

Lessons Learned CONSTRUCTABILITY

March 10th
2020

~~Office of Performance Management~~
Final Inspection Comments Report
Contract No. ~~F101503701, ESTP-N059 (09)~~
Wetland Mitigation at Peterson Wildlife Refuge
Group Construction
~~March 21, 2019~~

Contractor: ~~WHD Inc.~~
~~100 William Lane~~
~~Princeton, DE 19701~~

Contract Duration: ~~60~~ Calendar Days

Award Amount: \$ ~~600,000.00~~

Attendees: ~~Chris Covert~~ DeIDOT, Group Construction
~~James Burton~~ DeIDOT, Office of Performance Management
~~Chris Simpson~~ DeIDOT, Office of Performance Management
~~Steve Smith~~ DeIDOT, Office of Performance Management
~~Van Adams~~ DeIDOT, Office of Performance Management
~~Ken Dorn~~ DeIDOT, Office of Performance Management
~~Frank Dupli~~ DeIDOT, Office of Performance Management
~~Kevin Smith~~ DeIDOT, Office of Performance Management
~~Chris Smith~~ DeIDOT, Office of Performance Management
~~WHD Inc.~~
~~WHD Inc.~~
~~WHD Inc.~~
DeIDOT, ~~Chris Covert~~



General Comments:
There were no ADA facilities impacted and/or altered as part of this Contract. The overall quality of workmanship was very good. The Administering Section will generate a minor punchlist.

Respectfully submitted by:
~~Chris Simpson~~
District Compliance Technician
DeIDOT Office of Performance Management



Office of Performance Management
Final Inspection Comments Report
Contract No. **201701100**, PA# No. **2017-10**
McCoy Road Pedestrian Bridge
Group Construction
March 12, 2019

Contractor: **[Redacted]**
[Redacted]
[Redacted]

Contract Duration: Calendar Days

Award Amount: \$ **232,491.50**

Attendees: **[Redacted]** DeIDOT, **[Redacted]**
[Redacted] DeIDOT, **[Redacted]**
[Redacted] DeIDOT, **[Redacted]**
[Redacted] DeIDOT, **[Redacted]**
[Redacted] DeIDOT, **[Redacted]**
[Redacted] DeIDOT, **[Redacted]**
[Redacted] DeIDOT, **[Redacted]**



General Comments:

There were areas in need of acceptable vegetative stabilization. This work must be completed prior to acceptance

There were ADA facilities impacted and/or altered as part of this Contract, The overall quality of workmanship was very good.

Respectfully submitted by:

[Redacted]
[Redacted]
DeIDOT **[Redacted]**





Geotextile

712.07 Stone Riprap. Riprap shall be placed in accordance with this Section, to the dimensions and at the locations shown on the Plans or as established by the Engineer.

The area for placement of the stone riprap shall be excavated to the required placement depth. The area shall be in a relatively smooth condition, free from large stone, vegetation, debris, and areas of soft material. Preparation of the area may include, but is not limited to, excavating, removing unsuitable material, backfilling, placing embankment, and clearing and grubbing.

The geotextile shall be placed on the prepared area in a loose and unstretched condition to minimize tearing and shifting. The adjacent edges of the fabric shall be joined with a lock-type or chain-type stitch folded seam or overlapped a minimum of 12" (305 mm), if permitted. The overlap direction shall be upstream over downstream and upslope over downslope. The fabric shall be anchored in place

275

712

RIPRAP

by securing pins or other acceptable methods. The fabric shall be covered as soon as possible so that it is not exposed for more than two weeks.



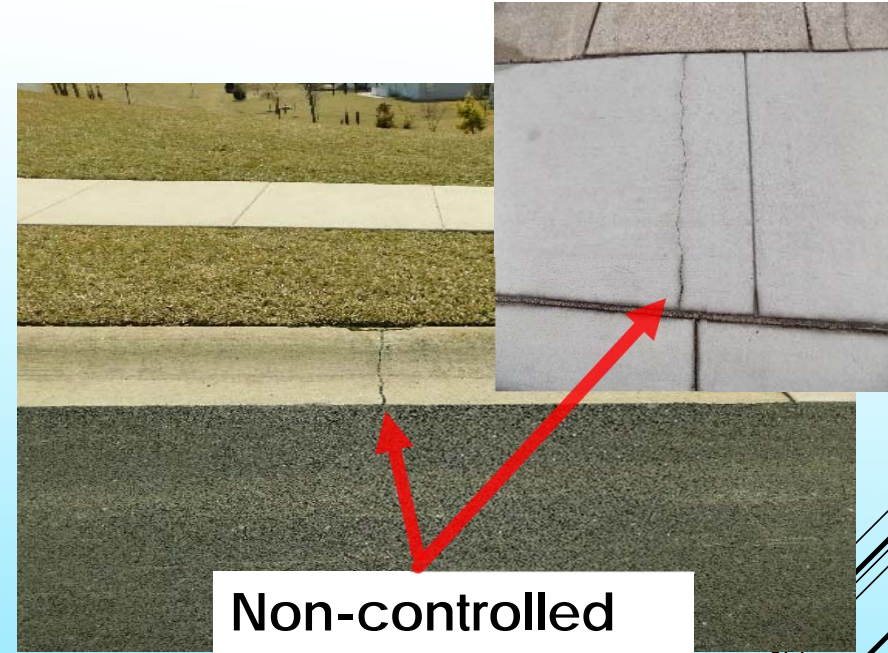
CURB

CHECK FLOW



E. Finishing.

1. Perform to a depth of 2 inches below the exposed surface elevations;
2. Use a wood or magnesium float to rub surface smooth;
3. Check the flow line of the gutter to ensure positive drainage
 - a. Match vertical alignment with adjacent surfaces such as curbs and drainage inlets.
 - b. Correct deviations in the flow line greater than 1/8 inch in 10 feet.
 - c. Correct irregularities in grade or alignment of the front and back edges of the curb greater than 1/4 inch in 10 feet.
4. Round front and back edges in accordance with the Standard Construction Details;
5. Brush longitudinally along the surface



**Non-controlled
construction joint**

G. Joints.

1. Construct contraction joint by tool or saw cut at 10 foot intervals when concrete is sufficiently set;
 - a. When curb is constructed adjacent to concrete pavement, align joints with joints in the pavement.
 - b. When sidewalk is behind the curb, align all joints in the curb to coincide with joints in the sidewalk.
 - c. When curb is placed adjacent to Portland Cement Concrete pavement the curb or pavement, form or tool to allow sealing as shown in the Standard Construction Details C-1 and P-2.

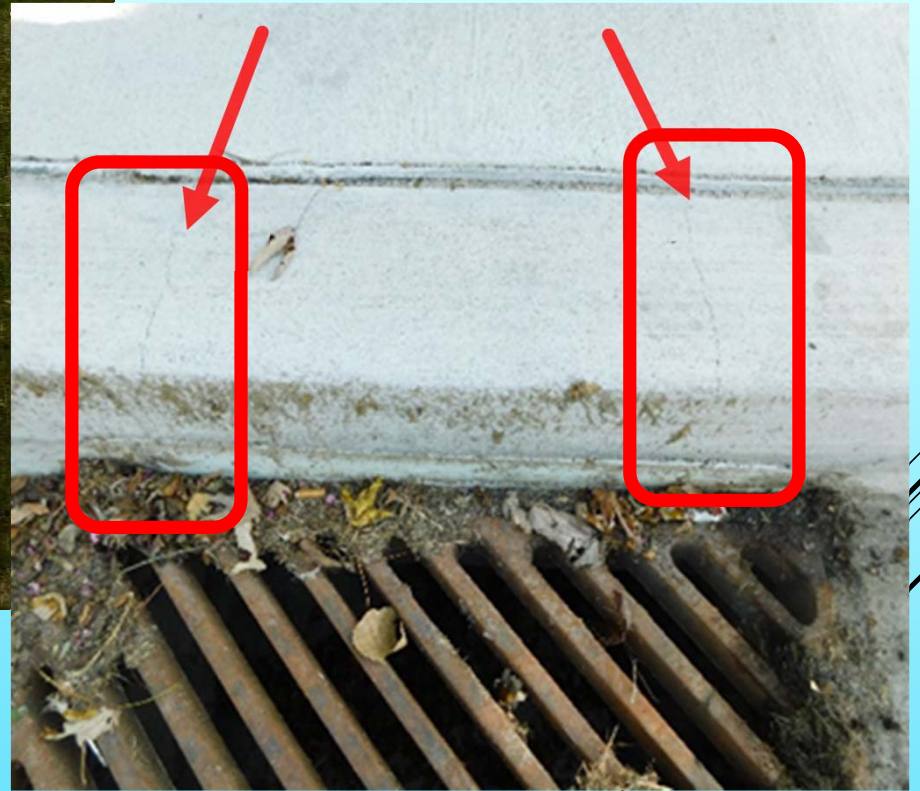
H. Removal of Forms and backfilling

1. Remove forms and backfill when concrete has hardened sufficiently;
2. Repair all defects
3. Remove and replace entire 10 foot finished section of cracked or damaged curb at the direction of the Engineer, at no cost to the Department.

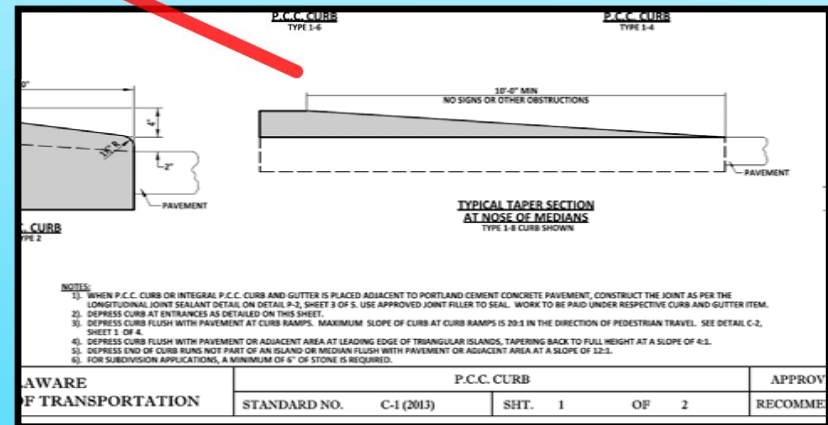
701.04 Method of Measurement. The Engineer will measure Portland Cement Concrete Curb and Integral Portland Cement Concrete Curb as the number of linear feet measured along the linear face of acceptably installed and completed



Weak points



10' offset





702.04 Method of Measurement.

The quantity of Triangular Channelizing Island(s) will be measured as the number of square feet, from face of curb to face of curb, of Triangular Channelizing Island(s) installed and accepted.

Sidewalk Surface Detectable Warning System will be measured and paid for under Item No. 705007.

702.05 Basis of Payment.

The quantity of Triangular Channelizing Island(s) will be paid for at the Contract Unit Price per square foot. Price and payment constitutes full compensation for saw cutting bituminous pavement, saw cutting concrete full depth, removal and disposal of existing Materials, foundation preparation, furnishing and placing all Materials including GABC, concrete for curb and sidewalk, expansion joint Material, construction of curb ramps within the limits of the island, bituminous and/or P.C.C. pavement patching, furnishing and installing delineator(s) and for all labor, tools and incidentals necessary to complete the Work.

No additional payment will be made under other Contract Items for Work necessary to construct the island except Item No. 705007 - Sidewalk Surface Detectable Warning System.

Note: The curb and sidewalk components are not to be placed monolithically unless otherwise directed by the Plans or the Engineer.

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
702000	TRIANGULAR CHANNELIZING ISLANDS	SF

revised 12/28/2018: The quantity of Triangular Channelizing Island(s) will be paid for at the Contract Unit Price per square foot. Price and payment constitutes full compensation for saw cutting bituminous pavement, saw cutting concrete full depth, removal and disposal of existing Materials, foundation preparation, furnishing and placing all Materials including GABC, concrete for curb and sidewalk, expansion joint Material, construction of Pedestrian Connections within the limits of the island, bituminous and/or P.C.C. pavement patching, furnishing and installing delineator(s) and for all labor, tools and incidentals necessary to complete the Work.

Delinators



HEADACHE



NOTES:

- 1). WHEN P.C.C. CURB OR INTEGRAL P.C.C. CURB AND GUTTER IS PLACED ADJACENT TO PORTLAND CEMENT CONCRETE PAVEMENT, CONSTRUCT THE JOINT AS PER THE LONGITUDINAL JOINT SEALANT DETAIL ON DETAIL P-2, SHEET 3. USE APPROVED JOINT FILLER TO SEAL. WORK TO BE PAID UNDER RESPECTIVE CURB AND GUTTER ITEM.
- 2). THE DEPRESSED CURB DIMENSIONS (INCLUDING 1" LIP) ON THIS SHEET ARE FOR USE AT ENTRANCES ONLY. FOR CURB DEPRESSIONS AT CURB RAMPS, SEE NOTE 3.
- 3). AT CURB RAMPS, DEPRESS CURB FLUSH WITH THE PAVEMENT (WITH NO LIP). SLOPE THE TOP OF THE CURB 8.3% OR FLATTER IN THE DIRECTION OF PEDESTRIAN TRAVEL.
- 4). DEPRESS CURB FLUSH WITH PAVEMENT OR ADJACENT AREA AT ALL CORNERS OF TRIANGULAR ISLANDS, TAPERING BACK TO FULL HEIGHT AT A RATE OF 4:1.
- 5). TAPER END OF CURB RUNS NOT PART OF AN ISLAND OR MEDIAN FLUSH WITH PAVEMENT OR ADJACENT AREA AT A RATE OF 12:1.
- 6). FOR SUBDIVISION APPLICATIONS, A MINIMUM OF 6" OF GABC IS REQUIRED.

WARE TRANSPORTATION	P.C.C. CURB			
	STANDARD NO.	C-1 (2017)	SHT.	1 OF 3

Pedestrians

CHECK FLOW



3.8.5.2 Drainage Design

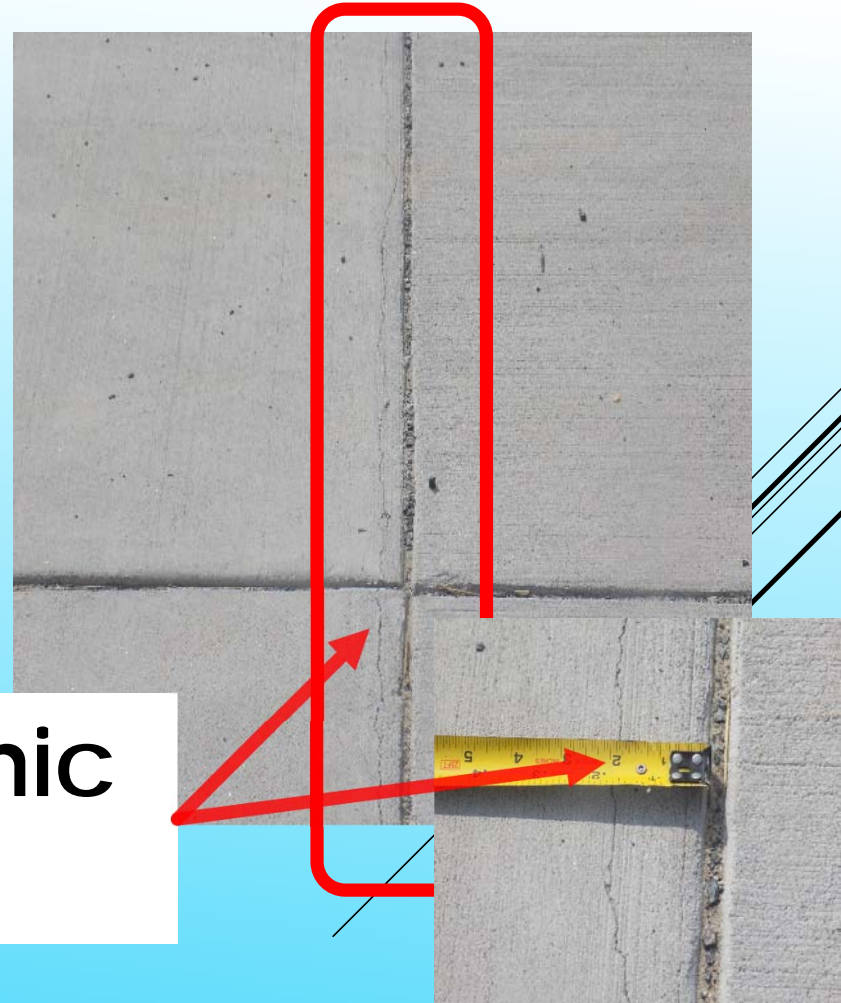
Drainage conditions shall be considered when designing blended transitions or curb ramps to avoid or correct existing ponding conditions. When a blended transitions or curb ramp is adjacent to a drainage inlet where ponding occurs, and the ponding cannot be corrected by modifying the throat of the drainage inlet, the designer should pursue relocation of the PAR and/or drainage facilities.

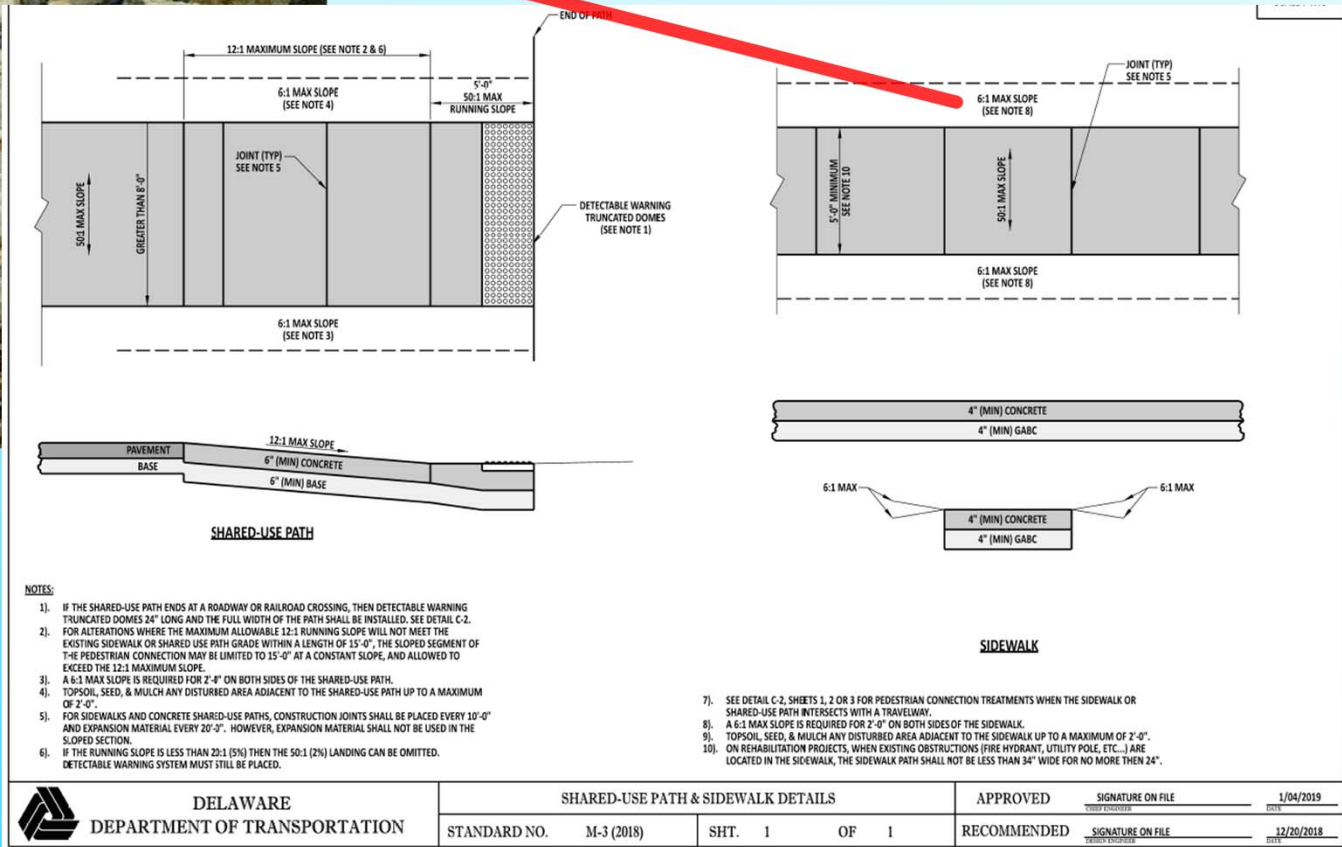
Snapshot taken from Section 3.8.5.2 of the 2018 Pedestrian Accessibility Standards



**Form
removal**

**Monolithic
pour?**





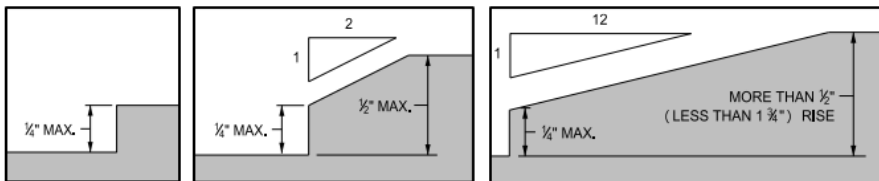
Vertical Gaps



3.3.2 PAR Vertical Surface Discontinuities

Vertical surface discontinuities between adjacent surfaces shall be beveled where greater than $\frac{1}{4}$ inch. Vertical surface discontinuities between $\frac{1}{4}$ inch and $\frac{1}{2}$ inch shall be beveled with a slope not steeper than 2H:1V (50.0%) as illustrated in Figure 3.3.2. Where a vertical difference of $\frac{1}{2}$ inch or less is impracticable, the surface discontinuity shall be sloped no steeper than 12H:1V (8.3%). The transition between the depressed curb at a blended transition or ramp segment and gutter must meet the requirements of Section 3.8.7.8. Beveling shall be applied across the entire limits of the vertical surface discontinuity.

Figure 3.3.2 PAR Vertical Elevation Differences



expansion

Non-controlled
construction joint

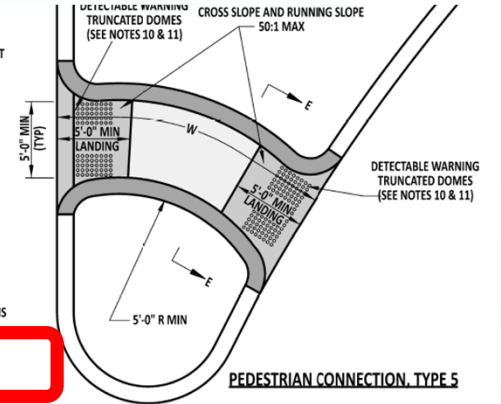


CREATES A GAP



NOTES:

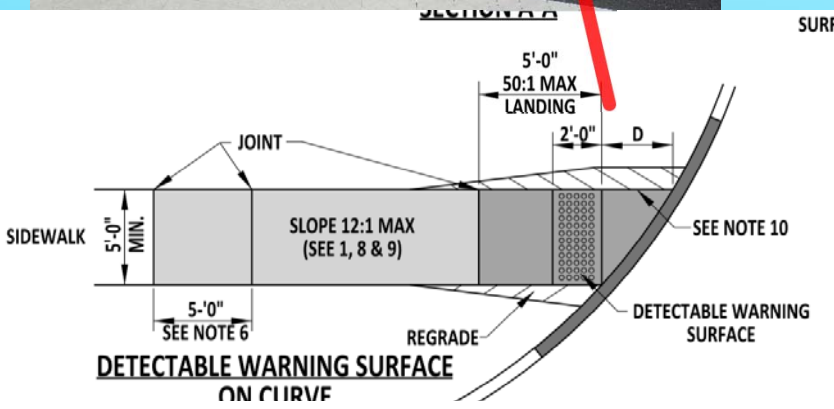
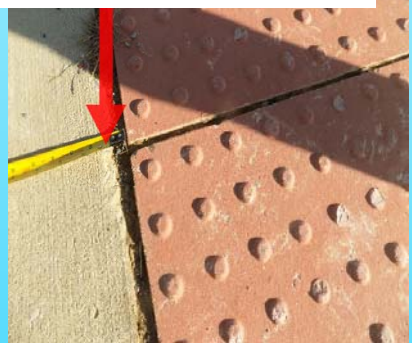
1. FOR ALTERATIONS WHERE THE MAXIMUM ALLOWABLE 12:1 RUNNING SLOPE WILL NOT MEET THE EXISTING SIDEWALK GRADE WITHIN A LENGTH OF 15'-0", THE SLOPED SEGMENT OF THE PEDESTRIAN CONNECTION MAY BE LIMITED TO 15'-0" AT A CONSTANT SLOPE, AND ALLOWED TO EXCEED THE 12:1 MAXIMUM SLOPE.
2. PEDESTRIAN CONNECTION AND SIDEWALK CROSS SLOPE SHALL BE 50:1 (2%) MAXIMUM. FOR REHABILITATION WORK, THE PEDESTRIAN CONNECTION CROSS SLOPE MAY MATCH THE SLOPE OF THE ADJACENT ROADWAY IN ACCORDANCE WITH THE LATEST VERSION OF THE PAS MANUAL.
3. THE MAXIMUM ALGEBRAIC DIFFERENCE IN GRADE BETWEEN THE PEDESTRIAN CONNECTION OR MODIFIED CURB AT THE FLOW LINE AND THE PAVEMENT SHALL BE 13.3%, HOWEVER 11% IS PREFERRED.
4. LANDING AREA SHALL BE CLEARLY DELINEATED WITH JOINTS.
5. REFER TO THE DELAWARE MANUAL FOR UNIFORM TRAFFIC CONTROL DEVICES FOR DETAILS REGARDING THE LOCATION OF PEDESTRIAN PUSH BUTTONS.
6. CONSTRUCTION JOINTS ARE REQUIRED ON PEDESTRIAN CONNECTIONS AT THE INTERVAL SPECIFIED IN NOTE 6 ON DETAIL M-3, SHEET 1 OF 1. HOWEVER, EXPANSION MATERIAL SHALL NOT BE USED IN THE PEDESTRIAN CONNECTION SECTION.
7. IF THE RUNNING SLOPE IS LESS THAN 20:1 (5%) THEN THE 50:1 (2%) LANDING CAN BE OMITTED. DETECTABLE WARNING SYSTEM MUST STILL BE PLACED.
8. IN ISLANDS AND MEDIANS, A CONTINUOUS PATH WITH A MAXIMUM RUNNING SLOPE OF 20:1 (5%) MUST BE PROVIDED BETWEEN PEDESTRIAN CONNECTIONS. AN INTERMEDIATE LANDING CONSISTING OF A 5'-0" BY 5'-0" WITH A MAXIMUM RUNNING SLOPE AND CROSS SLOPE OF 50:1 (2%) IS REQUIRED ONLY IN LOCATIONS WHERE THE PEDESTRIAN CONNECTIONS INTERSECT BEFORE REACHING FULL HEIGHT.
9. A CUT-THROUGH LEVEL WITH THE STREET IS THE PREFERRED TREATMENT FOR ISLANDS. RAMPS OR BLENDED TRANSITIONS CAN BE USED WHERE THE ISLAND IS OF SUFFICIENT SIZE TO ACCOMMODATE THEM. POSITIVE DRAINAGE MUST BE PROVIDED FOR EITHER TREATMENT. EITHER TREATMENT IS ACCEPTABLE.
10. WHERE THERE IS NO DEPRESSED CURB AT A CUT-THROUGH OR PEDESTRIAN CONNECTION, THE DETECTABLE WARNING SHALL BE INSTALLED 3" FROM THE PAVEMENT EDGE. WHERE THERE IS DEPRESSED CURB, THE DETECTABLE WARNING SYSTEM SHALL BE INSTALLED DIRECTLY BEHIND THE FULL WIDTH OF THE DEPRESSED CURB.



OR GREATER.		DELAWARE DEPARTMENT OF TRANSPORTATION		PEDESTRIAN CONNECTION, TYPE 5 & SECTIONS	
STANDARD NO.	C-2 (2018)	SHT.	3	OF	3

Maintenance issue without the curb

Horizontal Gap



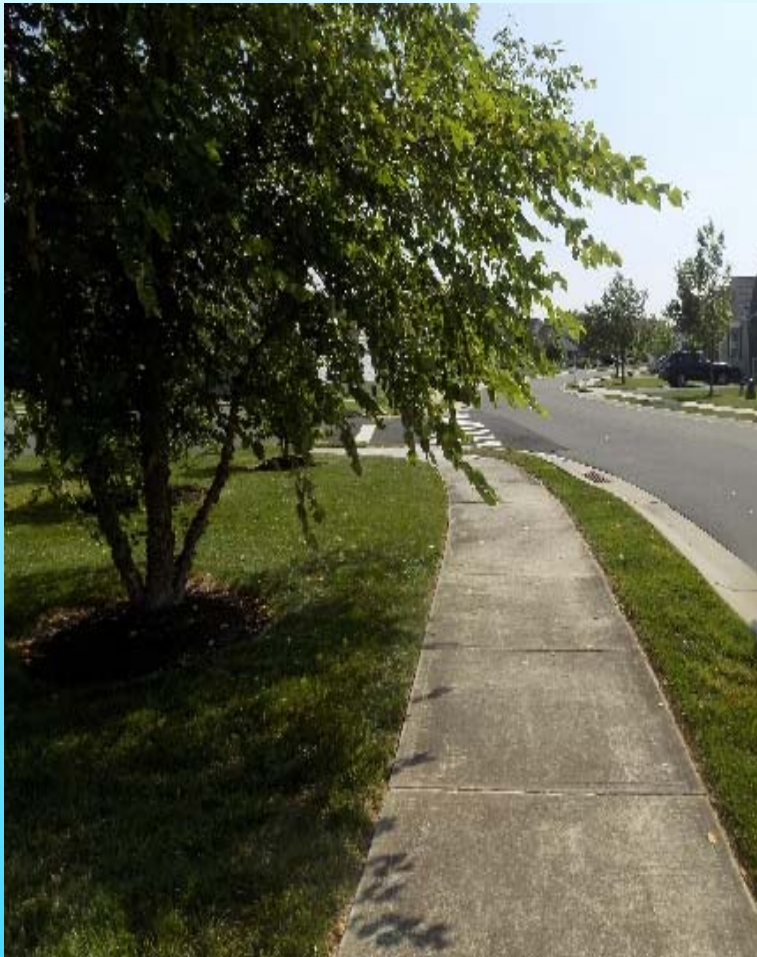


evidence of
ponding?

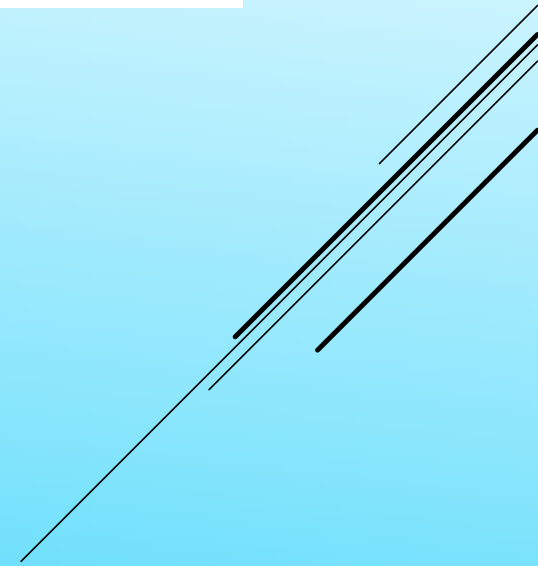
Sidewalk
elevation?



Ped height. 2020 detail



PEDESTRIAN IMPROVEMENTS

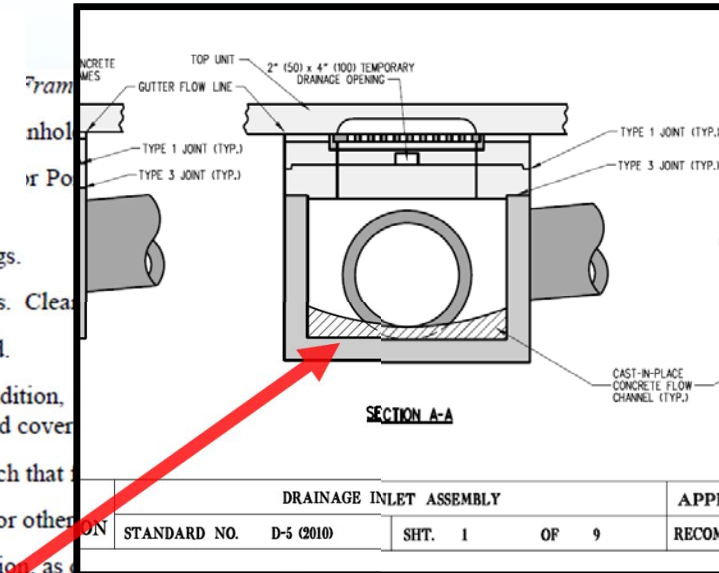


ADJUSTMENTS



> 4' ?

- face of drainage inlet.
3. Excavate and remove existing castings.
 - a. Take care to not damage castings. Clean and repair as needed.
 - b. Replace castings where specified.
 4. If existing structure is in good condition, install frame and grate or manhole frame and cover.
 - a. Set forms for adjusting frame such that the frame is level and square.
 - b. Place frame on bricks, blocks or other supports.
 5. If existing structure is in poor condition, as determined by the Engineer, excavate and reconstruct.
 - a. Keep silt and debris away from structure until work is complete.
 - b. Set frame as directed in Section 602.03.D.4.a.
 6. Install steps on the back wall of drainage inlets or manholes as needed in accordance with Section 602.03.B.4.
 7. Pour flow channel if specified in the Contract Documents and as directed by the Engineer.
 8. Form drainage inlet or manhole top unit as shown in the Contract Documents or approved Working Drawings.
 9. Place concrete in accordance with Section 610.03.E.
 - a. Cure concrete in accordance with Section 610.03.I.
 - b. Remove forms in accordance to Section 610.03.K.
 10. Backfill the area around drainage inlets and manholes in accordance with Section 602.03.B.7.
 11. Dispose of materials in accordance with Section 602.03.C.3.



VALUES VS mowers



Seal



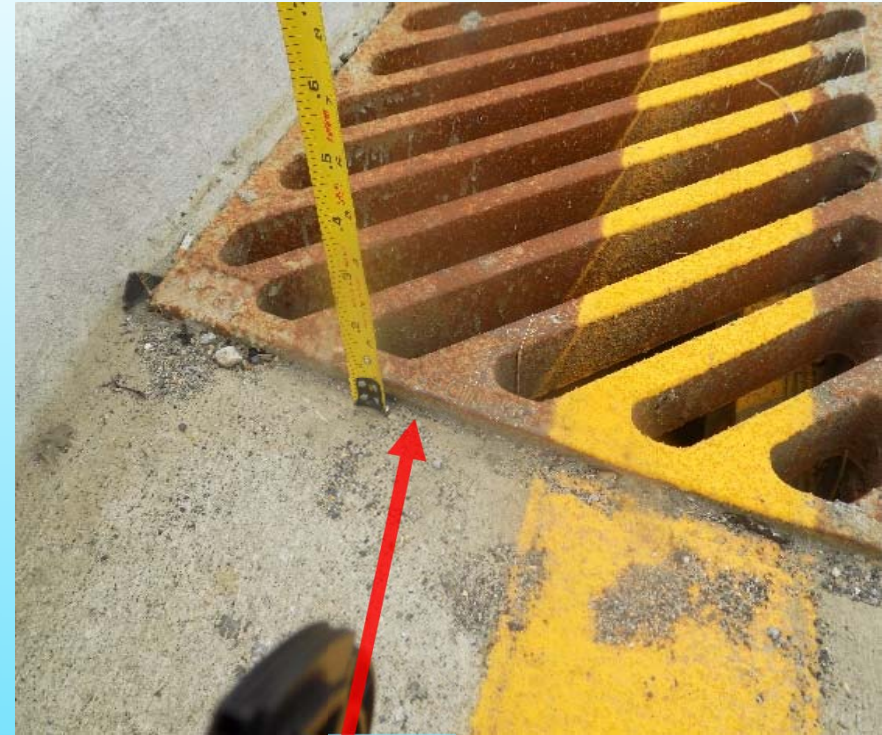
Drainage Inlets

Top unit

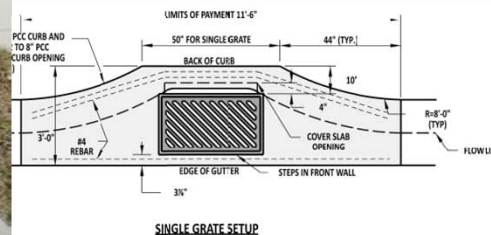




- Fill flush.
- Need positive drainage.
- Removal formwork.

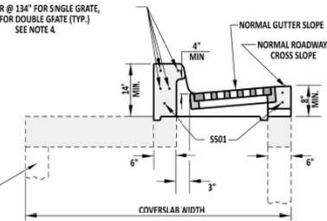


Flush for snow plows

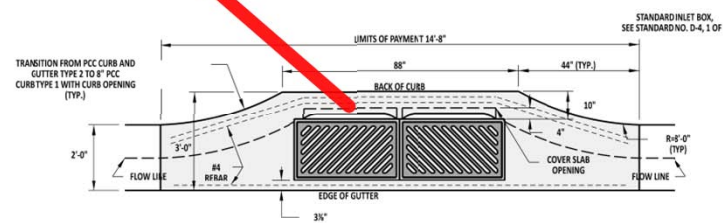


SINGLE GRATE SETUP

#4 REBAR @ 134" FOR SINGLE GRATE,
172" FOR DOUBLE GRATE [TYP.]
SEE NOTE 4



SUBDIVISION TOP & CONFIGURATION



DOUBLE GRATE SETUP

NOTES:

1. MINIMUM BOX SIZE TO BE 34" x 24".
2. PIPE OPENINGS IN THE FRONT WALL SHALL NOT INTERFERE WITH THE STEPS. THE PIPE SHALL BE SHIFTED HORIZONTALLY TO AVOID THE STEPS. IT MAY BE NECESSARY TO USE A LARGER BOX TO AVOID CONFLICT BETWEEN STEPS AND PIPE OPENING.
3. SEE DETAIL D-5, SHEET 3 OF 9, FOR S501 BAR DIAGRAM.
4. THE REBAR IN THE HEAD IS PREFERRED TO BE 1 CONTINUOUS PIECE, HOWEVER, IF MULTIPLE PIECES ARE TO BE USED, EACH PIECE SHALL OVERLAP BY 32" MINIMUM AND THE FINAL LENGTH OF THE SPLICED REBAR SHALL BE AS NOTED ON THIS DETAIL.



DELAWARE
DEPARTMENT OF TRANSPORTATION

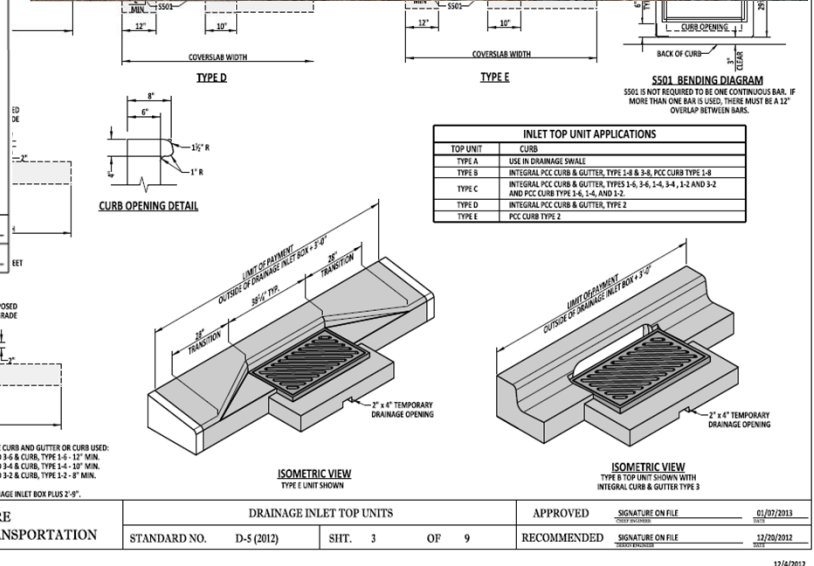
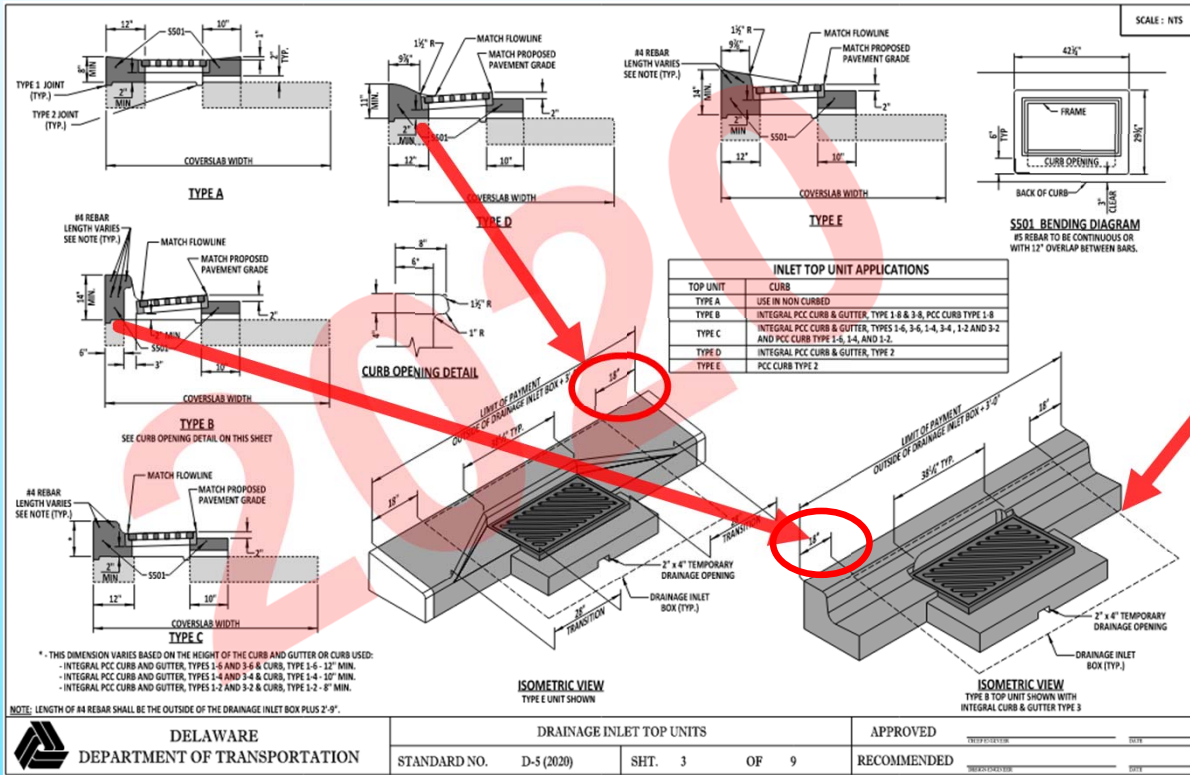
DRAINAGE INLET TOP UNIT, TYPE S				APPROVED	SIGNATURE ON FILE	1/04/2019
STANDARD NO.	D-5 (2018)	SHT.	8 OF 9	RECOMMENDED	SIGNATURE ON FILE	12/20/2018



**Frame
adjustments**



Flush
2020 clarification in Spec
and Detail





BRIDGE LOCATIONS

COMPACTION



Dirt is dumped in "lifts" and compacted



Settlement

STRUCTURES



Settlement
or joints?

B. *Furnish and Construct Drainage Inlets, Manholes and Junction Boxes:*

1. Excavate to the required depth in accordance with Section 207.03. Compact the foundation upon which the concrete floor of the Structure is to be placed to a firm, even surface to the acceptance of the Engineer.
2. Place the Structure as shown in the Contract Documents. Use cast-in-place construction for drainage Structures that tie in to existing pipes and Structures unless otherwise specified in the Contract Documents or if the Engineer approves the use of precast Structures. Use precast Structures for all new construction unless otherwise specified in the Contract Documents or directed by the Engineer.
 - a. Construct cast-in-place reinforced concrete Structures in accordance with Section 610.
 - b. Construct precast reinforced concrete Structures in accordance with Section 612.
 - c. Provide precast reinforced concrete round manhole riser sections and appurtenances in accordance with AASHTO M199.
3. Set the frames of castings in concrete.
4. Install steps on the backwall for all drainage inlets and manholes, and junction boxes that utilize a removable top slab, as specified in the Contract Documents or are 4 feet or more in depth, measured from the top of grate or cover to the invert of the lowest pipe. Provide a minimum embedment of 3 inches in the wall and ensure that the steps protrude out 6 inches from the wall. Begin steps within 24 inches of the top of grate/lid and end steps no more than 12 inches above the lowest invert except where a pipe is in the backwall. Space steps vertically at 12 inch intervals.
5. Ensure inlet and outlet pipes are the same size and type as the connecting pipes shown in the Contract Documents and that pipes extend through the walls and are flush with the inside of the wall. When the end of a reinforced concrete pipe is cut off, ensure that the end is cut clean and smoothly finished with mortar so that no bar reinforcement remains exposed. Fill any space between the pipe and the walls of the drainage inlet with non-shrink grout conforming to the requirements of Section 1047, with a minimum strength of 5000 pounds per square inch. Ensure that the greatest dimension of the opening in the drainage inlet for the pipe is no greater than the outside pipe diameter plus 4 inches.
6. Pour flow channel.
7. Backfill the area around drainage inlets and manholes with Borrow Type C Material to the required elevation in accordance with Section 207. Approval is required prior to the placement of any backfill.



Cut to wall
and mortar

Honeycombing

unconsolidated concrete



2020 SPECIFICATION

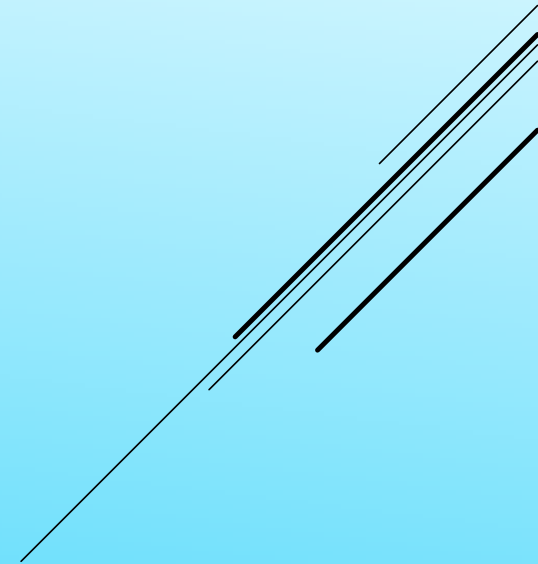


**2020
2" BELOW
FINISH GRADE**

SEE SOMETHING OUT OF THE NORM... SAY SOMETHING



DND



Standing Water



Remove Bag

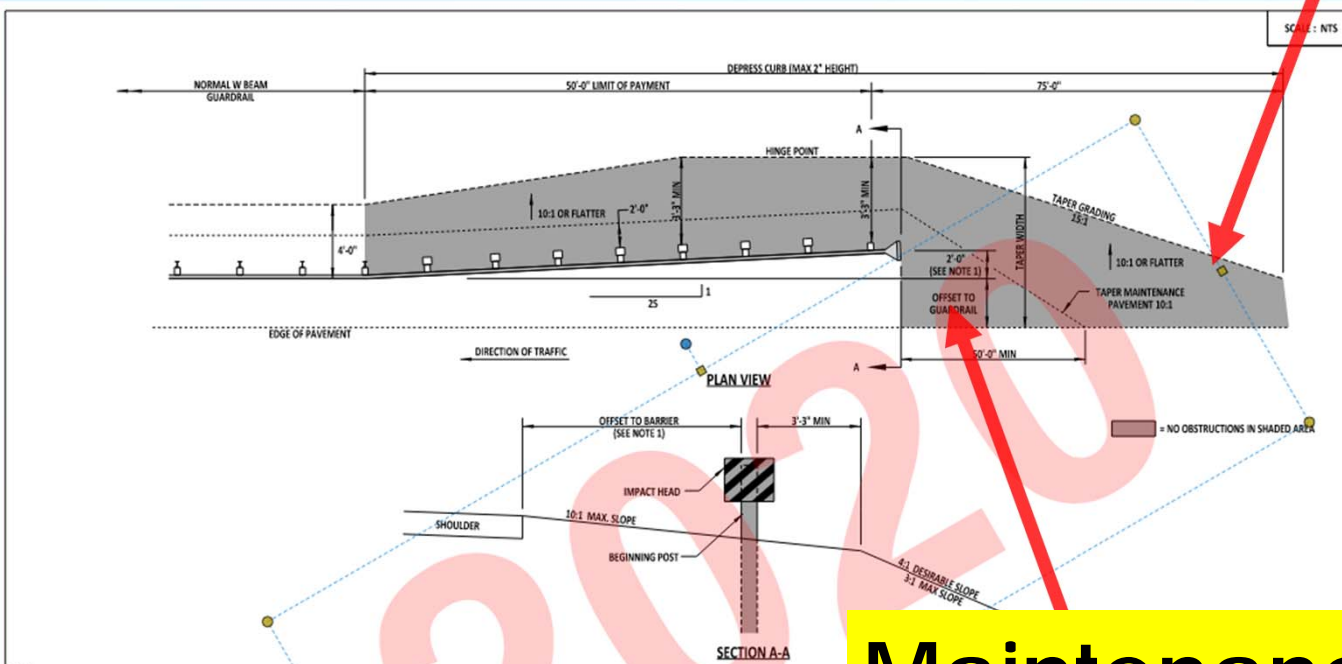




REPAIRS & REPLACEMENT

Guardrail

GRADING



- NOTES:**
1. FLARE THE END TREATMENT AT 25:1 BEGINNING 50'-0" FROM THE END OF THE IMPACT HEAD, UNLESS THE CONSTRUCTION PLANS OR SPECIFICATIONS SPECIFY A SMALLER FLARE.
 2. THIS DETAIL WAS SOLELY CREATED TO SHOW THE GRADING REQUIRED FOR THIS TYPE OF GUARDRAIL END TREATMENT AND IS APPLICABLE UNLESS THE GUARDRAIL END TREATMENT MANUFACTURER HAS A MORE CONSERVATIVE DETAIL.
 3. THE GUARDRAIL END TREATMENT SHALL BE INSTALLED AS PER THE MANUFACTURER'S AND THE DEPARTMENT OF TRANSPORTATION'S SPECIFICATIONS.
 4. IF CURB IS PRESENT, DEPRESS THE CURB TO A MAXIMUM HEIGHT OF 2" WITHIN THE LIMITS OF THE END TREATMENT AND THROUGHOUT THE LENGTH OF THE TAPER GRADING.
 5. GUARDRAIL DELINEATORS SHALL NOT BE PLACED WITHIN THE LIMITS OF THE GUARDRAIL END TERMINAL.

Maintenance Pavement Strip



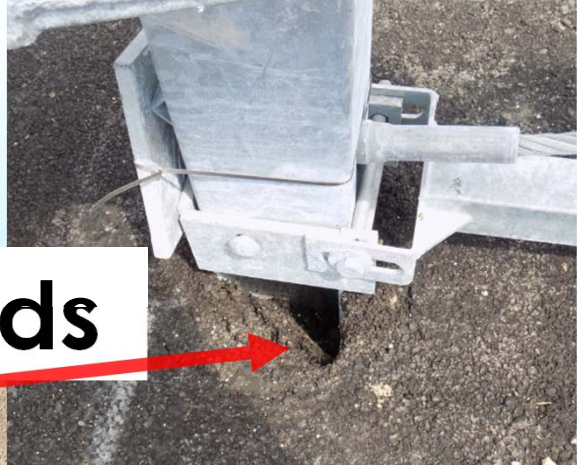
DELAWARE DEPARTMENT OF TRANSPORTATION	GRADING FOR GUARDRAIL END TREATMENT ATTENUATOR,			DATE
	STANDARD NO.	B-2 (2020)	SHT. 1 OF 3	RECOMMENDED



orientation

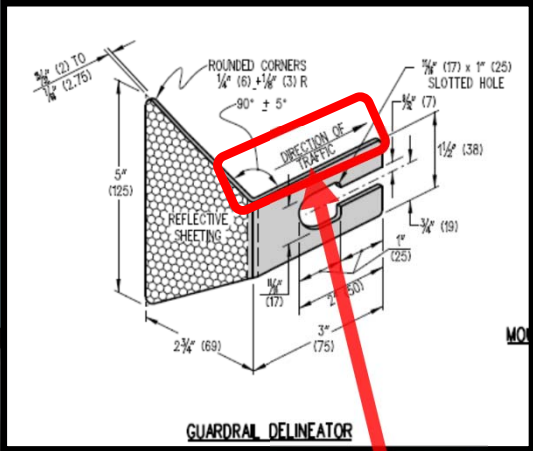


Voids



Removed post

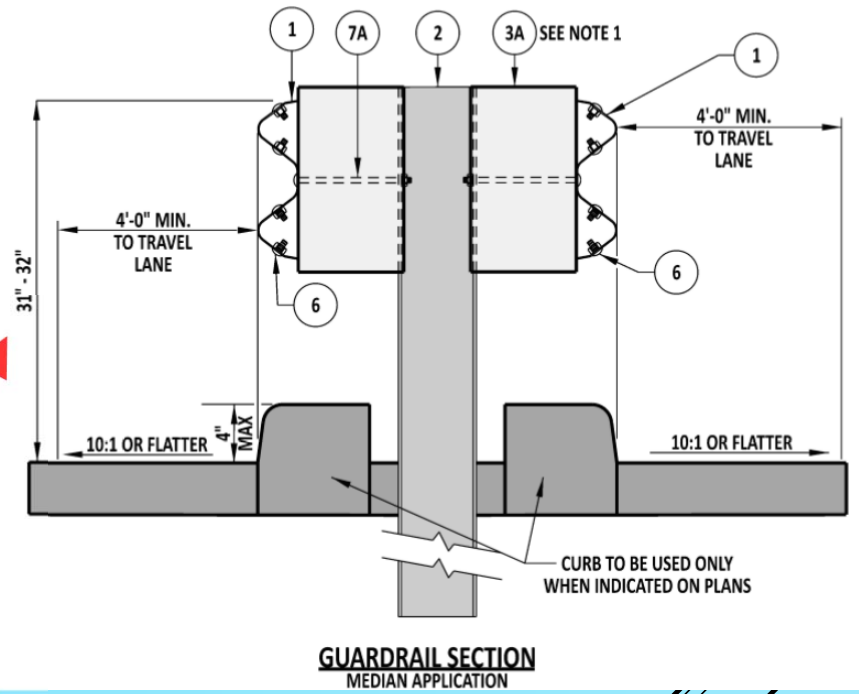
Strap per end anchorage and manufacture detail



Direction



Maintenance Strip





2020 Leave
out post

2020 curved
guardrail





**Post
placement**



**Thru bolts
and plate**

PIPES

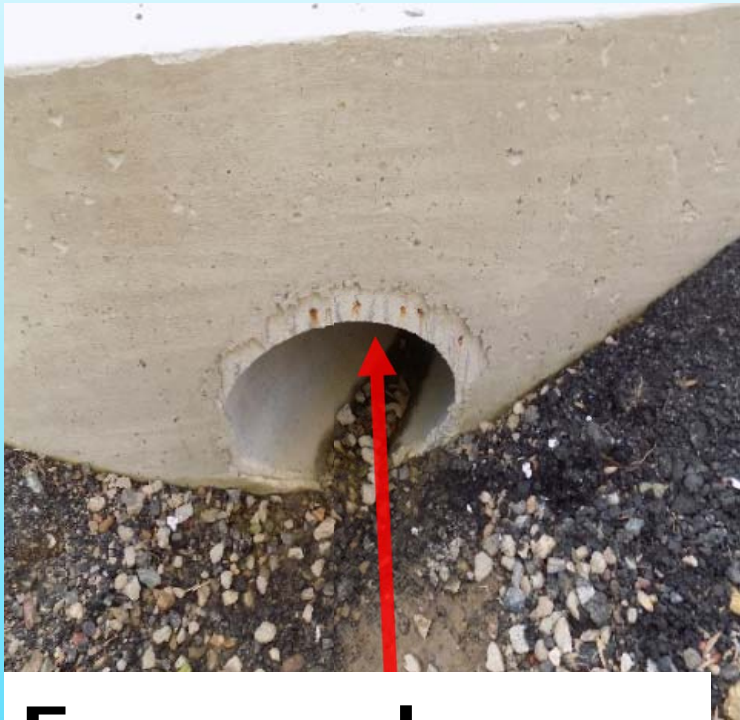


JOINTS

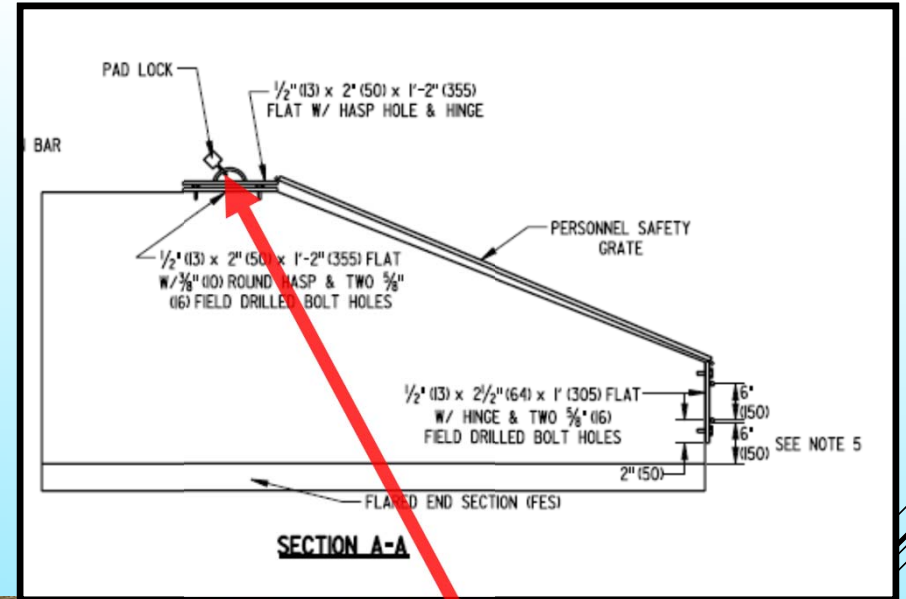
PIPE CULVERTS		SECTION 6
d.	Slabbing (large slabs of concrete peeling away from the sides with a straightening of the reinforcement)	
e.	Cracks greater than 0.1 inch in width	
f.	Crack widths greater than 0.01 inch in width and showing efflorescence or differential movement	
g.	Differential joint movement	
h.	Improper gasket placement	
i.	Joint leakage	
j.	Settlement	
k.	Joint separations greater than manufacturer's recommendation or as follows (whichever is less):	
i.	12-36 inch diameter Round	0.75 inch
ii.	42 inch and larger diameter Round	1.25 inch
iii.	All Elliptical	1.50 inch



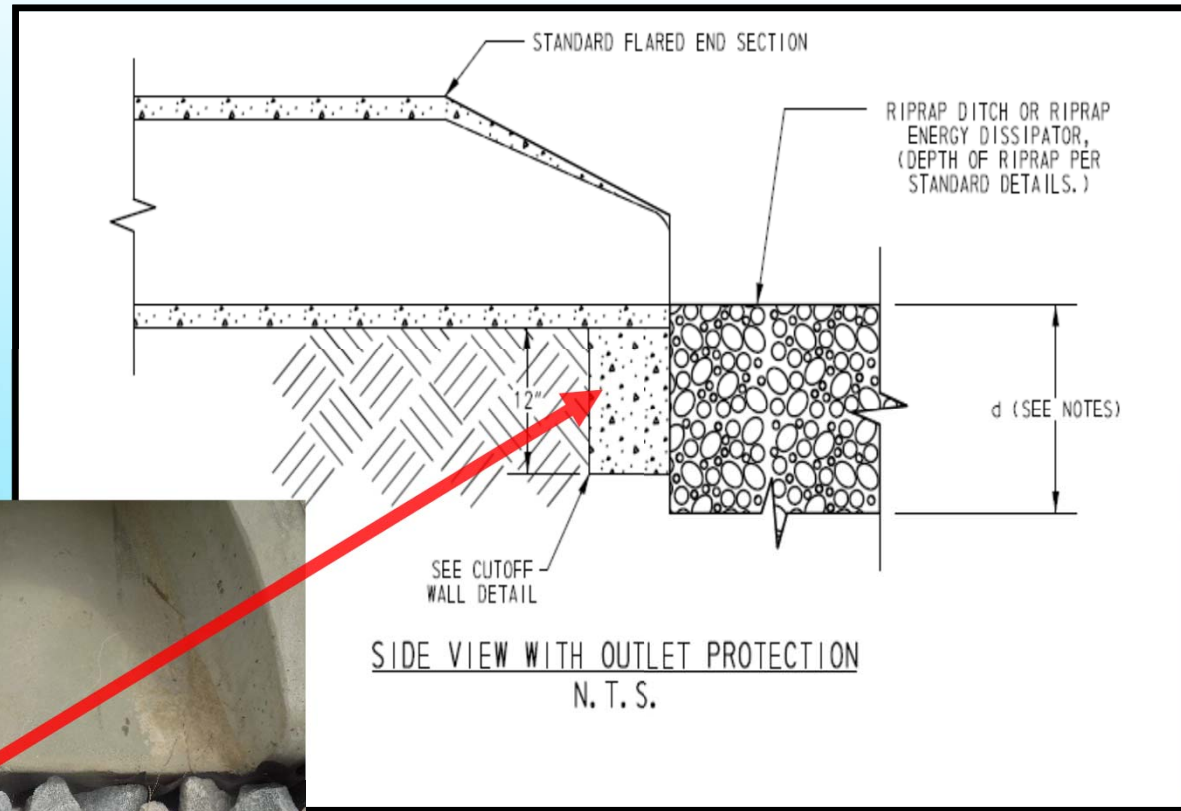
Fill lift holes



Exposed Rebar



Flare support: Adding to 2020 details



PAVEMENT

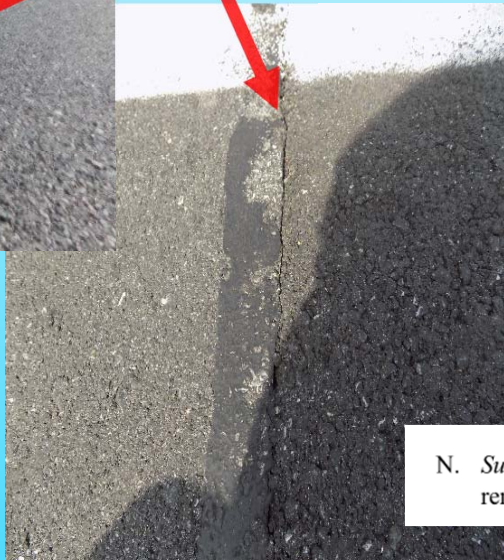
**END
WALK
HERE**

START

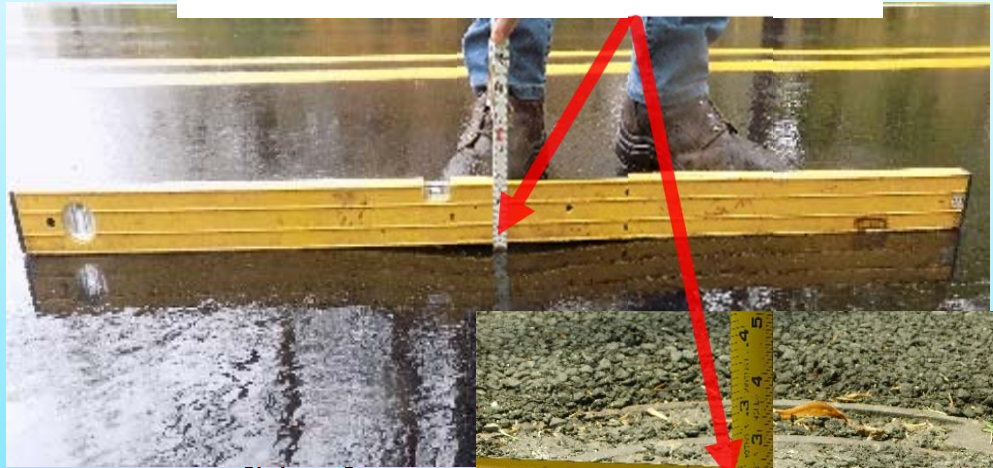




Open
Joints

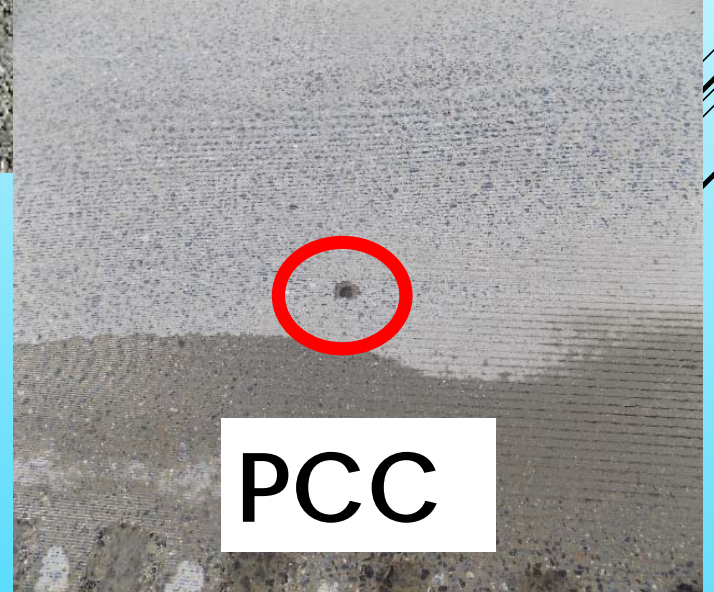


1/4" tolerance



N. *Surface Tolerances.* Maximum deviation both longitudinal and transverse is 1/4 inch in 10 feet. Correct or remove areas exceeding these tolerances at no expense to the Department.

Pop outs



401.15 Basis of Payment. The quantity of hot-mix, hot-laid bituminous concrete will be paid for at the Contract unit price per ton (metric ton). Price and payment will constitute full compensation for furnishing, preparing, hauling, and placing all materials, including asphalt for tack coat; for removing hot-mix bituminous concrete from around manholes, drainage inlets, valves, and similar features; for removing and replacing excess asphalt cement, as determined by the Engineer; for applying a fog coat; and for all labor, equipment, tools, and incidentals required to complete the work, including the correction of defective work.



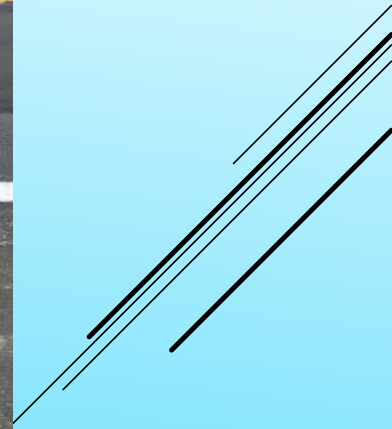
porous
bituminous
concrete



Paving beyond the width limits



Discuss Paving limits





**Drop offs
at the
edge of
pavement**



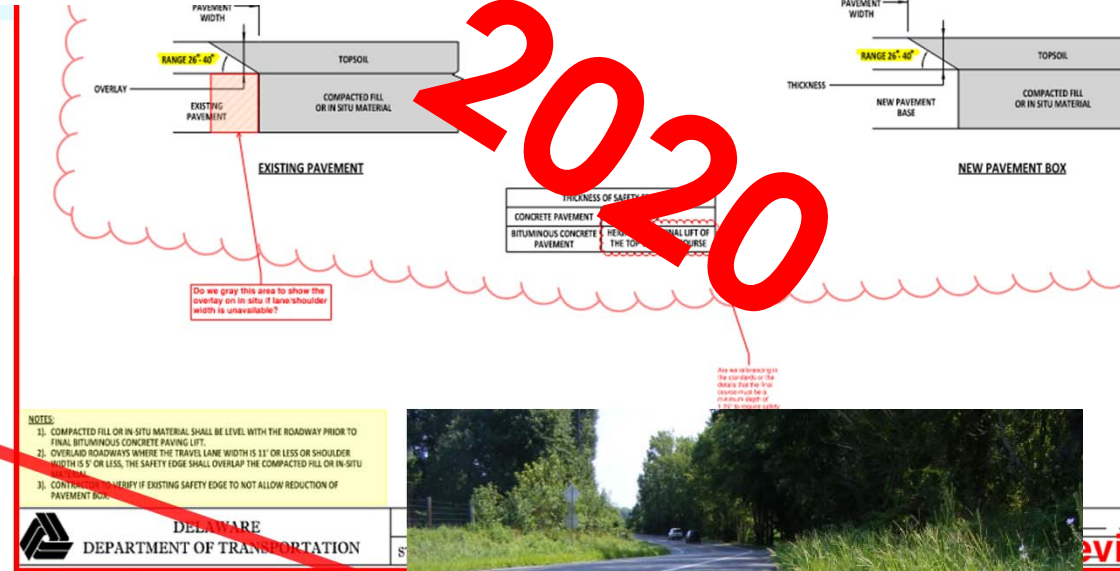
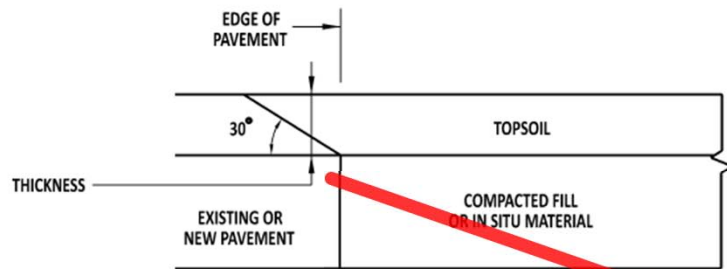
Water standing



Water standing ?



Pavement Safety Edge

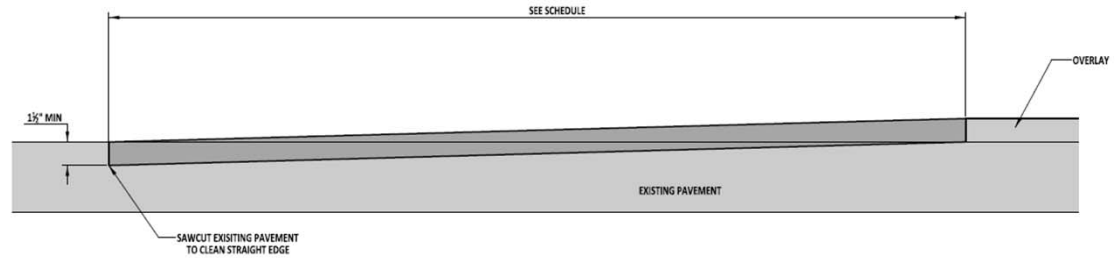


2018

THICKNESS OF SAFETY EDGE	
CONCRETE PAVEMENT	3"
BITUMINOUS CONCRETE PAVEMENT	HEIGHT OF THE FINAL LIFT OF THE TOP WEARING COURSE



JOINTS



- NOTES:
1. ADJUST THE PROFILE OF THE OVERLAY PAVING TO ASSURE A SMOOTH TRANSITION THROUGH THE BUTT JOINT.
 2. CRACK SEAL THE JOINT BETWEEN THE BUTT JOINT AND THE EXISTING PAVEMENT.

CONDITION	SLOPE FEET:INCHES
GREATER THAN OR EQUAL TO 55 MPH	40:1
LESS THAN 55 MPH	30:1
STOP CONTROLLED INTERSECTION	15:1

Seal



DELAWARE
DEPARTMENT OF TRANSPORTATION

BUTT JOINTS

STANDARD NO. P-3 (2014) SHT. 1 OF 1

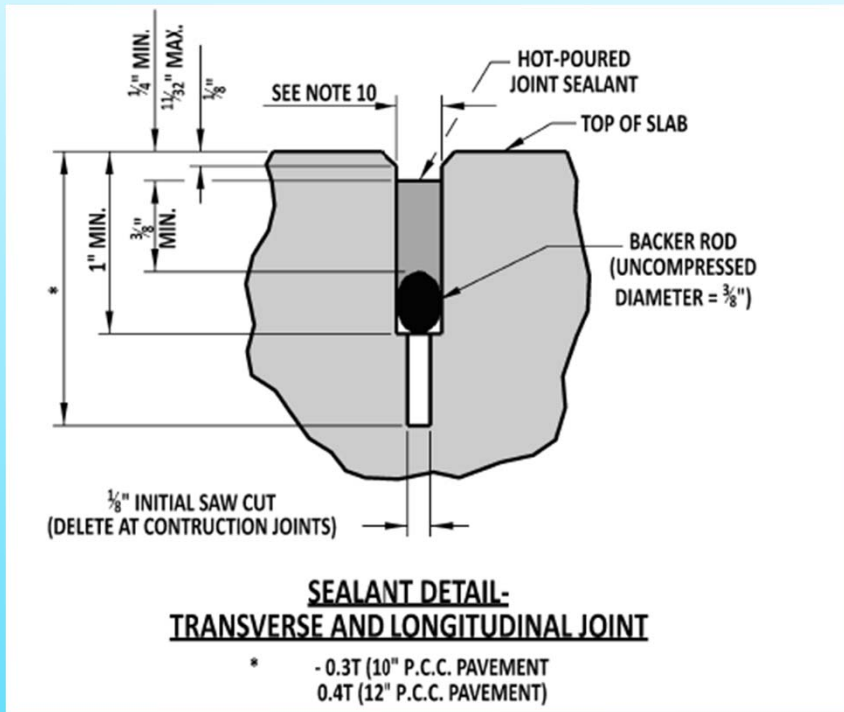
APPROVED

SIGNATURE ON FILE _____ 12/30/2014
DATE

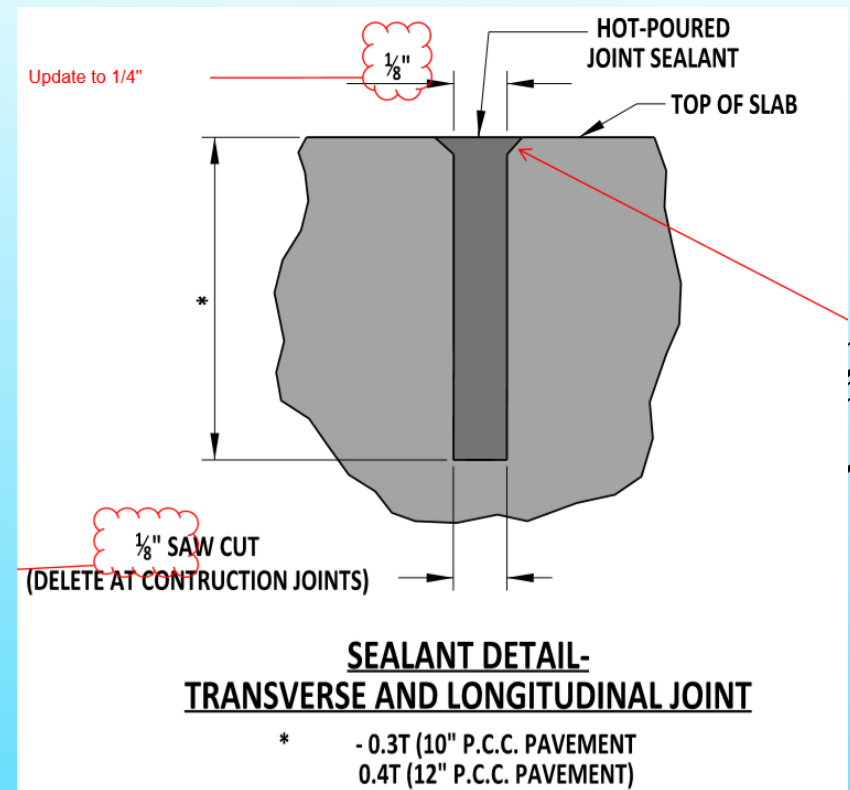
RECOMMENDED

SIGNATURE ON FILE _____ 12/11/2014
DATE

2018



2020



PCC Pavement

STABILIZATION



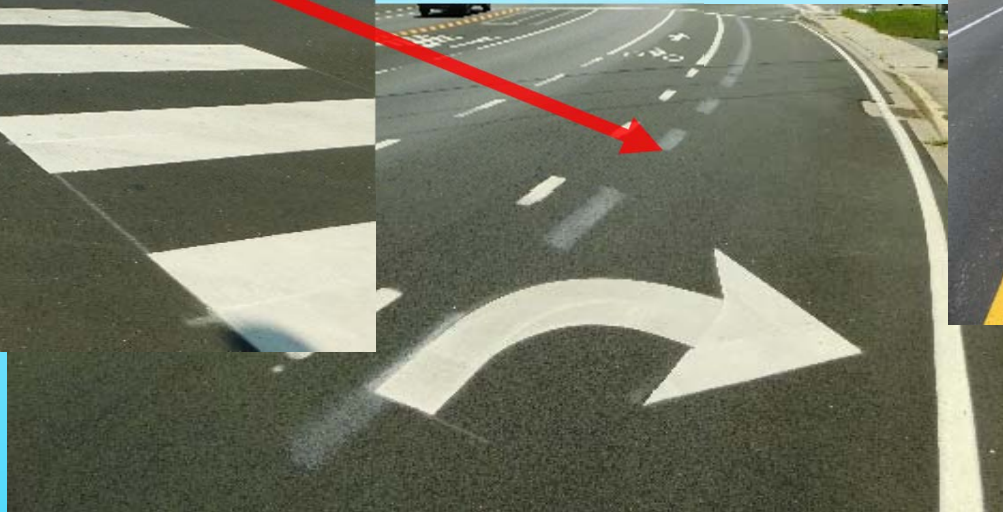
Slit Fence was here



STRIPING

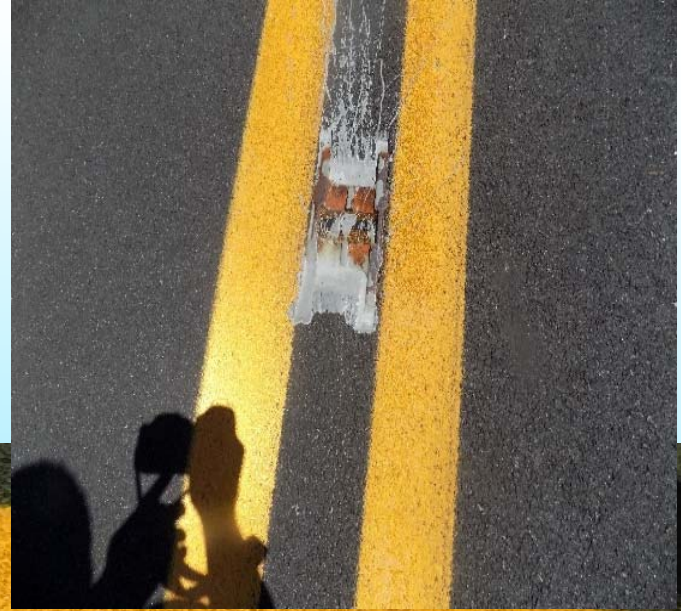
Remove
Temporary

Black out





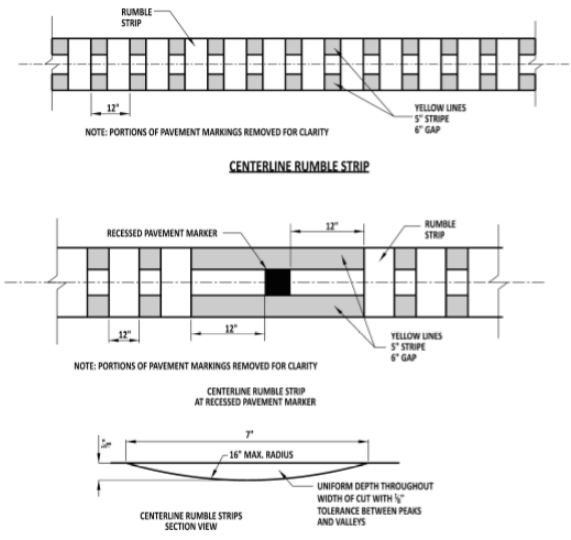
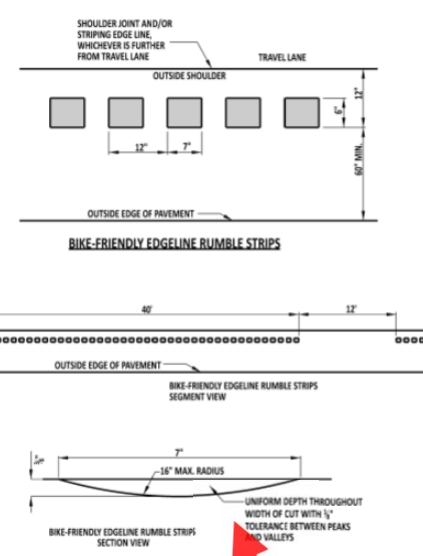
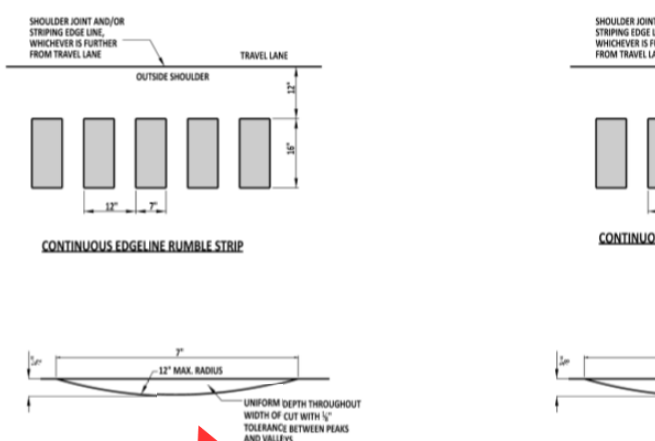
**Missing
Parts**



Reflector

RUMBLE STRIPS

SCALE: NTS



- NOTES:**
- RUMBLE STRIPS SHALL BE PLACED ON SHOULDERS IN LOCATIONS DESCRIBED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
 - RUMBLE STRIPS ARE TO BE BROKEN FOR ALL INTERSECTIONS AND DRIVEWAY ENTRANCES WHERE THE EDGELINE PAVEMENT MARKINGS ARE BROKEN. THE INSTALLATION OF RUMBLE STRIPS SHOULD BE STOPPED 25' PRIOR TO THE POINT OF CURVATURE (PC) AND RESTARTED 25' AFTER THE POINT OF TANGENCY (PT).
 - RUMBLE STRIPS SHOULD NOT BE INSTALLED ON ACCELERATION, DECELERATION LANES, DECELERATION OR BYPASS LANES, OR TWO-WAY LEFT TURN LANES. INSTALLATION SHOULD STOP 150' PRIOR TO THE DIVERGE POINT OF A DECELERATION LANE AND SHOULD NOT COMMENCE UNTIL 150' DOWNSTREAM OF THE MERGE POINT FOR AN ACCELERATION LANE.
 - BICYCLE-FRIENDLY RUMBLE STRIPS SHOULD BE DISCONTINUED 50' BEFORE AND RESTARTED 50' AFTER WHEN ADJACENT TO GUARDRAIL, WHERE THERE IS LESS THAN 5' BETWEEN THE OUTSIDE EDGE OF RUMBLE STRIP AND THE FACE OF THE GUARDRAIL.
 - IN AREAS WHERE THE CENTER LINE LEADS INTO A RAISED CONCRETE ISLAND, THE CENTERLINE RUMBLE STRIPS SHOULD BE DISCONTINUED 25' IN ADVANCE OF THESE ISLANDS.
 - IN AREAS WHERE THE CENTER LINE SPLITS TO CREATE, FOR EXAMPLE A TURN LANE, THE RUMBLE STRIPS SHOULD BE PLACED ONLY ALONG THE DOUBLE YELLOW CENTER LINE THAT IS NOT FORMING THE LEFT TURN LANE.
 - ON ROADS WITH RECESSED PAVEMENT MARKERS (RPMs), CENTER LINE RUMBLE STRIPS SHOULD BEGIN 1' DOWNSTREAM OF THE RPM HOUSING AND TERMINATE 1' UPSTREAM OF THE RPM HOUSING.
 - DO NOT INSTALL CENTERLINE RUMBLE STRIPS UNLESS THE DISTANCE BETWEEN THE EDGE OF THE PAVEMENT TO THE EDGE OF THE CENTER STRIPE IS GREATER THAN 10'.

DELAWARE DEPARTMENT OF TRANSPORTATION

RUMBLE STRIPS

STANDARD NO. P-5 (2018) SHT. 2 OF 2

APPROVED SIGNATURE ON FILE 1/04/2019

RECOMMENDED SIGNATURE ON FILE 12/20/2018

DELAWARE DEPARTMENT OF TRANSPORTATION

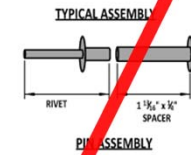
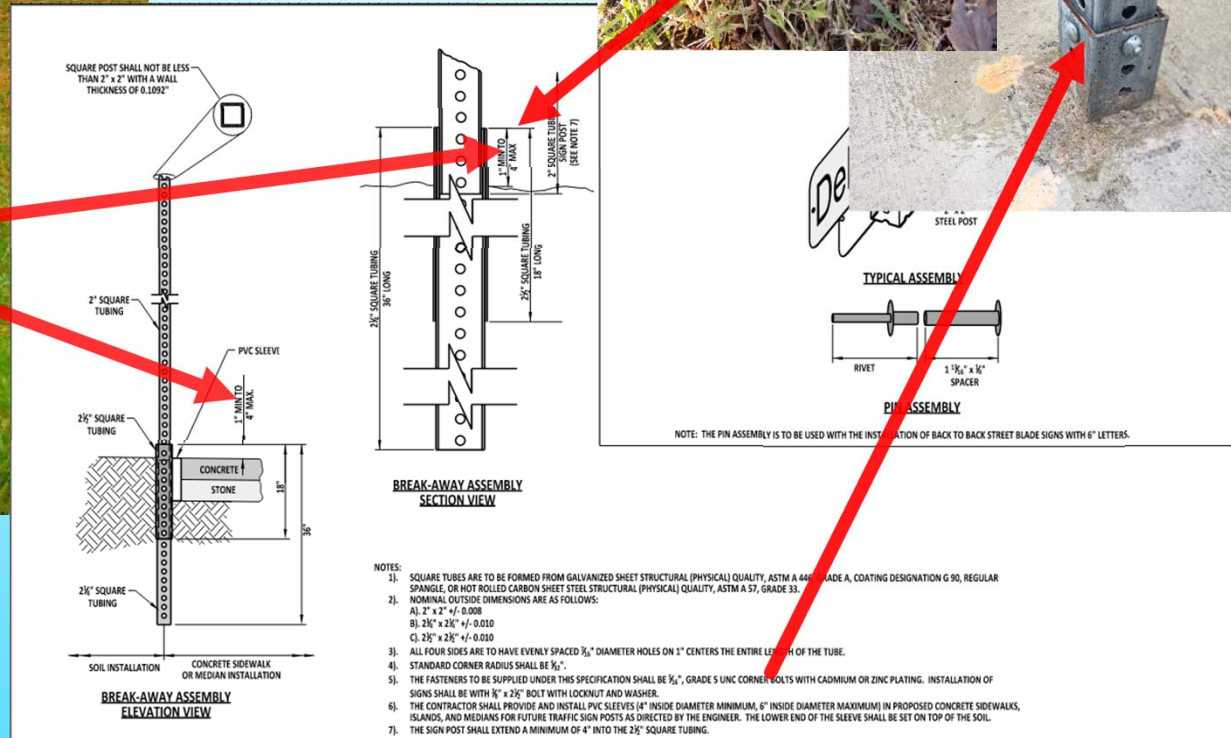
RUMBLE STRIPS

STANDARD NO. P-5 (2018) SHT. 1 OF 2

APPROVED SIGNATURE ON FILE 1/04/2019

RECOMMENDED SIGNATURE ON FILE 12/20/2018

SIGNS



NOTE: THE PIN ASSEMBLY IS TO BE USED WITH THE INSTALLATION OF BACK TO BACK STREET BLADE SIGNS WITH 6" LETTERS.

DELAWARE DEPARTMENT OF TRANSPORTATION	BREAKWAY SIGN POST AND PIN ASSEMBLY DETAILS			APPROVED	SIGNATURE ON FILE	02/14/2014
	STANDARD NO.	T-15 (2013)	SHT. 1 OF 1	RECOMMENDED	SIGNATURE ON FILE	02/14/2014

I saw the sign?



- 06 Signs should be located so that they:
- A. Are outside the clear zone unless placed on a breakaway or yielding support (see Section 2A.19),
 - B. Optimize nighttime visibility,
 - C. Minimize the effects of mud splatter and debris,
 - D. Do not obscure each other,
 - E. Do not obscure the sight distance to approaching vehicles on the major street for drivers who are stopped on minor-street approaches, and
 - F. Are not hidden from view.

Snapshot taken from [Section 2A.16](#), of the DEMUTCD

Are all the signs installed and per schedule?





Correct signs
with size,
placement,
color...

SIGNAL POLES



Filling below the base.
2020: Place shroud or skirt



Grading.

LIGHT POLES

Grading



LOOKING AHEAD

- Technology
- Spec and Detail improvements
- Communication

THANK YOU

James D. Osborne, P.E.

Engineering Support

Delaware Department of Transportation

800 S. Bay Rd | Dover, DE

☎: 302-760-2221

✉: James.Osborne@delaware.gov

www.deldot.gov



Bradford Saborio, P.E.

Group Engineer, Group 3 Construction

Delaware Department of Transportation

800 S. Bay Rd | Dover, DE

☎: 302-760-2420

✉: Bradford.Saborio@delaware.gov

www.deldot.gov

