



FACILITIES DEVELOPMENT MANUAL

Wisconsin Department of Transportation

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FDM 15-1-1 General

February 15, 2023

1.1 Originator

The Director, Bureau of Project Development is the Originator of this chapter. All questions and comments concerning this chapter should be directed to the following individuals:

- Section 1 (Standards) and 10 (Review) - Proposal Management Section, 608-266-3721.
- Section 5 (Methods) - Methods Development Unit, support.cae@dot.wi.gov.

1.2 Objective

Preparation of contract plans involves preparing a set of detailed drawings showing location and geometric configuration, quantities, and details of work to be performed on a project. The objective of this chapter is to present plan content that will meet the requirements of the Wisconsin Department of Transportation, the Federal Highway Administration, and the contractor.

1.3 Composition

The number and type of sheets is dependent on the type and scope of work. All plans shall be E Submitted as E Plans and shall be 11" x 17". All plans shall be black, white, and gray shade (no color). As a minimum, the following shall be included:

- Title Sheet
- General Notes
- Typical Sections or Detail Sheet
- Miscellaneous Quantities Sheet
- Plan Sheet

Other sheets included as needed:

- Project Overview
- Construction Details
- Plan Details
- Right-of-Way Plat
- Plan and Profile Sheet
- Standard Detail Drawings
- Sign Plates
- Structure Plans
- Computer Earthwork Data (Required When You Have Cross Sections)
- Cross Sections

Sheets may be combined when space permits (e.g. Typical Section and Details).

1.4 Multiple Projects in One Contract

When multiple project I.D.s are included under one contract, the plans may be prepared in separate plan sets for each project, multiple plan sets for multiple projects, or all the projects included in one plan set (max.9 projects per plan set.)

1.5 Numbering of Plans

The numbering system for plans begins with page 1 for the title sheet and increases sequentially through the last page of the plan. Final numbering shall only be completed by the Central Office Plan Examiner when the contract is ready for LET. The title sheet is not numbered.

A system of sections is used to subdivide the contract plan into various subject areas. The sections are identified by numbered tabs in the left and right margins of the plan sheet as shown in [FDM 15-5-5](#). All plan sheets included (except the Title Sheet) shall have these section tabs and be arranged within the plan according to section number. A complete listing of potential contract plan subject areas and associated sections are listed below.

Subject Area	Section
Title Sheet	1
Typical Sections	2
Estimate of Quantities	3
Miscellaneous Quantities	3
Right-of-Way Plat	4
Plan and Profile	5
Standard Detail Drawings	6
Sign Plates	7
Structure Plans	8
Computer Earthwork Data	9
Cross Sections	9

1.6 Typical Section and Detail Sheets

When there are 15 or more typical section and detail sheets (Section 2 sheets) a note showing the order of the sheets should be included in the plan. The note should appear on the first sheet of section 2. This is the preferred order of Section 2 sheets when incorporated into the plan:

- General Notes
- Project Overview
- Typical Sections
- Construction Details
- Intersections
- Interchanges
- Contour Maps
- **Earthwork Matchlines**
- Erosion Control and Drainage
- Storm Sewer and Utilities
- Planting
- Signing
- Lighting
- Traffic Signals
- Pavement Marking
- Traffic Control and Construction Staging
- Fencing
- Alignment

Some of the above sheets may be combined on one sheet as presented in [FDM 15-1-20](#). If combined, the detail highest on the preferred order list shall govern its placement.

FDM 15-1-4 Preliminary Plan

November 15, 2019

4.1 General

A preliminary plan is a graphical representation of the Design Study Report (DSR). It differs from the final plan in purpose since it is intended for designers and reviewers to reach agreement on project concepts whereas the final plan will provide detail for bidding and construction of the project by contractors. Preliminary plans are working documents; hence, they are less formal and are prepared with less detail than are final plans. Because of the varied nature of highway improvement projects, no single set of requirements can apply to all preliminary

plans, therefore, its content should be thoroughly discussed and agreed upon at the project scoping meeting(s).

4.2 Design Process

A preliminary plan should be prepared for every project. Preliminary plans should contain enough detail to prepare a R/W plat, if needed, and to prepare an updated cost estimate and construction schedule. The completed preliminary plan is provided to appropriate staff by region design or consultants for review. It is circulated for review, to gain acceptance of, or receive comments on project concepts prior to submitting the DSR for approval/concurrence. The reviewers are then responsible for returning the comments on preliminary plan(s) to region design, or the consultant, within a specified time. Complete this process prior to approval of the DSR. The preliminary plan is not an approval document for the Bureau of Project Development.

The preliminary plan process typically follows these steps.

1. Prepare the plan in accordance with final scoping document/decision.
2. Circulate the completed preliminary plan and DSR to appropriate staff to review for acceptance or comments. Include local units of government if applicable. Indicate response date so all relevant comments can be addressed during this period.
3. Resolve issues and make necessary changes to the preliminary plan and DSR. Preliminary plan changes may be hand written notes and comments since the preliminary plan is intended to be a working document.
4. Submit the DSR for approval/ concurrence. Preliminary plan sheets may be attached to the DSR as exhibits to clarify details difficult to describe when needed.

4.3 Content

[Attachment 4.1](#) is a list that identifies items that could potentially be included in a preliminary plan. All items unique to a specific project should be added to the list. This list can be used during project scoping to determine the content of the preliminary plan to be submitted.

LIST OF ATTACHMENTS

[Attachment 4.1](#) Preliminary Plan Checklist

FDM 15-1-5 Sample Plan: Improvement Projects

February 15, 2023

This procedure contains examples of plan sheet types. They are illustrated in the linked documents at the end of this section.

The attachments in this procedure have been included as typical examples only and are not intended to cover all situations. They should not be used as standard detail drawings or for establishing project design criteria. See [Chapter 11](#) for detailed design criteria information.

Each subject area is further described by a separate procedure, such as [FDM 15-1-15](#), "Typical Section Sheet." An example Right-of-Way Plat is not included here but is illustrated and described in [FDM 12-15-1](#).

Standard Detail Drawings are illustrated in [Chapter 16](#). Sign plates are shown in the Department's standard sign plate manual:

<https://wisconsin.gov/Pages/doing-bus/local-gov/traffic-ops/manuals-and-standards/signplate/signplate.aspx>

A listing of codes with sizes are shown in the Department's sign code manual:

<https://wisconsin.gov/dtsdManuals/traffic-ops/manuals-and-standards/signcode/signcode.pdf>

Structure Plan Sheets are described in the Bridge Manual.

LIST OF DOCUMENTS

[Sample Title Sheet](#)

[Sample General Notes Sheet](#)

[Sample Project Overview Sheet](#)

[Sample Typical Section Sheet](#)

[Sample Detail Sheet \(Construction Details\)](#)

[Sample Detail Sheet \(Intersection Details\)](#)
[Sample Detail Sheet \(Plan Details\)](#)
[Sample Detail Sheet \(Curb Ramp Details\)](#)
[Sample Detail Sheet \(Pavement Grades\)](#)
[Sample Detail Sheet \(Contour Map\)](#)
[Sample Detail Sheet \(Earthwork Matchlines\)](#)
[Sample Detail Sheet \(Erosion Control\)](#)
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[Sample Detail Sheet \(Traffic Control/Construction Staging\)](#)
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[Sample Detail Sheet \(Alignment\)](#)
[Sample Miscellaneous Quantities Sheets](#)
[Sample Plan and Profile Sheet](#)
[Sample Earthwork Quantities Sheet](#)
[Sample Cross Sections Sheet](#)

FDM 15-1-6 Sample Plan Abbreviated Project

November 15, 2021

Plans for Perpetuation and Rehabilitation with S-1 application Projects and Traffic Maintenance Projects shall be prepared in accordance with [FDM 15-1-5](#). Plans for these improvement strategy type projects having limited scope/complexity may be prepared as abbreviated plans.

The plans should generally only include those plan sheet types necessary to successfully bid and construct the project. The typical types of sheets to include in an abbreviated plan are a title sheet, typical section sheet(s), as needed detail sheet(s), estimate of quantities sheet(s), miscellaneous quantities sheet(s), as needed plan sheets (usually Plan Views), standard detail drawings and structure plans when applicable. Refer to [FDM 15-1-10](#), [FDM 15-1-12](#), [FDM 15-1-15](#) and [FDM 15-1-25](#).

This procedure contains typical examples of the most common plan sheets for these abbreviated plans and are shown in [Attachment 6.1](#), [6.2](#), [6.3](#) and [6.4](#).

Depending on the type of work being completed on any specific project, various Plan Detail Sheets, as shown in the sample sheet documents, may need to be provided to convey specialized information in detail.

LIST OF ATTACHMENTS

Attachment 6.1	Sample Title Sheet-Abbreviated Plan
Attachment 6.2	Sample Typical Section Sheet - Abbreviated Plan
Attachment 6.3	Estimate of Quantities Sheet – Abbreviated Plan
Attachment 6.4	Miscellaneous Quantities Sheet - Abbreviated Plan
Attachment 6.5	Sample Plan Sheet - Abbreviated Plan

FDM 15-1-10 Title Sheets

February 15, 2023

A [Title Sheet](#) is required on all contract plans. An abbreviated example is also illustrated in [Attachment 6.1](#).

Title sheets for Maintenance Projects shall contain the designation Federal Preventative Maintenance Project in the project description area. The designation of Federal Preventative Maintenance Project shall be deleted from title sheets used for Highway Maintenance Projects and Traffic Maintenance Projects.

10.1 Project Title

The project title and subtitle on the title sheet must be consistent with that shown on the DSR, and the Project Summary Screen in FIIPS. Follow the title/subtitle guidelines as set in the Program Management Manual (PMM). Once the DSR is signed the title /subtitle should not be changed.

10.2 Project Numbers

The state project number must appear on the title sheet in the box in the top right corner. This number is assigned by the region planning personnel.

If federal funds are involved, a federal project number is required and will be added by central office in the top right corner with the corresponding state project number(s). Each federally funded project will have its own federal ID.

10.3 Margin Information

Add the following information in the left margin of the title sheet. Data fields have been established in the plan sheet cell files for this information.

Project ID: enter the state project ID number(s) of all projects in the plan set.

County: enter the county(ies) where the work will be done.

With: enter the project ID's of all additional plan sets that will be let with the subject plan set. Enter "N/A" if the contract consists of only one plan set.

10.4 Order of Sheets

This information is for section reference. The plan examiner will line through any sections not used within a plan.

10.5 Location Sketch

A base map of appropriate scale, size, and detail to show nearby cities, villages or other landmarks should be used to identify where the project is located without requiring reference to other maps.

These maps should use one of the scales shown below with the project location accented.

Table 10.1 Project Scales

Rural:	1 inch = 1 mile
	1 inch = 2 miles
	1 inch = 4 miles
Urban:	1 inch = 500 ft
	1 inch = ½ mile

The following items should also be indicated:

Begin Project and End Project: Describe by station or log distance where applicable, and reference line label. The state project number is not required unless there are two or more projects listed on the title sheet.

Coordinates shall be calculated from a survey and shall be shown on all projects at the "Begin Project" location. They shall be referenced to the Wisconsin Coordinate Reference System (WISCRS) or an alternate approved coordinate system (see [FDM 9-5-10](#)). All coordinates shall be grid coordinates and indicated by "Y" and "X".

Equations: Show all station equations greater than 100 feet.

Place Names: Label counties, municipalities, and towns and ranges, as appropriate.

Road Identifications: On small-scale sketches all county, state, and federal highways should be labeled. On larger scale sketches street names within the immediate area of the project should also be shown. The names of all roads and streets that are referred to in the Special Provisions should be shown.

North Arrow: A north arrow is required. It is also required on every plan sheet depicting horizontal or plan layout

where cardinal direction is important.

Scale of Sketch: A graphic scale shall be placed directly beneath the sketch.

Structure Numbers: Structures on which work is to be done shall be described by their structure number and reference line label showing location.

10.6 State Map

Indicate the county or counties in which the project is located by crosshatching the appropriate county areas.

10.7 Design Designation

The Design Designation is required to be shown on all projects except those for which the type of work is unrelated to capacity or traffic volume of the highway (e.g., landscaping, erosion control, signing, lighting, maintenance projects, etc.).

For projects requiring a traffic forecast, complete all entries within the design designation block. Only the current year annual average daily traffic (AADT) is required on projects for which no traffic forecast is required. See [FDM 11-5-2](#) for more information on traffic forecasting.

AADT: Annual Average Daily Traffic (indicate the construction year).

AADT: Annual Average Daily Traffic (indicate the design year, see paragraph above).

DHV: Design Hour Volume (indicate the design year).

D: Directional distribution of traffic (design year).

T: Percent of trucks (indicated as percent of AADT).

(Values for DHV, D and T can be found on the [Traffic Forecast](#) webpage on the [WisDOT](#) homepage)

Design speed: Miles per hour (mph)

ESALS: The number of Equivalent Single Axle Loads (ESALS) the design lane is expected to accommodate during the design life of the project. This value is calculated as follows:

$$\text{ESALS} = 365 \times A \times L \quad \text{where}$$

"A" is the Traffic Analysis Period in years and

"L" is the Design Lane Total ESALS per day.

Both "A" and "L" can be obtained from the WisPave pavement design software. See [FDM 14-15-10](#).

Note: An ESALS value is required on only those improvement projects that include Asphaltic or Concrete pavements. For all other projects just note "N/A."

10.8 Net Length of Center Line

The total net length of center line shall be listed for every contract plan to the nearest thousandth of a mile. To determine Net Centerline, see PMM 05-10-10 Appendix A.

Log distance measured to the nearest one hundredth of a mile may be used as the basis for measuring net centerline length.

List the net centerline length for each project if there are two or more projects.

List 0.000 for the following situations:

- The improvement crosses the project route.
- The improvements are intermittent along the route or routes (spot locations only).
- The improvements involve park roads, institution roads, waysides, or rest areas.
- The improvement involves miscellaneous construction (e.g. highway lighting, pavement marking).
- When dual roadways are built at separate times, the roadway built along the auxiliary reference line will have zero length.
- Maintenance Perpetuation and Rehabilitation with S-1 application Resurfacing projects will have a net centerline length while Perpetuation Bridge and Traffic Maintenance Roadway projects will have 0.000.

10.9 Conventional Symbols

Commonly used symbols are preprinted on the title sheet. Additional symbols may be found in [FDM 15-5-30](#) and should be added below the preprinted symbols on the title sheet when appropriate.

10.10 Signatures

The Department establishes the following meanings for the signatures that appear on the title sheet.

Table 10.2 Title Sheet Signatures

1. Consultant Prepared Plans		
Who	Action	Meaning
a) Consultant	Prepared By	By signing and sealing, the Consulting Engineer is attesting to the engineering integrity and accuracy of the plan, including proper concern for public health, safety and welfare. This action constitutes the practice of engineering and the responsibilities attendant thereto, per Chapter 443 Wisconsin Statutes.
b) Municipality	Accepted	Municipality is accepting the plan as to concept, general intent, general design criteria, line, grade and related details.
c) Region	Approved By	In approving a consultant plan the region is generally approving the concept, general project intent, etc, as well as approving the project for submittal and letting.
2. Department Prepared Plans		
The Department practices engineering and accepts the responsibilities attendant to Chapter 443, Wisconsin Statutes.		
Who	Action	Meaning
a) Region	Prepared By or Checked By	Names (not initials) of persons closest to the work should appear in these blocks. Need not be a Professional Engineer.
	Approved By	Endorses or accepts concept design criteria, and general project intent as being appropriate. region person "in responsible charge of project" should sign. Must be a Professional Engineer. Discretionary – Region Director designates level.
3. Municipality Prepared Plans		
Who	Action	Meaning
a) Municipality	Prepared By	Same as Consultant.
	Accepted	Municipality is accepting the plan as to concept, general intent, general design criteria, line, grade and related details.
b) Region	Approved By	In approving a municipality plan the region is generally approving the concept, general design criteria, general project intent, etc., as well as approving the project for submittal and letting.

10.11 Signature Blocks

All STH and connecting highway P.S.& E.s submitted to central office shall use the signature block shown in [Figure 10.1](#). This includes all construction, traffic and maintenance projects. [Figure 10.1](#) is reserved for WisDOT staff only.

STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION	
PREPARED BY	
Surveyor	_____
Designer	_____
Project Manager	_____
Regional Examiner	_____
Regional Supervisor	_____
APPROVED FOR THE DEPARTMENT	
DATE: _____	_____ (Signature)

Figure 10.1 Signature Block for STH & Connecting Highway Projects

The signature block in [Attachment 10.1](#), Detail B is to be used for projects on local roads:

- Approved by the person in responsible charge in the region as designated by the Region Director.

See [FDM 15-5-5](#) for title sheet cells containing these signature blocks. Other combinations of signature blocks may be required depending upon the circumstances.

The signature block also provides for the names of region personnel directly involved in the preparation and processing of the plans. These must be filled in.

Two other types of signature blocks may also be required, as shown in [Attachment 10.2](#), Details A and B. These blocks should be placed above the standard signature block. Note: When the plans have been prepared by a consultant, the "Original Plans Prepared By" portion of Detail A would be replaced by Detail B.

- Plans Prepared and/or to be Signed by Cities, Villages, Counties or Towns (See [Attachment 10.2](#), Detail A): If the plans were prepared by the city, village, county or town, the signature and professional seal of the professional engineer in responsible charge must be included. The plans shall also be signed by the city, village, county or town official.
- Plans Prepared by Consultants (See [Attachment 10.2](#), Detail B): If the plans were prepared by a consultant, the consultant's name, professional seal, and signature must be included. The consultant's logo may also be shown in this signature block if it does not interfere with the information that is required to be shown on a title sheet.

10.12 Coordinates

Place the following notes on the title sheet based on the coordinate system used in the plan.

- *Horizontal positions shown on this plan are Wisconsin Coordinate Reference System (WISCRS), (County name) County, NAD83 (year), in U.S. Survey Feet. Positions shown are grid coordinates, grid bearings, and grid distances. Grid distances are the same as ground distances.*
- *Elevations are referenced to NAVD 88 (year). GPS derived elevations are based on GEOID (xx)*

The Region Survey Coordinator shall be consulted for proper verbiage when any other coordinate systems are used.

LIST OF ATTACHMENTS

Attachment 10.1	Signature Blocks for WisDOT Projects
Attachment 10.2	Signature Blocks for Local Road Projects

FDM 15-1-12 General Notes, Railroad, and Contacts Sheet

July 13, 2018

Sheet 2 of the plan should always have the Utility Contacts listed. General Notes, abbreviations, and typical sections may be included as space permits or on following sheets.

12.1 General Notes

Information contained in the General Notes is intended to supplement, but should not duplicate, the Special Provisions or Standard Specifications. General notes should not contain material that is properly a part of the Standard Specifications, the Special Provisions, a typical section, a detail, the miscellaneous quantity sheets or

the plan sheets. They should be kept to an absolute minimum. The following is a sample list of general notes that are commonly used:

- No trees or shrubs are to be removed without approval of the engineer.
- Disturbed areas within the right-of-way, except the areas within the finished shoulder points, shall be fertilized, seeded and mulched.
- X-inch HMA pavement shall be constructed with an x-inch upper layer and x-inch lower layer.
- The (paving, grading) contract shall include the backfill for the area behind the curb and gutter (specify appropriate contract when curb and gutter and grading are in separate contracts).
- The locations of existing and proposed utility installations as shown on the plans are approximate. There may be other utility installations within the project area that are not shown.

12.2 Abbreviations

The use of abbreviations in the plan should be kept to a minimum.

Abbreviations found within the plan that would not be readily recognized by the ordinary user of a highway plan shall be shown in an abbreviation listing on the first Typical Section Sheet. Other abbreviations used in the plan shall not be shown on the list. Right-of-way plat abbreviations shall not be included in this listing. [FDM 15-5-25](#) contains a list of standard abbreviations.

12.3 Utilities / Railroads Listing

A list of all utility companies, cooperatives, municipal utilities, and railroad companies whose facilities are located within the right-of-way shall be included on the first general note/utility contact sheet. The following shall be included:

1. Utility name
2. Address
3. Telephone number, including area code
4. Contact person or department
5. E-Mail address for the contact.

For railroad companies, the contact person is their local road master. The above information for road masters is available from either the region rail coordinator or the region project development section.

12.4 DNR Liaison

All projects require a WDNR area liaison, address, E Mail address, and phone number. A link to the WDNR liaison contacts is in [FDM 5-10-1](#).

See [Sample General Notes Sheet](#).

FDM 15-1-14 Project Overview

November 15, 2021

Projects of a complex nature with interchanges, frontage roads and numerous streets and/or side roads should have an overall view of the entire project on one sheet. It should show and label all the highways, streets, ramps, frontage roads, city or village limits, rivers, landmarks and other pertinent information relating to project orientation.

See [Sample Project Overview Sheet](#).

FDM 15-1-15 Typical Section Sheet

November 15, 2021

A [Typical Section Sheet](#) is required on all contract plans other than specialty type projects such as planting, pavement marking and signing, etc. The typical sections for structures are located with the structure plans.

A pavement boring log shall be provided on the typical section sheet for projects containing item(s) such as; Removing Asphaltic Pavement Milling, Pulverize and Relay, or Rubbelizing.

An abbreviated example is also illustrated in [Attachment 6.2](#).

Each typical section sheet shall have a title block along the bottom edge of the sheet. The title block shall include the State Project Number(s), space for a sheet number and title.

An existing typical section shall be shown when work is being done on the pavement or shoulder, the pavement

is being removed or the pavement or shoulder is being used to carry traffic.

A main line finished section shall be shown for all applicable projects. Additional typical sections shall be shown for side roads, frontage roads, ramps, driveways and temporary roads where applicable.

Each typical section shall utilize the following:

- Scale: The width of section shall be selected to provide clarity of detail. A horizontal scale of one-inch equals five feet is often used on plan sheets. The vertical scale is normally exaggerated such as one-inch equals two feet.
- Slopes: This is expressed as a ratio of horizontal distance to vertical distance. All slopes between edges of shoulder and original ground, and those between edge of shoulders in the median should be labeled. Where slopes are variable, maximum and minimum should be labeled also. A typical section should illustrate both cut and fill sections.
- Cross Slope: This is the amount of rise or fall indicated in percent. The gradient of the finished surface, shoulders and subgrade should be indicated.
- Width: The width of lanes, shoulders, roadbed, ditches, clear zone and median should be shown to the nearest tenth of a foot.
- Material Identification and Thickness: The thickness and type of materials constituting the pavement structure such as X" HMA Pavement XXX or X" Base Aggregate Dense 1 1/4-Inch shall be shown. For urban sections, other elements such as sidewalk and curb and gutter shall also be shown. Material thicknesses shall be shown to the nearest one-quarter inch (not decimals).
- The limits of topsoil, salvaged topsoil, fertilizer, seed or sod shall be shown.
- Where variations in material thickness are proposed, these may be shown in tabular form indicating thickness and station limits.
- Pavement ties, tie bars, underdrains, geotextile fabrics, islands, concrete barriers, removals, etc. shall be shown when they are required in the construction.
- Location Limits: Typical sections shall be titled, and stationing limits indicated. Minor equations may be omitted. Station limits need not be shown where there is only one typical section per roadway.
- Vertical and Horizontal Reference: All typical sections in plans containing Plan and Profile information shall show the relationship between the typical section and the grade line profile shown on the Plan and Profile Sheet(s) with a point referred to on profile note. The vertical relationship between the typical section(s) and the cross sections when included in the plan shall also be shown by a point referred to on cross section note unless indicated on the Cross-Section Sheets. Typical sections should also show their relationship to the horizontal alignment reference line.
- Doweled Concrete Pavements: All doweled concrete pavements shall have a notation indicating that dowels are required. An example of such a notation is: Concrete Pavement 10-inch (Doweled).
- Tined Concrete Pavements: All concrete pavements to be tined shall include a notation indicating that tining is required. An example of such a notation is: Concrete Pavement 10-inch (Doweled and Tined).

FDM 15-1-20 Detail Sheets

February 15, 2023

Detail sheets, when needed, immediately follow or are combined with typical section sheets in a contract plan. Information placed on these sheets supplement or complement the plan and profile sheets or other elements of the plan. Details will be referred to as construction details or layout details.

Construction details, when needed, focus on a particular item or associated items in a specialized area. Typical examples of construction details would be concrete steps, riprap, sod, flumes, pipe underdrain and stone walls.

Layout details, when needed, show the detail and layout for a sizeable area of construction. Typical examples of layout details would be intersections, interchanges, contour maps, **earthwork matchlines**, erosion control and drainage, storm sewer and utilities, planting, signing, lighting, traffic signals, pavement marking, traffic control and construction staging, fencing and alignment.

Each detail sheet shall have a title block along the bottom edge of the sheet. The title block shall include the State Project Number, space for a sheet number, and the title of the major item or items shown on that sheet.

Examples of Detail Sheets are illustrated in [FDM 15-1-5](#).

Abbreviated plan special details are not typically required when intersections, guardrail, etc., are not to be upgraded or modified. If any such work is incorporated in the contract, the details should be included.

20.1 Construction Details

Construction details are required for bid items that require detailing not covered in the standard detail drawings or other plan elements.

There is no standard format for construction details. They should be kept simple and should avoid duplication with standard detail drawings or plan and profile sheets. Choose a scale that will sufficiently display the detail. A title is required for each detail. If more than one detail is shown on a sheet the details should be separated by lines.

If control points and associated tie points are not shown on alignment sheets or plan and profile sheets, a construction details showing these shall be added. The control points should be shown graphically with Wisconsin State Plane Coordinate System ground coordinates (N, E) or Wisconsin County Coordinate system coordinates (X, Y) shown on the appropriate sheets.

Certain specialized construction details for projects such as planting, traffic signals, signing, pavement marking, electrical work, rest areas and waysides are available through the Bureau of Traffic Operations and can be obtained upon request.

When a beveled structural plate culvert (circular or arch shape) is used in a plan, a detail should be included which indicates the total structure lengths (top and bottom) given to the nearest foot. Also, to be indicated are span and rise (or diameter), radii of curvatures, skew angle (if not 90° to reference line), plate thickness and corrugation (2-inch x 6-inch etc.), and end treatment (angles of bevel and/or skew). Include details of end protection (sod, riprap, or concrete). Beveled ends should be reinforced with masonry or concrete collars when the bevel is flatter than 2:1 and the skew angle exceeds 20°.

See [Sample Detail Sheet \(Construction Details\)](#).

20.2 Intersection and Interchange

Intersections, other than the standard types shown on the standard detail drawings, shall be shown on detail sheets separate from the plan and profile sheets.

Interchange details shall also be shown on detail sheets separate from the plan and profile sheets.

The intersection and interchange details shall show the pavement and shoulder widths, curb and gutter, curve radii, pavement grades, manholes and inlets, culvert pipe, islands, medians, tapers and other pertinent information. The scale should be 1"=50' or larger.

All interchange details or other layout details not showing the full interchange or layout details on that sheet shall have a small line diagram of the full interchange or layout detail with the detailed portion shown by a darker line or other distinguishing designation on each layout detail sheet.

See [Sample Detail Sheet \(Intersection Details\)](#), [Sample Detail Sheet \(Plan Details\)](#) and [Sample Detail Sheet \(Pavement Grades\)](#).

20.3 Curb Ramps

See [FDM 11-46-10](#) for design requirements of curb ramps including a discussion of incorporating the Standard Detail Drawings (SDD 8D5) and curb ramp detail sheets that contain site specific dimensions, elevations, and grades into the plan. Per [FDM 11-46-10.2.1](#), curb ramp detail sheets are required for work on curb ramps. Curb ramp detail sheets shall show location information, elevations, slopes, an elevation table, general notes, and other pertinent information that the designer deems important to curb ramp construction.

See [Sample Detail Sheet \(Curb Ramp Details\)](#).

20.4 Contour Maps

Contours may best exhibit the finished grade elevations of intricate work such as intersection areas, rest areas, waysides, interchanges, special landscape grading, and special drainage grading.

Special contour maps, when provided, should include the existing features and the finished contours of the proposed improvement. Contour lines should not obscure pertinent topographic or design features. The contour lines should be labeled at the appropriate intervals.

See [Sample Detail Sheet \(Contour Map\)](#).

20.5 Earthwork Matchlines

Interchanges and complex intersections should have an **earthwork matchline** detail for use in computing cut and fill yardage. The details may be shown separately on a detail sheet or combined with another detail. It should show the stationing and distances to the matchline and other pertinent information necessary to compute the cut

and fill yardage. This detail is not necessary if the matchlines can be properly shown on the cross sections.

See [Sample Detail Sheet \(Earthwork Matchlines\)](#).

20.6 Erosion Control and Drainage

Erosion control and drainage shall be shown on separate detail sheets or on the plan sheets. Projects with complex erosion control and drainage patterns, such as interchanges, should be shown on a separate detail sheet. The detail should show the drainage pattern with direction of flow, drainage structures and erosion control features. Erosion control features consist of silt fence, erosion mat, erosion bales, sod, reinforced sod, riprap, intercepting embankments, ditch dikes, paved flumes and other necessary erosion control items. The slope intercepts should also be shown. See [FDM 10-5 Attachment 60.1](#) for a checklist of items required in an erosion control plan.

See [Sample Detail Sheet \(Erosion Control\)](#).

20.7 Storm Sewer and Utilities

The plan and profile of storm sewers and utilities shall be shown on detail sheets separate from the plan and profile sheets.

The plan view shall show the location of manholes and inlets, existing underground utilities, storm sewers and other information pertinent to the storm sewer system. The scale should normally be 1"=50' or larger.

The profile shall show the existing ground, existing utilities if available, flow line grades, the profile of the storm sewer, manholes and inlets, the size, type and grade of the storm sewer, and the manhole and inlet grades. The scales should normally be 1"=50' horizontally and 1"=5' vertically or larger.

See [Sample Detail Sheet \(Storm Sewer Plan/Profile\)](#).

20.8 Planting

Planting is the furnishing and planting of trees, shrubs, vines, perennial plants and special seed mixtures.

When planting is included under a contract with other construction operations such as grading, base, paving, etc., the planting shall be shown on detail sheets separate from the plan and profile sheet. The planting may be combined with other details such as intersection and interchange details, when appropriate.

If the planting is let as a separate contract, the planting layout detail sheets will become the plan sheets.

Planting layout details shall show the location of plants and plant beds, species and size of plants, the quantity of each planting, root condition and other pertinent planting information. The common name for trees, shrubs and vines shall be used on the planting layout details and shall be referenced to the plant data chart.

See [Sample Detail Sheet \(Planting\)](#).

20.9 Permanent Signing

When signing is included under a contract with other construction operations such as grading, base, paving, etc., the signing shall be shown on detail sheets separate from the plan view or plan and profile sheets. The signing may be combined with other details such as intersection and / or interchange details, when appropriate.

If signing is let as a separate contract, the signing layout detail sheets will become the plan.

A pictorial drawing of the signs shall appear on the sign layout sheets. A legend with pictorial drawings on each sign layout sheet is also acceptable. Each sign pictorial drawing shall be designated by standard sign code as shown on the department's Sign Plate book. Number each sign location on the sign layout sheet to refer to the signing miscellaneous quantities. Show the sign size and/or sign size code below the sign code. Specialized or additional information about a sign can be shown on either the miscellaneous quantity sheet or the sign layout sheet. Notes showing existing signs, moving signs and removing signs should appear on the signing plan sheet only.

Permanent signing miscellaneous quantities shall show a location referencing the sign to the sign layout sheet; a sign offset distance for Type 1 signs only (if applicable), sign code, sign size, sign message, and all applicable signing and post quantities. Any remarks/comments concerning permanent signing can be noted in the miscellaneous quantities or on the signing plan sheet. Contact the region signing/marketing Engineer for miscellaneous quantity preferences.

See [Sample Detail Sheet \(Permanent Signing\)](#) and [Sample Miscellaneous Quantities Sheets](#).

20.10 Lighting

When lighting is included under a contract with other construction operations such as grading, base, paving,

etc., the lighting shall be shown on detail sheets separate from the plan view or plan and profile sheets. The lighting may be combined with other details such as the intersection and/or interchange details, when appropriate.

If the lighting is let as a separate contract, the lighting layout detail sheets will become the plan sheets.

Lighting lay-out details shall show the location of conduits, cables, wires, concrete bases, poles, mast arms, luminaries, transformers, pull boxes, circuits, pole identification numbers, lighting unit codes, control cabinets, existing electrical facilities and other pertinent lighting information.

See [Sample Detail Sheet \(Lighting\)](#).

20.11 Traffic Signals

Traffic signal layout details shall be shown on detail sheets separate from the plan view or plan and profile sheets.

The traffic signal detail shall show the location of pull boxes, controllers, concrete bases, conduit, standards, poles, mast arms and loop detectors; the location, arrangement and direction of signal heads; the size of such items as conduit, loop detector, etc; and other pertinent traffic signal information.

State owned traffic signals shall be signed (initialed) and dated by both the Region Signals Engineer and the State Traffic Signals Systems Engineer.

Sequence of operation, controller logic, detector logic and cable layout shall be shown in tabular form.

See [Sample Detail Sheet \(Traffic Signal Plan\)](#) and [Sample Detail Sheet \(Traffic Signal Phasing\)](#).

20.12 Pavement Marking

When pavement marking is included under a contract with other construction operations such as grading, base, paving, etc., the pavement marking shall be shown on detail sheets separate from the plan view or plan and profile sheets. The pavement marking may be combined with other details such as the intersection and/or interchange details, when appropriate.

If the pavement marking is let as a separate contract, the pavement marking layout detail sheets will become the plan sheets.

Intersections, gore areas, parking lots, paved medians and lanes with words and arrows are typical areas where pavement marking layout details are required.

On resurfacing contracts where there is no change in either the horizontal or vertical alignments or the gravel or paved shoulder are not changed the Locating No Passing Zone bid item typically can be omitted. Before omitting the No Passing Zone bid item contact the region marking engineer to confirm no safety issues exist that may warrant including the Locating No Passing Zone bid item.

On contracts that contain changes in horizontal or vertical alignment or changing the width of shoulder include the Locating No Passing Zone and Moving Signs Type II bid items to the contract. On contracts that contain the Locating No Passing Zone bid item and have a 55 mph posted speed, the designer **shall** contact the Region Signing/Marking Engineer to determine the correct No Passing Zone Sight Distance to be used. STSP 648-005 **shall** be inserted into the Special Provisions with the correct No Passing Zone Sight Distance for 55 mph posted speed roadways.

See [Sample Detail Sheet \(Pavement Marking\)](#).

20.13 Traffic Control/Stage Construction

Traffic control/stage construction details shall be included in all plans except where the necessary information is provided by the standard detail drawings. These details shall be shown on detail sheets separate from the plan view or plan and profile sheets. These details shall include the location of traffic control signing, pavement markings, drums, barricades, safety barriers, arrow boards, temporary pavement marking, construction areas, direction of traffic and other pertinent traffic control information. Traffic control devices that are in place and the party responsible for their maintenance should be noted on the details.

The location of established detours shall be shown on the traffic control/stage construction layout details. Work being performed on the detour by parties other than the contractor should be noted on the details.

The sign layouts and sign code numbers used in the traffic control layout details shall be in accordance with the Federal Highway Administration Manual of Standard Highway Signs. If a desired sign is not contained in the Manual, then a department sign plate shall be specified.

Usually all warning signs in construction zones have an orange background. The Federal Highway Administration Manual of Standard Highway Signs lists most of the orange background signs commonly used in construction zones with a beginning sign code of "W". However, there are signs with other background colors listed in the Manual with a beginning sign code of "W" that may be used in construction zones. These signs shall be labeled with a beginning code of "WO".

The traffic control/stage construction layout details shall include the following notes when appropriate.

1. All signs are 48-inch x 48-inch unless otherwise noted. (This note may be used in place of labeling the size of each sign. Any other size of sign must be individually labeled.)
2. "WO" signs are the same as "W" signs except the background is orange.

See [Sample Detail Sheet \(Traffic Control/Construction Staging\)](#) and [Sample Detail Sheet \(Detour\)](#).

20.14 Fencing

Fencing layout details shall be included on projects where the right of way is required to be fenced. The details may be shown on separate detail sheets, combined with other details or shown on the plan sheets. The location of the fence shall be referenced with dimensions to the reference line or right of way line.

20.15 Alignment

For projects with complex alignment, such as interchanges, a separate alignment detail shall be included. The detail should show reference lines, survey lines, stationing (and equations), points of intersection, points of curvature, points of tangent, bearings, curves, etc. Curve data, offset data, coordinates referenced to the Wisconsin Grid Coordinate System, ties, and other pertinent data should also be included.

The control points shall be shown graphically with Wisconsin State Plane Coordinate System ground coordinates (N, E) or Wisconsin County Coordinate System coordinates (X, Y) so the initial layout construction staking can be performed.

See [Sample Detail Sheet \(Alignment\)](#).

20.16 Other Details

Layout details may also be required showing environmentally sensitive areas, soil boring or sounding locations, pipe underdrain and other pertinent information necessary for the bidding of the contract and construction of the highway. These details may be combined with other details, when appropriate.

FDM 15-1-25 Estimate of Quantities Sheet

November 15, 2021

An Estimate of Quantities Sheet is required for all bid contract plans. It is prepared by the Central Office Plan Examiner and inserted into the final plan. The Estimate of Quantities is a listing of all the bid items in the project(s) and their respective quantities. A sample is shown in [Attachment 6.3](#).

For Local Force Account and state forces contracts, the Estimate of Quantity list shall be manually prepared as shown in Figure 25.1. It shall be a one lump sum item for the type of work that is being performed. The list should be placed in a convenient place on the title sheet or second sheet of the plan.

Item Title		TRAFFIC SIGNALS
	Item No.	SPV.0105.01
	Unit	LUMP SUM
PROJECT 2290-01-02		1
Total		1

Figure 25.1 Estimate of Quantities

FDM 15-1-30 Miscellaneous Quantities Sheet

November 15, 2021

Miscellaneous quantities sheets are required on all projects that have bid items needing a detailed breakdown. See [Sample Miscellaneous Quantities Sheets](#) for an example of miscellaneous quantities sheets.

Each miscellaneous quantities sheet shall have a title block along the bottom edge of the sheet. The title block shall include the State Project Number(s) and space for a sheet number. If the title Miscellaneous Quantities is not preprinted on the sheet, it should be included in the title block.

A detailed breakdown of bid items is required to readily show the location, size, quantity and other pertinent information. It is needed to supply information to those who review the plans, bid the contract, supply materials, construct the project, etc. Examples of work requiring detailed breakdown of bid items on the miscellaneous quantities sheet are removals, earthwork, bases, pavements, drainage structures and incidental construction items. These listings shall be placed on the miscellaneous quantities sheet in numerical order of their bid item numbers beginning at the top left of the first sheet.

A detailed breakdown of structure items should be shown on the structure plans and not repeated on the miscellaneous quantity sheets.

Bid items such as Finishing Roadway, Maintenance and Repair of Haul Roads, Mobilization and some other lump sum items are not required to be shown on the Miscellaneous Quantities Sheet. "Lump Sum" or "Each" items such as Grading and Shaping Intersections or Grading Shaping and Finishing for Barrier Terminals shall be shown with the estimated quantities of materials incorporated into the item.

If a bid item is included in more than one category in the estimate, the distribution of the item by categories shall be shown on the miscellaneous quantities sheet. A subtotal for each category shall also be shown as well as an overall total for the bid item. See [Figure 30.1](#).

The bid items shall also be separated by construction stages and projects. Bid item subtotals shall be shown for each project.

The typical format for a given item should include the bid item number, description, unit of measure, quantity, category, project number (if more than one project), construction stages, remarks, and any other information that may clarify the quantities. When showing categories, show the complete four-digit category number (e.g., 0010, 0020, etc.).

A detailed earthwork summary table shall be shown in the miscellaneous quantities section of the plan for all projects involving grading. The earthwork summary table is a summary of the data from all of the earthwork data tables and identifies the contract quantities of all earthwork bid items. Each earthwork data table should be represented by one line in the earthwork summary table. The earthwork summary should identify for each segment: earthwork division, station to station location, applicable volumes of common excavation (cut and EBS excavation), salvaged/unusable pavement, available material, marsh excavation, rock excavation, reduced marsh in fill, reduced EBS in fill, expanded marsh backfill, expanded EBS backfill, expanded rock, unexpanded fill, expanded fill, mass ordinate, waste, borrow, and any comments needed to clarify the information in the table. If a project includes more than one division of earthwork, each division will be identified and treated as a separate entity in the earthwork summary table.

The following is further clarification on each of these columns in the earthwork summary table:

1. **Division** - Typically a project will only have one earthwork division. Staging needs or physical barriers may require a project to be separated into more than one division.
2. **Station to Station and Location** – Identifies the segment of the earthwork being analyzed in the line of the summary table. Each line in the summary table will correspond to the totals for each earthwork data sheet.
3. **Common Excavation (Cut and EBS)** – Cut includes the sum of all items, except EBS, that are paid for as common excavation (also includes all salvaged/unusable pavements). EBS includes the volume of any identified or estimated excavation below subgrade (EBS). Both "cut" and "EBS" are paid for as common excavation.
4. **Salvaged / Unusable Pavement material** – Include this column only if there is salvaged / unusable concrete or asphalt pavement that is included in the common excavation. This column identifies the quantities of any salvaged or other concrete or asphalt pavement that will not be used in the fill.
5. **Available Material** – Include this column only if there is salvaged/unusable pavement that will not be used in the embankment. This includes only the portion of the cut that is available to be used in the embankment. (Salvaged/unusable pavements that will not be used in the embankment are subtracted from the "cut").

6. **Marsh Excavation** – Include this column only if there is marsh excavation specified in the contract.
7. **Rock Excavation** – Include this column only if there is rock excavation specified in the contract.
8. **Reduced Marsh or EBS in Fill** – Include these columns only if marsh or EBS excavation will be used in the fill outside of the 1:1 slope. These columns identify the volume that the marsh or EBS will occupy in the fill.
9. **Expanded Marsh Backfill** – Include this column only if there is marsh excavation identified in the contract. This column identifies the volume of material required to backfill the marsh. This accounts for the shrinkage of the backfill material, the displacement of the marsh during the excavation and backfilling process, and the placement of one foot of select borrow or granular backfill placed above the marsh if the contract specifies granular backfill or select borrow for the marsh. The expanded marsh backfill is computed by multiplying the volume of marsh excavation times the marsh backfill expansion factor. If granular backfill or select borrow is specified for backfilling the marsh, this represents the quantity of the granular backfill or select borrow to backfill the marsh and is not included in the mass ordinate. If common or borrow is designated to be used as backfill, this quantity is used in the mass ordinate.
10. **Expanded EBS Backfill** – Include this column only if there is EBS specified in the contract. This column identifies the volume of material required to backfill the EBS. This volume is computed by multiplying the volume of EBS times the EBS expansion factor. If the contract specifies granular backfill or select borrow for backfill of EBS, this represents the required quantities of the granular backfill or select borrow required to backfill the EBS and is not included in the mass ordinate. If common excavation or borrow is specified to be used to backfill the EBS, this quantity is used in the mass ordinate.
11. **Expanded Rock** – Include this column only if there is rock specified in the contract. The expanded rock is the volume that the rock excavation will occupy in the fill. This volume is computed by multiplying the volume of rock excavation times the rock expansion factor.
12. **Unexpanded Fill** – This is the volume of fill identified in the earthwork data sheets for the segment being analyzed.
13. **Expanded Fill** – This is a visualization of the fill expanding to account for the percent increase in the volume of cut and / or borrow excavation, as measured in its original location that is needed in the fill. This is computed by multiplying the unexpanded fill (minus all rock, EBS, and/or marsh designated as fill) times the fill expansion factor.
14. **Mass Ordinate** – Indicates the volume of excess or deficient excavation required for the segment being analyzed. The mass ordinate is computed by deducting the expanded file from the "Available Material" or "Cut" if the "Available Material" column is not used. A plus value indicates the volume of waste, a minus value indicates the volume of borrow that is needed to complete the line segment being analyzed.
15. **Comments** – This column is used for any comments that are needed to clarify the information on the data sheet.

It is recommended that the earthwork be designed and computed using the Civil 3D “Earthwork Process” and that the earthwork summary table, in the miscellaneous quantities section of the plan, be created using the excel spreadsheet in [FDM 11-5-10](#). If this process is not used, the computations and the earthwork summary table must be similar and identify the same information.

The quantities on the earthwork summary table, in the miscellaneous quantities section of the plan, should be compared to the quantities on the earthwork data sheets. The earthwork summary table shall also include any comments or notations needed to supplement or clarify the information contained in the table. All discrepancies between the earthwork summary table and the earthwork data sheets should be explained in these notes.

An example of the earthwork summary table is illustrated in the [Sample Earthwork Quantities Sheet](#).

Miscellaneous areas of asphaltic pavement such as driveway aprons, side roads, etc. should be included on the miscellaneous quantities sheet under the appropriate bid item. Example: 10 P.E.'s at 5 ton = 50 tons. Whenever a plan includes the installation of culvert pipe, it shall be listed on the Miscellaneous Quantities Sheet. The pipes shall be listed under separate headings entitled Cross Drains and Minor Side Road, Private Entrance, and Slope Drains. The pipe culvert list should include, as a minimum, the pipe location, quantity and materials information necessary for ordering the drainage items. The required thicknesses of metal culvert pipe and the class of concrete culvert pipe should be clearly shown. If corrugated metal pipe with 3-inch x 1-inch corrugations is required, or if there are culvert pipes requiring Class B bedding, this should also be indicated. When Structural

Plate Pipes or Structural Plate Pipe Arches are used, the end treatment information on the culvert list should be supplemented with a drawing on the detail sheet as per [FDM 15-1-20](#).

BASE AGGREGATE DENSE 1 ¼ - INCH		
CATEGORY	LOCATION	TON
0010	200+25 – 230+31	10 398
0010	30+90'G' – 39+40'G'	3294
<u>Sub-total (0010)</u>		13 692
0020	15+18'Y' – 16+05'Y'	543
0020	14+12'H' – 16+10'H'	2003
<u>Sub-total (0020)</u>		2546
Project total		16 238

Figure 30.1 Sample Miscellaneous Quantities by Category

FDM 15-1-35 Plan View or Plan and Profile Sheet

November 15, 2021

A plan and profile sheet is required on most Rehabilitation and Modernization Improvement Strategy contract plans. A plan view sheet is typically all that is needed on Perpetuation and Rehabilitation with S-1 application contract plans. An example is illustrated in the [Sample Plan and Profile Sheet](#) and in [Attachment 6.3](#). The CADDs and Civil 3D programs produce sheets with different borders and title blocks than are shown in the above examples but they are acceptable.

Each Plan View or Plan and Profile Sheet shall have a title block that shall include the State Project Number(s) and space for a sheet number. This title block is along the bottom edge of the sheet.

When abbreviated plan sheets are necessary, they may be prepared as conventional plan sheets or as line diagrams. The plan sheets should include the centerline stationing, structure notations, stationing of exceptions and equations and side road locations. Log distance may be used in lieu of centerline stationing on highways where centerline stationing cannot be established from existing plans or surveys.

Superelevations are typically not revised with a maintenance overlay so curve and superelevation data is not required unless changes to the superelevation rate are proposed.

35.1 Scales

The scale to be used for plan and profile sheets should be adequate to show the necessary details. This is governed by the topography to be shown and the complexity of the work. Plans should be drawn to a horizontal scale of one-inch equals 100 feet, 50 feet or 20 feet. A scale of one-inch equals 20 feet is normally used for an urban project.

Profiles shall be drawn to the same horizontal scale as the plan, but the vertical scale is usually ten times that of the horizontal scale.

35.2 Plan Requirements

The plan shall show the centerline or other reference line of the proposed roadways, side roads, interchange ramps, frontage roads, rest areas, etc. When the centerline of the proposed roadway is not coincident with the survey base line, their relationship should be indicated unless the relationship is indicated elsewhere. Where independent centerlines or reference lines are used, only the general relationship between the two should be indicated.

Stationing - Stationing of all roadways shall increase from south to north or west to east based on the cardinal direction of the highway route.

When multiple alignments are required (ramps, alternate alignments, etc.) an identifier is often used to label each alignment. These alignment identifiers shall consist of 1 or 2 upper case alpha characters – no numeric characters. The format shall show the alignment identifier following the numeric stationing, e.g. 123+45 XX where XX is the alignment identifier.

Bearings - The bearing of all centerlines or reference lines shall be shown.

Station Equations - Station Equations shall be shown.

Begin Project and End Project Locations - Begin Project and End Project Locations should be noted and described by stationing or log distance where appropriate. The State Project Number should also be given if two or more projects are in a contract plan.

Begin Construction and End Construction Limits - Begin Construction and End Construction Limits should be indicated if different than Begin and/or End Project Locations. The construction limits for side roads should also be shown.

Coordinates - Coordinates referenced to the Wisconsin Coordinate Reference System (WISCRS) or approved coordinate system shall be shown for the beginning of all projects. If the centerline was tied to the Wisconsin Coordinate Reference System by a field survey traverse, the coordinates for points of intersection (PI's) and the end of the project shall also be shown.

Curve Design Data - Curve Design Data are required unless indicated elsewhere. Curve data should include the following:

- PI station
- < (Deflection Angle)
- Delta
- T (Tangent)
- L (Length)
- R (Radius)
- SE (Superelevation)
- RO (Runoff)
- SE Transition

PI grid coordinates (Y, X,) in the Wisconsin County Reference Coordinate System or an approved alternate coordinate system (see [FDM 9-5-10](#)) should be included except on resurfacing projects.

Right-of-Way - Right-of-Way shall be shown when the project contains construction impacts outside or very close to the existing road right-of-way. Dimensioning is required only if a right-of-way plat has not been included as part of the plan. The boundaries and dimensions of all construction permits shall be shown. Also show property lines and the names of property owners.

If the plan sheet is also being used as a right of way plat, see [FDM 12-15-5](#) for additional plan sheet requirements.

Slope Intercepts - shall be shown when applicable.

Topography - Topography and other features influencing the proposed construction shall be illustrated. Included are such items as streams, marshes, woods, fences, railroads, utilities (see [FDM 18-10-25](#)), drainage facilities, driveways, roads, streets, airports, buildings on or near the right-of-way and other pertinent features.

Show the names of streets, highways, railroads, airports, cities, villages, etc. Some plans show multiple utility lines of the same type (telephone, gas, electricity, etc.) but owned by different entities. In this case show the name of the owning entity near their line.

North Arrow - shall be shown.

Bench Marks - Bench Marks should be indicated when appropriate. Specialty projects such as planting and signing generally do not require benchmarks. Benchmarks should be described by location, station-offset, description, and elevation.

Special Areas - Special Areas such as interchanges, rest areas, and wide medians should be shown, including separate survey control lines as necessary. Details for these areas shall be shown on separate layout detail sheets.

Combustible Fluids - In order to more readily identify pipelines carrying combustible fluids, the use of the "CAUTION" symbol shown in [FDM 15-5 Attachment 30.2](#), is required on all contract plans. Within the highway right-of-way all pipelines carrying natural, manufactured, or liquefied petroleum gases, or any other combustible or explosive fluids shall be so identified. This includes identifying the location of all flush or below ground appurtenances such as valve and regulator pits. Additional notes may be added such as depth, pressure, location, pipe size, pipe type, etc.

Removing Culvert Notations - notations are required and shall include the station, size, type and disposition of the culvert. An example is given below.

Station 132 + 11 Remove 1-24" CMCP

Public Survey Landmark locations - locations within the right of way shall be shown.

Environmentally Sensitive Areas - and areas that are not to be disturbed shall be shown.

Intersections and Curb Ramps - The type of intersections and curb ramps as shown in the standard detail drawings shall be shown unless covered by a general note.

35.3 Profile Requirements

Profiles of both the proposed grade line and existing surface grade shall be shown when applicable. These may be supplemented with profiles of existing rock, marsh, existing roadway surfaces, special ditches, side roads, etc., as appropriate. On complex projects, some profiles may be shown on separate sheets. The proposed grade line shall be drafted as the dominant line, with the percentage of gradient and vertical curve information shown. Stationing and elevations should be indicated on the profile grid. All profile stationing shall be shown increasing from left to right on the sheet.

Original Surface Elevations are optional.

Proposed Grade Elevations shall be shown at all 100-foot stations when applicable.

Profile Notation should indicate if the proposed grade line represents the surface or subgrade unless it is indicated on the typical section.

Structures - The clearance and cross section of the intersecting roadway, railroad, or streambed at each existing and proposed structure should be illustrated.

A structure notation including the location, structure number, structure type, span lengths, clear roadway width and skew angle shall be shown on the profile. An example is given below.

Structure notations shall also be included for sign bridges, retaining walls and high mast lighting foundations.

Station 109 + 50 Structure B-60-47 Required 2 Span 48" Continuous Welded Plate Girder 40' Clear Roadway Skew 3° RHF
--

A notation is also required for old structures that are being removed. This notation should include the location, structure number, span length, width and type of structure. It may be shown on either the profile or plan portion of the sheet. An example is given below.

Station 10 + 00 Remove Structure P-12-79 Single Span Steel Pony Truss 40' Overall Length 14' Overall Width
--

Culverts - A culvert notation for cross drains including the location, number, size and skew angle shall be shown on the profile. An example is given below.

Station 240 + 50 1-36" CPRC Required Skew 20° RHF

The graphic location of the culvert shall be drawn on both the plan and profile portions of the sheet.

Balance Points show the location of all earthwork balance points, together with associated earthwork volumes, shrinkage and swell¹. If earthwork is to be performed by stages, the balances for each stage shall be shown. The earthwork volumes shall be absolute volumes before the shrinkage or swell has been applied.

Separating Plans and Profiles - In some cases it may be desirable to place plan data and profile data on separate sheets. Examples are interchanges and complex urban projects. On Perpetuation and Rehabilitation with S-1 Application projects and Traffic Maintenance Type project profiles are not required. Examples are

¹ Unless a computer earthwork data sheet is provided, or sufficient data is given in the earthwork summary in the miscellaneous quantities to cover balance points.

resurfacing, signing, and planting projects.

FDM 15-1-36 Standard Detail Drawings

November 15, 2019

The standard detail drawings to be inserted into the plan shall be selected in the Standard Detail Drawing Spreadsheet, see [FDM 15-5-15](#). Central Office Plan Examiners, will insert the details into the final plan. See [FDM 19-40-1, Exhibit 1.2](#) for Standard Detail Drawing usage guidance.

FDM 15-1-37 Sign Plates and/or Sign Details

November 15, 2019

The Plan Letter (see [FDM 19-10-15](#)) shall include a notice that central office will insert sign plates if required. No listing of sign plates is provided in the plan. Bureau of Traffic Operations will review the project and provide the Central Office Plan Examiner the department permanent sign plates, along with traffic control signs plates, to be insert into the final plan. Special Sign Plates are to be requested from Bureau of Traffic Operations using the Sign Request Form and emailing DOTBTOSigndetails@dot.wi.gov a minimum of three weeks prior to PS&E Submittal.

FDM 15-1-40 Earthwork Data Sheet

November 15, 2021

The earthwork data sheets, immediately preceding the cross sections in the plan, should be used to identify the following applicable information for each station or incremental station identified in the cross sections:

1. Incremental end areas, incremental volumes, cumulative volumes, expanded volumes and expansion factors for; cut, fill, marsh excavation, rock excavation, and EBS. If marsh and/or EBS are designated to be used in the fill outside of the 1:1 slope, the fill reduction factors and the resulting marsh and/or EBS fill should be identified.
2. Cumulative mass ordinate.

Materials or conditions that may affect the end areas include salvaged pavement, pavement removal, select materials in the upper portions of the subgrade, marsh or EBS placed in the embankment, staged construction, suitability of some common excavation in early or late season construction, suitability of rock excavation or pavement removal items in shallow fills, as well as storm sewer excavation and miscellaneous structure excavation that will be incorporated into the fill. If these materials or conditions are not accounted for in the cross sections, volume corrections must be made in the earthwork summary sheet. The suitability of the material used should be discussed with the regional soils engineer.

If the project involves staged construction or multiple earthwork divisions, the earthwork for each stage or earthwork division should be analyzed separately. Each stage or earthwork division should have a separate earthwork data table.

It is recommended that the earthwork be designed and computed using the Civil 3D “Earthwork Process” and that the earthwork data tables be created using the excel spreadsheet in [FDM 11-5-10.4](#). If this process is not used, the computations and the earthwork data tables must be similar and identify the same information. Note, if subgrade improvement is being used the designer should calculate earthwork quantities using the bottom of the subgrade improvement as the top of the earth subgrade. Excavation for subgrade improvement is included as part of the common excavation.

An example of earthwork data table is illustrated in [Sample Earthwork Quantities Sheet](#). The following is further clarification of each of the columns in the earthwork data table:

1. Station – Include all stations and incremental stations that are included in the cross sections.
2. Area (SF) – Include the end areas for all cut, fill, marsh, rock and EBS that is included in the cross sections. Include in the table, only the columns that apply to the project being considered. If the end areas for the “salvaged pavement/unusable material” are shown on the cross sections, these end areas should also be shown. An optional method of computing the “salvaged pavement/unusable material” is to do a length multiplied by width multiplied by depth volume calculation for the “incremental volume” column.
3. Incremental Volume – This is a computation of the volume for each end area column included in item 2 above. These are unadjusted values and do not include any expansion or shrinkage factors.
4. Cumulative Volumes – These are the cumulative volumes, with all volume correction factors applied for all of the columns identified in the “incremental volume”. In addition, any marsh or EBS that is designated to be used in the fill outside of the 1:1 slope will be identified with the shrinkage factor

applied. Marsh and EBS backfill will also be identified with the expansion factor applied.

5. Mass Ordinate – The mass ordinate indicates the cumulative volume of excess material (+ value indicates waste) or deficient material (- values indicate borrow) required to complete the fill.

FDM 15-1-45 Cross Section Sheets

November 15, 2022

Cross section sheets are required in contract plans that have the following bid items:

- Common Excavation
- Marsh Excavation
- Borrow Excavation
- Rock Excavation
- Fill being measured in place

The normal cross section interval shall be 100 feet. For urban projects, a 50-foot interval should be used. Additional cross sections shall be provided at the following locations:

- Begin and end transitions to horizontal and vertical geometry changes to proposed work. Examples of this include:
 - o Begin and end of lanes and shoulders and their slope transitions
 - o Begin and end of subgrade, side slope, and pavement transitions
 - o The beginning of the 15:1 taper, and posts 1, 5, and 9 of [Midwest Guardrail System \(MGS\) Energy Absorbing Terminal](#)
- Spot location features that impact roadway geometry. Examples of this include:
 - o Entrances (driveway may be half-section)
 - o Culverts crossing the cross-sectioned roadway
- Significant changes in the existing terrain between regular cross section intervals

Each sheet shall provide a direct reading grid pattern background, either by the use of a weighted dot pattern or a weighted/screened line pattern.

Each cross-section sheet shall have a title block along the bottom edge of the sheet. The title block shall include the state project number and space for a sheet number.

See [Sample Cross Sections Sheet](#).

45.1 Scale

Horizontal and vertical graphic scales shall be shown on each cross-section sheet in the lower right corner. The scales most commonly used are shown below. These scales are for 22" x 34" sheets, double the scale for 11" x 17" sheets. Example: 1"=10' Horz and 5' Vert on 22" x 34" sheets is 1"=20' Horz and 10' Vert on 11" x 17" sheets.

Table 45.1 Cross Section Sheet Scale Combinations

Scales	1"=10' Horz	1"=10' Horz	1"=5' Horz	1"=5' Horz
Project Type ↓	1"-10' Vert	1"=5' Vert	1"=5' Vert	1"=2' Vert
Rural	X	X	X	X
Urban	X	X	X	X
Roadside Development	NOT ACCEPTABLE	X	X	X

For consultant designed projects the choice of a scale should be determined during project scoping.

45.2 Earthwork Block

The earthwork block shall contain stationing, absolute volumes for excavation by type, absolute fill volumes and sheet totals or other appropriate totals and subtotals. The excavation shall be tabulated by the bid items used in the contract. If an Earthwork Summary Sheet(s) is shown in the contract plan, the earthwork block may be omitted.

The earthwork volumes shall be absolute volumes before the shrinkage or swell has been applied.

45.3 Cross Section

Each cross section shall show the original ground line with a lightweight dashed line and the proposed cross section with a heavy weight solid line. The cross sections shall be drawn to show the finished slopes, including any topsoil or salvaged topsoil that will be placed on them. Do not show topsoil or salvaged topsoil as separate items in the cross sections and do not adjust cross sections to remove topsoil or salvaged topsoil from the final slopes or earthwork quantities. The location of marsh, rock, or special drainage sections should be indicated when relevant. The Civil 3D surface models, referred to as the refinement surfaces in WisDOT Civil 3D workflow, shall be used to produce proposed work graphics in the section views used for plan cross section sheets.

Each cross section shall show station location, grade line elevation, proposed centerline, the right of way limits on both sides, and datum elevation. Additional grades, cross slopes, or transition diagrams may be shown for superelevated sections.

The cross sections can begin at the bottom of the sheet and progress to the top in ascending order of stationing. It is preferred that cross sections begin at the top of the sheet and progress to the bottom in ascending order of stationing. This allows cross sections to be viewed in ascending order across sheets in electronic format. There shall be a minimum of 1-inch clearance between cross sections.

Cross sections for divided highways shall be shown on one sheet. If the sheet lacks sufficient width to show the entire cross section at an acceptable scale, the cross section shall be split and offset.

All lines and data shall be drawn on the front of the sheet and shall be inside the printing borders as defined in [FDM 15-5-5](#).

45.4 Begin and End Notations

A notation indicating the beginning and ending of common, marsh and rock excavation, as well as the beginning and end of construction, shall be included, when appropriate.

45.5 Culvert Pipe and Cattle Pass Notation

Pipe culverts and cattle passes may be illustrated on the cross sections. If notations are included, they should be minimal. They should show the number, size, location and skew angle if applicable.

PRELIMINARY PLAN CHECKLIST

- A. Preliminary plan shall be CADDs prepared, as scoped.
- B. Review copies shall be E-Plans (reduced size), as scoped
- C. Title Sheet
 - 1. Location sketch
 - 2. I.D. - Project title
 - 3. Design designation
 - 4. Begin/End project limits (y, x coordinates)
- D. Typical Section Sheet
 - 1. Utilities/Railroads - name and contact person
 - 2. DNR liaison - contact person
 - 3. Diggers Hotline
 - 4. Existing typical section (complete)
 - 5. Proposed typical section (complete with pavement type and thickness)
 - a. Mainline
 - b. Side roads
- E. Detail Sheets (include if applicable)
 - 1. Project overview
 - 2. Contour maps with match lines
 - 3. Non-standard detail drawings (butt joints, sanitary storm sewer, etc.)
 - 4. Intersection details if not standard
 - 5. Traffic control concept plan, signals, signing, lighting and construction staging (drawings or memo)
- F. Plan and Profile Sheets (should include existing topography or aerial photography)
 - 1. Begin/End construction limits
 - 2. Alignment (mainline and side roads)
 - a. Horizontal and vertical (calculated)
 - K-value
 - Degree/radius of curves/superelevation
 - Percent of grade
 - 3. Slope intercepts
 - 4. Right of way and easements
 - a. Existing and/or new
 - b. Existing access control
 - c. Property lines
 - d. Property owner names
 - 5. Drainage arrows (direction of flow)
 - 6. Drainage plan
 - a. Rural
 - Cross drains (diameter and location)
 - Special ditches

- Berms
- Channel relocation
- Structures requiring R/W
- b. Urban
 - Outfalls
 - Trunk line location
 - Structures requiring R/W
- 7. Environmentally sensitive areas
- 8. Major erosion control (R/W required, retention or sedimentation basins, energy dissipaters, etc.)
 - Separate details or memo if minor
- 9. Numbered structures (including retaining walls high mast light and sign bridges)
 - Type of work defined/notations per FDM
- 10. Existing utilities
- 11. Railroads - planned work
- 12. Rock profiles (both rip-able and hard) and marsh profiles
- 13. Existing and proposed access points including type
- 14. Existing advertising signs
- 15. Maintenance crossovers on multi-lane highways
- G. Cross Section Sheets
 - 1. Original ground
 - 2. Marsh and rock lines
 - 3. Proposed subgrade or finished grade
 - 4. Cross drains
 - 5. Sidewalk
 - 6. Curb and gutter
 - 7. Barrier wall
 - 8. R/W or TLE, PLE
 - 9. Interval (location as needed to determine R/W requirements)
 - a. Rural 100 ft -400 ft
 - b. Urban 50 ft - 100 ft
 - c. Entrances (driveway may be half-section)
 - d. Selected locations
 - e. Side roads
- H. Additional Exhibits
 - 1. Estimate. Only as detailed as plan.
 - 2. Preliminary earthwork balance.
 - 3. Commitments or issues of concern which affected design.
 - 4. Traffic Management Plan (TMP)
 - 5. Preliminary Specials (if available)

STATE PROJECT		FEDERAL PROJECT	
PROJECT		CONTRACT	
3370-00-60			

ORDER OF SHEETS

Section No. 1 Title

Section No. 2 Typical Sections and Details

Section No. 3 Estimate of Quantities

Section No. 4 Miscellaneous Quantities

Section No. 5 Plan

Section No. 6 Standard Detail Drawings

Section No. 7 Sign Plates

Section No. 8 Structure Plans

TOTAL SHEETS =

STATE OF WISCONSIN

DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY REHABILITATION-MAINTENANCE PROJECT

BURLINGTON TO STH 75 ROAD

(EAST CITY LIMITS TO WHEATLAND ROAD)

STH 142

RACINE COUNTY

STATE PROJECT NUMBER

3370-00-60

DESIGN DESIGNATION

A.A.D.T. (2000) = 2,500

A.A.D.T. =

D.A.V. =

D.D. =

T. =

DESIGN SPEED =

ESALS =

CONVENTIONAL SYMBOLS

PLAN

CORPORATE LIMITS

REFERENCE LINE

COMBUSTIBLE FLUIDS

UTILITIES

ELECTRIC

FIBER OPTIC

GAS

SANITARY SEWER

STORM SEWER

TELEPHONE

WATER

UTILITY PEDESTAL

POWER POLE

TELEPHONE POLE

BEGIN PROJECT
STA. 38+70

END PROJECT
STA. 187+80

EXCEPTION TO NET C/L LENGTH
STA. 76+85.5-STA. 78+81.5
B-SI-10

LAYOUT
SCALE 0 1 MI

TOTAL NET LENGTH OF CENTERLINE = 2.787 MI

FILE NAME : ***.designfile....**

PLOT DATE : ***.plottingdate...** PLOT BY : ***.plotuser...** PLOT NAME :

PLOT SCALE : ***.plotscale.....** #1500T/CADDS SHEET 14

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

PREPARED BY

Surveyor _____

Designer _____

Project Manager _____

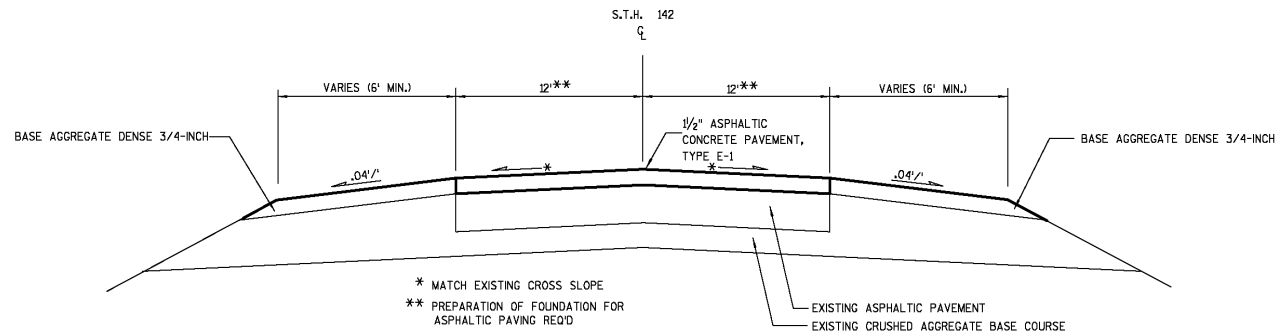
Regional Engineer _____

Regional Supervisor _____

APPROVED FOR THE DEPARTMENT

DATE _____ Signature _____

2



TYPICAL SECTION
STA. 38+70 TO STA. 187+80

UTILITIES

WISCONSIN ELECTRIC POWER COMPANY
MR. JERRY LONDRE
700 S. KANE STREET
BURLINGTON, WISCONSIN 53105
PHONE: (262) 763-3551

WISCONSIN SOUTHERN GAS CO.
MR. RON KUCHENBECKER
120 E. SHERIDAN SPRING RD.
LAKE GENEVA, WISCONSIN 53147
PHONE: (262) 248-8861

WISCONSIN BELL INC.
MR. DENNIS SCHOEERLE
301 EAST MILWAUKEE STREET
JANESVILLE, WISCONSIN 53545
PHONE: 608-755-5600

DNR CONTACT
MR. RUSSELL ANDERSON
SOUTHERN DISTRICT HEADQUARTERS
3911 FISH HATCHERY ROAD
FITCHBURG, WISCONSIN 53711
PHONE: 608-275-3266



Dial 811 or (800)242-8511

www.DiggersHotline.com

GENERAL NOTES

WHEN THE QUANTITY OF THE ITEMS OF BASE AGGREGATE OR HMA PAVEMENT IS MEASURED BY THE TON, THE DEPTH OR THICKNESS OF THE LAYER SHOWN ON THE PLANS IS APPROXIMATE, AND THE ACTUAL THICKNESS WILL DEPEND ON THE DISTRIBUTION OF THE MATERIAL AS DIRECTED BY THE ENGINEER.

MATCH EXISTING SIDEROAD GEOMETRICS AND OVERLAY EXISTING TAPERS.

MISCELLANEOUS QUANTITIES

SAWING ASPHALT AND REMOVING ASPHALTIC SURFACE, BUTT JOINTS

LOCATION	BUTT JOINTS S.Y.	SAWING L.F.
STA. 38+70	100	24
STA. 75+63	100	
STA. 80+03	100	
BEAVER RD	45	20
MT. TOM RD	45	20
STA. 187+80	100	24
TOTALS	490	88

BASE AGGREGATE DENSE 3/4-INCH

LOCATION	SHLDR. TON
STA. 38+70 - STA. 187+80	1900
2 SIDE ROADS	20
TOTALS	1920

HMA PAVEMENT & TACK COAT

LOCATION	TYPE E-1 TON	ASPH. MAT'L. TON	TACK COAT GALS
1 1/2 - INCH OVERLAY	4450	267	1300
WEDGING	200	12	
2 SIDE ROADS	100	6	
TOTALS	4750	285	1300

PAVEMENT MARKING, EPOXY, 4-INCH & PAVEMENT MARKING, SAME DAY, EPOXY, 4-INCH

LOCATION	EPOXY (WHITE) L.F.	SAME DAY (YELLOW) L.F.
NO PASSING		20,450
CENTER LINE		1,850
EDGE LINE	29,100	
TOTALS	29,100	22,300

TEMPORARY PAVEMENT MARKING

LOCATION	L.F.
NO PASSING	20,450
TEMP. & DASHES	590
TOTALS	21,040

PROJECT NO:3370-00-60

HWY:142

COUNTY:RACINE

TYPICAL SECTION & NOTES

SHEET

E

FILE NAME : C:\USERS\DOTL\3\DESKTOP\FDM UPDATES CH12-15\CHAPTER 15 UPDATES\FM1501A620.DWG

PLOT DATE : 9/3/2013 12:45 PM

PLOT BY : HEHRMANN, LISA J

PLOT NAME :

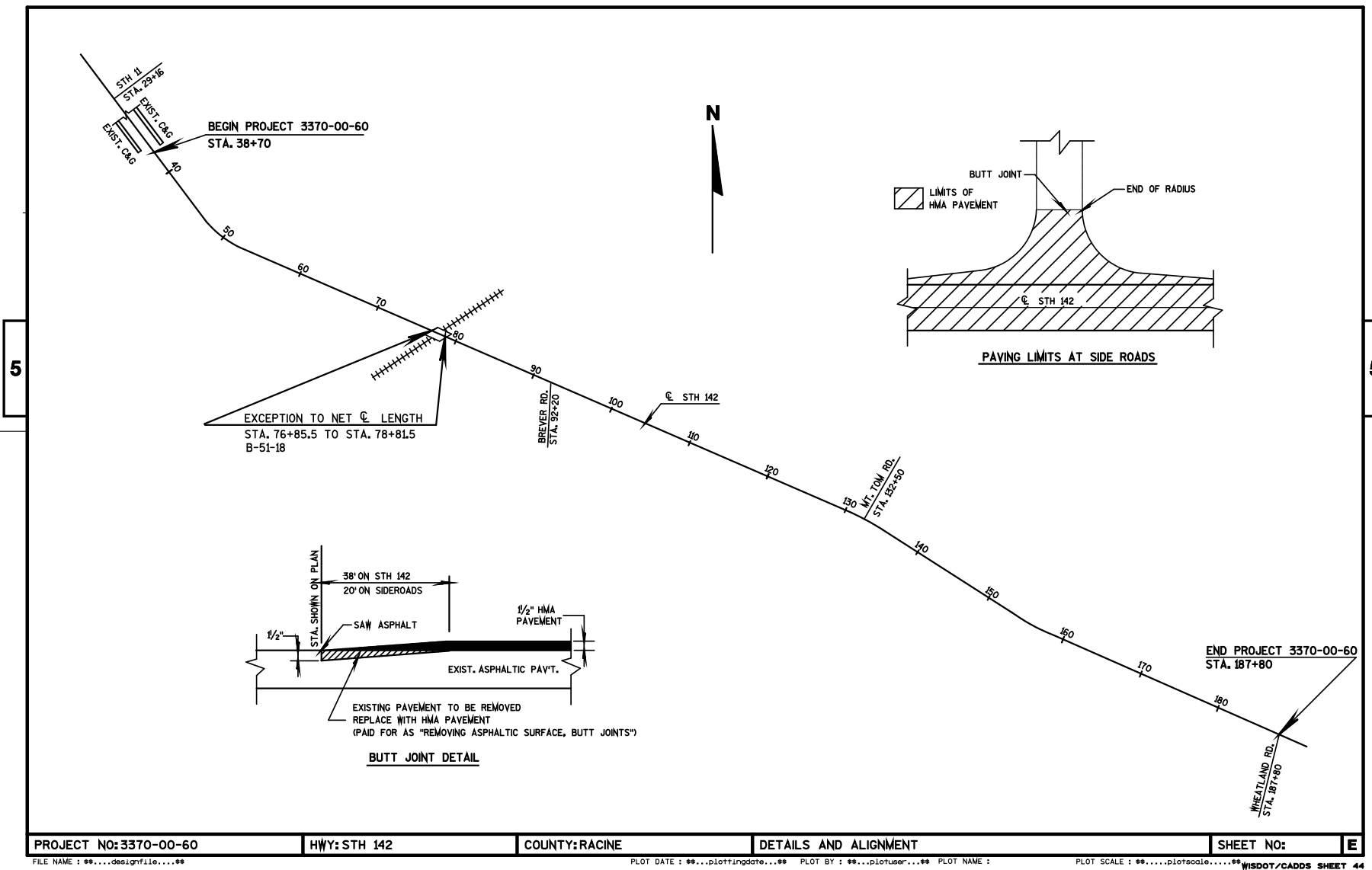
PLOT SCALE : 1 IN=200 FT

WISDOT/CADDs SHEET 42

DATE 05JUN08

ESTIMATE OF QUANTITIES

					1234-03-76
LINE NUMBER	ITEM	ITEM DESCRIPTION	UNIT	TOTAL	QUANTITY
0010	204.0115	REMOVING ASPHALTIC SURFACE, BUTT JOINTS	SY	490.000	490.000
0020	211.0100	PREPARE FOUNDATION FOR ASPHALTIC PAVING (PROJECT)	LS	1.000	1.000
		01. 1234-03-76			
0030	305.0110	BASE AGGREGATE DENSE 3/4-INCH	TON	350.000	350.000
0040	305.0120	BASE AGGREGATE DENSE 1 1/4-INCH	TON	1,550.000	1,550.000
0050	455.0105	ASPHALTIC MATERIAL PG58-28	TON	285.000	285.000
0060	455.0605	TACK COAT	GAL	1,300.000	1,300.000
0070	460.1101	HMA PAVEMENT TYPE E-1	TON	4,750.000	4,750.000
0080	460.2000	INCENTIVE DENSITY HMA PAVEMENT	DOL	3,040.000	3,040.000
0090	618.0100	MAINTENANCE AND REPAIR OF HAUL ROADS	EACH	1.000	1.000
		(PROJECT) 01. 1234-03-76			
0100	619.1000	MOBILIZATION	EACH	1.000	1.000
0110	642.5001	FIELD OFFICE TYPE B	EACH	1.000	1.000
0120	643.0100	TRAFFIC CONTROL (PROJECT)	EACH	1.000	1.000
		01. 1234-03-76			
0130	646.0106	PAVEMENT MARKING EPOXY 4-INCH	LF	29,100.000	29,100.000
0140	646.0406	PAVEMENT MARKING SAME DAY EPOXY 4-INCH	LF	22,300.000	22,300.000
0150	649.0100	TEMPORARY PAVEMENT MARKING 4- INCH	LF	21,040.000	21,040.000
0160	690.0150	SAWING ASPHALT	LF	88.000	88.000



**LOCAL PROJECTS
W/ MANAGEMENT CONSULTANT
DETAIL "A"**

STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION
PREPARED BY Surveyor _____ Designer _____ Management Consultant <u> (Company Name) </u>
APPROVED FOR THE DEPARTMENT DATE: _____ _____ Management Consultant Signature

**LOCAL PROJECTS
WO/ MANAGEMENT CONSULTANT
DETAIL "B"**

STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION
PREPARED BY Surveyor _____ Designer _____ Project Manager _____ Regional Examiner _____ Regional Supervisor _____ _____
APPROVED FOR THE DEPARTMENT DATE: _____ _____ <div style="text-align: right; margin-top: 10px;">(Signature)</div>

DETAIL "B"

Original Plans Prepared By

(Name of Consultant Firm)

*(Professional Engineer's Signature
and Professional Seal)*

(Date)

(Signature)

For Plans Prepared by Consultants



FDM 15-5-1 General

January 13, 2017

This section contains the basic information required for preparing and submitting contract plans. If additional information is desired, contact the design supervisor or the Proposal Management Section in the Bureau of Project Development. The requirements for such plans using Computer Aided Design and Drafting Systems (CADDs) are contained in [FDM 15-5-2](#).

Notice: Electronic plans are the only acceptable method of plan preparation.

1.1 Surveying and Mapping Section

All photogrammetric mapping and DTM data for plan preparation are provided by the Surveying & Mapping Section in the Bureau of Technical Services. Exact plan coverage is determined by the region and subsequently ordered from Surveying & Mapping. Refer to [FDM 9-45-1](#) for information on how to order photogrammetric mapping and DTM data.

1.2 Plan Development

The following standards are based on the preparation of 11" x 17 plans.

Format: All contract plan sheets shall conform to the standards listed in [FDM 15-5-5](#) for size and composition.

Lines and Artwork: Black ink shall be used and must appear continuously. Minimum pen width should be a zero weight ("0" - 0.014 in) rapidograph. Double zero weights ("00" - 0.012 in) are only acceptable for items such as crosshatching. Line weights shall be uniform with sufficient opacity to ensure acceptable reproduction.

Lettering: Lettering shall be placed by computers, or typewriter. It should be in a style and clarity consistent with accepted engineering drafting practice. Minimum acceptable height is 0.60" (60 LEROY, or equivalent), except that 0.050" (50 LEROY or equivalent) is permissible on R/W plats.

Stamping of plan notations is generally unacceptable due to poor reproductive quality. Professional seals affixed to the title sheet must be applied with even pressure, utilizing a fast drying, opaque ink.

Simplicity: Drawings should be kept simple. Eliminate repetitive details and unnecessary views, lines, and dimensioning.

1.3 Electronic Plans (E-Plans)

E-Plans are the only plan submittal format. E-Plans must be complete including signed & sealed title sheet, and sealed sheets where applicable. Not included are sign plates, SDD's, and structures. Follow the standards set in [FDM 15-5-10](#) and [FDM 19-10-1](#) for the preparation and submittal of electronic plans.

FDM 15-5-2 CADDs Preparation Standards

November 15, 2021

This procedure describes the requirements for preparing and recording maps and plans for highways using Computer Aided Design and Drafting Systems (CADDs). Electronic copies of design files are available for download from the internet at the following location:

<https://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/cad/default.aspx>

Note: Photogrammetric mapping conforms to the Surveying and Mapping Photogrammetric Specifications for MicroStation version J7. Photogrammetric mapping/DTM conforms to the FDM for MicroStation version 8.

The use of AutoCAD Civil 3D software and file formats native to it will be required on most highway projects. Further information is included in [FDM 19-10-43](#)

2.1 Design Files

2.1.1 File Format

The graphical data submitted shall be in accordance with digital data exchange standards.

Refer to [FDM 19-10-43](#).

2.1.2 File Ownership

When CADDs are used by consultants or outside agencies to develop project plans and the development contract is completed or terminated, a digital copy of the files shall be delivered to and become the property of the Department of Transportation. Refer to [FDM 19-10-43](#) for delivery methods and requirements.

2.2 Graphical Parameters

Graphic parameters such as level, color, weight, and line code (style) shall follow the standards as specified in the master template file found on the WisDOT internet site at:

<https://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/cad/civil-3d.aspx>

2.2.1 Weights

Line weights shall be similar to those required for manually prepared documents. For printing or plotting a 11"x 17" sheet, the line weight base of 0.01 inches is used for a 4 weight.

Weight	Inches (MicroStation /CAiCE)	Inches (Civil 3D)
0	0.010	0.00
1	0.015	0.006
2	0.020	0.007
3	0.025	0.008
4	0.030	0.010
5	0.035	0.012
6	0.040	0.014
7	0.045	0.016
8	0.050	0.020

If reduced size plans are to be submitted, then the weight base and increment should be reduced proportionately.

2.2.2 Linetypes

Only linetypes referenced in the WisDOT templates will be accepted.

2.2.3 Lettering

Minimum size lettering shall be equal to a 60 Leroy (0.06") size on an 11"x17' sheet. A 50 Leroy (0.05") is permissible on R/W plats only.

English Text Sizes (inches)				
Leroy Guide	Weight	200"=1'	100"=1'	40"=1'
250	8	0.50	0.025	0.010
175	5	0.35	0.0175	0.007
100	3	0.20	0.010	0.004
87.5	2	0.175	0.0875	0.0035
70	1	0.14	0.07	0.0028
60	0	0.12	0.06	0.0024

Calibri Light or Arial shall be used for general drafting work. These fonts are designed to approximate the appearance of Leroy lettering. Graphical parameters such as level, color, weight and line code (style) specified in this chapter also apply to text elements.

2.2.4 Existing Data

Existing data shall be gray shaded and all information on a Transportation Project Plat shall be shown as black on white with no gray shading.

FDM 15-5-3 CADDs Directory and File Name Convention

August 17, 2020

CADDs files for highway project design documents are required to be maintained for up to twenty years.

Project documents stored in active or archived CADDs files should be readily retrievable without recourse to file names which require extra documentation or indexes for the CADDs highway project documents. The following directory and file naming conventions will satisfy the retrieval concerns while meeting the requirements of the department host-based filing system.

The requirements for the directory names shall apply to department staff developed CADDs projects. Outside organizations, such as consultants, who utilize CADDs to develop projects, are required to satisfy only the specifications for file names within the design project.

3.1 Project Directory Conventions**3.1.1 AutoCAD Civil 3D**

Civil 3D projects contain all the geographic and CADDs files for a project. The standard WisDOT project structure included in the resource files at:

<https://wisconsin.gov/Pages/doing-business/eng-consultants/cnslt-rsrcs/tools/cad/default.aspx>

The project directory shall be the design project I.D. number, eight characters long. The typical project directory structure is first organized by the functional area responsible for the files contained within. Further structure within the functional areas is categorized based on the needs of that functional area (i.e the folder structure for design is different than right-of-way).

Additional folders should not be created directly under the project ID folder. Additional folders can be created within the functional area folders to give more structure to content as determined by the needs of the project. Additional folder names shall be mixed case, alphanumeric. No special characters shall be used (including spaces and underscores) except for hyphens. [Attachment 3.1](#) shows further description of the typical Civil 3D project folder structure.

3.2 File Naming Conventions**3.2.1 AutoCAD Civil 3D**

File names within a given Civil 3D project directory shall be unique. Files are named based on the objects contained and a description. Terms should be mixed case and should be separated by hyphens. [Attachment 3.2](#) shows some standard abbreviations and acronyms and describes how other abbreviations and acronyms should be created. [Attachment 3.3](#) shows the naming standard for Civil 3D files.

See [FDM 15-1-1](#) for a list of primary subject areas. The first 6 characters are required for sheet files and they must be numbers. The last two are an indication of what the file contains and are optional. This naming convention will arrange all sheet files in order for plan submittal. [Attachment 3.3](#) shows the structure of the numbering system for primary subject areas and subsets.

Example: Based on the guidance in [Attachment 3.3](#), the third sheet of construction details would be named 021003-cd

02 refers to the Typical Sections and Details ("2-point") sheet subject area.

10 identifies the sheet as a construction detail sheet (a subset of the Details subject area).

03 identifies this as the third construction detail sheet.

cd is just an abbreviation for construction details. This is optional.

[Attachment 3.3](#) shows the naming standard for the base files. Base files contain the graphical project data that is "referenced" to the sheet files. Each sheet file may use a combination of any number of base files to provide the data required on the sheet.

3.3 Object Naming Conventions

Civil 3D objects have names. [Attachment 3.2](#) shows some standard abbreviations and acronyms and describes how other abbreviations and acronyms should be created. [Attachment 3.4](#) shows the naming conventions for Civil 3D objects.

LIST OF ATTACHMENTS

[Attachment 3.1](#)

CADDs AutoCAD Civil 3D Project Folder Structure Standard

Attachment 3.2	CADDs AutoCAD Civil 3D File and Object Naming Abbreviation Standard
Attachment 3.3	CADDs AutoCAD Civil 3D File and Layout Naming Standard
Attachment 3.4	CADDs AutoCAD Civil 3D Object Naming Conventions
Attachment 3.5	Required PlatExp Folder Content

FDM 15-5-4 CADDs Block and Linetype Files

August 17, 2020

Block and linetype files for use in AutoCAD Civil 3D are located on the WisDOT internet site at:

<https://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/cad/civil-3d.aspx>

FDM 15-5-5 Plan Sheet Borders

February 15, 2022

This procedure contains a pictorial listing of WisDOT plan sheet borders acceptable for contract plan preparation. If other plan sheet borders are used, they shall conform to the size and composition shown herein.

5.1 Size

All plans submitted to central office shall use the dimensions listed in [Table 5.1](#).

Table 5.1 Plan Sheet Dimensions

Item	Dimensions
Sheet size	11" x 17"
Lined Border	10" x 15 3/4"
Right/Left Margins	5/8" each
Top/Bottom Margins	1/2" each

Note: it is important to be consistent with the dimensions used to create all the sheets in a plan. Sheets that have irregular dimensions have to be given special handling in the printing process and this is very inefficient considering the large volume of plan printing done every month.

5.2 Electronic Documents

Many of the attachments included in this procedure can be downloaded as AutoCAD blocks at:

<https://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/cad/default.aspx>

5.3 Structure Plans and Details

The Bureau of Structures maintains standard drawings, standard insert sheets and cell files for structures.

Inquiries should be directed to <https://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/strct/design-contacts.aspx>.

The standard drawings, standard insert sheets, and cell files for structures are located at:

<https://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/strct/bridge-manual.aspx>.

LIST OF DOCUMENTS

[Title Sheet Plan Border – Construction/Traffic/Maintenance Operations](#)

[Title Sheet Plan Border Consultant – Construction/Traffic/Maintenance Operations](#)

[Title Sheet Plan Border – Rehabilitation](#)

[Plan Sheet Border for Typical Section Sheet and Detail Sheet](#)

[Storm Sewer Plan Sheet Border](#)

[Miscellaneous Quantities Sheet Border](#)

[Plan Sheet Border Without Profile](#)

[Dual Plan Sheet Border Without Profile](#)

[Plan Sheet Border for Plan and Profile Sheet](#)

[Dual Profile Sheet Border Without Plan](#)

[Plan and Profile Sheet Border - Dual Profile](#)

[Cross Section Sheet](#)

[Earthwork Sheet Border](#)

[Traditional Right-of-Way 34x22 Title Sheet Border](#)

[Traditional Right-of-Way 34x22 Schedule Sheet Border](#)

[Traditional Right-of-Way 34x22 Layout Sheet Border](#)

[Traditional Right-of-Way 34x22 Detail Sheet Border](#)

[Transportation Project Plat 30x22 Detail Sheet Border](#)

[Transportation Project Plat 30x22 Detail Sheet Border – rotated](#)

[Transportation Project Plat 34x22 Detail Sheet Border](#)

[Transportation Project Plat 34x22 Detail Sheet Border – rotated](#)

[Transportation Project Plat 30x22 Title Sheet Border](#)

[Transportation Project Plat 34x22 Title Sheet Border](#)

[Acquisition Exhibit 17x11 Border](#)

FDM 15-5-7 Design Models

March 16, 2018

This procedure describes the requirements for preparing Design Model content for submittal to the Wisconsin Department of Transportation. Design model information includes: surface models, horizontal alignments, vertical alignments (profiles), superelevation transition information, right of way and easement 2D linework, proposed roadway features 2D linework, existing condition mapping, and metadata documentation. Design Model information is included in the Contractor Data Packet (See [FDM 19-10-43](#)). This procedure will define:

- What portions of the design are required for design model delivery
- Which projects will require design models
- The specifications of design models (How detailed, which features of design)

7.1 General Requirements

Design models are required for projects that are required to be designed in AutoCAD Civil 3D. See [FDM 19-10-43.1](#) for AutoCAD Civil 3D requirements. The surface model component of design models shall be delivered for each LET project that requires cross sections sheets be included in the plan. See [FDM 15-1-45](#) for cross sections requirements.

7.1.1 Exceptions to Design Model Requirements

The surface model component of Design Models are not required in the following circumstances:

- Beamguard energy absorbing terminal (EAT) installation is the only reason cross sections are needed for a project. See [FDM 11-45-2.4.1](#) for cross section requirements for beamguard EATs. Projects needing additional cross sections outside of beamguard EAT installations are not exempt from surface model delivery.

7.2 Surface Models

Surface Models are the principal component of the Design Model. They are a DTM surface representation of a feature or material of the proposed work of the project, and the supplemental data supporting the definition or use of the DTM surface.

7.2.1 Surface Model Types

Design models shall include the following proposed work surface model types. Provide a single surface model for each type per construction contract. For construction contracts where staged models are desired, provide a single surface model for each type per stage:

- Top (all earthwork and pavement features)
- Datum (finished earthwork)
- Rural Driveways (top of driveway surface)

In addition to the proposed work surface model types listed above, an existing terrain surface model shall be included in the Design Model. Existing condition top of rock surface model, and existing condition marsh bottom surface model are not required. See [Attachment 7.1](#) for explanation and examples.

7.2.2 Surface Model Content

Proposed work surface models shall consist of the following items:

- DTM surface
- 2D or 3D outer boundary
- 3D longitudinal breaklines and points that defined the surface triangulation

Note: In areas of surface models developed by Civil 3D grading objects only, it is acceptable to use surface triangle graphics in place of longitudinal breaklines in the surface model's breakline file. Surface triangle graphics can be obtained in Civil 3D by twice exploding surfaces from gradings, triangle graphics can then be inserted into the longitudinal breakline DWG file.

The Civil 3D corridor surfaces used in development of proposed work surface models shall only be defined by corridor feature lines.

Existing terrain surface models shall consist of the following items:

- DTM surface
- 2D or 3D outer boundary

7.2.2.1 Proposed Work Surface Model Definition Minimum Density

The proposed work surface model definition density is defined by the Department as the frequency spacing of corridors used to develop the surface model, the elevation point spacing of feature lines or 3D polylines in the areas where feature lines or 3D polylines are used to develop the surface model, and also the tessellation spacing where gradings are used to develop the surface model.

The proposed work surface model definition density requirements are shown in [Table 7.1](#).

Table 7.1 Proposed Work Surface Model Definition Density Requirements

Location [1]	Surface Model Type	Roadway alignment and profile state	Design Speed, DS (mph)	Maximum Frequency Spacing (ft)
Outside Intersection Footprint	Top, Datum	Tangent	All	50
		Horizontal Curve or Vertical Curve [2]	DS ≤ 30	12.5
			35 ≤ DS ≤ 55	25
			DS ≥ 60	50
Inside Intersection Footprint	All	All	All	2.5

Notes:

[1] Intersection footprint is the area within the intersection extending outward along all roadways to beginning taper points of intersection widening or auxiliary lanes.

[2] A 50 ft. frequency spacing may be used at any design speed if the horizontal curve superelevation is reverse crown or flatter. A 50 ft. frequency spacing may be used at any design speed if the vertical curve $K \geq 151$.

In addition to the frequency spacing requirements of [Table 7.1](#), additional corridor frequency locations shall be

added at all horizontal geometry points (PC, PT), superelevation transition points, profile geometry points (VPC, VPT), profile high/low points, corridor target object horizontal and vertical geometry points, at the intersection of side road alignments, typical section change locations, critical drainage locations, inlet locations, and all locations at which there is a cross section shown in the plan.

Interchange gore areas should be designed with a 2.5 ft corridor frequency spacing, or if using feature lines a 2.5 ft. elevation point spacing. When using feature lines to design earthwork around abutments and wingwalls, a 2.5 ft. elevation point spacing is appropriate.

Breaklines added to the surface definition for the sole purpose of forcing surface triangle orientation are exempt from the frequency spacing standards.

Model density and quality should also be increased in areas that are contextually sensitive. For example, an urban area does not require a higher corridor frequency spacing just because it is urban. However, if that urban area consists of residential front yards or a downtown commercial district, a frequency spacing should be selected that captures the variability of the adjacent properties.

7.2.2.2 Surface Model Detail Requirements

[Table 7.2](#) contains a list of features and states which surface models types they should be developed within. Optional features may be desirable for inclusion into the surface model depending on the project scope and complexity but are not required.

Determining the required or necessary level of detail for surface models takes an understanding of their usage. Level of detail is defined as the number of components that are modeled in addition to the density and quality at which the components are modeled.

In general, two questions should be considered when determining the appropriate level of detail.

1. Will the item in question be utilized in contractor's AMG operations the way AMG is currently being used, or be used in contractor staking operations?
2. Will exclusion of the item in question introduce the possibility of misinterpretation of design intent?

The item in question does not need to be represented in surface models if the answer to #1 is NO, and the answer to #2 is NO. Any other response to the questions above indicates the item in question should be designed into the surface models for the project.

Datum surfaces are primarily used for automated machine guidance (AMG) operations. Therefore, the datum surface models must contain enough detail to be useful for an AMG operation. There are other uses for the datum surface model, such as for earthwork computations. If it is desired that the datum surface model account for all earthwork on a project, the level of detail is high. However, it is often sufficient to provide a datum surface with a lower level of detail that is still sufficient for AMG operations and the majority of the earthwork volume computations. The remaining earthwork volumes can then be obtained through other means, such as hand calculations. A good example of this approach is an urban driveway. Modeling the subgrade of an urban driveway for the datum surface does not add value for an AMG operation. However, this is still a volume of earthwork that must be accounted for. The designer can choose to either model the subgrade of an urban driveway or determine the additional volume through hand calculation.

Top surfaces are not commonly used for AMG operations. From a construction perspective, they are most useful for conveying design intent. They can also be useful for visualization. The designer should increase the level of detail for areas where the design intent will not be obvious during construction or where there is a risk that the contractor may interpret the plan incorrectly. For example, not all curb ramp configurations are complex enough to warrant a surface model. However, if the curb ramp is located in a tight urban corridor with little room for error to comply with ADA standards, the extra effort for creating the surface model will reduce the risk of constructing a non-compliant curb ramp.

Designers may also choose to increase the level of detail for the benefit of the design quality or to help in the design process. For example, including the rural driveway models can assure that culvert pipe lengths are sufficient for traversable slopes. The additional detail can also be used for quantification or visualization.

Table 7.2 Proposed Work Surface Model Feature Requirements

Feature	Surface Model Types (Y = Yes, it is required; O = Optional, should be considered when warranted; N = No, it is not needed)
---------	---

	Top	Datum	Rural Driveway (Top of Driveway)
Urban Driveway	Y	N	N
Rural Driveway	N	N	O
Slope Rounding	N	N	N
Curb Ramps [1]	O	N	N
Curb or barrier wall transition between barrier shape changes	O	N	N
Median Noses	O	N	N
Transition between curb section and shoulder	O	O	N
Exposed Shape of Retaining Wall [2]	O	N	N
Earthwork grade along retaining wall	Y	Y	N
Grading transition at retaining wall ends	O	O	N
Gore areas	Y	Y	N
Grading at culvert inlet/outlet	N	N	N
Beam Guard EAT grading	Y	Y	N
Minor grading alongside urban driveways	O	O	N
Minor intersection islands where subgrade is continuous with adjacent pavement	O	Y	N
Construction Stages [3]	O	O	N
Bridge Abutment Earthwork Cone (significant grade changes) [4]	Y	Y	N
Bridge Abutment Earthwork Cone (minor grade changes) [4]	O	O	N

NOTES:

[1] While modeling isn't required, curb ramps should be modeled at locations where elevations make challenging to comply with ADA requirements according to the designs shown in the Standard Detail Drawings.

[2] Meaning is the actual wall shape incorporated into the surface model

[3] Staged surface models are not required. However, temporary roadways requiring earthwork to construct shall be modeled.

[4] Minor changes to the earthwork cone for bridge replacement projects that can be accommodated through small adjustments to rip rap or topsoil do not require modeling. It is desirable to model the earthwork cone for new fills or other significant changes to the abutment horizontal/vertical location.

LIST OF ATTACHMENTS

[Attachment 7.1](#) Surface Model Types

FDM 15-5-10 Electronic Plans

August 17, 2020

This procedure describes the requirements for preparing Adobe Portable Document Format (PDF) construction plans (EPlans) for submittal to the Wisconsin Department of Transportation.

1. All PDF files shall be compatible with PDF Version 1.7.
2. PDFs created from scanned hardcopy are generally not acceptable. One exception is sheets including an inked registration seal. These must be scanned in monochrome at 300 dots per inch (dpi). The JPEG image format should not be used when scanning title sheets.
3. Where linework is shaded gray as is the case with existing topography on plan sheets, or as with plan and profile and cross section sheet grids, use of a printer driver that supports grayscale is required.
4. If raster data (imagery) is included in the plan, observe the following requirements.

File format

- Use the JPEG format ONLY with photographic imagery, such as an aerial photo background. The JPEG format is NOT ACCEPTABLE for any non-photographic imagery.
- Use the TIFF or GIF format for all text or linework that must be scanned and included in the plan (title sheets, old plat sheets, sieve analysis sheets, soil borings, etc.)

Resolution

- Image resolution higher than 300 dots per inch (dpi) is generally not acceptable.
- Image resolution lower than 72 dpi is not recommended.

Color depth

- 256 shades of gray is the maximum acceptable color depth for imagery. 32 shades of gray is preferred. Color imagery is generally not acceptable.
- Use monochrome (black and white only) whenever the source material is black and white only.

5. All PDF files shall be landscape oriented 11x17 inch documents.
6. All fonts utilized in the plan shall be embedded in the PDF file.
7. All plan sheets shall be combined to form a single PDF file.
8. The document initial view shall be set to Bookmarks and Page with magnification set to Fit in Window.
9. To facilitate navigation within the plan, bookmarks in the Navigation Pane for these major plan sections are required (when the plan contains these sections): Title Page, Typical Sections, Details, Miscellaneous Quantities, Plat, Plan and Profile, Special Signs, Structures, Earthwork Data and Cross Sections.
10. The following project information shall be included in the PDF Document Summary
 - Title: Construction Project ID, Project Title
 - Subject: Route name, County
 - Author: Project Engineer
 - Keywords: Structure numbers, tied Project IDs and other info as appropriate
11. Document Security shall be set to No Security.
12. There shall be no layers in the pdf.
13. All PDF files shall be optimized for web viewing.
14. All graphics shall adhere to the plan production standards as specified in [Chapter 15](#), Plan Preparation.
15. An EPlan, as submitted to the Department, shall not include a list of Standard Detail Drawings (SDDs) in the plan. The SDDs are to be specified in the SDD Spreadsheet and copy of the spreadsheet must accompany the EPlan (see [FDM 15-5-15](#)). Department staff will include the SDD list in the plan at the appropriate time.
16. The plan preparer must ensure that the current state standard plan sheet borders and other applicable standard files are used. The most current version can be found on the web at:
<https://wisconsin.gov/Pages/doing-business/eng-consultants/cnslt-rsrcs/tools/cad/default.aspx>
17. All PDF files shall become the property of the Department.

accompanies an Electronic Plan (EPlan).

An EPlan, as submitted to central office, should not include a list of required SDDs in the plan. The SDDs must be specified in the SDD spreadsheet and the spreadsheet must accompany the EPlan as an additional exhibit. Central office staff will include the SDD list in the plan at the appropriate time.

Designers may access the SDD Spreadsheet (MS Excel file 0-select-sdd.xls) at:

<https://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/cad/eplans.aspx> (Right click on the file and select "Save target as")

Below are the steps necessary to complete the SDD Spreadsheet.

1. Save a copy of the spreadsheet in the project folder.
2. Name it XXXXXXXXX_sdd.xls (where XXXXXXXXX is the project id).
3. Key the project id into appropriate cell near the top of the spreadsheet (red text).
4. Scroll through the spreadsheet and enter an "x" in the yellow box next to the SDDs that are required (press enter after keying in the last "x").
5. Once you have specified all of the required SDDs, select File → Save As and save the spreadsheet again.
6. Submit the completed SDD spreadsheet with the EPlan per [FDM 19-10-1](#)

When submitting an EPlan, check that SDD spreadsheet is still current. Do this by opening the standard SDD spreadsheet at the above site and comparing the Last Effective P.S. & E. Date (in red near the top-right of spreadsheet) with the date on the one saved in your project folder. If the standard spreadsheet has been updated, check if any of the SDDs you have specified were affected. Each SDD listed in the spreadsheet has an effective P.S. & E. date listed to the right of the name.

FDM 15-5-25 Standard Abbreviations

April 26, 2007

25.1 General

Abbreviations should be considered only in the following cases:

- When the complete spelling of a word or term obliterates other detail.
- When sufficient space is not available on a plan sheet.
- When confusion is not caused by the use of an abbreviation.
- When a term is excessively long.

The use of abbreviations in the plan should be kept to a minimum.

A list of abbreviations found within a plan that would not be readily recognized by the ordinary user of a highway plan shall be listed on the Typical Section Sheet as stated in [FDM 15-1-15](#). Abbreviations as used within the Right of Way Plat shall be listed on the Right of Way Title Sheet as discussed in [FDM 12-10-1](#) and [FDM 12-15-1](#). The list of standard abbreviations is included as [Attachment 25.1](#).

LIST OF ATTACHMENTS

[Attachment 25.1](#) List of Standard Abbreviations

FDM 15-5-30 Conventional Signs and Symbols

February 15, 2022

30.1 General

Commonly used signs and symbols are preprinted on the Title Sheet. Additional ones may be added to the Title Sheet as indicated in [FDM 15-1-10](#). Right-of-way signs and symbols not used in the construction plans should not be included.

List signs and symbols used in the right-of-way plat on the Right-of-Way Title Sheet as indicated in [FDM 12-15-1](#).

Signs and symbols may be tailored to fit each individual project.

The signs illustrated do not differentiate between existing and proposed. The designer may indicate the difference by using shading, screening, dashed lines, notations, or any other appropriate method.

Conventional signs and symbols that are suggested for use in the preparation of contract plans are available through the WisDOT Civil 3D template.

Typical Civil 3D Project Folder Structure

12345678: Project folder shall be the eight-digit design ID for the project.

_Shortcuts: This folder is the default system folder generated by Autodesk for managing shortcuts. Folders should never be created within this folder. Files should never be created or edited within this folder except through AutoCAD Civil 3D.

base: This folder contains all of the inputs for the design. Common sources are survey, photogrammetry, GIS, and ortho photos. The current, complete files for the existing surface, topography, and existing utilities for the project shall be at this folder level regardless of the source(s) that created those files.

img: This folder contains ortho photos not from photogrammetry.

map: This folder contains files received from Central Office Survey and Mapping (photogrammetry)

orig: This folder contains the DGN files generated from Central Office Survey and Mapping (photogrammetry)

rastr: This folder contains the ortho photos or other images obtained from Central Office Survey and Mapping (photogrammetry)

othr: This folder contains vector data not from survey or photogrammetry.

srvy: This folder contains all Field survey data. The survey database is located in this folder and is typically inserted into specific files with survey queries.

orig: This folder contains the original field survey files.

const: This folder contains design data exported into a format that will be provided to the contractors pre-bid and will be used by contractors during construction.

CD-BaseData: This folder contains the dwg and xml files of existing data that will be provided to the contractors.

CD-Design: This folder contains the roadway features edgeline file and proposed point data.

CD-AliProf: This folder contains the proposed alignments and profiles.

CD-Surface: This folder contains the proposed surfaces and breaklines. Optional staged surfaces may also be included.

CD-X-Section: This folder contains the proposed slope staking information.

CD-RW: This folder contains the proposed right-of-way alignments and points.

dsgn: This folder contains all of the files created and edited by design. Files at this level will not have civil 3D objects in them. They are logical groupings of project items seen in plan sheets.

aliprof: This folder contains all of the stationed reference alignments and profiles for a project.

check: This folder contains supporting files used for checking the proposed design. These items may include but are not limited to sight distances checks, vehicle swept paths, fastest paths, etc.

crdr: This folder contains all of the corridors for the project. Depending on the modeling scenario an alignment could be in AliProf or Corridors.

edgeline: Files with elements representing roadway features. Files can contain 2D or 3D elements and AutoCAD or Civil 3D objects. Examples of content that should be in this folder include proposed roadway elements, slope intercepts, and matchlines.

pipe: This folder contains Civil 3D pipe network data and files used to delineate hydrologic areas.

	<p>anlyz: This folder includes culvert and storm sewer hydrologic and hydraulic analysis.</p> <p>qty: This folder contains files used in Quantity Take Off, such as sample lines for generating earthwork quantities.</p> <p>ewrk: This folder contains xml volume reports from Civil 3D, Excel spreadsheets generated from the detail xml reports, and the summary Excel spreadsheet.</p> <p>mq: This folder contains Excel spreadsheets used for Miscellaneous Quantities sheets.</p> <p>srfc: This folder contains all of the surfaces generated from design.</p> <p>vfg: This folder contains standard view frame groups used by layouts throughout the plan.</p>
meta:	This folder contains the metadata sheet for the project and reports associated with the sheet.
rw:	<p>This folder contains preliminary right-of-way files used by roadway design processes (example is preliminary RW linework files).</p> <p>87654321: The plat project ID folder contains all the files created and used by right-of-way.</p> <p>cadds: Raster images, location sketches, digital mapping.</p> <p>dwg: All dwg files including slope intercepts.</p> <p>misc: Miscellaneous Information.</p> <p>cnty-info: This folder contains county GIS data and other useful information.</p> <p>legal: New legals.</p> <p>misc: Miscellaneous files, CSMs, Subdivisions, etc.</p> <p>rprts: This folder contains closure reports, sta. and out reports, etc.</p> <p>sect-sum: Tie sheets, Section summary sheets.</p> <p>srvy-info: This folder contains surveyed iron pipes, and other survey data in dwg files.</p> <p>titles: Pdfs of title reports and updates; Tax ID (owner last name) (region specified description).</p> <p>topo: This folder contains topographic mapping files.</p> <p>uti: This folder contains utility line work.</p> <p>pdf: This folder contains pdf plat sheet files.</p> <p>pdf-co: This folder contains final pdf plat sheet files for recording.</p> <p>plat-exp: This folder contains files intended for export to other systems such as GIS. See FDM 15-5 Attachment 3.8 for listing of required PlatExp content.</p>
sheets:	<p>This folder contains the DWG files for all of the sheets in the plan and any files associated with plotting the plan sheets, such as DST or DSD files.</p> <p>othr: This folder is a holding place for sheets generated that do not belong in the plan. These would include meeting displays, maps to be included in reports, maps sent to external customers, etc.</p> <p>pdf: This folder contains PDF files that are not created for plan submittals.</p> <p>pdf: This folder contains PDF files created for plan submittals. Ex. 00000000_pln_30pct.pdf, 11302072_pln_pse_050916_1603.pdf.</p>

Civil 3D Abbreviations and Acronyms for Files and Objects

This table contains standard abbreviations for use in naming Civil 3D files and objects. These abbreviations should be used when appropriate, but abbreviations not contained in this list are acceptable.

When using abbreviations, they should be mixed case and preferably no more than four characters. When using acronyms, they should be all-caps. For example, abbreviating corridor results in Crdr. An acronym for proposed reference line results in PRL.

Abbreviation/ Acronym	Full term	Abbreviation/ Acronym	Full term
Ali	Alignment	Isld	Island
Alt	Alternative	L or Lt	Left
Asmb	Assembly	Lcl	Local
Back	Curb and gutter back	Ln	Lane outside edge
Bar	Barrier	ML	Matchline
BG	Beam guard	Med	Median
BL	Baseline (within a corridor. PRL should be used to designate a reference line)	Os	Offset
BrkSlp	Clear zone offset break slope	Out	Outside
Cable	Cable guard	PGL	Profile grade line (to be used when alignment with elevation set is different than the proposed reference line)
CFL	Corridor feature line	PRL	Proposed reference line (to be used when an alignment is not the centerline or lane edge of a highway)
CG	Curb and gutter flange	Prof	Profile
CR	Curb ramp	Prop	Proposed
Crdr	Corridor	PRW	Proposed right-of-way
Cty	County	R or Rt	Right
CZ	Clear zone	Rdbt	Roundabout
Dwy	Driveway	Rfnt	Refinement
EP	Edge of pavement	Rg	Region
EPS	Edge of paved shoulder	RL	Reference line
EGS	Edge of gravel shoulder	Rmp	Ramp
ERW	Existing right-of-way	RW	Right-of-way
ETW	Edge of traveled way	RM	Roadway model
Ex	Exist/Existing	SD	Survey database
Face	Curb and gutter face	Sdwk	Sidewalk
Grdg	Grading	Stg	Stage
GrdLine	Guardrail EAT grade line	Srfc	Surface
Hinge	Guardrail EAT shoulder hinge point	Topo	Topography
In	Inside	Ult	Ultimate
Int	Intersection	Uti	Utility

Civil 3D File Naming Standard

Following are examples of both standard files and standard application of WisDOT abbreviations and acronyms to file names. File names and locations for existing data and plan sheets should be used exactly as seen here unless they do not meet project needs. File names for specific objects (such as corridors or alignment profile combinations) should begin with an object prefix and then the name of the object within the file.

Project ID data in full format or partial (last two digits of construction ID for instance) can be added as a prefix or suffix to file names as an option for organizing data. This option is not required or standard practice.

Existing base data

Description:	Existing topography. This file is the current, complete topography of the project excluding utilities, regardless of collection method.
Name:	Topo-Ex.dwg
Location:	Proj ID\base
Description:	Existing utilities
Name:	Uti-Ex.dwg
Location:	Proj ID\base
Description:	Existing survey control. This file contains the horizontal and vertical control used during construction.
Name:	Srvy-Cntrl.dwg
Location:	Proj ID\base
Description:	Existing Mapping topography. This file name is assigned by Central Office Mapping.
Name:	M(flight name)-<C3D Version>.dwg
Location:	Proj ID\base\map
Description:	Existing Survey topography. This file is a working file containing all of the field survey data for a project.
Name:	Topo-Ex-Srvy.dwg
Location:	Proj ID\base\srvy

Survey databases

Description:	Field survey database.
Name:	SD-<ProjID>(-<ConsultantName>).sdb
Example:	SD-66660002.sdb SD-66660002-FirmA.sdb
Location:	Proj ID\base\srvy

Survey text files

Description:	Field survey text files.
Name:	<ProjID> (-<ConsultantName>)-<work order>.xml
Example:	66660002-FirmA -wo02.xml
Location:	Proj ID\base\srvy

Alignments and Profiles

Name:	AliProf-<Dominant Roadway Name>-<Comment>
Example:	AliProf-12-BestFit.dwg AliProf-CtyBB.dwg
Location:	Proj ID\dsgn\aliprof

Corridors

Description:	Contains corridors
Name:	Crdr-<CorridorName>-<Location>-<Comments>
Example:	Crdr-12-Begin-To-WoodAveE.dwg Crdr-12-WoodAveE-To-End.dwg Crdr-Int-12-WoodAve.dwg
Location:	Proj ID\dsgn\crdr

Surfaces

Description: Current, complete existing surface
Name: Srfc-<SurfaceName>-<Comments>
Example: Srfc-Ex.dwg
Location: Proj ID\base

Description: Proposed Refinement Surfaces
Name: Srfc-<SurfaceName>
Example: (keeping all refinement surfaces in one file)
Srfc-Rfmt-All-Datum.dwg
Srfc-Rfmt-All-Top.dwg
Location: Proj ID\dsgn\srfc

Design files that are not object specific (these files can contain Civil and/or AutoCAD objects)

Description: Proposed physical features of the roadway
Name: Pavt.dwg
Location: ProjID\dsgn\edgeline

Description: Longitudinal and transverse concrete pavement joints
Name: Pavt-Joints.dwg
Location: ProjID\dsgn\edgeline

Description: Slope intercepts
Name: SI-<Const-Stg>.dwg
Example: SI-S1.dwg
Location: ProjID\dsgn\edgeline

Description: Pavement marking
Name: PM.dwg
Location: ProjID\dsgn\edgeline

Right-of-way (all files located in ProjID\rw\dwg)

Description: Proposed right-of-way, TLE, PLE, etc.
Example: PRW.dwg

Description: Existing right-of-way
Example: ERW.dwg

Description: Right-of-way property lines (can also be stored in ERW.dwg)
Example: ERW-PL.dwg

Description: Right-of-way property pipes (can also be stored in ERW.dwg)
Example: ERW-PP.dwg

Description: Right-of-way section lines (can also be stored in ERW.dwg)
Example: ERW-SecLines.dwg

Description: Combination of existing and proposed right-of-way and easements
Example: Ult-RW.dwg

Plan Sheets (all files located in ProjID\sheets)

Sheet files should be named SSssPP-aa(#) .dwg where:

- SS** is the numerical designation of the primary subject area of the plan sheet.
- ss** is the numerical designation of a subset of the subject area.
- PP** refers to the page number of the sheet. NOTE: If there are multiple layouts in the file, then the file name shall represent the first sheet in the file.
- aa** indicates an alpha abbreviation of the sheet name.
- #** is an optional designation for staged work. For example, an erosion control sheet that was for the second stage of construction could be named 022004-ec2.dwg.

Sheet type	File name	Sheet type	File name
Title Sheet	010101-ti	Traffic Signal Temporary	024101-st
General Notes	020101-gn	Traffic Signal Plan	024201-sp
Project Overview	020201-po	Traffic Signal Phasing	024301-ph
Typical Sections	020301-ts	Cable Routing Chart	024401-cr
Construction Details	021001-cd	Pavement Marking	024501-pm
Intersection Details	021101-id	Advanced Warning Signing	025000-aw
Removal Details	021101-rm	Traffic Control	025100-tc
Plan Details	021201-pd	Stage Construction	026001-s1
Curb Ramp Details	021301-cr	Stage Construction (additional)	026101-s2
Joint Details	021401-jd	Detours	027001-dt
Freeway Mgt System	021501-fm	Fencing	027101-fn
Interchanges	021601-ic	Alignment	027201-ad
Contour Maps	021701-cm	Borings, Other, etc.	027301-xx
Earthwork Matchlines	021801-em	Estimate of Quantities	030101-eq
Erosion Control	022001-ec	Miscellaneous Quantities	030201-mq
Erosion Control staged	022001-ec1	Right-of-Way Plat	040101-rp
Storm Sewer Plan	022501-ss	Plan and Profile	050101-pp
Pipe Underdrain	022601-pu	Plan Sheets	050201-pn
Utility Plan	023001-up	Profiles	050301-pr
Planting	023101-pl	Line Diagram	050401-lid
Permanent Signing	023201-ps	Special Sign Details	070101-sd
Lighting Removal	023401-lr	Earthwork Quantities	090101-ew
Lighting Temporary	023501-lt	Cross Sections	090201-xs
Lighting Plan	023601-lp	Access Control Plan	090301-ac
Traffic Signal Removal	024001-sr		

Civil 3D layout naming standard

Layouts used in the plan set should only be named with a leading zero sheet number within that subsection. If a file has more than 99 layouts, two leading zeros can be used. Layouts not used for the plan set should use standard abbreviations and acronyms in their names.

Example: A plan sheet file that contained a lighting plan with 4 sheets would be named 023601-lp.dwg. The layouts within the file would be named 01, 02, 03, 04.

A description suffix can be added to plan sheet layout names if desired.

Other Plotted Items (all files located in ProjID\sheets\othr)

Description: Public Meeting Displays, other
Name: <Descriptive Name of Purpose and Content>
Example: Aug2010-PublicMtg-IntDetails.dwg

Contractor data files

All files in the contractor data packet should be located in ProjID\const. Civil 3D files that contain Civil 3D object data should be exported to an AutoCAD dwg file. Refer to [WisDOT Civil 3D forms](#) for the list of required files and file formats.

Civil 3D Object Naming Conventions

Abbreviations and acronyms should be used when naming Civil 3D objects. This is because object names can become prefixes for other objects. For example, a profile can have a parent alignment prefix. Object names that are very long can also be difficult to use in certain short dialog boxes in the software. See Attachment 3.2 for standard abbreviations and acronyms. Civil 3D objects should not have a prefix containing the object type. This is unnecessary and can be confusing when object names are passed on to other objects. Hyphens should be used to make object names easier to read.

Another factor to consider when naming Civil 3D objects is their organization. Civil 3D objects are sorted alphabetically by object type within the Data Shortcuts in Civil 3D. Below are guidelines and examples for good object naming conventions in Civil 3D as they would be seen in Data Shortcuts.

Alignments

- Alignment types (Centerline, Offset, Curb Return, and Miscellaneous) are set by Civil 3D from the method that they were created. These values should not be changed. Changing alignment type can break intelligent connections in the case of Offset or Curb Return alignments and problems may occur in targeting these alignments in corridors changing any of the types.
- Road-based alignments should always start with the road number or name. Highways should start with only the number. This will put highways at the top of the list of alignments. County and local road alignments can be prefixed to keep them sorted in order.
- After the road number or name, location should be defined. Undivided highways should use left and right designations. Divided highways should use highway directions with inside and outside designations.
- Right-of-way alignments should be named with RW-<ERW, PRW, or Ult>-<Highway>-<Location>-<Comment>
- Curb return alignments should be named with <Feature Span Type>-<Primary Road>-<Secondary Road>-<Location>-<Feature>

Undivided highway example (with edgelines, right-of-way, and utilities)	Divided highway example	Divided highway using PRL and PGL example
12	12-Med	12-PRL
12-L-EGS	12EB	12EB-PGL
12-L-EPS	12EB-In-EGS	12WB-PGL
12-L-TrnLn	12EB-In-EPS	
12-R-EGS	12EB-In-TrnLn	
12-R-EPS	12EB-Out-EGS	Ramp example
12-R-TrnLn	12EB-Out-EPS	(Rmp prefix)
25-L-Sdwk-In	12EB-Out-TrnLn	Rmp-A
25-R-Sdwk-In	12WB	Rmp-B
Cty-BB	12WB-In-EGS	Rmp-C
Int-12-BB-NE-CG	12WB-In-EPS	
Int-12-BB-NE-Face	12WB-In-TrnLn	OR (keeps ramps close to main alignment)
Int-12-BB-NE-Back	12WB-Out-EGS	
Int-12-BB-NW-CG	12WB-Out-EPS	12
Int-12-BB-SE-CG	12WB-Out-TrnLn	16
Int-12-BB-SW-CG	Cty-BB	94EB
Lcl-WoodAve	Int-12EB-BB-NE-CG	94EB-Rmp-12-Ent
Lcl-RiverBendRd	Int-12EB-BB-NE-Face	94EB-Rmp-12-Ext
RW-ERW-12-L-WoodToBB	Int-12EB-BB-NE-Back	94WB
RW-ERW-12-R-WoodToBB	Int-12EB-BB-NW-CG	94WB-Rmp-12-Ent
RW-PRW-12-L-WoodToBB	Int-12EB-BB-NW-Face	94WB-Rmp-12-Ext
RW-PRW-12-R-WoodToBB	Int-12EB-BB-NW-Back	
RW-Ult-12-L-WoodToBB	Int-12EB-BB-SE-CG	
RW-Ult-12-R-WoodToBB	Int-12EB-BB-SE-Face	
Uti-Elec-WoodCoop-2	Int-12EB-BB-SE-Back	Roundabout example
Uti-Gas1	Int-12EB-BB-SW-CG	Rdbt-12-16-NE-CG
Uti-Gas2	Int-12EB-BB-SW-Face	Rdbt-12-16-NE-Face
25-L-GrdLine-398+96	Int-12EB-BB-SW-Back	Rdbt-12-16-NE-Back
25-L-BrkSlp	Lcl-WoodAve	Rdbt-12-16-NW-CG
25-L-CZ	Lcl-RiverBendRd	Rdbt-12-16-NW-Face
25-L-BG-Rail-398+96		Rdbt-12-16-NW-Back
25-R-BG-Rail-398+97		Rdbt-12-16-SE-CG
25-L-BG-Hinge-398+96		Rdbt-12-16-SE-Face
Alternative example		Rdbt-12-16-SE-Back
12		Rdbt-12-16-SW-CG
12-Alt1		Rdbt-12-16-SW-Face
12-Alt2		Rdbt-12-16-SW-Back
Cty-BB		
Cty-BB-Alt4		

Profiles

Profile names should begin with the parent alignment name. Descriptions should be added after.

Examples:

12-Ex
12-Prop
12-PGL
12-L-Ditch
12EB-Med-Ditch
Int-12-CtyBB-NE-Prop

Assemblies

- Assembly names should describe the location where the assembly is to be used. Descriptive locations are preferred to station based locations to avoid confusion if the extents covered with the assembly change. Station based locations are acceptable. Intent of the assembly does not need to be included in the name.

Examples:

12-Setup-Daylight-Sub
12-Int-WoodAve (mainline section of 12 going through the intersection with Wood Avenue)
12-L-Begin-To-WoodAve
12-R-Begin-To-YellowCreek
Int-12-WoodAve-NW (curb return quadrant at the intersection of 12 and Wood Avenue)
WoodAve

Subassemblies (inside an assembly)

- Subassemblies should be named with the original subassembly name, side, and with a suffix of a target object if one is used. Using an assembly prefix designation is a good practice. A counter number suffix may be necessary if the version of Civil 3D being used requires unique subassembly names.

Examples:

GenCF-R-Dtch-Prof
CGGen
LnGeneric-L-TrnLn

Corridors

- Corridor names should begin with the alignment that most of the corridor is based on.
- Location information should be after the alignment. Descriptive locations are preferred to station based locations to avoid confusion if corridor limits change. Station based locations are acceptable.

Examples:

12-Setup-Daylight-Sub
12-Begin-To-WoodAveE
12-WoodAveE-To-End

Surfaces

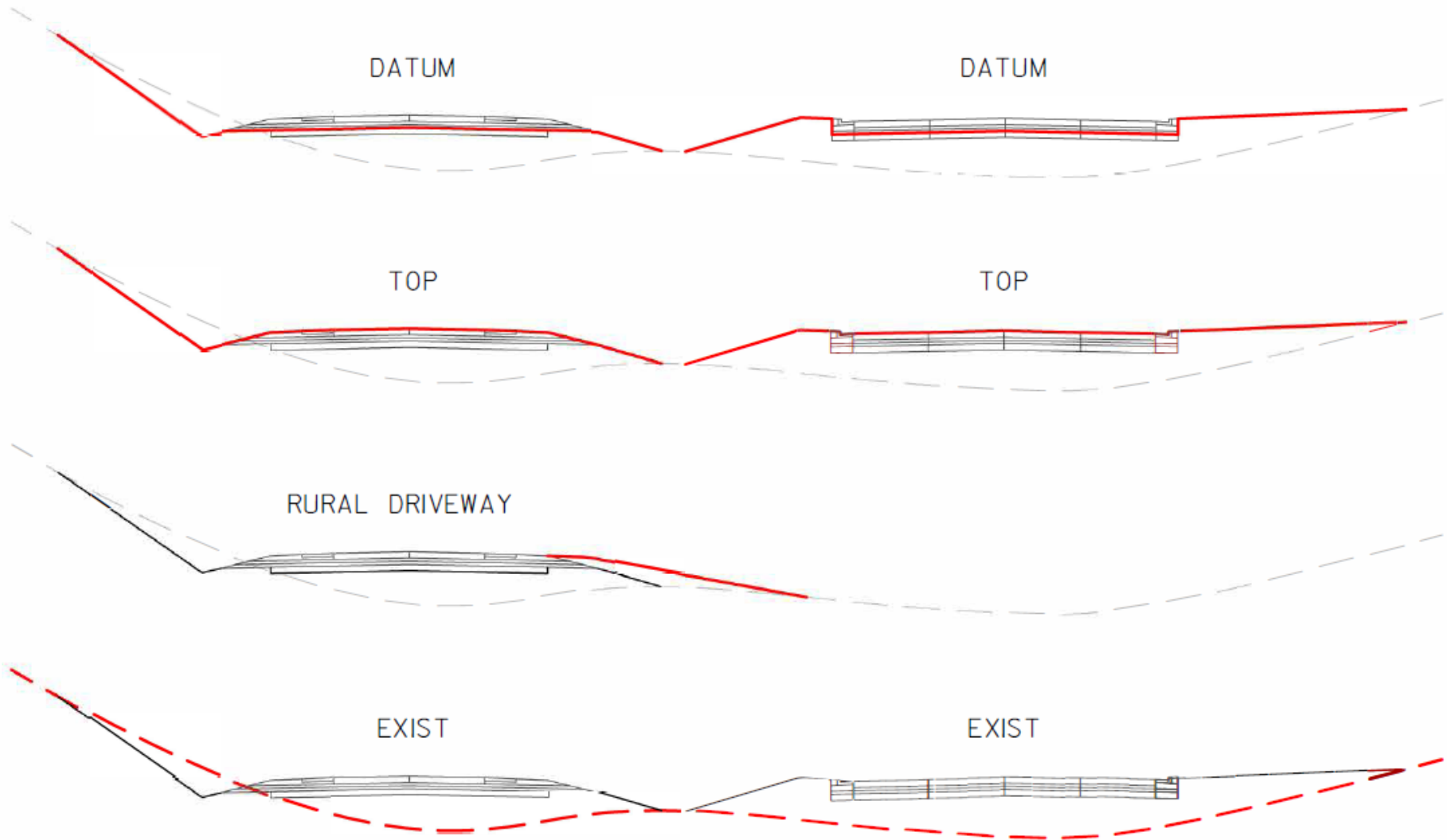
- Existing surfaces should be named "Exist" or begin with Ex.
- Design surfaces should be prefixed with their creation type (Corridor, Refinement, Grading, etc.).
- Corridor surfaces should be named Crdr-<Corridor Name>-<Surface type>.

Examples	
Crdr-12-Begin-To-WoodAveE-BaseCourse	Ex-North
Crdr-12-Begin-To-WoodAveE-Datum	Ex-South
Crdr-12-Begin-To-WoodAveE-PipeDatum	Exist
Crdr-12-Begin-To-WoodAveE-Top	Grdg-Int-12-BB-NE-Sdwk
Crdr-12-WoodAveE-To-End-BaseCourse	Grdg-Int-12-BB-NW-Sdwk
Crdr-12-WoodAveE-To-End -Datum	Rfnt-12-All-BaseCourse
Crdr-12-WoodAveE-To-End -PipeDatum	Rfnt-12-All-Datum
Crdr-12-WoodAveE-To-End -Top	Rfnt-12-All-Top
Rfnt-12-Begin-To-WoodAveE-PipeDatum	

Required PlatExp Folder Content

.dwg layer name	Content	Color	Object type	File Format
E_RW_Existing	Existing Right-of-Way	Green	Polyline	DWG
P_RW_Proposed	Proposed Right-of-Way (FEE, Highway Easement (HE))	Red	Polyline	DWG
P_RW_Parcel	84.09 takings (Fee)	Red	Polyline	DWG
P_RW_Parcel	84.09 takings (HE)	White	Polyline	DWG
P_RW_Parcel	84.09 takings (PLE)	Yellow	Polyline	DWG
P_RW_Ultimate	Ultimate ROW	Cyan	Polyline	DWG
P_RW_AccessAcquisition_Whiskers	Access control symbol - Whiskers	Red	Polyline	DWG
P_RW_AccessPreviousProject_Diamonds	Access control symbol - Diamonds	Red	Polyline	DWG
P_RW_AccessStatute_Balls	Access control symbol – Balls	Red	Polyline	DWG
P_RW_AccessNewRdwy_Triangles	Access control symbol – Triangles	Red	Polyline	DWG
P_RW_EasementPerm	Proposed Permanent Easements (PLE, RDE)	Yellow	Polyline	DWG
E_RW_Easement	Existing Permanent Easements (except HE)	Red	Polyline	DWG
N/A	Schedule of Lands & Interests, each table, Per Sheet (table in separate XLSX file referenced into dwg for table graphics)	N/A	worksheet	XLSX file

SURFACE MODEL TYPES



Add definitions primarily for polyethylene and polypropylene pipe for culverts and storm sewers.

LIST OF STANDARD ABBREVIATIONS

ABUT	Abutment
AP	Access Point
AR	Access Rights
AC	Acre
AGG	Aggregate
AH	Ahead
ET AL	And Others
∠	Angle
AADT	Annual Average Daily Traffic
ASPH	Asphaltic
APM	Asphaltic Plant Mix
AVG	Average
BK	Back
BF	Back Face
B & B	Balled and Burlapped
B & P	Balled and Potted
BR	Bare Root
BRP	Bare Root Potted
BL or B/L	Base Line
BM	Bench Mark
BLK	Block
BR	Bridge
CB	Catch Basin
C	Celsius
CL or C/L	Center Line
CC	Center to Center
Δ	Central Angle or Delta
CH	Chord
CH BRG	Chord Bearing
CE	Commercial Entrance
CONC	Concrete
CB#	Control Base
CO	County
CTH	County Trunk Highway
CR	Creek
CR	Crushed
CABC	Crushed Aggregate Base Course
CY or CUYD	Cubic Yard
CULT	Cultivated
CULV	Culvert
CP	Culvert Pipe
CPCA	Culvert Pipe Corrugated Aluminum
CPCPE	Culvert Pipe Corrugated Polyethylene
CPCPP	Culvert Pipe Corrugated Polypropylene
CPCS	Culvert Pipe Corrugated Steel
CPCSAC	Culvert Pipe Corrugated Steel Aluminum Coated
CPCSPC	Culvert Pipe Corrugated Steel Polymer Coated
CPRC	Culvert Pipe Reinforced Concrete
CPRCHE	Culvert Pipe Reinforced Concrete Horizontal Elliptical
CPS	Culvert Pipe Salvaged
CPT	Culvert Pipe Temporary
C & G	Curb and Gutter
(D)	Deed
DEF	Deformed
D	Degree of Curve
DHV	Design Hour Volume
DIA	Diameter

DD	Directional Distribution
DISCH	Discharge
DIST	District
DG	Ditch Grade
DOC	Document
DWY	Driveway
E	East
X	East Grid Coordinate
EB	Eastbound
ELEC	Electric (al)
EL or ELEV	Elevation
EMB	Embankment
EVP	Emergency Vehicle Preempt
EVPR	Emergency Vehicle Preempt Receiver
EW	Endwall
ENT	Entrance
ESALS	Equivalent Single Axle Loads
EST	Estate
EXC	Excavation
EBS	Excavation Below Subgrade
EXIST	Existing
EXP	Expansion
FF	Face to Face
FP	Fence Post
FERT	Fertilize
FE	Field Entrance
F	Fill
FG	Finished Grade
FAB	Flashing Arrow Board
FL or F/L	Flow Line
FT	Foot
FTG	Footing
FDN	Foundation
FTMS	Freeway Traffic Management System
G	Garage
GN	Grid North
HR	Handicap Ramp
HT	Height
HES	High Early Strength
H	House
CWT	Hundredweight
HYD	Hydrant
IN DIA	Inch Diameter
INL	Inlet
ID	Inside Diameter
INTERS	Intersection
I	Intersection Angle
INV	Invert
IP	Iron Pipe or Pin
JT	Joint
JCT	Junction
JB#	Junction Box
LC	Land Contract
LT	Left
LHF	Left-Hand Forward
L	Length of Curve
LIN FT or LF	Linear Foot
L	Liter
LC	Long Chord of Curve
LS	Lump Sum
MAINT	Maintenance
MGR	Manager

MH	Manhole
MP	Marker Post
M	Marsh
ML or M/L	Match Line
MATL	Material
MB	Message Board
NOM	Nominal
NC	Normal Crown
NW or N/W	Normal Water
N	North
Y	North Grid Coordinate
NB	Northbound
NO	Number
OBLIT	Obliterate
OL	Out Lot
OD	Outside Diameter
PSD	Passing Sight Distance
PAVT	Pavement
B	Pedestrian Push Button
PERM	Permanent
PLE	Permanent Limited Easement
PACS	Pipe Arch Corrugated Steel
PACSAC	Pipe Arch Corrugated Steel Aluminum Coated
PAPCCS	Pipe Arch Polymer Coated Corrugated Steel
PASP	Pipe Arch Structural Plate
PCPCS	Pipe Cattle Pass Corrugated Steel
PCP	Pipe Cattle Pass
PCPRC	Pipe Cattle Pass Reinforced Concrete
PSP	Pipe Structural Plate
PU	Pipe Underdrain
PUU	Pipe Underdrain Unperforated
PUW	Pipe Underdrain Wrapped
PUWP	Pipe Underdrain Wrapped and Plowed
PT	Point
PCC	Point of Compound Curve
PC	Point of Curvature
PI	Point of Intersection
PRC	Point of Reverse Curvature
PT	Point of Tangency
POC	Point On Curve
POT	Point on Tangent
PVC	Polyvinyl Chloride
PCC	Portland Cement Concrete
LB	Pound
PSI	Pounds Per Square Inch
PE	Private Entrance
PROJ	Project
PL	Property Line
PB#	Pull Box
QCD	Quitclaim Deed
R	Radius
RP	Radius Point
RR	Railroad
RY	Railway
RM	Ramp Meter
R	Range
RECY	Recycled
RL or R/L	Reference Line
RP	Reference Point
RCPA	Reinforced Concrete Pipe Arch
REBAR	Reinforcement Bar
REINF	Reinforcing or Reinforcement

REL	Relocate (d)
REM	Remaining
REP	Representative
REQD	Required
RES	Residence or Residential
RW	Retaining Wall
RT	Right
RHF	Right-Hand Forward
R/W	Right-of-Way
R	River
RD	Road
RDWY	Roadway
SALV	Salvaged
SSS	Sanitary and Storm Sewer
SAN S	Sanitary Sewer
SEC	Section
SHLDR	Shoulder
SHR	Shrinkage
SW	Sidewalk
SB#	Signal Base
S	South
SB	Southbound
SP	Special
SC	Special Crossing
SPECS	Specifications
SQ	Square
SF or SQ FT	Square Feet
SY or SQ YD	Square Yard
STD	Standard
SDD	Standard Detail Drawings
STH	State Trunk Highways
STA	Station
SSD	Stopping Sight Distance
SS	Storm Sewer
SSPC	Storm Sewer Pipe Composite
SSPNRC	Storm Sewer Pipe Non-Reinforced Concrete
SSPRC	Storm Sewer Pipe Reinforced Concrete
SSCPE	Storm Sewer Pipe Corrugated Polyethylene
SSCPP	Storm Sewer Pipe Corrugated Polypropylene
SSPRCHE	Storm Sewer Pipe Reinforced Concrete Horizontal Elliptical
STR	Structure or Structural
SUBD	Subdivision
SE	Superelevation
SRFC	Surface
SL or S/L	Survey Line
T	Tangent
TEL	Telephone
TEMP	Temporary
TI	Temporary Interest
TLE	Temporary Limited Easement
TPM	Temporary Pavement Marking
TPMRT	Temporary Pavement Marking, Removable Tape
MBM	Thousand Feet Board Measure
T	Ton
TC	Top of Curb
T or TN	Town
TRANS	Transition
TL or T/L	Transit Line
T	Trucks (percent of)
TYP	Typical
UG	Underground
USH	United States Highway

VAR	Variable
V	Velocity or Design Speed
VERT	Vertical
VC	Vertical Curve
VPCC	Vertical Point of Compound Curve
VPC	Vertical Point of Curve
VPI	Vertical Point of Intersection
VPRC	Vertical Point of Reverse Curve
VPT	Vertical Point of Tangency
VIT	Vitrified
VOL	Volume
W	Water
WM	Water Main
WV	Water Valve
W	Well
W	West
WB	Westbound
YD	Yard



FDM 15-10-1 Plan-in-Hand Field Inspections

November 2, 2001

Upon completion of the plan and prior to finalizing P.S. & E. activities, a plan-in-hand field inspection of the project site must be made. Its purpose is to provide a final observance of current existing field conditions (i.e. recent changes may have taken place in existing field conditions) and a review of the adequacy of various plan details in meeting these conditions. It also provides an opportunity to discover if any work items, potential conflicts, or problem situations have been overlooked during the plan preparation process.

Of major importance is the recognition of necessary items of work which may have been inadvertently omitted from the plan. Because such omissions often develop into problems during either construction or subsequent maintenance activities, region staff involved in construction, maintenance and traffic activities should be represented during this review.

If desirable work items have been purposely omitted from the plan for reasons of minimizing project costs, careful consideration of the future consequences should be made at this time. The omitting of necessary items to hold costs down must be evaluated in terms of future construction costs, additional inconvenience to motorists at a later date, and the potential for increased maintenance expenditures.

FDM 15-10-5 Pedestrian Considerations

December 3, 2008

A careful review of plan details must be made to ensure compatibility with a wide range of potential pedestrian activities. Particular attention should be given to those projects where a rural type job is extended for only a short distance into an urban setting. In these situations pedestrian needs may easily be overlooked.

For example, the securing of mulch using heavy twine and pegs is inappropriate where an errant shopper (or jogger) may unexpectedly become entangled in it. In these situations, tacked mulch, urban erosion mat, or soil stabilizer type A as specified in [standard spec 627](#) and 628 should be specified.

Other situations to be considered are as follows:

1. Locations where protective fencing should be used, such as on the wingwalls of box culverts.
2. The prudent placement or omission of steel marker posts for right of way.
3. The use of inlet grates without longitudinal slots in areas frequented by bicyclists.
4. Grate protection of culverts in areas frequented by children.
5. Adequate lighting, especially at underpass tunnels.
6. Use of refuge islands where wide areas of roadway are crossed by large numbers of pedestrians.

In all cases use good engineering judgment to ensure that roadway designs in urban and urbanizing areas recognize potential pedestrian usage and adequately provide for it.