

OPERATION & MAINTENANCE MANUAL

DFI No.: D00049

Facility Type: Water Quality Biofiltration
Swale



DECEMBER, 2010

1. Identification

Drainage Facility ID (DFI): **D00049**
Facility Type: Water Quality Biofiltration Swale
Construction Drawings: (V-File Number) 34V-107
Location: District: 1
Highway No.: 009
Mile Post: 4.18/4.20 (beg./end)
Description: This facility is located on the eastern side of the US 101 (Hwy 009) at the south corner of the Taylor Ave. Intersection. Access can be obtained from Taylor Avenue.

2. Facility Contact Information

Contact the Engineer of Record, Region Technical Center, or Geo-Environmental's Senior Hydraulics Engineer for:

- Operational clarification
- Maintenance clarification
- Repair or restoration assistance

Engineering Contacts:

Region Technical Center: Hydro

Or

Geo-Environmental Senior Hydraulics Engineer (503) 986-3365.

3. Construction

Engineer of Record: ODOT Designers: Region 2 Tech. Center, T. Yamada, K. Austin, 503-986-2990

Facility construction: 2001
Contractor: NB Hatch Company

4. Storm Drain System and Facility Overview

A water quality swale is a flat-bottomed open channel designed to treat stormwater runoff from highway pavement areas. This type of facility is lined with grass. Treatment by trapping sedimentation occurs when stormwater runoff flows through the grass.

Two pipes collect stormwater from the highways and connect to a single pipe, directing water into the northern end of the swale through Point A (See the Operational Plan in Appendix A). Refer to Photo 1 and Photo 2 for a photo of the inlet pipe. Water flows through the length of the swale and undergoes treatment. The treated stormwater exits the swale through an 18-inch storm culvert (Point B; Photo 3, Photo 4) which directs the water into a downstream swale facility, DFI D00050.

A. Maintenance equipment access:

Maintenance access to the facility can either be obtained along the Oregon Coast Hwy or from Taylor Avenue

B. Heavy equipment access into facility:

- Allowed (no limitations)
- Allowed (with limitations)
- Not allowed

C. Special Features:

- Amended Soils
- Porous Pavers
- Liners
- Underdrains



Photo 1: Swale Inlet at north end of swale looking north.

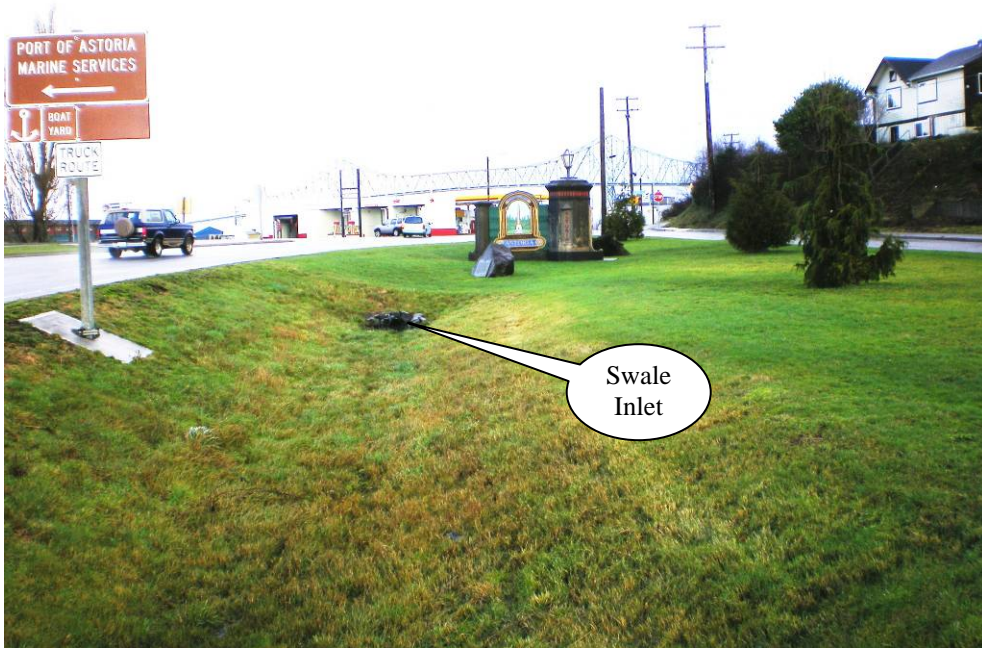


Photo 2: Swale Inlet at north end of swale looking north.



Photo 3: Swale outlet at the south end of the swale looking south.



Photo 4: Swale outlet at the south end of the swale.

5. Facility Haz Mat Spill Feature(s)

The swale can be used to store a volume of liquid by blocking the 18-inch-diameter outlet pipe located at the outlet of the swale. This pipe is noted as Point B in the Operational Plan in Appendix A.

6. Auxiliary Outlet (High Flow Bypass)

Auxiliary Outlets are provided if the primary outlet control structure can not safely pass the projected high flows. Broad-crested spillway weirs and over flow risers are the two most common auxiliary outlets used in stormwater treatment facility design. The auxiliary outlet feature is either a part of the facility or an additional storm drain feature/structure.

The auxiliary outlet feature for this facility is:

- Designed into facility
- Other, as noted below
There is no auxiliary outlet for this facility.

7. Maintenance Requirements

Routine maintenance table for non-proprietary stormwater treatment and storage/detention facilities have been incorporated into ODOT's Maintenance Guide. These tables summarize the maintenance requirements for ponds, swales, filter strips, bioslopes, and detention tanks and vaults. Special maintenance requirements in addition to the routine requirements are noted below when applicable.

The ODOT Maintenance Guide can be viewed at the following website:

<http://www.oregon.gov/ODOT/HWY/OOM/MGuide.shtml>

Maintenance requirements for proprietary structures, such as underground water quality manholes and/or vaults with filter media are noted in Appendix C when applicable.

The following stormwater facility maintenance table (See ODOT Maintenance Guide) should be used to maintain the facility outlined in this Operation and Maintenance Manual or follow the Maintenance requirements outlined in Appendix C when proprietary structure is selected below:

- Table 1 (general maintenance)
- Table 2 (stormwater ponds)

- Table 3 (water quality biofiltration swales)
- Table 4 (water quality filter strips)
- Table 5 (water quality bioslopes)
- Table 6 (detention tank)
- Table 7 (detention vault)
- Appendix C (proprietary structure)
- Special Maintenance requirements: N/A

Note: Special maintenance Requirements Require Concurrence from ODOT SR Hydraulics Engineer.

8. Waste Material Handling

Material removed from the facility is defined as waste by DEQ. Refer to the roadwaste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options: <http://egov.oregon.gov/ODOT/HWY/OOM/EMS.shtml>

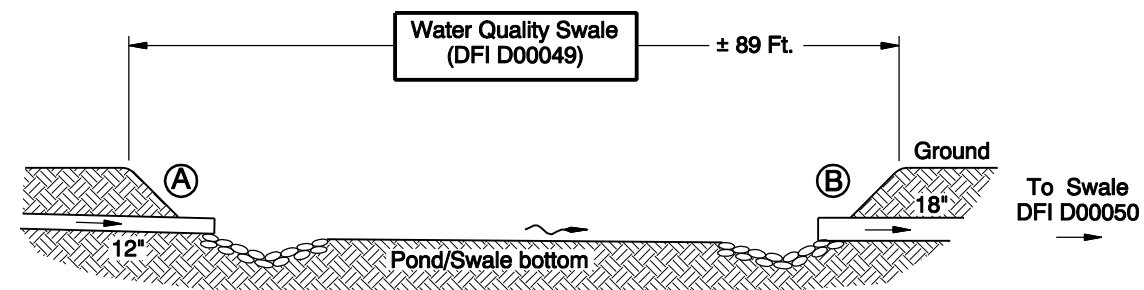
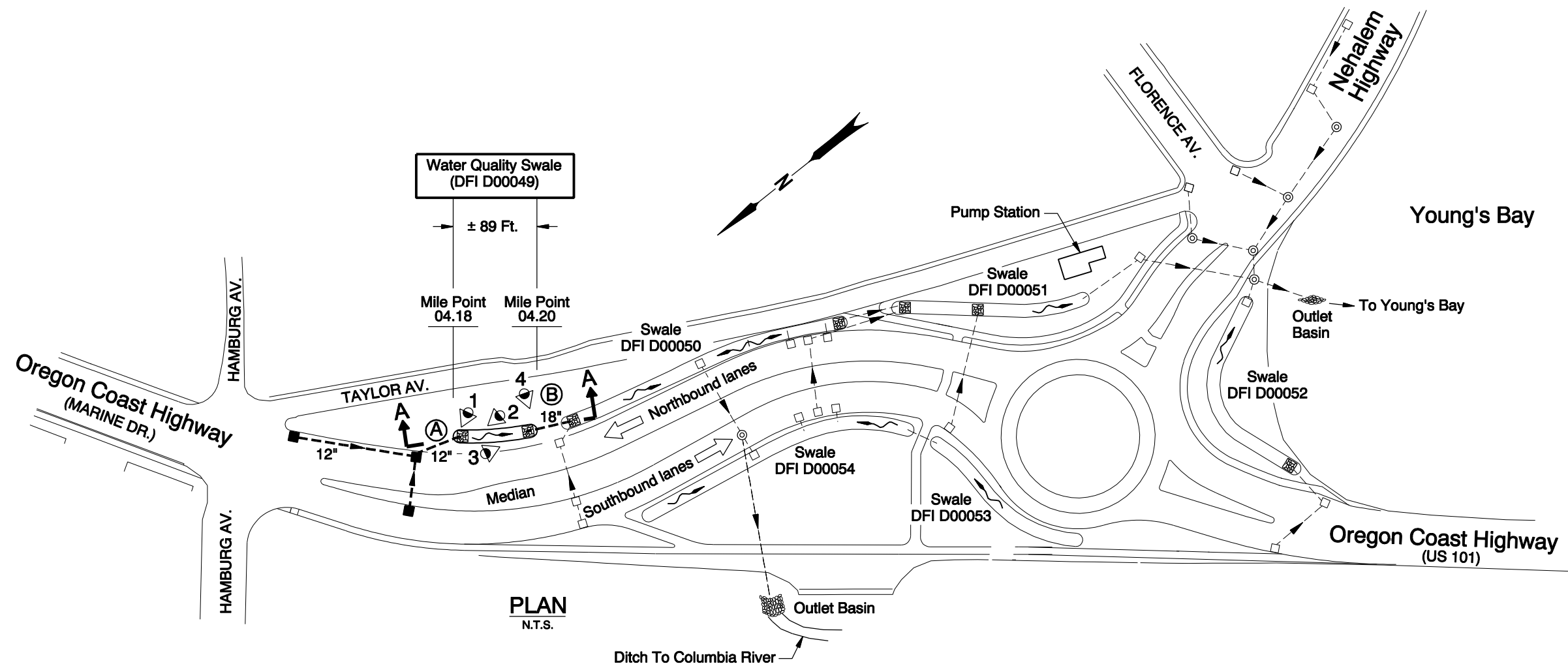
Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region Hazmat Coordinator	(503) 986-2647
ODEQ Northwest Region Office	(503) 229-5263

Appendix A

Content:

- **Operational Plan and Profile Drawing(s)**



- LEGEND:**
- Photo Location / Direction
 - Swale inlet, 12" dia.
 - Swale outlet, 18" dia.
 - Manhole
 - Inlet
 - Storm Pipe (Facility)
 - Storm Pipe
 - Conveyance Direction
 - Pavement / Facility Flow Path

Sht. 1 of 1 OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: M. Wittenbrink
 Drafted By: Jim Holeman

DFI D00049
MAINTENANCE DISTRICT 1 HWY 9
WATER QUALITY BIOFILTRATION SWALE
 OREGON COAST HIGHWAY MP 04.18-04.20
 CLATSOP COUNTY

Appendix B

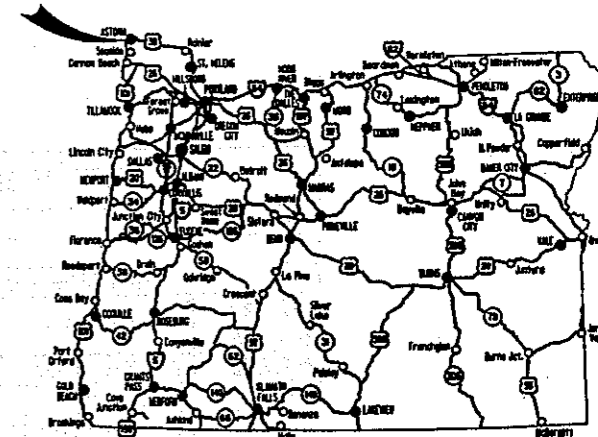
Content:

- **ODOT Project Plan Sheets**
 - *Cover/Title Sheet*
 - *Water Quality/Detention Plan Sheets*
 - *Other Details*

STATE OF OREGON
DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

GRADING, PAVING, & SIGNING
**US-101 AT NEHALEM HWY.
(ASTORIA) SEC.**
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY
OCTOBER 2001



Overall Length Of Project - 0.61 km (0.38 Mile)

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Index Of Sheets Cont'd. & Standard Drawing Nos.
2, 2A, 2A-2	Typical Sections
2B Thru 2B-6 Incl.	Details
2C	Traffic Control Detour & Details
2C-2 Thru 2C-21 Incl.	Traffic Control Plans
2D, 2D-2	Erosion Control Details
2D-3 Thru 2D-4 Incl.	Erosion Control Plans
2E	Pipe Data
3	"ML", "MR" Line Alignment
3A, 3B	General Construction
3C	"ML", "MR" Line Profile
4	"ML", "MR", "MC", "C", "TL", "TR" Line Alignment
4A, 4B	General Construction
4C	"ML", "MR" Line Profile
4D	"C" Line Profile
5	"MC", "TL", "TR" Line Alignment
5A, 5B	General Construction
5C	"MC" Line Profile
6	"TL", "TR" Line Alignment
6A, 6B	General Construction
6C	"TL", "TR" Line Profile
7	"TL" Line Alignment
7A, 7B	General Construction
7C	"TL" Line Profile

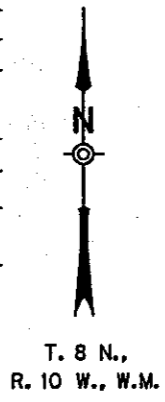
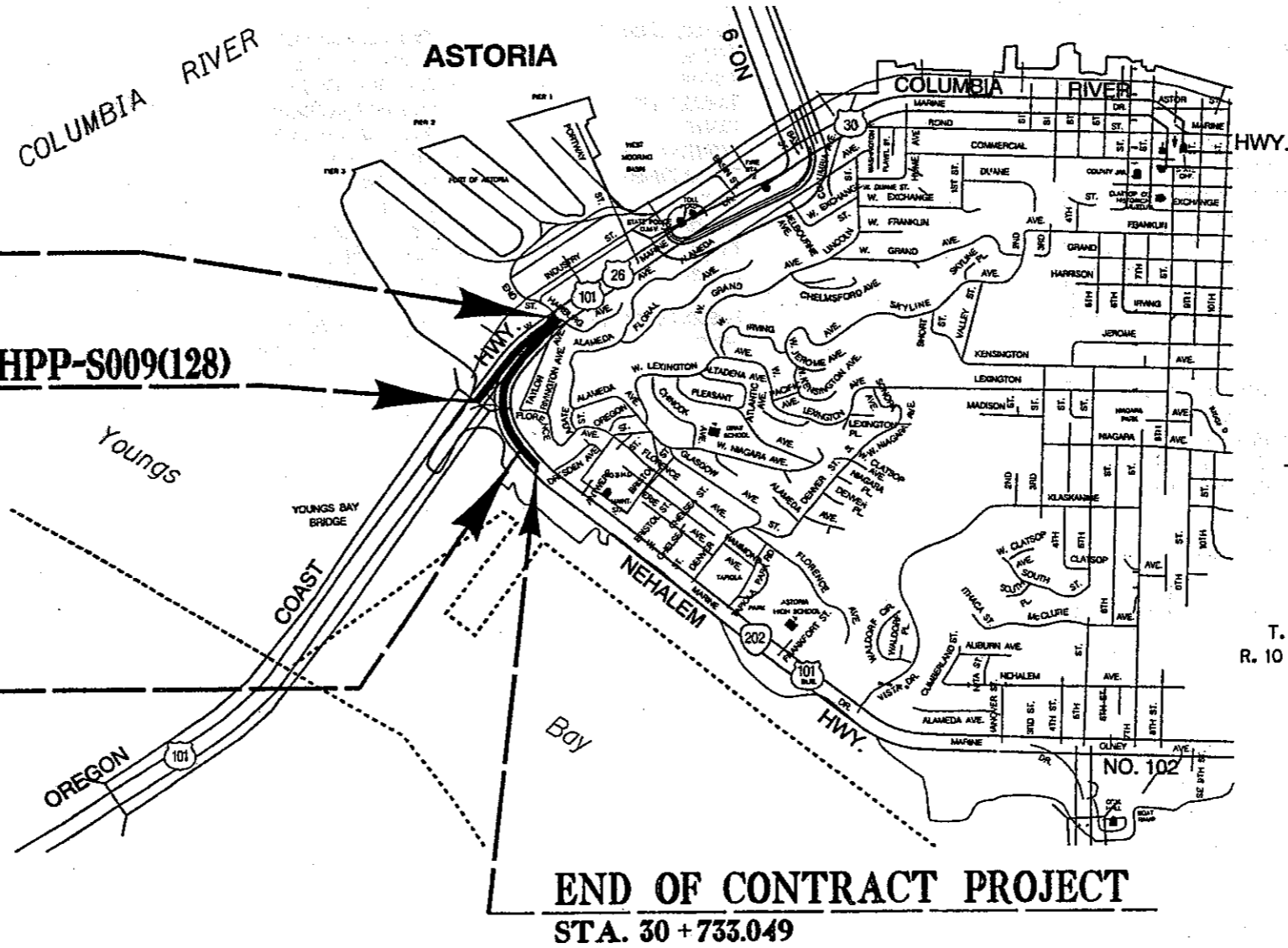
ATTENTION :
Oregon Law Requires You To Follow Rules Adopted By The Oregon Utility Notification Center. Those Rules Are Set Forth In OAR 952-001-0010 Through OAR 952-001-0030. You May Obtain Copies Of The Rules From The Center, Or Answers To Questions About The Rules By Calling (503) 232-1987.

LET'S ALL
WORK TOGETHER
TO MAKE THIS
JOB SAFE

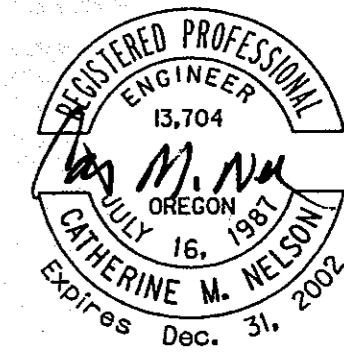
NH-HPP-ACHPP-S009(128)
BEGINNING OF PROJECT
STA. 'MR' 10 + 060

END OF PROJECT NH-HPP-ACHPP-S009(128)
STA. 'MR' 10 + 450

NH-HPP-ACHPP-S009(128)
END OF PROJECT
STA. 'TL' 30 + 640



- OREGON TRANSPORTATION COMMISSION**
- Steven H. Corey CHAIRMAN
 - Gail L. Achterman COMMISSIONER
 - Stuart Foster COMMISSIONER
 - Randall Pape COMMISSIONER
 - John Russell COMMISSIONER
 - Bruce A. Warner DIRECTOR OF TRANSPORTATION



Catherine M. Nelson
ACTING TECHNICAL SERVICES MANAGING ENGINEER

**US-101 AT NEHALEM HWY.
(ASTORIA) SEC.**
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	NH-HPP-ACHPP-S009(128)	1

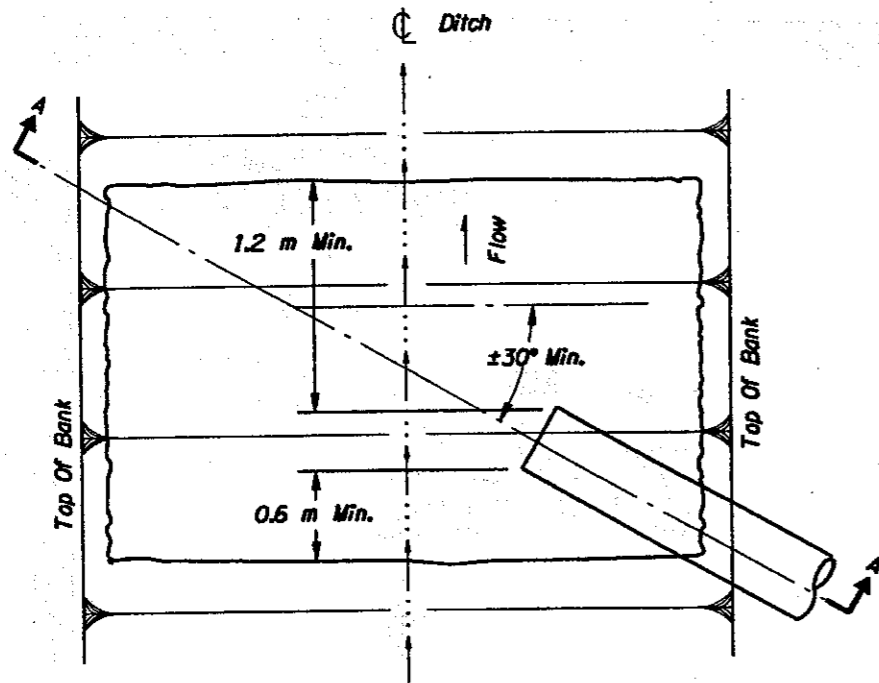


END OF CONTRACT PROJECT
STA. 30 + 733.049

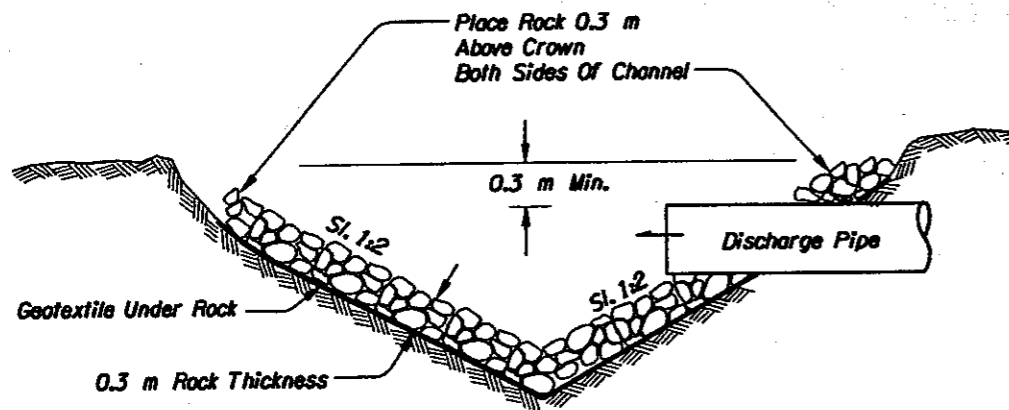
AS CONSTRUCTED
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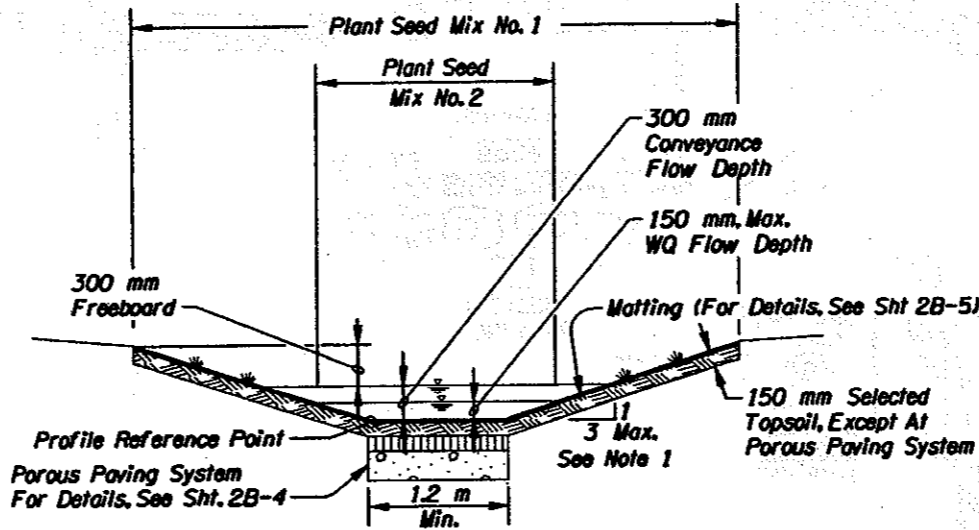
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PLAN



SECTION A - A
OUTLET BASIN

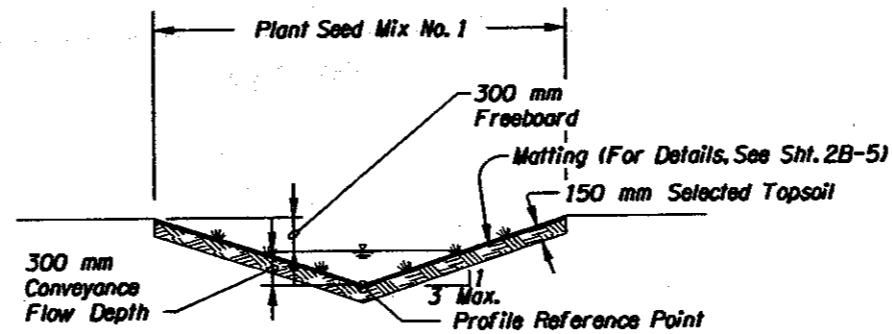


Eastside Ditch
Sta. "ML" 20+125.3 Lt. To Sta. "ML" 20+217.8 Lt.
Sta. "ML" 20+275.6 Lt. To Sta. "TL" 30+424.9 Lt.

Southside Ditch
Sta. "MC" 10+403.2 Lt. To Sta. "TL" 30+489.3 Rt.

NOTE:

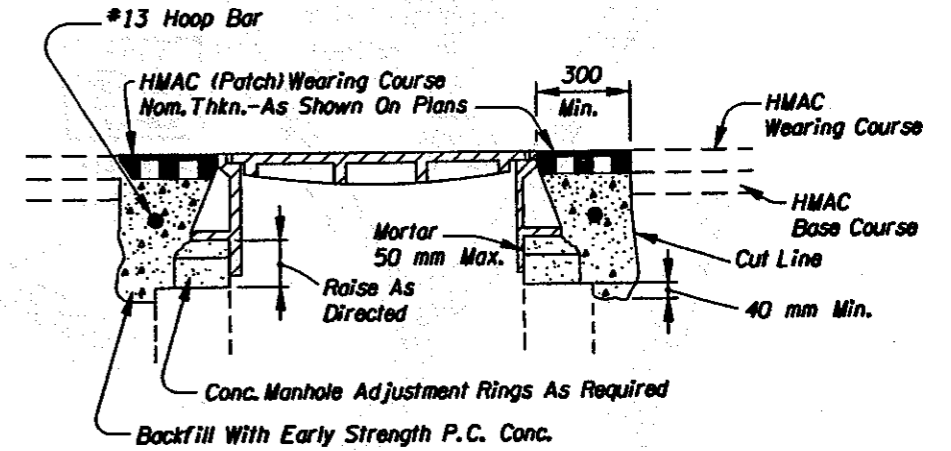
- Increase Slope To IV : 2H Adjacent To Existing Wastewater Pump Station (Sta. "TL" 30+432.7 Lt. To Sta. "TL" 30+452.9 Lt.)



Westside ditch
Sta. "MC" 10+342.9 Rt. To Sta. "MR" 10+163.4 Rt.

Eastside Ditch
Sta. "ML" 20+217.8 Lt. To Sta. "ML" 20+275.6 Lt.

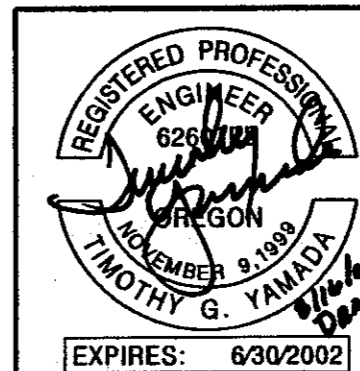
DRAINAGE SWALE DETAIL



- Cover Manhole With Building Paper And Const. HMAC Base And Wearing Courses.
- Sawcut Square Or Circular Excavation Around Manhole 300 mm Min. From M. H. Frame. Orient Diagonal Of Square So That Its Is Parallel To Roadway Center Line.
- Raise Manhole Frame And Cover To Finish Grade By Installing Conc. Rings And Levelling Mortar.
- Backfill With Early Strength P. C. Conc. And HMAC Wearing Course.

METHOD "A"
MANHOLE ADJUSTMENT SEQUENCE

Note:
All Dimensions Are
In Millimeters (mm) Unless
Otherwise Indicated.



OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

U.S.-101 AT NEHALEM HWY. (ASTORIA) SEC.
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY

Designed By - Tim Yamada
Drafted By - Rob Luke

DETAILS


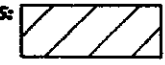



SHEET NO.
2B-6

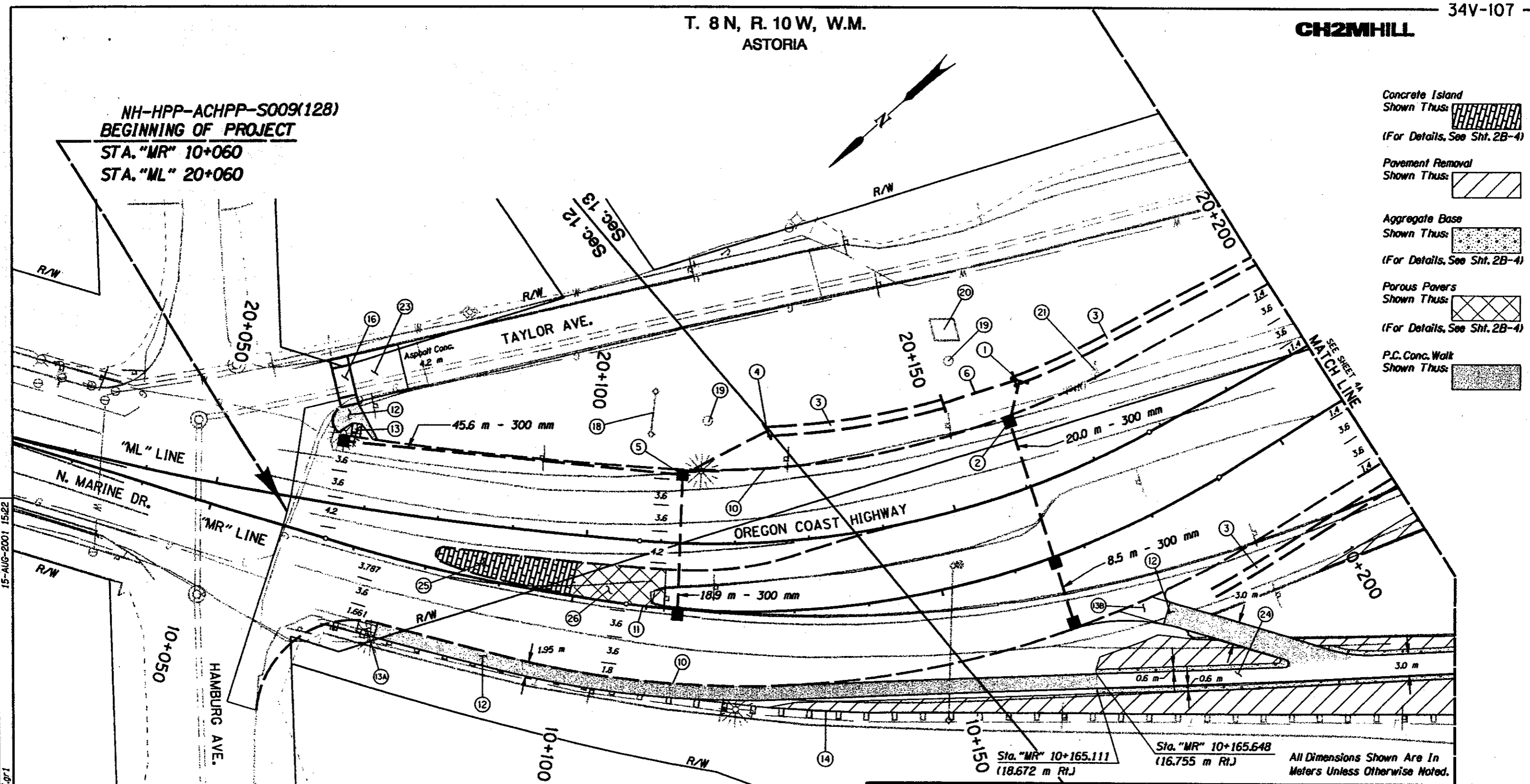
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T. 8 N, R. 10 W, W.M.
ASTORIA

CH2MHILL

NH-HPP-ACHPP-S009(128)
BEGINNING OF PROJECT
STA. "MR" 10+060
STA. "ML" 20+060

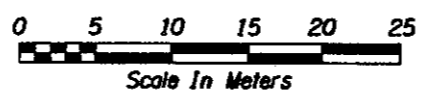
- Concrete Island
Shown Thus: 
(For Details, See Sht. 2B-4)
- Pavement Removal
Shown Thus: 
(For Details, See Sht. 2B-4)
- Aggregate Base
Shown Thus: 
(For Details, See Sht. 2B-4)
- Porous Pavers
Shown Thus: 
(For Details, See Sht. 2B-4)
- P.C. Conc. Walk
Shown Thus: 



Sta. "MR" 10+165.111 (18.672 m Rt.)
Sta. "MR" 10+165.648 (16.755 m Rt.)

All Dimensions Shown Are In Meters Unless Otherwise Noted.

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REGISTERED PROFESSIONAL ENGINEER
6260
Timothy G. Yamada
OREGON
NOVEMBER 9, 1999
TIMOTHY G. YAMADA
EXPIRES: 6/30/2002

REGISTERED PROFESSIONAL ENGINEER
16,901
James F. Bauman
OREGON
NOV. 16, 1993
JAMES F. BAUMAN
EXPIRES: 12/31/01

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

U.S.-101 AT NEHALEM HWY. (ASTORIA) SEC.
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY

Designed By - Tim Yamada
Designed By - Kristin Austin
Drafted By - Rob Luke

GENERAL CONSTRUCTION



SHEET NO. 3A

CH2MHILL

- ① Sta. "ML" 20+164.65
Inst. 300 mm Sew. Pipe Outfall - 5.8 m
Trench Exc. - 4.1 m³
Inst. Outlet Basin
(For Details, See Sht. 2B-6)
- ② Sta. "ML" 20+161.03
Const. Type "CG-2" Inlet - 2
Const. Type "G-2" Inlet
Inst. 300 mm Sew. Pipe - 28.5 m
Trench Exc. - 19.7 m³
(See Drg. No. RD336)
- ③ Const. Drainage Swale
(For Details, See Sht. 2B-6)
- ④ Sta. "ML" 20+125.26
Inst. 300 mm Sew. Pipe Outfall - 12.8 m
Trench Exc. - 11.2 m³
Inst. Outlet Basin
(For Details, See Sht. 2B-6)
- ⑤ Sta. "ML" 20+112.60
Const. Type "CG-2" Inlet
Const. Type "G-2" Inlet - 2
Inst. 300 mm Sew. Pipe - 64.5 m
Trench Exc. - 57.4 m³
(See Drg. No. RD336)
- ⑥ Sta. "ML" 20+152.65
Inst. 450 mm Culvert Pipe - 10.0 m
Trench Exc. 9.8 m³
- ⑩ Const. Type "A" Curb
(See Drg. No. RD700)
- ⑪ Const. Type "F" Curb
(See Drg. No. RD700)
- ⑫ Const. P.C. Conc. Walk
- ⑬ Const. Sidewalk Ramp
(See Drg. No. RD725)
- ⑬A Const. Modified Sidewalk Ramp
(For Details, See Sht. 2B-4)
- ⑬B Const. Modified Sidewalk Ramp (Bikeway)
(See Drg. No. RD725, General Note 7)
- ⑭ Sta. "MR" 10+068 To Sta. "MC" 10+453
Remove Extg. Guardrail - 384 m
- ⑯ Const. P.C. Conc. Driveway, Option A
(See Drg. No. 720)
- ⑱ Maintain And Protect Historic Sign
- ⑲ Maintain And Protect Stone Monument - 2
- ⑳ Maintain And Protect Historic Statue
- ㉑ Remove Utility Pole
- ㉒ Const. Asphalt Conc. Connection
(See Drg. No. 715)
- ㉓ Sawcut Extg. Pavement To Maintain 3.0 m
Wide Asphalt Conc. Path.
(For Details, See Sht. 2B-4)
Const. Connection Between P.C. Conc. Walks
And Asphalt Conc. Path As Directed By
Engineer.
- ㉔ Const. Conc. Island - 65 m²
Stamped Conc. Island Surfacing
(For Details, See Sht 2B-4)
- ㉕ Const. Porous Paver System - 60 m²
(For Details, See Sht 2B-4)

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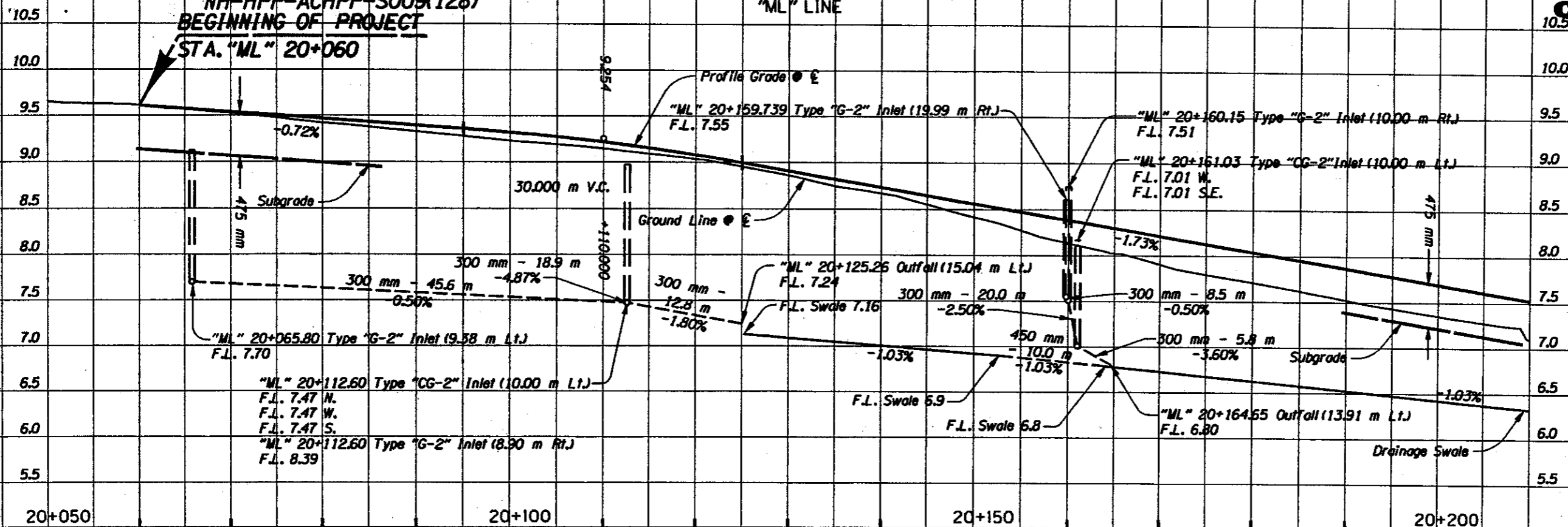
 <p>REGISTERED PROFESSIONAL ENGINEER 6260 OREGON NOVEMBER 9, 1998 TIMOTHY G. YAMADA EXPIRES: 6/30/2002</p>	 <p>REGISTERED PROFESSIONAL ENGINEER 16901 OREGON NOV. 16, 1993 JAMES F. BAUMAN EXPIRES: 12/31/01</p>	<p>OREGON DEPARTMENT OF TRANSPORTATION ROADWAY ENGINEERING SECTION</p> <p>U.S.-101 AT NEHALEM HWY. (ASTORIA) SEC. OREGON COAST & NEHALEM HWYS. CLATSOP COUNTY</p> <p>Designed By - Tim Yamada Designed By - Kristin Austin Drafted By - Rob Luke</p> <p>GENERAL CONSTRUCTION</p> <p>SHEET NO. 3B</p>
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NH-HPP-ACHPP-S009(128)

BEGINNING OF PROJECT

STA. "ML" 20+060

"ML" LINE

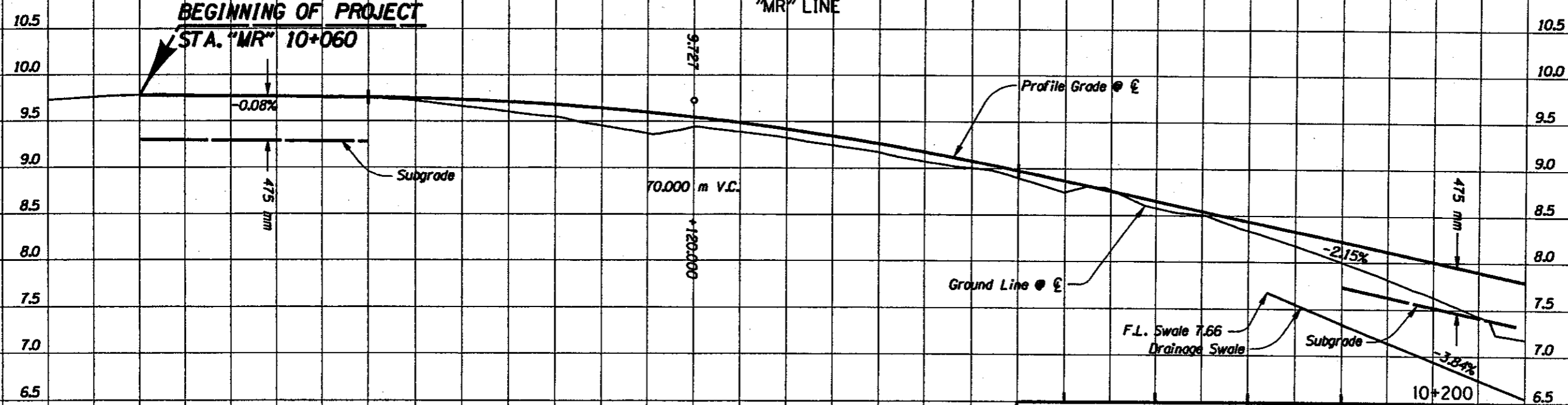


"ML" Line
Earthwork Quantities:
Exc. 590 m³
Emb. 1000 m³
Ditch Exc. 260 m³

BEGINNING OF PROJECT

STA. "MR" 10+060

"MR" LINE



"MR" Line
Earthwork Quantities:
Exc. 1190 m³
Emb. 970 m³
Ditch Exc. 100 m³

All Dimensions Shown Are In Meters Unless Otherwise Noted.

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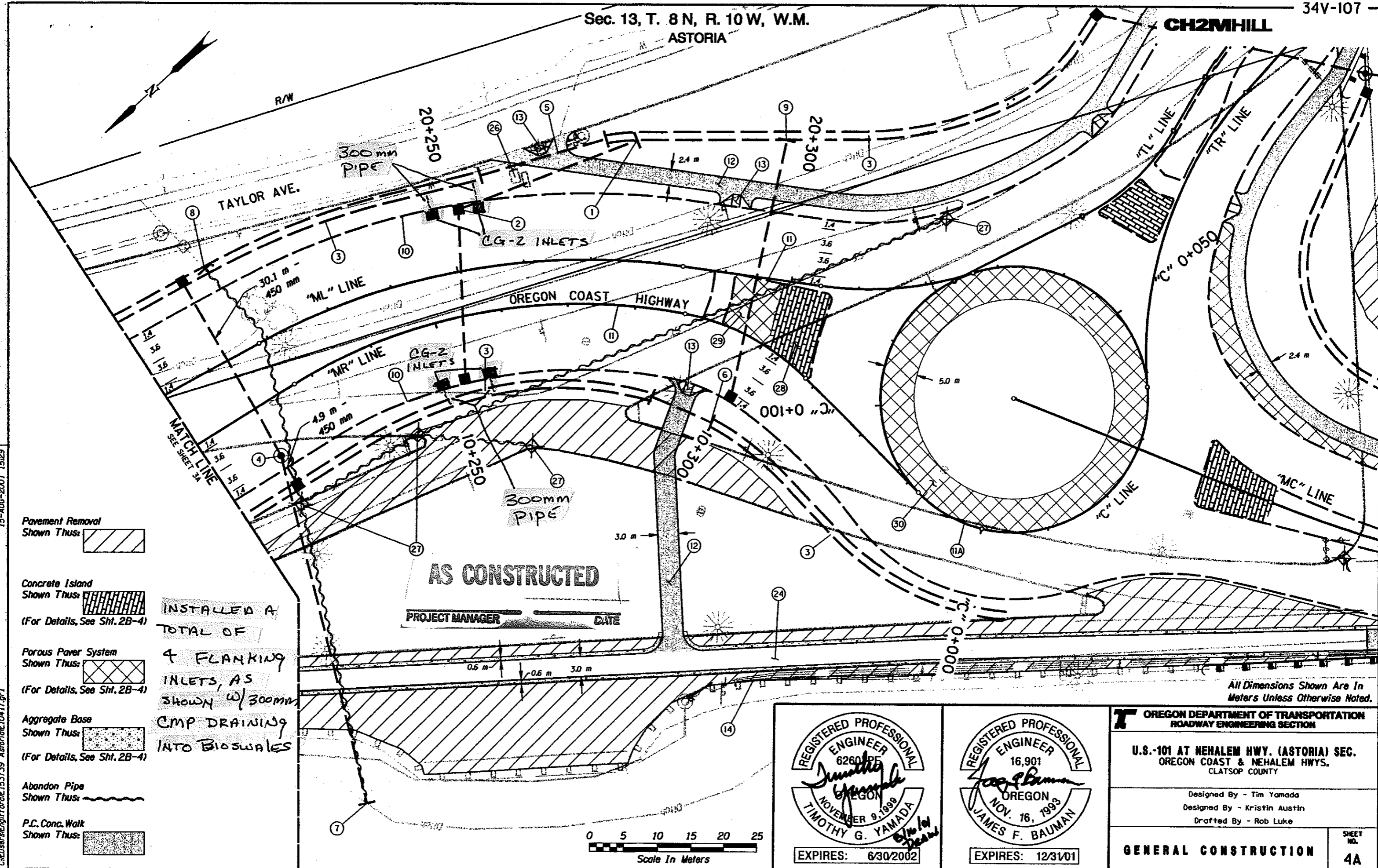
OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

U.S.-101 AT NEHALEM HWY. (ASTORIA) SEC.
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY

Designed By - Timothy Yamada
Designed By - Kristin Austin
Drafted By - Rob Luke

PROFILE

SHEET NO.
3C



15-AUG-2001 15:23
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- Pavement Removal
Shown Thus:
- Concrete Island
Shown Thus:
(For Details, See Sht. 2B-4)
- Porous Paver System
Shown Thus:
(For Details, See Sht. 2B-4)
- Aggregate Base
Shown Thus:
(For Details, See Sht. 2B-4)
- Abandon Pipe
Shown Thus:
- P.C. Conc. Walk
Shown Thus:

INSTALLED A
TOTAL OF
4 FLANKING
INLETS, AS
SHOWN w/ 300mm
CMP DRAINING
INTO BIOSWALES

AS CONSTRUCTED

PROJECT MANAGER _____ DATE _____

All Dimensions Shown Are In Meters Unless Otherwise Noted.

REGISTERED PROFESSIONAL ENGINEER
6260 PE
Timothy G. Yamada
OREGON
NOVEMBER 9, 1999
TIMOTHY G. YAMADA
EXPIRES: 6/30/2002

REGISTERED PROFESSIONAL ENGINEER
16,901
James F. Bauman
OREGON
NOV. 16, 1993
JAMES F. BAUMAN
EXPIRES: 12/31/01

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

U.S.-101 AT NEHALEM HWY. (ASTORIA) SEC.
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY

Designed By - Tim Yamada
Designed By - Kristin Austin
Drafted By - Rob Luke

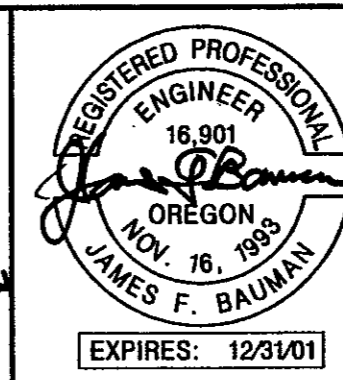
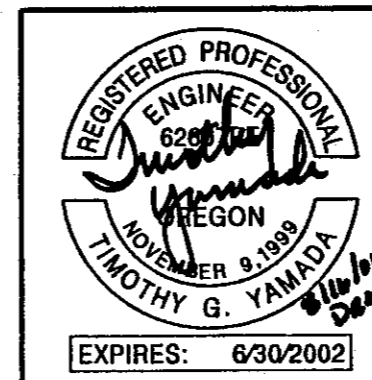
GENERAL CONSTRUCTION
SHEET NO. 4A

CH2MHILL

- ① Sta. "ML" 20+275.58
Inst. 450 mm Sew. Pipe Outfall - 28.5 m
Trench Exc. - 23.0 m³
Inst. Outlet Basin
(For Details, See Sht. 2B-6)
- ② Sta. "ML" 20+251.75
Const. Type "CG-2" Inlet - 2
Inst. 300 mm Sew. Pipe - 25.6 m
Trench Exc. - 20.3 m³
- ③ Const. Drainage Swale
(For Details, See Sht. 2B-6)
- ④ Sta. "MR" 10+219.74
Const. Manhole
(See Drg. No. RD327)
Const. Type "D" mod. Inlet - 2
(For Details, See Sht. 2B-4)
Inst. 450 mm Sew. Pipe - 35.0 m
Trench Exc. 29.2 m³
- ⑤ Sta. "ML" 20+255.29
Inst. 300 mm Culvert Pipe - 19.6 m
Trench Exc. - 14.5 m³
- ⑥ Sta. "MR" 10+284.69
Inst. 300 mm Culvert Pipe - 9.8 m
Trench Exc. - 5.9 m³
- ⑦ Sta. "MR" 10+203.11
Inst. 450 mm Sew. Pipe Outfall - 53.5 m
Trench Exc. - 87.6 m³
Inst. Outlet Basin
Remove Extg. Sew. Pipe
(For Details, See Sht. 2B-6)
- ⑧ Sta. "ML" 20+216.95
Cut Extg. Sew. Pipe At Proposed Ditch
I.E. 6.35
Inst. Outlet Basin
(For Details, See Sht. 2B-6)
- ⑨ Sta. "ML" 20+296.17
Inst. 300 mm Sew. Pipe Outfall - 39.5 m
Trench Exc. - 6.5 m³
Inst. Outlet Basin
(For Details, See Sht. 2B-6)
Const. Type "CG-2" Inlet - 1
- ⑩ Const. Type "A" Curb
- ⑪ Const. Type "F" Curb
- ⑪A Const. Type "B" Curb
(See Drg. No. RD700)
- ⑫ Const. P.C. Conc. Walk
- ⑬ Const. Sidewalk Ramp - 3
- ⑭ See Sht. 3B, Note 14
- ⑮ See Sht. 3B, Note 24
- ⑯ Abandon RV Dump Site (By Others)
- ⑰ Remove Inlet - 4
- ⑱ Const. Conc. Island - 84 m²
Stamped Conc. Island Surfacing
(For Details, See Sht 2B-4)
- ⑲ Const. Porous Paver System - 63 m²
- ⑳ Const. Porous Paver System - 550 m²
(For Details, See Sht 2B-4)

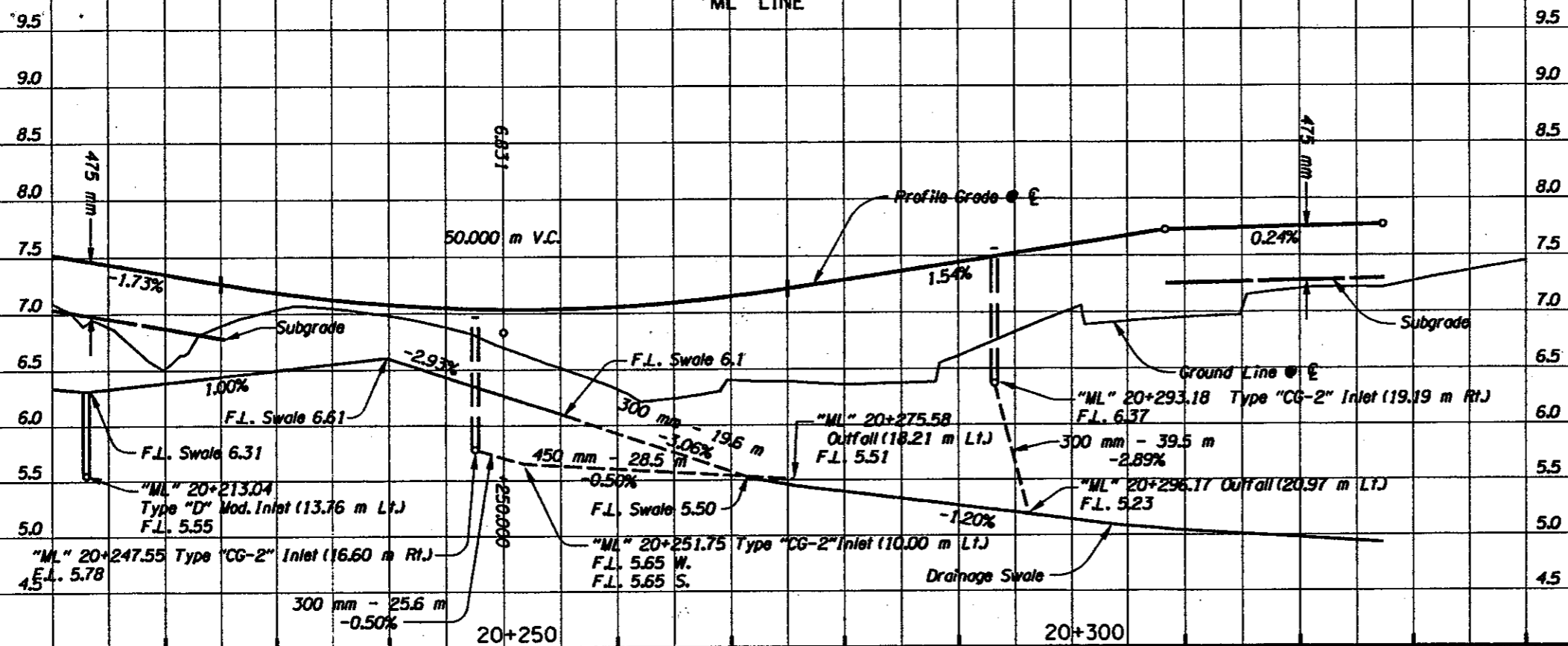
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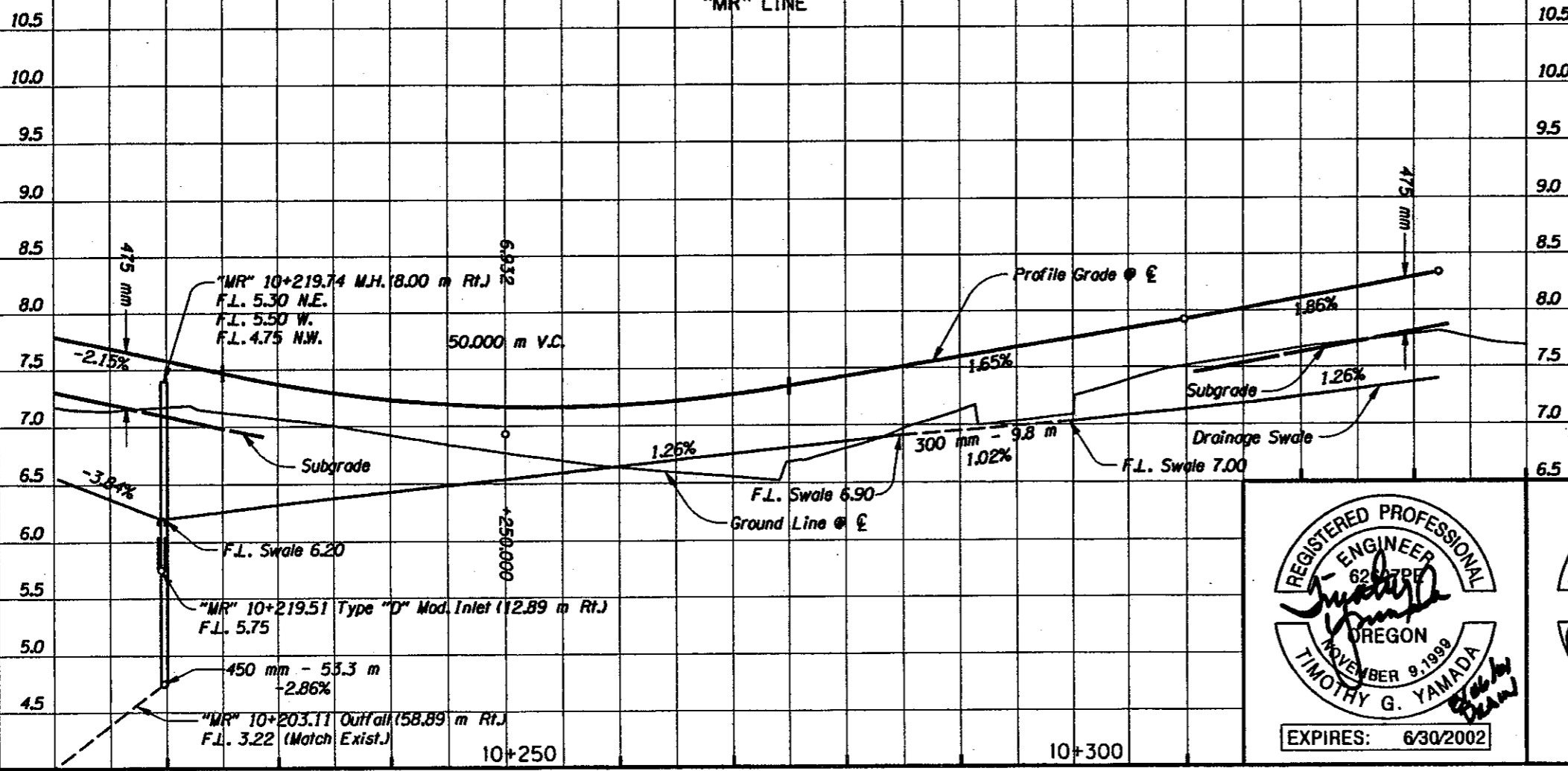
OREGON DEPARTMENT OF TRANSPORTATION ROADWAY ENGINEERING SECTION	
U.S.-101 AT NEHALEM HWY. (ASTORIA) SEC. OREGON COAST & NEHALEM HWYS. CLATSOP COUNTY	
Designed By - Tim Yamada Designed By - Kristin Austin Drafted By - Rob Luke	
GENERAL CONSTRUCTION	SHEET NO. 4B

"ML" LINE



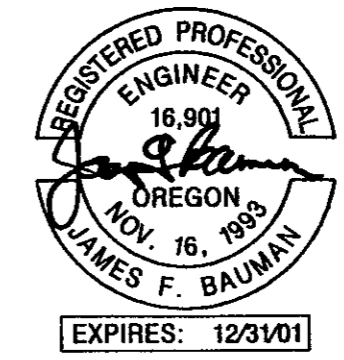
"ML" Line
Earthwork Quantities:
Exc. 490 m³
Emb. 1100 m³
Ditch Exc. 460 m³

"MR" LINE



"MR" Line
Earthwork Quantities:
Exc. 520 m³
Emb. 620 m³
Ditch Exc. 390 m³

All Dimensions Shown Are In Meters Unless Otherwise Noted.



OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

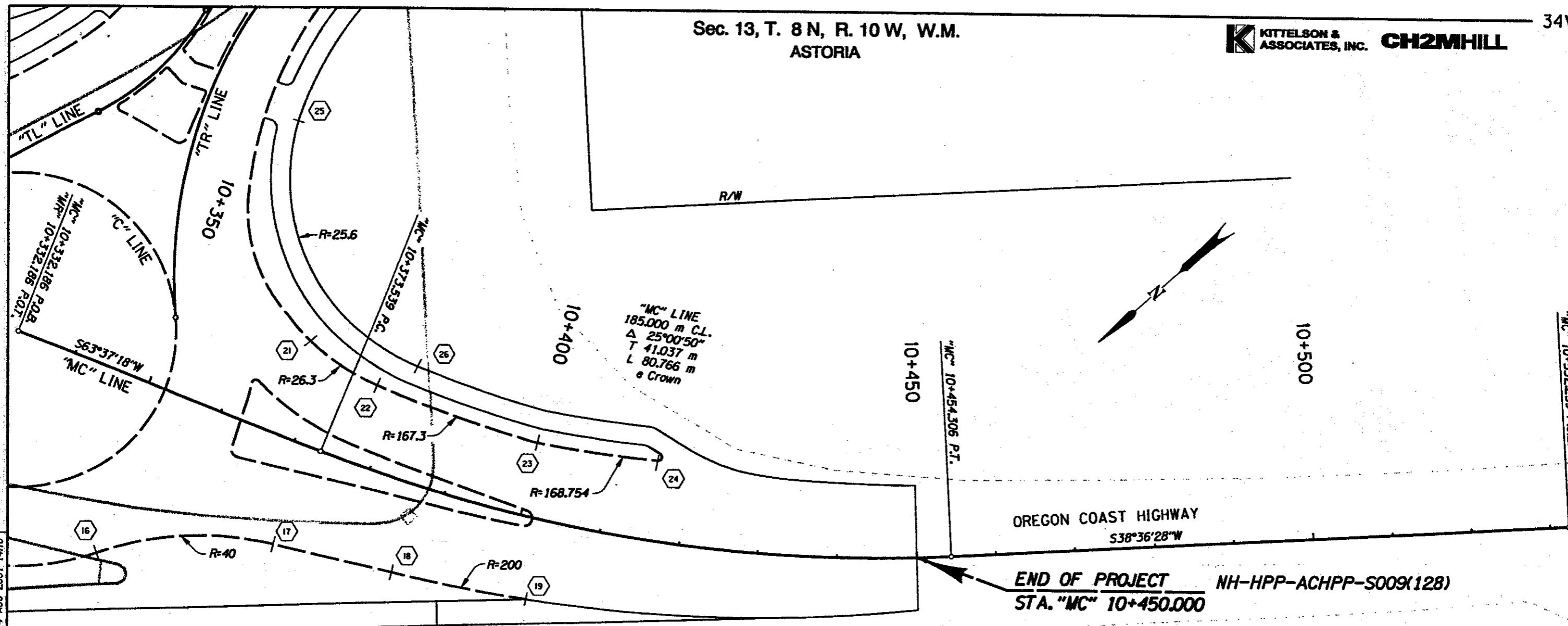
U.S.-101 AT NEHALEM HWY. (ASTORIA) SEC.
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY

Designed By - Timothy Yamada
Designed By - Kristin Austin
Drafted By - Rob Luke

PROFILE

SHEET NO.
4C

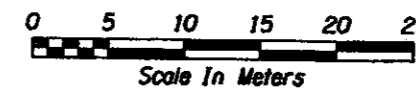
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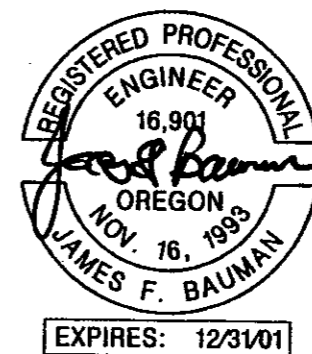
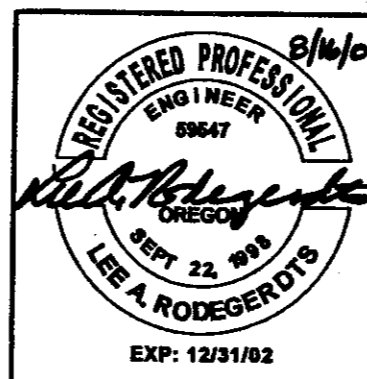
OREGON COAST HIGHWAY
S38°36'28\"/>

END OF PROJECT NH-HPP-ACHPP-S009(128)
STA. "MC" 10+450.000

Point No.	Station
16	"C" 0+011.374 (10.000 Rt.)
17	"MC" 10+372.423 (13.194 Rt.)
18	"MC" 10+386.636 (11.507 Rt.)
19	"MC" 10+402.993 (10.248 Rt.)
21	"MC" 10+363.364 (14.613 Lt.)
22	"MC" 10+377.070 (10.407 Lt.)
23	"MC" 10+399.805 (9.463 Lt.)
24	"MC" 10+415.681 (10.181 Lt.)
25	"TR" 40+458.805 (11.702 Rt.)
26	"MC" 10+381.358 (14.424 Lt.)



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OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

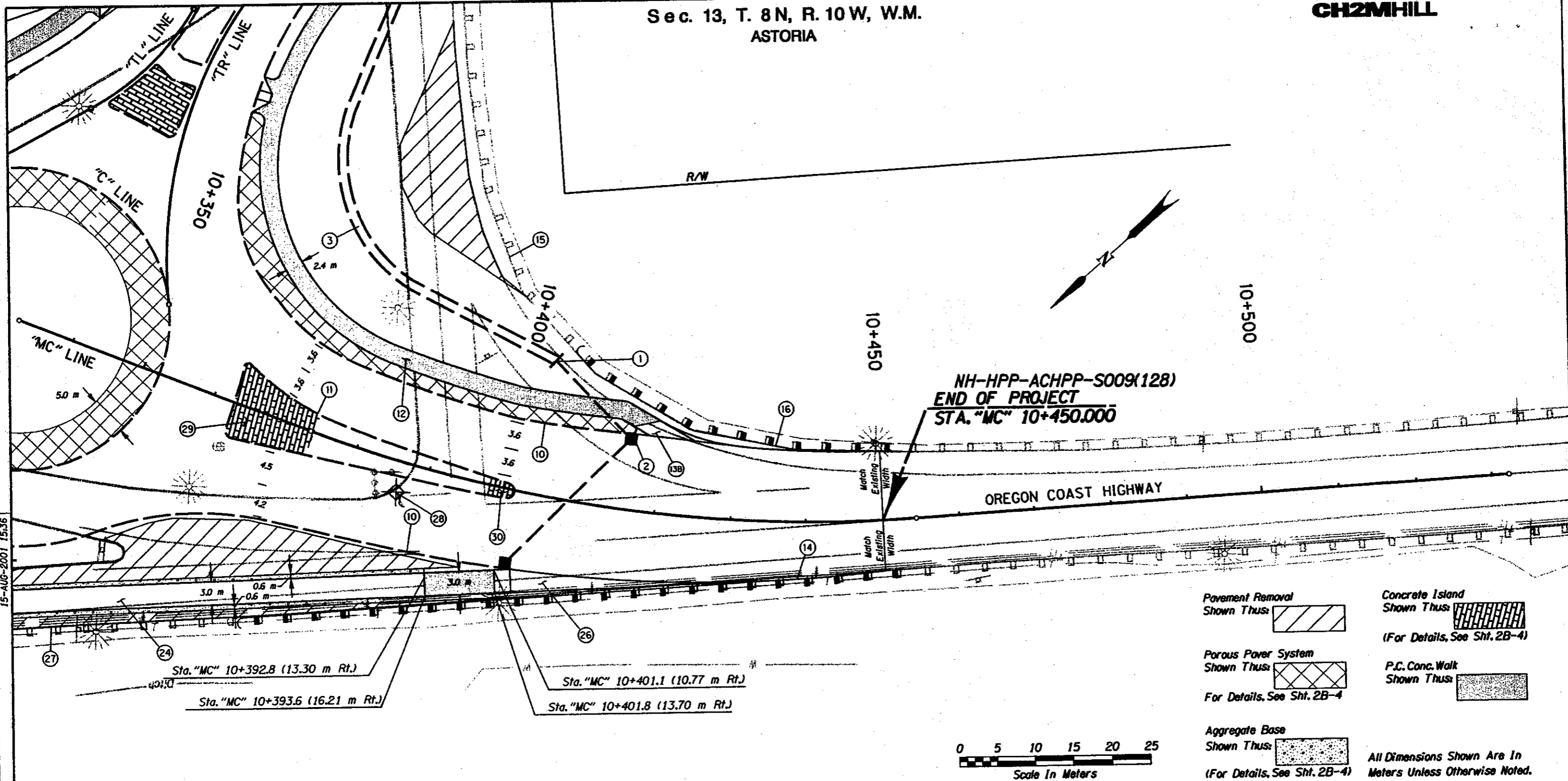
U.S.-101 AT NEHALEM HWY. (ASTORIA) SEC.
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY

Designed By - Lee Rodegerdts
Designed By - Kristin Austin
Drafted By - Rob Luke

ALIGNMENT

SHEET NO.
5

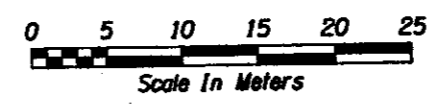
Sec. 13, T. 8 N, R. 10 W, W.M.
ASTORIA



NH-HPP-ACHPP-S009(128)
END OF PROJECT
STA. "MC" 10+450.000

OREGON COAST HIGHWAY

- Pavement Removal
Shown Thus:
 - Concrete Island
Shown Thus:
(For Details, See Sht. 2B-4)
 - Porous Paver System
Shown Thus:
For Details, See Sht. 2B-4
 - P.C. Conc. Walk
Shown Thus:
 - Aggregate Base
Shown Thus:
(For Details, See Sht. 2B-4)
- All Dimensions Shown Are In Meters Unless Otherwise Noted.



REGISTERED PROFESSIONAL
ENGINEER
6267PE
Timothy G. Yamada
OREGON
NOVEMBER 9, 1998
TIMOTHY G. YAMADA
EXPIRES: 6/30/2002

REGISTERED PROFESSIONAL
ENGINEER
16,901
James F. Bauman
OREGON
NOV. 16, 1993
JAMES F. BAUMAN
EXPIRES: 12/31/01

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

U.S.-101 AT NEHALEM HWY. (ASTORIA) SEC.
OREGON COAST & NEHALEM HWYS.
CLATSOP COUNTY

Designed By - Tim Yamada
Designed By - Kristin Austin
Drafted By - Rob Luke

GENERAL CONSTRUCTION

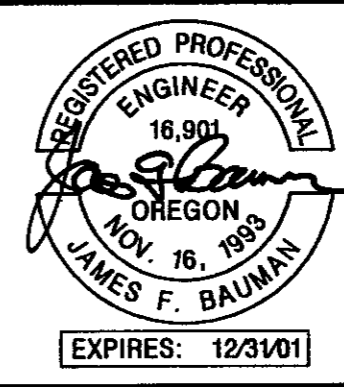
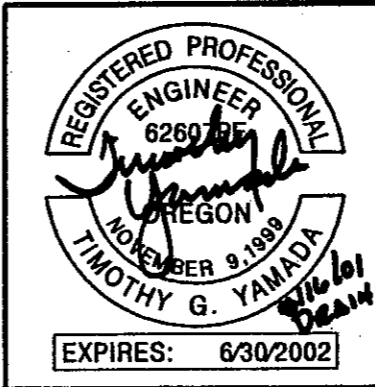
SHEET NO. 5A

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- ① Sta. "MC" 10+403.39
Inst. 300 mm Sew. Pipe Outfall - 14.3 m
Trench Exc. - 11.1 m³
Inst. Outlet Basin
(For Details, See Sht. 2B-6)
- ② Sta. "MC" 10+415.68
Const. Type "CG-2" Inlet - 2
Inst. 300 mm Sew. Pipe - 23.3 m
Trench Exc. - 16.7 m³
- ③ Const. Drainage Swale
(For Details, See Sht. 2B-6)
- ⑩ Const. Type "A" Curb
- ⑪ Const. Type "F" Curb
- ⑫ Const. P.C. Conc. Walk
- ⑬ Const. Sidewalk Ramp (Bikeway)
- ⑭ Sta. "MC" 10+373.9 (26.2 Rt.)
To Sta. "MC" 10+453.0 (6.6 Rt.)
Const. Guardrail - 87.63 m (Type 2A)
Const. Anchor (Type 1)
Inst. End Piece (Type B)
Const. Guardrail Connection
(See Drg. No. RD400, RD405, RD415,
RD417, RD440)
- ⑮ Sta. "TL" 30+627 To Sta. "MC" 10+453
Remove Extg. Guardrail - 245 m ±
- ⑯ Sta. "MC" 10+406.4 (19.4 Lt.)
To Sta. "MC" 10+453.0 (8.9 Lt.)
Const. Guardrail - 45.72 m (Type 2A)
Const. Anchor (Type 1)
Inst. End Piece (Type B)
Const. Guardrail Connection
- ⑳ See Sht. 3B, Note 24
- ㉔ Const. Asphalt Ramp
(For Details, See Sht. 2B-4)
- ㉕ See Sht. 3B, Note 14
- ㉖ Remove Inlet
- ㉗ Const. Conc. Island - 87 m²
Stamped Conc. Island Surfacing
(For Details, See Sht 2B-4)
- ㉘ Const. Conc. Island - 8 m²
Stamped Conc. Island Surfacing
(For Details, See Sht 2B-4)

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GENERAL CONSTRUCTION	SHEET NO. 5B