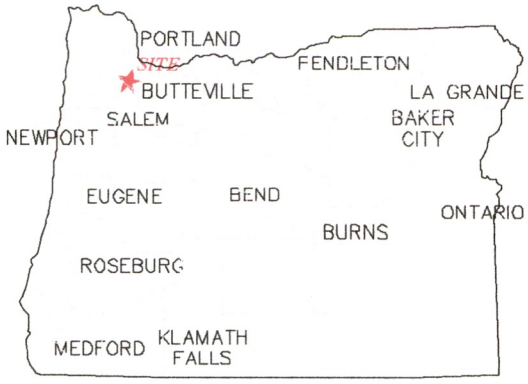
DATE 12/4/2017 NWP-_____ DSL _____-RF

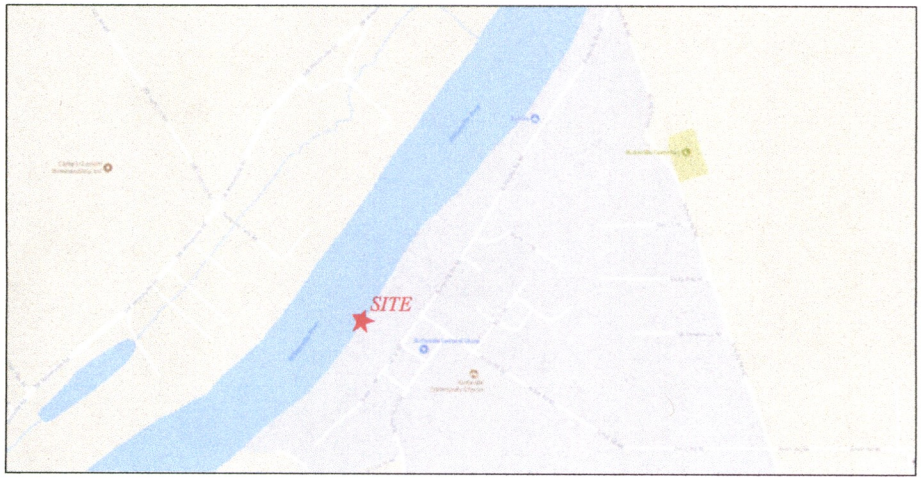


PROJECT KEY MAP

Sheet Index:

1. Cover Sheet
2. Tax Map
3. Air Photos
4. Site Survey
5. Proposed Dock
6. Ramp Profile
7. Details

LOCATOR MAP

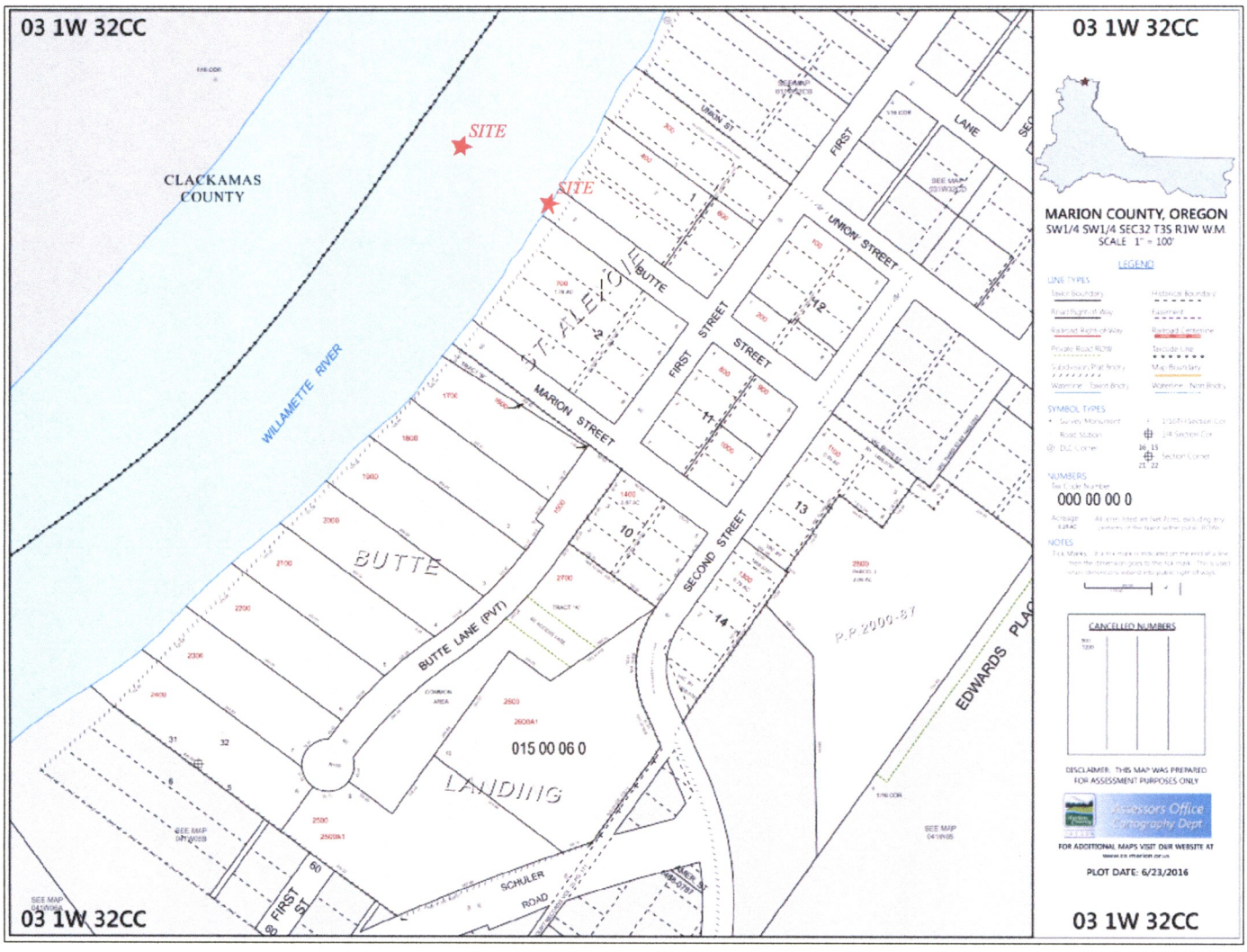


VICINTIY MAP

d:\fs\fsprojects\buttevillelanding\cad\fs-butteville-coe permit 12-4-2017.dwg

Flowing solutions SM Flowing Solutions 3305 SW 87th Avenue Portland, OR 97225 Phone (503) 297-6311	SHEET TITLE: COVER SHEET	DATE: 12/4/17
	PROJECT: BUTTEVILLE LANDING RIVER ACCESS BUTTE ST NE BUTTEVILLE, OREGON	SHEET NO. 1
	RIVER/MILE: WILLAMATTE RIVER, MILE 42.9	DATUM: NAVD88

DATE 12/4/2017 NWP-_____ DSL _____-RF



d:\fs\fsprojects\buttevillelanding\cad\fs-butteville-coe permit 12-4-2017.dwg

Flowing solutions Flowing Solutions 3305 SW 87th Avenue Portland, OR 97225 Phone (503) 297-6311	SHEET TITLE: TAX MAP		DATE: 12/4/17
	PROJECT: BUTTEVILLE LANDING RIVER ACCESS BUTTE ST NE BUTTEVILLE, OREGON		SHEET NO. 2
	RIVER/MILE: WILLAMATTE RIVER, MILE 42.9	DATUM: NAVD88	

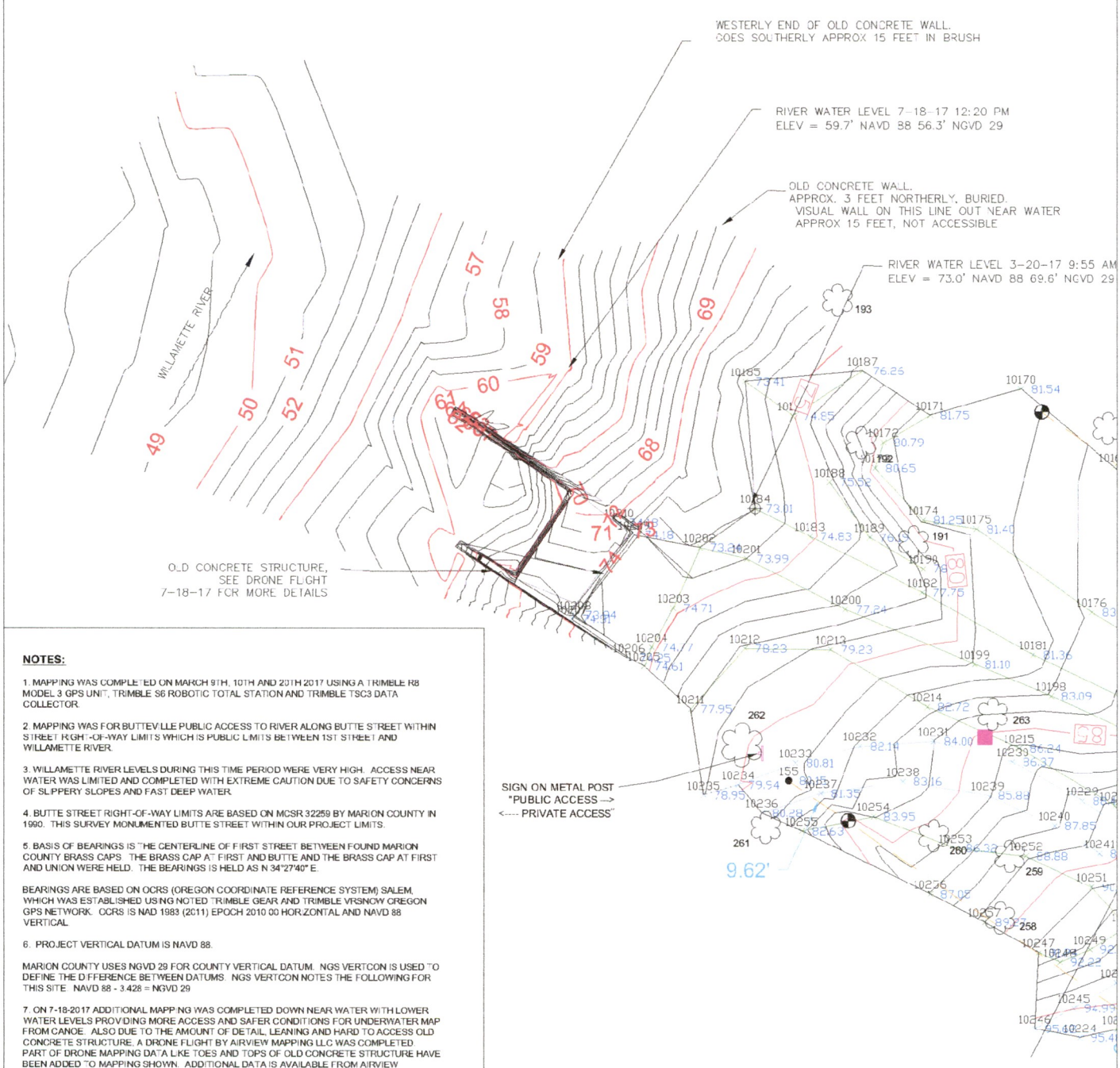
DATE 12/4/2017 NWP-_____ DSL _____-RF

d:\fs\fsprojects\buttevillelanding\cad\fs-butteville-coe permit 12-4-2017.dwg

Flowing solutions
Flowing Solutions
3305 SW 87th Avenue
Portland, OR 97225
Phone (503) 297-6311

SHEET TITLE: SITE PHOTOS		DATE: 12/4/17
PROJECT: BUTTEVILLE LANDING RIVER ACCESS BUTTE ST NE BUTTEVILLE, OREGON		SHEET NO. 3
RIVER/MILE: WILLAMATTE RIVER, MILE 42.9	DATUM: NAVD88	

Survey Provided By:
AG Geospatail NW, LLC
Molalla, OR
2017



NOTES:

1. MAPPING WAS COMPLETED ON MARCH 9TH, 10TH AND 20TH 2017 USING A TRIMBLE R8 MODEL 3 GPS UNIT, TRIMBLE S6 ROBOTIC TOTAL STATION AND TRIMBLE TSC3 DATA COLLECTOR.

2. MAPPING WAS FOR BUTTEVILLE PUBLIC ACCESS TO RIVER ALONG BUTTE STREET WITHIN STREET RIGHT-OF-WAY LIMITS WHICH IS PUBLIC LIMITS BETWEEN 1ST STREET AND WILLAMETTE RIVER.

3. WILLAMETTE RIVER LEVELS DURING THIS TIME PERIOD WERE VERY HIGH. ACCESS NEAR WATER WAS LIMITED AND COMPLETED WITH EXTREME CAUTION DUE TO SAFETY CONCERNS OF SLIPPERY SLOPES AND FAST DEEP WATER.

4. BUTTE STREET RIGHT-OF-WAY LIMITS ARE BASED ON MCSR 32259 BY MARION COUNTY IN 1990. THIS SURVEY MONUMENTED BUTTE STREET WITHIN OUR PROJECT LIMITS.

5. BASIS OF BEARINGS IS THE CENTERLINE OF FIRST STREET BETWEEN FOUND MARION COUNTY BRASS CAPS. THE BRASS CAP AT FIRST AND BUTTE AND THE BRASS CAP AT FIRST AND UNION WERE HELD. THE BEARINGS IS HELD AS N 34°27'40" E.

BEARINGS ARE BASED ON OCRS (OREGON COORDINATE REFERENCE SYSTEM) SALEM, WHICH WAS ESTABLISHED USING NOTED TRIMBLE GEAR AND TRIMBLE VRSNOW OREGON GPS NETWORK. OCRS IS NAD 1983 (2011) EPOCH 2010.00 HORIZONTAL AND NAVD 88 VERTICAL.

6. PROJECT VERTICAL DATUM IS NAVD 88.

MARION COUNTY USES NGVD 29 FOR COUNTY VERTICAL DATUM. NGS VERTCON IS USED TO DEFINE THE DIFFERENCE BETWEEN DATUMS. NGS VERTCON NOTES THE FOLLOWING FOR THIS SITE. NAVD 88 - 3.428 = NGVD 29

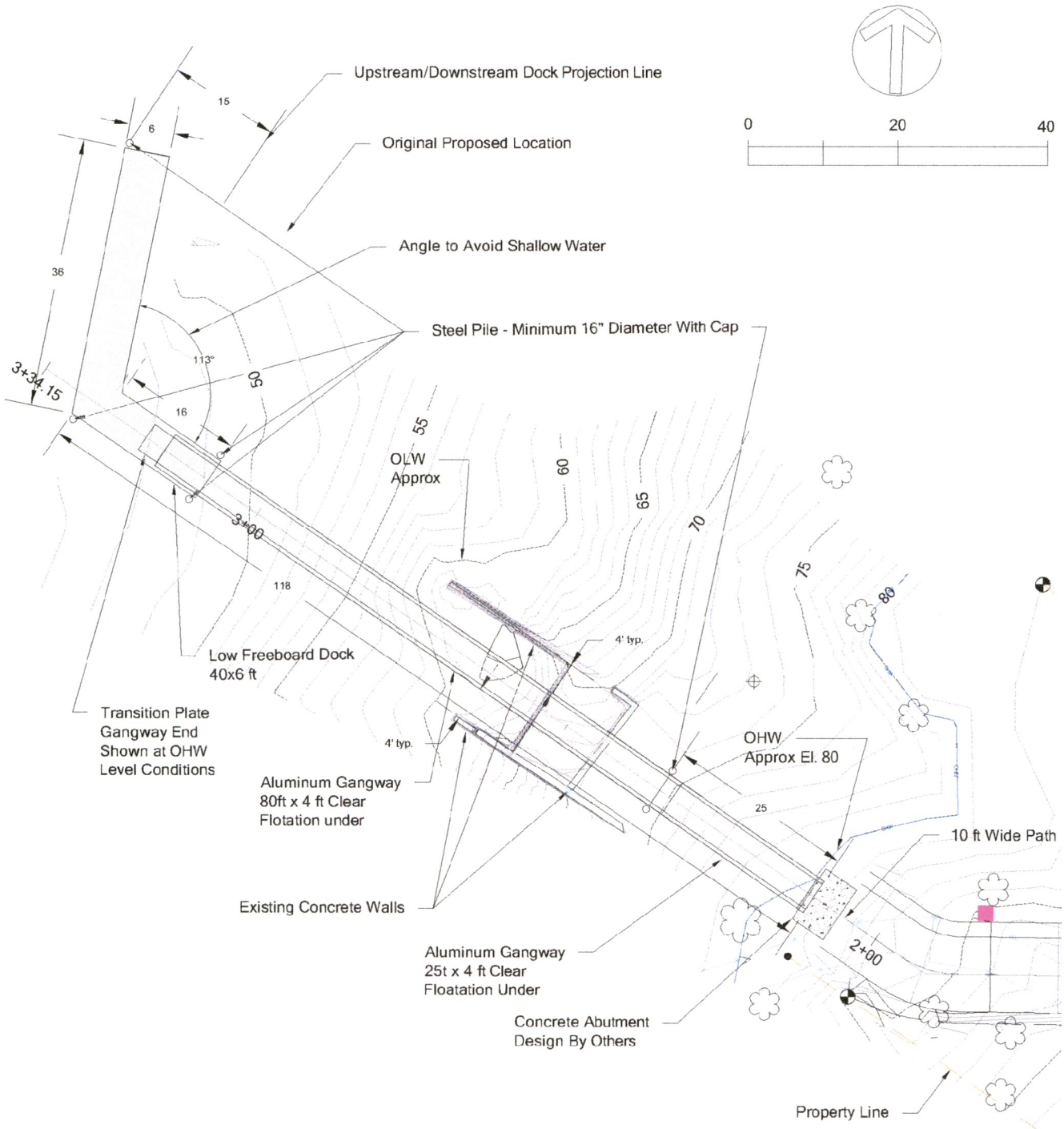
7. ON 7-18-2017 ADDITIONAL MAPPING WAS COMPLETED DOWN NEAR WATER WITH LOWER WATER LEVELS PROVIDING MORE ACCESS AND SAFER CONDITIONS FOR UNDERWATER MAP FROM CANOE. ALSO DUE TO THE AMOUNT OF DETAIL, LEANING AND HARD TO ACCESS OLD CONCRETE STRUCTURE. A DRONE FLIGHT BY AIRVIEW MAPPING LLC WAS COMPLETED. PART OF DRONE MAPPING DATA LIKE TOES AND TOPS OF OLD CONCRETE STRUCTURE HAVE BEEN ADDED TO MAPPING SHOWN. ADDITIONAL DATA IS AVAILABLE FROM AIRVIEW MAPPING LLC.

8. UNDERWATER MAPPING WAS COMPLETED FROM A TWO PERSON CANOE USING RTK GPS FOR LOCATION AND A HAND HELD DEPTH FINDER FOR WATER DEPTH. THE DATA WAS COMBINED IN THE OFFICE FOR BOTTOM OF RIVER ELEVATIONS.

9. DRONE MAPPING WAS COMPLETED BY AIRVIEW MAPPING LLC USING A DJI PHANTOM 3 PRO DRONE AND AGISOFT MAPPING SOFTWARE. DXF FILES WERE PROVIDED TO SURVEYING FOR THE TOES AND TOPS OF OLD CONCRETE STRUCTURE FOR LOCATION AND ELEVATIONS.

Flowing solutions
Flowing Solutions
3305 SW 87th Avenue
Portland, OR 97225
Phone (503) 297-6311

SHEET TITLE: EXISTING SURVEY	DATE: 12/4/17 Rev 5/8/19
PROJECT: BUTTEVILLE LANDING RIVER ACCESS BUTTE ST NE BUTTEVILLE, OREGON	SHEET NO. 4
RIVER/MILE: WILLAMATTE RIVER, MILE 42.9	DATUM: NAVD88



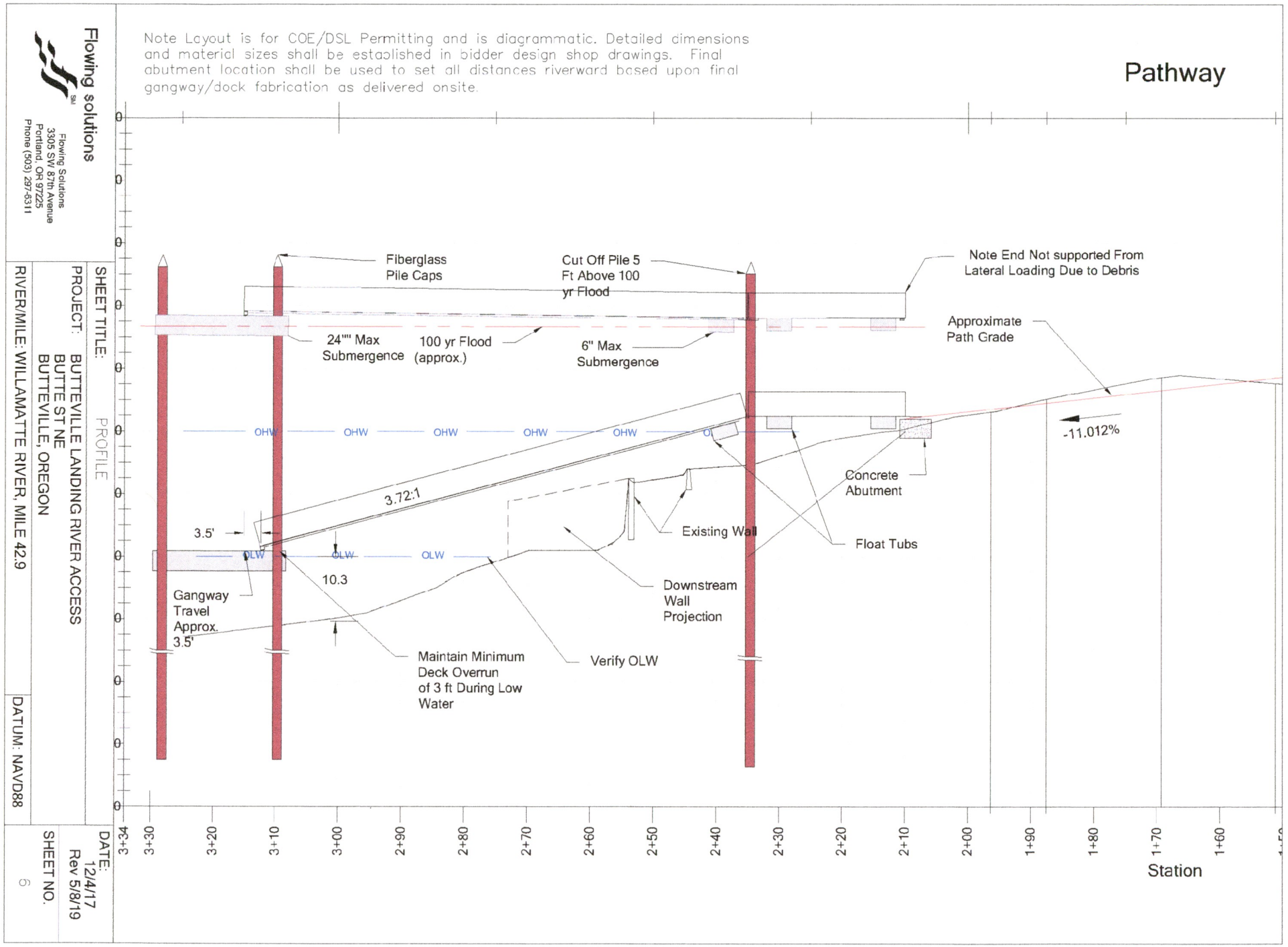
Note Layout is for COE/DSL Permitting and is diagrammatic. Detailed dimensions and material sizes shall be established in bidder design shop drawings. Final abutment location shall be used to set all distances riverward based upon final gangway/dock fabrication as delivered onsite.

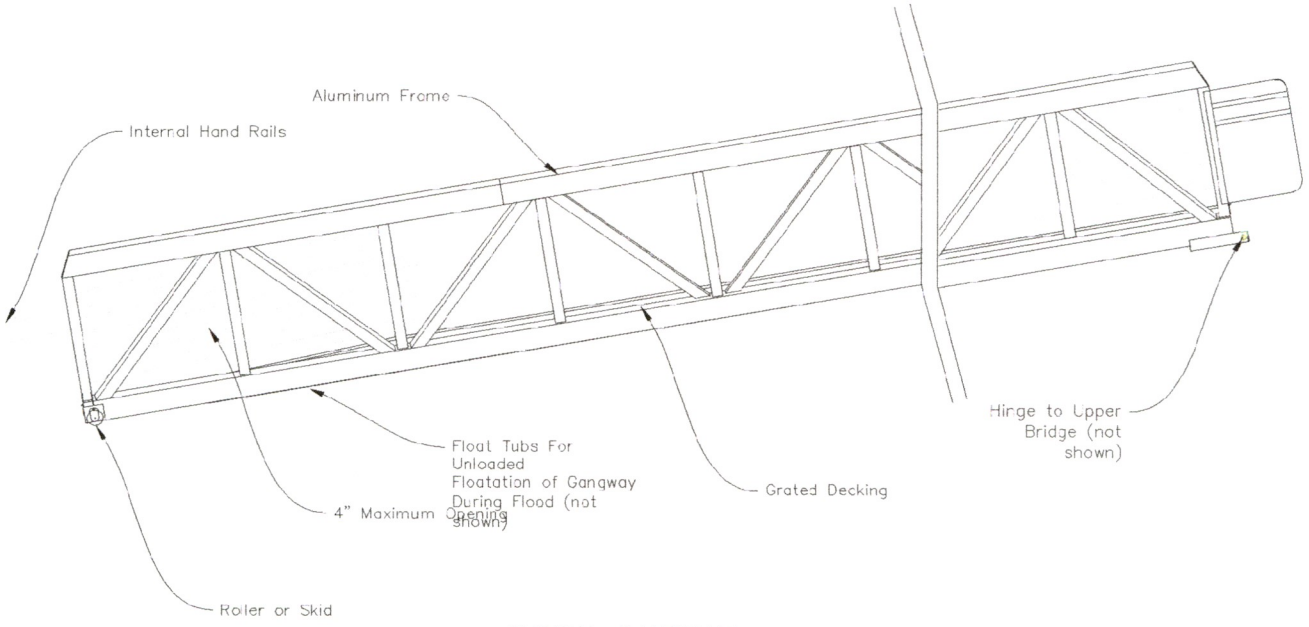
Flowing solutions
Flowing Solutions
3305 SW 87th Avenue
Portland, OR 97225
Phone (503) 297-6311

SHEET TITLE: SITE PLAN		DATE: 12/4/17 Rev 5/8/19
PROJECT: BUTTEVILLE LANDING RIVER ACCESS BUTTE ST NE BUTTEVILLE, OREGON		SHEET NO. 5
RIVER/MILE: WILLAMATTE RIVER, MILE 42.9	DATUM: NAVD88	

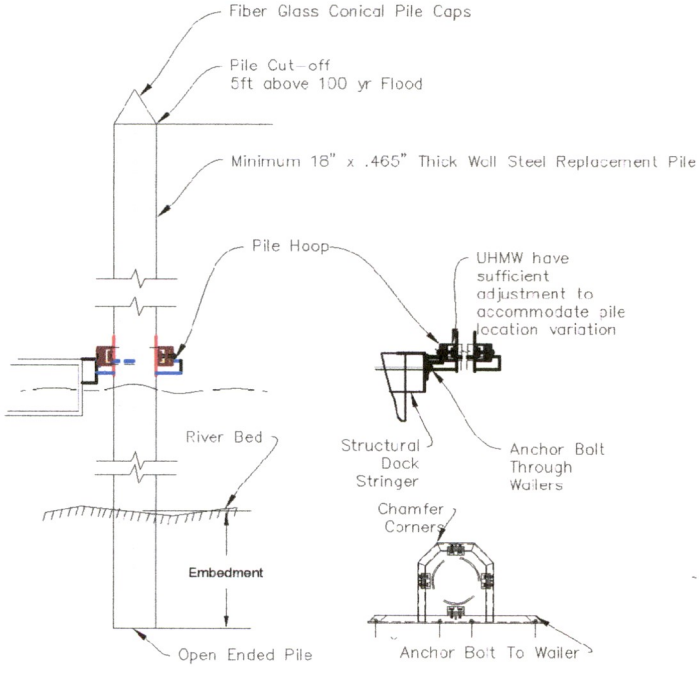
\\fscomp-4\fsprojects\buttevillelanding\cad\fs-butteville revisd permit 2-12-2020 move dock.dwg

\\fscomp-4\fsprojects\buttevillelanding\cad\fs-butteville revisd permit 2-12-2020 move dock.dwg

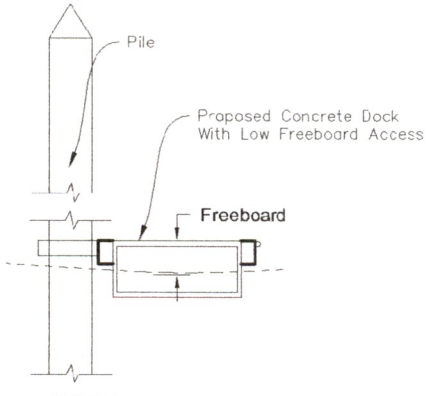




TYPICAL GANGWAY
not to scale



PILE AND HOOP
not to scale



DOCK
not to scale

Flowing solutions Flowing Solutions 3305 SW 87th Avenue Portland, OR 97225 Phone (503) 297-6311	SHEET TITLE: DETAILS	DATE: 12/4/17 Rev 5/8/19
	PROJECT: BUTTEVILLE LANDING RIVER ACCESS BUTTE ST NE BUTTEVILLE, OREGON	SHEET NO. 7
	RIVER/MILE: WILLAMATTE RIVER, MILE 42.9 — DATUM: NAVD88	

\\fscomp-4\fsprojects\buttevillelanding\cad\fs-butteville revisd permit 2-12-2020 move dock.dwg

BUTTEVILLE LANDING – STORMWATER MANAGEMENT PLAN

Description

The Butteville Landing is a Marion County right-of-way 60 ft by 360 ft), the upper 140 ft of which is the paved extension of Butte Street, and the lower 220 ft of which is the sloped unpaved extension of Butte Street down to the old dock footings at the Willamette River. In 2017 and 2018 Friends of Historic Butteville, working under an MOU with Marion County, improved the Landing from its previously unmaintained and severely eroded state to include:

- Grading to establish a trail bed and place boulder walls for slope retention
- Installation of a 10 ft by 170 ft concrete trail with a raked surface
- Landscaping of the remaining Landing surface

Functionally speaking the Landing is comprised of two parts. The upper section including the paved section of Butte Street has one lane paved in asphalt with a wide gravel shoulder to the west and gravel parking to the east. No stormwater from this area runs into the lower improved area of the Landing due to grade (Butte Street runs slightly uphill from 1st Street to the beginning of the trail.

The design of the concrete trail and the engineering of its placement in summer 2018 (surface rake-scored perpendicular to slope grade and slight surface slope (crown) to the east into 2 feet of drain rock above perf pipe covered with geo-cloth) was that all rain water on the trail would drain to the side and into drain rock. Because there is a single curve in the trail, to accommodate the possibility of run off at the curve during excessively heavy rainfall, two bioswale basins were created downhill from the curve, the upper with a catch basin connecting to drain pipe was placed to manage excess stormwater flows.

Stormwater Management

A stormwater management plan was developed based on the following premises:

- The landscaped areas apart from the concrete trail are comprised of 1) native plants with all surfaces covered in mulch (wood chips), and 2) creating of three bioswale basins
- Stormwater to be treated will come from impermeable surface of the concrete trail
- Treatment of stormwater from the concrete trail will be handled by:
    - Installation of 6 inch perf pipe covered with geo-tech cloth under 3" drain rock to constitute a gutter on the east side of the trail which connects through a catch basin to 6 inch pipe going under the Landing's lower boulder wall and to the Willamette River
    - Creation of two bioswale basins at the lower and steeper portions of the trail to collect and infiltrate excessive runoff that overflows the drain rock gutter
    - Installation of a steel grated catch basin in the middle bioswale basin to collect excess water flowing off the trail above the infiltration capacity of the middle bioswale basin.

Because of the combination of landscaping with mulch and the concrete of the trail, it is anticipated that stormwater running off the trail will contain almost no suspended sediment, and that what little there is will be treated by capture as it flows through drain rock in the gutter and/or infiltrates in the lower and middle bioswale basins.

The catch basin along with drain rock, and geo-tech cloth covered perf pipe was installed in the summer of 2018 following approval by Marion County Planning and Engineering. Jurisdictional requirements above OHW reside with Marion County.

Marion County stormwater management standards are not required on projects under 1 acre. However, this stormwater management plan is designed to comply with relevant urban

stormwater management plans (City of Wilsonville) and per consultation with NMFS to utilize the Marion County design storm of 1.38 inches for the sizing and calculations of stormwater facilities.

Stormwater Management calculations.

See attached Stormwater Information Form for Butteville Landing.

Attachments

As Built Stormwater Management diagram and slope profile.

Maintenance and Inspection

Maintenance of the restored Butteville Landing will be conducted by Friends of Historic Butteville. Inspection shall include twice yearly (Spring and Fall) visual inspection of:

- Trail gutter to assure drain rock is clear and functioning
- Lower and Middle bioswale basins to prevent collection of leaves, branches, etc. that could impede stormwater infiltration
- Assurance that raised planting beds on edges of bioswale basins are solid to hold excess water in the basins if required
- Catch basin to include removal of grate and removal of accumulated sediment and debris.

Contact info:

Friends of Historic Butteville

PO Box 506, Donald, OR 97020

E-mail: friendsbutteville@gmail.com

By email from: Marc Liverman - NOAA Federal marc.liverman@noaa.gov

To: Bond, Carrie L NWP Carrie.L.Bond@usace.army.mil

RE: SLOPES IWOWS: Butteville Landing River Access, Over-water Structures & Stormwater, Willamette River, Marion Co

July 9, 2019

Ms. Bond:

I read the notification form submitted to NMFS by the Corps on Mar 26, 2018 requesting that NMFS review and confirm the action named above is consistent with the SLOPES IWOWS opinion issued to the Corps on Apr 5, 2012. The proposed action was found inconsistent with the SLOPES opinion on Jul 17, 2019. This review is based on a revised project submittal, received by NMFS on Jun 13, 2019.

The proposed project is likely to adversely affect ESA-listed species, designated critical habitat, and essential fish habitat through the following activities:

- In-water construction
- Piling installation
- Habitat modification / New floats
- Stormwater

Based on information submitted by the Corps and the Friends of Historic Butteville Landing and their consultants, the proposed action is consistent with the SLOPES IWOWS opinion for:

- Project design
- In-water work period
- Piling Installation
- Heavy equipment use
- Stormwater Management
- New Floats
- All other relevant project design criteria for construction practices

I confirm this action meets the conditions of the SLOPES IWOW programmatic biological opinion issued on April 5, 2012. A copy of all review materials is on file at NMFS' Oregon-Washington Coastal Office. Please note that the opinion requires the Corps to submit a project completion report for this project within 60-days of end of project activities.

Reinitiation of consultation on this action is required and shall be requested by the Corps where discretionary Federal involvement or control over the action has been retained or is authorized by law and (a) the amount or extent of taking specified in the Incidental Take Statement is exceeded, (b) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, (c) the identified action is subsequently modified in a manner that has an effect to the listed species or critical habitat that was not considered in the biological opinion; or (d) a new species is listed or critical habitat designated that may be affected by the identified action (50 CFR 402.16).

My point of contact for this response is Brad Rawls, who can be reached at 503-230-5414 or by email at brad.rawls@noaa.gov.

Marc Liverman
Willamette Branch Chief
West Coast Region
NOAA Fisheries Service

December 13, 2021

Boatwright Engineering Inc.
2613 12th ST SE, SALEM, OREGON 97302
civil engineers • land surveyors
503 363-9225 FAX 363-1051

Brandon Reich
Marion County Planning Dept.
5155 Silverton Road, NE
Salem, Oregon 97301

Re: **FLOODPLAIN DEVELOPMENT/GREENWAY PERMIT APPLICATION**
Dock & Gangway, Butteville Landing
Butte Street Public Right-of-Way
Willamette River Mile 42.93

Dear Brandon,

Following, you will find responses to items that I anticipate will be required by conditions applied to a favorable decision on the above referenced permit application. These items pertain to the construction work that would be involved at the site. This work requires certification by a registered professional engineer.

17.178.050 Conditional use procedures and requirements.

D. Prior to obtaining a building permit, commencing development or placing fill in the floodplain the applicant shall submit a certification from a registered civil engineer demonstrating that a development or fill will not result in an increase in floodplain area on other properties and will not result in an increase in erosive velocity of the stream that may cause channel scouring or reduce slope stability downstream of the development or fill.

I used HEC-RAS version 6.1.0 to model the comparison between the existing flood elevation and velocity and the resultant flood elevation and velocity that will exist once the proposed improvements are constructed.

This site is located on the right bank of the Willamette River in north Marion County. To evaluate the location, I had to determine the base flood elevation and the river flow velocity at river mile 42.93 which is the most upstream point on the proposed dock installation. I obtained LIDAR bare earth topography from the Oregon Department of Geology and Mineral Industries (DOGAMI) encompassing both banks of the river from river mile 42.66 to 43.30. I also utilized the cross-section provided by Flowing Solutions on Sheet 6 of their Butteville Landing River Access plans, dated 5/8/19. All of this data is on NAVD88 datum which I then converted to NGVD29 to match the standard currently used by Marion County and FEMA.

I did not have any data source for the shape for the Willamette River bottom. I set the bottom elevations at cross-sections C, D and E, per page 108P of the Flood Insurance Study (FIS) for Marion

County (FIS No. 41047CV003B), dated October 18, 2019. I then looked at the floodway data for the Willamette River and used the Floodway Width, Floodway Elevation, Floodway Water Surface, and, the Floodway Cross-Sectional Area from Table 6 in Volume 1 of the FIS study noted above. Using trial and error calculations of the shape of the river bottom, I derived the configuration that matched all of the parameters of the Floodway Data in said Table 6, with the exception of the Floodway Mean Velocity. My velocities at the C, D, and E cross-sections were slightly faster. See my Calculations Chart, attached. The only way to slow the velocity down to meet the FIS numbers would be to enlarge the cross-sectional area, or change the bank coefficient, which would increase the height of the base flood elevation. I chose to leave the velocity at the rate I calculated.

I then checked the 10, 50, and 100-year flood elevations for the associated cross-sections and compared those to the flood profile (page 108P referred to above). When doing this, all elevations matched FEMA's levels. This gave me the 100-year BFE at river mile 42.93.

The ninety-degree angle of the cross sections, relative to the water flow, finds that the pilings are not in alignment. They are slightly off, so that the two tallest pilings, located at the north and south ends of the improvement, and which extend the furthest into the river, are not in line with any other pilings or components. Some of the shorter pilings, located between the tall end pilings, fall in paired alignment with the concrete pad/abutment. Other intermediate pilings do not line up with each other, or anything else, perpendicular to the line of flow. These last two scenarios have a much smaller effect on the water level than that which the end pilings cause. I did not include the flotation components since they will rise with the water level. I also evaluated the six trees that were recently removed at the site, which totaled 8.25 feet of width. I found that they were not in the same cross-section as the piling placements and could not be included in the study area, but would have had some impact on the river flow.

The cross-sectional area impacted by the pilings at the south end of the project produces a 0.02-foot increase in vertical elevation of the floodplain surface. This is below the 0.1-foot threshold that FEMA can monitor. To address the 0.02-foot rise, I looked at FEMA's Conveyance Compensation Analysis which involves removing some material from the same cross section wherein the partial obstruction from the pilings is located. In this case, excavation will compensate for the pilings and related improvements to ensure that there is no net rise in the river level at the base flood stage.

Because the tall pilings have the greater impact, their heights and locations establish the end area of the proposed compensatory excavation. The Conveyance Compensation Analysis calculations demonstrate that excavation of a 20.0 square foot cross sectional area on the upstream end and a 41.5 square foot cross sectional area on the downstream end will ensure no net rise during a flood. The proposed excavation across the entire south-to-north length of the dock improvement area will transition between 20.0 square feet on the south to 41.5 square feet on the north. This will fully compensate for the impact of the pilings and the concrete dock support being placed. The excavation will total 41.1 cubic yards, removed to an off-site location, which will meet the FEMA conveyance calculation requirement for no rise.

The intermediate pilings are shorter in height and the calculations show that no compensating excavation is needed for these.

I certify that the installation of the proposed pilings and the soil removal based on the Conveyance Compensation Analysis will not produce an increase in floodplain area on other properties.

Using the US Army Corps of Engineers' *Rule of Thumb* for *Scour at Vertical Piles for Small Diameter Piles* and the Corps' *Scour at Vertical Piles, Scour by Currents-Small Diameter Piles* formula, the limits of potential scouring for the piles at this site, that are located in the main channel, could be 2.0 to 3.5 feet in depth and could extend out from the piling at a 1:1 slope for a maximum radius about the piling of 2.5 to 4.0 feet. The two piles outside of the main channel, where the flow velocity is less than 2.5 ft/sec, will not produce any scouring.

I certify that this development may cause localized scouring but will not produce channel scouring and will not reduce slope stability downstream of the development site. The area where the soil has been removed should resist scouring provided the ground cover has been reestablished.

17.178.060 Flood protection standards.
In all areas of identified floodplain (which includes all areas of special flood hazard), the following requirements apply:

J. Floodways. Located within areas of floodplain established in MCC 17.178.030 are areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of floodwaters which carry debris, potential projectiles and erosion potential the following provisions shall apply in addition to the requirement in subsection (I) of this section:

1. Prohibit encroachments, including fill, new construction, substantial improvements and other development within the adopted regulatory floodway unless certification by a registered professional civil engineer is provided demonstrating through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment shall not result in any increase in flood levels within the community during the occurrence of the base flood discharge.

2. If subsection (J)(1) of this section is satisfied all new construction and substantial improvements shall comply with all applicable flood hazard reduction provisions of this section.

3. The area below the lowest floor shall remain open and unenclosed to allow the unrestricted flow of floodwaters beneath the structure.

Based on my HEC-RAS 6.1.0 modeling of this reach of the Willamette River for the encroachment of the gangway, dock, and related structures and supports, I can certify that this construction will not result in any increase in flood level during the occurrence of the base flood discharge. If you require additional data from my HEC-RAS analysis, please let me know.

The proposed dock and gangplank will float on the water, and the flow of floodwaters will not be restricted beneath these structures. The proposed concrete abutment at the east end of the gangplank is not within the floodway.

The information provided in response to 17.178.050 D., above, for the cross-sectional area impacted by the pilings, along with the Conveyance Compensation Analysis, demonstrates that no net rise shall

occur due to this construction.

I certify that the installation of the proposed pilings will not produce an increase in flood levels within the community during the occurrence of the base flood discharge.

The compensatory removal should be done after the winter rains and when the river level is below the work area. All of the existing riprap in the removal area should be set aside and replaced in the same area from which it came. A silt fence must be installed prior to any work commencing and maintained until grass seed has developed to a fully protective groundcover.

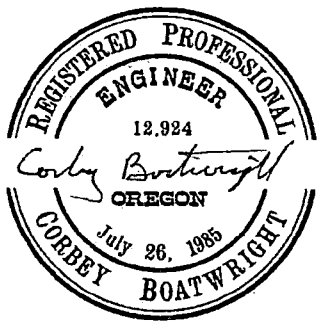
The Cross Section shown on Sheet 3 of 3 is at the south tall pier and does not reflect the cross section where the concrete abutment is located. The concrete abutment shown on this section view is downstream and is only included to portray the location within the typical river cross section.

Any issues that arise from Marion County Code MCC 17.178.060(C), (D)(1), (E), (F) are addressed per the letter dated 29 May 2020 from Kelly D. LaFave, PE.

Please contact me if you have any questions.

Sincerely,

Corbey Boatwright, PE



Renewal Date: December 31, 2021

Attachments:
- Copy of letter from LaFave to Reich, 29 May 2020
- FEMA FIRMette
- FIS, Marion County, Table 4, Table 6, & Page 108P
- HEC-RAS Butteville Dock cross-sections
- HEC-RAS 5.0.1 Output Results
- HEC-RAS Pre-Dock Output
- HEC-RAS Post-Dock Output
- Engineering Plans (3 sheets)
- Conveyance Calculations

CC: Ben Williams, president, Friends of Historic Butteville