RD	CN		STOP SIGN	N	DRY	TURN		PRVTE	SW-N									015		00
						2P			03	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	32	F	OR-Y OR<25		028	000		02
															01	NONE 0	TURN-L											
																PRVTE	SW-N									015		00
																PSNGR CAR		02	PSNG	NO<5	01	M			000	000		00
															01	NONE 0	TURN-L											
																PRVTE	SW-N									015		00
																PSNGR CAR		03	PSNG	NO<5	04	M			000	000		00
															02	NONE 0	STRGHT											
																PRVTE	N -S									000		00
																PSNGR CAR		01	DRVR	INJC	18	M	OR-Y OR<25		000	000		00
00397	N	N	N			01/31/2015	16	LELAND RD	ALLEY		N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT												02

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

CITY OF OREGON CITY, CLACKAMAS COUNTY

LELAND RD and Intersectional Crashes at LELAND RD, City of Oregon City, Clackamas County, 01/01/2011 to 12/31/2015

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NONE						SA	69	PEASE RD	N	(NONE)	UNKNOWN	N	DRY	BACK		PRVTE	S -N									000		00
						8A			07			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	48	F	OR-Y		000	000		00
										(02)													OR<25					
															02	NONE 0	BACK											
																PRVTE	E -W									018		00
																PSNGR CAR		01	DRVR	NONE	44	M	OR-Y		028	000		02
																							OR<25					
02086	N	N	N			06/12/2013	16	LELAND RD	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											07
NONE						WE	0	WARNER-MILNE RD	S		TRF SIGNAL	N	DRY	REAR		PRVTE	S -N									000		00
						7A			06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	M	OR-Y		026	000		07
																							OR<25					
															02	NONE 0	STOP											
																PRVTE	S -N									011		00
																PSNGR CAR		01	DRVR	NONE	42	F	OR-Y		000	000		00
																							OR<25					
03835	N	N	N			10/15/2012	16	LELAND RD	INTER	CROSS	N	N	RAIN	ANGL-OTH	01	NONE 0	STRGHT											04
NO RPT						MO	0	WARNER-MILNE RD	CN		TRF SIGNAL	N	WET	ANGL		PRVTE	E -W									000		00
						5P			02	0		N	DUSK	INJ		PSNGR CAR		01	DRVR	INJC	48	M	OR-Y		000	000		00
																							OR<25					
															01	NONE 0	STRGHT											
																PRVTE	E -W									000		00
																PSNGR CAR		02	PSNG	INJC	16	F			000	000		00
															02	NONE 0	STRGHT											
																PRVTE	S -N									000		00
																PSNGR CAR		01	DRVR	NONE	51	F	OR-Y		020	038		04
																							OR<25					
02245	N	N	N			06/09/2015	16	LELAND RD	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										004	29
NONE						TU	0	WARNER-MILNE RD	CN		TRF SIGNAL	N	DRY	REAR		PRVTE	E -W									000		00
						8A			02	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	17	M	OR-Y		026	000		29
																							OR<25					
															02	NONE 0	STOP											
																PRVTE	E -N									013	004	00
																PSNGR CAR		01	DRVR	INJC	27	M	OR-Y		000	000		00
																							OR<25					
01113	N	N	N			03/30/2015	16	LELAND RD	ALLEY		N	N	CLR	S-OTHER	01	NONE 0	TURN-L											08
NONE						MO	80	WARNER-MILNE RD	S	(NONE)	UNKNOWN	N	DRY	TURN		PRVTE	W -N									018		00
						4P			07			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	M	UNK		001	000		08
										(02)													UNK					
															02	NONE 0	STOP											
																PRVTE	W -E									011		00
																PSNGR CAR		01	DRVR	NONE	54	F	OR-Y		000	000		00
																							OR<25					
01720	N	N	N			05/10/2012	16	LELAND RD	STRGHT		N	N	CLR	S-1STOP	01	NONE 0	STRGHT											07
NONE						TH	137	WARNER-MILNE RD	S	(NONE)	UNKNOWN	N	DRY	REAR		PRVTE	S -N									000		00
						7A			08			N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	51	M	OR-Y		026	000		07
										(02)													OR<25					
															02	NONE 0	STOP											
																PRVTE	S -N									011		00
																PSNGR CAR		01	DRVR	INJC	43	M	OR-Y		000	000		00
																							OR<25					

CITY OF OREGON CITY, CLACKAMAS COUNTY

LELAND RD and Intersectional Crashes at LELAND RD, City of Oregon City, Clackamas County, 01/01/2011 to 12/31/2015

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03220	N	N	N			08/20/2014	16	LELAND RD	STRGHT		N	N	CLR	S-1STOP	01	NONE 0	STRGHT										099	29
NONE						WE	150	WARNER-MILNE RD	S	(NONE)	UNKNOWN	N	DRY	REAR		PRVTE	S -N									000		00
						UNK			08			N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	00	M	OR-Y		026	000	099	29
										(02)													OR<25					
															02	NONE 0	STOP											
																PRVTE	S -N									011		00
																PSNGR CAR		01	DRVR	INJC	17	F	OR-Y		000	000		00
																							OR<25					
03175	N	N	N			08/17/2014	16	LELAND RD	STRGHT		N	N	CLR	S-1STOP	01	NONE 0	STRGHT											29
NO RPT						SU	520	WARNER-MILNE RD	S	(NONE)	UNKNOWN	N	DRY	REAR		PRVTE	N -S									000		00
						2P			07			N	DAY	INJ		PSNGR CAR		01	DRVR	INJB	57	F	OR-Y		026	000		29
										(02)													OR<25					
															02	NONE 0	STOP											
																PRVTE	N -S									011		00
																PSNGR CAR		01	DRVR	NONE	43	M	OR-Y		000	000		00
																							OR<25					
00720	N	N	N			03/02/2013	16	LELAND RD	INTER	CROSS	N	N	RAIN	PED	01	NONE 0	TURN-R											02
CITY						SA	0	WARNER-PARROTT RD	SW		TRF SIGNAL	N	WET	PED		PRVTE	W -S									000		00
						8P			06	0		N	DUSK	INJ		PSNGR CAR		01	DRVR	NONE	42	M	OR-Y		029	000		02
																							OR<25					
																	- STRGHT W E	01	PED	INJB	14	M		I XWLK	000	035		00
04120	N	N	N			10/26/2013	16	LELAND RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											04
NONE						SA	0	WARNER-PARROTT RD	CN		TRF SIGNAL	N	DRY	ANGL		PRVTE	S -N									000		00
						5P			02	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	55	M	OR-Y		000	000		00
																							OR<25					
															02	NONE 0	STRGHT											
																PRVTE	E -W									000		00
																PSNGR CAR		01	DRVR	NONE	16	F	OR-Y		020	000		04
																							OR<25					
04405	Y	N	N	N	N	11/17/2012	16	LELAND RD	STRGHT		N	Y	RAIN	FIX OBJ	01	NONE 0	STRGHT										088,093,053	33,27,01
CITY						SA	31	WARNER-PARROTT RD	S	(NONE)	UNKNOWN	N	WET	FIX		PRVTE	N -S									000	010,040,037	00
						8P			05			N	DLIT	INJ		PSNGR CAR		01	DRVR	INJB	21	M	SUSP		051,016,081	038	093	33,27,01
										(02)													OR<25					

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING

CITY OF OREGON CITY, CLACKAMAS COUNTY

LELAND RD at JESSIE AVE, City of Oregon City, Clackamas County, 01/01/2011 to 12/31/2015

No Rows to Display

SER# / INVEST	S P E D	A L C	U G S	C H L	O R K	DATE / DAY / TIME	CLASS / DIST / FROM	CITY STREET / FIRST STREET / SECOND STREET	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE

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SER# / INVEST	S P E D	A L C	U G S	C H L	O R K	DATE / DAY / TIME	CLASS / DIST / FROM	CITY STREET / FIRST STREET / SECOND STREET	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE

Exhibit H: Site Assessment and Planning Checklist

SITE ASSESSMENT AND PLANNING CHECKLIST

✓	Information needed	Attach supporting materials as needed
2.2.1 Site Information		
	Applicant contact information	Applicant name: PDX Development, Inc. Business name: PDX Development, Inc. Contact address, phone number, and e-mail: P.O. Box 2559 Oregon City, OR 97045
	Project location	Site address: 19701 S Leland Road, Oregon City Site description: The property is located north of Lindsay Anne Estates Subdivision and west of S Leland Road. Major drainage basin: Beaver Basin Is the project site located with the WQRA as defined in OCMC 17.49? No (Y/N) *Include a vicinity map of the site (including location of property in relation to adjacent properties, roads, and pedestrian/bike facilities).*
	Project type	Identify types of development planned for the site such as commercial, industrial, single-family residential, multi-family residential, or other (describe): 28 single-family residential lots.
	Size of site	Size of site: 6.33± (acres) Number of existing/proposed tax lots: 1/28 Amount of new and replaced impervious area: 150,447 (SF)
2.2.2 Site Assessment *Note: Site assessment information may be available from the OCMaps online tool available through the City's website.*		
	Site Assessment Map	*Attach engineered scale Site Assessment Map, showing items below.*
	Topography Evaluate site and map slopes: *Flat: 0-10%* *Moderate: 10-25%* *Steep: 25% and greater*	*Surveyed or aerial-based mapping with 2-foot intervals for slopes 0-25% slope and 10-foot intervals for steeper. Indicate Geologic Hazard Areas as defined by OCMC 17.04.510 and Geologic Hazards Overlay Zone as defined by OCMC 17.04.515.*
	Soils and Groundwater Research and map site soil hydrologic group, depth to groundwater	NRCS Hydrologic Soil Type (show on map if more than one type present): C *Attach seasonal groundwater depth evaluation if available or required (site has floodplain and/or wetland). Groundwater depth information is available from the City.*
	Infiltration Assessment Determine soil capacity for onsite infiltration	If an infiltration test is performed, attach the documentation. Report the test type (Basic/Professional) performed and results. See **Appendix D** for the approved infiltration testing methods. Test type: Open Pit Falling Head Infiltration not recommended (inches/hour)

SITE ASSESSMENT AND PLANNING CHECKLIST		
	Hydrology – Conditions and Natural Features Map site floodplains, wetlands, streams, and location of outfalls	Clearly label on map all intermittent and perennial creeks/streams/rivers and wetlands, FEMA floodplains, and existing drainage systems (pipes, ditches, outfalls). Check here if present on site: _____ Sensitive area(s) _____ Floodplain _____
	Downstream Conveyance	Indicate the proposed point of discharge on the site plan. *Prepare and attach a Downstream Analysis as required by **Chapter 5**.* Check here to verify that adequate downstream capacity is available: X
	Existing Vegetation Map trees and vegetation	Using aerial photos or survey, map all trees and vegetation. Note all existing trees 6-inch caliper and greater (DBH) on map. Delineate and identify other areas and types of existing vegetation. The local planning authority may require a formal tree survey.
	Required Vegetated Buffers and Setbacks Assess and map buffers	Identify required vegetated buffer areas and other setback limits as defined by OCMC Title 17.
	Land Use and Zoning	Existing Land Use Zoning designation(s): R-6
	Access and Parking	Delineate proposed access points for all transportation modes on map. Indicate amount and area of required parking onsite if applicable, *attach documentation as needed.*
	Utilities to Site and Surrounding Area	Map existing utilities including stormwater facilities, storm conveyance, sewer, water, electricity, phone/cable, gas, and any public storm system/facility downstream.
2.2.3 Site Planning Design Objectives *(attach engineered scale Preliminary Site Plan)*		
	1. Preserve existing resources	**Required:** Show sensitive areas and buffers on site plan. Denote buffer areas that require enhancement. Show any proposed areas of encroachment and associated buffer mitigation areas.
	2. Minimize site disturbance	**Required:** Delineate protection areas on site plan for areas to remain undisturbed during construction.
	3. Minimize soil compaction	**Required:** Delineate and note temporary fencing on site plan for proposed infiltration facilities, vegetated stormwater management facilities, and re-vegetation areas.
	4. Minimize imperviousness	**Required:** Delineate proposed impervious areas and proposed impervious area reduction methods on the site plan. A. Total proposed new/replaced impervious area: 150,447 (SF) B. Area of proposed Green Roofs: 0 (SF) C. Area of proposed pervious pavements: 0 (SF) D. Describe type of pavers or pavement proposed: _____ E. Impervious area requiring management [A-(B+C)]: 150,447 (SF)

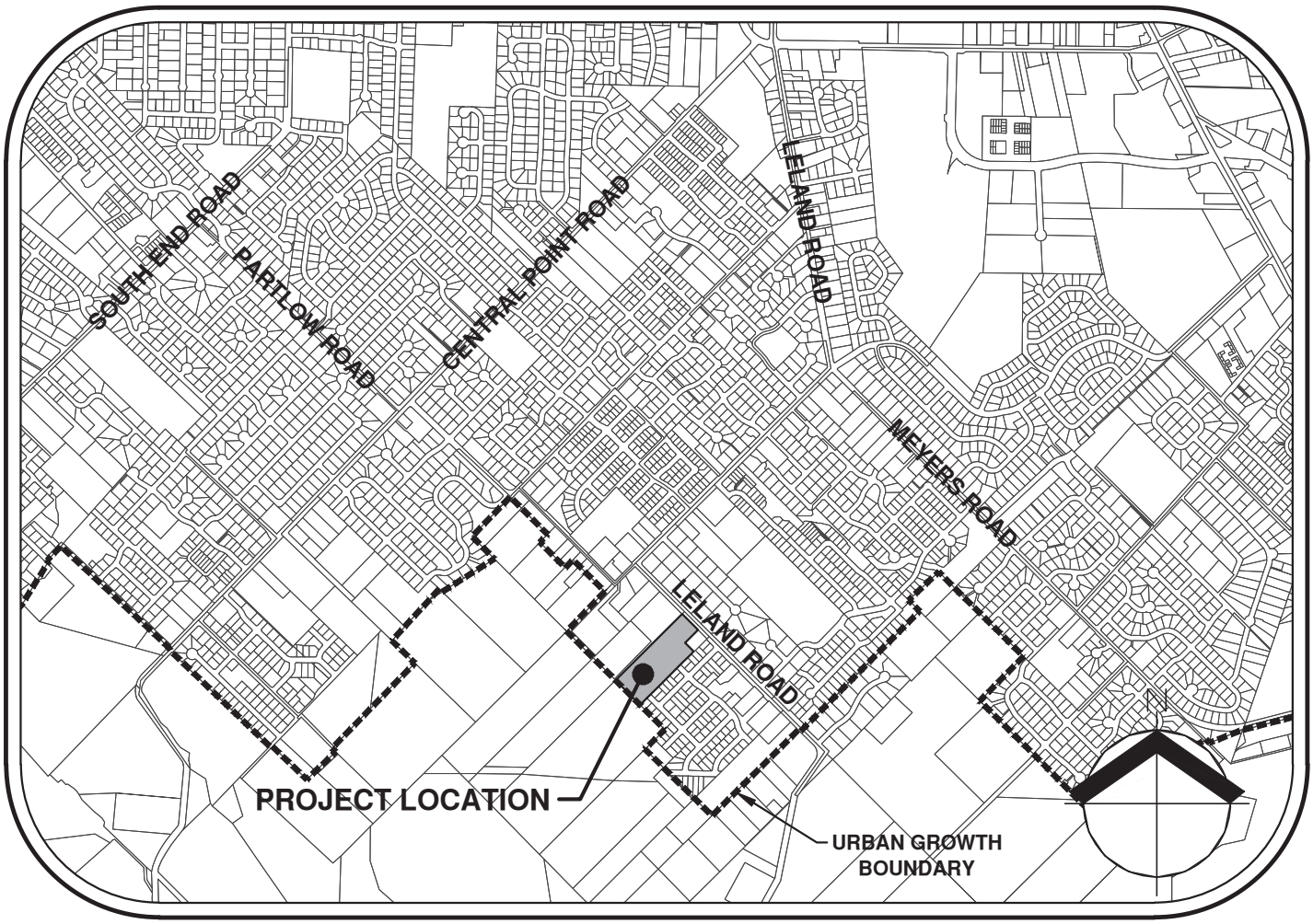
SITE ASSESSMENT AND PLANNING CHECKLIST

2.2.4 Proposed Stormwater Management Strategy

	Proposed Stormwater Management Strategy	_____ Infiltration facilities _____ Surface Infiltration facilities to the MEP _____ Full onsite retention/infiltration up to the 10-year storm event X Infiltration facilities are limited by the following conditions *(include documentation to demonstrate the limiting condition and choose an alternate strategy below):* _____ Stormwater management facility to be located on fill _____ Steep slopes X High groundwater _____ Contaminated soils _____ Conflict with required Source Controls (**Chapter 6**) _____ Onsite Stormwater management facilities (indicate below) _____ Offsite stormwater management facilities/regional facilities _____ Fee in Lieu, as determined by the City
	Preliminary Facility Selection/Sizing	Check all that apply, *attach output from BMP Sizing Tool*, and show proposed Stormwater Management Facilities on Preliminary Site Plan. LID facilities: _____ Infiltration Stormwater Planter X Filtration Stormwater Planter _____ Infiltration Rain Garden _____ Filtration Rain Garden _____ Vegetated Swale X Detention Pond _____ Infiltration Trench _____ Manufactured Treatment Technology _____ Other: _____
	Verify Minimum Facility Size	A. Required surface area of onsite surface infiltration facilities: As determined by BMP sizing tool or engineered method: 10,786 (SF) B. Calculate MEP surface area of surface infiltration facilities for sites with limiting conditions: Total new/replaced impervious area (SF) x 0.10 = 15,045 (SF) C. Calculate required surface area of onsite LID facilities: Smaller of [A] or [B]: 10,786 (SF) D. Proposed surface infiltration facility size(s): From site plan: 10,786 (SF) *must be larger than [C]*

SITE ASSESSMENT AND PLANNING CHECKLIST		
2.2.5 Other Project Requirements		
	Grading Permit	Review OCMC 15.48 to determine whether a grading permit will be required. Grading permit required? Y (Y/N) Type of Grading Plan proposed (see **Chapter 3**): Engineered Grading Plan
	Erosion Prevention and Sediment Control	Identify the required permits: _____ ESC Permit from the City *(sites that include 1,000+ SF new or replaced impervious area)* X 1200-C Permit from DEQ *(sites that disturb 1 acre or more land surface)*
	Source Control for High Use Sites	Identify whether the proposed development will include any of the following: _____ Fuel Dispensing Facilities and Surrounding Traffic Areas _____ Above-Ground Storage of Liquid Materials _____ Solid Waste Storage Areas, Containers, and Trash Compactors _____ Exterior Storage of Bulk Materials _____ Material Transfer Areas/Loading Docks _____ Equipment and/or Vehicle Washing Facilities _____ Development on Land With Suspected or Known Contamination _____ Covered Vehicle Parking Areas _____ Industrial and Commercial High Traffic Areas _____ Other land uses subject to the ODEQ 1200-Z Industrial Stormwater Permit
	Other Permits	Identify other natural resources related permits from local, state, or federal agencies that may be required as part of the proposed development activity. It is the responsibility of the applicant to identify and obtain required permits prior to project approval. List other anticipated permits: N/A

VICINITY MAP



VICINITY MAP

NOT TO SCALE

SITE ASSESSMENT MAP

NOTES:

- NRCS HYDROLOGICAL SOIL TYPE: BORNSTEDL SILT LOAM AND JORY SILTY CLAY LOAM
- INFILTRATION ASSESSMENT: INFILTRATION NOT RECOMMENDED PER GEOTECH ENGINEERING
- LAND USE AND ZONING: R-6

SCALE: 1"= 40 FEET

40 0 16 24 32 40

ON 34" X 24" PAPER

TAX LOT 101
TAX MAP 3S 2E 7C

TAX LOT 199
TAX MAP 3S 2E 7C

TAX LOT 600
TAX MAP 3S 2E 7DC

TAX LOT 700
TAX MAP 3S 2E 7DC

TAX LOT 800
TAX MAP 3S 2E 7DC

TAX LOT 900
TAX MAP 3S 2E 7DC

TAX LOT 1400
TAX MAP 3S 2E 18

TAX LOT 1401
TAX MAP 3S 2E 18

TAX LOT 1500
TAX MAP 3S 2E 18AB

TAX LOT 1300
TAX MAP 3S 2E 18AB

TAX LOT 1200
TAX MAP 3S 2E 18AB

TAX LOT 1100
TAX MAP 3S 2E 18AB

TAX LOT 1000
TAX MAP 3S 2E 18AB

TAX LOT 800
TAX MAP 3S 2E 18AB

TAX LOT 700
TAX MAP 3S 2E 18AB

TAX LOT 500
TAX MAP 3S 2E 18AB

TAX LOT 400
TAX MAP 3S 2E 18AB

TAX LOT 300
TAX MAP 3S 2E 18AB

TAX LOT 100
TAX MAP 3S 2E 18AB

S LELAND ROAD

LINDSAY ANNE LANE

CEDARWOOD WAY

CHERRYWOOD WAY

ASPHALT DRIVEWAY

GRAVEL DRIVE

DRIVEWAY

N43°40'13"E 893.94'

S43°34'15"W 719.97'

S43°34'29"W 173.97'

S46°21'05"E 215.00'

S46°19'21"E 115.02'

N46°20'29"W 331.56'

OUTHOUSE

EX BASKETBALL HOOP

BARN

STONE PATIO

CHICKEN COOP

POLE WITH LIGHT AND DROP

SHED

SHOP

HOUSE

COVERED PORCH

PGE POWER LINE TOWER

125' PGE TRANSMISSION LINE EASEMENT BOOK 278 PAGE 398

10' ELECTRIC LINE EASEMENT PER DOC. NO. 2014-049319

ELECTRICAL LINE EASEMENT PER DOC. NO. 2014-049319

STORMWATER DISCHARGE CONNECTION POINT

POWER CONDUIT STUB

BARRICADE

EX STM MH
RIM: 439.86
IE OUT: 433.60 (12"SE)

EX STM CI
RIM: 439.15
IE OUT: 433.98 (12"SE)
SUMP: 432.29

EX STM CI
RIM: 439.30
IE OUT: 435.35 (12"E)
SUMP: 433.62

EX STM MH
RIM: 438.92
IE IN: 433.85 (12"W)
IE IN: 433.46 (12"N)
IE IN: 432.46 (12"SE)
IE IN: 432.38 (12"NW)
IE OUT: 432.30 (12"NE)

EX STM CI
RIM: 436.67
IE OUT: 430.97 (12"NE)
SUMP: 429.29

EX STM CI
RIM: 435.63
IE IN: 432.28 (12"SE)
IE OUT: 432.19 (12"NE)
SUMP: 430.39

EX STM CI
RIM: 435.60
IE OUT: 432.44 (12"NW)
SUMP: 430.84

EX STM MH
RIM: 437.16
IE OUT: 431.36 (12"SE)

EX STM MH
RIM: 436.43
IE IN: 430.64 (12"NW)
IE IN: 430.82 (12"NE)
IE IN: 430.61 (12"SW)
IE OUT: 430.57 (12"SE)

EX STM MH
RIM: 435.92
IE IN: 431.99 (12"W)
IE IN: 430.50 (12"SW)
IE IN: 430.42 (12"NE)
IE IN: 430.32 (12"NW)
IE OUT: 430.25 (15"SE)

EX STM CI
RIM: 436.56
IE OUT: 430.88 (12"SW)
SUMP: 429.32

EX STM CB
RIM: 434.84
IE IN: 431.42 (12"NW)
IE OUT: 431.25 (12"SE)

EX STM AD
RIM: 435.19

EX STM CB
RIM: 435.23
IE IN: 432.25 (12"N)
IE OUT: 431.81 (12"SE)

EX STM CB
RIM: 435.29
IE IN: 430.90 (12"NW)
IE OUT: 430.85 (12"SE)

EX 12" CONC CULVERT
IE: 441.35

EX 12" CONC CULVERT
IE: 442.36

EX 12" CSP CULVERT
IE: 441.96

EX 12" CONC CULVERT
IE: 441.36

EX 12" CSP CULVERT
IE: 439.08

EX 12" CONC CULVERT
IE: 437.09

EX 8" STEEL CULVERT
IE: 436.29

EX 6" PVC CULVERT
IE: 434.51

EX 16" CONC CULVERT
IE: 433.62

EX STM DI
TOP GRATE: 435.12
BOT. GRATE: 433.68
IE OUT: 433.18 (12"S)

EX 12" CONC CULVERT
IE: 434.52

EX 12" STEEL CULVERT
IE: 433.59

EX 2" PVC OUTFALL
IE: 434.49

EX 2" PVC OUTFALL
IE: 434.39

EX STONE RETAINING WALL

EX 12" CONC CULVERT
IE: 433.74

EX 12" CONC CULVERT
IE: 433.63

EX 2" PVC OUTFALL
IE: 436.10

EX 12" CONC CULVERT
IE: 433.45

EX 2" PVC OUTFALL
IE: 435.65

10750 10745 10744 10739 10634 10633 10126 10186 10185 10177 10049 10047 10037 10034

11540 11539 11537 11530 11528 11523 11521 11516 11689 11698 11687 11665 11680 11691 11659 11684 11694 11460 11467 11474 11436 11404 11405 11741 11886 11738 11839 11830 11832 11818 11831 11834 11816 11813 11852 11812 11811 11803 11804

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LINDSAY ANNE ESTATES TOO

OREGON CITY, OREGON

CLACKAMAS COUNTY TAX MAP 3-2E-18

TAX LOT 1400

SITE ASSESSMENT MAP

DESIGNED BY:
DRAWN BY: NMC
CHECKED BY: MBH
SCALE: AS NOTED
DATE: 07/26/2017

REVISIONS

JOB NUMBER
5837

SHEET
1

AKS DRAWING FILE: 5837 BASIN PREDWG | LAYOUT: ASSESSMENT

PRELIMINARY SITE PLAN

SCALE: 1"= 40 FEET

40 0 16 24 32 40

ON 34" X 24" PAPER

TAX LOT 101
TAX MAP 3S 2E 7C

125' PGE TRANSMISSION LINE EASEMENT BOOK 278 PAGE 308

TAX LOT 199
TAX MAP 3S 2E 7C

ASPHALT DRIVEWAY

ASPHALT DRIVEWAY

TAX LOT 600
TAX MAP 3S 2E 7DC

10750

EX 12" CONC CULVERT IE: 442.36

DRIVEWAY

EX 12" CSP CULVERT IE: 441.96

10745

10744

10739

TAX LOT 700
TAX MAP 3S 2E 7DC

DRIVEWAY

EX 12" CSP CULVERT IE: 439.08

TAX LOT 800
TAX MAP 3S 2E 7DC

S LELAND ROAD

30'

30'

EX 12" CONC CULVERT IE: 437.09

GRAVEL DRIVE

EX 8" STEEL CULVERT IE: 436.29

EX 6" PVC CULVERT IE: 434.51

TAX LOT 900
TAX MAP 3S 2E 7DC

10634

10633

EX 12" CONC CULVERT IE: 434.52

COMM MH

EX STM CB RIM: 435.23 IN: 432.25 (12"N) IE OUT: 431.81 (12"SE)

EX STM AD RIM: 435.19

GRAVEL DRIVE

EX 12" STEEL CULVERT IE: 433.59

EX 2" PVC OUTFALL IE: 434.49

EX 2" PVC OUTFALL IE: 434.39

GRAVEL DRIVE

EX 12" CONC CULVERT IE: 433.74

EX STM CB RIM: 435.29 IN: 430.90 (12"NW) IE OUT: 430.85 (12"SE)

EX 12" CONC CULVERT IE: 433.63

EX 2" PVC OUTFALL IE: 436.10

EX 12" CONC CULVERT IE: 433.45

EX 2" PVC OUTFALL IE: 435.65

TAX LOT 1402
TAX MAP 3S 2E 18

11 10 8 7 6 5 1

12 9 4 3 2

STORMWATER PLANTER (TYP)

STORM WATER MANHOLE (TYP)

PGE POWER LINE TOWER

MILLER ROAD

13 18 22 26 28

19 20 21 27

14 17 23 25

STORM DRAIN LATERAL (TYP)

CURB INLET (TYP)

STORMWATER PLANTER (TYP)

EX STM MH RIM: 439.80 IE OUT: 433.60 (12"SE)

EX SAN MH RIM: 439.79 IE OUT: 429.04 (8"SE)

EX SAN MH RIM: 437.16 IE OUT: 427.33 (8"SE)

EX STM MH RIM: 437.16 IE OUT: 431.36 (12"SE)

TAX LOT 1401
TAX MAP 3S 2E 18

EX 16" CONC CULVERT IE: 433.62

EX STM DI TOP GRATE: 435.12 BOT. GRATE: 433.68 IE OUT: 433.18 (12"S)

15 16 24

TRACT A
STORMWATER FACILITY

POWER CONDUIT STUB

ELECTRICAL LINE EASEMENT PER DOC. NO. 2014-049319

BARRICADE

10' ELECTRIC LINE EASEMENT PER DOC. NO. 2014-049319

TAX LOT 1300
TAX MAP 3S 2E 18AB

TAX LOT 1500
TAX MAP 3S 2E 18AB

TAX LOT 1200
TAX MAP 3S 2E 18AB

TAX LOT 1100
TAX MAP 3S 2E 18AB

TAX LOT 1000
TAX MAP 3S 2E 18AB

TAX LOT 800
TAX MAP 3S 2E 18AB

TAX LOT 700
TAX MAP 3S 2E 18AB

TAX LOT 500
TAX MAP 3S 2E 18AB

TAX LOT 400
TAX MAP 3S 2E 18AB

TAX LOT 300
TAX MAP 3S 2E 18AB

TAX LOT 100
TAX MAP 3S 2E 18AB

EX STM CI RIM: 439.15 IE OUT: 433.98 (12"SE) SUMP: 432.29

EX STM CI RIM: 436.67 IE OUT: 430.97 (12"NE) SUMP: 429.29

EX STM MH RIM: 436.43 IE IN: 430.64 (12"NW) IE IN: 430.82 (12"NE) IE IN: 430.61 (12"SW) IE OUT: 430.57 (12"SE)

10' PUE

10' PUE

10128

10186

EX STM CB RIM: 434.84 IE IN: 431.42 (12"NW) IE OUT: 431.25 (12"SE)

10185

10177

EX STM CI RIM: 439.30 IE OUT: 435.35 (12"E) SUMP: 433.62

LINDSAY ANNE LANE

26.5'

26.5'

26.5'

26.5'

26.5'

EX SAN MH RIM: 438.87 IE IN: 428.11 (8"SE) IE IN: 428.02 (8"NW) IE OUT: 427.95 (8"NE)

10049

10047

EX STM CI RIM: 435.63 IE IN: 432.28 (12"SE) IE OUT: 432.19 (12"NE) SUMP: 430.39

EX STM CI RIM: 435.60 IE OUT: 432.44 (12"NW) SUMP: 430.84

EX STM CI RIM: 436.56 IE OUT: 430.88 (12"SW) SUMP: 429.32

EX STM MH RIM: 435.92 IE IN: 431.99 (12"W) IE IN: 430.50 (12"SW) IE IN: 430.42 (12"NE) IE IN: 430.32 (12"NW) IE OUT: 430.25 (15"SE)

EX STM MH RIM: 438.92 IE IN: 433.85 (12"W) IE IN: 433.46 (12"N) IE IN: 432.46 (12"SE) IE IN: 432.38 (12"NW) IE OUT: 432.30 (12"NE)

EX SAN MH RIM: 435.97 IE IN: 426.63 (8"SE) IE IN: 426.55 (8"SW) IE IN: 426.37 (8"NW) IE OUT: 426.31 (8"NE)

10037

10034

39'

30'

CEDARWOOD WAY

CHERRYWOOD WAY

AKS DRAWING FILE: 5837 BASIN POSTLDWG | LAYOUT: SITE

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LINDSAY ANNE ESTATES TOO

OREGON

CLACKAMAS COUNTY TAX MAP 3-2E-18

OREGON CITY

TAX LOT 1400

PRELIMINARY SITE PLAN

DESIGNED BY:	VHN
DRAWN BY:	NMC
CHECKED BY:	MBH
SCALE:	AS NOTED
DATE:	08/03/2017

REVISIONS

JOB NUMBER
5837

SHEET
1

BMP SIZING TOOL REPORT

WES BMP Sizing Software Version 1.6.0.1, August 2015

WES BMP Sizing Report

Project Information

Project Name	Lindsay Anne Estates Too
Project Type	Subdivision
Location	19701 S Leland Road, Oregon City
Stormwater Management Area	0
Project Applicant	PDX Development, Inc.
Jurisdiction	OutofDistrict

Drainage Management Area

Name	Area (sq-ft)	Pre-Project Cover	Post-Project Cover	DMA Soil Type	BMP
Basin 2 - Roof	2,640	Forested	Roofs	C	Basin 2 - Planter
Basin 1 - Pervious	2,471	Forested	Grass	C	Basin 1 - Planter
Basin 1 - Impervious	2,354	Forested	ConventionalConcrete	C	Basin 1 - Planter
Basin 1 - Roof	2,640	Forested	Roofs	C	Pond
Basin 2 - Impervious	3,120	Forested	ConventionalConcrete	C	Basin 2 - Planter
Basin 2 - Pervious	2,840	Forested	Grass	C	Basin 2 - Planter
Basin 3 - Roof	2,640	Forested	Roofs	C	Basin 3 - Planter
Basin 3 - Impervious	1,660	Forested	ConventionalConcrete	C	Basin 3 - Planter
Basin 3 - Pervious	2,774	Forested	Grass	C	Basin 3 - Planter
Basin 4 - Roof	5,280	Forested	Roofs	C	Basin 4 - Planter
Basin 4 - Impervious	5,160	Forested	ConventionalConcrete	C	Basin 4 - Planter
Basin 4 - Pervious	5,294	Forested	Grass	C	Basin 4 - Planter
Basin 5 - Roof	5,280	Forested	Roofs	C	Basin 5 - Planter
Basin 5 - Impervious	3,670	Forested	ConventionalConcrete	C	Basin 5 - Planter

Basin 5 - Pervious	5,311	Forested	Grass	C	Basin 5 - Planter
Basin 6 - Roof	2,640	Forested	Roofs	C	Basin 6 - Planter
Basin 6 - Impervious	3,200	Forested	ConventionalConcrete	C	Basin 6 - Planter
Basin 6 - Pervious	2,820	Forested	Grass	C	Basin 6 - Planter
Basin 7 - Roof	2,640	Forested	Roofs	C	Basin 7 - Planter
Basin 7 - Impervious	3,050	Forested	ConventionalConcrete	C	Basin 7 - Planter
Basin 7 - Pervious	2,910	Forested	Grass	C	Basin 7 - Planter
Basin 8 - Roof	2,640	Forested	Roofs	C	Pond
Basin 8 - Impervious	2,344	Forested	ConventionalConcrete	C	Basin 8 - Planter
Basin 8 - Pervious	2,522	Forested	Grass	C	Basin 8 - Planter
Basin 20 - Roof	39,600	Forested	Roofs	C	Pond
Basin 20 - Impervious	36,327	Forested	ConventionalConcrete	C	Pond
Basin 20 - Pervious	74,206	Forested	Grass	C	Pond
Basin 43 - Roof	7,920	Forested	Roofs	C	Basin 43 - Planter
Basin 43 - Impervious	5,410	Forested	ConventionalConcrete	C	Basin 43 - Planter
Basin 43 - Pervious	10,446	Forested	Grass	C	Basin 43 - Planter
Basin 42 - Impervious	3,150	Forested	ConventionalConcrete	C	Basin 42 - Planter
Basin 42 - Pervious	8,991	Forested	Grass	C	Basin 42 - Planter
Basin 40 - Impervious	3,658	Forested	ConventionalConcrete	C	Basin 40 - Planter
Basin 40 - Pervious	470	Forested	Grass	C	Basin 40 - Planter
Basin 41 - Impervious	3,424	Forested	ConventionalConcrete	C	Basin 41 - Planter
Basin 41 - Pervious	350	Forested	Grass	C	Basin 41 - Planter

LID Facility Sizing Details

LID ID	Design Criteria	BMP Type	Facility Soil Type	Minimum Area (sq-ft)	Planned Areas (sq-ft)	Orifice Diameter (in)
Basin 1 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	46.1	47.0	0.3
Basin 2 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	98.8	99.0	0.5
Basin 3 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	76.6	81.0	0.4
Basin 4 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	179.6	180.0	0.6
Basin 5 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	157.4	162.0	0.6
Basin 6 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	99.9	104.0	0.5
Basin 7 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	98.0	104.0	0.5
Basin 8 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	46.1	47.0	0.3
Basin 43 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	245.4	246.0	0.7
Basin 42 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	86.4	90.0	0.4
Basin 40 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	56.9	63.0	0.3
Basin 41 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	52.9	63.0	0.3

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?
Pond	FCWQT	Lined	5.50	9,500.0	3	36,555.7	26,791.7	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.

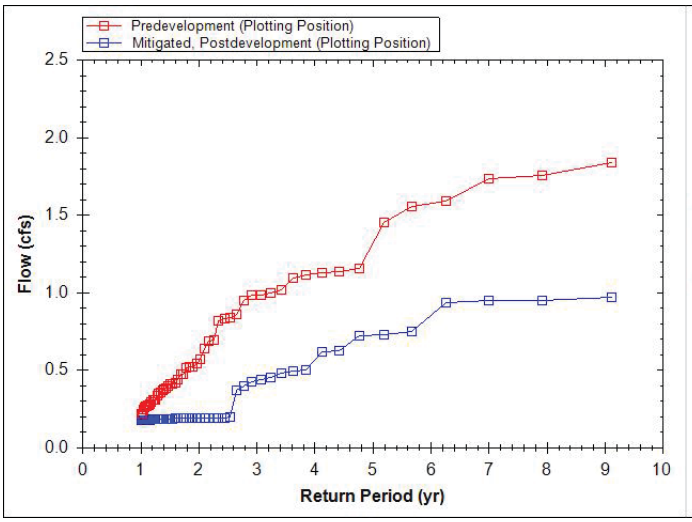
Custom Pond Geometry Configuration

Pond ID: Pond
Design: FlowControlAndTreatment

Shape Curve

Depth (ft)	Area (sq ft)	Discharge (cfs)
NaN	NaN	NaN

Flow Frequency Chart



Flow Duration Chart

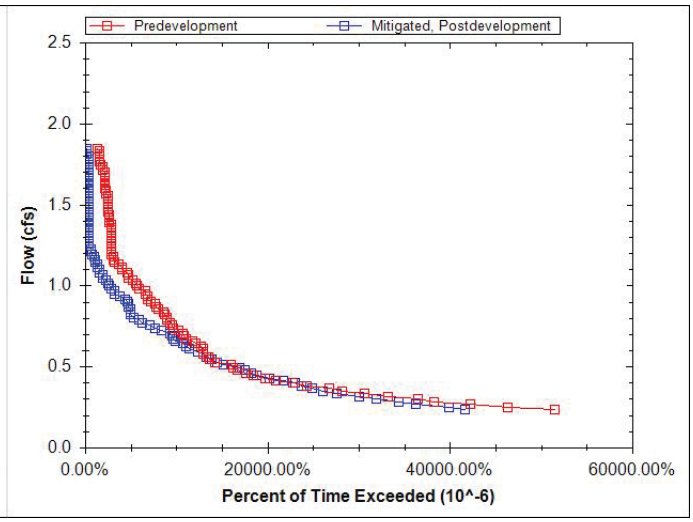


Exhibit I: Geotechnical Engineering Report

Real-World Geotechnical Solutions
Investigation • Design • Construction Support

Revised August 2, 2017
Project No. 17-4623

PDX Development, Inc.

PO Box 2559
Oregon City, Oregon 97045
Email: bament2001@aol.com

Via email with hard copies mailed upon request

SUBJECT: GEOTECHNICAL ENGINEERING REPORT
LINDSAY ANNE ESTATES TOO
19701 SOUTH LELAND ROAD
TAX LOT 3S2E18 01400
OREGON CITY, OREGON

This report presents the results of a geotechnical explorations conducted by GeoPacific Engineering, Inc. (GeoPacific) for the above-referenced project. The purpose of our work was to evaluate subsurface conditions at the site and provide recommendations for site development. This geotechnical study was performed in accordance with GeoPacific Proposal No. P-6079 dated April 27, 2017, and your subsequent authorization of our proposals and *General Conditions for Geotechnical Services*.

SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The subject site is located on the southwest side of Leland Road in Oregon City, Clackamas County, Oregon. The site consists of Tax lot 3S2E18 01400 and is approximately 6.3 acres in size. Based on topographical mapping provided by AKS Engineering and Forestry, topography is gently undulating, with site elevations ranging between 435 to 445 feet AMSL. Vegetation on the site generally consists of grass, with some small to large trees in the central and western portions of the site. There is one existing residence in the central portion of the site, with several outbuildings. A PGE transmission line crosses the northern corner of the site.

Preliminary site plans indicate that the proposed development will consist of construction of a 28 lot subdivision for single family home construction, new public streets, associated underground utilities, and the construction of a stormwater detention pond. Based on our review of the grading plan provided by AKS Engineering and Forestry, LLC, we anticipate that maximum cuts and fills will be on the order of 5 feet or less. The existing residences and outbuildings will be demolished and removed from the site. We understand that a stormwater facility is proposed in Tract A, in the central-eastern portion of the site.

SITE GEOLOGY

Regionally, the subject site lies within the Willamette Valley/Puget Sound lowland, a broad structural depression situated between the Coast Range on the west and the Cascade Range on the east. A series of discontinuous faults subdivide the Willamette Valley into a mosaic of fault-

bounded, structural blocks (Yeats et al., 1996). Uplifted structural blocks form bedrock highlands, while down-warped structural blocks form sedimentary basins. Valley-fill sediment in the adjacent basin achieves a maximum thickness of 1,500 feet and overlies Miocene Columbia River Basalt at depth (Madin, 1990; Yeats et al., 1996).

The subject site lies on a broad volcanic plateau underlain by the Boring Lava which formed during a period of Plio-Pleistocene (5 to 0.2 million years ago) volcanism and faulting (Schlicker and Finlayson, 1979). The Boring Lava consists mainly of basaltic lava flows, but locally contains tuff breccia, ash, tuff, cinders, and scoriaceous volcanic debris flows deposited on the flanks of volcanic cones. The flows are commonly light gray to nearly black, with lighter tones predominating, and are characterized by columnar jointing and flow structures. The upper surface of the Boring Lava is typically weathered to depths of 25 feet or more with the upper 5 to 15 feet consisting of red-brown, clayey silt to silty clay soil.

REGIONAL SEISMIC SETTING

At least three major fault zones capable of generating damaging earthquakes are thought to exist in the vicinity of the subject site. These include the Portland Hills Fault Zone, the Gales Creek-Newberg-Mt. Angel Structural Zone, and the Cascadia Subduction Zone.

Portland Hills Fault Zone

The Portland Hills Fault Zone is a series of NW-trending faults that include the central Portland Hills Fault, the western Oatfield Fault, and the eastern East Bank Fault. These faults occur in a northwest-trending zone that varies in width between 3.5 and 5.0 miles. The combined three faults vertically displace the Columbia River Basalt by 1,130 feet and appear to control thickness changes in late Pleistocene (approx. 780,000 years) sediment (Madin, 1990). The Portland Hills Fault occurs along the Willamette River at the base of the Portland Hills, and is about 4.9 miles northeast of the site. The East Bank Fault occurs along the eastern margin of the Willamette River, and is located approximately 9.9 miles northeast of the subject site. The Oatfield Fault occurs along the western side of the Portland Hills, and is about 4.7 miles northeast of the site. The Oatfield Fault is considered to be potentially seismogenic (Wong, et al., 2000). Mabey et al., (1996) indicate the Portland Hills Fault Zone has experienced Late Quaternary (last 780,000 years) fault movement; however, movement has not been detected in the last 20,000 years. The accuracy of the fault mapping is stated to be within 500 meters (Wong, et al., 2000). No historical seismicity is correlated with the mapped portion of the Portland Hills Fault Zone, but in 1991 a M3.5 earthquake occurred on a NW-trending shear plane located 1.3 miles east of the fault (Yelin, 1992). Although there is no definitive evidence of recent activity, the Portland Hills Fault Zone is assumed to be potentially active (Geomatrix Consultants, 1995).

Gales Creek-Newberg-Mt. Angel Structural Zone

The Gales Creek-Newberg-Mt. Angel Structural Zone is a 50-mile-long zone of discontinuous, NW-trending faults that lies about 18 miles southwest of the subject site. These faults are recognized in the subsurface by vertical separation of the Columbia River Basalt and offset seismic reflectors in the overlying basin sediment (Yeats et al., 1996; Werner et al., 1992). A geologic reconnaissance and photogeologic analysis study conducted for the Scoggins Dam site in the Tualatin Basin revealed no evidence of deformed geomorphic surfaces along the structural zone (Unruh et al., 1994). No seismicity has been recorded on the Gales Creek Fault or Newberg Fault (the fault closest to the subject site); however, these faults are considered to

be potentially active because they may connect with the seismically active Mount Angel Fault and the rupture plane of the 1993 M5.6 Scotts Mills earthquake (Werner et al. 1992; Geomatrix Consultants, 1995).

Cascadia Subduction Zone

The Cascadia Subduction Zone is a 680-mile-long zone of active tectonic convergence where oceanic crust of the Juan de Fuca Plate is subducting beneath the North American continent at a rate of 4 cm per year (Goldfinger et al., 1996). A growing body of geologic evidence suggests that prehistoric subduction zone earthquakes have occurred (Atwater, 1992; Carver, 1992; Peterson et al., 1993; Geomatrix Consultants, 1995). This evidence includes: (1) buried tidal marshes recording episodic, sudden subsidence along the coast of northern California, Oregon, and Washington, (2) burial of subsided tidal marshes by tsunami wave deposits, (3) paleoliquefaction features, and (4) geodetic uplift patterns on the Oregon coast. Radiocarbon dates on buried tidal marshes indicate a recurrence interval for major subduction zone earthquakes of 250 to 650 years with the last event occurring 300 years ago (Atwater, 1992; Carver, 1992; Peterson et al., 1993; Geomatrix Consultants, 1995). The inferred seismogenic portion of the plate interface lies roughly along the Oregon coast at depths of between 20 and 40 miles.

SUBSURFACE CONDITIONS

Our site-specific exploration for this report was conducted on June 2, 2017. A total of 6 exploratory test pits were excavated with a small track-mounted excavator to depths ranging from 4.5 to 9.5 feet bgs (below ground surface) at the approximate locations indicated on Figures 2 & 3. It should be noted that test pit locations were located in the field by pacing distances from apparent property corners and other site features shown on the plans provided. As such, the locations of the explorations should be considered approximate.

Table 1 - Rock Hardness Classification Chart

ODOT Rock Hardness Rating	Field Criteria	Unconfined Compressive Strength	Typical Equipment Needed For Excavation
Extremely Soft (R0)	Indented by thumbnail	<100 psi	Small excavator
Very Soft (R1)	Scratched by thumbnail, crumbled by rock hammer	100-1,000 psi	Small excavator
Soft (R2)	Not scratched by thumbnail, indented by rock hammer	1,000-4,000 psi	Medium excavator (slow digging with small excavator)
Medium Hard (R3)	Scratched or fractured by rock hammer	4,000-8,000 psi	Medium to large excavator (slow to very slow digging), typically requires chipping with hydraulic hammer or mass excavation)
Hard (R4)	Scratched or fractured w/ difficulty	8,000-16,000 psi	Slow chipping with hydraulic hammer and/or blasting
Very Hard (R5)	Not scratched or fractured after many blows, hammer rebounds	>16,000 psi	Blasting

A GeoPacific engineer continuously monitored the field exploration program and logged the test pits. Soils observed in the explorations were classified in general accordance with the Unified Soil Classification System. Rock hardness was classified in accordance with Table 1, modified from the ODOT Rock Hardness Classification Chart. During exploration, GeoPacific also noted geotechnical conditions such as soil consistency, moisture and groundwater conditions. Logs of test pits are attached to this report. The following report sections are based on the exploration program and summarize subsurface conditions encountered at the site.

Topsoil Horizon: Directly underlying the ground surface in all test pits, we observed low to moderately organic SILT (OL-ML). This organic silt layer was classified as topsoil horizon. The topsoil horizon consisted of a moist, low to moderately organic upper layer that extended to a depth of 10-15 inches bgs with fine roots extending to depths ranging from 5 to 13 inches.

Table 2 – Depth of Topsoil Horizon in Test Pit Explorations

Test Pit Designation	Topsoil Horizon Thickness (in)
TP-1	14
TP-2	15
TP-3	13
TP-4	10
TP-5	13
TP-6	13

Residual Soil: Underlying the topsoil horizon in all test pits we encountered residual soil derived from in-place weathering of the underlying Boring Lava Formation. The residual soil generally consisted of stiff to very stiff, moist, reddish-brown CLAY (CL), with trace black staining, subtle orange and gray mottling, and vesicular basalt gravels. These soils extended to depths of 4.0 feet in test pits TP-1, TP-2, TP-4, TP-5, and TP-6 and a depth of 3.5 feet in test pit TP-3. The residual soil grades to hard between the depths of 3.5 feet and 4 feet in test pits TP-1, TP-2, and TP-4.

***Boring Lava* –** Beneath the residual soil, we encountered weathered rock belonging to the Boring Lava Formation in all test pit explorations. The upper two to three feet of the weathered rock was generally extremely soft to very soft (R0-R1), but below that the weathered rock graded to very soft to soft (R1-R2). In test pit TP-6, a large boulder was encountered in the north side of the test pit. We experienced practical refusal on medium hard (R3) basalt at a depth of 9 feet in test pit TP-1. Very soft to soft (R1-R2) basalt extended beyond the maximum depth of exploration in all other test pits.

Soil Moisture and Groundwater

On June 2, 2017, GeoPacific observed groundwater seepage in test pits TP-1 and TP-5 at depths of 6 feet and 8.5 feet, respectively. Groundwater seepage was not found in the other explorations to a depth of 9.5 feet below the ground surface. Soil moisture conditions were moist in test pits TP-2, TP-3, TP-4, and TP-6 and ranged from moist to wet in test pits TP-1 and TP-5. According to the *Estimated Depth to Groundwater in the Portland, Oregon Area, (United States Geological Survey, Snyder, 2017 website)*, groundwater is expected to be present at an approximate depth of 20 feet below the ground surface. It is anticipated that groundwater

conditions will vary depending on the season, local subsurface conditions, changes in site utilization, and other factors. Perched groundwater may be encountered in localized areas. Seeps and springs may exist in areas not explored, and may become evident during site grading.

CONCLUSIONS AND RECOMMENDATIONS

Based on our review, we consider the proposed development to be geotechnically feasible, provided that the recommendations of this report are incorporated into the design and construction phases of the project. In our opinion, the primary geotechnical concern associated with development at the site are the presence of bedrock at relatively shallow depths across the site and site preparation due to the thickness of topsoil layer across the site. Topsoil was found at depths ranging from 10 to 15 inches in all test pits during our explorations. This thick layer of topsoil will either have to be removed or structural foundations may have to be deepened in order to bear on competent native soils. It is possible that portions of the topsoil containing medium to large roots, but not much other organic content, may be remediated by ripping/tilling, root-picking, and recompacting. The Boring Lava Formation, which underlies the site, is known for rounded residual boulders, which could hamper excavations, such as for utility trenching. The potential for encountering boulders should be anticipated. The following report sections provide recommendations for site development and construction in accordance with the current applicable codes and local standards of practice.

Site Preparation

Areas of proposed buildings, streets, and areas to receive fill should be cleared of vegetation and any organic and inorganic debris. Existing structures should be demolished and any cavities structurally backfilled. Inorganic debris should be removed from the site. Organic materials from clearing should either be removed from the site or placed as landscape fill in areas not planned for structures.

Organic-rich topsoil should then be stripped from construction areas of the site or where engineered fill is to be placed. The estimated average necessary depth of removal in undisturbed areas for low to moderately organic soils is 6 inches. Deeper stripping to remove large tree roots or other organics may be necessary in portions of the site. It is possible that portions of the topsoil containing medium to large roots, but not much other organic content, may be remediated by ripping/tilling, root-picking, and recompacting.

The final depth of soil removal will be determined based on a site inspection after the stripping/ excavation has been performed. Stripped topsoil should be stockpiled only in designated areas and stripping operations should be observed and documented by the geotechnical engineer or his representative.

Any remaining undocumented fills, and subsurface structures (tile drains, basements, driveway and landscaping fill, old utility lines, septic leach fields, etc.) should be removed and the excavations backfilled with engineered fill. Disturbed native soil should either be removed and replaced, or should be ripped/tilled, root-picked, and recompacted in place. Undocumented fill soils were not encountered in our test pit explorations, but may be present in areas outside of our explorations. Undocumented fill material likely exists in the vicinity of the existing homes and structures.

Once stripping of a particular area is approved, the area must be ripped or tilled to a depth of 12 inches, moisture conditioned, root-picked, and compacted in-place prior to the placement of engineered fill or crushed aggregate base for pavement. Exposed subgrade soils should be evaluated by the geotechnical engineer. For large areas, this evaluation is normally performed by proof-rolling the exposed subgrade with a fully loaded scraper or dump truck. For smaller areas where access is restricted, the subgrade should be evaluated by probing the soil with a steel probe. Soft/loose soils identified during subgrade preparation should be compacted to a firm and unyielding condition, over-excavated and replaced with engineered fill (as described below), or stabilized with rock prior to placement of engineered fill. The depth of overexcavation, if required, should be evaluated by the geotechnical engineer at the time of construction.

Engineered Fill

All grading for the proposed development should be performed as engineered grading in accordance with the applicable building code at time of construction with the exceptions and additions noted herein. Proper test frequency and earthwork documentation usually requires daily observation and testing during stripping, rough grading, and placement of engineered fill. Imported fill material must be approved by the geotechnical engineer prior to being imported to the site. Oversize material greater than 6 inches in size should not be used within 3 feet of foundation footings, and material greater than 12 inches in diameter should not be used in engineered fill.

Engineered fill should be compacted in horizontal lifts not exceeding 8 inches using standard compaction equipment. We recommend that engineered fill be compacted to at least 95 percent of the maximum dry density determined by ASTM D698 (Standard Proctor) or equivalent. Field density testing should conform to ASTM D2922 and D3017, or D1556. All engineered fill should be observed and tested by the project geotechnical engineer or his representative. Typically, one density test is performed for at least every 2 vertical feet of fill placed or every 500 yd^3, whichever requires more testing. Because testing is performed on an on-call basis, we recommend that the earthwork contractor be held contractually responsible for test scheduling and frequency.

Site earthwork will be impacted by soil moisture and shallow groundwater conditions. Earthwork in wet weather would likely require extensive use of cement or lime treatment, or other special measures, at considerable additional cost compared to earthwork performed under dry-weather conditions.

Excavating Conditions and Utility Trenches

Subsurface test pit exploration indicates that, in general, utility trenches can be excavated using conventional heavy equipment such as dozers and trackhoes. Maintenance of safe working conditions, including temporary excavation stability, is the responsibility of the contractor. Actual slope inclinations at the time of construction should be determined based on safety requirements and actual soil and groundwater conditions. All temporary cuts in excess of 4 feet in height should be sloped in accordance with U.S. Occupational Safety and Heath Administration (OSHA) regulations (29 CFR Part 1926), or be shored. The existing native soils classify as Type B Soil and temporary excavation side slope inclinations as steep as 1H:1V may be assumed for planning purposes. The existing bedrock classifies as Type A Soil and temporary excavation side slope inclinations as steep as 3/4H:1V may be assumed for planning purposes. These cut slope inclinations are applicable to excavations above the water table

only. Maintenance of safe working conditions, including temporary excavation stability, is the responsibility of the contractor. Actual slope inclinations at the time of construction should be determined based on safety requirements and actual soil and groundwater conditions.

Saturated soils and groundwater may be encountered in utility trenches, particularly during the wet season. We anticipate that dewatering systems consisting of ditches, sumps and pumps would be adequate for control of perched groundwater. Regardless of the dewatering system used, it should be installed and operated such that in-place soils are prevented from being removed along with the groundwater.

Vibrations created by traffic and construction equipment may cause some caving and raveling of excavation walls. In such an event, lateral support for the excavation walls should be provided by the contractor to prevent loss of ground support and possible distress to existing or previously constructed structural improvements.

PVC pipe should be installed in accordance with the procedures specified in ASTM D2321. We recommend that trench backfill be compacted to at least 95% of the maximum dry density obtained by Standard Proctor ASTM D698 or equivalent. Initial backfill lift thickness for a ¾"-0 crushed aggregate base may need to be as great as 4 feet to reduce the risk of flattening underlying flexible pipe. Subsequent lift thickness should not exceed 1 foot. If imported granular fill material is used, then the lifts for large vibrating plate-compaction equipment (e.g. hoe compactor attachments) may be up to 2 feet, provided that proper compaction is being achieved and each lift is tested. Use of large vibrating compaction equipment should be carefully monitored near existing structures and improvements due to the potential for vibration-induced damage.

Adequate density testing should be performed during construction to verify that the recommended relative compaction is achieved. Typically, one density test is taken for every 4 vertical feet of backfill on each 200-lineal-foot section of trench.

Erosion Control Considerations

During our field exploration program, we did not observe soil types that would be considered highly susceptible to erosion. In our opinion, the primary concern regarding erosion potential will occur during construction, in areas that have been stripped of vegetation. Erosion at the site during construction can be minimized by implementing the project erosion control plan, which should include judicious use of straw waddles and silt fences. If used, these erosion control devices should be in place and remain in place throughout site preparation and construction.

Erosion and sedimentation of exposed soils can also be minimized by quickly re-vegetating exposed areas of soil, and by staging construction such that large areas of the project site are not denuded and exposed at the same time. Areas of exposed soil requiring immediate and/or temporary protection against exposure should be covered with either mulch or erosion control netting/blankets. Areas of exposed soil requiring permanent stabilization should be seeded with an approved grass seed mixture, or hydroseeded with an approved seed-mulch-fertilizer mixture.

Wet Weather Earthwork

Soils underlying the site are likely to be moisture sensitive and may be difficult to handle or traverse with construction equipment during periods of wet weather. Earthwork is typically most

economical when performed under dry weather conditions. Earthwork performed during the wet-weather season will probably require expensive measures such as cement treatment or imported granular material to compact fill to the recommended engineering specifications. If earthwork is to be performed or fill is to be placed in wet weather or under wet conditions when soil moisture content is difficult to control, the following recommendations should be incorporated into the contract specifications.

- Earthwork should be performed in small areas to minimize exposure to wet weather. Excavation or the removal of unsuitable soils should be followed promptly by the placement and compaction of clean engineered fill. The size and type of construction equipment used may have to be limited to prevent soil disturbance. Under some circumstances, it may be necessary to excavate soils with a backhoe to minimize subgrade disturbance caused by equipment traffic;
- The ground surface within the construction area should be graded to promote run-off of surface water and to prevent the ponding of water;
- Material used as engineered fill should consist of clean, granular soil containing less than 5 percent fines. The fines should be non-plastic. Alternatively, cement treatment of on-site soils may be performed to facilitate wet weather placement;
- The ground surface within the construction area should be sealed by a smooth drum vibratory roller, or equivalent, and under no circumstances should be left uncompacted and exposed to moisture. Soils which become too wet for compaction should be removed and replaced with clean granular materials;
- Excavation and placement of fill should be observed by the geotechnical engineer to verify that all unsuitable materials are removed and suitable compaction and site drainage is achieved; and
- Straw waddles and/or geotextile silt fences should be strategically located to control erosion.

If cement or lime treatment is used to facilitate wet weather construction, GeoPacific should be contacted to provide additional recommendations and field monitoring.

Pavement Design – Light-Duty Public Streets

We understand that plans for development include on-site light-duty public streets. An assumed CBR value of 6 and a corresponding roadbed soil resilient modulus of 9,000 psi were used for our analysis for the design of the new pavement section. Table 3 presents our flexible pavement design input parameters for the on-site light-duty public streets. The calculated design structural number is 2.03. We estimated the ADT to be 280 by considering the number of houses that will be serviced by the proposed new section of road. We assume 3 percent heavy trucks. Table 4 presents our recommended minimum dry-weather pavement section for both the new on-site public streets, supporting 20 years of vehicle traffic. Table 4 presents our recommended minimum dry-weather pavement section for the new public streets supporting 20 years of vehicle traffic. Pavement design calculations are attached to this report.

Table 3 – Flexible Pavement Section Design Input Parameters for On-Site Light-Duty Public Streets

Input Parameter	Design Value
18-kip ESAL Initial Performance Period (20 Years)	78,850
Initial Serviceability	4.2
Terminal Serviceability	2.5
Reliability Level	85 Percent
Overall Standard Deviation	0.44
Roadbed Soil Resilient Modulus (PSI)	9,000
Design Structural Number	**2.03**

Table 4 - Recommended Minimum Dry-Weather Pavement Section for On-Site Light-Duty Public Streets

Material Layer	Section Thickness (in.)	Structural Coefficient	Compaction Standard
Asphaltic Concrete (AC)	3	0.44	91%/ 92% of Rice Density AASHTO T-209
Crushed Aggregate Base ¾"-0 (leveling course)	2	0.12	95% of Modified Proctor ASTM D1557 or equivalent
Crushed Aggregate Base 1½"-0	8	0.12	95% of Modified Proctor ASTM D1557 or equivalent
Subgrade	12	9,000 PSI	95% of Standard Proctor ASTM D698 or equivalent
Total Calculated Structural Number		**2.52**	

Pavement subgrade should be ripped/tilled, root-picked, moisture-conditioned, and compacted to at least 95% of Standard Proctor (ASTM D698 or equivalent). Any pockets of organic debris or loose fill encountered during ripping or tilling should be removed and replaced with engineered fill (see *Site Preparation* Section). In order to verify subgrade strength, we recommend proof-rolling directly on subgrade with a loaded dump truck during dry weather and on top of base course in wet weather. Soft areas that pump, rut, or weave should be stabilized prior to paving. If pavement areas are to be constructed during wet weather, the subgrade and construction plan should be reviewed by the project geotechnical engineer at the time of construction so that condition specific recommendations can be provided. The moisture sensitive subgrade soils make the site a difficult wet weather construction project.

During placement of pavement section materials, density testing should be performed to verify compliance with project specifications. Generally, one subgrade, one base course, and one asphalt compaction test is performed for every 100 to 200 linear feet of paving.

Anticipated Foundations

The proposed residential structures may be supported on shallow foundations bearing on competent undisturbed, native soils and/or engineered fill, appropriately designed and constructed as recommended in this report. Foundation design, construction, and setback requirements should conform to the applicable building code at the time of construction. For maximization of bearing strength and protection against frost heave, spread footings should be embedded at a minimum depth of 12 inches below exterior grade. The recommended minimum widths for continuous footings supporting wood-framed walls without masonry are 12 inches for single-story, 15 inches for two-story, and 18 inches for three-story homes.

The anticipated allowable soil bearing pressure is 1,500 lbs/ft^2 for footings bearing on competent, native soil and/or engineered fill. A maximum chimney and column load of 30 kips is recommended for the site. The recommended maximum allowable bearing pressure may be increased by 1/3 for short-term transient conditions such as wind and seismic loading. For heavier loads, the geotechnical engineer should be consulted. The coefficient of friction between on-site soil and poured-in-place concrete may be taken as 0.42, which includes no factor of safety. The maximum anticipated total and differential footing movements (generally from soil expansion and/or settlement) are 1 inch and ¾ inch over a span of 20 feet, respectively. We anticipate that the majority of the estimated settlement will occur during construction, as loads are applied. Excavations near structural footings should not extend within a 1H:1V plane projected downward from the bottom edge of footings.

Footing excavations should penetrate through topsoil and any loose soil to competent subgrade that is suitable for bearing support. All footing excavations should be trimmed neat, and all loose or softened soil should be removed from the excavation bottom prior to placing reinforcing steel bars. Due to the moisture sensitivity of on-site native soils, foundations constructed during the wet weather season may require overexcavation of footings and backfill with compacted, crushed aggregate.

Footing and Roof Drains

If the proposed structures will have a raised floor, and no concrete slab-on-grade floors are used, perimeter footing drains would not be required based on soil conditions encountered at the site and experience with standard local construction practices. Where it is desired to reduce the potential for moist crawl spaces, footing drains may be installed. If concrete slab-on-grade floors are used (excluding garage slabs), perimeter footing drains should be installed as recommended below.

Where used, perimeter footing drains should consist of 3 or 4-inch diameter, perforated plastic pipe embedded in a minimum of 1 ft^3 per lineal foot of clean, free-draining drain rock. The drain pipe and surrounding drain rock should be wrapped in non-woven geotextile (Mirafi 140N, or approved equivalent) to minimize the potential for clogging and/or ground loss due to piping. Water collected from the footing drains should be directed to the local storm drain system or other suitable outlet. A minimum 0.5 percent fall should be maintained throughout the drain and non-perforated pipe outlet. The footing drains should include clean-outs to allow periodic maintenance and inspection. In our opinion, footing drains may outlet at the curb, or on the back sides of lots where sufficient fall is not available to allow drainage to the street.

Construction should include typical measures for controlling subsurface water beneath the homes, including positive crawlspace drainage to an adequate low-point drain exiting the

foundation, visqueen covering the exposed ground in the crawlspace, and crawlspace ventilation (foundation vents). The homebuyers should be informed and educated that some slow flowing water in the crawlspaces is considered normal and not necessarily detrimental to the home given these other design elements incorporated into its construction. Appropriate design professionals should be consulted regarding crawlspace ventilation, building material selection and mold prevention issues, which are outside GeoPacific's area of expertise.

Down spouts and roof drains should collect roof water in a system separate from the footing drains in order to reduce the potential for clogging. Roof drain water should be directed to an appropriate discharge point well away from structural foundations. Grades should be sloped downward and away from buildings to reduce the potential for ponded water near structures.

Concrete Slabs-on-Grade

Preparation of areas beneath concrete slab-on-grade floors should be performed as recommended in the *Site Preparation* section. Care should be taken during excavation for foundations and floor slabs, to avoid disturbing subgrade soils. If subgrade soils have been adversely impacted by wet weather or otherwise disturbed, the surficial soils should be scarified to a minimum depth of 8 inches, moisture conditioned to within about 3 percent of optimum moisture content, and compacted to engineered fill specifications. Alternatively, disturbed soils may be removed and the removal zone backfilled with additional crushed rock.

For evaluation of the concrete slab-on-grade floors using the beam on elastic foundation method, a modulus of subgrade reaction of 150 kcf (87 pci) should be assumed for the stiff native clay soils anticipated at subgrade depth. This value assumes the concrete slab system is designed and constructed as recommended herein, with a minimum thickness of crushed rock of 8 inches beneath the slab.

Interior slab-on-grade floors (excluding garage slabs) should be provided with an adequate moisture break. The capillary break material should consist of ODOT open graded aggregate per ODOT Standard Specifications 02630-2. The minimum recommended thickness of capillary break materials on re-compacted soil subgrade is 8 inches. The total thickness of crushed aggregate will be dependent on the subgrade conditions at the time of construction, and should be verified visually by proof-rolling. Under-slab aggregate should be compacted to at least 95 percent of its maximum dry density as determined by ASTM D698 (Standard Proctor) or equivalent.

In areas where moisture will be detrimental to floor coverings or equipment inside the proposed structure, appropriate vapor barrier and damp-proofing measures should be implemented. Appropriate design professionals should be consulted regarding vapor barrier and damp proofing systems, ventilation, building material selection and mold prevention issues, which are outside GeoPacific's area of expertise.

Permanent Below-Grade Walls

Lateral earth pressures against below-grade retaining walls will depend upon the inclination of any adjacent slopes, type of backfill, degree of wall restraint, method of backfill placement, degree of backfill compaction, drainage provisions, and magnitude and location of any adjacent

surcharge loads. At-rest soil pressure is exerted on a retaining wall when it is restrained against rotation. In contrast, active soil pressure will be exerted on a wall if its top is allowed to rotate or yield a distance of roughly 0.001 times its height or greater.

If the subject retaining walls will be free to rotate at the top, they should be designed for an active earth pressure equivalent to that generated by a fluid weighing 35 pcf for level backfill against the wall. For restrained wall, an at-rest equivalent fluid pressure of 55 pcf should be used in design, again assuming level backfill against the wall. These values assume that the recommended drainage provisions are incorporated, and hydrostatic pressures are not allowed to develop against the wall.

During a seismic event, lateral earth pressures acting on below-grade structural walls will increase by an incremental amount that corresponds to the earthquake loading. Based on the Mononobe-Okabe equation and peak horizontal accelerations appropriate for the site location, seismic loading should be modeled using the active or at-rest earth pressures recommended above, plus an incremental rectangular-shaped seismic load of magnitude 6.5H, where H is the total height of the wall.

We assume relatively level ground surface below the base of the walls. As such, we recommend passive earth pressure of 320 pcf for use in design, assuming wall footings are cast against competent native soils or engineered fill. If the ground surface slopes down and away from the base of any of the walls, a lower passive earth pressure should be used and GeoPacific should be contacted for additional recommendations.

A coefficient of friction of 0.42 may be assumed along the interface between the base of the wall footing and subgrade soils. The recommended coefficient of friction and passive earth pressure values do not include a safety factor, and an appropriate safety factor should be included in design. The upper 12 inches of soil should be neglected in passive pressure computations unless it is protected by pavement or slabs on grade.

The above recommendations for lateral earth pressures assume that the backfill behind the subsurface walls will consist of properly compacted structural fill, and no adjacent surcharge loading. If the walls will be subjected to the influence of surcharge loading within a horizontal distance equal to or less than the height of the wall, the walls should be designed for the additional horizontal pressure. For uniform surcharge pressures, a uniformly distributed lateral pressure of 0.3 times the surcharge pressure should be added. Traffic surcharges may be estimated using an additional vertical load of 250 psf (2 feet of additional fill), in accordance with local practice.

The recommended equivalent fluid densities assume a free-draining condition behind the walls so that hydrostatic pressures do not build-up. This can be accomplished by placing a 12 to 18-inch wide zone of sand and gravel containing less than 5 percent passing the No. 200 sieve against the walls. A 3-inch minimum diameter perforated, plastic drain pipe should be installed at the base of the walls and connected to a suitable discharge point to remove water in this zone of sand and gravel. The drain pipe should be wrapped in filter fabric (Mirafi 140N or other as approved by the geotechnical engineer) to minimize clogging.

Wall drains are recommended to prevent detrimental effects of surface water runoff on foundations – not to dewater groundwater. Drains should not be expected to eliminate all potential sources of water entering a basement or beneath a slab-on-grade. An adequate grade to a low point outlet drain in the crawlspace is required by code. Underslab drains are sometimes added beneath the slab when placed over soils of low permeability and shallow, perched groundwater.

Water collected from the wall drains should be directed into the local storm drain system or other suitable outlet. A minimum 0.5 percent fall should be maintained throughout the drain and non-perforated pipe outlet. Down spouts and roof drains should not be connected to the wall drains in order to reduce the potential for clogging. The drains should include clean-outs to allow periodic maintenance and inspection. Grades around the proposed structure should be sloped such that surface water drains away from the building.

GeoPacific should be contacted during construction to verify subgrade strength in wall keyway excavations, to verify that backslope soils are in accordance with our assumptions, and to take density tests on the wall backfill materials.

Structures should be located a horizontal distance of at least 1.5H away from the back of the retaining wall, where H is the total height of the wall. GeoPacific should be contacted for additional foundation recommendations where structures are located closer than 1.5H to the top of any wall.

Feasibility of Subsurface Infiltration

We understand that it is desired to incorporate subsurface infiltration of stormwater into the design of stormwater management facilities. However, during our geotechnical investigation of the site, we encountered rock at relatively shallow depths across the site. In our test pits, rock was generally encountered at 3.5 to 4 feet below the ground surface. Generally, at least 5 feet of separation is recommended between infiltration facilities and rock. Also, on June 2, 2017, we encountered groundwater seepage at a depth of 6 feet in test pit TP-1 and at 8.5 feet in TP-6, indicating that the rock underlying the site does not infiltrate well.

Based on the subsurface conditions encountered, subsurface infiltration of stormwater is not recommended for this site. Our opinion is based on the fact that the native soil layer overlying bedrock is generally less than 5 feet thick and that perched groundwater was encountered during a period of dry weather.

Stormwater management systems should be constructed as specified by the designer and/or in accordance with jurisdictional design manuals. Stormwater exceeding storage capacities will need to be directed to a suitable surface discharge location, away from structures. Stormwater management systems may need to include overflow outlets, surface water control measures and/or be connected to the street storm drain system, if available. In no case should uncontrolled stormwater be allowed to flow over slopes.

Seismic Design

The Oregon Department of Geology and Mineral Industries (DOGAMI), Oregon HazVu: 2017 Statewide GeoHazards Viewer indicates that the site is in an area where *very strong* ground shaking is anticipated during an earthquake. Structures should be designed to resist earthquake loading in accordance with the methodology described in the 2012 International Building Code (IBC) with applicable Oregon Structural Specialty Code (OSSC) revisions (current 2014). We recommend Site Class D be used for design per the OSSC, Table 1613.5.2 and as defined in ASCE 7, Chapter 20, Table 20.3-1. Design values determined for the site using the USGS (United States Geological Survey) 2017 Seismic Design Maps Summary Report are summarized in Table 4, and are based upon existing soil conditions.

Table 4 - Recommended Earthquake Ground Motion Parameters (USGS 2017)

Parameter	Value
Location (Lat, Long), degrees	45.321, -122.607
Probabilistic Ground Motion Values, 2% Probability of Exceedance in 50 yrs	
Peak Ground Acceleration	0.437 g
Short Period, S_s	0.910 g
1.0 Sec Period, S_1	0.395 g
Soil Factors for Site Class D:	
F_a	1.136
F_v	1.609
$SD_s = 2/3 \times F_a \times S_s$	0.689 g
$SD_1 = 2/3 \times F_v \times S_1$	0.424 g
Seismic Design Category	D

Soil Liquefaction

The Oregon Department of Geology and Mineral Industries (DOGAMI), Oregon HazVu: 2017 Statewide GeoHazards Viewer indicates that the site is not mapped to be at risk for soil liquefaction during an earthquake. Soil liquefaction is a phenomenon wherein saturated soil deposits temporarily lose strength and behave as a liquid in response to ground shaking caused by strong earthquakes. Soil liquefaction typically occurs in loose sands and granular soils located below the water table, and fine-grained soils with a plasticity index less than 15. The subsurface profile observed within our test pit explorations which extended to a maximum depth of 9.5 feet bgs, indicated that the site is underlain by stiff Lean CLAY (CL) and weathered BASALT (R0-R3), which are not considered susceptible to liquefaction. Light groundwater seepage was observed in test pits TP-1 and TP-5, and no groundwater was observed in all other test pits (TP-2, TP-3, TP-4, TP-6). According to the *Estimated Depth to Groundwater in the Portland, Oregon Area, (United States Geological Survey, Snyder, 2017 website)*, groundwater is expected to be present at an approximate depth of 20 feet below the ground surface.

UNCERTAINTIES AND LIMITATIONS

We have prepared this report for the owner and their consultants for use in design of this project only. This report should be provided in its entirety to prospective contractors for bidding and estimating purposes; however, the conclusions and interpretations presented in this report should not be construed as a warranty of the subsurface conditions. Experience has shown that soil and groundwater conditions can vary significantly over small distances. Inconsistent conditions can occur between explorations that may not be detected by a geotechnical study. If, during future site operations, subsurface conditions are encountered which vary appreciably from those described herein, GeoPacific should be notified for review of the recommendations of this report, and revision of such if necessary.

Sufficient geotechnical monitoring, testing and consultation should be provided during construction to confirm that the conditions encountered are consistent with those indicated by explorations. The checklist attached to this report outlines recommended geotechnical observations and testing for the project. Recommendations for design changes will be provided should conditions revealed during construction differ from those anticipated, and to verify that the geotechnical aspects of construction comply with the contract plans and specifications.

Within the limitations of scope, schedule and budget, GeoPacific attempted to execute these services in accordance with generally accepted professional principles and practices in the fields of geotechnical engineering and engineering geology at the time the report was prepared. No warranty, expressed or implied, is made. The scope of our work did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous or toxic substances in the soil, surface water, or groundwater at this site.

We appreciate this opportunity to be of service.

Sincerely,

GEOPACIFIC ENGINEERING, INC.

Thomas J. Torkelson, E.I.
Engineering Staff

REGISTERED PROFESSIONAL ENGINEER
90013PE
OREGON
MAY 22, 2015
BENJAMIN G. ANDERSON
Expires: 12/31/17

Benjamin G. Anderson, P.E.
Project Engineer

Attachments: References
Figures
- Figure 1 - Vicinity Map
- Figure 2 - Site Plan and Exploration Locations
- Figure 3 - Aerial View and Exploration Locations

Exploration Logs
Flexible Pavement Design Calculations
Site Research
Photographic Log

REFERENCES

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FIGURES

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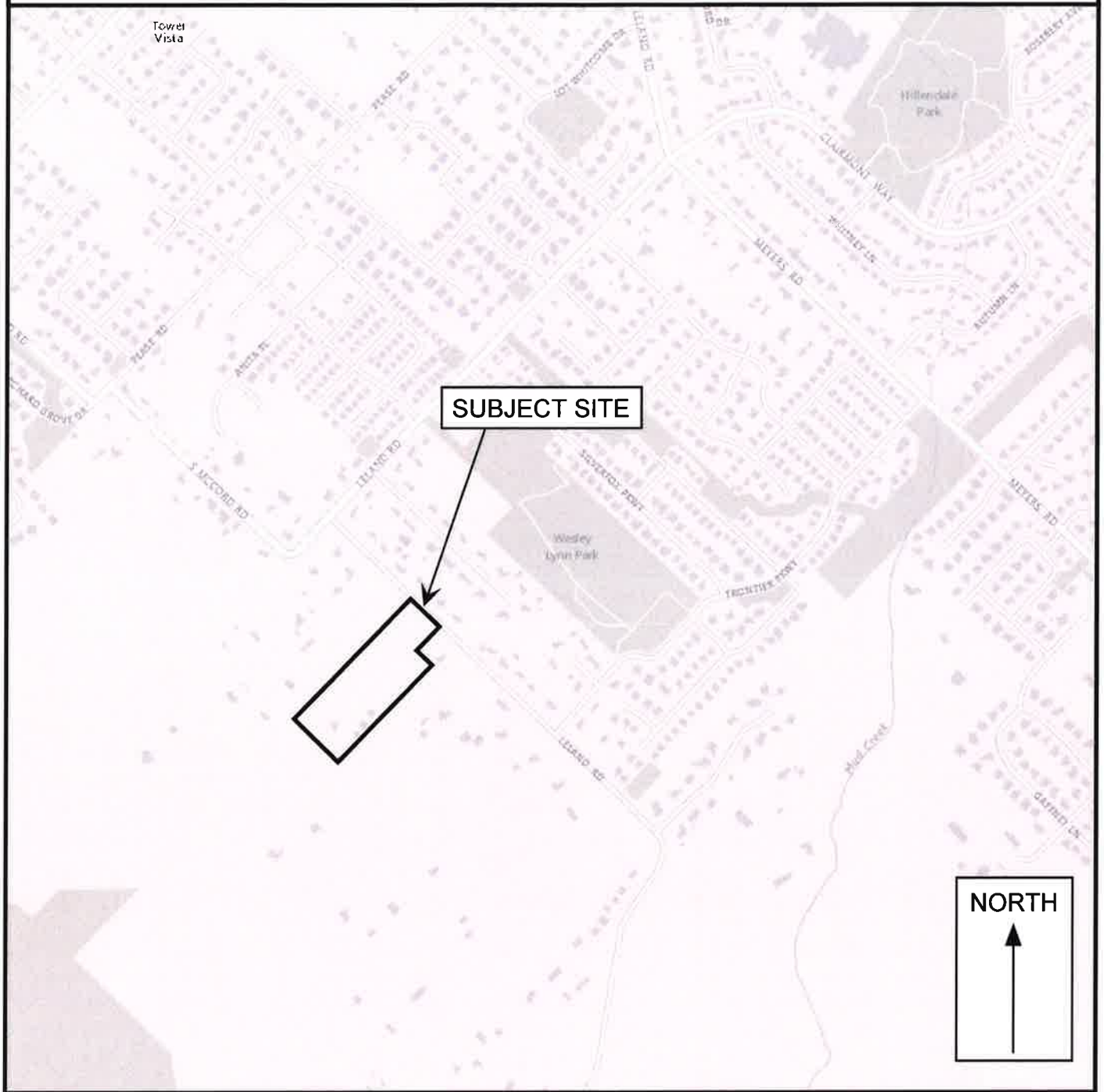
VICINITY MAP



Date: 06/28/17
Drawn by: BGA

Approximate Scale 1 in = 800 ft

Base Map Obtained from http://www.oregongeology.org/hazvu/

Project: 19701 Leland Road Oregon City, Oregon	Project No. 17-4623	FIGURE 1

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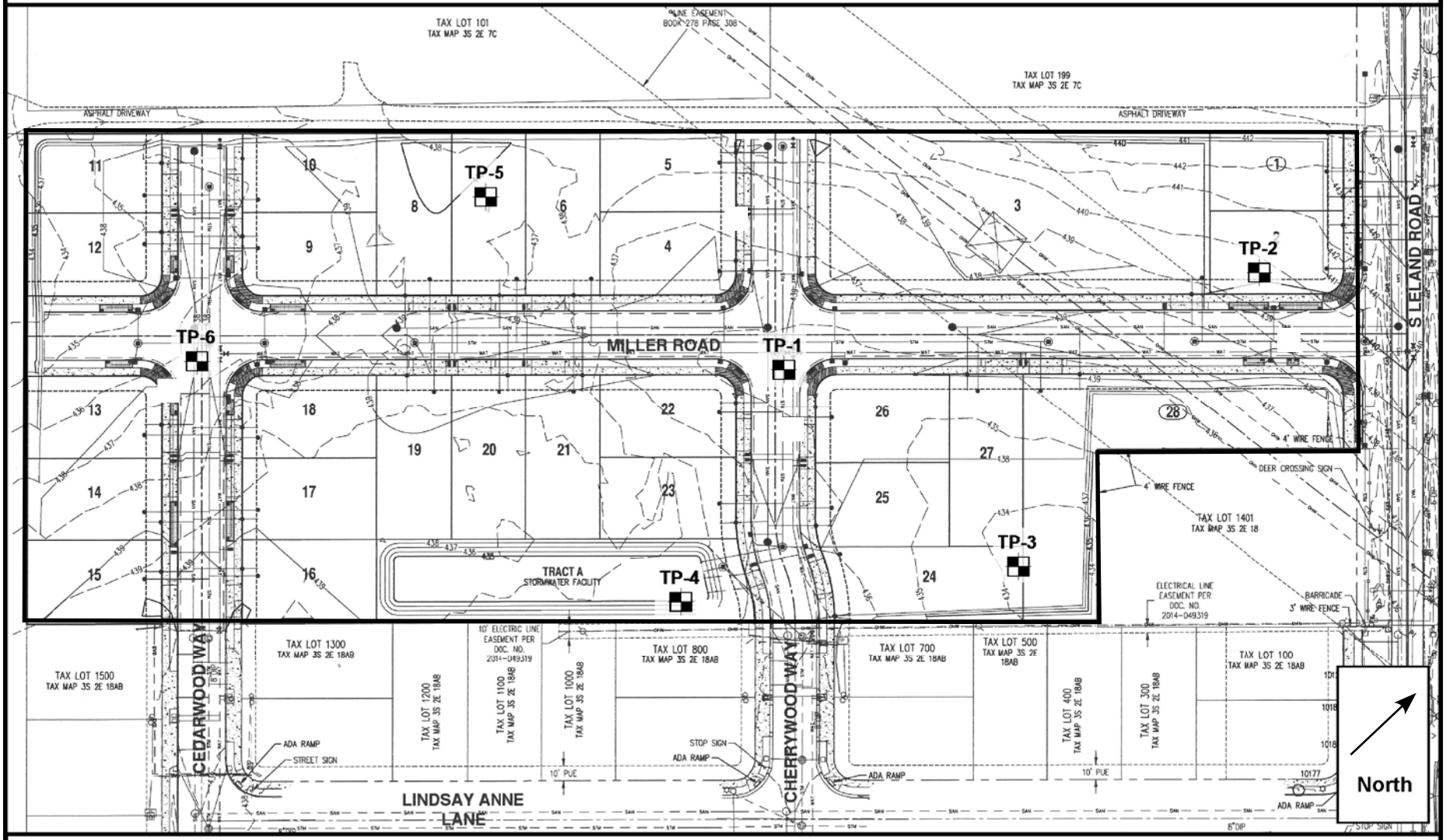
SITE PLAN AND EXPLORATION LOCATIONS



Legend

TP-1 Test Pit Designation and Approximate Location

Date: 08/02/17
Drawn by: BGA

0 100'

APPROXIMATE SCALE 1"=100'

Project: 19701 Leland Road Oregon City, Oregon	Project No. 17-4623	FIGURE 2

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SITE AERIAL AND EXPLORATION LOCATIONS

Legend: Test Pit Exploration Designation and Approximate Location

0 225'
APPROXIMATE SCALE 1"=225'

Drawn by: TJT
Date: 6/30/2017

Project: 19701 Leland Road Oregon City, Oregon	Project No. 17-4623	FIGURE 3

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EXPLORATION LOGS

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TEST PIT LOG

Project: 19701 Leland Road
Oregon City, Oregon

Project No. 17-4623

Test Pit No. **TP- 1**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1						14" soft, low to moderately organic SILT (OL-ML), dark brown, with fine roots throughout upper 4 inches, moist (Topsoil)
2	2.0	100 to 1,000 g				Stiff, CLAY (CL), reddish brown, with some gravel-size clasts of basalt, moist (Residual Soil)
3	2.0					Grades to hard
4						
5						Extremely soft to very soft (R0-R1), highly weathered BASALT, trace reddish-brown matrix of silty clay, light gray, black staining, moist (Boring Lava)
6						Grades to very soft to soft (R1-R2) and wet
7						
8						
9						Test pit terminated at 9 feet due to practical refusal on medium hard (R3) BASALT
10						
11						Notes: Light groundwater seepage encountered below 6 feet (<1 gpm) Heavy groundwater seepage encountered below 7.5 feet (3-5 gpm) No significant caving observed
12						
13						
14						
15						
16						
17						

LEGEND

100 to 1,000 g — Bag Sample
5 Gal. Bucket — Bucket Sample
Shelby Tube Sample
Seepage
Water Bearing Zone
Water Level at Abandonment

Date Excavated: 06/02/17
Logged By: BGA
Surface Elevation:

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TEST PIT LOG

Project: 19701 Leland Road
Oregon City, Oregon

Project No. 17-4623

Test Pit No. **TP-2**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1						15" soft, low to moderately organic SILT (OL-ML), dark brown, with fine roots throughout upper 5 inches, moist (Topsoil)
2	4.0					Very stiff, CLAY (CL), reddish brown, with some gravel-size clasts of basalt, moist (Residual Soil)
3	4.5					Grades to hard
4						
5						Extremely soft to very soft (R0-R1), highly weathered BASALT, trace reddish-brown matrix of silty clay, light gray, black staining, moist (Boring Lava)
6						Grades to very soft to soft (R1-R2)
7						
8						
9						
10						Test pit terminated at 9.5 feet
11						
12						Notes: No seepage or static groundwater encountered No significant caving observed
13						
14						
15						
16						
17						

LEGEND

Bag Sample

Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 06/02/17
Logged By: BGA
Surface Elevation:

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TEST PIT LOG

Project: 19701 Leland Road
Oregon City, Oregon

Project No. 17-4623

Test Pit No. **TP-3**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1						13" soft, low to moderately organic SILT (OL-ML), dark brown, with fine roots throughout upper 5 inches, moist (Topsoil)
2						Very stiff, CLAY (CL), reddish brown, with some gravel-size clasts of basalt, very moist (Residual Soil)
3						Extremely soft to very soft (R0-R1), highly weathered BASALT, trace reddish-brown matrix of silty clay, light gray, black staining, moist (Boring Lava)
4						
5						Test pit terminated at 4.5 feet
6						
7						Notes: No seepage or static groundwater encountered No significant caving observed
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						

LEGEND

Bag Sample

Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 06/02/17
Logged By: BGA
Surface Elevation:

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TEST PIT LOG

Project: 19701 Leland Road
Oregon City, Oregon

Project No. 17-4623

Test Pit No. **TP-4**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1						10" soft, low to moderately organic SILT (OL-ML), dark brown, with fine roots throughout upper 5 inches, moist (Topsoil)
2	2.5					Very stiff, CLAY (CL), reddish brown, with some gravel-size clasts of basalt, moist (Residual Soil)
3	3.0					Grades to hard
4						
5						Extremely soft to very soft (R0-R1), highly weathered BASALT, trace reddish-brown matrix of silty clay, light gray, black staining, moist (Boring Lava)
6						
7						Grades to very soft to soft (R1-R2)
8						
9						
10						Test pit terminated at 9.5 feet
11						
12						Notes: No seepage or static groundwater encountered No significant caving observed
13						
14						
15						
16						
17						

LEGEND

Bag Sample

Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 06/02/17
Logged By: BGA
Surface Elevation:

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TEST PIT LOG

Project: 19701 Leland Road
Oregon City, Oregon

Project No. 17-4623

Test Pit No. **TP-5**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1						13" soft, low to moderately organic SILT (OL-ML), dark brown, with fine to medium roots throughout, moist (Topsoil)
2	3.0					Very stiff, CLAY (CL), reddish brown, with some gravel-size clasts of basalt, moist (Residual Soil)
3	2.5					
4						
5						Extremely soft to very soft (R0-R1), highly weathered BASALT, trace reddish-brown matrix of silty clay, light gray, black staining, moist (Boring Lava)
6						
7						Grades to very soft to soft (R1-R2)
8						
9						Grades to wet
10						Test pit terminated at 9.5 feet
11						
12						Notes: Light groundwater seepage encountered below 9 feet (<1 gpm) No significant caving observed
13						
14						
15						
16						
17						

LEGEND

Bag Sample (100 to 1,000 g) | Bucket Sample (5 Gal. Bucket) | Shelby Tube Sample | Seepage | Water Bearing Zone | Water Level at Abandonment

Date Excavated: 06/02/17
Logged By: BGA
Surface Elevation:

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TEST PIT LOG

Project: 19701 Leland Road
Oregon City, Oregon

Project No. 17-4623

Test Pit No. **TP-6**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1						13" soft, low to moderately organic SILT (OL-ML), dark brown, with fine roots throughout upper 5 inches, moist (Topsoil)
2	3.0					Very stiff, CLAY (CL), reddish brown, with some gravel-size clasts of basalt, moist (Residual Soil)
3	3.0					
4						
5						Extremely soft to very soft (R0-R1), highly weathered BASALT, trace reddish-brown matrix of silty clay, light gray, black staining, moist (Boring Lava)
6						
7						
8						
9						Large boulder in north side of test pit
10						Test pit terminated at 9.5 feet
11						
12						Notes: No seepage or static groundwater encountered No significant caving observed
13						
14						
15						
16						
17						

LEGEND

Bag Sample

Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 06/02/17
Logged By: BGA
Surface Elevation:

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FLEXIBLE PAVEMENT DESIGN CALCULATIONS

==========

DARWin(tm) - Pavement Design

A Proprietary AASHTOWARE(tm)
Computer Software Product

Flexible Structural Design Module

Project Description
17-4623, New Public Pavement, 19701 Leland Road, 20 Year Design Life

Flexible Structural Design Module Data

18-kip ESALs Over Initial Performance Period:	78,850
Initial Serviceability:	4.2
Terminal Serviceability:	2.5
Reliability Level (%):	85
Overall Standard Deviation:	.44
Roadbed Soil Resilient Modulus (PSI):	9,000
Stage Construction:	1

Calculated Structural Number: 2.03

==========

DARWin(tm) - Pavement Design

A Proprietary AASHTOWARE(tm)
Computer Software Product

Flexible Structural Design Module

Specified Layer Design

Layer: 1
Material Description: A/C
Structural Coefficient (Ai): .44
Drainage Coefficient (Mi): 1
Layer Thickness (Di) (in): 3.00
Calculated Layer SN: 1.32

Layer: 2
Material Description: 3/4"-0 Crushed Aggregate
Structural Coefficient (Ai): .12
Drainage Coefficient (Mi): 1
Layer Thickness (Di) (in): 2.00
Calculated Layer SN: .24

Layer: 3
Material Description: 1.5"-0 Crushed Aggregate
Structural Coefficient (Ai): .12
Drainage Coefficient (Mi): 1
Layer Thickness (Di) (in): 8.00
Calculated Layer SN: .96

Total Thickness (in): 13.00
Total Calculated SN: 2.52

Simple ESAL Calculation

Initial Performance Period (years):	20
Initial Two-Way Daily Traffic (ADT):	280
% Heavy Trucks (of ADT) FHWA Class 5 or Greater:	3
Number of Lanes In Design Direction:	1
Percent of All Trucks In Design Lane (%):	100
Percent Trucks In Design Direction (%):	50
Average Initial Truck Factor (ESALs/truck):	2
Annual Truck Factor Growth Rate (%):	0
Annual Truck Volume Growth Rate (%):	3
Growth:	Simple

Total Calculated Cumulative Esals: 78,850

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SITE RESEARCH

USGS Design Maps Summary Report

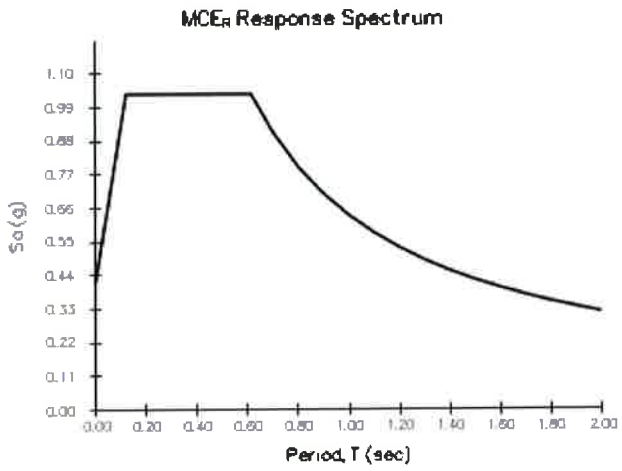
User-Specified Input

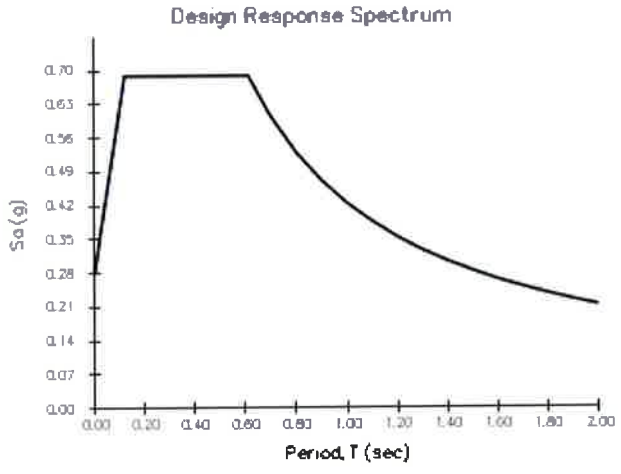
Report Title	19701 Leland Road 17-4623 Mon July 3, 2017 22:18:58 UTC
Building Code Reference Document	ASCE 7-10 Standard (which utilizes USGS hazard data available in 2008)
Site Coordinates	45.32124°N, 122.60725°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

USGS-Provided Output

S_S =	0.910 g	S_{MS} =	1.034 g	S_{DS} =	0.689 g
S_1 =	0.395 g	S_{M1} =	0.636 g	S_{D1} =	0.424 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (45.32124°N, 122.60725°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1] $S_S = 0.910$ g

From Figure 22-2 [2] $S_1 = 0.395$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\overline{v}_s$	$\overline{N}$ or $\overline{N}_{ch}$	$\overline{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index PI > 20, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\overline{s}_u$ < 500 psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk-Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4-1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_S

For Site Class = D and S_s = 0.910 g, F_a = 1.136

Table 11.4-2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1-s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_1

For Site Class = D and S_1 = 0.395 g, F_v = 1.609

Equation (11.4–1): $S_{MS} = F_a S_S = 1.136 \times 0.910 = 1.034$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.609 \times 0.395 = 0.636$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

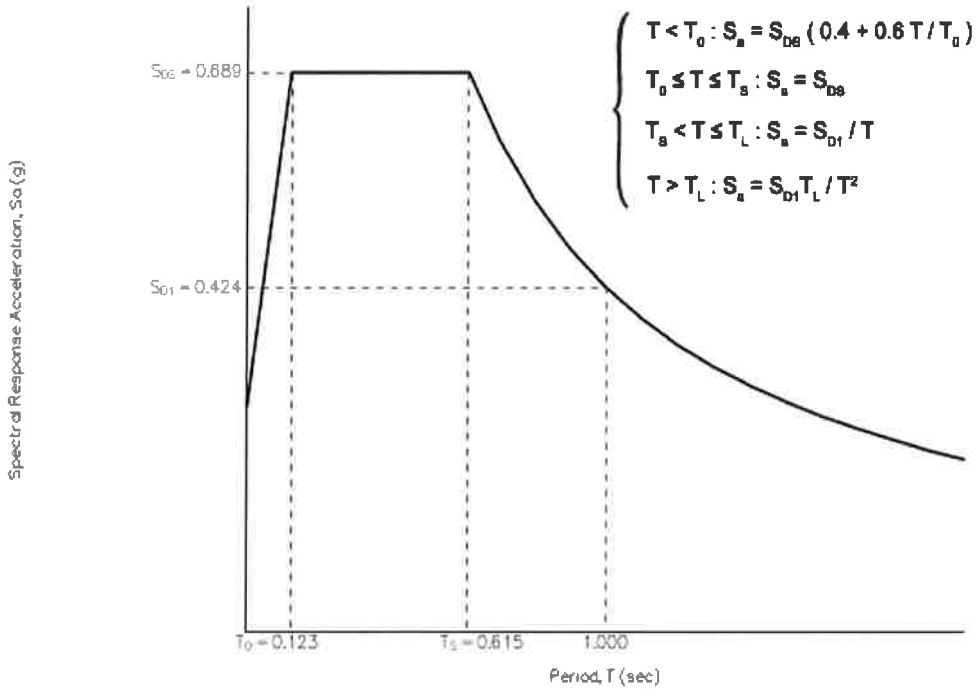
Equation (11.4–3): $S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3} \times 1.034 = 0.689$ g

Equation (11.4–4): $S_{D1} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 0.636 = 0.424$ g

Section 11.4.5 — Design Response Spectrum

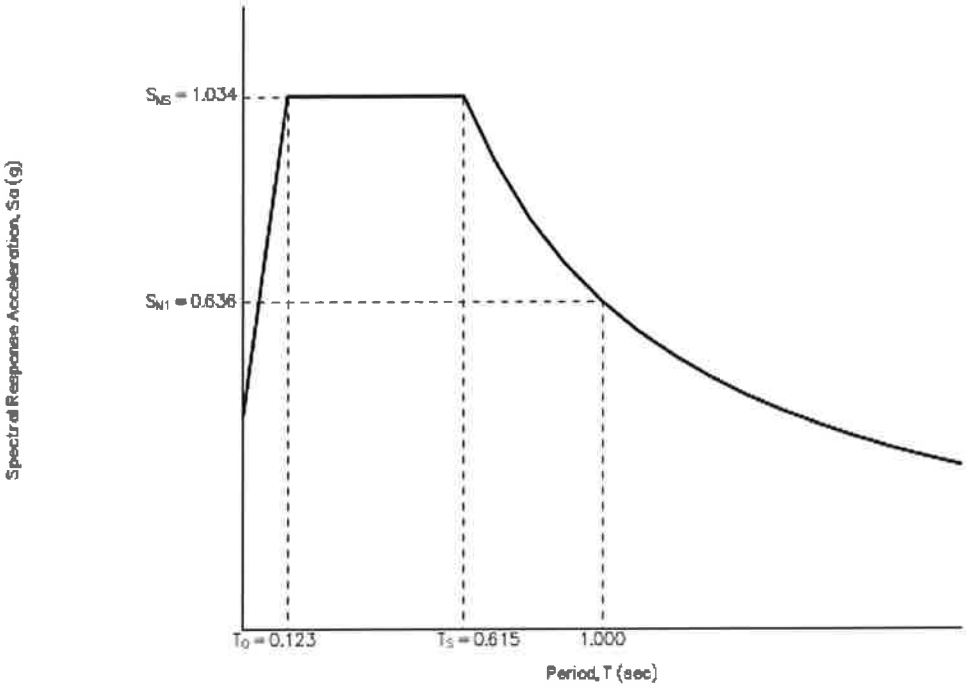
From Figure 22-12 [3] $T_L = 16$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.396

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.104 \times 0.396 = 0.437$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.396 g, F_{PGA} = 1.104

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 0.906

From Figure 22-18 [6] C_{R1} = 0.872

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \le S_{DS} < 0.33g$	B	B	C
$0.33g \le S_{DS} < 0.50g$	C	C	D
$0.50g \le S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 0.689 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \le S_{D1} < 0.133g$	B	B	C
$0.133g \le S_{D1} < 0.20g$	C	C	D
$0.20g \le S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 0.424 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = D

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

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:
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 11, Sep 16, 2016

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.

Map Unit Legend

Clackamas County Area, Oregon (OR610)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
8B	Bornstedt silt loam, 0 to 8 percent slopes	19.4	60.1%
45B	Jory silty clay loam, 2 to 8 percent slopes	12.9	39.9%
Totals for Area of Interest		**32.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the

development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Clackamas County Area, Oregon

8B—Bornstedt silt loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 227t
Elevation: 300 to 650 feet
Mean annual precipitation: 48 to 65 inches
Mean annual air temperature: 50 to 52 degrees F
Frost-free period: 140 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Bornstedt and similar soils: 85 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bornstedt

Setting

Landform: Terraces, hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed old alluvium

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 33 inches: silty clay loam
H3 - 33 to 71 inches: silty clay

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Borges

Percent of map unit: 5 percent
Landform: Depressions on terraces, hillslopes

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Aquults

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

45B—Jory silty clay loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 224x
Elevation: 250 to 1,200 feet
Mean annual precipitation: 50 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Jory and similar soils: 90 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Jory

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Base slope, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium

Typical profile

H1 - 0 to 13 inches: silty clay loam
H2 - 13 to 60 inches: silty clay

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

GeoPacific Engineering, Inc.

Real-World Geotechnical Solutions
Investigation • Design • Construction Support

PHOTOGRAPHIC LOG

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NW corner of 19701 Leland Road, view to the southeast

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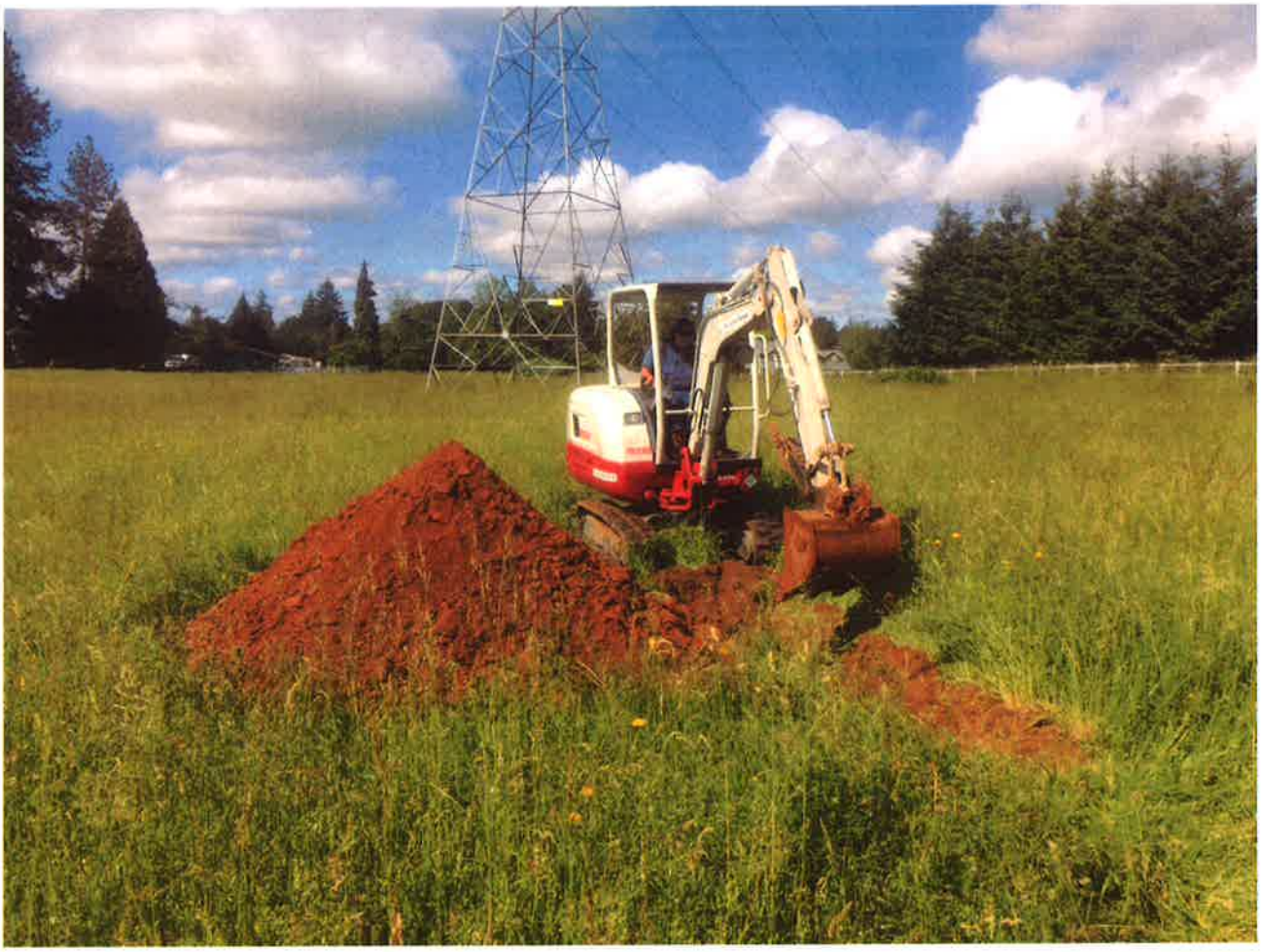
Test Pit TP-2, 19701 Leland Road, view to the southeast

GeoPacific Engineering, Inc.

Real-World Geotechnical Solutions
Investigation • Design • Construction Support



TP-3, 19701 Leland Road, view to the southwest

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Residual Soil, weathered basalt

Test Pit TP-5, view to the east

Residual soil, weathered basalt

Test Pit TP-5, view to the North

Exhibit J: Preliminary Stormwater Report

Lindsay Anne Estates Too
Oregon City, Oregon

Preliminary Stormwater Report

Date:	August 2017
Client:	PDX Development, Inc.
Engineering Contact:	Monty Hurley, PE, PLS Vu Nguyen, PE
Engineering Firm:	AKS Engineering & Forestry, LLC
AKS Job No Number:	5837

RENEWAL DATE: 6/30/19

AKS ENGINEERING & FORESTRY

12965 SW Herman Road, Suite 100
Tualatin, OR 97062
P: (503) 563-6151
www.aks-eng.com

Table of Contents

Tables

Appendices

APPENDIX 9-1 LINDSAY ANNE ESTATES STORMWATER REPORT NARRATIVE AND DOWNSTREAM ANALYSIS

Preliminary Stormwater Report

LINDSAY ANNE ESTATES TOO
OREGON CITY, OREGON

1.0 Purpose of Report

This report documents the stormwater analysis for the subject site, the sources of information upon which the analysis was based, the design methodology, and the results of the analysis.

2.0 Project Location/Description

The proposed development comprises approximately 6.33 acres in Clackamas County, Oregon. The development will encompass Tax 1400 of Clackamas County Assessor's Map 3S 2E 18. The project site has frontage along S Leland Road.

3.0 Regulatory Design Criteria

3.1 STORMWATER QUANTITY MANAGEMENT CRITERIA

The stormwater quantity management criteria required by the Oregon City Public Works Stormwater and Grading Design Standards (February 2015) states:

> *Flow control facilities shall be designed so that the duration of peak flow rates from post-development conditions shall be less than or equal to the duration of peak flow rates from pre-development conditions for all peak flows between 42 percent of the 2-year peak flow rate up to the 10-year peak flow rate. […] The BMP Sizing Tool addresses these flow control requirements to size stormwater management facilities.*

The BMP Sizing Tool was used to size stormwater quantity management facilities for this project.

3.2 STORMWATER QUALITY MANAGEMENT CRITERIA

The stormwater quality management criteria required by the Oregon City Public Works Stormwater and Grading Design Standards (February 2015) states:

> *Water quality facilities shall be designed to capture and treat 80 percent of the average annual runoff volume to the MEP [maximum extent practicable] with the goal of 70 percent total suspended solids removal. The treatment volume equates to a water quality design storm of 1.0 inch over 24 hours. The BMP Sizing Tool addresses these water quality requirements to size stormwater management facilities.*

The BMP Sizing Tool was used to size stormwater quality management facilities for this project.

3.3 FLOODPLAIN

There are no floodplains present on the subject site according to the Flood Insurance Rate Map (FIRM), produced by the Federal Emergency Management Agency (FEMA).

3.4 REQUIRED PERMITS

Permits are not required from the Oregon Department of State Lands (DSL) or the U.S. Army Corps of Engineers (USACE).

4.0 Infiltration Test Result

Per the Geotechnical Engineering Report prepared by GeoPacific Engineering, Inc., dated August 2, 2017, subsurface infiltration of stormwater is not recommended for this site due to rock at relatively shallow depths across the site, and groundwater seepage. The new stormwater facilities have a filtration system with lining at the base.

5.0 Sources of Information and Design Methodology

The Santa Barbara Urban Hydrograph (SBUH) Method was used for the stormwater conveyance systems analysis of the subject site. This method uses the SCS Type 1A 24-hour storm. HydroCAD software aided in the analysis. The BMP Sizing Tool was used to size the stormwater management facilities.

6.0 Design Parameters

6.1 DESIGN STORM

6.1.1 Stormwater Management Facilities Design

All the flow results contained in the BMP sizing report were used to perform the stormwater management facilities sizing and analysis.

6.1.2 Inlet and Conduit Sizing

The stormwater inlets (curb inlet catch basins) for the site will be placed according to the grading (at all low points and other required locations) to manage the stormwater for the site. The distance between catch basins will generally be 400 feet or less.

The on-site stormwater pipes will be sized using the SBUH method to adequately convey the 10-year (3.5 inch) storm event (gravity flow).

6.2 PRE-DEVELOPED SITE TOPOGRAPHY AND LAND USE

6.2.1 Site Topography

The site slopes to the south and southeast, with slopes ranging from 1% to 10%.

6.2.2 Land Use

There is an existing single-family home on the site, as well as outbuildings, grasslands, and trees.

6.2.3 Pre-Developed Input Parameters

The input parameters for each subcatchment (basin) are shown in the appendices.

6.3 SOIL TYPE

The soils on this site consist of Bornstedt silt loam and Jory silty clay loam. Per the U.S. Department of Agriculture (USDA) Soil Survey for Clackamas County, these soil types belong to hydrologic soil group "C." Applicable soil information is provided in Appendix 7-1.

6.4 POST-DEVELOPED SITE TOPOGRAPHY AND LAND USE

6.4.1 Site Topography

The post-developed site topography will be altered to construct streets and lots for the future construction of single-family detached housing. There are no substantial terrain alterations planned.

6.4.2 Land Use

The post-developed land use will consist of 28 lots conforming to R-6 zoning standards for detached single-family homes, as well as one tract for a stormwater pond, and three public streets.

6.4.3 Future Development

The project's stormwater facilities are not sized to treat any future development beyond the planned 28-lot Lindsay Anne Estates Too subdivision.

6.4.4 Post-Developed Input Parameters

Input parameters for each subcatchment (basin) and pond are shown in the appendices. The calculation method used to determine impervious area for the site post-development included measuring all impervious area within the new rights-of-way (streets, curbs, sidewalks, and driveway approaches) and adding 2,640 square feet of impervious area per lot (total of 28 lots).

6.5 DESCRIPTION OF OFF-SITE CONTRIBUTORY BASINS

There is approximately three acres of off-site upstream basin area located along the northwestern property line of the subject site.

6.6 POINTS OF DISCHARGE

Stormwater discharge from the on-site stormwater facility will flow southeast into an existing storm line on Cherrywood Way.

Stormwater runoff from lots 1-3, pavement and sidewalk along lots 1-3 frontage, S Leland Road will be collected and routed to existing storm line in S Leland Road.

Stormwater runoff from lots 9-18 and along the extension of Cedarwood Way will connect into an existing storm manhole to the southeast of the site in the existing Cedarwood Way street stub.

7.0 Calculation Methodology

7.1 PROPOSED STORMWATER CONDUIT SIZING AND INLET SPACING

The proposed stormwater pipes will be sized during final engineering using the SBUH method to adequately convey the 10-year storm event (gravity flow).

7.2 PROPOSED STORMWATER QUANTITY CONTROL (DETENTION) FACILITY DESIGN

The detention pond has been sized using the BMP Sizing Tool to provide flow control for the stormwater runoff from impervious area within the new interior rights-of-way and lots.

Stormwater quantity facility design parameters were determined using topographic survey information, aerial photos, contours, design, and analysis. The detention pond was designed to address the stormwater quantity (detention) requirements of the Oregon City Public Works Stormwater and Grading Design Standards (February 2015).

Due to topographic constraints on the portion of the project site, stormwater runoff from northeast and southwest of Miller Road, extension of Cedarwood Way, S Leland Road, and impervious area on Lots 1-3 and 9-18 will not be able to be routed to the detention pond for detention. The detention pond was sized and over-detains to mitigate for these undetained areas.

7.3 PROPOSED STORMWATER QUALITY CONTROL FACILITY DESIGN

The detention pond was sized using the BMP Sizing Tool to provide water quality management for the stormwater runoff from impervious areas on the Lots 4-8 and 19-28.

Stormwater planters (filtration) between the curb and sidewalk of streets within the development were sized using the BMP Sizing Tool to provide water quality management for stormwater runoff from impervious area within the new rights-of-way and on Lots 1-3 and 9-18.

Stormwater quality facility design parameters were determined using topographic survey information, aerial photos, contours, design, and analysis. The stormwater pond and stormwater planters (filtration) were designed to address the stormwater quality requirements of the Oregon City Public Works Stormwater and Grading Design Standards (February 2015).

7.4 ENERGY DISSIPATER CALCULATIONS

Riprap will be placed at the inlet of the pond to act as an energy dissipater. The riprap will be designed in accordance with information listed in Table 5-7 of the Oregon City Public Works Stormwater and Grading Design Standards (February 2015).

7.5 DOWNSTREAM ANALYSIS

The subject site is designated in the City's Drainage Master Plan as being in the Beaver Basin.

Stormwater flows from the on-site stormwater pond discharge into existing storm drain on Cherrywood Way which was built under Lindsay Anne Estates Subdivision. The downstream pipes have been analyzed and approved under Lindsay Anne Estates Subdivision, and no downstream deficiencies are predicted.

7.6 CULVERT ANALYSIS

Culverts are not proposed with this project.

8.0 BMP Sizing Tool Summary

The stormwater from the site will be routed through a series of curb inlets, pipes, and manholes prior to reaching the pond in Tract A. There will be one main inlet and one outlet in the pond. The pond bottom will be at an elevation of 435.00 feet and the top of the pond will be at an elevation of 438.75 feet. The pond outlet structure will have the following orifices per the BMP Sizing Tool model:

Table 8-1: Pond Outlet Structure Parameters

Pond Outlet	Size	Type	Invert Elevation
Orifice A	1.9" diameter	Round orifice	432.00
Orifice B	6.8" diameter	Round orifice	435.70
Riser C	12.0" diameter	Round orifice	437.50

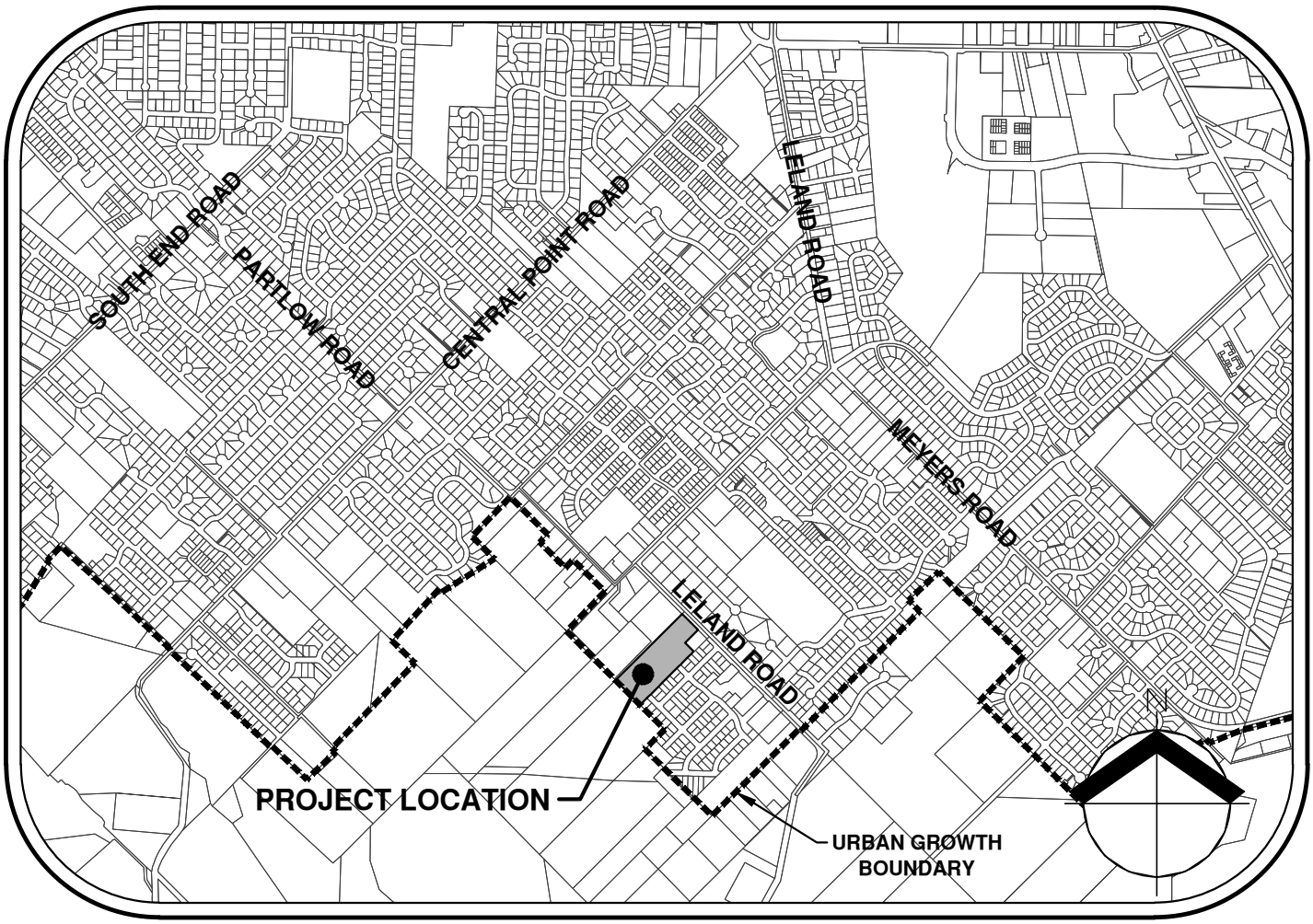
The project will adhere to the grading and compaction guidelines of the Oregon City Public Works Stormwater and Grading Design Standards (February 2015) to the maximum extent possible.

9.0 Stormwater Detention Pond Safeguards

Calculations for the 100-year storm event are included in the appendices. The stormwater pond is designed to adequately handle this storm event. If the outlet structure becomes plugged, or for some other reason cannot convey the stormwater, the stormwater will overflow through the emergency overflow (maintenance access drive), and direct overflow to the downstream conveyance system. The emergency overflows were sized to accommodate flows from the 100-year storm (assuming the outlet structure is plugged). There are no foreseen problems with this method.

APPENDIX 1-1

VICINITY MAP



VICINITY MAP

NOT TO SCALE

APPENDIX 2-1

PRE-DEVELOPED BASIN MAP

SCALE: 1"=40 FEET

40 0 16 24 32 40

ON 34" X 24" PAPER

TAX LOT 101
TAX MAP 3S 2E 7C

TAX LOT 199
TAX MAP 3S 2E 7C

TAX LOT 600
TAX MAP 3S 2E 7DC

TAX LOT 700
TAX MAP 3S 2E 7DC

TAX LOT 800
TAX MAP 3S 2E 7DC

TAX LOT 900
TAX MAP 3S 2E 7DC

TAX LOT 1400
TAX MAP 3S 2E 18

TAX LOT 1401
TAX MAP 3S 2E 18

TAX LOT 1500
TAX MAP 3S 2E 18AB

TAX LOT 1300
TAX MAP 3S 2E 18AB

TAX LOT 1200
TAX MAP 3S 2E 18AB

TAX LOT 1100
TAX MAP 3S 2E 18AB

TAX LOT 1000
TAX MAP 3S 2E 18AB

TAX LOT 800
TAX MAP 3S 2E 18AB

TAX LOT 700
TAX MAP 3S 2E 18AB

TAX LOT 500
TAX MAP 3S 2E 18AB

TAX LOT 400
TAX MAP 3S 2E 18AB

TAX LOT 300
TAX MAP 3S 2E 18AB

TAX LOT 100
TAX MAP 3S 2E 18AB

S LELAND ROAD

LINDSAY ANNE LANE

CEDARWOOD WAY

CHERRYWOOD WAY

ASPHALT DRIVEWAY

GRAVEL DRIVE

N43°40'13"E 893.94'

S43°34'15"W 719.97'

S43°34'29"W 173.97'

S46°21'05"E 215.00'

S46°19'21"E 115.02'

N46°20'29"W 331.56'

OUTHOUSE

EX BASKETBALL HOOP

BARN

STONE PATIO

CHICKEN COOP

POLE WITH LIGHT AND DROP

COVERED PORCH

HOUSE

SHED

SHOP

PGE POWER LINE TOWER

125' PGE TRANSMISSION LINE EASEMENT BOOK 278 PAGE 398

10' ELECTRIC LINE EASEMENT PER DOC. NO. 2014-049319

ELECTRICAL LINE EASEMENT PER DOC. NO. 2014-049319

POWER CONDUIT STUB

BARRICADE

DRIVEWAY

EX 12" CONC CULVERT IE: 441.35

EX 12" CONC CULVERT IE: 442.36

EX 12" CSP CULVERT IE: 441.96

EX 12" CONC CULVERT IE: 441.36

EX 12" CSP CULVERT IE: 439.08

EX 12" CONC CULVERT IE: 437.09

EX 8" STEEL CULVERT IE: 436.29

EX 6" PVC CULVERT IE: 434.51

EX 16" CONC CULVERT IE: 433.62

EX STM DI TOP GRATE: 435.12 BOT. GRATE: 433.68 IE OUT: 433.18 (12"S)

EX 12" CONC CULVERT IE: 434.52

COMM MH

EX STM CB RIM: 435.23 IE IN: 432.25 (12"N) IE OUT: 431.81 (12"SE)

EX STM AD RIM: 435.19

EX 12" STEEL CULVERT IE: 433.59

EX 2" PVC OUTFALL IE: 434.49

EX 2" PVC OUTFALL IE: 434.39

EX STONE RETAINING WALL

EX 12" CONC CULVERT IE: 433.74

EX STM CB RIM: 435.29 IE IN: 430.90 (12"NW) IE OUT: 430.85 (12"SE)

EX 12" CONC CULVERT IE: 433.63

EX 2" PVC OUTFALL IE: 436.10

EX 12" CONC CULVERT IE: 433.45

EX 2" PVC OUTFALL IE: 435.65

EX STM MH RIM: 438.92 IE IN: 433.85 (12"W) IE IN: 433.46 (12"N) IE IN: 432.46 (12"SE) IE IN: 432.38 (12"NW) IE OUT: 432.30 (12"NE)

EX STM MH RIM: 439.86 IE OUT: 433.60 (12"SE)

EX STM CI RIM: 439.15 IE OUT: 433.98 (12"SE) SUMP: 432.29

EX STM CI RIM: 439.30 IE OUT: 435.35 (12"E) SUMP: 433.62

EX STM CI RIM: 436.67 IE OUT: 430.97 (12"NE) SUMP: 429.29

EX STM MH RIM: 436.43 IE IN: 430.64 (12"NW) IE IN: 430.82 (12"NE) IE IN: 430.61 (12"SW) IE OUT: 430.57 (12"SE)

EX STM CB RIM: 434.84 IE IN: 431.42 (12"NW) IE OUT: 431.25 (12"SE)

EX STM CI RIM: 435.63 IE IN: 432.28 (12"SE) IE OUT: 432.19 (12"NE) SUMP: 430.39

EX STM CI RIM: 435.60 IE OUT: 432.44 (12"NW) SUMP: 430.84

EX STM MH RIM: 435.92 IE IN: 431.99 (12"W) IE IN: 430.50 (12"SW) IE IN: 430.42 (12"NE) IE IN: 430.32 (12"NW) IE OUT: 430.25 (15"SE)

EX STM CI RIM: 436.56 IE OUT: 430.88 (12"SW) SUMP: 429.32

EX STM MH RIM: 437.16 IE OUT: 431.36 (12"SE)

10750 10745 10744 10739 10634 10633 10128 10186 10185 10177 10049 10047 10037 10034

11540 11539 11537 11530 11528 11523 11521 11516 11689 11698 11687 11665 11680 11691 11659 11684 11694 11460 11467 11474 11436 11404 11405 11738 11741 11886 11839 11830 11832 11818 11831 11834 11816 11813 11852 11812 11811 11803 11804

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ENGINEERING · SURVEYING · NATURAL RESOURCES
FORESTRY · PLANNING · LANDSCAPE ARCHITECTURE

LINDSAY ANNE ESTATES TOO

OREGON CITY, OREGON

CLACKAMAS COUNTY TAX MAP 3-2E-18

TAX LOT 1400

PRE-DEVELOPED BASIN MAP

DESIGNED BY:	
DRAWN BY:	NMC
CHECKED BY:	MBH
SCALE:	AS NOTED
DATE:	07/26/2017

REVISIONS

JOB NUMBER 5837

SHEET 1

AKS DRAWING FILE: 5837 BASIN PRE.DWG | LAYOUT: PRE

APPENDIX 3-1

POST-DEVELOPED BASIN MAP

SCALE: 1"= 40 FEET

40 0 16 24 32 40

ON 34" X 24" PAPER

TAX LOT 101
TAX MAP 3S 2E 7C

125' PGE TRANSMISSION LINE EASEMENT BOOK 278 PAGE 308

TAX LOT 199
TAX MAP 3S 2E 7C

ASPHALT DRIVEWAY

ASPHALT DRIVEWAY

TAX LOT 600
TAX MAP 3S 2E 7DC

10750

EX 12" CONC CULVERT IE: 442.36

DRIVEWAY

EX 12" CSP CULVERT IE: 441.96

10745

10744

10739

TAX LOT 700
TAX MAP 3S 2E 7DC

DRIVEWAY

EX 12" CSP CULVERT IE: 439.08

TAX LOT 800
TAX MAP 3S 2E 7DC

S LELAND ROAD

STORM WATER MANHOLE (TYP)

PGE POWER LINE TOWER

STORMWATER PLANTER (TYP)

MILLER ROAD

CURB INLET (TYP)

STORMWATER PLANTER (TYP)

30'

30'

EX 12" CONC CULVERT IE: 437.09

GRAVEL DRIVE

EX 8" STEEL CULVERT IE: 436.29

EX 6" PVC CULVERT IE: 434.51

TAX LOT 900
TAX MAP 3S 2E 7DC

EX 16" CONC CULVERT IE: 433.62

TAX LOT 1401
TAX MAP 3S 2E 18

EX STM DI
TOP GRATE: 435.12
BOT. GRATE: 433.68
IE OUT: 433.18 (12"S)

10634

10633

EX 12" CONC CULVERT IE: 434.52

BARRICADE

COMM MH

EX STM CB
RIM: 435.23
IE IN: 432.25 (12"N)
IE OUT: 431.81 (12"SE)

EX STM AD
RIM: 435.19

GRAVEL DRIVE

EX 12" STEEL CULVERT IE: 433.59

EX 2" PVC OUTFALL IE: 434.49

EX 2" PVC OUTFALL IE: 434.39

EX STM CB
RIM: 435.29
IE IN: 430.90 (12"NW)
IE OUT: 430.85 (12"SE)

EX 12" CONC CULVERT IE: 433.74

GRAVEL DRIVE

EX 12" CONC CULVERT IE: 433.63

EX 2" PVC OUTFALL IE: 436.10

EX 12" CONC CULVERT IE: 433.45

EX 2" PVC OUTFALL IE: 435.65

10049

10047

10037

10034

39'

30'

10128

10186

10185

10177

EX STM CB
RIM: 434.84
IE IN: 431.42 (12"NW)
IE OUT: 431.25 (12"SE)

TAX LOT 100
TAX MAP 3S 2E 18AB

TAX LOT 500
TAX MAP 3S 2E 18AB

TAX LOT 400
TAX MAP 3S 2E 18AB

TAX LOT 300
TAX MAP 3S 2E 18AB

TAX LOT 700
TAX MAP 3S 2E 18AB

EX STM MH
RIM: 436.43
IE IN: 430.64 (12"NW)
IE IN: 430.82 (12"NE)
IE IN: 430.61 (12"SW)
IE OUT: 430.57 (12"SE)

ELECTRICAL LINE EASEMENT PER DOC. NO. 2014-049319

10' ELECTRIC LINE EASEMENT PER DOC. NO. 2014-049319

TAX LOT 800
TAX MAP 3S 2E 18AB

EX STM CI
RIM: 436.67
IE OUT: 430.97 (12"NE)
SUMP: 429.29

TAX LOT 1000
TAX MAP 3S 2E 18AB

TAX LOT 1100
TAX MAP 3S 2E 18AB

TAX LOT 1200
TAX MAP 3S 2E 18AB

TAX LOT 1300
TAX MAP 3S 2E 18AB

EX STM CI
RIM: 439.15
IE OUT: 433.98 (12"SE)
SUMP: 432.29

TAX LOT 1500
TAX MAP 3S 2E 18AB

EX STM CI
RIM: 439.30
IE OUT: 435.35 (12"E)
SUMP: 433.62

EX SAN MH
RIM: 438.87
IE IN: 428.11 (8"SE)
IE IN: 428.02 (8"NW)
IE OUT: 427.95 (8"NE)

10' PUE

10' PUE

LINDSAY ANNE LANE

26.5'

EX STM MH
RIM: 438.92
IE IN: 433.85 (12"W)
IE IN: 433.46 (12"N)
IE IN: 432.46 (12"SE)
IE IN: 432.38 (12"NW)
IE OUT: 432.30 (12"NE)

EX STM CI
RIM: 435.63
IE IN: 432.28 (12"SE)
IE OUT: 432.19 (12"NE)
SUMP: 430.39

EX STM CI
RIM: 435.60
IE OUT: 432.44 (12"NW)
SUMP: 430.84

EX SAN MH
RIM: 435.97
IE IN: 426.63 (8"SE)
IE IN: 426.55 (8"SW)
IE IN: 426.37 (8"NW)
IE OUT: 426.31 (8"NE)

EX STM MH
RIM: 435.92
IE IN: 431.99 (12"W)
IE IN: 430.50 (12"SW)
IE IN: 430.42 (12"NE)
IE IN: 430.32 (12"NW)
IE OUT: 430.25 (15"SE)

EX STM CI
RIM: 436.56
IE OUT: 430.88 (12"SW)
SUMP: 429.32

CEDARWOOD WAY

CHERRYWOOD WAY

TRACT A
STORMWATER FACILITY

EX SAN MH
RIM: 437.16
IE OUT: 427.33 (8"SE)

EX STM MH
RIM: 437.16
IE OUT: 431.36 (12"SE)

POWER CONDUIT STUB

TP

TAX LOT 1402
TAX MAP 3S 2E 18

EX STM MH
RIM: 439.79
IE OUT: 433.60 (12"E)

EX SAN MH
RIM: 439.79
IE OUT: 429.04 (8"SE)

STORM DRAIN LATERAL (TYP)

STORMWATER PLANTER (TYP)

1 11
2 12
3 13
4 14
5 15
6 18
7 9
8 10
17
16
20
8
7
6
5
4
3
2
1
43
40
41
42
28
22
19
20
21
23
26
25
24
27

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FORESTRY · PLANNING · LANDSCAPE ARCHITECTURE

LINDSAY ANNE ESTATES TOO

OREGON CITY OREGON

CLACKAMAS COUNTY TAX MAP 3-2E-18

TAX LOT 1400

POST-DEVELOPED BASIN MAP

DESIGNED BY:	VHN
DRAWN BY:	NMC
CHECKED BY:	MBH
SCALE:	AS NOTED
DATE:	07/28/2017

REVISIONS

JOB NUMBER 5837

SHEET 1

AKS DRAWING FILE: 5837 BASIN POSTDWG | LAYOUT: BASIN

APPENDIX 4-1

BMP SIZING TOOL REPORT

WES BMP Sizing Software Version 1.6.0.1, August 2015

WES BMP Sizing Report

Project Information

Project Name	Lindsay Anne Estates Too
Project Type	Subdivision
Location	19701 S Leland Road, Oregon City
Stormwater Management Area	0
Project Applicant	PDX Development, Inc.
Jurisdiction	OutofDistrict

Drainage Management Area

Name	Area (sq-ft)	Pre-Project Cover	Post-Project Cover	DMA Soil Type	BMP
Basin 2 - Roof	2,640	Forested	Roofs	C	Basin 2 - Planter
Basin 1 - Pervious	2,471	Forested	Grass	C	Basin 1 - Planter
Basin 1 - Impervious	2,354	Forested	ConventionalConcrete	C	Basin 1 - Planter
Basin 1 - Roof	2,640	Forested	Roofs	C	Pond
Basin 2 - Impervious	3,120	Forested	ConventionalConcrete	C	Basin 2 - Planter
Basin 2 - Pervious	2,840	Forested	Grass	C	Basin 2 - Planter
Basin 3 - Roof	2,640	Forested	Roofs	C	Basin 3 - Planter
Basin 3 - Impervious	1,660	Forested	ConventionalConcrete	C	Basin 3 - Planter
Basin 3 - Pervious	2,774	Forested	Grass	C	Basin 3 - Planter
Basin 4 - Roof	5,280	Forested	Roofs	C	Basin 4 - Planter
Basin 4 - Impervious	5,160	Forested	ConventionalConcrete	C	Basin 4 - Planter
Basin 4 - Pervious	5,294	Forested	Grass	C	Basin 4 - Planter
Basin 5 - Roof	5,280	Forested	Roofs	C	Basin 5 - Planter
Basin 5 - Impervious	3,670	Forested	ConventionalConcrete	C	Basin 5 - Planter

Basin 5 - Pervious	5,311	Forested	Grass	C	Basin 5 - Planter
Basin 6 - Roof	2,640	Forested	Roofs	C	Basin 6 - Planter
Basin 6 - Impervious	3,200	Forested	ConventionalConcrete	C	Basin 6 - Planter
Basin 6 - Pervious	2,820	Forested	Grass	C	Basin 6 - Planter
Basin 7 - Roof	2,640	Forested	Roofs	C	Basin 7 - Planter
Basin 7 - Impervious	3,050	Forested	ConventionalConcrete	C	Basin 7 - Planter
Basin 7 - Pervious	2,910	Forested	Grass	C	Basin 7 - Planter
Basin 8 - Roof	2,640	Forested	Roofs	C	Pond
Basin 8 - Impervious	2,344	Forested	ConventionalConcrete	C	Basin 8 - Planter
Basin 8 - Pervious	2,522	Forested	Grass	C	Basin 8 - Planter
Basin 20 - Roof	39,600	Forested	Roofs	C	Pond
Basin 20 - Impervious	36,327	Forested	ConventionalConcrete	C	Pond
Basin 20 - Pervious	74,206	Forested	Grass	C	Pond
Basin 43 - Roof	7,920	Forested	Roofs	C	Basin 43 - Planter
Basin 43 - Impervious	5,410	Forested	ConventionalConcrete	C	Basin 43 - Planter
Basin 43 - Pervious	10,446	Forested	Grass	C	Basin 43 - Planter
Basin 42 - Impervious	3,150	Forested	ConventionalConcrete	C	Basin 42 - Planter
Basin 42 - Pervious	8,991	Forested	Grass	C	Basin 42 - Planter
Basin 40 - Impervious	3,658	Forested	ConventionalConcrete	C	Basin 40 - Planter
Basin 40 - Pervious	470	Forested	Grass	C	Basin 40 - Planter
Basin 41 - Impervious	3,424	Forested	ConventionalConcrete	C	Basin 41 - Planter
Basin 41 - Pervious	350	Forested	Grass	C	Basin 41 - Planter

LID Facility Sizing Details

LID ID	Design Criteria	BMP Type	Facility Soil Type	Minimum Area (sq-ft)	Planned Areas (sq-ft)	Orifice Diameter (in)
Basin 1 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	46.1	47.0	0.3
Basin 2 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	98.8	99.0	0.5
Basin 3 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	76.6	81.0	0.4
Basin 4 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	179.6	180.0	0.6
Basin 5 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	157.4	162.0	0.6
Basin 6 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	99.9	104.0	0.5
Basin 7 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	98.0	104.0	0.5
Basin 8 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	46.1	47.0	0.3
Basin 43 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	245.4	246.0	0.7
Basin 42 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	86.4	90.0	0.4
Basin 40 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	56.9	63.0	0.3
Basin 41 - Planter	WaterQuality	Stormwater Planter - Filtration	Lined	52.9	63.0	0.3

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?
Pond	FCWQT	Lined	5.50	9,500.0	3	36,555.7	26,791.7	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.

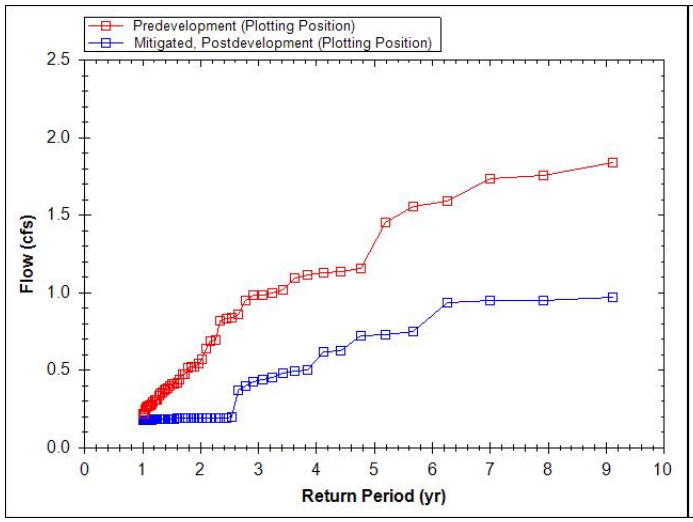
Custom Pond Geometry Configuration

Pond ID: Pond
Design: FlowControlAndTreatment

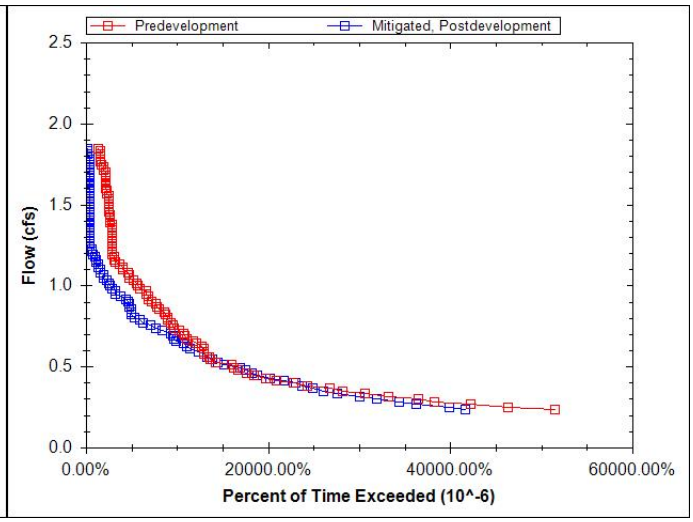
Shape Curve

Depth (ft)	Area (sq ft)	Discharge (cfs)
NaN	NaN	NaN

Flow Frequency Chart



Flow Duration Chart



APPENDIX 5-1

STORMWATER FACILITIES LOCATION AND DETAIL

SCALE: 1"= 40 FEET
40 0 16 24 32 40
ON 34" X 24" PAPER

TAX LOT 101
TAX MAP 3S 2E 7C

125' PGE TRANSMISSION LINE EASEMENT BOOK 278 PAGE 308

TAX LOT 199
TAX MAP 3S 2E 7C

TAX LOT 600
TAX MAP 3S 2E 7DC

TAX LOT 700
TAX MAP 3S 2E 7DC

TAX LOT 800
TAX MAP 3S 2E 7DC

TAX LOT 900
TAX MAP 3S 2E 7DC

TAX LOT 1402
TAX MAP 3S 2E 18

TAX LOT 1401
TAX MAP 3S 2E 18

TAX LOT 1500
TAX MAP 3S 2E 18AB

TAX LOT 1300
TAX MAP 3S 2E 18AB

TAX LOT 1200
TAX MAP 3S 2E 18AB

TAX LOT 1100
TAX MAP 3S 2E 18AB

TAX LOT 1000
TAX MAP 3S 2E 18AB

TAX LOT 800
TAX MAP 3S 2E 18AB

TAX LOT 700
TAX MAP 3S 2E 18AB

TAX LOT 500
TAX MAP 3S 2E 18AB

TAX LOT 400
TAX MAP 3S 2E 18AB

TAX LOT 300
TAX MAP 3S 2E 18AB

TAX LOT 100
TAX MAP 3S 2E 18AB

ASPHALT DRIVEWAY

ASPHALT DRIVEWAY

S LELAND ROAD

MILLER ROAD

LINDSAY ANNE LANE

CEDARWOOD WAY

CHERRYWOOD WAY

TRACT A
STORMWATER FACILITY

STORM WATER MANHOLE (TYP)

PGE POWER LINE TOWER

STORMWATER PLANTER (TYP)

STORM DRAIN LATERAL (TYP)

CURB INLET (TYP)

POWER CONDUIT STUB

10' ELECTRIC LINE EASEMENT PER DOC. NO. 2014-049319

ELECTRICAL LINE EASEMENT PER DOC. NO. 2014-049319

10' PUE

10' PUE

BARRICADE

DRIVEWAY

DRIVEWAY

GRAVEL DRIVE

GRAVEL DRIVE

GRAVEL DRIVE

GRAVEL DRIVE

EX 12" CONC CULVERT IE: 442.36

EX 12" CSP CULVERT IE: 441.96

EX 12" CSP CULVERT IE: 439.08

EX 12" CONC CULVERT IE: 437.09

EX 8" STEEL CULVERT IE: 436.29

EX 6" PVC CULVERT IE: 434.51

EX 16" CONC CULVERT IE: 433.62

EX 12" CONC CULVERT IE: 434.52

EX 12" STEEL CULVERT IE: 433.59

EX 2" PVC OUTFALL IE: 434.49

EX 2" PVC OUTFALL IE: 434.39

EX 12" CONC CULVERT IE: 433.74

EX 12" CONC CULVERT IE: 433.63

EX 2" PVC OUTFALL IE: 436.10

EX 12" CONC CULVERT IE: 433.45

EX 2" PVC OUTFALL IE: 435.65

EX STM CB RIM: 435.23 IE IN: 432.25 (12"N) IE OUT: 431.81 (12"SE)

EX STM AD RIM: 435.19

EX STM CB RIM: 434.84 IE IN: 431.42 (12"NW) IE OUT: 431.25 (12"SE)

EX STM CB RIM: 435.29 IE IN: 430.90 (12"NW) IE OUT: 430.85 (12"SE)

EX STM MH RIM: 439.84 IE OUT: 433.60 (12"SE)

EX SAN MH RIM: 439.79 IE OUT: 429.04 (8"SE)

EX STM CI RIM: 439.30 IE OUT: 435.35 (12"E) SUMP: 433.62

EX SAN MH RIM: 438.87 IE IN: 428.11 (8"SE) IE IN: 428.02 (8"NW) IE OUT: 427.95 (8"NE)

EX STM MH RIM: 438.92 IE IN: 433.85 (12"W) IE IN: 433.46 (12"N) IE IN: 432.46 (12"SE) IE IN: 432.38 (12"NW) IE OUT: 432.30 (12"NE)

EX STM CI RIM: 439.15 IE OUT: 433.98 (12"SE) SUMP: 432.29

EX STM CI RIM: 436.67 IE OUT: 430.97 (12"NE) SUMP: 429.29

EX STM CI RIM: 435.63 IE IN: 432.28 (12"SE) IE OUT: 432.19 (12"NE) SUMP: 430.39

EX STM CI RIM: 435.60 IE OUT: 432.44 (12"NW) SUMP: 430.84

EX SAN MH RIM: 435.97 IE IN: 426.63 (8"SE) IE IN: 426.55 (8"SW) IE IN: 426.37 (8"NW) IE OUT: 426.31 (8"NE)

EX STM MH RIM: 435.92 IE IN: 431.99 (12"W) IE IN: 430.50 (12"SW) IE IN: 430.42 (12"NE) IE IN: 430.32 (12"NW) IE OUT: 430.25 (15"SE)

EX STM CI RIM: 436.56 IE OUT: 430.88 (12"SW) SUMP: 429.32

EX SAN MH RIM: 437.16 IE OUT: 427.33 (8"SE)

EX STM MH RIM: 437.16 IE OUT: 431.36 (12"SE)

EX STM MH RIM: 436.43 IE IN: 430.64 (12"NW) IE IN: 430.82 (12"NE) IE IN: 430.61 (12"SW) IE OUT: 430.57 (12"SE)

EX STM DI TOP GRATE: 435.12 BOT. GRATE: 433.68 IE OUT: 433.18 (12"S)

COMM MH

10750 10745 10744 10739 10634 10633 10128 10186 10185 10177 10049 10047 10037 10034

30' 30' 26.5' 26.5' 26.5' 26.5' 26.5' 26.5' 39'

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LINDSAY ANNE ESTATES TOO

OREGON
CLACKAMAS COUNTY TAX MAP 3-2E-18
OREGON CITY
TAX LOT 1400

STORMWATER FACILITIES LOCATION PLAN

DESIGNED BY:	VHN
DRAWN BY:	NMC
CHECKED BY:	MBH
SCALE:	AS NOTED
DATE: 07/28/2017	

REVISIONS

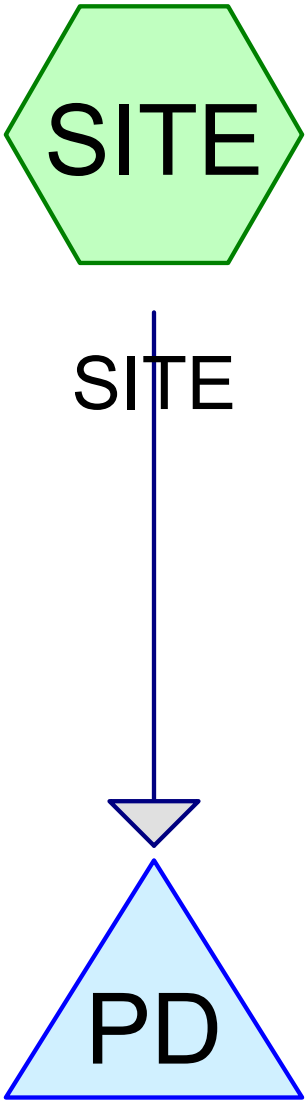
JOB NUMBER
5837

SHEET
1

AKS DRAWING FILE: 5837 BASIN POST.DWG | LAYOUT: LOCATION

APPENDIX 6-1

EMERGENCY OVERFLOW CALCS



Detention Pond

Subcat Reach Pond Link

Drainage Diagram for 5837 Overflow HydroCad
Prepared by AKS Engineering & Forestry, LLC, Printed 7/26/2017

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.880	86	Pervious (SITE)
3.450	98	Impervious (SITE)
6.330		TOTAL AREA

Soil Listing (all nodes)

Area (acres)	Soil Goup	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
6.330	Other	SITE
6.330		TOTAL AREA

Time span=0.00-24.00 hrs, dt=0.15 hrs, 161 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment SITE: SITE — Runoff Area=6.330 ac 54.50% Impervious Runoff Depth>3.68"
Tc=10.0 min CN=86/98 Runoff=5.43 cfs 1.939 af

Pond PD: Detention Pond — Peak Elev=438.24' Storage=29,367 cf Inflow=5.43 cfs 1.939 af
Outflow=2.95 cfs 1.308 af

Total Runoff Area = 6.330 ac Runoff Volume = 1.939 af Average Runoff Depth = 3.68"
45.50% Pervious = 2.880 ac 54.50% Impervious = 3.450 ac

Summary for Subcatchment SITE: SITE

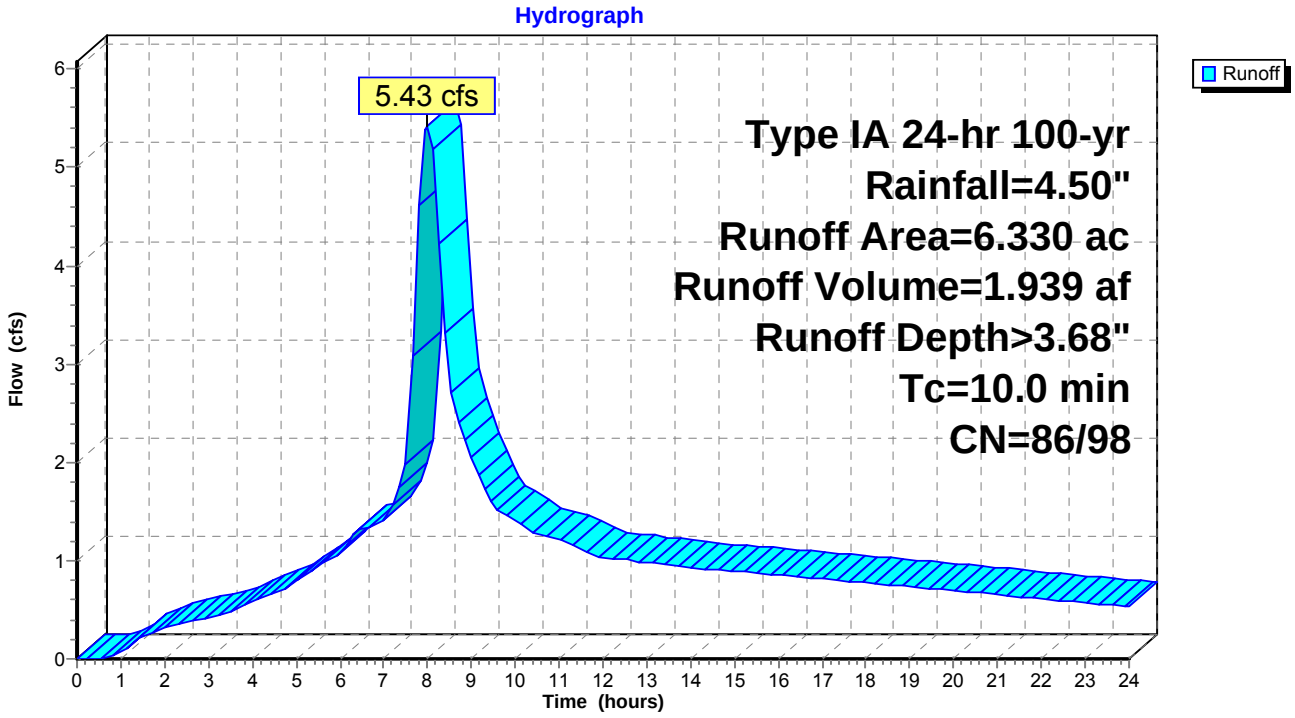
Runoff = 5.43 cfs @ 7.99 hrs, Volume= 1.939 af, Depth> 3.68"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
Type IA 24-hr 100-yr Rainfall=4.50"

	Area (ac)	CN	Description
*	2.880	86	Pervious
*	3.450	98	Impervious
	6.330	93	Weighted Average
	2.880	86	Pervious Area
	3.450	98	Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment SITE: SITE



Summary for Pond PD: Detention Pond

Inflow Area = 6.330 ac, 54.50% Impervious, Inflow Depth > 3.68" for 100-yr event
Inflow = 5.43 cfs @ 7.99 hrs, Volume= 1.939 af
Outflow = 2.95 cfs @ 8.52 hrs, Volume= 1.308 af, Atten= 46%, Lag= 31.6 min
Primary = 2.95 cfs @ 8.52 hrs, Volume= 1.308 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
Peak Elev= 438.24' @ 8.52 hrs Surf.Area= 11,803 sf Storage= 29,367 cf

Plug-Flow detention time= 357.3 min calculated for 1.308 af (67% of inflow)
Center-of-Mass det. time= 162.4 min (860.2 - 697.8)

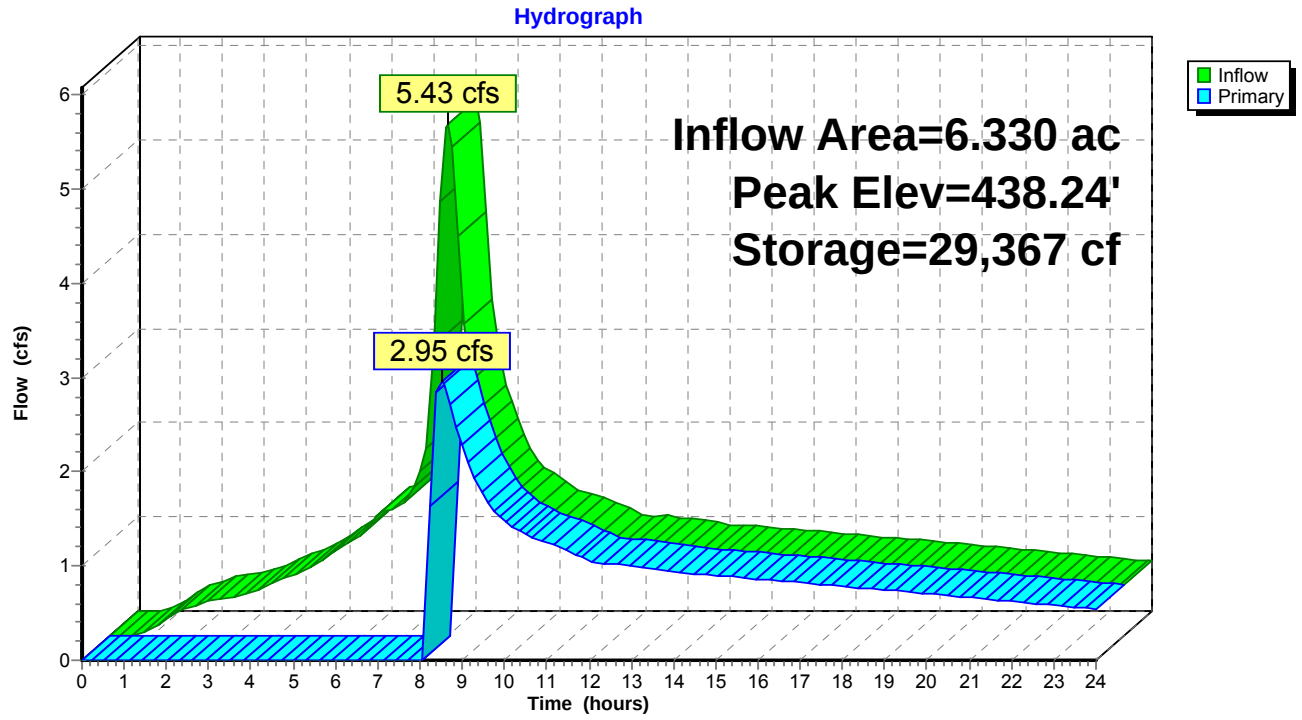
Volume	Invert	Avail.Storage	Storage Description
#1	435.00'	35,663 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
435.00	6,350	0	0
438.75	12,670	35,663	35,663

Device	Routing	Invert	Outlet Devices
#1	Primary	438.00'	10.0' long x 12.0' breadth Driveway Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=2.92 cfs @ 8.52 hrs HW=438.23' (Free Discharge)
└1=Driveway Weir (Weir Controls 2.92 cfs @ 1.25 fps)

Pond PD: Detention Pond



APPENDIX 7-1

SOIL INFORMATION FROM THE USDA SOIL SURVEY OF CLACKAMAS COUNTY, OREGON

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Clackamas County Area, Oregon

May 10, 2017

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:1,890 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 25 50 100 150

Feet
0 50 100 200 300

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 Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

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:
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 11, Sep 16, 2016

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.

Map Unit Legend

Clackamas County Area, Oregon (OR610)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
8B	Bornstedt silt loam, 0 to 8 percent slopes	4.1	61.0%
45B	Jory silty clay loam, 2 to 8 percent slopes	2.6	39.0%
Totals for Area of Interest		**6.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the

development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Clackamas County Area, Oregon

8B—Bornstedt silt loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 227t
Elevation: 300 to 650 feet
Mean annual precipitation: 48 to 65 inches
Mean annual air temperature: 50 to 52 degrees F
Frost-free period: 140 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Bornstedt and similar soils: 85 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bornstedt

Setting

Landform: Terraces, hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed old alluvium

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 33 inches: silty clay loam
H3 - 33 to 71 inches: silty clay

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Borges

Percent of map unit: 5 percent
Landform: Depressions on terraces, hillslopes

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Aquults

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

45B—Jory silty clay loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 224x
Elevation: 250 to 1,200 feet
Mean annual precipitation: 50 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Jory and similar soils: 90 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Jory

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Base slope, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium

Typical profile

H1 - 0 to 13 inches: silty clay loam
H2 - 13 to 60 inches: silty clay

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

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.

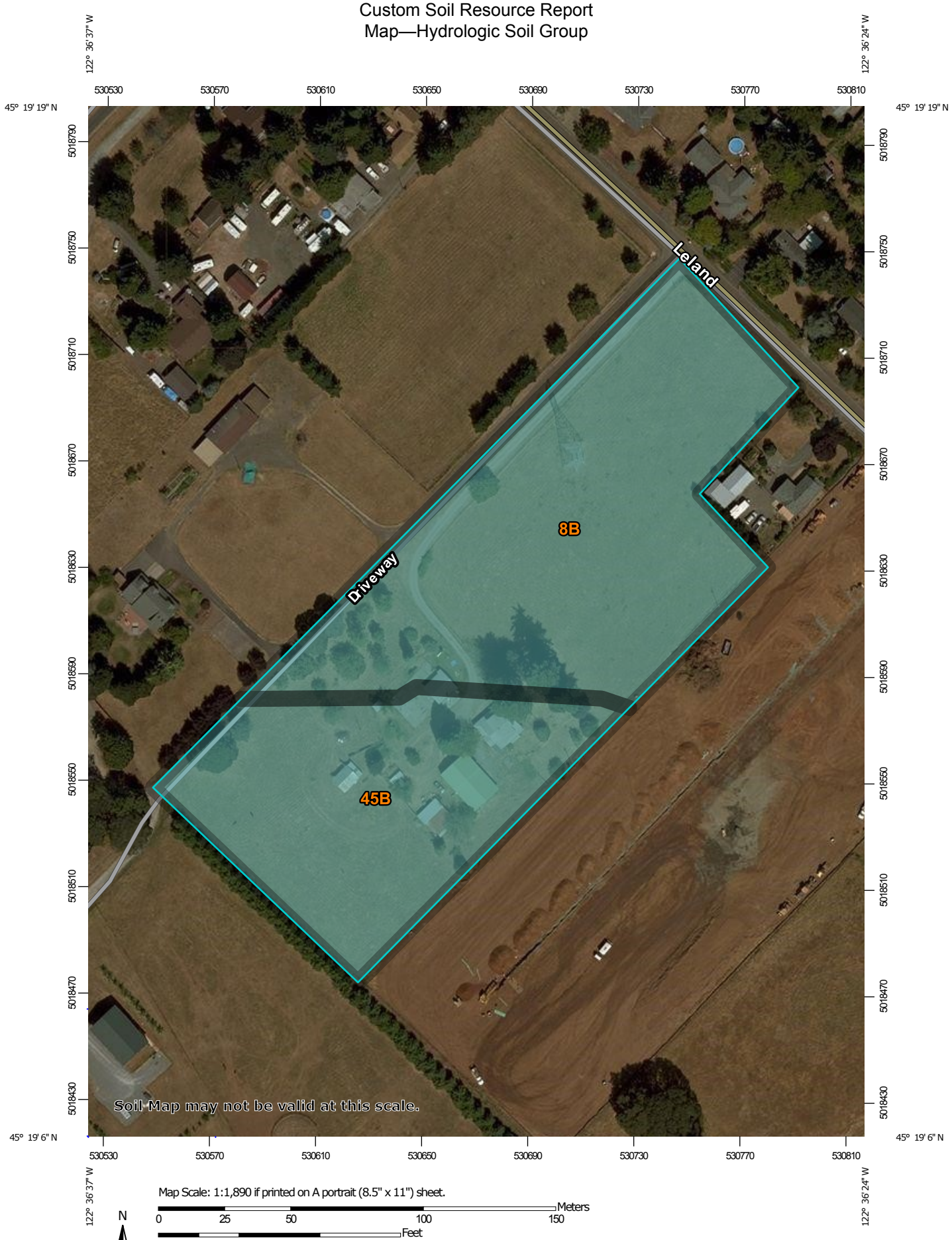
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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.

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:1,890 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

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:
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 11, Sep 16, 2016

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.

Table—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**
8B	Bornstedt silt loam, 0 to 8 percent slopes	C	4.1	61.0%
45B	Jory silty clay loam, 2 to 8 percent slopes	C	2.6	39.0%
Totals for Area of Interest			**6.8**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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APPENDIX 8-1

RELEVANT INFORMATION

TABLE 3.5.2B SCS WESTERN WASHINGTON RUNOFF CURVE NUMBERS

SCS WESTERN WASHINGTON RUNOFF CURVE NUMBERS (Published by SCS in 1982)					
Runoff curve numbers for selected agricultural, suburban and urban land use for Type 1A rainfall distribution, 24-hour storm duration.					
LAND USE DESCRIPTION		CURVE NUMBERS BY HYDROLOGIC SOIL GROUP A	B	C	D
Cultivated land(1):	winter condition	86	91	94	95
Mountain open areas:	low growing brush and grasslands	74	82	89	92
Meadow or pasture:		65	78	85	89
Wood or forest land:	undisturbed or older second growth	42	64	76	81
Wood or forest land:	young second growth or brush	55	72	81	86
Orchard:	with cover crop	81	88	92	94
Open spaces, lawns, parks, golf courses, cemeteries, landscaping.					
good condition:	grass cover on 75% or more of the area	68	80	86	90
fair condition:	grass cover on 50% to 75% of the area	77	85	90	92
Gravel roads and parking lots		76	85	89	91
Dirt roads and parking lots		72	82	87	89
Impervious surfaces, pavement, roofs, etc.		98	98	98	98
Open water bodies:	lakes, wetlands, ponds, etc.	100	100	100	100
Single Family Residential (2)					
Dwelling Unit/Gross Acre	% Impervious (3)				
1.0 DU/GA	15	Separate curve number shall be selected for pervious and impervious portion of the site or basin			
1.5 DU/GA	20				
2.0 DU/GA	25				
2.5 DU/GA	30				
3.0 DU/GA	34				
3.5 DU/GA	38				
4.0 DU/GA	42				
4.5 DU/GA	46				
5.0 DU/GA	48				
5.5 DU/GA	50				
6.0 DU/GA	52				
6.5 DU/GA	54				
7.0 DU/GA	56				
Planned unit developments, condominiums, apartments, commercial business and industrial areas.	% impervious must be computed				

(1) For a more detailed description of agricultural land use curve numbers refer to National Engineering Handbook, Section 4, Hydrology, Chapter 9, August 1972.
(2) Assumes roof and driveway runoff is directed into street/storm system.
(3) The remaining pervious areas (lawn) are considered to be in good condition for these curve numbers.

APPENDIX 9-1

LINDSAY ANNE ESTATES
STORMWATER REPORT NARRATIVE
AND DOWNSTREAM ANALYSIS

Lindsay Anne Estates

Stormwater Report

Date:	March, 2014
Client:	Rian Park Development, Inc. 15239 S Lakeridge Way Oregon City, OR 97045
Engineering Contact:	Monty Hurley, PE, PLS
Engineering Firm:	AKS Engineering & Forestry, LLC.
AKS Job No.:	3589

RENEWAL DATE: 6/30/15

AKS Engineering & Forestry

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Sherwood, OR 97140
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TABLE OF CONTENTS

PRELIMINARY STORMWATER REPORT

PROJECT: LINDSAY ANNE ESTATES

1.0 PURPOSE OF REPORT

The purpose of this report is to document the criteria for which the stormwater for this site was designed to meet, the sources of information upon which the analysis is based, the design methodology, and the results of the analysis.

2.0 PROJECT LOCATION/DESCRIPTION

The proposed development is on approximately 6.77 acres in the northeast one-quarter and northwest one-quarter of section 18, township 3 South, Range 2 East, Willamette Meridian, City of Oregon City, Clackamas County, Oregon. It is also identified as Tax Lot 1300, Clackamas County Assessor's Map No. 3S-2E-18. The project site has frontage along Leland Road.

Stormwater from the site is proposed to be routed to a stormwater facility that will be constructed on Tract A.

3.0 REGULATORY DESIGN CRITERIA

3.1 STORMWATER QUANTITY MANAGEMENT CRITERIA

The required stormwater quantity management criteria are summarized below.

The post-development peak stormwater discharge rate from the site for the two-year, 24-hour duration design storm event shall at no time exceed half the pre-development peak stormwater runoff rate for the same design storm event.

The post-development peak stormwater discharge rate from the site for the five-year, 24-hour duration design storm event shall at no time exceed the pre-development peak stormwater runoff rate for the same design storm event.

The post-development peak stormwater discharge rate from the site for the 25-year, 24-hour duration design storm event shall at no time exceed the pre-development peak stormwater runoff rate for the ten-year, 24-hour duration design storm event.

The design storms are based on the standard SCS Type 1A rainfall distribution with a 24-hour distribution and a total depth of 2.6" (2-year), 3.1" (5-year), 3.4" (10-year), 4.0" (25-year), and 4.5" (100-year).

3.2 STORMWATER QUALITY MANAGEMENT CRITERIA

The required stormwater quality management criteria are summarized below:

The water quality design storm is 1/3 of the SCS 2-year / 24-hour design storm (0.87").

The water quality treatment will be achieved with an extended wet pond. Permanent pool volume shall be no less than 50% of the design water quality storm.

The remainder of the volume shall be released through an orifice sized to release the stormwater in no less than 12 hours.

3.3 FLOOD PLAIN
There are no flood plains shown on the Flood Insurance Rate Map (FIRM) produced by the Federal Emergency Management Agency (FEMA).

3.4 REQUIRED PERMITS
No permits are needed from DSL or USACE for this project.

4.0 SUMMARY OF ON-SITE STORMWATER DETENTION RESULTS

See Stormwater Summary Table at the end.

5.0 SOURCES OF INFORMATION AND DESIGN METHODOLOGY

The Santa Barbara Urban Hydrograph (SBUH) Method was used for the stormwater analysis. This method utilizes the SCS Type 1A 24-hour storm. HydroCAD software aided in the analysis. References are cited at the end of the report.

6.0 DESIGN PARAMETERS

6.1 DESIGN STORM

6.1.1 STORMWATER DETENTION FACILITY DESIGN

All of the flow results in stormwater summary table are incorporated in the detention pond sizing and analysis. The flow results stated in the table reflect the maximum flows released from the pond.

6.1.2 INLET AND CONDUIT SIZING

The stormwater inlets (catch basins) for the site are placed according to the grading (at all low points in grade and other necessary locations) and will adequately handle the stormwater for the site. Oversized catch basin curb inlets (4A) will be placed at all low points. The distance between catch basins is generally 400 feet or less.

The stormwater pipes will be sized from the SBUH method to adequately convey the 25-year storm event (gravity flow).

6.2 PRE-DEVELOPED SITE TOPOGRAPHY AND LAND USE

6.2.1 SITE TOPOGRAPHY

The site slopes to the east with slopes generally less than 5%.

6.2.2 LAND USE

There are existing homes and outbuildings with pastures, orchards, and scattered trees on the site.

6.2.3 PRE-DEVELOPED INPUT PARAMETERS

The input parameters are shown for each subcatchment (basin) in the appendices.

6.3 SOIL TYPE

The soils for this site consist of Bornstedt silt loam and Jory silty clay loam. Per the City of Oregon City Stormwater and Grading Design Standards, these soils belong to hydrologic soil group "C". The applicable soils information is provided in the appendices.

6.4 POST-DEVELOPED SITE TOPOGRAPHY AND LAND USE

6.4.1 SITE TOPOGRAPHY

The post-developed site topography will be altered from the pre-developed site topography to allow for the construction of streets and attached housing. There are no substantial terrain alterations.

6.4.2 LAND USE

The post-developed land use consists of 35 lots conforming to R6 standards for detached single family homes, one tract for a stormwater facility, and three public streets.

6.4.3 POST-DEVELOPED INPUT PARAMETERS

The input parameters are shown for each subcatchment (basin) and pond in the appendices. The calculation method for determination of impervious area includes measuring all the area within the right-of-way as impervious and adding 2,500 square feet impervious per lot.

6.5 DESCRIPTION OF OFF-SITE CONTRIBUTORY BASINS

There are two upstream basins, one is adjacent properties to the west and the other is along Leland Road. Only the upstream basin to the west is contribute to the proposed pond after this development. This basin is generally pastureland with a few structures.

The basin along Leland Road consists of pavement and grass land.

7.0 CALCULATION METHODOLOGY

7.1 PROPOSED STORMWATER CONDUIT SIZING AND INLET SPACING

The proposed stormwater pipes will be sized during final engineering from the SBUH method and will adequately convey the 25-year storm event (gravity flow).

7.2 PROPOSED STORMWATER QUANTITY CONTROL (DETENTION) FACILITY DESIGN

The input parameters are shown for each subcatchment (basin) and the pond in the appendices. They are determined by topographic survey information, aerial photos and contours, design, and analysis. The hydrographs were created with HydroCAD software. Pond is utilized to adequately address stormwater quantity (detention) requirements from

the *City of Oregon City Public Works Stormwater and Grading Design Standards (November 17, 1999).*

7.3 PROPOSED STORMWATER QUALITY CONTROL FACILITY DESIGN
The input parameters are shown for each subcatchment (basin) and the pond in the appendices. They are determined by topographic survey information, aerial photos, contours, design, and analysis. The hydrographs were created with HydroCAD software. Pond is utilized to adequately address the stormwater quality requirements from the *City of Oregon City Public Works Stormwater and Grading Design Standards (November 17, 1999).* Half of the water quality design storm (1/3 of the 2-year storm) is detained as the permanent pool, and the remaining half is released over 12 hours.

7.4 ENERGY DISSIPATER CALCULATIONS
Rip-rap will be placed at the inlet and outlet of the pond to act as an energy dissipater. The required rip-rap size shall be a minimum of Class 100.

7.5 DOWNSTREAM ANALYSIS
This site is located in the Beaver Basin (designated in the City's Drainage Master Plan). Per *City of Oregon City Public Works Stormwater and Grading Design Standards (November 17, 1999),* the 10-year storm event is use for downstream analysis when the contributing drainage area is less than 40 acres.

Stormwater flows from the on-site detention pond discharge off-site into an existing drainage channel on tax lot 1204 that has been noted as possibly being a jurisdictional stream. The well-defined drainage channel is approximately 3-5 feet wide and 1 feet deep and free from any obstruction. Beyond the drainage channel, there are two existing 12-inch culverts under driveways on tax lots 1282 and 1205. Stormwater peak flow will pass through these existing culverts under surcharged conditions. These head waters / flows will overtop the driveways and continue to flow downstream without impact any building structures.

Downstream of the culvert, stormwater flows continue into an existing well-defined drainage channel as they have historically. The existing drainage channel eventually runs easterly and then continues southerly along the Leland Road public right-of-way.

Any peak storm events that are greater than the 10-year storm event, may result in flows that overtop area drains and driveways but will not impact existing building structures.

7.6 CULVERT ANALYSIS
No culverts are proposed on the site.

8.0 STORMWATER QUANTITY CONTROL FACILITY OPERATION
The stormwater from the site will be routed through a series of curb inlets, pipes, and manholes prior to reaching the pond in Tract A. There are two main inlets, one lateral, and one outlet in the pond. Rip-rap will be placed at each of these. The pond bottom is at elevation *428.00*. There is a permanent pool volume of *approximately 5,249* cubic feet

(~1.10 feet deep). Stormwater is conveyed from the pond to outfall through the following orifices:

Pond Outlet	Size	Type	Invert Elevation	Purpose
Orifice A	8.3" diameter	Round Orifice	429.10	Water Quality
Orifice B	11.5" diameter	Round Orifice	430.37	Detention
Weir C	8' long Sharp-Crested	Rectangular Weir	431.50	Emergency Overflow

The grading and compaction guidelines from the *City of Oregon City Public Works Stormwater and Grading Design Standards (November 17, 1999)* shall be adhered to the maximum extent possible.

9.0 STORMWATER QUALITY CONTROL FACILITY OPERATION

The stormwater for the site will be routed through a series of catch basins, pipes, and manholes. The catch basins will be sumped. Water quality is provided in the extended wet pond (with permanent dead storage) through gravitational settling, biological processes, and hydraulic residence time. As stated above, the pond has a bottom elevation of *428.00*. There is a permanent pool volume of *approximately 5,249* cubic feet (~1.10 feet deep). The remaining water quality volume is conveyed to outfall via Orifice A, which was sized to release the volume over 12 hours. These were sized from the design criteria for an Extended Wet Pond (with detention storage above) described in the *City of Oregon City Public Works Stormwater and Grading Design Standards (November 17, 1999).*

10.0 STORMWATER DETENTION POND SAFEGUARDS

Calculations for the 100-year storm event are included. The stormwater pond is designed to adequately handle this storm event. If the outlet structure becomes plugged or for some other reason cannot convey the stormwater, then the stormwater will overflow through the emergency overflow. A channel lined with rip-rap will serve as a overflow to release stormwater in the event that the outlet structure is plugged. The emergency overflows are sized to accommodate the flows from the 100-year storm (assuming the outlet structure is plugged). There are no foreseen problems with this.

STORMWATER SUMMARY

The table below shows a summary of the peak flows for each storm event.

STORMWATER SUMMARY TABLE

	PRE-DEVELOPED PEAK FLOWS (CFS)			
CATCHMENT	2-YR (2.6")	5-YR (3.1")	10-YR (3.4")	25-YR (4.0")
10-i Impervious Area	0.17	0.21	0.23	0.28
11-P Pervious Area (Orchard)	1.27	1.63	1.84	2.27
12-P Pervious Area (Pasture)	0.71	0.99	1.16	1.52
13-S Offsite Contribute Basin West	0.44	0.62	0.73	0.96
14-S Offsite Contribute Basin Leland	0.55	0.73	0.83	1.05

	POST-DEVELOPED PEAK FLOWS (CFS)		
	2-YR (2.6")	5-YR (3.1")	25-YR (4.0")
***ALLOWABLE RELEASE RATE**	2.07	4.18	5.24
POND RELEASE RATE	2.04	3.32	5.15

*The allowable release rate for the post-developed 2-year storm event is equal to HALF of the sum of the pre-developed peak runoff rate for the 2-year storm from Catchments 10-i, 11-P, and 12-P plus the sum of the pre-developed peak runoff rates for the 2-year storm from Catchments 13-S, and 14-S.

*The allowable release rate for the post-developed 5-year storm event is equal to the sum of the pre-developed peak flows for the 5-year storm from Catchments 10-i, 11-P, and 12-P plus the sum of the pre-developed peak runoff rates for the 5-year storm from Catchments 13-S, and 14-S.

*The allowable release rate for the post-developed 25-year storm event is equal to the sum of the pre-developed peak runoff rate for the 10-year storm from Catchments 10-i, 11-P, and 12-P plus the sum of the pre-developed peak runoff rates for the 25-year storm from Catchments 13-S, and 14-S.

TIME OF CONCENTRATION SUMMARY

The table below shows a summary of the time of concentration.

TIME OF CONCENTRATION SUMMARY TABLE

EXISTING CONDITION BASIN CONTRIBUTE TO PROPOSED POND

CATCHMENT	TIME (minute)
10-i Impervious Area	5.0
11-P Pervious Area (Orchard)	27.2
12-P Pervious Area (Pasture)	11.9
13-S Offsite Contribute Basin West	30.3

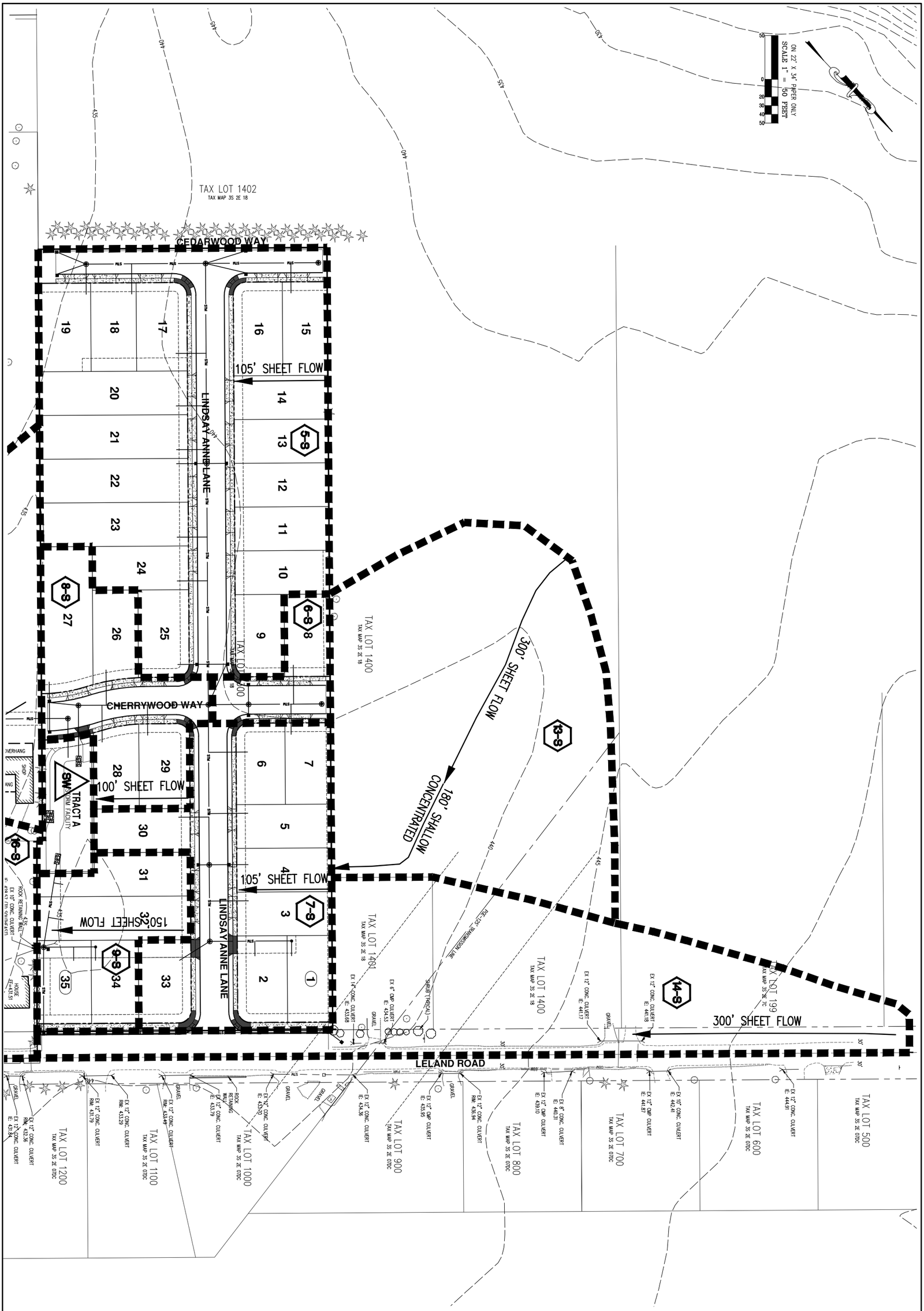
POST-DEVELOPED CONDITION

CATCHMENT	TIME (minute)
5-S West MH 23 Basin	11.3
6-S North MH 23 Basin	5.0
7-S East MH 23 Basin	14.9
8-S South MH 23 Basin	9.2
9-S East Pond Basin	15.0
13-S Offsite Contribute Basin West	53.3
14-S Offsite Contribute Basin Leland	42.8

DOWNSTREAM STUDY

CATCHMENT	TIME (minute)
5-S West MH 23 Basin	11.3
6-S North MH 23 Basin	5.0
7-S East MH 23 Basin	14.9
8-S South MH 23 Basin	9.2
9-S East Pond Basin	15.0
13-S Offsite Contribute Basin West	53.3
14-S Offsite Contribute Basin Leland	42.8
15-S Offsite Contribute Basin South	28.3
16-S Offsite Contribute Basin Leland South	14.3

APPENDIX 6-1
DOWNSTREAM ANALYSIS



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AKS ENGINEERING & FORESTRY

LINDSAY ANNE ESTATES

OREGON CITY OREGON
TAX LOT 1300 CLACKAMAS COUNTY TAX MAP 3S 2E 18

DOWNSTREAM STUDY MAP

DESIGNED BY: VIN
DRAWN BY: VIN, BLF
CHECKED BY: MBRL, GG
DRAWING NO.: 3589 BASN MAP
SCALE: AS NOTED

PREPARED FOR:
RIAN PARK DEVELOPMENT, INC
15239 S LAKERIDGE WAY
OREGON CITY, OR 97045

DATE: 03/14/2014

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 13, 2004
MICHAEL B. RILEY
RENEWAL DATE: 6/30/15

JOB NUMBER
3589

SHEET
1

ON 22" X 34" PAPER ONLY
SCALE 1" = 50 FEET

TRACT A
STORM FACILITY

300' SHEET FLOW OF CATCHMENT 15-S

200' SHEET FLOW

280' SHALLOW CONCENTRATED OF CATCHMENT 15-S

TAX LOT 1280
TAX MAP 3S 2E 18

TAX LOT 1206
TAX MAP 3S 2E 18

TAX LOT 1282
TAX MAP 3S 2E 18

TAX LOT 1201
TAX MAP 3S 2E 18

TAX LOT 1204
TAX MAP 3S 2E 18

TAX LOT 1205
TAX MAP 3S 2E 18

TAX LOT 1100
TAX MAP 3S 2E 18

TAX LOT 1000
TAX MAP 3S 2E 18

TAX LOT 906
TAX MAP 3S 2E 18

TAX LOT 1200
TAX MAP 3S 2E 07DC

TAX LOT 1400
TAX MAP 3S 2E 07DC

TAX LOT 3700
TAX MAP 3S 2E 07DC

TAX LOT 1600
TAX MAP 3S 2E 07DC

TAX LOT 1500
TAX MAP 3S 2E 07DC

TAX LOT 2000
TAX MAP 3S 2E 07DD

TAX LOT 1000
TAX MAP 3S 2E 07DD

JESSIE AVE

LELAND ROAD

SHOP
OVERHANG
GRAVEL
ROCK RETAINING WALL
EX 10" CONC. CULVERT
IE: 428.57 (TO SOUTHEAST)
HOUSE
FF=431.51
GARAGE
FF=430.56
EX 12" CONC. CULVERT
IE: 430.90
EX STM AREA DRAIN
RIM: 427.41
IE IN: 426.21 (10"CONC. WNW)
IE OUT: 425.33 (8"CONC. ESE)
SUMP: 425.06
EX 12" CONC. CULVERT
IE: 430.11
GUESTHOUSE
CARPORT
EX SAN CO
RIM: 430.13
IE BEND: 427.53
DECK W/OVERHANG
PAVERS
DECK
HOUSE
EX 12" DI CULVERT
IE: 422.68
(TO SOUTHEAST)
ROCK RETAINING WALL
EX 2" PVC SUMP OUTFALL
IE: 429.31
WOOD FENCE
FERRIERS PEN
SHED
EX 12" CONC. CULVERT
TOP: 420.91 (FROM NORTHWEST)
EX 12" CONC. CULVERT
TOP: 421.05 (FROM SOUTH)
EX 6" PERF PIPE
TOP: 422.18 (FROM WEST)
EX 6" PVC CULVERT
TOP: 422.18 (FROM SOUTH)
POSSIBLE DRYWELL
FILLED WITH DIRT
23R
RIVER ROCK
24R
25R
26R
27R
28R
GRAVEL
EX 12" CONC. CULVERT
IE: 419.41
EX 12" CONC. CULVERT
IE: 419.27
EX 12" CMP CULVERT
IE: 424.08
EX 12" CONC. CULVERT
IE: 418.27
EX 12" CONC. CULVERT
IE: 417.69
EX 12" CONC. CULVERT
IE: 420.64
EX 12" CONC. CULVERT
IE: 421.05
EX 12" CONC. CULVERT
IE: 418.77
EX 12" CONC. CULVERT
IE: 418.27
BRICK RETAINING WALL
RIP-TIE RETAINING WALL
EX DITCH INLET
INLET: 417.62
IE OUT: 413.63 (18"S)
SUMP: 413.40
EX STM MH
RIM: 419.28
IE IN: 411.18 (18"N)
IE OUT: 411.08 (18"SE)
PAVERS
KEYSTONE RETAINING WALL
COMMUNICATIONS MANHOLE
EX 12" PVC CULVERT
IE: 415.89
EX 12" CONC. CULVERT
IE: 414.13
EX 12" CONC./10" CLAY CULVERT
IE: 413.74
EX 12" CPP CULVERT
IE: 412.75
EX 18" CONC. CULVERT
IE: 412.44
EX 14" CONC. CULVERT
IE: 412.25
EX STM CB
RIM: 415.38
IE IN: 411.91 (18"NE)
IE OUT: 411.91 (18"SW)
SUMP: 410.06 (SEDIMENT)
EX STM MH
RIM: 415.41
EX 12" CONC. CULVERT
RIM: 431.79
EX 12" CONC. CULVERT
RIM: 432.36
EX 12" CONC. CULVERT
IE: 431.84
EX 12" CONC. CULVERT
IE: 431.30
EX 12" CONC. CULVERT
IE: 430.14
OBSERVED SEEP
05/30/13
EX 8" CONC. CULVERT
IE: 423.02
(FROM WEST-NORTHWEST)
EX 12" CMP CULVERT
IE: 427.23
EX 12" CMP CULVERT
IE: 426.94
EX 12" CMP CULVERT
IE: 425.36
EX STM CB
RIM: 426.59
IE IN: 424.39 (12"NW)
IE OUT: 424.29 (12"SE)
EX STM CB
RIM: 425.93
IE IN: 423.84 (12"NW)
IE OUT: 423.73 (12"SE)
EX 12" CONC. CULVERT
IE: 423.88

DOWNSTREAM STUDY MAP

LINDSAY ANNE ESTATES

OREGON CITY, OREGON
CLACKAMAS COUNTY TAX MAP 3S 2E 18
TAX LOT 1300

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FAX: (503) 925-8969

DESIGNED BY:	VN
DRAWN BY:	VN, BLF
CHECKED BY:	MBH, CG
DRAWING NO.:	3589 BASIN MAP
SCALE:	AS NOTED

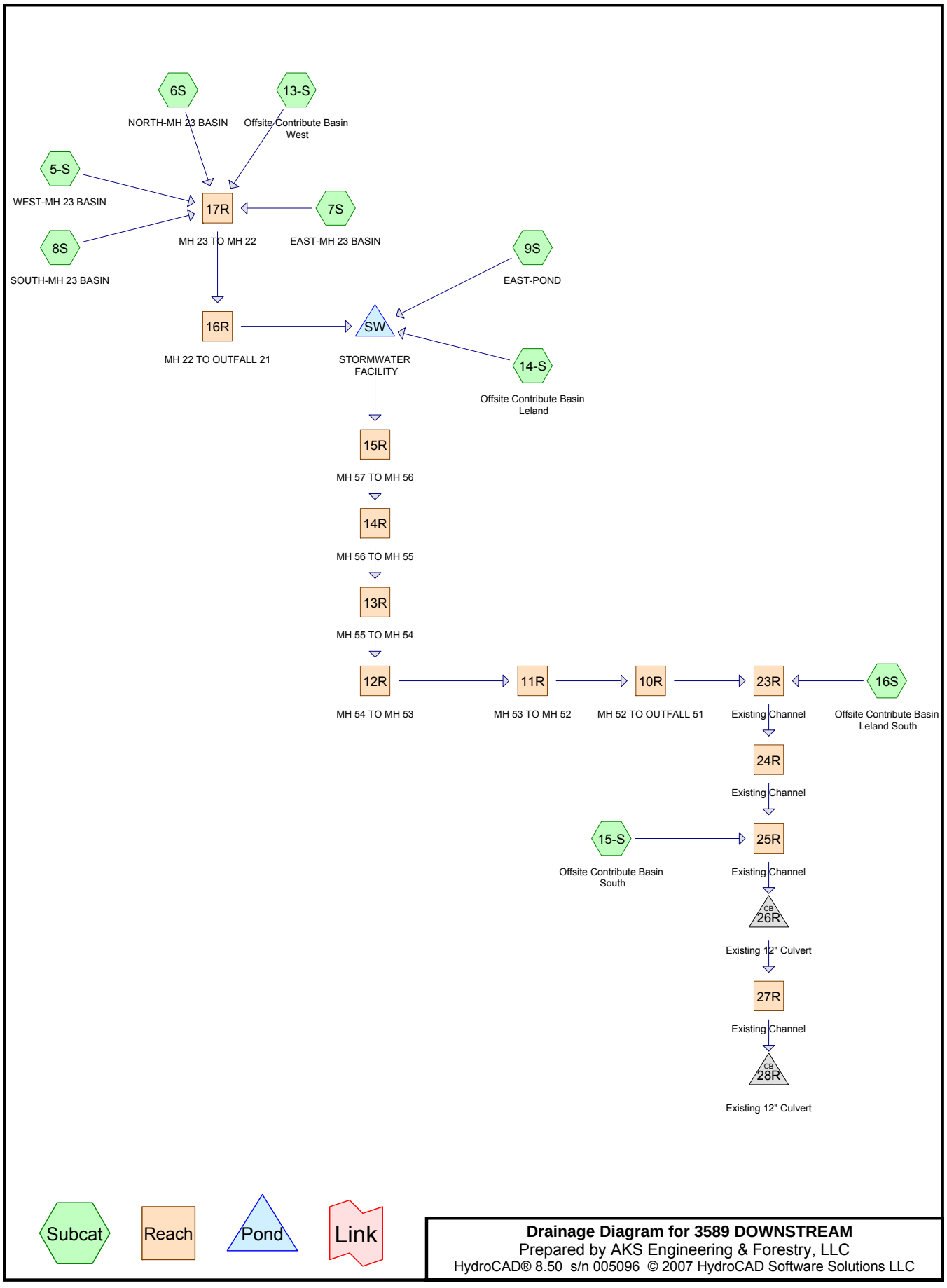
PREPARED FOR:
RIAN PARK DEVELOPMENT, INC.
15239 S LAKERIDGE WAY
OREGON CITY, OR 97045

DATE: 03/14/2014

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 8, 2003
MONTGOMERY B. HURLEY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWAL DATE: 6/30/15

JOB NUMBER
3589

SHEET
2



Drainage Diagram for 3589 DOWNSTREAM
Prepared by AKS Engineering & Forestry, LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
8.808	85	Meadow and Pasture (13-S,14-S,15-S)
2.883	86	Grass Cover >= 75% (5-S,6S,7S,8S,9S)
1.204	90	Grass Cover On 50%-75% of Area (16S)
0.057	98	1 lot x 2,500 s.f. (6S)
0.976	98	17 lot x 2,500 s.f. (5-S)
0.459	98	4 lot x 2,500 s.f. (8S,9S)
0.517	98	9 lot x 2,500 s.f. (7S)
1.700	98	Area Within ROW (5-S,6S,7S,8S)
1.224	98	Impervious Area (13-S,14-S,15-S,16S)
17.827		**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Goup	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
17.827	Other	5-S, 6S, 7S, 8S, 9S, 13-S, 14-S, 15-S, 16S
17.827		**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 5-S: WEST-MH 23 BASIN Runoff Area=142,726 sf 55.69% Impervious Runoff Depth>2.64"
Flow Length=105' Slope=0.0200 '/' Tc=11.3 min CN=86/98 Runoff=2.02 cfs 0.722 af

Subcatchment 6S: NORTH-MH 23 BASIN Runoff Area=12,007 sf 80.19% Impervious Runoff Depth>2.93"
Tc=5.0 min CN=86/98 Runoff=0.20 cfs 0.067 af

Subcatchment 7S: EAST-MH 23 BASIN Runoff Area=68,337 sf 61.34% Impervious Runoff Depth>2.70"
Flow Length=105' Slope=0.0100 '/' Tc=14.9 min CN=86/98 Runoff=0.95 cfs 0.354 af

Subcatchment 8S: SOUTH-MH 23 BASIN Runoff Area=35,974 sf 57.04% Impervious Runoff Depth>2.66"
Flow Length=100' Slope=0.0300 '/' Tc=9.2 min CN=86/98 Runoff=0.53 cfs 0.183 af

Subcatchment 9S: EAST-POND Runoff Area=28,100 sf 35.59% Impervious Runoff Depth>2.41"
Flow Length=150' Slope=0.0200 '/' Tc=15.0 min CN=86/98 Runoff=0.34 cfs 0.129 af

Subcatchment 13-S: Offsite Contribute Basin West Runoff Area=123,035 sf 2.03% Impervious Runoff Depth>1.90"
Flow Length=480' Slope=0.0100 '/' Tc=53.3 min CN=85/98 Runoff=0.73 cfs 0.448 af

Subcatchment 14-S: Offsite Contribute Basin Leland Runoff Area=105,140 sf 28.53% Impervious Runoff Depth>2.24"
Flow Length=300' Slope=0.0150 '/' Tc=42.8 min CN=85/98 Runoff=0.83 cfs 0.450 af

Subcatchment 15-S: Offsite Contribute Basin South Runoff Area=197,900 sf 5.00% Impervious Runoff Depth>1.96"
Flow Length=580' Tc=28.3 min CN=85/98 Runoff=1.58 cfs 0.744 af

Subcatchment 16S: Offsite Contribute Basin Leland South Runoff Area=63,329 sf 17.21% Impervious Runoff Depth>2.48"
Flow Length=200' Slope=0.0400 '/' Tc=14.3 min CN=90/98 Runoff=0.83 cfs 0.300 af

Reach 10R: MH 52 TO OUTFALL 51 Avg. Depth=0.92' Max Vel=2.95 fps Inflow=4.17 cfs 2.204 af
D=24.0" n=0.011 L=131.6' S=0.0013 '/' Capacity=9.61 cfs Outflow=4.16 cfs 2.202 af

Reach 11R: MH 53 TO MH 52 Avg. Depth=0.86' Max Vel=4.65 fps Inflow=4.17 cfs 2.205 af
D=15.0" n=0.011 L=124.3' S=0.0045 '/' Capacity=5.12 cfs Outflow=4.17 cfs 2.204 af

Reach 12R: MH 54 TO MH 53 Avg. Depth=0.86' Max Vel=4.61 fps Inflow=4.17 cfs 2.206 af
D=15.0" n=0.011 L=43.2' S=0.0044 '/' Capacity=5.06 cfs Outflow=4.17 cfs 2.205 af

Reach 13R: MH 55 TO MH 54 Avg. Depth=0.60' Max Vel=7.21 fps Inflow=4.17 cfs 2.206 af
D=15.0" n=0.011 L=137.9' S=0.0140 '/' Capacity=9.03 cfs Outflow=4.17 cfs 2.206 af

Reach 14R: MH 56 TO MH 55 Avg. Depth=0.50' Max Vel=9.07 fps Inflow=4.17 cfs 2.207 af
D=15.0" n=0.011 L=66.3' S=0.0261 '/' Capacity=12.33 cfs Outflow=4.17 cfs 2.206 af

Reach 15R: MH 57 TO MH 56 Avg. Depth=0.50' Max Vel=9.07 fps Inflow=4.17 cfs 2.207 af
D=15.0" n=0.011 L=89.7' S=0.0261 '/' Capacity=12.33 cfs Outflow=4.17 cfs 2.207 af

Reach 16R: MH 22 TO OUTFALL 21 Avg. Depth=0.89' Max Vel=4.69 fps Inflow=4.39 cfs 1.772 af
D=15.0" n=0.011 L=57.8' S=0.0045 '/' Capacity=5.12 cfs Outflow=4.39 cfs 1.772 af

Reach 17R: MH 23 TO MH 22 Avg. Depth=0.89' Max Vel=4.70 fps Inflow=4.40 cfs 1.773 af
D=15.0" n=0.011 L=148.5' S=0.0045 '/' Capacity=5.13 cfs Outflow=4.39 cfs 1.772 af

Reach 23R: Existing Channel Avg. Depth=0.44' Max Vel=2.80 fps Inflow=4.71 cfs 2.502 af
n=0.030 L=50.0' S=0.0190 '/' Capacity=40.06 cfs Outflow=4.71 cfs 2.502 af

Reach 24R: Existing Channel Avg. Depth=0.45' Max Vel=2.64 fps Inflow=4.71 cfs 2.502 af
n=0.030 L=50.0' S=0.0160 '/' Capacity=36.37 cfs Outflow=4.70 cfs 2.501 af

Reach 25R: Existing Channel Avg. Depth=0.56' Max Vel=3.24 fps Inflow=6.08 cfs 3.244 af
n=0.030 L=50.0' S=0.0200 '/' Capacity=26.01 cfs Outflow=6.08 cfs 3.243 af

Reach 27R: Existing Channel Avg. Depth=0.58' Max Vel=3.07 fps Inflow=6.08 cfs 3.243 af
n=0.030 L=30.0' S=0.0177 '/' Capacity=49.55 cfs Outflow=6.08 cfs 3.243 af

Pond 26R: Existing 12" Culvert Peak Elev=421.69' Inflow=6.08 cfs 3.243 af
12.0" x 21.5' Culvert Outflow=6.08 cfs 3.243 af

Pond 28R: Existing 12" Culvert Peak Elev=420.43' Inflow=6.08 cfs 3.243 af
12.0" x 21.6' Culvert Outflow=6.08 cfs 3.243 af

Pond SW: STORMWATERFACILITY Peak Elev=430.70' Storage=14,112 cf Inflow=5.56 cfs 2.352 af
Outflow=4.17 cfs 2.207 af

Total Runoff Area = 17.827 ac Runoff Volume = 3.397 af Average Runoff Depth = 2.29"
72.33% Pervious = 12.895 ac 27.67% Impervious = 4.932 ac

Summary for Subcatchment 5-S: WEST-MH 23 BASIN

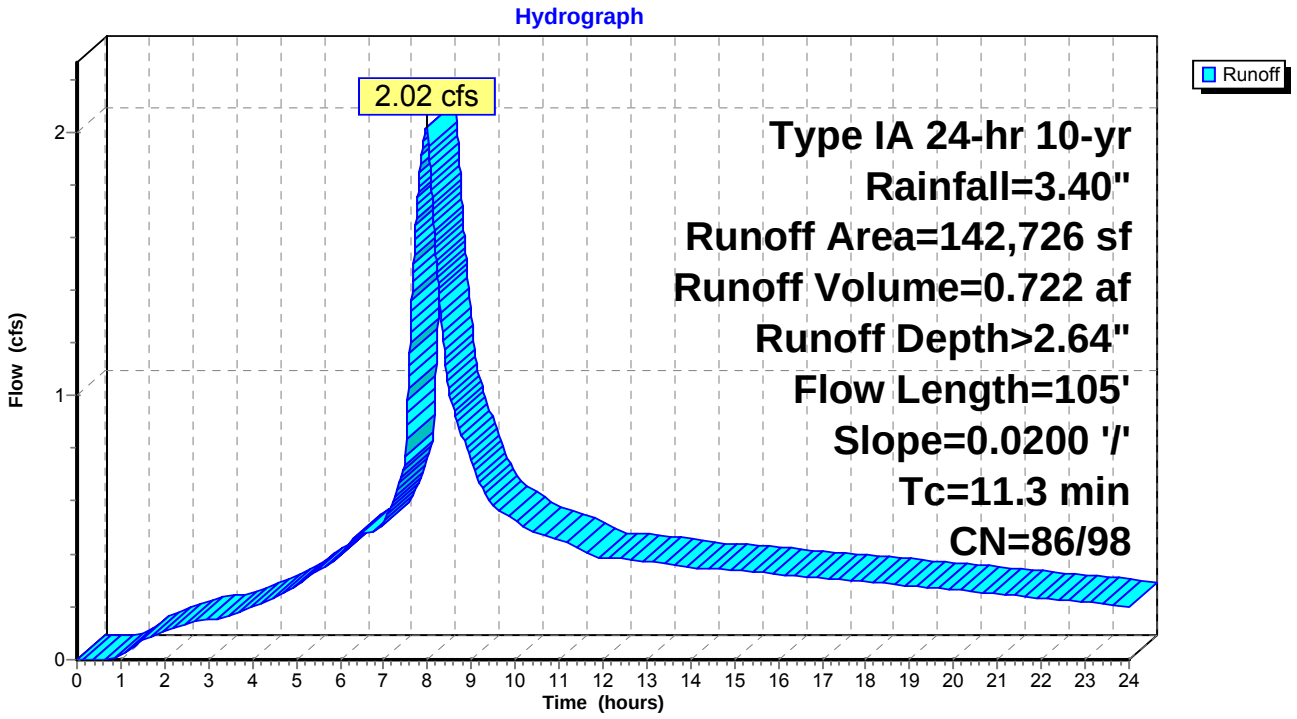
Runoff = 2.02 cfs @ 8.00 hrs, Volume= 0.722 af, Depth> 2.64"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	42,500	98	17 lot x 2,500 s.f.
*	36,978	98	Area Within ROW
*	63,248	86	Grass Cover >= 75%
	142,726	93	Weighted Average
	63,248	86	Pervious Area
	79,478	98	Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	105	0.0200	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.60"

Subcatchment 5-S: WEST-MH 23 BASIN



Summary for Subcatchment 6S: NORTH-MH 23 BASIN

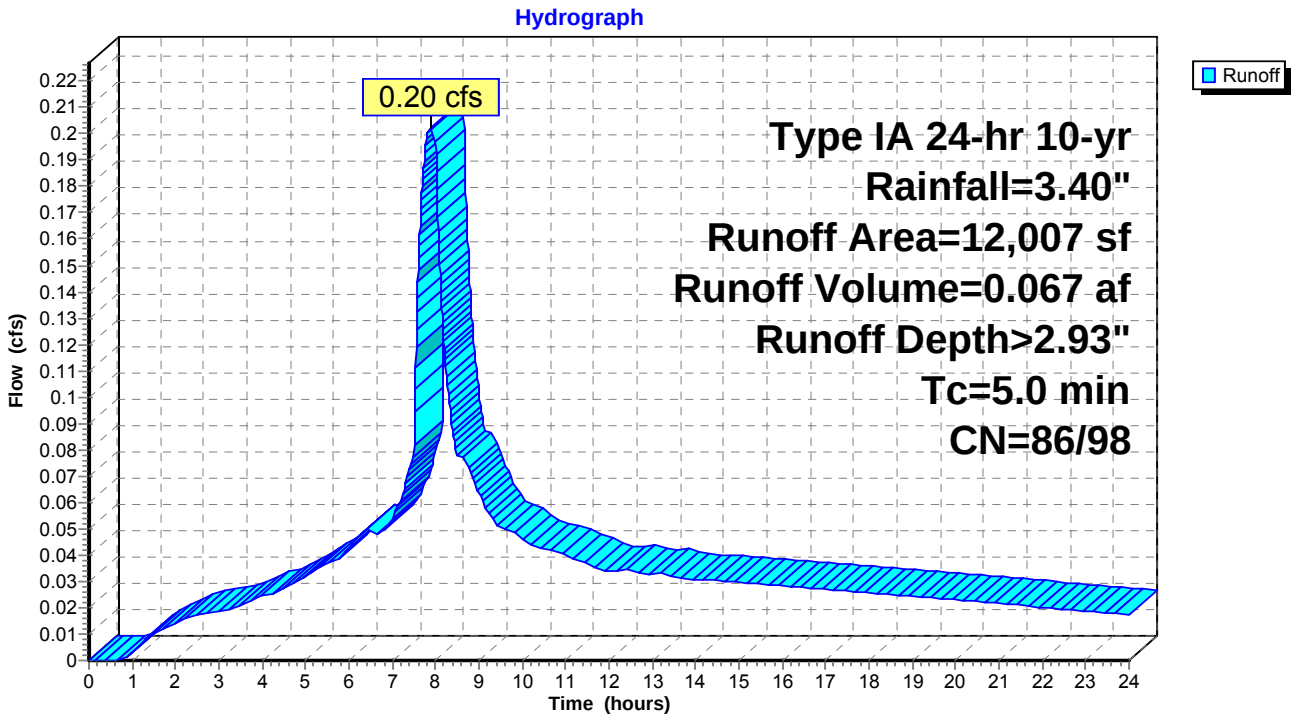
Runoff = 0.20 cfs @ 7.89 hrs, Volume= 0.067 af, Depth> 2.93"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	2,500	98	1 lot x 2,500 s.f.
*	7,128	98	Area Within ROW
*	2,379	86	Grass Cover >= 75%
	12,007	96	Weighted Average
	2,379	86	Pervious Area
	9,628	98	Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Min.**

Subcatchment 6S: NORTH-MH 23 BASIN



Summary for Subcatchment 7S: EAST-MH 23 BASIN

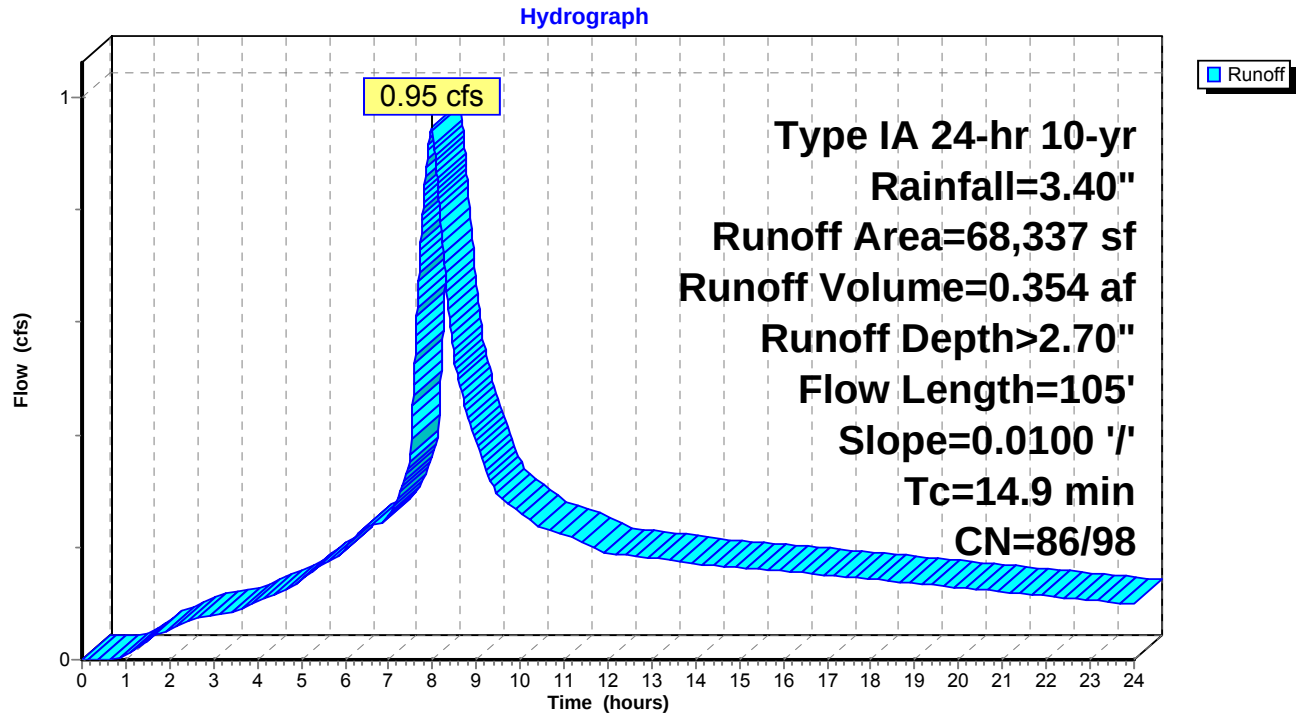
Runoff = 0.95 cfs @ 8.00 hrs, Volume= 0.354 af, Depth> 2.70"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	22,500	98	9 lot x 2,500 s.f.
*	19,420	98	Area Within ROW
*	26,417	86	Grass Cover >= 75%
	68,337	93	Weighted Average
	26,417	86	Pervious Area
	41,920	98	Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9	105	0.0100	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.60"

Subcatchment 7S: EAST-MH 23 BASIN



Summary for Subcatchment 8S: SOUTH-MH 23 BASIN

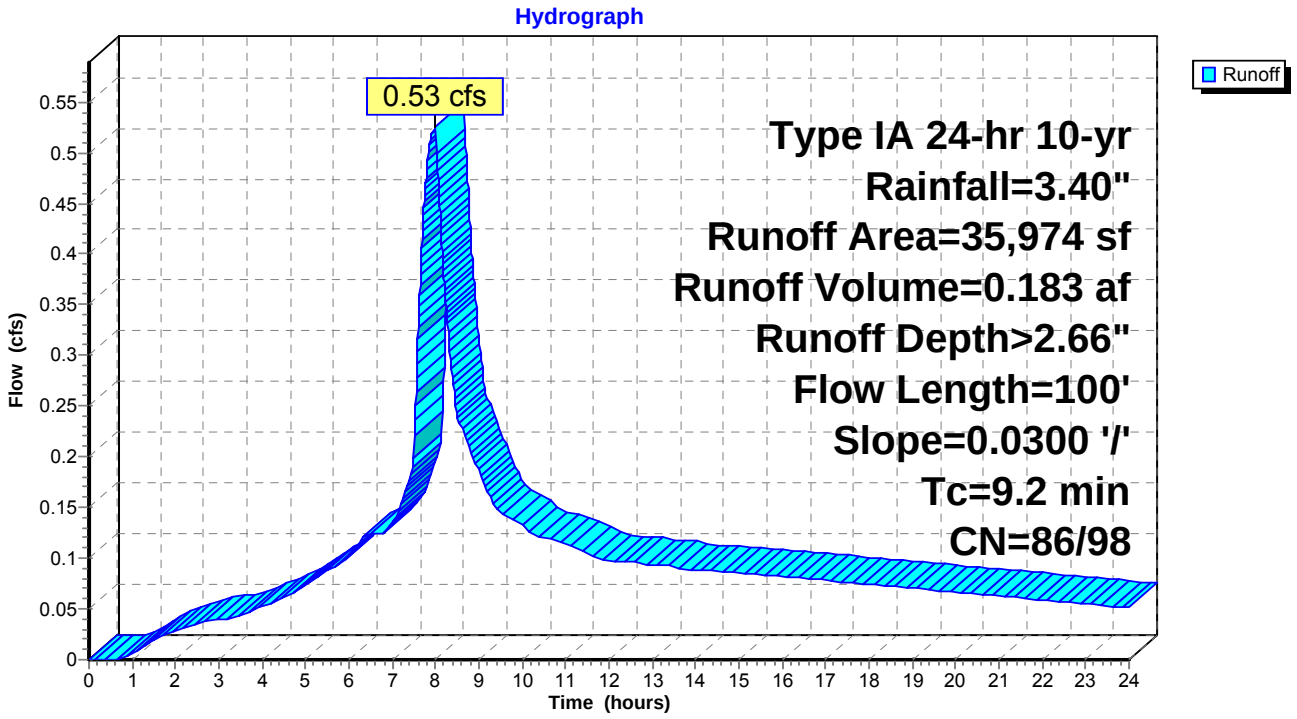
Runoff = 0.53 cfs @ 7.97 hrs, Volume= 0.183 af, Depth> 2.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	10,000	98	4 lot x 2,500 s.f.
*	10,520	98	Area Within ROW
*	15,454	86	Grass Cover >= 75%
	35,974	93	Weighted Average
	15,454	86	Pervious Area
	20,520	98	Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0300	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.60"

Subcatchment 8S: SOUTH-MH 23 BASIN



Summary for Subcatchment 9S: EAST-POND

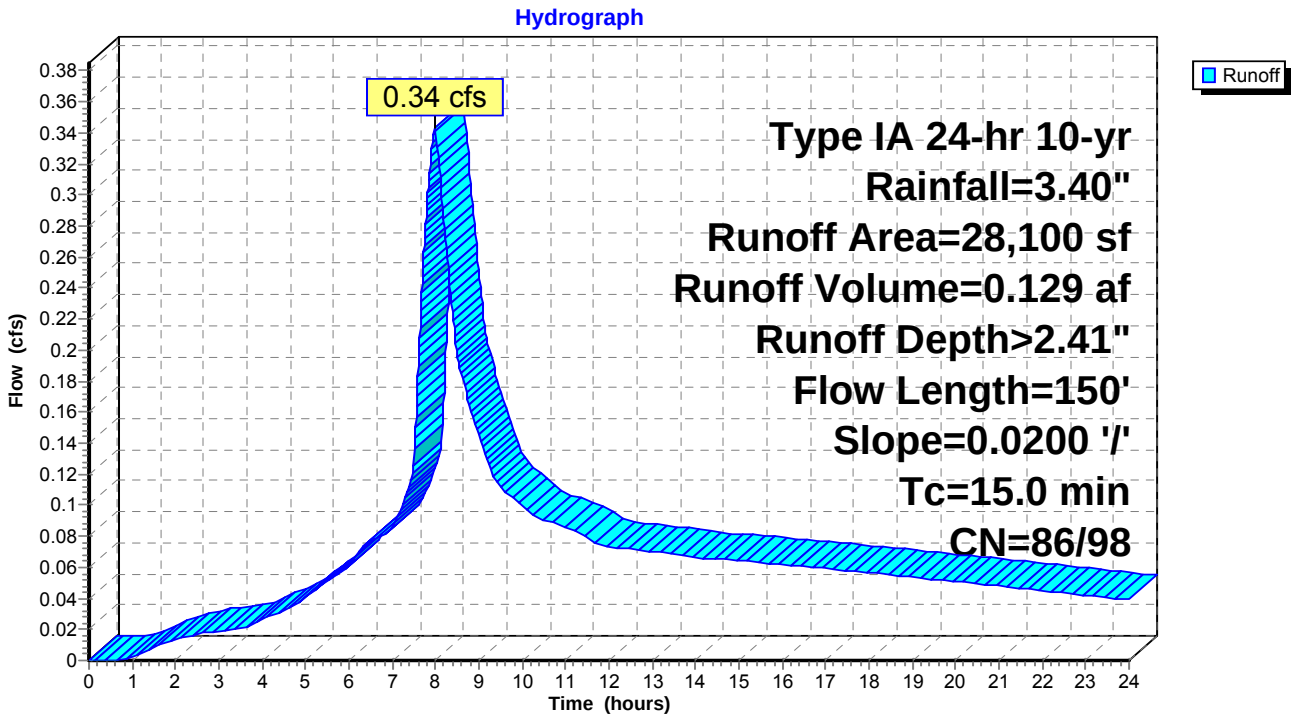
Runoff = 0.34 cfs @ 8.00 hrs, Volume= 0.129 af, Depth> 2.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	10,000	98	4 lot x 2,500 s.f.
*	18,100	86	Grass Cover >= 75%
	28,100	90	Weighted Average
	18,100	86	Pervious Area
	10,000	98	Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	150	0.0200	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.60"

Subcatchment 9S: EAST-POND



Summary for Subcatchment 13-S: Offsite Contribute Basin West

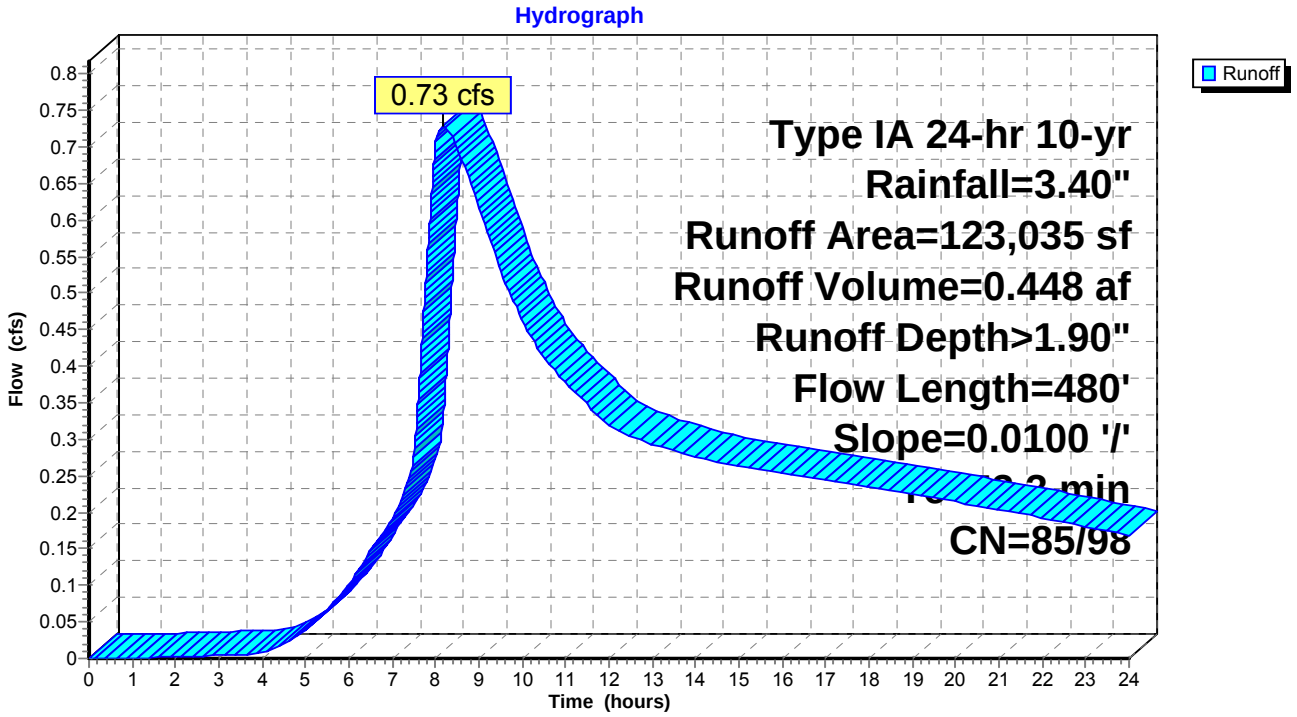
Runoff = 0.73 cfs @ 8.19 hrs, Volume= 0.448 af, Depth> 1.90"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	120,535	85	Meadow and Pasture
*	2,500	98	Impervious Area
	123,035	85	Weighted Average
	120,535	85	Pervious Area
	2,500	98	Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
50.3	300	0.0100	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.60"
3.0	180	0.0100	1.00		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
53.3	480	Total			

Subcatchment 13-S: Offsite Contribute Basin West



Summary for Subcatchment 14-S: Offsite Contribute Basin Leland

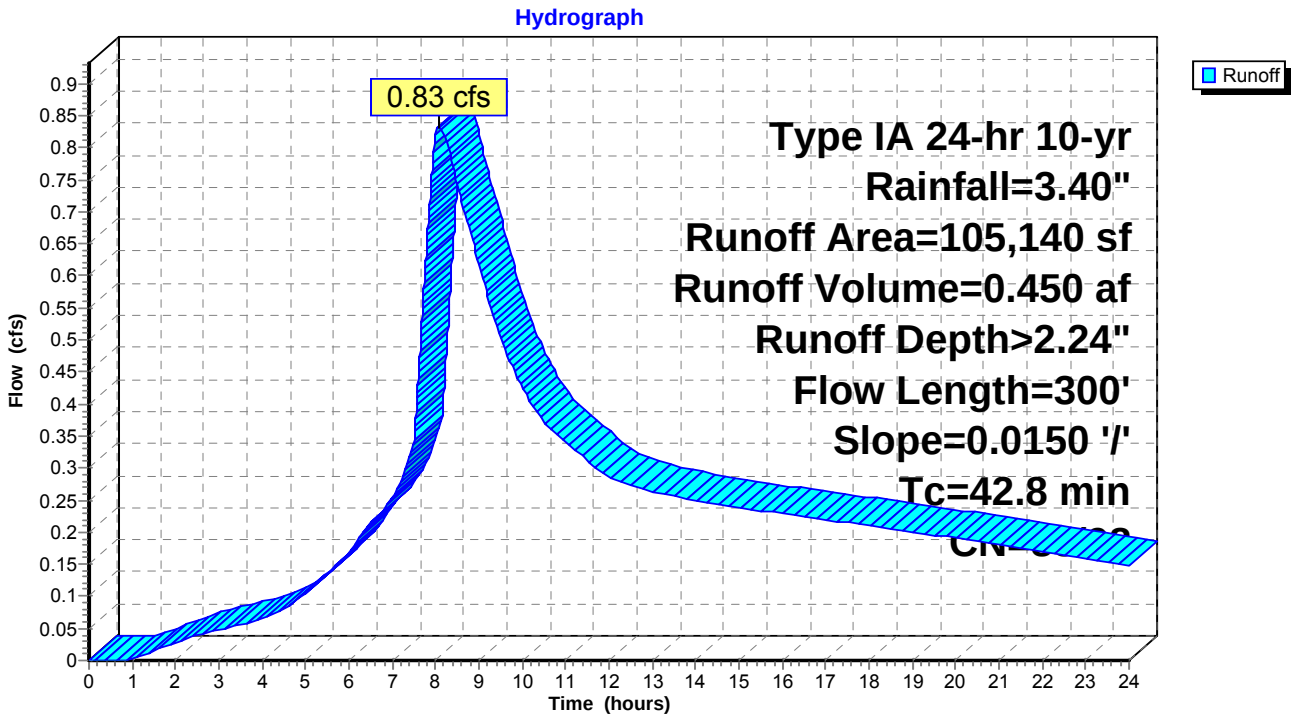
Runoff = 0.83 cfs @ 8.08 hrs, Volume= 0.450 af, Depth> 2.24"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	75,140	85	Meadow and Pasture
*	30,000	98	Impervious Area
	105,140	89	Weighted Average
	75,140	85	Pervious Area
	30,000	98	Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
42.8	300	0.0150	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.60"

Subcatchment 14-S: Offsite Contribute Basin Leland



Summary for Subcatchment 15-S: Offsite Contribute Basin South

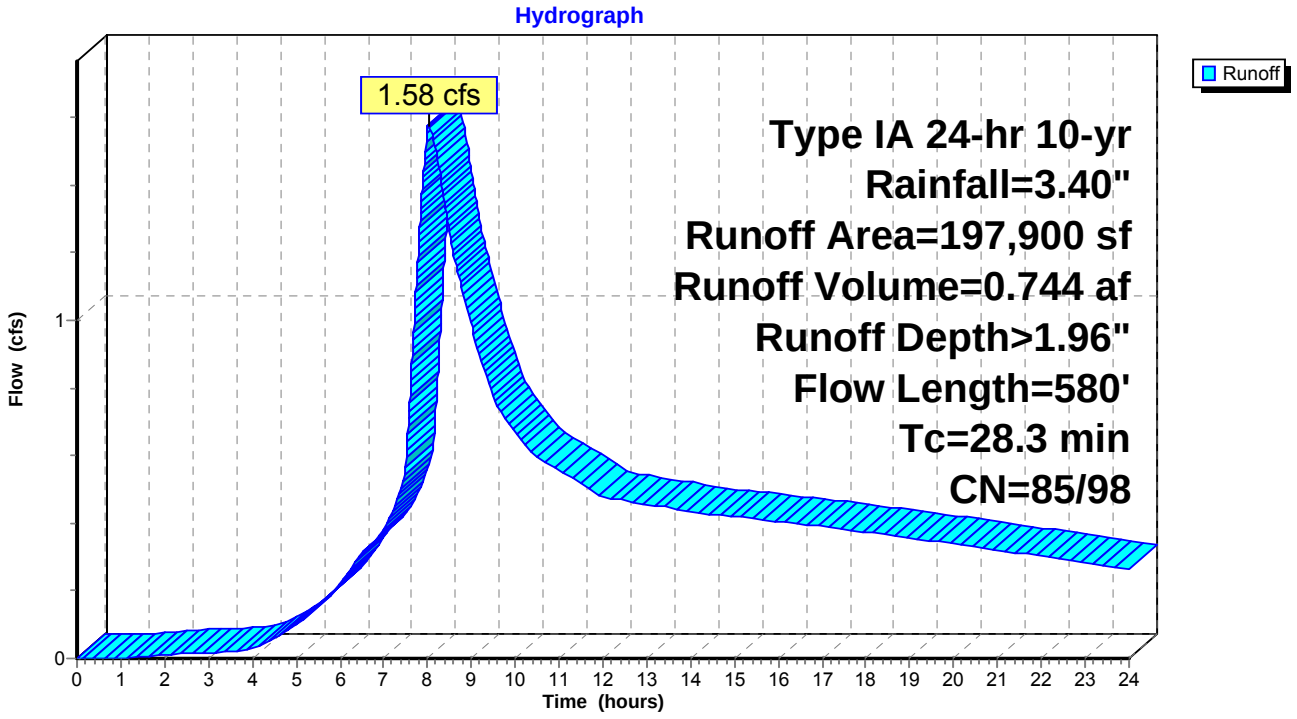
Runoff = 1.58 cfs @ 8.01 hrs, Volume= 0.744 af, Depth> 1.96"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	188,000	85	Meadow and Pasture
*	9,900	98	Impervious Area
	197,900	86	Weighted Average
	188,000	85	Pervious Area
	9,900	98	Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.1	300	0.0167	0.20		**Sheet Flow,** Range n= 0.130 P2= 2.60"
3.2	280	0.0214	1.46		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
28.3	580	Total			

Subcatchment 15-S: Offsite Contribute Basin South



Summary for Subcatchment 16S: Offsite Contribute Basin Leland South

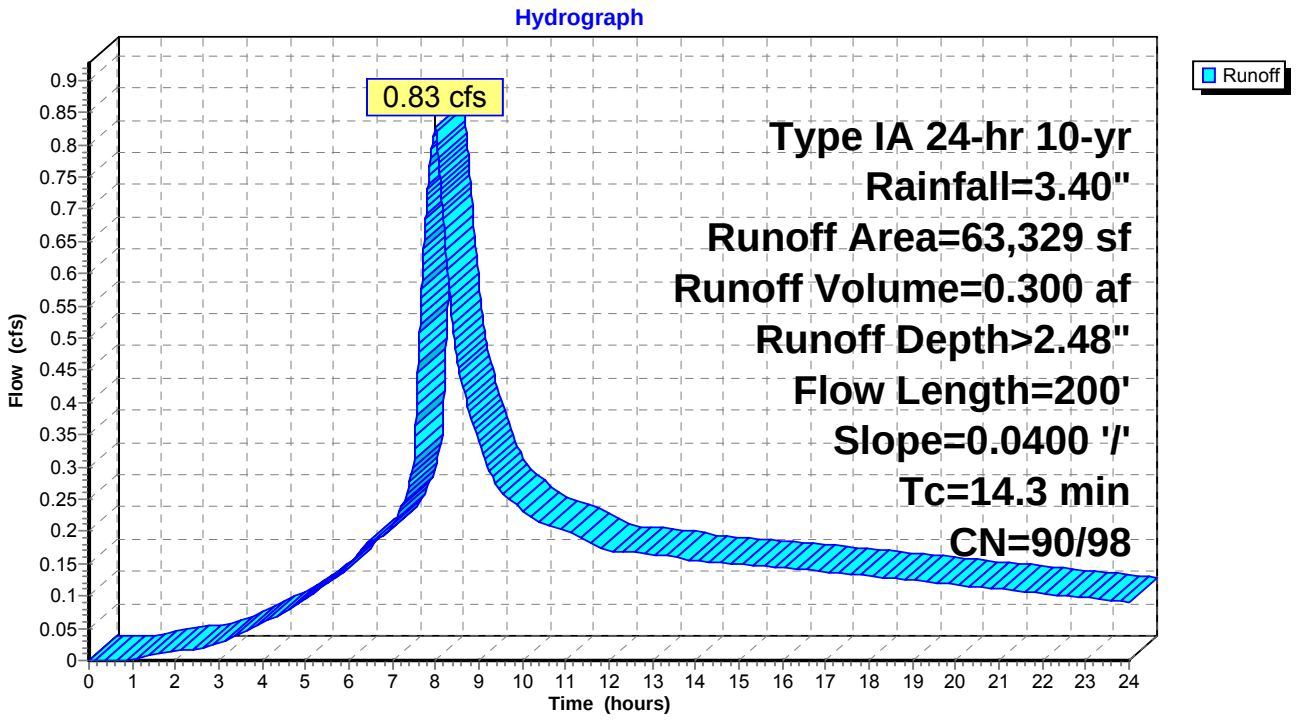
Runoff = 0.83 cfs @ 8.00 hrs, Volume= 0.300 af, Depth> 2.48"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	52,429	90	Grass Cover On 50%-75% of Area
*	10,900	98	Impervious Area
	63,329	91	Weighted Average
	52,429	90	Pervious Area
	10,900	98	Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	200	0.0400	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.60"

Subcatchment 16S: Offsite Contribute Basin Leland South



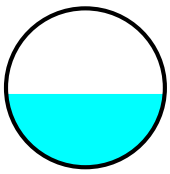
Summary for Reach 10R: MH 52 TO OUTFALL 51

Inflow Area = 11.830 ac, 37.66% Impervious, Inflow Depth > 2.24" for 10-yr event
Inflow = 4.17 cfs @ 8.36 hrs, Volume= 2.204 af
Outflow = 4.16 cfs @ 8.38 hrs, Volume= 2.202 af, Atten= 0%, Lag= 1.3 min

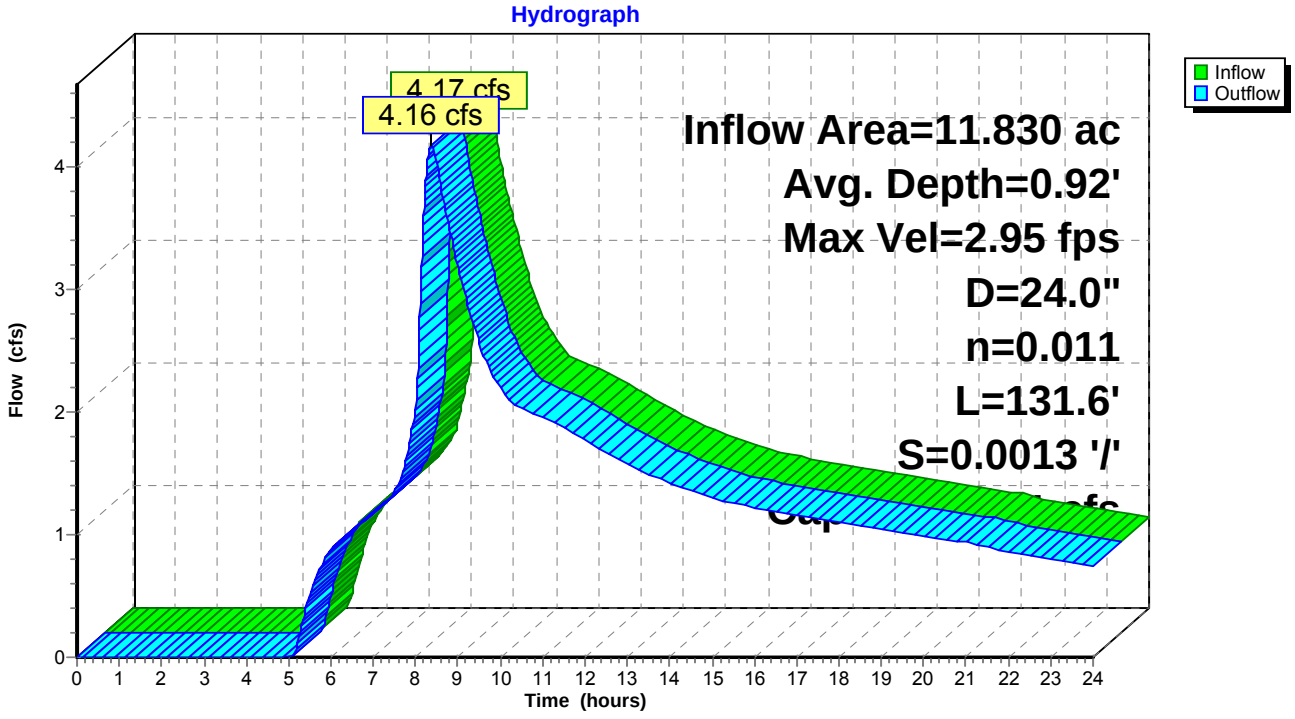
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.95 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 2.13 fps, Avg. Travel Time= 1.0 min

Peak Storage= 186 cf @ 8.37 hrs, Average Depth at Peak Storage= 0.92'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 9.61 cfs

24.0" Diameter Pipe, n= 0.011
Length= 131.6' Slope= 0.0013 '/'
Inlet Invert= 421.85', Outlet Invert= 421.68'



Reach 10R: MH 52 TO OUTFALL 51



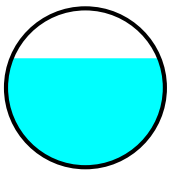
Summary for Reach 11R: MH 53 TO MH 52

Inflow Area = 11.830 ac, 37.66% Impervious, Inflow Depth > 2.24" for 10-yr event
Inflow = 4.17 cfs @ 8.34 hrs, Volume= 2.205 af
Outflow = 4.17 cfs @ 8.36 hrs, Volume= 2.204 af, Atten= 0%, Lag= 0.8 min

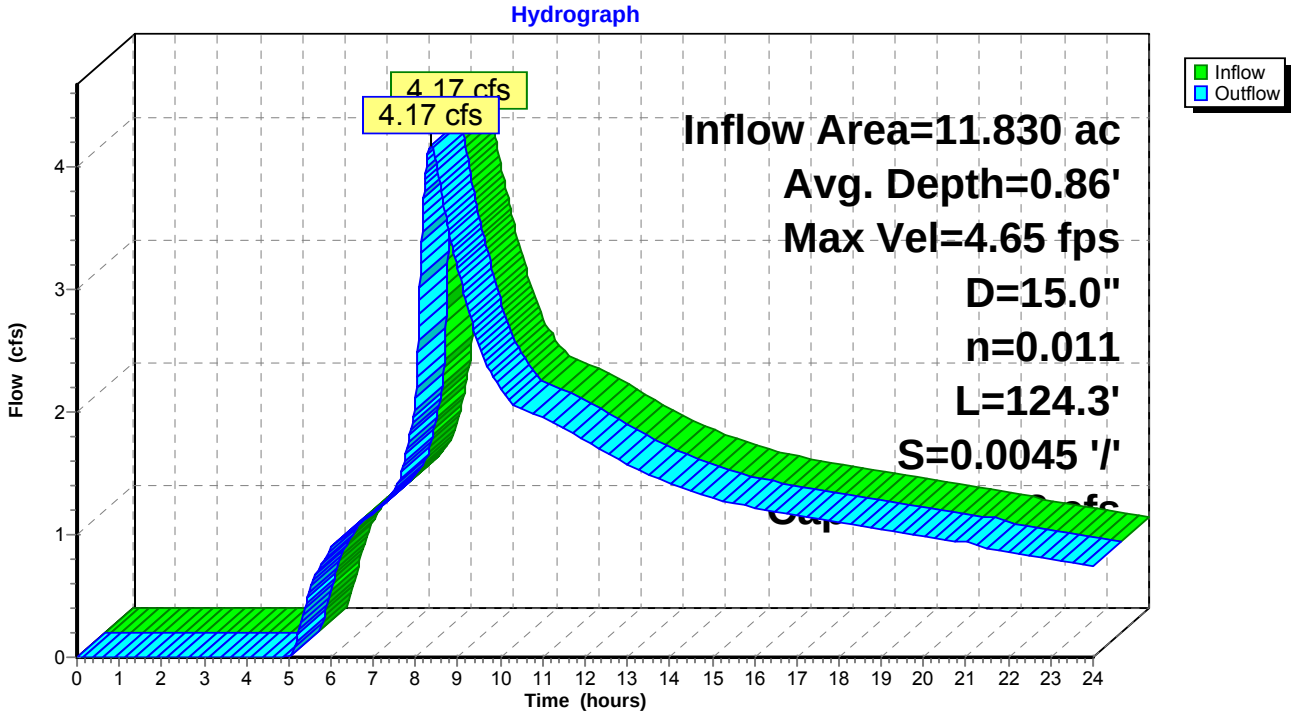
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.65 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 3.47 fps, Avg. Travel Time= 0.6 min

Peak Storage= 111 cf @ 8.35 hrs, Average Depth at Peak Storage= 0.86'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 5.12 cfs

15.0" Diameter Pipe, n= 0.011
Length= 124.3' Slope= 0.0045 '/'
Inlet Invert= 422.61', Outlet Invert= 422.05'



Reach 11R: MH 53 TO MH 52



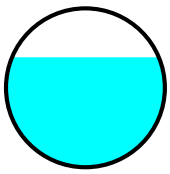
Summary for Reach 12R: MH 54 TO MH 53

Inflow Area = 11.830 ac, 37.66% Impervious, Inflow Depth > 2.24" for 10-yr event
Inflow = 4.17 cfs @ 8.34 hrs, Volume= 2.206 af
Outflow = 4.17 cfs @ 8.34 hrs, Volume= 2.205 af, Atten= 0%, Lag= 0.3 min

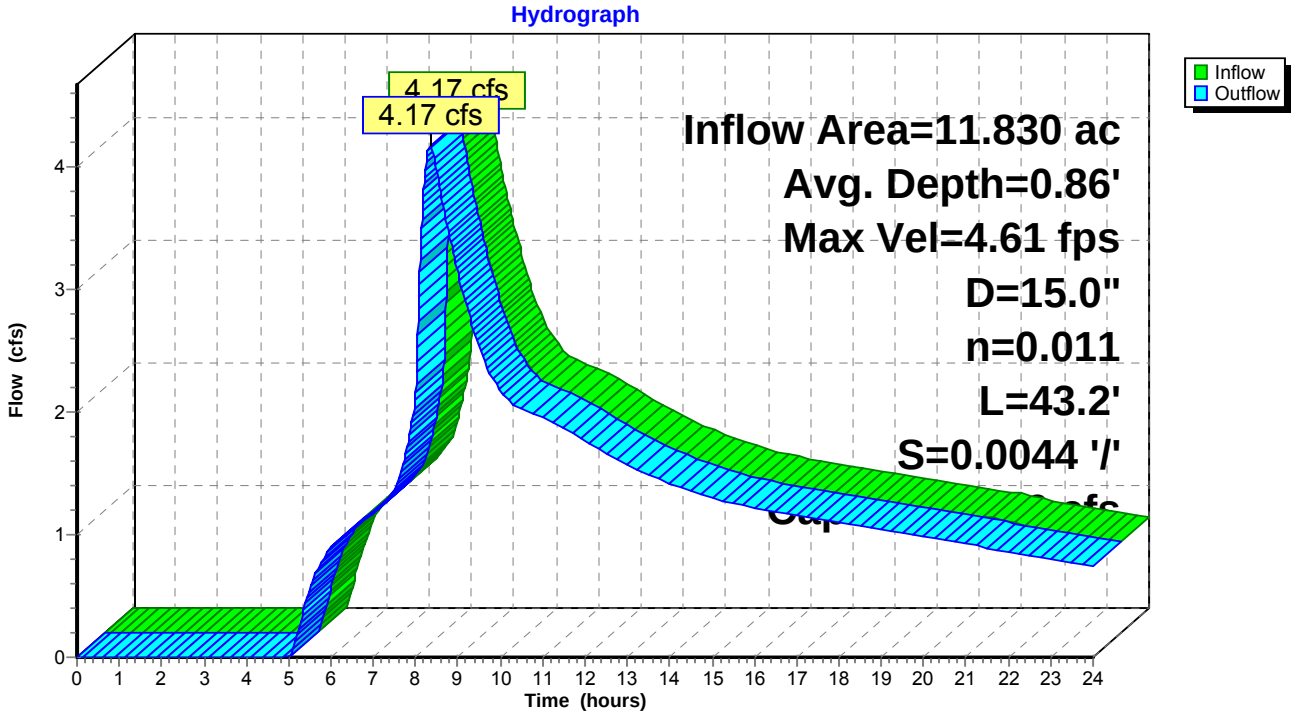
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.61 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.43 fps, Avg. Travel Time= 0.2 min

Peak Storage= 39 cf @ 8.34 hrs, Average Depth at Peak Storage= 0.86'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 5.06 cfs

15.0" Diameter Pipe, n= 0.011
Length= 43.2' Slope= 0.0044 '/'
Inlet Invert= 423.00', Outlet Invert= 422.81'



Reach 12R: MH 54 TO MH 53



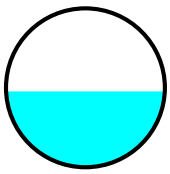
Summary for Reach 13R: MH 55 TO MH 54

Inflow Area = 11.830 ac, 37.66% Impervious, Inflow Depth > 2.24" for 10-yr event
Inflow = 4.17 cfs @ 8.33 hrs, Volume= 2.206 af
Outflow = 4.17 cfs @ 8.34 hrs, Volume= 2.206 af, Atten= 0%, Lag= 0.6 min

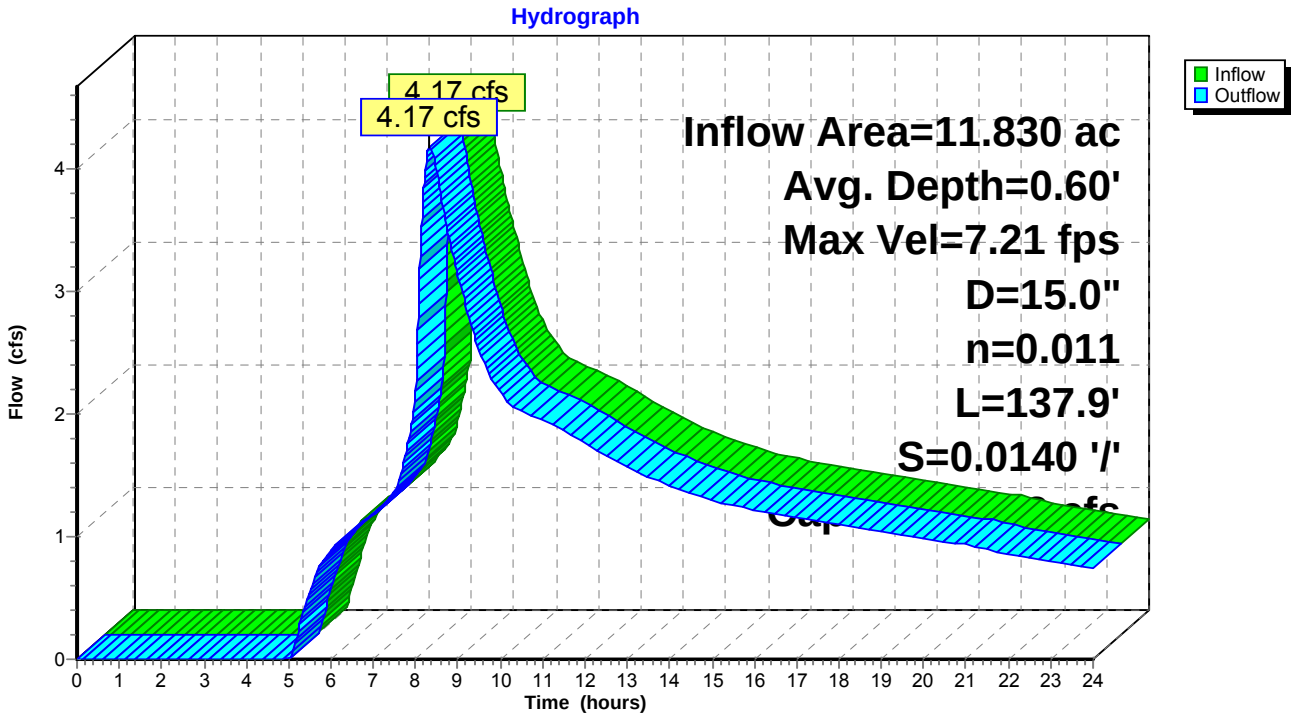
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.21 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 5.21 fps, Avg. Travel Time= 0.4 min

Peak Storage= 80 cf @ 8.33 hrs, Average Depth at Peak Storage= 0.60'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 9.03 cfs

15.0" Diameter Pipe, n= 0.011
Length= 137.9' Slope= 0.0140 '/'
Inlet Invert= 424.63', Outlet Invert= 422.70'



Reach 13R: MH 55 TO MH 54



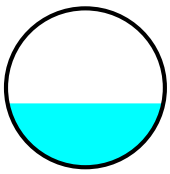
Summary for Reach 14R: MH 56 TO MH 55

Inflow Area = 11.830 ac, 37.66% Impervious, Inflow Depth > 2.24" for 10-yr event
Inflow = 4.17 cfs @ 8.33 hrs, Volume= 2.207 af
Outflow = 4.17 cfs @ 8.33 hrs, Volume= 2.206 af, Atten= 0%, Lag= 0.2 min

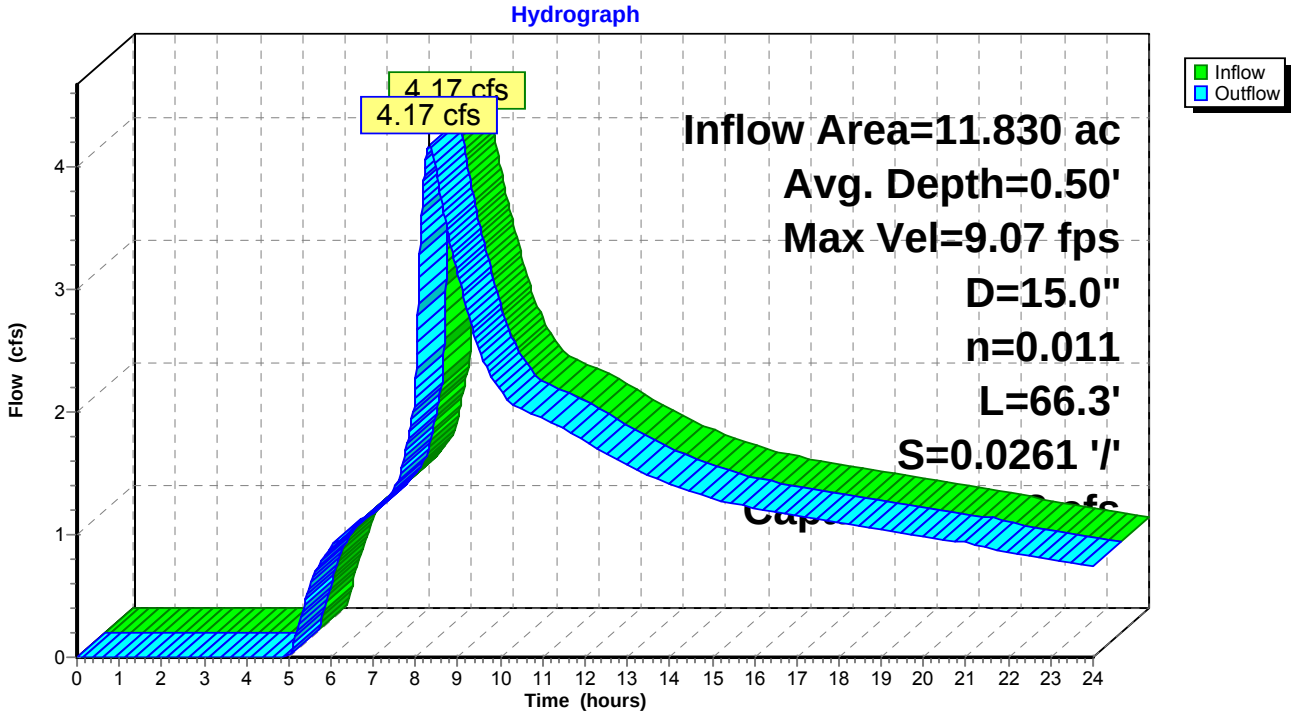
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.07 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.50 fps, Avg. Travel Time= 0.2 min

Peak Storage= 30 cf @ 8.33 hrs, Average Depth at Peak Storage= 0.50'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 12.33 cfs

15.0" Diameter Pipe, n= 0.011
Length= 66.3' Slope= 0.0261 '/'
Inlet Invert= 426.56', Outlet Invert= 424.83'



Reach 14R: MH 56 TO MH 55



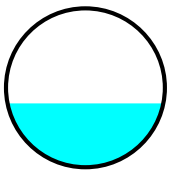
Summary for Reach 15R: MH 57 TO MH 56

Inflow Area = 11.830 ac, 37.66% Impervious, Inflow Depth > 2.24" for 10-yr event
Inflow = 4.17 cfs @ 8.32 hrs, Volume= 2.207 af
Outflow = 4.17 cfs @ 8.33 hrs, Volume= 2.207 af, Atten= 0%, Lag= 0.3 min

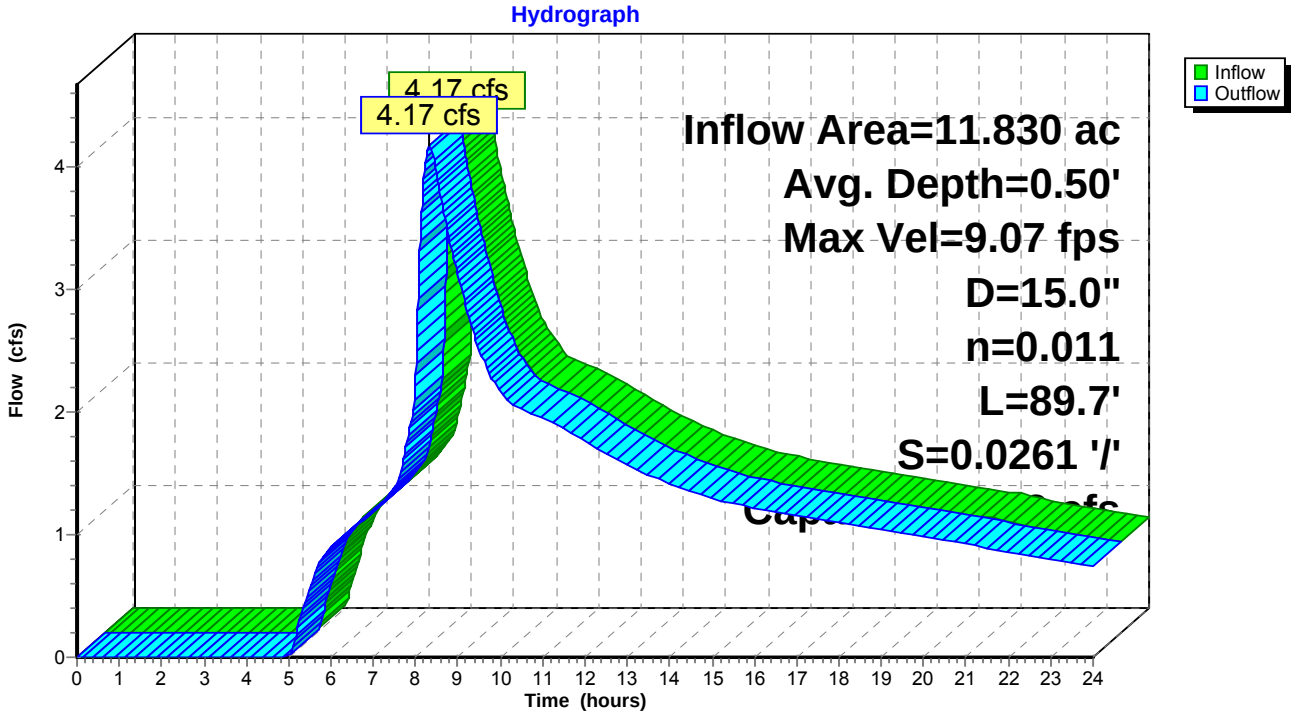
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.07 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 6.50 fps, Avg. Travel Time= 0.2 min

Peak Storage= 41 cf @ 8.32 hrs, Average Depth at Peak Storage= 0.50'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 12.33 cfs

15.0" Diameter Pipe, n= 0.011
Length= 89.7' Slope= 0.0261 '/'
Inlet Invert= 429.10', Outlet Invert= 426.76'



Reach 15R: MH 57 TO MH 56



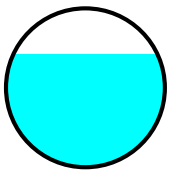
Summary for Reach 16R: MH 22 TO OUTFALL 21

Inflow Area = 8.771 ac, 40.32% Impervious, Inflow Depth > 2.42" for 10-yr event
Inflow = 4.39 cfs @ 8.01 hrs, Volume= 1.772 af
Outflow = 4.39 cfs @ 8.02 hrs, Volume= 1.772 af, Atten= 0%, Lag= 0.3 min

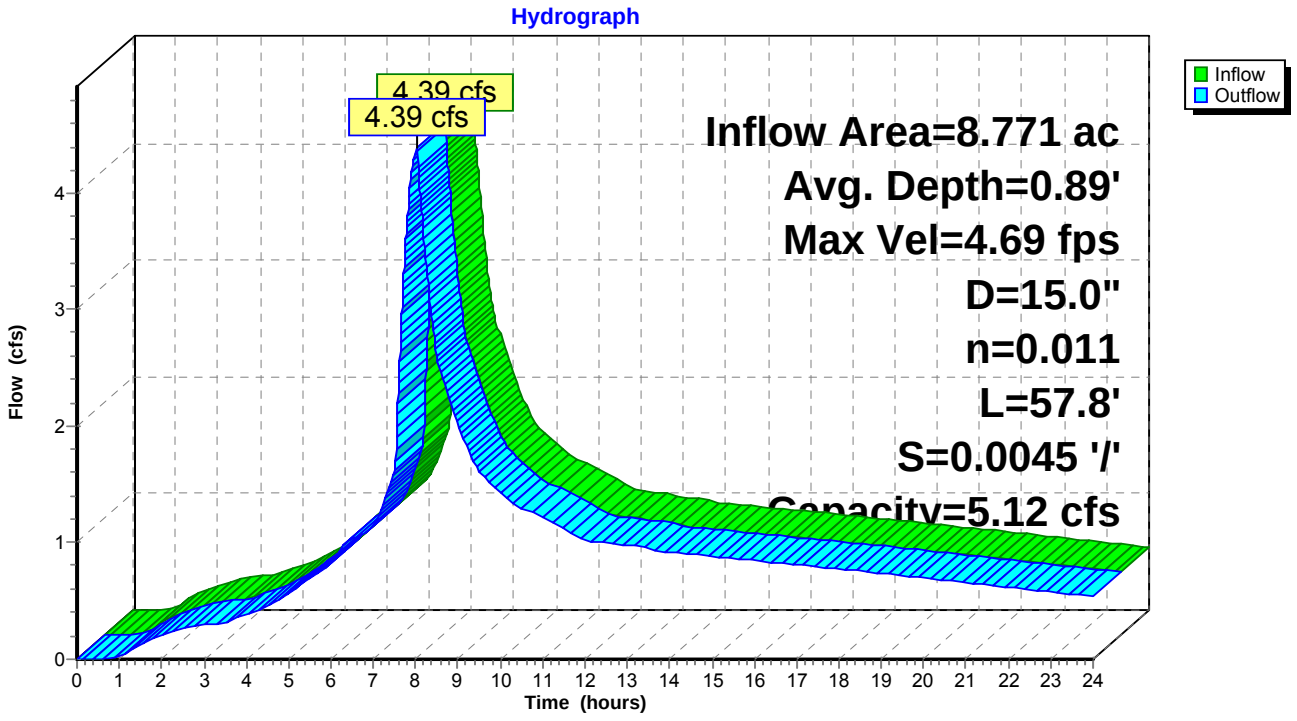
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.69 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.00 fps, Avg. Travel Time= 0.3 min

Peak Storage= 54 cf @ 8.01 hrs, Average Depth at Peak Storage= 0.89'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 5.12 cfs

15.0" Diameter Pipe, n= 0.011
Length= 57.8' Slope= 0.0045 '/'
Inlet Invert= 429.36', Outlet Invert= 429.10'



Reach 16R: MH 22 TO OUTFALL 21



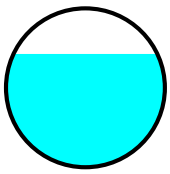
Summary for Reach 17R: MH 23 TO MH 22

Inflow Area = 8.771 ac, 40.32% Impervious, Inflow Depth > 2.43" for 10-yr event
Inflow = 4.40 cfs @ 8.00 hrs, Volume= 1.773 af
Outflow = 4.39 cfs @ 8.01 hrs, Volume= 1.772 af, Atten= 0%, Lag= 0.7 min

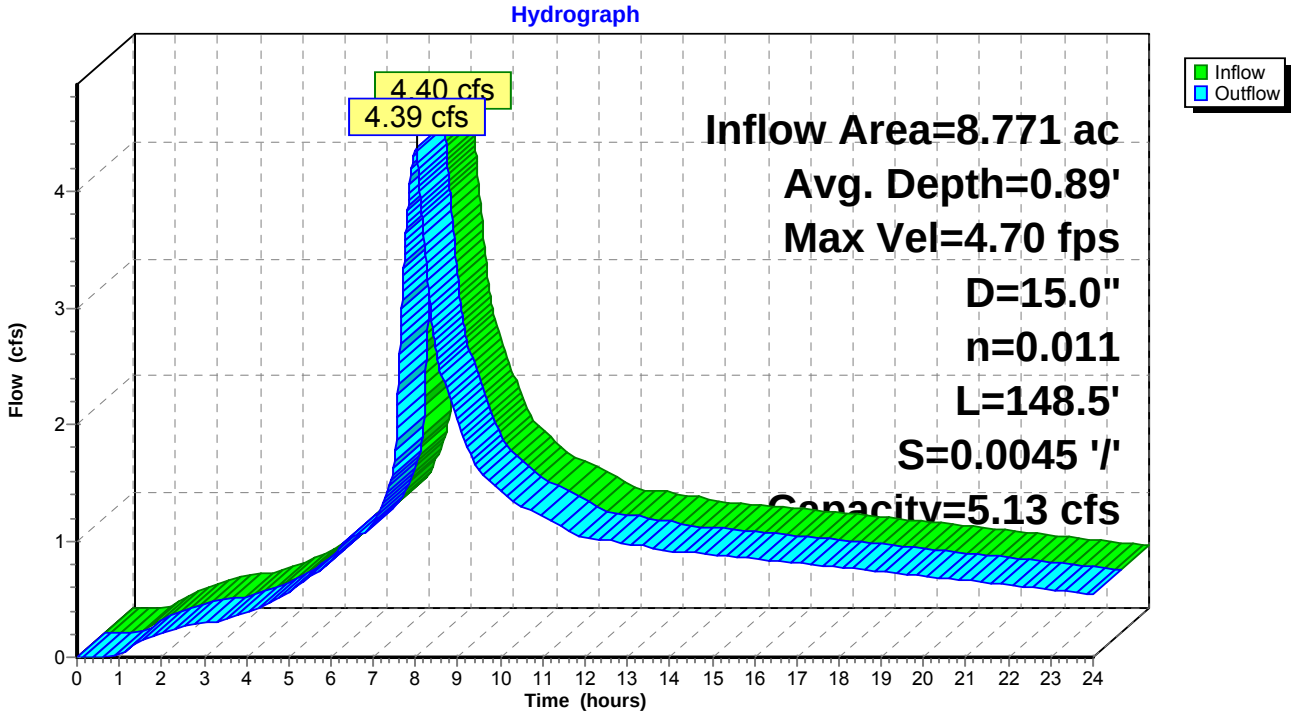
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.70 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 3.00 fps, Avg. Travel Time= 0.8 min

Peak Storage= 139 cf @ 8.00 hrs, Average Depth at Peak Storage= 0.89'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 5.13 cfs

15.0" Diameter Pipe, n= 0.011
Length= 148.5' Slope= 0.0045 '/'
Inlet Invert= 430.25', Outlet Invert= 429.58'



Reach 17R: MH 23 TO MH 22



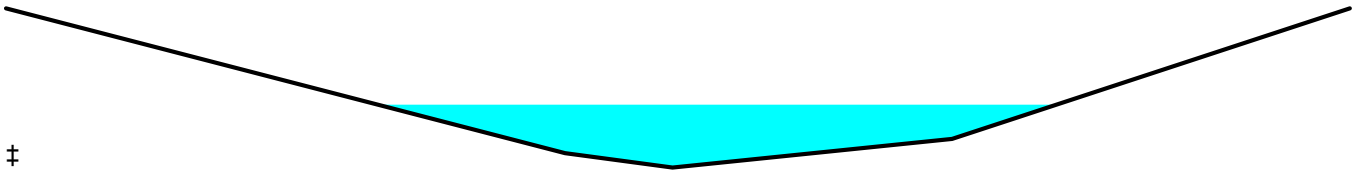
Summary for Reach 23R: Existing Channel

Inflow Area = 13.284 ac, 35.42% Impervious, Inflow Depth > 2.26" for 10-yr event
Inflow = 4.71 cfs @ 8.35 hrs, Volume= 2.502 af
Outflow = 4.71 cfs @ 8.36 hrs, Volume= 2.502 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.80 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.72 fps, Avg. Travel Time= 0.5 min

Peak Storage= 84 cf @ 8.35 hrs, Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 1.11', Capacity at Bank-Full= 40.06 cfs

Custom cross-section, Length= 50.0' Slope= 0.0190 '/'
Constant n= 0.030 Earth, grassed & winding
Inlet Invert= 0.00', Outlet Invert= -0.95'

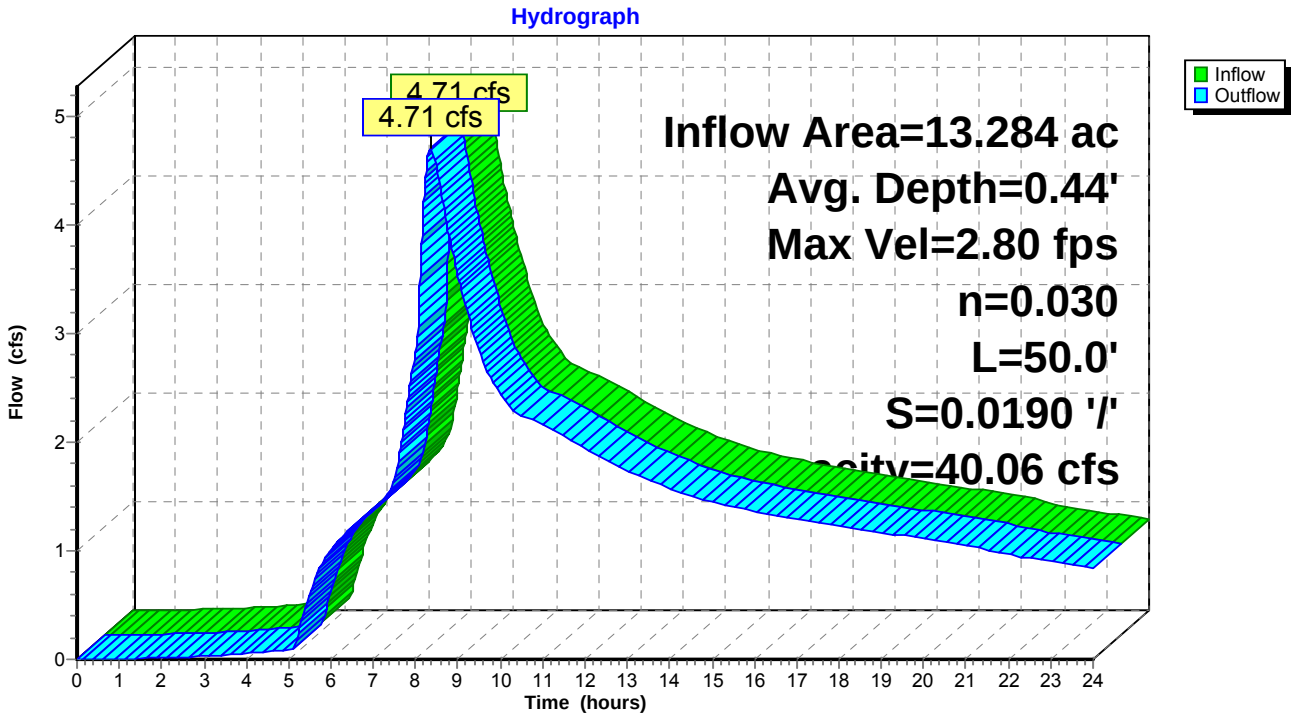


‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	423.26	0.00
5.20	422.25	1.01
6.20	422.15	1.11
8.80	422.35	0.91
12.50	423.26	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0	0.00
0.10	0.1	2.3	6	0.11
0.20	0.4	4.1	22	0.66
1.11	8.0	12.7	400	40.06

Reach 23R: Existing Channel



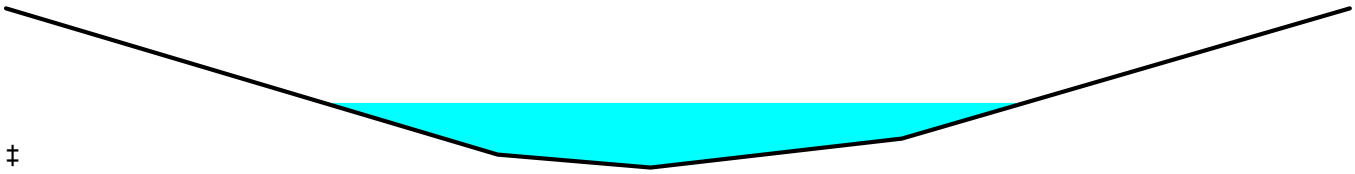
Summary for Reach 24R: Existing Channel

Inflow Area = 13.284 ac, 35.42% Impervious, Inflow Depth > 2.26" for 10-yr event
Inflow = 4.71 cfs @ 8.36 hrs, Volume= 2.502 af
Outflow = 4.70 cfs @ 8.37 hrs, Volume= 2.501 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.64 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.62 fps, Avg. Travel Time= 0.5 min

Peak Storage= 89 cf @ 8.36 hrs, Average Depth at Peak Storage= 0.45'
Bank-Full Depth= 1.10', Capacity at Bank-Full= 36.37 cfs

Custom cross-section, Length= 50.0' Slope= 0.0160 '/'
Constant n= 0.030 Earth, grassed & winding
Inlet Invert= 0.00', Outlet Invert= -0.80'

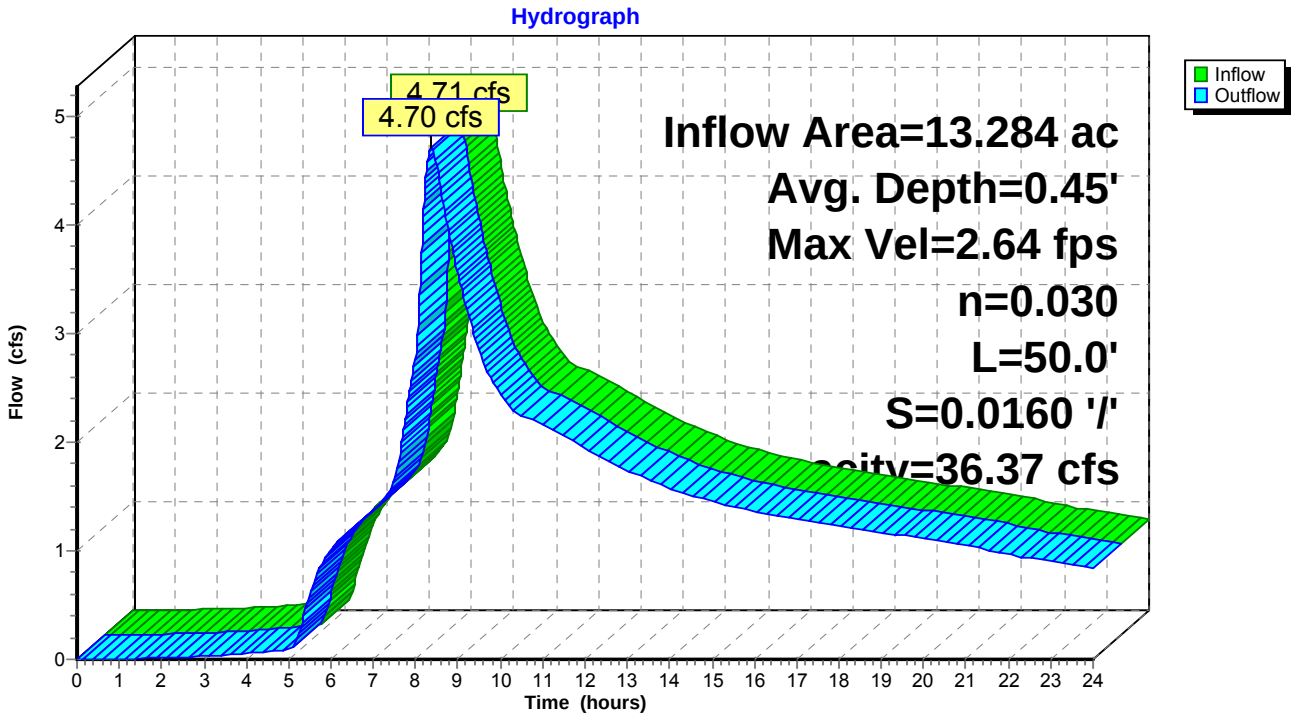


‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	422.80	0.00
4.50	421.79	1.01
5.90	421.70	1.10
8.20	421.90	0.90
12.30	422.80	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0	0.00
0.09	0.1	2.4	5	0.09
0.20	0.5	4.2	24	0.69
1.10	7.9	12.5	395	36.37

Reach 24R: Existing Channel



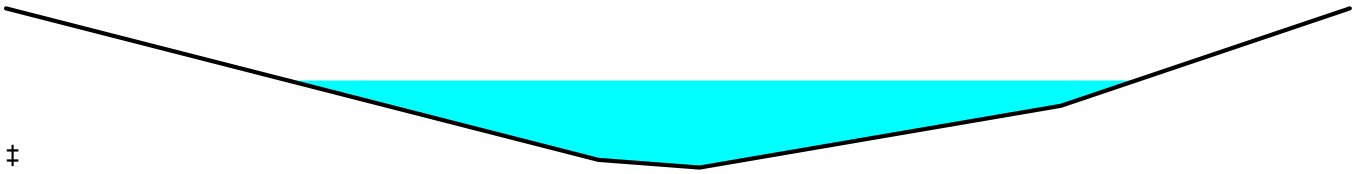
Summary for Reach 25R: Existing Channel

Inflow Area = 17.827 ac, 27.67% Impervious, Inflow Depth > 2.18" for 10-yr event
Inflow = 6.08 cfs @ 8.34 hrs, Volume= 3.244 af
Outflow = 6.08 cfs @ 8.34 hrs, Volume= 3.243 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.24 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.05 fps, Avg. Travel Time= 0.4 min

Peak Storage= 94 cf @ 8.34 hrs, Average Depth at Peak Storage= 0.56'
Bank-Full Depth= 1.03', Capacity at Bank-Full= 26.01 cfs

Custom cross-section, Length= 50.0' Slope= 0.0200 '/'
Constant n= 0.030 Earth, grassed & winding
Inlet Invert= 0.00', Outlet Invert= -1.00'

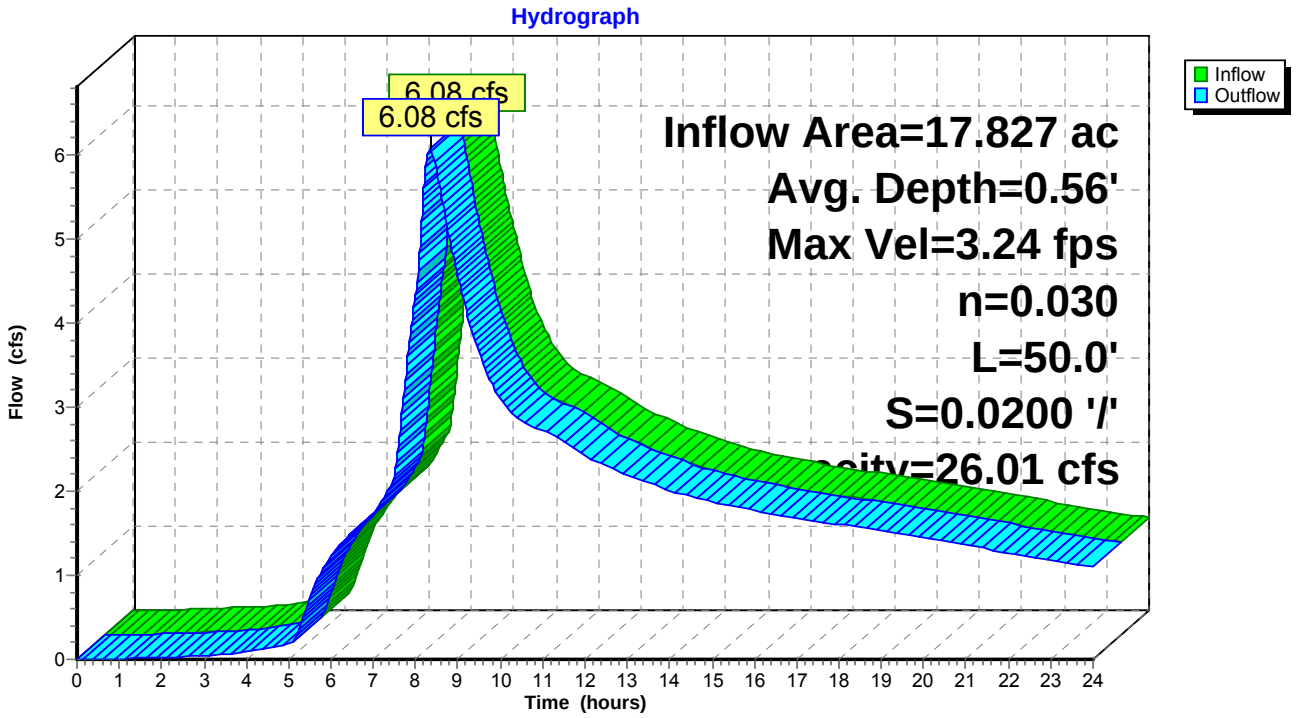


‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	420.86	0.00
4.10	419.88	0.98
4.80	419.83	1.03
7.30	420.23	0.63
9.30	420.86	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0	0.00
0.05	0.0	1.0	1	0.02
0.40	1.0	4.7	51	2.56
1.03	5.4	9.5	271	26.01

Reach 25R: Existing Channel



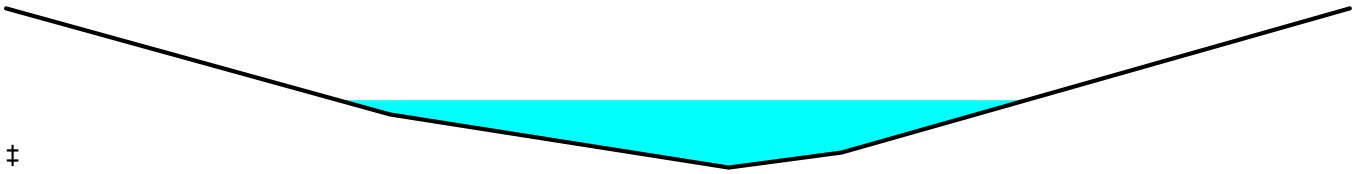
Summary for Reach 27R: Existing Channel

Inflow Area = 17.827 ac, 27.67% Impervious, Inflow Depth > 2.18" for 10-yr event
Inflow = 6.08 cfs @ 8.34 hrs, Volume= 3.243 af
Outflow = 6.08 cfs @ 8.35 hrs, Volume= 3.243 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.07 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.96 fps, Avg. Travel Time= 0.3 min

Peak Storage= 59 cf @ 8.35 hrs, Average Depth at Peak Storage= 0.58'
Bank-Full Depth= 1.38', Capacity at Bank-Full= 49.55 cfs

Custom cross-section, Length= 30.0' Slope= 0.0177 '/' (101 Elevation Intervals)
Constant n= 0.030 Earth, grassed & winding
Inlet Invert= 0.00', Outlet Invert= -0.53'

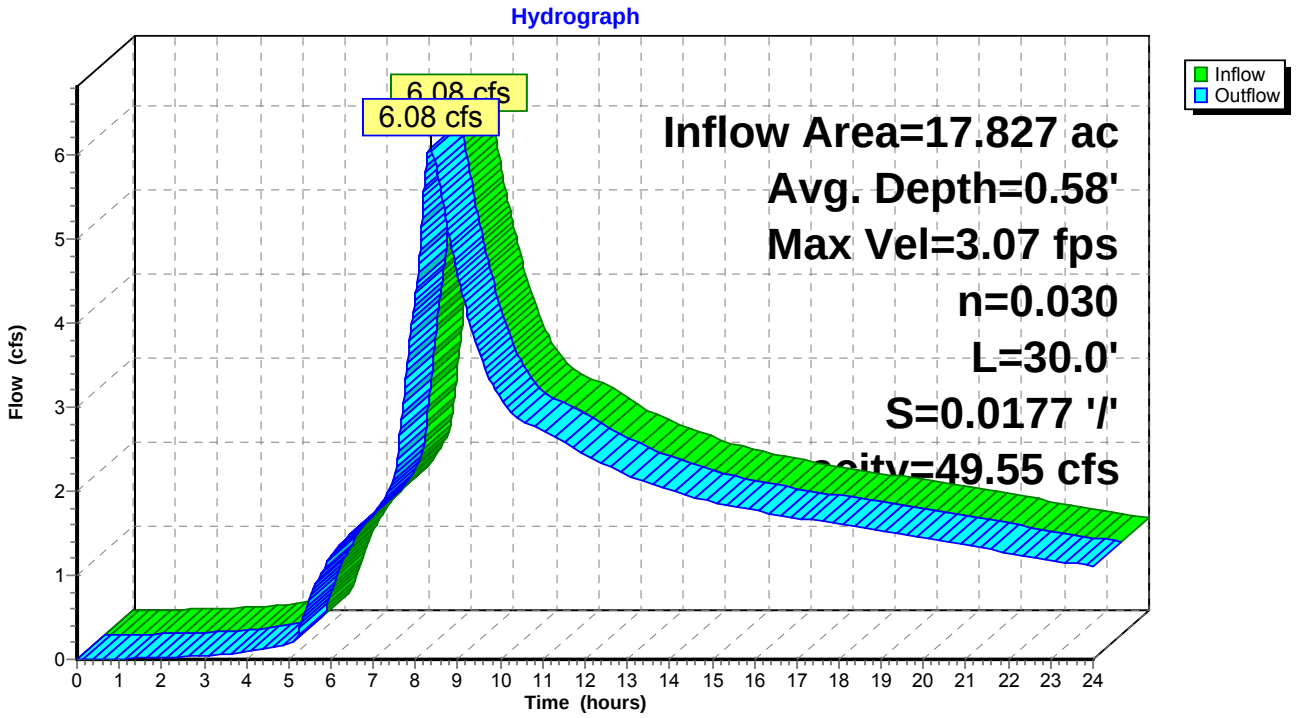


‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	419.92	0.00
3.40	419.00	0.92
6.40	418.54	1.38
7.40	418.67	1.25
11.90	419.92	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0	0.00
0.13	0.1	1.9	4	0.13
0.46	1.3	5.3	38	3.29
1.38	9.1	12.2	274	49.55

Reach 27R: Existing Channel



Summary for Pond 26R: Existing 12" Culvert

Inflow Area = 17.827 ac, 27.67% Impervious, Inflow Depth > 2.18" for 10-yr event
Inflow = 6.08 cfs @ 8.34 hrs, Volume= 3.243 af
Outflow = 6.08 cfs @ 8.34 hrs, Volume= 3.243 af, Atten= 0%, Lag= 0.0 min
Primary = 6.08 cfs @ 8.34 hrs, Volume= 3.243 af

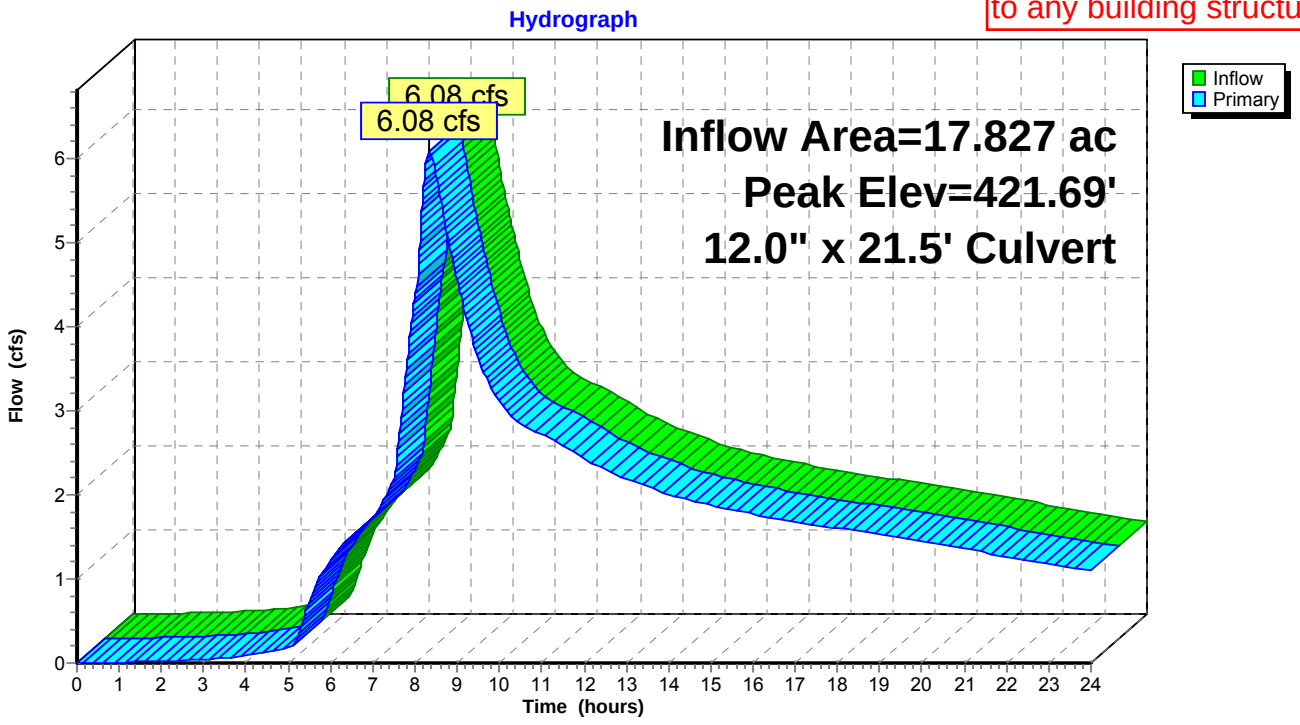
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 421.69' @ 8.34 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	419.41'	**12.0" x 21.5' long Culvert** RCP, groove end projecting, Ke= 0.200 Outlet Invert= 419.04' S= 0.0172 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=6.08 cfs @ 8.34 hrs HW=421.69' (Free Discharge)
↑**1=Culvert** (Barrel Controls 6.08 cfs @ 7.74 fps)

Existing driveway=421.15' Headwater/ Flow will overtop the driveway and flow downstream without impact to any building structures

Pond 26R: Existing 12" Culvert



Summary for Pond 28R: Existing 12" Culvert

Inflow Area = 17.827 ac, 27.67% Impervious, Inflow Depth > 2.18" for 10-yr event
Inflow = 6.08 cfs @ 8.35 hrs, Volume= 3.243 af
Outflow = 6.08 cfs @ 8.35 hrs, Volume= 3.243 af, Atten= 0%, Lag= 0.0 min
Primary = 6.08 cfs @ 8.35 hrs, Volume= 3.243 af

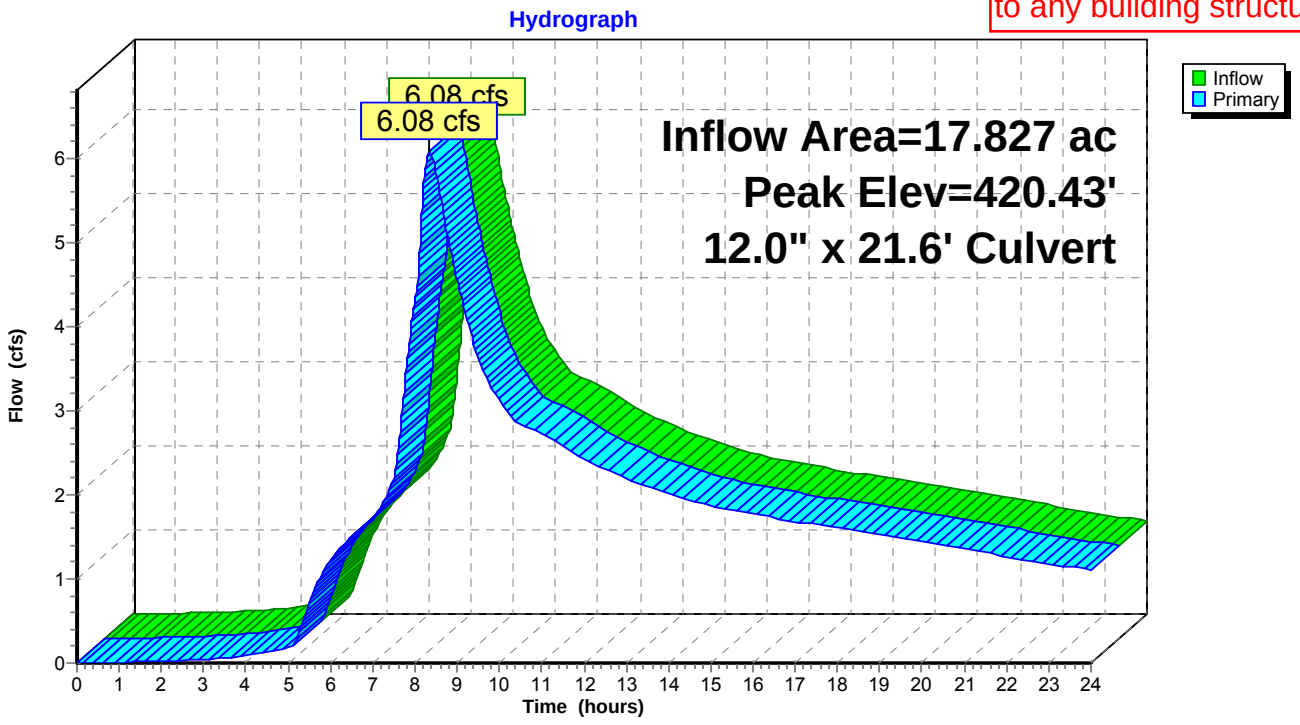
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 420.43' @ 8.35 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	418.27'	**12.0" x 21.6' long Culvert** RCP, groove end projecting, Ke= 0.200 Outlet Invert= 417.69' S= 0.0269 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=6.08 cfs @ 8.35 hrs HW=420.43' (Free Discharge)
↑**1=Culvert** (Inlet Controls 6.08 cfs @ 7.74 fps)

Existing driveway=419.70'
Headwater/ Flow will overtop the driveway and flow downstream without impact to any building structures

Pond 28R: Existing 12" Culvert



Summary for Pond SW: STORMWATER FACILITY

Inflow Area = 11.830 ac, 37.66% Impervious, Inflow Depth > 2.39" for 10-yr event
Inflow = 5.56 cfs @ 8.01 hrs, Volume= 2.352 af
Outflow = 4.17 cfs @ 8.32 hrs, Volume= 2.207 af, Atten= 25%, Lag= 18.4 min
Primary = 4.17 cfs @ 8.32 hrs, Volume= 2.207 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 430.70' @ 8.32 hrs Surf.Area= 6,161 sf Storage= 14,112 cf

Plug-Flow detention time= 99.6 min calculated for 2.207 af (94% of inflow)
Center-of-Mass det. time= 58.0 min (792.0 - 734.0)

Volume	Invert	Avail.Storage	Storage Description
#1	428.00'	22,729 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
428.00	4,321	0	0	4,321
429.00	4,981	4,647	4,647	5,035
430.00	5,667	5,320	9,967	5,781
431.00	6,378	6,019	15,986	6,556
432.00	7,114	6,743	22,729	7,362

Device	Routing	Invert	Outlet Devices
#1	Primary	429.10'	**8.3" Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#2	Primary	430.37'	**11.5" Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#3	Primary	431.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=4.16 cfs @ 8.32 hrs HW=430.70' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 2.29 cfs @ 6.09 fps)
- **2=Orifice/Grate** (Weir Controls 1.88 cfs @ 1.88 fps)
- **3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond SW: STORMWATER FACILITY

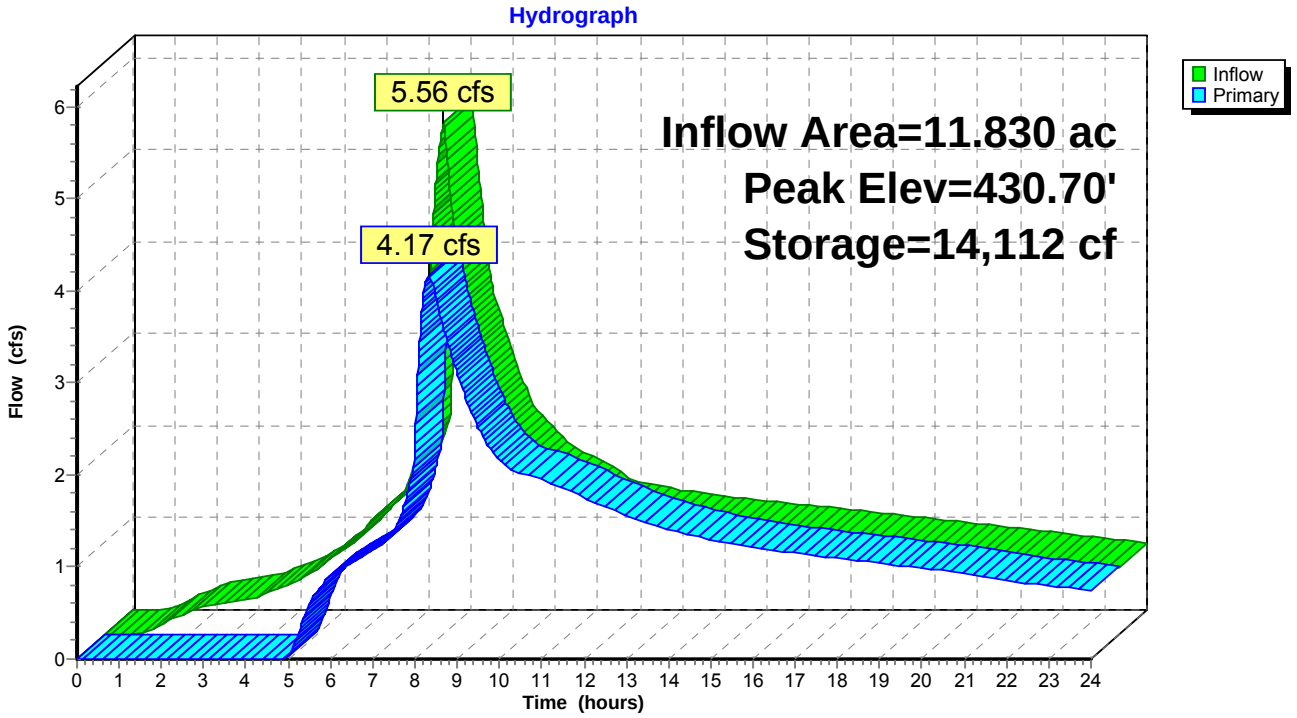
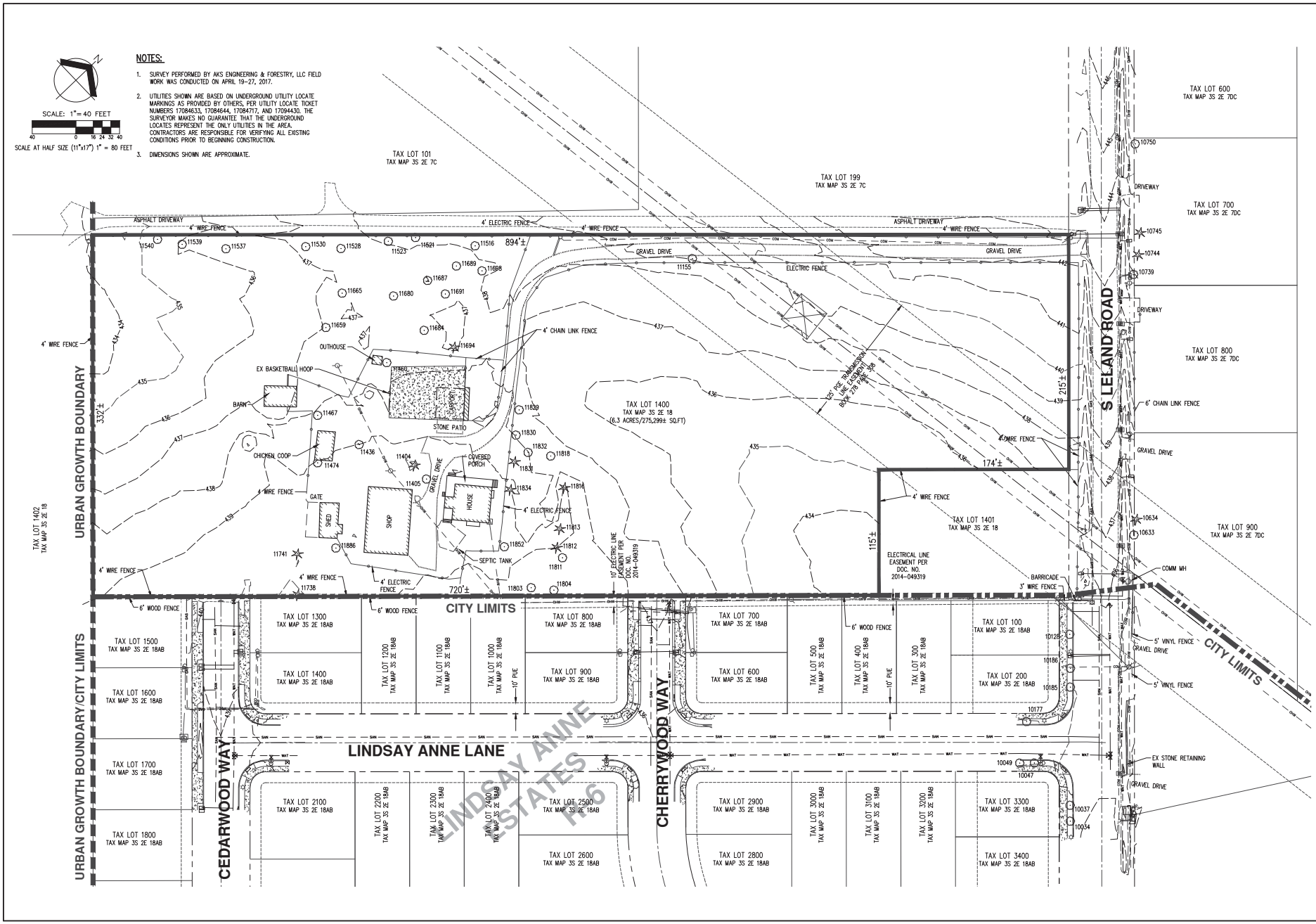


Exhibit K: Neighborhood Meeting Materials

Hillendale / Tower Vista Neighborhood Steering Meeting
/w Presenters
June 6, 2017

7:00 – 7:10	Call to order – Introductions
7:10 – 7:15	Minutes from 4/4/17 meeting
7:15 – 8:00	Jacki Herb, AKS Engineering Annexation & Subdivision Presentation
8:00 – 8:30	CIC report, PRAC report, Chief's Advisory report Land Use report
8:30 – 9:00	Open Discussion, plans for July General Meeting
9:00	Adjourn.



AKS ENGINEERING & FORESTRY, LLC
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KEIZER, OR 97303
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aks-eng.com

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LELAND ROAD SUBDIVISION

OREGON CITY, OREGON
CLACKAMAS CO. TAX MAP 3S2E18
TAX LOT 1400

PRELIMINARY EXISTING CONDITIONS PLAN

DESIGNED BY:	VHN
DRAWN BY:	NMC
CHECKED BY:	CCG
SCALE:	AS NOTED
DATE:	06/01/2017

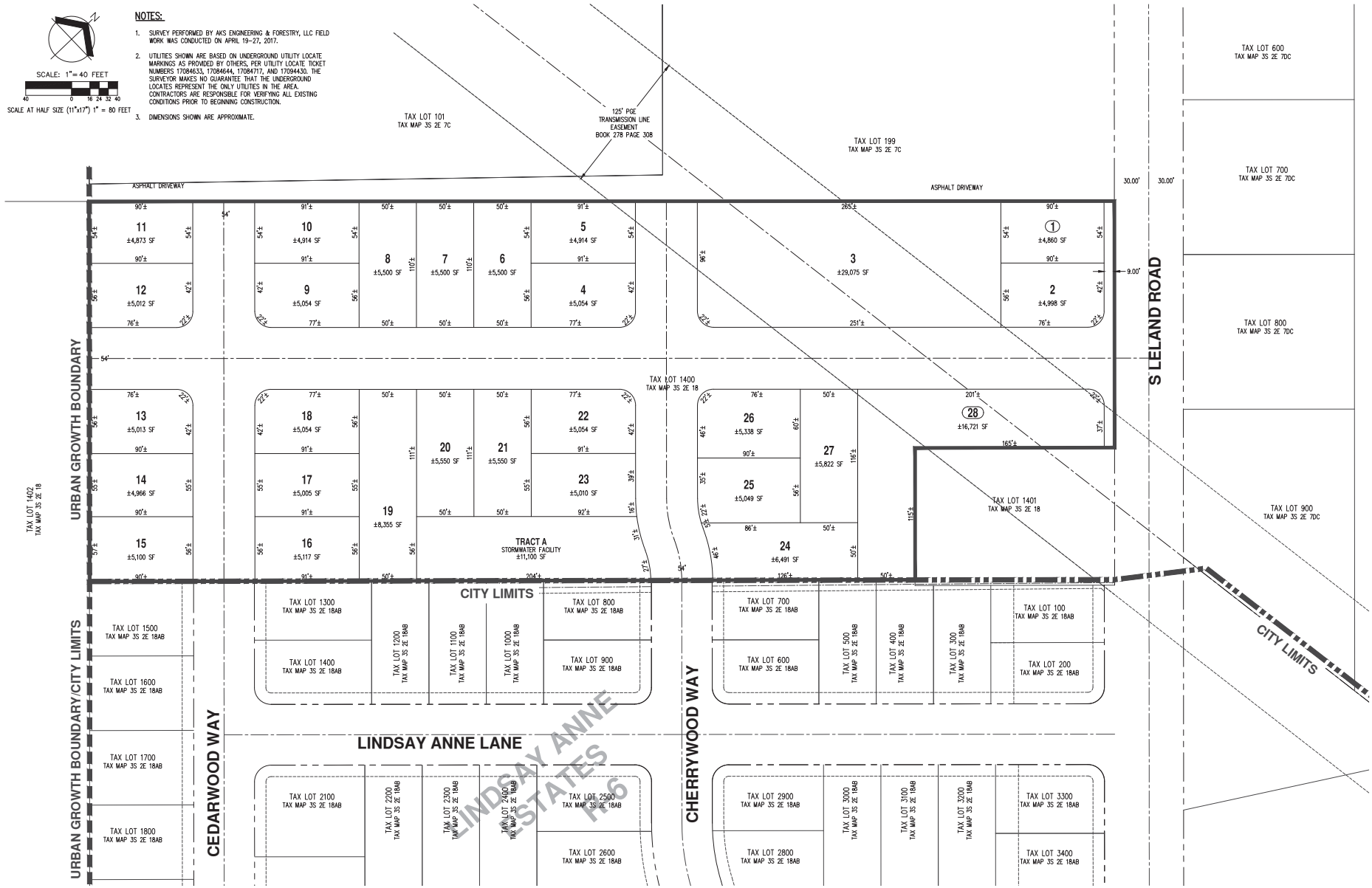
PRELIMINARY

REVISIONS

JOB NUMBER 5837

SHEET 1

AKS DRAWING FILE: 5837-I-NEIGHBORHOOD PLANS.DWG | LAYOUT: 1



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LELAND ROAD SUBDIVISION

OREGON CITY, OREGON
CLACKAMAS CO. TAX MAP 3S2E18
TAX LOT 1400

PRELIMINARY SUBDIVISION LAYOUT

DESIGNED BY:	VHN
DRAWN BY:	NMC
CHECKED BY:	CCG
SCALE:	AS NOTED
DATE:	06/01/2017

PRELIMINARY

REVISIONS

JOB NUMBER
5837

SHEET
2

AKS DRAWING FILE: 5837-2-NEIGHBORHOOD PLANS.DWG | LAYOUT: 2

SCALE: 1"= 40 FEET

40 0 16 24 32 40

SCALE AT HALF SIZE (11"x17") 1" = 80 FEET

NOTES:

1. SURVEY PERFORMED BY AKS ENGINEERING & FORESTRY, LLC FIELD WORK WAS CONDUCTED ON APRIL 19-27, 2017.
2. UTILITIES SHOWN ARE BASED ON UNDERGROUND UTILITY LOCATE MARKINGS AS PROVIDED BY OTHERS, PER UTILITY LOCATE TICKET NUMBERS 17084633, 17084644, 17084717, AND 17094430. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND LOCATES REPRESENT THE ONLY UTILITIES IN THE AREA. CONTRACTORS ARE RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS PRIOR TO BEGINNING CONSTRUCTION.
3. DIMENSIONS SHOWN ARE APPROXIMATE.

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LELAND ROAD SUBDIVISION

OREGON CITY, OREGON

TAX LOT 1400 CLACKAMAS CO. TAX MAP 3S2E18

AERIAL PHOTO PLAN

DESIGNED BY:	VHN
DRAWN BY:	NMC
CHECKED BY:	CCG
SCALE:	AS NOTED
DATE: 06/01/2017	

PRELIMINARY

REVISIONS

JOB NUMBER 5837

SHEET 3

AKS DRAWING FILE: 5837-3-NEIGHBORHOOD PLANS.DWG | LAYOUT: 3

PRELIMINARY

DESIGNED BY:	VHN
DRAWN BY:	NMC
CHECKED BY:	CCC
SCALE:	AS NOTED
DATE:	06/01/2017

REVISIONS

JOB NUMBER 5837
SHEET 4

OVERALL AERIAL

LELAND ROAD SUBDIVISION

OREGON CITY OREGON
TAX LOT 1400 CLACKAMAS CO. TAX MAP 3S2E18

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June 6, 2017

To whom it may concern:

Matt Scheidegger

~~Chris Goodell~~ with AKS Engineering & Forestry attended a Hillendale/Tower Vista Neighborhood Association meeting and provided a project summary of a planned annexation, zone change and subdivision for property located at 19701 S. Leland road.

Meeting Date: June 6, 2017
Time: 7:00 PM
Location: Living Hope Church, 19691 Meyers Road, Oregon City, OR

Sincerely,

Hillendale Neighborhood Association — 06 JUN 17 Date

WILLIAM CIFFORD

Tower Vista Neighborhood Association — 06/June 17 Date

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June 12, 2017

Neighborhood Meeting Minutes: Leland Road Subdivision
19701 S. Leland Road, Oregon City, OR

Meeting Date: June 6, 2017
Time: 7:00 PM
Location: Living Hope Church, 19691 Meyers Road, Oregon City, OR

The Applicant's representative attended a Hillendale/Tower Vista Neighborhood Association meeting to present details to neighbors and community members in preparation for the submission of land use applications for an annexation, zone change, and subdivision. Matt Scheidegger, with AKS Engineering & Forestry, was present. An overview of the project location, current and future zoning, lot sizes, lot configuration, public utilities, and public streets was provided. The planned applications and a general process and timeframe for the land use reviews and construction permitting process were described. Business cards were provided.

Following the presentation, attendees asked questions and/or provided general comments about the project. The following topics were discussed:

- Timing of construction of new homes
- Estimated price of future homes
- Traffic concerns
- Other nearby developments
- Off-site intersections
- Existing trees

The meeting concluded at approximately 7:30 p.m.

Sincerely,
AKS ENGINEERING & FORESTRY, LLC

Matt Scheidegger, Planner

Jacki Herb

From: Joyce Gifford <Joyce@smALLFLAGs.com>
Sent: Tuesday, June 13, 2017 8:04 PM
To: Jacki Herb
Cc: 'Roy and Anna Harris'
Subject: RE: Neighborhood Association Meeting

The attendees were:
Roy Harris – Hillendale Neighborhood Association (HNA)
Vern Johnson – Tower Vista NA
Debbie DeRusha – HNA
Craig DeRusha – HNA
Mike Albin – Gaffney Lane NA
William Gifford – HNA
Joyce Gifford – HNA

Email address can be provided if needed.

From: Jacki Herb [mailto:herbj@aks-eng.com]
Sent: Monday, June 12, 2017 11:48 AM
To: Roy and Anna Harris <royandanna@centurylink.net>; 'Joyce Gifford' <Joyce@smALLFLAGs.com>
Subject: RE: Neighborhood Association Meeting

Hello,

I was just following up to see if you would be able to email this? I sometimes get documents stuck in my spam filter, so I apologize if you have already sent it.

Regards,

Jacki Herb

AKS ENGINEERING & FORESTRY, LLC
12965 SW Herman Road, Suite 100 | Tualatin, OR 97062
P: 503.563.6151 ext. 279 | F: 503.563.6152 | www.aks-eng.com | herbj@aks-eng.com
Offices in: Tualatin, OR | Salem-Keizer, OR | Vancouver, WA

From: Roy and Anna Harris [mailto:royandanna@centurylink.net]
Sent: Wednesday, June 07, 2017 6:37 PM
To: Jacki Herb <herbj@aks-eng.com>; 'Joyce Gifford' <Joyce@smALLFLAGs.com>
Subject: Re: Neighborhood Association Meeting

Joyce,

Could you get a copy of the sign in sheet over to Jacki?

Thanks,

Roy

On 6/7/2017 1:43 PM, Jacki Herb wrote:

> Roy,
>
> Thank you fitting us into your neighborhood association meeting and allowing us to present information on the Leland Road project.
>
> Would it be possible to get a copy of the meeting in sign in sheet? The City requires that we include this in our application submittal materials. If you could email it to me at your earliest convenience, we would appreciate it.
>
> Thank you again,

Jacki Herb

AKS ENGINEERING & FORESTRY, LLC
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Offices in: Tualatin, OR | Salem-Keizer, OR | Vancouver, WA

Exhibit L: City Pre-Application Conference Summary

OREGON CITY
Community Development Department
221 Molalla Ave. Suite 200 | Oregon City OR 97045
Ph (503) 722-3789 | Fax (503) 722-3880

PRE-APPLICATION MEETING NOTES
Date of Meeting: March 8, 2017

File Number:	**PA 17-07** – Annexation / Zone Change / Subdivision
Address:	19701 S. Leland Road, Oregon City, OR 97045
Tax Assessor Map:	3S 2E 18, Tax Lot: 1400
Total Acres:	6.32 acres
Project Name:	Annexation, Zone Change to R-6, Subdivision
Staff Present:	Pete Walter, AICP, Associate Planner Email: pwalter@orcity.org Ph: (503) 496-1568 Mario De La Rosa, PE, Development Project Engineer, Email: mdelarosa@orcity.org Ph: (503) 974-5518

Approval Criteria

City Code Chapter 14

- OCMC 14.04.050.(E).(1-9). The required narrative statement in response to items 7(a) through (g) must be included:

  7. A narrative statement explaining the conditions surrounding the proposal and addressing the factors contained in the ordinance codified in this chapter, as relevant, including:

  a. *Statement of availability, capacity and status of existing water, sewer, drainage, transportation, park and school facilities;*
  b. *Statement of increased demand for such facilities to be generated by the proposed development, if any, at this time;*
  c. *Statement of additional facilities, if any, required to meet the increased demand and any proposed phasing of such facilities in accordance with projected demand;*
  d. *Statement outlining method and source of financing required to provide additional facilities, if any;*
  e. *Statement of overall development concept and methods by which the physical and related social environment of the site, surrounding area and community will be enhanced;*
  f. *Statement of potential physical, aesthetic, and related social effects of the proposed, or potential development on the community as a whole and on the small subcommunity or neighborhood of which it will become a part; and proposed actions to mitigate such negative effects, if any;*
  g. *Statement indicating the type and nature of any comprehensive plan text or map amendments, or zoning text or map amendments that may be required to complete the proposed development;*

- OCMC 14.04.060 – Annexation Factors. Narrative shall address each of the required Annexation Factors (1) through (7). *When reviewing a proposed annexation, the commission shall consider the following factors, as relevant:*

  1. Adequacy of access to the site;
  Comment: Address how current and future access to the site is adequate.

  2. Conformity of the proposal with the city's comprehensive plan;
  Comment: The applicant's narrative should the applicable goals and policies. Staff will include the applicable goals and policies with the Code Response Template.

  3. Adequacy and availability of public facilities and services to service potential development;
  Comment: The applicant's narrative should the current Oregon City public facilities plans for Water, Sewer, Stormwater and Transportation and the respective demand placed on these services by the potential development of the site.

  4. Compliance with applicable sections of ORS Ch. 222, and Metro Code Section 3.09;
  Comment: The applicant's narrative should these criteria.

  5. Natural hazards identified by the city, such as wetlands, floodplains and steep slopes;
  Comment: The applicant's narrative should address any natural hazards present on site.

  6. Any significant adverse effects on specially designated open space, scenic, historic or natural resource areas by urbanization of the subject property at time of annexation;
  Comment: The applicant's narrative should address any specially designated open space, scenic, historic or natural resource areas on the site. Staff is not aware of any, although there are constraints on building in a powerline easement. We recommend contacting the County Historic Preservation staff for any cultural or historic records for the site.

  7. Lack of any significant adverse effects on the economic, social and physical environment of the community by the overall impact of the annexation.
  Comment: The applicant's narrative should address any significant adverse effects on the economic, social and physical environment of the community by the overall impact of the annexation.

Metro Code 3.09.045.A-D (Boundary Change Criteria)

- Whether the proposed boundary change will promote the timely, orderly and economic provision of public facilities and services.
- Whether the proposed boundary change will affect the quality and quantity of urban services
- Whether the proposed boundary change would eliminate or avoid unnecessary duplication of facilities or services.
- **Comment**: See comments from Public Works.
- Water - Please see attached comments from CRW regarding water services along Leland Road.
  Schools - Oregon City School District representative indicated verbally at the pre-application that school capacity at Gardiner Elementary and Oregon City High School should have sufficient capacity to serve development of the proposed annexation area.

Oregon City Comprehensive Plan – Applicable Goals and Policies

- Goal 14.1.2 – Concept Plans (Address Park Place Concept Plan)
- Goal 14.3 - Orderly Provision of Services to Growth Areas
- Goal 14.4 – Annexation of Lands to the city

Concept Plan Goals and Policies

- This area was not within any Concept Plan study area boundary regulated under Metro Title 11.

Zone Change

- The Zone Change request to R-6 may be submitted concurrently with the annexation request or submitted separately and is a discretionary zone change processed pursuant to the criteria in OCMC 17.68.
- Non-discretionary default zoning is R-10 based on the designation of Low Density Residential, pursuant to OCMC 17.68.025.
- Discretionary re-zoning to R-6 must comply with the criteria in 17.68.020 - Criteria. These include:
  A. The proposal shall be consistent with the goals and policies of the comprehensive plan.
  B. That public facilities and services (water, sewer, storm drainage, transportation, schools, police and fire protection) are presently capable of supporting the uses allowed by the zone, or can be made available prior to issuing a certificate of occupancy. Service shall be sufficient to support the range of uses and development allowed by the zone.
  C. The land uses authorized by the proposal are consistent with the existing or planned function, capacity and level of service of the transportation system serving the proposed zoning district.
  D. Statewide planning goals shall be addressed if the comprehensive plan does not contain specific policies or provisions which control the amendment.
- A separate zone change application is required for both R-10 and R-6 rezoning.
- Applicant is advised to review and consider the City's decision on the current applications AN-16-0003 (OC Golf Course, 113 acres), and AN-16-0004 / ZC-16-0001 (Serres Property, 35 acres). Staff can provide this information.

Subdivision

- Subdivisions are typically reviewed as a Type II process based on clear and objective review criteria and staff recommends that the applicant apply separately for subdivision following approval of annexation and zone change.
- Pursuant to ORS 227.175, any applicant may elect to consolidate applications for two or more related permits needed for a single development project. Any grading activity associated with development shall be subject to preliminary review as part of the review process for the underlying development. It is the express policy of the city that development review not be segmented into discrete parts in a manner that precludes a comprehensive review of the entire development and its cumulative impacts.
- Review of a concurrent subdivision application may be submitted either concurrently with or separate from the annexation and zone change, however, the subdivision cannot be approved until the zone change is effective. The applicant should discuss and propose appropriate conditions of approval with staff and the City attorney if the applicant intends to submit the application for subdivision as a Type II.
- It appears that the subdivision could meet the requirements of the R-6 zone district and land division requirements
- Per OCMC 16.12.070 - Building site—Setbacks and building location. Lots 1 and 2 shall orient the front setback and the most architecturally significant elevation toward Leland Road. The applicant shall maintain the proposed access to the aforementioned lots by utilizing a shared driveway at the rear of the lots. If the applicant chooses to alter the access to the lots, the access shall comply with OCMC 16.12.070. (P)

Transportation

Traffic Impact Analysis is required. Fees for review of the traffic impact analysis will be required pursuant to the TIA fee structure. The City's transportation consultant John Replinger has reviewed the pre-application and has the following comments;

> *Please provide the following guidance to the applicant in connection with the pre-app for the proposed development:*
>
> *The applicant will need to have a traffic engineer conduct a transportation study in conformance with the City's Guidelines for Transportation Impact Analyses available on the Oregon City website.*
>
> *Based on the information provided by the applicant, it appears the trip generation exceeds the level at which the project's transportation analysis requirements can be satisfied by submittal of a Transportation Analysis Letter (TAL). A full Transportation Impact Analysis (TIA) will be required. Among other requirements, a full TIA includes conducting traffic counts and operational analysis of impacted intersections will be required. Intersections to be analyzed include the site access and intersections of collector/collector and higher where traffic volumes from the development exceed 20 peak hour trips.*
>
> *The applicant and his traffic engineer should review the Guidelines for Transportation Impact Analyses and the most recent mobility standards as specified in Oregon City Municipal Code section 12.04.205.*
>
> *Because the proposal includes a zone change, the applicant will also need to address the requirements of Oregon's Transportation Planning Rule. Specifically, the applicant shall address the provisions of 660-12-0060 Plan and Land Use Regulation Amendments. When a zone change is proposed, a future year analysis is required assessing the impact associated with the planning horizon specified in the city's adopted Transportation System Plan.*
>
> *The applicant's traffic engineer is welcome to contact the city's traffic engineering consultant, John Replinger, at Replinger-Associates@comcast.net or at 503-719- 3383.*

To summarize, zone changes must comply with the Transportation Planning Rule, and development will not be permitted until compliance with the TPR is shown. ODOT staff will likely be involved with the scoping analysis for the TIA / TPR. A copy of the recent Staff Report with proposed Condition of Approval for transportation mitigation, developed in collaboration with ODOT staff, for the zone change and annexation of 35 acres north of Holcomb Boulevard (AN-16-0004/ZC-16-0001) is attached for reference.

Annexation Election

It appears that this annexation may be exempt from the voter approval requirements of OCMC 14.04, pursuant to SB 1573. SB 1573 is survived a recent legal challenge from Corvallis in Benton County Circuit Court. Staff will be tracking this issue as it develops.

Review Fees (2017 Fee Schedule)

Annexation: $4,342.00

Zone Change:	$2,798.00
Traffic Impact Analysis:	
TIA Base Fee (<50 units):	$1,092.00
- Zone Change / Comp Plan Amendment	$2,046.00
Mailing Labels:	$15.00
Metro Mapping Fees:	$300.00
Subdivision:	$4,136.00 + $344 per lot

Neighborhood Association Meeting Required

Per OCMC 17.50.055 - Neighborhood association meeting. Documentation of the meeting with the applicable Neighborhood Association is required for a complete application. Staff will confirm which N.A. the annexation would be included within upon annexation. The annexation property is within the Hillendale Neighborhood Association boundary. See Web page http://www.orcity.org/community/neighborhood-associations for contact and meeting information.

Miscellaneous Comments

Staff will provide you a Code Response template similar to a Staff Report and electronic versions of the applicable plans, policies and approval criteria above to assist in the preparation of your application.

These pre-application conference notes were prepared in accordance with OCMC 17.50.050 - Preapplication conference.

A. Preapplication Conference. Prior to submitting an application for any form of permit, the applicant shall schedule and attend a preapplication conference with City staff to discuss the proposal. To schedule a preapplication conference, the applicant shall contact the Planning Division, submit the required materials, and pay the appropriate conference fee. At a minimum, an applicant should submit a short narrative describing the proposal and a proposed site plan, drawn to a scale acceptable to the City, which identifies the proposed land uses, traffic circulation, and public rights-of-way and all other required plans. The purpose of the preapplication conference is to provide an opportunity for staff to provide the applicant with information on the likely impacts, limitations, requirements, approval standards, fees and other information that may affect the proposal. The Planning Division shall provide the applicant(s) with the identity and contact persons for all affected neighborhood associations as well as a written summary of the preapplication conference. Notwithstanding any representations by City staff at a preapplication conference, staff is not authorized to waive any requirements of this code, and any omission or failure by staff to recite to an applicant all relevant applicable land use requirements shall not constitute a waiver by the City of any standard or requirement.

B. A preapplication conference shall be valid for a period of six months from the date it is held. If no application is filed within six months of the conference or meeting, the applicant must schedule and attend another conference before the city will accept a permit application. The community development director may waive the preapplication requirement if, in the Director's opinion, the development does not warrant this step. In no case shall a preapplication conference be valid for more than one year.

OREGON CITY

Public Works – Development Services

625 Center Street | Oregon City OR 97045
Ph (503) 657-0891 | Fax (503) 657-7829

DEVELOPMENT SERVICES

PRE-APPLICATION MEETING NOTES

Date: 03-10-2017

Planning Project Number:	PA 17-07
Address:	19701 S Leland Road
Map Number(s):	3S 2E 18
Tax Lot(s):	1400
Project Name:	19701 S Leland Road Annexation/Subdivision
Meeting Date:	March 8, 2017
Reviewer(s):	Mario de la Rosa, PE

ENGINEERING - UTILITIES

Stormwater

1. The City Stormwater and Grading Design Standards dated 2015 must be adhered to for this development. The Standards can be found online here:**http://www.orcity.org/sites/default/files/final_manual_0.pdf**

2. An existing storm sewer conveyance system exists directly to the east along two (2) separate stub streets located within Lindsey Anne Estates to the east. An existing 12-inch storm main is located within S Leland Road just east of the project frontage.

3. A downstream analysis per the requirements of the Stormwater and Grading Design Standards will be required to document existing conditions and demonstrate adequate conveyance capacity of the natural and constructed drainage system downstream of the project site.

4. Based on review of City GIS System, the project site is mostly located within a high water table area. A Geotechnical Report will be required for this project and should identify elevation of ground water.

5. Applicant indicates stormwater outfall from proposed stormwater facility will be discharged to Leland Road or Cherrywood Way and is still to be determined.

Water

1. The City of Oregon City has 12-inch water main located nearby within Leland Road. The water main would need to be extended to and through to the west property boundary along Leland Road.

2. Water service extension to adjacent property owners along Leland Road property frontage will be required via Developer Agreement with City will be required for following addresses off of S Leland Road, 19717, 19658, 19646, and 19634.

3. An existing 6-inch water main owned by Clackamas River Water is located along the property frontage within S Leland Road.

4. The proposed annexation area is within the Upper Zone water system pressure zone.

5. The 2012 Water Distribution System Master Plan was adopted in February 2012. A PDF version of the adopted master plan is available on our City website.

6. The Water Master Plan currently indicates a 6" water main proposed for S Leland Road along the project frontage. However, the minimum water main size is 8-inches. The City will reimburse the Applicant for the cost difference between a 12-inch and 8-inch water main.

Sanitary Sewer

1. The 2014 Sanitary Sewer Master Plan Update was adopted in November 2014. A PDF version of the adopted master plan is available on our City website.

2. The 2014 Sanitary Sewer Master Plan identifies a proposed 8-inch, sanitary sewer main to be constructed along Leland Road in the vicinity of the proposed project.

3. An existing 8-inch PVC sanitary sewer main is located approximately 120-feet east of the proposed site along S Leland Road, which will need to be extended to the west end of the project frontage to serve the site.

4. Existing sanitary sewer manholes currently exist along the east property line and are located at Cedarwood Way and Cherrywood Way, which are stub streets from Lindsay Anne Estates and are also able to serve the site.

5. Two-way cleanouts will be required for each lot located at Right-of-Way.

Transportation

1. No development of this property will occur as result of annexation. The transportation analysis will be deferred until the time a future zone change is approved.

2. Local streets are stubbed to the annexation area from adjacent single-family neighborhoods at Cedarwood Way and Cherrywood Way. Connections to these streets can be made from Lindsay Anne Lane, which has direct access off of Leland Road.

3. Primary access to the subject property will be from the north along Leland Road. Leland Road is a minor arterial street owned by Clackamas County. Street improvements and permitting for Leland Road will need to be coordinated with Clackamas County.

4. SDC credits for construction of S Leland Road will be available similar to Lindsay Anne Estates.

Questions

Access / Transportation / Circulation

10. Please confirm if the City or County has jurisdiction of Leland Road, which jurisdiction standards apply, who will be reviewing plans, issuing permits, etc. RESPONSE: Leland Road is a Clackamas County owned roadway. Plans associated with road improvements will be reviewed/issued a permit by Clackamas County. All utilities within S Leland Road are owned by City of Oregon City and will be reviewed/issued a permit by City of Oregon City excluding the 6-inch water main owned by Clackamas River Water.

11. Please confirm access spacing requirements and if the planned spacing of the new street is acceptable. RESPONSE: Spacing between local streets is 150-feet.

12. Please discuss requirements for access to Leland Road for Lots 1 and 2. RESPONSE: Access for Lots 1 and 2 will need to be coordinated with Clackamas County. We believe it will need to be a shared driveway off of S Leland Road or access will be required from internal street.

13. Please confirm required right-of-way dedication for S. Leland Road, Cherrywood Way, Cedarwood Way, and the new internal street. RESPONSE: Right-of-Way dedication for S. Leland Road should meet the right-of-way required for a minor arterial and should match the right-of-way required for Lindsay Anne Estates. A 9-foot dedication was required for Lindsay Anne Estates for a half-street right-of-way width of 39-feet. Right-of-way dedication for Cherrywood Way, Cedarwood Way and the new internal street should meet the right-of-way required for a local street, which is 54-feet.

14. Please discuss requirements for frontage improvements along S. Leland Road. RESPONSE: Frontage improvements for S. Leland Road will need to be coordinated with Clackamas County.

15. Will a traffic study be required? If so, please describe the required scope. RESPONSE: See Planning Notes.

16. Please confirm if there are any known transportation issues in the area that may affect the annexation/zone change or subdivision applications. RESPONSE: See City's traffic subconsultant – John Repliner's comments.

Service and Utilities

17. Please confirm the stormwater requirements (water quality, detention, etc.) for this site/project. RESPONSE: Yes, per above, the City Stormwater and Grading Design Standards dated 2015 must be adhered to for this development.

18. Are the stormwater planters, rain gardens, or vegetated swales required to treat and detain stormwater runoff from the public right-of-way area? Can these facilities be located in the planter strip in between the curb and sidewalk? Does the City have any standard details yet? RESPONSE: Per the City's Stormwater and Grading Design Standards, low-impact development (LID) facilities such as planters, swales, rain gardens, ponds, and other vegetated facilities are best management practices and are the preferred strategy to meet the stormwater management requirements for water quality treatment, and flow control. Yes, facilities can be located in planter strip. The City is currently updating a standard detail for this application.

19. Please confirm access, side slope, and other requirements for the stormwater facility? RESPONSE: See Appendix C of Stormwater and Grading Standards for specific stormwater facility design.

20. Are there any known stormwater capacity issues with the site or surrounding areas? RESPONSE: To the best of our knowledge there are no known stormwater capacity issues within the project vicinity.

21. Are there any known water supply (capacity or pressure issues)? RESPONSE: No, per the Water Master Plan there are no known capacity or pressure issues. The master plan indicates the extension of 6-inch and 8-inch water mains within the project vicinity.

22. Are there any known sanitary sewer capacity issues? RESPONSE: No, per the Sanitary Sewer Master Plan there are no known capacity issues. The master plan indicates the extension of 8-inch sanitary sewer lines in the vicinity.

23. Are there any other known utility issues that we should be made aware of? RESPONSE: No, not to the best of my knowledge.

24. Please discuss the status of new City requirements for performance bonding. RESPONSE: Currently in progress, will have by time construction will start for this project.

25. Please confirm what items are planned to be included in the required performance bond. RESPONSE: Everything in existing right-of-way plus erosion control, vegetation to button up site in event Contractor walks away from project.

26. How is this affected by Clackamas County's jurisdiction of Leland Road? RESPONSE: Applicant will need to coordinate with Clackamas County.

27. Please discuss the status of the City's new stormwater facility maintenance option program? RESPONSE: The stormwater facility maintenance option program is being implemented.

28. Please describe the methodology for the City fee option. How is it calculated? RESPONSE: Fee is calculated per SF of pond.

29. Please confirm that the fee would not include maintenance of dead storage areas? RESPONSE: Yes, this is correct.

30. Please confirm that if the fee is paid to the City that the City will be responsible for replanting required vegetation that does not survive. RESPONSE: Yes, this is correct.

31. Are any special studies or assessments (natural resources, traffic, etc.) required? RESPONSE: A TPR Analysis will be required for the annexation.

32. Please confirm if a geotechnical/soils/infiltration report will be required for land use application? RESPONSE: A geotechnical report will be required for infiltration testing based on the Professional Method and should determine depth of groundwater. See Stormwater and Grading Standards for Infiltration Testing procedures.

The Confederated Tribes of the Grand Ronde Community of Oregon

Historic Preservation Department
Phone (503) 879-2185
1-800 422-0232
Fax (503) 879-2126

8720 Grand Ronde Rd
Grand Ronde, OR 97347

4/11/2017

Diliana Vassileva
Assistant Planner, Planning Division
City of Oregon City
PO Box 3040
221 Molalla Avenue, Suite 200
Oregon City, Oregon 97045

RE: Development Review in Oregon City -- Multiple Properties

Greetings Diliana,

The Confederated Tribes of Grand Ronde Cultural Protection staff have reviewed Oregon City Projects PA 17-06, PA 17-07, PA 17-08, and PA 17-09. We have no additional information to provide at this time for this project. We request that an inadvertent discovery plan be in place for projects with ground disturbing activities. We also ask to be contacted immediately if archaeological and/or cultural resources are discovered during the project.

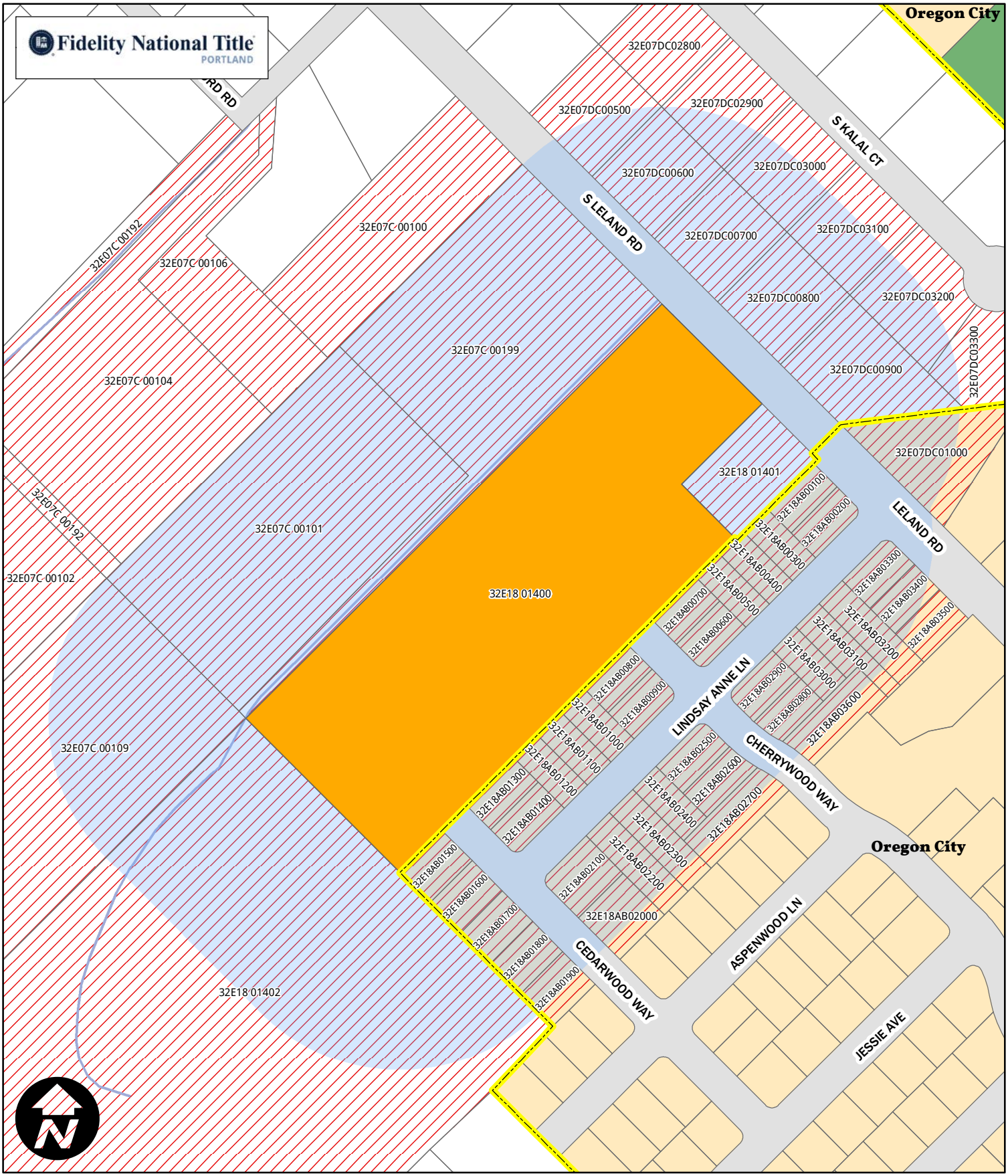
Should you have any questions, please feel free to contact me.

Respectfully,

Christopher Bailey
Cultural Protection Specialist
Cultural Protection
Historic Preservation
Confederated Tribes of the Grand Ronde Community of Oregon

chris.bailey@grandronde.org
503-879-1665

Exhibit M: Mailing Labels for 300-Foot Radius Owners



Public Notification Search

- Subject
- Notification
- City limits
- Radius
- Parks and/or Natural Areas
- Taxlots
- Incorporated city

300 Feet

Prepared by: Fidelity National Title
Data: CoreLogic, Metro RLIS
Date: 7/10/2017
This information is reliable, but not guaranteed. It is not a survey.

32E07C 00100
Wayne & Patsy Streight
19673 Leland Rd
Oregon City, OR 97045

32E07C 00101
Patricia Lynae McClure
19681 Leland Rd
Oregon City, OR 97045

32E07C 00102
Shawna Faye Co-E Morris
19659 Mccord Rd
Oregon City, OR 97045

32E07C 00104
Levi & Jillian Morris
19665 Mccord Rd
Oregon City, OR 97045

32E07C 00106
Jerry & Faye Rainbolt
19663 Mccord Rd
Oregon City, OR 97045

32E07DC00500
Terry & Anita Anderson
19600 Leland Rd
Oregon City, OR 97045

32E07DC00600
Patricia & Thomas Kitancevski
Po Box 1297
Oregon City, OR 97045

32E07DC00700
Trina Houck
19634 Leland Rd
Oregon City, OR 97045

32E07DC00800
Colleen Commons
19646 Leland Rd
Oregon City, OR 97045

32E07DC00900
Arhondisa Thompson
19658 Leland Rd
Oregon City, OR 97045

32E07DC01000
Paul Daniel Wyland
19700 Leland Rd
Oregon City, OR 97045

32E07DC02800
Kurt & Susan Gross
19590 Kalal Ct
Oregon City, OR 97045

32E07DC02900
John Rizzo
19600 Kalal Ct
Oregon City, OR 97045

32E07DC03000
Angelika Murray
19620 Kalal Ct
Oregon City, OR 97045

32E07DC03100
Sean & Lauren Fuller
19630 Kalal Ct
Oregon City, OR 97045

32E07DC03200
Wendy Smith
19640 Kalal Ct
Oregon City, OR 97045

32E07DC03300
Mark & Cindy Shaw
19650 Kalal Ct
Oregon City, OR 97045

32E18 01400
Bruce Raymond Trstee Miller
19701 Leland Rd
Oregon City, OR 97045

32E18 01401
Jeff & Tina Westenfelt
19717 Leland Rd
Oregon City, OR 97045

32E07C 00109
Ross & Kay Smith
19691 Leland Rd
Oregon City, OR 97045

32E18 01402
Rick & Keli Dotson
19695 Leland Rd
Oregon City, OR 97045

32E07C 00192
Bradley Dean Co-E Morris
19659 Mccord Rd
Oregon City, OR 97045

32E07C 00199
Ross & Kay Smith
19691 Leland Rd
Oregon City, OR 97045

32E18AB00100
Andrew & Shannon Hietschold
19727 Leland Rd
Oregon City, OR 97045

32E18AB00200
Lindsey Suzanne Wilde
19737 Leland Rd
Oregon City, OR 97045

32E18AB00300
Shane Killian
12795 Lindsay Anne Ln
Oregon City, OR 97045

32E18AB00400
Jonathan & Jane Newman
12787 Lindsay Anne Ln
Oregon City, OR 97045

32E18AB00500
Curtis Lee Williams
12779 Lindsay Anne Ln
Oregon City, OR 97045

32E18AB00600
Roland Romero
19736 Cherrywood Way
Oregon City, OR 97045

32E18AB00700
Bryan & Donna Easlick
19726 Cherrywood Way
Oregon City, OR 97045

32E18AB00800
Matthew Johnson
19725 Cherrywood Way
Oregon City, OR 97045

32E18AB00900
Justin Meininger
19735 Cherrywood Way
Oregon City, OR 97045

32E18AB01000
Nicholas & Natalie Cardoza
12755 Lindsay Anne Ln
Oregon City, OR 97045

32E18AB01100
Mysha Angell
12747 Lindsay Anne Ln
Oregon City, OR 97045

32E18AB01200
Joshua & Eileen Weeks
12739 Lindsay Anne Ln
Oregon City, OR 97045

32E18AB01300
Jeremy Todd Pincoski
19724 Cedarwood Way
Oregon City, OR 97045

32E18AB01400
Billie Adams
19734 Cedarwood Way
Oregon City, OR 97045

32E18AB01500
Betty Meisel
19723 Cedarwood Way
Oregon City, OR 97045

32E18AB01600
Mark Horn
Po Box 118
Oregon City, OR 97045

32E18AB01700
Amber & Adam Wilkins
19743 Cedarwood Way
Oregon City, OR 97045

32E18AB01800
Kimberly Donaca
19753 Cedarwood Way
Oregon City, OR 97045

32E18AB01900
Shanon Kmetic
19763 Cedarwood Way
Oregon City, OR 97045

32E18AB02000
Jennifer Porter Bown
19764 Cedarwood Way
Oregon City, OR 97045

32E18AB02100
Ronald & Kathleen Rodwick
19754 Cedarwood Way
Oregon City, OR 97045

32E18AB02200
Michael Harrison
12738 Lindsay Anne Ln
Oregon City, OR 97045

32E18AB02300
Jeffery Dunham
12746 Lindsay Anne Ln
Oregon City, OR 97045

32E18AB02400
James Williams
12754 Lindsay Anne Ln
Oregon City, OR 97045

32E18AB02500
Corey Johnson
Po Box 743
Canby, OR 97013

32E18AB02600
Stefanie Hassan
19755 Cherrywood Way
Oregon City, OR 97045

32E18AB02700
Donald & Rita Bredehoeft
19765 Cherrywood Way
Oregon City, OR 97045

32E18AB02800
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