

CHAPTER 3: DETAILS and ADA

ADA PLAN REVIEW CHECKLISTS

When there is ADA work in a project the ADA Plan Review Checklists NEED to be filled out and submitted.

The ADA Plan Review Checklist #1 Shall be submitted with the 30% to 60% plan, or whenever the design work and checklist is filled out completely as described in the links on the DESIGN SCENE and GUIDANCE website to ensure an adequate ADA review.

ADA Plan Review Checklist #2 SHALL be submitted with the 60% to 90% plan, or whenever the checklist is filled out completely as described in the links on the DESIGN SCENE and GUIDANCE website to ensure an adequate ADA review.

See the links at the top of the Design Scene and Guidance web page General - "ADA Design Checklists and Guidance"

ADA SAFETY GRATES, CURB BOXES, and HELPER STRUCTURES

ADA Safe Grates:

The threshold to use an ADA safety grate is when an existing catch basin is located within:

- The PAR, or
- 1' outside of the edge of the detectable warnings, or
- A high use walkable flare or
- The path of travel of an APS push button

When constructing new catch basins or relocating existing catch basins, the new structures should be located 10' away from the edge of the curb ramp and preferably upstream of the curb ramp. Constructing new structures 10' away allows the catch basin sumps to be located adequately away from the curb ramp and provides the needed space to construct curb ramp tapers and ensure flow line and gutter inslopes transitions can be made in the field without trapping water.

Curb Boxes:

Curb inlets (curb boxes) are not needed on catch basin structures when they are on grade, but they are always needed at low points. Curb boxes can't be part of the curb taper if it doesn't allow compliant flare or ramp slopes.

Helper Structures:

ADA safe grates have approximately a 50% reduction in intake flow capacity and can clog more easily with debris than standard grates. When utilizing an ADA safe grate or removing a curb box at a low point, the hydraulic impacts should be reviewed. To restore and improve hydraulic capacity in areas of concern "helper" structures should be utilized. "Helper" structures are

generally minimum depth new structures connected into an existing catch basin in the same quadrant with a 10' -12" rcp lead. Most often these helper structures are relatively low cost (\$5000 for structure, lead, castings, and associated work) since the construction limits are contained within the quadrant being worked on and are not extended to the storm sewer main line.

For ADA safe grates use the pay item 2506.502 CASTING ASSEMBLY by EACH. Where we typically reference what standard plate you would use we will add ADA instead. You will also need to include the detail for it in the plan which can be found at <http://www.dot.state.mn.us/ada/design.html>

Look under the section called “Standard plans and details” and click on the bullet “ADA Safe Grate Detail (DGN)”.

They are in the process of getting a standard plate but until then we will just reference it and add the detail in the plan.

ADA PAY ITEMS

The ADA group has set up a location for their project design guide, provisions, pay items and other useful information which can be found on ProjectWise at...

[pw://pw8i.ad.dot.state.mn.us:cadp/Documents/Operations/ADA_Review/ADA_Provisions/](http://pw8i.ad.dot.state.mn.us:cadp/Documents/Operations/ADA_Review/ADA_Provisions/)

They have also established a new webpage which can be found at MnDOT A to Z under **ADA Design and Construction Tools...**

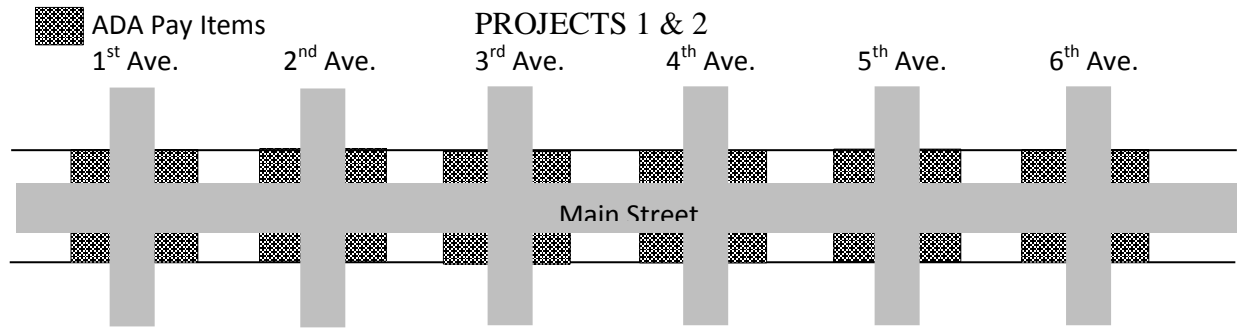
<http://www.dot.state.mn.us/ada/design.html>

All designers should follow the design guide when working on ADA Improvements. <http://www.dot.state.mn.us/ada/pdf/adaprojectdesignguide.pdf>

There has been some confusion on when to use the new ADA pay items and when to use the traditional pay items. The following are basic guidelines on which pay items should be used for which situations....

Project 1 – Standalone Curb Ramp Replacement Project or Standalone Signal Installation/Replacement

These projects would only use new ADA pay items for roadway/curb ramp work

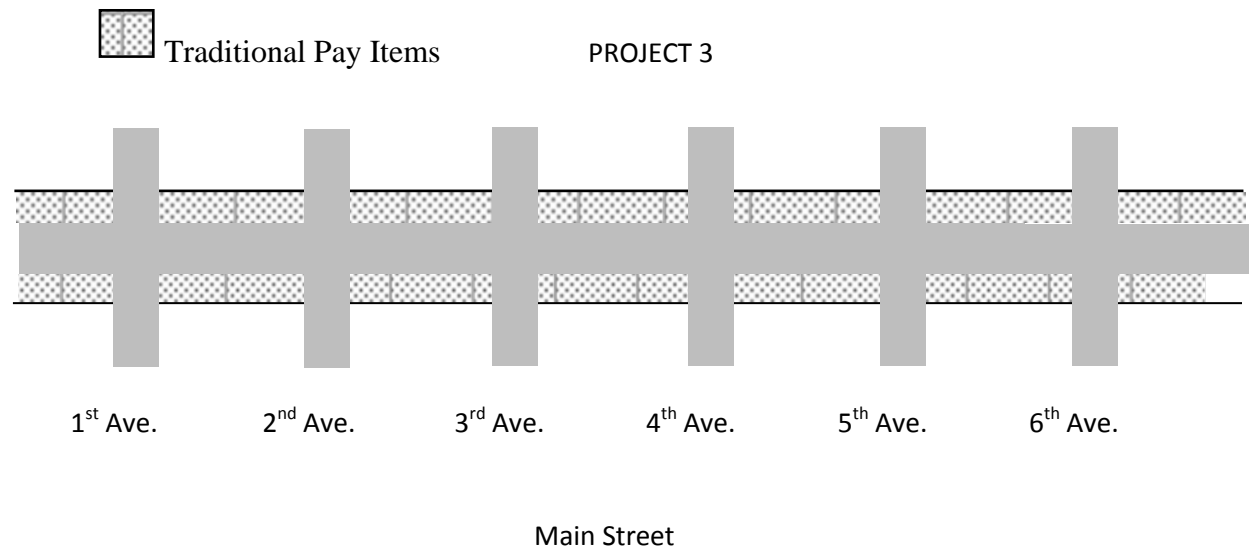


Project 2 – Mill & Overlay with Curb Ramp Replacements

These projects would use ADA pay items for curb ramp work (Concrete Walk, Concrete Curb & Gutter, Site Restoration). Traditional pay items would be used for roadway work unless there are areas with curb ramp replacements beyond the mill & overlay limits, in which case the ADA items for bituminous pavement could be used for bit. removal and replacement in those areas.

Project 3 – Reconstruction/Regrade

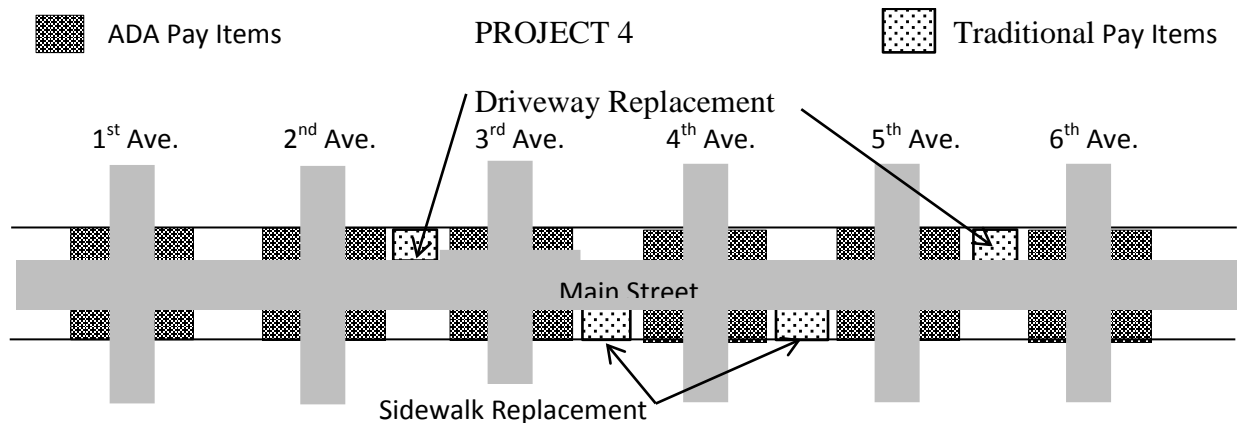
Project is a roadway reconstruction project including replacement of sidewalk, signals, etc. Use all traditional pay items, no incidentals.



Project 4 – Mill & Overlay with Curb Ramp, Driveway, and Sidewalk Replacements

Project is a mill and overlay with curb ramp replacements and replacement of sections of sidewalk and some driveways.

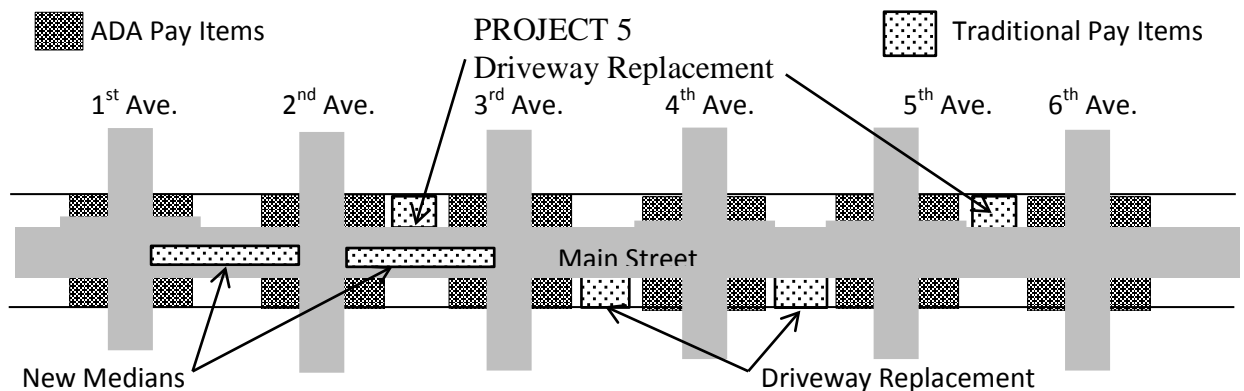
- Sidewalk and driveway replacements would be paid for using traditional pay items.
- Curb ramp replacements would be paid for using ADA pay items.



Project 5 – Access Management Project, Mill & Overlay, Median Installations, Driveway Replacements, and Curb Ramp Replacements

Project is an access management project, which includes mill and overlay, installation of concrete medians, removal of some driveways and replacements of others, curb ramp replacements and APS signal upgrades.

- Installation of medians and driveway replacements would be paid for using traditional pay items.
- Curb ramp replacements would be paid for using ADA pay items.
- If project was replacing all of the sidewalk, only traditional pay items would be used, no ADA pay items.

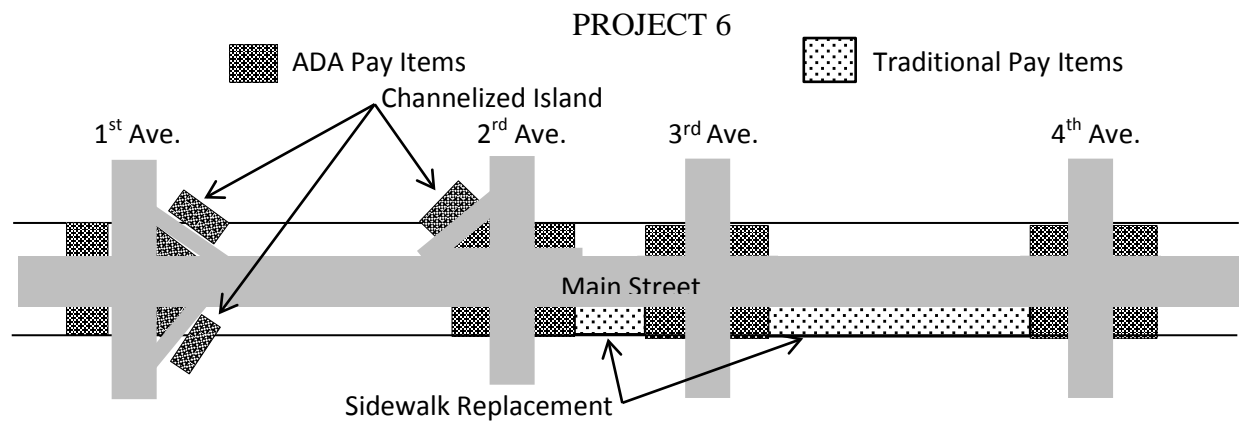


Project 6 – Mill & Overlay, Sidewalk Additions, Replacement of Channelization Islands and Curb Ramps

Project is a mill and overlay with ADA Improvements including pork chop channelization island replacements, curb ramps, and signal upgrades to APS. Project also adds 2 blocks of new sidewalk along the highway.

- Two blocks of new sidewalk would be paid for using traditional pay items. Sidewalks would be 4" concrete walk. Curb Ramps for the new sidewalk would be paid for using the ADA Concrete Walk pay item.

- All curb and gutter, pork chop island replacements, median modifications, and curb ramps would be paid for using ADA pay items: Concrete Walk and Concrete Curb & Gutter with aggregate base and earthwork incidental. Turf establishment and side grading would be paid for using Site Restoration pay item.



Project 7 – Full Regrade and Mill & Overlay with Curb Ramps

Half of the project is highway reconstruction with a subcut including new sidewalks, drainage, lighting, signals, etc.

- On this portion of the project, traditional pay items would be used. Sidewalks would be 4" concrete walk and curb ramps would be 6" concrete walk. Aggregate Base, Earthwork, and Turf Establishment would all have traditional pay items. Curb and gutter payment would be paid for by the type. (B624, etc.)

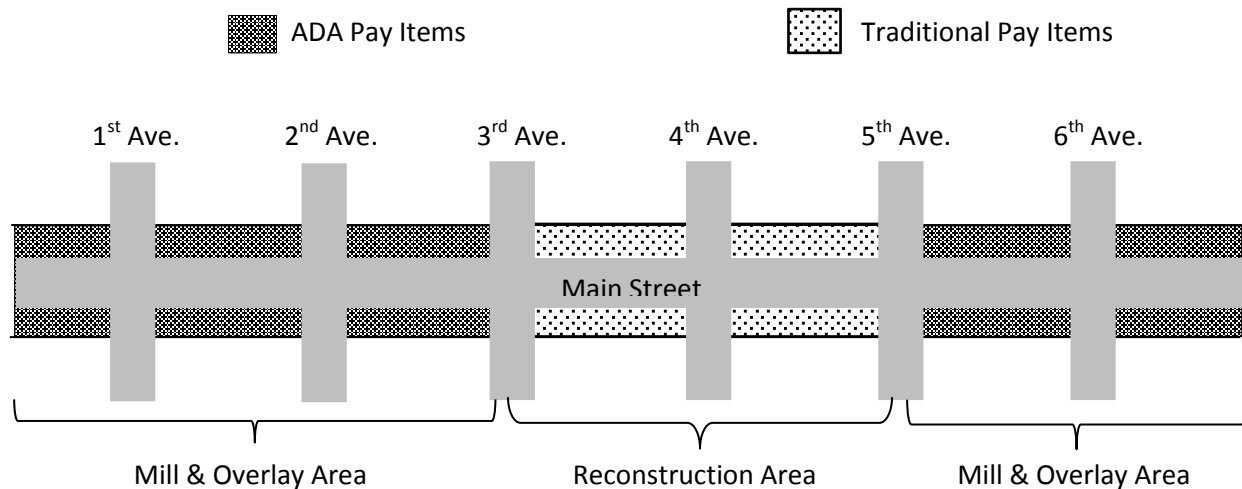
The other half of the project is a mill and overlay with ADA Improvements including curb ramp replacements and APS signal upgrades.

- On this portion of the project, curb ramp replacements and curb and gutter at curb ramps would be paid for using ADA pay items: Concrete Walk and Concrete Curb & Gutter. Aggregate Base and any earthwork is incidental. Side grading and turf establishment would be paid for using Site Restoration pay item by the EACH. Ideally each site's grading limits would not touch so the limits of each site can be clearly defined.

Clarification: Curb ramp replacement includes all of the walk area necessary to meet existing walk grades, including any transition panels.

Curb Line Changes: In areas where curb lines are moving more than 2 feet, traditional pay items should be used for roadway pavement removal and replacement. ADA pay items would be used for concrete walk and concrete curb & gutter.

PROJECT 7



The following are the ADA pay items as mentioned in the examples above....

- 2104.503 REMOVE CURB AND GUTTER by LIN FT...note that sawcuts are incidental.
- 2104.518 REMOVE CONCRETE WALK by SQ FT...note that sawcuts are incidental.
- 2104.603 REMOVE AND REPLACE BITUMINOUS PAVEMENT by LIN FT...for bit in poor condition.
- 2232.603 MILL AND PATCH BITUMINOUS PAVEMENT by LIN FT...for bit in good condition
- 2521.618 CONCRETE WALK by SQ FT
- 2531.603 CONCRETE CURB & GUTTER by LIN FT
- 2531.603 CONCRETE CURB DESIGN V by LIN FT
- 2531.618 TRUNCATED DOMES by SQ FT
- 2575.602 SITE RESTORATION by EACH

APPROACH PANEL STANDARDS - IMPLEMENTATION GUIDELINES

The approach panel standard sheets have been revised and updated. The old standard sheets will be archived and replaced by new standard sheets. Many details have been rearranged and expanded so that the information needed for construction is more complete. There are eight new standard sheets, with each sheet containing a particular set of details. A typical bridge will require six standard approach panel sheets, the first two sheets will vary depending on the approach barrier configuration (see below), the other four sheets will be typical for all approach panel configurations. A description of each of the standard approach panel sheets follows:
Geometry & Reinforcing Details

Depending on the approach barrier configuration, use one of the following 2 alternates to select the first two sheets of approach panel standards for a particular bridge (check with the bridge designer if necessary);

ALTERNATE A - Use the following 2 sheets for bridges where the concrete barrier off the end of the bridge is mounted on a wingwall (typical of past bridge designs);

5-297.222 Geometry - - This sheet contains the approach panel layout information. This is project/bridge specific information showing the skew, stationing and elevation of key panel points. The type of joint at the end of the panel is indicated on this sheet. This sheet along with sheet 5-297.223 should be used when the concrete barrier is mounted on a wingwall.

5-297.223 Reinforcing Details - - This sheets shows the details for the steel reinforcing bars, including plan views and cross section views indicating the size and spacing of the reinforcement in the panel. The new standards now include a bar mark (e.g. AP1302E) for each reinforcing bar. A blank *Bill of Reinforcement* is provided for the contractor/fabricator to complete, to be submitted along shop drawings for each panel.

ALTERNATE B - Use the following 2 sheets for bridges where the concrete barrier off the end of the bridge is mounted on the approach panel (This is a new construction detail and is expected to be used very often in the future).

5-297.224 Geometry - This sheet contains the approach panel layout information. This is project/bridge specific information showing the skew, stationing and elevation of key panel points. The type of joint at the end of the panel is also indicated on this sheet. This sheet along with sheet 5-297.225 should be used on bridges where the concrete barrier is mounted on the approach panel. To accommodate guardrail connection and crash test requirements the concrete barrier must extend 7'-0" minimum onto the approach panel. For wingwalls that are parallel to the roadway centerline the barrier must extend 5'-7'-0" minimum onto the approach panel or to the end of the wingwall, whichever is longer. Barrier reinforcement and payment will be included in the bridge plan.

5-297.225 Reinforcing Details - This sheets shows the details for the steel reinforcing bars, including plan views and cross section views indicating the size and spacing of the reinforcement in the panel. The new standards now include a bar mark (e.g. AP1302E) for each reinforcing bar. A blank *Bill of Reinforcement* is provided for the contractor/fabricator to complete, to be submitted along shop drawings for each panel.

Other Approach Panel Standard Sheets

5-297.227 Miscellaneous Details - This sheet includes the details and reinforcement for the sill at the end of the approach panel and the curb transition details. Blank *Bill of Reinforcement* tables are provided for the contractor/fabricator to complete, to be submitted along with shop drawings for each panel.

5-297.228 Joint Layout - This sheet indicates the joint locations and types for all of the longitudinal and transverse joints on the approach panel and is intended to be customized by the grading/roadway designer to include the unique features (skew, length, etc.) of each approach panel. The Concrete Engineering Unit at the Maplewood Lab can be contacted for assistance with joint layouts.

5-297.229 Joint Details - This sheet provides the sawing, sealing, and other requirements for the joints indicated on sheet 5-297.228 and details regarding sidewalk (if present) cover plates.

5-297.231 Drainage Details - The location of pipe drains and catch basins are included on this sheet. In the future a sheet with details for a drainage flume (in lieu of a catch basin) will be added.

Road Designer Responsibilities:

Select the first two standard sheets (Either Alternate A or Alternate B). The choice depends on the location of the concrete barrier and whether it is attached to the approach panel or to the bridge abutment wingwall. The Bridge Preliminary Plan will indicate which detail should be used. The Bridge Office will provide assistance on the selection if needed.

Include either 5-297.222 & 5-297.223 (Alternate A) or 5-297.224 & 5-297.225 (Alternate Option B) Choose the correct panel plan view based on the skew of approach panel. Cross out the unneeded view. The approach panel plan view should be modified/mirrored to show the actual skew orientation, wingwall and curb transition configuration, and traffic direction arrows. Fill in the proposed skew angle (where needed).

Fill in all data for proposed stations and elevations. Contact the Bridge Office for stations and elevations at the end of the bridge.

Fill in the proposed expansion joint type (E8H, or None). Contact the Bridge Office for the appropriate type, which will generally be E8H for trunk highway bridges and "None" for low volume local roads. Details of the E8H expansion joint are shown on sheet 5-297.227 and 5-297.229.

Note that the Contractor is directed to provide shop drawings for the reinforcing layout and a completed *Bill of Reinforcement* table. The Contractor is to send this information to the Project Engineer at least 3 weeks prior to rebar fabrication. The Bridge Office Construction Unit will provide help on reviewing the shop drawings if necessary.

Work with the Concrete Engineering Unit to determine the location and type of all joints on the approach panel and complete standard sheet 5-297.228. Sheet 5-297.229 should also be included as it provides additional joint details.

Complete standard sheet 5-297.227 by verifying the proposed curb transition lengths and details. Also, in the lower left corner of the sheet, based on the type of joint at the end of the approach panel, cross out the details that do not apply. Note that one end of the panel rests on a concrete sill and is NOT to be tied or doweled to the concrete approach panel in order to allow the approach panel to slide to accommodate the temperature movement of the bridge. The sill is placed under the lanes, shoulders and curbs. When approach panels abut concrete pavement, the concrete pavement (not the approach panel) is rigidly tied to the sill.

Previously, concrete lugs were provided under the concrete approach panel. They have since been removed from under the approach panel and are now located under the first concrete pavement panel beyond the sill (away from the bridge). This is an important change since many

new bridge designs include “integral” abutments, where all of the bridge thermal movement takes place at the E-8H joint. Moving the lugs to the first concrete pavement panel allows the bridge thermal movement to take place and limits the amount of pavement “growth” due to incompressible entering the pavement joints.

Include standard 5-297.231 which provides general drainage details. Identify the location and type of proposed drainage. The Road Designer has the prerogative to select an appropriate drainage system, but should provide either a catch basin or a flume at each corner of the bridge in order to reduce the possibility of erosion around the wingwalls, which has been a very significant and all too common problem when this detail is neglected.

Guidance is being developed regarding the use of approach panels adjacent to mechanically stabilized earth retaining walls and will be issued in the future.

Specific questions regarding the Approach Panel Standard Sheets can be directed to the Bridge Standards Engineer.

CONCRETE MEDIAN ISLANDS

Concrete median islands placed on overlay projects that are 4 ft. or less in width and have only a 1 ½ in. wearing course holding it in place should be pinned in place. A dowel 1 in. x ____ in. long reinforcement bar spaced at about 4 ft. - 5 ft. shall be used to pin median in place. The dowel bar will be incidental. The length of the dowel will vary according to thickness of concrete median. Bar should begin in 1 ½ in below the top of concrete median to an embedment of approximately 6 in. - 8 in.

CURBS

Curbs on high-speed roadways should be discouraged. But if they are deemed necessary, use a B4 design. On ramps a D4 should be used. For loops, use a D4 on the outside and a B4 on the inside.

DESIGN STANDARDS CAD DRAWINGS

CAD Directories

Because of a few inquiries on how to get information from our CAD directories, here are our present CAD directories on the system:

Unapproved Drawings

(These drawings are frequently used in plans; they have not been fully tested and approved. Some of the drawings show proprietary products.)

On the internal web (for MnDOT only), Design
Details: <http://ihub/designsupport/standards/design.html>

The “Reference Date” shown on the Unapproved Drawing must be kept in the drawing (and not altered) when preparing the sheet for insertion into the plan.

Standard Plate Drawings

Standard Plates: <http://standardplates.dot.state.mn.us/StdPlate.aspx>

Standard Plans: <http://standardplans.dot.state.mn.us/StdPlan.aspx>

Standard Plans Drawings

In the updating of approved standard plan sheets, changes may be of a minor nature, that the sheet does not need to be re-approved. In those cases a date will be put on the drawing in the area to the left of the title box as shown. Final copies of standard CAD drawings should be put into the plans at the district final review, so as to get the most current copy. If modified this date should remain visible. Be careful that you are selecting the latest approved version and not a draft version as both are filed in the same location.

Revision Date 11-8-94	STANDARD SHEET NO. 5-297.108M	
	STANDARD APPROVED JULY 30, 1991	
	STATE PROJ. NO.	----

Be sure to fill in all pertinent cross reference notes on the standard plan sheets. Filling in the sheet numbers is not considered a modification.

Modifying Standard Drawings

Most of our standard drawings are used in plans as is, but on occasion there is a need to change or modify a standard drawing.

If a Standard Plan sheet contains details not associated with your project, it is optional for designers to cross out the undesired details. If any change is made to a Standard Plan sheet, including crossing out details as mentioned above, the following must be done to the plan sheet:

- Clearly cross-out the *Standard Sheet No.* and *Standard Approved* boxes in the sheet border.
- Add “Modified” text just above the Standard Sheet No. to indicate the standard plan has been modified.
- Move Chris Roy’s signature to the left and add a signature block to the left of the title block for engineer’s signature.

- Clearly cross-out and move any *Revision Date* notation, if present, to the left of or above the signature block.
- Identify the changes made to the details.

Label the changes using italicized text.

Footnote the changes with an asterisk. Place the following footnote above the signature block in italics: * *DENOTES MODIFICATION FROM STANDARD PLAN*

Use the MicroStation custom line style StdsPlnMod to place a double line (thick/thin) box around the text to highlight/identify the modification(s).
See example below...

MnDOT Internal Only - When accessing Standard Plan CADD files from ProjectWise, only those file versions marked APPROVED are suitable to be included as a Standard Plan. Those versions marked Historical or Working are not to be included as a Standard Plan.

Before using an old detail in the plan, check the Project wise design detail index to see if the detail sheet has been updated. Standards is constantly updating and adding standard sheets to their computer library. Be careful that you are selecting the latest version and not a draft version.

If you are unfamiliar with our CAD directory, ask your local CAD operator for help. This is the best way to get any information you might need.

MOMENT SLAB

There has been some confusion as to the type of concrete mix to use when designing a moment slab. In conversations with the concrete and bridge office it has been determined that details for moment slabs should call out the concrete mix 3B52. Make sure that this is the mix used in future moment slab designs.

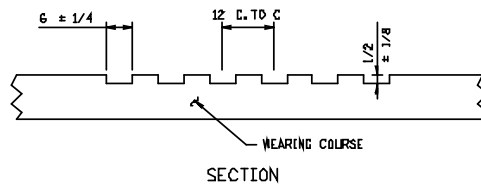
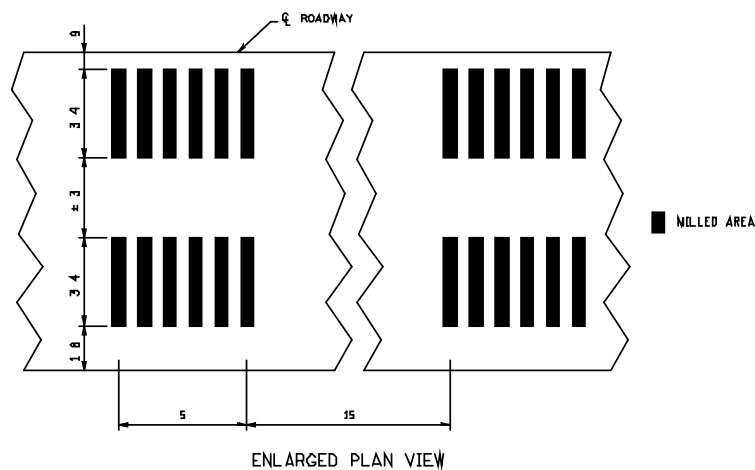
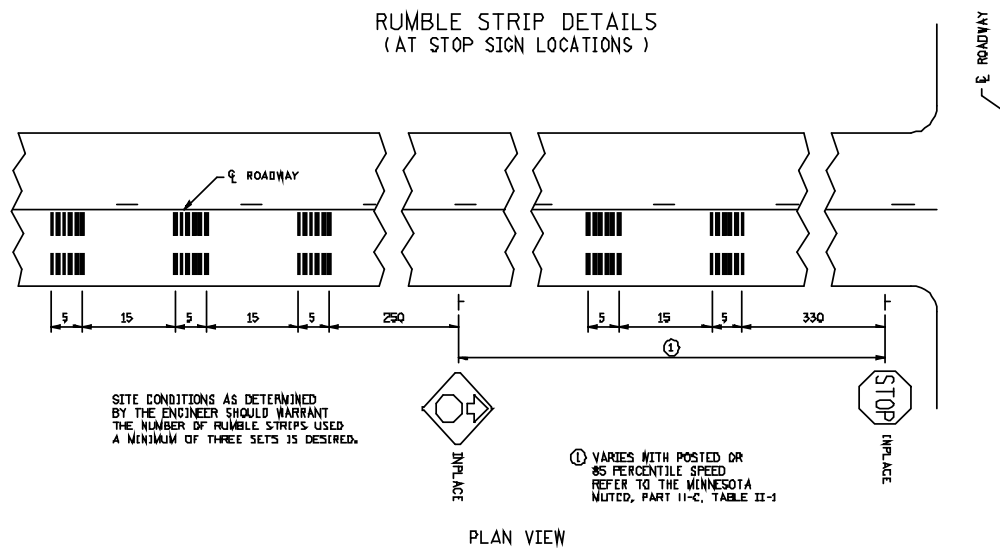
These should be paid for as two separate items....

- 2411.507 STRUCTURAL CONCRETE (3B52) by CU YD
- 2411.508 REINFORCEMENT BARS (EPOXY COATED) by POUND

RUMBLE STRIP DETAIL (AT STOP SIGN LOCATIONS)

The detail shown below shall be considered an unapproved standard detail to be used at stop sign locations (all units are in inches). However, the usage shall be a District/Division Traffic Engineers recommendation as to when and where to be used.

This should be paid for as 2232.602 MILLED RUMBLE STRIPS by the EACH. The quantity is based per pair of rumbles. For the example shown below would be a quantity of 5 EACH.



REFERENCE DATE
10-21-99

RUMBLE STRIP/STRIPE

Technical Memorandum No. 17-08-T-02 Rumble Strips and Stripes on Rural Trunk Highways was issued on August 21, 2017. As a result there are now typical details on the traffic pavement marking website (MnDOT A to Z under “Pavement Markings”...”Pavement marking typical detail sheets”).

These are general details for rumbles. If the typical is modified the designer will need to follow the modification guidelines as stated in the Design Scene Chapter 16 – PAVEMENT MARKING TYPICALS article.

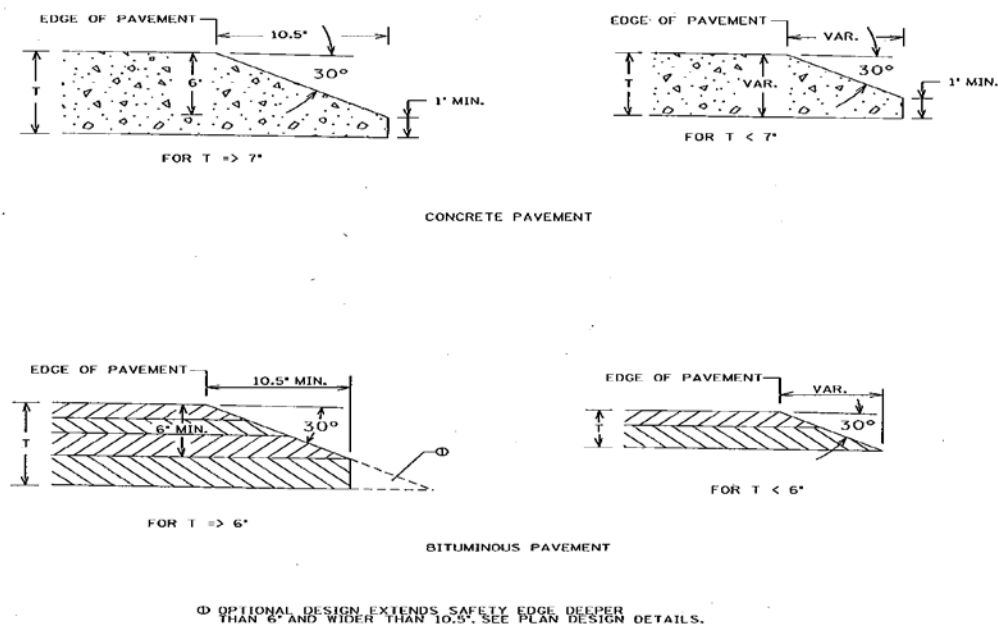
SAFETY EDGE

Technical Memorandum No. 16-01-T-01 dated February 15, 2016 states that ALL Mn/DOT projects will have to include a safety edge if it meets the requirements as outlined in the Technical Memorandum (under guidelines).

Construction of a Safety Edge at the edge of the paved surface significantly reduces the potential of “tire scrubbing” and minimizing the consequences of drifting off the pavement surface.

The safety edge construction is done by shaping the edge of the pavement material with a 30-degree slope during the paving process (measured from the pavement/shoulder cross slope plane).

Payment for the Safety Edge will be included in the Roadway Bituminous quantities.



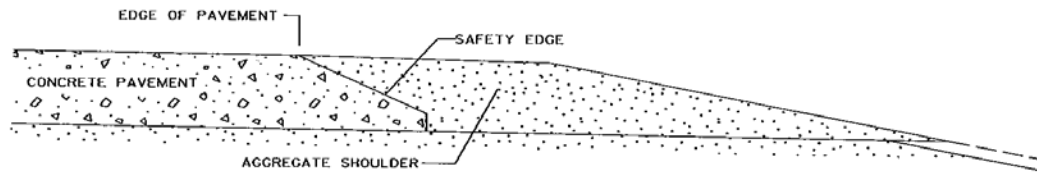


FIGURE A
CONCRETE PAVEMENT

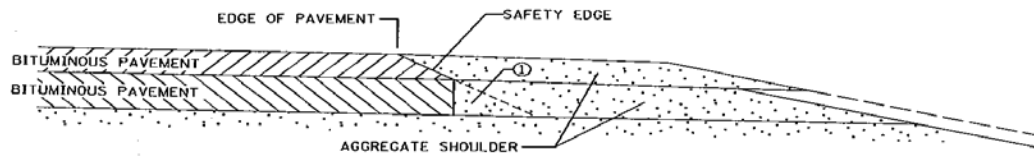


FIGURE B
BITUMINOUS PAVEMENT

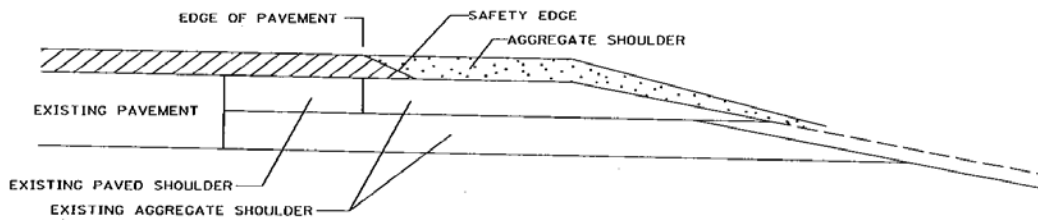


FIGURE C
BITUMINOUS OVERLAY

① OPTIONAL DESIGN EXTENDS SAFETY EDGE DEEPER THAN 6" AND WIDER THAN 10.5". SEE PLAN DESIGN DETAILS.

STANDARD PLAN 5-297.219

There is an error on standard plan sheet 5-297-219 dated February 16, 2016. Until this is corrected the designer will need to cross out the last sentence on note 2...*DR4 JOINTS SHALL BE SEALED*...as this does not apply.

This will be considered a modification and will therefore require that the sheet be signed.

STANDARD PLATE 3006

On all construction plans whenever you have (2501) RC Pipe, (2501) Reinforced Concrete Dissipater Ring, (2502) Reinforced Concrete Pipe, (2503) Reinforced Concrete Pipe Sewer, or (2506) Reinforced Concrete Pipe. Add Standard Plate 3006 to the plan.