

March 30, 2016

Ms. Gail Terzi
US Army Corps of Engineers Seattle District
Regulatory Branch CENWS OD RG
PO Box 3755
Seattle, WA 98124-3755

RE: I-405 Bellevue to Lynnwood Improvement Project (Yarrow Creek Farms, C28, and Sammamish River) Mitigation Sites
USACE NWS-2007-1711

Dear Ms. Terzi:

The Washington State Department of Transportation completed qualitative monitoring of the I-405 Yarrow Creek Farms, C28, and Sammamish River mitigation sites on October 8, 2015, to address Year-2 (2015) performance standards. Monitoring activities included vegetation observations and photo documentation. This Year-2 report is being issued for compliance with the reporting requirements of the US Army Corps of Engineers Permit NWS-2007-1711.

General Site Information			
USACE Number	NWS-2007-1711		
WDFW HPA Number	122949-1		
Mitigation Location	<p>Yarrow Creek: East side of I-405 south of Bridle Trails State Park</p> <p>C28: Downstream of I-405 on an unnamed tributary to Juanita Creek</p> <p>Sammamish River: South bank of the Sammamish River, downstream of the confluence with Little Bear Creek, city of Bothell</p>		
LLID Number	1221986476401		
Construction Date	2013		
Monitoring Period	2014-2018		
Year of Monitoring	2 of 5		
Mitigation Sites	Yarrow Creek Farms	C28	Sammamish River
Area of Project Wetland Impact	0.21 acre	0.40 acre	0.12 acre
Type of Mitigation	Stream Buffer Enhancement		
Area of Mitigation¹	0.62 acre	0.42 acre	0.10 acre

¹ Impact and mitigation numbers from *Stream Mitigation Report I-405, Bellevue to Lynnwood Improvement Project* (WSDOT 2013)

Performance Standards (Year-2)	2015 Results	Management Activities
d50 and corresponding critical shear stress for appropriate flows in C28 and the Sammamish River verified	Heavy loose rip rap used in place of round rock	
Inspection of logs and HEC-RAS or approved equal modeling to confirms that structures will withstand 100-year flows and substrate will remain in place at 15 year flows	Outfall protection was designed using the 100-year design flow of 13.7 cfs. In accordance with the project permit conditions, an effort was made to develop a hydraulically effective design that minimizes the structure footprint within the channel. The WSDOT Hydraulics Manual, Highway Runoff Manual, and Federal Highway Administration (FHWA) design guidance (HEC-14 Hydraulic Design of Energy Dissipaters for Culverts and Channels and HEC-15 Design of Roadside Channels with Flexible Linings) were referenced. The computer programs CulvertMaster and FlowMaster were also used to estimate flow characteristics, such as culvert outlet velocity and channel depth. Repairs to two channels that enter Stream 28 were included in the design, with similar methods used for design. The two channels include the highway drainage ditch inletting from the north (north ditch) and a pond drainage that inlets from the south (south ditch).	
Minimal return of invasive species	<p>Yarrow Creek: Invasive cover is low</p> <p>C28: Invasive cover is low</p> <p>Sammamish River: Invasive cover is low however planting area is surrounded by invasive plant species</p>	Herbicide and manual weed control occurred one to two times per month during growing season for all three sites. Outside of growing season weed control occurred one time every other month.
80% survival of planted tree and shrub species in the buffer enhancement areas of the mitigation sites for each of 2 years after the sites are planted	<p>Yarrow Creek: Greater than 90% survival</p> <p>C28: 85% survival</p> <p>Sammamish River: 50-60% survival</p>	Yarrow Creek – 14 container plants planted Fall 2015 C28 – 56 container plants planted Fall 2015 Sammamish River – 60 container plants planted Fall 2015

Site development:

The Yarrow Creek Farm and C28 sites have developed as intended. The planted species have become established and are taking off. The Sammamish River site has some issues with erosion due to the steep slopes (Photo 4). The plants on top of the slope have become established and appear to be thriving. However, there is higher mortality of the willow (*Salix* species) stakes near the toe of the slope. Stormwater runoff from the bridges above is flowing down the planting area and creating some erosion on the steep slopes. In 2016, routine weed treatment at all of the sites and replanting of eroded areas at the Sammamish River site is planned.

Results for Performance Standard 1
(d50 for appropriate flows in C28 and Sammamish Rivers):

The Northwest Region Design-Build Team found d50 round rock to not be suitable in the streams because it would not have adequately dissipated the energy from the water. Heavy loose rip rap was used instead and monitoring and reporting on the rock is unnecessary.

Results for Performance Standard 2
(Structures will withstand 100-year flows and substrate will remain in place at 15 year flows. Logs inspected):

Monitoring does not yet have this information.

Results for Performance Standard 3
(Minimal return of invasive species):

Yarrow Creek Farms: Invasive cover at this planting area is minimal. There are blackberries (*Rubus* species) just off site and climbing nightshade (*Solanum dulcamara*) near the creek.

C28: Invasive cover at this site is low. There are patches of nonnative blackberry in the northwest corner and some Robert geranium (*Geranium robertianum*) and climbing nightshade near the creek.

Sammamish River: This planting area is surrounded by invasive knotweed (*Reynoutria* species) and nonnative blackberries that are encroaching from the edge of the site.

Results for Performance Standard 4
(80% survival of planted tree and shrub species in the buffer enhancement area):

Yarrow Creek Farms: Survival of planted woody species is qualitatively estimated at more than 90 percent (Photo 1). Dominant species include salal (*Gaultheria shallon*) and salmonberry (*Rubus spectabilis*).

C28: Survival of planted woody species is qualitatively estimated at 85 percent (Photo 2).

Dominant species include salmonberry and snowberry (*Symphoricarpos albus*).

Sammamish River: Survival of planted woody species is qualitatively estimated at 50 to 60 percent (Photo 3). Dominant species include Nootka rose (*Rosa nutkana*) and snowberry. Willow species line the river bank.



Photo 1 – Survival at Yarrow Creek Farms



Photo 2 – Survival at C28



Photo 3 – Survival at Sammamish River

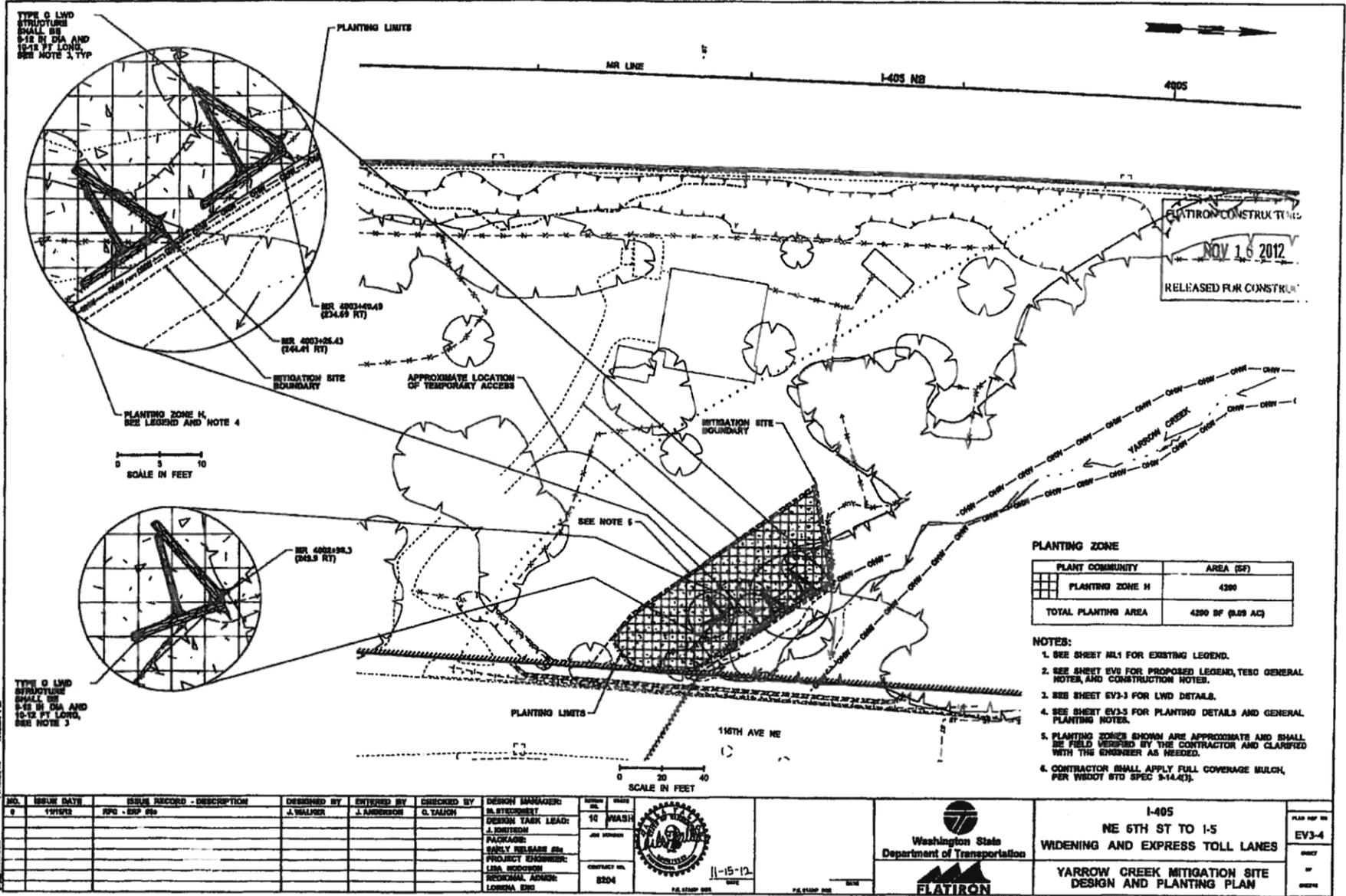


Photo 4 – Bank Erosion at Sammamish River

We welcome your questions or comments. Please contact me at 360/570-2579 or by e-mail at littaud@wsdot.wa.gov for questions about these mitigation sites.

Sincerely,

Doug Littauer
Wetlands Program



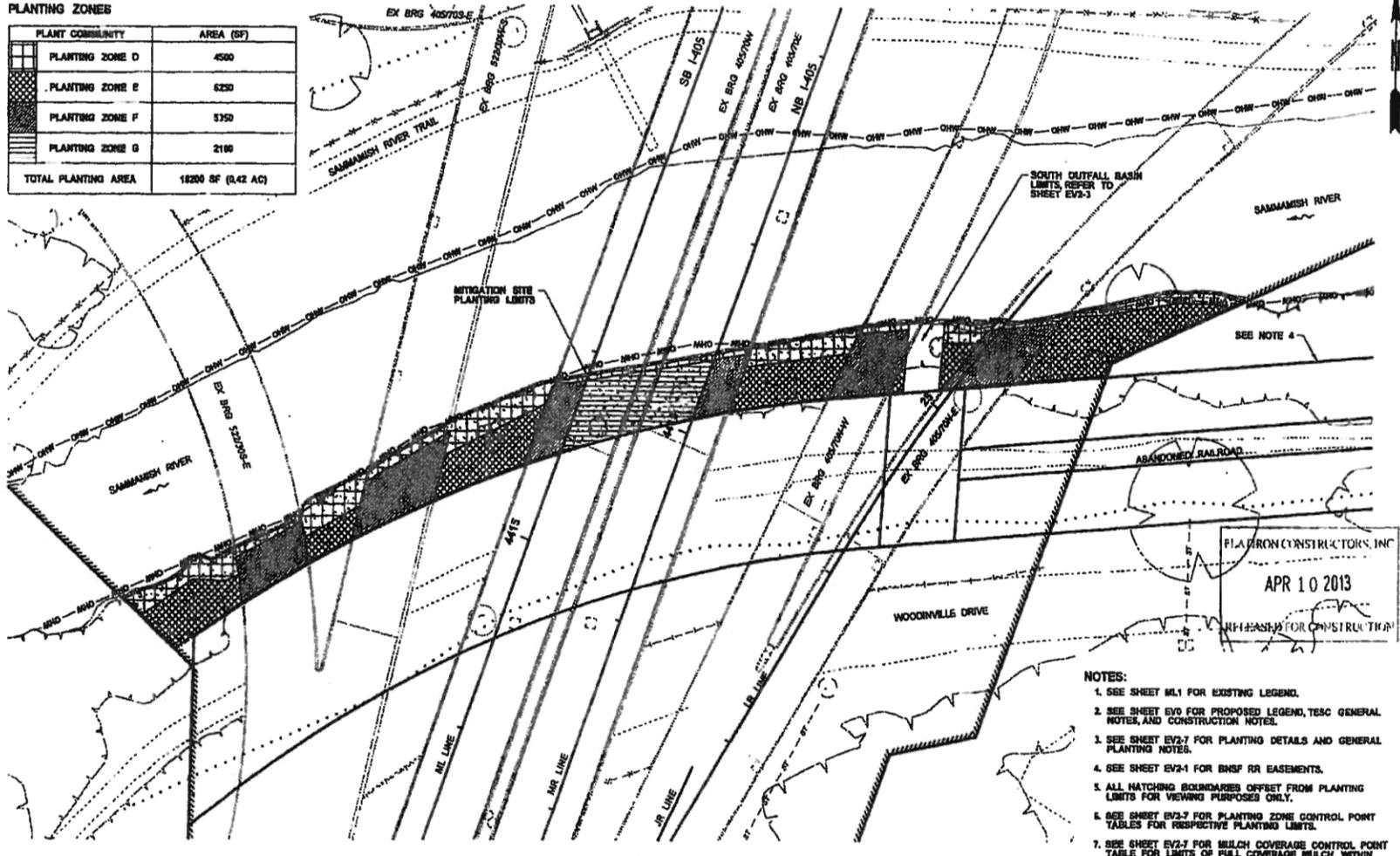
PLANTING ZONE	
PLANT COMMUNITY	AREA (SF)
PLANTING ZONE H	4200
TOTAL PLANTING AREA	4200 SF (0.09 AC)

- NOTES:**
1. SEE SHEET AL1 FOR EXISTING LEGEND.
 2. SEE SHEET EV3 FOR PROPOSED LEGEND, TRIC GENERAL NOTES, AND CONSTRUCTION NOTES.
 3. SEE SHEET EV3-3 FOR LWD DETAILS.
 4. SEE SHEET EV3-3 FOR PLANTING DETAILS AND GENERAL PLANTING NOTES.
 5. PLANTING ZONES SHOWN ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR AND CLARIFIED WITH THE ENGINEER AS NEEDED.
 6. CONTRACTOR SHALL APPLY FULL COVERAGE MULCH, PER WSDOT STD SPEC 9-14.4(3).

NO. 6	ISSUE DATE	ISSUE RECORD - DESCRIPTION	DESIGNED BY	ENTERED BY	CHECKED BY	DESIGN MANAGER:	REVISION NO.	ISSUED		WASHINGTON STATE Department of Transportation	I-405 NE 6TH ST TO I-5 WIDENING AND EXPRESS TOLL LANES YARROW CREEK MITIGATION SITE DESIGN AND PLANTING PLAN	PLAN SHEET NO. EV3-4
	10/19/13	RPG - EXP #6	J. WALKER	J. ANDERSON	C. TALON	SA. INTRODUCTION DESIGN TASK LEAD: J. ANDERSON PACKAGE: EARLY DELIVERABLES #2 PROJECT ENGINEER: LISA WICKSTROM REGIONAL AGENT: LORNA END	90	WASH				
							CONTRACT NO.	8204				
							DATE	11-15-13				

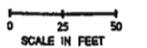
PLANTING ZONES

PLANT COMMUNITY	AREA (SF)
PLANTING ZONE D	4500
PLANTING ZONE E	6250
PLANTING ZONE F	5350
PLANTING ZONE G	2100
TOTAL PLANTING AREA	18200 SF (0.42 AC)



FLATIRON CONSTRUCTORS, INC
 APR 10 2013
 PREPARED FOR CONSTRUCTION

- NOTES:**
- SEE SHEET ML1 FOR EXISTING LEGEND.
 - SEE SHEET EVD FOR PROPOSED LEGEND, TESC GENERAL NOTES, AND CONSTRUCTION NOTES.
 - SEE SHEET EV2-7 FOR PLANTING DETAILS AND GENERAL PLANTING NOTES.
 - SEE SHEET EV2-1 FOR BNSF RR EASEMENTS.
 - ALL HATCHING BOUNDARIES OFFSET FROM PLANTING LIMITS FOR VIEWING PURPOSES ONLY.
 - SEE SHEET EV2-7 FOR PLANTING ZONE CONTROL POINT TABLES FOR RESPECTIVE PLANTING LIMITS.
 - SEE SHEET EV2-7 FOR MULCH COVERAGE CONTROL POINT TABLE FOR LIMITS OF FULL COVERAGE MULCH. WITHIN THE PROVIDED LIMITS, THE CONTRACTOR SHALL APPLY FULL COVERAGE MULCH, PER WSDOT STD SPEC 8-14-41).



14-005 - BTL - 3178101705-01 - WASHINGTON STATE DEPARTMENT OF TRANSPORTATION - PROJECT I-405 - NE 6TH ST TO I-5 - CONTRACT NO. 8204 - SHEET NO. EV2-6

NO.	ISSUE DATE	ISSUE RECORD - DESCRIPTION	DESIGNED BY	ENTERED BY	CHECKED BY	DESIGN MANAGER:	ISSUE NO.	STATE
0	02/1/13	RPC - PWD #1	J. WALKER	J. ANDERSON	C. TALCH	B. STECKERT	10	WASH
						DESIGN TASK LEAD:		
						J. JOHNSON		
						PACKAGE:		
						PACKAGE #1		
						PROJECT ENGINEER:		
						LISA HODGSON		
						REGIONAL ADMIN:		
						LORENA EWG		

	Washington State Department of Transportation	I-405 NE 6TH ST TO I-5 WIDENING AND EXPRESS TOLL LANES	PLAN SHEET NO: EV2-6
		SAMMAMISH RIVER MITIGATION SITE PLANTING PLAN	