City of SeaTac
Addendum to Road Standards

Updated November, 2020

This page is intentionally left blank.

Introduction

This document is organized into two sections:

- **Section 1:** Addendum to the 2007 King County Road Standards (KCRS)
- **Section 2:** Addendum to the 2016 Washington Department of Transportation (WSDOT) Standard Specifications for Road, Bridge, and Municipal Construction

This document applies to development and redevelopment proposals within the City of SeaTac (City). This addendum includes revisions to the KCRS and WSDOT Standard Specifications for Road, Bridge, and Municipal Construction to address differences in the City's organization and processes. No major substantive changes have been made to the KCRS or the WSDOT Standard Specifications for Road, Bridge, and Municipal Construction.

[Note: Clarifications and interpretations will be documented and made available through policy statements within the City's Development Standards.]

The information presented in each section is organized as follows:

- **Terminology:** At times King County, WSDOT, and the City use different terminology to describe or refer to equivalent subject matter. This subsection identifies these terms and the City's equivalent terminology.
- **Key Revisions:** This subsection specifically identifies revisions the City has made to the KCRS and the WSDOT Standard Specifications for Road, Bridge, and Municipal Construction. These revisions are necessary to meet the intent of the low impact development (LID) code and enforceable document review and revision requirement in the National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater Phase II Permit and to address differences between King County, WSDOT, and City procedures.
- **Supplemental Documents (Section 1 only):** This section identifies technical guidance manuals and documents which shall be used to supplement the KCRS.
- **Code Reference Table (Section 1 only):** The King County Code (KCC) is referenced in several places in the KCRS. This subsection identifies these code references and equivalent city code where applicable.

Supplemental information in the appendices includes the following:

- **Appendix A:** City Road and Stormwater Design Details
- **Appendix B:** WSDOT General Special Provisions (GSPs) for Permeable Pavement
- **Appendix C:** Reference Materials
- **Appendix D:** Road Standard Sections

Section 1. Addendum to the 2007 King County Road Standards

1.1 Terminology

At times King County and the City use different terminology to describe or to refer to equivalent subject matter. This subsection identifies these terms and the City's equivalent terminology.

County Road Engineer = Public Works City Engineer or designee.

Department of Development and Environmental Services (DDES) = City of SeaTac Public Works and Community and Economic Development Departments.

Department of Natural Resources and Parks (DNRP) = City of SeaTac Department of Parks & Recreation.

Department of Transportation = City of SeaTac Public Works Department.

King County = City of SeaTac.

King County Adopted Basin Plans = City of SeaTac Adopted Basin Plans.

King County Capital Improvement Program = City of SeaTac Capital Improvement Program.

King County Code (KCC) = SeaTac Municipal Code (SMC). Check code reference table for equivalent code sections.

King County Comprehensive Plan = City of SeaTac Comprehensive Plan.

King County Flood Hazard Plan = City of SeaTac requirements in Chapter 15.700 SMC Environmentally Sensitive Areas.

King County Historic Preservation Program = No equivalent.

King County Landmarks Register = No equivalent.

King County Parks and Open Space Plan = City of SeaTac Parks, Recreation, and Open Space Element of the Comprehensive Plan.

King County Regional Trails Plan = City of SeaTac Trails Plan.

King County Road Standards = King County Road Standards as amended by this document.

King County Non-Motorized Transportation Plan = City of SeaTac Transportation Master Plan.

Reviewing Agency = City of SeaTac Public Works Department.

Surface Water Design Manual = King County Surface Water Design Manual (KCSWDM) as amended by the City Addendum to the KCSWDM.

Water and Land Resources (WLR) Division = City of SeaTac Public Works Department.

Zoning Classifications: Where the KCRS references Agricultural (A) Zoning, Forest (F) Zoning, or Rural (R) Zoning = These zoning classifications are intended for areas outside of the Urban Growth Boundary, therefore the City of SeaTac contains no equivalent zoning. Refer to City zoning maps to determine which zoning classifications apply to your project.

1.2 Key Revisions

This subsection identifies revisions the City has made to the KCRS. These revisions are necessary to meet the intent of the low impact development (LID) code and enforceable document review and revision requirement in the National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater Phase II Permit and to address differences between King County and City procedures.

1.2.1 General Revisions

Cul-de-sac Islands – The City allows vegetated or bioretention islands as an optional feature for any cul-de-sac when bulb paved diameter is 80 feet or less and mandatory when bulb paved diameter exceeds 80 feet. Vegetated islands shall have full depth vertical curb with a minimum diameter of 20 feet. Bioretention islands shall have extruded curb with curb cuts to allow stormwater to enter the facility and a minimum diameter of 15 feet. The paved travel way around the circumference shall be a minimum of 20 feet. Vegetated and bioretention islands shall be landscaped with native and drought tolerant vegetation and maintained by the adjoining landowners or the homeowners' association.

Curb and Gutter Exemptions – Curb cuts and grates can be incorporated to allow water to enter stormwater facilities and LID BMPs.

Compaction Requirements for Permeable Pavement Base Course – The City allows 90–92 percent compaction and deviations in base course requirements for permeable pavement as documented in WSDOT's GSPs (see Permeable Pavement Guidance below).

Compaction Requirements for Bioretention –The City allows 85 compaction for bioretention facilities.

Erosion Hazard Areas – For the purposes of site assessment and site planning and design, slopes greater than or equal to 15 percent are considered "Erosion Hazard Areas." Project designs and erosion sedimentation control plans must address these areas accordingly.

Interpretation or Modification of Standards – The Public Works Director or his/her designee is responsible for all interpretations and/or revisions to the roadway and surface water design standards as may be required for their implementation. These standards will be considered as reasonable minimum requirements, and will not be modified, except as may be permitted by the Public Works Director pursuant to a requested modification, adjustment, or variance, and subject to all applicable decision criteria.

Separation Requirements – Stormwater BMPs shall not have utilities located within them unless approved by the City. Adequate separation (as determined by the City) between stormwater facilities and other utilities will also be required. Perpendicular utility crossings within stormwater BMPs are allowed with the following conditions:

- Water service lines/piping may be located within the bioretention facility footprint when necessary. City approval is required.
- Water meters shall be located outside of bioretention facility footprint.
- Fire hydrants shall be located at least 5 feet outside of bioretention facility footprint.
- No plantings except groundcover and sods within 5 feet of hydrant.
- New side sewers and service drains may be located within bioretention facility footprint with approved pipe sleeves and/or liners.
- New infiltration facilities are allowed over existing PVC or ductile iron side sewer crossings with approved pipe sleeves and/or liners.
- Franchise utilities (power, gas, communication) are allowed with approval from the Public Works Director or designee and the franchisee.

Soil Amendments – The City requires soil amendments for disturbed areas in accordance with the KCSWDM as amended by the City Addendum to the KCSWDM.

Street Trees and Landscaping – City-specific requirements for street trees and landscaping are included in the following SMC sections:

- Planting strip landscaping shall be designed in accordance with SMC 15.445.120
- Street tree diameters and heights shall be designed in accordance with SMC 15.445.120
- Requirements for on-site street frontage landscaping are described in SMC 15.445.200.
- Requirements for retaining significant trees are described in SMC 15.445.400 through 15.445.450
- Irrigation requirements are described in SMC 15.445.140

Shared Utility Trenches – The City promotes the use of joint or common trenches by all utilities and rights-of-way franchise holders where feasible as described in SMC 11.20.070.

Permeable Pavement Guidance – The City allows the use of WSDOT's General Special Provisions (GSPs) for Porous Hot Mix Asphalt (PHMA), Porous Warm Mix Asphalt (PWMA), and Pervious Concrete (PConcrete) developed by the Construction Materials Committee of the American Public Works Association (APWA) Washington dated March 9, 2016. These GSPs are included in Appendix B of this document.

1.2.2 Specific Revisions

City Revisions to the King County Road Standards		
KCRS Reference	**KCRS Existing Requirement**	**City Specific Revision**
1.02	These Standards shall apply prospectively to all newly constructed road and right-of-way facilities, both public and private, within King County. In the event of conflict with the Surface Water Design Manual, improvements within the roadway right-of-way shall meet the requirements of these Standards.	The City requires that the KCSWDM as amended by the Addendum to the KCSWDM govern in the case of conflict with the KCRS.
1.11.A.	Required elements on Engineering Plans, Final Corrected Plans, and Final Plat Plans.	The City requires all plan submittals to meet the minimum requirements in the KCSWDM as amended by the Addendum to the KCSWDM.
1.11.B	Waiver of Plan Requirements	The City requires all projects to meet the minimum requirements in the KCSWDM as amended by the Addendum to the KCSWDM. The City does not allow waiver 1.11.B.4.
1.12	Variances	Refer SMC Variances
1.14.A.	Performance/ Restoration Financial Guarantees	The City's performance requirements are provided in SMC 11.05.120.
1.14.B.	Maintenance/Defect Guarantees	The City's maintenance/defect guarantees are provided in SMC 11.05.120.
Table 2.03(A)	2.03(A) Urban Arterials (Curb Roadway Section)	Replace this table with Appendix D**:** Road Standard Sections. Appendix D replaces this table with revised standards specific to SeaTac roadway sections.
2.06.C.	King County will not accept private streets for maintenance as public streets until such streets are brought into conformance with current King County Code and these Standards.	Section 2.06.C is replaced with SMC14.27.050.This section details the criteria for consideration of accepting a private road as a public street
2.06.E.	King County will not accept private streets within short plats when the roads providing access to the plat are private and already have the potential to serve more than the number of lots specified in Section 2.06(B.7). If a short plat has been proposed on a property to which the only access is over private streets that fail to meet the standards specified in this section, the proposal shall be denied.	Section 2.06.E is replaced with SMC14.27.050. This section details the criteria for consideration of accepting a private road as a public street.

Chapter 3 Figures	2 percent sidewalk slope towards curb inlet	The City allows sidewalks adjacent to bioretention facilities to drain towards the facility.

City Revisions to the King County Road Standards		
KCRS Reference	**KCRS Existing Requirement**	**City Specific Revision**
3.01.E-F. 4.02 Figures 3-003, through 3-009, Figures 3-012 through 3-014	Driveways	The City allows permeable pavement (porous concrete, pervious asphalt, and permeable pavers) for driveways. The City also allows two-track driveways.
5.03.D.	Requirements for placing planter strip next to the curb.	The City requires a root barrier for trees planted next to the curb.
7.01.C.	**Drainage Conflicts** Where technical conflicts may occur between this document and the Surface Water Design Manual, the County Road Engineer shall decide which document governs.	Where technical conflicts may occur between this document and the KCSWDM as amended by the Addendum to the KCSWDM, the Public Works Director or designee shall decide which document governs.
9.02	All roadway and drainage infrastructures must be inspected. Subgrade inspection will not commence until density tests confirm that the compaction is in accordance with the specifications. Prior to any critical task being started the applicant/developer must schedule in advance with LUIS (206) 296-6642: At a minimum the following critical tasks require advance notification:	The City identifies the following as additional critical tasks: N. Inspect, prior to clearing and construction, all permitted development sites that have a high potential for sediment transport as determined through plan review O. Inspect all permitted development sites during construction to verify proper installation and maintenance of required erosion and sediment controls. P. Inspect all permitted development sites upon completion of construction and prior to final approval or occupancy to ensure proper installation of permanent stormwater facilities. Verify that a maintenance plan is completed and responsibility for maintenance is assigned for stormwater treatment and flow control BMPs/facilities.
9.05.B.2.	**Compaction Reports** Compaction reports are required for all projects. The reports shall include a sketch showing the locations the tests were taken. Compaction testing shall be accomplished as backfill or embankment construction progresses. At a minimum, compaction tests are required at the following locations. Additional tests and/or shorter intervals may be required by the inspector.	Compaction reports are also required for LID BMP installations, including bioretention and permeable pavement, as required by the KCSWDM as amended by the Addendum to the KCSWDM.
9.07.C.	Haul Routes	Haul routes are prohibited on permeable pavement streets, unless approved by the Public Works Director, or designee.

City Revisions to the King County Road Standards		
KCRS Reference	**KCRS Existing Requirement**	**City Specific Revision**
Figure 5-013	Minor fill around trees	The City requires one of the following modifications to preserve gas exchange and avoid burying the tree trunk: 1. Additional perforated aeration system connected to the gravel around collar of tree or 2. Extending gravel around the tree trunk up to soil surface.

1.3 Supplemental Documents

This section identifies technical guidance manuals and documents which shall be used to supplement the KCRS.

Stormwater Standard Plans – The City of Tacoma Standard Plans currently found at <www.cityoftacoma.org/government/city_departments/public_works/engineering/city_of_tacoma_right_of_way_design_manual> are approved by the City of SeaTac on a conceptual basis. City of SeaTac development review staff will work with applicants to review and implement these standard details.

1.4 Code Reference Table

King County Code (KCC) is referenced in several places in the KCRS. The following table identifies these code references and equivalent SeaTac Municipal Code (SMC) where applicable.

King County Code to SeaTac Municipal Code (SMC) Reference Table			
KCC Reference	**Subject of Reference**	**SMC Equivalent**	**Comment**
Title 9	Surface Water Management	Title 12	KCRS 1.06 General References
KCC 9.04	Drainage, erosion/sedimentation control and sensitive areas	No Equivalent	See Addendum to KCSWDM
KCC 13.04.230	Water & Sewer Systems	Title 12	
Title 14	Roads and Bridges	Title 11	KCRS 1.06 General References
KCC 14.40	ROW vacation process	11.05.090	
Title 16	Building and Construction Standards	Title 13	KCRS 1.06 General References

King County Code to SeaTac Municipal Code (SMC) Reference Table			
KCC Reference	**Subject of Reference**	**SMC Equivalent**	**Comment**
Title 17 or KCC 17	Fire Code and Fire access requirements (Driveways)	Title 13.150	KCRS 1.06 General References
Title 19A	Subdivisions	Title 14	KCRS 1.06 General References
KCC 19A.08.130	Vertical and horizontal survey controls	14.26.050	
Title 20	Planning	No Equivalent	KCRS 1.06 General References
KCC 20.62	Avoid impacts to cultural resources	No Equivalent	
Title 21A or KCC 21A	Zoning	Title 15	KCRS 1.06 General References
KCC 23	Enforcement	1.15	
Title 27	Variance review fee	No Equivalent	Variance fees are outlined in the City's adopted fee schedule.
Title 27A (KC ordinance 12020)	Financial Guarantees	Title 3	KCRS 1.06 General References
Titles 46 and 47	Traffic	Title 9	KCRS 1.06 General References

Section 2. Addendum to the 2016 WSDOT Standard Specifications for Road, Bridge, and Municipal Construction

2.1 Terminology

At times WSDOT and the City use different terminology to describe or to refer to equivalent subject matter. This section identifies these terms and the City's equivalent terminology.

All Regional Administrators of the Department = Public Works Director or designee

County Engineer = Public Works City Engineer or designee

Contracting Agency = City of SeaTac

Ecology's Stormwater Management Manuals = King County Surface Water Design Manual (KCSWDM) as amended by the City Addendum to the KCSWDM.

Engineer = Public Works City Engineer or designee

2.2 Key Revisions

This section identifies revisions the City has made to the WSDOT Standard Specifications for Road, Bridge, and Municipal Construction. These revisions are necessary to meet the intent of the LID Code Review and revision requirement in the NPDES Municipal Stormwater Phase II Permit and to address differences between WSDOT and City procedures.

2.2.1 General Revisions

Soil Amendments – The City requires soil amendments for disturbed areas in accordance with the KCSWDM as amended by the City Addendum to the KCSWDM. This requirement amends sections including, but not limited to, 8-02.3(6).

Compaction Requirements for Permeable Pavement Base Course – The City allows 90-92 percent compaction and deviations in base course requirements for permeable pavement as documented in WSDOT's GSPs (see Permeable Pavement Guidance below). This requirement amends sections including, but not limited to, 2-03.3(14)C, 7-08.3, and 7-09.3(11).

Compaction Requirements for Bioretention – The City allows 85 compaction for bioretention facilities. This requirement amends sections including, but not limited to, 2-03.3(14)C, 7-08.3, and 7-09.3(11).

Curb and Gutter Exemptions – Curb cuts and grates can be incorporated to allow water to enter stormwater facilities and LID BMPs. This requirement amends sections including, but not limited to, 8-04.3.

Permeable Pavement Guidance – The City allows the use of WSDOT's General Special Provisions (GSPs) for Porous Hot Mix Asphalt (PHMA), Porous Warm Mix Asphalt (PWMA), and Pervious Concrete (PConcrete) developed by the Construction Materials Committee of the American Public Works Association (APWA) Washington dated March 9, 2016. These GSPs are included in Appendix B of this document.

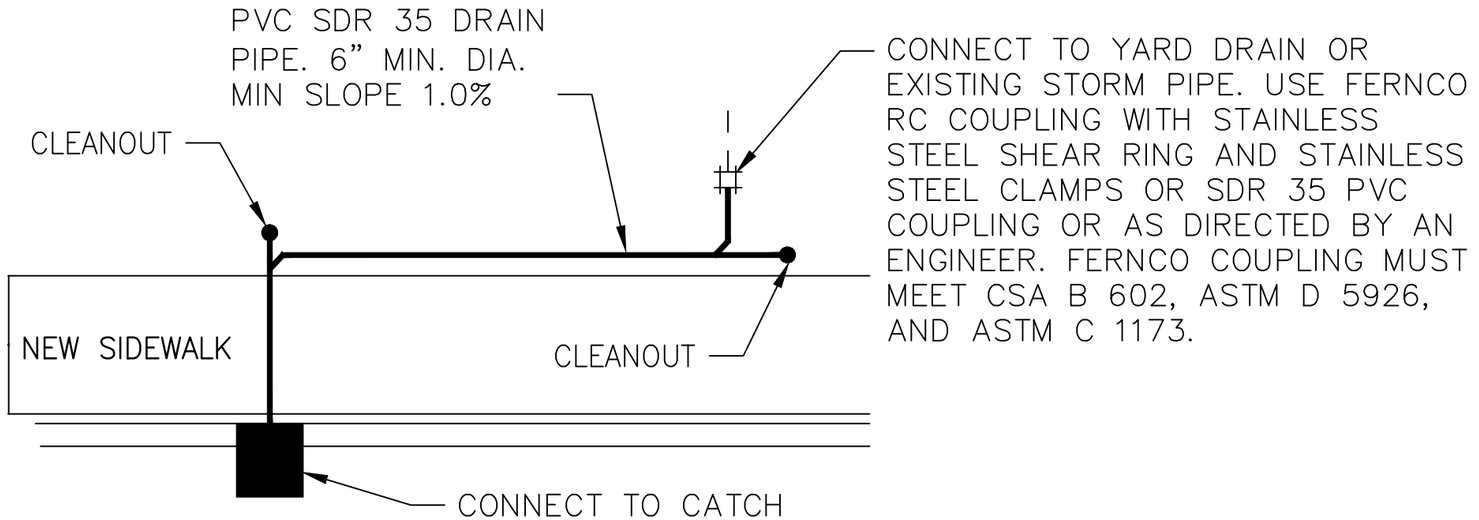
2.2.2 Specific Revisions

City Revisions to the WSDOT Standard Specifications		
WSDOT Reference	**WSDOT Existing Requirement**	**City Specific Revision**
1-02.9	Delivery of Proposal	Refer to Requests for Proposals for bid submittal instructions.
2-01.3(1)	Clearing, Grubbing, and Roadside Clean Up – Clearing	Where the clearing requirements in 2-01.3(1) are in conflict with SMC, Chapter 13.190 (Clearing and Grading Code) and SMC, Chapter 15.445.430 (Tree Retention – Clearing of Multi-Family, Commercial, and Industrial Zoned Lots), the SMC governs.
2-03.3(10)	Roadway Excavation and Embankment – Selected Material – Stockpiling	The City allows stockpiling of excavated materials for use on site if it meets organic matter and pH requirements specified in the Soil Amendment Standards in Appendix B of the Addendum to the KCSWDM. Laboratory testing may be required.
7-01.3(2)	Drains – Underdrain pipe	Refer to the KCSWDM as amended by the Addendum to the KCSWDM for underdrain pipe design criteria for bioretention and permeable pavement.
8-01.3(1)D	Erosion Control and Water Pollution Control – Dispersion/ Infiltration	The City requires that construction of dispersion/ infiltration areas are protected from compaction and sedimentation in accordance with the KCSWDM as amended by the City's Addendum to the KCSWDM.
8-02.3(2)A	Roadside Restoration – Roadside Work Plan	Refer to the KCSWDM as amended by the Addendum to the KCSWDM.
8-02.3(3)B	Roadside Restoration – Chemical Pesticides	Refer to the KCSWDM as amended by the Addendum to the KCSWDM and the City's Integrated Pest Management Plan (IPMP).
8-02.3(8)	Roadside Restoration – Planting Timing	The City supplements the planting timings defined in this section with the following: "unless otherwise specified in the KCSWDM and the City's Addendum to the KCSWDM."

City Revisions to the WSDOT Standard Specifications		
WSDOT Reference	**WSDOT Existing Requirement**	**City Specific Revision**
8-14	Cement Concrete Sidewalks	Porous concrete is also allowed for sidewalks unless otherwise specified by the City. Silva cells under cement concrete sidewalk are preferred to porous concrete sidewalk.
9-14	Erosion Control and Roadside Planting	Refer to the KCSWDM as amended by the Addendum to the KCSWDM.
9-14.4(8)	Compost specifications	The City requires compost to meet the requirements in the KCSWDM and the City's Addendum to the KCSWDM.
9-20	Concrete Patching Material, Grout, and Mortar	Existing permeable pavements must use steel plates for temporary patching. Permeable pavement shall be replaced in-kind where feasible. Patching porous asphalt with conventional asphalt is acceptable if it is less than 10 percent of the total facility area and does not impact the overall facility function. Take appropriate precautions during pavement repair and replacement efforts to prevent clogging of adjacent surfaces. Base aggregates shall be washed crushed aggregate. Permeable pavement shall conform to the requirements outlined in the WSDOT GSPs for permeable pavement. City inspection approval of the setup for the permeable pavement patch repair is required prior to commencing work.

This page is intentionally left blank.

Appendix A – City Road and Stormwater Standard Details



NOTES:

1. PROVIDE CLEANOUT AT ALL BENDS
2. CONNECT YARD DRAINS AS SHOWN ON THE PLAN SHEETS.
3. MAXIMUM 100' BETWEEN CLEANOUTS.

TYPICAL AREA DRAIN CONNECTION

DETAIL 4

NO SCALE

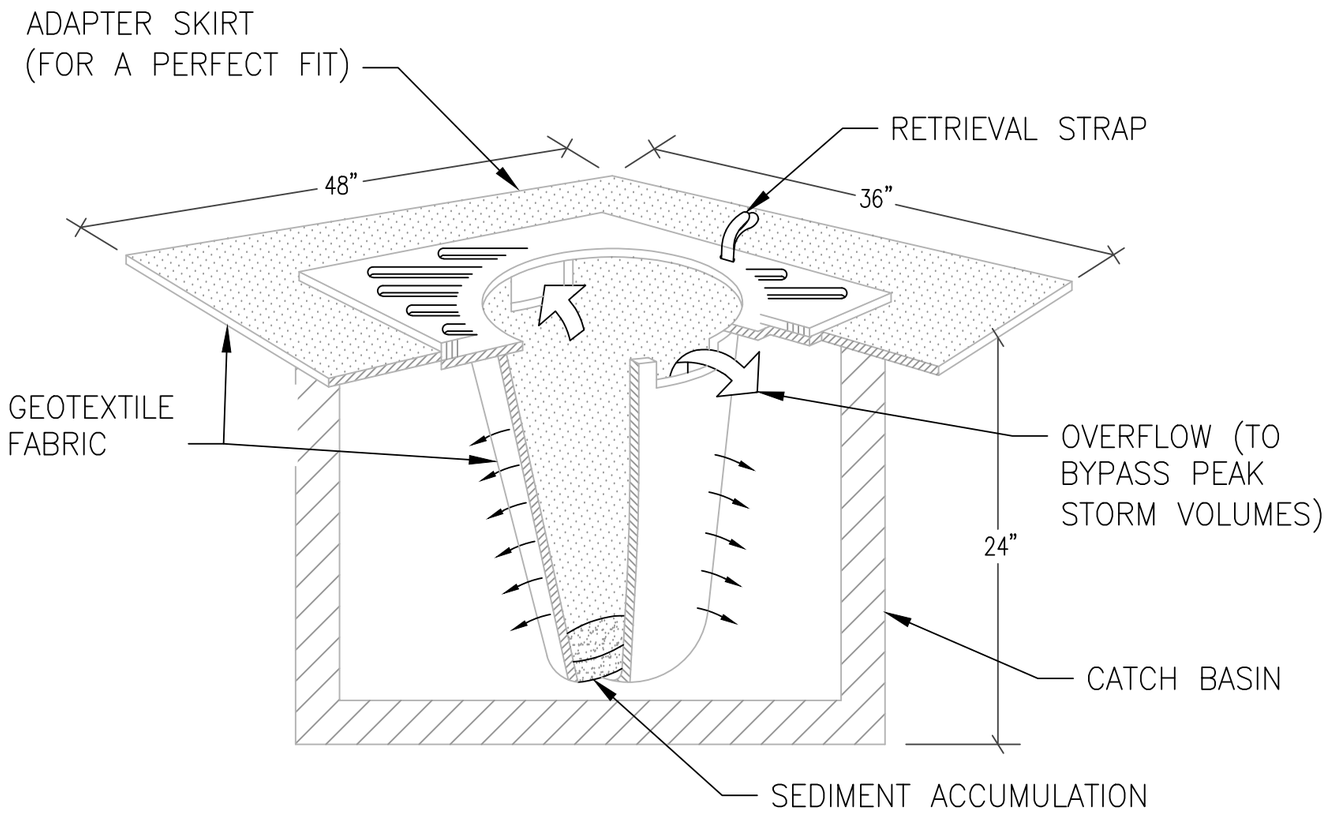
NO.	DATE	BY	APPR.	REVISION

DRN. TK | DSGN. TK | CHKD. EAP

Public Works Department
Tom Gut, P.E., Public Works Director
Susan Sanderson, P.E., City Engineer
4800 South 188th Street, SeaTac, Wa 98188-8605
Telephone: (206) 973-4730, Engineering Division

CITY OF SEATAC
24TH AVENUE SOUTH OVERLAY PROJECT
PARALLEL CURB RAMP
DETAILS

DATE: 03/06/2015 | JOB # ST-884 | SCALE: NTS



STORM DRAIN INLET PROTECTION

DETAIL 2

NO SCALE

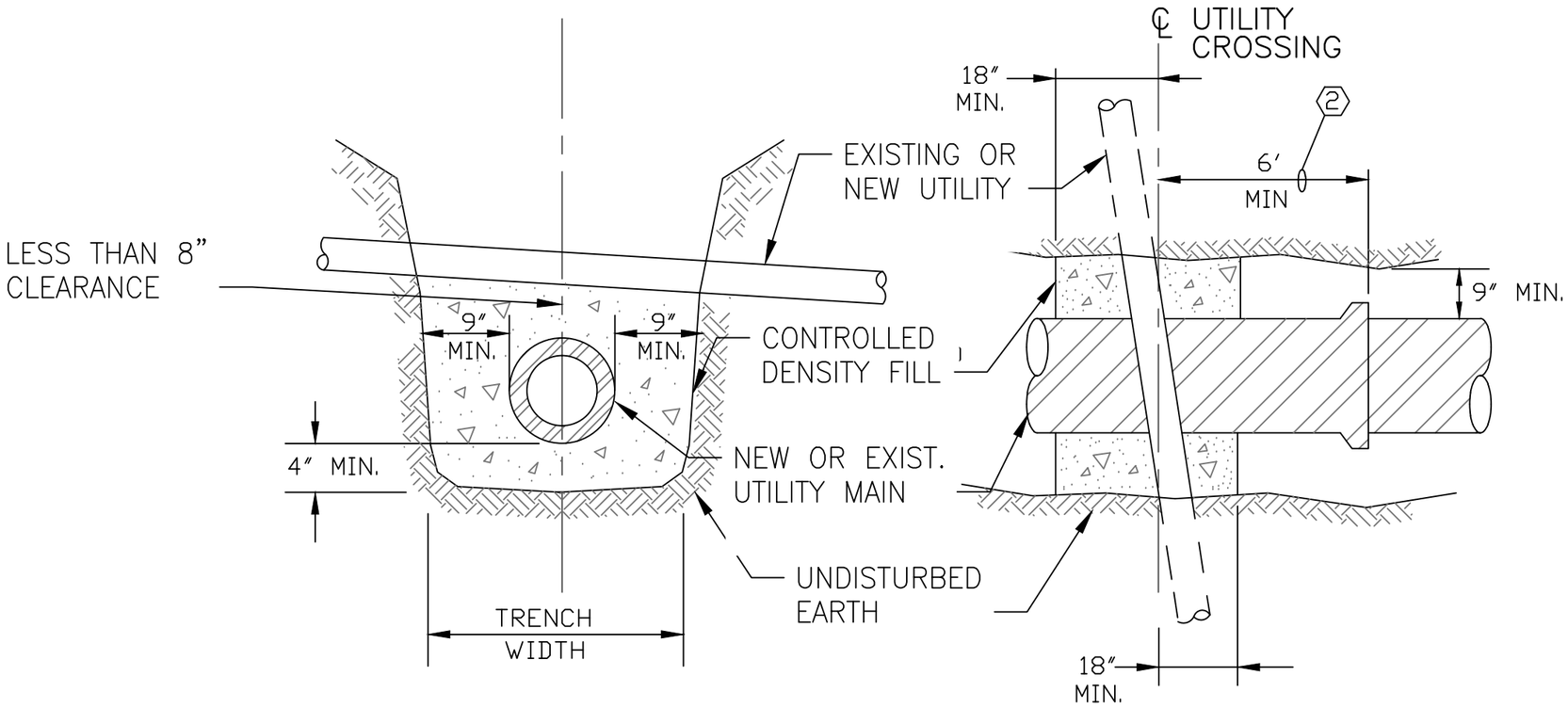
NO.	DATE	BY	APPR.	REVISION

DRN. TK | DSGN. TK | CHKD. EAP

CITY OF SEATAC
Public Works Department
Tom Gut, P.E., Public Works Director
Susan Sanderson, P.E., City Engineer
4800 South 188th Street, SeaTac, Wa 98188-8605
Telephone: (206) 973-4730, Engineering Division

CITY OF SEATAC
24TH AVENUE SOUTH OVERLAY PROJECT
PARALLEL CURB RAMP
DETAILS

DATE: 03/06/2015 | JOB # ST-884 | SCALE: NTS



NOTES:

1. CONTRACTOR SHALL PROVIDE CONTROLLED DENSITY FILL (CDF) PIPE ENCASEMENT AT ALL UTILITY CROSSINGS IN THE EVENT THAT AN 8" SEPARATION CANNOT BE PROVIDED. THE CONTRACTOR SHALL FAMILIARIZE THEMSELVES WITH THE SITE UTILITIES TO ANTICIPATE PROVIDING AND INSTALLING CDF ENCASEMENTS WHERE NECESSARY.
2. CONTRACTOR SHALL NOT CONSTRUCT ANY NEW PIPE JOINT WITHIN 6 FEET OF THE EXISTING CENTERLINE OF THE UTILITY CROSSING.

CONTROLLED DENSITY FILL PIPE ENCASEMENT DETAIL

DETAIL 2

NO SCALE

NO.	DATE	BY	APPR.	REVISION

DRN. TK | DSGN. TK | CHKD. EAP

CITY OF SEATAC

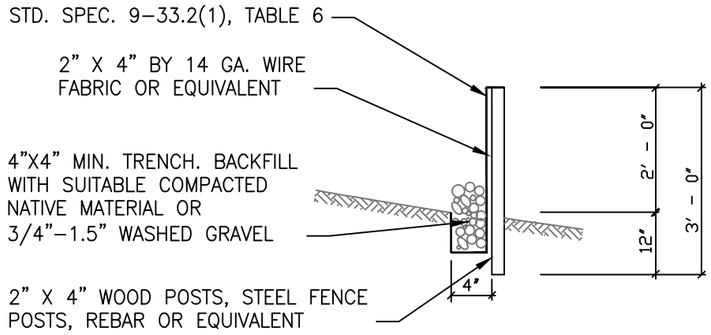
Public Works Department
Tom Gut, P.E., Public Works Director
Susan Sanderson, P.E., City Engineer
4800 South 188th Street, SeaTac, Wa 98188-8605
Telephone: (206) 973-4730, Engineering Division

CITY OF SEATAC
24TH AVENUE SOUTH OVERLAY PROJECT
PARALLEL CURB RAMP
DETAILS

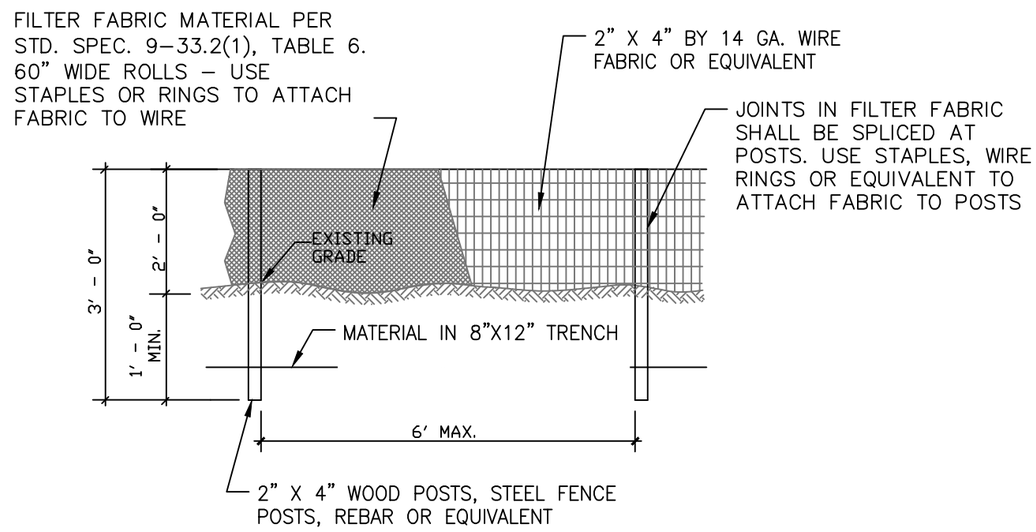
DATE: 03/06/2015 | JOB # ST-884 | SCALE: NTS

SHEET NO: 20

20 OF 20



CROSS SECTION



ELEVATION

NOTES

1. MAXIMIZE DETENTION OF STORMWATER BY PLACING FENCE AS FAR AWAY FROM TOE OF SLOPE AS POSSIBLE WITHOUT ENCROACHING ON SENSITIVE AREAS OR OUTSIDE OF THE CLEARING BOUNDARIES.
2. INSTALL SILT FENCING ALONG CONTOURS WHENEVER POSSIBLE.
3. INSTALL THE ENDS OF THE SILT FENCE TO POINT SLIGHTLY UP–SLOPE TO PREVENT SEDIMENT FROM FLOWING AROUND THE ENDS OF THE FENCE.
4. PERFORM MAINTENANCE IN ACCORDANCE WITH STANDARD SPECIFICATIONS 8.01.3(9)A AND 8.01.3(15).
5. POST SPACING MAY BE INCREASED TO BE 8' IF WIRE BACKING IS USED.

SILT FENCE
DETAIL
NO SCALE
1

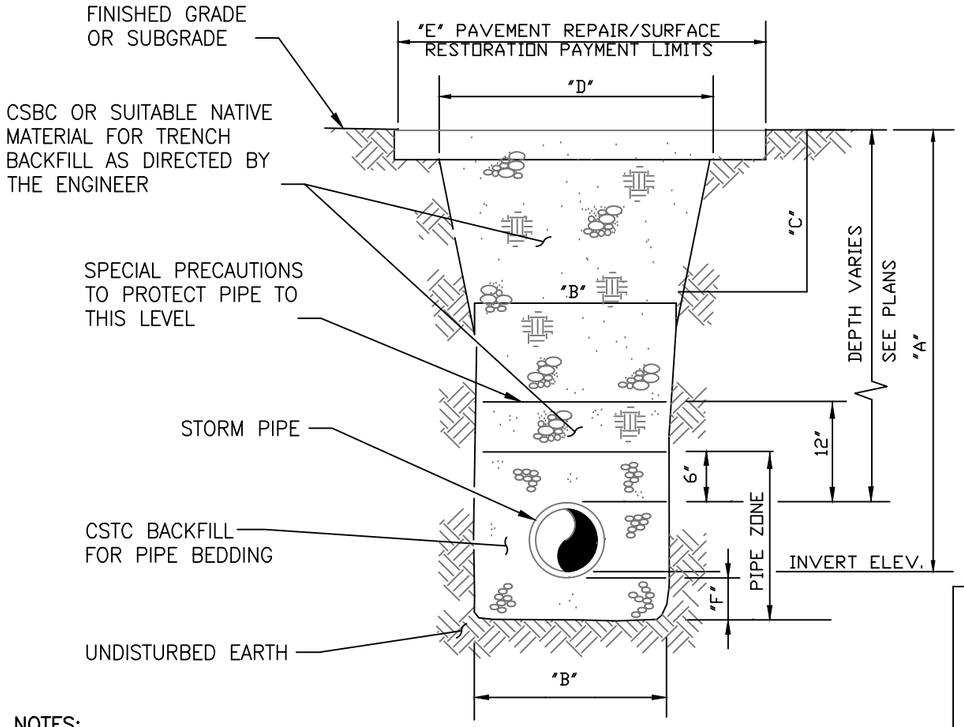
NO.	DATE	BY	APPR.	REVISION

DRN. TK | DSGN. TK | CHKD. EAP

Public Works Department
Tom Gut, P.E., Public Works Director
Susan Sanderson, P.E., City Engineer
4800 South 188th Street, SeaTac, Wa 98188–8605
Telephone: (206) 973–4730, Engineering Division

CITY OF SEATAC
24TH AVENUE SOUTH OVERLAY PROJECT
PARALLEL CURB RAMP
DETAILS

DATE: 03/06/2015 | JOB # ST–884 | SCALE: NTS



ALL OPEN TRENCHES SHALL BE NON-SKID PLATED, PINNED, SHIMMED, (SUITABLE FOR H20 LOADING) OR BACKFILLED AND CAPPED WITH TEMPORARY HMA WHERE AUTHORIZED BY THE CITY AT THE END OF EACH WORK DAY.

NOTES:

1. THE TRENCH SECTIONS SHOWN ON THE PLANS ARE FOR THE PAYMENT LIMITS FOR CSBC FOR TRENCH BACKFILL. PAYMENT FOR ALL CSBC FOR TRENCH BACKFILL SHALL BE COMPUTED FROM THE MEASUREMENT OF THE CONSTRUCTED TRENCH SECTION, TO THE MAXIMUM LIMITS AS INDICATED IN THE TABLES.

2. WHERE A "NEW ROADWAY SECTION" OR PAVEMENT REPAIR IS PROPOSED, THE TRENCH SECTION PAYMENT LIMIT LINE WILL BE BOUNDED AT THE TOP BY SUBGRADE, PER TYPICAL ROADWAY SECTION DETAILS.

TYPICAL TRENCH EXCAVATION LIMITS STORM SEWER PIPE					
PIPE DIAMETER(IN)	6 TO 8	12	18	24	36
A	8' OR LESS				
B	2.50'	3.00'	3.75'	4.50'	6.00'
C	1.50'				
D	5.50'	6.00'	6.75'	7.50'	9.00'
E	6.50'	7.00'	7.75'	8.50'	10.00'
F	4 IN		6 IN		

STORM PIPE TRENCH SECTION
DETAIL 5
NO SCALE

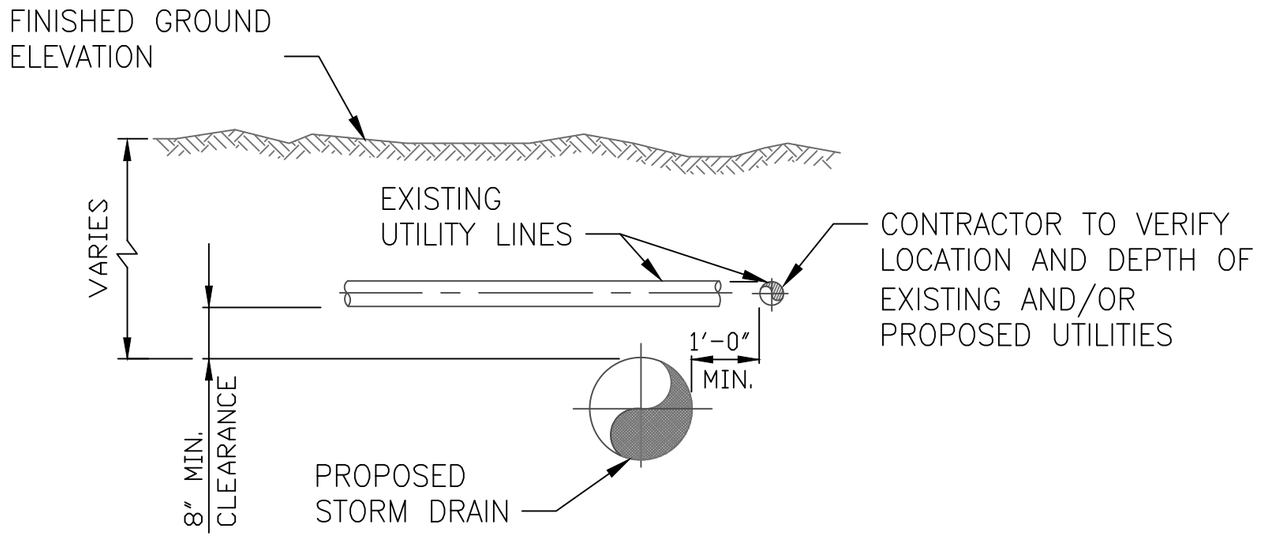
NO.	DATE	BY	APPR.	REVISION

DRN. TK | DSGN. TK | CHKD. EAP

Public Works Department
Tom Gut, P.E., Public Works Director
Susan Sanderson, P.E., City Engineer
4800 South 188th Street, SeaTac, Wa 98188-8605
Telephone: (206) 973-4730, Engineering Division

CITY OF SEATAC
24TH AVENUE SOUTH OVERLAY PROJECT
PARALLEL CURB RAMP
DETAILS

DATE: 03/06/2015 | JOB # ST-884 | SCALE: NTS



NOTE: CONCRETE ENCASEMENT (BEDDING) SHALL BE UTILIZED AT LOCALIZED UTILITY CROSSING IF MINIMUM PIPE SEPARATION (ELEVATION) CANNOT BE MAINTAINED / ACHIEVED.

TYPICAL UTILITY CROSSING
DETAIL
NO SCALE

3

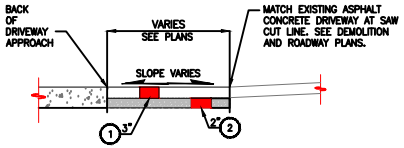
NO.	DATE	BY	APPR.	REVISION

DRN. TK | DSGN. TK | CHKD. EAP

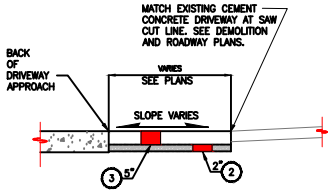
Public Works Department
Tom Gut, P.E., Public Works Director
Susan Sanderson, P.E., City Engineer
4800 South 188th Street, SeaTac, Wa 98188-8605
Telephone: (206) 973-4730, Engineering Division

CITY OF SEATAC
24TH AVENUE SOUTH OVERLAY PROJECT
PARALLEL CURB RAMP
DETAILS

DATE: 03/06/2015 | JOB # ST-884 | SCALE: NTS



ASPHALT DRIVEWAYS



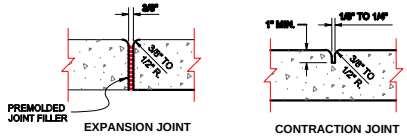
CEMENT CONCRETE DRIVEWAYS

DRIVEWAY NOTES:

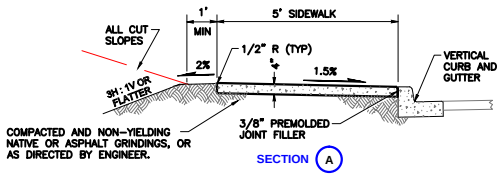
1. ACCESS TO ALL PROPERTIES SHALL BE PROVIDED TO RESIDENTS AT ALL TIMES.
2. DETAILS SHOWN ARE TYPICAL. THE ENGINEER RESERVES THE RIGHT TO ADJUST WORK TO ACCOMMODATE FIELD CONDITIONS.

1. COMMERCIAL HMA
2. CRUSHED SURFACING TOP COURSE
3. CLASS 4000 CEMENT CONCRETE PAVEMENT

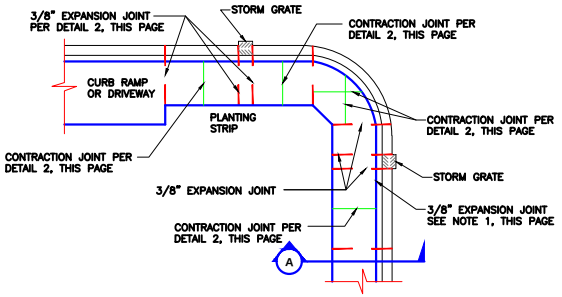
DRIVEWAY REPAIR
DETAIL
NO SCALE
1



CEMENT CONCRETE JOINTS
DETAIL
NO SCALE
2



SECTION A



VERTICAL CURB & SIDEWALK

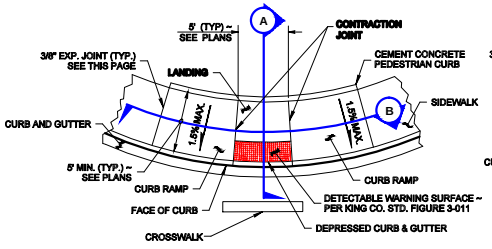
NOTE

1. 1" EDGED GROOVE MAY REPLACE 3/8" EXPANSION JOINT AT INTERFACE BETWEEN CURB AND ADJACENT SIDEWALK FOR SEPERATE POUR CONSTRUCTION. SEE PROJECT SPECIFICATIONS FOR JOINT REQUIREMENTS.
2. GRATINGS, ACCESS COVERS, JUNCTION BOXES, CABLE VAULTS, PULL BOXES AND OTHER APPURTENANCES WITHIN THE SIDEWALK MUST HAVE SLIP RESISTANT SURFACES, BE FLUSH WITH SURFACE, AND MATCH GRADE OF THE SIDEWALK.
3. ALL CONCRETE SHALL BE "CLASS 4000"

LEGEND

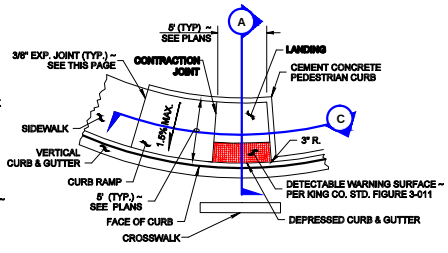
- SLOPE IN EITHER DIRECTION
- 3/8" EXPANSION JOINT ALONG CURB AT MAX. 10' O.C.
- CONTRACTION JOINT AT 5' O.C. PER DETAIL 2, THIS PAGE

CEMENT CONCRETE SIDEWALK AND JOINTS
DETAIL
NO SCALE
3



PLAN VIEW

PARALLEL CURB RAMP TYPE A

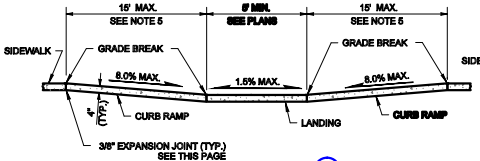


PLAN VIEW

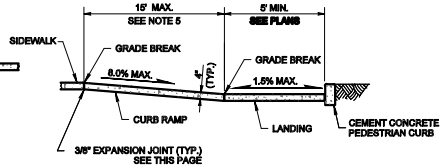
PARALLEL CURB RAMP TYPE B

NOTES

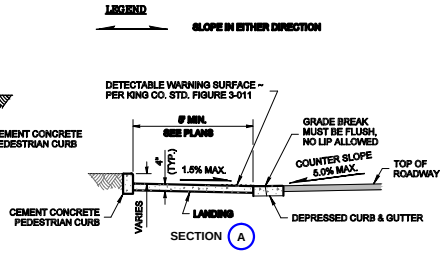
1. CURB RAMP LOCATION SHALL BE PLACED WITHIN THE WIDTH OF THE ASSOCIATED CROSSWALK, OR AS SHOWN IN THE PLANS.
2. WHERE "GRADE BREAK" IS CALLED OUT, THE ENTIRE LENGTH OF THE GRADE BREAK BETWEEN THE TWO ADJACENT SURFACE PLANES SHALL BE FLUSH.
3. GRATINGS, JUNCTION BOXES, ACCESS COVERS OR OTHER APPURTENANCES SHALL NOT BE LOCATED IN FRONT OF THE CURB RAMP OR ANY OTHER PART OF THE CURB RAMP OR LANDING.
4. THE CURB RAMP, LANDING, AND FLARES SHALL BE BROOM FINISHED PER PROJECT SPECIFICATIONS.
5. THE CURB RAMP MAXIMUM RUNNING SLOPE SHALL NOT REQUIRE THE RAMP LENGTH TO EXCEED 15 FEET TO AVOID CHASING THE SLOPE INDEFINITELY WHEN CONNECTING TO STEEP GRADES. WHEN APPLYING THE 15 FOOT MAXIMUM LENGTH, THE RUNNING SLOPE OF THE CURB RAMP SHALL BE AS FLAT AS FEASIBLE.
6. THE BID ITEM "CEMENT CONCRETE PARALLEL CURB RAMP TYPE _" DOES NOT INCLUDE THE ADJACENT CURB AND GUTTER, PEDESTRIAN CURB AND SIDEWALK.



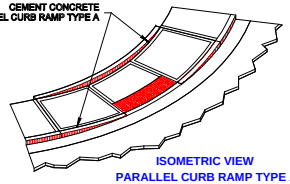
SECTION B



SECTION C

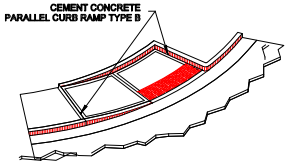


SECTION A



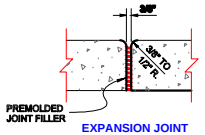
ISOMETRIC VIEW

PARALLEL CURB RAMP TYPE A

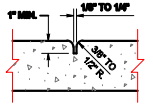


ISOMETRIC VIEW

PARALLEL CURB RAMP TYPE B

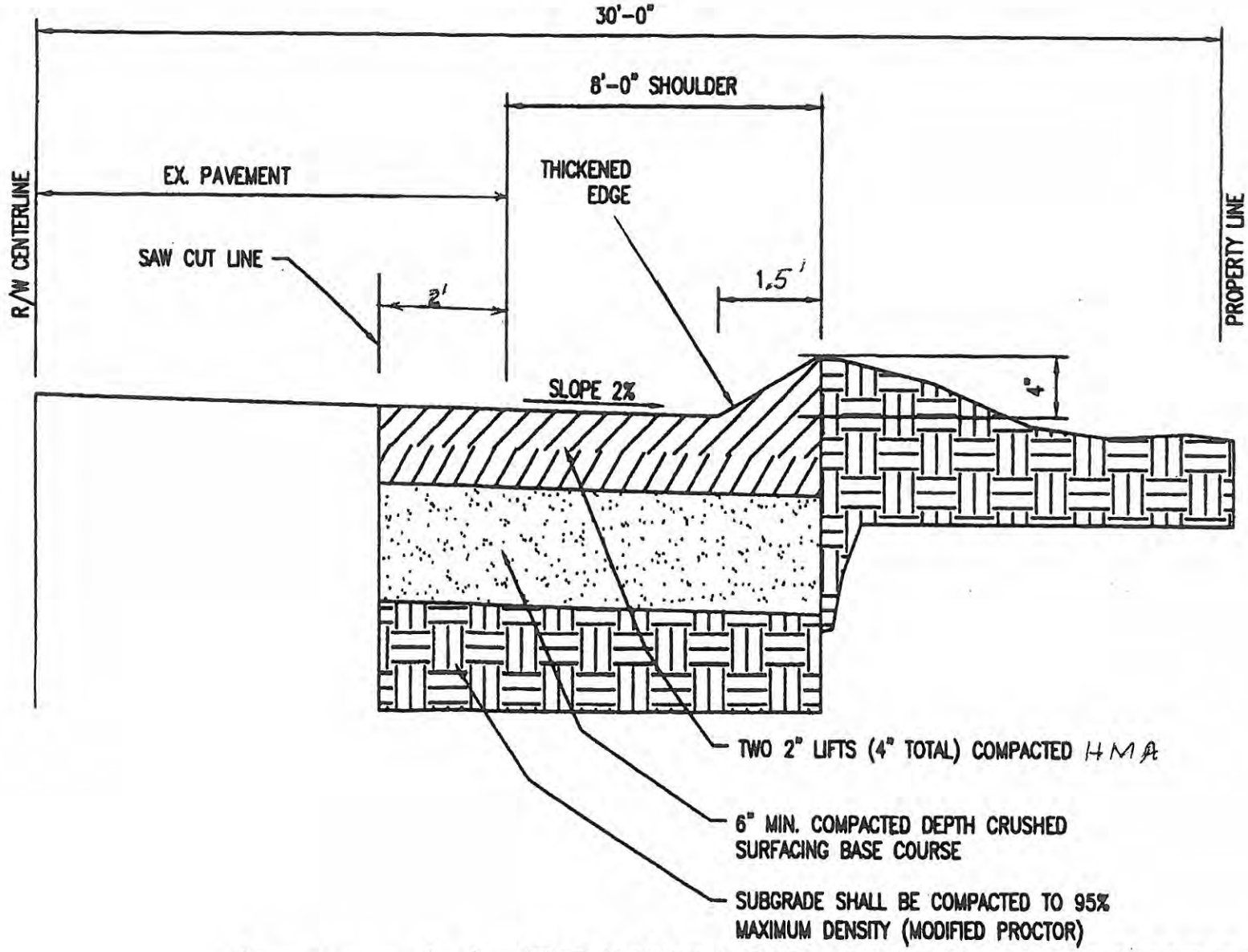


EXPANSION JOINT



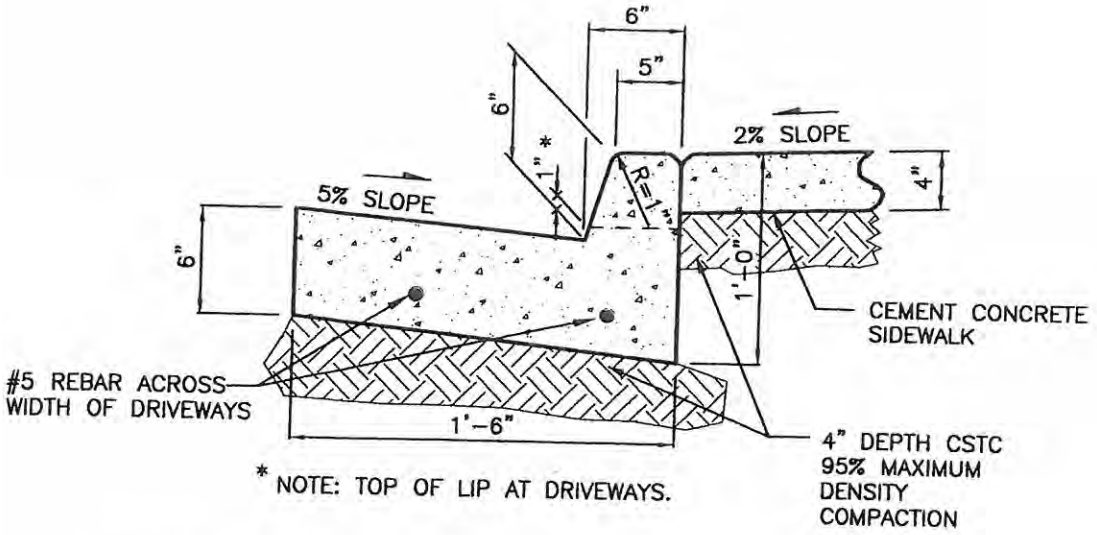
CONTRACTION JOINT

PARALLEL CURB RAMP



SECTION A-A **FRONTAGE IMPROVEMENTS**

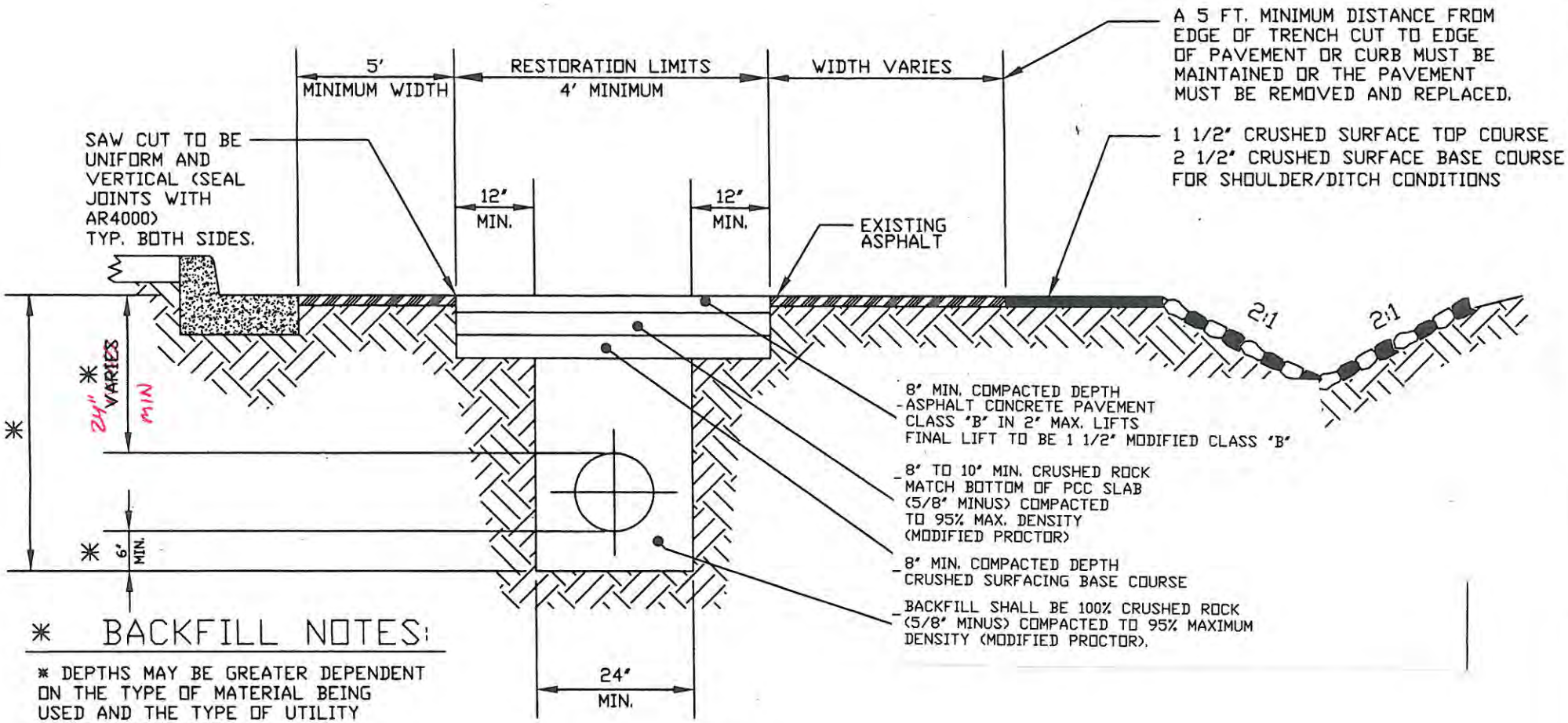
NTS



NOTES:

1. SEE SEC. 3.04 K.C.R.S. FOR JOINT REQUIREMENTS.
2. ROLL GUTTER TO MATCH POSITIVE SUPERELEVATION.
3. SEE DRAWING NO. 1–006 FOR CONFIGURATION OF FILL & WALKWAY BEHIND CURB IF REQUIRED.
4. SEE SEC. 3.03 FOR EXTRUDED CURB ANCHORAGE.

CEMENT CONCRETE VERTICAL CURB & GUTTER



* BACKFILL NOTES:

* DEPTHS MAY BE GREATER DEPENDENT ON THE TYPE OF MATERIAL BEING USED AND THE TYPE OF UTILITY BEING CONSTRUCTED.

* TRENCH BACKFILL IS TO BE 100% CRUSHED, EXCEPT THOSE TRENCHES PARALLEL TO THE RIGHT-OF-WAY CENTERLINE THAT ARE GREATER THAN 100 FT. IN LENGTH AND THOSE TRENCHES THAT ARE OUTSIDE PAVED OR IMPROVED AREAS. THE CITY WILL CONSIDER TRENCHES GREATER THAN 100 FT. IN LENGTH AND AREAS UNDER PAVEMENT AND OTHER RIGHT-OF-WAY IMPROVEMENTS ON A CASE BY CASE BASIS. FACTORS TO CONSIDER INCLUDE GEOTECH REPORTS AND COMPACTION TESTING UNDER PAVED AND IMPROVED AREAS AND POTENTIAL FUTURE IMPROVEMENTS OUTSIDE EXISTING IMPROVED AREAS.

NOTES:

1. DAMAGE TO PAVEMENT SURFACE SEAL COATS DURING BACKFILL OPERATIONS WILL REQUIRE THAT A FOG SEAL OF CSS-1 AT THE RATE OF 0.05 TO 0.10 (0.03 TO 0.05 RESIDUAL) GALLONS PER SQUARE YARD BE APPLIED TO THE PAVEMENT TO RETURN THE PAVEMENT SEAL TO ORIGINAL OR BETTER CONDITION. ADDITIONAL STRUCTURAL DAMAGE TO THE PAVEMENT SHALL REQUIRE BUT NOT BE LIMITED TO SQUARE CUT PATCHING AND OR OVERLAYS.
2. DITCH SIDE SLOPES AND FLOW LINE ARE TO BE STABILIZED BY PLACING RIP RAP OR OTHER TREATMENTS AS REQUIRED BY THE PUBLIC WORKS DIRECTORS REPRESENTATIVE.

CITY OF SEATAC

Public Works Department
Engineering Division
Dale Schroeder, P.E., Director

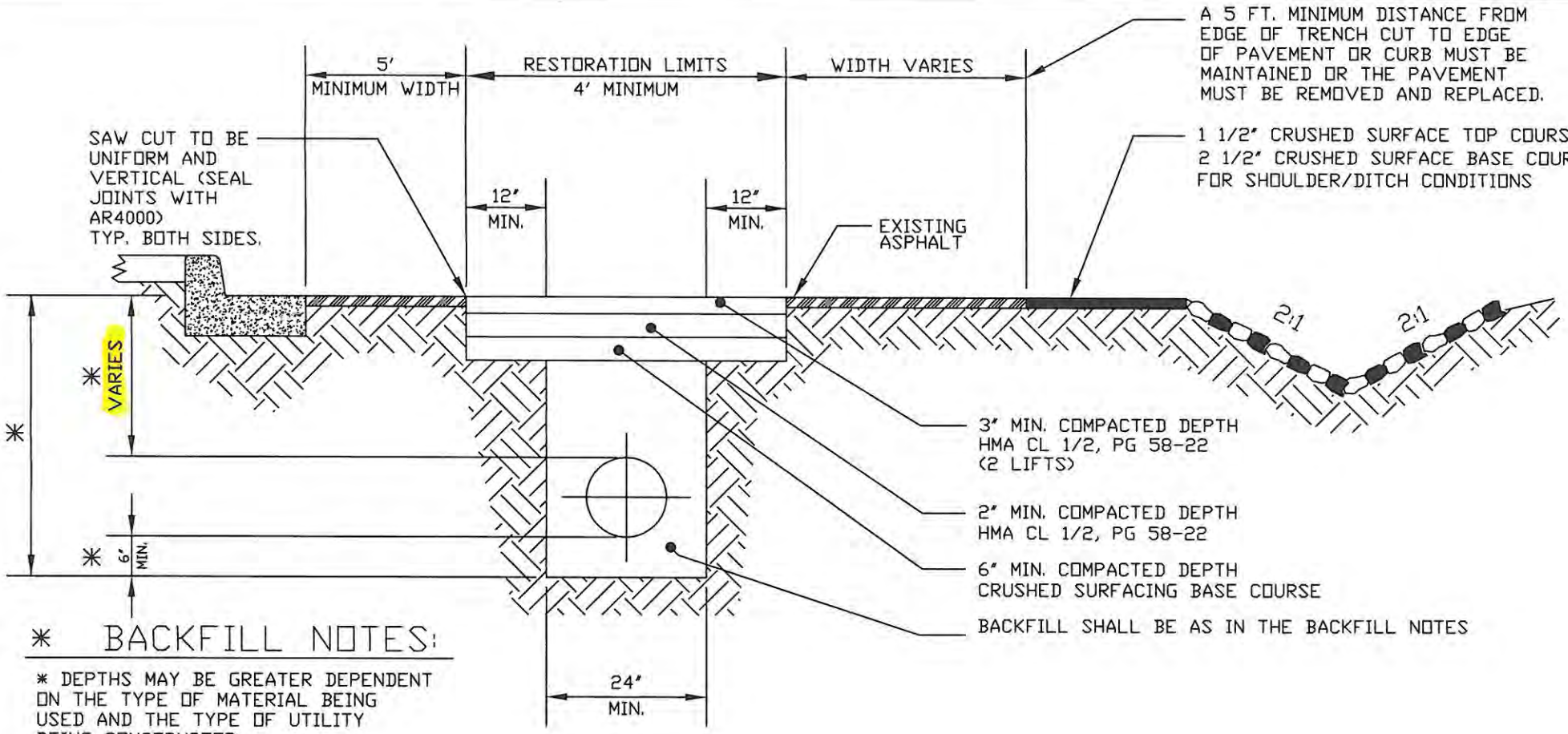
4800 S. 188th St., SeaTac, WA 98188-8605
Telephone: 206-973-4730

CHECKED:	DLS
DRAWN:	DLH
REV.:	8/30/2006
DATE:	9/1/1994

ARTERIAL
~~NEIGHBORHOOD~~ TYP. STREET
ROADWAY REPAIR

K:\ENGR\CADD\DETAILS\SR_1

DETAIL NO. SR-1



* BACKFILL NOTES:

* DEPTHS MAY BE GREATER DEPENDENT ON THE TYPE OF MATERIAL BEING USED AND THE TYPE OF UTILITY BEING CONSTRUCTED.

* TRENCH BACKFILL IS TO BE 100% CRUSHED, EXCEPT THOSE TRENCHES PARALLEL TO THE RIGHT-OF-WAY CENTERLINE THAT ARE GREATER THAN 100 FT. IN LENGTH AND THOSE TRENCHES THAT ARE OUTSIDE PAVED OR IMPROVED AREAS. THE CITY WILL CONSIDER TRENCHES GREATER THAN 100 FT. IN LENGTH AND AREAS UNDER PAVEMENT AND OTHER RIGHT-OF-WAY IMPROVEMENTS ON A CASE BY CASE BASIS. FACTORS TO CONSIDER INCLUDE GEOTECH REPORTS AND COMPACTION TESTING UNDER PAVED AND IMPROVED AREAS AND POTENTIAL FUTURE IMPROVEMENTS OUTSIDE EXISTING IMPROVED AREAS.

NOTES:

1. DAMAGE TO PAVEMENT SURFACE SEAL COATS DURING BACKFILL OPERATIONS WILL REQUIRE THAT A FOG SEAL OF CSS-1 AT THE RATE OF 0.05 TO 0.10 (0.03 TO 0.05 RESIDUAL) GALLONS PER SQUARE YARD BE APPLIED TO THE PAVEMENT TO RETURN THE PAVEMENT SEAL TO ORIGINAL OR BETTER CONDITION. ADDITIONAL STRUCTURAL DAMAGE TO THE PAVEMENT SHALL REQUIRE BUT NOT BE LIMITED TO SQUARE CUT PATCHING AND OR OVERLAYS.
2. DITCH SIDE SLOPES AND FLOW LINE ARE TO BE STABILIZED BY PLACING RIP RAP OR OTHER TREATMENTS AS REQUIRED BY THE PUBLIC WORKS DIRECTORS REPRESENTATIVE.

CITY OF SEATAC

Public Works Department
Engineering Division
Dale Schroeder, P.E., Director

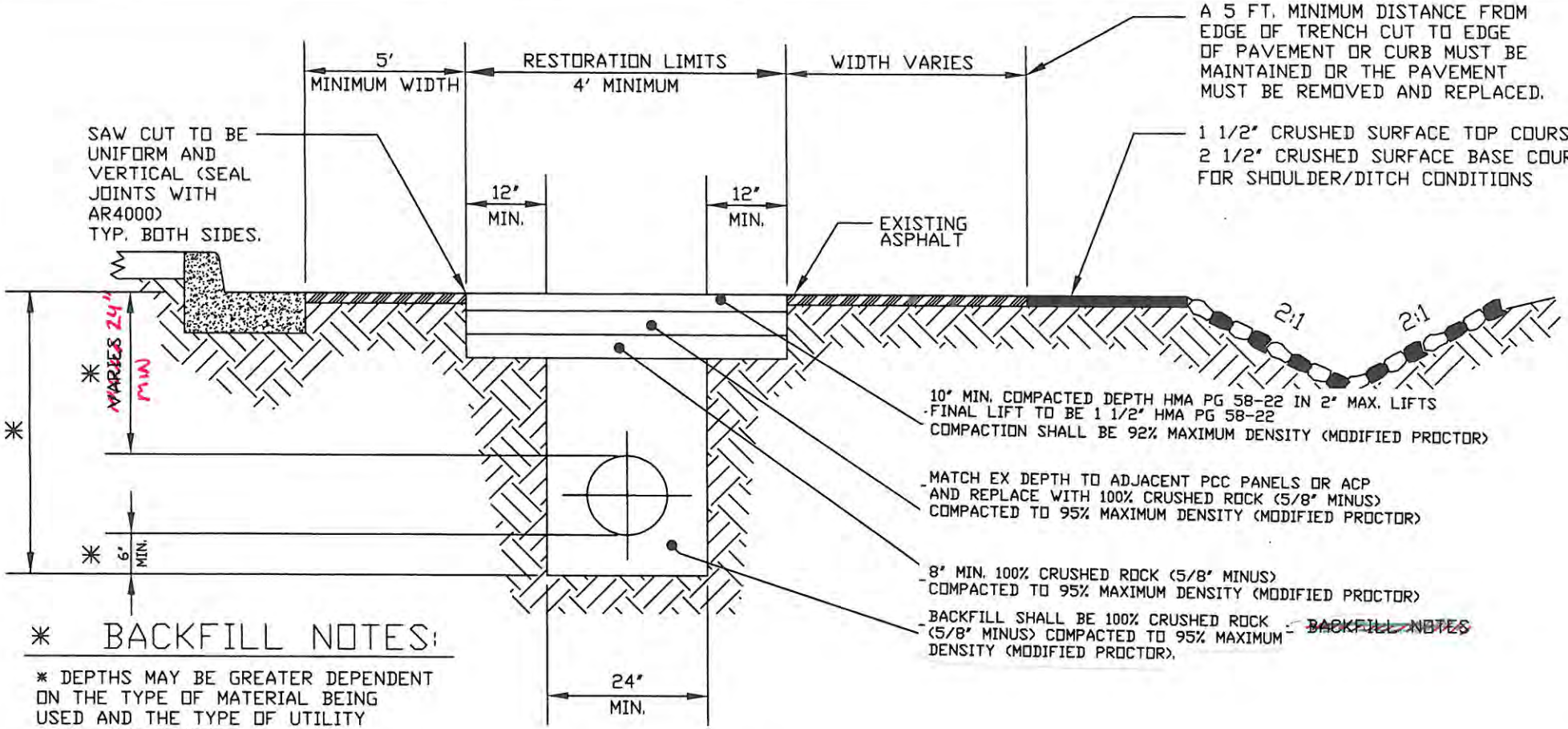
4800 S. 188th St., SeaTac, WA 98188-8605
Telephone: 206-973-4730

CHECKED: DLS
DRAWN: DLH
REV.: 8/30/2006
DATE: 9/1/1994

NEIGHBORHOOD STREET ROADWAY REPAIR

K:\ENGR\CADD\DETAILS\SR_1

DETAIL NO. SR-1



* BACKFILL NOTES:

* DEPTHS MAY BE GREATER DEPENDENT ON THE TYPE OF MATERIAL BEING USED AND THE TYPE OF UTILITY BEING CONSTRUCTED.

* TRENCH BACKFILL IS TO BE 100% CRUSHED, EXCEPT THOSE TRENCHES PARALLEL TO THE RIGHT-OF-WAY CENTERLINE THAT ARE GREATER THAN 100 FT. IN LENGTH AND THOSE TRENCHES THAT ARE OUTSIDE PAVED OR IMPROVED AREAS. THE CITY WILL CONSIDER TRENCHES GREATER THAN 100 FT. IN LENGTH AND AREAS UNDER PAVEMENT AND OTHER RIGHT-OF-WAY IMPROVEMENTS ON A CASE BY CASE BASIS. FACTORS TO CONSIDER INCLUDE GEOTECH REPORTS AND COMPACTION TESTING UNDER PAVED AND IMPROVED AREAS AND POTENTIAL FUTURE IMPROVEMENTS OUTSIDE EXISTING IMPROVED AREAS.

NOTES:

1. DAMAGE TO PAVEMENT SURFACE SEAL COATS DURING BACKFILL OPERATIONS WILL REQUIRE THAT A FOG SEAL OF CSS-1 AT THE RATE OF 0.05 TO 0.10 (0.03 TO 0.05 RESIDUAL) GALLONS PER SQUARE YARD BE APPLIED TO THE PAVEMENT TO RETURN THE PAVEMENT SEAL TO ORIGINAL OR BETTER CONDITION. ADDITIONAL STRUCTURAL DAMAGE TO THE PAVEMENT SHALL REQUIRE BUT NOT BE LIMITED TO SQUARE CUT PATCHING AND OR OVERLAYS.
2. DITCH SIDE SLOPES AND FLOW LINE ARE TO BE STABILIZED BY PLACING RIP RAP OR OTHER TREATMENTS AS REQUIRED BY THE PUBLIC WORKS DIRECTORS REPRESENTATIVE.
3. COMPACTION TESTS FOR BACKFILL AND ASPHALT SHALL BE REQUIRED EVERY 25 FEET ALONG THE TRENCH BY AN INDEPENDANT CONTRACTOR.

CITY OF SEATAC
Public Works Department
Engineering Division
Dale Schroeder, P.E., Director
4800 S. 188th St., SeaTac, WA 98188-8605
Telephone: 206-973-4730

CHECKED: DLS
DRAWN: DLH
REV.: 8/30/2006
DATE: 9/1/1994

INTERNATIONAL BLVD
~~NEIGHBORHOOD STREET~~
TYP. ROADWAY REPAIR

K:\ENGR\CADD\DETAILS\SR_1

DETAIL NO. SR-1

Appendix B – WSDOT GSPs for Permeable Pavement

- **These GSPs may not be used on WSDOT Projects**.
- **See the log of changes/additions to these GSPs, for the reasons and history behind each GSP; this will give you guidelines for their use.**
- **These GSPs are written assuming the spec writer will include in their Bid Documents, all related Division 1 Amendments to the Standard Specifications.**
- **Please read notes at http://www.wsdot.wa.gov/partners/apwa/HMA-WMA_Notes.pdf before using**

DIVISION 2

2-06.3(3).RTF **Subgrade for Permeable Pavements**
(March 9, 2016)
May be used on FHWA funded projects.
For use when specifying Permeable pavement.

2-06.5.RTF **Subgrade for Permeable Pavements**
(March 9, 2016)
May be used on FHWA funded projects.
For use when specifying Permeable pavement.

DIVISION 4

4-04.2(9-03.9(2)).OPT1.RTF Permeable Ballast
(March 9, 2016)
May be used on FHWA funded projects.
Use when specifying Permeable pavements.

4-04.2(9-03.9(2)).OPT2.RTF Crushed Surfacing Choker Course
(March 9, 2016)
May be used on FHWA funded projects.
Use when specifying Permeable pavements.
Optional - at the discretion of the Engineer. Use with 2-06.3 RTF and 4-04.2 opt1.RTF or, consider using Asphalt Treated Permeable Base over Permeable Ballast.

Do NOT use Crushed Surfacing Choker Course for Pervious Concrete installations. For Porous Asphalt you may want to consider Asphalt Treated Permeable Base (ATPB) instead of Crushed Surfacing Choker Course.

4-04.2(9-03.9(2)).OPT3.RTF Aggregates for Permeable Base
(March 9, 2016)
May be used on FHWA funded projects.
Must use with 4-04.2(9-03.9(2)).OPT1.rtf and/or 4-04.2(9-03.9(2)).OPT2.rtf.

4-04.3(5).RTF **Shaping and Compaction**
(March 9, 2016)
May be used on FHWA funded projects.

Use when specifying Porous HMA or Pervious Concrete.

Because of the high void content in the aggregates, there will be some displacement of the aggregate surface under load. Crushed Surfacing Choker Course is used to minimize the displacement in preparation for paving. The use of Asphalt Treated Permeable Base (ATPB) directly over the Permeable Ballast Base Course eliminates the need for Crushed Surfacing Choker Course.]

4-04.4.RTF **Measurement**
(March 9, 2016)
May be used on FHWA funded projects.
Use when specifying Crushed Surfacing Choker Course.

4-04.5.RTF **Payment**
(March 9, 2016)
May be used on FHWA funded projects.
Use when specifying Crushed Surfacing Choker Course.

4-SA2.RTF **Asphalt Treated Permeable Base (ATPB)**
(March 9, 2016)
May be used on FHWA funded projects.
Optional - May be used as a Base for Porous Hot Mix Asphalt, when used, also use 2-06.3(3).rtf.

DIVISION 5

5-04.1.RTF **Description**
(March 9, 2016)
Hot Mix Asphalt
May be used on FHWA funded projects.
Use when specifying Porous HMA.

5-04.2(9-03.8).RTF **Materials**
(March 9, 2016)
Aggregates for Porous Hot Mix Asphalt/Porous Warm Mix Asphalt (PHMA/PWMA)
May be used on FHWA funded projects.
Use when specifying Porous HMA.

5-04.3.RTF **Construction Requirements**
(March 9, 2016)
Porous Asphalt (PHMA/PWMA) Acceptance Infiltration Test
May be used on FHWA funded projects.
Use when specifying Porous HMA.

5-04.3(1).RTF **Hot Asphalt Mixing Plant**
(March 9, 2016)
Fiber Supply System
May be used on FHWA funded projects.
Use when specifying Porous HMA.

5-04.3(7)A.RTF **Mix Design**
(March 9, 2016)
May be used on FHWA funded projects.
Use when specifying Porous HMA.

5-04.3(8)A1.OPT2.RTF **General**
(March 9, 2016)
May be used on FHWA funded projects.
Use when specifying Porous HMA.

5-04.3(8)A6.OPT2.RTF **Test Methods**
(March 9, 2016)
May be used on FHWA funded projects.

5-04.3(9).RTF **Spreading and Finishing**
(March 9, 2016)
May be used on FHWA funded projects.
Use when specifying Porous HMA.

5-04.3(10)A.RTF **General**
(March 9, 2016)
May be used on FHWA funded projects.
Use when specifying Porous HMA.

5-04.4.RTF **Measurement**
(March 9, 2016)
May be used on FHWA funded projects.
Use when specifying Porous HMA.

5-04.5.RTF **Payment**
(March 9, 2016)
May be used on FHWA funded projects.
Use when specifying Porous HMA.

5-06.SA.RTF **Pervious Concrete Pavement**
(March 9, 2016)
May be used on FHWA funded projects.
When used, include 2-06.3(3).rtf, 4-04.2(9-03.9(2)).OPT1.rtf, or 4-04.2(9-03.9(2)).OPT1.rtf and 4-SA2.rtf or 4-04.2(9-03.9(2)).OPT2.rtf as sub base and base courses.

Add the following new section:

2-06.3(3) Subgrade for Permeable Pavements
(March 9, 2016 APWA GSP)

Before placing permeable ballast for Porous HMA/WMA, the Contractor shall bring the Subgrade to the required line, grade, and cross-section. The Contractor shall compact the Subgrade to a depth of 6 inches to at least 90 percent, but not more than 92 percent, of the maximum density as determined by the compaction control tests described in Section 2-03.3(14)D. Two (2) density tests will be conducted for every 5,000 square feet of prepared subgrade; or four (4) tests per 200 lineal feet of roadway or sidewalk. All subgrade shall be firm and unyielding as determined by the Engineer.

The Contractor shall take measures to protect the prepared and approved subgrade from traffic, water run-on, standing water, or other damage. Subgrade that has been over compacted, shall be scarified to a minimum depth of eight (8) inches and recompacted.

Material used to protect the Subgrade from traffic or provide access to adjacent facilities shall be removed and the subgrade compacted prior to placing geotextile, if used and/or permeable ballast.

2-06.5 Measurement and Payment

(March 9, 2016 APWA GSP)

Supplement this section with the following:

Measurement for Subgrade for Permeable Pavement will be in accordance with 2-06.5.

4-04.2 Gravel Base
(March 9, 2016 APWA GSP)

Revise section 9-03.9(2) to read:

Permeable Ballast
Permeable ballast shall meet the requirements of Section 9-03.9(1) for ballast except for the following special requirements.

The grading and quality requirements are:

Grading No. 1		Grading No. 2 (AASHTO No. 3)	
Sieve Size	Percent Passing	Sieve Size	Percent Passing
2-1/2”	99-100	2-1/2”	100
2”	65-100	2”	90-100
¾”	40-80	1-½”	35-70
No. 4	0-5	1”	0-15
No. 100	0-2	½”	0-5
% Fracture	95	No. 100	0-3
All percentages are by weight.		% Fracture	95

The sand equivalent value and dust ratio requirements do not apply.

Los Angeles Wear, 500 Rev. 30% maximum
Degradation Factor 30 minimum

The fracture requirement shall be at least two (2) fractured faces and will apply to the combined aggregate retained on the No. 4 sieve in accordance with WSDOT FOP for AASHTO T 335.

The minimum void ratio of the aggregate shall be 30 percent as determined by AASHTO T 19.

Permeable ballast material may be conditionally approved based on Contractor submitted sampled materials prior to delivery to the site. Final Acceptance will be based on conformance testing completed on material that has been delivered, installed, and compacted on site. The exact point of acceptance will be determined by the Engineer. Material out of conformance with the project specifications will be removed and replaced at the Contractor’s expense.

4-04.2 Gravel Base
(March 9, 2016 APWA GSP)

Supplement section 9-03.9(2) with the following:

Crushed Surfacing Choker Course
Crushed Surfacing Choker Course shall be manufactured from ledge rock, talus, or gravel in accordance with the provisions of Section 3-01. Recycled concrete is not permitted. The materials shall be uniform in quality and substantially free from wood, roots, bark, and other extraneous material and shall meet the following quality test requirements:

Los Angeles Wear, 500 Rev	30% maximum
Degradation Factor	30 minimum
Minimum Void Content:	30% as determined by AASHTO T19 or ASTM C29, rodding procedure.

The grading and quality requirements are:

Sieve Size	Percent Passing
1-1/2 inch	100
1 inch	95-100
½ inch	25-60
#4	0-10
#8	0-5
% Fracture	95

All percentages are by weight.

The fracture requirement shall be at least two (2) fractured faces and will apply to the combined aggregate retained on the No. 4 sieve in accordance with WSDOT FOP for AASHTO T 335.

4-04.2 Gravel Base
(March 9, 2016 APWA GSP)

Supplement section 9-03.9(2) with the following:

Aggregates for permeable base shall meet the requirements for grading and quality when placed in hauling vehicles for delivery to the site, after placement in temporary stockpiles on site, during installation, and after installation and compaction.

Acceptance of aggregates shall be as provided under non-statistical evaluation.

The Contractor's submittal for the aggregate material shall provide description of sampling methodology, identify where and how the sample was collected, total weight of sampled collected, description of sample preparation procedures, total weight of sample sieved to determine grain size distribution, and test results. Sampling and preparation shall be in conformance with ASTM D75 and ASTM C702.

4-04.3(5) Shaping and Compaction
(March 9, 2016 APWA GSP)

Supplement this section with the following:

Immediately following spreading and final shaping each layer of surfacing shall be lightly compacted in one lift until no visible movement of aggregate is observed resulting in a firm and unyielding condition, as determined by the Engineer.

4-04.4 Measurement
(March 9, 2016 APWA GSP)

Supplement this section with the following:

Crushed Surfacing Choker Course will be measured by the ton in accordance with Section 1-09.2, based on certified truck tickets collected by the Contractor and provided to the inspector at the end of each working day.

4-04.5 Payment
(March 9, 2016 APWA GSP)

Supplement this section with the following:

"Crushed Surfacing Choker Course", per ton.

Supplement Division 4 with the following:
(March 9, 2016 APWA GSP)

ASPHALT TREATED PERMEABLE BASE (ATPB)

Description

Asphalt treated permeable base (ATPB) consists of a compacted course of base material which has been weatherproofed and stabilized by treatment with an asphalt binder.

This work consists of constructing one or more courses of asphalt treated permeable base (ATPB) upon a prepared foundation or base in accordance with these Specifications and in conformity with the lines, grades, thicknesses, and typical cross-sections shown in the Plans or as established by the Engineer.

Materials

Materials shall meet the requirements of the following sections:

Asphalt	9-02.1
Anti-Stripping Additive	9-02.4

Aggregates for Asphalt Treated Permeable Base (ATPB)

General Requirements

Aggregates for asphalt treated permeable base shall be manufactured from ledge rock, talus, or gravel, in accordance with the provisions of Section 3-01 that meet the following test requirements:

Los Angeles Wear, 500 Rev.	30% maximum
Degradation Factor	15 minimum

Grading

Aggregates for asphalt treated permeable base (ATPB) shall meet the following requirements for grading:

Sieve Size	Percent Passing *
¾" square	100
½" square	90 - 100
3/8" square	40 - 80
U.S. No. 4	0 - 30
U.S. No. 8	0 - 20
U.S No. 16	0 - 10

* All percentages are by weight.

The aggregate shall consist of a combination of crushed and natural aggregates with a percent fracture greater than 75% on one face on the No. 4 sieve and above, in accordance with the field operating procedures for AASHTO T 335.

Test Requirements
When the aggregates are combined within the limits set forth in Section 9-03.6(2) and mixed in the laboratory with the designated grade of asphalt, the mixture shall meet the following test values:

% of Theoretical Maximum Specific Gravity (Gmm)	70 @ 75 gyrations (approximate = 30% void space)
AASHTO T324, WSDOT TM T718 or ASTM D3625	Pass (Acceptable anti-strip evaluation tests)

The sand equivalent value of the mineral aggregate for asphalt treated permeable base (ATPB) shall not be less than 35.

Paving Asphalt
The grade of paving asphalt binder shall be PG70-22ER unless otherwise specified by the Contract.

The manufacture of ATPB may include warm mix asphalt (WMA) processes in accordance with these Specifications. WMA processes include organic additives, chemical additives, and foaming that allow for lower mixing and placement temperatures without impacting the final ATPB pavement properties.

Construction Requirements

Asphalt Mixing Plant

Asphalt mixing plants for ATPB shall meet the following requirements:

Heating
The plant shall be capable of heating the aggregates to the required temperature.

Proportioning
The mixing plant shall be capable of proportioning: the aggregates to meet the Specifications, and the asphalt binder at the rate specified in the approved job mix formula (JMF). If the aggregates are supplied in two or more sizes, means shall be provided for proportioning or blending the different sizes of aggregates to produce material meeting the Specification requirements

Mixing
The mixer shall be capable of producing a uniform mixture of uniformly coated aggregates meeting the requirements of these Specifications.

Preparation of Aggregates

Aggregates for ATPB shall be stockpiled before use in accordance with the requirements of Section 3-02. The aggregates shall be heated in the Asphalt Mixing

Plant in compliance with the JMF and related temperature viscosity curves for the asphalt binder grade specified.

Mix Design
The asphalt binder for ATPB shall be PG 70-22ER polymer modified or higher grade unless otherwise stated. Binder content shall be between 3.0% and 4.5% by total weight of the mix, and will be the highest percentage that passes void requirements test at Ndesign = 75 gyrations. The binder content tolerance shall be ± 0.3% during production/ placement of the ATPB. The Contractor shall adjust the aggregate to meet the targeted void space specification.

Target void space shall be approximately 30% per ASTM D3203.

The Contractor shall include a mix design submittal documenting the ATPB mix design test results presented alongside the mix design specification criteria included in this Specification, along with the submittal temperature-viscosity curves from the polymer-modified asphalt binder supplier showing the recommended mixing and compaction temperatures developed for dense graded HMA applications.

The Contractor shall determine anti-strip requirements for ATPB and provide data for anti-strip dosage as part of the mix design approval process. The ATPB mix shall be tested for its resistance to stripping by water in accordance with ASTM D-3625. If the estimated coating area is not above 95 percent, a Qualified Products List (QPL) anti-stripping agent shall be added to the ATPB to a level that achieves 95 percent plus asphalt binder retention using ASTM D-3625. The Contractor shall be responsible for conducting the anti-stripping evaluation and providing a report to the Engineer. A documented anti-strip evaluation (either AASHTO T324 or WSDOT TM T718) of an existing dense graded hot mix asphalt (HMA) from the same aggregate source and binder supplier as the proposed ATPB may be used to document acceptable anti-strip dosage rates in lieu of ASTM D-3625 testing.

Mixing
The asphalt treated permeable base shall be mixed in accordance with the requirements of Section 5-04.3(8).

Hauling Equipment
Hauling equipment for asphalt treated permeable base shall conform to the requirements of Section 5-04.3(2).

Spreading and Finishing
Asphalt treated permeable base shall be spread with a spreading machine equipped with a stationary, vibratory, or oscillating screed or cut-off device, subject to the approval of the Engineer. Approval of the equipment shall be based on a test section demonstrating that the finished product will meet all requirements of the Specifications. Automatic controls will not be required.

The internal temperature of the ATPB mixture at the time final rolling and targeted consolidation is achieved shall be a minimum of 185°F. Rollers shall only be operated in the static mode when the internal temperature of the ATPB in less than 175°F.

Unless otherwise directed by the Engineer the nominal compacted depth for any layer of asphalt treated permeable base shall not exceed 0.40 feet. A light tack coat (approximately 0.02 gallons/square yard residual asphalt) shall be applied between lifts of ATPB. A tack coat shall also be applied between the ATPB surface and the subsequent paving lifts when cleaning of the ATPB surface is necessary.

Tack coat shall be uniformly applied to cover the existing porous pavement with a thin film of residual asphalt free of streaks and bare spots. A heavy application of tack coat shall be applied to all joints. The spreading equipment shall be equipped with a thermometer to indicate the temperature of the tack coat material.

Equipment shall not operate on tacked surfaces until the tack has broken and cured. If the Contractor's operation damages the tack coat it shall be repaired prior to placement of the PHMA.

Unless otherwise approved by the Engineer, the tack coat shall be CSS-1 or CSS-1h emulsified asphalt. The CSS-1 and CSS-1h emulsified asphalt may be diluted with water at a rate not to exceed one part water to one part emulsified asphalt. The tack coat shall not exceed the maximum temperature recommended by the emulsified asphalt manufacturer.

Subgrade Protection Course
Unless otherwise specified by the Engineer, the Contractor shall place the asphalt treated permeable base as a protection for the prepared foundation or base on all sections of individual Roadways which are to receive ATPB as soon as 10,000 square yards of prepared foundation or base is completed. This requirement shall not be limited to contiguous areas on the project.

The surface of the prepared foundation or base protection layer when constructed on a grading project shall conform to grade and smoothness requirements that apply to the prepared foundation or base upon which it is placed.

Finish Course
The final surface course of the ATPB, excluding shoulders, shall not deviate at any point more than ⅜ inch from the bottom of a 10-foot straightedge laid in any direction on the surface on either side of the Roadway crown. Failure to meet this requirement shall necessitate sufficient surface correction to achieve the required tolerance, as approved by the Engineer, at no expense to the Contracting Agency.

When portland cement concrete pavement is placed on an asphalt base, the surface tolerance of the asphalt base shall be such that no elevation lies more than 0.05 feet below nor 0.00 feet above the plan grade minus the specified plan depth of portland cement concrete pavement. Prior to placing the portland cement concrete pavement, any such irregularities shall be brought to the required tolerance by grinding or other means approved by the Engineer, at no expense to the Contracting Agency.

Density & Infiltration Testing for Acceptance
The asphalt treated permeable base shall be consolidated to a firm and unyielding state. The Contractor will develop a roller pattern that will initially consolidate the pavement structure and then use static rolling only thereafter. Density testing targeting 15 to 20% final air voids (80% to 85% of maximum theoretical (Rice)

density) in the ATPB will be performed by the Contractor to monitor the consolidation effort and to avoid over compaction. The frequency of these tests shall be at the discretion of the Engineer. The use of equipment which results in damage to the materials, over consolidates the ATPB or produces substandard workmanship will not be permitted.

Pneumatic tire rollers shall not be used.

The Contractor shall conduct infiltration tests on the finished ATPB per ASTM C1701 at locations chosen by the Engineer. Newly-placed ATPB shall have a minimum infiltration rate of 150 inches/hour. Infiltration tests shall be completed every 150 linear feet of roadway and conducted in accordance with ASTM C1701. Target density may be adjusted and used for acceptance, at the discretion of the Engineer, if the ATPB is consistently meeting the 150 inches/hour acceptance standard.

If the measured infiltration rate is less than 150 inches/hour, the Contractor shall conduct four additional tests as follows in line with the paver direction of travel. Two tests upstream and two tests downstream of the initial test location shall be taken at distances of 20 feet and 40 feet. Results of the additional tests will be averaged. The Contractor shall conduct additional testing upstream and downstream to identify areas to be removed. If the average infiltration rate is less than required the Contractor shall remove and replace the failing ATPB areas at the direction of the Engineer and at no cost to the Contracting Agency.

Measurement
ATPB will be measured by the ton in accordance with Section 1-09.2, based on certified truck tickets collected on the day of placement. No deductions will be made for the weight of asphalt binder, anti-stripping additive, tack coating between lifts or any other component of the mixture.

Payment
Payment will be made for the following Bid item:

> "Asphalt Treated Permeable Base, PG ____ ER", per ton.
> The unit contract price per ton for "Asphalt Treated Permeable Base, PG ____ ER" shall be full pay for all labor, equipment, and materials required to construct the ATPB including joints, where required, haul, compaction, tack coat, anti-stripping additive, if required, and Contractor testing as specified.

5-04.1 Description

(March 9, 2016 APWA GSP)

Supplement this section with the following:

This Work shall also consist of providing and placing one or more layers of plant-mixed porous hot mix asphalt (PHMA) on a prepared foundation or base in accordance with these Specifications and the lines, grades, thicknesses, and typical cross-sections shown in the Plans or established by the Engineer. The manufacture of PHMA may include porous warm mix asphalt (PWMA) processes in accordance with these Specifications. PWMA processes include organic additives, chemical additives, and foaming.

5-04.2 Materials

(March 9, 2016 APWA GSP)

Supplement section 9-03.8 with the following:

Aggregates for Porous Hot Mix Asphalt/Porous Warm Mix Asphalt (PHMA/PWMA)

General Requirements

Aggregates for Porous Hot Mix Asphalt (PHMA) or Porous Warm Mix Asphalt (PWMA) shall be manufactured from ledge rock, talus, or gravel, in accordance with the provisions of Section 3-01 that meet the following test requirements:

Los Angeles Wear, 500 Rev.	30% max.
Degradation Factor	15 min.

Grading

Aggregates for PHMA/PWMA shall meet the following requirements for grading:

Sieve Size	Percent Passing
¾" square	100
½" square	900 - 100
⅜" square	55 - 90
U.S. No. 4	10 - 40
U.S. No. 8	0 - 20
U.S No. 40	0 - 13
U.S. No. 200	0 - 5

* All percentages are by weight.

The aggregate for PHMA/PWMA shall consist of crushed stone with a percent fracture greater than 90% on two faces on the No. 4 sieve and above, and shall be tested in accordance with the field operating procedures for AASHTO T 335.

5-04.3 Construction Requirements
(March 9, 2016 APWA GSP)

Supplement this section with the following:

Porous Asphalt (PHMA/PWMA) Acceptance Infiltration Test
Contractor shall conduct infiltration tests on the finished PHMA/PWMA per ASTM C1701 at locations chosen by the Engineer. Newly-placed PHMA/PHWA shall have a minimum infiltration rate of 100 inches/hour. I Infiltration tests shall be completed every 150 linear feet of roadway and conducted in accordance with ASTM C1701.

If the measured infiltration rate is less than 100 inches/hour, the Contractor shall conduct an additional four infiltration tests in line with the paver direction of travel. Two tests upstream and two tests downstream of the initial test locations shall be taken at distances of 20 feet and 40 feet. Results of the additional tests will be averaged. The Contractor shall conduit additional testing upstream and downstream to identify area to be removed. If the average infiltration rate is less than required remove and replace the failing section at the direction of the Engineer and at no cost to the Contracting Agency.

5-04.3(1) Hot Asphalt Mixing Plant
(March 9, 2016 APWA GSP)

Supplement this section with the following:

Plants used for preparation of PHMA shall conform to the following requirements:

Fiber Supply System
When fiber stabilizing additives are determined necessary to achieve drain down criteria per APWA GSP 5-04.3(7)A of these Specifications, a separate feed system that meets the following shall be required:

1. Accurately proportions by weight the required quantity into the mixture in such a manner that uniform distribution will be obtained.
2. The fibers shall be uniformly distributed prior to the injection of the asphalt binder into the mixture. When a continuous or drier-drum type plant is used, the fiber shall be added to the aggregate and uniformly dispersed prior to the injection of asphalt binder.

Surge and Storage Systems
The storage time for PHMA/PWMA mixtures shall be no more than four (4) hours for non-insulated silos or eight (8) hours for insulated silos. Placement temperature specifications shall be met regardless of silo storage time.

5-04.3(7)A Mix Design
(March 9, 2016 APWA GSP)

Supplement this section with the following:

Mix Designs for PHMA shall be submitted to the Engineer on Washington State DOT Form 350-042 with the additional PHMA test data required by this specification provided as a one page supplemental attachment. The supplemental test data form is available at http://www.wsdot.wa.gov/partners/apwa/PorousAsphaltPavement.pdf.

The asphalt binder for PHMA/PWMA shall be PG 70-22ER polymer modified or higher grade. Binder content shall be between 6.0% and 7.0% by total weight of the mix, and will be the highest percentage that passes both the drain down and void requirements tests at N_{design} = 75 gyrations. The binder content tolerance shall be ±0.3% during production/ placement of the PHMA/PWMA. The Contractor shall adjust the aggregate to meet the maximum drain down test requirements within the ranges provided below.

1. Drain down shall be 0.3 %, maximum, according to ASTM D6390
2. Void ratio shall be 16% to 25% per ASTM D3203 at N_{design} = 75 gyrations.

The Contractor shall include with the submittal temperature-viscosity curves from the polymer-modified asphalt binder supplier showing the recommended mixing and compaction temperatures developed for dense graded HMA applications.

The Contractor shall determine anti-strip requirements for PHMA/PWMA and provide data for anti-stripping. The asphaltic mix shall be tested for its resistance to stripping by water in accordance with ASTM D-3625. If the estimated coating area is not above 95 percent, anti-stripping agents shall be added to the asphalt. Contractor shall be responsible for conducting the anti-stripping evaluation and providing a report to the Engineer.

Alternately, anti-strip evaluation of an existing dense graded hot mix asphalt of the same maximum nominal aggregate class and from the same aggregate materials source may be used to set the anti-stripping requirements for PHMA/PWMA. The anti-strip requirement for the PHMA/PWMA shall be equivalent to the anti-stripping requirement for the HMA.

5-04.3(8)A1 General
(March 9, 2016 APWA GSP)

Supplement this section with the following:

Commercial evaluation will be the basis for acceptance of PHMA/ PWMA.

5-04.3(8)A6 Test Methods
(March 9, 2016 APWA GSP)

Supplement this section with the following:

The temperature of the mix at the time of discharge from the haul vehicle shall be within the temperature range identified in the approved PHMA submittal.

5-04.3(9) Spreading and Finishing
(March 9, 2016 APWA GSP)

Supplement this section with the following:

Placement temperature of the mixture shall be within the temperature range identified in the approved PHMA/PWMA submittal.

5-04.3(10)A General
(March 9, 2016 APWA GSP)

Supplement this section with the following:

Pneumatic tire rollers shall not be used for compaction of PHMA/PWMA.

The Contractor shall develop a roller pattern that will initially consolidate the pavement structure as well as target 15% to 18% final air voids (82% to 85% of maximum theoretical (Rice) density). The Contractor shall monitor compaction during placement of PHMA/PWMA with a pavement density gauge.

5-04.4 Measurement
(March 9, 2016 APWA GSP)

Supplement this section with the following:

PHMA/PWMA will be measured by the ton in accordance with Section 1-09.2, with no deduction being made for the weight of asphalt binder, blending sand, mineral filler, or any other component of the HMA. If the Contractor elects to remove and replace mix as allowed in Section 5-04.3(11), the material removed will not be measured.

5-04.5 Payment
(March 9, 2016 APWA GSP)

Supplement this section with the following:

"PHMA CL. 1/2" In. PG 70-22ER", per ton.
The unit Contract price per ton for "PHMA CL. 1/2 In. PG 70-22ER" shall be full compensation for all costs, including anti-stripping additive and tack coat, incurred to carry out requirements of Section 5-04 except for those costs included in other items which are included in this Subsection and which are included in the Proposal.

Supplement Division 5 with the following:
(*March 9, 2016 APWA GSP*)

5-06 PERVIOUS CONCRETE PAVEMENT

5-06.1 Description

This work shall consist of constructing a pervious cementitious pavement composed of portland cement concrete on a prepared subgrade or subbase in accordance with these Specifications and in conformity with the lines grades, thicknesses, and typical cross-sections shown in the Plans or established by the Engineer.

5-06.2 Materials

Materials shall meet the requirements of the following sections:

Portland Cement	9-01
Aggregates for Portland Cement Concrete	9-03.1
Premolded Joint Filler for Expansion Joints	9-04.1(2)
Curing Materials and Admixtures	9-23
Water	9-25

Hydration stabilizing admixtures shall conform to the requirements of Section 9-23.6(3) or 9-23.6(5).

Synthetic Fibers for Concrete

When specified synthetic fibers to be included in the mix for portland cement concrete shall conform to the requirements of ASTM D 7508/7508M.

5-06.3 Construction Requirements

5-06.3(1) Pervious Concrete Preconstruction Meeting

Prior to the start of construction of the pervious concrete pavement section, including excavation of the pavement section, the Contractor shall coordinate, schedule and attend a preconstruction meeting for the pervious concrete pavement. The following are required to attend the meeting:

1. Contracting Agency representative.
2. General Contractor's representative(s).
3. Engineer of Record for the pervious concrete pavement.
4. Concrete placement lead person(s).
5. Associated Subcontractor's representative.
6. Pervious concrete Supplier's representative.
7. Material Testing Laboratory's representative.

The meeting shall cover all aspects of the work including, but not limited to:

1. Submittals.
2. Short and long term schedule.
3. Inspection of the Work.
4. Protection of the Work.
5. Pervious concrete placement.
6. Curing.

7. Materials.
8. Specifications.
9. Testing.
10. Test panel and JMF.
11. Acceptance criteria.

5-06.3(2) Pervious Concrete Mix Design
The Contractor shall provide a mix design for pervious concrete and shall submit the mix design to the Engineer in writing. Pervious concrete shall not be placed in the test panels without a mix design that has been reviewed and accepted by the Engineer.

5-06.3(2)A Mix Design Criteria
The Contractor shall include the following elements and results of the described procedures in the proposed mix design:

1. A unique identification number for the mix design that is approved for the Job Mix Formula (JMF).
2. Portland cement shall be Type I, Type II, Type I-II Type IP, or Type IS.
3. The cementitious content, including pozzolans if used, shall be a minimum of 480 pounds per cubic yard.
4. The mix shall incorporate a hydration stabilizing admixture.
5. Synthetic microfibers may be utilized at the manufacturer's recommended dosage rate.
6. The water / cement ratio shall not exceed 0.35.
7. No more than 25 percent of portland cement in the mix, by weight, may be replaced by fly ash, ground granulated blast furnace slag, or a combination of both.
8. Coarse aggregate shall conform to Section 9-03.1(4), AASHTO Grading No.8.

5-06.3(2)B Job Mix Formula (JMF)
The approved mix design established through the approved test panel becomes the JMF.

5-06.3(3) Submittals
In accordance to Section 1-05.3, the Contractor shall submit the following items to the Engineer for acceptance prior to placing any pervious concrete pavement:

1. The source of all materials proposed for use in constructing pervious concrete pavement.
2. Batch weights for all constituents of one (1) cubic yard of the proposed pervious concrete mix.
3. The specific gravity (SSD) of all aggregates to be used in the proposed pervious concrete mix.
4. The proposed gradation of coarse aggregates used in pervious concrete.
5. The designed volume in cubic feet of all proposed components for 1(one) cubic yard of the proposed pervious concrete mix.
6. The design water / cement ratio of the proposed mix design.
7. The fresh density of the proposed pervious concrete mixture as determined by ASTM C1688.
8. Catalogue cuts and Certificates of Compliance for all proposed admixtures.

9. Mill Certification of the portland cement and pozzolans, if used, for the current lot to be used in the production of the proposed pervious concrete mix. The Contractor shall maintain this submittal throughout the duration of the project as lots change.
10. Current certification by the National Ready Mix Concrete Association (NRMCA) for the batch plant(s) to be used in the production of pervious concrete.
11. Current certifications by the NRMCA for the trucks to be used in transporting pervious concrete from the batch plant to the point of placement.
12. Qualification documentation for current certifications by the NRMCA for the Contractor's personnel who will be installing pervious concrete. See Section 5-06.3(10)A. Valid acceptable documentation is the NRMCA issued wallet card or certification certificate.
13. At the time of delivery of the material to the site, the Contractor shall provide an original Certificate of Compliance for each truckload of pervious concrete. The Certificate of Compliance shall include information noted in Section 6-02.3(5)B. If the Certificate of Compliance from the concrete producer is not provided to the Engineer upon delivery, the truckload shall not be placed.

5-06.3(4) Equipment

Equipment necessary for handling materials, mixing, delivering, and performing all parts of the Work, shall be in good repair, designed for the task, and operated by trained and qualified personnel.

5-06.3(4)A Batching Plant and Equipment

Pervious concrete shall be centrally mixed in a plant with a current NRMCA certification.

5-06.3(4)B Mixer Trucks

Pervious concrete shall be transported to the location by truck mixers, non-agitating trucks shall not be used for the transport of pervious concrete. The drums on mixer trucks used to transport pervious concrete shall have fins that are not excessively worn, damaged or have excessive concrete buildup. Mixer trucks shall have a current NRMCA certification.

5-06.3(4)C Side Forms

Pervious concrete shall be placed in stationary forms. If pervious concrete is to be placed against a curb, previously placed concrete, or other existing structure, they may be used as a side form for the pervious concrete paving. Forms for pervious concrete shall be made of steel or wood and shall be in good condition, and shall be capable of being anchored in place so that they will be true to grade, line and slope. Forms shall be sufficiently rigid to maintain specified tolerances and capable of supporting concrete and mechanical concrete placing equipment. Forms shall be in good condition, straight, clean, free of debris, non-adherent rust and hardened concrete.

Set, align, and brace forms so that they hardened pavement meets the lines, grades and slopes as shown in the drawings. Apply form-release agent to the form face, which will be in contact with concrete, immediately before placing concrete. Form release agent shall not be applied to previously placed concrete. Previously placed pavement shall be protected from damage.

The Contractor shall inspect all forms for line, grade and slope. No pervious concrete shall be placed until the forms have been inspected by the Engineer.

5-06.3(4)D Finishing Equipment
Finishing equipment for pervious concrete paving shall be designed for the intended work, shall be clean and in good operating condition.

Equipment used for striking off the pervious concrete shall leave a smooth surface at the planned grades and shall not cause excess paste to be left on, or drawn to, the surface. If rollers or spinning screeds are used to compact, they shall be of sufficient weight and width to compact the pervious concrete uniformly through its depth and to grade without marring the surface. Equipment used for compacting pervious concrete shall not cause the surface to close or otherwise clog and shall produce a surface that is free of ridges or other imperfections. Tools used for producing joints shall be designed and manufactured for the purpose and shall not otherwise damage or mar the surface.

Vibrating equipment shall not be used for placement or compaction of pervious concrete.

5-06.3(5) Measuring and Batching Materials
Measuring and batching materials for pervious concrete pavement shall conform to the requirements of Section 5-05.3(4).

5-06.3(6) Acceptance
For acceptance, pervious concrete pavement will be divided into lots as follows: A single lot (lot) is represented by the lesser of: one (1) day's production or 360 square yards of pervious concrete in place. Where the Contractor has more than one crew placing pervious concrete, lots will be associated with each crew. Representative lot size will be determined to the nearest square yard. If no sample is taken on a Day, that Day's quantities may be included in the next or previous Day's lot(s). The Engineer may isolate an area of pervious concrete within a lot that is deemed to be defective in any way and such an area will be considered to be a new lot for purposes of acceptance. New lots determined in this manner shall be extended as necessary such that they are bounded by planned joints. Acceptance of a lot of pervious concrete pavement will be based on the following criteria:

1. **Grade:** Conform to the dimensions, lines, slopes and grades specified on the plans. Pervious concrete pavement shall be true to planned grades and shall not deviate from grade more than ¼ inch in ten (10) feet. Where abutting existing facilities such as sidewalks, walkways, curbs, driveways or other pavements, the pervious concrete shall be flush.
2. **Conformance to JMF:** The pervious concrete pavement used shall conform to the mix design for the JMF within the limits as set forth in Section 6-02.3(5)C and as determined from the accepted test panel.
3. **Compacted Thickness and Average Hardened Density:** After a minimum of seven (7) calendar days of curing, remove and measure three (3) cores from each lot. Remove cores in accordance with ASTM C42/C42M. Measure the length of each core in accordance with ASTM C1542/1542M. No single core shall be less than 3/4 inch of the design depth on the drawings. The average of all cores from a lot shall be within minus 3/8 inch of the design depth on the plans.

After length is measured, measure hardened density of each core in the lot in accordance with ASTM C1754/C1754M. The hardened density from a lot must be within +/- 5 percent of the average hardened density of the JMF (approved test panel).

4. **Infiltration Rate:** The infiltration rate at any single test point shall not be less than 100 inches per hour.
5. **Fresh Density:** The fresh density of each lot will be measured by ASTM C1688 at the point of placement shall be within +/- five (5) pounds per cubic foot of the fresh density determined from the JMF (approved test panel).
6. **Appearance:** The appearance of each lot shall be consistent with the JMF (approved test panel). The pervious concrete pavement shall have a consistent surface texture, shall not be raveled, shall be free of ridges or other surface imperfections, shall have joints that are in the specified location and are constructed per specification, and shall be free of cracks.

Testing for acceptance will be performed by the Engineer.

5-06.3(6)A Infiltration Rate of the Placed Pavement

The infiltration rate of the pervious concrete shall be determined at four (4) random locations within each lot. The locations for conducting infiltration tests will be determined by the Engineer. The Contractor shall coordinate and schedule testing with the Engineer a minimum of five (5) Working Days in advance. The infiltration rate on the finished surface will be determined in accordance with ASTM C1701, except the infiltration ring diameter may be 12-inches to 24-inches in diameter. The infiltration test will be conducted after a minimum of seven (7) calendar days of curing has occurred.

If the measured infiltration rate is less than 100 inches/hour at any test location, the Contractor may request in writing that the Engineer perform additional infiltration tests for the purpose of assessing overall infiltration performance and/or determining a defective lot in accordance with Section 5-06.3(6). The determination of a defective lot, or lots, and the extent(s), will be by the Engineer. The cost of additional testing shall borne by the Contractor at a rate of ($$1$$) per test.

5-06.3(7) Rejection

Pervious concrete may be rejected by the Contractor for any reason.

A truckload of pervious concrete will be rejected if the Certificate of Compliance is not provided at the time of delivery of the material to the site. See Section 5-06.3(4)B.

Pervious concrete that is improperly cured or is allowed to freeze during the initial seven (7) day curing period will be rejected.

Pervious concrete pavement that does not meet the acceptance criteria put forth in Section 5-06.3(6) will be rejected by the Engineer on a lot by lot basis.

During the removal process of the rejected pavement, The Contractor shall implement measures to protect the adjacent pervious concrete pavement to remain. If pervious concrete pavement becomes damaged by the Contractor during removal

of the rejected pavement then additional pavement areas may be rejected by the Engineer to the next planned joint.

Fresh pervious concrete that has been rejected by the Engineer, or the Contractor, shall not be placed, or shall be removed and replaced, at no additional cost.

5-06.3(8) Mixing Pervious Concrete
Batch, mix and deliver pervious concrete in compliance with ASTM C94/C94M except that pervious concrete shall not be transit mixed or shrink mixed. If water is added to the mix after it is delivered on site, the fresh density for the pervious concrete shall meet the requirements of the approved JMF referenced in this section.

5-06.3(8)A Limitations of Mixing Pervious Concrete
Mixing and placing concrete shall be discontinued when a descending air temperature in the shade away from artificial heat reaches 40º F and shall not be resumed until an ascending air temperature in the shade and away from artificial heat reaches 40º F.

The temperature of fresh pervious concrete shall not be less than 55° F, nor more than 90° F when placed.

Pervious concrete shall not be mixed with aggregates at less than 32° F.

5-06.3(9) Subgrade Preparation and Subbase
Prepare and protect subgrade in accordance with Section 2-06.

Prepare and protect subbase in accordance with Section 4-04.

5-06.3(10) Placing, Spreading, Finishing, Edging, Tolerances and Curing
Pervious concrete shall not be placed, compacted or finished when the natural light is inadequate, unless an adequate lighting system is in operation. The adequacy of light will be determined by the Engineer.

Wet the surface of the subbase with water immediately before placing pervious concrete. Deposit concrete either directly from the transporting equipment or by conveyor on the subbase, unless otherwise specified. Pervious concrete shall not be placed on frozen subbase. Deposit concrete between the forms to an approximately uniform height. Spread the concrete using mechanized equipment or hand tools. Vibrating equipment shall not be used for spreading pervious concrete.

Strike off concrete between forms using a form-riding paving machine, roller screed, or spinning screed.

Compact concrete to a uniformly dense structure without clogging the surface with paste.

Finish the pervious concrete to a uniform, open-textured surface to match the appearance of the approved JMF test panel.

Edges shall be hand tooled to a radius of ¼ inch.

Curing materials for pervious concrete shall be in place no more than 20 minutes of discharge onto the subbase. The pavement surface and all exposed edges shall be completely covered with sheet curing materials conforming to Section 9-23.1. The curing material shall secured at all exterior edges and interior laps without damaging the pervious concrete. The method of securing the curing material shall prevent wind from removing the sheet and from blowing under the sheet across the surface of the concrete. Cure the pavement for a minimum of seven (7) uninterrupted days.

All traffic (foot and vehicular), staging, stockpiling or other work shall be kept off of the pervious concrete pavement during the curing period. Any testing for acceptance shall not occur until the end of the curing period.

Protect concrete from freezing and cold weather in accordance with 5-06.3(12).

5-06.3(10)A Contractor's Qualifications

The contractor shall employ no less than one (1) National Ready Mixed Concrete Association (NRMCA) certified Pervious Concrete Craftsman for each crew, who must be on site, over-seeing the work during all pervious concrete placement; or employ no less than three (3) NRMCA Certified Pervious Concrete Installers per crew, who must be on site working during each pervious concrete placement. The minimum number of certified individuals must be present on each crew for every pervious concrete placement, including the test panel placements, and a certified individual must be in charge of the placement crew and procedures.

If, in the opinion of the Engineer, personnel used for installing pervious concrete are unqualified, inattentive to quality, or unsafe, they shall be removed or reassigned from installation of pervious concrete at the written request of the Engineer.

5-06.3(10)B Test Panel

Production placement of pervious concrete shall not occur until the Contractor has completed a test panel of pervious concrete pavement that meets all of the acceptance criteria described herein and is accepted by the Engineer.

The Contractor shall construct a test panel utilizing a minimum of seven (7) cubic yards of pervious concrete. If multiple pavement section depths are shown on the plans, a test panel shall be constructed for each pavement section depth/thickness. The width of the test panel shall have a width no smaller than the greatest width to be used during the construction and installation of the pervious concrete onsite. The test panel(s) shall include at least one joint and at the spacing specified on the plans and specifications. Test panels may be placed non-contiguously. The test panel(s) shall be equivalent and representative of the production pervious concrete pavement in all aspects including subbase, depth, joints, method of placement, curing, and preparation. Construction and evaluation of the test panel shall occur as follows:

1. Notify the Engineer at least ten (10) Working Days before installing pervious concrete test panels.
2. Coordinate the location of the test panel with the Engineer.
3. Install the test panel in accordance with the Specifications and Drawings.
4. Notify the Engineer when the test panel is ready for inspection and acceptance testing.
5. Acceptance testing will be conducted in accordance with Section 5-03.3(6).

6. Remove, replace, and dispose of any unsatisfactory portions of test panels as determined by the Engineer, at no additional cost to the Contracting Agency.

Failure to install acceptable test panel(s) of pervious concrete will indicate an unapproved test panel(s) and require new test panel(s) for review.

The completed and approved test panel(s) shall establish the JMF.

The approved test panel shall meet the requirements of Section 5-03.3(6).

Upon successful completion of the infiltration test, unless otherwise determined by the Engineer, three (3), cores will be cut in accordance with ASTM C42 and will be used to validate the mix design under the acceptance criteria of Section 5-06.3(6). Cores shall be taken at the same location where the infiltration test was conducted. The average hardened density of the cores shall be the hardened density used for the JMF. The hardened density of each core used for determining the JMF shall be within five (5) percent of the mean value of the three cores. Core holes shall be filled by the Contractor with pervious concrete meeting the proposed JMF and shall match adjacent pavement color, texture and grade.

The completed and accepted test panels shall be maintained and protected throughout the duration of the Work and may not be demolished and disposed of without written permission from the Engineer. If the test panel(s) is incorporated into the Work, it shall remain in place accepted as a single lot.

5-06.3(11) Joints

Construct joints at the locations, depths and with horizontal dimensions indicated on plans unless noted otherwise in this section. Joints shall be of three (3) types: construction, contraction, isolation. Construction joints shall be formed at the end of a day's work or when necessary to stop production for any reason. Contraction joints shall be used to control random cracking. Isolation joints shall be used where the pervious concrete abuts existing facilities or where shown on the Plans.

5-06.3(11)A Construction Joints

Construction joints shall be located at the location of a planned contraction or isolation joint. Construction joints are to be formed by placing a header between the forms, at right angles, to the full depth of the finished pervious concrete, and set to the height of the forms. Pervious concrete shall be placed against the header and compacted and finished as normal, including edging. The header shall remain in place until paving resumes.

5-06.3(11)B Contraction Joints

Contraction joints (transverse and longitudinal) shall be constructed at the locations and intervals shown in the Contract. Contraction joints shall be a depth of 1/3 the thickness of the pervious concrete pavement section and have a width of no more than 1/4 inch. Contraction joints shall not be saw cut unless specifically noted on the Plans. Saw cut joints shall have a minimum width of 1/8 inch. Plastic formed contraction joints shall be tooled on both sides of the joint with a radius of ½ inch. Tool joint to the depth and width in fresh concrete immediately after the concrete is compacted.

5-06.3(11)C Isolation Joints
Isolation joints shall be placed where the pervious concrete abuts existing structures or where shown on the Plans. Isolation joints shall continue through the depth of the pervious concrete using a 3/8 inch premolded joint filler meeting the requirements of Section 9-04.1(2). Isolation joints may be formed by forming a construction joint and affixing the premolded joint filler against one side of the joint and placing fresh pervious concrete against it. Isolation joints and filler shall be flush with the surrounding pervious concrete and shall not deviate from the acceptance criteria for smoothness as shown in Section 5-06.3(6). The edge of the pervious concrete adjacent the premolded joint filler shall be hand tooled with a ½ inch radius.

5-06.3(12) Cold Weather Work
When concrete is being placed and the ambient air temperature is expected to drop below 35° F during the day or night, the Contractor shall protect the concrete from freezing. The Contractor shall submit for approval a Cold Weather Plan prior to placing concrete when ambient air temperature below 35° F is anticipated, or when requested by the Engineer. When a Cold Weather Plan is required, pervious concrete shall not be placed without an approved Cold Weather Plan.

Under the Cold Weather Plan, the Contractor shall, provide a sufficient supply of straw, hay, blankets, or other suitable blanketing material and spread it over the pavement to a sufficient depth to prevent freezing of the concrete. The blanket material shall be placed on top of the sheet curing materials and covered with a layer of burlap or plastic sheeting, weighted or anchored to prevent the wind from displacing the insulation. At no time during the curing period shall the temperature of the pervious concrete be allowed to drop below 55° F. The Engineer may require recording thermometers if daytime temperature is below 50°. The curing period may be extended by the Engineer if the pervious concrete temperature has been allowed to drop below 55° F.

The cold weather protection shall be maintained for seven (7) days. Pervious concrete that has frozen during this period will be rejected.

5-06.3(13) Protection of Pervious Concrete Pavement
As part of the Construction Stormwater Pollution Prevention plan (SWPPP), rain runoff, surface water of any kind and sediment shall be prevented from entering the area of pervious concrete construction, including excavation, until the pervious concrete application has cured, testing is completed and determined to meet specifications and the adjacent areas that sheet flow/drain onto the pervious concrete are permanently stabilized from erosion and plantings are established. Once pavement is placed, flow diversion measures and protective covers shall continually be maintained until adjacent areas are permanently stabilized and concrete has been accepted. Construction vehicular traffic shall not be allowed onto the pervious concrete pavement.

Do not open the pavement to vehicular traffic until the concrete has cured for at least seven (7) uninterrupted days, testing has been completed, and the pavement has been accepted by the Engineer.

The Contractor shall take every precaution to protect the pervious concrete pavement from damage, including the introduction of foreign materials to the surface,

throughout the course of the work. Pervious concrete pavement that is damaged or has been adversely impacted by the introduction of foreign materials shall be remediated to the satisfaction of the Engineer or rejected and replaced to the nearest joint.

5-06.4 Measurement

Measurement for “Pervious Concrete Pavement - Sidewalk” will be by the square yard of finished surface of pervious concrete walk. No measurement will be made for blocked out areas, castings or other discontinuities in the sidewalk nine (9) square feet or larger.

Measurement for “Pervious Concrete Pavement-Vehicular” will be by the square yard for the finished surface of pervious concrete pavement. No Measurement will be made for blocked out areas, castings or other discontinuities in the pavement nine (9) square feet or larger.

5-06.5 Payment

Payment will be made in accordance with Section 1-04.1, for each of the following Bid Items that are included in the Proposal:

“Pervious Concrete Pavement - Sidewalk”, per square yard.
The Unit contract price per square yard for “Pervious Concrete Pavement - Sidewalk” shall be full pay for furnishing all labor, tools, equipment and materials required to construct the pervious concrete sidewalk as specified in this Section, including but not limited to; performing mix designs, and placing pervious concrete.

“Pervious Concrete Pavement- vehicular”, per square yard.
The Unit contract price for “Pervious Concrete Pavement-Vehicular” shall be full pay for furnishing all labor, tools, equipment and materials required to construct the pervious concrete pavement as specified in this Section, including but not limited to; performing mix designs, and placing pervious concrete.

Appendix C – Reference Materials

WSDOT Environmental Procedures Manual (M 31-11), last modified June 2015:
http://www.wsdot.wa.gov/Publications/Manuals/M31-11.htm

WSDOT Geotechnical Design Manual (M 46-03), last modified May 2015:
http://www.wsdot.wa.gov/Publications/Manuals/M46-03.htm

WSDOT Materials Manual (M 46-01), last modified January 2016:
http://www.wsdot.wa.gov/Publications/Manuals/M46-01.htm

WSDOT General Special Provisions (GSPs):
http://www.wsdot.wa.gov/Partners/APWA/Division_5_Page.htm

Appendix D: Road Standard Sections

Classification	Principal	Minor	Collector	Local
Access to ROW	Controlled with very restricted access to abutting properties.	Partially controlled with infrequent access to abutting properties.	Partially controlled with infrequent access to abutting properties.	Restricted, lots front on local access street where feasible.
Overlay Districts	Refer Division III of Title 15 of the SeaTac Municipal Code for specific road standard sections and provisions	Refer Division III of Title 15 of the SeaTac Municipal Code for specific road standard sections and provisions	Refer Division III of Title 15 of the SeaTac Municipal Code for specific road standard sections and provisions	Refer Division III of Title 15 of the SeaTac Municipal Code for specific road standard sections and provisions
Arterial Spacing[1]	Under 1 mile	Under 1 mile	Under 0.5 mile	N/A
Design Speed[2]	See AASHTO	See AASHTO	See AASHTO	See AASHTO
Horizontal Curvature	See AASHTO	See AASHTO	See AASHTO	See AASHTO
Maximum Grade[3]	See AASHTO	See AASHTO	See AASHTO	See AASHTO
Roadway Width[4]	44 to 60 feet	44 to 60 feet	26 to 44 feet	32 feet[7]
Minimum Lane Width	11 feet	11 feet	11 feet	11 feet
Minimum Left Turn Lane Width	12 feet	12 feet	12 feet	N/A
Minimum Right Turn Lane Width	12 feet	12 feet	12 feet	N/A
Minimum Widened Curb Lane Width[6]	14 feet	14 feet	14 feet	N/A
Minimum Bike Lane Width	5 feet	5 feet	5 feet	5 feet
Maximum Superelevation[5]	6%	6%	6%	See Table 2.4B
Minimum Stopping Sight Distance	See Table 2.1	See Table 2.1	See Table 2.1	See Table 2.1

Minimum Entering Sight Distance	See Table 2.1	See Table 2.1	See Table 2.1	See Table 2.1
Minimum Right-of-Way Width[4]	100 feet	84 feet	84 feet	60 feet
Minimum Sidewalk Width	8 feet	6 feet	6 feet	6 feet
Minimum Parking Lane Width	8 feet	8 feet	8 feet	8 feet
Minimum Landscape Strip Width	6 feet	6 feet	4 feet	4 feet
Curb Type	Vertical	Vertical	Vertical	Vertical