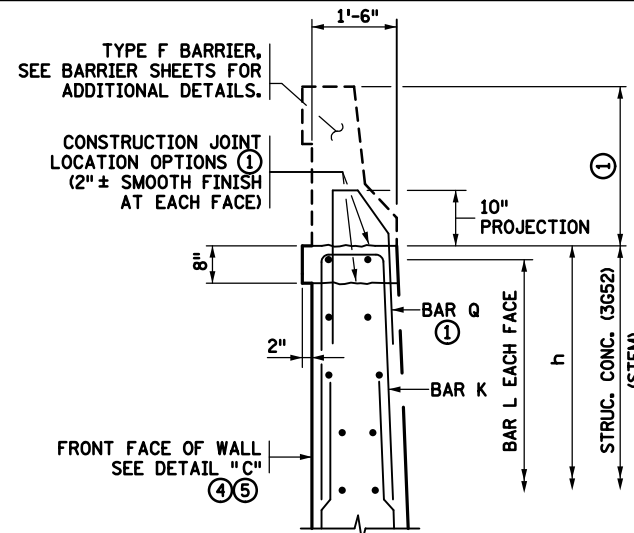
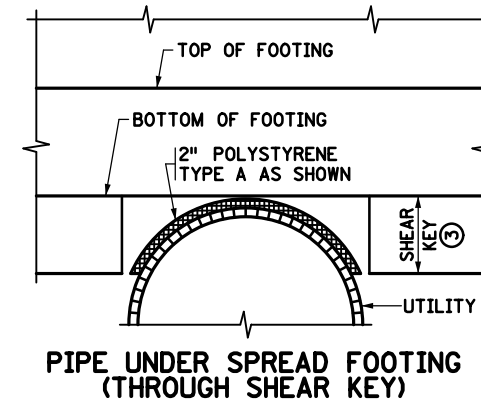


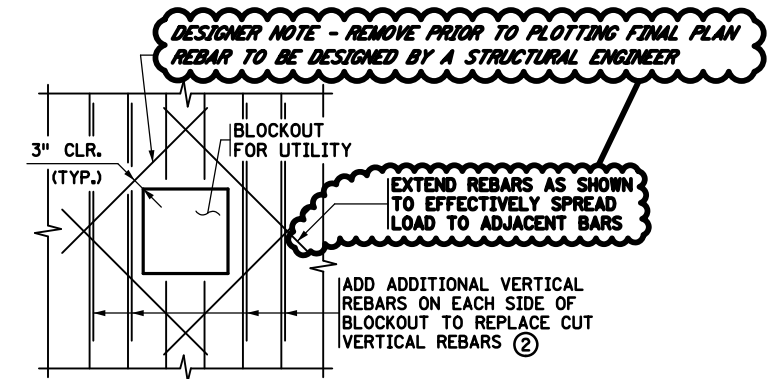
CONCRETE PARAPET P-1 DETAIL
2" COPING OPTION SHOWN



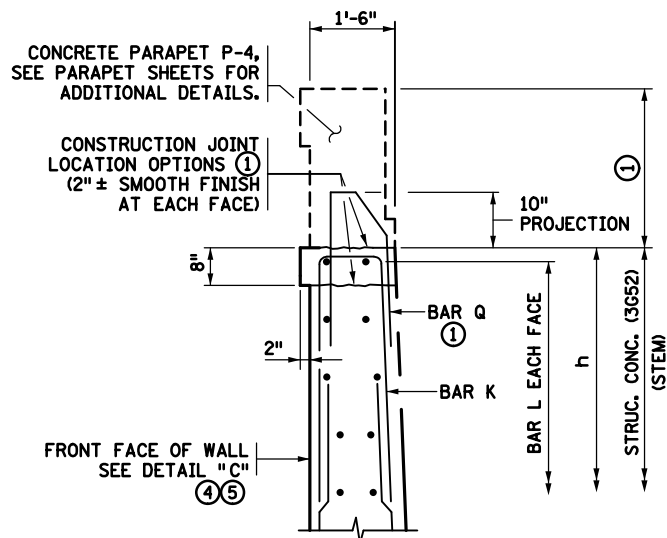
TYPE F BARRIER DETAIL
2" COPING OPTION SHOWN



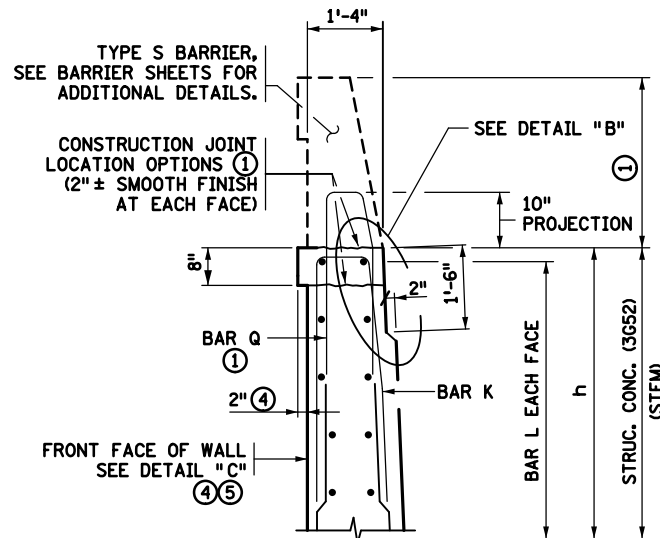
PIPE UNDER SPREAD FOOTING
(THROUGH SHEAR KEY)



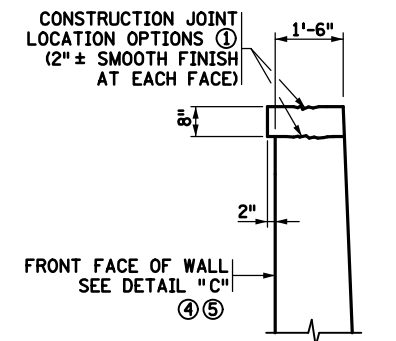
UTILITY BLOCKOUT DETAIL



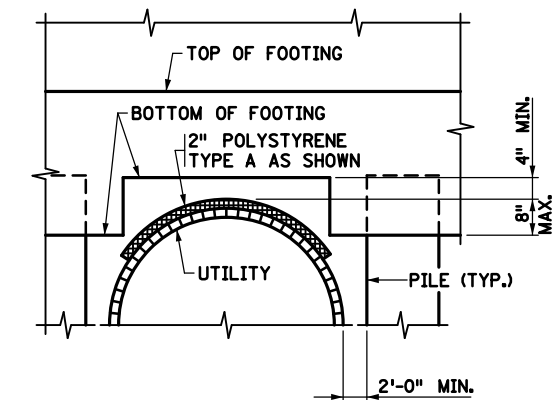
CONCRETE PARAPET P-4 DETAIL
2" COPING OPTION SHOWN



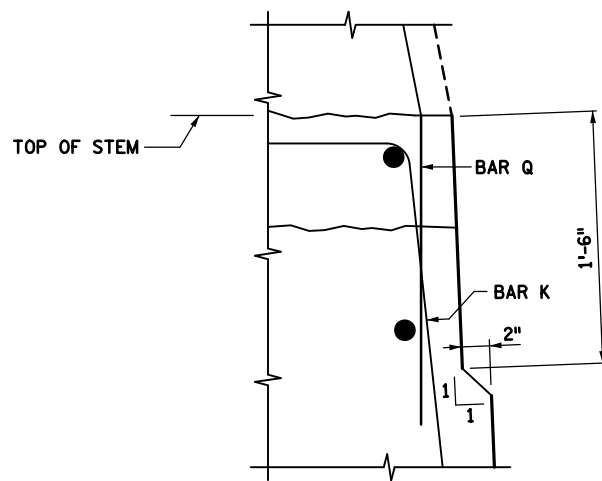
TYPE S BARRIER DETAIL
2" COPING OPTION SHOWN



COPING DETAIL



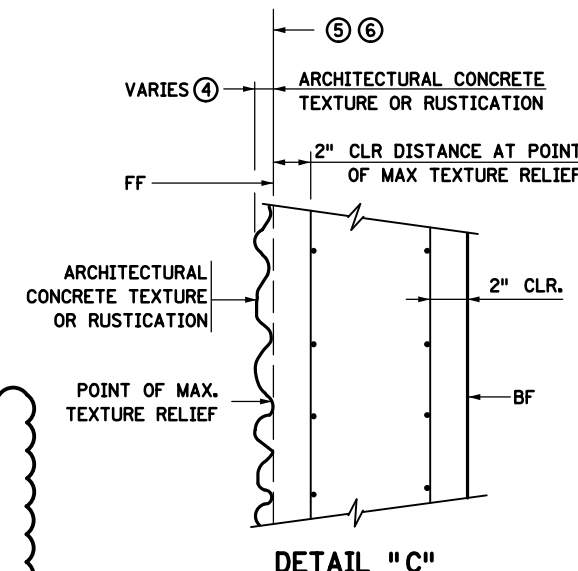
PIPE THROUGH PILE FOOTING



DETAIL "B"

DESIGNER NOTE - REMOVE PRIOR TO PLOTTING FINAL PLAN

CAREFULLY REVIEW THE DIMENSIONS OF THE COPING AT THE TOP OF THE WALL AS IT WILL NEED TO BE MODIFIED DEPENDING ON THE AMOUNT OF TEXTURE RELIEF OF THE FORM LINER. IF THE RETAINING WALL ABUTS A BRIDGE OR BRIDGE WING WALL, BE SURE TO COORDINATE THESE DETAILS WITH THE BRIDGE DESIGNER. SEE NOTES 4 AND 5.



DETAIL "C"

NOTES:

ARCHITECTURAL TREATMENT OPTION ON FRONT FACE OF RETAINING WALL, INCLUDING COPING OR HORIZONTAL REVEL OPTION TO BE DETERMINED BY MnDOT.

- ① REFER TO PARAPET OR BARRIER SHEETS FOR ADDITIONAL INFORMATION INCLUDING Q BAR PLACEMENT DETAILS, AND PAYMENT.
- ② FIELD CUT/ADJUST VERTICAL AND HORIZONTAL REINFORCEMENT AS NECESSARY TO CLEAR BLOCKOUT. PLACE REINFORCEMENT AS SHOWN.
- ③ MODIFY AS NEEDED FOR INTERRUPTION.
- ④ THE THICKNESS OF THE ARCHITECTURAL CONCRETE TEXTURE VARIES WITH THE TEXTURE RELIEF. THE STRUCTURAL CONCRETE QUANTITIES DO NOT INCLUDE THE MATERIAL WITHIN THE ARCHITECTURAL CONCRETE TEXTURE. MATERIAL NEEDED FOR THE TEXTURING SHALL BE INCIDENTAL. SEE SPECIAL PROVISIONS 2411. TEXTURE RELIEF TO ADHERE TO NCHRP REPORT 554 CRASH BARRIER GUIDANCE WHENEVER THE WALL FACE IS INSIDE OR NEAR THE CLEAR ZONE.
- ⑤ FOR RETAINING WALLS THAT ABUT A BRIDGE OR BRIDGE WING WALL, NOTE THAT THE DESIGNATION OF "FRONT FACE" MAY VARY FROM THE BRIDGE PLANS TO THE RETAINING WALL PLANS.
- ⑥ DATA FOR BASELINE GEOMETRY IS TABULATED FOR WALL ALIGNMENT, SEE LAYOUT SHEETS. WALL ALIGNMENT REFERENCE IS ALONG FRONT FACE OF WALL.

LEAD EXPERT OFFICE
KEVIN WESTERN
STATE BRIDGE ENGINEER

RETAINING WALL MISCELLANEOUS DETAILS

APPROVED: 02-16-2016
REVISED: 09-01-2016

STANDARD PLAN
5-297.624
1 OF 6



STANDARD PLAN

STATE PROJ. NO.
TRUNK HWY.
SHEET NO.
TOTAL SHEETS

BILL OF REINFORCEMENT FOR STEPPED FOOTING DETAILS ①②									
STATION	STEP TYPE (VAR. OR MIN.)	JOINT	BOT. OF FOOTING EL. LOW END	BOT. OF FOOTING EL. HIGH END	BAR (B, C, V)	MARK	NO.	LENGTH	A- DIMENSION
					B (8)				N.A.
					C (8)		4		N.A.
					V (7)				
					B (8)				N.A.
					C (8)		4		N.A.
					V (7)				
					B (8)				N.A.
					C (8)		4		N.A.
					V (7)				
					B (8)				N.A.
					C (8)		4		N.A.
					V (7)				
					B (8)				N.A.
					C (8)		4		N.A.
					V (7)				
					B (8)				N.A.
					C (8)		4		N.A.
					V (7)				
					B (8)				N.A.
					C (8)		4		N.A.
					V (7)				
					B (8)				N.A.
					C (8)		4		N.A.
					V (7)				
					B (8)				N.A.
					C (8)		4		N.A.
					V (7)				
					B (8)				N.A.
					C (8)		4		N.A.
					V (7)				
					B (8)				N.A.
					C (8)		4		N.A.
					V (7)				
					B (8)				N.A.
					C (8)		4		N.A.
					V (7)				

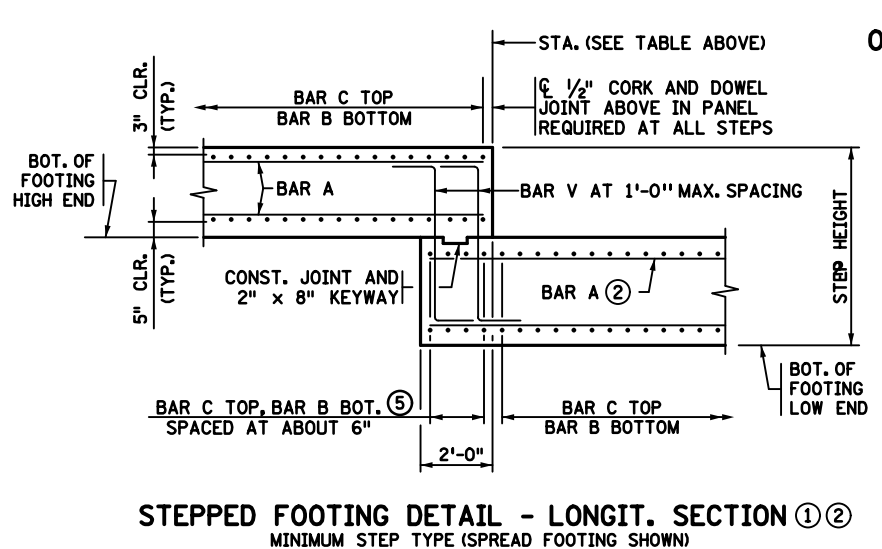
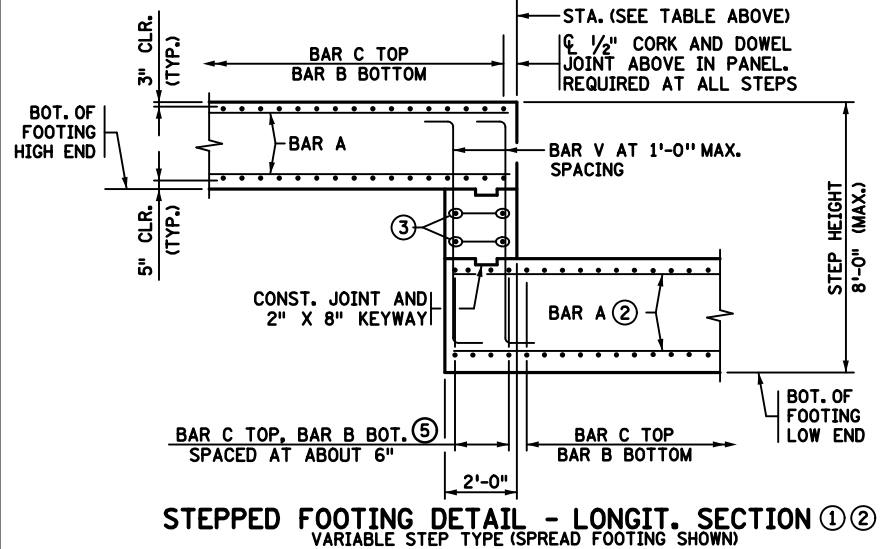
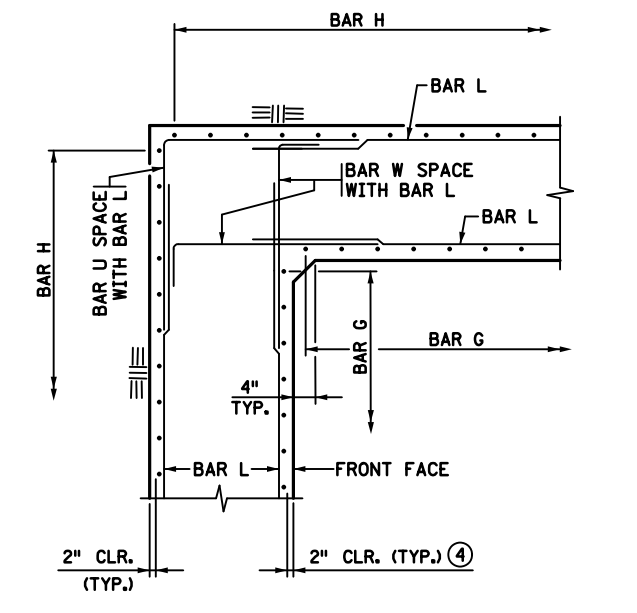
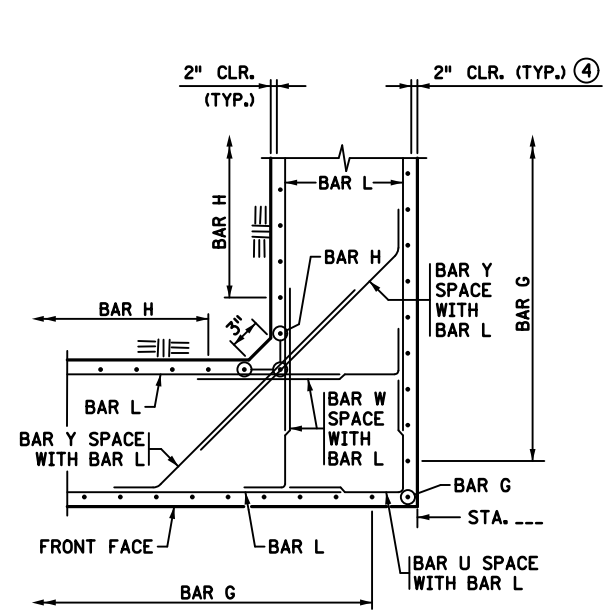
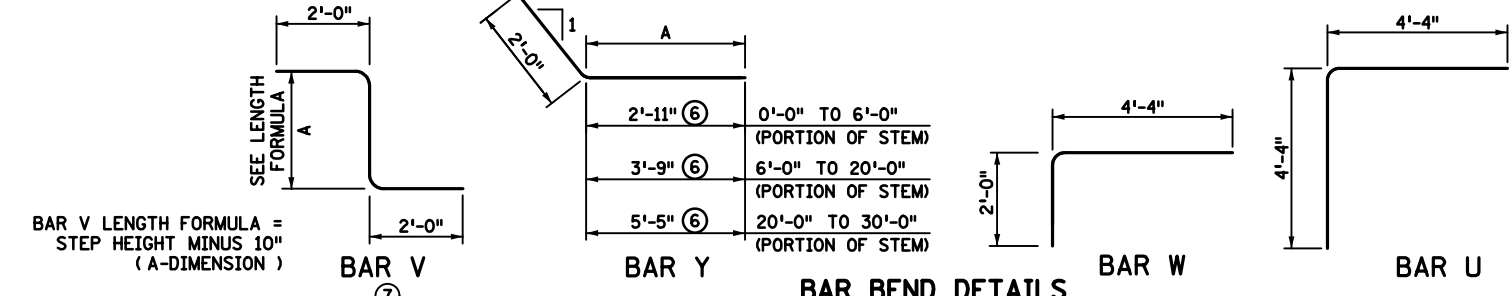
N.A. = NOT APPLICABLE

DESIGNER NOTE
(REMOVE PRIOR TO PLOTTING FINAL PLAN)
FOR WALLS WITH CORNERS, FILL IN THE FIRST 3 COLUMNS OF THE BILL OF REINFORCEMENT.

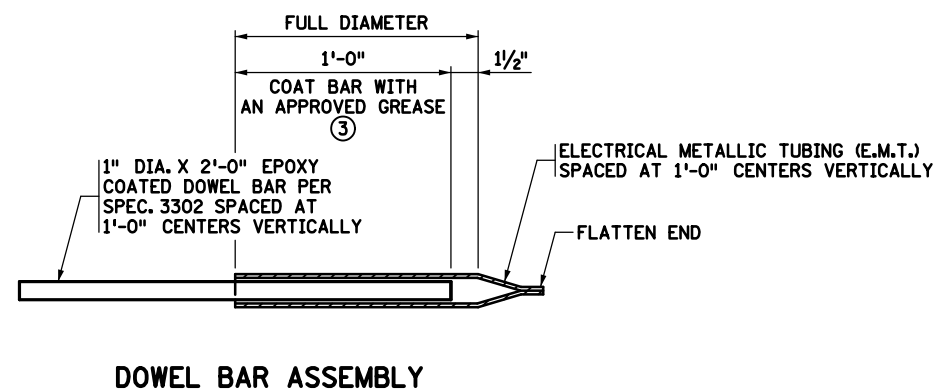
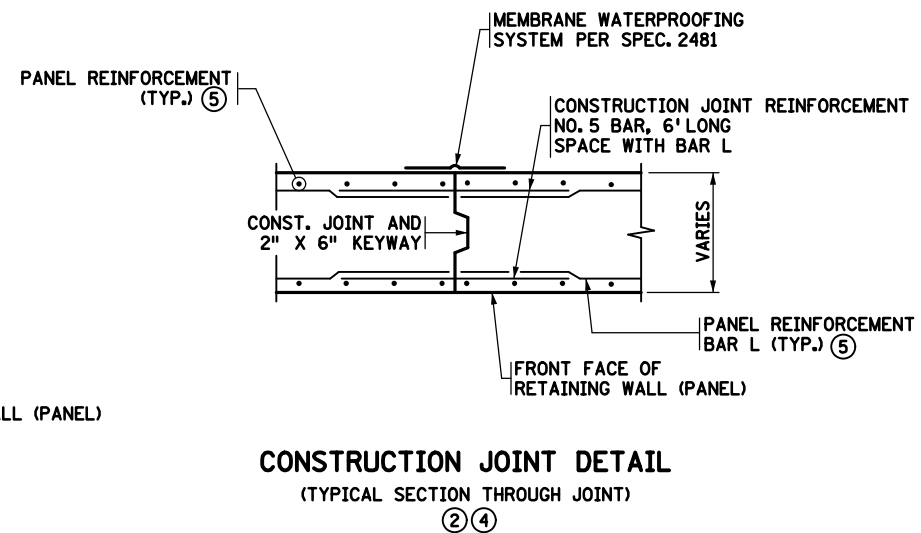
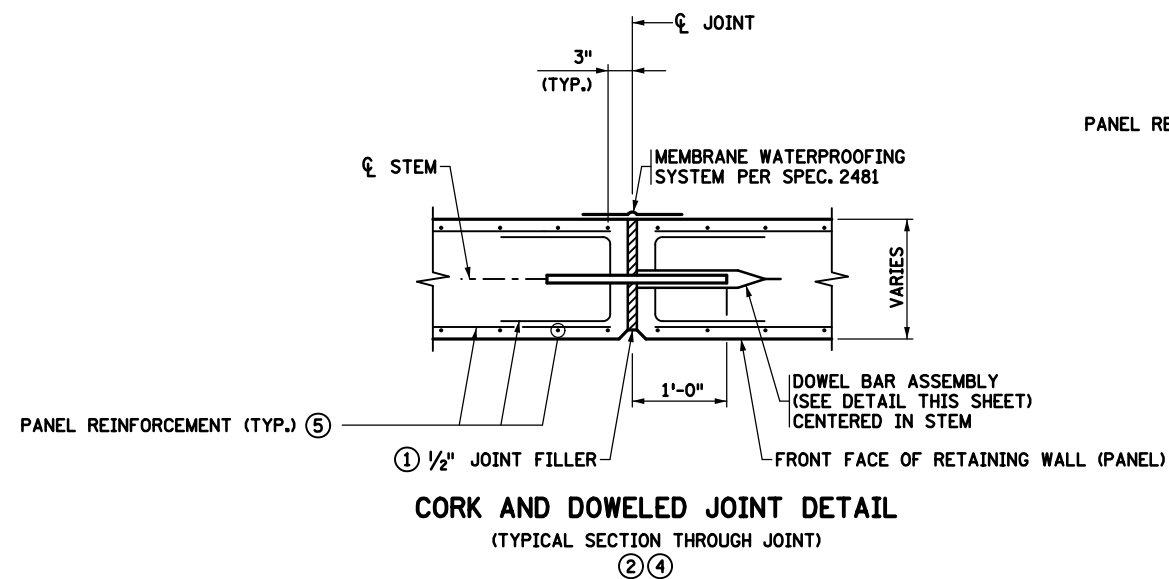
DESIGNER NOTE
(REMOVE PRIOR TO PLOTTING FINAL PLAN)
FOR STEPPED FOOTINGS, FILL IN THE FIRST 5 COLUMNS OF THE BILL OF REINFORCEMENT. THE CONTRACTOR WILL FILL IN THE LAST 5 COLUMNS.

BILL OF REINFORCEMENT FOR CORNER DETAILS ①									
STATION	JOINT	INSIDE OR OUTSIDE CORNER	BAR	MARK	NO.	LENGTH	SHAPE	A- DIMENSION	
			U	C4 E		8'-8"	┌	N.A.	
			W	C4 E		6'-4"	└	N.A.	
			Y	C4 E		4'-11"	┘	2'-11"	
			Y	C4 E		5'-9"	┘	3'-9"	
			Y	C4 E		7'-5"	┘	5'-5"	
			U	C4 E		8'-8"	┌	N.A.	
			W	C4 E		6'-4"	└	N.A.	
			Y	C4 E		4'-11"	┘	2'-11"	
			Y	C4 E		5'-9"	┘	3'-9"	
			Y	C4 E		7'-5"	┘	5'-5"	
			U	C4 E		8'-8"	┌	N.A.	
			W	C4 E		6'-4"	└	N.A.	
			Y	C4 E		4'-11"	┘	2'-11"	
			Y	C4 E		5'-9"	┘	3'-9"	
			Y	C4 E		7'-5"	┘	5'-5"	
			U	C4 E		8'-8"	┌	N.A.	
			W	C4 E		6'-4"	└	N.A.	
			Y	C4 E		4'-11"	┘	2'-11"	
			Y	C4 E		5'-9"	┘	3'-9"	
			Y	C4 E		7'-5"	┘	5'-5"	

N.A. = NOT APPLICABLE



- NOTES:**
ADDITIONAL REINFORCING BARS, STRUCTURAL CONCRETE, AND OTHER COMPONENTS REQUIRED TO CONSTRUCT CORNERS AND STEPPED FOOTINGS ARE INCIDENTAL.
- CONTRACTOR IS REQUIRED TO COMPLETE THE BILL OF REINFORCEMENT TABLE AND SUBMIT TO PROJECT ENGINEER AT LEAST 3 WEEKS PRIOR TO REBAR FABRICATION.
 - FOR THE LOWER OF THE TWO FOOTINGS AT A STEP, THE CONTRACTOR IS RESPONSIBLE FOR MODIFYING THE LENGTH OF FOOTING BAR A TO EXTEND BENEATH THE STEP OR USE SPLICED BARS.
 - 6 INCH MAX. SPACING. BARS TO BE SAME SIZE AND LENGTH AS BAR B OF THE LOWER FOOTING.
 - REFER TO DETAIL "C" AND NOTES ON STANDARD PLAN 5-297.624 (1 OF 6).
 - REFER TO TABLE LABELED "BILL OF REINFORCEMENT FOR STEPPED FOOTING DETAILS" FOR ADDITIONAL B AND C BARS IN LOWER FOOTING.
 - USE THE BAR Y LEG DIMENSION FOR THE PORTION OF STEM LOCATION INDICATED IN THE BAR BEND IN DETAIL. (0'-0" REPRESENTS TOP OF THE STEM).
 - BAR V SIZE TO MATCH BAR B. SEE PANEL TABULATIONS FOR SIZE.
 - SEE PANEL TABULATIONS FOR BAR SIZE AND LENGTH.



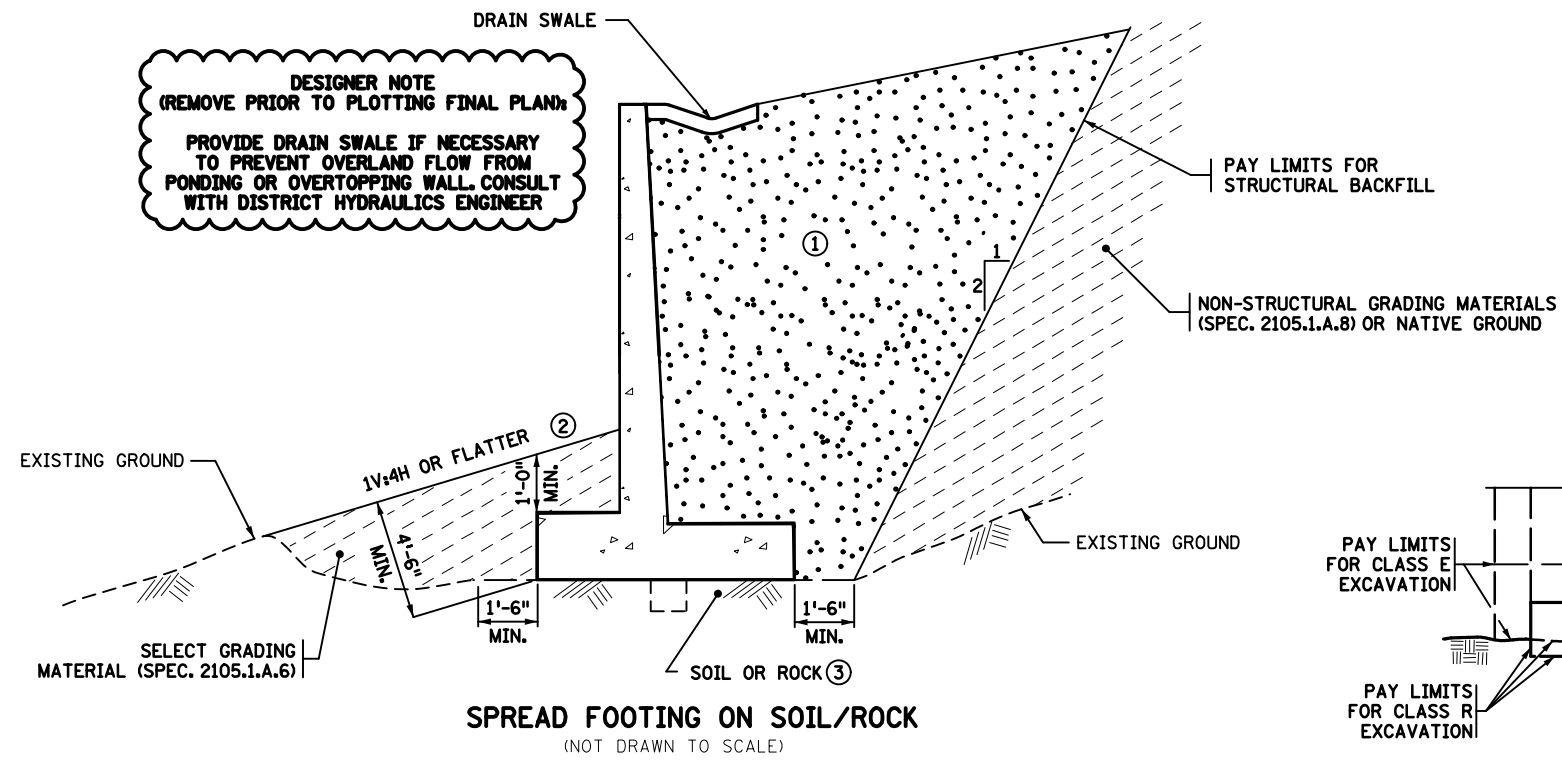
NOTES:

THE MATERIALS AND PLACEMENT OF THE CORK AND DOWEL JOINT/ CONSTRUCTION JOINT (DOWEL BAR ASSEMBLIES, NO. 5 REINFORCING BARS, JOINT FILLER, AND JOINT WATERPROOFING) ARE INCIDENTAL.

THE CONTRACTOR SHALL ASSIGN TO THE REINFORCING BAR SUPPLIER THE RESPONSIBILITY OF SUPPLYING THE NECESSARY MATERIALS ASSOCIATED WITH THE DETAILS SHOWN ON THIS SHEET.

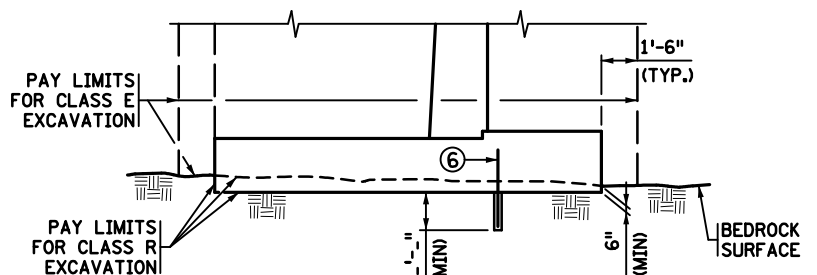
- ① JOINT FILLER SHALL BE CORK SPEC. 2401.3.E.3.
- ② AT THE CONTRACTOR'S OPTION, CONSTRUCTION JOINTS MAY BE SUBSTITUTED IN LIEU OF CORK AND DOWEL JOINTS. REINFORCEMENT QUANTITIES WERE COMPUTED ASSUMING A CORK AND DOWEL JOINT BETWEEN EVERY PANEL. CHANGES IN THE BILL OF REINFORCEMENT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR, AND NO ADDITIONAL PAYMENT WILL BE MADE. AT A MINIMUM, PLACE CORK AND DOWEL JOINTS EVERY 9'-6". A CORK AND DOWEL JOINT IS REQUIRED AT ALL VERTICAL FOOTING STEPS.
- ③ GREASE SHALL BE AN APPROVED HIGH PRESSURE TYPE THAT IS EFFECTIVE OVER THE FULL RANGE OF EXPECTED TEMPERATURES AND RESISTANT TO CHEMICAL ACTION.
- ④ DOWEL BAR ASSEMBLY MUST BE PLACED PERPENDICULAR TO JOINT AND PARALLEL TO THE WALL FACE, AND TO EACH OTHER.
- ⑤ SEE PANEL SHEETS FOR REINFORCING DETAILS.

LEAD EXPERT OFFICE	NANCY DAUBENBERGER STATE BRIDGE ENGINEER	RETAINING WALL MISCELLANEOUS DETAILS	APPROVED: 08-27-2014 REVISED: 09-01-2016	STANDARD PLAN 5-297.624	3 OF 6
		STANDARD PLAN		TRUNK HWY.	TOTAL SHEETS

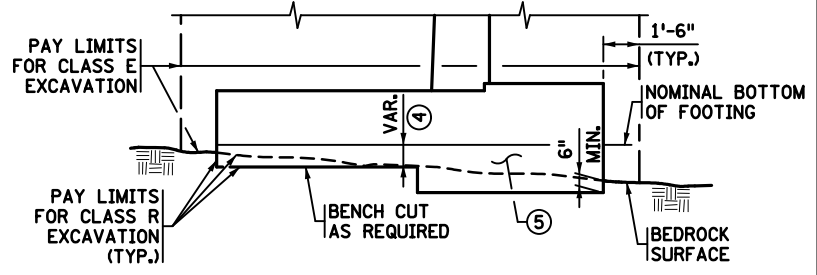


DESIGNER NOTES
(REMOVE PRIOR TO PLOTTING FINAL PLAN)
ALTER BACKFILL AND FINAL GRADE SECTIONS SHOWN IN THIS STANDARD TO MATCH PROJECT SPECIFIC CONDITIONS.
CHECK THE FOUNDATIONS REPORT FOR ADDITIONAL NOTES AND RECOMMENDATIONS THAT SHOULD BE INCLUDED IN PROJECT PLANS.

DESIGNER NOTE
(REMOVE PRIOR TO PLOTTING FINAL PLAN)
CONSULT FOUNDATION RECOMMENDATIONS TO DETERMINE WHICH ROCK FOUNDATION OPTION TO USE (IF ANY).
IF ROCK FOUNDATION OPTION IS USED, REMOVE NOTE ③

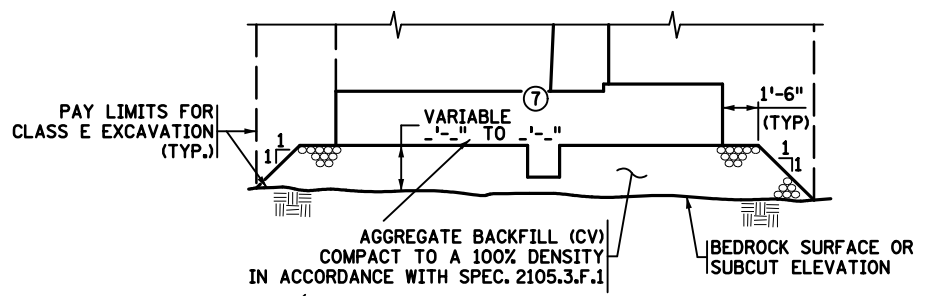


ROCK EXCAVATION OPTION

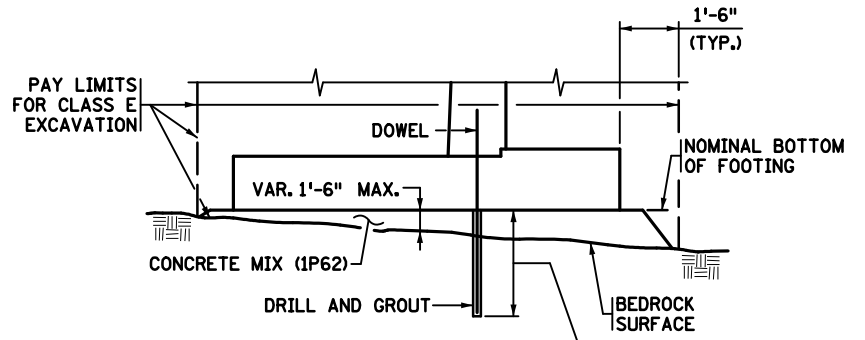


ROCK SUBCUT WITH CONCRETE BACKFILL OPTION

DESIGNER NOTE
(REMOVE PRIOR TO PLOTTING FINAL PLAN)
FILL IN DOWEL DEPTH, DETERMINED FROM FOUNDATION RECOMMENDATION REPORT (1'-6\"/>



AGGREGATE BACKFILL OPTION



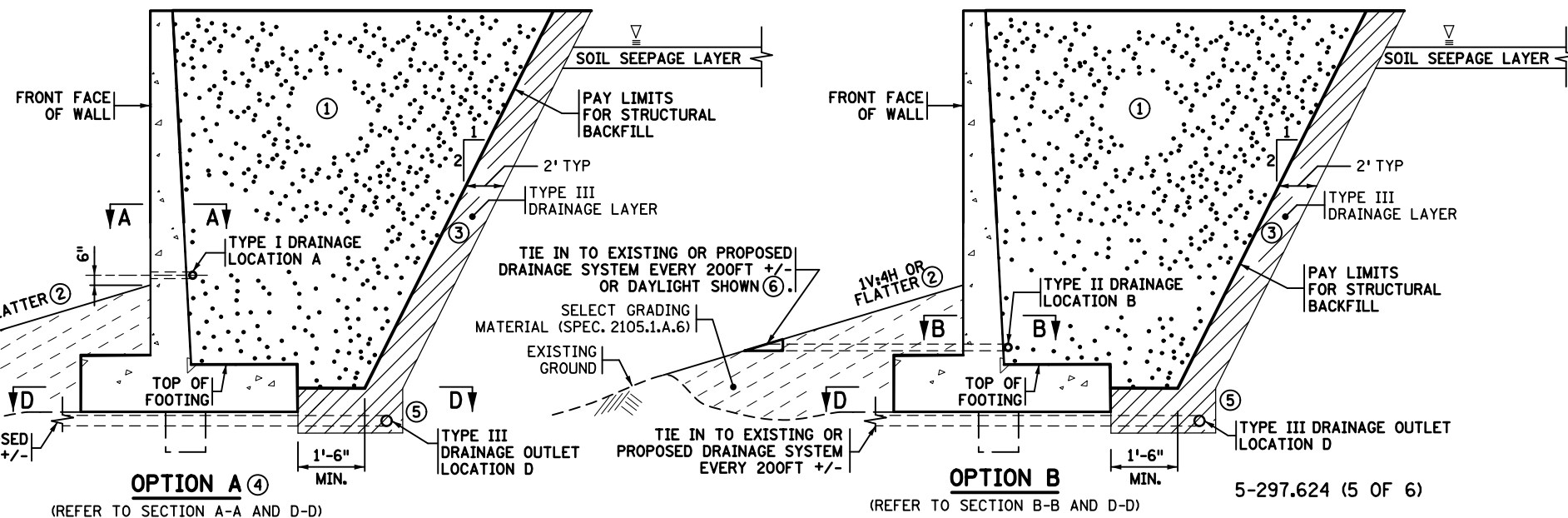
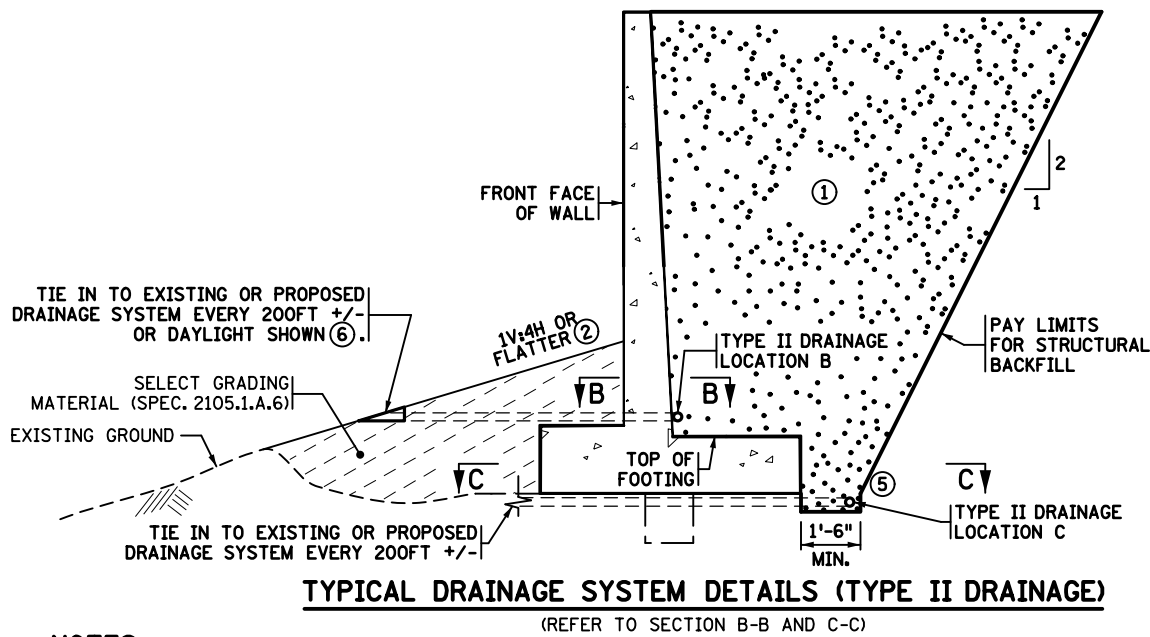
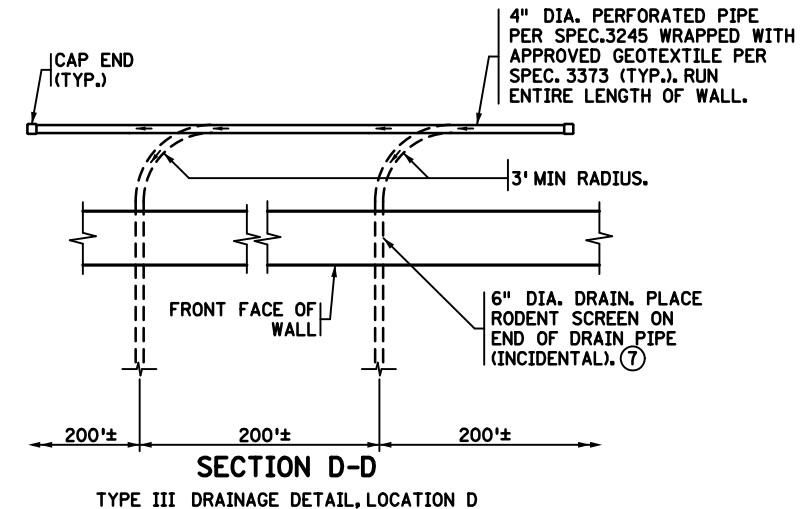
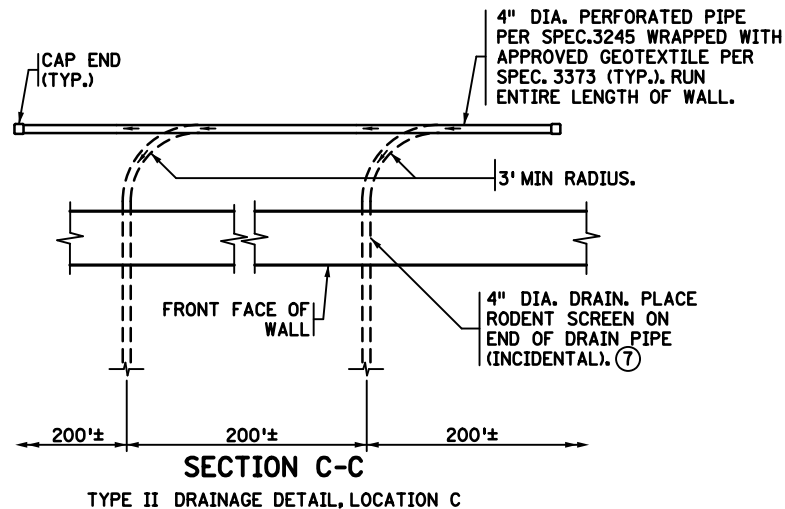
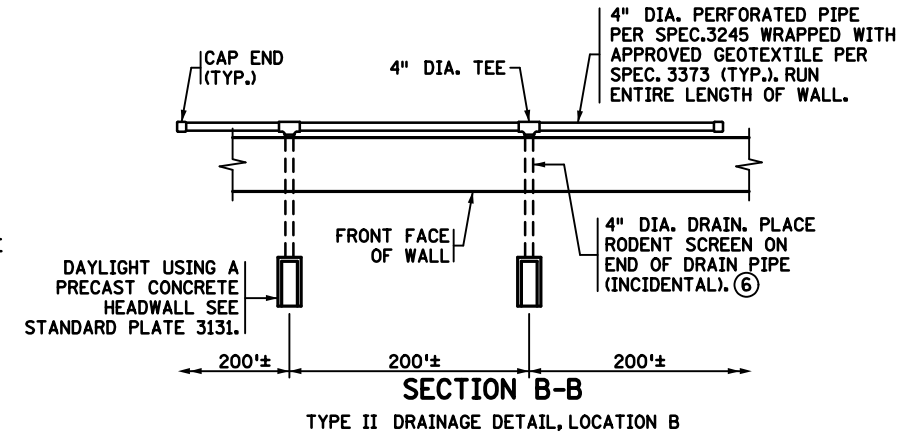
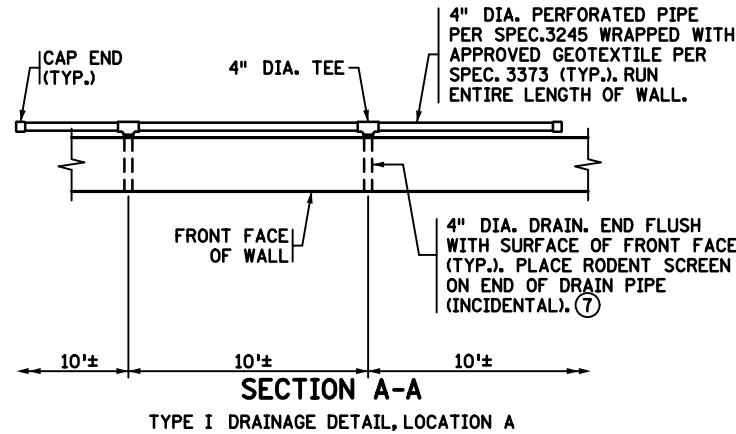
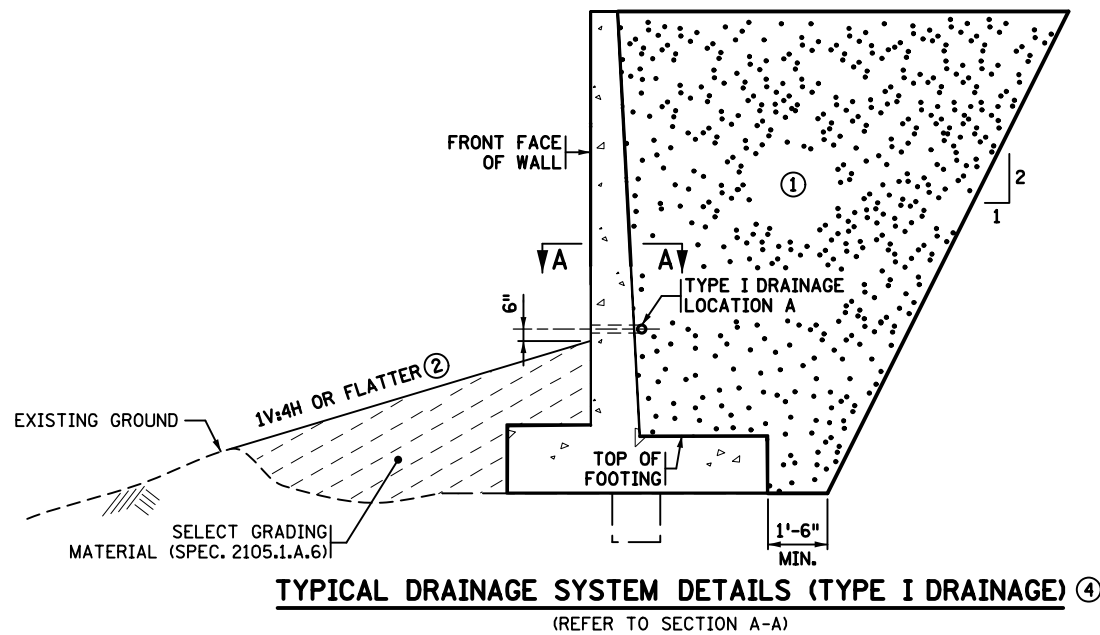
DOWEL AND LEAN CONCRETE BACKFILL OPTION

- ① STRUCTURAL BACKFILL (SPEC. 3149.2.D.2) COMPACT BACKFILL TO SPECIFIED DENSITY METHOD SPEC. 2105.3.F.1
- ② PROVIDE SLOPE OF 1V:24H TO 1V:4H FOR PROPER DRAINAGE.
- ③ LEVEL FOUNDATION SURFACE AND CLEAR SURFACE OF LOOSE DEBRIS BEFORE PLACING FOUNDATION DIRECTLY ON SOIL OR ROCK.
- ④ SEE SPECIAL PROVISIONS FOR PAYMENT OF ADDITIONAL CONCRETE.
- ⑤ STRUCTURAL CONCRETE (1G52) OR LEAN CONCRETE BACKFILL (1P62), AS APPROVED BY ENGINEER.
- ⑥ DRILL HOLES FOR ANCHORS TO KEY FOOTING IN ROCK.
- ⑦ MINIMUM DEPTH 1 FT. 6 INCH OR SHEAR KEY DEPTH.

DESIGNER NOTE
(REMOVE PRIOR TO PLOTTING FINAL PLAN)
FILL IN DEPTHS BASED ON CONSULTATION WITH FOUNDATIONS UNIT.
MINIMUM DEPTH IS 1'-6\"/>

ROCK FOUNDATION OPTIONS

DESIGNER NOTE
(REMOVE PRIOR TO PLOTTING FINAL PLAN)
ROCK ANCHOR EMBEDMENT DEPTH SHALL BE DETERMINED BY ENGINEER.



NOTES:

BACKFILL MATERIAL SHALL COMPLETELY SURROUND PIPE AT ALL TIMES.
 SLOPE PIPE TO ENSURE PROPER DRAINAGE AT ALL TIMES.
 DRAINAGE SYSTEM PAID BY LUMP SUM PER SPEC. 2502.

- ① STRUCTURAL BACKFILL. SEE SHEET 5-297.620. COMPACT BACKFILL TO SPECIFIED DENSITY METHOD SPEC. 2105.3.F.1.
- ② PROVIDE SLOPE OF 1V:24H TO 1V:4H FOR PROPER DRAINAGE.
- ③ TYPE III DRAINAGE LAYER TO BE FINE FILTER AGGREGATE PER SPEC. 3149.2.J.2. FINE FILTER AGGREGATE MAY BE REPLACED WITH TYPE VI DRAINAGE GEOCOMPOSITE MATERIAL.
- ④ DRAINAGE SYSTEMS INSTALLED AT LOCATION A SHALL NOT BE USED WHEN A SIDEWALK, TRAIL, OR ROADWAY IS LOCATED ADJACENT TO THE FRONT FACE OF THE WALL TO PREVENT PONDING OR ICE ACCUMULATION.
- ⑤ EXTEND STRUCTURAL BACKFILL OR FINE FILTER AGGREGATE 8" BELOW BOTTOM OF FOOTING.

- ⑥ TYPE II LOCATION B DRAINAGE MAY DAYLIGHT DIRECTLY USING PRECAST CONCRETE HEADWALLS OR BE TIED INTO DRAINAGE SYSTEM.
- ⑦ THE RODENT SCREEN SHALL BE FABRICATED FROM CARBON STEEL FLATTENED EXPANDED METAL, STYLE 1/2" NO. 4F. IT SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION.

5-297.624 (5 OF 6)
 AUGUST 27, 2014

REVISION DATE
 9-1-16

LEAD EXPERT OFFICE
 NANCY DAUBENBERGER
 STATE BRIDGE ENGINEER



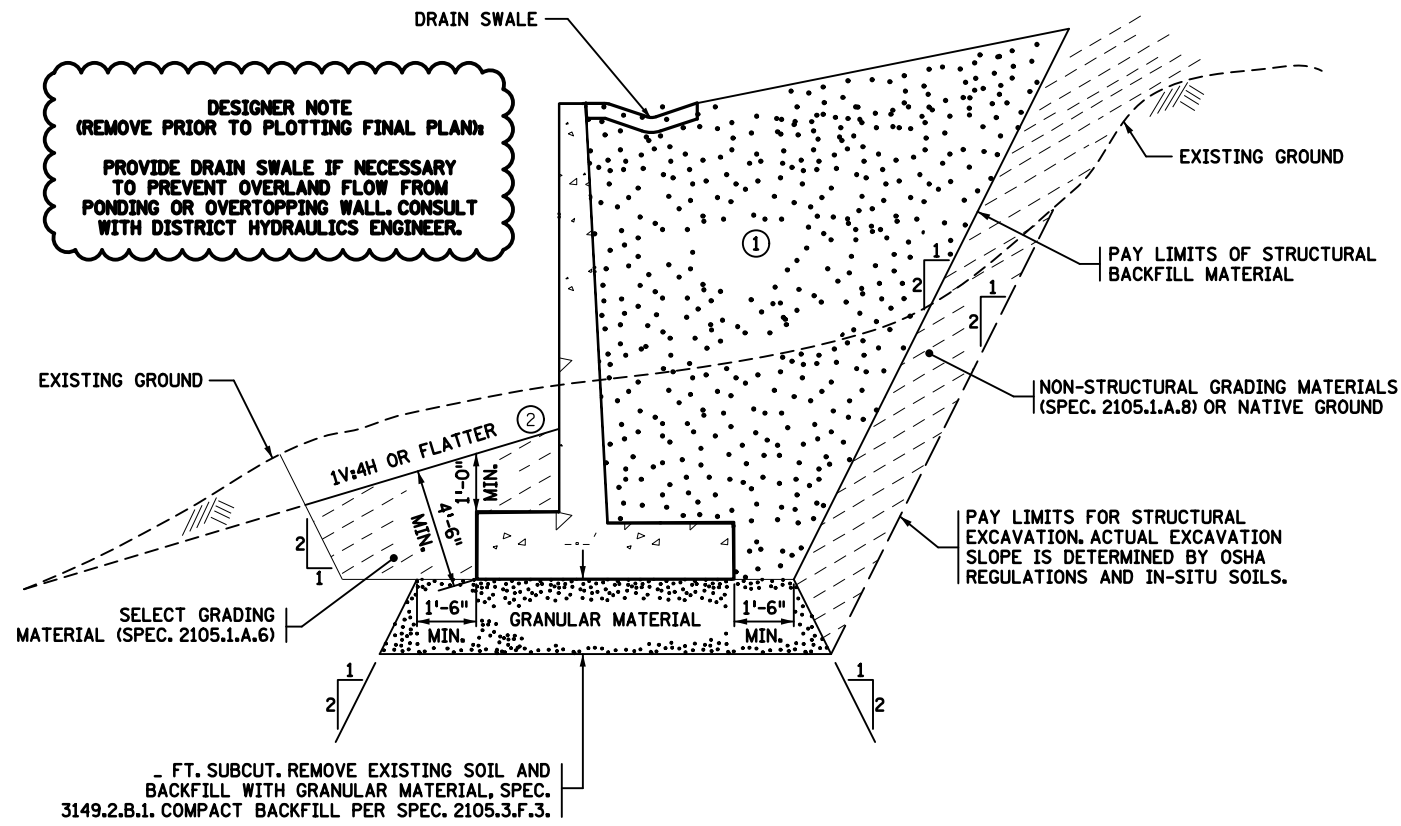
RETAINING WALL MISCELLANEOUS DETAILS
 (GEOTECHNICAL DETAILS)

APPROVED: 08-27-2014
 REVISED: 09-01-2016

STANDARD PLAN
 5-297.624
 5 OF 6

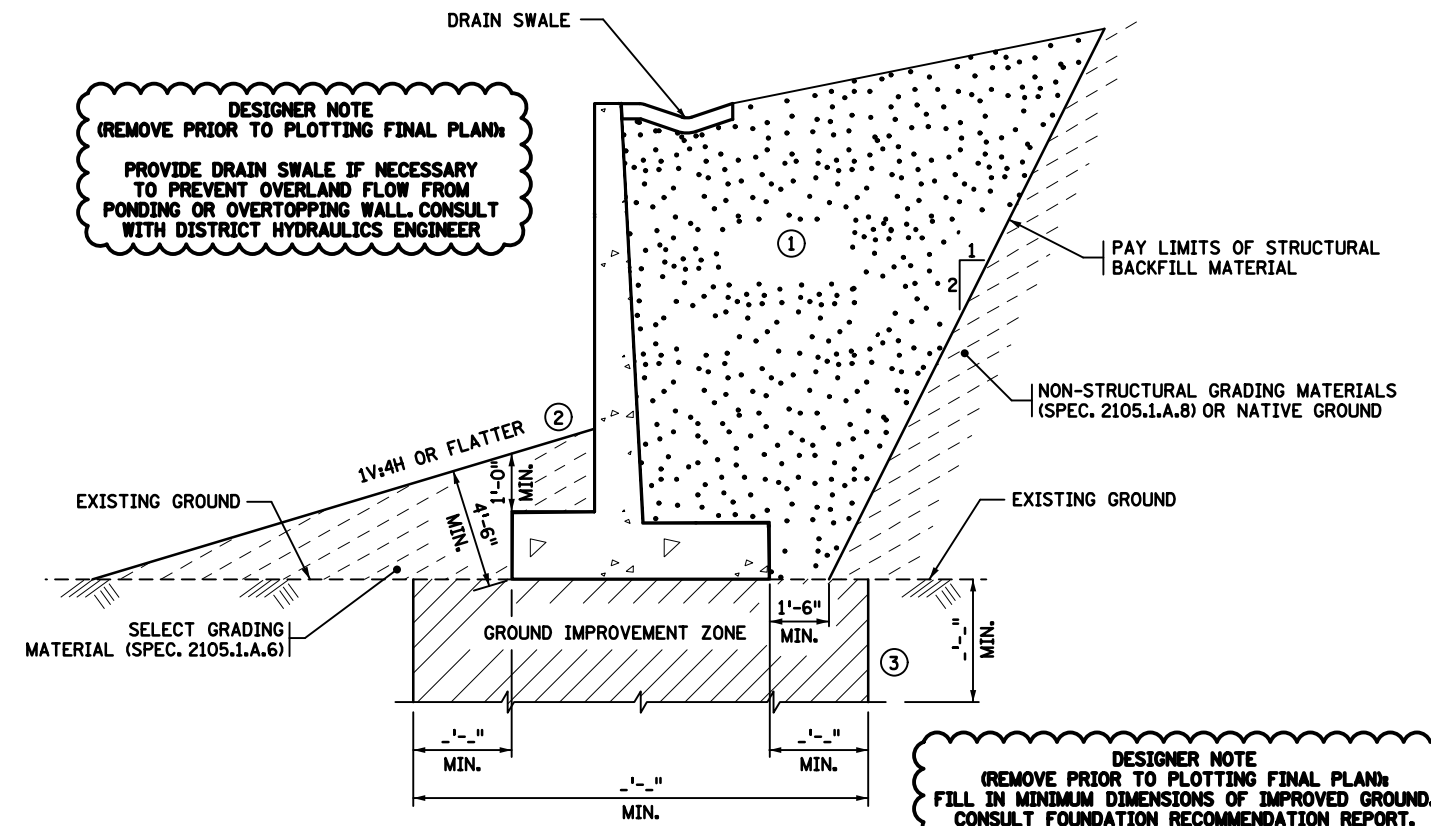
STANDARD PLAN

STATE PROJ. NO.
 TRUNK HWY.
 SHEET NO.
 TOTAL SHEETS



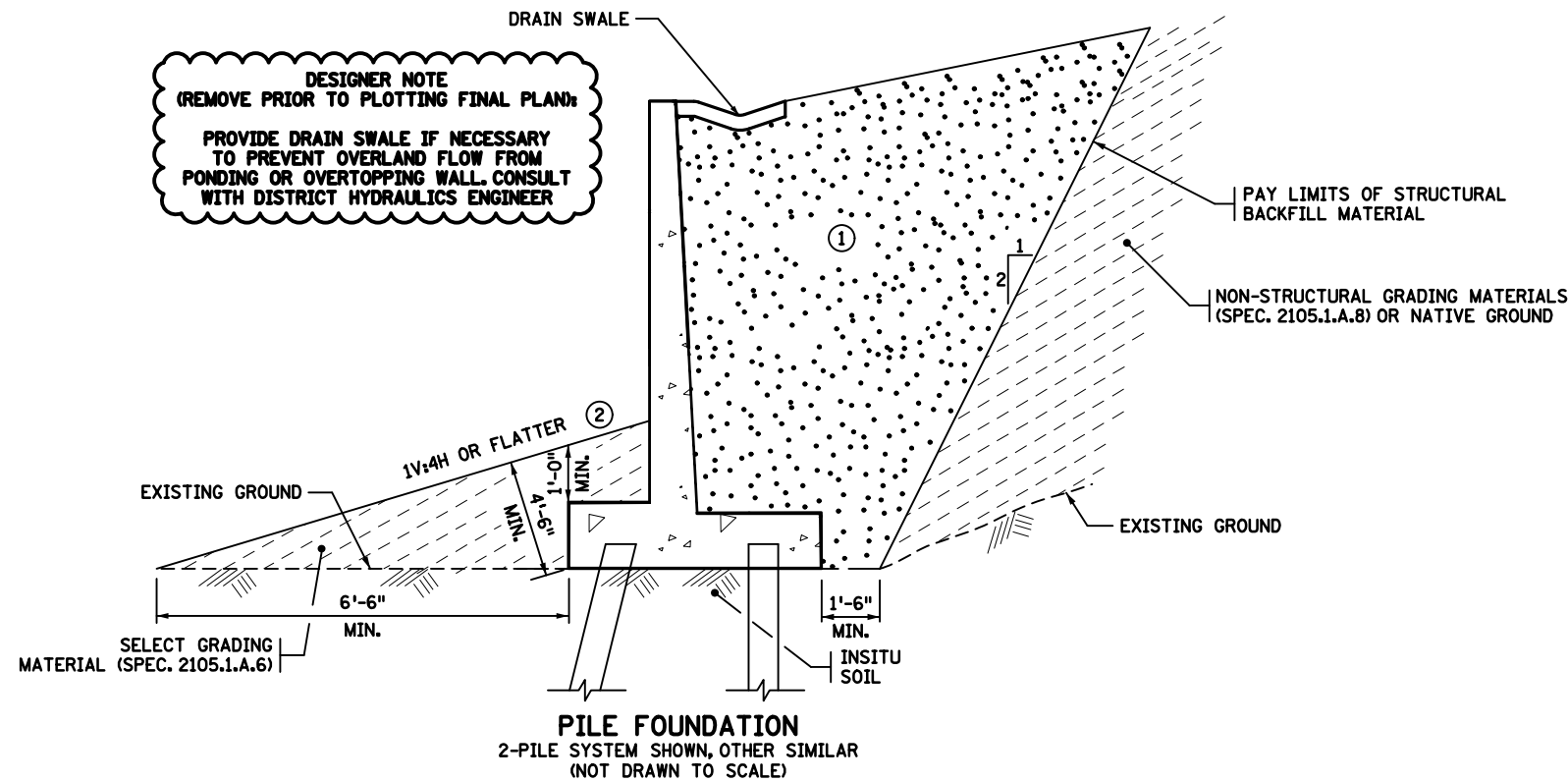
SPREAD FOOTING WITH SOIL SUBCUT
(NOT DRAWN TO SCALE)

DESIGNER NOTE
(REMOVE PRIOR TO PLOTTING FINAL PLAN)
FILL IN SUBCUT DEPTH FROM FOUNDATION
RECOMMENDATION REPORT



SPREAD FOOTING PLACED OVER GROUND IMPROVEMENT
(NOT DRAWN TO SCALE)

DESIGNER NOTE
(REMOVE PRIOR TO PLOTTING FINAL PLAN)
FILL IN MINIMUM DIMENSIONS OF IMPROVED GROUND.
CONSULT FOUNDATION RECOMMENDATION REPORT.



PILE FOUNDATION
2-PILE SYSTEM SHOWN, OTHER SIMILAR
(NOT DRAWN TO SCALE)

DESIGNER NOTES
(REMOVE PRIOR TO PLOTTING FINAL PLAN)
ALTER BACKFILL AND FINAL GRADE SECTIONS SHOWN IN
THIS STANDARD TO MATCH PROJECT SPECIFIC CONDITIONS.
CHECK THE FOUNDATIONS REPORT FOR ADDITIONAL NOTES AND
RECOMMENDATIONS THAT SHOULD BE INCLUDED IN PROJECT PLANS.
IF GROUND WATER IS ENCOUNTERED WITHIN TWICE THE FOOTING
WIDTH BELOW THE FOOTING, CONTACT THE GEOTECHNICAL
ENGINEER TO EVALUATE IF THE STANDARD CAN BE USED OR
A REDESIGN IS NEEDED.

- ① BACKFILL WITH STRUCTURAL BACKFILL SPEC. 3149.2.D.2 COMPACT BACKFILL PER SPEC. 2105.3.F.3.
- ② PROVIDE SLOPE OF 1V:24H TO 1V:4H FOR PROPER DRAINAGE.
- ③ PROVIDE SUFFICIENT COVERAGE AREA AND TREATMENT VOLUME TO GIVE GENERALLY UNIFORM SUPPORT TO THE FOUNDATION. IMPROVED GROUND OR SURFACE PREPARATIONS PLACED TO IMPROVE GROUND SUPPORT ARE TO BE IN IMMEDIATE CONTACT WITH THE FOOTING AND FOUNDATION MATERIAL.

LEAD EXPERT OFFICE
NANCY DAUBENBERGER
STATE BRIDGE ENGINEER



RETAINING WALL MISCELLANEOUS DETAILS
(GEOTECHNICAL DETAILS)

APPROVED: 08-27-2014
REVISED: 09-01-2016

STANDARD PLAN
5-297.624
6 OF 6

STANDARD PLAN

STATE PROJ. NO.
TRUNK HWY.
SHEET NO.
TOTAL SHEETS