Section 1300
Plan Components

1301 Introduction

Plan development relies on standards and guidelines to provide clear, concise, and accurate construction documents. Detailed construction plans include illustrations of proposed work, plan notes, specifications, and quantities enabling contractors to bid and execute an ODOT project. Section 1300 has been developed to provide general guidelines under which to develop ODOT construction plans.

Section 1300 combines many components of final plan development and outlines the content required in each plan set. The subsections listed within this document are intended to provide details related to plan format and **not** design standards. ODOT maintains specific manuals related to design standards (i.e. **Bridge Design Manual**, **Location and Design Manual, Volume 1**, **Traffic Engineering Manual**, etc.) which establish design criteria required for the facility.

Section 1300 includes references to Figures and Sample Plans. The figures are additional tables and diagrams emphasizing plan sheet requirements. The figures are referenced with bold text. The following is an example: **Figure 1302-1**.

The Sample Plans are examples of ODOT plan sheets (i.e. Title Sheet, Schematic, Typical Sections, etc.) and are intended to be used as a "guide" to assist the designer with plan development. The Sample Plans are not all inclusive and final plan development in accordance with ODOT standards is the responsibility of the designer. Structural plans (**Bridge Design Manual**) and Right of Way plans (**Right of Way Manual**) shall be developed per their respective manuals. The Sample Plans are referenced with a brackets and bold text. The following is an example: **[SP 1302-1]**.

1301.1 Standard Plans

Standard highway plans are made up of several components. Most of these components are discussed in detail in this section. Except for very complex projects, seldom will all of the components be required in a plan. However, when they are required, they should be located in the order indicated below.

- Title Sheet
- Schematic Plan
- Typical Sections
- General Notes
- Maintenance of Traffic (Notes and Plan Details)
- General Summary
- Subsummaries
- Calculations
- Project Site Plan
- Plan & Profile (Mainline)
- Plan & Profile (Side Roads, ramps, etc.)
- Cross-Sections (Mainline)
- Cross-Sections (Side Roads, ramps, etc.)
- Superelevation Tables

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- Interchange Details
- Intersection Details
- Drive Details
- Storm Sewer Profiles
- Culvert Details
- Channel Details
- Channel Cross-Sections
- Drainage Details
- Retaining Walls (not associated with Structures)
- Sanitary Sewer
- Water Work
- Miscellaneous Details
- Traffic Control
  - Pavement Marking
  - Signing
  - Signals
- Lighting
- Landscaping
- Structures (less than 20' [6.1 m])
- Structures (20' [6.1m] and over)
  - Site Plan
  - General Plan
  - General Notes
  - Estimated Quantities
  - Stage Construction Details
  - Foundation Plan
  - Abutment Details
  - Retaining Wall Details
  - Pier Details
  - Superstructure Details
  - Reinforcing Steel List
- Fence Plan
- Right of Way
  - Right of Way Legend Sheet
  - Centerline Plat
  - Property Map
  - Summary of Additional Right of Way
  - Detailed Right of Way
  - Railroad or Government Land Plats

- Soil Profile/Foundation Investigation (These sheets are not included in the sequential numbering of the construction plan. On the Title Sheet list "Soil Profiles" without sheet numbers. Soil profiles should be numbered separately from the construction plans.)

1301.2 Simplified Plans

Simplified Plans are appropriate when the proposed work is simple and straightforward. Some examples include: guardrail upgrading, pavement marking, herbicidal spraying, mowing, fencing, and resurfacing projects.

Simplified plans contain only the information necessary to minimally describe the type and location of the work. Typically, such plans consist of the following components:

- Title Sheet **[SP 1302-7]**
- Typical Sections
- General Notes
- General Summary, Subsummaries, Calculations
- General plan, sketch, line drawing, or plan and profile
- Special Details

Simplified plans may be used provided they give sufficient information to adequately describe the work so that a contractor can properly bid and construct the project. In some cases, this information can be presented entirely in written format, without the use of drawings. See **Section 1315** for additional information regarding simplified plan content.

1301.3 Order of Precedence

The order of precedence for all contract documents shall be:

1. Addenda.
2. Proposal and Special Provisions.
3. Plans.
4. Supplemental Specifications.
5. Standard Construction Drawings.
6. Standard Specifications.

1302 Title Sheet

1302.1 General

The title sheet serves as a preface for the remainder of the construction plan. It gives a brief description and the length of the project, shows the general location of the project, sets up the specifications under which the project is to be built, states whether traffic is to be maintained or detoured, lists earth disturbed areas, gives an index of all sheets in the plan, lists standard construction drawings, supplemental specifications, and special provisions, and contains the signature of approval by the proper officials.

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The information to be included on the Title Sheet is discussed in the following sections.

1302.2 Plan Title

1302.2.1 Heading

All construction plans processed by the Ohio Department of Transportation must show in bold letters at the top of the Title Sheet, “STATE OF OHIO, DEPARTMENT OF TRANSPORTATION”.

Metric projects shall be identified by a metric logo placed near the upper right corner of the Title Sheet.

1302.2.2 Project Designation

1302.2.2.1 Projects in One or Two Counties

A. On-System Projects - Projects on the state system are identified by county code, route number and section number to the nearest hundredth of a mile [thousandth of a kilometer] (straight-line mileage [straight-line distance]) as shown in the following example **[SP 1302-4]** for a project in Wyandot County, on Route 30, beginning at straight-line mileage 9.11[straight-line distance 14.661].

WYA-30-9.11

[WYA-30-14.661]

The county code consists of the first three letters of the county name with the following exceptions:

County	Code
Ashland	ASD
Ashtabula	ATB
Champaign	CHP
Harrison	HAS
Meigs	MEG
Monroe	MOE
Montgomery	MOT
Morgan	MRG
Morrow	MRW

The route number is identical to the actual route number assigned to the highway on which the improvement is located. The section number is the straight-line mileage (SLM) [straight-line distance (SLD)] at the point where the project begins, measured from the county line in miles [kilometers] from west to east for east-west routes or from south to north for north-south routes, as the route is viewed across the entire state.

Listed below are several special conditions which may be encountered in determining a project designation for a project on the state system.

County Line Located on Project Centerline
The county code letters should be in accordance with the predetermined straight-line mileage [straight line distance] assignment as listed in the Straight Line Diagrams.

Project Limits Extend into Adjacent County
A project designation must be shown for each county.

FRA-3-26.18, DEL-3-0.00

[FRA-3-42.133, DEL-3-0.000]

or

FRA/DEL-3-26.18/0.00

[FRA/DEL-3-42.133/0.000]

Work Limits Extend into Adjacent County
The adjoining county code letters are shown in parentheses.

TUS-77-10.64(STA)

[TUS-77-17.123(STA)]

More than One Route (Not Overlapping)
A separate project designation is used for each.

UNI-31-8.19, UNI-37-2.04

[UNI-31-13.180, UNI-37-3.283]

or

UNI-31/37-8.19/2.04

[UNI-31/37-13.180/3.283]

Overlapping Routes - For projects on overlapping highways of different systems (Interstate, U.S. or State), only the project designation for the highest-classed system should be used. For overlapping routes on the same system, the project designation for the lowest route number is used.

Intersecting Routes - A separate project designation is not required when other routes intersect the proposed improvement (junction or grade separation) unless it is determined that the intersecting route will have different funding than the principal route.

Suspended Projects - A separate straight-line mileage [straight-line distance] section number is used at the point the project limit is resumed. The example below and **[SP 1302-2]** shows a project limit that begins at SLM 21.73 [SLD 34.980], is suspended for a distance, then is resumed at SLM 22.33 [SLD 36.751]. For additional information on how to determine project limits, see **Section 1303.6**

DAR-121-(21.73) (22.33)

[DAR-121-(34.980) (36.751)]

For projects with numerous suspend/resume the words "and various" may be used within the project designation as shown as follows and in **[SP 1302-5].**

ERI-2-30.51 and various

[ERI-2-49.114 and various]

B. Off System Projects - The project designation for improvements on county or township road systems include the county code, county or township route number, and local name (if any). A section number may also be included, if appropriate. **[SP 1302-6(a)]**

CRA-C.R. 6–1.61 (Boundary Rd.)

[CRA-C.R. 6-2.592 (Boundary Rd.)]

POR-T.R. 233D (Asbury Road)

If a route number is not available, City street improvements simply use the county code letters and the street name as the project designation. **[SP 1302-1]**

JEF-FERNWOOD RD.

1302.2.2.2 District-Wide Projects

District-wide projects are defined as projects that involve work in three or more counties within the District. The project designation for a District-Wide project is as follows: District Identifier - Project Type - Fiscal Year. The following example is for a district-wide pavement marking plan in District 4 that is scheduled to be awarded in fiscal year 2010.

D04-PM-FY2010

There may be a need to have multiple projects of the same project type in the same district in one fiscal year. If this is the case, the project designation is as follows:

D04-PM-FY2010(A)

and

D04-PM-FY2010(B)

The following is a list of project types. Contact the **Office of Production** if another project type is needed.

BC - Bridge Cleaning
BH - Bridge Repair
BI - Bridge Inspection
BK - Generic PIDs (Block)
BP - Bridge Painting
CB - Catch Basins
CH - Cleaning/Sweeping highways
CHIP - Chip Seal
CR - Small Culvert Repair/Replacement
(Rise < 60” [1500 mm], round or elliptical conduit only)
CS - Crack Sealing
FEN - Fence
ENV - Environmental
GT - Geotechnical
GES - General Engineering Services Contract
GR - Guardrail
HS - Herbicidal Spraying
IMC - Interstate Maintenance Contract
ITS - Intelligent Transportation Systems
LG - Lighting
LOOP - Loop Detector Repair
MOW - Mowing
NW - Noise Walls
PM - Pavement Marking
PR - Pruning, Tree/Brush removal
PS - Pavement/Shoulder Sealing
RPM - Raised Pavement Markers
RS - Ride Share
RUM - Rumble Strips
SIGN - Signing
SP - Spot Paving (under 1000’ / [305m])
TSG - Traffic Signals
WIM - Weigh in Motion

1302.2.2.3 Statewide Projects

Statewide projects should use the same project designation as District-wide projects; except, the District Identifier is replaced with STW. For example: STW-ITS-FY2013.

1302.2.3 Political Subdivisions

Whenever any work is located within a political subdivision, it is necessary to include the name of the subdivision. If the improvement is located entirely within the corporate limits of a city or village, the township name is omitted. The order of political subdivisions from top to bottom is: city, village, township, and county. If the work limits extend into an adjoining county, the county is shown in parentheses. The following example shows how a title would read when portions of the improvement are located in several political subdivisions and the work limits extend into the adjoining county.

TUS-77-0.00 (STA) [TUS-77-0.000 (STA)]

CITY OF TROY

VILLAGE OF SPARTAN

OXFORD TOWNSHIP

TUSCARAWAS COUNTY

(STARK COUNTY)

1302.2.4 Railroads

When the improvement involves a railroad separation, the involvement must be indicated by a subtitle under the project designation **[SP 1302-3]**.

Grade Crossing Elimination - When an existing railroad grade crossing is to be eliminated by constructing a separation or relocating the highway, the following subtitle should be used:

GRADE CROSSING ELIMINATION WITH THE _____ RAILROAD

Separation Constructed Without Elimination - When the highway is to be separated from a railroad and the existing railroad grade crossing is not eliminated, use the following subtitle:

GRADE SEPARATION WITH THE _____ RAILROAD

Existing Separation Rebuilt - When an existing separated crossing is to be rebuilt, the subtitle should read:

RECONSTRUCTION OF EXISTING SEPARATED CROSSING WITH THE _____ RAILROAD

Projects with grade separations or any other railroad involvement should list the railroad company name in the Railroad Involvement portion of the title block.

It should be noted that some companies are incorporated as railroads and some as railways. Verify the proper name is placed on the title sheet.

1302.2.5 Title Block

See Section 1201.5 for required title block information. The Construction Project Number will be filled in during final plan processing. For projects that do not use federal funds list “Non-Federal” under Federal Project Number. For projects without Railroad Involvement list “None” in the Railroad Involvement block.

1302.3 Design Designation

The Design Designation is an expression of the basic factors that control the design of the highway. It may be included in the plan for any type of construction project, but it is required on any improvement having pavement work or geometric changes.

Normally, only one representative Design Designation is necessary. On improvements involving interchanges, major intersections, or other major traffic generators that materially affect traffic volumes,

additional Design Designations are required. Design designations are necessary for side roads if relocation or significant improvements equal to or greater than three-hundred feet (300') are involved. If only one Design Designation is used, it should be shown on the Title Sheet. On improvements requiring more than one Design Designation, they should be shown on a special sheet or on the Schematic Plan with the location noted in the Index of Sheets.

The following is an example of the Design Designation format **[SP 1302-1 through 1302-6(b)]**:

DESIGN DESIGNATION (ENGLISH UNITS)

Current ADT (2010)	10,390
Design Year ADT (2030)	25,200
Design Hourly Volume (2030)	2,520
Directional Distribution	55%
Trucks (24 hour B&C)	2.6%
T_d	4%
Design Speed	50 MPH
Legal Speed	40 MPH
Design Functional Classification:	Urban Arterial
NHS Project	Yes

DESIGN DESIGNATION (METRIC UNITS)

Current ADT (2010)	10,390
Design Year ADT (2030)	25,200
Design Hourly Volume (2030)	2,520
Directional Distribution	55%
Trucks (24 hour B&C)	2.6%
T_d	4%
Design Speed	80 km/h
Legal Speed	40 MPH (64 km/h)
Design Functional Classification:	Urban Arterial
NHS Project	Yes

Current ADT is the Average Daily Traffic for the anticipated opening year of the project. Design year is defined in **Location and Design Manual, Volume 1, Section 102.2**. T_d is the percentage of trucks during the design hour in the design year, and is required for interstates, other freeways and expressways only.

Legal speeds are defined by the Ohio Revised Code in miles per hour. For metric plans, the legal speed is shown on the Title Sheet in miles per hour followed by the converted speed in kilometers per hour. This converted speed should be rounded to the nearest kilometer per hour.

If the project design is based on 3R **[SP 1302-1]** values as described in **Location and Design Manual, Volume 1, Section 901**, the phrase "3R Project" should be used in lieu of the design speed. If a project mixes 3R work with other work that does not qualify as 3R, it is necessary to delineate or tabulate the non-3R portions and indicate the applicable design speeds.

The Design Functional Classification is based on **Location and Design Manual, Volume 1, Section 101** and includes Rural Interstate, Rural Freeway (Expressway), Rural Arterial, Rural Collector, Local Road, Urban Interstate, Urban Freeway (Expressway), Urban Arterial, Urban Collector, and Local Street. For projects with multiple design designations (e.g., more than one route), this information may be shown on a sheet other than the title sheet. The title sheet must include a reference to the sheet(s) where these items are shown. **[SP 1302-5]**

1302.4 Design Exceptions

Design Exceptions are required as specified in **Location and Design Manual, Volume 1, Section 105**. The difference between the actual design and the normal design criteria must be clearly denoted on the appropriate plan sheet in the construction plans.

Design exceptions should be shown on the plan sheets in accordance with the guidelines on **Figure 1302-3** and on the Title Sheet **[SP 1302-1]** utilizing the following format.

DESIGN EXCEPTIONS

Design Feature	Approval Dates	Sheet Numbers
Lane Width	7/7/10	24
Bridge Width	7/7/10	46

If there are no design exceptions, indicate this by adding the words "None Required".

1302.5 Index of Sheets

The index serves as a table of contents for the entire set of plans. Soil profile and structure foundation sheets should appear in the index without sheet numbers. Eight and one half inches by eleven inches geotechnical data from geotechnical reports may be included as special provisions.

Since sheets are often added, deleted or rearranged during plan development, the final sheet numbering is usually deferred until the Stage 3 Review. To assist the reviewer in describing review comments, sheets should be designated with numerical or alphabetical characters for each review submission.

As a last resort, sheets may be inserted into the plan by alphabetizing (Example: 88A, 88B, 88C, etc.). All alphabetized sheets must be shown in the Index of Sheets. The last actual sheet number in the plan is never alphabetized. **[SP 1302-4]**

Sheet numbers that are not used must be noted as "Not Used". **[SP 1302-4]**

It is extremely important that the Index of Sheets agrees exactly with the plan sheet numbering system to ensure that the plan is complete.

1302.6 Plan Preparer Identification

1302.6.1 Engineer's Seal

All construction plans, including those prepared by ODOT staff, must be sealed by a Registered Professional Engineer **[SP 1302-1]** in accordance with Ohio Revised Code. More than one Engineer may seal the title sheet or different Engineers may seal different portions of a plan (e.g., seal on bridge site plan to cover all bridge work). It must be clear what design elements each seal covers. **[SP 1302-2]** A single Engineer's seal on the Title Sheet is assumed to cover the entire plan; unless otherwise noted.

A handwritten signature and date placed adjacent to or across the seal is also required. Electronic files shall have the computer-generated seal removed from the electronic file before transmittal to ODOT. An electronic transmission with no computer-generated seal shall have the following inserted in place of the signature and date: "This document was originally issued by ..... (name of registrant) on ..... (date). This document is not considered a sealed document."

Any design changes after the plans have been sealed should be performed by the Engineer who sealed the plans. If this is not possible, all design changes shall be clearly noted and sealed somewhere in the plans. This may be accomplished by a general note listing all changes or by a revision block on each sheet that is affected. **[SP 1302-6(a)]**

Sample Plan [SP 1302-1 through 1302-7] shows the normal placement of the Engineer's seal. The Engineer must sign and date the plans immediately below the seal.

Requirements for sealing plans by professional surveyors (e.g., Right of Way plans) are covered in the **Right of Way Manual**.

1302.6.2 Design Firm Information

The name and address of the firm preparing the plan shall be shown **[SP 1302-1 through 1302-7]**.

1302.7 Underground Utilities Note

The "Before You Dig" warning note must be on the Title Sheet for all plans. The exact wording is shown on the Title Sheet examples in the Sample Plan Sheets **[SP 1302-1 through 1302-7]**.

1302.8 Location Map

The Location Map **[SP 1302-1 through 1302-7]** shows the general area in which the project is located and the project limits. The map should be approximately 7" x 7" [175 mm x 175 mm], for a full size plan, and 3 1/4" x 3 1/4" [85 mm x 85 mm], for a simplified plan, with north pointing toward the top of the sheet. A scale of 1" = 1 mile [1:50000] is often used, however, the map scale shall be such that the limits of the

project are clearly identified and the lettering clearly legible on an 11"x17" [279 mm x 432 mm] reduced set of plans. The latitude and longitude shall be provided for the project. They shall be measured to the center of the project and shall be accurate to the nearest 5 seconds of a degree. Latitude and longitude are required for all projects because the geographic references are used to identify project locations for use in estimating software and in computer analysis of bid data. The latitude and longitude values need to be presented accurately to provide reliable results utilizing the estimating software.

The Location Map shall contain sufficient information to clearly show the location of the improvement with respect to: federal, state, county and township roads; identifiable streets in urban areas; villages, cities, townships and counties; and rivers and creeks. ODOT maintains an application for use in placing location maps. The application utilizes area maps from the **Office of Technical Services**, and is available for download from the ODOT web site.

Detour routes should be shown on the Location Map **[SP 1302-2]** if possible. If not, the detour shall be shown on the Schematic Plan or Maintenance of Traffic Sheets **[SP 1302-6(a)]** and so noted in the Index of Sheets.

On district wide contracts the latitude and longitude used shall be the centroid of the district.

1302.9 Supplemental Specifications

A list of the Supplemental Specifications (including the current revision date) applicable to the project shall be included on the Title Sheet **[SP 1302-1]**. Supplements, 1000 series and above, are not to be listed on the Title Sheet.

Supplemental Specification 800 is used as a boiler plate specification. That is, it includes errata and other corrections to the Construction and Materials Specifications. As such, the current revision date used on the Title Sheet should match the quarterly revision date that will be in effect when the Engineers Estimate is completed by the **Office of Estimating**. This date corresponds to the “Estimate Completed – All changes by addenda from this date forward” on the letting scheduled published by the **Office of Estimating**.

1302.9.1 Special Provisions

When a special provision is needed for a project, the title and date of the special provision will be listed on the Title Sheet **[SP 1302-1]**. See **Section 1305.3.**

1302.10 Standard Construction Drawings

A list of up-to-date Standard Construction Drawings (including the current revision date) applicable to the project shall be included on the Title Sheet. Standard Construction Drawings are published in three sets. The sets include Roadway Drawings, Bridge Drawings, and Traffic Drawings and are maintained by the following offices:

1. Roadway Drawings

Drawing Series:	Office:
BP (Base Pavement) (BP-1.1; 2.1;2.2;2.3:2.4:2.5:2.6:3.1:6.1:8.1)	**Office of Pavement Engineering**
BP (BP-4.1;5.1;7.1;9.1)	**Office of Roadway Engineering**
CB (Catch Basins)	**Office of Structural Engineering**

DM (Drainage Miscellaneous)	**Office of Structural Engineering**
F (Fence)	**Office of Roadway Engineering**
GR (Guardrail)	**Office of Roadway Engineering**
HW (Headwalls)	**Office of Structural Engineering**
I (Inlets)	**Office of Structural Engineering**
LA (Landscaping)	**Office of Roadway Engineering**
MH (Manholes)	**Office of Structural Engineering**
RM (Roadway Miscellaneous)	**Office of Roadway Engineering**
WQ (Water Quality)	**Office of Structural Engineering**

2. Bridge Drawings

Drawing Series:	Office:
A	**Office of Structural Engineering**
AS	**Office of Structural Engineering**
BR	**Office of Structural Engineering**
BS	**Office of Structural Engineering**
CPA	**Office of Structural Engineering**
CPP	**Office of Structural Engineering**
CS	**Office of Structural Engineering**
DBR	**Office of Structural Engineering**
DS	**Office of Structural Engineering**
EXJ	**Office of Structural Engineering**
FB	**Office of Structural Engineering**
GSD	**Office of Structural Engineering**
ICD	**Office of Structural Engineering**
PCB	**Office of Structural Engineering**
PSBD	**Office of Structural Engineering**
PSID	**Office of Structural Engineering**
RB	**Office of Structural Engineering**
SB	**Office of Structural Engineering**
SBR	**Office of Structural Engineering**
SICD	**Office of Structural Engineering**
TBR	**Office of Structural Engineering**
TST	**Office of Structural Engineering**
VPF	**Office of Structural Engineering**

3. Traffic Drawings

Drawing Series:	Office:
HL (Highway Lighting)	**Office of Traffic Engineering**
MT (Maintenance of Traffic)	**Office of Traffic Engineering**
TC (Traffic Control)	**Office of Traffic Engineering**

The Title Sheet includes a table listing the Standard Drawings that apply to the project. During plan preparation the drawings should be grouped by set, listed in alpha-numeric order within that set, and added to the Title Sheet **[SP 1302-1]**.

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1302.11 Project Description and Earth Disturbed Areas

1302.11.1 Project Description

The Project Description consists of a brief note describing the primary purpose of the improvement and the project length.

The project length is the total distance between the begin and end project points, adjusted for suspensions and station equations, measured along the centerline of construction. It is calculated to the nearest hundredth of a mile [thousandth of a kilometer]. In addition, the Project Description should describe other incidental construction. Incidental construction may include the following items (unless they are included in the primary construction): bridge work, interchanges, major connecting roads, lighting, traffic control, etc. The descriptions should use words and phrases such as: resurfacing of; widening and resurfacing of; reconstruction of; relocation of; construction of; rehabilitation of; replacement of; etc.

1302.11.2 Earth Disturbed Areas

For Maintenance Projects per **Location and Design Manual, Volume 2, Section 1112.2**, the following items should be included in the Project Description:

Project Earth Disturbed Area = N/A (Maintenance Project)
Estimated Contractor Earth Disturbed Area = N/A (Maintenance Project)
Notice of Intent Earth Disturbed Area = N/A (Maintenance Project)

For non Maintenance projects involving very little to no earthwork, such as light strain pole and weigh in motion device installation, the following descriptions apply: **[SP 1302-7]**.

Project Earth Disturbed Area = N/A
Estimated Contractor Earth Disturbed Area = N/A
Notice of Intent Earth Disturbed Area = N/A

All other projects must list acreages for the following: **[SP 1302-1]**

Project Earth Disturbed Area:
Estimated Contractor Earth Disturbed Area:
Notice of Intent Earth Disturbed Area:

1302.12 Notes

1302.12.1 Limited Access

The following note should be used on the Title Sheet when any portion of the existing or proposed right of way is designated as limited access (includes cases where bridges span a limited access facility): **[SP 1302-4]**

LIMITED ACCESS

THIS IMPROVEMENT IS ESPECIALLY DESIGNED FOR THROUGH TRAFFIC AND HAS BEEN DECLARED A LIMITED ACCESS HIGHWAY OR FREEWAY BY ACTION OF THE DIRECTOR IN ACCORDANCE WITH THE PROVISIONS OF SECTION 5511.02 OF THE OHIO REVISED CODE.

1302.12.2 Specifications

The following note shall be used to indicate the publication date of the Construction and Material Specifications used on the project. The current specification revision year shall be used. Plan details and pay items must be modified to reflect the specification year used.

_____ SPECIFICATIONS

THE STANDARD SPECIFICATIONS OF THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, INCLUDING CHANGES AND SUPPLEMENTAL SPECIFICATIONS LISTED IN THE PROPOSAL SHALL GOVERN THIS IMPROVEMENT.

1302.12.3 Maintenance of Traffic Endorsement

All contract plans are to be endorsed. One of the notes below shall be used on the Title Sheet as appropriate. It may be necessary to alter these notes to some degree so that the intent clearly and accurately reflects the project conditions. **[SP 1302-5]**

Traffic Not Rerouted

I HEREBY APPROVE THESE PLANS AND DECLARE THAT THE MAKING OF THIS IMPROVEMENT WILL NOT REQUIRE THE CLOSING TO TRAFFIC OF THE HIGHWAY AND THAT PROVISIONS FOR THE MAINTENANCE AND SAFETY OF TRAFFIC WILL BE AS SET FORTH ON THE PLANS AND ESTIMATES.

Traffic Rerouted

I HEREBY APPROVE THESE PLANS AND DECLARE THAT THE MAKING OF THIS IMPROVEMENT WILL REQUIRE THE CLOSING TO TRAFFIC OF THE HIGHWAY AND THAT DETOURS WILL BE PROVIDED AS INDICATED ON SHEET _____ .

Traffic Rerouted for Brief Time Periods

I HEREBY APPROVE THESE PLANS AND DECLARE THAT THE MAKING OF THIS IMPROVEMENT WILL NOT REQUIRE THE CLOSING TO TRAFFIC OF THE HIGHWAY EXCEPT AS NOTED ON SHEET ____ , AND THAT PROVISIONS FOR THE MAINTENANCE AND SAFETY OF TRAFFIC WILL BE AS SET FORTH ON THE PLANS AND ESTIMATES.

Traffic Rerouted Majority of Time

I HEREBY APPROVE THESE PLANS AND DECLARE THAT THE MAKING OF THIS IMPROVEMENT WILL REQUIRE THE CLOSING TO TRAFFIC OF THE HIGHWAY EXCEPT AS NOTED ON SHEET _____ , AND THAT DETOURS WILL BE PROVIDED AS INDICATED ON THE PLANS.

Traffic Rerouted Approximately Half Time

I HEREBY APPROVE THESE PLANS AND DECLARE THAT THE MAKING OF THIS IMPROVEMENT WILL REQUIRE THE PART TIME CLOSING OF THE HIGHWAY TO TRAFFIC, AS NOTED ON SHEET _____. DURING WHICH TIME DETOURS WILL BE PROVIDED AS SHOWN HEREIN. PROVISIONS FOR THE MAINTENANCE AND SAFETY OF TRAFFIC WILL BE AS SET FORTH ON THE PLANS AND ESTIMATES.

Traffic Rerouted for Side Road Closure

I HEREBY APPROVE THESE PLANS AND DECLARE THAT THE MAKING OF THIS IMPROVEMENT WILL NOT REQUIRE THE CLOSING TO TRAFFIC OF THE HIGHWAY EXCEPT FOR THE SIDE ROADS AS DESCRIBED ON SHEETS _____ AND THAT PROVISIONS FOR THE MAINTENANCE AND SAFETY OF TRAFFIC WILL BE AS SET FORTH ON THE PLANS AND ESTIMATES.

1302.12.4 Prima Facie Speed Limit

The following note is to be used on the Title Sheet, located immediately above the plan signatures, for all projects where speed limits are legally reduced through work zones.

UNDER AUTHORITY OF SECTION 4511.21, DIVISION (H) OF THE OHIO REVISED CODE, THE REVISED PRIMA FACIE SPEED LIMITS AS INDICATED HEREIN ARE DETERMINED TO BE REASONABLE AND SAFE, AND ARE HEREBY ESTABLISHED FOR THE DURATION OF THIS PROJECT. THE PRIMA FACIE SPEED LIMIT OR LIMITS HEREBY ESTABLISHED SHALL BECOME EFFECTIVE WHEN APPROPRIATE SIGNS GIVING NOTICE THEREOF ARE ERECTED.

1302.13 Plan Signatures

Approval spaces shall be provided for the following:

- District Deputy Director
- Director, Department of Transportation

When additional signatures are desired, such as those for city or county officials, they shall appear directly above the District Deputy Director **(SP 1302-1, SP 1302-6(a)]**. Local officials should sign the Title Sheet prior to submission of final tracings to the district office.

1302.14 Combined Plans

When construction plans for two or more projects are combined to be sold as one construction project, the following Title Sheet **[SP 1302-6(a), SP 1302-6(b)]** changes should be made:

- Add “Part 1” after the project designation on the first title sheet. Add “Part 2”, “Part 3”, etc. to each succeeding plan title sheet.
- Cross reference all parts on all title sheets. For example, on the first title sheet for a three part project, add “For Part 2 see _____” and “For Part 3 see _____ .”

- Expand the Standard Construction Drawings, Supplemental Specification and Special Provisions lists on the Part 1 title sheet to include those required for all parts. Remove Standard Construction Drawing, Supplemental Specification and Special Provisions lists from all subsequent title sheets and add a cross-reference to Part 1.

In addition to the above title sheet changes, the type of Field Office specified in each plan should be adjusted to provide for the combined construction costs; and, the maintenance of traffic should be coordinated for all parts.

Items 614, 619, 623, and 624 should be provided on all parts where they are applicable.

1303 Schematic Plan

1303.1 General

The purpose of a Schematic Plan **[SP 1303-1]** is to show the geometric location of proposed roadway segments in relation to existing roadway segments and other features. All projects shall include a Schematic Plan unless the project is short enough to be shown entirely on less than four Plan & Profile sheets.

Schematic Plans are normally prepared to a scale of 1"=100', 1"=200', or 1"=400' [1:1000, 1:2000, or 1:5000]. It is preferable to limit the Schematic Plan to one sheet. The scale shall be shown in bar format.

Many of the features included on a Schematic Plan are discussed in the following sections. Other features may be added, as necessary, to provide a clearer picture of the proposed improvement and its relationship to existing facilities.

1303.2 Reference Lines

All reference lines should be clearly shown on the Schematic Plan **[SP 1303-1]**. These include the centerline of construction, baselines of ramps, directional roadways and other similar facilities. The centerline of construction and centerline of Right of Way should normally be the same. When they differ, their relationship to each other must be shown in the plan.

With modern survey technology, topographic surveys are no longer completed based on a centerline of survey. Consequently, survey centerlines are a misnomer and should not be shown.

The intersection angle as well as the intersecting stations should be shown for all intersecting roadways. It may be more convenient to show this information on an intersection detail.

1303.3 Stationing

In general, tick marks shall be shown at full stations (100 ft. intervals) along the center and base reference lines. Stationing shall increase in the direction of the straight-line mileage [straight-line distance].

For metric plans, full stations (1 km intervals), and tick marks at intermediate points no more than 20 meters apart, shall be shown along all center and base reference lines. Full stations and intermediate points in even multiples of 100 meters (e.g. +100, +200, etc.) should be labeled.

The Schematic Plan should generally be oriented in such a manner that the stationing on the mainline will increase from left to right regardless of the north direction **[SP 1303-2]**.

Ramp stationing should be a continuation of mainline stationing from the exit or entrance nose, and should increase or decrease along the ramp as it does along the mainline. In general, it is not desirable to use ramp stations in the terminal area, as the required pavement slopes and transitions can be laid out using the mainline stations.

Station equations, if necessary, are to be indicated on the reference line by stating the station back and station ahead **[SP 1303-3]**.

1303.4 Bearings

Bearings shall be shown for the tangent sections of all reference lines.

1303.5 Horizontal Curve Data

Horizontal curve data and deflections without curves for all existing and proposed alignments must be shown on the Schematic Plan. **Figures 1303-1 through 1303-3** show elements and data for simple curves, spiral curves and combining spirals between two simple curves. Curve data (except angles) should be shown to two [three] decimal place accuracy. Deflections without curves are identified as follows:

P.I. = Sta. _____

Deflection = _____

NO CURVE

Use "e_{max} = NC" to indicate that normal crown is provided.

1303.6 Project Limits

Project limits are points on the mainline centerline of construction where the proposed improvement, as described in the project description on the Title Sheet (excluding incidental construction), begins and ends. Incidental construction includes all work required to complete a project in addition to the primary purpose for the improvement. Work such as pavement feathering and tapering, traffic control devices, drainage, guardrail, drives, side roads, service roads, etc. may be considered as incidental construction and not be included in the project limits.

Where the primary work on the mainline is suspended for a substantial distance, suspend and resume project points must also be shown. Begin Project, End Project, Suspend Project, and Resume Project are each shown on the Schematic Plan and the Plan & Profile sheets by both stationing and straight-line mileage (SLM) [straight- line distance (SLD)].

1303.7 Work Limits

Work Limits are the extreme limits of the contractor's responsibility on a project, including all temporary and incidental construction, with the exception of work zone traffic control devices required for maintenance of traffic. Work Limit stations are shown along the centerline of construction of the mainline

facility and along the centerline of all side roads, cross roads, and other construction generally running perpendicular to the project or separated from the project.

1303.8 Federal Project Flags

Federal Project Flags, including Federal Project numbers, should be placed at the project limits **[SP 1303-2]**. The flags should always point toward the project. If more than one Federal number is used, the limits of each Federal number should be shown, again pointing to the portion of the project to which it applies.

1303.9 Political Boundaries

All county, township, corporation limits, and other political boundaries shall be labeled. The station where these boundaries intersect the centerline of construction shall be shown. When the political boundary is located along the centerline, stationing shall be shown at the points where the political boundary meets and leaves the centerline.

1303.10 Waterways

All waterways (lakes, rivers, streams, creeks, etc.), crossing or adjacent to the proposed improvement, shall be shown by name, and the direction of flow shall be indicated. This includes any relocated waterways.

1303.11 Bridges

All bridges, existing and proposed, shall be shown at their appropriate location and identified by their structure number, including left and right notation.

1303.12 Roads for Maintaining Traffic

The location of all roads for maintaining traffic located on an independent alignment shall be shown. Roads for maintaining traffic may be shown using centerline only.

1303.13 Railroads

All railroads in the vicinity of the proposed improvement shall be shown. If a railroad intersects the highway, the station shall be indicated.

1303.14 Utility Lines

High voltage power lines and other major overhead utilities shall be shown. High pressure underground utility lines shall also be shown. Include size/voltage and ownership for these lines **[SP 1303-3]**.

1303.15 Pipelines

All major pipelines shall be located and shown.

1303.16 Service/Public Roads

All existing and proposed service roads and other public roads shall be shown and identified by the name and number.

1303.17 Culverts and Sewers

All existing and proposed culverts shall be shown at their appropriate location and the size indicated. Include flow arrows showing direction of flow in the culvert. List the structure number for any structure on the State/Federal system having a span greater than or equal to 10 feet [3.0 meters].

Outfall sewers shall be shown.

Drive pipes do not need to be shown.

1303.18 Landscaped Areas

All existing and proposed landscaped areas should be shown. If no landscaped areas exist, then include the phrase "There are no existing landscaped areas within the work limits."

1303.19 Participation Splits

All participation split locations shall be shown. This usually applies to situations where portions of the project are financed under different Federal Project Numbers, are split by municipal corporation lines, or there are areas to be paid for by only one agency.

1303.20 Contractor's Use of ODOT Right-of-Way

On large projects it may be economical for the Department to permit the contractor to use ODOT property to dispose of waste material and construction debris, excavate borrow material or place a portable plant.

These areas should be checked to ensure that their use is in keeping with all design criteria, environmental regulations and public involvement commitments. When evaluating an area for waste material the designer should consider future widening and the location of underground utilities.

Areas where the above activities are permissible should be identified in the plans (i.e., on the schematic plan, on the plan and profile sheets, on the cross-sections, in a plan note). Grading restrictions should be identified on the cross sections or specified in the General Notes. Unless additional requirements are provided in the plans, there are no limits on the type of waste material that can be used (e.g., plant material, stumps, etc.). The plan should show if environmental and/or FEMA permits have been obtained or if the contractor is required to obtain them.

1303.21 Wetlands

All existing wetlands within 100 feet [30 meters] of the proposed construction limits shall be shown. Wetlands are located and delineated as per the **Office of Environmental Services Ecological Manual**.

1303.22 Benchmarks and Reference Points

All reference points needed to reestablish the highway alignment must be shown. A bench mark is to be shown at least every 1000' [300 m] of alignment and on each side of all streams.

Coordinate information shown in the plans will show all necessary information concerning the coordinate system used in the creation of the plans. Information that will be required is Coordinate System Name, Control Stations used to establish control, Scale Factor, whether coordinates shown on plans are grid or ground values.

1304 Typical Sections

1304.1 General

The Typical Section is a portrayal, with dimensions, of how a cross-sectional view of the roadway would appear after construction is completed. Except in the case of some ramps, typical sections should be shown relative to the direction of increasing stationing regardless of the direction of travel. Sections should generally be drawn to the same scale horizontally and vertically, although the vertical scale of the pavement thickness may be exaggerated to show the thickness of the various layers. The scale should be large enough to clearly show the proposed section as well as existing features. No scale should be shown on the typical section. Although sections on the same sheet are usually drawn to the same scale, enlarged details may be used to show items such as pavement edge treatment. Ground lines, existing pavement and all other existing features should be shown (if relevant) using dashed lines.

Mainline, ramp and other roadway typical sections should be grouped together.

Most of the features included in the Typical Sections are discussed in the following sections. Other features may be necessary to cover special circumstances. Examples are included in the Sample Plan Sheets.

1304.2 Typical Section Type and Limits

Unless they have identical typical sections, separate sections must be shown for the mainline, side roads, crossroads, ramps, and other roadways involving paving or earthwork. The typical section of the adjoining pavement including type, thickness, and cross slopes of all pavement courses should be provided.

Sections should be shown for each roadway when: the pavement build-up changes, the type of median changes, guardrail and concrete barriers begin or end, lanes are added or dropped (minimum and maximum limits are sufficient), and in superelevated areas. Separate sections and lane widths are not required for intersections.

Varying pavement widths in intersection return areas should also be disregarded. A reference to the sheet containing the intersection detail may be added, if necessary. Each section must be adequately labeled to indicate if it is a normal or superelevated section and the roadway and station limits where it applies. Partial sections may be applicable for: changes in treated shoulder build-up; shoulder slope changes in superelevated sections; cut and fill slopes; and other similar situations.

Special sections may be required for speed change lanes, approach slabs, linear grading, etc. Typical sections should also be shown where pavement composition is adjusted over culverts with shallow fill.

Under each section, the station limits where the typical section is applicable shall be indicated. Calculation of the lengths where these typicals apply is not necessary.

Limiting stations for side road typical sections shall break at the side road stations of the extended mainline edges of pavement.

1304.3 Reference Line Location

The location of the centerline or baseline of construction, must be shown on each typical section.

1304.4 Rounding

Rounding of slopes shall be shown on each typical section where applicable.

1304.5 Profile Grade Point

The location of the profile grade elevation (normally the crown point) shall be noted on each typical section. Its location should be clearly identified. On a divided highway the profile grade for both sides shall be shown. When the crown line and profile grade line are not the same **[SP 1304-5]**, their relationship to each other must be shown.

1304.6 Dimensions

Items on each typical section shall be dimensioned. All dimensions must be shown either in a vertical or horizontal plane. None are to be measured along slope lines. When referring to items detailed in the Standard Construction Drawing, dimensions may be omitted.

If a dimension varies within the limits of a typical section, it should be noted as “varies”, the maximum and minimum dimensions within the limits shall be identified. The limits shall be clearly shown; either on the Typical Section, the Plan and Profile Sheet, or other appropriate detail sheet.

Vertical dimensions include: pavement course thicknesses, edge thicknesses, underdrain depths, ditch depths, etc. Where variations in a pavement course thickness are proposed, the typical section should show the thickness as “varies” and the variations shown in tabular form. Vertical dimensions shall normally be in inches [millimeters].

Horizontal dimensions include: widths of pavement, graded shoulders, treated shoulders, steps at edges of pavements, ditches, sidewalks, approach slabs, rounding, pavement widening, medians, barrier offsets, etc. On projects with multilane configurations or curbed shoulders, the lane locations and widths should be shown. Variations in horizontal dimensions due to intersections, etc. should not be included in the typical section. They should be clearly shown on, the pertinent plan detail sheets. Horizontal dimensions shall normally be in tenths of a foot [tenths of a meter].

1304.7 Pavement and Shoulder Cross-Slopes

The shape of the finished surface of the pavement and shoulders should be shown on each typical section by indicating the direction (by an arrow pointing downslope) and the rate of slope. Cross-slopes on pavements and shoulders are to be expressed in dimensionless, vertical-to-horizontal ratios, in decimal form, e.g. 0.01, 0.016, 0.08, etc.

1304.8 Subsurface Drainage

The location of pipe underdrains, aggregate drains, etc. should be shown on each typical section. Include slopes for aggregate drains.

1304.9 Pavement Build-up

Pavement and treated shoulder build-ups and course steps shall be clearly indicated on each typical section. This includes such items as: surface, base and subbase courses; curb, curb and gutter; saw cuts; depth of planing; pavement for maintaining traffic to remain, etc.

Step details may be needed to adequately show pavement "steps" as per the **Pavement Design Manual**.

1304.10 Foreslopes and Backslopes

If the limiting stations of a typical section include both cuts and fills, examples of each should be shown. Cut and fill foreslope and backslope rates shall be indicated as 2:1, 3:1, 4:1, (horizontal: vertical) etc. Percentages should not be used. Guardrail offset locations shall also be shown, where applicable.

1304.11 Legend

The legend is required to describe the pay items used in the Typical Sections and also the build-up of the existing pavement. It may be shown on only the first Typical Section sheet with a cross-reference shown on each succeeding sheet.

Numbered or lettered balloons are used to tie the legend to the drawings. Proposed items are to be differentiated from existing by using numbers for proposed and letters for existing. In addition, dashed balloons may be used to show existing items. Balloon references should be consistent throughout the typical section sheets.

The legend for proposed items shall include the specification number and the exact pay item description, as listed in the ODOT Item Master. The legend for existing items should never include a specification number but should describe the item in more generic terms such as: Asphalt Concrete, Reinforced Concrete, or Subbase. The approximate existing depth (+/-) should be listed.

1304.12 Longitudinal Joints

For rigid pavements, the location and type of all longitudinal joints should be indicated on each typical section **[SP 1304-3]**.

1304.13 Approach Slabs

Although approach slabs are paid for as structure items, base pavement, cross slopes, etc. must be shown on the typical sections.

1304.14 Warranty Pavement

When warranty pavement is included in a project, show the total thickness of the pavement along with an assumed configuration.

1304.15 Subgrade Treatment

Subgrade treatments such as lime stabilization, cement stabilization or undercuts should be shown on the typical sections and the cross sections.

1305 General Notes and Special Provisions

1305.1 General

The General Notes contain those plan notes required to clarify construction items that are not satisfactorily covered by the specifications or plan details. They are also used to modify the Standard Construction Drawings. All pay items that are "As Per Plan" or "Item Special" require a plan note, a special detail, or both.

On small projects, the General Note Sheets will include the majority of all plan notes for the project. For large projects, components such as: Maintenance of Traffic, Sanitary Sewers, Water Work, Traffic Control, Lighting, Landscaping or Structures should be accompanied by their own plan notes.

Plan notes should be consistent with the intent and requirements of the plans. Notes that repeat provisions clearly covered by the Construction and Material Specifications, Supplemental Specifications or Standard Construction Drawings should be avoided. For unusual or potentially controversial plan notes, contact the involved specification committee chair for advice on the content of the note.

Sample Plan Sheet **SP 1305-1** shows an example General Note format. Specific notes must be selected by the project designer. Notes may be right and left justified as shown in SP 1305-1; or left justified as shown in **SP 1306-1**.

1305.2 Sample Plan Notes

Sample Plan Notes for environmental, pavements and general project information are found in **Appendix B.** Sample Plan Notes for other project issues such as bridges, guardrail, traffic control and maintenance of traffic are available from the responsible ODOT unit (**Offices of Structural Engineering**, **Roadway Engineering**, **Traffic Engineering**, etc.) Each general note is accompanied by a designer note which provides guidance on when to specify the note as well as details on how the note may need to be customized to address project specific issues.

The ODOT **Office of Production, CADD Section** maintains a plan note application available for download from the CADD web page. The application assists with plan note placement in MicroStation files.

1305.3 Special Provisions

Special Provisions are notes and/or specifications developed for a project that are not related to standard ODOT Construction and Material Specifications. Ordinarily, these notes should be included in the General Notes. However, when these notes would take up a significant number of plan sheets, the designer may opt to include them with the plan as Special Provisions produced on 8-1/2" x 11" sheets. All waterway permits, (i.e. U.S. Army Corps of Engineers Section 404 permits, OEPA Section 401 Water Quality Certifications, U.S. Coast Guard Section 9 permits, etc.) including special and general conditions shall be included with the plans as Special Provisions. Special Provisions, title and date, are listed on the

Title Sheet. A reproducible letter size copy of all special provisions is to be included in the Final Plan Package submitted to the **Office of Estimating**.

1306 Maintenance of Traffic

1306.1 General

Maintenance of Traffic sheets normally follow the General Notes. On projects where traffic maintenance is uncomplicated or traffic is detoured, a separate Maintenance of Traffic Section of the plan is not required, and the notes may be included with the General Notes. When bridge plans include staged construction details, a cross-reference to these details should be added to the Maintenance of Traffic notes.

Examples of Maintenance of Traffic sheets are included in the Sample Plan Sheets **[SP 1306-1 through 1306-7].**

1306.2 Maintenance of Traffic Plan Contents

Probably the least complicated plans for maintaining traffic result when through traffic is detoured during the entire construction period. In such cases, the detour route is shown on the Title Sheet Location Map [**SP 1302-2**], Schematic Plan, General Notes or on a separate detour sheet [**SP 1306-3**]. If the detour is shown somewhere other than on the Title Sheet Location Map, it should be referenced in the Index of Sheets.

When traffic is maintained during construction, the plan will normally require a number of notes along with several details. The following is a list of some of the details that may be required:

- Sequence of operations [**SP 1306-1** and SP **1306-2**].
- Phase drawings showing construction by phase [**SP 1306-4(a) through 1306-7**], method of maintaining traffic for each phase, barriers, drums, maintenance of traffic signing, existing signing, and pavement marking. Phasing plans may be drawn at 1”=20’, 1”=30’, 1”=40’, 1”=50’, 1”=100’ or 1”=200’ [1:20, 1:40, 1:50, 1:100, 1:200].
- Section details for maintaining traffic, showing: existing pavement widths, pavement for maintaining traffic widths (including guardrail offset and grading), lateral construction limits, placement of channeling devices (barriers, drums, etc.) and work zone lane widths.
- Supplemental details for work zone traffic control devices.
- Plan insert sheets
- Crossover details
- Roads / Pavement for maintaining traffic details
- Miscellaneous MOT details

The **Traffic Engineering Manual** provides guidance on how to maintain traffic during construction and gives specific details on what is required on maintenance of traffic streets.

For addition information regarding maintenance of traffic, contact the **Office of Traffic Engineering**.

1306.3 Roads and Pavements for Maintaining Traffic

A temporary road is a road whose sole purpose is to temporarily maintain traffic during construction, after which it is normally removed. Temporary roads are constructed using Item 615 Roads for Maintaining Traffic and Item 615 Pavement for Maintaining Traffic.

Item 615 Roads for Maintaining Traffic is a lump sum quantity that includes all embankment and excavation necessary to construct and remove the temporary road; including temporary pavement. When undercuts are necessary for permanent mainline pavement or embankment construction, the proposed temporary road should be evaluated for undercuts. A geotechnical evaluation should be considered to determine if the existing soil conditions are adequate to support the temporary road. Additional soil borings along the temporary road are not normally required to make the geotechnical evaluation.

Item 615 Pavement for Maintaining Traffic is paid for by the square yard [square meter] and includes the necessary pavement for the temporary road as per CMS 615.05. When the pavement build up differs from that shown for in CMS 615.05, Item 615, Pavement for Maintaining Traffic, As Per Plan, shall be used with the pavement build-up as shown in the plans.

Sample Plan Sheets **SP 1306-6 and 1306-7** show details such as alignment, grade, typical sections, cross-sections, and superelevation that are typically required for a temporary road on independent alignment. In order to facilitate the use of GEOPAK software, temporary roads on independent alignment should be drawn at 20'=1" [20:1] or 50'=1" [50:1].

When the earthwork required to maintain traffic is relatively small, a plan note can be used to indicate that the earthwork required to construct the temporary road will be included as part of Item 615, Pavement for Maintaining Traffic, As Per Plan and not paid for separately under Item 615 Roads for Maintaining Traffic. **SP 1306-4(a)** shows an example of when it may be beneficial to combine the two quantities.

Item 615 Pavement for Maintaining Traffic should not be confused with items such as 410, 448, and 616 which may also be included in the plans to be used for maintenance of traffic. Nor should it confused with the pavement quantities listed in the Local Alternate Detour Note.

1307 Estimated Quantities

1307.1 General

Quantities shall be calculated and presented in the plan in such a manner that they may be traced from the General Summary Sheet to their origin through a system of cross referencing. **SP 1307-1 through 1307-5** provide examples of Subsummary and General Summary format.

1307.2 General Summary Sheet

1307.2.1 Sheet Number Columns

The sheet number columns are used to show a cross reference to the sheet from which the quantities are carried. Extra columns should be provided to allow for possible additions. Quantities may originate from many sources, and these sources may often exceed the number of columns available on the General Summary. For this reason, subsummaries are often used. Subsummaries are described in more detail in Section 1307.3.

1307.2.2 Participation and Funding Splits

To facilitate project accounting, pay quantities should be separated in the General Summary and throughout the plans according to participation by the involved agencies **[SP 1307-4 and 1307-5]**. This usually applies to situations where portions of the project are financed under different federal project numbers, are split by municipal corporation lines, or contain items that are to be paid for by only one agency. The General Summary should show a separate subtotal for each unique combination of local, State and Federal fund participation in addition to the grand total. Funding splits for projects using combined funds (e.g. Bridge and Safety) shall also show separate subtotals for each unique combination of funding in addition to the grand total in the General Summary. When participation or funding splits are needed for a project, the participation or funding split columns should be included on all sheets of the General Summary.

Pavement Quantities listed under the "Office Calcs" column on the General Summary should reflect participation or funding splits when needed.

If space permits, extra columns should be provided on the General Summary to permit additional participation or funding splits.

1307.2.3 Item Code, Unit of Measure, and Description

The ODOT Item Master is a listing of item codes and their corresponding pay item descriptions and units of measure. This list is continually revised and posted on the ODOT web page. Questions regarding the ODOT Item Master should be directed to the **Office of Estimating**.

The item code is a nine character identifier used to catalogue pay item descriptions into a computerized database. All item codes and descriptions must be written exactly as listed in the Item Master. The first three digits of the item code generally refer to the specification number of the pay item and are entered in the "Item" column on the General Summary. The last five digits of the item code (referred to as the "Item Extension") are used to catalogue the pay items within the specification number. The item extension is entered in the "Item Extension" column. The fourth character refers to the type of measurement being used ("E" for English, "M" for metric). The fourth character should not be included in the item code on the General Summary. It will be added at the time the information is entered into the computer during final plan processing. Item Specials are an exception to the above and are discussed in Section 1307.2.6. Item extensions are to be shown on the General Summary only (not subsummaries, notes, etc.).

Water work items using city specifications are to be item "specials" and their descriptions are to be per ODOT's item master. See **SP 1307-4** for an example. Only a few cities have made arrangements with the **Office of Estimating** to use their own specifications.

Item descriptions are limited to an additional 120 characters beyond those shown in the item master.

Lump sum items shall show "lump" in the grand total column with the unit column left blank.

The various items of work are grouped in order in the General Summary under the following headings:

Roadway

Erosion Control

Drainage

Section 1300
Plan Components

Pavement

Water Work

Sanitary Sewer

Lighting

Traffic Surveillance

Traffic Control

Traffic Signals

Landscaping

Retaining Walls

Building Demolition

Noise Barriers

Structures (20' [6.1 m] and Under)

Structures (Over 20' [6.1 m])

Maintenance of Traffic

Three-sided culverts must be listed as separate structures. Prefabricated structures with spans greater than or equal to 10 feet [3.0 meters] should be listed as structure items. Prefabricated structures with spans less than 10 feet should be included with the drainage items. Work that may require a sub-contractor may have a separate summary or subsummary unless very few items are involved. Examples are Water Work, Lighting, Traffic Control, Traffic Signals, Landscaping, Retaining Walls and Structures. When a separate summary is used, a cross reference must be shown on the General Summary to the sheet numbers on which the quantities are listed. A separate summary is usually provided for Sanitary Sewer items, although these items may be included under Drainage if the sanitary work involves only minor adjustments. Building Demolished is often considered a Roadway item when only a few buildings are involved. Structures are divided into two categories: “20' and under” [“6.1 m and under”] and “over 20'” [“over 6.1m”] to facilitate collection of data for a report required by FHWA.

The pay items within each of the listed headings must be arranged in ascending numerical order by the item code. For items with the same item code but different supplemental descriptions, the items are placed in alpha-numeric order by supplemental description. As a general rule, at least one blank line should be left between every five pay items to provide for possible additions.

Pay items should be included under each heading as per the following list. Unless otherwise noted, all items under the stated specification number are included.

Roadway - 201, 202 (except Structure Removed, except Approach Slab Removed, Portions of Structure Removed, and Building Demolished), 203, 204, 205, 206, 208, 209, 604 (Monument items only), 606, 607, 608, 622 (Concrete Barrier only), 625 (Ground Rod for Fence only), 651, 652, 653, 654, 656, 871.

Erosion Control - 601, 616, 659, 660, 670, 671, 672, 673, 832, 836, 838.

The Department will furnish Item 832, Each, Erosion Control with an amount in the proposal to pay for Temporary Sediment and Erosion Control (TSEC) Best Management Practices (BMP) work. This amount is an estimate by the Department of the total cost of TSEC BMP work. If the TSEC BMP work exceeds

this amount the TSEC BMP work will still be paid at the pre-determined prices. The pre-determined prices are located in the Proposal.

A Lump Sum pay item for the Storm Water Pollution Prevention Plan (SWPPP) should be included in the General Summary when a SWPPP is required.

Item 616 Water must be added to all projects that require a 404 or 401 waterway permit.

Item 207 is provided in the Construction and Materials Specifications to describe temporary sediment and erosion control methods to be used in conjunction with supplemental specification 832. No 207 items should be included in the General Summary.

Drainage - 602, 603 (Except three-sided flat-top and arch structures or if used for sanitary sewer), 604 (Except Monument items), 605, 613, 835, 837, 895.

Pipe Alternates - In the following examples, the figure in parentheses at the end of the corrugated metal pipe descriptions indicates the metal thickness of the pipe; if there are two figures, the first figure indicates the thickness of the top plates and the second figure indicates the thickness of the bottom plates. If there is no figure, the thickness shown for that pipe size in the appropriate 707 Table of the Construction and Material Specifications will suffice and need not be shown on the plan. Figures in brackets for 707.04 indicate the height of corrugation. The 1inch [25-mm] corrugation should generally be noted for pipe diameters over 48 inches [1200 millimeters].

Small Diameter (Less than 36")

603 _____ Ft. 21" Conduit, Type A 706.01, 706.02, 706.08 or 24" 707.01 (0.138), 707.04 (0.109), 707.05 (0.109), 707.21.

Metric Units

Small Diameter (Less than 900 millimeters)

603 _____ Meter 525 mm Conduit, Type A 706.01, 706.02, 706.08 or 600 mm 707.01 (3.51 mm), 707.04 (2.77 mm), 707.05 (2.77 mm), 707.21.

Large Diameter (36" and over)

603 _____ Ft. 66" Conduit, Type A 706.02 or 72" 707.02 (0.138), 707.04 (1") (0.109), 707.07 (0.109), 707.22.

Metric Units

Large Diameter [900 millimeters and over]

603 _____ Meter 1650 mm Conduit, Type A 706.02 or 1800 mm 707.02 (3.51 mm), 707.04 (25 mm) (2.77 mm), 707.07 (2.77 mm), 707.22.

Pavement - 251, 252, 253, 254, 255, 256, 258, 301, 302, 304, 305, 306, 307, 308, 320, 321, 407, 408, 409, 411, 421, 422, 423, 424, 442, 443, 446, 448, 451, 452, 609, 617, 618, 801, 803, 811, 812, 822, 826, 852, 857, 859, 874, 880, 881, 882, 884, 886, 888, 896, Special Pressure Relief Joint.

Water Work - 638 (Item Special when local government specification is used for water work).

Sanitary Sewer - 603, 604 (When used for Sanitary Sewers).

Lighting - 625 (Except Ground Rod for Fence).Traffic Surveillance - 625, 630, 631, 632, 633 (When used for Traffic Surveillance).

Traffic Control - 620, 621, 626, 630, 631, 642, 643, 644, 645, 646, 647.

Traffic Signals - 603 (Conduit for pull boxes only), 625 (When used for Traffic Signals), 632, 633, 872.

Landscaping - 657, 658, 661, 662, 666.

Retaining Walls - 203, 503, 509, 511, 518, 610.

Building Demolition - 202 (Building Demolished).

Noise Barriers - Special Noise Barrier.

Structures - 202 (Structure Removed and Portions of Structure Removed, Approach Slab Removed), 203 (When used for Mechanically Stabilized Earth walls at bridge abutments. See the **Bridge Design Manual** for additional information.), 503, 504, 505, 506, 507, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 522, 523, 524, 526, 603 (3-sided flat-top and arch structures), 840, 843, 847, 848, 893, 894, 885, 892, 898.

In order to effectively track bridge maintenance costs, separate quantities must be recorded for each bridge structure. The following three options are acceptable:

- Providing a separate general summary for each bridge within the bridge sheets with a reference from the General Summary to the structure General Summary.
- Using a combined structure general summary that splits out quantities for each bridge; also with a reference from the General Summary.
- Including structure quantities broken out by bridge number on the General Summary.

Maintenance of Traffic - 410, 502, 614, 615, 616, 622 (Portable Concrete Barrier only), 873, any additional items used specifically for maintenance of traffic.

The following items are listed in order at the bottom of the last General Summary sheet without a group heading:

614 Lump, Maintaining Traffic

619 Month, Field Office, Type (A, B or C)

623 Lump, Construction Layout Stakes

624 Lump, Mobilization

Item 614, Maintaining Traffic, is required on most projects. A building demolition plan would be an example of a project that would not require Item 614, Maintaining Traffic.

Two-lane resurfacing, mowing, pavement marking, guardrail replacement, bridge painting, and other similar types of projects may not require pay items for Field Office, Construction Layout Stakes or Mobilization. The District Highway Management Administrator should be consulted when there is a question regarding the need for these items. The following guidelines should be used for determining the type of Field Office to specify:

Estimated Project Construction Cost	Office Type
Less than $500,000	A
$500,000 to $5,000,000	B
Over $5,000,000	C

The basis of payment for a Field Office should be month unless otherwise instructed.

1307.2.4 Contingency Quantities

In some cases, it may not be feasible to obtain precise quantities due to uncertainties regarding existing conditions. In these cases, a reasonable estimate (not contingency) of the items necessary along with the location they apply should be completed and appropriate quantities should be shown in the plans. Contingency quantities should not be used.

Pavement cores, soil borings and other condition surveys commensurate with the nature of the proposed work should be used to assist with the determination of these quantities.

1307.2.5 Linear Grading

Linear grading pay items are intended for shallow grading and/or filling operations performed from the edge of pavement outward to prepare, dress and/or reshape the roadside.

Item 209, Reshaping Under Guardrail and Item 209, Preparing Subgrade for Shoulder Paving are described in the Construction and Material Specifications. Item 209, Linear Grading may be used at other locations with minor grading. All three pay items are based on a linear measurement along each side of the pavement.

Sufficient detail must be included in the plans to estimate and construct the work. When two or more different types of Item 209, Linear Grading are required in the same plan, they should be differentiated by designating them as “Method A”, “Method B”, etc. If off-project material is needed for the work, a quantity of Item 209, Borrow must be specified in the plans. Consideration should be given as to how this item is paid. If Item 209, Borrow can be measured and calculated, then payment should be by the Cu. Yd. [Cu. Meter]. If the borrow cannot be measured due to settlement or because the area is under water, then payment should be by the Ton [Metric Ton].

1307.2.6 “Standard”, “As Per Plan” and “Special” Pay Items

There are three types of pay items in a construction plan, “Standard”, “As Per Plan” and “Special”. A “Standard” pay item is one whose requirements are defined by the Standard Construction Drawings and the Construction and Material Specifications or Supplemental Specifications. The description of a

"Standard" pay item is consistent from plan to plan and is listed under the heading "Basis of Payment" in the Construction and Material Specifications or Supplemental Specifications.

An "As Per Plan" item is a standard pay item whose requirements need to be modified from that which is defined by the Standard Construction Drawings and the Construction and Material Specifications or Supplemental Specifications. Every "As Per Plan" item must have a corresponding plan note, or proposal note, or plan detail or combination thereof which clearly and completely explains the deviation(s) from the standard item. The location of "As Per Plan" notes and details shall be cross-referenced in the "See Sheet No." column on the General Summary.

A "Special" item is an item that does not exist in the Standard Construction Drawings, the Construction and Material Specifications or Supplemental Specifications. It must be created by means of plan notes, plan details, proposal notes, special provisions or a combination thereof, which clearly and completely defines all aspects of the item. The location of "Special" item notes and details shall be cross-referenced in the "See Sheet No." column on the General Summary. "Special" pay items are coded according to the closest related Specification number. If the item is a "Special", the word "Special" must be entered in the "Item" column and all eight digits of the item code are entered in the "Item Extension" column.

1307.2.7 Alternate and Optional Items

Alternate and Optional bid items are included in a plan when so dictated by the sponsoring agency. Alternate items shall be listed as "Alternate" at the end of the section where they would normally occur in the General Summary **[SP 1307-4]**. The description for "Alternate" items should vary to give distinction between items. One group of bid items can be alternated to another group of bid items without there being a one to one item match. Plan notes, plan details, proposal notes, special provisions or a combination thereof shall be provided to clearly and completely define and identify the alternate. The bidder is required to bid all alternate items. The sponsoring agency will determine the alternate item or group of alternate items selected for the contract to be awarded. When the higher priced alternate item is selected, the additional cost of the alternate will be the responsibility of the sponsoring agency.

Optional bid items are listed in numerical sequence under their appropriate heading in the General Summary. Optional bid items are designated with alphabetical labels (e.g. Option A, Option B, etc.) **[SP 1307-3(c)]**. When a group of bid items is optional to another group of bid items each group of items will be given a single label. The bidder is to bid on one option only with the choice of options left the bidder.

Questions regarding the use of alternate and optional bid items should be addressed to the **Office of Estimating**.

1307.2.8 Sheet Cross References

The "See Sheet No." column is used to show a cross reference to a general note sheet, plan detail sheet or description group general summary. References to a general note or plan detail for items that are not "As Per Plan" or "Special" should be made when the note or detail describes a specific method of performing work. Description groups that have their general summaries cross referenced should be listed in the order shown in Section 1307.2.3.

Reference to a proposal note may be made at the end of a pay item description only if the pay item is new or if the item is rarely used.

1307.2.9 Buildings Demolished

Buildings to be demolished should be paid for under Item 202, Building Demolished. A single lump sum item is used for each parcel. The item description should include the parcel number and a list of the buildings to be removed. For example:

Item 202, Building Demolished, Parcel 10 WD, 2-Story Framed House, Basement, Shed

Item 202, Building Demolished, Parcel 20 T, 1-Story Brick House, 2-Car Detached Garage

Item 202, Building Demolished, Parcel 102 WL, Remove 20 Trailers, 6 Sheds

For additional information contact the **Office of Real Estate**.

1307.2.10 Salvage of Utility Items

Existing utility facilities (fire hydrants, valve boxes, etc.) to be removed by the highway contractor shall be disposed of and replaced, adjusted or removed and reset. These items shall not be removed and stored for retrieval by the utility owner. The rules governing utility relocation and reimbursement differ from other functions of the highway construction process. The removal of existing facilities for storage would require that a salvage credit be given to the project for the value of the removed items and any contractor charges for handling and/or transportation of the items would be ineligible for project cost.

1307.3 Subsummaries

A limited number of sheet number columns are available on the General Summary. This limits the number of sheets from which quantities can be brought forward. It is therefore necessary on larger plans to summarize quantities in stages. Subsummaries are plan sheets where quantities from several sheets are gathered. The items may or may not have some relationship to each other.

Some of the pavement marking quantities are subdivided and subtotaled by color and/or type. Examples of subsummary sheets are included in the Sample Plan Sheets**.**

Subsummaries are generally located in a set of plans near (normally in front of) the source of the quantities they summarize. However, when they summarize a number of unrelated items, they may be located either after the General Summary or after the calculation sheets.

1307.4 Quantity Calculations

1307.4.1 General

In order to prepare a valid engineering cost estimate for a project, it is essential that quantities be accurately calculated, accurately carried to the General Summary, and that substantiating data for all calculated items be included in the plan.

1307.4.2 Pavement Calculations

Pavement, subgrade compaction and treated shoulder quantity computations should be completed on 8 1/2" x 11" sheets. These sheets may be handwritten or computer generated (e.g., spreadsheets). Computations should clearly show how the quantities were derived. Irregular areas should be noted as CADD generated or planimetered areas. All sheets must include the project title and be numbered (e.g., 2 of 10). Quantities should be carried to the General Summary and listed under a column entitled "Office Calcs." **[SP 1307-3(a) and 1307-3(b)]**.

1307.4.3 Rounding of Quantities

Rounding of quantities should be made at the subsummary level. All quantities are whole numbers except as follows:

- Carried to tenths:

  Cubic Yards [Cubic Meters] - Masonry

  [Square Meters] - Signs

  [Meters] - Ground Mounted Sign Supports

- Carried to the nearest foot [highest 0.5 meters]

  Feet [Meters] - Conduit and Underdrains, Subdrainage piping (Structural)

- Carried to hundredths:

  Miles [Kilometers] - Pavement Marking

  Feet [Meters] - Bridge Deck Joints, DripStrip, Prestressed Concrete Bridge Members

  Tons [Kilograms] - Commercial Fertilizer

  Acres [Hectares] - Lime

- Nearest 100 Pounds [50 Kilograms]

  Pounds [Kilograms] - Structural Steel

- Guardrail quantities are normally determined in standard 12.5' [3.81 m] panel lengths. The following, however, are instances when this is not the case.

  Where there is a continuous run of guardrail between two structures, it may be necessary to use a partial panel to properly close the opening. In this case, the length may be carried to hundredths of a foot [thousandths of a meter].

  Type 1, Type 3, and TST Bridge Terminal Assemblies have a length of 18.75' [5.715 m] which does not utilize W-beam guardrail panels. Since the length of W-beam guardrail used in conjunction with

these Bridge Terminal Assemblies must be in multiples of 12.5' [3.81 m], the total length of run (including the 18.75' [5.715 m] length discussed above) should be an odd multiple of 6.25' [1.905 m].

When utilizing W-beam guardrail across structures, the entire length of rail (including approaches) from Anchor Assembly to Anchor Assembly should be a multiple of 12.5' [3.81 m]. However, since the length of the portion on the structure may be an odd multiple of 6.25' [1.905 m], it is possible that the length of either the approach or trailing end may have to be adjusted to an odd multiple of 6.25' [1.905 m].

1307.4.4 Validation of Quantities

Prior to submission of the completed plans, all plan quantities shall be independently checked by competent personnel other than the person(s) who originally computed the quantities. Each plan sheet that lists quantities or calculations shall be validated by the signed initials or names of persons who computed the quantities and those who performed the checking operations. These initials should be shown in the title block. While it is contemplated that spot checks of quantities will be made during review of the plan, the correctness of the quantities is the responsibility of the design unit preparing the plans.

1308 Project Site Plan

1308.1 General

A Project Site Plan is required for all projects that include any Project Earth Disturbed Area as estimated from the **Location and Design Manual, Volume 2, Figure 1112-1**, line a. The Project Site Plan is prepared by the designer and provided as part of the contract documents. A sample Project Site Plan is shown in the Sample Plan Sheets **[SP 1308-1]**.

A Storm Water Pollution Prevention Plan (SWPPP) is required for all projects with a Project Earth Disturbed area greater than or equal to one (total) acre. The construction contractor is responsible for modifying the Project Site Plan to prepare a SWPPP that meets the Ohio EPA NPDES (National Pollutant Discharge Elimination System) Permit requirements. The contractor shall develop the SWPPP in accordance with Supplemental Specification 832 after the contract is awarded and prior to any construction activity. The contractor's engineer must sign, seal, and submit the proposed plan to ODOT for review. Additional guidance can be found in the **Location and Design Manual, Volume 2**.

1308.2 Requirements

The Project Site Plan shall consist of a schematic plan similar to that required in Section 1303. It will generally have a scale of 1"=200' [1:2000]. This plan shall show all Project Disturbed Areas.

The following items shall be included on the plan and may be listed in tabular form:

- A site description indicating the nature and type of construction activity.
- The total area of project (right of way).
- The total area of the project that is expected to undergo earth disturbing activities as estimated from **Figure 1112-1**, line a.
- The estimated Contractor Earth Disturbed Area as estimated from **Figure 1112-1**, line k.

- The Notice of Intent Earth Disturbed Area as estimated from **Figure 1112-1**, line m.
- An approximate determination of the Rational Method runoff coefficient for both the pre-construction and post-construction site conditions.
- An estimate of the impervious (paved) area for both the pre-construction and post construction site conditions.
- Reference to the soil profile sheets or soil conservation service sheets for data describing the soil.
- The name and location of the immediate receiving stream or surface water(s) and the subsequent named receiving water(s) (e.g. Black Run/Sandy Creek).
- Surface water locations including streams, lakes, wetlands, springs, etc. within 200' [65 meters] of the right-of-way.
- The approximate latitude and longitude (± 5 seconds) of the center of the project.
- The name and number of the USGS 7.5 minute quadrangle map(s) on which the project is located.
- Existing contours with enough accuracy to define the existing drainage patterns.
- Flow arrows indicating proposed drainage patterns.
- Existing buildings and current land uses (e.g. residential, commercial, or agricultural).
- Permanent drainage items such as culverts, storm sewers, catch basins, etc.

The location of permanent erosion control measures and permanent storm water Best Management Practices (BMP).

1309 Plan & Profile Sheets

1309.1 General

Plan & Profile Sheets **[SP 1309-1(a) through SP 1309-8]** show what an area looks like before (existing) and after (proposed) construction of the project. In addition, they show quantities, dimensions, and other items required to construct the project. Plan and Profile Sheets are normally drawn to the following scales:

- Rural Projects:

  - Horizontal: 1"=50', or 1"=20'
  - Vertical: 1"= 5', or 1"=10'

  [- Horizontal: 1:500, or 1:200
  - Vertical: 1:50, 1:20, or 1:100]

- Urban (or Short Rural) Projects:

  - Horizontal: 1"=20'
  - Vertical: 1'=5' (preferred) or 1=10'

  [- Horizontal: 1:200
  - Vertical: 1:50 (preferred) or 1:20]

The above scales will result in coverage on a typical sheet of 1500' at 1"=50' and 600' at 1"=20'. For a typical metric sheet, coverage will be 250 meters at 1:500 and 100 meters at 1:200. For convenience, the scale used for the roadway plan and profile sheets should match the scale used on the right of way detail sheets.

The profile should be plotted on a square grid system subdivided in accordance with the examples shown in **Figure 1202-1**.

The plan and profile sheets at the beginning and end of the project should include additional length of existing topographic features beyond the ends of the permanent pavement construction. The minimum additional length is 300 feet [100 meters] for design speeds of 40 mph [70 km/h] or less and 500 feet [150 meters] for design speeds over 40 mph [70 km/h]. Horizontal and vertical alignments and all topography should be shown in these “extension” areas.

1309.2 Format

Plan & Profile Sheets are composed of three distinct parts - plan, profile and quantities. All of these parts may be shown on a single sheet **[SP 1309-5, 1309-6, and 1309-8]**. However, because of the complexity of some plans, it may be necessary to vary the format to more clearly show the proposed work. In such cases, the plan, profile and quantities may be shown on separate sheets **[SP 1309-2]** or combined in any manner **[SP 1309-1(a) and 1309-1(b)]**. When varying from the single-sheet format, the designer should locate the plan, profile and quantity sheets as near to each other as possible and provide cross-references on each sheet.

1309.3 Existing Information

All existing features should be shown and the disposition of all such items within the existing and/or proposed right-of-way should be indicated. Existing features, except buildings, should be shown using dashed lines. The following sections list many of the existing items that should be shown on a Plan & Profile Sheet. This list should not be considered all-inclusive.

1309.3.1 Topography

- Trees and stumps – For projects involving earth disturbing activities or any other construction activity that may require tree removal, the diameter of all trees and stumps 12 inches [0.3 meter] and over must be shown. Symbols should be used to differentiate between deciduous and coniferous trees. Species names (e.g., Oak, Maple, Pine) do not need to be labeled. In general, labels designating tree size (as defined in the Construction and Material Specifications) should be provided for trees located within the construction limits and 25 feet [8 m] outside the project construction limits. Trees and stumps to be removed should be noted by an "X".

- Shrubs

- Moving water such as creeks, streams, rivers and ditches - The direction of flow should be denoted by flow arrows.

- Ponds and lakes

- Wetland areas

1309.3.2 Buildings and Appurtenances

- Buildings – Identify usage (i.e., residential commercial, etc.), type of construction and number of stories

- Wells, cisterns, sanitary systems (leach fields, septic tanks)

- Underground storage tanks, oil and gas wells with associated piping

- Walks, drives, paved areas

- Walls, fences

- Non-highway signs – Highway signs are not typically shown on the Plan and Profile Sheets but rather in the Traffic Control Plans.

- Railroad facilities shall be shown when they are located within the normal limits of the Plan & Profile Sheet. The location of the tracks with respect to the centerline of construction should be shown together with the rail elevations at intervals not to exceed 500 feet [150 meters]. This information may be shown on the cross-sections if more convenient.

1309.3.3 Roadway Items

- Pavement, curbs, treated shoulder, drives.

- Guardrails, fences.
- Profile of the ground line at the centerline of construction, with elevations every 50' [20 meters] and at abrupt changes **[SP 1309-1(a) through SP 1309-8]**.
- Storm sewers, inlets, manholes, catch basins, culverts (type, size and elevations) **[SP 1309-6 and 1309-8]**. For metric plans size shall be soft converted to the nearest millimeter.
- Bridges.
- Light poles.

1309.3.4 Boundary Lines

- Property lines, easements.
- Right-of-way lines.
- Governmental boundaries (State, County, City, Village, Township, etc.).
- Railroad right-of-way lines.

1309.3.5 Utilities

- Location and depth of underground utilities (gas, telephone, water, sanitary, etc.)
- Location of overhead utilities (electric, telephone, cable television, etc.). Only poles should be shown unless actual lines are located such that they may impact the contractor's operations. Indicate the rating of major overhead electric transmission lines and the existing clearance.

1309.3.6 Underground Mines

- Location of any field observed or mapped mine features (openings, subsidence features, etc.).
- Limits of mapped mine workings labeled with the Ohio Department of Natural Resources Division of Geological Survey Mine Code. A note referencing the appropriate Mine Map Overlay Sheets should be shown on the Plan & Profile sheets when the extent of the mine workings exceeds the normal limits of the sheet.

1309.4 Proposed Facility Information

Listed below are many of the proposed facility items that should be shown on a Plan & Profile sheet. This list should not be considered all-inclusive.

1309.4.1 Alignment and Grade

- Centerline of construction and any other construction baselines should be shown along with their relationship to each other. Stations, station equations, and bearings (at each tangent and at least one per sheet) must be shown.

The centerline of construction should match the centerline of right of way. In those instances where it is not possible to match the two centerlines, a constant offset between the two centerlines is preferred. When the two centerlines differ, their relationship must be shown in the right of way plans. It is not necessary to show this relationship within the construction plans.

Stationing shall be designated in feet [Stationing shall be designated in kilometers (km) and meters, with kilometers being the unit] per the following examples:

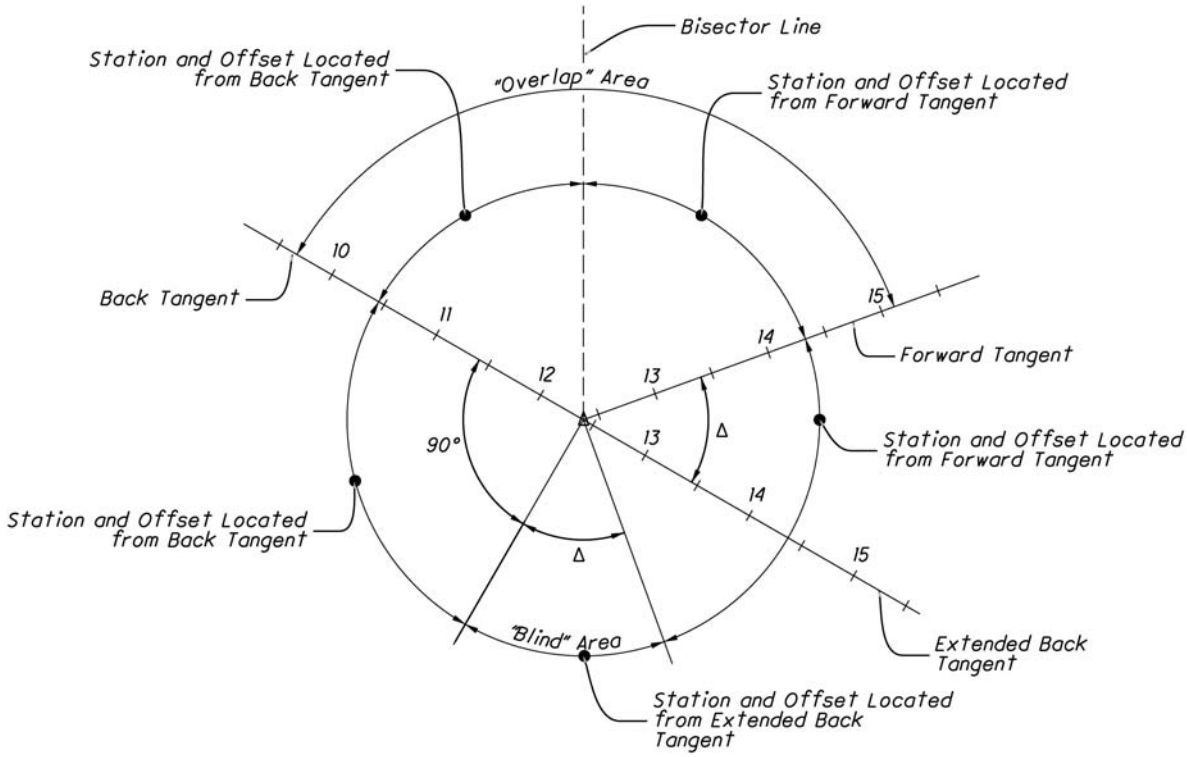
104+59.35, meaning 10,459.35 feet from Sta 0+00.

[8+175.21, meaning 8 km plus 175.21 meters from Sta. 0+000.]

When giving locations of points intermediate of full stations and leaving off the full station designation, all leading zeros should be included. For example: +03.17 would be the abbreviated form of Sta. 2+03.17.

For metric plans, full stations and intermediate tick points should be labeled in even multiples of 20 meters (e.g. +100, +120, etc) for 200:1 scale sheets and 40 meters (e.g. +100, +140, etc.) for 500:1 scale sheets.

When a centerline includes a deflection angle (i.e., a P.I. without a horizontal curve), there can be confusion on how to measure stations and offsets from the back and forward tangents. The following figure clarifies which tangent to use depending on a point's location in the "overlap" area.



In addition to the "overlap" area, there is a "blind" area in which a station and offset cannot be measured from either the back or forward tangent. Stations and offsets in the "blind" area should be measured off an extended back tangent as shown in the figure.

Indicate when station and offset are being reported along the extended back tangent in the "blind" area as follows:

Sta. 12+75.00, 30.00' Rt., on Extended Back Tangent

- Grades are to be shown using percentages to the hundredths.
- Profile grade elevations are to be shown every 25' [10 meters]. The location of the profile grade elevation is shown on the Typical Sections.
- Elevations shall be expressed in feet [meters] above the specified datum.
- Horizontal alignment data – Show all data for simple curves and spiral curves (See **Figures 1303-1, 1303-2 and 1303-3**). All proposed horizontal alignment data (i.e. curve information, station equations, reference points, etc.) shall be specified to the nearest hundredth of a foot [nearest millimeter].
- Vertical alignment data – The data includes the station and elevation of the PVI and the limits and length of vertical curve. When there is a grade break without a vertical curve, the words "NO CURVE" should be added adjacent to the PVI station and elevation **[SP 1309-1(a)]**.
- Vertical clearance under overhead structures - The existing, proposed and required clearance shall be shown.
- Vertical clearance under major overhead electric transmission lines.

1309.4.2 Roadway Items

- Lane widths – Where lane widths are not obvious, they should be shown on the plan view or on a separate sketch. The location and dimensions of all pavement transitions should be shown, including "tie-ins" to existing pavement.
- Pavement width, treated shoulder width – Label width dimensions left and right of the centerline of construction at transition end points **[SP 1309-5]**.
- Curbs – Show and label transitions **[SP 1309-1(a)]**.
- Drives – Label the location, type, existing surface type, width, and alignment with mainline (i.e., angle relative to centerline) on plan and profile sheets, drive detail sheets or tables.
- Guardrail – Label anchor assemblies, bridge terminal assemblies, terminal stations, flare and radii **[SP 1309-2 and 1309-8]**.
- Signs – Normally shown on a separate traffic control plan sheet.
- Bridge limits, structure number, approach slab limits, and pier locations **[SP 1309-8]**.

1309.4.3 Boundary Lines

- Right-of-Way, easement, temporary right-of-way and limited access lines

- Construction limits – These limits must encompass all work. This includes removals, room for construction equipment to complete work, site access, etc. Construction limits are not intended to encompass storage areas for materials or equipment. However, it may be necessary to address storage areas when determining a project's environmental impacts.

- Property Lines – Show property lines when right-of-way is being acquired or when the project includes access management changes for properties along the roadway.

1309.4.4 Drainage Items

- Storm sewers, inlets, manholes, catch basins, culverts - These items should be shown in both plan and profile **[SP 1309-1(a), 1309-3, 1309-4, 1309-5, 1309-6]**. Drainage items are often shown on the cross-sections and drainage details, in addition to the Plan & Profile sheets. Detailed information should be indicated on only one of these sheets. The remaining sheets need only show the type of structure and a reference to the sheet showing additional details. Proposed and existing elevations should be shown on the Plan & Profile sheets for manholes and catch basins which are to be either reconstructed or adjusted to grade.

- Underdrains - Include all bends, branches, outlet offsets and elevations **[SP 1309-5]**. In addition, include the profile grade for unclassified underdrains.

- Flow arrows showing direction of flow in ditches, underdrains and culverts.

- Erosion protection - includes dimensions of rock channel protection, sodding, ditch erosion protection, etc.

- Slope lines, where necessary, to better define drainage.

- Design and 100-year water elevations, if not shown elsewhere in the plans (e.g., culvert details, etc.).

1309.5 Quantities

Plan & Profile sheets are used to show many of the plan quantities as described in the following sections.

1309.5.1 Reference Balloons

Reference balloons are used to tie the items on the plan to the pay quantities in the estimated quantities table. The designations within the balloon correspond with the reference designation in the estimated quantities table. Dashed balloons are used to indicate that quantities are picked up on a different sheet.

A separate reference balloon is used for each drainage structure and its outlet run of conduit regardless of whether or not the run of conduit extends onto an adjacent plan and profile sheet. For example, reference balloon D-5 on **SP 1309-1(a) and SP 1309-1(b)** includes a catch basin and proposed storm sewer conduit that extends to the next sheet.

Reference balloon numbering may be restarted on each plan view or may be carried through the entire plan. A consistent system of reference balloon numbering should be used for each project. **SP 1309-1(a)** and **SP 1309-1(b)** provide an example of sequential balloon numbering that is carried through all plan and profile sheets. **SP 1309-6** provides an example of balloon numbering that is restarted for each plan and profile sheet.

1309.5.2 Estimated Quantities

Quantities should be shown in tabular form in such a manner as to clearly show the following:

- Reference Designation - This is usually a combination of letters and numbers. The letters indicate the general description of the item (Example - UD or U for underdrain, GR or G for guardrail, D for drainage, S for sanitary sewer, C for curb, DR for driveways, R for removal, WQ for manufactured water quality structure), and numbers differentiate between similar items (D-1, D-2 and D-3 might be used when there were three drainage items on one Plan & Profile Sheet).
- Location - This includes the limiting stations and side (Rt. or Lt.)
- Item Number or Special and item description
- Unit of Measure (ft^2, yd^3, mi., etc.) [(Meter, m^2, m^3, Kilometer, etc.)]
- Item quantity and total quantity.

Indicate whether the total quantities are carried to the General Summary or to a Subsummary Sheet.

1309.6 Miscellaneous Information

In addition to existing and proposed information and quantities, Plan & Profile sheets include other information pertinent to the project, such as the following:

1309.6.1 Bench Marks and Reference Points

A bench mark is to be shown every 1000' [300 m] (maximum) of alignment, and one on each side of all streams. All reference points needed to reestablish the highway alignment must also be shown. Reference points and benchmarks are more commonly shown on the Schematic Plan.

1309.6.2 Cross References to Other Sheets

Where quantities, details, etc. are shown on other sheets, cross-references are required.

1309.6.3 Typical Sections of Adjoining Pavement

When not shown with the Typical Section Sheets, the first and last Plan & Profile Sheet should show a detail of the Typical Section of the Adjoining Pavement, including type, thickness and cross slopes of all pavement courses.

1309.6.4 Project and Work Limits

If the Project and Work Limits are not provided in the Schematic Plan, the limits should be shown on the appropriate Plan & Profile Sheets.

1309.6.5 Match Lines

A match line should be shown, and the station given, wherever the plan view, work or quantities are continued on another sheet. It is recommended that the match lines be made at a location where the stationing is a multiple of 100 feet [20 meters].

1310 Cross-Sections

1310.1 General

Although the main purpose for cross-sections is to show end areas and surface dimensions for the calculation of earthwork and seeding quantities, they conveniently show a wealth of additional information, which will be discussed in part in the following sections **[SP 1310-1 through SP 1310-4]**.

In complicated areas such as interchanges, a cross-section layout sheet may be required. A cross-section layout sheet is a plan sheet showing where each section is located **[SP 1310-6]**.

1310.2 Format

Cross-Sections are plotted on a 1" x 1" [20 mm x 20 mm] grid system subdivided in accordance with the examples shown in **Figure 1205-1**. Horizontal and vertical scales are equal - usually 1"=5' or 1"=10' [1:50 or 1:100]. Elevations are labeled along each side at the major grid lines. When a 1"=10' [1:100] scale is used, the even elevations are located at the 1" [20-millimeter] grid lines. The distance, measured from the centerline of construction, is labeled at the top and bottom of the sheet at the vertical major grid lines.

Cross-section sheets shall be laid out such that stationing increases from the bottom to the top of the sheet.

Intervals between regular sections should normally be 50' [20 meters]. Intervals of 25' [10 meter] should be used where greater detail is required. In addition, sections (or partial sections) are plotted at abrupt ground line changes or to show special features such as drives, bridges, or drainage items. Sections must be shown as often as necessary to accurately determine the character and extent of the proposed work. The station is shown in bold print under each section at the centerline of construction. The existing ground elevation at the centerline of construction is shown directly below the station number and the elevation of the proposed grade at the profile grade point is shown directly above the station number. A project may require two profile grade points to be shown on the cross-sections.

Exaggerated cross-sections may be included in the plan or provided on separate sheets with the Stage Three submission for review and reference during construction of the project. They are used to calculate variable depth pavement leveling course quantities or to show variable depth pavement planing.

Existing features are shown with dashed lines and proposed features are shown with solid lines. Surface, base and subbase courses of proposed pavement are not shown. Likewise, interpretations of the subsurface investigation, such as top of rock, are not shown. The limits of the existing pavement should be shown.

The ratio for each side slope and back slope (2:1, 3:1, etc.) should be labeled at the top and bottom sections on each sheet and at any intermediate sections where there is a change in the slope.

1310.3 Earthwork and Seeding Quantities

1310.3.1 Earthwork Calculations

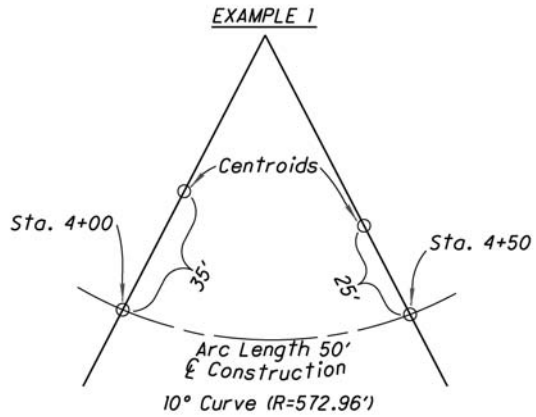
End areas (calculated to the nearest square foot [0.1 of a square meter]) and earthwork volumes (cubic yards [cubic meters]) are shown for cuts and fills in the columns on the right side of the cross-section sheet. Separate calculations must be shown when different types of earthwork (e.g., Item 203 and Item 204) are included **[SP 1310-2 and 1310-4]**. Concrete pavement removal must be itemized separately and paid for under Item 202, Pavement Removed. On large projects, asphalt concrete pavement removal should be itemized separately under Item 202, Pavement Removed, Asphalt. Adjustments must be made for drives, intersections, etc. End areas may be determined using computer programs, planimetering, or summation of geometric shapes. Subtotals for earthwork quantities should be shown on each sheet and carried to a subsummary in advance of the cross-sections or directly to the General Summary.

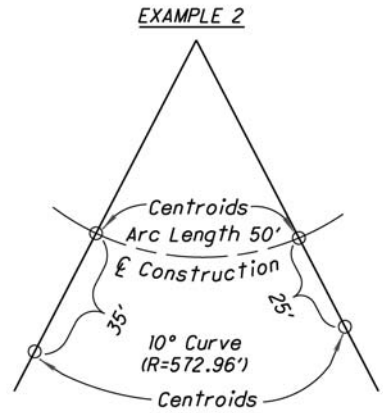
1310.3.2 Earthwork Corrections for Curvature

When computing earthwork for a project, it is important that the designer consider the effect of curvature on the volumes of cut and fill and adjust the quantities where warranted. Curvature may have a significant effect where there are side-hill cuts and/or fills where the centroid of either area is significantly displaced from the centerline. The magnitude is a function of the curve radius, with shorter radii curves (such as may be used on ramps) having the greater effect. Whenever the true volume of cut or fill, or both combined, based on the centroidal arc length, differs by one cubic yard per yard [one cubic meter per meter] of distance between adjacent cross-sections from the estimated volumes based on the survey length, a correction shall be shown in the plans.

It is assumed that the actual true volume of a curved prismoid is the product of the average area of end sections times the arch length passing midway between the centroids (centers-of-gravity) of the end sections. If the centroidal arc lies on the inside of a curve, its length is shorter than the centerline distance; if it lies on the outside, its length is longer.

To adjust earthwork volumes for curvature, the corrected-arc-length method should be used. This method is simple and easy to understand and is easily adapted to computer programs for earthwork. An example of this method is shown in the following figure.





EXAMPLE 1: Find corrected arc length where centroids are located inside the curve.

English: Corrected Radius = 572.96' - $\frac{35'+25'}{2}$ = 542.96'

Alignment Factor = $\frac{542.96'}{572.96'}$ = 0.94764

Corrected Arc Length = 50' x 0.94764 = 47.38'

EXAMPLE 2: Find corrected arc length where centroids are located outside the curve.

English: Corrected Radius = 572.96' + $\frac{35'+25'}{2}$ = 602.96'

Alignment Factor = $\frac{602.96'}{572.96'}$ = 1.05236

Corrected Arc Length = 50' x 1.05236 = 52.62'

[A similar procedure applies to metric units]

The diagram of the example showing the method of correction should be shown on the General Note Sheet. The corrected arc lengths should be shown in the earthwork tabulations on the cross-section sheets.

1310.3.3 Roads for Maintaining Traffic

Roads for Maintaining Traffic, along with their baseline (if any) should be shown on the cross-sections **[SP 1310-2 and SP 1310-3]**. Earthwork for Roads for Maintaining Traffic shall be shown by heavy dashed lines. This includes both the portion to be removed under 615, Roads for Maintaining Traffic, as well as the overlapping areas of earthwork that will remain as part of the permanent facility.

Earthwork cut and fill end areas for roads for maintaining traffic may be shown on the cross-sections with quantities located in separate cut and fill columns or marked with an asterisk. Alternatively, they may be calculated on separate letter size sheets and included with the LD-4 form (submitted with the final tracings) for estimating purposes. The totals of the earthwork cut and fill for roads for maintaining traffic shall be provided in the General Notes.

1310.3.4 Seeding Calculations

Except on projects where the seeding quantities can otherwise be determined with reasonable accuracy, seeding end widths and areas should be shown on the cross-sections. The limits of seeding shall be all areas of exposed soil between the right-of-way lines and within the construction limits for areas outside the right-of-way lines.

End widths measured to the closest foot [0.5 meters] and seeding areas (sq. yards [square meters]) are shown in the columns on the left side of the Cross-Section sheet. Adjustments must be made for drives, intersections, etc. **[SP 1310-3]** Subtotals for seeding quantities should be shown on each sheet and carried to a subsummary in advance of the Cross-Sections or directly to the General Summary.

1310.4 Drainage Items

Existing and proposed drainage facilities should be shown on the Cross-Sections. This includes, but is not limited to: ditches, permanent erosion control items, flow arrows, culverts, headwalls (type and elevations), inlets, manholes, drive pipes, underdrains, and other longitudinal drainage items. Ditch flowline elevations should be shown. Existing facilities to be removed or abandoned should be so noted. Existing normal water level elevations should also be noted for lakes, ponds, rivers and streams.

Drainage items are normally shown on the Plan & Profile Sheets and on the Drainage Detail sheets in addition to the Cross-Sections. Full design information should be indicated on only one of these sheets. The remaining sheets need only show the type of structure and a reference to the sheet showing additional details.

1310.5 Drives

Drive profiles should be shown on the cross-sections. Profiles which do not fall at a full cross-section should be shown on a partial section. The drive station, length and grade should be labeled. Separate drive profile sheets are not typically required. Separate sheets may be needed for long drives **[SP 1310-5]**.

1310.6 Miscellaneous Items

Some of the other items that should be shown on the Cross-Sections include: retaining walls, limits of subgrade stabilization and all underground utilities.

1311 Miscellaneous Details

Miscellaneous Details is a section of the plan that serves as a “catch-all” for items that do not fit under other headings. Some of the items that may fall into this category include:

1311.1 Drive Details

Drive details **[SP 1311-4 and 1311-5]** show the geometry and build-up of drives. Typically, this information can be adequately presented in tabular format and separate drive details are not needed.

1311.2 Grading Details

Grading Details **[SP 1311-12]** are sheets showing the graded shoulder, slope breaks, drainage structures, ditches, and flow arrows. A grading detail should be provided for intersections and interchanges on complicated plans where cross sections and profiles cannot adequately describe the grading.

1311.3 Intersection Details

Intersection Details **[SP 1311-2 and SP 1311-3]** show the intersection angle, pavement widths, radius return curve data (location of origin point, radius, interior angle and length of curve), centerline and edge of pavement elevations at 25 ft. [10 meter] intervals, elevations around the radius returns at 10 to 15 ft. [3 to 5 meter] intervals, drainage structures including elevations, ditch and conduit flow arrows, and top of curb elevation. An intersection detail should be provided for all intersections.

1311.4 Interchange and Ramp Terminal Details

Addition of new or modification of existing interchanges should be accompanied by Interchange Details showing baseline layout information, profiles, horizontal alignment, ramp intersections, class terminals, tapers in terminal areas, superelevation rates and superelevation transition lengths.

Ramp Terminal Details **[SP 1311-13]** show pavement elevations and stations for proposed edge of pavement, crown and edge of shoulder. Width dimensions associated with ramp terminals are provided.

1311.5 Pavement Joint Details

A Pavement Joint Detail **[SP 1311-7(a) and 1311-7(b)]** should be provided for all intersections, ramp terminals and other varying width sections when constructed with concrete pavement. The Pavement Joint Detail shows the locations of all expansion, longitudinal and contraction joints.

1311.6 Pavement/Transition Details

Pavement/Transition Details **[SP 1311-6 and 1311-9 through 1311-11]** show the pavement build-up within a transition. A Pavement/Transition Detail should be provided for areas at the ends of a project that are not easily depicted by a typical section.

1311.7 Superelevation Tables

Superelevation Tables **[SP 1311-1]** show edge of pavement elevations, profile grade elevation, pavement cross slopes at 25 ft. [10 meter] intervals and at all P.C., P.T., T.S., S.C., S.T., and C.S. as well as the transition rates.

1311.8 Other Details

Additional details that may be needed include:

- Noise Barriers - Additional information may be obtained by contacting the **Office of Environmental Services**.
- Linear Grading Details
- Median Crossover Details **[SP 1311-8]**
- Roundabout Details **[SP 1311-14(a) and 1311-14(b)]** show roundabout geometry in addition to what is shown on the Schematic Plan. Additional information may be obtained by contacting the **Office of Roadway Engineering Services**.

1312 Drainage Details

1312.1 General

Drainage Details include details for prefabricated structures and other drainage related items that cannot be adequately shown on other plan sheets. Several of these are discussed in the following sections.

1312.2 Culvert Details

If larger than minimum pipe sizes are used, a separate culvert detail is required **[SP 1312-1, 1312-2, 1312-3 and 1312-7]**. If space permits, two or more details may be placed on one sheet. The horizontal and vertical scales are the same, preferably 1"=10' [1:100]. Culvert details should include the following:

A. Hydraulic Design Data to be shown on the profile or as an information block for each culvert:

- Drainage area to the nearest acre [hectare].
- Design-year and 100-year discharge in cfs [m³/s].
- Design-year and 100-year velocity in ft/s [m/s].
- Design-year and 100-year headwater elevation to the nearest 0.1 ft. [0.01 meter].
- All existing structure data - size, type, length, date built.

B. Plan View Information:

- Station to nearest 0.01 ft. [0.01 meters] where structure centerline intersects centerline of construction.
- Skew angle to the nearest degree as measured from the centerline of the culvert to the centerline of the roadway.
- Stations and offsets (nearest 0.01 foot [0.01 meters]) at structure ends.
- Channel protection with dimensions.
- Slope treatment.
- Conduit channels and ditches with flow arrows.
- Pavement dimensions.
- Guardrail dimensions and offsets.
- Headwall angle to structure and location with dimensions.
- Right-of-Way limits, easements.
- Construction limits.

C. Profile Information:

- Structure type, length and grade.
- Structure grade to nearest hundredth of a percent.
- Inlet and outlet flowline elevations to the nearest 0.1 foot [0.01meter].

- Profile grade elevation.
- Edge of pavement elevations.
- Minimum cover elevation to the nearest foot [0.1 meter].
- Maximum cover elevation to the nearest foot [0.1 meter].
- Type of headwall with elevations.
- Ditch grades to the nearest tenth of a foot.
- Type of channel and/or ditch protection with thickness.
- Guardrail treatment.
- Centerline of construction.
- All offsets (measured along centerline of culvert).
- Amount of fill material below ordinary high water [for waterway permits].

D. Estimated Quantities:

- End treatment (riprap, etc.).
- Item 602 concrete masonry for headwalls or Item 511 concrete if non-standard.
- Conduit. The pay quantity for pipe on slopes 3:1 or steeper is measured along the invert. All other pipe is measured horizontal from station to station.
- Pavement restoration. All items that are required to restore the pavement after the installation of 603 and 604 items.

If the quantities are carried to any sheet other than the General Summary, a cross-reference note should be added.

All items that are located such that they would prevent a 603, 604 or 605 item from being constructed require a 202 removal item (headwall removed, pipe removed, catch basin removed, etc.).

1312.3 Storm Sewer Profiles

Storm sewers are usually shown in detail on the Plan & Profile sheets. However, it is sometimes necessary to show storm sewer profiles on separate sheets if the profile on the Plan & Profile sheets is too congested. Storm sewer profiles should include: pipe type, size, length, direction of flow, existing and proposed cover; grade, flowline elevations, stations and offsets, and all catch basins, manholes and inlets **[SP 1312-4 and 1312-5]**.

Hydraulic information at the storm sewer outlet should include: the total drainage area, the design year discharge, and the hydraulic gradeline for the check discharge.

1312.4 Three-Sided Precast Culverts

In addition to the culvert details specified in Section 1312.2, three-sided precast culvert details will consist of the following as a minimum **[SP 1312-6(a) through 6(h)]**:

A. Plan Details

- Wall and slab thicknesses.
- Footing, wingwall, and headwall details.
- Reinforcing steel list (cast-in-place concrete only).
- Structure number with station.
- Foundation notes.
- Estimated quantities - 503, 511 or 898, and 509 should be used for headwalls, footings and wingwalls. The plans should define the limits of work under 503 and 603.

B. Optional Designs

For three-sided culvert plans involving optional designs (flat top/arch top), the structure details may be combined or separated, depending on the degree of similarity. Footing and wingwall designs should generally be the same for each option. Quantities for optional designs should use one of the following formats:

- Separate list of estimated quantities for each option.
- A combined list with all common quantities listed together and all quantities not common listed separately under each option (i.e., Option A, Option B, etc.)

1312.5 Underdrain Details

Underdrain Details show the size of underdrain, type of underdrain, tees, bends, crosses, and outlets for underdrains.

1313 Sanitary Sewer and Water Work Plans

Normally, sanitary sewer and water work can adequately be shown on the regular Plan & Profile sheets. Occasionally, however, where the project is complex, or the magnitude of this type of work is extensive, special plan sheets may be required **[SP 1313-1 and SP 1313-2]**.

Section 1300
Plan Components

1314 Traffic Control, Lighting, Landscaping, Rest Areas, Structures, Right of Way, and Soils Information

1314.1 Traffic Control Plans

Plans and details involving permanent traffic control items, such as pavement markings, signing, and signalization **[SP 1314-1 through 1314-8]**, shall be prepared in accordance with the **Ohio Manual of Uniform Traffic Control Devices** and the **Traffic Engineering Manual**. Additional information may be obtained by contacting the **Office of Traffic Engineering**.

1314.2 Lighting Plans

Lighting plans should be prepared in accordance with the **Traffic Engineering Manual [SP 1314-9 through 1314-11]**. The **Office of Traffic Engineering** should be contacted for assistance in the preparation of plans involving highway lighting.

1314.3 Landscaping Plans

The **Office of Roadway Engineering Services** and the **Office of Environmental Services** should be contacted for assistance in the preparation of plans involving highway landscaping **[SP 1314-12]**.

1314.4 Rest Area Plans

The **Office of Facilities Management** should be contacted for assistance in the preparation of plans involving rest areas.

1314.5 Structures

Structure plan preparation should be in accordance with the **Bridge Design Manual**. Additional information may be obtained by contacting the **Office of Structural Engineering**.

1314.6 Right-of-Way Plans

The **Real Estate Administration Policies and Procedures Manual** should be used as a guide for preparation of Right-of-Way plans. Right-of-way sample plan sheets are contained within the **Real Estate Manual**. Additional information may be obtained by contacting the **Office of Production**.

1314.7 Soils Information Sheets

Soil profiles, foundation investigations, etc. should be prepared using the **Specifications for Subsurface Investigations**. Additional soils information, if any, may be obtained by contacting the **Office of Geotechnical Engineering** and the **Office of Structural Engineering**.

All available soils information should be included in the contract documents. This is usually accomplished by the use of soils plan sheets. Special Provisions or plan notes referencing the location of the soils information may also be used.

1314.8 Mine Map Overlay Sheets

Mine Map Overlay sheets should be used when a mine exists within 500' of the proposed work. These sheets should show mine maps overlain on the proposed roadway. The mine maps are usually electronically scanned and attached to the CADD file. Additional features located within 500 feet [150 m] on both sides of the centerline, including but not limited to the following, should be shown on the overlay sheets:

- Location of any field observed or mapped mine features (openings, subsidence features, etc.).
- Limits of mapped mine workings labeled with the Ohio Department of Natural Resources Division of Geological Survey Mine Code. A note should be shown on the Plan & Profile sheets when the extent of the mine workings exceeds the normal limits of the sheet.
- Existing and proposed roadways and centerlines
- Property and section lines
- Contours
- Construction limits
- Existing and proposed structures (houses, bridges, culverts, etc.)
- Driveways
- Railroads
- Streams, seeps, and springs
- All terrain vehicle trails, hiking and horse trails, and bike paths

Additional information regarding Mine Map Overlay Sheets may be obtained by contacting the **Office of Geotechnical Engineering**.

1315 Simplified Plans

1315.1 General

Simplified plans **[SP 1315-1 through SP 1315-4]** are not required to follow the format requirements described in the previous sections. However, they shall contain enough information to adequately describe the work so that the contractor can properly bid and construct the project.

1315.2 Plan Sheets

As a minimum, all plan sheets shall have a project identifier and sheet number.

1315.2.1 Title Sheet

The following is the minimum information that shall be provided on the title sheet:

- Plan Title - Section 1302.2
- Design Designation 1302.3
- Design Exceptions 1302.4
- Index of Sheets 1302.5
- Plan Preparer Identification - Section 1302.6
- Underground Utilities Note - Section 1302.7
- Location Map - Section 1302.8
- Supplemental Specifications - Section 1302.9

- Standard Construction Drawings - Section 1302.10
- Project Information 1302.11
- Notes - Section 1302.12
- Plan Signatures - Section 1302.13

Quarter size sheets should follow the format shown on **Figure 1302-1**. A letter size format is shown in the sample plans **[SP 1302-7]**.

1315.2.2 General Summary

All Simplified Plans must include a General Summary. The format of the General Summary shall be as per Section 1307.2.

1300 PLAN COMPONENTS

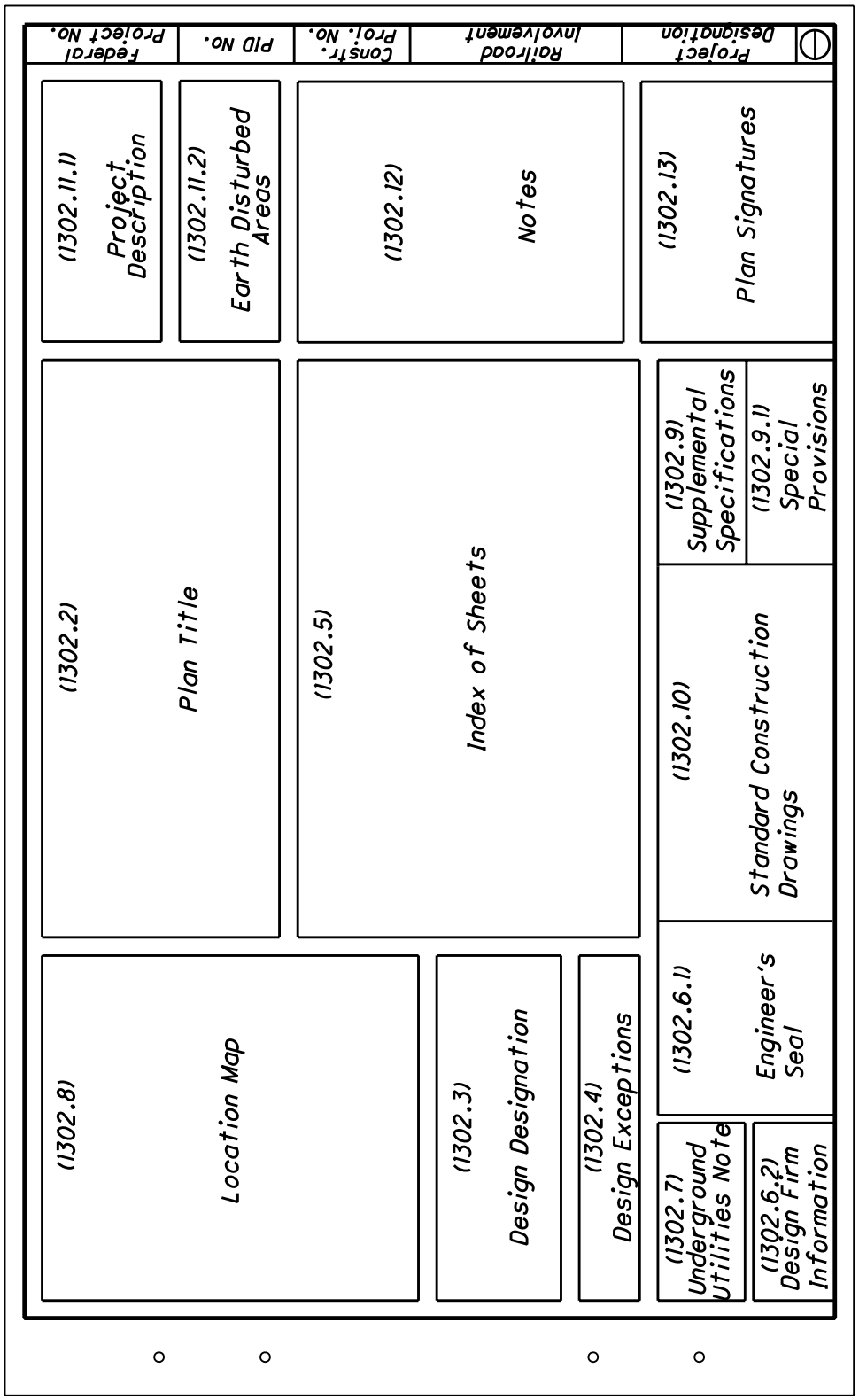
List of Figures

Figure	Subject
1302-1	Standard Title Sheet Layout
1302-2	Simplified Plan Title Sheet Layout: Letter or Legal Size
1302-3	Guide for Showing Design Exceptions in Plan
1303-1	Simple Curve Elements and Data
1303-2	Spiral Curve Elements and Data
1303-3	Combining Spiral Curve Elements and Data

STANDARD TITLE SHEET LAYOUT

1302-1

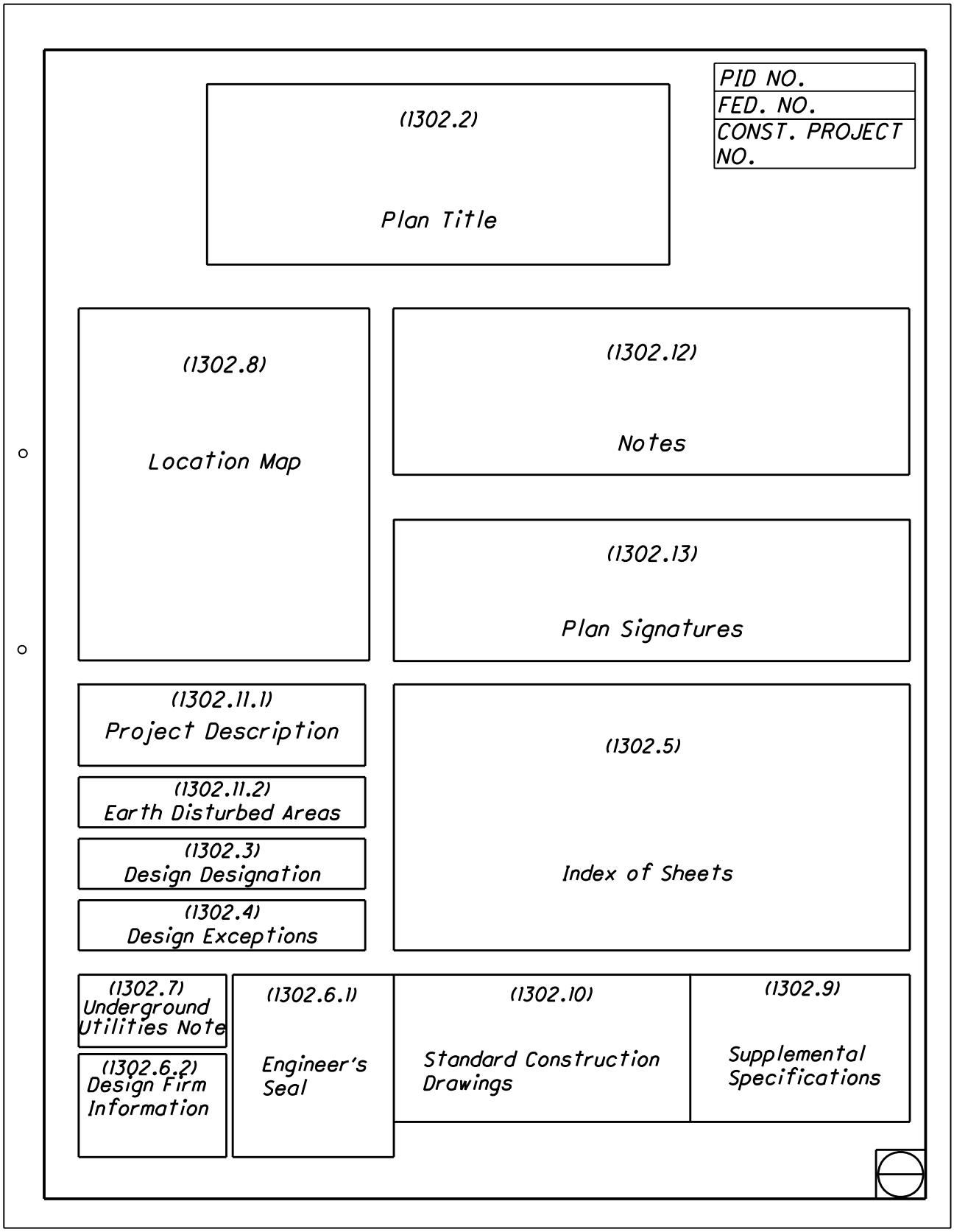
REFERENCE SECTION 1302



SIMPLIFIED PLAN TITLE SHEET LAYOUT: LETTER OR LEGAL SIZE

1302-2

REFERENCE SECTION
1315.2.1



GUIDE FOR SHOWING DESIGN EXCEPTIONS IN PLAN	1302-3
	REFERENCE SECTION 1302.4

NDC = Normal Design Criteria

PLAN SHEET	DESIGN EXCEPTION	DESIGN FEATURE	EXAMPLE
Schematic (A)	Horizontal Alignment	Degree of Curve	Dc = 7°00' (NDC Dc = 6°00'MAX)
	Horizontal Alignment	Deflection	Deflection = 2°00' (NDC 1°00'MAX)
	Horizontal Alignment	Lack of Spiral (B)	No Spiral (NDC 200' Spiral)
	Superelevation	Superelevation Rate	e_{max}= 0.077 (NDC 0.08)
Typical Section	Lane Width	Lane Width	11' (NDC 12')
	Shoulder Width	Graded/Curbed Shoulder Width	8' (NDC 10')
	Cross Slope	Pavement Cross Slope	0.0208 (NDC 0.0156)
Plan Sheet	Stopping Sight Distance	Horizontal SSD (B)(C)	SSD=381'(450' Min) Actual Design Speed 48 MPH
	Bridge Width	Bridge Width	30' (NDC 34')
	Horizontal Clearance	Horizontal Clearance	8' (NDC 10')
Profile Sheet	Vertical Alignment	Grade Break	0.20% (NDC 0.40% MAX)
	Stopping Sight Distance	Vertical SSD (C)	SSD=381'(450' Min) Actual Design Speed 48 MPH
	Grades	Grades	4.36% (NDC 4.00% MAX)
	Vertical Clearance	Vertical Clearance	15.5' (NDC 16.5' MIN)
	Superelevation	Superelevation Rate of Transition (D)	Rate of Transition=1:165 (NDC 1:213)
	Horizontal Alignment	Intersection Angle	Angle = 55° (NDC 70°
	Horizontal Alignment	Transition (Taper) Rates	Taper Rate = 50:1 (NDC 60:1)
Bridge Plan Sheets	Structural Capacity	Structural Capacity	(E)
	Bridge Parapets/ Curb Configuration	Bridge Parapets/ Curb Configuration	(E)
Superelevation Sheets	Superelevation	Superelevation Position	Position 35% (NDC 50%)

(A) If no Schematic Plan, show on Plan and Profile Sheets.

(B) Show with Curve Data.

(C) Stopping Sight Distance (SSD) and Actual Design Speed are shown only when the SSD is less than the normal design criteria.

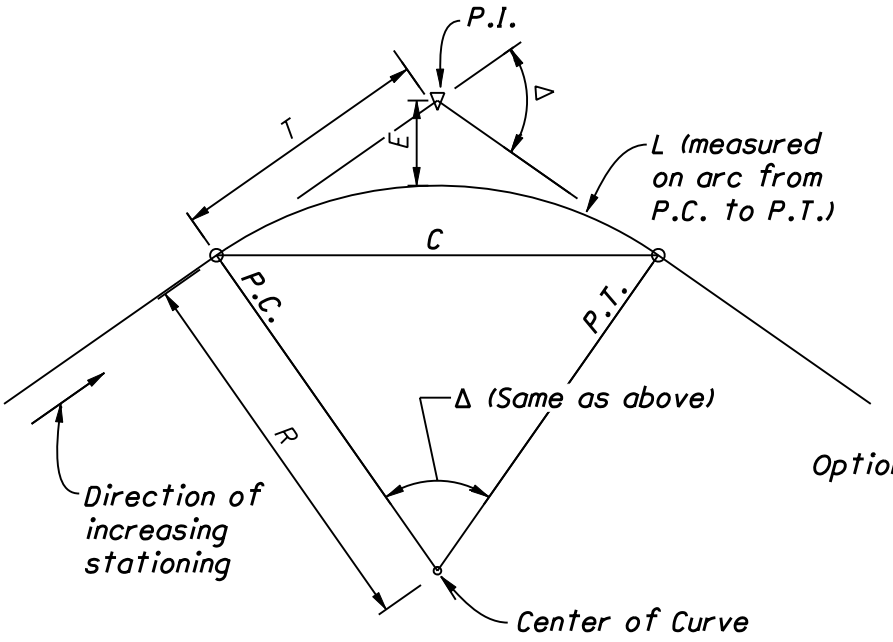
(D) Superelevation rate of transition is shown only when it is faster than the normal design criteria. If is shown on the Superelevation Tables when such tables are included in the plan.

(E) See Bridge Design Manual or contact the Office of Structural Engineering.

SIMPLE CURVE ELEMENTS AND DATA

1303-1

REFERENCE SECTION
1303.5, 1309.4.1



CURVE DATA

P.I.= Sta.
Δ = ___° ___' ___" Lt. or Rt.
* D_C = ___° ___' ___"
R =
T =
L =
E =
e_{max} =
Optional { C =
C.B. = ___ ___° ___' ___" ___
P.C. = Sta. } (1)
P.T. = Sta. }

(1) Normally shown on Plan View.

ELEMENTS

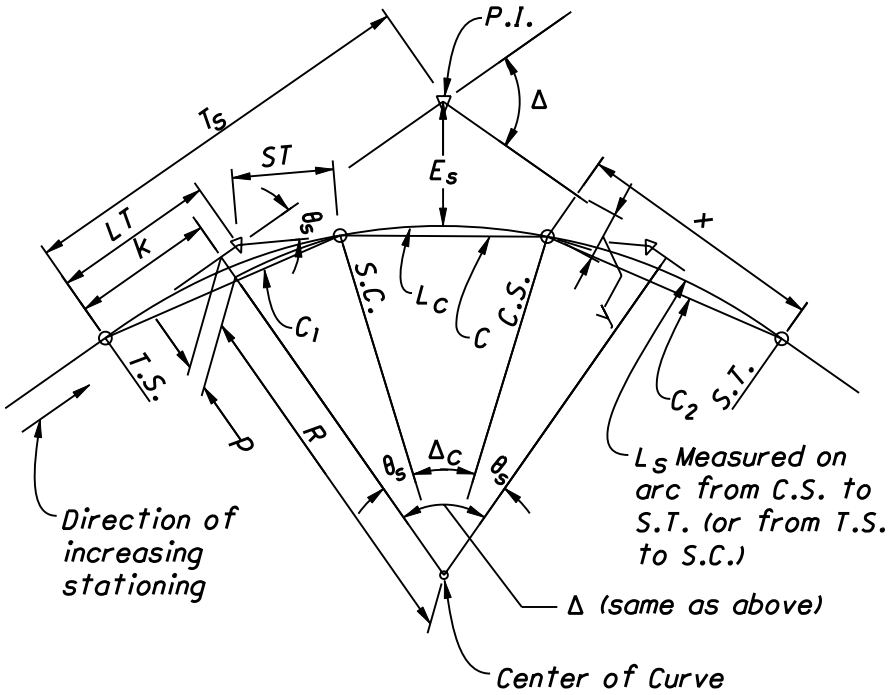
P.I.- Point of Intersection
Δ - Angle of Intersection
* D_C - Degree of Curve
R - Radius
T - Tangent Length
L - Length of Curve
E - External Distance
e_{max} - Maximum Superelevation
C - Chord Length
C.B.- Chord Bearing
P.C.- Point of Curve
P.T.- Point of Tangent

* English Units only

SPIRAL CURVE ELEMENTS AND DATA

1303-2

REFERENCE SECTION
1303.5, 1309.4.1



Note:
If the spiral is only on one end of a curve, substitute T_1 and T_2 for T_s and either P.C. for T.S. and S.C. or P.T. for C.S. and S.T. . The E_s distance becomes optional.

(1) For unequal spirals, show two sets of data for these items and substitute T_1 and T_2 for T_s.

(2) Normally shown on Plan view.

CURVE DATA

P.I.= Sta.
Δ = ___ °___ ′___ ″ Lt. or Rt.
*D_C = ___ °___ ′___ ″
R =
L_S =
θ_S =
LT =
ST =
x =
y =
k =
p =
Δ_C =
(1)
Optional
L_C =
T_S =
E_S =
e_{max} =
Optional
C_1 =
C =
C_2 =
T.S. = Sta.
S.C. = Sta.
C.S. = Sta.
S.T. = Sta.
(2)
Optional
$C.B._1$ = ___ °___ ′___ ″
C.B. = ___ °___ ′___ ″
$C.B._2$ = ___ °___ ′___ ″

ELEMENTS

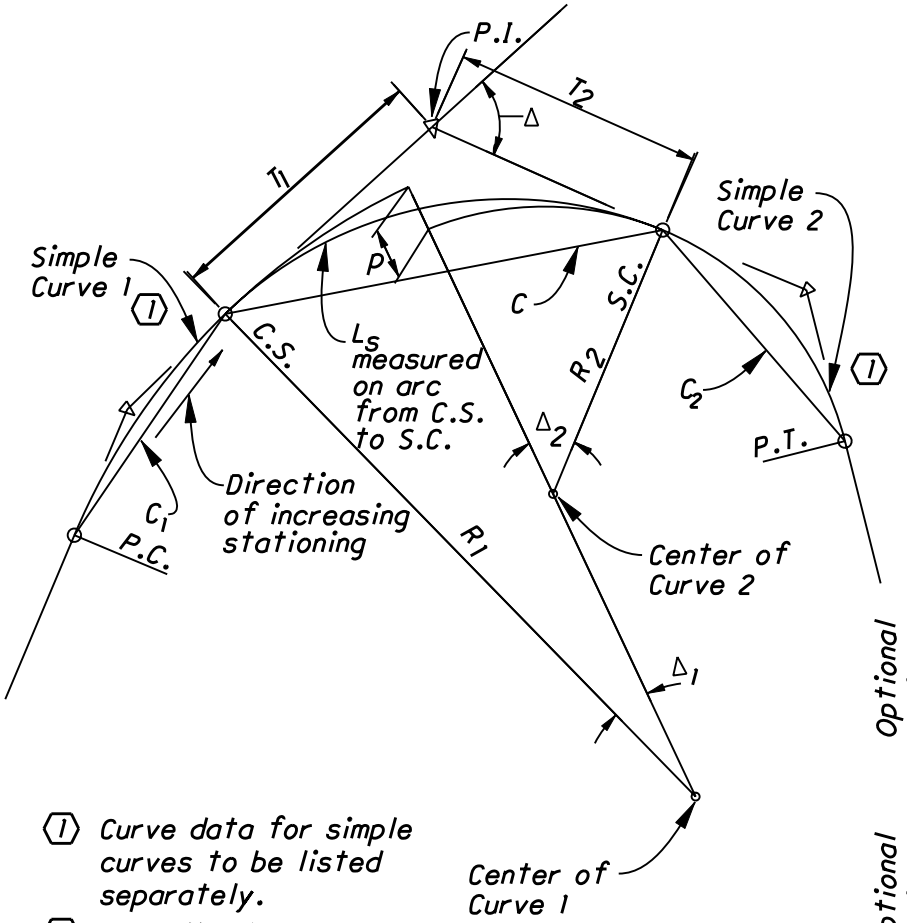
P.I. - Point of Intersection
Δ - Angle of Intersection
*D_c - Degree of Curve
R - Radius of Curve
L_S - Length of Spiral
θ_S - Angle of Intersection of the LT and ST.
LT - Long Tangent
ST - Short Tangent
x - Tangent distance of the C.S. with reference to the S.T. and the T_s.
y - Tangent offset of the C.S. with reference to the S.T. and the T_s.
k - Distance from the T.S. to the perpendicular projection of the center of curve.
p - Offset of Curve to Tangent
Δ_c - Central Angle of Curve
L_C - Length of Curve
T_s - Distance from T.S. or S.T. to P.I.
E_S - Distance from curve to P.I.
e_{max} - Maximum Superelevation
C_1 = Chord Length from T.S. to S.C.
C = Chord Length from S.C. to C.S.
C_2 = Chord Length from C.S. to S.T.
T.S. - Tangent to Spiral
S.C. - Spiral to Curve
C.S. - Curve to Spiral
S.T. - Spiral to Tangent
$C.B._1$ = C_1 Bearing
C.B. = C Bearing
$C.B._2$ = C_2 Bearing

* English Units only

COMBINING SPIRAL CURVE ELEMENTS AND DATA

1303-3

REFERENCE SECTION
1303.5, 1309.4.1



1 Curve data for simple curves to be listed separately.

2 Normally shown on Plan view.

CURVE DATA

P.I. = Sta.
Δ = ___ °___ ′___ ″ Lt. or Rt.
* D_1 = ___ °___ ′___ ″
R_1 =
* D_2 = ___ °___ ′___ ″
R_2 =
L_s =
p =
Δ_1 = ___ °___ ′___ ″
Δ_2 = ___ °___ ′___ ″
T_1 =
T_2 =
e_1 =
e_2 =

Optional
C_1 =
C =
C_2 =

C.S. = Sta.
S.C. = Sta.
} 2

Optional
$C.B._1$ = ___ °___ ′___ ″
C.B. = ___ °___ ′___ ″
$C.B._2$ = ___ °___ ′___ ″

ELEMENTS

P.I. - Point of Intersection
Δ - Angle of Intersection
* D_1 - Degree of Curve 1
R_1 - Radius of Curve 1
* D_2 - Degree of Curve 2
R_2 - Radius of Curve 2
L_s - Length of Spiral
θ_s - Nominal Spiral Angle (Not Shown on Diagram)
p - Radial Shift (Distance that Curve 1 is offset from Curve 2)
Δ_1 - Central Angle of the extension of Curve 1 into Spiral
Δ_2 - Central Angle of the extension of Curve 2 into Spiral

C_1 = Chord Length from T.S. to S.C.
C = Chord Length from S.C. to C.S.
C_2 = Chord Length from C.S. to S.T.
T_1 - Distance from C.S. to P.I.
T_2 - Distance from P.I. to S.C.
e_1 - Superelevation at C.S.
e_2 - Superelevation at S.C.
C.S. - Curve to Spiral
S.C. - Spiral to Curve
$C.B._1$ = C_1 Bearing
C.B. = C Bearing
$C.B._2$ = C_2 Bearing

* English Units only