# OPERATION & MAINTENANCE MANUAL

## DFI No. : D00118
## Facility Type: Water Quality Biofiltration Swale


**March 2011**

**INDEX**

## 1. Identification

| | |
|---|---|
| Drainage Facility ID (DFI): | **D00118** |
| Facility Type: | Water Quality Biofiltration Swale |
| Construction Drawings: | (V-File Number) 32V-22 |
| Location: | District: 2B (Old 2A) |
| | Highway No.: 001 |
| | Mile Post: 292.74 to 292.43 (beg./end) |
| | Description: This facility is located on the east side of I-5 (Hwy 001) just north of Kruse Way/OR 217 Interchange. |

## 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 Designer – Region 1 Tech. Center, Jeffery Scheick, P.E./Mngr., (503) 731-8200 |
| Facility construction: | 1999 |
| Contractor: | Kiewit Pacific |

## 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 typically lined with vegetation, although this WQ swale is lined with riprap.

Treatment by trapping sedimentation occurs when stormwater runoff flows through the grass.

The facility is located on the east side of the northbound lanes of I-5 (Hwy 001) just north of the Kruse Way Interchange. The swale encompasses approximately 1,800 feet in length and is primarily lined with riprap. Stormwater runoff that is treated by this swale enters as one of three means including: 1) sheet flow from I-5 (Hwy 001) along the entire length of the swale; 2) through a 15-inch swale inlet (served by a inlet structure) at the north end of the swale; or 3) road base drain piping that discharges in a series of outfalls to the swale (See Photo 2 for a 4-inch outfall of the road base drain piping). The runoff collected by this 15-inch storm pipe includes a storm conveyance system for both the southbound and northbound lanes of I-5 (Hwy 001) north of the swale.

After treatment through the swale, the runoff is collected by a swale outlet structure (Point B of the Operational Plan in Appendix A, Photo 3). This structure conveys the water from the swale to DFI D00122 via a 36-inch storm pipe.

After initial construction of the swale, flows were significant enough to require arming of riprap to prevent erosion (Refer to Photo 2 and 3 for examples of the riprap lining and erosion issues. This swale may require retrofit to benefit water quality treatment objectives as originally intended.

Photo 1: WQ Swale looking towards the north along the northbound travel lanes of I-5 (Hwy 001).

Photo 2: Road base 4-inch drain pipe outfall. There is evidence of highly erosive flow undercutting outfall's integrity.

Photo 3: Swale outlet structure composed of two inlets. Flow from this structure is conveyed to WQ Facility DFI D00122 by a 36-inch storm pipe. There is evidence of the flow bypassing the outlet to the right.

Photo 4: Swale inlet structure at the north end of the swale.

Photo 5: Swale looking north.

A. Maintenance equipment access:
Maintenance crew can access the facility from I-5 (Hwy 001) northbound along the shoulder.

B. Heavy equipment access into facility:

☒ Allowed (no limitations)
☐ Allowed (with limitations)
☐ Not allowed

C. Special Features:

☐ Amended Soils
☐ Porous Pavers
☐ Liners
☐ Underdrains

## 5. Facility Haz Mat Spill Feature(s)

The WQ swale can be used to store a volume of liquid by blocking the swale outlet (Point B in the Operational Plan of Appendix A). This outlet can be blocked by either blocking the grate of the inlet or plugging the outlet pipe.

## 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 or 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)

## 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

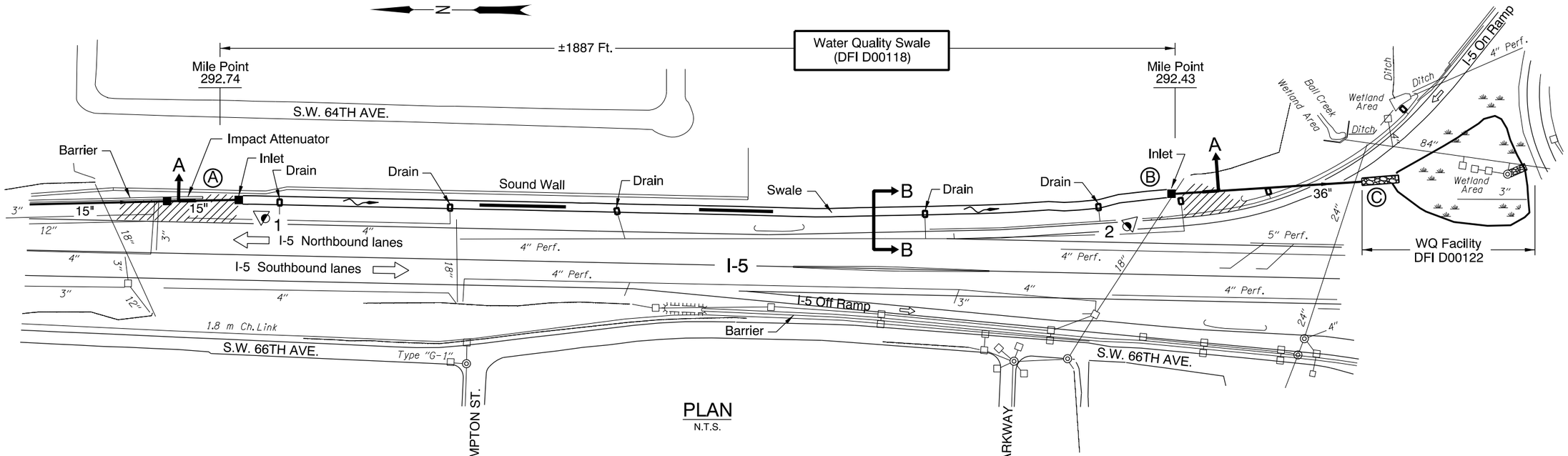
Contact any of the following for more detailed information about management of waste materials found on site:

| | |
|---|---|
| ODOT Clean Water Unit | (503) 986-3008 |
| ODOT Statewide Hazmat Coordinator | (503) 229-5129 |
| ODOT Region Hazmat Coordinator | (503) 731-8290 |
| ODEQ Northwest Region Office | (503) 229-5263 |

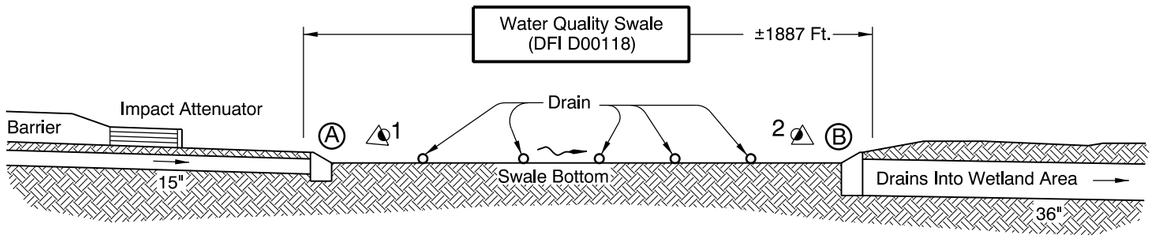
# Appendix A

**Content:**

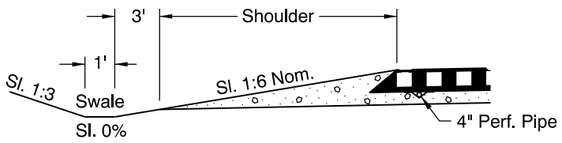
- **Operational Plan and Profile Drawing(s)**




PLAN
N.T.S.




SECTION A-A
N.T.S.




SECTION B-B
N.T.S.

LEGEND:

- Photo Location / Direction
- Swale Inlet
- Swale Outlet
- Riprap Splash Pad
- Access to Swale
- 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 D00118**
**MAINTENANCE DISTRICT 2B HWY 1**
**WATER QUALITY BIOFILTRATION SWALE**
PACIFIC HIGHWAY MP 292.43-292.74
CLACKAMAS COUNTY

DFI_D00118.dgn

# Appendix B

**Content:**

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

| INDEX OF SHEETS | |
|---|---|
| SHEET NO. | DESCRIPTION |
| 1 | Title Sheet |
| 1A | Offsite Wetland Mitigation Vicinity Map & Index Of Sheets Contd. |
| 1A-2 | Index Of Sheets Contd. & Standard Drawing Nos. |
| 1A-3 | Standard Drawing Nos. |
| 1B | Signature Sheet |
| 1C | Colored Sheet Layout |
| 1D | Colored Photo |
| 2, 2A Thru 2A-30 Incl. | Typical Sections |
| 2B Thru 2B-21 Incl. | Details |
| 2C, 2C-2 | Traffic Control Details |
| 2C-3 | Traffic Control Detour Plan |
| 2C-4 Thru 2C-26 Incl., 2C-26A, 2C-7 Thru 2C-35 Incl., 2C-35A, 2C-36 Thru 2C-95 Incl. | Traffic Control Plans |
| 2D Thru 2D-4 Incl., 2D-4A, 2D-5, 2D-6 | Water Quality Details |
| 2D-7 Thru 2D-14 Incl. | Water Quality Plans |
| 2E, 2E-2, 2E-2A, 2E-3 | Erosion Control Details |
| 2E-4 Thru 2E-22 Incl. | Erosion Control Plans |
| 2F Thru 2F-5 Incl. | Pipe Data |
| 3 | Alignment Plan |
| 3A | General Construction Plan |
| 3B | Utility & Drainage Plan |
| 3C | Profile & Super Rate Chart |
| 4 | Alignment Plan |
| 4A | General Construction Plan |
| 4B | Utility & Drainage Plan |
| 5 | Alignment Plan |
| 5A | General Construction Plan |
| 5B | Utility & Drainage Plan |
| 6 | Alignment Plan |
| 6A | General Construction Plan |
| 6A-2 | Construction Notes |
| 6B | Utility & Drainage Plan |
| 6C | Profile |
| 7 | Alignment & Plan |
| 7A | General Construction Plan |
| 7A-2 | Construction Notes |
| 7B, 7B-2, | Utility & Drainage Plan & Notes |
| 7C, 7C-2, 7D | Profile & Super Rate Charts |
| 8 | Alignment Plan |
| 8A | General Construction Plan |
| 8A-2 | Construction Notes |
| 8A-3 | Intersection Construction Plan |
| 8B | Utility & Drainage Plan |
| 8B-2, 8B-3 | Sanitary Sewer Relocate Plans And Details |
| 8C | Contour Grading Plan |
| 8D, 8D-2, 8E, 8F, 8F-2, 8F-3, 8G | Profile & Super Rate Charts |
| | |

STATE OF OREGON

# DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

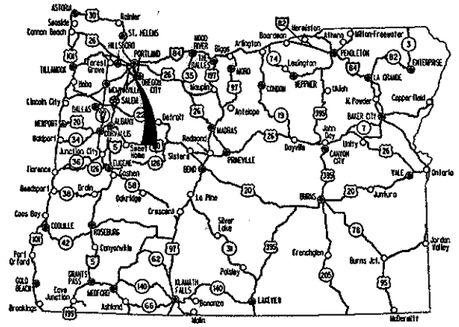
## GRADING, STRUCTURES, PAVING, SIGNING, SIGNALS, & ILLUMINATION

# I-5 AT HWY. 217/ KRUSE WAY (UNIT 1) SEC.

## PACIFIC HIGHWAY

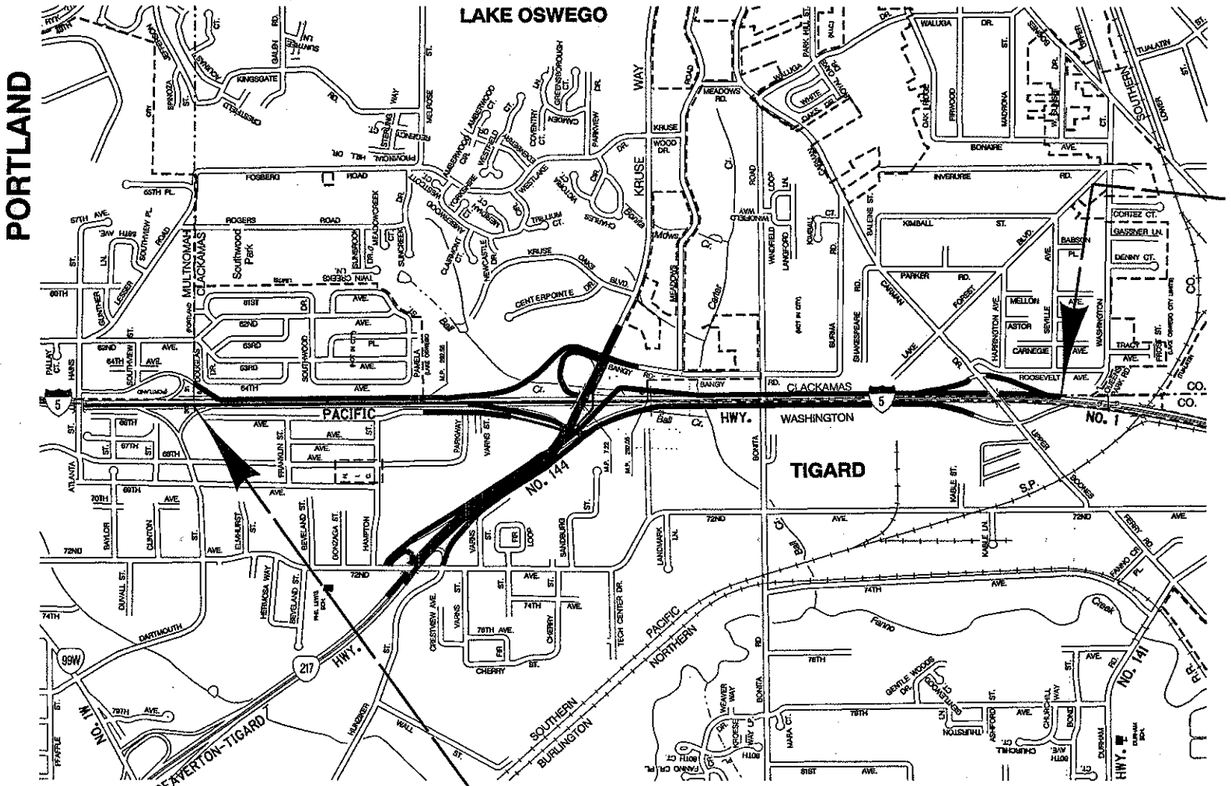
## CLACKAMAS & WASHINGTON COUNTIES

## NOVEMBER 1999



*Overall Length Of Project - 3.13 km (1.95 Miles)*
*Overall Length Of Work Area - 4.80 km (2.98 Miles)*

**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 952-001-0090. You May Obtain Copies Of The Rules From The Center, Or Answers To Questions About The Rules By Calling (503) 232-1987.


**BEGINNING OF PROJECT** HPP-ACHPP-ACNH-S001(80)
**STA. "L5" 24+673 (M.P. 293.05)**

**HPP-ACHPP-ACNH-S001(80)**
**END OF PROJECT**
**STA. "L5" 27+730.500 (M.P. 291.15)**

T. 2 S.,
R. 1 W., 1 E., W.M.

METRIC

OREGON TRANSPORTATION COMMISSION

| | |
|---|---|
| Henry H. Hewitt | CHAIRMAN |
| Susan Brody | VICE CHAIRMAN |
| Steven H. Corey | COMMISSIONER |
| Stuart Foster | COMMISSIONER |
| John Russell | COMMISSIONER |
| Grace Crunican | DIRECTOR OF TRANSPORTATION |

REGISTERED PROFESSIONAL ENGINEER 16,458 OREGON MAY 14, 1998 JEFFREY SCHEICK Expires Jun. 30, 2000

Jeffrey Scheick

TECHNICAL SERVICES MANAGING ENGINEER

**I-5 AT HWY. 217/ KRUSE WAY (UNIT 1) SEC.**
PACIFIC HIGHWAY
CLACKAMAS & WASHINGTON COUNTIES

| FEDERAL HIGHWAY ADMINISTRATION | | PROJECT NUMBER | SHEET NO. |
|---|---|---|---|
| REGION 10 | OREGON DIVISION | HPP-ACHPP-ACNH-S001(80) | 1 |

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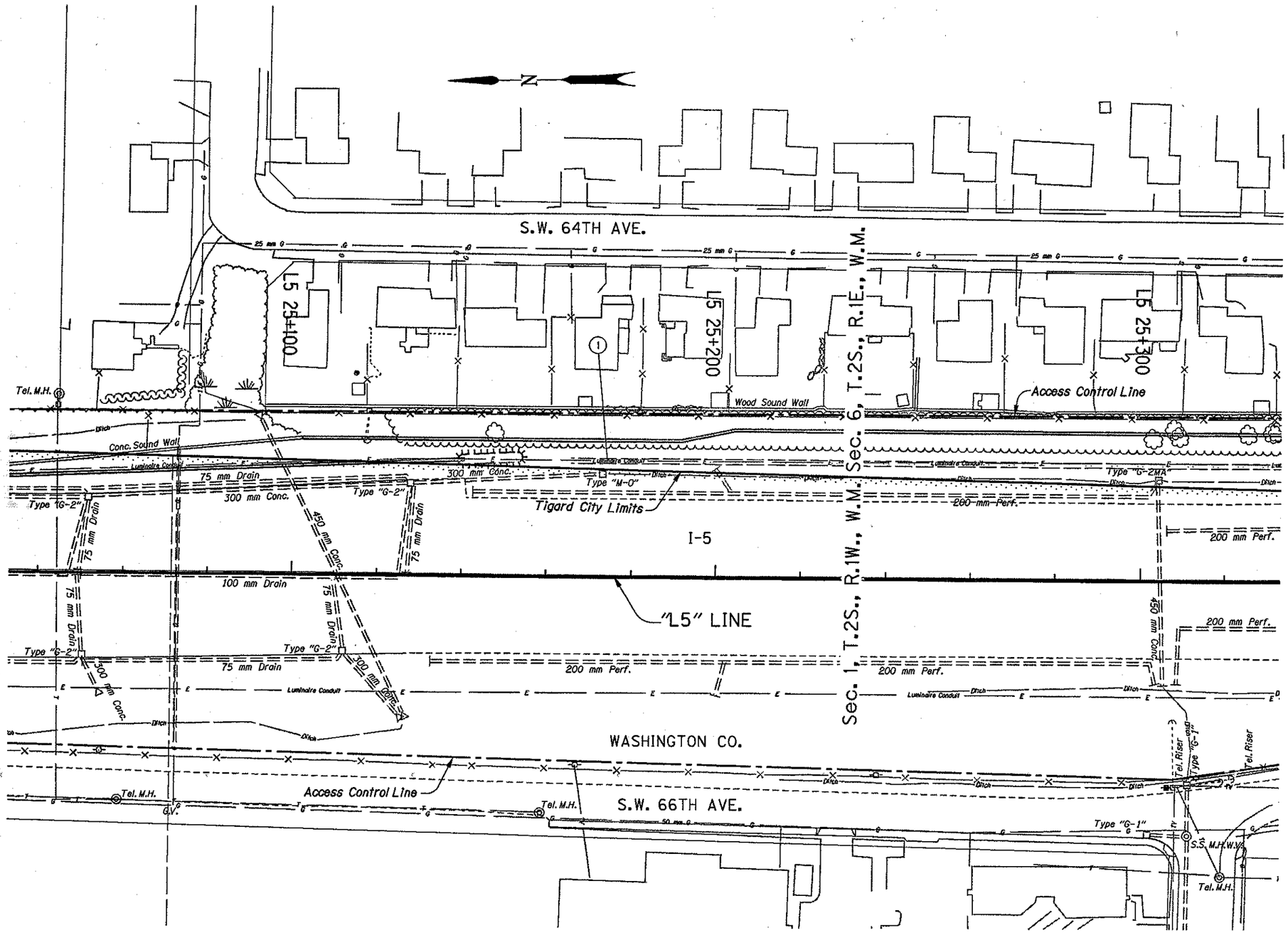
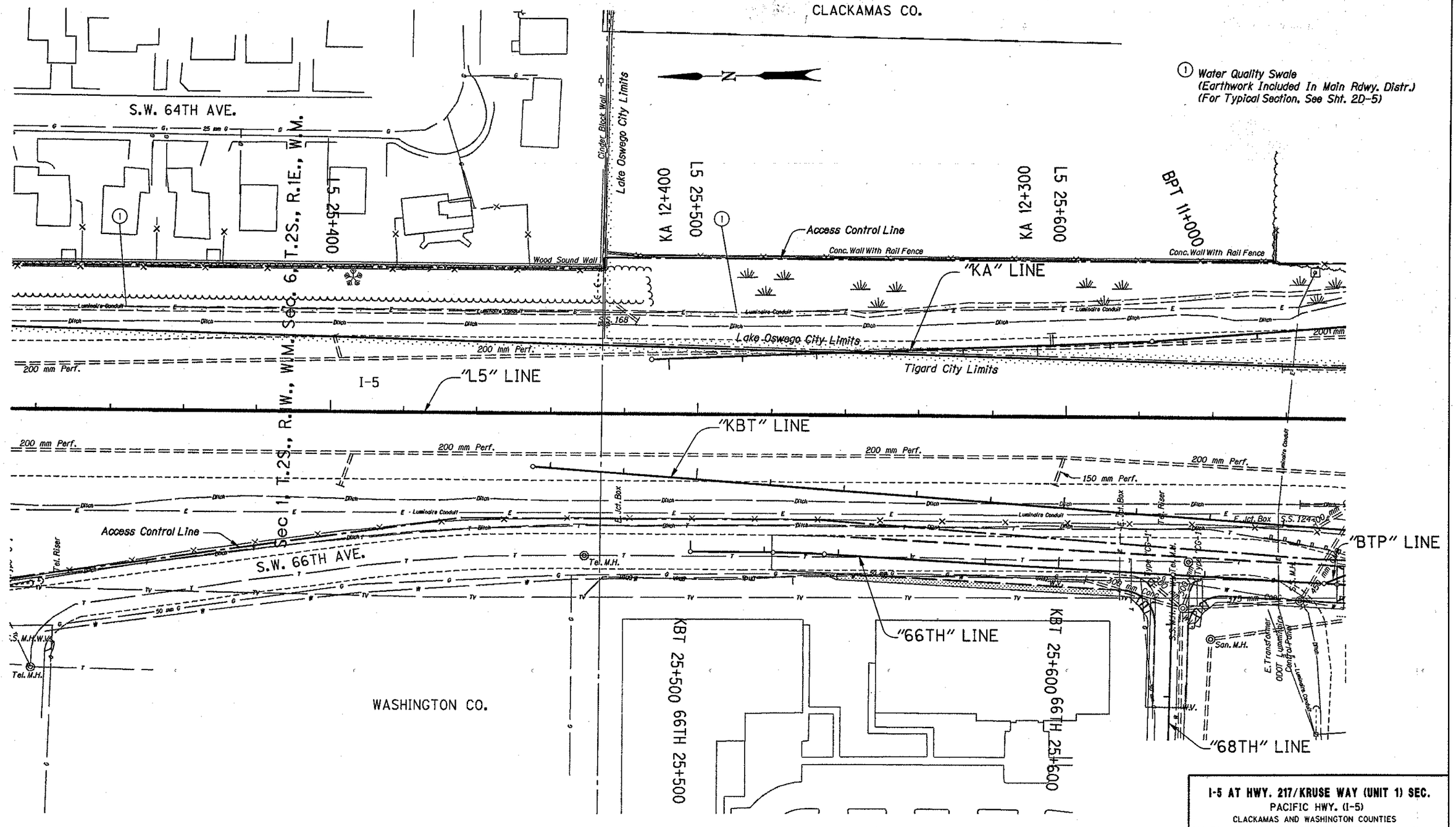
# WATER QUALITY PLAN




① *Begin Water Quality Swale Sta. "L5" 25+165 To Sta. "KA" 12+163.45 (Earthwork Included In Main Rdwy. Distr.) (For Typical Section, See Sht. 2D-5)*

| I-5 AT HWY. 217/KRUSE WAY (UNIT 1) SEC. | | | |
|---|---|---|---|
| PACIFIC HWY. (I-5) | | | |
| CLACKAMAS AND WASHINGTON COUNTIES | | | |
| FEDERAL HIGHWAY ADMINISTRATION | | PROJECT NUMBER | SHEET NO. |
| REGION 10 | OREGON DIVISION | | 2D-7 |

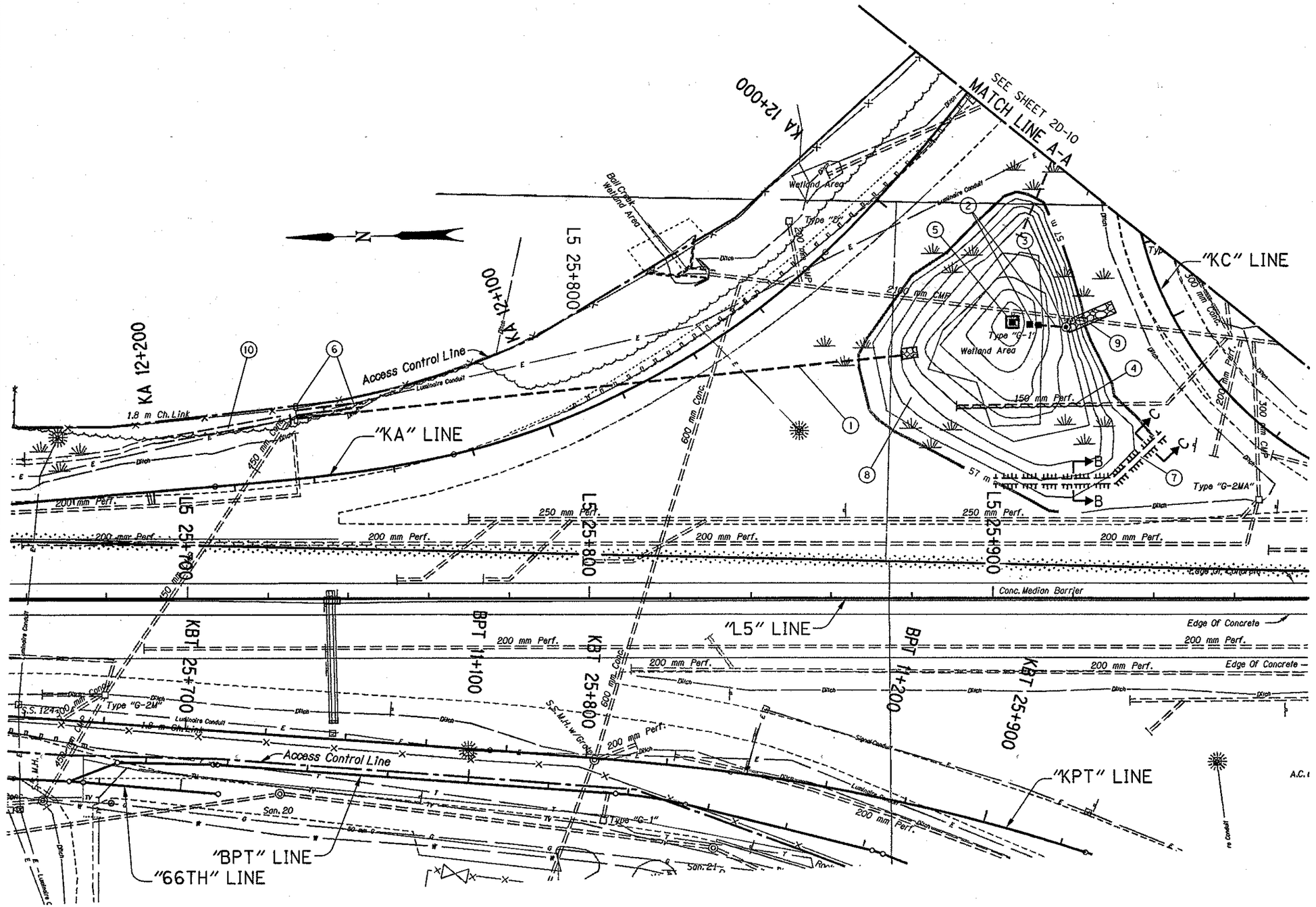
# WATER QUALITY PLAN




**I-5 AT HWY. 217/KRUSE WAY (UNIT 1) SEC.**
PACIFIC HWY. (I-5)
CLACKAMAS AND WASHINGTON COUNTIES

| FEDERAL HIGHWAY ADMINISTRATION | | PROJECT NUMBER | SHEET NO. |
|---|---|---|---|
| REGION 10 | OREGON DIVISION | | 2D-8 |

# WATER QUALITY PLAN




(1) *Const. Riprap Basin*
*Inst. 900 mm Sewer Pipe - 152 m*
*Tr. Exc. - 319 m³*
*(For Details, See Sht. 2B-3)*

(2) *Water Quality Extended Dry Detention Outflow Device*
*Inst. 300 mm Sewer Pipe - 6.0 m*
*(100 mm Corr. Poly. Sewer Pipe)*
*Tr. Exc. - 5.4 m³*
*(For Details, See Sht. 2D-3)*

(3) *Const. "Special Manhole" With Overflow Riser And Cover*
*Inst. 900 mm C.M.P. - 1.0 m*
*(Blind Connect To 2100 mm C.M.P.*
*Tr. Exc. - 2.1 m³*
*(For Details, See Sht. 2D)*

(4) *Plug Existing 150 mm Perf.*

(5) *Const. Inlet Protection, Plug Inlet At Completion Of Project*
*(For Details See Sht. 2E)*

(6) *Const. Check Dam*
*Const. Ditch - 20 m*
*Dt. Exc. - 24 m³*
*(For Details See Sht. 2E)*

(7) *Const. Berm To Elev. 57.0*
*Embankment - 68 m³*
*(Earthwork Included In Main Rdwy. Distr.)*
*(For Details, See Sht. 2D-6)*

(8) *Existing Pond*

(9) *Const. Riprap Mattress*
*(Class 50) Riprap - 16.2 m³*
*(For Details, See Sht. 2D-2)*

(10) *See Sht. 2D-7, Note 1*

*Check Dam In Ditch Section*

*Inlet Protection*

**I-5 AT HWY. 217/KRUSE WAY (UNIT 1) SEC.**
PACIFIC HWY. (I-5)
CLACKAMAS AND WASHINGTON COUNTIES

| FEDERAL HIGHWAY ADMINISTRATION | | PROJECT NUMBER | SHEET NO. |
|---|---|---|---|
| REGION 10 | OREGON DIVISION | | 2D-9 |



VIEW 6

VIEW 6