MSE Wall Notes:

Provide design in accordance with the SCDOT Supplemental Technical Specification for Mechanically Stabilized Earth (MSE) Walls.

Design Methodology:
LRFD Design

Design Life:
Permanent structures = 100 years.
Temporary structures in service for 5 years or longer = 100 years.
Temporary structures in service for less than 5 years = 5 years.

Reinforced Backfill Material:
★ Backfill:
Internal Friction Angle (deg) = XX
Total Unit Weight = XXX pcf

Foundation Soils:
Total – Internal Friction Angle (deg)	XX	
Total – Cohesion	XXX psf	
Effective – Internal Friction Angle (deg)	XX	
Effective – Cohesion	XXX psf	

Wall Height X ft. ∠ H ∠ X ft.
Min. B_{Req}		X ft.
Factored Net Bearing	Static	XXX psf
	Seismic	XXX psf

Wall Height H ∠ X ft.
Min. B_{Req}		X ft.
Factored Net Bearing	Static	XXX psf
	Seismic	XXX psf

External Stability Limit State Design:

1. Permanent MSE Walls have been evaluated to meet external stability for Strength, Service, and Extreme Event I limit states.

2. The external stability of the MSE walls, with appropriate load and resistance factors, is satisfied with the minimum base width required, B_{Req}. Measure the minimum base width required, B_{Req}, from the front of the facing element to the end of the soil reinforcement.

MSE Wall Loadings:

1. Design walls for live load surcharge (LS) located at the top of the MSE walls either perpendicular or parallel to the roadway. The live loads are modeled as uniform surcharge (LS), q_{LS}, and are factored using load factors. The unfactored live load surcharge (LS) is 250 psf.

2. Design MSE walls for Long Term design using a uniform dead load vertical surcharge pressure, q_{DL}, to account for the pavement section constructed on top of the MSE wall. In addition, use a minimum uniform dead load vertical surcharge pressure of ☑ psf to account for future pavement overlay sections.

3. Design MSE walls to resist horizontal loadings resulting from live load uniform vertical surcharge (LS), dead load vertical surcharges, and active pressure backfill by multiplying the vertical surcharge pressures or effective overburden pressures times the active earth pressure coefficient, K_o, of X.XX and the appropriate load factors, ɣ.

Extreme Event I Limit State: Two-Level Seismic Design

1. Project Location and Site Class
   – Latitude: XX.XXXX
   – Longitude: XX.XXXX
   – Site Class: X

2. Design Earthquake:
   – Functional Evaluation Earthquake (FEE) 15% Probability of Exceedance in 75 years
   – Safety Evaluation Earthquake (SEE) 3% Probability of Exceedance in 75 years

3. Peak ground accelerations obtained from ADRS are presented in the table below.

Parameter	MSE Walls	
	FEE	SEE
PGA	X.XX g	X.XX g

Values determined from

MSE Wall LRFD Design Criteria:

1. Design MSE Walls for the following limit states:

   – Strength I Limit State
   – Service I Limit State
   – Extreme Event I Limit State
   – Extreme Event II Limit State

2. MSE wall design criteria for each limit state are presented below in Tables 1-1, 1-2, 1-3, 1-4 and 1-5.

Table 1-1 MSE Wall Strength I Limit State Design Criteria

Design Parameter	Factor Type	Factor Value	
		Max.	Min.
DC: Dead Load of Components and Attachments ($ɣ_p$)	Load	1.25	0.90
LS: Live Load Surcharge (ɣ)	Load	1.75	
EH: Horizontal Earth Pressure – Active ($ɣ_p$)	Load	1.50	0.90
EV: Vertical Earth Pressure – MSE Walls ($ɣ_p$)	Load	1.35	1.00
ES: Earth Surcharge ($ɣ_p$)	Load	1.50	0.75
Limiting Eccentricity Due To Overturning (φ)	Eccentricity	$B_{Req}/4$	
Soil Bearing Capacity (φ Bearing)	Resistance	0.65	
Sliding Frictional Resistance (Soil – Soil) (φ Sliding)	Resistance	1.0	
Sliding Frictional Resistance (Soil – Soil Reinforcement) (φ Sliding)	Resistance	1.0	

Table 1-2 MSE Wall Service I Limit State Design Criteria

Design Parameter	Factor Type	Factor Value
DC: Dead Load of Components and Attachments ($ɣ_p$)	Load	1.00
LS: Live Load Surcharge (ɣ)	Load	1.00
EH: Horizontal Earth Pressure – Active ($ɣ_p$)	Load	1.00
EV: Vertical Earth Pressure – Overall Stability ($ɣ_p$)	Load	1.00
EV: Vertical Earth Pressure – MSE Walls ($ɣ_p$)	Load	1.00
ES: Earth Surcharge ($ɣ_p$)	Load	1.00
Lateral Displacement (φ)	Resistance	1.00
Vertical Displacement (φ)	Resistance	1.00
Global Stability (Fill Walls) (φ Stability) ROC = I, II	Resistance	0.65
Global Stability (Fill Walls) (φ Stability) ROC = III	Resistance	0.75

Table 1-3 MSE Wall Extreme Event I Limit State Design Criteria

Design Parameter	Factor Type	Factor Value	
		MAX.	MIN.
DC: Dead Load of Components and Attachments ($ɣ_p$)	Load	1.00	
LS: Live Load Surcharge (ɣ)	Load	0.50	0.00
EH: Horizontal Earth Pressure – Active ($ɣ_p$)	Load	1.00	
EV: Vertical Earth Pressure – Overall Stability ($ɣ_p$)	Load	1.00	
EV: Vertical Earth Pressure – MSE Walls ($ɣ_p$)	Load	1.00	0.0
ES: Earth Surcharge ($ɣ_p$)	Load	1.00	0.0
EQ: Earthquake (ɣ)	Load	1.00	
Limiting Eccentricity Due To Overturning ($φ_{Req}$)	Eccentricity	$B_{Req}/3$	
Soil Bearing Capacity (φ Bearing-eq)	Resistance	0.70	
Sliding Frictional Resistance (Soil – Soil) (φ Sliding)	Resistance	0.95	
Sliding Frictional Resistance (Soil – Soil Reinforcement) (φ Sliding eq)	Resistance	1.00	
Lateral Displacement (φ)	Resistance	1.00	
Vertical Displacement (φ)	Resistance	1.00	
Global Stability (Fill Walls) (φ Stability-eq) FEE	Resistance	0.90	
Global Stability (Fill Walls) (φ Stability-eq) SEE	Resistance	1.00	

3. Assume responsibility for the design of the MSE wall internal stability. Internal stability load and resistance factors are presented in Tables 1-4 and 1-5. Load factors outlined in Table 1-4 are for Extreme Event II only. Load Factors used for internal stability analysis at other limit states are defined in Tables 1-1 through 1-3.

Table 1-4 MSE Wall Extreme Event II Limit State Design Criteria

Design Parameter	Factor Type	Factor Value	
		MAX.	MIN.
DC: Dead Load of Components and Attachments ($ɣ_p$)	Load	1.00	
LS: Live Load Surcharge (ɣ)	Load	0.50	
EH: Horizontal Earth Pressure – Active ($ɣ_p$)	Load	1.00	
EV: Vertical Earth Pressure – Overall Stability ($ɣ_p$)	Load	1.00	
EV: Vertical Earth Pressure – MSE Walls ($ɣ_p$)	Load	1.00	0.0
ES: Earth Surcharge ($ɣ_p$)	Load	1.00	0.0
CT: Vehicular Collision (ɣ)	Load	1.00	

Table 1-5 Internal Stability Resistance Factors

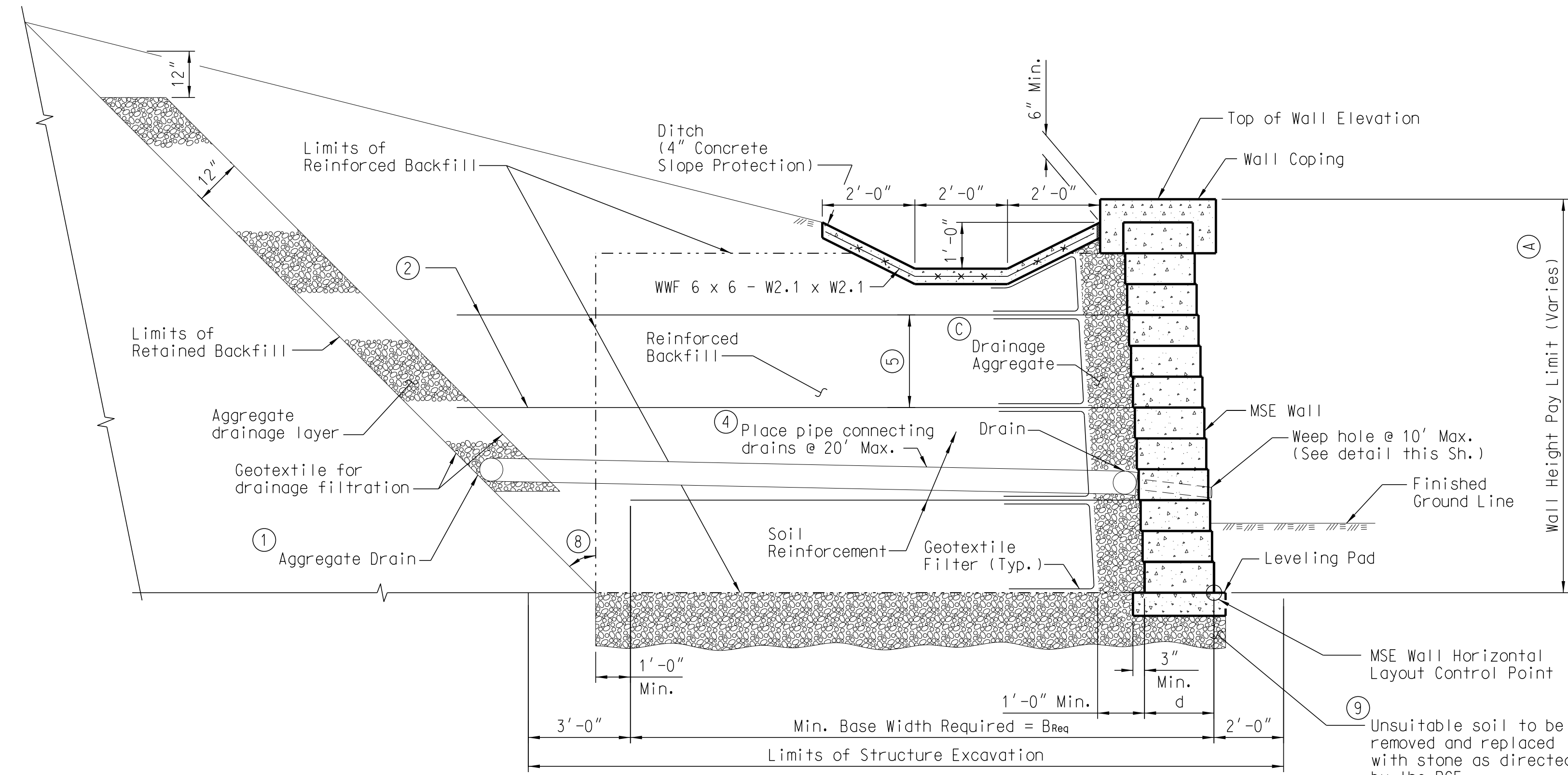| Performance Limit		Factor Value		
		Strength	Service	Extreme Event I and II
① Tensile Resistance of Metallic Reinforcement and Connectors	Strip Reinforcement	0.75	N/A	1.00
	② Grid Reinforcement	0.65		0.85
Tensile Resistance of Geosynthetic Reinforcement and Connectors		0.90	N/A	1.20
Pullout Resistance of Tensile Reinforcement		0.90	N/A	1.20

① Apply to gross cross-section less sacrificial area. For sections with holes, reduce the gross area and apply to net section less sacrificial area.

② Applies to grid reinforcements connected to a rigid facing element (concrete panel or block). For grid reinforcements connected to a flexible facing mat or which are continuous with the facing mat, use the resistance factor for strip reinforcements.
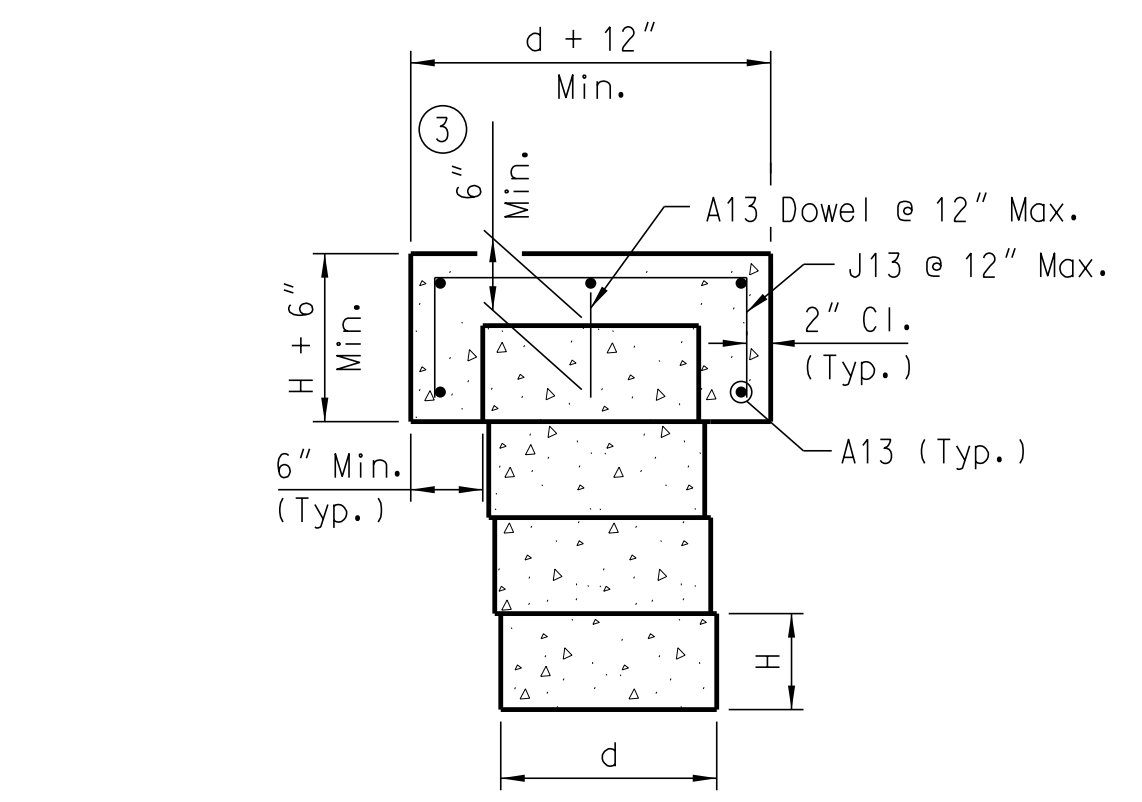
Additional Requirements:

1. For leveling pad, provide Class 2500 concrete.

2. For 4" concrete slope protection ditches, provide Class 2500 concrete.

3. Any portion of wall coping sloped at 2H:1V or steeper must be cast-in-place concrete and anchored with dowels.

4. Do not attach traffic barrier, pedestrian railing, or moment slab to MSE wall facing or wall coping.

5. Determine the location of all guardrail posts behind wall facing. Show guardrail post locations on the Shop Plans. Prior to placement of soil reinforcement, individual reinforcing strips/mesh may be skewed (15° Max.) to avoid post locations. No cutting of soil reinforcement is allowed. Repair any damage done to the soil reinforcement due to guardrail installation at no additional expense to the Department.

6. To ensure that the wall does not have a negative slope or batter (Slope outward from the face) after completion of construction, a batter is recommended. Monitor the actual movement of blocks during the placement and compaction of each lift of backfill and adjust the amount of batter as needed according to field conditions. In accordance with Supplemental Technical Specification SC-M-713, walls constructed with negative batter are not acceptable.

REV.				SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
REV.				
REV.	JXY	SAN	3-14	MSE WALL NOTES (BLOCK FACE) (1 OF 4)
	New Border			
REVIEWED				
QUAN.				
DR.	MRW	SAN	2-12	
DES.				
	BY	CHK.	DATE	

COUNTY	ROUTE
XXXXXXXX	XXXXXX

DRAWING NO. 713-02a

TYPICAL SECTION

- 12"
- 12"
- Ditch (4" Concrete Slope Protection)
- 2'-0" 2'-0" 2'-0"
- 6" Min.
- Top of Wall Elevation
- Wall Coping
- Limits of Reinforced Backfill
- 1'-0"
- WWF 6 x 6 - W2.1 x W2.1
- Limits of Retained Backfill
- Reinforced Backfill
- Drainage Aggregate
- MSE Wall
- Weep hole @ 10' Max. (See detail this Sh.)
- Aggregate drainage layer
- Place pipe connecting drains @ 20' Max.
- Drain
- Finished Ground Line
- Geotextile for drainage filtration
- Soil Reinforcement
- Geotextile Filter (Typ.)
- Aggregate Drain
- Leveling Pad
- MSE Wall Horizontal Layout Control Point
- Unsuitable soil to be removed and replaced with stone as directed by the RCE.
- 1'-0" Min.
- 3'-0"
- 1'-0" Min.
- 3" Min. / d
- 2'-0"
- Min. Base Width Required = B_{Req}
- Limits of Structure Excavation
- Wall Height Pay Limit (Varies)
- (A) (B) (C) (1) (2) (4) (5) (8) (9)

COPING DETAILS

- d + 12" Min.
- A13 Dowel @ 12" Max.
- J13 @ 12" Max.
- 6" Min.
- H + 6" Min.
- 2" Cl. (Typ.)
- A13 (Typ.)
- 6" Min. (Typ.)
- H
- d
- (3)

LEVELING PAD STEP DETAIL

- 6" Min.
- Step Height
- 6" Min.
- 45°
- (7)

LEVELING PAD DETAIL

- 4'-0" Bench (Min.)
- Leveling Pad
- MSE Wall Horizontal Layout Control Point
- H / V
- 3" Min. (Typ.)
- 6" Min.
- 2'-0" (Min. Embed.)

WALL TERMINATION DETAIL - ALTERNATE "A"

- Top of Coping
- 4" Concrete Slope Protection
- Top of Leveling Pad
- Ground Line in Front of Wall
- 2'-0" Min.
- 2'-0" Min.
- 2 / 1
- 30° Max.
- (B)

WALL TERMINATION DETAIL - ALTERNATE "B"

- Top of Coping
- 4" Concrete Slope Protection
- Ground Line in Front of Wall
- Top of Leveling Pad
- 2'-0" Min.

WEEP HOLE DETAIL

- 1/2" preformed joint filler wrapped around pipe
- Manufactured Tee connector to join drain pipe and weep hole
- Front Face of MSE Wall
- Place rodent screen over end of weep hole or inside pipe forming weep hole no more than 12" from exposed end of pipe.
- Wrap filter fabric around pipe and covering wall opening prior to placing backfill
- 6" Min.
- 1/4" Min. Max.
- 4" Min. 10" Max.
- Ground Line
- (6)

Notes
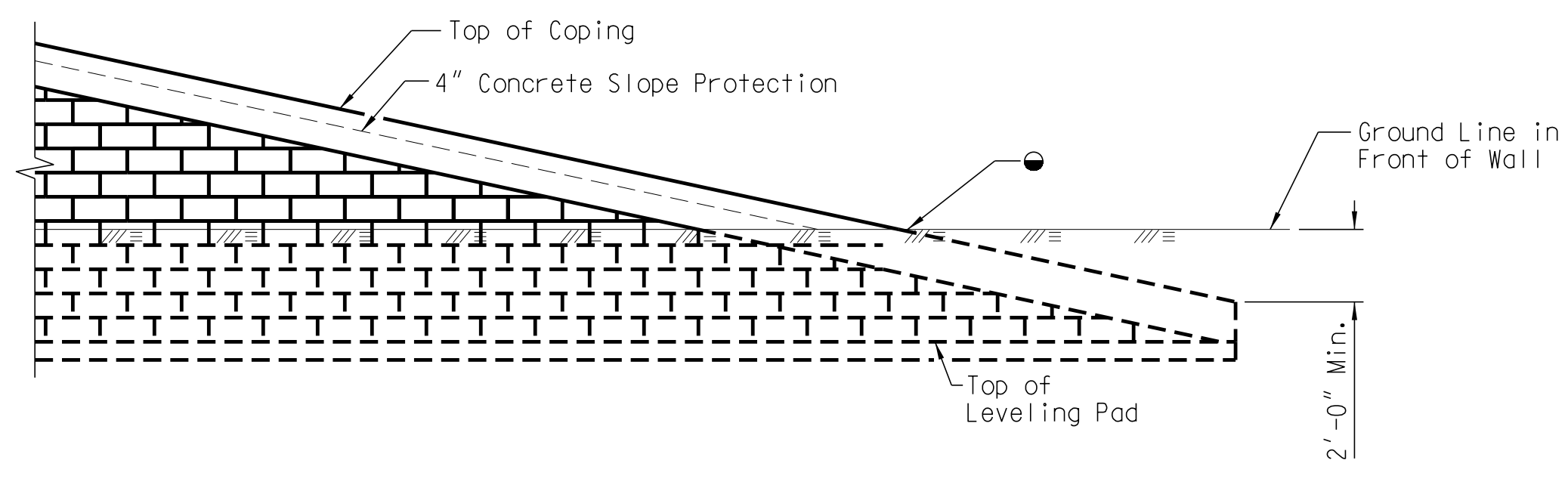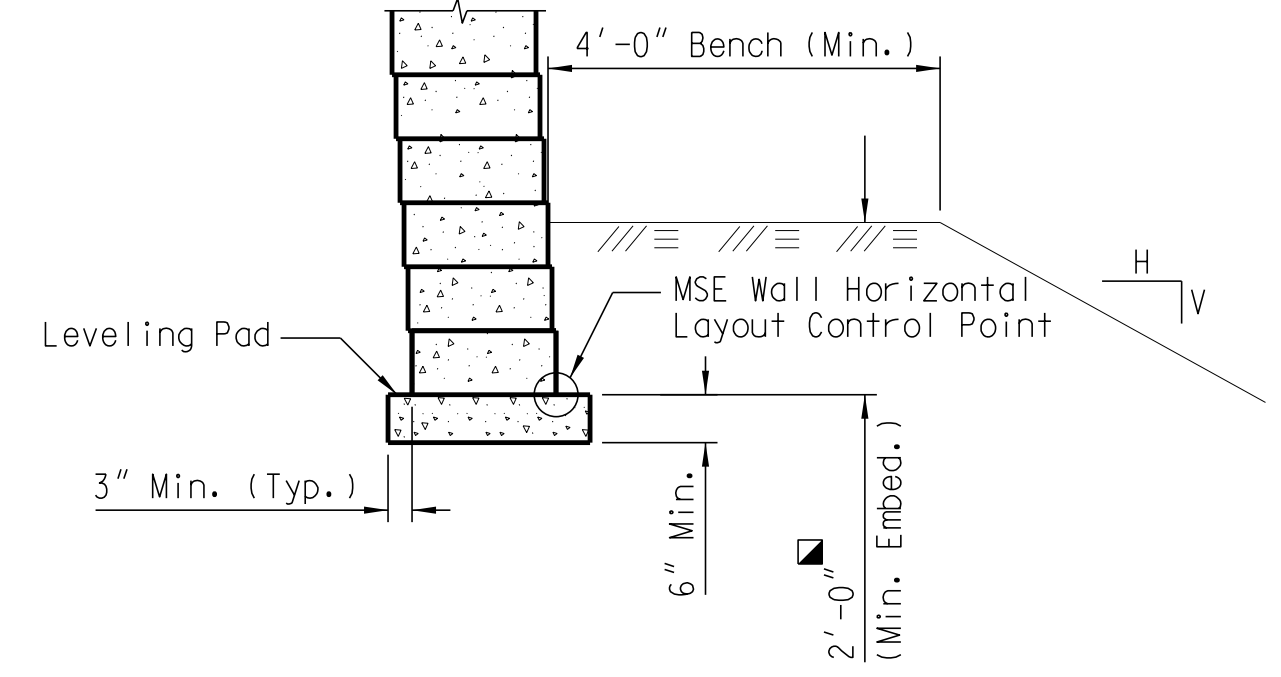
1. Construct aggregate drain using 6" dia. perforated pipe. Provide aggregate, other than Macadam, that meets the requirements for stone backfill in Supplemental Technical Specification SC-M-713. Wrap geotextile for drainage filtration (see Supplemental Technical Specification SC-M-713) completely around aggregate drain and overlap 1'-0". Design MSE Wall drainage system to drain the aggregate drain.

2. Extend top two layers of soil reinforcement 5 feet beyond the end of the lower layers of soil reinforcement.

3. Dowel to be embedded in Class 4000 concrete placed in void. Required minimum depth of concrete in void is required dowel embedment depth plus 2".

4. Slope 2% min. Provide unperforated pipe connecting aggregate drain to drain at wall facing.

5. Maximum vertical spacing of soil reinforcement is the lesser of "d" multiplied by 2 or 32".

6. Provide rodent screen manufactured from T304 stainless steel or galvanized steel with a minimum wire diameter of 0.050". Provide rodent screen with minimum of 2 openings per inch and a maximum of 4 openings per inch.

7. Limit step height for modular concrete block facing to the height of a single block.

8. Angle to be determined by the Contractor based on site conditions and the method of construction used. Excavation and/or shoring of retained backfill to permit construction of the MSE wall is considered incidental to the MSE wall construction and is not paid for as a separate item.

9. Provide aggregate, other than Macadam, that meets the requirements for stone backfill in the Supplemental Technical Specification SC-M-713.

A. Pay limit is from top of leveling pad elevation to top of wall. See MSE wall profiles.

B. This portion of coping must be cast-in-place.

C. Provide aggregate, other than Macadam, that meets the requirements for stone backfill in the Supplemental Technical Specification SC-M-713 for the type of soil reinforcement used.
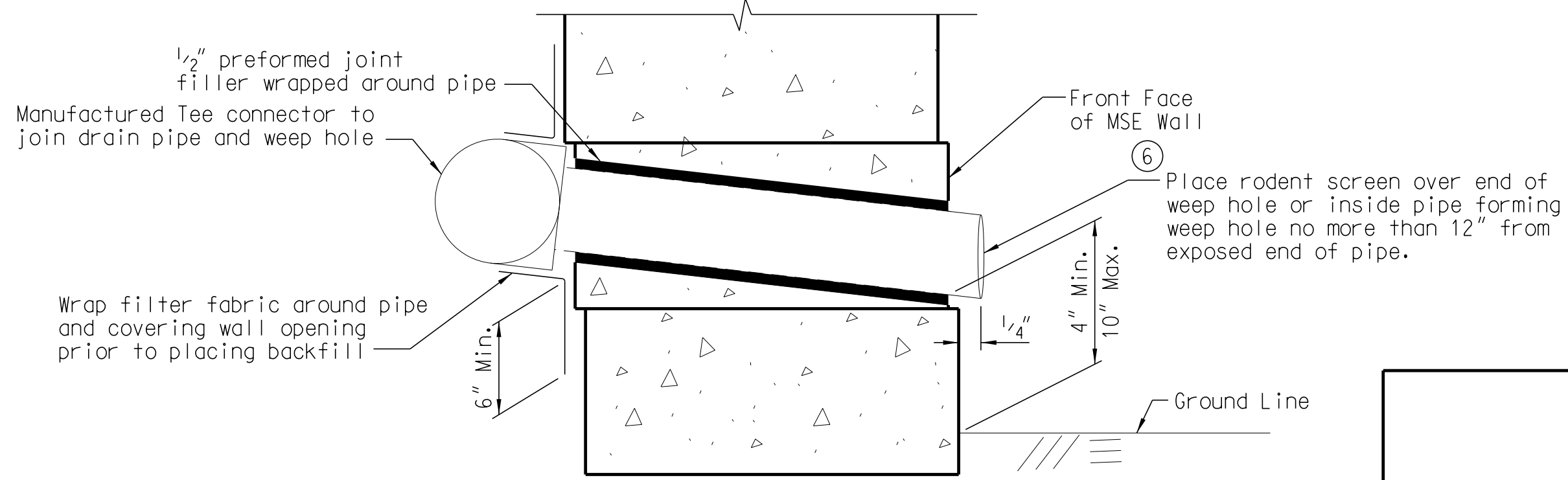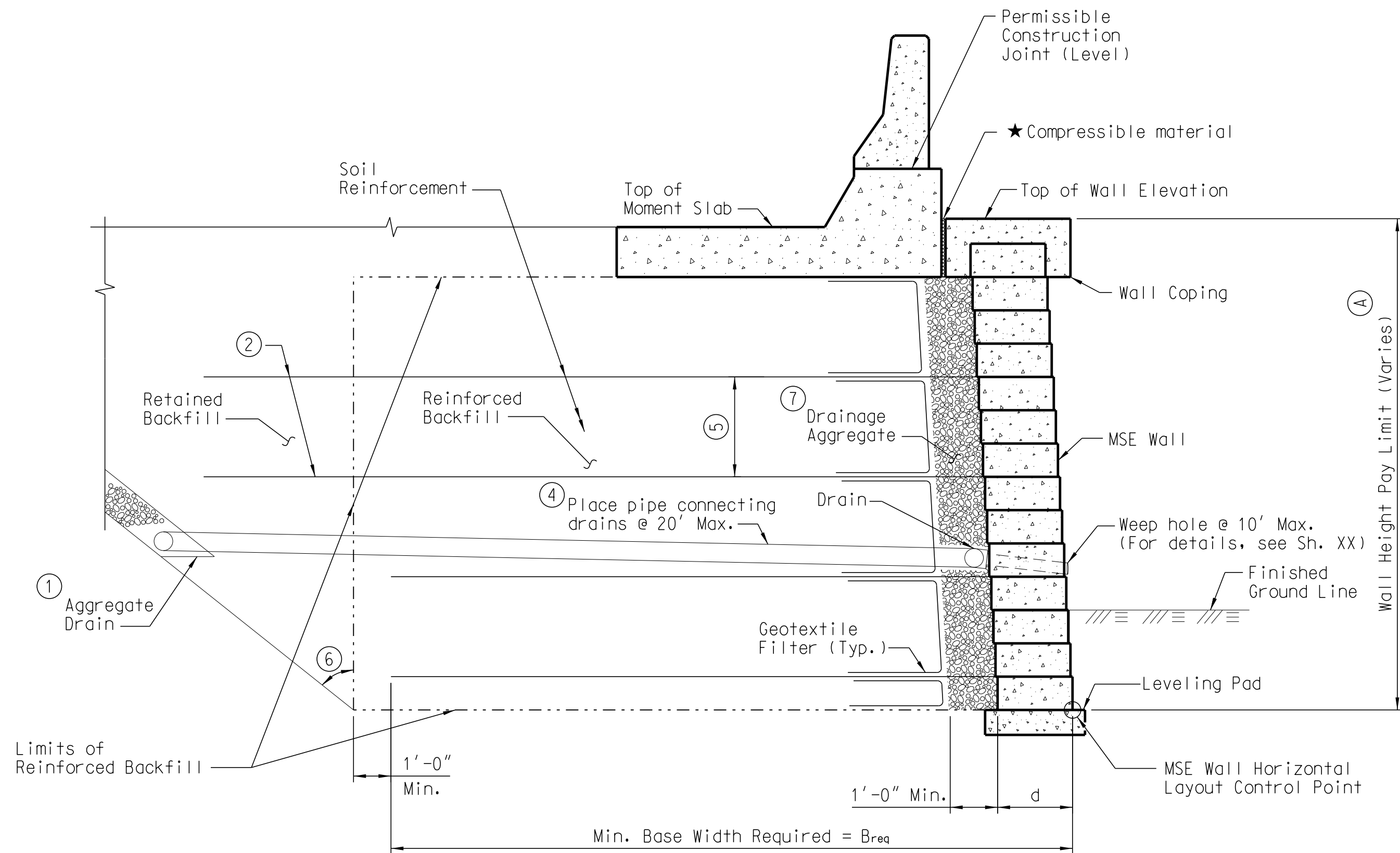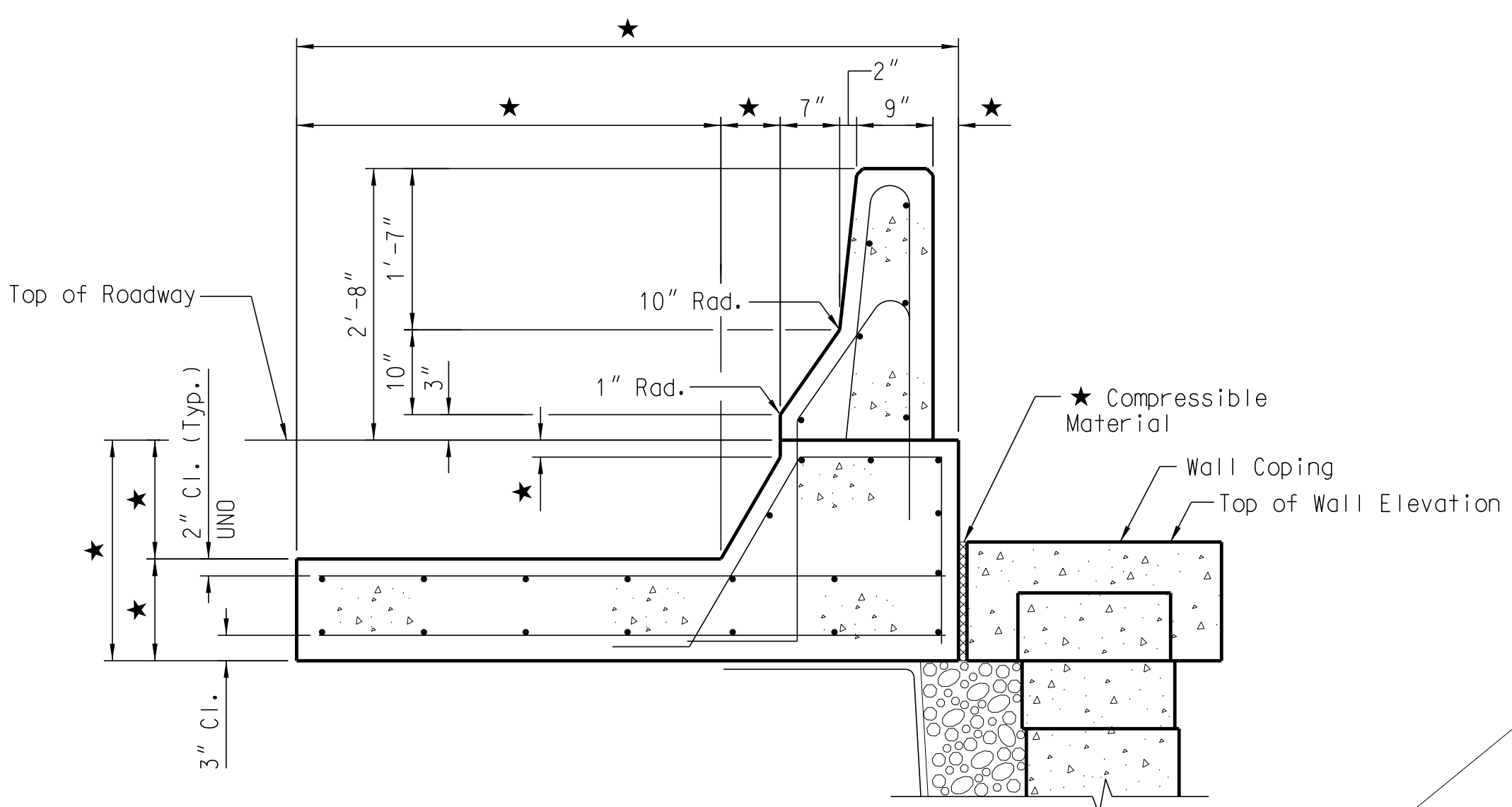
Minimum MSE Wall Embedment Depth	
Slope of Ground in front of Wall	Minimum Embedment Depth *
Horizontal (Walls) or slopes flatter than 3H:1V	Wall Height/20
3H:1V	Wall Height/10
2H:1V	Wall Height/7
1.5H:1V	Wall Height/5

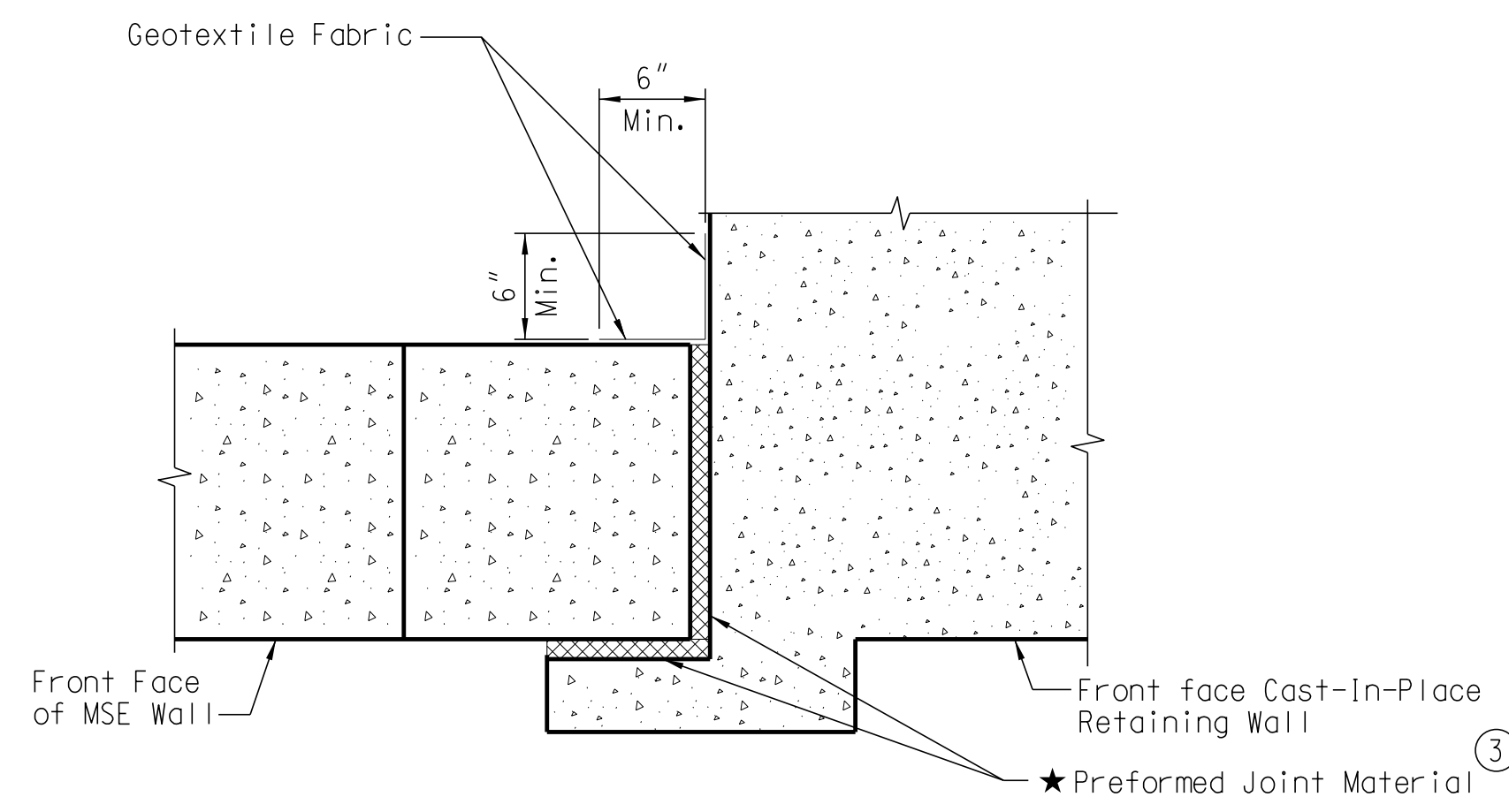* If table results in embedment depth less than 2'-0", use 2'-0".

TYPICAL SECTION – WALL WITH MOMENT SLAB*

Permissible Construction Joint (Level)

★ Compressible material

Soil Reinforcement

Top of Moment Slab

Top of Wall Elevation

Wall Coping

② Retained Backfill

Reinforced Backfill

⑦ Drainage Aggregate

MSE Wall

⑤

④ Place pipe connecting drains @ 20' Max.

Drain

Weep hole @ 10' Max. (For details, see Sh. XX)

Finished Ground Line

Geotextile Filter (Typ.)

① Aggregate Drain

⑥

Wall Height Pay Limit (Varies)

Ⓐ

Limits of Reinforced Backfill

1'-0" Min.

1'-0" Min.

d

Leveling Pad

MSE Wall Horizontal Layout Control Point

Min. Base Width Required = B_{req}

MSE WALL INTERFACE WITH CAST-IN-PLACE WALL
(Plan View)

Geotextile Fabric

6" Min.

6" Min.

Front Face of MSE Wall

Front face Cast-In-Place Retaining Wall

★ Preformed Joint Material ③

MOMENT SLAB SECTION

Top of Roadway

2" Cl. (Typ.) UNO

2" Cl. UNO

3" Cl.

2'-8"

1'-7"

10"

3"

10" Rad.

1" Rad.

2"

7"

9"

★ Compressible Material

Wall Coping

Top of Wall Elevation
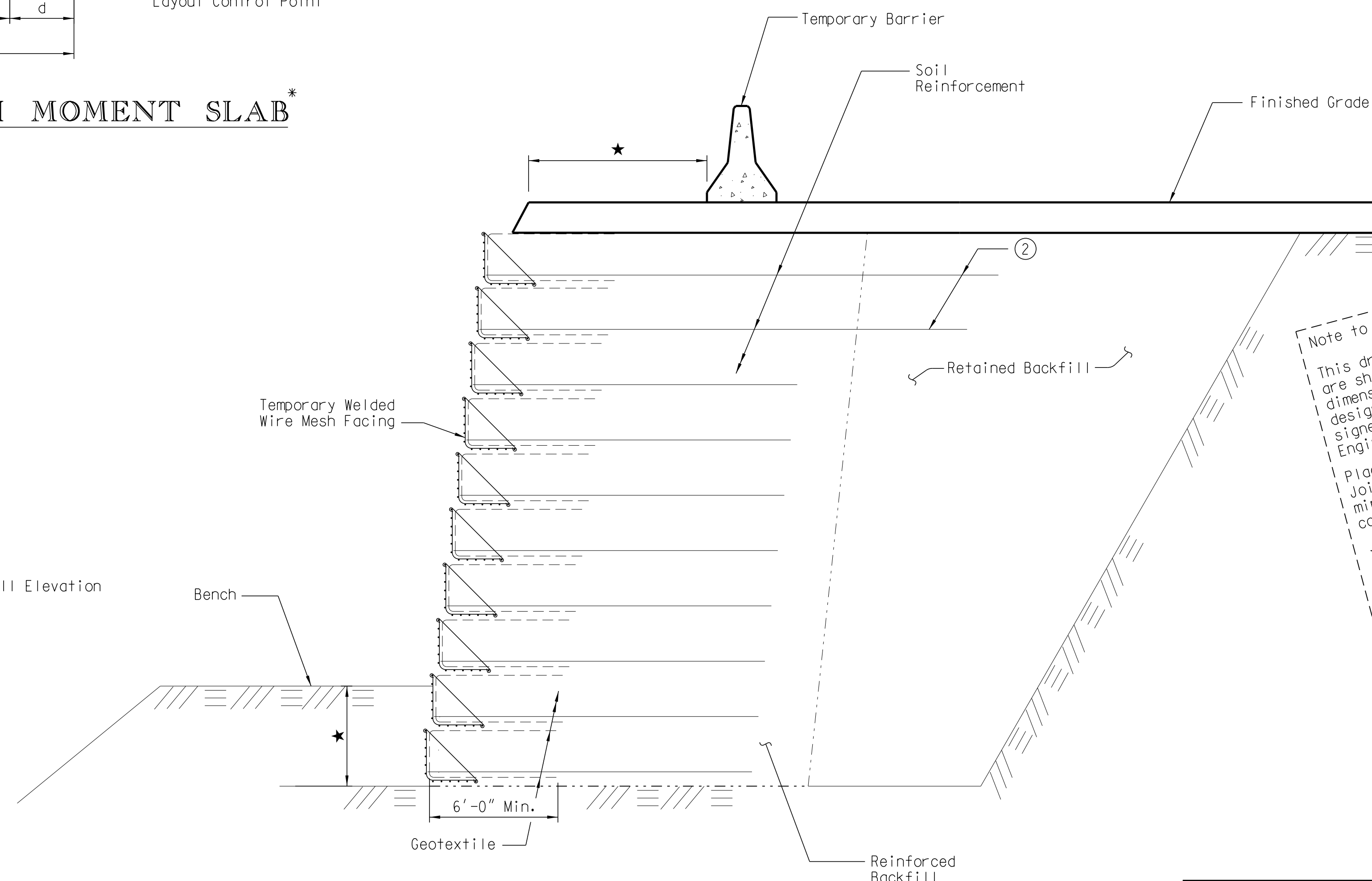
TEMPORARY MSE WALL WITH TEMPORARY BARRIER

Temporary Barrier

Soil Reinforcement

Finished Grade

★

②

Retained Backfill

Temporary Welded Wire Mesh Facing

Bench

★

6'-0" Min.

Geotextile

Reinforced Backfill

Notes:

Include the cost of reinforcing, concrete, and all other items needed for construction of the barrier wall and the moment slab in the bid price for Concrete Roadside Barrier.

Extend compressible material from bottom of moment slab to top of barrier in transverse expansion joint.

UNO – Denotes Unless Noted Otherwise

① Construct aggregate drain using 6" dia. perforated pipe. Provide aggregate, other than Macadam, that meets the requirements for stone backfill in Supplemental Technical Specification SC-M-713. Wrap geotextile for drainage filtration (see Supplemental Technical Specification SC-M-713) completely around aggregate drain and overlap 1'-0". Design MSE Wall drainage system to drain the aggregate drain.

② Extend top two layers of soil reinforcement 5 feet beyond the end of the lower layers of soil reinforcement.

③ Attach preformed joint material to MSE Wall facing material.

④ Slope 2% min. Provide unperforated pipe connecting aggregate drain to drain at wall facing.

⑤ Maximum vertical spacing of soil reinforcement is the lesser of "d" multiplied by 2 or 32".

⑥ Angle to be determined by the Contractor based on site conditions and the method of construction used. Excavation and/or shoring of retained backfill to permit construction of the MSE wall is considered incidental to the MSE wall construction and is not paid for as a separate item.

⑦ Provide aggregate, other than Macadam, that meets the requirements for stone backfill in the Supplemental Technical Specification SC-M-713, for the type of soil reinforcement used.

Ⓐ Pay limit is from top of leveling pad elevation to top of wall. See MSE wall profiles.

Note to Designer:

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Place Contraction Joints at 30' maximum spacing and Expansion Joints at 90' maximum spacing, in moment slab. Designer to detail minimum length of moment slab section between joints so that continuous unit length satisfies design requirements.

★ – Designer to input dimension

☑ – Designer to design, detail, and label reinforcing steel. Minimum reinforcing requirement is #16 bars at 12" max. spacing in each direction of each face.

* – For locations where the roadway or paved shoulder is directly above or within 5 feet of the end of the soil reinforcement, use a geomembrane on all roads/routes located North of a line along SC Route 72 from the Georgia State line to Chester, SC and North of SC Route 9 from Chester, SC to Interstate Route I-77 and West of a line along Interstate Route I-77 from the intersection of SC Route 9 and I-77 to the North Carolina State line. Designer to determine the need for geomembrane for other locations. See alternate detail with moment slab and geomembrane.

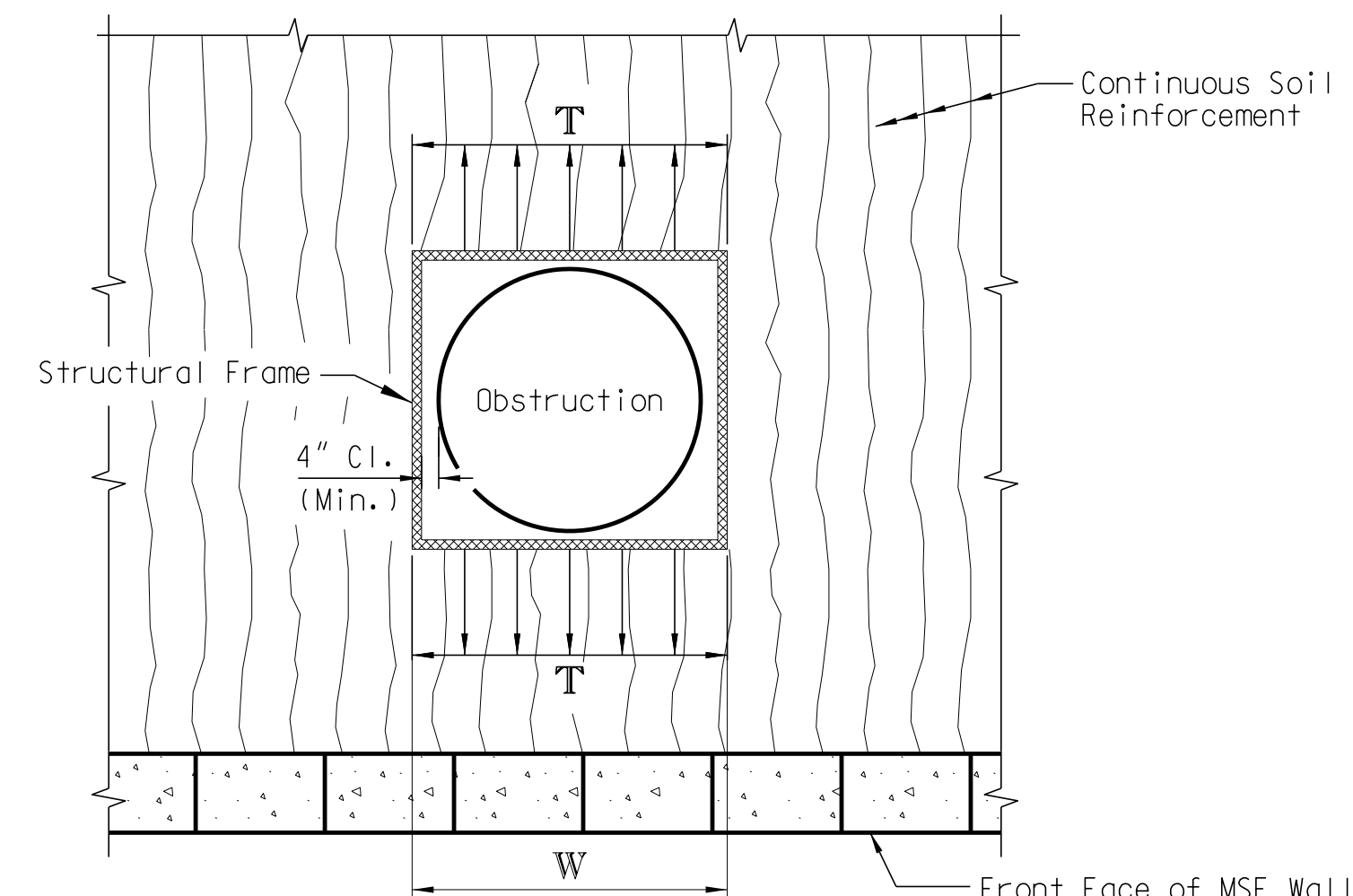|	BRIDGE PLANS ID	SHEET NO.
	XXXXXXX-BXX	XX

Notes:

① MSE Wall Supplier to design and provide additional soil reinforcement on each side of obstruction or a structural frame around the obstruction to transfer the load from the soil reinforcement on one side of the obstruction to the other. Design and detailing of either method is the MSE Wall Supplier's responsibility.

TRANSITION DISTANCE
(Under Obstruction)

Soil Reinforcement (Typ.)
Smooth Curves (no kinks)(Typ.)
15° Max.
4" Min.
3" Min.
℄ Obstruction
Geotextile Filter (Typ.)
*＊ "t" "+"

TRANSITION DISTANCE
(Over Obstruction)

Geotextile Filter (Typ.)
Soil Reinforcement (Typ.)
Smooth Curves (no kinks)(Typ.)
3" Min.
15° Max.
4" Min.
℄ Obstruction
X"
X"
6"
*＊ "t" "+"
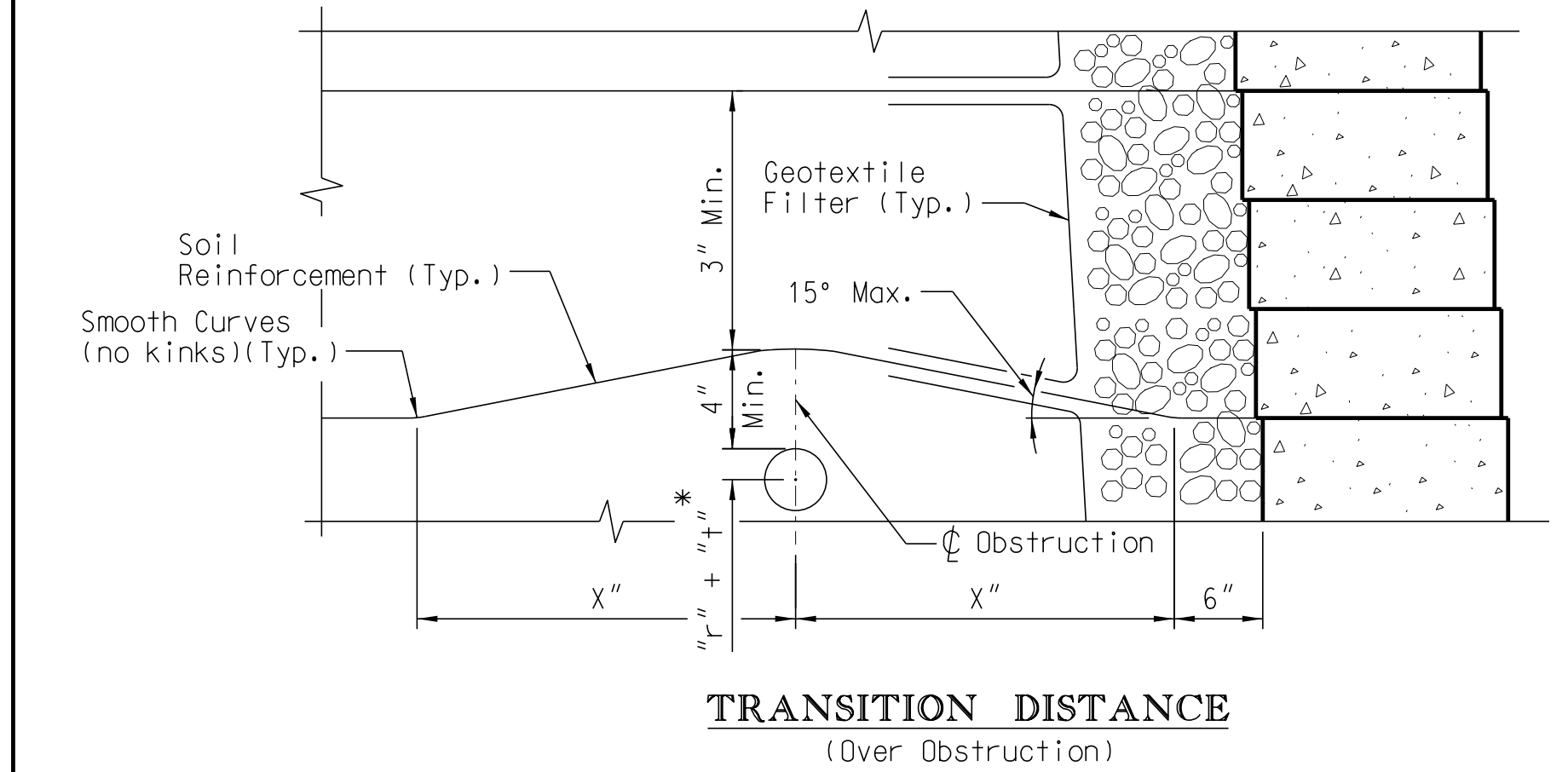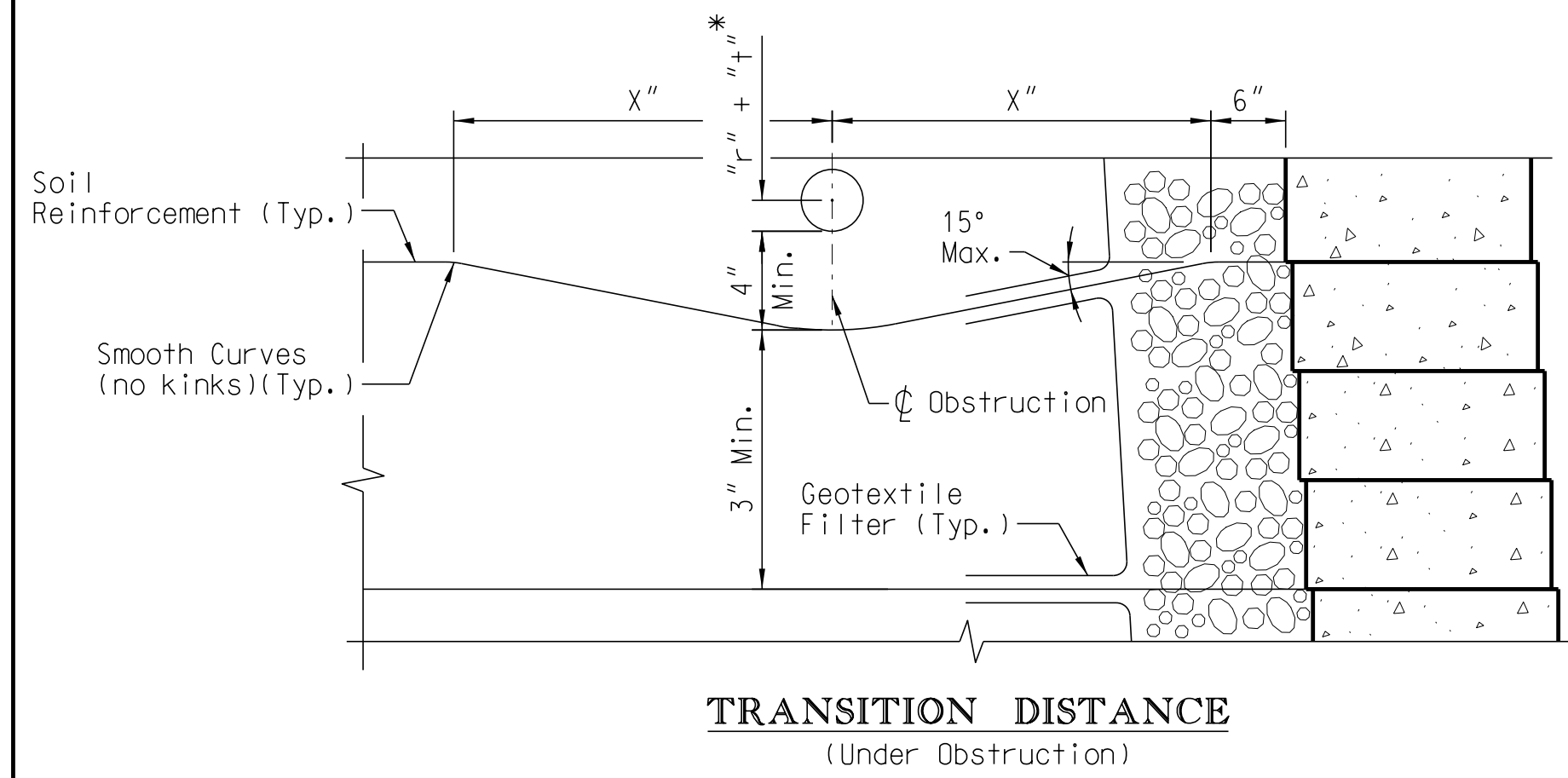
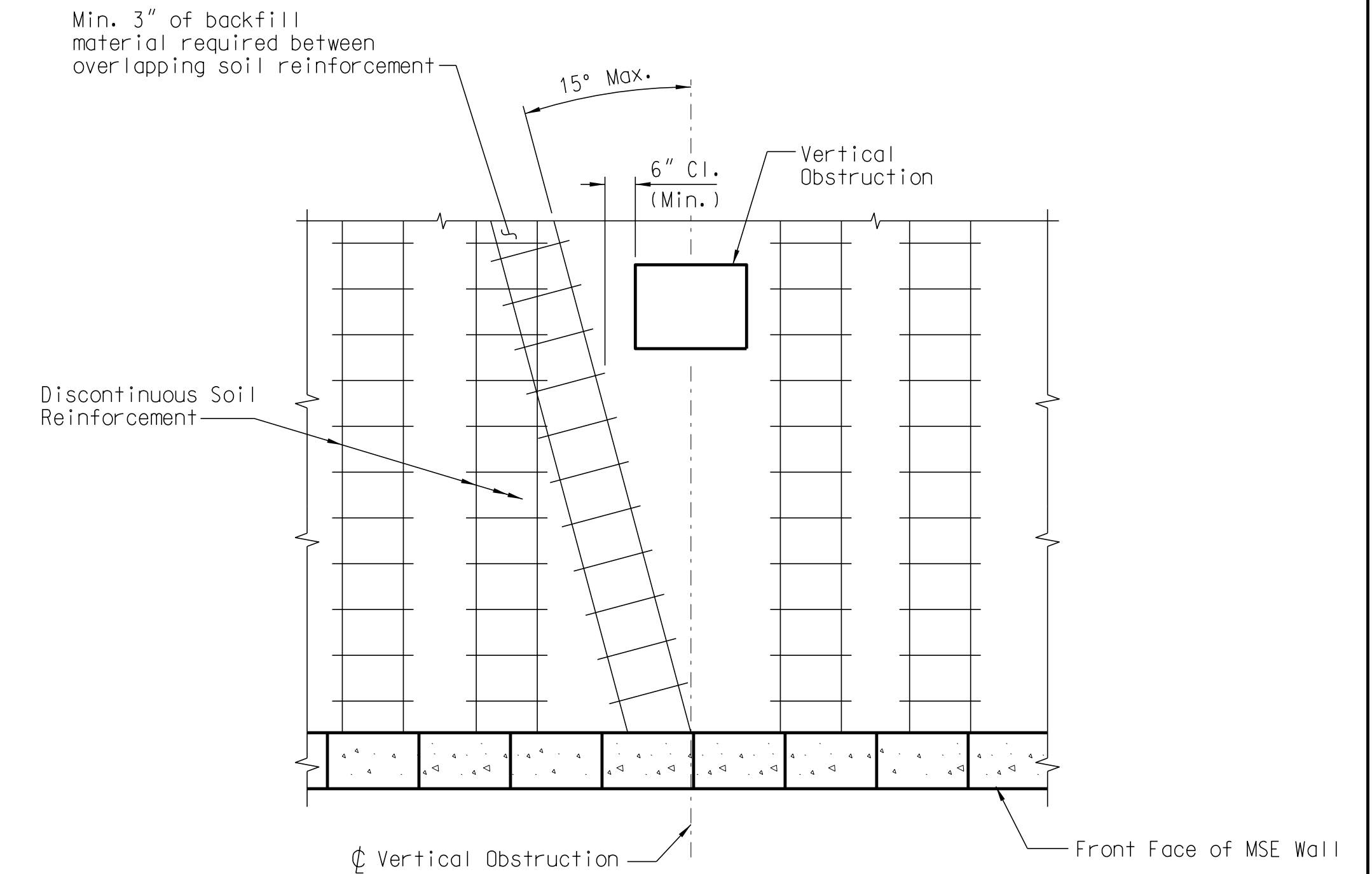| Pipe Inside Diameter	Pipe Radius "r"	"X"[1]	"X"[2]
6"	3"	27"	34"
12"	6"	38"	49"
18"	9"	49"	58"
24"	12"	60"	73"
30"	15"	71"	84"

＊ - "t" denotes pipe wall thickness
1 - Use for all pipe material except concrete
2 - Use for concrete pipe

MSE WALL OBSTRUCTION (HORIZONTAL)

MSE WALL OBSTRUCTION (VERTICAL) WITH STRUCTURAL FRAME ①
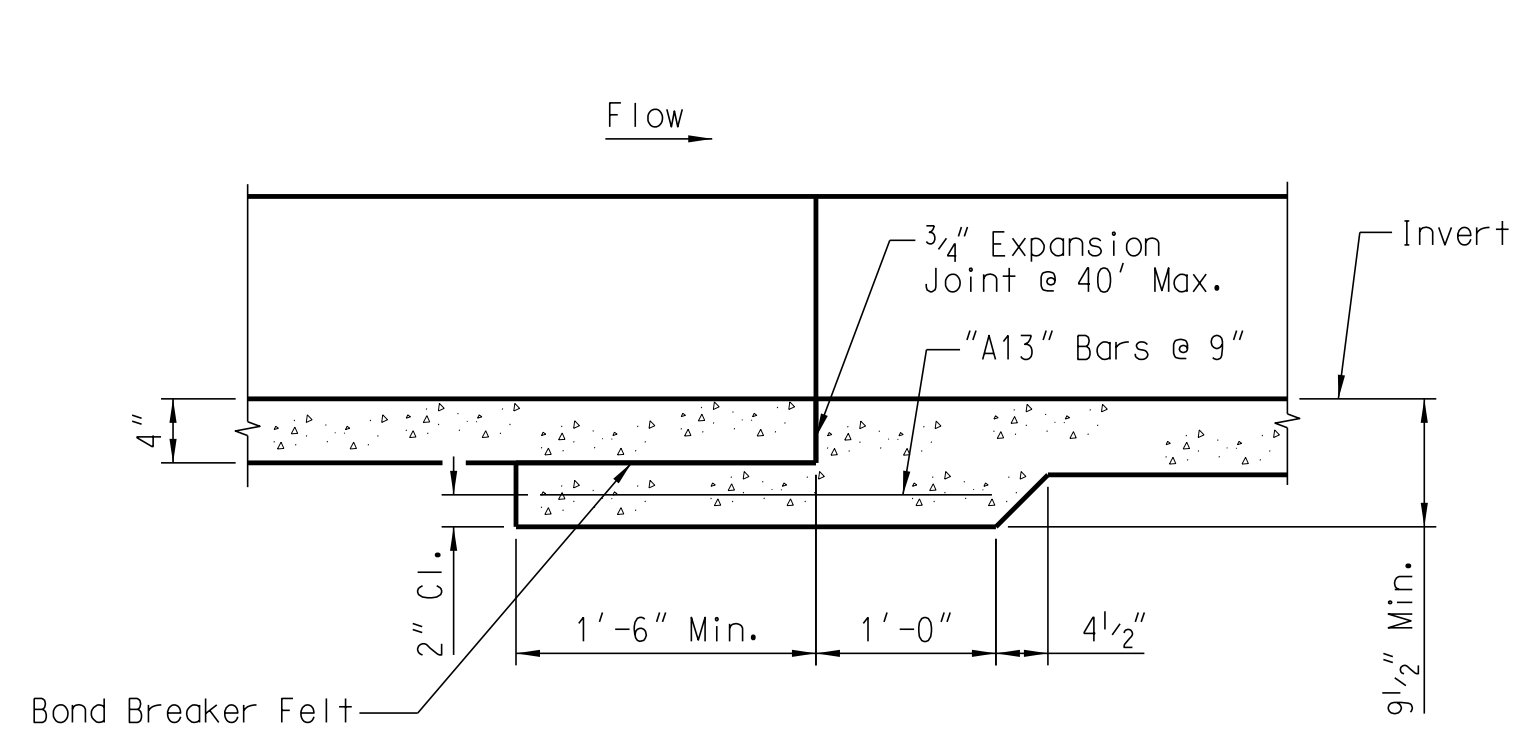(Plan View)

T
Continuous Soil Reinforcement
Structural Frame
Obstruction
4" Cl. (Min.)
T
W
Front Face of MSE Wall

T = Total Load Which Structural Frame Must Carry = Tmax X W

Tmax = Max. Reinforcement Unit Tensile Load

MSE WALL OBSTRUCTION (VERTICAL) ①
(Plan View)

Min. 3" of backfill material required between overlapping soil reinforcement
15° Max.
6" Cl. (Min.)
Vertical Obstruction
Discontinuous Soil Reinforcement
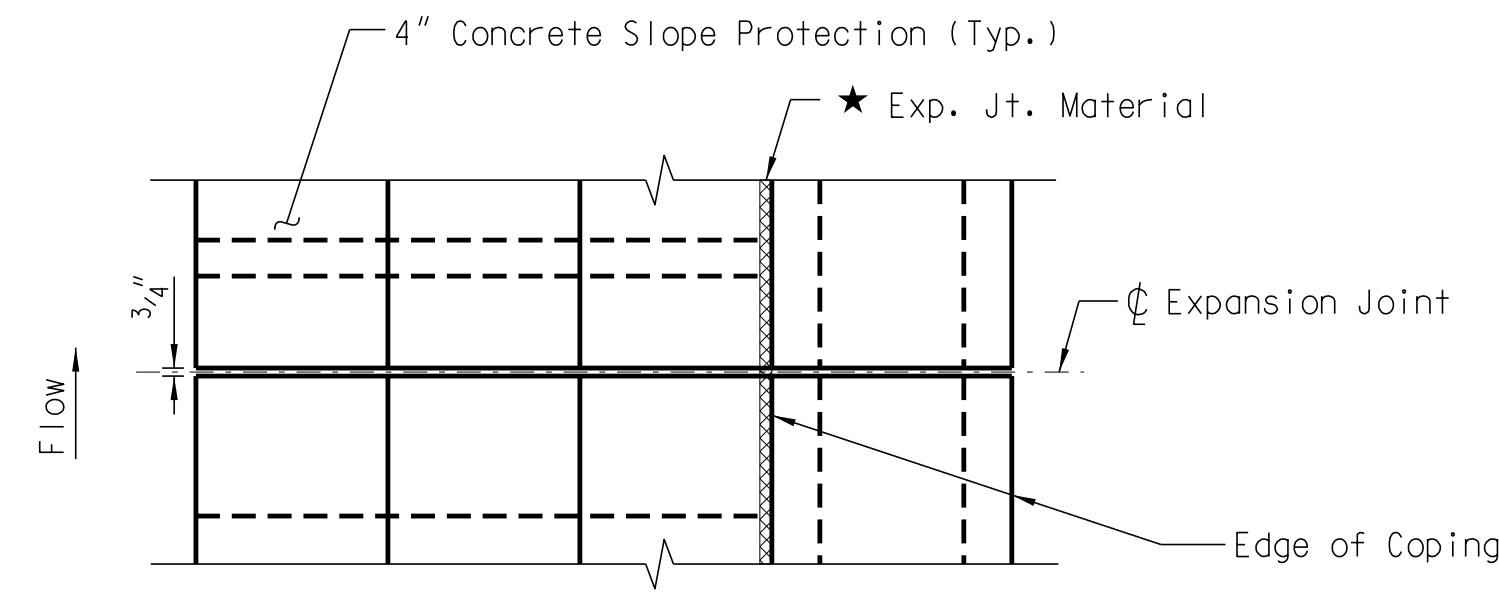℄ Vertical Obstruction
Front Face of MSE Wall

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Whenever possible relocate utilities, roadway drainage system, or other obstructions from the reinforced backfill.

★ - Designer to input dimension

REV.				SOUTH CAROLINA
REV.				DEPARTMENT OF TRANSPORTATION
REV.	JXY	SAN	3-14	**MSE WALL DETAILS**
	New Border			**(BLOCK FACE)**
REVIEWED				**(4 OF 4)**
QUAN.				
DR.	MRW	SAN	2-12	
DES.				
	BY	CHK.	DATE	COUNTY XXXXXXXX

ROUTE XXXXXX

DRAWING NO. 713-02d

SECTION THRU DITCH AT EXPANSION JOINT

Flow

3/4" Expansion Joint @ 40' Max.

"A13" Bars @ 9"

Invert

4"

2" Cl.

1'-6" Min. 1'-0" 4 1/2"

9 1/2" Min.

Bond Breaker Felt

PART. PLAN OF DITCH AT EXPANSION JOINT

4" Concrete Slope Protection (Typ.)

★ Exp. Jt. Material

₵ Expansion Joint

3/4"

Flow

Edge of Coping

SECTION A-A
(Not To Scale)

₵ Slip Joint

Preformed Joint Material

Geotextile (Typ.)

SECTION B-B
(Not To Scale)

₵ Slip Joint

Preformed Joint Material

Geotextile (Typ.)
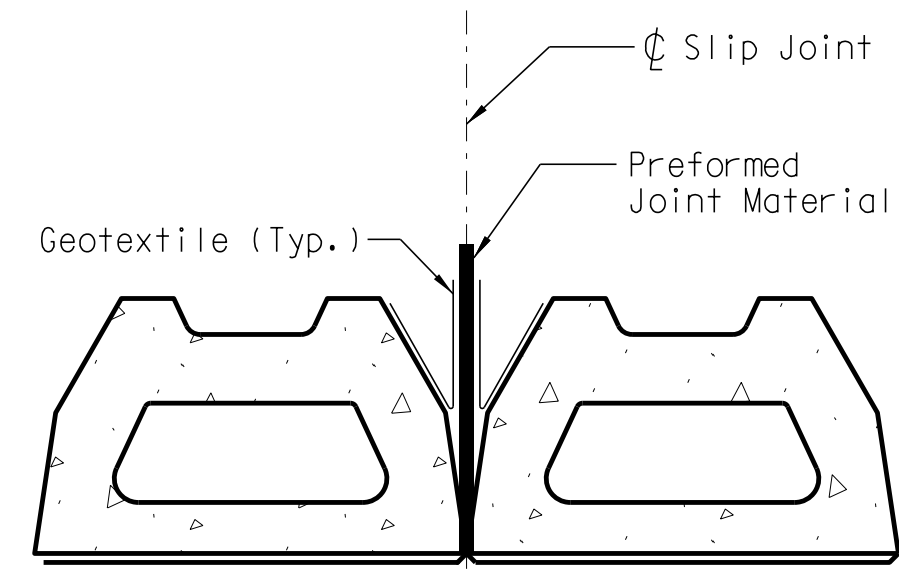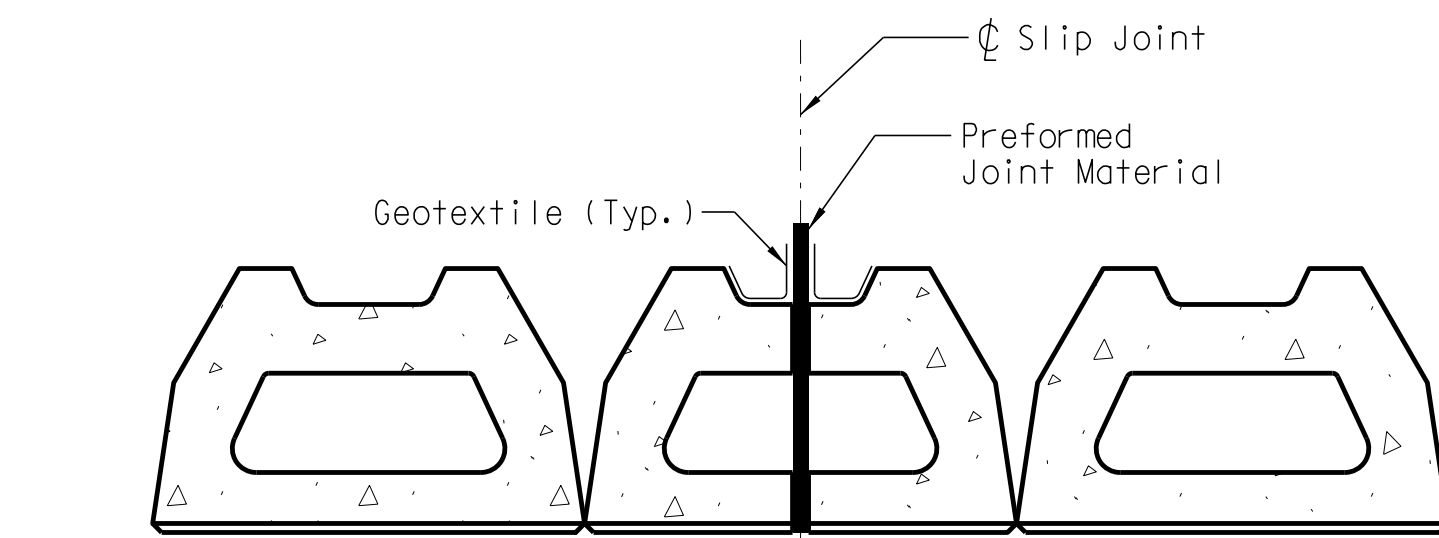
Use prefabricated half size block or field cut facing unit at slip joint location

Note to Designer:

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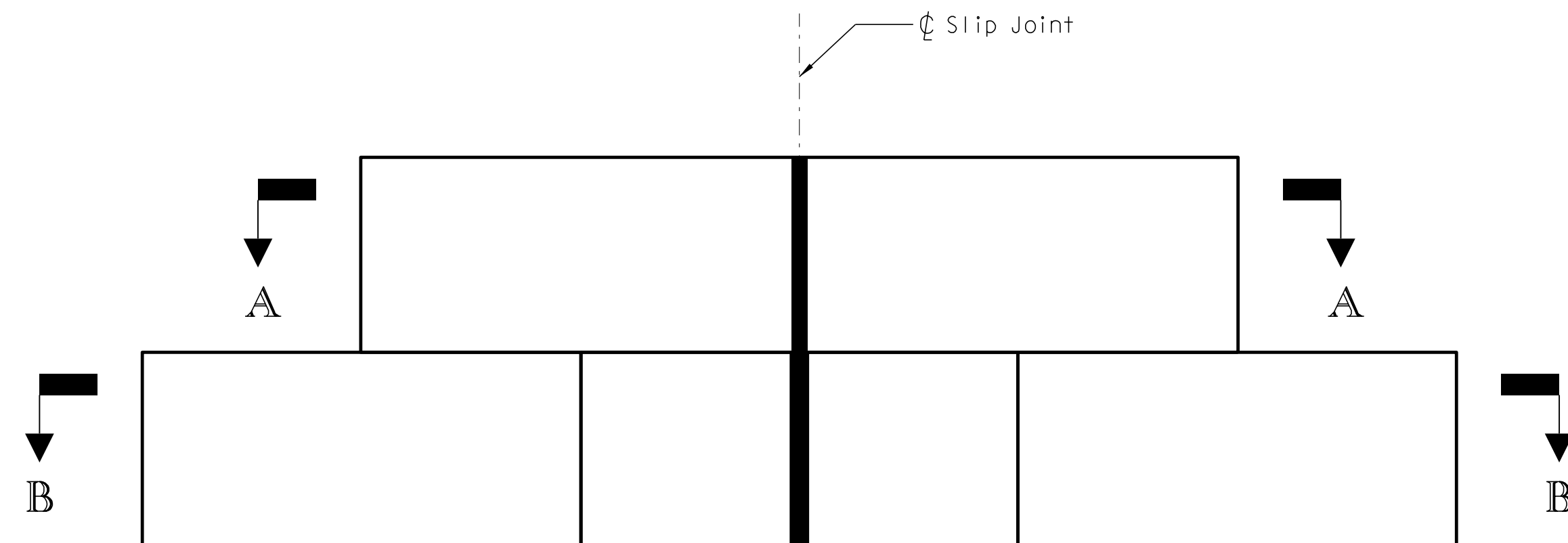
★ - Designer to input dimension

☑ - Designer to input required Class for Rip Rap

Do not use Typical Section at Waterfront MSE Wall where the maximum velocity of the water exceeds 5 ft/sec.

TYPICAL SECTION AT WATERFRONT MSE WALL

4" Concrete Slope Protection

6" Min.

Top of Wall Elevation

Wall Coping

Limits of Reinforced backfill

Drainage Aggregate

Soil Reinforcement

Reinforced Backfill

Retained Backfill

④

③

⑥ Place pipe connecting drains @ 20' Max.

MSE Wall and Layout Line

Weep hole @ 10' Max. (For details, see Sh. XX)

500 Year High Water Level

⑦ Aggregate Drain

Reinforced Stone Backfill

⑤

②

Geotextile (Typ.)

Stream Bed

Rip Rap

MSE Wall Horizontal Layout Control Point

Leveling Pad

1'-0" Min.

Min. Base Width Required = B_Req

3" Min.

1'-0"

d

Wall Height Pay Limit (Varies)

Ⓐ

① Construct top of leveling pad below the maximum scour elevation and no higher than 3'-0" below the bottom of the stream bed. Backfill excavated area in front of wall with Class ☑ Rip Rap.

② Provide aggregate that meets requirements for stone backfill in Supplemental Technical Specification SC-M-713. Do not use Macadam in this zone. Wrap perimeter with geotextile for drainage filtration.

③ Maximum vertical spacing of soil reinforcement is the lesser of "d" multiplied by 2 or 32".

④ Extend top two layers of soil reinforcement 5 feet beyond the end of the lower layers of soil reinforcement.

⑤ Angle to be determined by the Contractor based on site conditions and the method of construction used. Excavation and/or shoring of retained backfill to permit construction of the MSE wall is considered incidental to the MSE wall construction and is not paid for as a separate item.

⑥ Slope 2% min. Provide unperforated pipe connecting aggregate drain to drain at wall facing.

⑦ Construct aggregate drain using 6" dia. perforated pipe. Provide aggregate, other than Macadam, that meets the requirements for stone backfill in Supplemental Technical Specification SC-M-713. Wrap geotextile for drainage filtration (see Supplemental Technical Specification SC-M-713) completely around aggregate drain and overlap 1'-0". Design MSE Wall drainage system to drain the aggregate drain.

⑧ Provide aggregate, other than Macadam, that meets the requirements for stone backfill in the Supplemental Technical Specification SC-M-713, for the type of soil reinforcement used.

⑨ Provide aggregate, other than Macadam, that meets the requirements for stone backfill in the Supplemental Technical Specification SC-M-713.

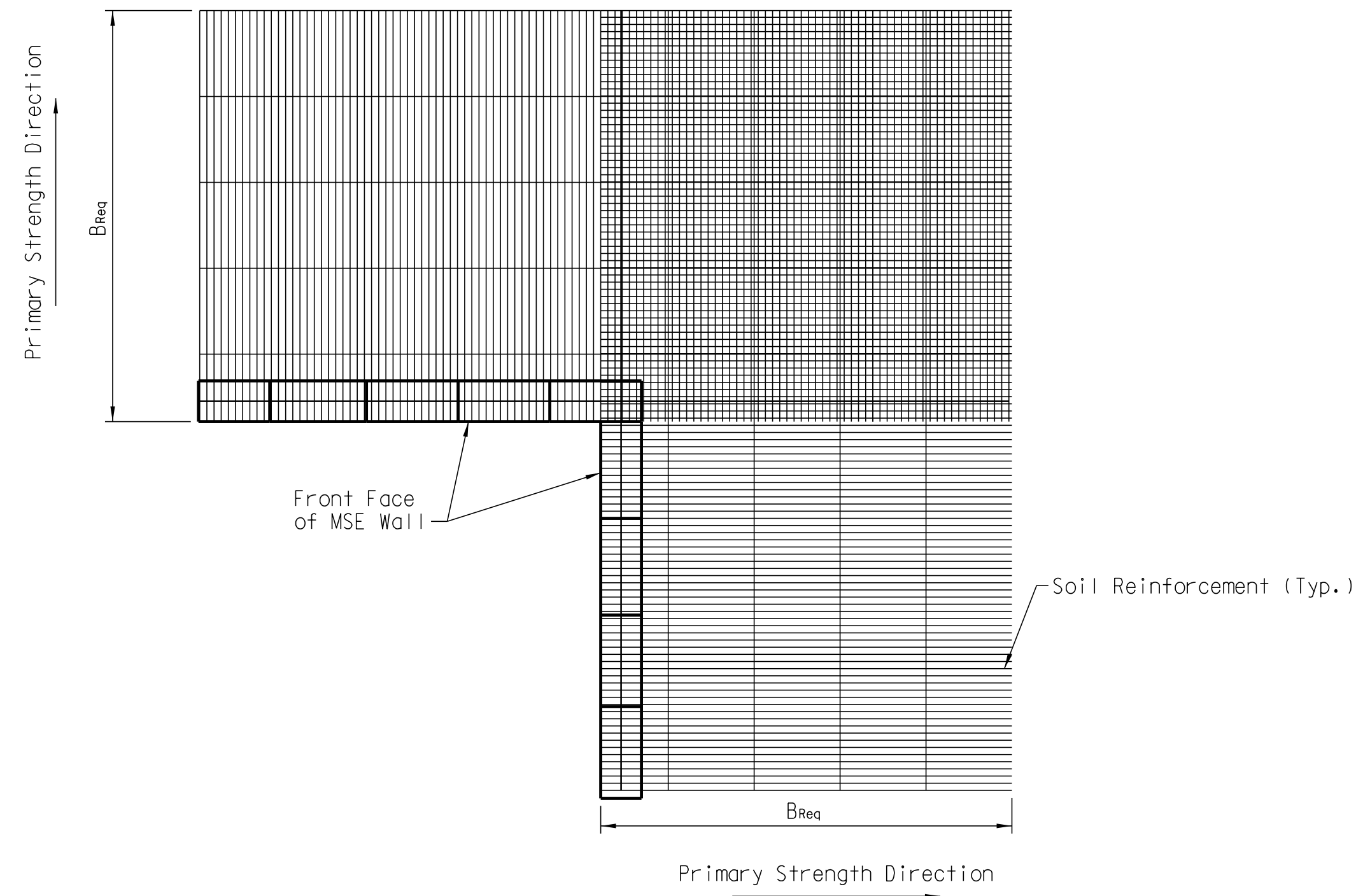Ⓐ Pay limit is from top of leveling pad elevation to top of wall. See MSE wall profiles.

SLIP JOINT DETAIL - BLOCK FACING

₵ Slip Joint

A A

B B

Primary Strength Direction

B_{Req}

Front Face of MSE Wall

Soil Reinforcement (Typ.)

B_{Req}

Primary Strength Direction

Front Face of MSE Wall
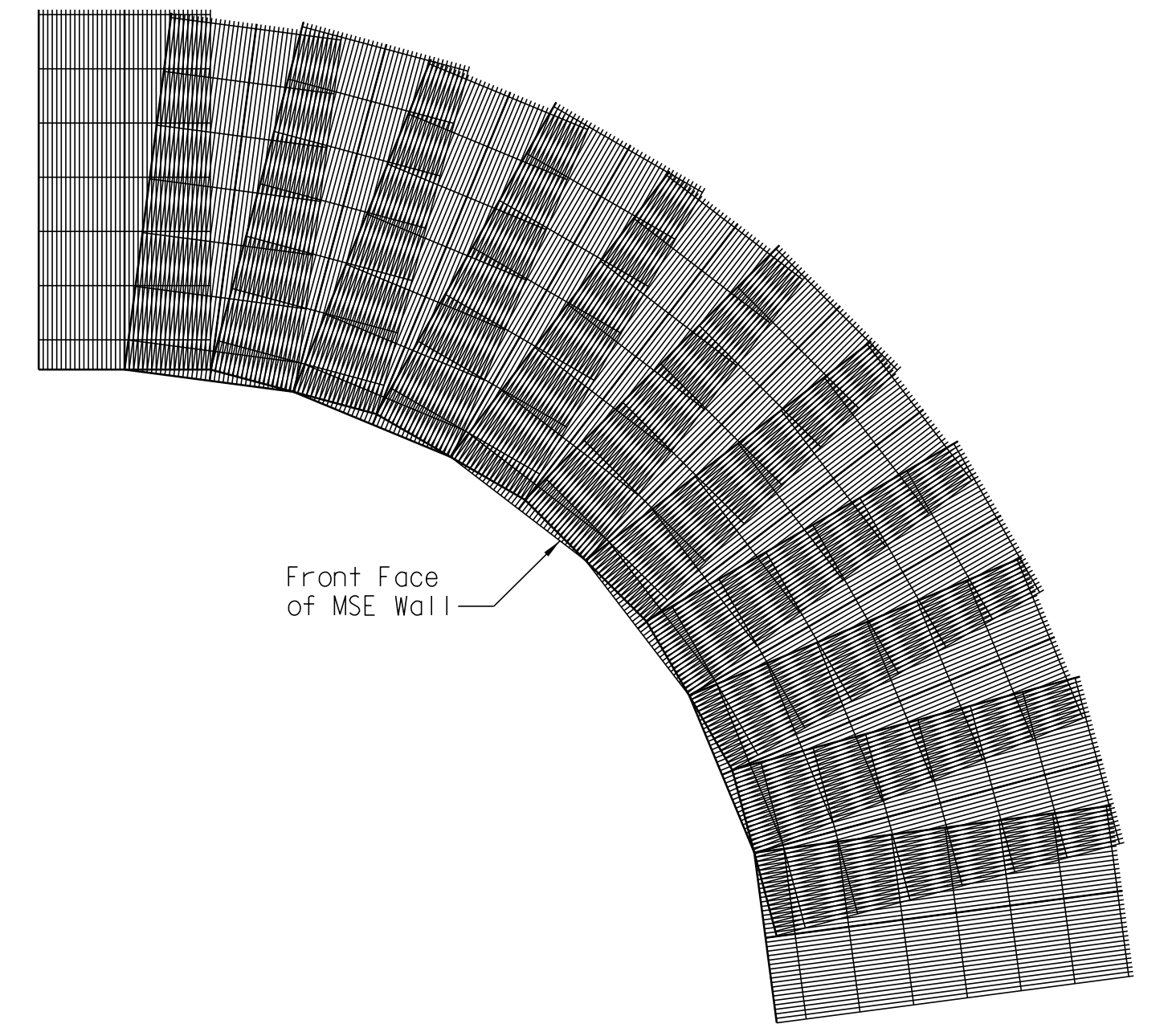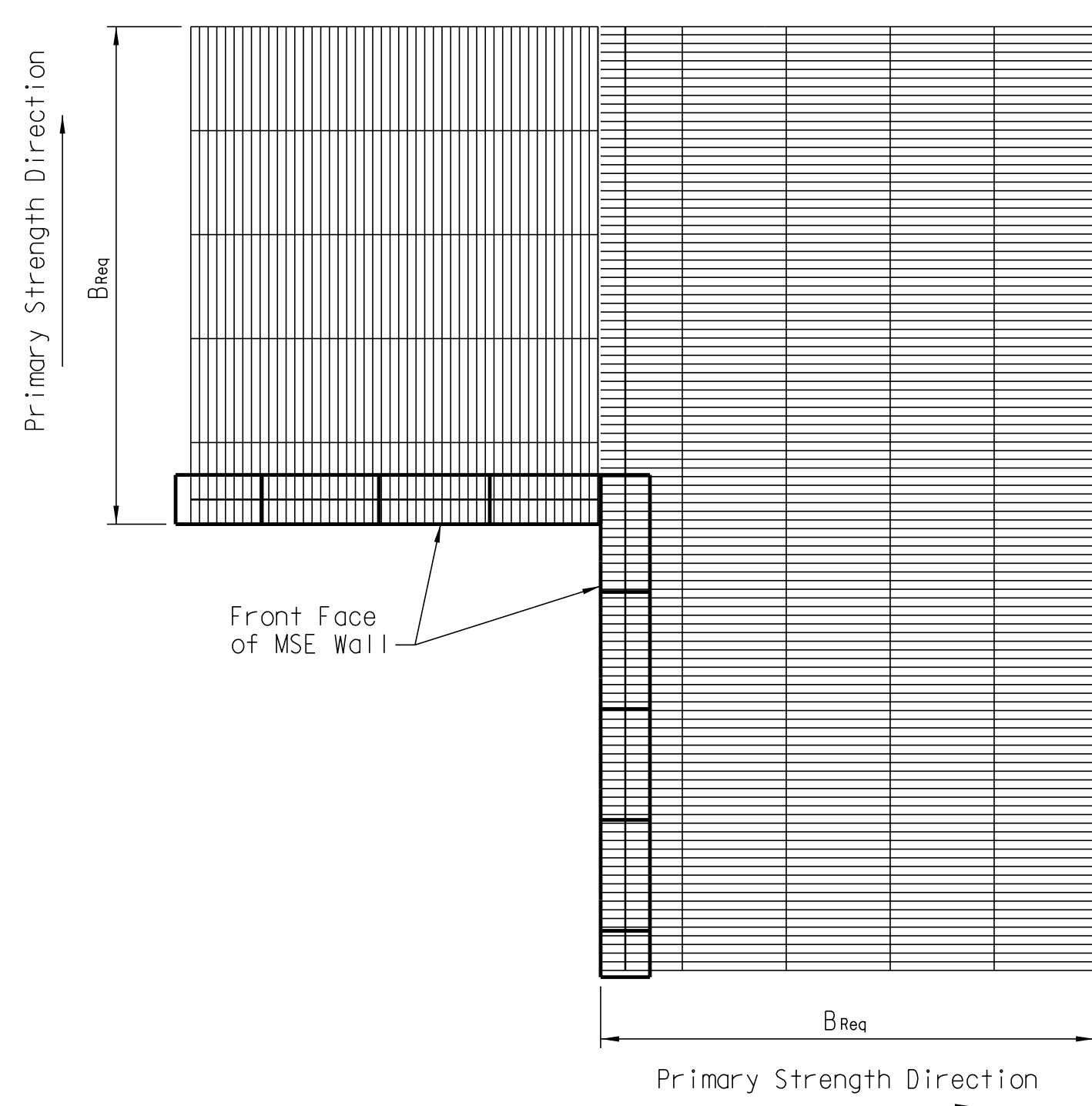
CURVED INSIDE CORNER DETAIL

Note:

Alternate adjacent layers of reinforcement using Layout C and Layout D.

Note to Designer:

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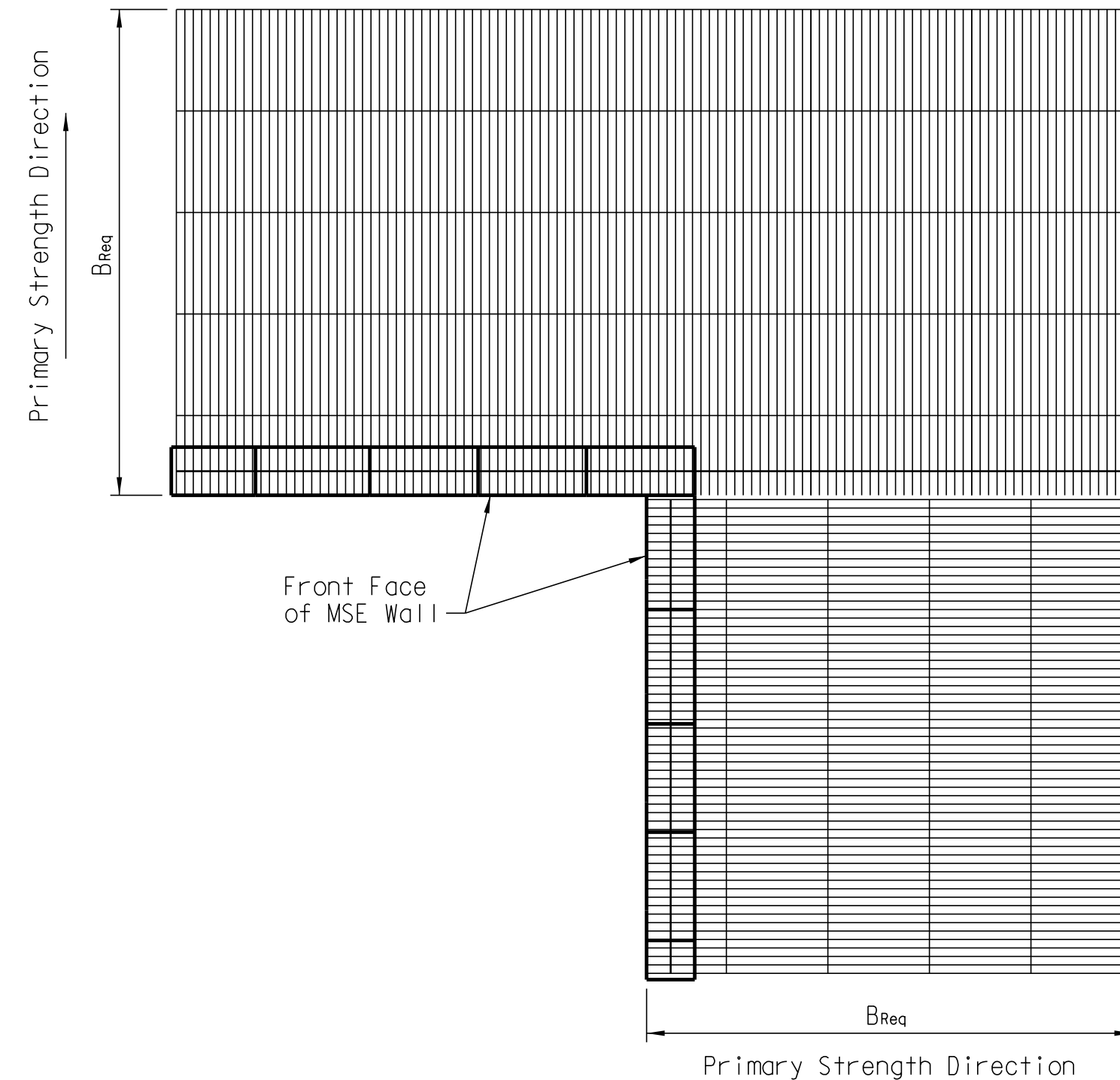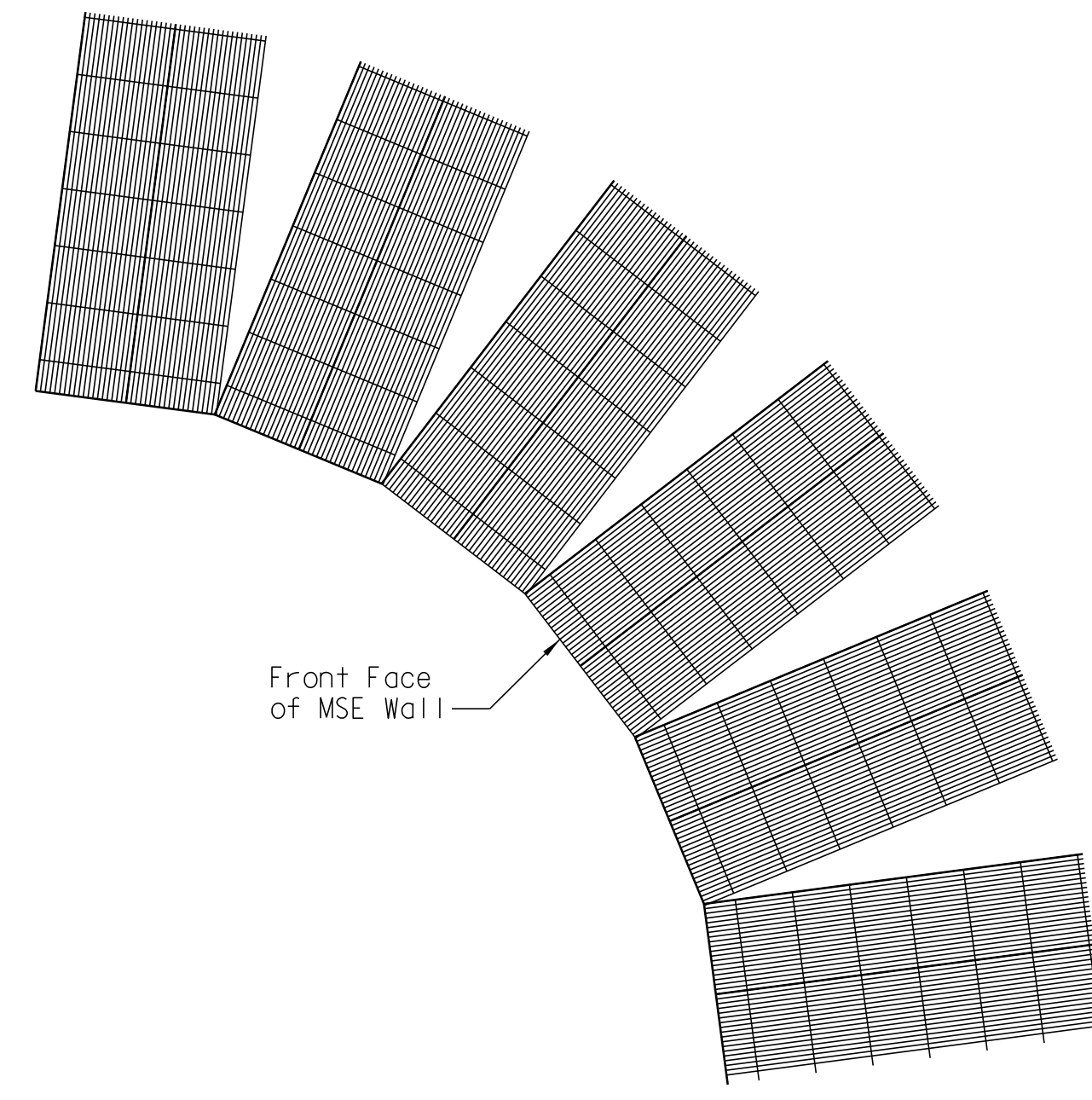
90 DEGREE INSIDE CORNER DETAIL

Note:

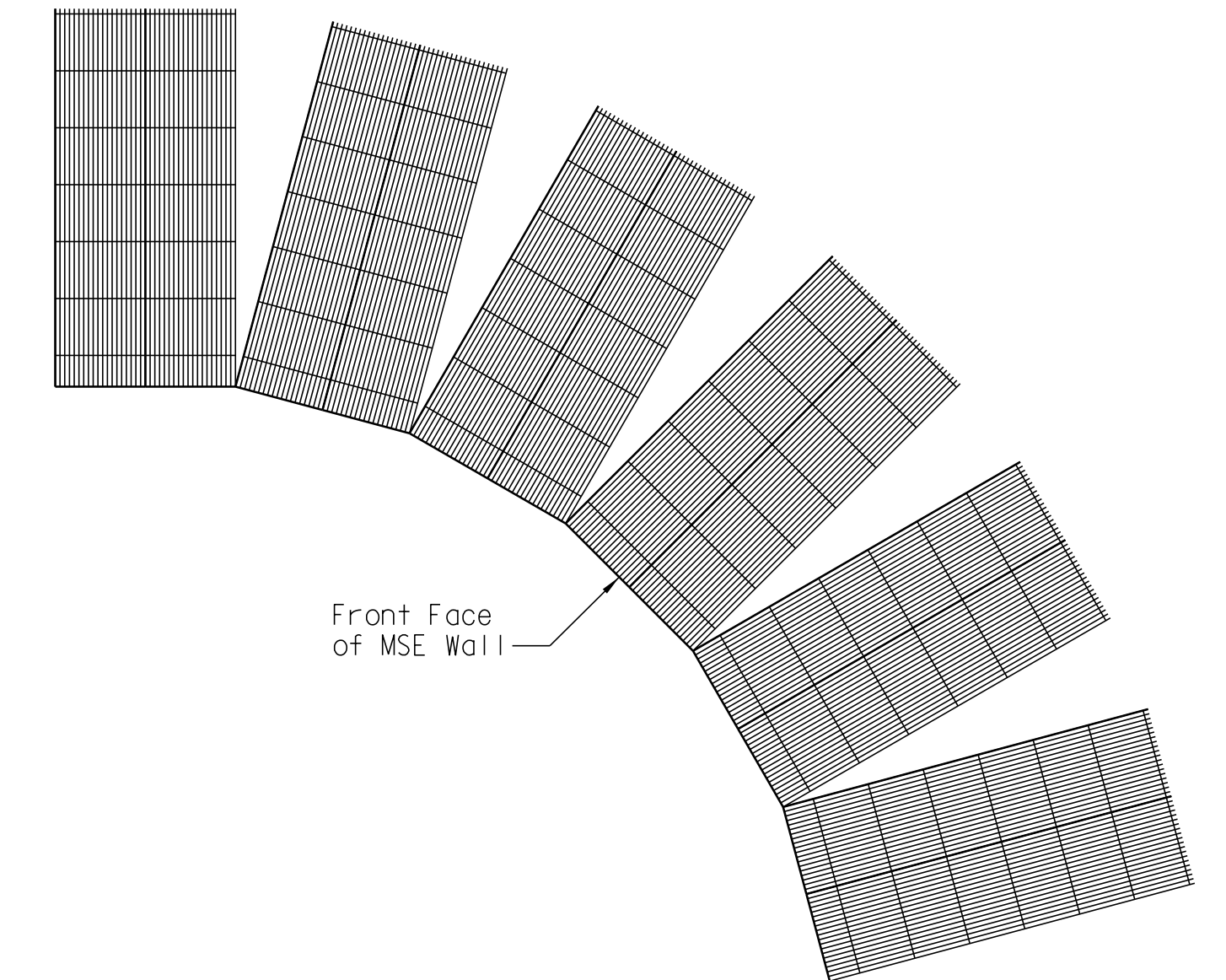Alternate adjacent layers of reinforcement using Layout A and Layout B.

Primary Strength Direction

B_{Req}

Front Face of MSE Wall

B_{Req}

Primary Strength Direction

LAYOUT A

Primary Strength Direction

B_{Req}

Front Face of MSE Wall

B_{Req}

Primary Strength Direction

LAYOUT B

Front Face of MSE Wall

LAYOUT C

Front Face of MSE Wall

LAYOUT D

ALTERNATE MSE WALL DETAILS

Min. 3" of backfill material
required between overlapping
soil reinforcement (Typ.)

Front Face

Trim geogrid at face
where necessary

CURVED WALL GEOGRID DETAILS

Front Face
of MSE Wall

Front Face
of MSE Wall

B_{Req}

Primary Strength Direction

B_{Req}

Primary Strength Direction

90 DEGREE OUTSIDE CORNER DETAIL

Note:

Alternate primary strength direction of adjacent soil
reinforcement layers using Layout E and Layout F.

Front face

Place geogrid to
fit around radius

Min. 3" of backfill material
required between overlapping
soil reinforcement (Typ.)

CURVED OUTSIDE CORNER GEOGRID DETAIL

Front Face
of MSE Wall

Front Face
of MSE Wall

B_{Req}

Primary Strength Direction

B_{Req}

Primary Strength Direction

LAYOUT E

Front Face
of MSE Wall

Front Face
of MSE Wall

B_{Req}

Primary Strength Direction

B_{Req}

Primary Strength Direction

LAYOUT F

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DR. MRW SAN 2-12

TWO-STAGE MSE WALL DETAILS

TWO-STAGE MSE WALL TYPICAL SECTION
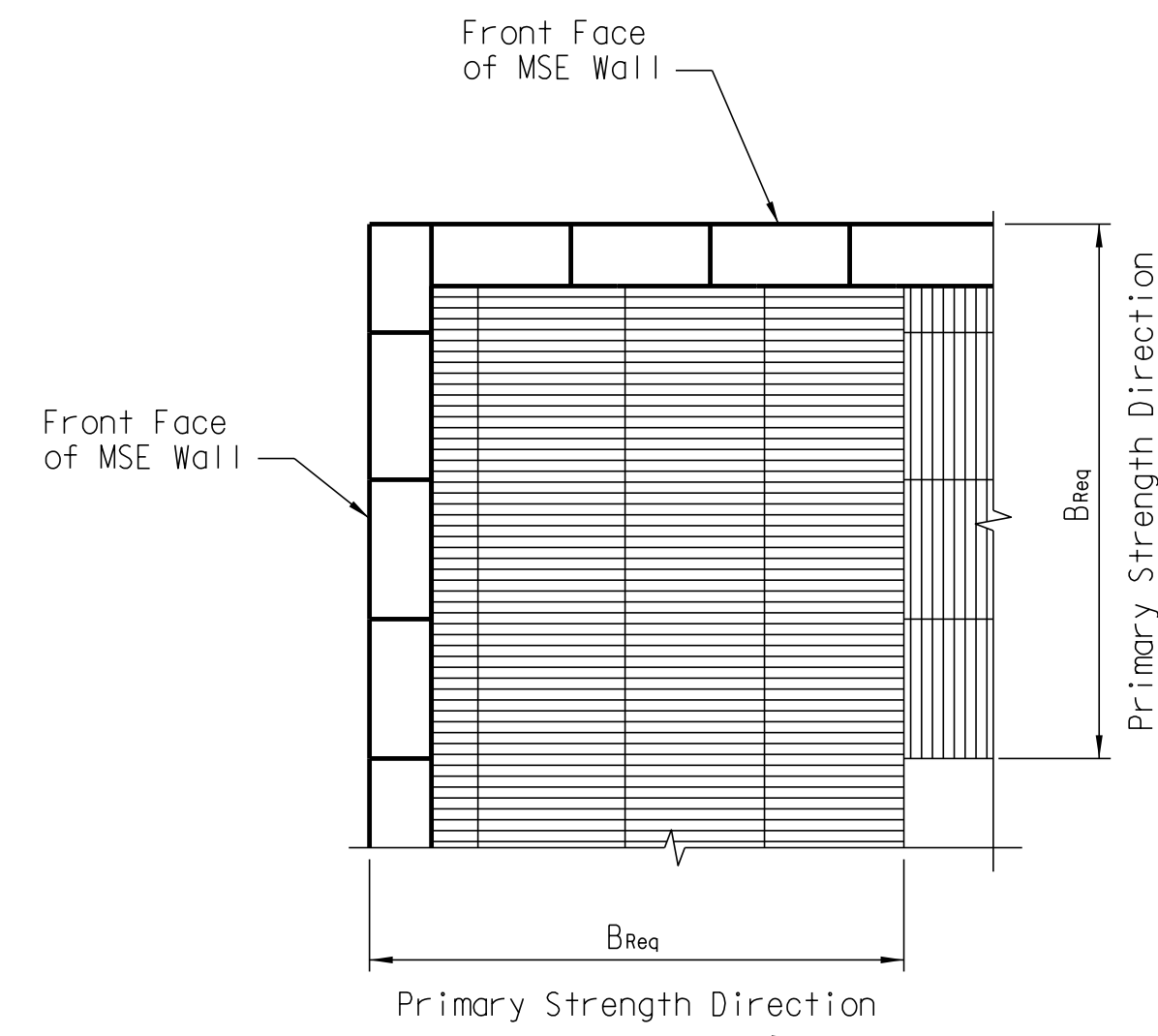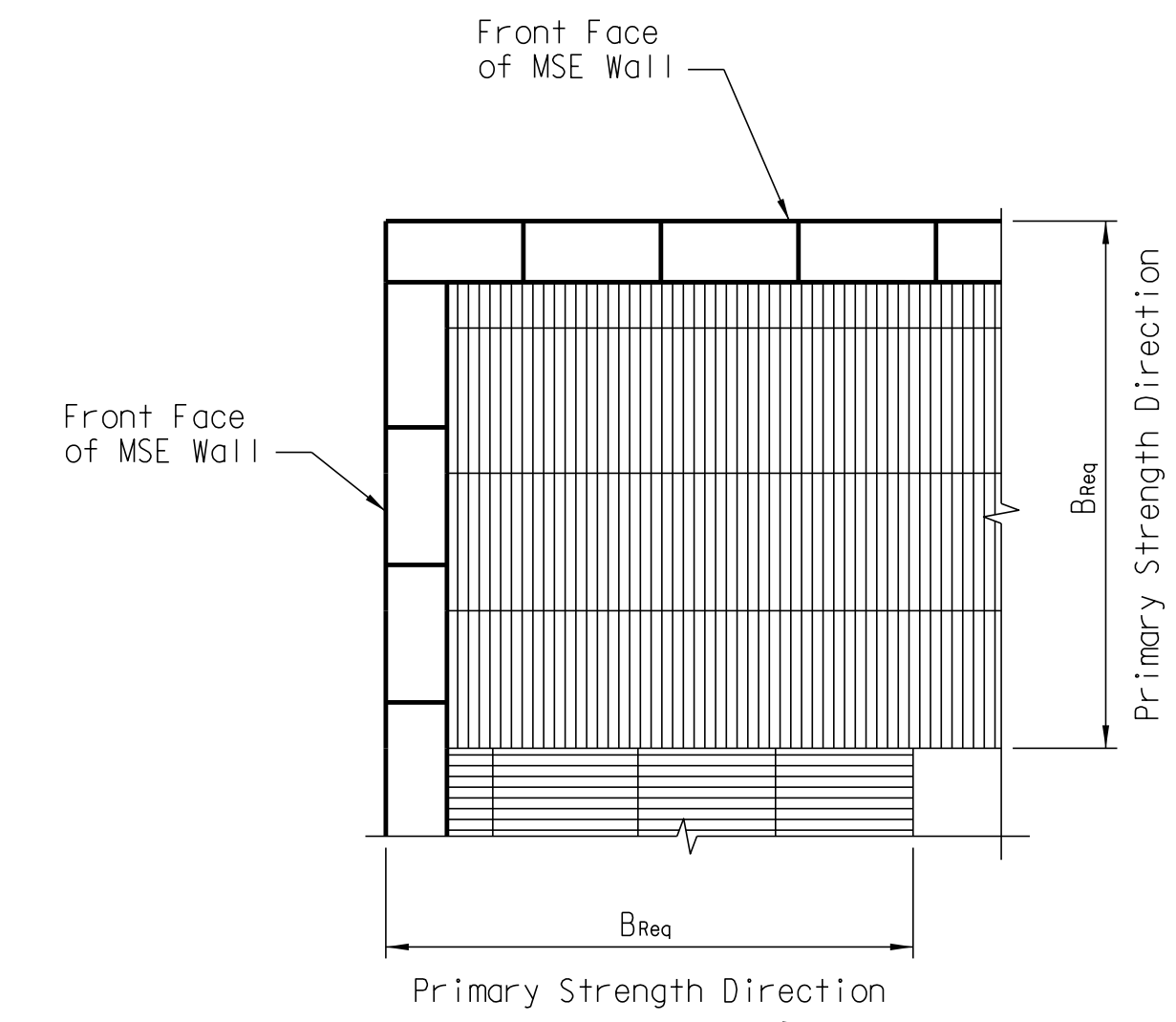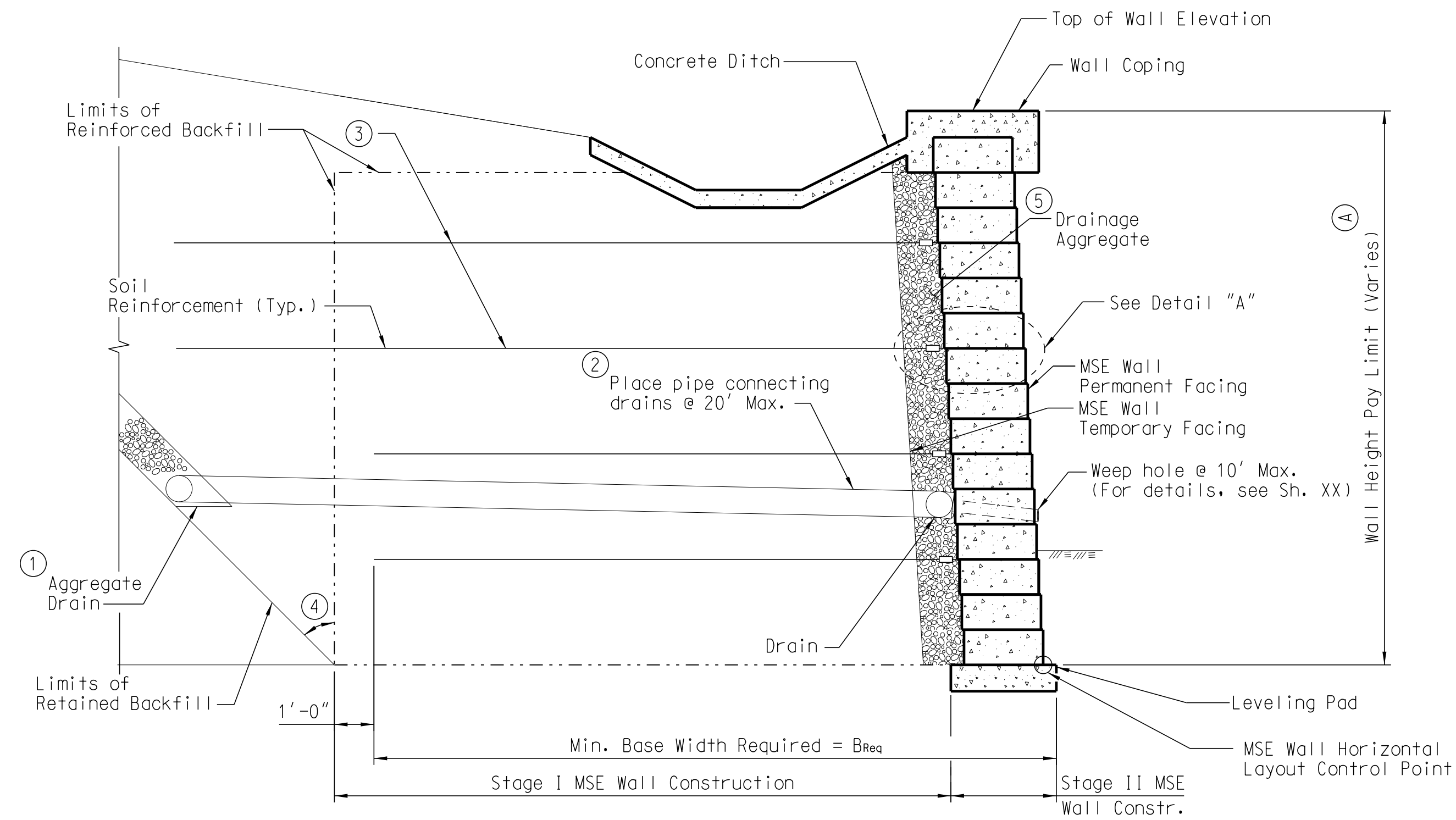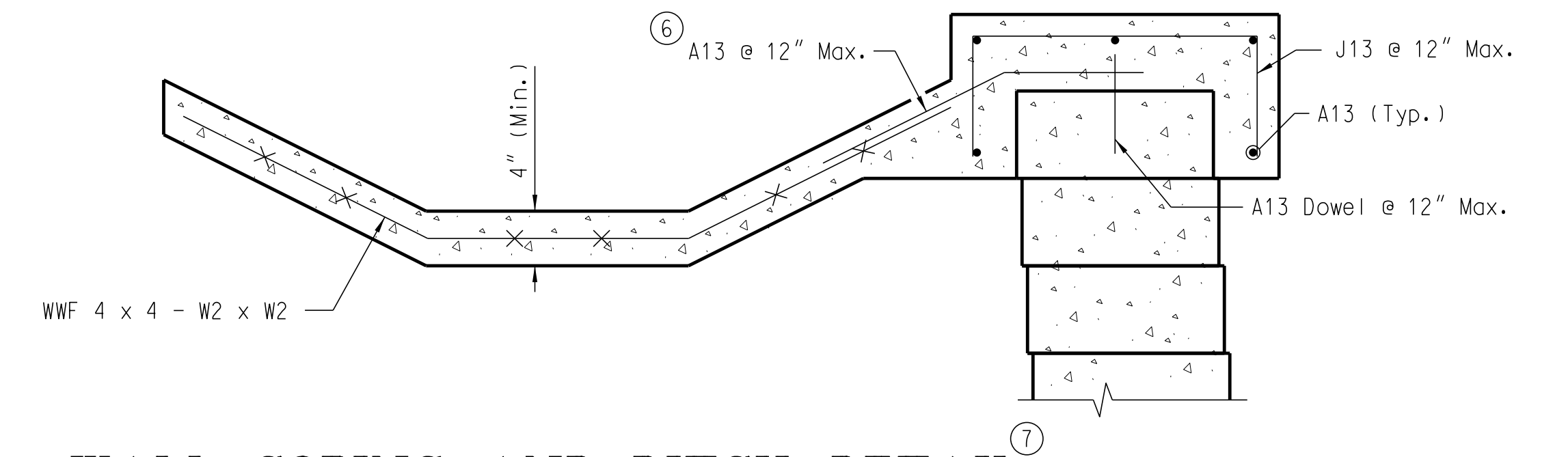
Labels:
- Concrete Ditch
- Top of Wall Elevation
- Wall Coping
- Limits of Reinforced Backfill
- ③
- ⑤ Drainage Aggregate
- Soil Reinforcement (Typ.)
- See Detail "A"
- ② Place pipe connecting drains @ 20' Max.
- MSE Wall Permanent Facing
- MSE Wall Temporary Facing
- Weep hole @ 10' Max. (For details, see Sh. XX)
- ① Aggregate Drain
- Drain
- ④
- Limits of Retained Backfill
- 1'-0"
- Leveling Pad
- MSE Wall Horizontal Layout Control Point
- Min. Base Width Required = B_Req
- Stage I MSE Wall Construction
- Stage II MSE Wall Constr.
- Ⓐ Wall Height Pay Limit (Varies)

WALL COPING AND DITCH DETAIL

Labels:
- ⑥ A13 @ 12" Max.
- J13 @ 12" Max.
- 4" (Min.)
- A13 (Typ.)
- A13 Dowel @ 12" Max.
- WWF 4 x 4 – W2 x W2
- ⑦

⑥ Field bend as necessary.

⑦ Use Class 4000 concrete for concrete in ditch section. Include cost of ditch concrete and reinforcing steel in unit price bid for coping.

DETAIL "A"

Labels:
- Turn-Buckle Connector
- ★
- Permanent MSE Wall Facing
- MSE Wall Soil Reinforcement
- Reinforced Backfill
- Temporary Welded Wire Mesh Facing
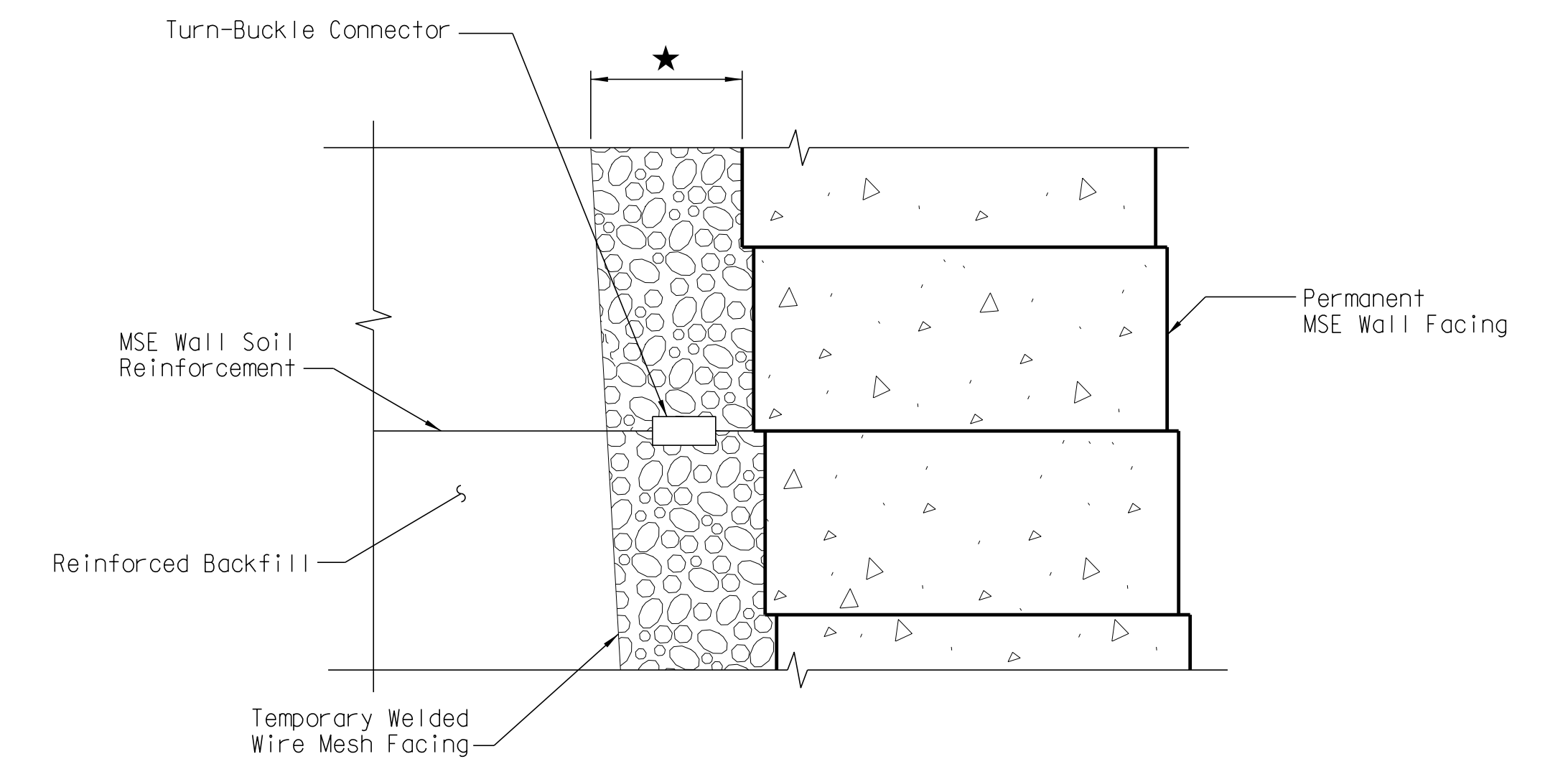
Attach the permanent MSE Wall facing to the MSE Wall soil reinforcement as shown. Align the permanent MSE Wall facing connection point and the MSE Wall soil reinforcement and connect with a turn-buckle connector. Do not attach the permanent MSE Wall facing to the MSE Wall temporary facing.

① Construct aggregate drain using 6" dia. perforated pipe. Provide aggregate, other than Macadam, that meets the requirements for stone backfill in Supplemental Technical Specification SC-M-713. Wrap geotextile for drainage filtration (see Supplemental Technical Specification SC-M-713) completely around aggregate drain and overlap 1'-0". Design MSE Wall drainage system to drain the aggregate drain.

② Slope 2% min. Provide non perforated pipe connecting aggregate drain to drain at wall facing.

③ Extend top two layers of soil reinforcement 5 feet beyond the end of the lower layers of soil reinforcement.

④ Angle to be determined by the Contractor based on site conditions and the method of construction used. Excavation and/or shoring of retained backfill to permit construction of the MSE wall is considered incidental to the MSE wall construction and is not paid for as a separate item.

⑤ Provide aggregate, other than Macadam, that meets the requirements for stone backfill in Supplemental Technical Specification SC-M-713.

Ⓐ Pay limit is from top of leveling pad elevation to top of wall. See MSE wall profiles.

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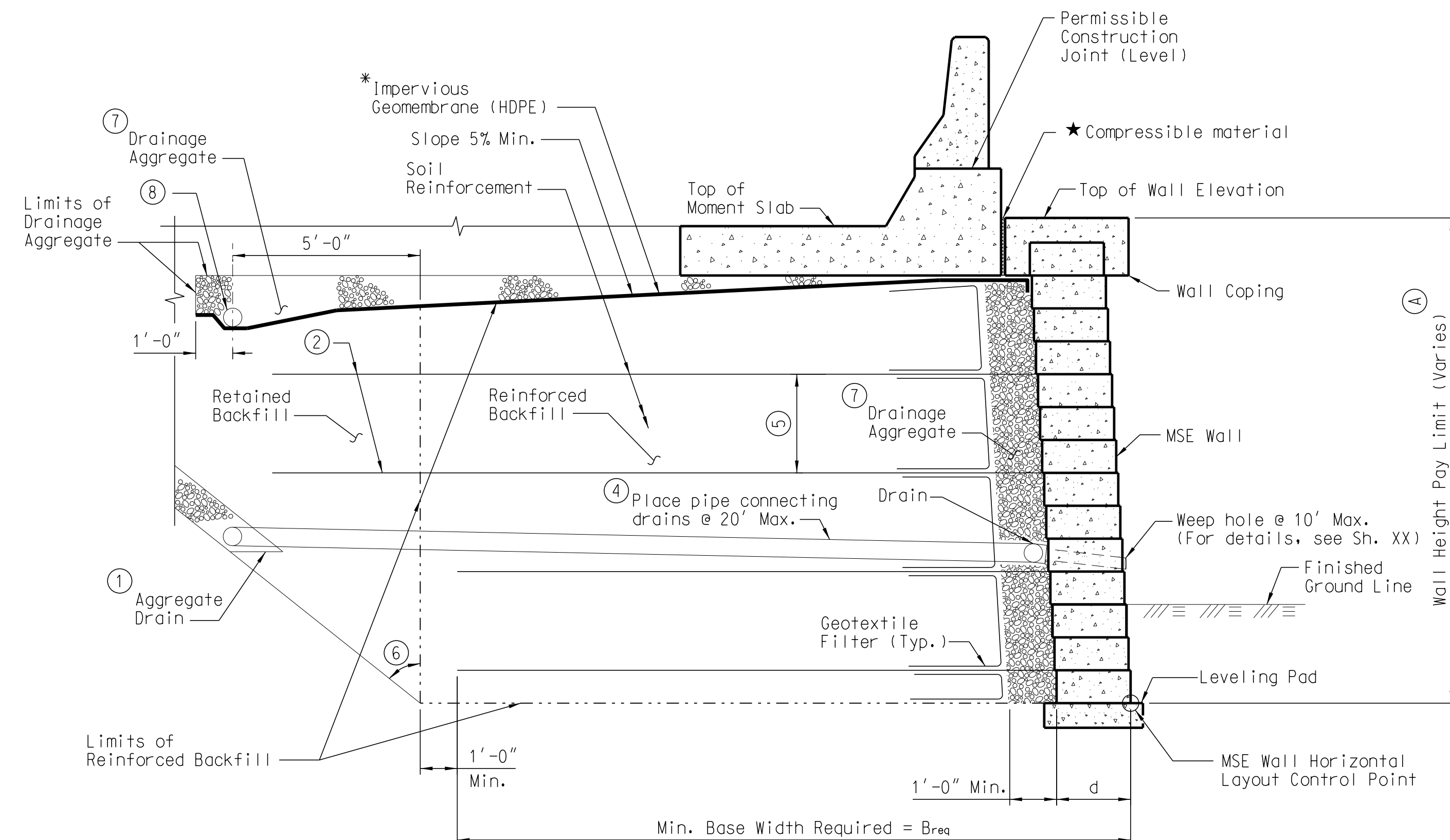
ALTERNATE MSE WALL DETAILS

Notes:

Include the cost of reinforcing, concrete, and all other items needed for construction of the barrier wall and the moment slab in the bid price for Concrete Roadside Barrier.

Extend compressible material from bottom of moment slab to top of barrier in transverse expansion joint.

For impervious geomembrane requirements see Supplemental Technical Specification SC-M-713.

Glue or weld all seams in the geomembrane to prevent leakage.

① Construct aggregate drain using 6" dia. perforated pipe. Provide aggregate, other than Macadam, that meets the requirements for stone backfill in Supplemental Technical Specification SC-M-713. Wrap geotextile for drainage filtration (see Supplemental Technical Specification SC-M-713) completely around aggregate drain and overlap 1'-0". Design MSE Wall drainage system to drain the aggregate drain.

② Extend top two layers of soil reinforcement 5 feet beyond the end of the lower layers of soil reinforcement.

④ Slope 2% min. Provide unperforated pipe connecting aggregate drain to drain at wall facing.

⑤ Maximum vertical spacing of soil reinforcement is the lesser of "d" multiplied by 2 or 32".

⑥ Angle to be determined by the Contractor based on site conditions and the method of construction used. Excavation and/or shoring of retained backfill to permit construction of the MSE wall is considered incidental to the MSE wall construction and is not paid for as a separate item.

⑦ Provide aggregate, other than Macadam, that meets the requirements for stone backfill in the Supplemental Technical Specification SC-M-713, for the type of soil reinforcement used.

⑧ 6" dia. perforated pipe wrap with geotextile for drainage filtration (See Supplemental Technical Specification SC-M-713). Drain to end of wall.

Ⓐ Pay limit is from top of leveling pad elevation to top of wall. See MSE wall profiles.

TYPICAL SECTION - WALL WITH MOMENT SLAB*

Labels in drawing:
- ⑦ Drainage Aggregate
- *Impervious Geomembrane (HDPE)
- Slope 5% Min.
- Soil Reinforcement
- Permissible Construction Joint (Level)
- ★ Compressible material
- Top of Moment Slab
- Top of Wall Elevation
- Limits of Drainage Aggregate
- ⑧
- 5'-0"
- Wall Coping
- 1'-0"
- ②
- Ⓐ
- Retained Backfill
- Reinforced Backfill
- ⑦ Drainage Aggregate
- ⑤
- MSE Wall
- Wall Height Pay Limit (Varies)
- ④ Place pipe connecting drains @ 20' Max.
- Drain
- Weep hole @ 10' Max. (For details, see Sh. XX)
- ① Aggregate Drain
- Geotextile Filter (Typ.)
- Finished Ground Line
- ⑥
- Limits of Reinforced Backfill
- Leveling Pad
- 1'-0" Min.
- 1'-0" Min.
- d
- MSE Wall Horizontal Layout Control Point
- Min. Base Width Required = B_req

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★ - Designer to input dimension

* - For locations where the roadway or paved shoulder is directly above or within 5 feet of the end of the soil reinforcement, use a geomembrane on all roads/routes located North of a line along SC Route 72 from the Georgia State line to Chester, SC and North of SC Route 9 from Chester, SC to Interstate Route I-77 and West of a line along Route 9 and I-77 to the North Carolina State line. Designer to determine the need for geomembrane for other locations.