

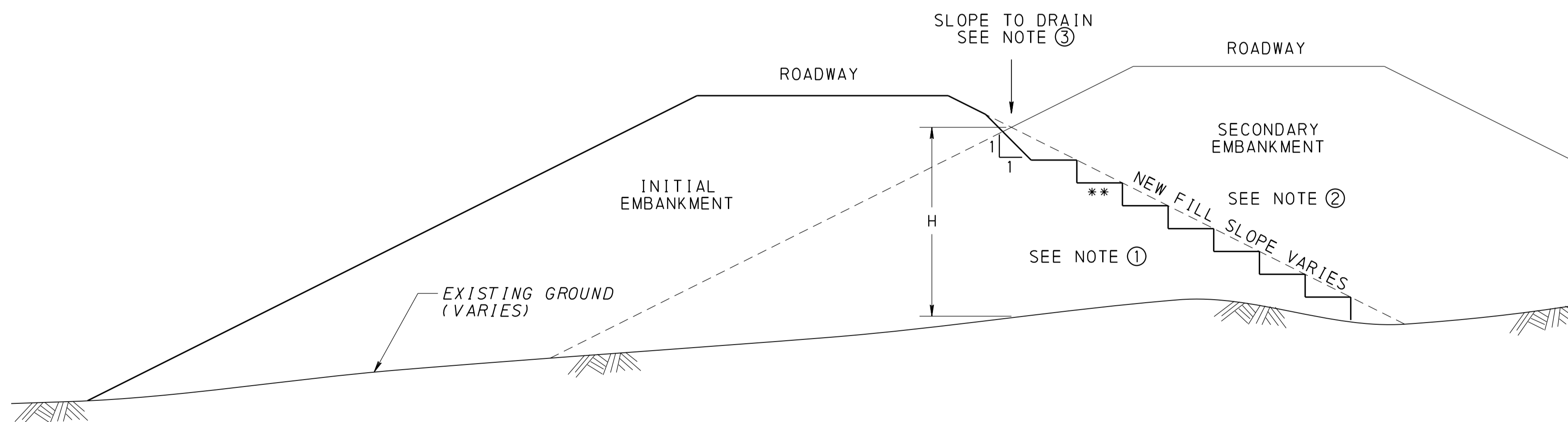
EXISTING SLOPE	BENCH H = 2 FT	BENCH H = 3 FT	BENCH H = 4 FT
	BENCH WIDTH (FT)	BENCH WIDTH (FT)	BENCH WIDTH (FT)
1.5H : 1V	3	4.5	6
1.75H : 1V	3.5	5.25	7
2H : 1V	4	6	8
2.5H : 1V	5	7.5	10
3H : 1V	6	9	12

TOTAL EXCAVATION WIDTH, W	MINIMUM PIPE DIAMETER (IN)
< 15 FT	4
15-45 FT	6
> 45'	8

* USE 4-INCH DIAMETER BENCH DRAIN PIPES FOR SOIL FILL SLOPES.

GENERAL NOTES FOR ALL EMBANKMENT WIDENING FILLS:

- 1) THESE DETAILS ARE PROVIDED AS STANDARDS FOR THE CONDITIONS INDICATED. ALTERNATIVES REQUIRE JOB-SPECIFIC SPECIAL PROVISIONS AND/OR DETAILS.
- 2) DETAILS APPLY ONLY FOR STABLE SITE CONDITIONS WITHIN THE SLOPE LIMITS INDICATED. JOB-SPECIFIC SPECIAL PROVISIONS AND DETAILS ARE REQUIRED FOR PROBLEMATIC OR UNSTABLE SITE CONDITIONS OR THE FOLLOWING:
 - EXISTING SLOPE IS STEEPER THAN 2H : 1V
 - PLANNED EXCAVATION SLOPE IS STEEPER THAN 1.5H : 1V
 - NEW FINAL SLOPE IS STEEPER THAN 2H : 1V
- 3) BACKFILL THE EXCAVATION OF AN EMBANKMENT SLOPE WITHIN THE SAME WORK SHIFT, WITH NO EXCAVATION LEFT OPEN BETWEEN SHIFTS. DO NOT EXCEED A LENGTH OF 50 FT FOR THE LENGTH OF ANY CONTINUOUS OPEN-EXCAVATION OF EXISTING EMBANKMENT.
- 4) EXCEPT FOR THE 2-FT MINIMUM UNDERCUT AREAS INDICATED, REMOVE THE TOP 3 FT (MINIMUM) OF SOIL FROM THE EXISTING SLOPE, FOR THE EXCAVATION AND BENCHING.
- 5) EXCAVATE TOE BENCH TO EITHER: 1) TO ACHIEVE A FIRM FOUNDATION OR; 2) AS REQUIRED BY THE REPRESENTATIVE.
- 6) BONDING BENCHES ARE REQUIRED WHEN BACKFILLING WITH SOIL OR WHEN EXCAVATION HEIGHT (H) IS GREATER THAN 12 FT WHEN BACKFILLING WITH ROCK.
- 7) BENCHING PAID AS CLASS-1 EXCAVATION.
- 8) SEE RC-30 DETAIL FOR SUBSURFACE DRAIN OUTLETS. OUTLET ALL PIPE BENCH DRAINS AT MAXIMUM 150 FT CENTER-TO-CENTER SPACING TO PROVIDE A FREELY-DRAINED CONDITION. USE PIPE OF THE SIZE INDICATED OR SPECIFIED, BUT IN NO CASE LESS THAN A MINIMUM DIAMETER OF 4-INCHES. SLOPE ALL PIPE BENCH DRAINS AND OUTLETS A MINIMUM OF 0.5%.
- 9) PLACE PIPE BENCH DRAINS AT LOWEST BENCH ELEVATION AS SHOWN, UNLESS PIPE CANNOT BE DAYLIGHTED AT OR BEYOND THE TOE OF SLOPE. IN SUCH CASES, USE THE ALTERNATE LATERAL DRAIN OUTLET DETAIL AND PLACE THE OUTLET PIPE SO IT DRAINS AND OUTLETS ABOVE GROUND SURFACE.
- 10) CAP PIPE BENCH DRAIN OUTLETS PER RC-30, SHEET 1, DETAIL A.
- 11) CONFIGURE BENCH DRAINS AND OUTLETS PER RC-30, SHEET 1, NOTE 5.
- 12) WHEN ROCK FILL OR AGGREGATE IS PLACED OVER SOIL, OR SOIL IS PLACED OVER ROCK FILL OR AGGREGATE, PLACE CLASS-4 TYPE-A GEOTEXTILE SEPARATOR BETWEEN THE SOIL AND THE ROCK FILL/AGGREGATE.
- 13) EXCEPT WHERE SPECIFIC MATERIAL REQUIREMENTS ARE INDICATED, USE R-CLASS ROCK MEETING SECTION 850, OR ROCK EMBANKMENT MEETING SECTION 206.2(A) I.D TO CONSTRUCT ROCK TOES, MID-SLOPE FILL BENCHES, AND FILL SLOPES STEEPER THAN 2H : 1V.
- 14) ALL EMBANKMENT MATERIAL MUST BE COMPACTED IN ACCORDANCE WITH PUB 408 SECTION 206.3.
- 15) NEW EMBANKMENT MATERIAL MUST ALLOW INSTALLATION OF ROADWAY ELEMENTS WITHOUT OBSTRUCTION TO THE DEPTHS REQUIRED AND/OR INDICATED. VARIOUS ROADWAY ELEMENTS MAY INCLUDE GUIDERAIL, SIGN POSTS, PAVEMENT BASE DRAIN, OR OTHER SUBSURFACE ROADWAY ELEMENTS.
- 16) SEE ROADWAY TYPICALS FOR PAVEMENT STRUCTURE AND GUIDERAIL BACKUP REQUIREMENTS.



NOTES:

- 1) ALL EMBANKMENT MATERIAL MUST BE COMPACTED IN ACCORDANCE WITH PUB 408 SECTION 206.
- 2) BENCHING BETWEEN INITIAL AND SECONDARY EMBANKMENT IS INCIDENTAL TO EMBANKMENT CONSTRUCTION.
- 3) DO NOT LEAVE LOW SPOT BETWEEN EMBANKMENTS. FINAL EMBANKMENT MUST BE SLOPED TO DRAIN WITH A POSITIVE OUTLET.

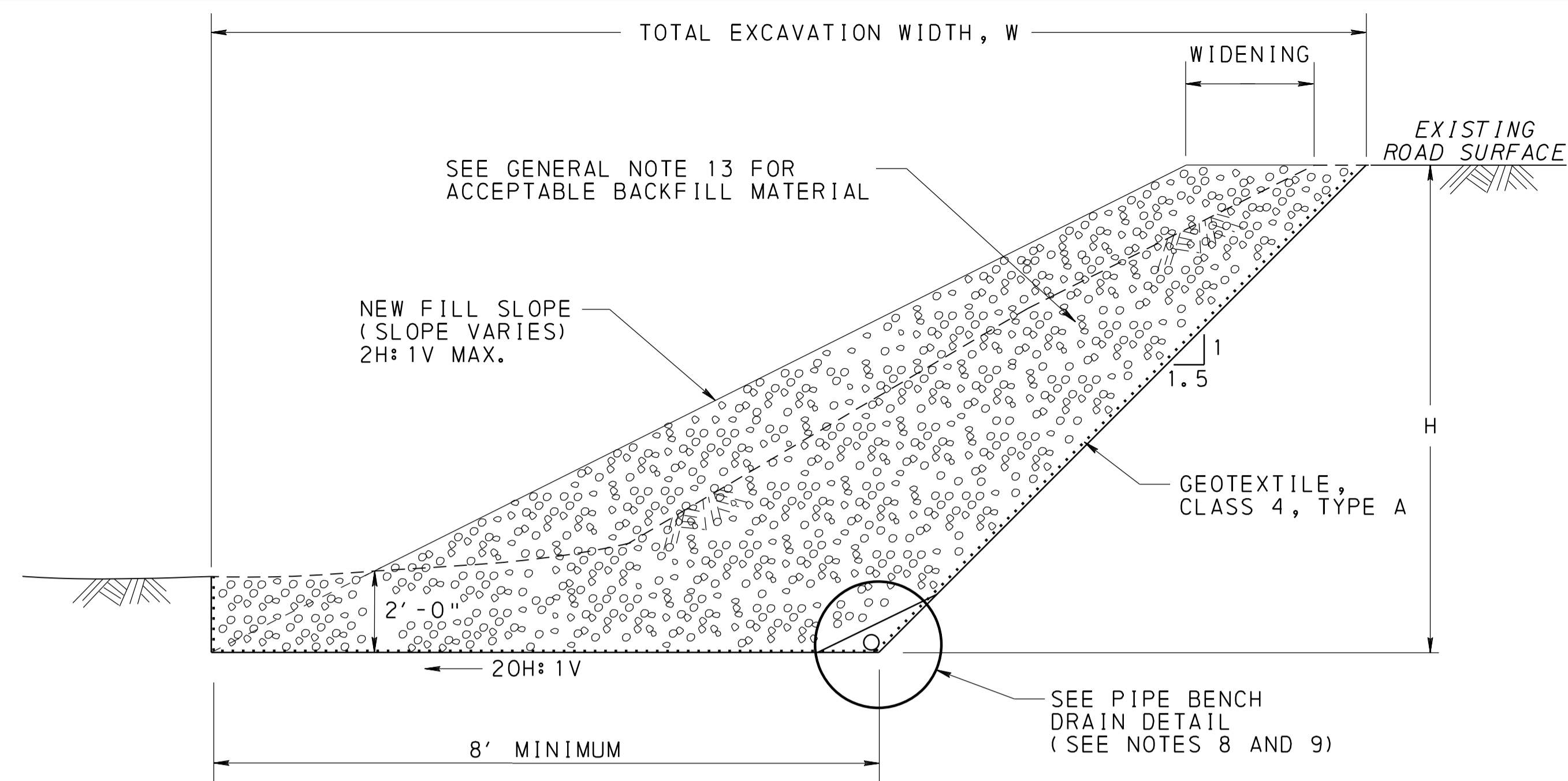
** REFER TO TABLE 1 FOR BENCH WIDTH

MERGE BENCHING
N. T. S.

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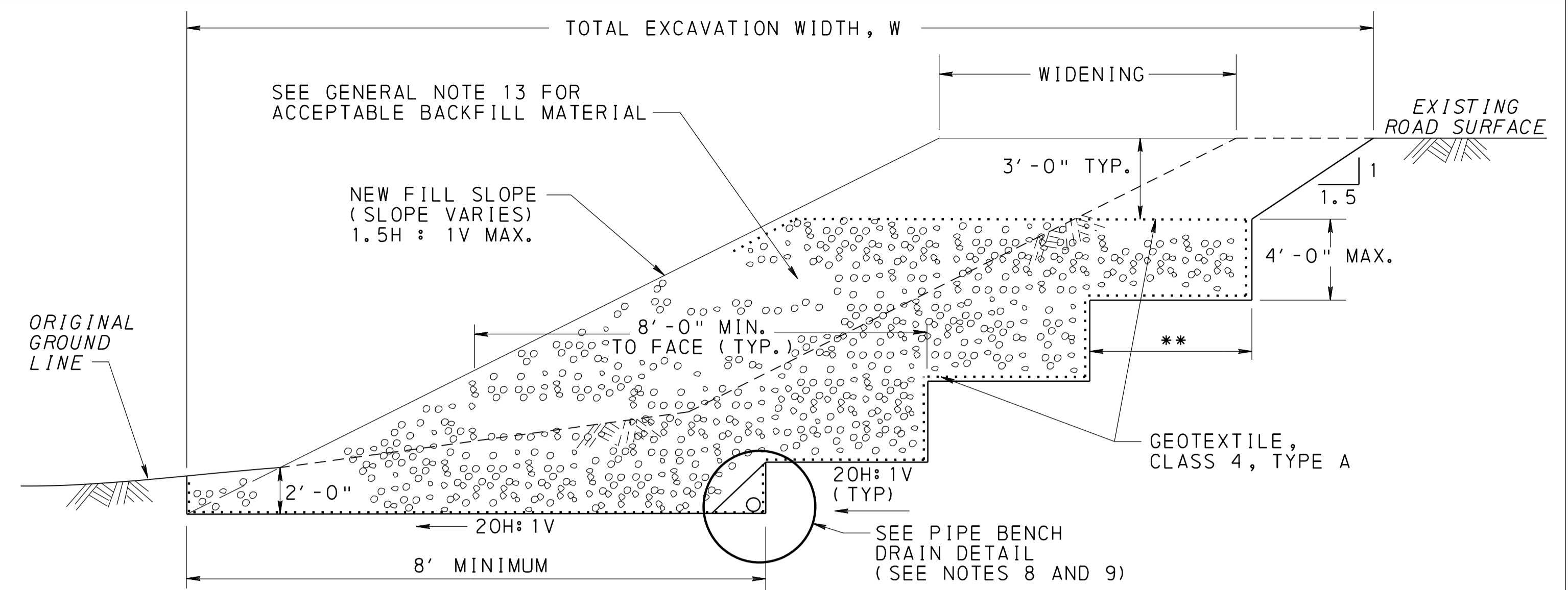
WIDENING EMBANKMENT DETAILS

RECOMMENDED XXX. XX, 2016	RECOMMENDED XXX. XX, 2016	SHT 1 OF XX
CHIEF, HWY. DELIVERY DIVISION	DIRECTOR, BUREAU OF PROJECT DELIVERY	RC-XXM



EMBANKMENT WIDENING - ROCK BACKFILL, < 12' HIGH

N. T. S.



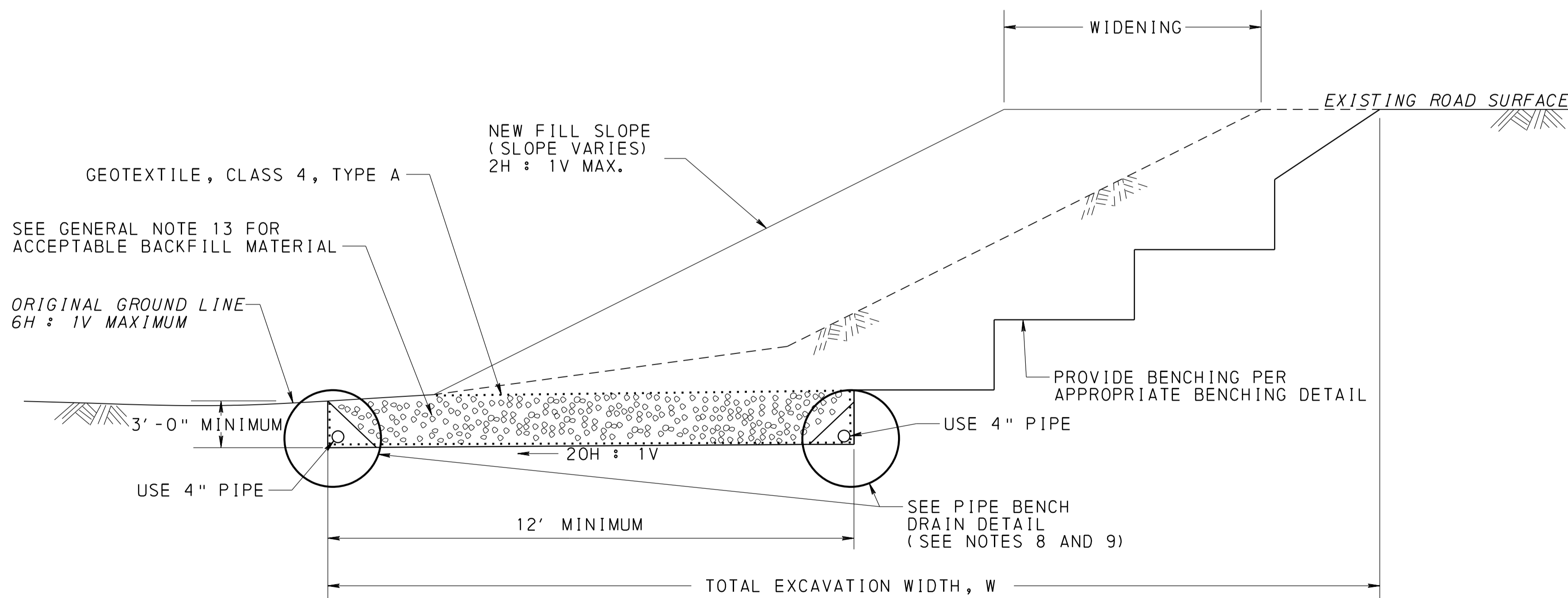
NOTES:

- 1) CONSULT DISTRICT GEOTECHNICAL ENGINEER IF NEW OR EXISTING SLOPES EXCEED 2H : 1V.
- 2) FOR SLOPES > 20' HIGH, A STABILITY ANALYSIS IS REQUIRED

** REFER TO TABLE 1 FOR BENCH WIDTH

EMBANKMENT WIDENING - ROCK BACKFILL, > 12' HIGH

N. T. S.

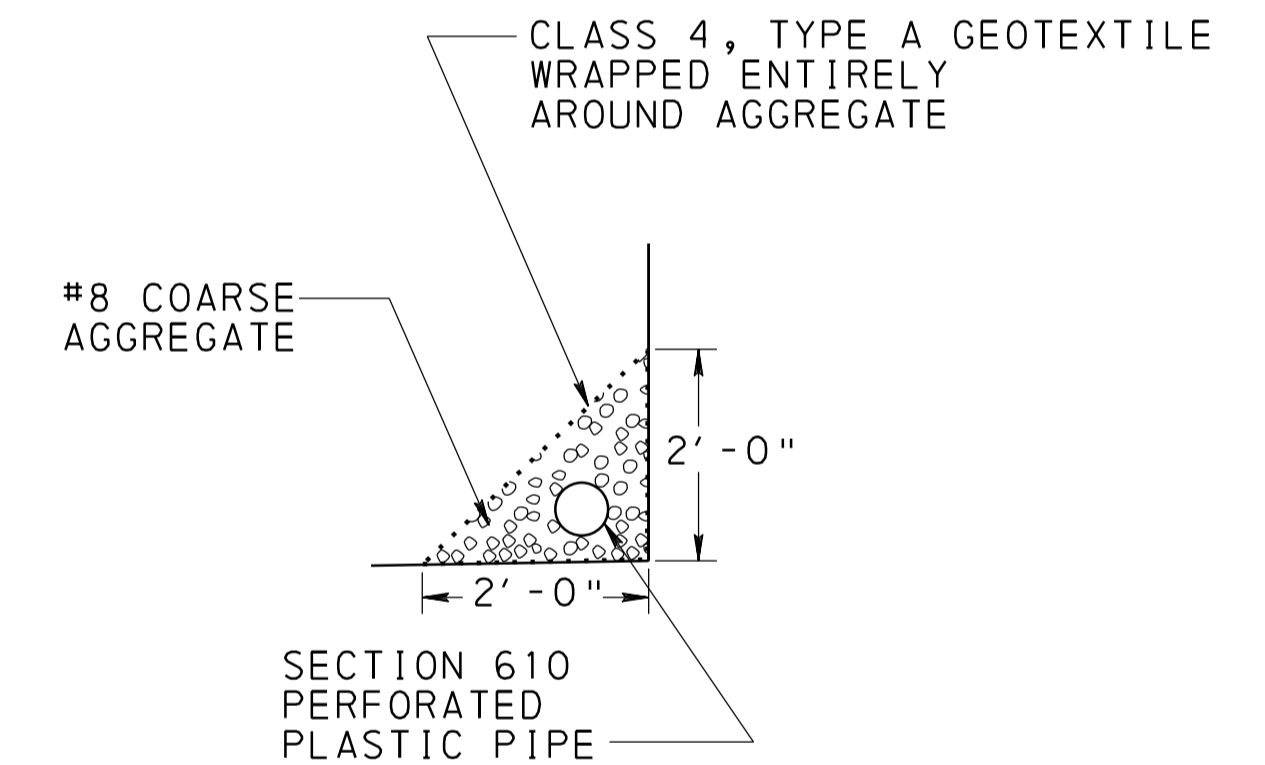


NOTE:

USE THIS DETAIL WHEN CORE BORINGS OR PROOF-ROLLING REVEAL MARGINALLY STABLE, SOFT, OR WET SOIL AT THE TOE OF SLOPE, OR AS DIRECTED BY THE DISTRICT GEOTECHNICAL ENGINEER.

ROCK TOE BENCH

N. T. S.



NOTES:

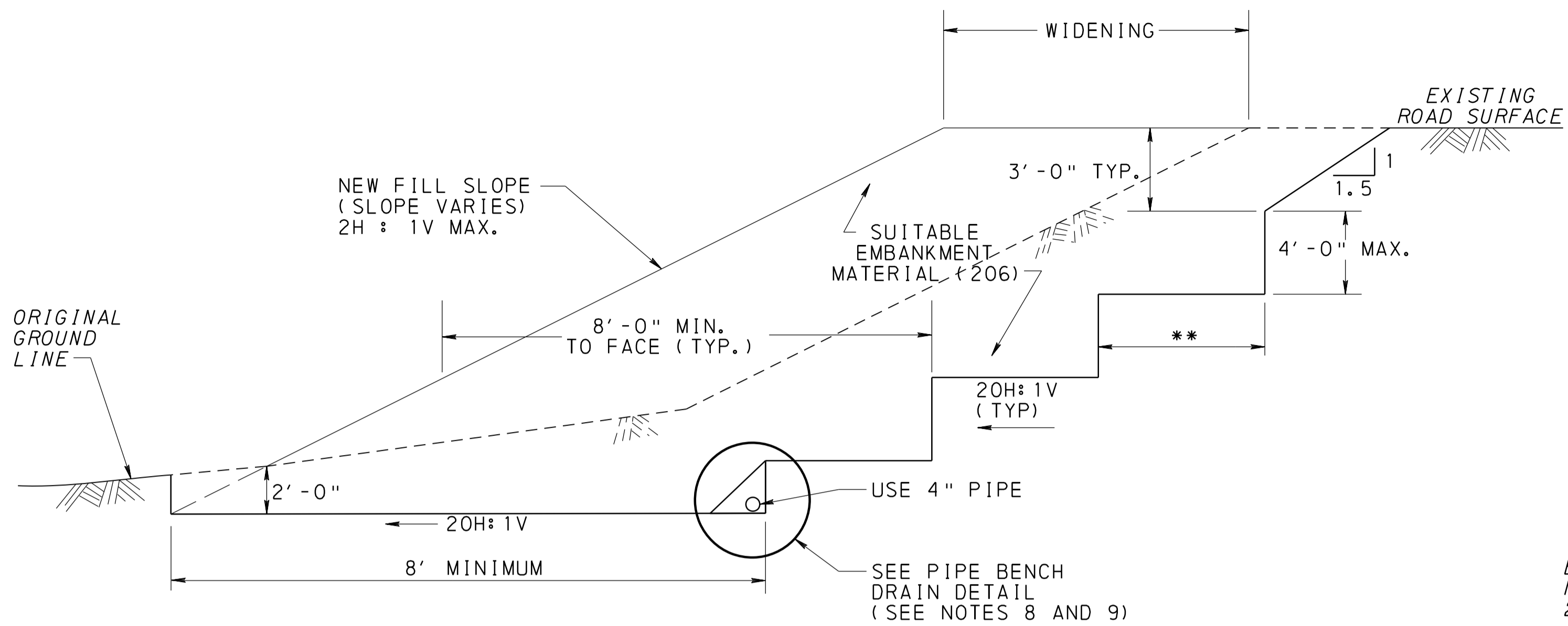
- 1) USE 4-INCH DIAMETER PIPES FOR SOIL FILL SLOPES.
- 2) SEE TABLE 2 FOR REQUIRED PIPE SIZE FOR ROCK FILL SLOPES.

PIPE BENCH DRAIN

N. T. S.

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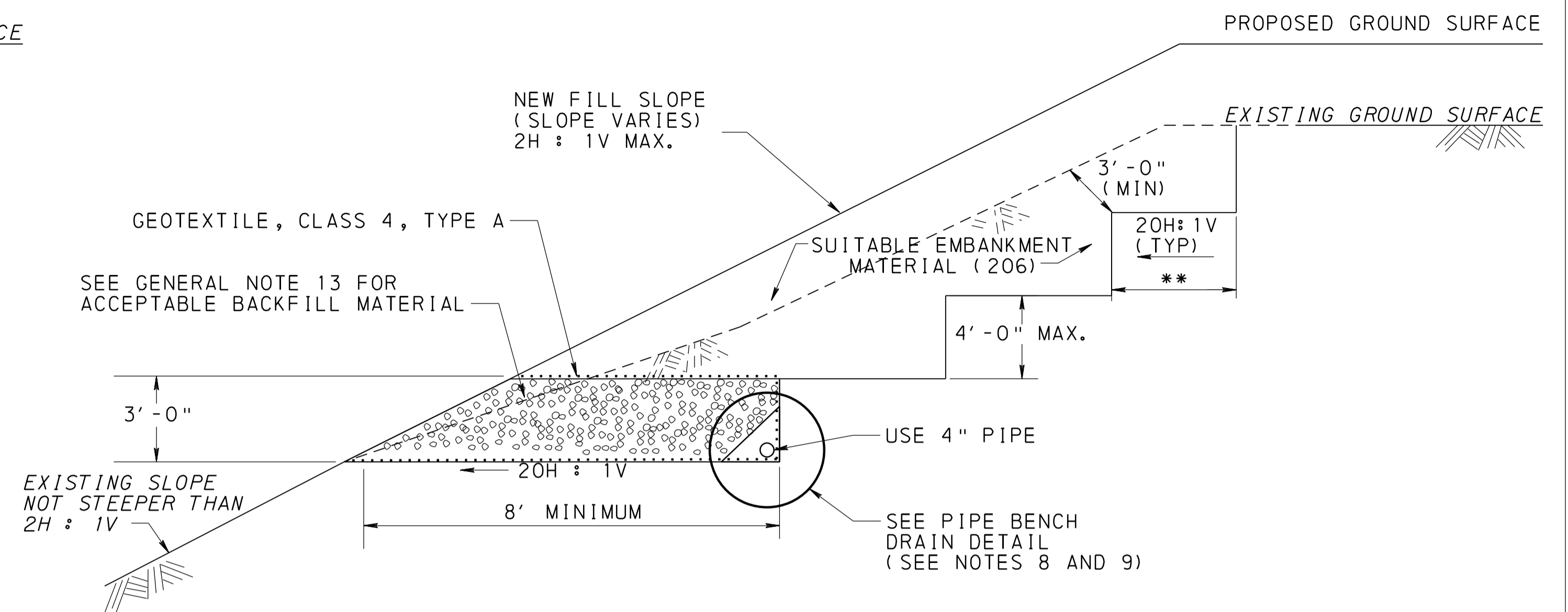
WIDENED EMBANKMENT DETAILS



** REFER TO TABLE 1 FOR BENCH WIDTH

EMBANKMENT WIDENING - SOIL BACKFILL

N. T. S.



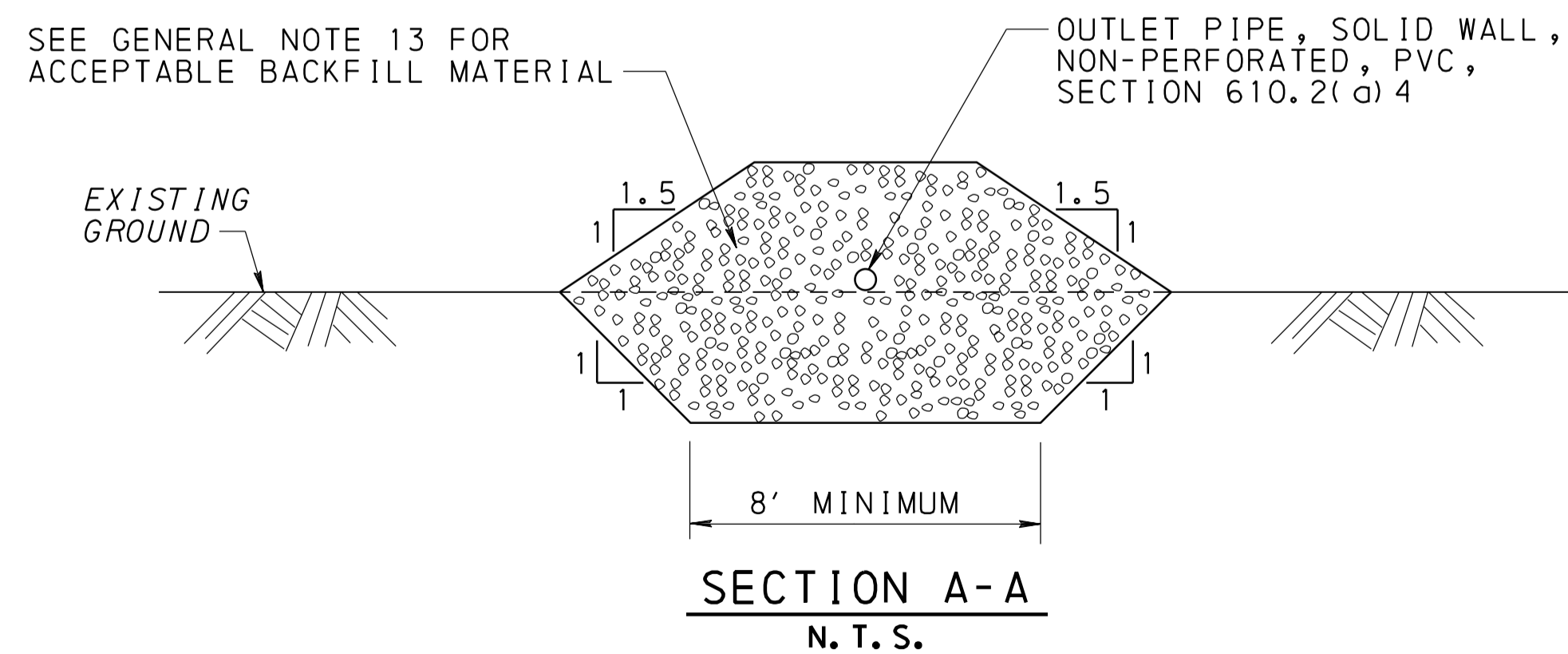
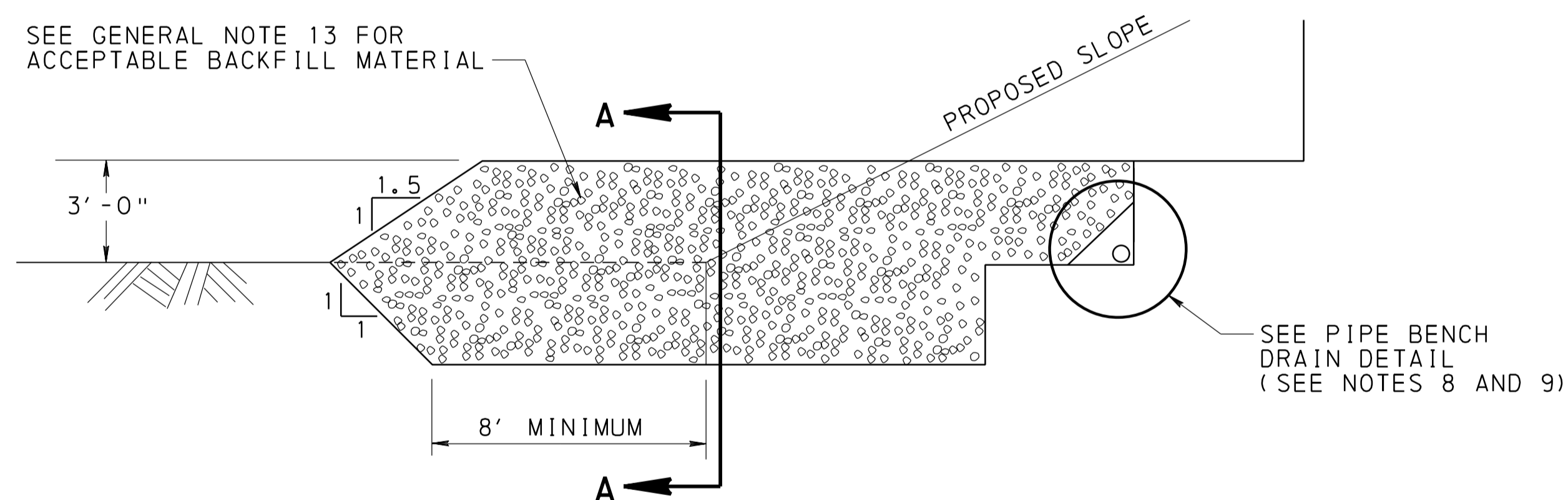
NOTES:

- 1) DETAIL FOR ROADWAY WIDENING WHEN PROPOSED SLOPE DOES NOT EXTEND TO TOE OF EXISING SLOPE.
- 2) MID-SLOPE WIDENING USING THIS DETAIL REQUIRES THE DESIGNER TO VERIFY BY ANALYSIS THE GLOBAL STABILITY AND STABILITY OF THE SLOPE BELOW THE WIDENING.

** REFER TO TABLE 1 FOR BENCH WIDTH

MID SLOPE EMBANKMENT WIDENING

N. T. S.



ALTERNATE LATERAL DRAIN OUTLET

(DAYLIGHTING OF UNDERCUT OR TOE BENCH PROHIBITED)

N. T. S.

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DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

WIDENED EMBANKMENT DETAILS

RECOMMENDED XXX. XX, 2016	RECOMMENDED XXX. XX, 2016	SHT 3 OF XX
CHIEF, HWY. DELIVERY DIVISION	DIRECTOR, BUREAU OF PROJECT DELIVERY	RC-XXM