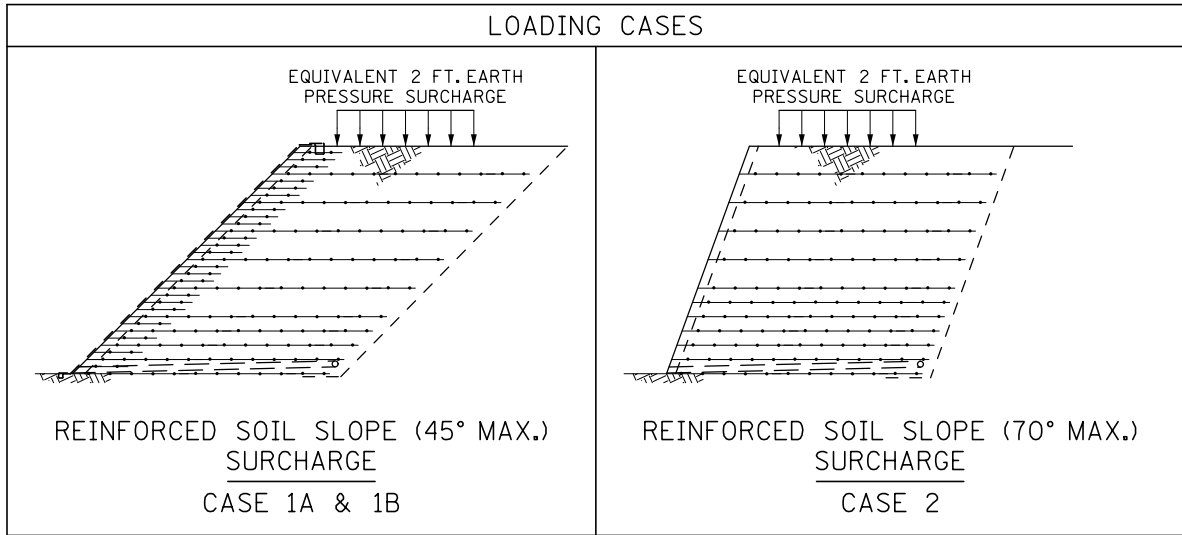


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NOTES TO CONTRACTOR:

APPROVED SOIL REINFORCEMENT PRODUCTS LIST, WITH TYPE NOTED, IS HELD AND MAINTAINED BY THE FOUNDATIONS UNIT, (GEOTECHNICAL ENGINEERING SECTION) AND CURRENTLY POSTED AT <http://www.dot.state.mn.us/products/walls/rssgeosyntheticreinforcement.html>. ONLY APPROVED PRODUCTS MAY BE USED IN STANDARD DESIGNS.

PROVIDE DETAILED DRAWINGS FOR CONSTRUCTION CONTAINING:

- ELEVATION VIEW WITH REINFORCEMENT PLACEMENT REQUIREMENTS, SOIL SLOPE LAYOUT, AND GEOMETRIC INFORMATION.
- CROSS SECTIONS DETAILING SLOPE FACE ANGLE, REINFORCEMENT, VERTICAL SPACING, REINFORCEMENT LENGTHS, SUBSURFACE DRAINAGE, SURFACE DRAINAGE, AND SLOPE FACE EROSION PROTECTION.
- DETAIL ALL REINFORCED FILL PENETRATIONS AND RSS FACE PENETRATIONS. DETAIL REINFORCEMENT AND EROSION PROTECTION PLACEMENT AROUND PENETRATIONS.
- LIST INFORMATION ON APPROVED GEOSYNTHETIC REINFORCEMENT, INCLUDING MnDOT CLASSIFICATION CODE, PROPERTIES FOR FIELD IDENTIFICATION, AND INSTALLATION INSTRUCTIONS. LIST PRODUCT AND INSTALLATION INFORMATION ON WELDED WIRE MESH FACING FORMS IF USED.
- CERTIFICATION BY MN PROFESSIONAL ENGINEER EXPERIENCED IN RSS DESIGN THAT THE CONSTRUCTION LAYOUT MEETS THE REQUIREMENTS OF PLANS AND MnDOT RSS STANDARDS.
- DEVIATION FROM STANDARD DESIGN TABLES BY VALUE ENGINEERING SUBMITTAL ONLY ON SLOPES OVER 5000 SQUARE FEET AND SLOPES WHICH DO NOT MEET THE REQUIREMENTS OF NOTES TO DESIGNER.

DEFINITION OF TERMS	
RSS	= REINFORCED SOIL SLOPE
WWM	= WELDED WIRE MESH
H	= SLOPE HEIGHT
S	= VERTICAL REINFORCEMENT SPACING
PRIMARY REINFORCEMENT	= REINFORCEMENT USED ACROSS WIDTH OF REINFORCED FILL
SECONDARY REINFORCEMENT	= REINFORCEMENT AT FACE PLACED BETWEEN PRIMARY LAYERS
REINFORCEMENT COVERAGE RATIO	= WIDTH OF SOIL REINFORCEMENTS TO HORIZONTAL SPACING (100% COVERAGE RATIO REQUIRED)
W.I.N.	= WATER INSOLUBLE NITROGEN

RSS DESIGN CRITERIA

THESE SHEETS ARE A GUIDE TO BE USED ON A CASE-BY-CASE BASIS BY MnDOT AND/OR CONSULTANT PROJECT DESIGNER. THE DESIGNS ARE BASED UPON THE FHWA MSEW AND RSS DESIGN AND CONSTRUCTION GUIDELINES (FHWA-NHI-10-024) WITHOUT ANY DEVIATIONS.

LOAD AND RESISTANCE FACTOR DESIGN (LRFD)
RSS GEOTECHNICAL GLOBAL AND COMPOUND STABILITY MODES ARE ANALYZED AT A SERVICE I LOAD COMBINATION. RSS EXTERNAL AND INTERNAL STABILITY MODES ARE ANALYZED AT STRENGTH I LOAD LIMIT STATE.

A MAXIMUM RESISTANCE FACTOR (ϕ) OF 0.65 IS USED FOR THE GEOTECHNICAL GLOBAL AND COMPOUND STABILITY MODES.

LOAD FACTORS STRENGTH LIMIT STATE
HORIZONTAL EARTH PRESSURE (γ_{EH}) = 1.5 FOR EXTERNAL STABILITY
HORIZONTAL EARTH PRESSURE (γ_{EH}) = 1.35 FOR INTERNAL STABILITY
VERTICAL PRESSURE FROM DEAD LOAD OF EARTH FILL (γ_{EH}) = 1.35 FOR BEARING CAPACITY
VERTICAL PRESSURE FROM DEAD LOAD OF EARTH FILL (γ_{EH}) = 1.0 FOR SLIDING AND PULLOUT
EQUIVALENT EARTH PRESSURE SURCHARGE (γ_{EH}) = 1.35

RESISTANCE FACTORS STRENGTH LIMIT STATE
BEARING ϕ_{EH} = 0.65
DIRECT SLIDING ϕ_{EH} = 1.0
GEOGRID STRENGTH ϕ = 0.9
GEOGRID BLOCK CONNECTION STRENGTH ϕ = 0.9
GEOGRID PULLOUT ϕ = 0.9

CAPACITY TO DEMAND RATIO >1.0 FOR ALL STABILITY MODES.

REINFORCED SLOPE FILL CHARACTERISTICS
A. GRANULAR MATERIAL (CASE 1A):
1. GRANULAR MATERIAL PER SPEC. 3149.2B1.
2. INTERNAL ANGLE OF FRICTION (ϕ_r) = 30°
3. COHESION (C) = 0 PSF
4. MOIST UNIT WEIGHT (γ_r) = 120 PCF
B. STRUCTURAL BACKFILL (CASE 1B AND CASE 2):
1. USE STRUCTURAL BACKFILL PER SPEC. 3149.2D2.
2. INTERNAL ANGLE OF FRICTION (ϕ_r) = 34° MINIMUM
3. COHESION (C) = 0
4. MOIST UNIT WEIGHT (γ_r) = 125 PCF MAXIMUM

RETAINED BACKFILL CHARACTERISTICS:
A. INTERNAL ANGLE OF FRICTION (ϕ_b) = 30° MINIMUM
B. COHESION (C) = 0
C. MOIST UNIT WEIGHT (γ_b) = 120 PCF MAXIMUM

FOUNDATION SOIL CHARACTERISTICS:
A. INTERNAL ANGLE OF FRICTION (ϕ_f) = 30° MINIMUM
B. COHESION (C) = 0
C. UNIT WEIGHT (γ_f) = 120 PCF MAXIMUM

SOIL REINFORCEMENT CHARACTERISTICS:
A. SPACING AND STRENGTH SHALL CONFORM TO MINIMUMS IN DESIGN TABLES, FOR APPLICABLE REINFORCED SOIL FILL TYPE AND MAXIMUM SLOPE ANGLE.
B. REINFORCEMENT COVERAGE SHALL BE 100%.

NOTES TO DESIGNER:

REVIEW BY TURF AND EROSION PREVENTION UNIT AND THE OFFICE OF ENVIRONMENTAL SERVICES, SHALL BE PERFORMED FOR ALL RSS APPLICATIONS. TURF ESTABLISHMENT AND MAINTENANCE ITEMS, HYDROSEEDING OVER EROSION CONTROL BLANKET, USE OF TURF REINFORCEMENT MAT IN CHANNELIZED FLOW AREAS, MODIFICATION OF SEED MIX, TURF MAINTENANCE CONTRACT ITEMS, IN ADDITION TO THE DETAILS CONTAINED ON THESE DRAWINGS, SHOULD BE EVALUATED ON A PROJECT BASIS.

IN ADDITION TO THE STANDARD SHEETS, TYPICAL CROSS SECTIONS OF THE SOIL SLOPES SHALL BE INCLUDED IN THE PLANS AS WELL AS INCLUDING SOIL SLOPES ON THE PROJECT CROSS SECTIONS.

DETAIL TRANSITION OF RSS TO ADJACENT SLOPES OR STRUCTURES.

SCREENED SANDY LOAM TOPSOIL, WITH SEED AND FERTILIZER, SHALL BE SPECIFIED BY PROJECT DESIGNER. PROJECT DESIGNER SHALL DEVELOP SITE SPECIFIC SEED AND FERTILIZER FOR HIGHLY SHADED AREAS, HIGHLY VISIBLE URBAN APPLICATIONS OR IN SENSITIVE AREAS.

REFERENCE STANDARD PLATES AND PROVIDE DETAILS FOR TRAFFIC BARRIERS, CURB AND GUTTER, HANDRAILS AND FENCING AS REQUIRED BY PROJECT CONDITIONS. SEE AASHTO AND MnDOT DESIGN MANUALS, STANDARD PLATES, AND DETAILS FOR REQUIREMENTS.

DETAIL LINES AND GRADES OF THE INTERNAL DRAINAGE COLLECTION PIPE. DETAIL AND NOTE THE DESTINATION OF INTERNAL DRAINS AS WELL AS THE METHOD OF TERMINATION (DAYLIGHT END OF PIPE OR CONNECTION INTO ADJACENT HYDRAULIC STRUCTURE).

SURFACE DRAINAGE PATTERNS SHALL BE SHOWN IN THE PLAN VIEW. SURFACE WATER RUNOFF SHOULD BE COLLECTED ABOVE AND DIVERTED AROUND SLOPE FACE. SURFACE WATER SHOULD NOT DRAIN OVER SLOPE FACE. EXIT DRAINAGE DISCHARGE LOCATIONS TO BE DESIGNATED BY THE PROJECT DESIGNER.

DEFINE REINFORCED SOIL SLOPE ANGLE AND DEFINE CONSTRUCTION LIMITS ON THE PLAN VIEW BASED ON THIS ANGLE. STANDARD SLOPE ANGLES ARE 45° AND 70°.

SOFT SOILS AND/OR HIGH WATER ARE CONDITIONS (DEFINED AS GROUNDWATER WITHIN A DEPTH EQUAL TO THE SLOPE HEIGHT H) ARE NOT SUITABLE FOR APPLICATION OF THESE STANDARD DESIGNS AND REQUIRES SPECIAL CONSIDERATION BY THE RSS CONSULTANT DESIGNER AND/OR THE MnDOT FOUNDATIONS UNIT.

STANDARD DESIGNS ARE NOT APPLICABLE FOR PROJECTS WITH LARGE QUANTITY OF VERTICAL FACE AREA WHERE PROJECT SPECIFIC DESIGNS ARE RECOMMENDED, AS DEFINED IN MnDOT ROAD DESIGN MANUAL.

THESE STANDARD DESIGNS ARE BASED ON A LEVEL TOP OF SLOPE, ZERO TOE SLOPE AND A SURCHARGE AT THE TOP OF THE SLOPE. SLOPES ABOVE OR BELOW THE REINFORCED SOIL SLOPE ARE NOT SUITABLE FOR APPLICATION OF STANDARD DESIGNS AND REQUIRE SPECIAL CONSIDERATION BY AN RSS CONSULTANT DESIGNER OR THE MnDOT FOUNDATIONS UNIT.

USE CASE 1A AND 1B FOR SOIL SLOPES BETWEEN 1:2 (26.5°) AND 1:1 (45°) MAXIMUM.
USE CASE 2 FOR SOIL SLOPES GREATER THAN 1:1 (45°) AND UP TO 2.75:1 (70°) MAXIMUM.

IF USING CONCRETE RAILING, INCLUDE STANDARD BRIDGE DETAIL "CONCRETE RAILING (TYPE F)" IN PLAN SET.

GEOTECHNICAL INVESTIGATION SHALL BE PERFORMED FOR ALL RSS APPLICATIONS.

GENERAL NOTES:

UTILITIES:
EXISTING AND PROPOSED UTILITIES SHALL BE ON THE GRADING PLANS. THE CONTRACTOR SHALL VERIFY THE LOCATION OF EXISTING FACILITIES AND SHALL EXERCISE CARE IN ADJACENT CONSTRUCTION.

EXCAVATION AND EARTHWORK:
ALL EXCAVATION AND EMBANKMENT WORK SHALL CONFORM TO MnDOT 245I.

CONSTRUCTION:
CONSTRUCTION SHALL BE IN ACCORDANCE WITH MnDOT 24II, EXCEPT AS NOTED.

COMPACTION REQUIREMENTS:
COMPACT REINFORCED FILL IN ACCORDANCE WITH MnDOT SPEC. 2105.3FI UNLESS OTHERWISE SPECIFIED BY THE PROJECT DESIGNER AND ACCEPTED BY THE FOUNDATION UNIT.

ENGINEER DEFINITIONS:
RSS DESIGNER- MN PROF. ENGINEER RETAINED BY CONTRACTOR.
PROJECT DESIGNER- MnDOT OR CONSULTANT ENGINEER
FOUNDATIONS UNIT- MnDOT
ENGINEER- MnDOT

SAMPLE ESTIMATED QUANTITIES FOR REINFORCED SOIL SLOPES ②		
	UNIT	QUANTITY
STRUCTURE EXCAVATION CLASS ---	CU. YD.	
GRANULAR MATERIAL (CV)	CU. YD.	
STRUCTURAL BACKFILL (CV)	CU. YD.	
RAILING CONCRETE (3S52)	LIN. FT.	
STRUCTURAL CONCRETE (1G52)	CU. YD.	
① REINFORCED SOIL SLOPE	SQ. YD.	

- ① VERTICAL FACE AREA OF SLOPE AS MEASURED FROM PLAN BOTTOM TO PLAN TOP OF SLOPE ELEVATION.
- ② REFER TO TABULATIONS / ESTIMATE SHEETS FOR QUANTITIES, IF REQUIRED.

DESIGNER NOTE - REMOVE PRIOR TO PLOTTING FINAL PLAN
IF THIS STANDARD PLAN IS USED, THE PROJECT DESIGNER MUST IDENTIFY 1) IF CASE 1A OR 1B OR IF CASE 2A OR 2B IS TO BE USED AND IF CASE 2A OR 2B IS TO BE USED WHETHER A DEGRADABLE EROSION CONTROL BLANKET OR A NON-DEGRADABLE TURF REINFORCEMENT MAT OR A NON DEGRADABLE GEOSYNTHETIC MESH IS USED TO WRAP THE FACE AND 2) WHETHER A WELDED WIRE MESH FACE FORM WITH STRUTS OR A WRAP FACE IS TO BE USED. (THE PROJECT DESIGNER MUST IDENTIFY DRAINAGE PATTERNS ABOVE AND BELOW THE RSS AND WHERE DRAINS EXITING THE FACE SHOULD DRAIN TO.)

REVISION:
APPROVED: xxxxxxxxxx x, xxxx
----- DIRECTOR, OFFICE OF MATERIALS AND ROAD RESEARCH

	REVISED:	REINFORCED SOIL SLOPE GENERAL NOTES	
	APPROVED:		
STATE DESIGN ENGINEER		STANDARD PLAN 5-297.646	1 OF 1

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REINFORCED SOIL SLOPES

CASE 1A - 45° MAXIMUM SLOPE ANGLE, GRANULAR MATERIAL (SPEC. 3149.2B1) REINFORCED SOIL FILL

MAX. SLOPE ANGLE (DEGREES)	REINFORCED SOIL FILL FRICTION ANGLE (DEGREES)	MINIMUM PRIMARY REINFORCEMENT LENGTH, L (FT)	PRIMARY SOIL REINFORCEMENT ⑤		MAXIMUM SLOPE HEIGHT H (FT)	ZONE 1 ⑤		ZONE 2 ⑤	
			RSS CLASS	LONG TERM STRENGTH (T _{dl}) (PLF)		H1 (FT)	S1 _{MAX} (IN)	H2 (FT)	S2 _{MAX} (IN)
45	30	1.1 H	700	700	26.2	11.5	40	14.7	20
			1050	1050	26.2	26.2	24	-	-
			1400	1400	26.2	17.7	48	8.5	24

CASE 1B - 45° MAXIMUM SLOPE ANGLE, STRUCTURAL BACKFILL (SPEC. 3149.2D2) REINFORCED SOIL FILL

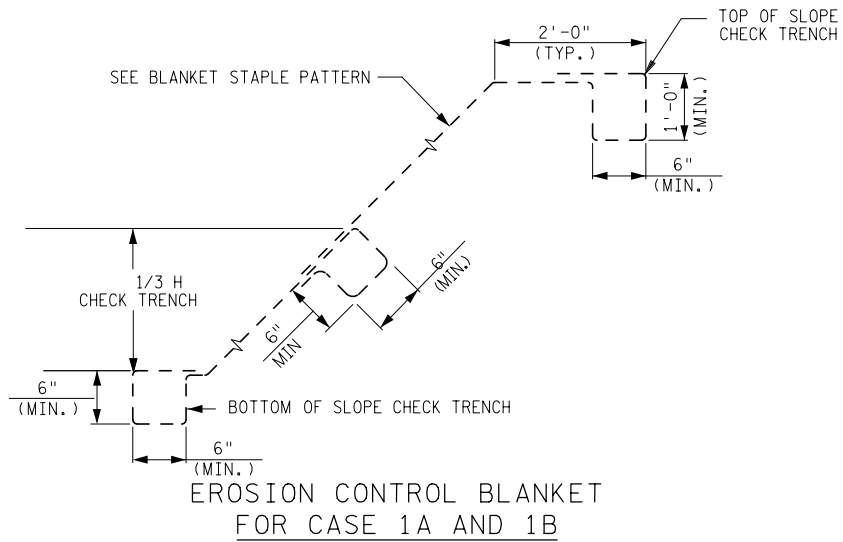
MAX. SLOPE ANGLE (DEGREES)	REINFORCED SOIL FILL FRICTION ANGLE (DEGREES)	MINIMUM PRIMARY REINFORCEMENT LENGTH, L (FT)	PRIMARY SOIL REINFORCEMENT ⑤		MAXIMUM SLOPE HEIGHT H (FT)	ZONE 1 ⑤		ZONE 2 ⑤	
			RSS CLASS	LONG TERM STRENGTH (T _{dl}) (PLF)		H1 (FT)	S1 _{MAX} (IN)	H2 (FT)	S2 _{MAX} (IN)
45	34	0.8 H	700	700	26.2	26.2	40	-	-
			1050	1050	26.2	17.7	48	8.5	24
			1400	1400	26.2	26.2	48	-	-

NOTES:
SECONDARY REINFORCEMENT SHALL BE ON THE APPROVED SECONDARY REINFORCEMENT LIST ⑤.

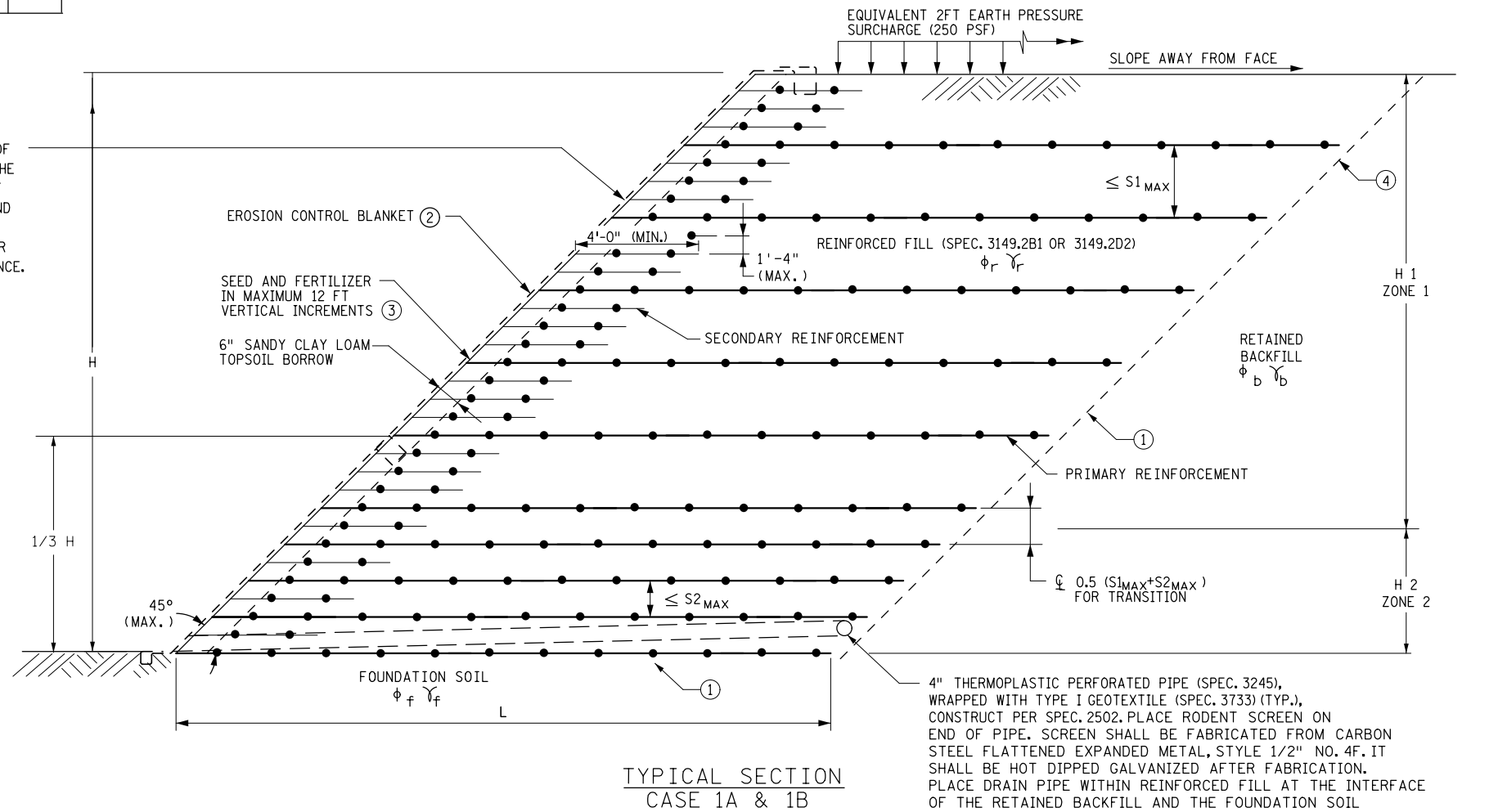
MAINTENANCE IS REQUIRED AND IS INCIDENTAL. MAINTENANCE CONSISTS OF WATERING AND EROSION REPAIR RESTORATION SUCH THAT THE FACE OF THE SLOPE WILL BE FULLY VEGETATED. MAINTENANCE INCLUDES A MINIMUM OF 45 GROWING DAYS AND TERMINATES WHEN A VEGETAL DENSITY OF 80% AND A PLANT GROWTH HEIGHT OF 6" IS ACHIEVED. AREAS THAT SUCCUMB TO EROSION OR SEEDING FAILURE WILL BE RESTORED WITHIN THREE CALENDAR DAYS AND WILL REQUIRE AN ADDITIONAL 20 GROWING DAYS OF MAINTENANCE. GROWING DAYS ARE DEFINED AS PER STANDARD SPECIFICATION 2575.

NOTES:

- ① OBSERVE EXCAVATION SLOPES FOR ACTIVE SEEPAGE AND PLACE ADDITIONAL AND/OR LARGER DRAINS WHERE SEEPAGE OCCURS AS DIRECTED BY THE ENGINEER. DRAINS SHALL OUTLET SLOPE EVERY 200 FT.
- ② STRAW-COCONUT EROSION CONTROL BLANKET (SPEC. 3885.2A, CATEGORY 4) WILL REQUIRE MAINTENANCE. BEST TO STABILIZE SLOPE IN SECTIONS AT THE END OF EACH DAY. SEE MnDOT'S APPROVED/QUALIFIED PRODUCTS LIST.
- ③ SEED AND FERTILIZER PRODUCTS AND RATE OF APPLICATION SHALL BE AS SPECIFIED BY PROJECT DESIGNER.
- ④ PAY LIMITS OF STRUCTURAL EXCAVATION EQUAL TO ANGLE OF SLOPE FACE 45° MAXIMUM. ACTUAL EXCAVATION SLOPE IS DETERMINED BY OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) REGULATIONS AND IN-SITU SOILS; EXCAVATION BEYOND "LIMITS OF STRUCTURAL EXCAVATION" SHALL BE AT CONTRACTOR'S EXPENSE.
- ⑤ PRIMARY SOIL REINFORCEMENT RSS CLASS 700, 1050, 1400 AND SECONDARY SOIL REINFORCEMENT ARE FOUND ON MnDOT'S APPROVED/QUALIFIED PRODUCTS LIST CURRENTLY AT <http://www.dot.state.mn.us/products/walls/rssgeosyntheticreinforcement.html>. ZONE 1 AND ZONE 2 ONLY APPLY TO PRIMARY REINFORCEMENT.



EROSION CONTROL BLANKET STAPLE PATTERN FOR CASE 1A AND 1B
USE 8" STAPLES



TYPICAL SECTION
CASE 1A & 1B

4" THERMOPLASTIC PERFORATED PIPE (SPEC. 3245), WRAPPED WITH TYPE I GEOTEXTILE (SPEC. 3733) (TYP.), CONSTRUCT PER SPEC. 2502. PLACE RODENT SCREEN ON END OF PIPE. SCREEN SHALL BE FABRICATED FROM CARBON STEEL FLATTENED EXPANDED METAL, STYLE 1/2" NO. 4F. IT SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION. PLACE DRAIN PIPE WITHIN REINFORCED FILL AT THE INTERFACE OF THE RETAINED BACKFILL AND THE FOUNDATION SOIL AND RUN ENTIRE LENGTH OF REINFORCED SOIL SLOPE. OUTLET THROUGH SLOPE FACE OR TO STORM SEWER OUTLET AT LEAST EVERY 200 FT. OF REINFORCED SOIL SLOPE. DO NOT OUTLET ONTO SIDEWALK, ROADWAY OR CURB.

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APPROVED: xxxxxxxxxxxx, xxxx
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STATE DESIGN ENGINEER

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REINFORCED SOIL SLOPE
(45° MAXIMUM SLOPE)

STANDARD PLAN 5-297.647

1 OF 1

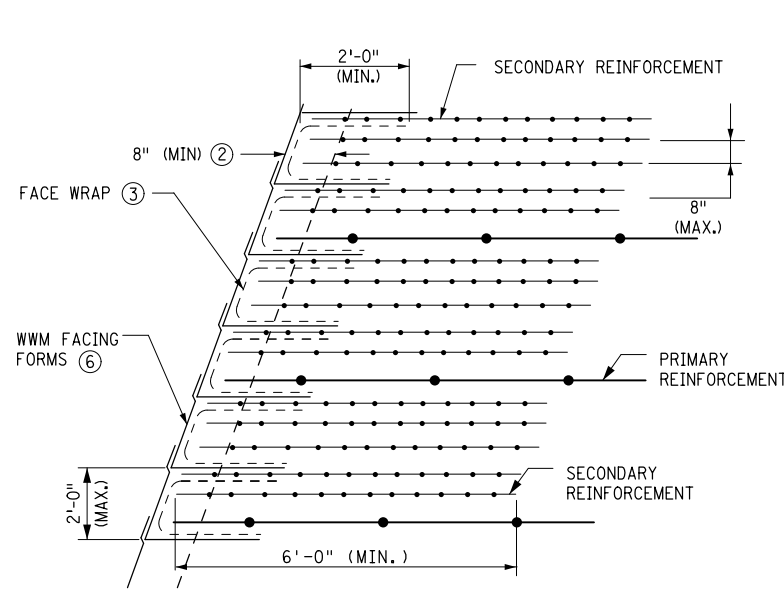
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REINFORCED SOIL SLOPE

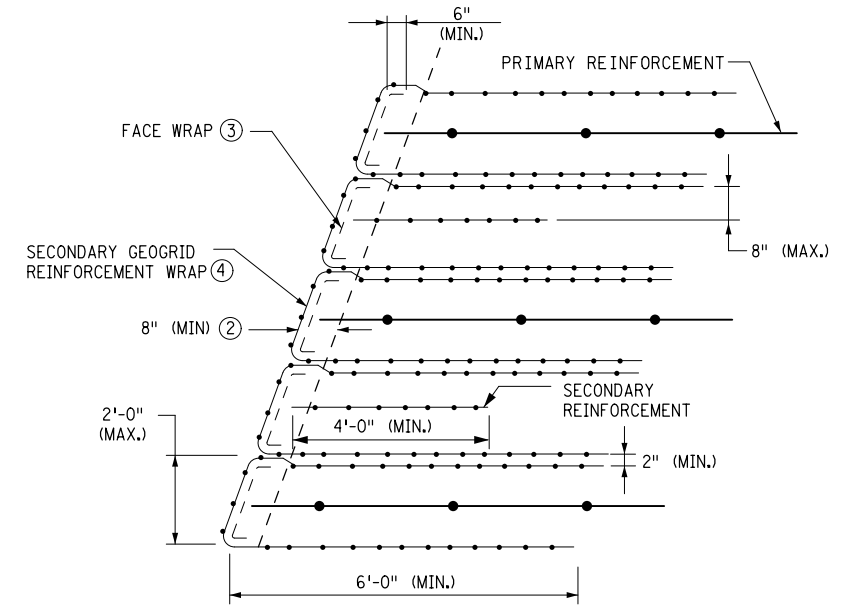
CASE 2 - 70° MAXIMUM SLOPE ANGLE, STRUCTURAL BACKFILL (SPEC. 3149.2D2) REINFORCED SOIL FILL

MAX. SLOPE ANGLE (DEGREES)	REINFORCED SOIL FILL FRICTION ANGLE (DEGREES)	MINIMUM PRIMARY REINFORCEMENT LENGTH, L (FT)	PRIMARY SOIL REINFORCEMENT ⑦		MAXIMUM SLOPE HEIGHT H (FT)	ZONE 1 ⑦		ZONE 2 ⑦	
			RSS CLASS	LONG TERM STRENGTH (T _q) (PLF)		H1 (FT)	S1 _{MAX} (IN)	H2 (FT)	S2 _{MAX} (IN)
70	34	1.0 H	1050	1050	21.3	13.1	40	8.2	20
					23.6	23.6	24	-	-
			1400	1400	26.2	18.0	40	8.2	20
					26.2	13.8	48	12.4	24

NOTES:
SECONDARY REINFORCEMENT SHALL BE ON THE ON THE APPROVED SECONDARY REINFORCEMENT LIST ⑦.



CASE 2A - 70° SLOPE -
WELDED WIRE MESH (WWM) FACE FORM

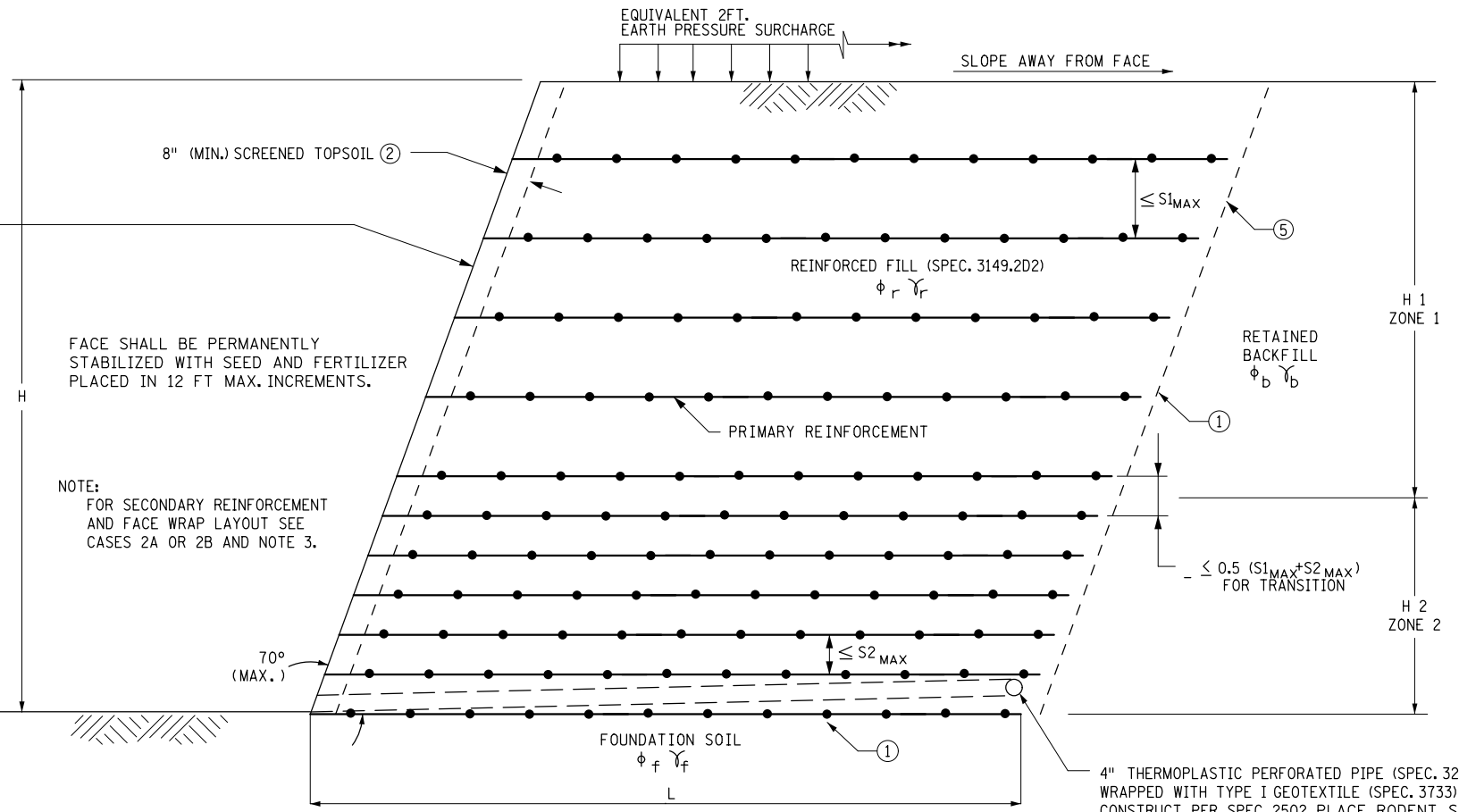


CASE 2B - 70° SLOPE - WRAPPED FACE

MAINTENANCE IS REQUIRED AND IS INCIDENTAL. MAINTENANCE CONSISTS OF WATERING AND EROSION REPAIR RESTORATION SUCH THAT THE FACE OF THE SLOPE WILL BE FULLY VEGETATED. MAINTENANCE INCLUDES A MINIMUM OF 45 GROWING DAYS AND TERMINATES WHEN A VEGETAL DENSITY OF 80% AND A PLANT GROWTH HEIGHT OF 6" IS ACHIEVED. AREAS THAT SUCCUMB TO EROSION OR SEEDING FAILURE WILL BE RESTORED WITHIN THREE CALENDAR DAYS AND WILL REQUIRE AN ADDITIONAL 20 GROWING DAYS OF MAINTENANCE. GROWING DAYS ARE DEFINED AS PER STANDARD SPECIFICATION 2575.

FACE SHALL BE PERMANENTLY STABILIZED WITH SEED AND FERTILIZER PLACED IN 12 FT MAX. INCREMENTS.

NOTE:
FOR SECONDARY REINFORCEMENT AND FACE WRAP LAYOUT SEE CASES 2A OR 2B AND NOTE 3.



TYPICAL SECTION
CASE 2

4" THERMOPLASTIC PERFORATED PIPE (SPEC. 3245), WRAPPED WITH TYPE I GEOTEXTILE (SPEC. 3733) (TYP.), CONSTRUCT PER SPEC. 2502. PLACE RODENT SCREEN ON END OF PIPE. SCREEN SHALL BE FABRICATED FROM CARBON STEEL FLATTENED EXPANDED METAL, STYLE 1/2" NO. 4F. IT SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION. PLACE DRAIN PIPE WITHIN REINFORCED FILL AT THE INTERFACE OF THE RETAINED BACKFILL AND THE FOUNDATION SOIL AND RUN ENTIRE LENGTH OF REINFORCED SOIL SLOPE. OUTLET THROUGH SLOPE FACE OR TO STORM SEWER OUTLET AT LEAST EVERY 200 FT. OF REINFORCED SOIL SLOPE. DO NOT OUTLET ONTO SIDEWALK, ROADWAY OR CURB.

NOTES:

- ① OBSERVE EXCAVATION SLOPES FOR ACTIVE SEEPAGE AND PLACE ADDITIONAL AND/OR LARGER DRAINS WHERE SEEPAGE OCCURS AS DIRECTED BY THE ENGINEER. DRAINS SHALL OUTLET SLOPE EVERY 200 FT. MAX.
- ② 8 INCHES OF SANDY CLAY LOAM TOPSOIL BORROW SHALL BE PLACED AT THE FACE WITH A SEED AND FERTILIZER MIX, SPECIFIED BY PROJECT DESIGNER. PROJECT DESIGNER SHALL DEVELOP SITE SPECIFIC SEED AND FERTILIZER FOR HIGHLY SHADED AREAS, HIGHLY VISIBLE URBAN APPLICATIONS OR IN SENSITIVE AREAS.
- ③ PROJECT DESIGNER SHALL DESIGNATE WHETHER A DEGRADABLE MNDOT 3885 CATEGORY 4 EROSION CONTROL BLANKET CAN BE USED AS THE FACE WRAP. OTHERWISE, THE FACE WRAP SHALL BE EITHER A NON-DEGRADABLE MNDOT 3885 TURF REINFORCEMENT MAT (TRM) CATEGORY 2 OR A NON-DEGRADABLE GEOSYNTHETIC MESH WITH OPENINGS RANGING FROM 0.1 TO 0.2 INCHES. EITHER NON-DEGRADABLE PRODUCT SHALL BE STABILIZED FOR LONG-TERM ULTRAVIOLET LIGHT EXPOSURE. DOCUMENTATION SHALL BE PROVIDED BY THE MANUFACTURER. IF THE FACE WRAP PRODUCT IS ON THE APPROVED SECONDARY REINFORCEMENT LIST, THEN THIS ONE PRODUCT CAN BE USED TO SATISFY BOTH FACE WRAP AND SECONDARY REINFORCEMENT REQUIREMENTS FOR CASE 2 - 70° - SLOPE - WRAPPED FACE.
- ④ SECONDARY REINFORCEMENT, IF USED TO WRAP THE FACE, SHALL BE STABILIZED FOR LONG-TERM ULTRAVIOLET LIGHT EXPOSURE. DOCUMENTATION SHALL BE PROVIDED BY THE MANUFACTURER.
- ⑤ PAY LIMITS OF EXCAVATION FOR REINFORCED FILL EQUAL TO ANGLE OF SLOPE FACE, 70° MAXIMUM. ACTUAL EXCAVATION SLOPE SHALL BE DETERMINED BY OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) REGULATIONS AND IN-SITU SOILS: EXCAVATION BEYOND LIMITS OF REINFORCED FILL AT CONTRACTOR'S EXPENSE.
- ⑥ PROJECT DESIGNER SHALL DESIGNATE WHETHER CASE 2A - WELDED WIRE MESH (WWM) FACE FORM OR CASE 2B WRAPPED FACE SHALL BE USED. WWM FACE FORM AND STRUTS SHALL BE APPROVED BY THE ENGINEER. GALVANIZED WELDED WIRE MESH FACE FORM AND GALVANIZED STRUTS ARE NOT REQUIRED UNLESS SPECIFIED BY PROJECT DESIGNER.
- ⑦ PRIMARY SOIL REINFORCEMENT RSS CLASS 700, 1050 AND 1400 AND SECONDARY REINFORCEMENT ARE FOUND ON MnDOT'S APPROVED/QUALIFIED PRODUCTS LIST CURRENTLY AT <https://www.dot.state.mn.us/products/walls/rssgeosyntheticreinforcement.html>. ZONE 1 AND ZONE 2 ONLY APPLY TO PRIMARY REINFORCEMENT.

REVISION:
APPROVED: xxxxxxxxxxx x, xxxx

DIRECTOR, OFFICE OF MATERIALS AND ROAD RESEARCH



REVISOR:

APPROVED:

NOT APPROVED

REINFORCED SOIL SLOPE
(70° MAXIMUM SLOPE)

STANDARD PLAN 5-297.648

1 OF 1

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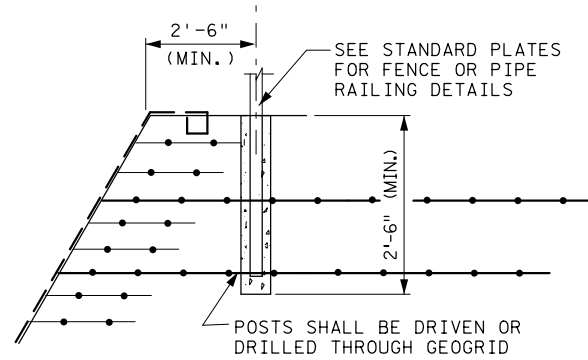
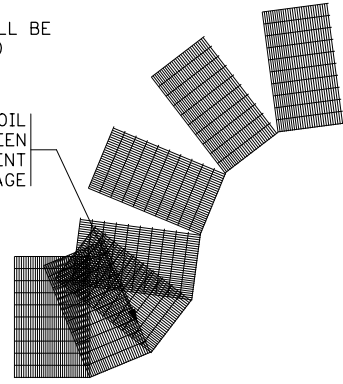
NOTES:

CORRECT ORIENTATION OF PRIMARY AND SECONDARY REINFORCEMENT TO OBTAIN PROPER STRENGTH SHALL BE DETAILED ON CONTRACTOR DRAWINGS.

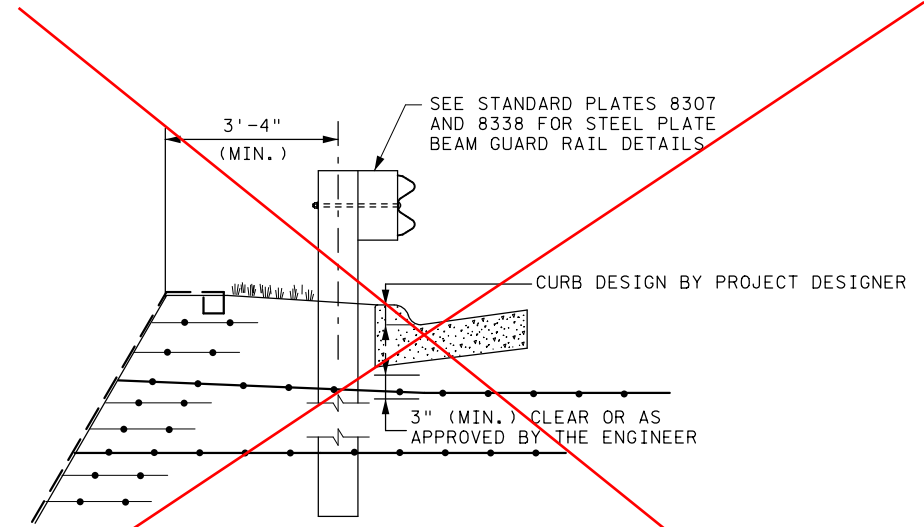
ADJACENT WIDTHS OF REINFORCEMENT SHALL BE EXTENDED AS NECESSARY AND NOT PLACED DIRECTLY ON TOP OF EACH OTHER.

MINIMUM OF 3" OF SOIL FILL IS REQUIRED BETWEEN OVERLAPPING REINFORCEMENT FOR PROPER ANCHORAGE

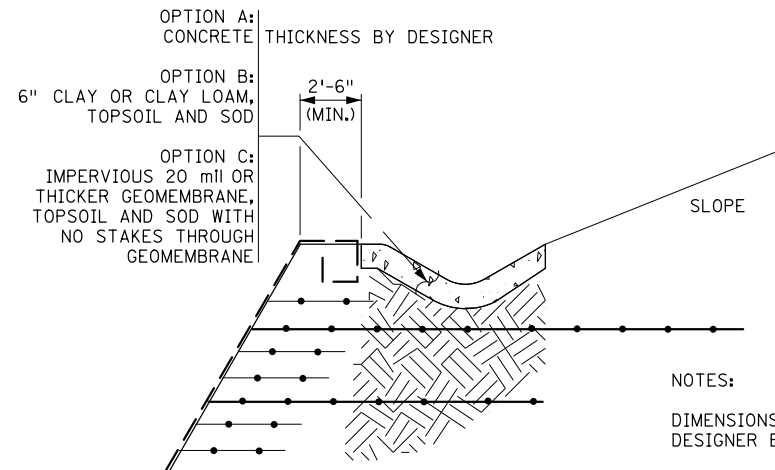
REINFORCEMENT PLACEMENT AROUND CURVES AND CORNERS



POST DETAIL
TYPICAL HANDRAIL AND/OR FENCE POST

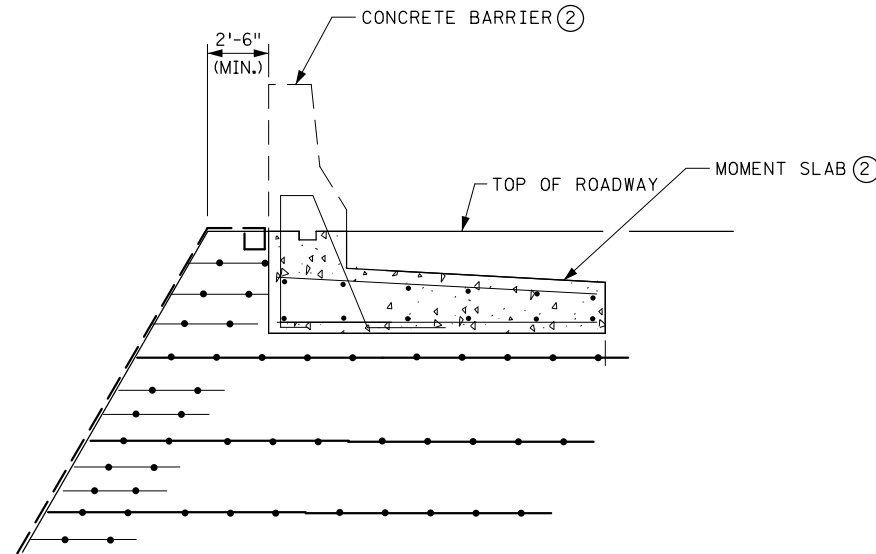


STEEL PLATE BEAM GUARDRAIL DETAIL



TYPICAL DRAIN SWALE DETAIL

NOTES:
DIMENSIONS TO BE DETERMINED BY PROJECT DESIGNER BASED ON SITE REQUIREMENTS



BARRIER FOOTING DETAIL

NOTES:
NOMINAL SPACING OF CONCRETE CONTRACTION JOINTS SHALL BE 200 FT.
WORK REINFORCEMENT SHOWN WITH CONCRETE RAILING DETAILS.
ALL CONCRETE REINFORCEMENT SHALL BE EPOXY COATED AS PER PROJECT DESIGNER.

NOTES:

- ① USE CAUTION WHEN PLACING CURB WITH GUARDRAIL. CURBS ADVERSELY AFFECT THE PERFORMANCE OF THE GUARDRAIL. GENERALLY PLACE CURB DIRECTLY BELOW GUARDRAIL. SEE PLANS OR REFER TO STANDARD PLAN 5-297.601 (2). FOR CURB LOCATIONS ON NCHRP REPORT NO. 350 APPROVED BRIDGE TRANSITIONS, SEE STANDARD PLANS 5-297.603, 5-297.605, 5-297.606 ETC..
- ② CONCRETE BARRIER AND MOMENT SLAB DIMENSIONS/GEOMETRY ARE SITE SPECIFIC AND SHALL BE DETERMINED BY PROJECT DESIGNER.

REVISION:
APPROVED: xxxxxxxxxxx x, xxxx

DIRECTOR, OFFICE OF MATERIALS AND ROAD RESEARCH



REVISOR:
APPROVED:
NOT APPROVED
STATE DESIGN ENGINEER

REINFORCED SOIL SLOPE
DETAILS
STANDARD PLAN 5-297.649 1 OF 1