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TECHNICAL MEMORANDUM

April 16, 2024 Project # 19531.016

To: Dayna Webb, PE
City of Oregon City

From: Marc Butorac, PE, PTOE, PMP; Nicholas Gross; Sophia Semensky

CC: Mahasti Hastings, Oregon Department of Transportation

RE: 3.3.3B - TM#6: Most Promising Alternatives
McLoughlin Boulevard Enhancements - 10th Street to tumwata village

Executive Summary

TM#6: Most Promising Alternatives assesses and identifies up to three alternatives to further develop through conceptual design and screening. Originally, the project team recommended as Part of TM#5 Existing Safety and Active Transportation Conditions the three most promising alternatives: Alternative 1B: High Route (Refined), Alternative 1D: High Route (North Tie-In), and Alternative 1E: High Route (South Tie-In). As structural and geotechnical criteria are crucial in the technical feasibility of the alternatives, a structural and constructability screening was then performed on these three most promising alternatives along with additional environmental and maintenance review.

Through this screening, the original three most promising alternatives were technically screened out due to concerns with foundation locations, cost, and impacts to historical and cultural resources. However, two refined most promising alternatives emerged from this screening process:

- Alternative 1B: Long Span High Route
- Alternative 1B: Viaduct High Route

These two refined most promising alternatives were then further evaluated for criteria related to user experience, environmental feasibility, constructability, and community input.

Initial Most Promising Alternatives

The initial three (3) most promising alternatives were identified based on their abilities to successfully address the Corridor Vision, Purpose and Need, and intended outcomes of the Project.

The selection of the most promising alternatives has been informed by input received from various agency and department staff, including but not limited to, ODOT Tribal Affairs, ODOT Maintenance, Clackamas County Water Environment Services (WES), City of Oregon City Commission, and input received as part of the Online Public Open House.

The three most promising alternatives were developed based on an evaluation of the safety and active transportation conditions in Technical Memorandum (TM) #5 as well as a preliminary evaluation of Section 4(f), Aquatic Species Impact, Historic Resource Impact, United States Coast Guard (USCG) Permit, and United States Army Corps of Engineers (USACE) Permit as part of the High-Level Environmental Screening.

Based on these resources, the following alternatives are identified as the three (3) most promising external alignment alternatives to be advanced and further evaluated.

- Alternative 1B: Full External Alignment (Refined)
- Alternative 1D: Partial External Alignment (North Tie-in)
- Alternative 1E: Partial External Alignment (South Tie-in)

ALTERNATIVE DESCRIPTIONS

The following section includes a narrative and visual description of each of the initial most promising alternatives.

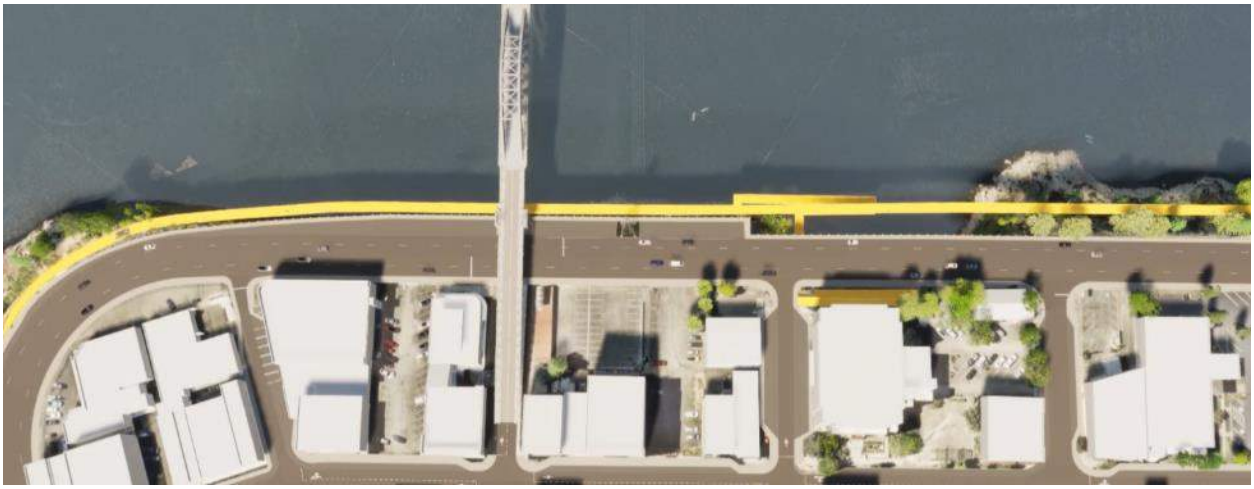
Alternative 1B: Full External Alignment (Refined)

The 1B alternative is a full length alignment comprised of a standalone structure fully separated and independent from the viaduct and McLoughlin Boulevard seawall. The shared-use path runs parallel and adjacent to McLoughlin Boulevard with a 20-foot minimum offset when adjacent to the viaduct. A grade separated undercrossing of McLoughlin Boulevard at 8th Street is included as part of Alternative 1B. The separated structure provides passage through available openings in the Historic Arch Bridge without physical need to perforate the bridge pier and enabling for alignment continuity at the existing arch bridge.

Southwest of the Historic Arch Bridge, the shared-use path runs parallel to the seawall connecting to the planned open space and tumwata village development. Figure 1 illustrates the conceptual rendering for Alternative 1B: High Route (Refined) and Figure 2 illustrates the conceptual alignment as an aerial view.

Figure 1. Alternative 1B: High Route (Refined) Concept Design

Figure 2. Alternative 1B: High Route (Refined) Alignment



Alternative 1D: Partial External Alignment (North Tie-in)

The 1D alternative is a partial length alignment comprised of a standalone structure fully separate and independent from the viaduct between 10th Street and 8th Street only. Between 10th Street and 8th Street, the shared-use path runs parallel and adjacent to McLoughlin Boulevard with a 20-foot minimum offset.

North of the Historic Arch Bridge, the shared-use path ties into McLoughlin Boulevard right-of-way at 8th Street where the section widens and is supported by a seawall (currently occupied by on-street parking). This alignment passes through the utility tower requiring modifications to the utility structure to afford this alignment alternative. A separated structure connecting portions of the seawall adjacent to the existing arch bridge is provided to enable passage through available openings in the Historic Arch Bridge without physical need to perforate the bridge pier. Southwest of the Historic Arch Bridge, the shared-use

path ties back to McLoughlin Boulevard right-of-way and runs along the seawall connecting to the planned open space and tumwata village development. Figure 3 illustrates the conceptual rendering for Alternative 1B: High Route (North Tie-In) and Figure 4 illustrates the conceptual alignment as an aerial view.

Figure 3. Alternative 1D: High Route (North Tie-In) Concept Design

Figure 4. Alternative 1D: High Route (North Tie-In) Alignment

Alternative 1E: Partial External Alignment (South Tie-in)

The 1E Alternative is a partial length alignment consisting of a standalone structure fully separated, and independent from the viaduct and the McLoughlin Boulevard seawall northeast of the Historic Arch Bridge. Once the shared-use path traverses around the existing arch bridge pier (similar to 1D, through the arch columns), the alignment ties back into McLoughlin Boulevard right-of-way and runs along the seawall connecting to the planned open space and tumwata village development (similar to Alternative 1D).

Figure 5 illustrates the conceptual rendering for Alternative 1E: High Route (South Tie-In) and Figure 6 illustrates the conceptual alignment as an aerial view.

Figure 5. Alternative 1E: High Route (South Tie-In) Concept Design

Figure 6. Alternative 1E: High Route (South Tie-In) Alignment

Structural and Constructability Evaluation & Screening

Focused on the initial three most promising alternatives previously described, the project team evaluated the alignments to determine conceptual structural viability to support solutions by considering aspects ranging from ground support to span options. The third mile long project site is comprised of a wide range of physical constraints and boundary conditions which directly influence opportunity for viable superstructure and substructure solutions. These portions are as summarized Table 1 and descriptions of the segments shown in Figure 7.

Figure 7. Alignment Segments

Conceptual structural viability commenced with coordination with the geotechnical engineer to determine the availability of potential ground support locations capable of accommodating a range of evaluated conceptual structural solutions. In addition to considering externally supported span layouts and viable superstructure types to the west of the existing seawall and viaducts, the project team also considered in-board (behind the seawall) structural support options capable of providing external (to the wall) support to external alignments *without* the need for external supports. By cantilevering a structure anchored behind the seawall over the top of the wall, it was considered conceptually possible to eliminate external ground support and avoid wall-mounted supports to the unreinforced existing seawall.

The availability, condition, and capability of ground support conditions is critical to determining viable structural superstructure and substructure options. This is necessary to ensure that the initial most promising alternatives could meet conceptual structural, geotechnical, and constructability requirements before further refinement and conceptual design development and evaluation is advanced.

Table 1. Description of Alignment Portions

Alignment Portion	Physical Constraint	Challenge
A. North of Seawall	Existing Viaduct Structures Ground conditions Water frontage	Existing span configurations, physical offset for maintenance and inspection Variable ground conditions and availability for foundations Proximity of river limits, river water level fluctuations, bathymetric ground support limitations Utility structures
B. Seawall (North of the Existing Arch)	Existing Seawall Structure Existing gravity main, gas, and other utilities Overhead utility catenaries	Variable ground conditions and availability for foundations Proximity of river limits, river water level fluctuations, bathymetric ground support limitations Utility structures Seawall sensitivity conditions: Unreinforced concrete wall with limited data providing construction and structural properties. Portions of the seawall may be failing Cultural and archeological impacts in fill and native ground behind the seawall
C. Existing Historic Arch Bridge	Historic Bridge Structure	Limited availability of ground support Proximity of river limits, river water level fluctuations, water depths over 80 ft. No capability for existing arch to provide structural support
D. Seawall (South of the Existing Arch)	Existing Seawall Structure Existing gravity main, gas, and other utilities	Proximity of river limits, river water level fluctuations, bathymetric ground support restrictions, water depths over 80 ft Variable ground conditions and availability for foundations Utility structures Seawall sensitivity conditions: Unreinforced concrete wall with limited data providing construction and structural properties. Portions of the seawall may be failing Cultural and archeological impacts in fill and native ground behind the seawall
E. Seawall at South End of Alignment	Ground conditions Utilities Horizontal curvature	Horizontal alignment and tie in between the project limits

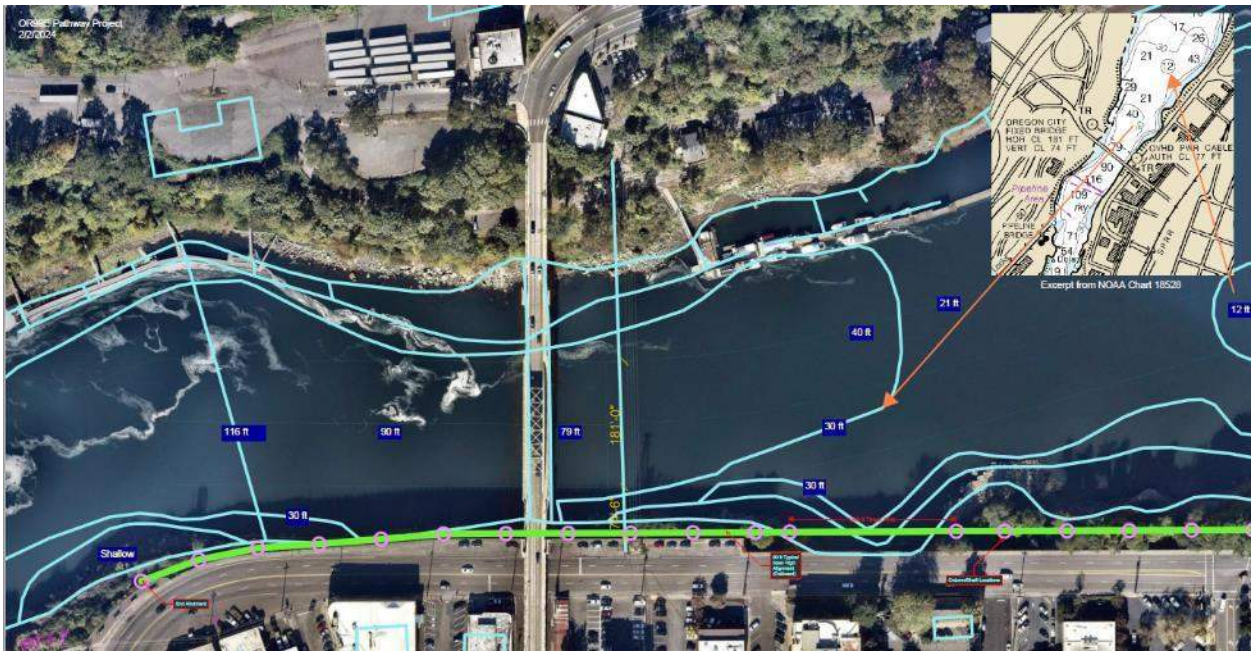
GEOTECHNICAL AND FOUNDATION ASSESSMENT

The project team evaluated the possible foundation locations and geotechnical conditions for all three of the initial most promising alternatives. As shown in Figure 8, 18 bents were identified as locations for footings based upon conventional conceptual span arrangements that could provide cost-effective and constructible concrete girder solutions for the initial most promising alignment supports.

Figure 8. Bents along Alignment

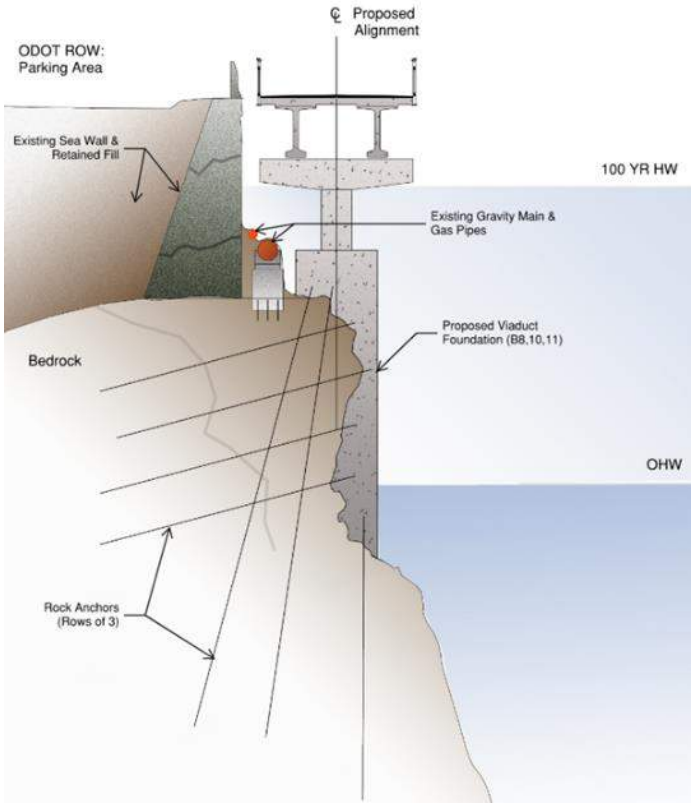
A geotechnical analysis and review of the publicly available ground and bathymetric conditions, shown in Figure 9, indicated that there was little to no opportunity for external foundation support between Bent 11 and Bent 15. This finding was due to the practical lack of available ground, steep vertical rock surfaces, and a steep ground drop off at the base of the seawall extending below water where depths extend up to 90 feet.

Figure 9. Ground and Bathymetric Conditions



The availability for foundations in the vicinity of the arch is extremely limited and a minimum structural span of at least 90 feet is required to connect available rock outcroppings adjacent to the existing arch piers. South of the existing arch, it was determined that there could be a unique opportunity for a foundation support at Bent 11 which could be feasibly accommodated by drilling and anchoring into the rock face below the front face of the seawall as shown in Figure 10.

Figure 10. Typical Foundation with Rock Anchorage



It was determined that foundations and structural supports in the vicinity of the existing arch bridge would require extensive vertical and horizontal anchorage to provide adequate support to the rock face while improving the rock layer's stability. This approach could be conceptually achieved with rock anchors drilled and anchored into the rock outcropping below the existing seawall. The concept shown in Figure 10 for Bent 11 would also apply at Bent 10 and Bent 8, whereas other locations could employ more typical vertical bearing-type footings assuming excavated rock benches and micropiled footings were constructed. All external footings would require vertical micropiles in addition to horizontal rock anchorages to resist both lateral seismic forces and overturning demands.

Footings adjacent to the existing arch (Bents 10 and 11) produce increased risk due to the high number of rock anchors required and the proximity to the existing arch bridge, gravity sewer main, and gas line. In addition, most of the bents would require construction work within the ordinary high-water zone which increases challenges due to in-water work, proximity to the river, and the need for containment and pollution control in a river generating high flow rates, strong currents, and large vertical fluctuation rates. Completed foundations at these locations would require scour protection as the river is hydraulically abrasive along the entire length of the most promising alternatives.

Anticipated ground-support constructability challenges and risks associated with the majority of the 18 foundations would require complicated structural solutions which may have limited construction timing windows (I.e. in-water work) to construct them as well as requirements to meet permitting requirements and lead times. As seen in Figure 11 which provide a visual of potential footing locations superimposed on the LiDAR point cloud data, Bents 12 to 14 would not be able to viably support a footing, requiring alternate conceptual solutions to structural address this gap, and could involve longer spans or a cantilevered solutions extending out over the existing seawall, in order to complete this portion of any alignment following potential foundation support at Bent 11.

Figure 11. Challenges for Foundation Construction

The availability of ground for foundations and structural supports south of Bent 11 becomes available near Bent 15, or approximately, where McLoughlin Boulevard curves eastward and as the existing ground and rock outcropping extends away from the seawall at this location. As shown in the LiDAR point cloud data isometric view in Figure 12, the availability of exposed rock on higher ground provides significantly more accessible and favorable constructability conditions at this location, and consequently, less risk for foundations options assuming that conceptual structural span options can leverage this availability.

Figure 12. Possible Bent Location

STRUCTURAL ASSESSMENT

The project team evaluated the structural requirements for the initial three alignments at a conceptual level to assess feasibility (without completed detailed calculations) to evaluate the viability of structure type and materials to support the most promising alternatives.

Aspects including ease of access, constructability, and substructure placement challenges vary along the initial three most promising alignments in accordance with the physical features previously identified. A wide range of boundary conditions and site constraints influenced the assessment approach and resulted in dividing the project limits into different structural sections along the alignment for the purpose of identifying viable concepts for each segment. Different alignment presented different constraints and unique challenges which required innovative conceptual solutions. Conceptual structural support configurations to support the most promising alternatives are described in more detail in the following sections.

The availability of external ground support provides the locations where conventional viaduct-style support can be located along the project site. An externally or independently supported viaduct-type structure avoids any need to retrofit, widen, or otherwise augment the existing viaduct and seawall structures to rely upon support.

A separated structure reduces direct risk associated with connectivity to existing structures which may have structural integrity issues and/or support limitations; there are key aspects which can only be determined from condition assessments and evaluation of structural capacity for proposed improvements. The limited availability of as-built data and plan sheets for the existing seawall results with a long list of unknowns which substantially increase project constructability risk and cost when considering options which rely upon these structures for support or interaction.

Conceptual structural support options for the most promising alignments which could be accommodated by attaching proposed structures to the external face of the existing wall were eliminated. Numerous risks are associated with anchoring an outboard structure to the unreinforced concrete seawall, especially where limited details and knowledge of the structural condition and the structure’s integrity are available. Unlike the existing viaducts which provide as-built data, the Consultant team was not able to source as-built data for the existing seawall which resulted in difficulty understanding the current and proposed structural capacity of the existing seawall.

Viable conceptual structural support options for supporting the most promising alignments focused on independent, externally supported options consisting of a viaduct-type structure and a longer span alternative. These are described further in detail in the following sections.

All of the conceptual structural solutions considered at this stage and for this viability assessment have been made with limitations to structural engineering calculations and leverage expertise of previous technical and built project approaches. All assumptions made for structural depths and materials uses would need to be verified by detailed design and analysis when evaluated during future design phases.

CONVENTIONAL VIADUCT ALTERNATIVE

This conceptual structural alignment alternative consists of conventional span length structures as external viaduct elements providing physical separation between the existing viaduct and seawall. This conceptual structural solution includes sub elements which include conventional span lengths in addition to a longer span concrete spandrel arch and a tied steel arch section for the purpose of connecting between available ground support and foundation locations. Each conceptual structural sub section and their variations considered in this study are described further in the sections below.

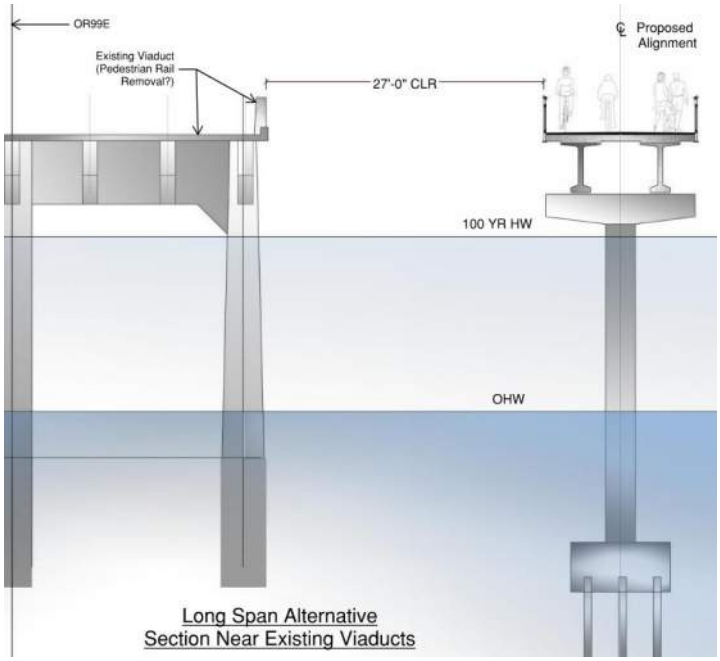
Conventional Span Variations

Three externally supported variations for conventional span arrangement structures were considered for the separated viaduct spans sub sections. Three superstructure variations consisted for locations where bent spacing could be achieved with conventional spans consisted of the following:

1. **Lightweight steel supported superstructure (Lightest superstructure variation)**
    a. Aluminum decking and two wide-flanged steel girders could provide a viable solution. Different alternatives such as FRP decking, composite steel decking and concrete deck were considered, however, aluminum deck was selected due to the benefits of strength, durability, and weight advantages improving constructability.
    b. Span lengths could be in the range of 50 ft. to 90 ft. A maximum span length of 90 ft was selected so that the superstructure could accommodate most locations and span between/thru the existing arch while connecting with available ground supported foundation opportunities.
    c. Substructure elements could consist of single column bents on concrete footings supported by micropiles and rock anchors. Some foundation locations are challenging because of limited support area outside of the existing seawall and utilities and which require lateral anchorage to the existing slope.
    d. This variation provides the lowest weight and results in a lower seismic demand.

2. **Concrete superstructure (Heaviest superstructure variation)**
    a. Consisting of a concrete deck supported by ODOT Standard BT60 girders as shown in Figure 13.
    b. Span lengths similar to steel alternative (50 ft. to 90 ft.) utilizing BT60 girders for most spans and between the existing arc selected so that they can span between/thru the existing arch while also providing the required vertical clearance through the arch.
    c. A concrete superstructure provides improved ease of construction and is a familiar solution for bridges in the Pacific Northwest.
    d. Substructures consisting of single column bents on concrete footings supported by micropiles and rock anchors. Some foundation locations are challenging because of limited support area which require lateral anchorage to the existing slope.
    e. This variation provides the highest weight and results in a higher seismic demand.

Figure 13. Typical External Viaduct Cross Section



3. Seawall cantilever superstructure:

a. A lightweight steel deck supported on steel bents as shown in to provide external support where the availability of outboard ground support was not possible (I.e. between Bent 11 and 15)
b. Cantilevered beams which are anchored and extend out from behind the existing retaining wall, passing over a removed portion of the existing wall (and pedestrian rail) to pick up an outboard alignment supported on the river side of the existing wall.
c. The existing parking lot and ODOT ROW would provide the ground support region and where the roadway could be used to support the structure.
d. Substructure elements to support the cantilever beams would consist of micropiles placed behind the wall that would provide vertical anchorage for backspan uplift. Micropiles would be installed through seawall fil materials and anchored into rock sockets.
e. Cantilevered beams would require close spacing with multiple micropiles to support the cantilever. The cantilever structure could also present user comfort challenges due to the potential for deflection and vibrations as a result of the span and may require vibration mitigation measures to address them.
f. Post-tensioned cantilever beams supported by precast prestressed (PCPS) in-fill slabs could be used as decking between the cantilever beams and would provide finished grade for parking, a multiuse path, or landscaping elements.
g. Modification to the top of the existing seawall would be required to retain finished grade and provide structural separation over the top of the remaining seawall to eliminate any vertical load path between the proposed and existing structures.
h. The variation requires excavation of materials from behind the seawall and results in a structure which is residually loaded in tension under live pedestrian and/or traffic condition is applied where vehicles may travel.

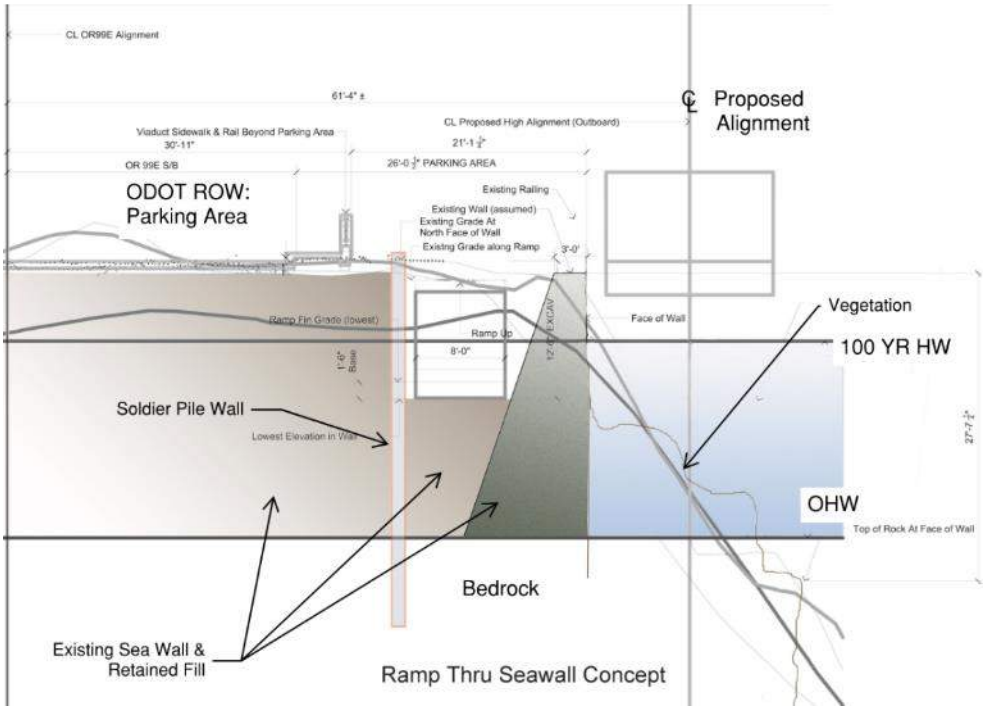
The seawall cantilever variation was also evaluated and considered for conceptual structural support of initial most promising alignment portions south of the existing arch between Bent 11 and 15 where the existing ground availability and conditions on front of the existing seawall conditions prevented any viable foundation options.

In order to progress this alignment variation further south than Bent 11, the parking area adjacent to the OR99E southbound roadway would need to be removed to construct the seawall cantilever system. A depth of approximately two to five feet of the parking area would be removed from from the southbound curb line to the back of the existing seawall. The parking area would not be available during construction of the seawall cantilever variation. However, pedestrian use, landscaping and/or traffic flow could be restored to the final constructed condition.

Application of the seawall cantilever concept any further south of the area where the parking area tapers back towards the southbound lane of OR99E would require lane reductions to McLoughlin Boulevard during construction and would result in a structure which remains anchored in sustained uplift (tension) throughout the service life, offering risk to serviceability. Figure 14 shows the structural approach considered for the seawall cantilever option and indicates that excavation of the upper 2-5 feet of materials behind the seawall would be required to be removed for the installation of the cantilever system. Additionally, numerous micropiles are required for the purpose of anchoring the cantilever span which involves perforating the materials behind the seawall and embedding piles into rock for anchorage.

Further evaluation and consideration of this variation to conceptually support the initial most promising alignments was discontinued due to constructability issues and the structure’s permanent state of tension in its final condition under live use. As a result, this structural support sub element was eliminated as a structural option for any alignment support portions.

Figure 14. Typical Seawall Cantilever Cross Section



Longer Span: 240 ft Spandrel Arch

At a section of the alignment located between 8th Street and 9th Street and as shown in Figure 15, the alignment posed challenges for foundation construction in the river. The longer span elements of the existing viaducts span an area considered to be an original natural river channel and produces a ground profile that presents challenges for providing viable foundation supports without more detailed bathymetric and hydraulic data. To provide a conservative conceptual structural span solution given the lack of available ground information and based upon what is available, a 240 ft long span spandrel arch with foundations connecting locations denoted Bent 5 and Bent 6 as shown in Figure 15 would be viable: This structural concept is illustrated in Figure 16 as an isometric sketch in the LiDAR point cloud data model.

The longer span spandrel arch concept integrates conventional BT-60 girders and concrete decking similar to the conventional span structures described previously while being supported by a longer span concrete arch rib located below the deck. The arch rib would have a typical rise to span ration of 15% and provide supports to deck at quarter points, producing thrust at the foundations which would be resisted by foundations anchored into the rock.

Figure 15. Foundation Limitations/Challenges Between Bent 5 and 6 (9th Street to 8th Street)

Figure 16. Spandrel Arch Concept View

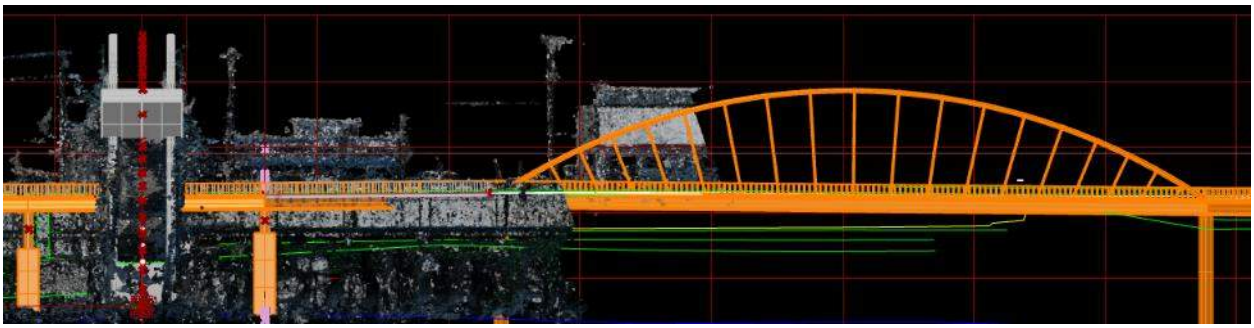
Longer Span: 270 ft Steel Arch

To meet the requirements to complete a portion of the most promising alignments where the availability of external ground support does not exist, a longer span option could be required to span between available foundation support near Bent 11 and Bent 15. In particular, this conceptual structural support alignment variation (see elevation view in Figure 17) was considered structurally viable and would consist of a long span steel tied arch as shown in Figure 18.

This structure could span from a bent constructed behind the seawall to a bent location located on available ground support near Bent 15 on the river side of the existing seawall. Assuming that risks associated with excavating the fill behind the existing seawall or adjacent to the existing arch could be managed, this fill-in span could provide for a conventional span arrangement to complete the portion of most promising alignment to the end of the project site.

The steel arch would provide an above-the-deck structure to minimize deck structural depth and provide the least impact to grade changes of the alignment in order to traverse this portion of the most promising alignment.

Figure 17. Long Span Steel Arch Concept South of the Existing Arch



The north foundation of the steel-tied arch could be located immediately south of the existing arch behind the seawall, and the south foundation could be located at the shore where there is ground support availability for a foundation near Bent 15. Improved construction site access and staging provide space for crane to drill large diameter shafts at this location, however, there are risks associated with excavation of backfill materials and working in close proximity to both the existing arch and seawall structures. Both of these existing structures would need to be adequately evaluated to confirm that foundation supports in this area are feasible and cost effective.

Construction of the foundation closest to the existing arch would require excavation of materials from behind the existing seawall in addition to modifications to the existing pedestrian rail to ensure that the finished grade can be accommodated.

In addition, foundations for this portion of the alignment would require excavation of materials to construct the large diameter shafts required to support the arches, and barrier separation between McLoughlin Boulevard and the bridge structure would be required to ensure safety from vehicle impacts. A vertical grade separation of the through arch could mitigate impacts to the existing paved parking surfaces by limiting excavation for bridge low chord clearances to shallow depths. Grade separation could also mitigate seawall backfill and actual seawall structure removal and could introduce a vertical profile into the alignment that may impact user comfort, when combined with horizontal alignment changes to connect the spans between available foundations at Bent 11 and Bent 14.

Figure 18. Steel Arch Isometric View

Table 2 provides a summary of the different types of structures considered for the conventional viaduct alternative along with their advantages and disadvantages.

Table 2. Type of Structure

Conceptual Structure Type	Description	Advantages	Disadvantages
Seawall Cantilever	• Aluminum decking • W-flanged Steel bents anchored to closely spaced post-tensioned concrete bents supporting PCPS slabs • Multiple micropiles with threaded rods or anchors	Anchors in the parking area, spans over the seawall without external supports, reduced utility impacts	Back span challenges, loaded in tension (anchor), deflection sensitive, excavation behind seawall, post-tensioning and dampening may be required. Excavation and cultural/archeological impacts
Externally Supported Viaduct (Concrete)	• Concrete deck • Two-ODOT Std. 'BT' girders • Hammerhead Pier • Single column bent • Concrete foundation supported by micropiles and rock anchors, Foundation depth and size varies.	Conventional, low cost and maintenance	Seismically heavy with increased lateral demands and clearances, limited spans, low aesthetic value, foundation challenges, hydraulic and in-water permitting, excavation over numerous locations increases archeological/ cultural impacts, temporary access bridges, roadway impacts

Externally Supported Viaduct (Lightweight)	• Aluminum decking • W-flanged Steel girders • Hammerhead Pier • Single column bent • Concrete foundation supported by micropiles and rock anchors, Foundation depth and size varies.	Low seismic weight and lower lateral displacement demand/separation, construction speed, durable aluminum	Expensive alternative, steel corrosion protection/maintenance
Extended Span Spandrel Arch	• Concrete deck • ODOT Std BT60 girder spans • Main concrete arch ribs • Single column bents • Concrete foundation supported by micropiles and rock anchors.	Span length, aesthetic value	Foundations near, in water/ permitting and excavations increase cultural/archeological impacts
Extended Span Steel Tied Arch	• Aluminum deck or concrete deck • Steel tied arch with steel arch and edge beams • Drilled shaft foundation	Avoids challenging foundations where no ground exists, above deck for low chord reduction	Visual impacts, seawall excavation and integration impacts, alignment challenges, Excavation and cultural/archeological impacts

Conventional Viaduct Alternative Summary

Each of the structural variations considered as conceptual structural support for the initial most promising alignment are known to introduce numerous risks to the existing seawall, the adjacent utilities, and the constructability of the foundation in front of, or behind, the seawall.

Excavation, drilling, or replacement of materials behind or adjacent to the seawall introduce risk to the structural integrity and safety of the seawall in addition to the potential risk of impacts to cultural/archeological materials, which are challenging to assess and quantify risk and construction cost for due to a wide variability of unknown conditions below the surface.

A conventional span arrangement in addition to a longer span arch span configuration provide a viable independently and physically separated alignment support options for a portion of the most promising alignment from Bent 0 to Bent 10, and a viable passage through the existing arch bridge to Bent 11. However, the portion of the most promising alignment located between Bent 11 and Bent 15 is challenged by the lack of available ground support options which introduce risks to existing structures when considering the conceptual structural solutions as evaluated for this section.

Increased constructability risks may result from excavation of materials for grading and structural foundations near the existing seawall and the arch bridge to support the most promising alignment. This may also be impacted by the introduction of additional vertical and horizontal alignment elements which may add challenges and may impact the user experience.

Constructability challenges associated with the unknown structural integrity and condition of the existing seawall present challenges for the construction of new structural elements near them, while risks to cultural and archeological impacts escalate also. Due to the challenges of the fill-in span portion between

Bent 11 and Bent 15, the viability of this conceptual structural support variation may be limited and may not provide a feasible solution.

LONG SPAN CABLE SUPPORTED ALTERNATIVE

The consideration of foundation challenges, construction access difficulties, traffic control measures, and numerous constructability challenges associated with exploring the viability of the conventional conceptual structure span variations highlighted the challenges with attaining the structural support for the most promising alignment 1B.

Presented with the numerous challenges, the project team pushed further to explore bridge types beyond conventional spans in order to explore viable and constructible solutions for completing the most promising alignment, from one end of the proposed project site to the other.

To determine an alternative conceptual structural support solution that could alleviate all of these constraining obstacles, a long-span cable-supported structure was explored as it was considered key to leveraging the geometric and structural benefits of this type of structure to address the project site's challenges by spanning above them.

A cable-supported, suspended-style structure like the one shown in Figure 19 could provide a structural support concept that may be able to efficiently and effectively traverses these difficult conditions and leverages the location of improved ground conditions that were identified at either end of the alignment.

Figure 19. Example of a Cable-Supported Structure

Vranov Lake Suspension Bridge, Source: SHP

Long-span, cable-supported bridges are effective specialty solutions when boundary conditions and site constraints prevent the economical application of conventional bridge types. By increasing the span, fewer foundations are required, and the value of long-span structures are realized. The reduced number of foundations provides significant reductions in risk and improved opportunities to avoid excavation issues

and minimize in-water and permitting risks. With significantly fewer foundation locations, the opportunity for cultural or archeological impacts is also significantly minimized. Figure 20 shows how a temporary connection between the bridge's towers (a high line) may provide construction access that avoids the need for a temporary bridge, designated traffic lane access on adjacent roadways, or access in the waterway. This approach would need to be checked for the project site conditions taking into account the clearance envelope of the existing arch bridge's vehicular traffic and understanding all adjacent impacts from overhead utilities.

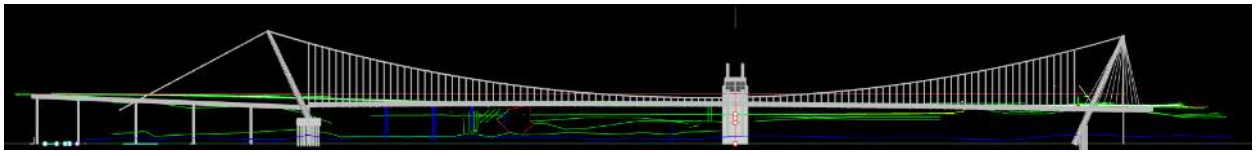
Figure 20. Construction Access Between Bridge Towers

Columbia River Skywalk, Source: Coastline Composites

Willamette River Bridge Construction, Eugene, Oregon, Source: SHP

The long-span cable-supported alternative as shown in Figure 21 would consist of a cable-supported structure with the north foundation located north of 9th Street and the south foundation that is located south of 6th Street. This alternative spans across the two challenging locations where foundations cannot be placed and avoids conflict with the existing arch and the existing utility tower.

Figure 21. Long Span Cable Supported Elevation



As part of this conceptual structure support evaluation, two cable-supported superstructure alternatives were considered. One alternative was to utilize the lightweight steel/aluminum deck with smaller towers and smaller foundations, and the second alternative was to utilize a concrete deck requiring larger towers and substructures in order to accommodate the increased forces on the main span cables supporting the deck of the span. Both approaches offer a 14'-0" clear travel width except through the existing arch which would be narrowed to 12'-0" to ensure that a 16'-0" wide total deck width would provide sufficient clearance to the arch bridge during service deflections.

Conceptually, the towers could be inclined tapered steel section with concrete encasing to support the required geometry for the catenary mainlines which support the deck along the alignment profile and provide strength in resisting the imposed structural loading on the towers into the foundations. This approach has structural advantages to resisting the dead and live load demands while also providing a symmetrical structural configuration in elevation and providing an opportunity for a viewing area at the south tower to add ballast and reduce in-span loading.

The north tower support footing could be a large concrete foundation supported by micropiles because of the difficulty to mobilize drilled shaft equipment. The south tower support footing could be a drilled shaft foundation because of improved non-water access for drilled shaft equipment from McLoughlin Boulevard roadway. Both these foundations would require tie down anchors and foundation anchorages to support the structure.

Table 3 provides the advantages and disadvantages of the long span cable supported alternative over the conventional viaduct alternative.

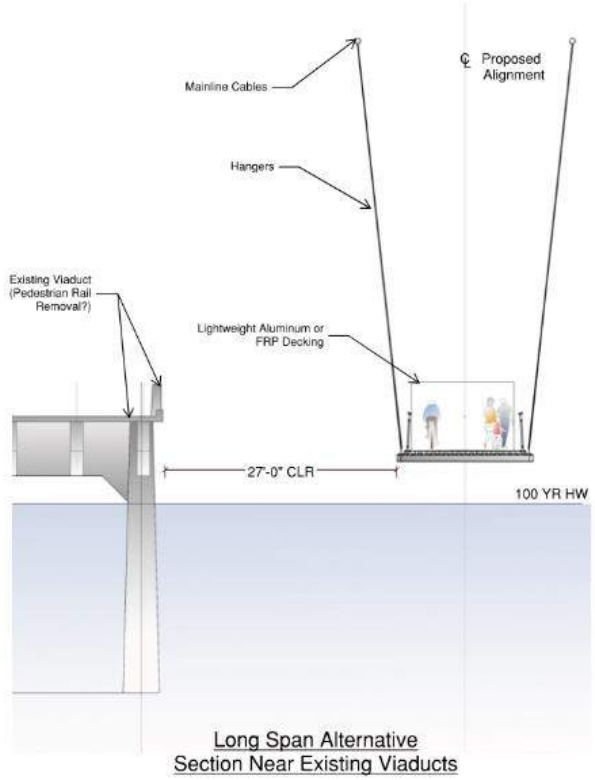
Table 3. Advantages and Disadvantages of Long Span Alternative

Conceptual Structure Type	Description	Advantages	Disadvantages
Long Span Cable Supported Span	• Aluminum deck or concrete deck • Deck supported by main cables and steel hangers • Inclined tapered main towers • Foundations either supported on micropiles or drilled shafts with tie down anchors.	Minimal foundations/ excavation locations with impacts to cultural/ archeological areas, impact to existing arch (structural and aesthetic), bypasses (by spanning over) site constraints	Specialized design, long term maintenance program for cables and hardware, lateral support, wind and vibration assessment will require scale model testing at design stage, above deck support structure

LONG SPAN CABLE SUPPORTED ALTERNATIVE SUMMARY

By leveraging the benefits of the cable-supported suspension bridge mainline sag at midspan, the bridge's support structure drops to a minimal level at midspan to provide adequate clearance and passage through the existing arch bridge without requiring additional foundations for support: In effect, a very low profile structural producing minimal visual impact to the existing arch and seawall while avoiding foundation impacts to the adjacent utilities and the existing seawall due to clear separation between the structures as seen in Figure 22.

Figure 22. Long Span Section



As viewed in Figure 23, the structure efficiently passes through the existing arch bridge and under the overhead catenary utility lines with foundations that are the farthest possible location from these existing structures. The risks of a long span bridge can be managed through design and construction utilizing expertise and would eliminate many of the unknowns associated with excavation on or near the existing arch bridge and the seawall.

Figure 23. 1B Long Span Variation

The effectiveness of the long span solution is evident from its minimal foundation footprint. The conceptual long span solution addresses many of the site constraints imposed by the unknown structural integrity and condition of the existing seawall, effectively spanning over the issues.

A significant reduction of the number of foundations allows for risks associated with the excavation of materials to be reduced and mitigated: This minimizing risks to cultural and archeological impacts by avoiding what's not known entirely.

Technically the long span solution is bold for its ability to bypass most of the site through a cable supported system but also raises technical risk both for design and construction to address.

GRADE SEPARATED UNDERCROSSING OF MCLOUGHLIN BLVD

For all alternatives there is a desire to create a grade separated crossing of McLoughlin Boulevard to increase access, comfort, connectivity, and safety for shared-use path users to and from downtown Oregon City. The existing McLoughlin Boulevard viaduct presents the opportunity for a grade separated undercrossing. Based on preliminary assessment and survey, geometric clearances for a grade separated undercrossing appear to be feasible. The following section describes the grade separated undercrossings of McLoughlin Boulevard that have been explored and evaluated to-date.

It is worth noting that the grade separated undercrossing concept can be advanced independently from the shared-use path concept as an at-grade crossing of McLoughlin Boulevard is still being explored.

8th Street Undercrossing (Ramp Outside Shared-use Path)

The initial undercrossing concept included a ramp that extended under McLoughlin Boulevard at 8th Street, with access provided at the location of the existing 8th Street stairwell. The connection passed under the viaduct utilizing conventional concrete girders and foundation supports, then ramping up on the outside (river side) of the shared-use path. This concept is shown in Figure 24.

Figure 24. 8th Street Undercrossing (Ramp Outside Shared-use Path)

The 8th Street Undercrossing (Ramp Outside Shared-use Path) was determined infeasible and dismissed due to an inability to structurally support that westerly external ramping over the river. This location would require in-water construction with deep foundations and additional permits including the US Coast Guard.

8th Street Undercrossing (Ramp Inside Shared-use Path)

The second grade separated undercrossing concept explored included a ramping structure on the inside of the shared-use path between the shared-use path and viaduct. This concept required utilization of the existing parking area to ramp path users up to the grade of the McLoughlin Boulevard right-of-way. This concept is shown in Figure 25 and involved a soldier piled wall to support McLoughlin Boulevard while providing the opportunity for a grade separation in the fill behind the existing seawall.

Figure 25. 8th Street Undercrossing (Ramp Inside Shared-use Path)

This approach was also dismissed due to cultural and structural concerns in developing internal ramping within the parking area behind the seawall. Specifically, cultural concerns arise from excavation behind the wall, which might damage some cultural resources. Issues due to excavation near the wall also carry the risk of damage to the unreinforced structure, in addition to requiring modifications to the utility tower.

9th Street Undercrossing

To address the issues identified in the two initial 8th Street concepts, a third approach for a grade separated undercrossing was identified utilizing a new location and tie in of the undercrossing. This third approach is being evaluated to shift the undercrossing to 9th Street. This concept would consist of an entry ramp at 8th Street (near the existing stairwell), and would then ramp down to toward 9th Street, traverse underneath McLoughlin Boulevard, and connect to the shared-use path alignment at 9th Street. A sketch of the alignment is shown in Figure 26.

Figure 26. 9th Street Undercrossing

Table 4 presents a summary of the grade separated undercrossing options considered. The 9th Street Undercrossing and No-Build concepts have been identified as the most promising alternatives based on cultural and structural concerns.

Table 4. McLoughlin Boulevard Grade Separated Undercrossing Alternatives Options Summary

Ramp Option	Description	Considerations/Disadvantages
8th Street (Ramp Outside Shared-use Path)	Connects near existing 8th Street stairwell. Ramps down and passes underneath McLoughlin Boulevard. Ramps up on the outside (riverside) of the shared-use path.	- Structurally infeasible due to piles in water and lack of support.
8th Street (Ramp Inside Shared-use Path)	Connects near existing 8th Street stairwell. Ramps down and passes underneath McLoughlin Boulevard. Ramps up on the inside of the shared-use path (between viaduct and shared-use path) utilizing existing parking area.	- Cultural concerns from excavation behind the wall. - Risk to damage of the unreinforced structure from excavation. - Requires modifications to the utility tower.
9th Street Undercrossing	Connects near existing 8th Street stairwell. Ramps down and passes underneath McLoughlin Boulevard near 9th Street. Ramps up on the outside (riverside) of the shared-use path.	- Limited ROW - Numerous utility elements to be traversed/passed - Lack of available foundation supports below the viaducts - Impacts to current viaduct inspection and maintenance procedures - Security issues
No-Build	No connection from 8th Street to the shared-use path.	- Does not require any structural modification to the alignment. - No cost.

REFINED MOST PROMISING ALTERNATIVES

Based on the structural and geotechnical analysis, the original three most promising alternatives were refined into the following most promising alternative consisting of two conceptual structural support variations:

- Alternative 1B: Viaduct Full External Alignment
- Alternative 1B: Long Span Full External Alignment

Alternative 1B: Viaduct Full External Alignment

The conventional viaduct as a conceptual structural support variation for Alternative 1B would involve an externally supported path along the viaduct section of the alignment utilizing conventional spas of about 80 to 100 feet. To traverse areas with reduced ground availability, longer fill-in spans are proposed as an approach to span these ground constraints. Between Bent 5 and 6, a 240-ft spandrel arch would provide below deck support to the alignment, while an above deck supported steel tied arch would span approximately 270 ft to span a challenging section of the alignment between Bents 11 and 15. A conventional viaduct span of approximately 90 feet would be supported on foundations adjacent to the Historic Arch Bridge and provide structural support to the alignment through openings between the existing arch bridges columns. Figure 27 provides a conceptual elevation view and Figure 28 provides a conceptual sketch view of this alignment support concept variation.

Figure 27. Alternative 1B: Long-Span Alternative

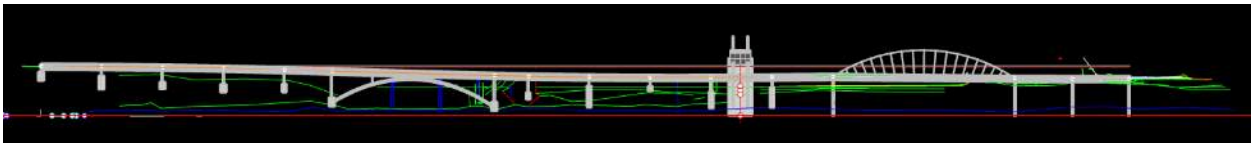


Figure 28. 1B Viaduct Concept Looking Towards the Existing Arch Bridge

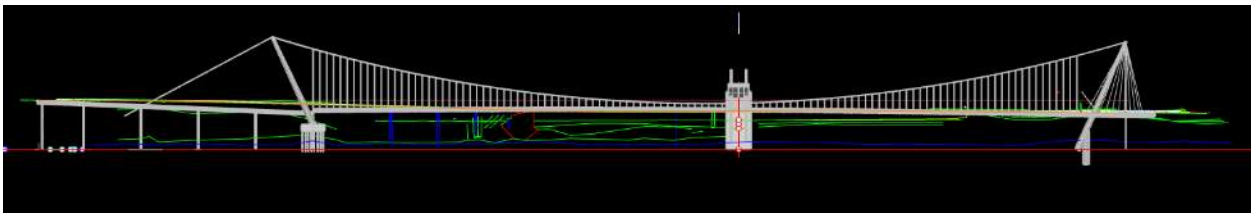
Alternative 1B: Long Span Full External Alignment

The long span conceptual structural support variation for Alternative 1B would involve a long span, cable supported, suspension structure. The structure would span approximately 1,250 feet and be located at

least 20 feet from the viaduct. The deck could be concrete or lightweight aluminum or FRP deck panels and could provide a minimized foundation footprint by eliminating a majority of foundation requirements and eliminating the needs for temporary supports on the ground or in the river.

During construction, the long span alternative provides advantages that minimize traffic disruption and in-water work as the suspension bridge erection methods offer unique methods which allow the work to be constructed from the mainline cables, temporary bearing cables, and/or with the use of a high-line to supply and deliver prefabricated decking panels and construction materials. Reduced construction time is an advantage especially when the necessary components are prefabricated off-site and assembled on location during a recued window of construction activities for the superstructure erection procedures.

Figure 29. Alternative 1B: Long-Span Alternative



This conceptual span would minimize impacts to the seawall by providing adequate physical separation while effectively passing through the existing arch bridge with a low impact structural solution. The long span concept ensures that major foundations are located a maximum distance from the existing arch, seawall, and utility locations. Figure 29 provides a conceptual elevation view of the alignment while Figure 30 provides an isometric sketch view of this concept as it passes through the existing arch and below the existing overhead utility catenaries to connect both ends of the project site and to fulfill the objectives of supporting the most promising Alternative 1B.

Figure 30. 1B Long Span Concept Looking South Towards the Existing Arch Bridge

Most Promising Alternative Considerations

The following section describes the considerations, opportunities, and challenges impacting the feasibility of the two refined most promising alternatives. This includes placemaking opportunities, connectivity, economic development opportunities, environmental feasibility, relative cost, environmental screening, and community input for the two refined most promising alternatives.

USER EXPERIENCE

Connectivity

The two refined most promising alternatives provide equal opportunities for connectivity to adjacent land uses, existing and planned active transportation facilities, and grade separated crossings of McLoughlin Boulevard. However, certain shared-use path alternative alignments may require additional structural support and shared-use path design adaptation to accommodate these connections, resulting in higher cost.

The following section describes the anticipated connectivity opportunities and considerations for the most promising alternatives.

LOCATION OF SHARED-USE PATH CONNECTIONS

Both alternatives provide four connection points to other facilities and destinations.

- The northeastern access point at McLoughlin Boulevard and 10th Street connects to the existing shared-use path east of 10th Street. There is also a signalized crossing to downtown at 10th Street, which has continuous sidewalks but no existing or planned bicycle facilities.
- The southwestern access point at the tumwata village connects to planned facilities and amenities in the tumwata village, including a riverfront promenade. In addition, people walking or biking could use the existing signalized crossing at McLoughlin Boulevard and Main Street to access destinations in downtown.
- The potential new grade separated undercrossing of McLoughlin Boulevard at 8th Street/9th Street provides a connection to the stairs to the historic 8th Street dock stairs and downtown.
- All alternatives can provide a connection from the shared-use path to the existing signalized crossing (pedestrian signal) at McLoughlin Boulevard and 7th Street, under the Historic Arch Bridge. This provides an additional connection opportunity to downtown and the parking along McLoughlin Boulevard (or potential alternative linear park).

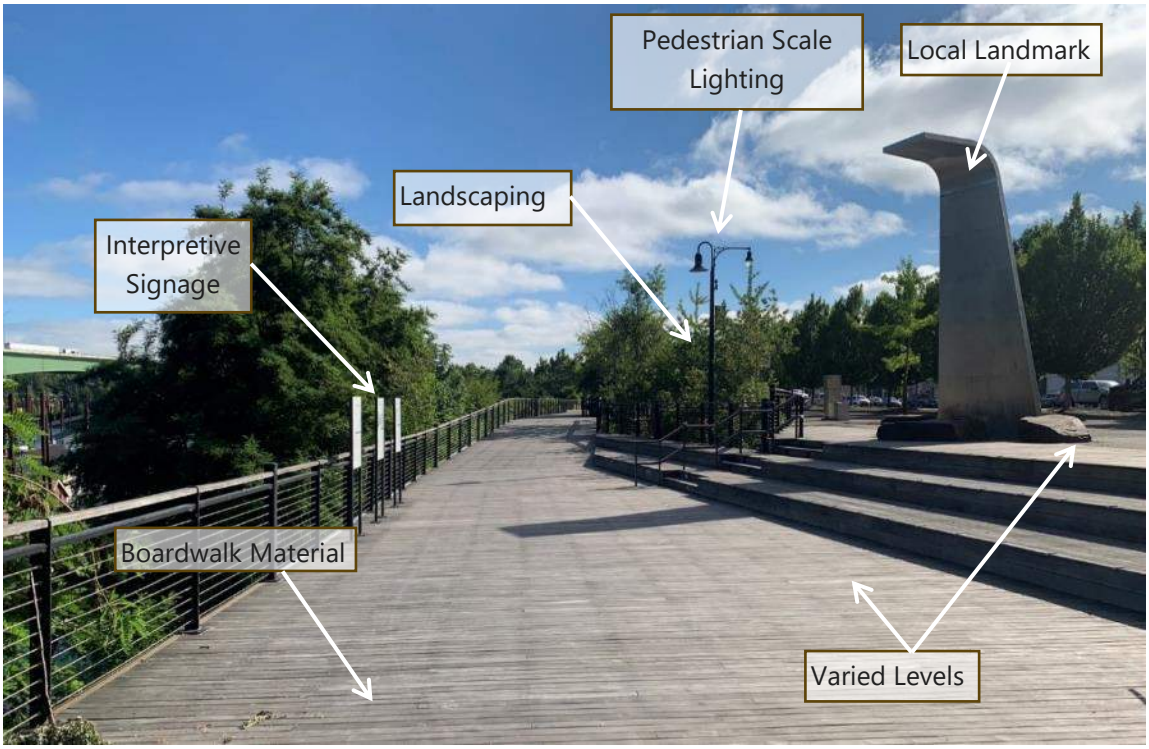
Therefore, all alternatives provide equal connectivity to surrounding areas.

Placemaking Opportunities

Each of the refined most promising alternatives has been developed and will continue to be further refined to optimize placemaking opportunities. Beyond the transportation functionality of the shared-use path, the vision for placemaking elements for the new shared-use path alternative is based on the functionality, characteristics, and aesthetics of the existing shared-use path located north of 10th Street.

The shared-use path northeast of 10th Street has several placemaking elements that could be carried through to the new alignment. Placemaking elements from the existing shared-use path for incorporation into the most promising alternatives are illustrated and described in Figure 31. Additional placemaking opportunities are outlined in the sections below.

Figure 31. Placemaking Elements for Most Promising Alternatives



PATH AMENITIES

Opportunities for shared-use path amenities include:

- **Bulb-Outs:** "Bulb-outs" at certain locations along the alignment that serve as resting spots and viewpoints for shared-use path users. These bulb-outs could include benches, wayfinding, interpretive signage, small landmarks, and/or landscaping. These bulb-outs could be aligned with key views of the river, the Historic Arch Bridge, and the Willamette Falls.

Both viaduct and long span options provide for opportunities for bulb-outs along the alignment. Due to the structural configuration, the long span alternative also provide improved opportunities for significant views of both the Willamette Falls and the Historic Arch Bridge from the south end of the alignment. A bulb-out at this location could be a landmark point of the path, integrating a walkway, seating, landscaping, and design elements to enhance the views. The City of Vancouver provides a similar landmark bulb-out on its Waterfront Path, shown in Figure 32.

  - The new tower foundations could be developed with tribal input to create community features, such as look-outs or to integrate platforms at the tower, potentially for both fishing and improved waterfall viewing.

Figure 32. Example City of Vancouver Landmark Bulb-Out

Source: CODAworx

- **Landmarks:** Landmarks at the bulb-outs and throughout the path (where space allows) could tie into existing design elements on the existing shared-use path and/or highlight certain themes of water, the Willamette Falls, Historic Arch Bridge, and historical and cultural references to place. A consistent theme of elements would create a distinct, recognizable path with its own unique feel. Both refined alternatives create a unique placemaking opportunity for people walking and biking to experience the riverfront, the Willamette Falls, and the Historic Arch Bridge from a new perspective, enabling path users the experience of travelling through the unique historical and cultural resources in the area.

  - For Alternative 1B: Long Span Full External Alignment, the long span structure provides an opportunity to create a landmark through the cable towers, which would improve the visibility of Oregon City from I-205 and to the waterfront path from McLoughlin Boulevard. This could

enhance interest and tourism to the waterfront path, the tumwata village, and downtown Oregon City. However, with this more visible structure, it is important to ensure that the shared-use path structure does not impact views of the Historic Arch Bridge and the Willamette Falls and does mesh well into the fabric of the community.
  - This also applies to the shorter 300-foot span of Alternative 1B: Viaduct Full External Alignment.

- **Lighting:** Human-scale lighting should be included in regular intervals throughout the path to ensure a high level of illumination in the night, increasing personal sense of security. Alternatively, the path could be illuminated with lights embedded in the path structure, such as in Figure 33.
  - Lighting can work to augment and complement the waterfront experience and the existing Historic Arch Bridge and history, as well as avoid impacting them with contemporary lighting.

Figure 33. Shared-Use Path Lighting

Source: iLight Technologies, Inc.

Source: Bixby Electric

- **Wayfinding**: Wayfinding signage that points to specific destinations (such as Main Street and tumwata village) could be added along the path, at bulb-outs, and at key junctions to help direct people to explore Oregon City and its surrounding amenities.
- **Materials:** Material type of the shared-use path railings and surface helps create a more separated, "trail-like" experience and contributes to the overall feel of the path. A boardwalk-type flooring with a sleek, winding railing could tie into the existing shared-use path and help create a calming, nature-focused atmosphere, as shown in the examples illustrated in Figure 34 below.
  - Materials play a key role in minimizing adverse impacts to historic structures and also to complement them. Intentionality in new contemporary materials that tastefully integrate the new structure into the historic and urban fabric can improve the integration of new and historic, versus bolder approaches, which use stronger materials and colors to make statements which may isolate or create intentional difference between structures to develop new aesthetic character.
  - Opportunities to integrate tribal works and materials may also exist; for example, shaping the main tower footings like rock outcroppings with cast concrete to better fit into the natural landscape. Materials with less contrast (i.e. reflective materials vs weathering steels) reflect their surroundings and offer visual integration.

Figure 34. Shared-Use Path Materials

Source: Steven Kroodsma

Source: Abergeldie Complex Infrastructure

- **Landscaping:** Landscaping can be included throughout the shared-use path where space allows, especially in the bulb-outs. This adds to the shared-use path experience and nature-like feel of the space along the water. Landscaping should require minimal maintenance and space, and favor smaller, durable plantings in lieu of trees or plants with complex root systems. In addition, landscaping elements along the path could be tied into the proposed 7th/8th Street park, described in the next section. The current parking areas immediately north and south of the Historic Arch Bridge could also be considered locations for enhanced landscaping with alternative parking locations provided in the future within tumwata village.
  - Footings and structural elements could be integrated into the natural topography by shaping footings to mimic rock outcroppings.
- **Boardwalk:** There is an opportunity to build a boardwalk on the rock outcropping between 9th Street and 10th Street due to the additional structural support, as shown in the red box in Figure 35. This would mean a wider shared-use path structure; the outcropping extends about 60 feet from the roadway. With a 30-foot offset, this leads to an area of about 30 feet. Therefore, this block of widened path could include increased amenities to encourage trail users to recreate, linger and enjoy views, while still providing 14 feet for travel. As discussed in later sections, the 8th Street dock could also be restored to create a hub for recreational water activities.
  - Figure 36 presents possible boardwalk styles and materials, including an example from Bend that could represent the boardwalk structure for both alternatives in this area.

Figure 35. Boardwalk Area

Figure 36. Boardwalk Materials

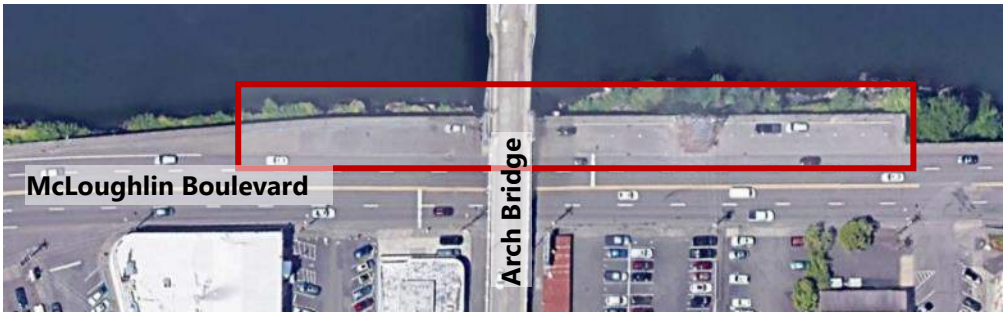
Source: Azure Magazine

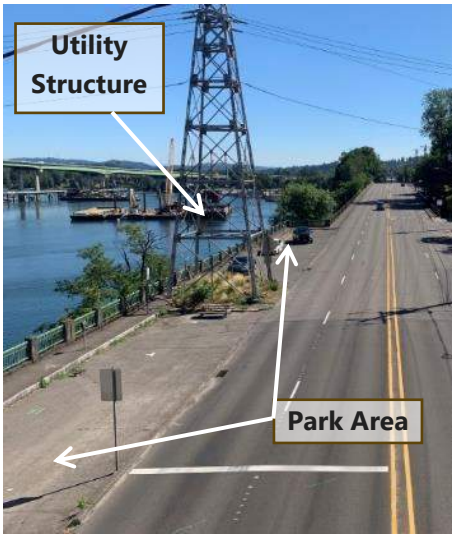
Source: Bend, Oregon

PARK OPPORTUNITIES

The existing parking area along McLoughlin Boulevard between approximately 6th Street and 8th Street, shown in the red box in Figure 37, could be transformed into a green, linear park-like space. This park space would both provide a buffer for the shared-use path from McLoughlin Boulevard and create a new riverfront gathering area for Oregon City residents and tourists. Details of this opportunity for the two refined most promising alternatives are outlined in the sections below.

Figure 37. Potential Park and Placemaking Opportunities





Alternative 1B: Long Span Full External Alignment

Alternative 1B: Long Span Full External Alignment has the shared-use path alignment located completely outside of the parking area. Therefore, that parking area could be transformed into a full "mini" waterfront park, taking up space on either side of the Arch Bridge. The park could include trees and landscaping, benches, picnic tables, and bike parking. It could also serve as a community space and programming opportunity for summer events or special occasions, such as art markets, concerts, and holiday celebrations. The park would allow both users of the shared-use path and people from McLoughlin Boulevard and Main Street to easily access and enjoy the space. Further analysis would need to be conducted regarding the feasibility of removing or modifying the utility structure to create more space for the park. Examples of waterfront parks are shown in Figure 38.

Special attention should be paid to connecting the shared-use path with this park, both physically and visually. This alternative provides an opportunity for a connecting path to the park between the utility tower and the Historic Arch Bridge, facilitating the flow of people to and from the shared-use path and park. Visually, some materials, themes, and landmarks from the path could be carried through from the path to the park.

Figure 38. Alternative 1B: Long Span Full External Alignment

Source: Secret NYC

Source: Experience Mount Pleasant

Alternative 1B: Viaduct Full External Alignment

This alternative would provide a similar opportunity for a park area northeast of the Historic Arch Bridge as described above in Alternative 1B: Long Span Full External Alignment. However, the area southwest of the Historic Arch Bridge would be used for structural support for the 300-foot span. Therefore, the available area for the park is smaller in this alternative.

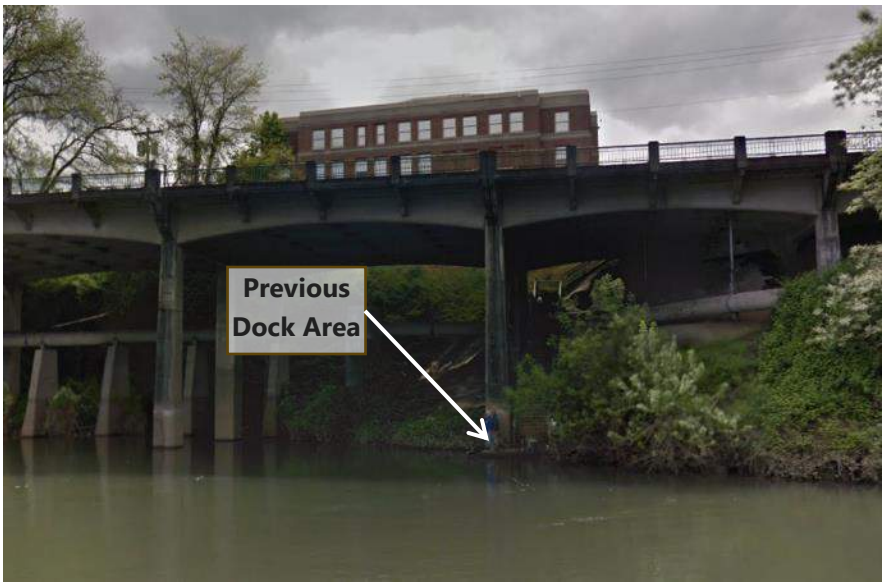
HISTORIC 8TH STREET DOCK LOCATION

Both alternatives will preserve access to the historic dock location at 8th Street, shown in Figure 39. Today, access is provided via a stairwell located adjacent to the Clackamas County Court House between McLoughin Boulevard. Historically, this dock location has been a popular location for swimming, fishing, and other recreational activities. However, it was damaged and then removed. As described in the Structural and Constructability Evaluation & Screening section, the proposed alignment of the new ramping structure to the dock could include a ramp on the south side of McLoughlin Boulevard from 8th

Street to 9th Street, which would then cross under McLoughlin Boulevard and connect to the shared-use path on the north side of McLoughlin Boulevard at 9th Street.

While the shared-use path would not connect directly to the historic dock area, it would improve visibility of the area. In addition, with more people travelling on foot and by bike in this area, it could generate interest in using the space for recreation. Therefore, there is an opportunity to reintroduce the dock to create a hub for easily accessible water activities in Oregon City. A replacement dock could include seating, pedestrian scale lighting, and potential ladders into the water.

Figure 39. Historic 8th Street Dock Location



Frog Ferry Initiative

The Frog Ferry is an initiative to bring passenger ferry service from Vancouver, Washington through Portland to Oregon City. An initial pilot is starting with service from Cathedral Park to RiverPlace in Portland. If and when future ferry service does come to Oregon City, the service could be integrated with the 8th Street dock and the shared-use path in general to create an attractive active transportation connection to the service. A potential ferry stop could be considered if a larger dock is built out.

More information on the Frog Ferry initiative can be found at https://frogferry.com/

Economic Development Opportunities

The existing shared-use path on McLoughlin Boulevard terminates at 10th Street, leaving a gap in comfortable active transportation facilities. The narrow sidewalk currently provided west of 10th Street makes it unappealing as a recreational route and impractical for travelling by bike or foot for transportation. With the proposed tumwata village, an active transportation connection is even more pressing along McLoughlin Boulevard to provide a safe, comfortable, and direct route for people walking and biking.

All shared-use path alternatives would fill that gap by providing easy, fast, and convenient active transportation access along McLoughlin Boulevard. The proposed alternatives would attract recreational trips, with walking, running, and biking encouraged along the waterfront on the shared-use path connection. In addition, it would provide Oregon City residents with a more direct and faster route for transportation trips, with easy access to the proposed tumwata village and businesses along McLoughlin Boulevard and beyond.

Multiple connection points to Main Street (downtown) encourage people visiting or recreating on the shared-use path to patronize Main Street's many shops and restaurants. Vehicular parking can be retained on Main Street, and opportunities to add in additional bike parking and pedestrian amenities to further encourage people to stop by Main Street. Regional recreational trips could induce demand for bicycle rentals, hotels, restaurants, and more.

Further, the shared-use path could help spur economic development along McLoughlin Boulevard. More activity along this major throughway could encourage investment of underdeveloped parcels over time, such as parking lots and auto-centric businesses. Higher land values and higher utilization of land could lead to more potential tax revenue for Oregon City.

Signature structures can increase tourism and visitors to a location, especially for the opportunities that the long span provide to the area, which include:

- Creating a new icon in the region, identifiable from I-205;
- Providing the unique experience of experiencing history on a cable supported structure;
- Creating a gathering space and fostering new experiences and views of the waterfalls, the waterfront, and the Historic Arch Bridge.

Research and case studies conducted on similar pedestrian and bicycle improvement projects provide analytical and evidence-based data that indicates the installation of multimodal street improvements not only positively contribute to local business but can increase number of customers and their spending habits.

North Carolina

The North Carolina Department of Transportation and North Carolina State University's Institute for Transportation Research and Education conducted a study (Reference 1) on the business, community, and trail user benefits of shared-use paths in North Carolina. Several key takeaways from this study include:

- The four studied shared-use paths supported substantial economic benefits to businesses and employees. Shared-use path users made purchases at businesses along the trails, which increased the productivity of these regions and contributed to the state's economy. Shared-use path users spent money on grocery, retail, bike rental, real estate, restaurant, and entertainment sectors.
- The total annual estimated local and state tax collections resulting from trip expenditures for all four shared-use paths was significant ($675,000).
- There was a cost savings related to increased physical activity and reduction in congestion, traffic injuries, and air pollution ($25.7M)

Massachusetts

- MassTrails examined the impacts of four rural and urban shared use paths across Massachusetts in its Shared Use Path Impacts Study (Reference 2). The study found that the economic impacts of each trail ranged from $378,000 to $9.2M, which includes spending at local businesses near the trail. In addition, the paths created 200 jobs and lead to health and environmental savings.

Toronto, Canada

- According to the survey results included in the Bike Lanes, On-street Parking & Business Report produced by Toronto Centre of Active Transportation and Clean Air Partnership (Reference 3), customers who reported that they usually drive, were found to visit less businesses frequently and spend significantly less money per month in the neighborhood than those who did not drive.

National

- The Economic Impacts of Bicycle and Pedestrian Street Improvements study produced by The Summit Foundation (Reference 4) analyzed 14 multimodal street improvement projects in 6 different cities to understand the impacts on local business. Based on the study, street improvements had either positive or non-significant impacts on corridor employment and sales. Food service industry benefits the most and retail industry benefits somewhat from the addition of active transportation infrastructure.
- Making the Economic Case for Cycling a study produced by the Institute for Transportation & Development Policy (Reference 5) documents the economic and environmental benefits as well as individual cost savings for active transportation travel options. Several key takeaways from the study include:
  - In North Carolina's Outer Banks, a onetime investment of $6.7 million in cycling infrastructure generates approximately $60 million in economic activity each year through cycle tourism.
  - Cyclists have been found to spend more per trip and to make shopping and dining trips more often than drivers.
  - Improving access by bicycle to commercial areas results in higher retail sales.
  - Data from corridor improvement projects in several US cities shows that both the number of customers and customers pending crease because of adding bicycle lanes in commercial areas.

ENVIRONMENTAL FEASIBILITY

This section provides a high-level environmental screening of the refined most promising alternatives. The analysis relies on a desktop review of existing environmental resources most likely to be impacted by the alternatives.

Environmental Assessment

HISTORIC AND CULTURAL IMPACTS

Existing resources within the footprint of the most promising alternatives include several historic resources listed or potentially eligible for listing on the National Register of Historic Places. A Determination of Eligibility will be required for those potentially eligible resources to determine if they meet criteria for listing on the Nation Register of Historic Place. Known resources within the footprint of the most promising alternatives include:

- Willamette River (Oregon City) Bridge, aka Oregon City Arch, 1922, listed in the National Register in 2005. (ODOT Bridge # 00357)
- McLoughlin Boulevard, 1940
- McLoughlin Boulevard Guardrail, Parking, and Sidewalk near the Oregon City Arch. c.1940
- Water Street Viaducts and Railing, ODOT Bridge Nos. 02732 and 02374,1940
- Electrical Tower adjacent to Oregon City Historic Arch Bridge, date unknown

Adverse impacts to resources eligible for or listed on the National Register of Historic Places would result in a 4(f) use as defined 49 U.S.C. §303 and 23 U.S.C. §138. Use of a Section 4(f) resource cannot be permitted by Federal Highway Administration (FHWA) if there is a feasible and prudent alternative meeting the project purpose and need that would avoid use of the Section 4(f) resource or would result in least overall harm.

The project area is rich in history and has been used by Tribes for various activities throughout time. Information regarding archaeological sites is not publicly available and therefore not used in the assessment of alternatives.

Preliminary Tribal consult natation has been initiated through the ODOT Tribal Liaison. Additional details are provided later in this memorandum under the Tribal Consultation section.

UNITED STATES ARMY CORPS OF ENGINEERS

In addition to historic resources, components included within the most promising alternatives may include construction elements below the ordinary high water (OHW) of the Willamette River. Placement of fill below OHW will require a Section 404 permit from USACE and possibly Section 408 authorization from USACE. Additional coordination would be required to determine if a USACE Section 408 Authorization would be required.

ENDANGERED SPECIES ACT & MARINE MAMMAL PROTECTION ACT.

This segment of the Willamette River is known to contain Endangered Species Act (ESA) listed salmonids as well as species protected under the Marine Mammal Protection Act.

UNITED STATES COAST GUARD

The Willamette River through the project area is also considered to be a navigable waterway regulated by the United States Coast Guard (USCG).

POTENTIAL IMPACTS

Based on the background information and other work completed by the project team in the vicinity of the study area, a high-level screening of potential impacts for the two most promising alternatives was prepared. Table 5 summarizes the preliminary results of the screening.

Table 5. Potential Impacts for Most Promising Alternatives

Alternative	Section 4(f)	Aquatic Species Impact	Historic Resource Impact	USCG Permit	USACE Permit
1B: Long Span Full External Alignment	Unknown	Yes	Unknown	Yes	Yes
1B: Viaduct Full External Alignment	Unknown	Yes	Yes	Yes	Yes

Environmental Screening Findings

The high-level environmental screening was used to narrow the 11 preliminary alternatives to the three most promising alternatives and then to the two refined most promising alternatives. The environmental screening will be refined as the structural design elements for the two refined most promising alternatives are advanced.

HISTORIC RESOURCE IMPACT

The project team is working on a Determination of Eligibility regarding the utility tower. However, the two refined most promising alternatives are not anticipated to impact the utility tower, as the alignment of the shared-use path in both is outside of the existing parking area, where the utility tower is located.

Both path alignments go through the first span of the Historic Arch Bridge, but do not require any structural modifications to the bridge. However, careful design consideration is needed to ensure that minimal visual impact is made to the Historic Arch Bridge, especially for Alternative 1B: Long Span Full External Alignment, which will have a cable structure through that section of the alignment.

HAZARDOUS MATERIALS

A Hazardous Materials Corridor Assessment (HMCA) was conducted to identify potential environmental conditions that may impact Project construction. The full assessment is provided in Appendix C. Key takeaways include:

- Soils on the embankments and Willamette River shoreline sediments are present at northern locations along OR99E. Because the soils and sediment are adjacent to the roadway and are sinks for roadway pollutants, there is the potential that the soil and sediment do not meet Oregon Department of Environmental Quality (DEQ) Clean Fill criteria and would require disposal at a landfill if disturbed.
- Suspect heating oil tank and underground storage tank (UST) fill ports were identified in or adjacent to the Project Area at 117 6th St./603 Main St., 624 McLoughlin Blvd., and 706 Main St. If the ground surface and/or soils are disturbed in these areas, it is recommended the property owner(s) be notified to determine the status of the suspect tank(s) and to request related documentation. A geophysical survey and soil and groundwater sampling in the vicinity of a tank, and possibly tank decommissioning, may be required.
- The outfall(s) of the catch basins observed during the site walk could not be determined. Determining the outfalls is recommended, and if the outfall is into an underground injection control (UIC), meeting DEQ UIC Program requirements will be necessary.
- The structures and equipment in railings, utility poles, and light poles within and/or adjacent to the Project Area should be inspected for hazardous building materials (e.g., asbestos, lead-based paint, polychlorinated biphenyls (PCBs), and mercury) if they are to be disturbed. Coordination with utility providers and Oregon City may be required for inspection, sampling, and removal.
- Treated timber utility poles are present within the Project Area and may be disturbed by Project construction. Poles with electrical transformers will require coordination with utility providers for proper removal.
- Sites listed in regulatory databases with known and potential contamination were identified on and adjacent to the Project Area. Petroleum contamination may be present in groundwater and soils in the vicinity of these regulatory sites. If dewatering or soil excavation occurs in the vicinity of these sites, soil and groundwater characterizations are recommended. A geophysical survey may also be recommended.

The recommendations for ODOT are listed below.

1. ODOT's Beneficial Use Determination (BUD) does not allow excavated soils to be reused on lots zoned for residential use, but they may be reused on adjacent rights-of-way. However, because the reuse of excavated soils on the Project may be limited in volume and such soils cannot come into contact with or adversely impact groundwater or surface water (including stormwater sheet flow), we recommend sampling escarpment and riverbank soils and river sediment that will be disturbed by construction activities and completing a Clean Fill Determination for managing the material.
2. If structures and equipment in railings, utility poles, and light poles within the Area of Potential Impact (API) are disturbed during construction, a hazardous building material survey is recommended. Special handling of these items and ODOT Special Provisions may be required.

3. If treated timber utility poles within the API are disturbed during construction, coordination with utility companies and management of the timbers according to Oregon Standard Specifications for Construction, Section 00290.20(c)(3)(c) will be required.
4. If soils will be disturbed and/or construction dewatering is required at or near the suspect USTs observed and the regulatory database sites, a geophysical survey, and/ soil and/or groundwater characterization are recommended to be completed as necessary.
5. The outfall(s) of the catch basins observed during the site walk could not be determined. Determining the outfalls is recommended, and if the outfall is into a UIC, meeting DEQ UIC Program requirements will be necessary.

RELATIVE COST & DURABILITY

A planning-level relative cost has been developed for two variations of the most promising 1B alignment in order to provide an equivalent materials comparison for the purpose of evaluating the options side-by-side recognizing that risk-based factors will increase these costs.

Alignment support options for 1B have distinct structural solutions offering constructability advantages and disadvantages which are summarized in Table 6.

Table 6. Aspects Related to the Structure Options

Alternative	*Full Alignment*	*External, Separated*	*Avoids Augmented Viaduct*	*Existing Arch Bypass*	*Utility Tower Bypass*	*Avoids Utility Tower Modifications*	*Minimizes Construction Access needs*	*Minimizes Seawall Excavation*	*Minimizes Impact to Existing Arch*	*Minimizes traffic Disruption*	*Minimizes Archeological Issues*	*Minimizes Seismic demand*	*Improved Construct-ability*	*Improved Views*
1B-Viaduct Full External Alignment	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N
1B-Long Span	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Due to the uniqueness of the project and the wide range of project specific challenges, each option has associated risk for construction which cannot be adequately evaluated at this stage without specialized cost consulting inputs.

The range of risk for each alternative will vary between contractor approaches, comfort levels, and procurement/supply chain availabilities. Limits of these aspects can be captured in contingency costing efforts, however, unforeseen circumstances and unique aspects at the project site will impact the accuracy of assumed contingencies which may deem these contingencies inadequate towards estimating the economic viability of the project.

The structural alternatives provide a viable means to support the promising alignments that can be compared based upon the materials necessary to conceptually support the loading demands of the structure based upon its span and configuration.

The relative cost summary between Alternative 1B most promising alignment conceptual structure support variations only provide a relative snapshot cost of the structural approaches evaluated and is based upon the assumed structural and geotechnical conditions for support elements for this conceptual level stage of assessment.

Each option has inherent risks which necessitate appropriate understanding and quantification of associated risk. For example, the viaduct option has risks which include (and not limited to), environmental, archeological/cultural, in-water and permitting works, existing structure proximity and interactions, and hydraulics. Some of the viaduct's risks can be managed and quantified, however, others may never be known or be manageable, such as the presence of archeological remains or artifacts in fill materials behind the existing seawall, viaducts, or historic arch bridge.

The long span option also has risk associated with the technical challenge of constructing the suspension bridge through the opening in the existing historic arch bridge. Structurally, this is a technical risk which can be managed through design expertise and the application/leverage of long span cable supported bridge construction expertise. Unknows risks associated with the excavation of existing seawall fill or interaction with sensitive existing structures are minimized and thus reduce these risks significantly.

This is an early stage of planning and feasibility and the Consultant's high-level estimate is dependent upon design progression and development in combination with input from contractor approaches and project risks which have wide variabilities and are challenging to assess at this preliminary phase.

Maintenance Requirements

The Project Team held a Virtual Project Subteam Meeting with Oregon Department of Transportation (ODOT) maintenance staff on Thursday, November 30, 2023. The purpose of the meeting was to discuss the maintenance requirements for the shared-use path alternatives and maintenance approaches between ODOT and the City,

EXISTING AND FUTURE MAINTENANCE ACCESSIBILITY

Key findings and elements discussed as part of the meeting are summarized below:

- ODOT prefers a minimum of a 30-foot clear width between the viaduct and the shared-use path in order to use the current maintenance vehicle (an A62 snooper).
  - The 30-foot clear width is preferred but not mandatory. An offset of 24-foot could be sufficient enough for the machinery, but would make maintenance more challenging.
  - While newer technologies may change maintenance requirements in the future, the shared-use path should be designed to the current practice.
  - Maintenance from McLoughlin Boulevard would be possible, but would require removal of trees and powerlines and/or a lane reduction.
- While the possibility of locating the snooper truck on the shared-use path was discussed, it was dismissed due to risk and liability concerns of damaging the shared-use path structure.
- While the possibility of a platform underneath the shared-use path structure was considered, it was dismissed due to added costs and limited benefits.
- No issues or concerns were identified related to the shared-use path structuring passing through the Arch Bridge.

As a result of the Virtual Project Subteam meeting with ODOT maintenance, the two refined most promising alternatives have been developed to address the needs expressed by ODOT maintenance including a minimum 30-foot offset of the shared-use path alignment from the McLoughlin Boulevard

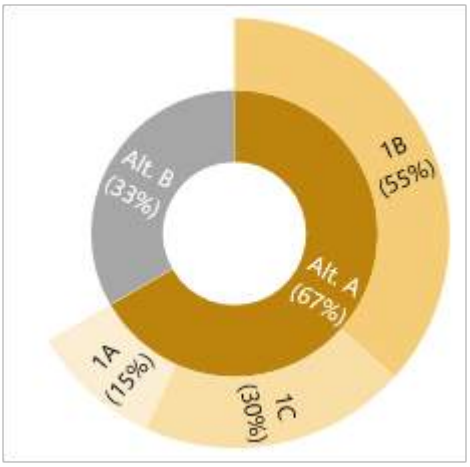
viaduct for Alternative 1B: Viaduct Full External Alignment and a minimum 20-foot offset for Alternative 1B: Long Span Full External Alignment.

All bridge types will require maintenance procedures and programs to monitor and maintain structural elements. The long span cable elements of the two refined most promising alternatives will require aerial inspections (rope, drone), while the viaduct portion of Alternative 1B: Viaduct Full External Alignment will necessitate below deck inspections similar to the viaducts (snooper, maintenance travelers).

COMMUNITY

Public Support

An online public open house was conducted December 6 to December 22, 2023; 169 users accessed the open house, and 154 comments were received through the open house, project website, and emails. Forty-seven percent of users (81 users) were identified using a device to access the open house from Oregon City or Portland. Note that the open house referred to the original seven alternatives developed in TM#4: Alternative Concepts.



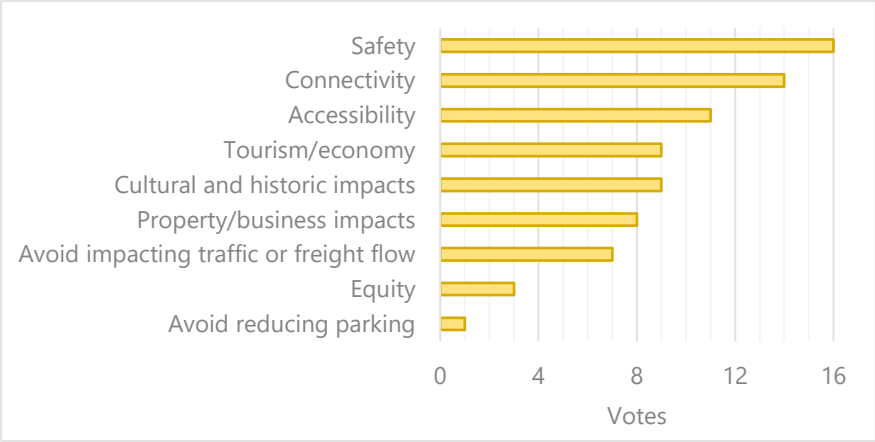
ALTERNATIVE PREFERENCE

Participants overwhelmingly supported the Alternative 1 series (1A, 1B, and 1C) which features an independent structure for the shared-use path (67% of votes), over the Alternative 2 series (2A, 2B, and 2C) which consisted of various modifications to the McLoughlin Boulevard/OR-99E viaduct structure itself (33% of votes).

THEMES

A general desire in the comments for the shared-use path to be separated from traffic and to avoid slowing the flow of traffic on McLoughlin Boulevard supported this choice. Most respondents supported Alternative 1B (55% of votes) – the "high route" – over options 1A and 1C (15% and 30% of votes, respectively), and preferred to bypass the Historic Arch Bridge by passing through the arch columns (70% of votes) rather than passing underneath the bridge or through the bridge tower (15% of votes, each).

TOP ISSUES



Safety (20% of votes), connectivity (18%), and accessibility (14%) were ranked as the top issues that the project should address. A general desire for separation from the danger, discomfort, and noise of the adjacent roadway were expressed, as were concerns for personal safety and security on the shared-use path if it were to be placed below-grade. As a result, design details that saw strong support from the community included a path that is visible and at street level, a separate facility from McLoughlin Boulevard, and physical barriers from traffic. Respondents also expressed concerns about the history of unhoused people and accumulating garbage and debris in the area. An above-grade or below-grade crossing of McLoughlin Boulevard, connections to Willamette Falls, tumwata village, downtown, and other off-street paths in the area were also requested as part of this project.

PUBLIC SUPPORT FINDINGS

Based on the feedback received from the online public open house, project website, and email, Alternative 1B (Refined) is the public's preference among the three most promising alternatives. This alternative maintains the largest degree of separation from McLoughlin Boulevard along the length of the project, remains at-grade, and passes through the Historic Arch Bridge structure, rather than underneath it or through the tower.

It is worth noting that there will be more design elements focused on connectivity to the existing street network than are shown in the current renderings. More tie-ins near the Historic Arch Bridge will provide further access to downtown Oregon City.

Tribal

PEOPLED HISTORY

For millennia, the area around tumwata/Willamette Falls has been a central place to the native groups in the area. The falls themselves are a historic cultural, population, trade, and fishing center, and served as a connecting point for numerous groups, including the Clackamas Chinook, Tualatin Kalapuya, and Molala. Social and economic networks stemming from the falls extended to many groups in the greater Willamette and Columbia River to the Dalles and beyond. Despite catastrophic disruption, the use of the falls site and surrounding areas for such purposes has been continuous though time to modern tribal communities.

Native populations were decimated by disease, displacement, and violence during contact with settlers in the early 1800s. The Clackamas Chinook experienced a 98% mortality in the 80 years following 1770. In

1829, John McLoughlin, the Chief Factor of the Hudson's Bay Company, laid out a two-square-mile claim centered on the area that would become Oregon City. Clackamas Indians burned the first settlement on the plat but lacked the numbers for sustained resistance. Various treaties were considered and broken with the tribes in the area. In 1855 the Clackamas Chinook, Tualatin Kalapuya, and Molala signed a treaty as a confederation. Most survivors were forcibly relocated to the Grand Ronde Reservation in 1856. Native people continued to maintain a camp and fish Willamette Falls into the 1870s.

POST-CONTACT HISTORY

Construction of the Willamette Falls Locks was completed in 1873. Paper production at the falls took place under various companies – most recently the Blue Heron Paper Company – from 1889 until 2011 when the locks were placed on "non-operational status" by the US Army Corps of Engineers. The Willamette Falls Locks and Canal were placed on the National Register of Historic Places in February 1974. The nearby West Linn-Oregon City Bridge, opened in 1922, was likewise placed on the National Register in 2005.

In 2019, The Confederated Tribes of Grand Ronde finalized the purchase of the Blue Heron site, a 23-acre property adjacent to tumwata/Willamette Falls. In partnership with the Confederated Tribes and Bands of the Yakama Nation, the Confederated Tribes of Siletz Indians, the Confederated Tribes of the Umatilla Indian Reservation, and the Confederated Tribes of Warm Springs, the new landowners plan to redevelop the site, first healing the place and mitigating the effects of its industrial history before constructing a multi-use development focused on connecting people to the place and its storied history. The first two rounds of demolition at the site took place in September 2021 and in April 2022.

CULTURAL RESOURCES PLANNING

Due to the long history of habitation, use, violent displacement, urban and industrial development, and the introduction of culturally sterile fill material in the area, there is likely a high degree of disruption to any archeological resources. However, potential for archaeological resources associated with both the millennia-long occupation by Native peoples and the early residential and industrial history of the post-contact period remains high throughout the project area. Intact and undisturbed cultural deposits have been documented beneath fill material, and historic fill materials have the potential to contain human remains.

Because of the vitally important role of the place to native people of the Willamette Valley and beyond, their renewed role as stewards of the space is notable, and their role as partners in any future infrastructure work in the area should be viewed as requisite. A history of disturbance to resources central to their culture is instilled in this place, eliciting a higher sensitivity to any change.

TRIBAL CONSULTATION SUMMARY

There is a tension between the sensitivity to the sovereignty and sanctity of place and the re-development of the tumwata village plot for the benefit of tribal stewards and connection to the greater Oregon City and Willamette Valley communities. The planned shared-use path will occupy previously unused space and will require additional structures suspended above the river wall and the Columbia River itself. As a result, impacts relating to connectivity, viewshed, and cultural resource disturbance should be considered in selecting an alternative.

Current communications regarding the tumwata village development indicates plans for a mixed-use development on the northern end of the site and a publicly accessible riverwalk. Future connection to downtown Oregon City from these spaces will be an important design consideration on this project's southern extent. Each of the two refined most promising alternatives provide this opportunity.

The new shared-use path structure will provide users with a view towards tumwata/Willamette Falls and will be part of the viewshed for people in and around the Falls. The view towards the Falls and associated impacts on the privacy of Falls users is not likely to be meaningfully different under any of the three most promising alternatives. Alternative 1B: Long Span Full External Alignment will have a more prominent profile with the cable structures and towers for the whole alignment. This will create a larger impact on the viewshed from near the Falls, but also provides a stronger opportunity to improve viewshed aesthetics from existing conditions. Alternative 1B: Viaduct Full External Alignment will have a more prominent profile southwest of the Historic Arch Bridge. Both will provide an opportunity for a landmark look-out with unique views of the Willamette Falls and Historic Arch Bridge.

Because of the high likelihood of archeologically valuable remains in the project area, the degree to which the construction of the shared-use path impacts the river wall and surrounding areas is an important consideration in alternative selection. Both alternatives will have requirements for new structural elements with the potential to impact sensitive materials and result in disturbed cultural resources and delayed project timelines, though Alternative 1B: Viaduct Full External Alignment will require more footings. Coordination with tribal planners will be necessary to understand whether the required structures will have significant impacts or opportunities for collaboration on any planned remediation efforts as a part of the tumwata village development.

In summary, both most promising alternatives provide similar levels of access to proposed developments in the area. Alternative 1B: Long Span Full External Alignment provides the greatest level of impact aesthetically, which may be seen as both a detriment and an opportunity. Alternative 1B: Viaduct Full External Alignment provides less visual impact, but will require more structural footings and this more disturbance to the river wall.

NEXT STEPS

The evaluation of the two refined most promising alternatives will be used to select and develop a preferred alternative in TM#7: Preferred Shared-Use Path Alternative.

REFERENCES

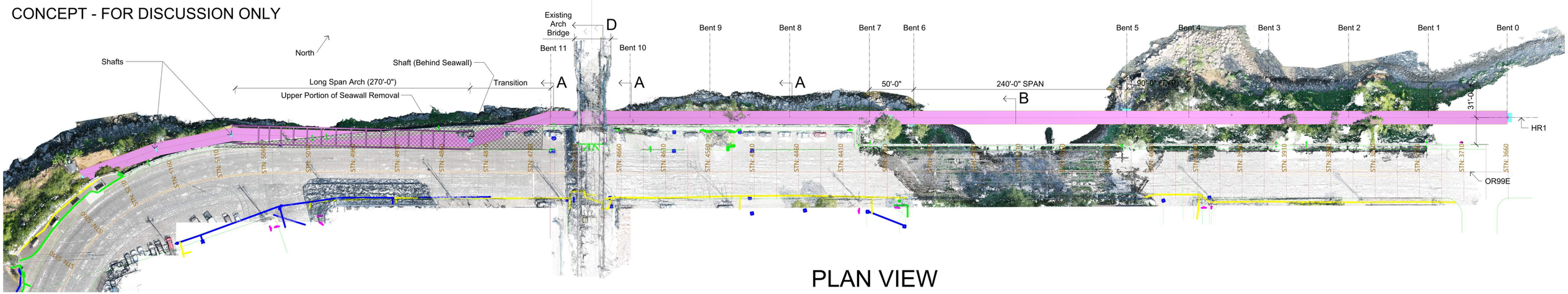
1. Evaluating the Economic Impact of Shared use Paths in North Carolina, 2017. Institute for Transportation Research and Education.
2. Shared Use Path Impacts Study, 2021. MassTrails.
3. Bike Lanes, On-Street Parking & Business, 2010. Toronto Centre for Active Transportation & Clean Air Partnership
4. Economic Impacts of Street Improvements. The Summit Foundation.
5. Making the Economic Case for Cycling. Institute for Transportation & Development Policy.

APPENDICES

A. Viaduct Full External Alignment Plan View
B. Long Span Full External Alignment Plan View
C. Hazardous Materials Corridor Assessment

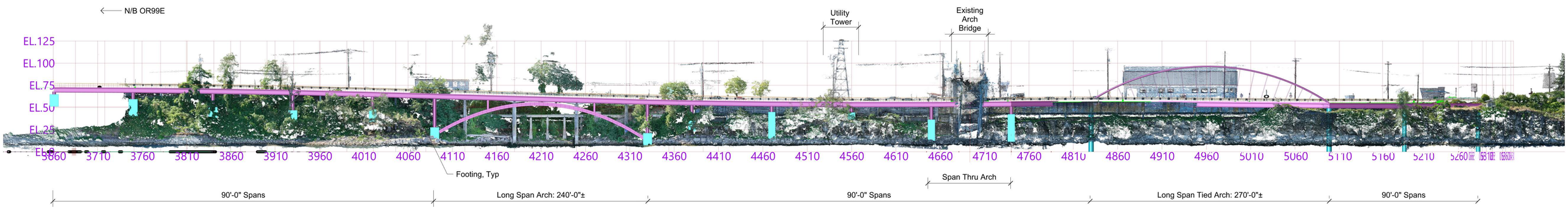
Appendix A:
Viaduct Full External Alignment Plan View

CONCEPT - FOR DISCUSSION ONLY

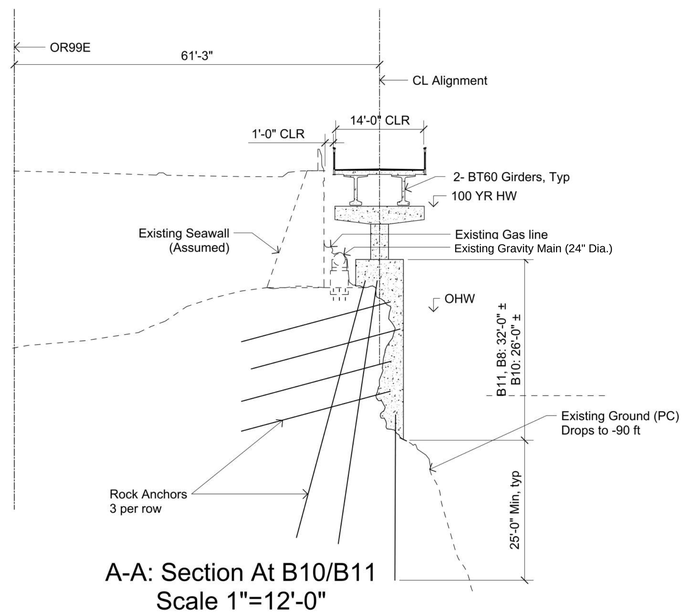


PLAN VIEW

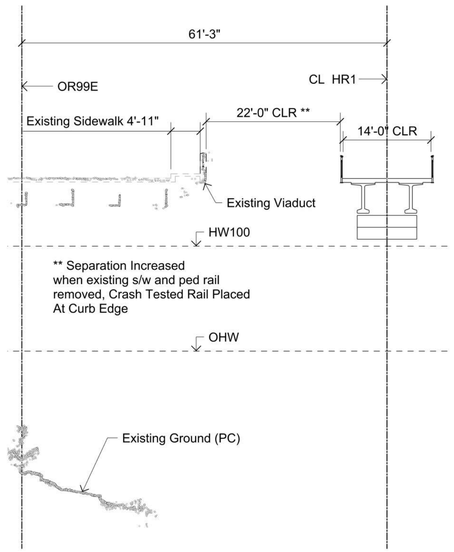
01-HR-S-HIGH ROUTE EXTERNAL ALIGNMENT (1,650'-0")



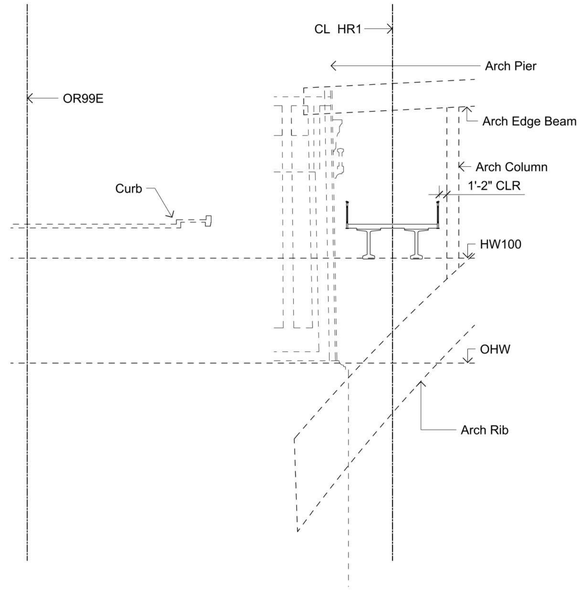
ELEVATION VIEW



A-A: Section At B10/B11
Scale 1"=12'-0"



B-B: Section At 240 ft Span
Scale 1"=12'-0"

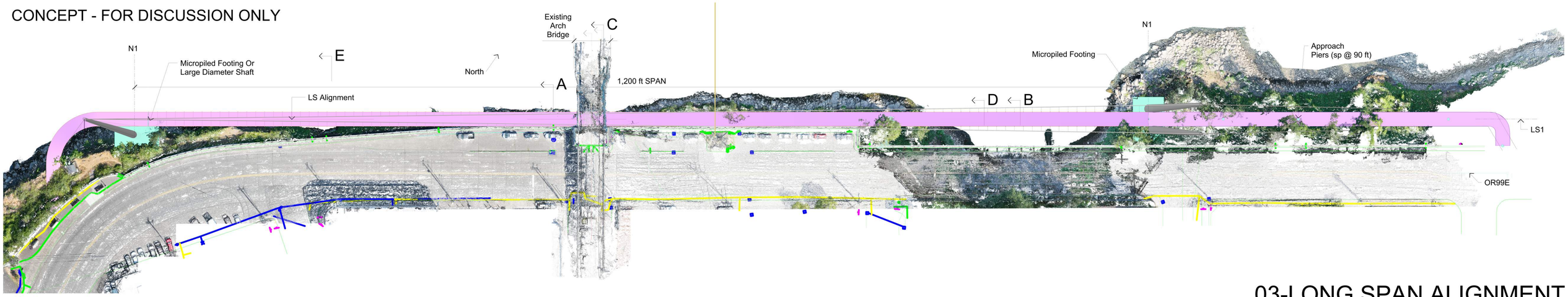


D-D: Section Thru Existing Arch Bridge (1023)
Scale 1"=12'-0"

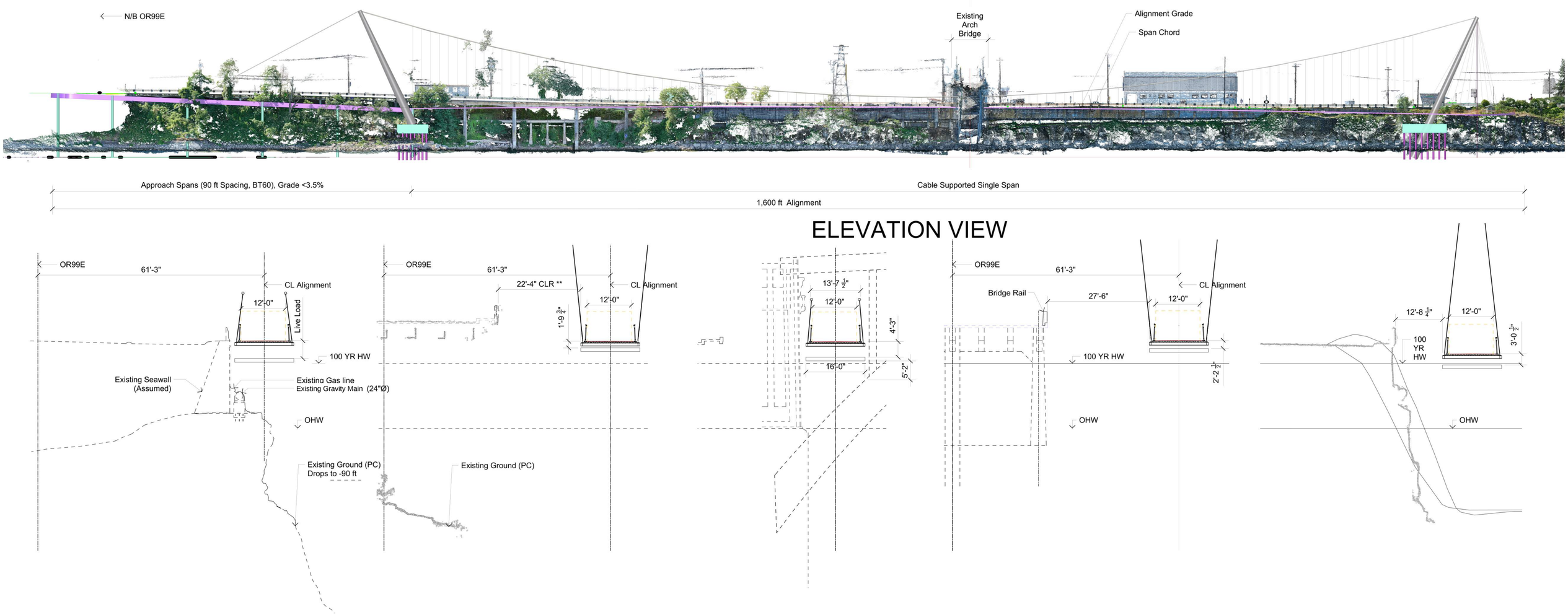
CONCEPT - FOR DISCUSSION ONLY

03-LONG SPAN ALIGNMENT

PLAN VIEW



ELEVATION VIEW



A-A: Section At B10/B11 (1080)
Scale 1"=12'-0"

B-B: 550
Scale 1"=12'-0"

C-C: THRu Existing ARCH (1023)
Scale 1"=12'-0"

D-D: Section At (E) Bent 6 (590)
Scale 1"=12'-0"

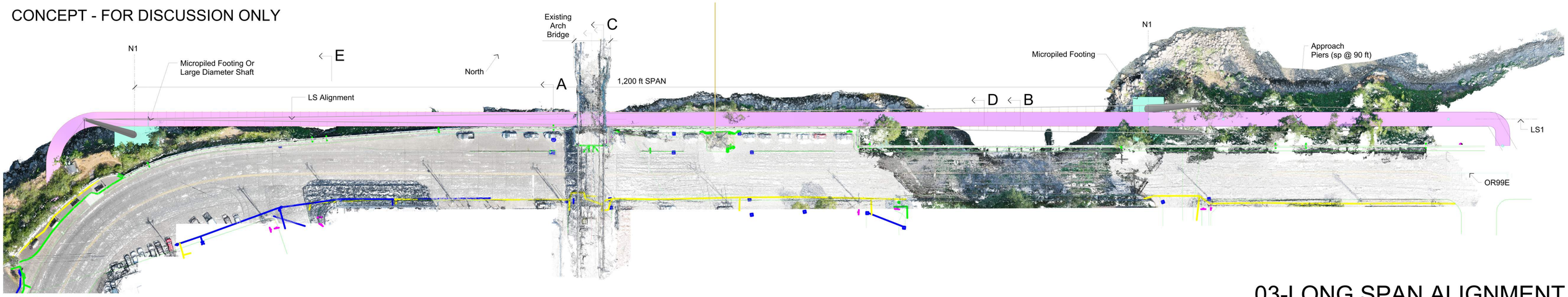
E-E: Section At Seawall (1325)
Scale 1"=12'-0"

Appendix B:
Long Span Full External Alignment Plan View

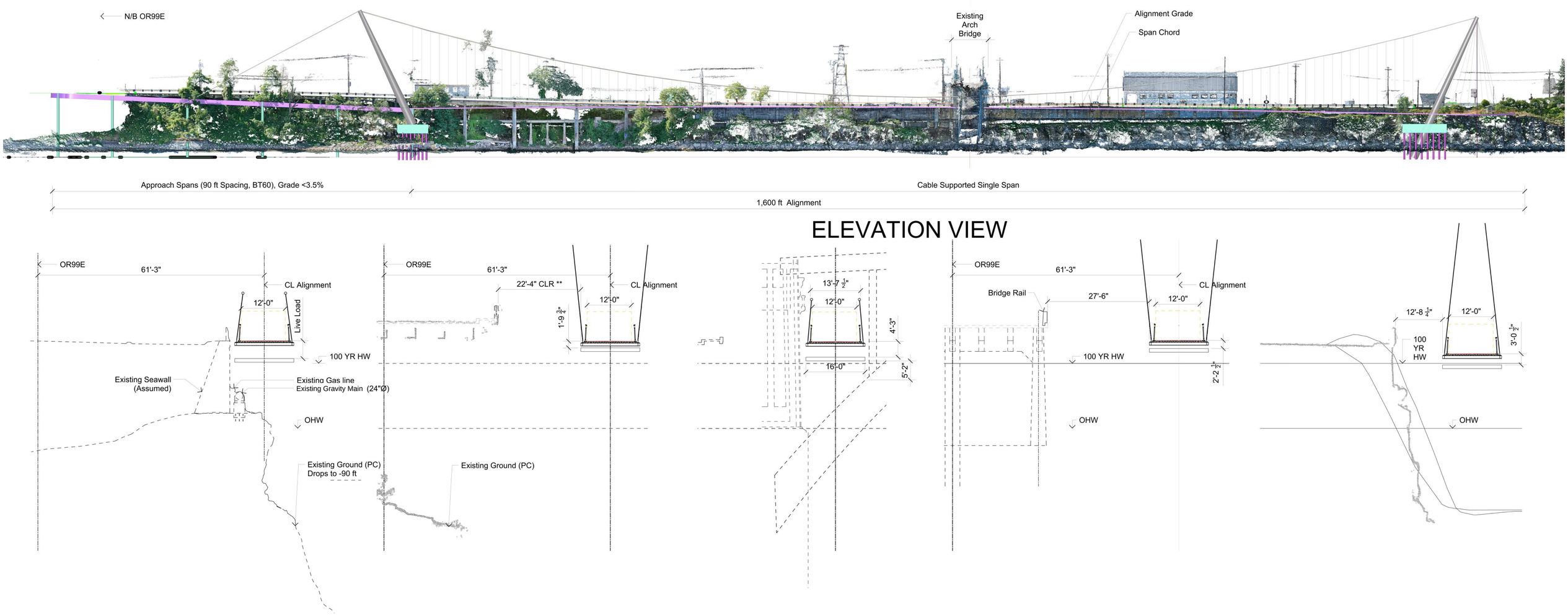
CONCEPT - FOR DISCUSSION ONLY

03-LONG SPAN ALIGNMENT

PLAN VIEW



ELEVATION VIEW



A-A: Section At B10/B11 (1080)
Scale 1"=12'-0"

B-B: 550
Scale 1"=12'-0"

C-C: THRu Existing ARCH (1023)
Scale 1"=12'-0"

D-D: Section At (E) Bent 6 (590)
Scale 1"=12'-0"

E-E: Section At Seawall (1325)
Scale 1"=12'-0"

Appendix C:
Hazardous Materials Corridor Assessment

DRAFT
Hazardous Materials Corridor Assessment

ODOT Project:
Willamette Falls Path/OR99E Enhancement: 10th St. – Railroad Ave.,
Oregon City, Clackamas County, Oregon 97045

Task 6.4.1 Hazardous Materials Corridor Assessment

ODOT Key #: 22142
Kittelson & Associates Project #: 19531.016

March 13, 2024

Prepared by:

COLES+BETTS environmental consulting

5741 NE Flanders Street
Portland, OR 97213

Job No. 382

In collaboration with Reynolds Engineering, LLC.

Oregon Department of Transportation

123 NW Flanders St., Portland, OR 97209

EXECUTIVE SUMMARY

Coles + Betts Environmental Consulting, LLC, in collaboration with Reynolds Engineering, LLC, has completed a Hazardous Materials Corridor Assessment (HMCA) for the Oregon Department of Transportation (ODOT) public improvement project: Willamette Falls Path/OR99E Enhancement: 10th St. – Railroad Ave., Oregon City, Clackamas County, Oregon (the Project), ODOT Key #22142 (Appendix A, Figure 1). The HMCA was conducted on behalf of ODOT and their design consulting team led by Kittelson & Associates.

The Project Area covers OR99E (McLoughlin Blvd.) between 10th St and Railroad Ave. and Main St. between 10th St. and OR99E (Appendix A, Figure 2). The Project will develop the Willamette Falls Shared Use Path and OR99E pedestrian, bicycle, and streetscape enhancements between 10th St. and Railroad Ave. to provide a safe route for pedestrians and bicycles between OR99E and the Willamette Falls Riverwalk.

The purpose of the HMCA was to identify potential environmental conditions that may impact Project construction. Per the project contract, this HMCA was prepared according to the most current version of the ODOT Level 1 Hazardous Materials Corridor Study report template. The HMCA does not include inspection or sampling of materials that would be disturbed during construction.

The following conclusions were reached based on the findings of this corridor study:

- Soils on the embankments and Willamette River shoreline sediments are present at northern locations along OR99E. Because the soils and sediment are adjacent to the roadway and are sinks for roadway pollutants, there is the potential that the soil and sediment do not meet Oregon Department of Environmental Quality (DEQ) Clean Fill criteria and would require disposal at a landfill if disturbed.
- Suspect heating oil tank and underground storage tank (UST) fill ports were identified in or adjacent to the Project Area at 117 6th St./603 Main St., 624 McLoughlin Blvd., and 706 Main St. If the ground surface and/or soils are disturbed in these areas, it is recommended the property owner(s) be notified to determine the status of the suspect tank(s) and to request related documentation. A geophysical survey and soil and groundwater sampling in the vicinity of a tank, and possibly tank decommissioning, may be required.
- The outfall(s) of the catch basins observed during the site walk could not be determined. Determining the outfalls is recommended, and if the outfall is into an underground injection control (UIC), meeting DEQ UIC Program requirements will be necessary.
- The structures and equipment in railings, utility poles, and light poles within and/or adjacent to the Project Area should be inspected for hazardous building materials (e.g.,

asbestos, lead-based paint, polychlorinated biphenyls (PCBs), and mercury) if they are to be disturbed. Coordination with utility providers and Oregon City may be required for inspection, sampling, and removal.

- Treated timber utility poles are present within the Project Area and may be disturbed by Project construction. Poles with electrical transformers will require coordination with utility providers for proper removal.
- Sites listed in regulatory databases with known and potential contamination were identified on and adjacent to the Project Area. Petroleum contamination may be present in groundwater and soils in the vicinity of these regulatory sites. If dewatering or soil excavation occurs in the vicinity of these sites, soil and groundwater characterization is recommended. A geophysical survey may also be recommended.

The locations of the features listed above are shown in Figure 3A and 3B in Appendix A.

The recommendations for ODOT are listed below.

1. ODOT's Beneficial Use Determination (BUD) does not allow excavated soils to be reused on lots zoned for residential use, but they may be reused on adjacent rights-of-way. However, because the reuse of excavated soils on the Project may be limited in volume and such soils cannot come into contact with or adversely impact groundwater or surface water (including stormwater sheet flow), we recommend sampling escarpment and riverbank soils and river sediment that will be disturbed by construction activities and completing a Clean Fill Determination for managing the material.
2. If structures and equipment in railings, utility poles, and light poles within the Area of Potential Impact (API) are disturbed during construction, a hazardous building material survey is recommended. Special handling of these items and ODOT Special Provisions may be required.
3. If treated timber utility poles within the API are disturbed during construction, coordination with utility companies and management of the timbers according to Oregon Standard Specifications for Construction, Section 00290.20(c)(3)(c) will be required.
4. If soils will be disturbed and/or construction dewatering is required at or near the suspect USTs observed and the regulatory database sites, a geophysical survey, and/ soil and/or groundwater characterization are recommended to be completed as necessary.
5. The outfall(s) of the catch basins observed during the site walk could not be determined. Determining the outfalls is recommended, and if the outfall is into a UIC, meeting DEQ UIC Program requirements will be necessary.

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HAZARDOUS MATERIALS CORRIDOR ASSESSMENT
WILLAMETTE FALLS PATH/OR99E ENHANCEMENT: 10TH ST. – RAILROAD AVE.
OREGON CITY, CLACKAMAS COUNTY, OREGON
ODOT KEY #22142

1.0 INTRODUCTION

Coles + Betts Environmental Consulting, LLC, in collaboration with Reynolds Engineering, LLC, has completed a Hazardous Materials Corridor Assessment (HMCA) for the Oregon Department of Transportation (ODOT) public improvement project: Willamette Falls Path/OR99E Enhancement: 10th St. – Railroad Ave., Oregon City, Clackamas County, Oregon (the Project), ODOT Key #22142 (Appendix A, Figure 1). The HMCA was conducted on behalf of ODOT and their design consulting team led by Kittelson & Associates.

The Project Area covers OR99E (McLoughlin Blvd.) between 10th St. and Railroad Ave. and Main St. between 10th St. and OR99E (Appendix A, Figure 2). The Project will develop the Willamette Falls Shared Use Path and OR99E pedestrian, bicycle, and streetscape enhancements between 10th St. and Railroad Ave. to provide a safe route for pedestrians and bicycles between OR99E and the Willamette Falls Riverwalk.

The purpose of the HMCA was to identify potential environmental conditions that may impact Project construction. Per the project contract, this HMCA was prepared according to the most current version of the ODOT Level 1 Hazardous Materials Corridor Study report template. The HMCA does not include inspection or sampling of materials that would be disturbed during construction.

2.0 PROJECT AREA DESCRIPTION

2.1 Physical Setting

The Project Area is located in downtown Oregon City within Section 31, Township 2 South, Range 2 East in Clackamas County, Oregon (Appendix A, Figure 1). The Project Area includes OR99E between 10th St. and Railroad Ave., and Main St .between 10th St. and OR99E (Appendix A, Figure 2). Current land use is commercial in the vicinity of the Project Area with a public use area overlooking the Willamette River.

2.1.1 Geology

Geological information was obtained from the Oregon Geologic Data Compilation, release 6 (OGDC-6), which is a statewide compilation of geologic data created by the Oregon Department of Geology and Mineral Industries (DOGAMI, 2023). The Project Area is in the north

Willamette River valley. The primary geologic units are Quaternary Surficial Deposits of unconsolidated alluvium and colluvium and outburst flood deposits between OR99E and Main St.; and Miocene Columbia River Basalt Group at and south of Main St. (Grande Ronde Basalt and Wanapum Basalt).

A sample of Oregon Water Resources Department (OWRD) boring logs for water wells within the Project Area were reviewed (OWRD, 2024). Fill material, with no description of the fill material provided, was encountered in the vicinity of the County Courthouse (807 Main St.) to depths up to 15 feet below ground surface (bgs) and fill material described as silty sand and gravel up to 8 feet bgs at 517-519 Main St. Soils encountered in the Project Area were gravels, silty gravels, silts, silty sands, clayey silts, and sands to approximately 7 and 27 feet bgs, which were underlain by basalt encountered at depths between 10.7 and 25 feet bgs.

2.1.2 Hydrogeology

A review of water well records filed with the OWRD indicates that groundwater can be encountered at varying depths in the vicinity of the Project Area (OWRD, 2023). Water at many sites was first encountered at depths ranging from 3 and 25 feet bgs. Water was typically found in sandy gravel or sandy soil layers at 7 and 15 feet bgs, respectively, or above a silty clay layer at approximately 900 Main St., or just above the basalt. Static water levels generally ranged between 5 and 19 feet bgs.

2.1.3 Topography

According to the United States Geologic Survey (USGS) 7.5-minute Oregon City Quadrangle Map (2020), the Project Area is situated on a bluff approximately 50 feet above the Willamette River. The roadways OR99E and Main St. are within a relatively flat area of downtown Oregon City that ranges in elevation from approximately 50 to 70 feet mean sea level (msl). Nearby bluff/cliff to the east/southeast range in elevation from 70 to 150 feet msl.

The nearest water body is the Willamette River to the north/northwest. Abernethy Creek, a tributary to the Willamette River, is located approximately 2,000 feet north of the Project Area. Willamette Falls within the Willamette River is located approximately 2,000 feet south of the Project Area. Based on the topography and surface water bodies around the Project Area, groundwater is presumed to flow in the northwest/north/northeast direction.

2.2 Observations

A site reconnaissance of the Project Area was conducted on February 15, 2024. The reconnaissance consisted of systematically traversing the Project Area and viewing adjoining properties from roadways and public access areas.

Land use adjacent to the Project Area is predominantly commercial development with a public viewpoint at the western end along OR99E. Table 1 below summarizes potential sources of hazardous substances identified during the site reconnaissance.

Table 1: Potential Sources Identified During Site Reconnaissance

Potential Sources of Hazardous Substances	Present?
Heating oil tanks	Yes
Aboveground storage tanks (ASTs)	No
Underground storage tanks (USTs), fill and vent pipes, fuel dispensers	Yes
Other hazardous substance containers	No
Hazardous waste generation	Yes
Oil water separators, dry wells, or floor/storm drains	Yes
Septic systems	No
Stains or odors	No
Stressed vegetation	No
Solid waste	No
Suspect asbestos-containing materials	Yes
Suspect lead-based paint	Yes
Potential polychlorinated biphenyl (PCB)-containing equipment	Yes
Florescent or mercury vapor light bulbs	Yes
Treated timbers	Yes
Water wells or monitoring wells	Yes

A summary of our site reconnaissance is detailed below. The summary starts at the northeast corner of the Project Area and continues counter-clockwise around the area. Figures 2 and 3 (Appendix A) show the Project Area and adjoining properties. Photographs documenting reconnaissance observations are included in Appendix B. The AASHTO Initial Site Assessment (ISA) Checklist is provided in Appendix C.

- Adjacent to the Project Area at the southeast corner of the OR99E and 10th St. intersection is a Chevron gas station (1002 OR99E) (Appendix B, Photos 1 and 2). The UST nest and fuel island are on the northwest corner of the property. There are three regulated USTs that are operating and five that are decommissioned at this facility per

DEQ records. DEQ records also list this property twice in its leaking UST (i.e., LUST) database. One pole-mounted transformer is present at the southeast corner of the intersection.

- The southwest corner of the OR99E and 10th St. intersection is a commercial office plaza and parking area (911 OR99E) (Photos 2 and 3). Three pole-mounted transformers were present in the OR99E right-of-way (ROW) north of the commercial office building property (Photos 5 and 6).
- The escarpment and bank of the Willamette River are adjacent north of the intersection (Photos 3 through 7), and adjacent north of the OR99E alignment from 10th St. to west of 6th St., where OR99E curves south.
- A vacant commercial building and parking lot undergoing renovations is on the southeast corner of the intersection of OR99E (901 OR99E) (Photo 5). Three pole-mounted transformers were in the ROW adjacent to the northwest corner of this property.
- A commercial building occupied by a McMenamins restaurant is at the southwest corner of the intersection of 9th St. and OR99E (102 9th St) (Photos 8 through 10).
- The Clackamas County Courthouse (807 Main St.) is at the southeast corner of the intersection of 8th St. and OR99E (Photos 8, 11, 12, and 18).
- A stairwell leading to the Willamette River is below OR99E at the northwest corner of the courthouse/at the northeast corner of the intersection of OR99E and 8th St. (Photos 11, 12 and 14). Multiple utility corridors are present below OR99E, with some outfall pipes located above and below the river's waterline (Photos 9, 11, 13 through 15). The basalt escarpment and riverbank are visible from the stairwell to the Willamette River (Photos 9, 11, and 13 through 16).
- A retaining wall and basalt cliff are below the McMenamins restaurant property (102 9th St.) and Clackamas County Courthouse property (807 OR99E) (i.e., the south side of OR99E between 9th St. and 8th St.) (Photo 9). Three pole-mounted transformers were located in the middle of the block in the ROW.
- A commercial building and parking area are occupied by law offices at the southwest corner of 8th St. and OR99E (720 OR99E) (Photo 18). Three pole-mounted transformers were also in the ROW at this corner. Two pole-mounted transformers are located in the ROW mid-block, on the south side of OR99E.
- Parking areas are adjacent north of OR99E between 8th St. and the Oregon City Arch Bridge/7th St. (Photos 17 and 18). A lattice tower carrying power lines is located in the parking area north of the bridge (Photo 19).
- A sidewalk is below the bridge on the north side of OR99E (Photos 20 and 22).

- An eroded sidewalk/walkway is below the bridge on the south side of OR99E (Photo 19).
- A parking lot is located southeast of the intersection of 7th St./the Oregon City Arch Bridge (710 OR99E) (Photos 18 and 19).
- A building occupied by a commercial radio sales business is at the southwest corner of the intersection of 7th St./the Oregon City Arch Bridge (624 OR99E). Two suspected UST or heating oil tank fill ports were identified in the eastern ROW along 7th St., with one near the southwest corner of 7th St. and OR99E (Photos 20 through 22). Five decommissioned, regulated USTs and no active tanks are listed for this property. One pole-mounted transformer is located in the ROW at this corner.
- A parking area is adjacent north of OR99E south of the Oregon City Arch Bridge/7th St. to 6th St. (Photos 23 and 24).
- A commercial building occupied by the Elks Lodge and a parking lot are located southeast of the intersection of 6th St. and OR99E (610 OR99E) (Photos 23 and 26). Three pole-mounted transformers are in the ROW west of the Elks Lodge building.
- A commercial building occupied by Transaxle Parts, Inc. is at the southwest corner of the intersection of 6th St. and OR99E (516 OR99E) (Photos 23 and 26).
- North of the intersection of OR99E and 6th St. is an embankment that slopes downward to the basalt cliff escarpment and Willamette River. West of the intersection is a walkway with a Willamette River overlook area (Photos 24, 25, 31, and 32). A small building with utilities/monitors is on the escarpment below the overlook area. A metal cantilever to support a utility pole on the south side of OR99E is located on the north escarpment northeast of the intersection of OR99E and 6th St.
- South of the overlook area is an alleyway that separates the 516 OR99E property from the commercial auto repair buildings operated by Larry Morton's Transmission Service (508, 510, and 514 OR99E) (Photos 26 through 29). ASTs were not observed.
- The OR99E alignment turns south/southeast approximately one block west of 6th St. (Photos 28, 29, 31 and 32). The former Blue Heron paper company mill is on the west side of OR99E and north of Main St., and its office building is at the northwest corner of OR99E and Main St. (427 Main St.) (Photos 28 and 31). A LUST file is listed for the 427 Main St. address. One pole-mounted transformer and a pad-mounted transformer are located mid-block on the former mill property. Environmental reports reviewed for this HMCA indicate there are two or three tanks on the former mill property south of the pad-mounted transformer. Larry Morton's Transmission Service, an alleyway, and a commercial building occupied by a coffee shop (503 Main St.) are on the east side of OR99E and north of Main St. (Photos 28 through 30 and 32 through 34). A leaking heating

oil tank record is listed for 503 Main St. The alleyway was used to store garbage and recycling containers for the businesses on the north side of the 500 block of Main St. A drum of used cooking oil was stored in the alleyway behind 505 Main St. There was no evidence of a release.

- Southeast of the intersection of OR99E and Main St. is a vacant commercial building (502 Main St.) (Photos 33, 34 and 35). There is a DEQ LUST file for this property. Two pole-mounted transformers are located south of the building in the sidewalk ROW.
- Southwest of the intersection of OR99E and Main St. is a former gasoline station used for vehicle parking (450 Main St.) (Photos 34 through 37). DEQ lists 13 decommissioned, regulated USTs and no active USTs for this property. One LUST file is listed for this property. An unlabeled, 55-gallon drum was at the northwest corner of the property. There was no evidence of a release. The drum is visible inside the gate in Photo 36. A groundwater monitoring well and/or vapor extraction well was observed inside the north entryway to the former gas station property. The alignment between 407 and 450 Main St. has railroad tracks.
- East of the intersection of OR99E and Main St., on the south side of Main St. beyond 502 Main St., are commercial buildings (504, 508, 510, 512, 514 and 524 Main St.) (Photos 37, 41 and 42). 504 through 514 Main St. are occupied by Soulflags (an art and literature-based community center), Acadia NW counseling center, Angel Ink Tattoo School, Consignment Revolution, and a vacant storefront, respectively. The commercial building at 524 Main St. is occupied with a liquor store and the office of ZCS Engineering and Architecture and a parking lot. Two decommissioned, regulated tanks are listed for the 524 Main St. property, and a LUST file is listed for the 508 Main St. property.
- East of the intersection of OR 99E and Main St. and 503 Main St., on the north side of Main St., are commercial buildings (505, 507, 509 and 511 Main St.), a parking lot, and additional commercial buildings (515 and 527 Main St. and 517 6th St.). The commercial buildings at 505 through 511 Main St. are occupied by Black Ink White Rabbit gifts and book shop, Thirsty Duck tavern, The Vintage Nest furniture store, Commons (a retail shop), office spaces, and a parking lot (Photos 38 and 39). This parking lot is at the southwest corner of the intersection of 6th St. and Main St. The commercial buildings at 515 and 527 Main St. are occupied by the Oregon City Grill, New Hings Restaurant, and the Illuminated Tattoo Parlour (Photos 40 and 41). The tattoo parlour is at the northwest corner of the intersection of Main St. and 6th St. (Photo 43). There is one leaking heating oil tank record for 527 Main St., and one leaking heating oil tank record for 517 6th St.
- Northeast of the intersection of 6th St. and Main St. are two buildings at 117 6th St. and 603 Main St. (Photos 41, 43 and 44). A suspected heating oil tank fill port is located in

the 6th St. sidewalk adjacent to a stairwell between these buildings (Photo 41). It is unclear if the UST is associated with 117 6th St. or 603 Main St. The commercial building at 117 6th St. is a retail store (Imperfection) and office space, and the commercial building at 603 Main St. is occupied by Oregon City Records (Photos 43 through 45). Three pole-mounted transformers are located in the ROW west of the 603 Main St. building.

- A commercial building is at the southeast corner of the intersection of 6th St. and Main St. that is occupied by Homelife Furniture (610 Main St.) (Photo 45).
- Commercial buildings are located east of Homelife Furniture (610 Main St.), on the south side of the 600 Main St block. The buildings are occupied by Sweet Masterpiece specialty bakery and chocolatier and Salon Pretty beauty salon and clothing store (616 and 618 Main St., respectively), and Bridgeview Beer & Wine Supply (622 and 624 Main St.) (Photos 45, 47, and 48). There is a leaking heating oil tank DEQ record for 616 Main St. Bridgeview Beer & Wine Supply is at the southwest corner of the intersection of 7th St. and Main St.
- The commercial buildings on the north side of Main St. and east of 603 Main St. (Oregon City Records) are occupied by an antique shop (605 Main St), entrance to offices on the upper levels (607 Main St.), the Clackamas County Democratic headquarters (609 Main St.), and a vacant storefront (611 Main St.) (Photos 43 through 45). East of 611 Main St. is the parking lot for the Elks Lodge building at 610 OR99E (Photo 46). The commercial building east of the parking lot (615, 619, 621, and 623 Main St) is occupied by offices and two antique shops and FreightO freight logistics company (Photo 46). There is a DEQ leaking tank record for 621 Main St. This commercial building is at the northwest corner of the intersection of 7th St./the Oregon City Arch Bridge and Main St. (Photo 47).
- A commercial building occupied by multiple offices is at the southeast corner of 7th St. and Main St. (702 and 704 Main St.) (Photo 48).
- At the northeast corner of the intersection of 7th St. and Main St. is a commercial building occupied by Mi Famiglia pizzeria (701 Main St.) (Photo 49). There is a DEQ heating oil tank decommissioning record for this property.
- The south side of the 700 block of Main St., to the east beyond 702 Main St., has commercial buildings occupied by Northwest Treatment office (706 Main St.), a vacant retail space and evolution healing arts office (708 Main St.), and a vacant storefront (712 Main St.) (Photo 53). A suspect heating oil tank fill port is in the sidewalk north of 706 Main St. (Photo 54). A small alleyway separates the eastern and western half of the southern block of 700 Main St. Commercial buildings located on the eastern half of the southern 700 block of Main St (Photo 55) are occupied by Hardware Barber Shop, Pho Thi restaurant and offices (714 Main St), Lucky Supreme Tattoo (716 Main St), Pioneer

Pub (720 Main St), Jansen Construction (722 Main St), and Mesa Fresca restaurant (724 Main St). There is a DEQ record of a decommissioned heating oil tank at 722 Main St. The Mesa Fresca restaurant is at the southwest corner of the intersection of 8th St. and Main St.

- The north side of the 700 block of Main St. beyond 701 Main St. is occupied by commercial buildings with offices on the second floor and the ground floor that includes the LondonD Aesthetics (703 Main St.), Don Pepe's Fresh Mexican Food restaurant (705 Main St.), Goldstar ATM (707 Main St.), and Next Home Design and Bistro Cubano (709 Main St.) (Photos 49 and 50). There is a DEQ record of a decommissioned heating oil tank at 707 Main St. Beyond these buildings is a parking lot (Photo 51).
- Commercial buildings are east of the parking lot on the north side of the 700 block (719, 721, and 723 Main St.) (Photo 52). These buildings are occupied by Five Zero + Trees marijuana dispensary (719 Main St.), Corcilla Cellars tasting room (721 Main St.), and The Verdict restaurant (110 8th St.). There is a DEQ record of a decommissioned heating oil tank at 719 to 721 Main St. The Verdict restaurant is at the northwest corner of the intersection of 8th St. and Main St.
- The Clackamas County Courthouse (807 Main St.) is at the northeast corner of the intersection of 8th St. and Main St. (Photos 56 and 57). There is a DEQ record of a leaking, decommissioned heating oil tank at 807 Main St.
- A commercial building occupied by Nebbiolo Wine Bar & Market and offices (800 and 802 Main St.) is at the southeast corner of the intersection of 8th St. and Main St. (Photo 58).
- The north side of the 800 block of Main St., east of the Courthouse, is occupied by a public space (813 and 817 Main St.) (Photos 56 and 57) and Clackamas County Jury Services Law Center (821 Main St.) (Photos 61 and 62). There is a DEQ record of a leaking decommissioned heating oil tank at 815 Main St. The Jury Services Law Center is at the northwest corner of the intersection of 9th St. and Main St.
- The south side of the 800 block of Main St., east of 800 and 802 Main St. (Photos 59 and 60), has commercial buildings occupied by Busch furniture store (804 Main St.), the Weinhard Grill restaurant (812 Main St.), a small alleyway, and commercial buildings occupied by Downtown Oregon City (814 Main St.), a vacant storefront (818 Main St.), McAnulty & Barry's restaurant, and Nail Spa salon (820 Main St.). There is a DEQ record of a leaking UST at 804 Main St., and a leaking heating oil tank at 820 Main St. The Nail Spa is at the southwest corner of the intersection of 9th St. and Main St.
- The commercial building at the northwest corner of the intersection of 9th St. and Main St. (901 Main St.) is vacant and was a former bank (Photos 62, 63, and 64). There is a DEQ record of a leaking, decommissioned heating oil tank at 901 Main St. The remainder of

the north 900 block of Main St. is occupied by a commercial office building and parking lot (911 Main St.) (Photos 66 and 68). The office building's parking lot is at the northwest corner of 10th St. and Main St.

- The southeast corner of the intersection of 9th St. and Main St. is a commercial building with parking lot (900 Main St.) with multiple offices (e.g., temporary worker services, medical offices, and vacant) and coffee shop (Photos 64 and 65). There is a DEQ leaking UST record for 900 Main St. The remainder of the south 900 block of Main St. is occupied by Access Endodontics (912 Main St.), parking lot, and building with vacant retail space and screen print design business (916 Main St.), and a vacant lot (922 Main St.). The vacant lot has a DEQ LUST record. The vacant lot is at the southwest corner of the intersection of 10th St. and Main St. (Photos 67 and 69).
- The commercial building at the northeast corner of the intersection of 10th St. and Main St. is occupied by Ranee's on Main restaurant (1005 Main St.) (Photo 68). Clackamas Auto Parts (1009 Main St) is adjacent east to 1005 Main St.
- A Dutch Bros coffee drive-thru kiosk and parking lot are located at the southeast corner of the intersection of 10th St. and Main St. (1002 Main St.) (Photos 67 and 69).

Based on observations of land uses within the Project Area, several properties and roadway elements present an environmental concern to the Project. They include:

- Soils on the embankments and Willamette River shoreline sediments are present at northern locations along OR99E. Because the soils and sediment are adjacent to the roadway, and they are sinks for roadway pollutants, the soil and sediments potentially do not meet DEQ Clean Fill criteria and would require disposal at a landfill if disturbed.
- Suspected heating oil tank and UST fill ports were identified in or adjacent to the Project Area at 117 6th St./603 Main St., 624 McLoughlin Blvd., and 706 Main St. If the ground surface and/or soils are to be disturbed in these areas, it is recommended that the property owner(s) be notified to determine the status of the suspected tank(s) and to request related documentation. A geophysical survey and soil and groundwater sampling in the vicinity of a tank, and possibly tank decommissioning, may be required.
- The outfall(s) of the catch basins observed during the site walk could not be determined. Determining the outfalls is recommended, and if the outfall is into an underground injection control (UIC), meeting DEQ UIC Program requirements will be necessary.
- The structures and equipment in railings, utility poles, and light poles within and/or adjacent to the Project Area should be inspected for hazardous building materials (e.g., asbestos, lead-based paint, PCBs, and mercury) if they are to be disturbed. Coordination

with utility providers and the city of Oregon City may be required for inspection, sampling, and removal.

- Treated timber utility poles are present within the Project Area and may be disturbed by Project construction. Poles with electrical transformers will require coordination with utility providers for proper removal.

3.0 HISTORICAL RECORDS

3.1 Topographical Maps

Topographical maps dated 1914, 1939, 1941, 1954, 1961, 1970, 1984, 2014, 2017, and 2020 obtained from Environmental Data Resources, Inc. (EDR) were reviewed to identify historical land uses, as described below. A copy of the EDR Historical Topo Map Report is included in Appendix D.

1914 – The Project Area and surrounding properties are developed, with structures concentrated along Main St. and Water St. Adjacent to the Willamette River. Water St. is at approximately the same alignment as OR99E. Larger industrial operations are observed to the west of the Project Area on either side of the river downstream of Willamette Falls. The 7th St. bridge is located across the river and the rail corridor is south of the Project Area. The bluff beyond the rail corridor to the south is developed.

1939 – The Project Area and surrounding properties are shown as generally developed. Larger building is shown adjacent west of the Project Area on the northwest corner of 5th St. and Main St. (former post office building) and adjacent east on the northeast corner of 10th St. and Main St. Larger structures are shown further to the west and further to the east of the Project Area along Water St.

1941 – The Project Area and surrounding properties are shown as generally developed. The Project Area appears unchanged.

1954 – The Project Area and surrounding properties are shown as generally developed. A large structure is present on the northeast corner of 8th St. and Main St. (courthouse building). Industrial operations across the river to the west of the Project Area have expanded.

1961 – The Project Area and surrounding properties are shown as generally developed. The Project Area appears unchanged. Several larger industrial buildings are shown west of the Project Area on the southern bank of the river.

1970 – The Project Area and surrounding properties are shown as generally developed. 5th St. and Water St. to 7th St. are shown as improved.

1984 – The Project Area appears unchanged.

2014-2020 – Individual structures are no longer shown on the maps. The Project Area appears unchanged.

Based our review, potential commercial USTs and heating oil tanks along the Project Area have the potential to impact the Project; however, considering proposed construction activities, adjoining properties are not considered to be an environmental concern.

3.2 Aerial Photographs

Aerial photographs dated 1936, 1948, 1952, 1955, 1960, 1970, 1975, 1981, 1994, 2000, 2006, 2009, 2012, 2016, and 2020 obtained from EDR were reviewed to identify historical land uses, as described below. A copy of the EDR Aerial Photo Decade Report is included in Appendix D.

1936 – The Oregon City waterfront is almost completely developed. Industrial operations (predominantly pulp and paper) are to the west of the Project Area along the river, and commercial development progresses eastward through the Project Area, with some remaining residential development at the east end. Gas stations are observed at the southwest corner of 5th St. and Main St., southwest corner of 6th St. and Water St. (OR99E), southwest corner 8th St. and Water St., northwest corner of 9th St. and Main St., and southwest and southeast corners of 10th St. and Main St.

1948 – OR99E was completed with improvements to Water St. and 5th St. Commercial development has increased to the east end of the Project Area and few residential properties are observed. Additional gas stations are present at the southeast corner of former Water St. and 5th St. intersection and at the southeast corner of 9th St. and Water St.

1952 – (Poor resolution) Except for infill commercial development at the east end and potentially some adjacent redevelopment to the west at 5th St., the Project Area appears unchanged.

1955 – (Poor resolution) An additional gas station is present at the southeast corner of 10th St. and OR99E (Water St.). A small water treatment facility is adjacent to the west of the Project Area along the former Water St. alignment. The Project Area appears otherwise unchanged.

1960 – The gas stations at the southeast corner of former Water St. and 5th St. intersection and at the southeast corner of 9th St. and OR99E (Water St.) are no longer present. The Project Area appears otherwise unchanged.

1970 – (Poor resolution) The building at the northwest corner of 5th St. and Main St. was redeveloped with a larger building (former post office building). The gas station at the

southwest corner of 6th St. and OR99E no longer appears to be in operation (i.e., a canopy is no longer observed). A large commercial building was constructed east of the Project Area along Main St., and the two gas stations on 10th St. no longer appear to be present.

1975 – (Poor resolution) The Project Area appears unchanged.

1981 – The gas station at 8th St. and OR99E (Water St.) no longer appears to be in operation, and the property at the southwest corner of 10th St. and Main St. is redeveloped with a commercial building. The building associated with the water treatment facility adjacent west of the Project Area is removed.

1994 – The Project Area appears unchanged.

2000 – The Project Area appears unchanged.

2006 – The Project Area appears unchanged.

2009 – The gas station at the southeast corner of 10th St. and OR99E (Water St.) is redeveloped with the same purpose. The Project Area appears otherwise unchanged.

2012-2020 – Land use along the Project Area appears unchanged.

Based our review, identified gas stations within and adjacent to the Project Area have the potential to impact project construction from historical spills or leaking USTs; however, considering proposed construction activities, these properties are not considered an environmental concern unless excavation below depths of 2 feet will occur.

3.3 Sanborn Fire Insurance Maps

Sanborn Fire Insurance Maps dated 1884, 1888, 1890, 1892, 1900, 1911, 1925, 1943, 1950, 1956, and 1959 obtained from EDR were reviewed to identify historical land uses, as described below. A copy of the EDR Certified Sanborn® Map Report is included in Appendix D.

1884 – (Coverage west of 7th St. only.) The Oregon & California Railroad line is present and the Project Area and adjacent parcels are developed with commercial properties predominantly along Main St., including printing and photo operations. Commercial and industrial land use is adjacent west of the Project Area. Residential properties and numerous livestock stables are adjacent to the commercial properties.

1888 – Some infill commercial development is observed along Main St. west of 7th St. The 7th St. bridge and approach are present on the map. Land use east of 7th St. is predominantly residential with some commercial properties along Main St. and several churches. Fewer stables are observed. A larger commercial operation, Oregon City Brewing, is present east of 8th St. and south Main St., and across Main St. is a large county courthouse building.

1890 – Except for a larger commercial operation east of 7th St. and south of Main St., Noblitt's Feed & Livery, land use along the Project Area appears relatively unchanged.

1892 – Infill commercial development is observed west of 6th St., and the Oregon City Brewing operations has expanded east. Land use along the Project Area appears otherwise relatively unchanged.

1900 – Infill commercial development is observed between of 7th St. and 8th St. along Main St. Oregon City Brewing is no longer present, and the buildings are occupied by various commercial operations. An elevated walkway up the bluff to the south is present on 8th St. south of Main St. Land use along the Project Area appears otherwise relatively unchanged.

1911 – Infill residential development is observed on the south side of Water St., and infill commercial development is observed along Main St. between 7th St. and 8th St. as well as at 10th St. that includes a photo shop. Land north of Water St. between 5th St. and 6th St. along the riverfront is developed with two large stable buildings and a feed store. The walkway at 8th St. is no longer shown and printing operations are present at the former brewery building at 8th St.

1925 – Infill commercial development is observed along the Project Area, replacing some residential properties along Water St. and adjacent to the rail lines. The Oregon City Laundry is listed on the east side of 5th St. between Water St. and Main St. A large auto garage with repair services is adjacent to the Project Area on the south side of Main St. east of 9th St., and a gas station is present east of the Project Area at 10th St. on the south side of Main St.

1943 – 5th St. is realigned, and the west side of 5th St. between Water St. and Main St. is redeveloped with a larger garage building and a post office. The stable buildings along Water St. at 5th St. are no longer present, and buildings at the southeast corner of the Project Area have been removed for the realignment. Residential properties west of 8th St. along Water St. have been largely redeveloped with commercial properties that include auto sales and service, auto repair, a machine shop, and the relocated Oregon City Laundry. Additional gas stations are present within and adjacent to the Project Area, including at the southeast corner of 5th St. and Water St., southwest and southeast corners of 5th St. and Main St., mid-block on Railroad Ave between 5th St. and 6th St., southwest corner of 6th St. and Water St., northwest corner of 9th St. and Main St., southwest corner of 8th St. and Water St., and southwest corner of 10th St. and Main St. The county courthouse building on 8th St. is improved with a larger building.

1950 – Most of the remaining residential properties and churches east of 8th St. along Water St. have been removed. The parcels have been redeveloped with an office building and large

parking area, a large store building and large parking area, and one additional gas station and auto repair shop at the southeast corner of 9th St. and Water St.

1956 – Most residential properties within and adjacent to the Project Area have been removed, and infill commercial development is observed. The gas stations at the southeast corner of 5th St. and Water St. and at the southeast corner of 9th St. and Water St. have been removed. The gas station at the southeast corner of 5th St. and Main St. is now listed as a dry cleaning business. An additional gas station is present at the southeast corner of 10th St. and Water St.

1959 – Water St. is in the process of being replaced with OR99E/McLoughlin Blvd. The gas station along Railroad Ave. is no longer present.

Based our review, the former gas station, auto repair, and laundry/dry cleaning operations identified within and adjacent to the Project Area have the potential to impact Project construction from historical spills or leaking USTs; however, considering proposed construction activities, these properties are not considered an environmental concern unless excavation below depths of 2 feet will occur.

3.4 City Directory Listings

City Directory listings dated 1953, 1960, 1964, 1969, 1974, 1979, 1984, 1987, 1992, 1995, 2000, 2005, 2010, 2014, 2017, and 2020 obtained from EDR were reviewed. A copy of the EDR-City Directory Abstract is included in Appendix D. Notable listings include:

- 419 and 427 Main St.: Smurfit Newsprint Corp/Blue Heron Paper/Publisher's Paper Co. – 1969 through 2017
- 502/506 Main St.: Midway Cleaners/Pat's American Cleaners/American Cleaners dry cleaners – 1953 through 1992
- 814 Main St.: Portland Gas & Coke Co. (office building) – 1953
- 908 Main St.: Cloths Clean Center dry cleaners – 1987
- 922 Main St.: Wlk Bros Chevron Serv service station – 1953
- 1002 Main St.: Tom's Discount Service/Joe's Shell Service/Shell service station – 1953 through 1979

The listings support other historical documents and observations made during the site reconnaissance.

4.0 ENVRIONMENTAL RECORDS REVIEW

Available federal and state records for identified hazardous waste sites were reviewed using EDR, supplemented using information available through DEQ online databases and the Oregon State Fire Marshal (OSFM) hazardous substance incident database. Table 2 shows the database search radii used in our review, along with the total number of sites found for each database and whether the site is on or adjoining the Project Area.

Table 2: Environmental Database Minimum Search Radii

Database Record	Search Radius (Miles)	Total Sites Found	Sites On or Adjoining Project Area
State-Equivalent NPL List: Environmental Cleanup Site Information System (ECSIS)	0.5	10	3
Oregon Permitted Landfill List	0.5	1	1*
State Leaking Underground Storage Tank (LUST) List	0.25	80	20*
Federal Resource Conservation and Recovery Act (RCRA) Generators List	On site and adjoining	5	5
Oregon State Fire Marshall (OSFM) Spill Response List	On site and adjoining	10	10
State Certified Underground Storage Tanks (UST) List	On site and adjoining	4	4

* Incorrect address in database for a site listing. Not on or adjoining the Project Area.

4.1 Environmental Cleanup Site Information System (ECSIS)

DEQ Environmental Cleanup Site Information System (ECSIS)-listed sites include suspected and confirmed hazardous waste sites. There are 10 ECSIS sites located within 0.5 miles of the Project Area, and 3 ECSIS sites are within or adjacent to the Project Area.

The 7 of 10 ECSIS sites within 0.5 miles of the Project Area are not of environmental concern based on several factors: the proposed construction activities, their distance from the Project Area, the fact that only soil was impacted by the leaking tanks, the cross- to down-gradient or hydrogeologically separation from the Project Area by the Willamette River or Abernethy Creek or the basalt bluff south/southeast of the Project Area, and/or on their No Further Action (NFA) status. Based on this information, these 17 sites are not discussed herein.

Table 3 summarizes the regulatory status research findings for the 3 ECSIS sites on or adjoining the Project Area. Each ECSIS site location is shown in Figures 3A and 3B (Appendix A).

Table 3: ECSIS Sites with the Potential to Impact the Project Area

Site Name and Location	DEQ ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
BP#11001 202 5th St. (a.k.a. 450 Main St.) Oregon City, OR 97045 (Site A)	2521	Adjacent	SW	**Status:** Suspected site requiring further investigation. A groundwater monitoring well (MW-6) associated with the site's former gas station LUST remediation contained hydraulic oil-free product. MW-6 is located near the northwest corner of the site. This contamination is outside the DEQ UST Program and was referred to the DEQ Cleanup (ECSIS) Program. The source of the hydraulic oil is believed to be the hydraulic lifts at the adjacent former Smurfit Newsprint Corp. In 1995, the DEQ Cleanup Program ranked the isolated occurrence of free product a low priority and indicated the waste oil tank and associated solvent contamination in groundwater would be evaluated after the gas station LUST site is remediated. The LUST file for the property received a NFA in 2006. The ECSI file remains open. See the LUST Section of this report for further details on the leaking tanks. Petroleum and solvent contamination may be present in groundwater and soils. If dewatering or soil excavation occurs in the vicinity of this property, soil and groundwater characterizations are recommended.

Site Name and Location	DEQ ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
Trachsel Property 502/504 Main St. Oregon City, OR 97045 (Site B)	4597	Adjacent	E of SW Panhandle	**Status:** Further investigation of area facilities recommended. Two heating oil tanks (HOTs) at the south side of the building were decommissioned in-place. Site investigation activities encountered petroleum contamination in soil and groundwater and solvent contamination in groundwater (likely from historic dry cleaning operations on the property). The DEQ Cleanup Program was involved due to the solvent contamination and requested additional investigation to determine the extent of contamination and indoor air quality risks. DEQ ranked the site a medium priority for further characterization. See the open LUST file for this property for additional information about the heating oil tanks. Petroleum and solvent contamination may be present in groundwater and soils. If dewatering or soil excavation occurs in the vicinity of this property, soil and groundwater characterizations are recommended.
Smurfit Newsprint Corp., Oregon City Div. (a.k.a. Blue Heron Paper Company) 419 Main St. Oregon City, OR 97045 (Site C)	4811	Adjacent	W	**Status:** Suspected site requiring further investigation. Numerous investigations were completed across the 23-acre property and the property is currently being investigated and remediated per a Prospective Purchaser Agreement (PPA) between the Confederated Tribes of the Grand Ronde and DEQ.

Site Name and Location	DEQ ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
				PCBs, petroleum hydrocarbons and petroleum hydrocarbon constituents, dioxins, and metals were above human health screening levels. As part of the PPA, remediation, demolition activities, additional investigation and assessment activities, UST removal, and stormwater best management practice improvements are occurring on the property. A Feasibility Study is scheduled for completion March 1, 2024, followed by DEQ review. The ECSI file closure is anticipated at the end of 2025. Site investigation activities completed adjacent or within the Project Area indicate 3 USTs are located adjacent to the parking lot and north of the former mill office building at 427 Main St. Records indicate two heating oil tanks were decommissioned and contaminated soil was removed at this location. The tanks are not of environmental concern to the Project Area. See the LUST Section of this report for details. In addition, boring B-19 was installed in Main St. between the former mill office building and former gas station (450 Main St.). Polynuclear aromatic hydrocarbons (PAHs), metals, and volatile organic compounds (VOCs) were detected in soils below urban residential DEQ Risk-Based Criteria (RBCs). PCBs were not detected in soils. The groundwater sample collected from boring B-19 detected petroleum hydrocarbons, and petroleum

Site Name and Location	DEQ ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
				hydrocarbon VOC constituents above DEQ RBCs for Groundwater Ingestion/inhalation for Urban Residential scenario. A geophysical survey identified numerous utility piping/wood pipes for water transport below concrete pads in Main St. Petroleum and solvent contamination may be present in groundwater and soils in the vicinity of the 400 block of Main St. If dewatering or soil excavation occurs in the vicinity of Main St., soil and groundwater characterizations are recommended.

4.2 Solid Waste Landfills

There are no Oregon permitted landfills listed within 0.5 miles of the Project Area. The historical landfill listed in the EDR Database is incorrect. The EDR Database lists the landfill site name as Enterprise-Courier Inc. located at 922 Main St. in Oregon City; the landfill owner as the City of Enterprise; the landfill closure date as 1976; and the township, range, and section of the historical landfill listed as Township 1S, Range 44E, and Section 36. This township, range, and section corresponds to the town of Enterprise, Oregon, not Oregon City, which is Township 2 South, Range 2 East, Section 31. Based on this information, there are no landfill sites within or adjacent to the Project Area.

4.3 Leaking Underground Storage Tanks (LUSTs)

There are 80 DEQ LUST sites located within 0.25 miles of the Project Area. Four of the LUST sites are across the hydrogeologic divide of the Willamette River and are not an environmental concern. Also not of concern are the 4 sites between approximately 475 feet and 1,275 feet northeast of the Project Area and the 52 LUST sites atop the approximately 80-foot-high basalt bluff to the east and southeast of the Project Area. This is based on the proposed construction activities, their distance from the Project Area, only soil was impacted by the leaking tanks, the sites are cross- to down-gradient from the Project Area, and/or on their NFA status.

There are 20 LUST sites on or adjoining the Project Area. They are described in Table 4 below and shown on Figures 3A and 3B (Appendix A).

Table 4: LUST Sites with the Potential to Impact the Project Area

Site Name and Location	DEQ ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
Arco #4110 1002 McLoughlin Blvd. Oregon City, OR 97045 (Site D)	03-02-0985 and 03-90-0042	Adjacent	E	**Status:** Both sites are closed. In 1990, a heating oil tank (HOT) used oil UST and three USTs were decommissioned by removal. Approximately 437 cubic yards of soil were removed, and DEQ issued a NFA letter in November 1990 for LUST File #03-90-0042. A release from the tanks was discovered during a Phase II Environmental Site Assessment in September 2002 and reported to DEQ (LUST File # 03-02-0985). Additional site investigations were completed, including the installation of 4 groundwater monitoring wells. Contaminated soil remains in place between 7 and 16 feet below the shop floor and exceeded DEQ Risk-Based Criteria (RBCs) for construction workers and indoor air for Urban Residential. Groundwater was impacted with petroleum hydrocarbons and flowed to the north. There were no USTs in the right-of-way (ROW). Contamination above RBCs are on the property, with minor petroleum and petroleum constituent contamination likely at the western and northern property perimeter. DEQ issued an NFA, with an Easement & Equitable Servitude stating urban residences shall not be constructed at the property

Site Name and Location	DEQ ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
				without DEQ approval and groundwater on the property will not be used (does not apply to dewatering activities). Petroleum contamination may be present in groundwater and soils 7 feet bgs. Petroleum contamination may be present in groundwater and soils in the vicinity of this property. If dewatering or soil excavation occurs in the vicinity of this property and Main St., soil and groundwater characterizations are recommended.
Heating Oil Tank 512 McLoughlin Blvd. Oregon City, OR 97045 (Site E)	03-14-1389	Outside of Project Area	-	**Status:** Closed. EDR incorrectly mapped this location based as there is no 512 McLoughlin Blvd. address in the Project Area. The DEQ database refers to it as a residential HOT. The residential address of 512 McLoughlin Blvd. is 1.84 miles southwest of the Project Area. This LUST is not of environmental concern.
Willamette Falls Legacy Site 427 Main St. Oregon City, OR 97045 (Site F)	03-18-0364	0.25	W	**Status:** Unassigned. Soil and groundwater contaminated with heating oil was encountered during a site investigation in March 2018 approximately 0.25 miles west in the interior of the former mill property, and not on the 427 Main St. parcel. This UST release is part of the ECSI cleanup site (see Site C). Based on the distance from the Project Area, this LUST is not of environmental concern.
Heating Oil Tank and Smurfit Newsprint Corp Oregon City Div. 419 Main St.	03-21-0133 (Both listings	Adjacent	W	**Status:** Closed. Two HOTs were located north of the former mill office building at

Site Name and Location	DEQ ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
Oregon City, OR 97045 (Site C)	have the same LUST number)			427 Main St., not on the 419 Main St. parcel. The tanks and contaminated soil were removed. Confirmatory sampling indicates petroleum contaminated soils have been removed. DEQ closed the LUST file in June 2021. Based on this information, this LUST is not of environmental concern.
Former Mobil 10-D8N 202 5th St. Oregon City, OR 97045 (Site A)	03-90-0017	Adjacent	W	**Status:** Closed. On- and off-site investigation activities were conducted (soil sampling and groundwater monitoring wells were installed), 15 USTs and 3 hydraulic hoists were decommissioned, and contaminated soils were removed between 1989 and 1994. A soil vapor extraction (SVE) system was installed on the property and operated between October 1990 and June 2000. Free product was discovered in the vicinity of groundwater monitoring well MW-6 in June 1992, and the site was referred to the DEQ Cleanup Program to address detected solvents and free product (see Figure 3B, Site A). Petroleum contamination was not encountered during compliance groundwater monitoring between 2002 and 2003, after the SVE system was turned off. Based on the site's industrial zoning and the remaining contaminant levels in soil and groundwater, DEQ issued a NFA in November 2006. DEQ required notification prior to the installation of groundwater supply wells, for any purpose. The USTs and SVE system were not in the ROW. Push probe

Site Name and Location	DEQ ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
				borings installed at the northeast, southeast, and southwest corners of the intersection did not detect benzene, toluene, ethylbenzene and total xylenes (BTEX) in soils between 7.5 and 9 feet bgs, with the exception of GP-2 installed at the northeast corner of the property. Also detected in soils were 2.0 mg/kg of ethylbenzene and 3.7 mg/kg of xylenes at 6.8 feet bgs. These detections are below Construction and Excavation Worker DEQ RBCs and above Clean Fill Criteria. The location of GP-2 is indicated on Figure 3B. Petroleum and solvent contamination may be present in groundwater and soils. If dewatering or soil excavation occurs in the vicinity of this property, soil and groundwater characterizations are recommended.
Heating Oil Tank 502 Main St. Oregon City, OR 97045 (Site B)	03-05-0459	Adjacent	S	**Status:** Unassigned. Two HOTs on the south side of the building were decommissioned in place. Site investigation activities encountered petroleum contamination in soil and groundwater and solvent contamination in groundwater. There is potential free product associated with the HOTs (the highest heating oil concentration in soil was 22,100 mg/kg). The location and depth of this sample are unknown. The LUST file remains open. DEQ Cleanup Program became involved due to the solvent

Site Name and Location	DEQ ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
				contamination (see ECSI Site B, Traschel Property, 502/504 Main St.). DEQ requested additional investigation to determine the extent of contamination and indoor air quality risks. The ECSI file remains open. Petroleum and solvent contamination may be present in groundwater and soils. If dewatering or soil excavation occurs in the vicinity of this property, soil and groundwater characterizations are recommended.
Elkins Railroad Parking 508 Main St. Oregon City, OR 97045 (Site G)	03-19-1227	Adjacent	S	**Status:** Closed. Two USTs at the rear of the property, adjacent to the north side of Railroad Ave., were decommissioned by removal, and contaminated soil was removed in December 2019. Confirmatory sampling indicates less than 40 mg/kg of gasoline remained in soil. Groundwater testing in January 2019 from temporary push probe borings around the former tank location indicate petroleum contamination and BTEX were not detected in groundwater. DEQ issued an NFA determination in March 2020. This LUST is not of environmental concern.
Heating Oil Tank 517 and 527 Main St. Oregon City, OR 97045 (Site H)	03-10-0766	Adjacent	N	**Status:** Closed. Three HOTs were decommissioned by removal in October 2013. One HOT was located in the sidewalk along 6th Ave., and 2 HOTs were located at the rear (north side) of the building. Site investigations at all

Site Name and Location	DEQ ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
				tanks, soil gas testing at nearby buildings, and soil removal activities at tanks on the north side of the building were completed between 2010 and August 2014. Groundwater was encountered at approximately 8 to 8.5 feet and was contaminated with petroleum hydrocarbons at the north tanks and possibly below the adjacent building to the north. Approximately 120 cubic yards of contamination between 6.8 and 10.5 feet bgs surrounds the former tank locations on the property on the north side of the building. The contamination exceeds construction worker direct contact RBCs, and groundwater exceeded the construction and excavation worker RBCs. Contamination was not detected around the former tank below the sidewalk. Soil gas results indicate indoor air RBCs were not exceeded. A risk-based evaluation was completed, and DEQ closed the file in September 2014. Petroleum contamination may be present in groundwater in the Project Area located downgradient (i.e., north) of 527 Main St. at the adjacent north property (516 McLoughlin Blvd.) and its adjacent ROW. If dewatering occurs in the vicinity of 527 Main St. and 516 McLoughlin Blvd., groundwater characterization is recommended.
Heating Oil Tank 616 Main St.	03-98-0216	Adjacent	S	**Status:** Closed.

Site Name and Location	DEQ ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
Oregon City, OR 97045 (Site I)				One HOT was decommissioned at the rear of the building, approximately 175 feet southeast of the Main St. ROW. The tank was decommissioned in place, and contaminated soil extended to within 3 feet in all directions of the tank. Groundwater testing around the tank indicates minor amounts of detected petroleum constituents were below DEQ RBCs. Based on this information, DEQ closed the LUST file in January 2019. This LUST is not of environmental concern as based on the limited lateral extent of contamination and distance from the Main St. ROW.
Heating Oil Tank 621 Main St. Oregon City, OR 97045 (Site J)	03-90-0113	Adjacent	N	**Status:** Closed. Gasoline and Stoddard solvent contamination were encountered during tank decommissioning activities in 1990. Five USTs were located within the loading dock on the north end of the property building. Halogenated solvents, PCBs, and leachable metals were not detected in the solvent-contaminated soil. Contaminated soil was removed from the solvent tank area, and 60 parts per million (ppm) of total petroleum hydrocarbons remained in soil at the solvent tank. Contaminated soil at the gasoline tank was removed, aerated, and placed in the gasoline tank pit. In-place soil sampling indicates 230 ppm of gasoline remains in the in-place soil. Bedrock was encountered at 15 feet bgs, and groundwater was not encountered. A passive vent system was installed in the former

Site Name and Location	DEQ ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
				tank cavity. No BTEX was detected in the vent monitoring. DEQ closed the site in March 1992. Petroleum and solvent contamination may be present in groundwater and soils in the vicinity of the rear of the property and down-gradient of the property (624 McLoughlin Blvd. and the 7th St. ROW). If dewatering or soil excavation occurs in these vicinities, soil and groundwater characterizations are recommended. This LUST file documentation shows one gasoline tank and dispenser were located along the north wall of 624 McLoughlin Blvd. (see Site Ac in Table 7, Section 4.6 of this report).
Oregon City ROW at 7th St. and Railroad Ave. Oregon City, OR 97045 (Site K)	03-12-0386	0.054	S	**Status:** Unassigned. Soil contaminated with miscellaneous gas from a non-regulated tank was encountered April 2012 at the intersection of 7th St. and Railroad Ave. (approximately 400 feet south of the Main St. ROW). The soil matrix cleanup was reported and it is unknown if groundwater was encountered. The file remains open. Based on the distance from the Project Area, this LUST is not of environmental concern.
Heating Oil Tank 719-721 Main St. Oregon City, OR 97045 (Site L)	03-01-5232	Adjacent	N	**Status:** Closed. A 675-gallon HOT was decommissioned. The decommissioning method (removal or in-place) is unknown. The tank was located behind (on the north side) of the 719 Main St.

Site Name and Location	DEQ ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
				building in 2001. Approximately 8 cubic yards of contaminated soil were left in place. The maximum concentration was 78,300 ppm of diesel-range petroleum hydrocarbons directly below the tank. Groundwater was not encountered. Based on the risk-based closure evaluation, DEQ closed the LUST file in June 2001. Based on the limited extent of contamination and distance from the Main St. ROW (180 feet), this LUST is not of environmental concern.
Heating Oil Tank 807 Main St. Oregon City, OR 97045 (Site M)	03-13-0033	Adjacent	N	**Status:** Closed. Two HOTs on the east side of the courthouse building were decommissioned by removal in January 2013. Soil contaminated with heating oil was encountered at the northern tank, and subsequent investigations and soil removal activities indicated the extent of soil contamination was limited to within 5 feet of the tank, and groundwater surrounding the tanks had not been impacted by the release. A risk-based cleanup was reported in January 2013. DEQ closed the site in March 2013. Based on the limited extent of contamination, these LUSTs are not of environmental concern.
Heating Oil Tank 815 Main St. Oregon City, OR 97045 (Site N)	03-04-1091	Adjacent	N	**Status:** Closed. Two HOTs were reported to be decommissioned at this address (mapped in the center of the north 800 block of Main St.). One tank was removed and one was decommissioned in place in March and April 2004. A release

Site Name and Location	DEQ ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
				was reported to DEQ in June 2004, and a soil matrix cleanup was reported in June 2004. DEQ closed the site in July 2004. The location(s) of the in-place tank, and the leaking tank and soil contamination (if they are different or the same) are unknown. Petroleum contamination may be present in groundwater and soils in the vicinity of this address. If dewatering or soil excavation occurs in the vicinity of this property, soil and groundwater characterizations are recommended.
Tom Busch Home Furnishings 804 Main St. Oregon City, OR 97045 (Site O)	03-00-0847	Adjacent	S	**Status:** Closed. A 500-gallon unleaded gasoline UST and dispenser were located on the south side of the building adjacent to Railroad Ave. The tank is approximately 200 feet from the Main St. ROW. The owner stopped operating the tank in 1969. The tank was decommissioned in June 2000, and contaminated soil was limited to a few feet from the tank. Groundwater entering the tank did not contain benzene or PAHs. Approximately 5 tons of contaminated soil was excavated for off-site treatment, and 41 ppm gasoline remains in soils after excavation. DEQ closed the site in October 2001. Based on the soil and groundwater data and the distance of the tank from the Main St. ROW, this LUST is not of environmental concern.
Heating Oil Tank	03-12-0491	Adjacent	S	**Status:** Closed.

Site Name and Location	DEQ ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
820 Main St. Oregon City, OR 97045 (Site P)				A 720-gallon HOT was located in the sidewalk approximately 97 feet from the 9th St. curb line at the intersection of Main St. and 9th St. The tank was decommissioned by removal in May 2012. Approximately 19.42 tons of impacted soil were removed from the 13-foot-long, 7- to 8-foot-deep, and 8-foot-wide (from curb to 1.5 feet from the building) excavation. Soil contamination left in place contained up to 11,300 mg/kg of diesel-range petroleum hydrocarbons. Groundwater was impacted by the release, and the extent of groundwater contamination is inferred to extend below Main St. to the west (see Appendix A, Figure 3A). A risk-based evaluation was reported in October 2014. DEQ closed the site in October 2014. A note in the file states that the tank may have been punctured during removal, resulting in free product in the groundwater directly below the former tank location. Petroleum contamination may be present in groundwater and soils in the vicinity of this address. If dewatering or soil excavation occurs in the vicinity of this property and/or below Main St., soil and groundwater characterizations are recommended.
Heating Oil Tank 901 Main St. Oregon City, OR 97045 (Site Q)	03-03-2374	Adjacent	N	**Status:** Unassigned. A HOT release to soil was reported to DEQ in November 2003, with cleanup starting the

Site Name and Location	DEQ ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
				same day. DEQ issued a LUST number to the site in November 2003. There is no additional information in the DEQ file. The location of the tank and contaminated soil relative to the Main St. ROW is unknown. Petroleum contamination may be present in groundwater and soils in the vicinity of this address. If dewatering or soil excavation occurs in the vicinity of this property and/or below Main St., soil and groundwater characterizations are recommended.
Heating Oil Tank 900 Main St. Oregon City, OR 97045 (Site R)	03-12-0921	Adjacent	S	**Status:** Closed. Contaminated soil was encountered in 2012 during decommissioning a HOT by removal below the sidewalk near the northwest corner of the building. Approximately 7.6 tons of petroleum-contaminated soils were removed and transported off-site for disposal. Confirmation soil data indicate 9,510 mg/kg of gasoline and 308 mg/kg of diesel were left in place. A subsequent site investigation confirmed soil and groundwater contamination extend beyond the excavation boundaries below the Main St. ROW (see, Appendix A, Figure 3A). Soil contamination depths ranged between 6.5 and 10 feet bgs with a maximum gasoline detection of 2,100 mg/kg and diesel detections up to 210 mg/kg. Groundwater contamination contains gasoline-range hydrocarbons up to 2,500 micrograms/L with related VOC constituents. Diesel was detected

Site Name and Location	DEQ ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
				up to 410 micrograms/L. A risk-based assessment was reported in May 2019. DEQ issued an NFA letter in August 2019. Petroleum contamination is present in groundwater and soils in the vicinity of this address. If dewatering or soil excavation occurs in the vicinity of this property and/or below the Main St. ROW, soil and groundwater characterizations are recommended.
Enterprise Courier Building 922 Main St. Oregon City, OR 97045 (Site S)	03-94-0036	Adjacent	S	**Status:** Closed. Site investigations and soil removal activities at the property in 1994 determined less than 11 cubic yards of contaminated soil are located up to approximately 10 feet below the sidewalk at the northwest corner of the property (see Figure 3A). Contaminant concentrations were up to 140 mg/kg of gasoline. Contamination was left in place elsewhere on the property. Based on the site investigation, DEQ issued an NFA letter in March 1995. Groundwater was not encountered at up to 11 feet bgs, the maximum depth excavated. It is unclear if samples were collected below the dispenser island at the northeast corner of the property. If there was a release, contamination may extend below the sidewalk in Main St. and possibly 10th St. Petroleum contamination is present in groundwater and soils in the vicinity of this address. If dewatering or soil excavation

Site Name and Location	DEQ ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
				occurs in the vicinity of this property and/or below the Main St. ROW, soil and groundwater characterizations are recommended.

4.4 Resource Conservation and Recovery Act (RCRA) Generators

RCRA generators are facilities that generate or store hazardous waste. There are 6 properties with 6 hazardous waste generator listings each located on or adjoining the Project Area, as described in Table 5 and shown on Figures 3A and 3B in Appendix A. These sites are not of environmental concern based on their not having any violations, or if they did, they were corrected to the satisfaction of DEQ.

Table 5: RCRA Generators On or Adjoining the Project Area

Site Name and Location	EPA ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
Arco Products Co 4110 1002 McLoughlin Blvd. Oregon City, OR 97045 (Site D)	ORD98720 0862	Adjacent	NE	Arco is verified as Not a Generator and no violations were found.
Smurfit Newsprint Corp-Water Tower Corner of 1st St and High St/Platt 2, LO Oregon City, OR 97045 (Site C)	ORD98719 8488	Adjacent	W	Smurfit is verified as Not a Generator and no violations were found.
Blue Heron Paper Co. 419 Main St. Oregon City, OR 97045 (Site C)	ORD00902 5677	Adjacent	W	Blue Heron Paper Co when operating was verified as Conditionally Exempt Small Quantity Generator, Small Quantity Generator and Large Quantity Generator of waste paint related material and waste oil with solvent. While violations and notices of non-compliance were found, all were corrected.

Site Name and Location	EPA ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
Circle K Store 30071 202 5th St. Oregon City, OR 97045 (Site A)	ORD98718 9636	Adjacent	W	Circle K Store is verified as Not a Generator and no violations were found.
Masonic Lodge 707 Main St. Oregon City, OR 97045 (Site T)	ORQ00002 0370	Adjacent	S	Masonic Lodge is verified as Not a Generator and no violations were found.
Enterprise-Courier Inc. 922 Main St. Oregon City, OR 97045 (Site S)	ORD98719 7233	Adjacent	S	Enterprise-Courier Inc. is verified as Not a Generator and no violations were found.

4.5 Hazardous Substance Incidents

The OSFM hazardous substance incident database listed 10 spills or incidents adjoining or within the Project Area. Two of these incidents (at 517 and 707 Main St.) pertained to a natural gas leak and are eliminated as environmental concerns. Four spills listed below in Table 6 (Sites V, W, X and Ab) are of potential environmental concern.

Table 6: Hazardous Substance Incidents On or Adjoining the Project Area

Site Name and Location	ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
911 Main St. Oregon City, OR 97045 (Site U)	930572	Adjacent	N and S	Approximately 0.5 gallons of gasoline were released on 11/11/93 in the parking lot when a tank was damaged in an accident. Based on the volume released, age of the release, and location outside of the Project Area, this spill is not of environmental concern.
710 McLoughlin Blvd. Oregon City, OR 97045 (Site V)	2018-2109	Adjacent	NW	On 9/11/2018, the City of Oregon City reported a gray water overflow, approximately 25 gallons per day, from a stormwater line. The Willamette River was impacted. Oregon City Public Works and ODOT are noted as coordinating to

Site Name and Location	ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
				determine the cause. ODOT did not have any documentation in their records of this spill or investigation. If the Project will impact stormwater in this area, it is recommended stormwater flow in this area be evaluated and the source identified and repaired.
OR99E and 6th St. Oregon City, OR 97045 (Site W)	930213	Adjacent	N	On August 2, 2021, a truck ran over the overlook-viewing area and was partially hanging over the edge of the slope above the basalt bluff that drops to the Willamette River. Approximately 5 to 10 gallons of diesel fuel leaked from the truck. An emergency response crew cleaned the sidewalk and noted the motor oil was limited to the top 2 to 3 inches of soil, and diesel impacts were found to be approximately 6 inches in diameter. Approximately 4 cubic yards of contaminated soils were removed on August 3, 16, 24, and 25, 2021 using hand tools or vacuum truck due to a high-pressure natural gas utility line. Contamination was observed below the sidewalk pavers and guardrail, and additional excavation occurred on August 26 and 27 and September 3 through 17, 2021. The maximum depth excavated below the sidewalk was 3.5 feet, and the depth of excavation at the retaining wall in the slope above the bluff was 6 to 8 feet bgs. Soil sampling confirmed that the maximum diesel concentration was 4,260 ppm beyond the sidewalk and below the retaining wall. DEQ approved leaving this

Site Name and Location	ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
				contamination in place, as it is not accessible to the public. The excavation was subsequently backfilled. Petroleum contamination is present in soils at the retaining wall. If soil excavation occurs in the vicinity of this area, soil and characterization is recommended.
Near 504 Main St. Oregon City, OR 97045 (Site X)	1998-0822	-	-	On February 1, 1998, there was a periodic solvent odor in 7 businesses for approximately 1 hour mid-day. The source was not identified. If excavations are made in this area, it is recommended that ODOT ask businesses if this odor is still occurring and characterize the odor to determine its source as necessary.
506 SE McLoughlin Blvd. Oregon City, OR 97045 (Site Y)	1997-3071	Adjacent	E	A drug lab was reported on December 19, 1997. There is no record of it being remediated. However, based on age of the drug lab release and the site walk visual observations, this spill is not of environmental concern.
7th St. and Main St. Oregon City, OR 97045 (Site Z)	900303	-	-	On September 5, 1990, 2 gallons of diesel fuel were released at this location. Based on the volume and age of the release, this spill is not of environmental concern.
400 McLoughlin Blvd. Oregon City, OR 97045 (Site Aa)	1106239	*	*	On 5/15/11, there was a report of possible oil on the roadway. Upon the Fire Department's inspection, the substance was determined to be soap. Based on this information, this spill is not of environmental concern.
5th St. and Main St. Oregon City, OR 97045 (Site Ab)	930186	-	-	On May 27, 1993, the Clackamas County Fire Department responded to a report via CB

Site Name and Location	ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
				radio of a spill on OR99E at 5th St. and Main St. The Fire Department found some evidence of a more than normal amount of roadside oil film along the northbound curb. The amount of the release and whether it was cleaned up was not reported. Based on the date of the release, this spill is not of environmental concern. However, if soils will be disturbed in this area for the Project, soil characterization is recommended.

4.6 Permitted Underground Storage Tanks (USTs)

There are 4 DEQ permitted UST facilities adjoining the Project Area. Permitted UST facilities have currently or formerly operated regulated USTs storing diesel, gasoline, or waste oil. Heating oil tanks are not considered permitted USTs. A facility at 1002 McLoughlin Blvd. is an active gas station with active USTs that are not leaking. The remaining 3 UST listings are associated with decommissioned tanks. Three of the 4 permitted USTs have closed LUST records associated with former UST operations, and only the USTs at 624 McLoughlin Blvd. do not have a LUST file (see Section 4.3, Leaking Underground Storage Tanks [LUSTs], for details). Except for 624 McLoughlin Blvd. (Site Ac) and 524 Main St. (Site Ad), none of the current or former USTs are in the Project Area. Contamination associated with these USTs may be in the Project Area.

Table 7: Permitted USTs On or Adjoining the Project Area

Site Name and Location	DEQ ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
Oregon City Station 1002 McLoughlin Blvd. Oregon City, OR 97045 (Site D)	3948	Adjacent	E	There are 3 active, permitted tanks associated with the current gas station operations, and 5 decommissioned permitted tanks. No tanks were reported in the Project Area ROW.

Site Name and Location	DEQ ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
Dave's Quality Uniform 624 McLoughlin Blvd. Oregon City, OR 97045 (Site Ac)	7217	Adjacent	S	There are no active or permitted tanks at this site. There are 5 decommissioned permitted tanks. Based on review of the LUST report for 621 and 623 Main St. (Site J), there were 5 tanks immediately adjacent south of the 624 McLoughlin Blvd. building, and a 550-gallon gas tank and dispenser adjacent to the north side of the 624 McLoughlin Blvd. building. The dispenser and tank were not visible during site observations. The site observations did note two suspected fill ports in the sidewalk along 7th St. in the right-of-way (ROW) on the northeast and east sides of the building. It is unknown if these fill ports refer to the previously decommissioned USTs. Except for the gasoline UST and dispenser on the north side of the building (assumed to be decommissioned), the location of the previously decommissioned USTs is unknown. Petroleum contamination may be present in groundwater soils at the property and adjacent ROW. If soil excavation and/or groundwater dewatering occurs in the vicinity of this property, soil and groundwater characterizations are recommended.
BP Oil Site #11001 202 5th St. Oregon City, OR 97045 (Site A)	693	Adjacent	W	There are no active or permitted tanks at this site. Thirteen permitted tanks have been decommissioned. No tanks were reported in the Project Area ROW.

Site Name and Location	DEQ ID#	Approx. Dist. (Miles)	Dir. (N,S, W,E)	Regulatory Status/Notes
Elkins Railroad Parking 524 Main St. Oregon City, OR 97045 (Site Ad)	12627	Adjacent	S	There are no active or permitted tanks at this site. Two permitted tanks have been decommissioned. It is believed this tank decommissioning record may be associated with the 508 Main St. LUST file (#03-19-1227, Site G), as two tanks were associated with the 508 Main St. file at the rear of the property, adjacent to the north side of Railroad Ave. Based on this information, it is uncertain if the two decommissioned tanks were associated with the 508 Main St. LUST site, or if they were or are in the Project ROW at 524 Main St. This UST record is of environmental concern as a UST or soil and/or groundwater contamination may be present in the Project Area. It may be necessary to complete a geophysical survey, and soil and/or groundwater characterization.

5.0 ADDITIONAL RESEARCH

Additional research was not necessary.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of this corridor study, we reached the following conclusions:

- Soils on the embankments and Willamette River shoreline sediments are present at northern locations along OR99E. Because the soils and sediment are adjacent to the roadway and are sinks for roadway pollutants, there is the potential that the soil and

sediment do not meet DEQ Clean Fill criteria and would require disposal at a landfill if disturbed.

- Suspected heating oil tank and UST fill ports were identified in or adjacent to the Project Area at 117 6th St./603 Main St., 624 McLoughlin Blvd., and 706 Main St. If the ground surface and/or soils are to be disturbed in these areas, it is recommended the property owner(s) be notified to determine the status of the suspect tank(s) and to request related documentation. A geophysical survey and soil and groundwater sampling in the vicinity of a tank, and possibly tank decommissioning, may be required.
- The outfall(s) of the catch basins observed during the site walk could not be determined. Determining the outfalls is recommended, and if the outfall flows into a UIC, meeting DEQ UIC Program requirements will be necessary.
- The structures and equipment in railings, utility poles, and light poles within and/or adjacent to the Project Area should be inspected for hazardous building materials (e.g., asbestos, lead-based paint, PCBs, and mercury) if they are to be disturbed. Coordination with utility providers and Oregon City may be required for inspection, sampling, and removal.
- Treated timber utility poles are present within the Project Area and may be disturbed by Project construction. Poles with electrical transformers will require coordination with utility providers for proper removal.
- Sites listed in regulatory databases with known and potential contamination were identified on and adjacent to the Project Area. Petroleum contamination may be present in groundwater and soils in the vicinity of these regulatory sites. If dewatering or soil excavation occurs in the vicinity of these sites, soil and groundwater characterizations are recommended. A geophysical survey may also be recommended.

The locations of the features listed above are indicated in Appendix A, Figures 3A and 3B.

The recommendations for ODOT are listed below.

1. ODOT's Beneficial Use Determination (BUD) does not allow excavated soils to be reused on lots zoned for residential use, but they may be reused on adjacent rights-of-way. However, because the reuse of excavated soils on the Project may be limited in volume and such soils cannot come into contact with or adversely impact groundwater or surface water (including stormwater sheet flow), we recommend sampling escarpment and riverbank soils and river sediment that will be disturbed by construction activities and completing a Clean Fill Determination for managing the material; and

2. If structures and equipment in railings, utility poles, and light poles within the API are disturbed during construction, a hazardous building material survey is recommended. Special handling of these items and ODOT Special Provisions may be required; and
3. If treated timber utility poles within the API are disturbed during construction, coordination with utility companies and management of the timbers according to Oregon Standard Specifications for Construction, Section 00290.20(c)(3)(c) will be required.
4. If soils will be disturbed and/or construction dewatering is required at or near the suspect USTs observed and the regulatory database sites, a geophysical survey, and/ soil and/or groundwater characterization is recommended to be completed as necessary.
5. The outfall(s) of the catch basins observed during the site walk could not be determined. Determining the outfalls is recommended, and if the outfall flows into a UIC, meeting DEQ UIC Program requirements will be necessary.

7.0 LIMITATIONS

This HMCA was conducted according to American Association of State Highway and Transportation Officials (AASHTO) criteria for Hazardous Materials Corridor Assessment and does not represent an American Society for Testing and Materials (ASTM) Phase 1 Environmental Site Assessment. Performance of a HMCA is intended to reduce, but not eliminate, uncertainty regarding the existence of environmental conditions. The AASHTO practice is intended primarily as an approach to identifying potential sources of contamination that could impact a project. Based on the AASHTO guide, this HMCA constitutes appropriate inquiry into current and past uses of properties within the Project Area and is consistent with good commercial or customary practice. However, no environmental assessment can wholly eliminate uncertainty regarding the potential for environmental conditions in connection with a project.

Coles + Betts Environmental Consulting, LLC, and Reynolds Engineering, LLC, have reviewed historical records and conducted a visual reconnaissance of the Project Area and adjoining properties. We have examined and relied on documents referenced in this report and have not conducted an independent examination of the facts contained in referenced materials and statements. We have assumed that these documents are genuine, and that the information and statements provided in these documents are true and accurate. Data generated from our site reconnaissance reflect what can be reasonably inferred or what was obvious by direct visual observation. Coles + Betts Environmental Consulting, LLC, and Reynolds Engineering, LLC, assume no responsibility for identifying characteristics that were not readily identifiable by visual reconnaissance at the time of our site visit.

Coles + Betts Environmental Consulting, LLC, and Reynolds Engineering, LLC, have prepared this report in a professional manner, using that level of skill and care normally exercised for similar projects under similar conditions by reputable and competent environmental consultants currently practicing in the area, and in accordance with the terms and conditions set forth in our contract with HDR, Inc. Coles + Betts Environmental Consulting, LLC, and Reynolds Engineering, LLC, are not responsible for conditions or consequences arising from relevant facts that were concealed, withheld, or not fully disclosed at the time this report was prepared. Facts and conditions referenced in this report may change over time, and the conclusions set forth here are applicable to the facts and conditions as described at the time of this report. We believe that the conditions stated here are factual, but no guarantee is made or implied.

This HMCA was prepared for use by ODOT and their Project design team lead by Kittelson & Associates. Any reliance on this report by other parties will require written permission from an authorized ODOT representative.

COLES + BETTS ENVIRONMENTAL CONSULTING, LLC, and REYNOLDS ENGINEERING, LLC

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8.0 REFERENCES

American Association of State Highway and Transportation Officials (AASHTO), 1990, Hazardous Waste Guide for Project Development, February.

Apex Companies, 2018, *Phase II Environmental Site Investigation, Former blue Heron Mill, Oregon City, Oregon*, January 4.

BB&A Environmental, 2021, *Diesel Spill Cleanup Report, West Side of Hwy 99/McLoughlin Blvd, Lat 45.357537, Long -122.610832*, October 20.

Coffey & Associates, 1995, *Addendum to Matrix Report, 922 Main Street Oregon City, Oregon*, January 19.

EDR, 2024, *Certified Sanborn® Map Report,* January 19.

EDR, 2024, *EDR Historical Topo Map Report*, January 17.

EDR, 2024, *The EDR Aerial Photo Decade Package,* January 17.

EDR, 2024, *The EDR Radius Map™ Report with Geocheck®*, January 18.

EvrenNorthwest, 2019, *Focused Site Investigation (With Risk-Based Decision Making), Settlers Corner Property, 900 Main Street, Oregon City, Oregon 97045,* May 31.

Foundation Engineering, Inc., 2008, *Foundation Report, Hwy 99E: Dunes Drive – 10th Street, Oregon City, Oregon, ODOT Key No. 12460, Federal Aid No. X-STP-5520(014)*, January 16.

GRI Geotechnical & Environmental Consultants, 2005, *Subsurface Exploration and Geotechnical Consultation, Main Street Rail Replacement and Sewer Relocation Project, Oregon City, Oregon*, July 1.

HartCrowser, 2014, *Geotechnical Engineering Design Study, Oregon City Parking Facility, Oregon City, Oregon*, December 2.

K&S Environmental, Inc., 2018, *Report for Heating Oil UST Decommissioning and Risk-Based Cleanup, Property Located at 616 Main Street, Oregon City, OR,* December 28.

Oregon Department of Environmental Quality (DEQ), 2019, Letter to ODOT RE: Beneficial Use Determination (BUD)-20181204), Highway shoulder soil throughout Oregon, July 2.

Oregon Department of Environmental Quality (DEQ), 2020, *Clean Fill Determinations*, Internal Management Directive, Solid Waste Department, February 21.

Oregon Department of Geology and Mineral Industries (DOGAMI), 2024, Geologic Map of Oregon Interactive Map: https://www.oregongeology.org/geologicmap/index.htm.

Oregon Department of Transportation (ODOT), 2020, *HazMat Program Manual*, Geological Engineering and Engineering Geology Section, Delivery & Operations Division, July.

ODOT, 2021, *Incident Response Memo*, August 2.

Oregon State Fire Marshal (OSFM), 2023, Oregon State Fire Marshal's Hazardous Materials Incident Searchable Database: https://www.oregon.gov/osp/programs/sfm/Pages/Hazardous-Incident-Information.aspx.

Oregon Water Resources Department (OWRD), 2024, Well Report Mapping Tool: https://apps.wrd.state.or.us/apps/gw/wl_well_report_map/Default.aspx.

Rittenhouse-Zeman & Associates, Inc., 1990, *Report on Environmental Monitoring, Underground Storage Tank Excavation*, June 15.

Soil Solutions Environmental Services, 2020, *Underground Storage Tank Closure Report, Elkins Railroad Parking, 508 Main Street, Oregon City, Oregon 97045*, February 1.

Stantec Consulting Services, Inc., 2023, *Letter from Stantec to Ryan Web, Engineering and Planning Manager of the Confederated Tribes of Grand Ronde, Reference: Tumwater Village – UST Assessment Phase 1 Activities and Findings*, March 30.

Stratus Corporation, 2012, *Certified Report*, August 1.

URS, 2004, *Corrective Action Plan, Former BP Facility 11001, 202 Fifth Street, Oregon City, Oregon,* August.