

Preface

Purpose

Highway plans must ultimately satisfy many needs. In addition to the obvious needs of contractors who build the project, plans must serve the needs of designers, project engineers and inspectors, reviewers, and other interested parties. These plans become a part of the construction agreement and serve as an historic record.

Since highway plans incorporate the expertise of many specialty governmental units, organizations and personnel, various reviews are necessary throughout the plan preparation process.

Application

The guidelines contained in this manual are considered a primary source of reference by personnel involved in the preparation of highway plans for the State of Ohio.

Although this manual is an attempt to standardize the form and the process for highway plan preparation in Ohio, it is recognized that many projects will involve unusual circumstances which will require deviation from these guidelines.

Preparation

This Plan Preparation Manual has been developed by the Office of CADD and Mapping Services. Errors and omissions should be reported to the Administrator, Office of CADD and Mapping Services, Ohio Department of Transportation, P.O. Box 0899, Columbus, Ohio, 43216-0899.

Format and Revisions

A separate set of Sample Construction Plans is available, and considered to be, an integral part of the Plan Preparation Manual.

Manuals and revisions may be downloaded from the [Design Reference Resource Center](#) web page. Users are encouraged to sign up on this page for electronic (email) notification of revisions.

ODOT's Internet address is <http://www.dot.state.oh.us>.

Unit of Measure

Plans are to be prepared using the English system of units.

Standard Construction Drawings (SCDs) are listed using only the root number of the drawing (e.g., BP-3.1 rather than BP-3.1M). Highway plans must always use the SCD showing the most up-to-date details available. The most current SCD may be in English and/or dual (English and metric) units.

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Ohio Counties

County	Code	District	County	Code	District
Adams	ADA	9	Knox	KNO	5
Allen	ALL	1			
Ashland	ASD	3	Lake	LAK	12
Ashtabula	ATB	4	Lawrence	LAW	9
Athens	ATH	10	Licking	LIC	5
Auglaize	AUG	7	Logan	LOG	7
			Lorain	LOR	3
Belmont	BEL	11	Lucas	LUC	2
Brown	BRO	9			
Butler	BUT	8	Madison	MAD	6
			Mahoning	MAH	4
Carroll	CAR	11	Marion	MAR	6
Champaign	CHP	7	Medina	MED	3
Clark	CLA	7	Meigs	MEG	10
Clermont	CLE	8	Mercer	MER	7
Clinton	CLI	8	Miami	MIA	7
Columbiana	COL	11	Monroe	MOE	10
Coshocton	COS	5	Montgomery	MOT	7
Crawford	CRA	3	Morgan	MRG	10
Cuyahoga	CUY	12	Morrow	MRW	6
			Muskingum	MUS	5
Darke	DAR	7			
Defiance	DEF	1	Noble	NOB	10
Delaware	DEL	6			
			Ottawa	OTT	2
Erie	ERI	3			
			Paulding	PAU	1
Fairfield	FAI	5	Perry	PER	5
Fayette	FAY	6	Pickaway	PIC	6
Franklin	FRA	6	Pike	PIK	9
Fulton	FUL	2	Portage	POR	4
			Preble	PRE	8
Gallia	GAL	10	Putnam	PUT	1
Geauga	GEA	12			
Greene	GRE	8	Richland	RIC	3
Guernsey	GUE	5	Ross	ROS	9
Hamilton	HAM	8	Sandusky	SAN	2
Hancock	HAN	1	Scioto	SCI	9
Hardin	HAR	1	Seneca	SEN	2
Harrison	HAS	11	Shelby	SHE	7
Henry	HEN	2	Stark	STA	4
Highland	HIG	9	Summit	SUM	4
Hocking	HOC	10			
Holmes	HOL	11	Trumbull	TRU	4
Huron	HUR	3	Tuscarawas	TUS	11
Jackson	JAC	9	Union	UNI	6
Jefferson	JEF	11			

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County	Code	District
Van Wert	VAN	1
Vinton	VIN	10
Warren	WAR	8
Washington	WAS	10
Wayne	WAY	3
Williams	WIL	2
Wood	WOO	2
Wyandot	WYA	1

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ODOT Districts

Ohio Department of Transportation Districts



District 1

1885 N. McCullough St.
Lima, OH 45801-0040
419-222-9055
fax: 419-222-0438

District 2

317 East Poe Rd.
Bowling Green, OH 43402-1330
419-353-8131
fax: 419-353-1468

District 3

906 North Clark St.
Ashland, OH 44805-1989
800-276-4188 or 419-281-0513
fax: 419-281-0874

District 4

2088 S. Arlington Rd.
Akron, OH 44306
800-603-1054 or 330-786-3100
fax: 330-786-2232

District 5

9600 Jacksontown Rd., S.E.
PO Box 306
Jacksontown, OH 43030
740-323-4400
fax: 740-323-3715

District 6

400 East William St.
Delaware, OH 43015
800-372-7714 or 740-363-1251
fax: 740-833-8100

District 7

1001 St. Marys Ave.
SR 29 PO Box 969
Sidney, OH 45365-0969
937-492-1141
fax: 937-497-9734

District 8

505 South SR 741
Lebanon, OH 45036-9518
800-831-2142 or 513-932-3030
fax: 513-932-7651

Central Office

1980 W. Broad Street
Columbus, OH 43223
614-466-7170
fax: 614-644-8662
ODOT Web Site:
<http://www.dot.state.oh.us>

District 9

650 Eastern Ave. PO Box 467
Chillicothe, OH 45601
740-773-2691
fax: 740-775-4889

District 10

338 Muskingum Dr. PO Box 658
Marletta, OH 45750
800-845-0226 or 740-373-0212
fax: 740-373-7317

District 11

2201 Reiser Ave.
New Philadelphia, OH 44663
330-339-6633
fax: 330-308-3942

District 12

5500 Transportation Blvd.
Garfield Heights, OH 44125-5396
866-737-8112 or 216-581-2100
fax: 216-584-2274

Glossary of Terms

As Per Plan Item: A standard pay item whose requirements need to be modified from that which is defined by the standard drawings, Construction and Materials Specifications, or Supplemental Specifications.

Backslope: The slope from the back of a ditch to the existing ground surface.

Benchmark: A marker of known elevation and location used in surveying for establishing vertical control.

Calculation Sheet: Highway plan sheet used to show the derivation of quantities.

Centerline of Construction: The reference line used for construction of a project. Normally located at the median centerline on a divided highway or at the normal crown point location on an undivided highway.

Centerline of Right-of-Way: The reference line used for the right-of-way of a project. Normally located at the center of a highway's existing right-of-way.

Centerline of Survey: The reference line used in the field survey of a project. Although it is usually the same as the centerline of construction, it may be a separate survey line established for convenience. With modern surveying instruments, surveys are no longer completed based on a centerline of survey.

Construction Limits: Lines shown on a plan view that outline the lateral extent of the work. Typically placed 4 feet outside the point where the backslope touches the existing ground unless additional room is required for construction activities.

Construction Plan Tracings: The original copy of a highway plan.

Cross Section: A view produced by a vertical plane cutting through the roadway, usually at right angles to the centerline or baseline, showing the transverse profile of the existing ground surface and proposed grade lines. The main use of cross-section sheets is for calculation of earthwork and seeding quantities.

Cross Slope: The rate of change of elevation along a straight line from one point in a cross section to another.

Design Designation: Information shown on the Title Sheet expressing basic factors which control design (Current ADT, Design Year ADT, Design Hourly Volume, Directional Distribution, Percent B&C Vehicles, Design Speed, Legal Speed, Functional Classification).

Design Exception: A document which explains the engineering and/or other reasons for allowing certain design criteria to be relaxed in extreme, unique, or unusual circumstances.

Drainage Details: A portion of a highway plan which includes design details for all prefabricated structures as well as other drainage related items.

Federal Project Number: A number assigned to a project when Federal participation is involved.

Foreslope: The slope from the edge of the graded shoulder to the bottom of the ditch.

General Notes: A portion of a highway plan containing those plan notes required to clarify construction items not adequately covered by the specifications or plan details.

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General Summary: A portion of a highway plan used to summarize the total estimated quantities with complete pay item descriptions, item numbers, item extensions and funding splits.

Item Code: A nine-digit character used to catalog pay item descriptions.

Item Master: A list of acceptable item codes and their corresponding pay item descriptions and units of measure.

Item Special: An item that does not exist in the standard drawings, the Construction and Material Specifications or Supplemental Specifications.

Landscaped Area: An area containing an arrangement of plant materials specifically selected and located based on principles of design (line, form, color, texture, repetition, variety, balance and emphasis) for one or more of the following functions: visual control, architectural uses, climate control, noise control, erosion control, aesthetics and wildlife habitat.

Landscaping Plan: A portion of a highway plan dedicated to highway landscaping, including all plans, details and quantities required for landscaping items.

Lighting Plan: A portion of a highway plan dedicated to highway lighting, including all plans, details and quantities required for highway lighting items.

Location Map: A map on the Title Sheet showing the area in which the project is located and the project limits.

Maintenance of Traffic Plan: A portion of a highway plan which includes the notes and details required for maintaining traffic during construction.

Miscellaneous Details: A “catch-all” portion of a highway plan for details that do not specifically fall into another category.

Plan and Profile Sheet: A portion of a highway plan showing horizontal and elevation views an area before and after proposed construction: including quantities, dimensions, and other reference items required to lay out and construct a project.

Plan Insert Sheet: Special detail drawings furnished by ODOT and used with the original set of tracings as normal numbered plan sheets.

Profile Grade Point: The point on a typical highway cross-section which correlates with the profile grade line shown on the plan and profile sheets.

Project Designation: The identification assigned to a particular project. This includes county, route, section number and local name for projects on county or township systems, or county and local name for city street improvements.

Project Length: The total distance between the project limits, adjusted for station equations and suspensions, measured along the centerline of construction.

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Project Limits: Points on the mainline centerline of construction where the proposed improvement, as described in the project description, begins and ends. This is generally defined as the beginning/ending of full-depth, full-width pavement. Project limits do not include incidental construction, such as: pavement feathering and tapering, traffic control devices, drainage, guardrail, drives, side roads, service roads, etc., unless this type of work is the primary reason for the improvement.

Proposal Note: A note that is a part of a project's proposal that alters a pay item, standard drawing, Construction and Materials Specification or Supplemental Specification.

Reference Balloon: A circle with a leader line used to tie construction items to pay quantities on Plan and Profile sheets and to the legend on Typical Sections.

Reference Monument: An object that marks a point of known location. Used in surveying to establish horizontal control.

Reference Points: Fixed marked points, located on permanent objects in the field, from which various points on the reference line can be established using distances and directions.

Right-of-Way Plan: A portion of a highway plan showing a graphical representation of a highway improvement and its relation to adjacent property, the parcels or portions thereof needed for highway purposes, and other pertinent information.

Sanitary Sewer Plan: A portion of a highway plan dedicated to construction of sanitary sewers, including all plans, profiles, details and quantities required for sanitary sewer items.

Schematic Plan: A portion of a highway plan which shows the geometric location of a roadway in relation to existing features, such as; political boundaries, waterways, railroads, utilities, etc.

Service Road: Sometimes referred to as a Frontage Road or Access Road, it is a roadway, generally running parallel to the mainline, which provides access to commercial, residential or farm areas.

Simplified Plans: An abbreviated highway construction plan format consisting only of that information necessary to describe the type of work and its limits. Particularly adaptable to special types of projects (minor emergency relief, resurfacing, pavement markings, etc.)

SPEDuP Plans: Simplified Plans – Expedited Delivery Project Plans are a straightforward letter-size format which reduces the time to process, advertise and bid a project. Projects which qualify for this type of format are routine maintenance-type projects which have minimal design, and no complexities such as funding splits, right-of-way, utilities, or environmental impacts.

Staged Review Process: A series of review submissions at various stages in the design process.

Standard Construction Drawings: Detail drawings, identified by a specific number, published by ODOT, of items which are frequently used in plans and would otherwise require redrawing for each plan and have been pre-approved for general use.

Standard Pay Item: An item whose requirements are defined by the standard construction drawings and the Construction and Materials Specifications or Supplemental Specifications.

Station: A point or position on a measured line using 100-foot increments as a base of reference.

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Straight Line Distance (SLD): Distance based on the centerline of the roadway as measured from the western or southern county line or other true beginning.

Subsummary Sheet: Plan sheets used to gather quantities prior to carrying them to the General Summary.

Supplemental Specifications: Detailed specifications for items which are in the development stage or are used only occasionally. These specifications supplement or supersede the Construction and Material Specifications.

Tie Points: Any three points used to verify the location of the control point for the centerline of construction.

Title Sheet: The cover sheet in a set of highway plans showing project identification and location, sheet index, design parameters, specifications, standard construction drawings, approvals, and other pertinent information.

Traffic Control Plan: A portion of a highway plan dedicated to signing, signalization, pavement marking and other traffic control details.

Typical Section: A portion of a highway plan showing typical cross-sectional views of the existing pavement and the roadway after construction is complete.

Waterwork Plans: A portion of a highway plan dedicated to construction of waterwork items including all plans, profiles, details and quantities required for waterwork items.

Work Limits: The extreme longitudinal limits of the contractor's responsibility, including all temporary and incidental construction (except temporary traffic control devices). Identified by the "Work Limit" station on the centerline of construction on the mainline and on the centerline of all side roads, cross roads, and other construction generally running perpendicular to the project or separated from the project.

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1201 General Plan Sheet Information

1201.1 Introduction

The purpose of a set of construction plans is to delineate the proposed work with sufficient design details, supplemented with notes, calculations and summaries of quantities, in such a manner that it can be clearly and uniformly interpreted by engineers and contractors. Sufficient data must be provided to enable the contractor to make an intelligent bid and perform the work as intended. Clarity, completeness and conciseness are essential so as to avoid misinterpretation. Unnecessary details should be avoided.

1201.2 Unit of Measure

Plans shall be prepared using the English system of units.

1201.3 Plan Sheet Materials and File Format

With the exception of some local-let projects, plans shall be submitted in a PDF electronic image format. Text-based documents should be provided in searchable PDF files.

Some external agencies do not allow submission of electronic images as final documents. In instances where hard copy (i.e., paper) documents are required, the District Planning and Engineering Administrator will determine whether the hard copy document will be created by the District or by the consultant. The requirement to produce hard copy documents shall be included in the Scope of Services document.

Unacceptable hard copy originals include: mylars, negatives, sepias, vellums, damaged sheets, dark backgrounds, pencil drawings, zipatone, paste-ons, stick-ons or bond papers. Decals are not permitted.

1201.4 Plan Sheet Dimensions

All plan sheets, including plans prepared by sub-consultants (e.g., soil boring sheets), shall be the same size and format. With the exception of SPEDuP plans, electronic image files shall be formatted to be 22 inches by 34 inches and shall be capable of being bound and punched when printed as shown in **Figure 1201-1**.

Simplified plans shall be formatted to quarter size (11 inches by 17 inches).

SPEDuP plans shall be formatted to be letter size (8 ½ inches by 11 inches). See **Location and Design Manual**, Sections 1301.3 and 1316 for additional information on SPEDuP plan requirements.

1201.5 Title Block Information

1201.5.1 General

Figure 1201-1 shows the location of the border and title block for standard size (22 inches by 34 inches) plan sheets. An example title block is shown in **Figure 1201-2**. The **Bridge Design Manual** and **Real Estate Policies and Procedures Manual** show standard structures and right-of-way title sheet blocks, respectively. All plan sheets shall display, as a minimum, the plan sheet number, the project designation and the sheet title. Additional items that may be required include: quantity validation initials, plan scales and a north arrow. Title blocks are not required for SPEDuP plans.

1201.5.2 Sheet Numbers

Sheet numbers are shown in the split circle in the lower right corner of the sheet. The number at the

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top of the circle is the actual sheet number, in consecutive order, and the bottom number is the total number of sheets in the plan based on the last actual sheet number. Sheets that require supplemental sheet numbers (e.g., structure plans and right-of-way plans) may be grouped within the plan. Sheet numbers on SPEDuP plans shall be located in the lower right of the page footer, using the PAGE X of XX format.

Occasionally, sheets may need to be inserted into a set of plans that has already been numbered. These sheets should be labeled with the number of the preceding sheet, followed by consecutive letters (e.g., 26A, 26B...26Z) and then by consecutive double letters (e.g., 26AA, 26BB...26ZZ). This will permit the insertion of up to 52 additional sheets. The bottom number in the split circle will still be the number of the last sheet. The last sheet shall not be labeled with a number/letter combination. If a significant number of sheets need to be inserted or added to a set of plans, consideration should be given to renumbering the entire set.

1201.5.3 Project Designation

The project designation is normally the county code, route number, and section number as shown in the plan title on the Title Sheet (**Section 1302**). When multiple section numbers are involved and space in the title block does not permit a complete listing, the county, all route numbers, and the first section number followed by the words “and various” should be shown.

1201.5.4 Sheet Title

The sheet title should include: the general plan sheet description (e.g., Schematic Plan, General Summary, Plan and Profile, Cross-Sections, etc.), the applicable roadway, if not obvious (e.g., U.S. 35, S.R. 315, Ramp A, Main Street, Connecting Road, etc.) and the applicable station limits.

1201.5.5 Quantity Validation

Where sheets include quantities, space should be provided for the date and initials of the individuals who calculated and checked the quantities.

1201.5.6 Plan Scales

A bar scale should be shown whenever a plan view is required. Bar scales are not normally required in the vertical dimension on profiles or for cross-sections, since these should be adequately labeled. If the plan sheet requires more than one scale, bar scales should be shown on the plan and the words “See Details” shown in the title block.

1201.5.7 North Arrow

A north arrow should be shown as accurately as possible (usually $\pm 5^\circ$) whenever a plan view is required. If the plan sheet contains more than one plan view, no north arrow should be shown in the title block.

1201.5.8 Additional Requirements

The **Bridge Design Manual**, Section 100 and the **Real Estate Policies and Procedures Manual**, Section 3100 contain additional requirements for bridge and right-of-way plan sheets, respectively.

1201.6 Title Sheet Title Block

1201.6.1 General

The title block on the Title Sheet is unlike the title block on other plan sheets, in that it includes spaces for Railroad Involvement, the Construction Project Number, the Project Identification (PID) Number and the Federal Project Number. Formal Title blocks are not required for SPEDuP plans, but items as described in Sections 1201.6.2, 1201.6.3, 1201.6.4, and 1201.6.5 shall be shown on the SPEDuP Title sheet [SP 1302-8].

1201.6.2 Railroad Involvement

The names of all railroads involved in the project must be entered in the space provided on the title sheet. If there is no railroad involvement, this should be indicated by entering the word “NONE” in this space.

1201.6.3 Construction Project Number

The construction project number is added to the title sheet by the Office of Contracts prior to the letting date.

1201.6.4 PID Number

Each project is assigned a unique Project Identification (PID) Number when it is entered into Ellis. This number should be shown in the proper space on the title sheet. On occasion, this number may change during project development. The plan, file names and directory structure should always reflect the latest number, with former numbers noted on the Title Sheet.

1201.6.5 Federal Project Number

The Federal Project Number should be entered in the appropriate box on the title sheet. If the project has no federal participation, the words “Non-Federal” should be entered in this space.

1202 Drafting

1202.1 Plan Scales

The designer should prepare plans keeping in mind that a 22 inch by 34 inch full-size plan sheet **may** be reproduced to a 11 inch by 17 inch print.

It is recommended that plan sheet scales normally be limited to the following:

For English unit plan sheets: 1:1, 1:5, 1:10, 1:20, 1:50, 1:100, 1:200, 1:500 or 1:1000. These scales are in inches per foot. For example, 1:20 indicates 1 inch on the plan sheet equals 20 feet in the field.

Scales that are multiples of ten of the above scales may be used (e.g., 1:2000 is a multiple of 1:200).

If it is believed that a better product will result, other scales may be used. The intent should always be to clearly and adequately show the work to be performed, keeping in mind that the plans used during construction could be reduced to one-half the original scale (e.g., 1:20 full size prints become 1:40 quarter size prints).

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1202.2 Lettering

Fancy lettering should not be used. Lettering should be oriented in such a manner that it can be read from either the bottom or right side of the plan sheet. The minimum text size is 0.14 inches. The lettering in SPEDuP plans shall be Arial Bold, with a minimum font size of 10.

1202.3 Cross-Section Grids

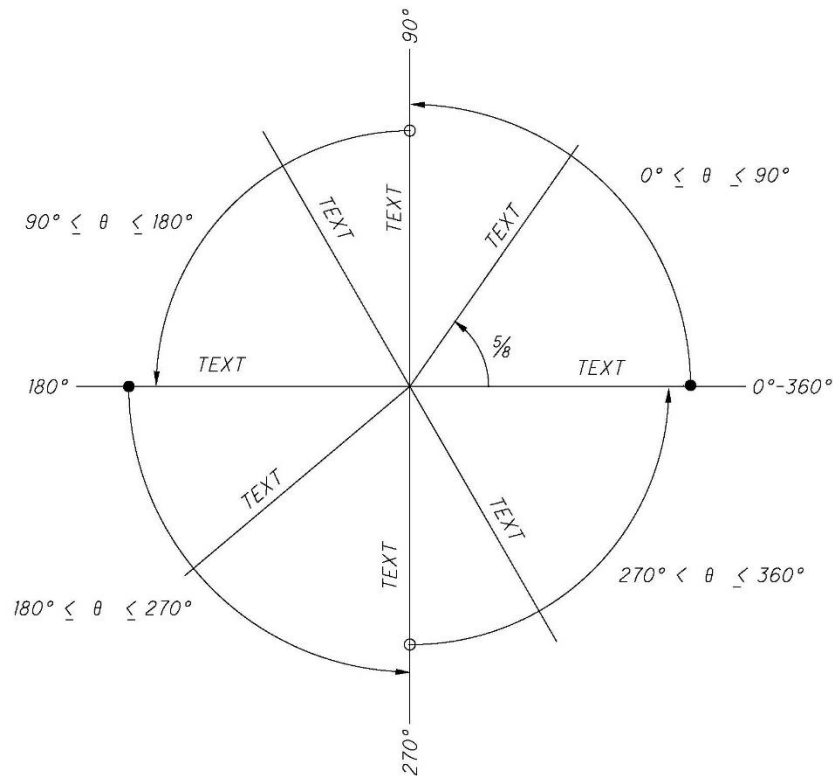
Acceptable grid systems for cross-sections and profiles are shown in **Figure 1202-1**. Letters and lines should be bolder when they are superimposed over cross-section grids.

1202.4 Drafting Conventions

The following sections present the preferred standard drafting guidelines for roadway construction plans. Standard drafting symbols are available from the Office of CADD and Mapping Services, [CADD Services](#) website.

1202.4.1 Text Orientation

Text on inclined lines should be orientated as shown.

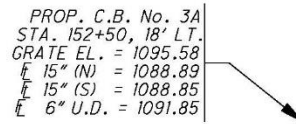
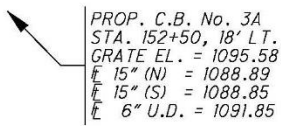
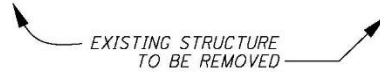
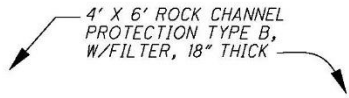


1202.4.2 Placement of Leaders from Notes

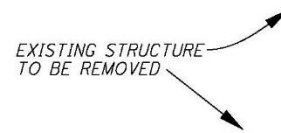
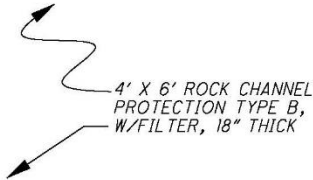
A leader line should originate from the first line on the left, the last line on the right, or from a vertical bar on either side, as shown. The leader should generally be an inclined straight line, if possible, except for the short horizontal shoulder extending from mid-height of the lettering at the beginning or end of a note.

Where space prohibits the use of straight leader lines, curved leaders may be used. Curves should be smooth and simple, beginning with a short, horizontal, shoulder extending from mid-height of the lettering.

CORRECT

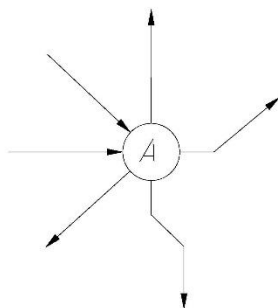


INCORRECT

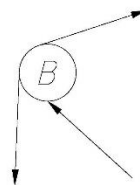


1202.4.3 Placement of Leaders to, or from, a Circular Object

A leader to, or from, a circular object should extend radially, so that if extended it would pass through the center of the circle.



CORRECT



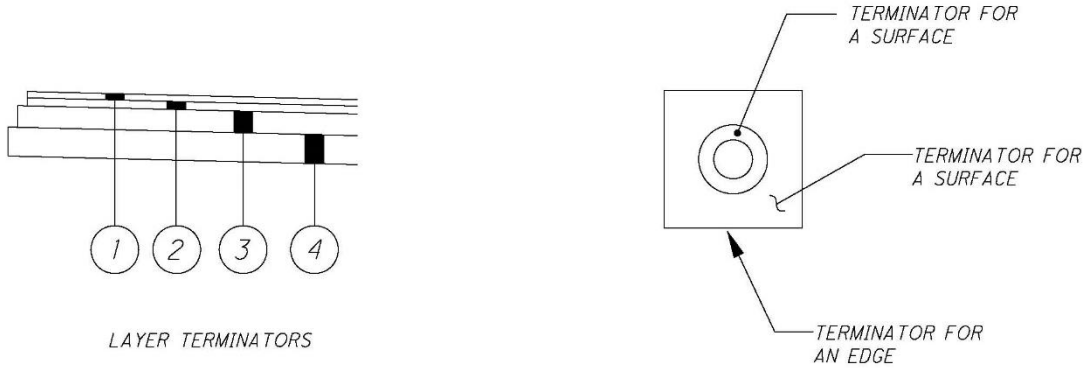
INCORRECT

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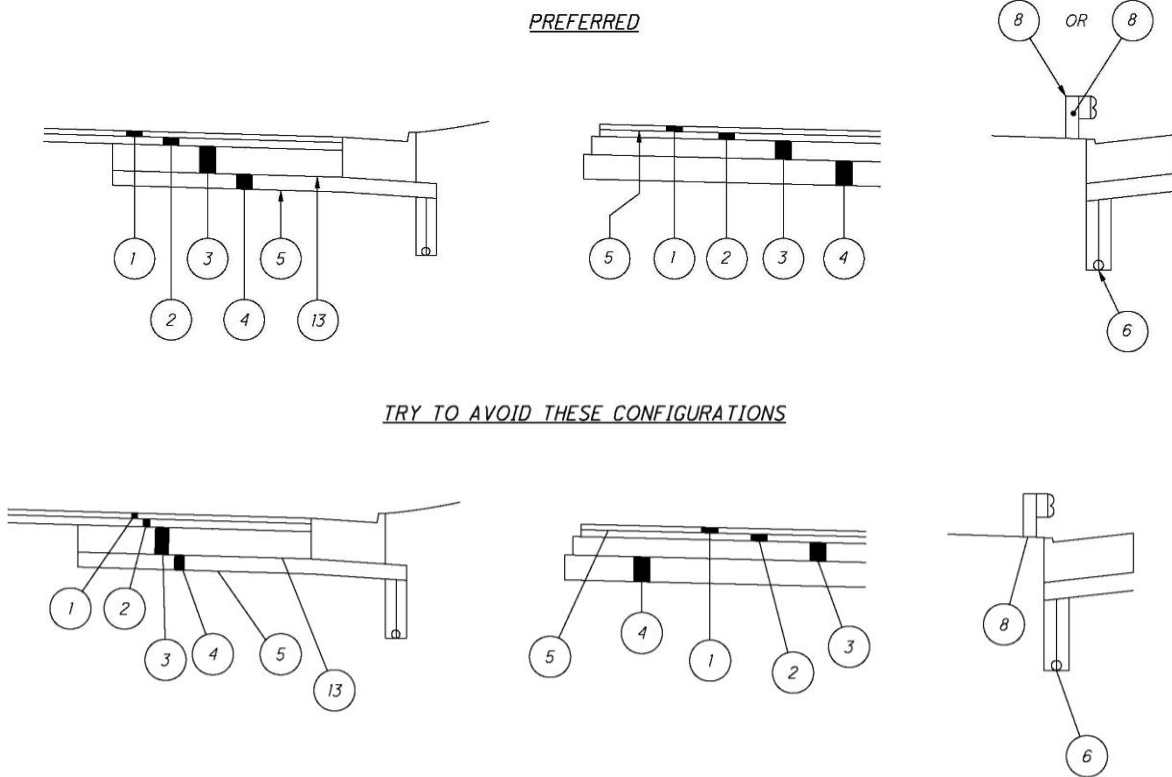
1202.4.4 Terminators

Leaders should terminate with an arrowhead when pointing to an object or to an edge, and should terminate as shown when pointing to a surface or layer.



1202.4.5 Placement of Balloons

Balloons on typical sections should be aligned as much as possible, rather than placed randomly around the section. The leader lines extending from the bubbles to pavement layers should be vertical, where possible. Other items, such as guardrail and underdrains may be labeled with straight, inclined, leaders. All leaders should end with a terminator.



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1202.4.6 Sheet Notes, Charts, and Summary Sheets

Groups of sheet notes shall be left justified. Right justification is optional.

Text in charts should be placed slightly above the lines (never directly on the line) to improve readability. It is recommended to leave an empty line at the beginning and end of the chart and between every fifth item to accommodate future additions.

ITEM	ITEM EXT.	GRAND TOTAL	UNIT	DESCRIPTION
ROADWAY				
201	11000	LS		CLEARING AND GRUBBING
202	23000	32738	SY	PAVEMENT REMOVED
202	23500	1503	SY	WEARING COURSE REMOVED
202	32000	1953	FT	CURB REMOVED
202	32001	927	FT	CURB REMOVED, AS PER PLAN
202	38000	12687.5	FT	GUARDRAIL REMOVED
202	38700	34	EACH	GUARDRAIL POST REMOVED
202	58500	3	EACH	CATCH BASIN ABANDONED
203	10000	39679	CY	EXCAVATION
203	20000	12954	CY	EMBANKMENT
204	10000	71464	SY	SUBGRADE COMPACTION
606	15050	11650	FT	GUARDRAIL, TYPE MGS
606	15150	175	FT	GUARDRAIL, TYPE MGS HALF POST SPACING
606	25550	12	EACH	ANCHOR ASSEMBLY, MGS TYPE A
606	26150	12	EACH	ANCHOR ASSEMBLY, MGS TYPE E
606	26550	23	EACH	ANCHOR ASSEMBLY, MGS TYPE T

Numbers with decimals in a chart should be aligned in columns along the decimal point. Integer values should be either right justified or centered in columns.

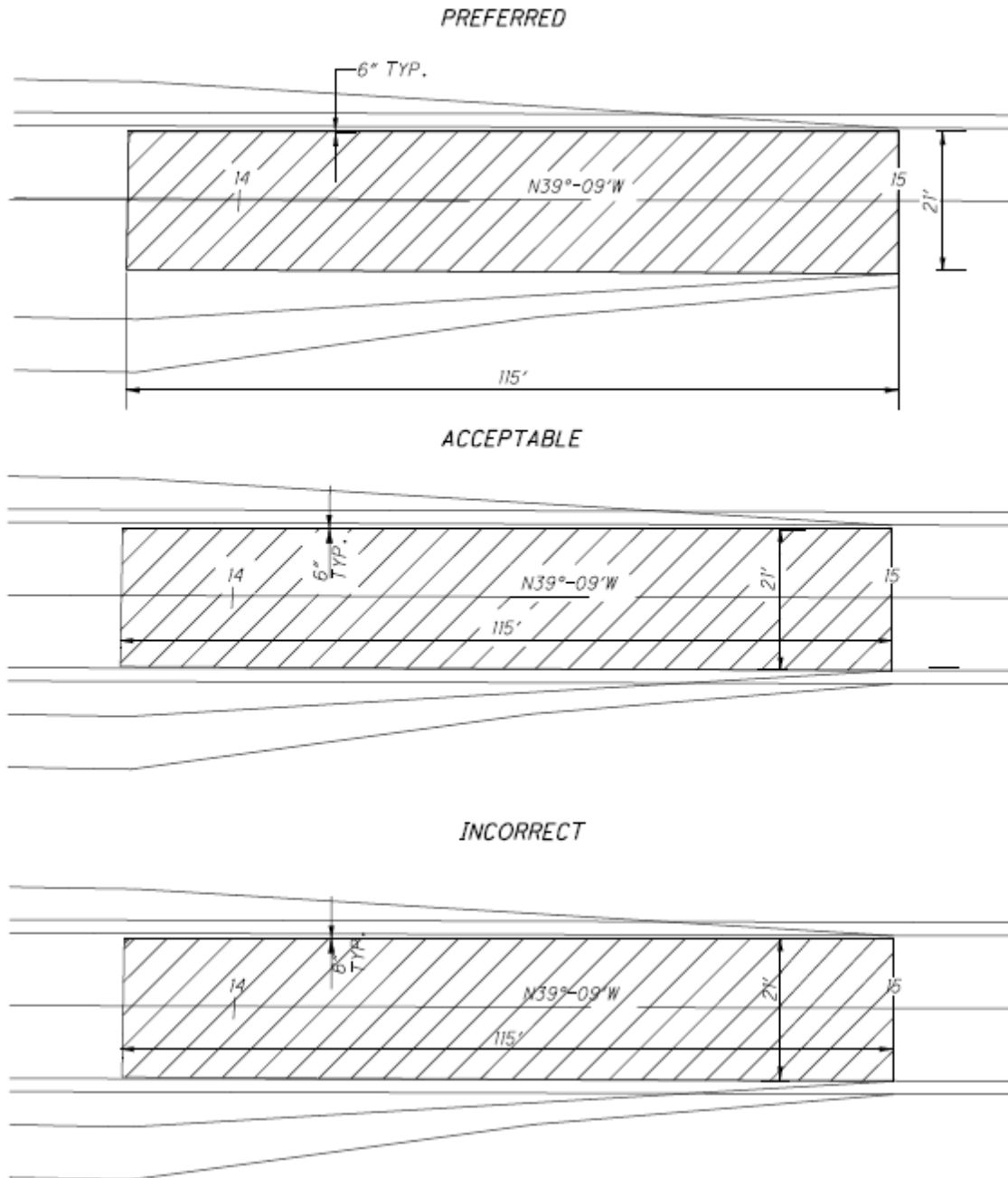
606.93		-0.19	-0.0156		33+92.16	
607.13		-0.16	-0.0133		34+00.00	
607.76		-0.05	-0.04		+25.00	
608.04		0.00	0.0		+37.09	
608.34		+0.05	+0.0042		+50.00	
608.88		+0.16	+0.013		+75.00	
609.02		+0.19	+0.0156		+82.02	
609.38		+0.27	+0.02		35+00.00	
609.84		+0.37	+0.33		+25.00	
610.26		+0.48	+0.4		+50.00	
610.63		+0.58	+0.48		+75.00	
610.97		+0.69	+0.575		36+00.00	

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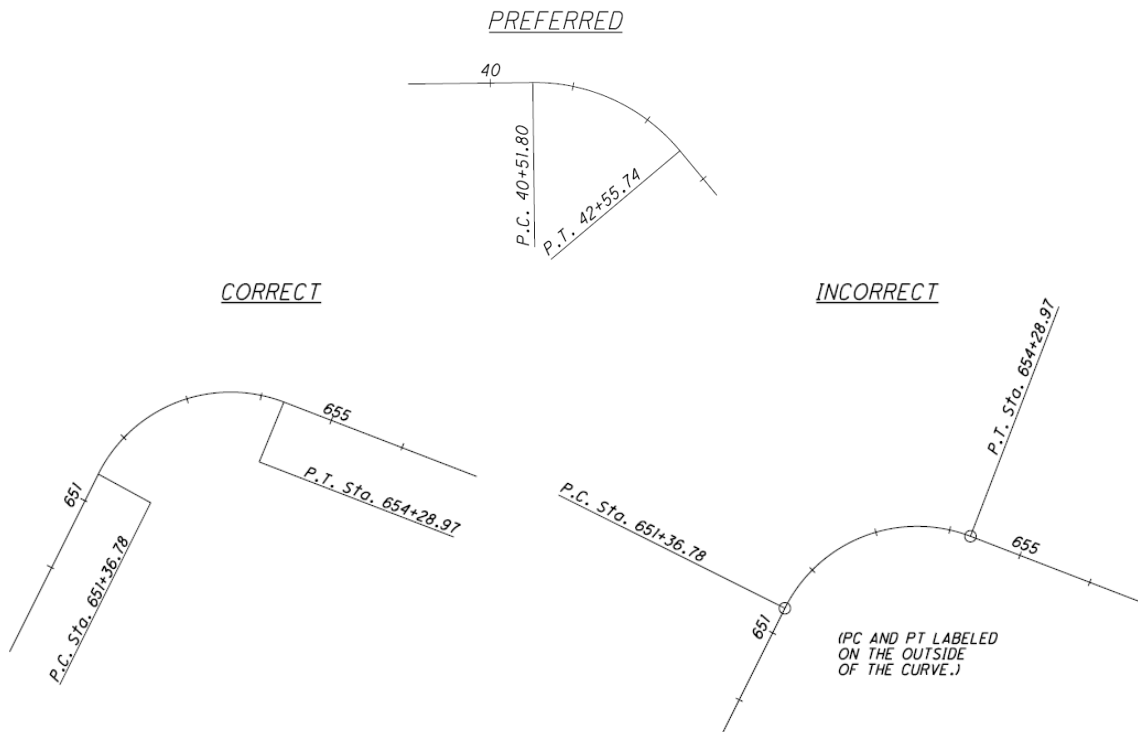
1202.4.7 Overdrafting

It is preferable to place dimensions outside areas which contain cross-hatching and other line work. Where this is not possible, the cross-hatching, or line work, should be broken around the text. Hatch lines should never cross through text, however, certain critical line work elements, such as centerlines may pass through text.

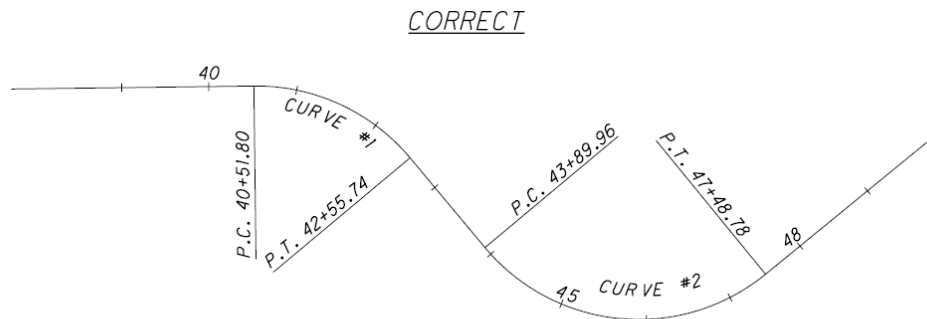


1202.4.8 Horizontal Curve Data

The curve data should be shown on the inside of the specified curve and between the PC and PT, where possible. As shown, it is permissible to jog the lines for the PC and PT provided the initial portions of the lines extending from the curve are along the correct radius.



When space prohibits or when an alignment has a large number of horizontal curves, label each curve and tabulate the curve data. If it is necessary to tabulate curve data for a few curves along an alignment, then all curves should be tabulated to provide consistency.



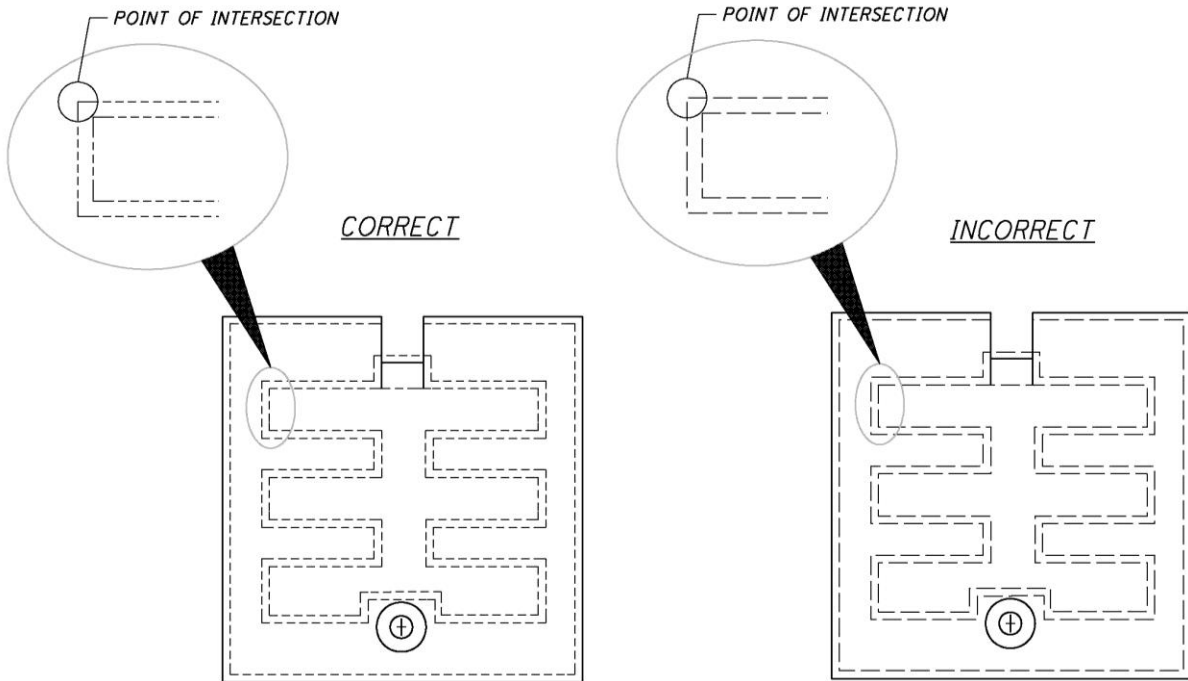
CURVE #1 DATA	CURVE #2 DATA
P.I. STA. 41+61.02, @ CONST. TRUMP RD.	P.I. STA. 46+17.51, @ CONST. TRUMP RD.
$\Delta = 50^\circ 48' 16''$ RT.	$\Delta = 89^\circ 23' 07''$ LT.
$D_C = 24^\circ 54' 40''$	$D_C = 24^\circ 54' 40''$
$R = 230.00'$	$R = 230.00'$
$T = 109.22'$	$T = 227.55'$
$L = 203.94'$	$L = 358.82'$
$E = 24.62'$	$E = 93.54'$
$e_{max} = 0.025$	$e_{max} = 0.025$

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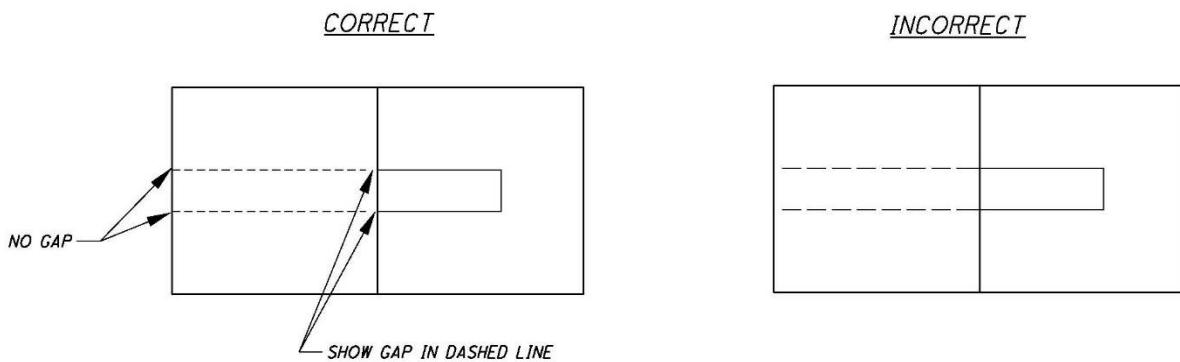
Plan Preparation

1202.4.9 Dashed Lines

When needed for clarity, dashed lines should connect at all points of intersection and points of tangency. (You may need to subdivide certain CADD cells into individual elements in order to connect the lines properly.)

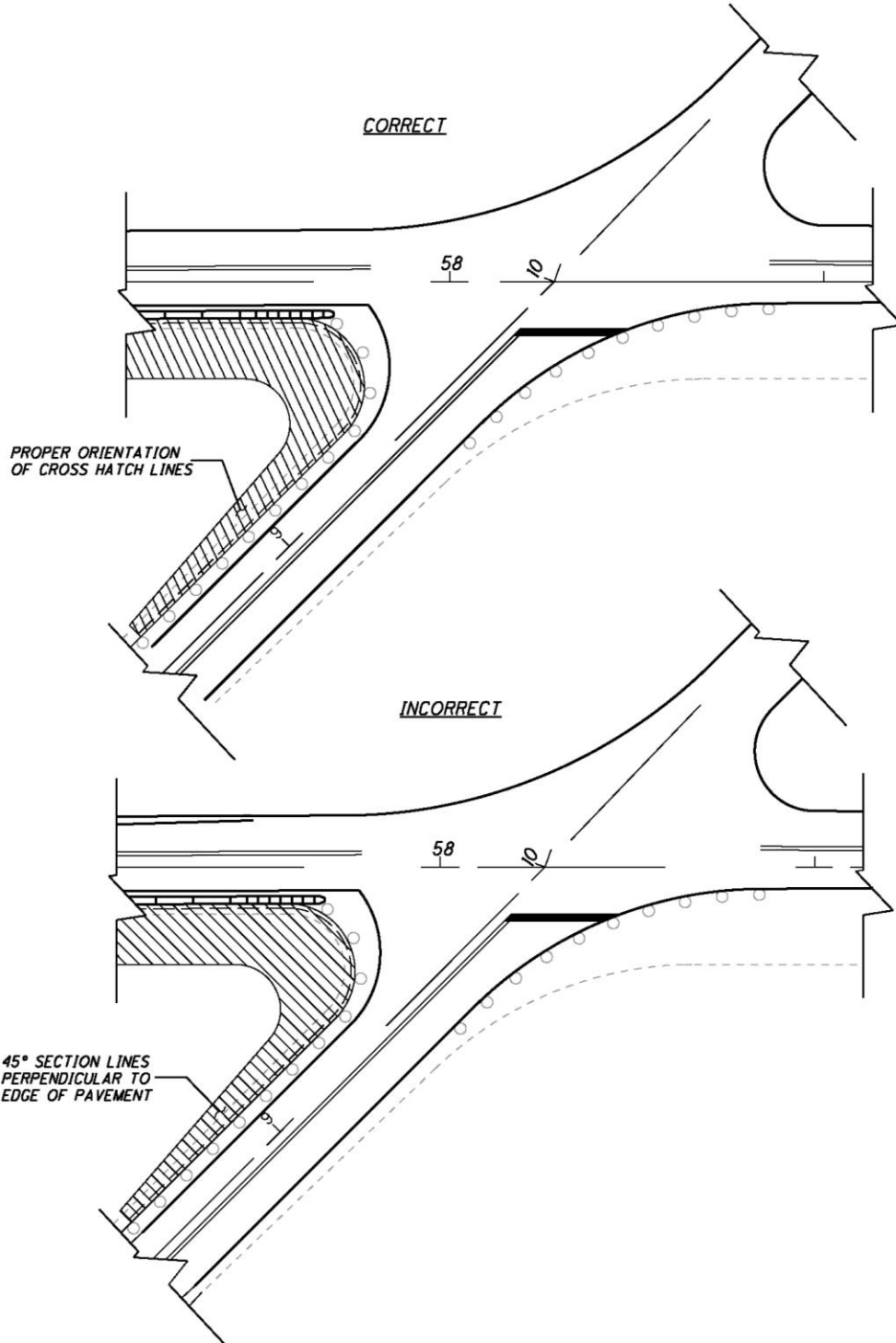


When needed for clarity, a gap should be shown at all locations where a visible edge becomes hidden by another surface as shown below.



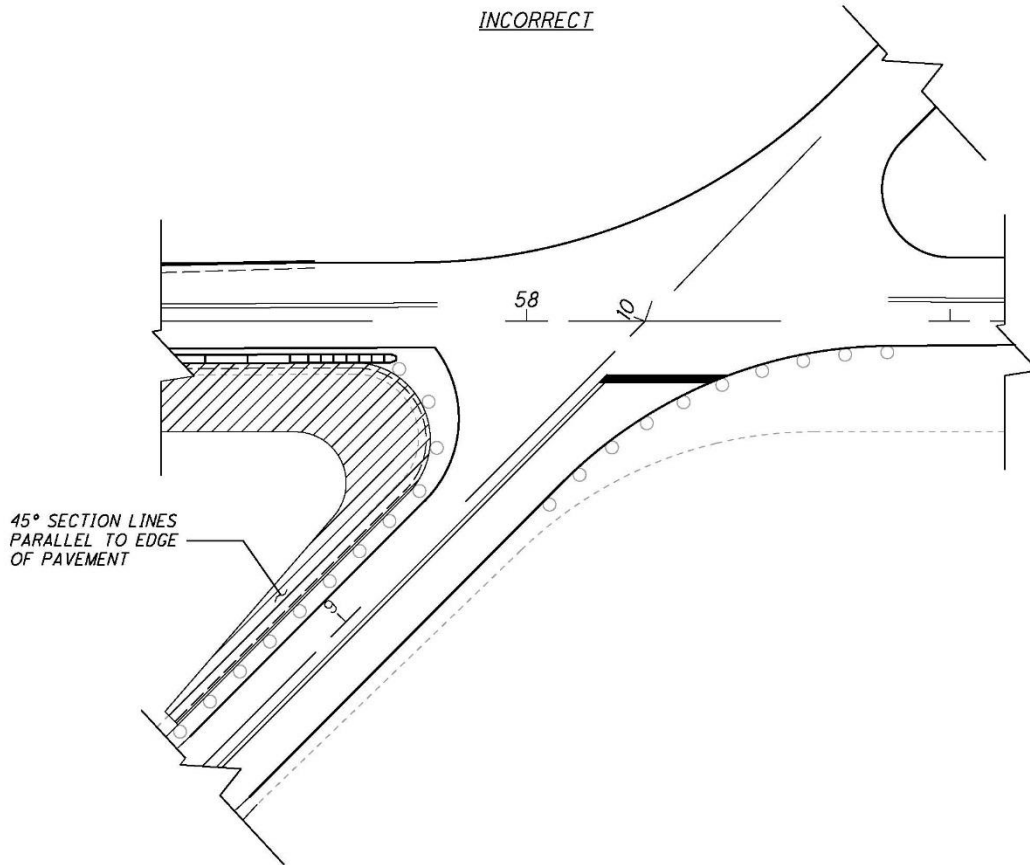
1202.4.10 Direction of Cross-Hatch Lines

In general, draw cross-hatched lines at 45° with horizontal. If cross-hatch lines drawn at 45° with horizontal would be parallel or perpendicular (or nearly so) to a prominent visible outline, the angle should be modified.



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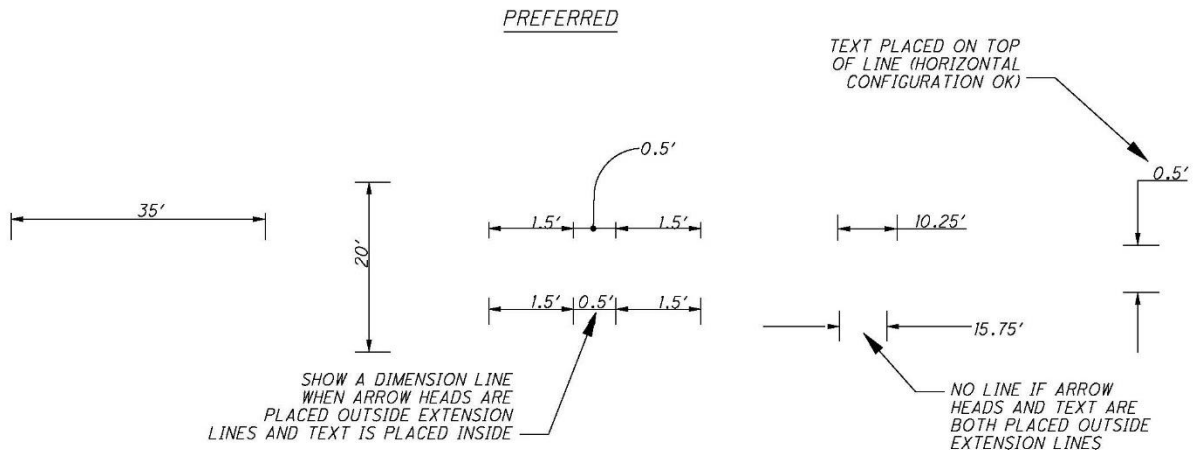
Plan Preparation



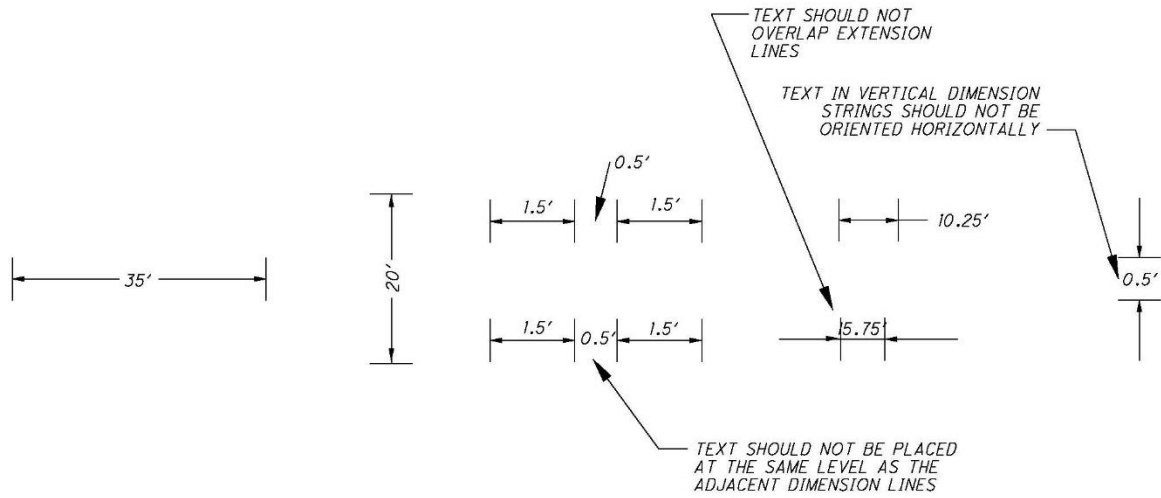
1202.4.11 Placement of Dimension Text

Generally, text should be placed above a solid dimension line and oriented parallel to the line, as shown below. Horizontal text shall be read parallel to the bottom edge of the sheet. Vertical text shall be read parallel to the right edge of the sheet. Text in dimension strings should be placed at the same level.

See examples below:



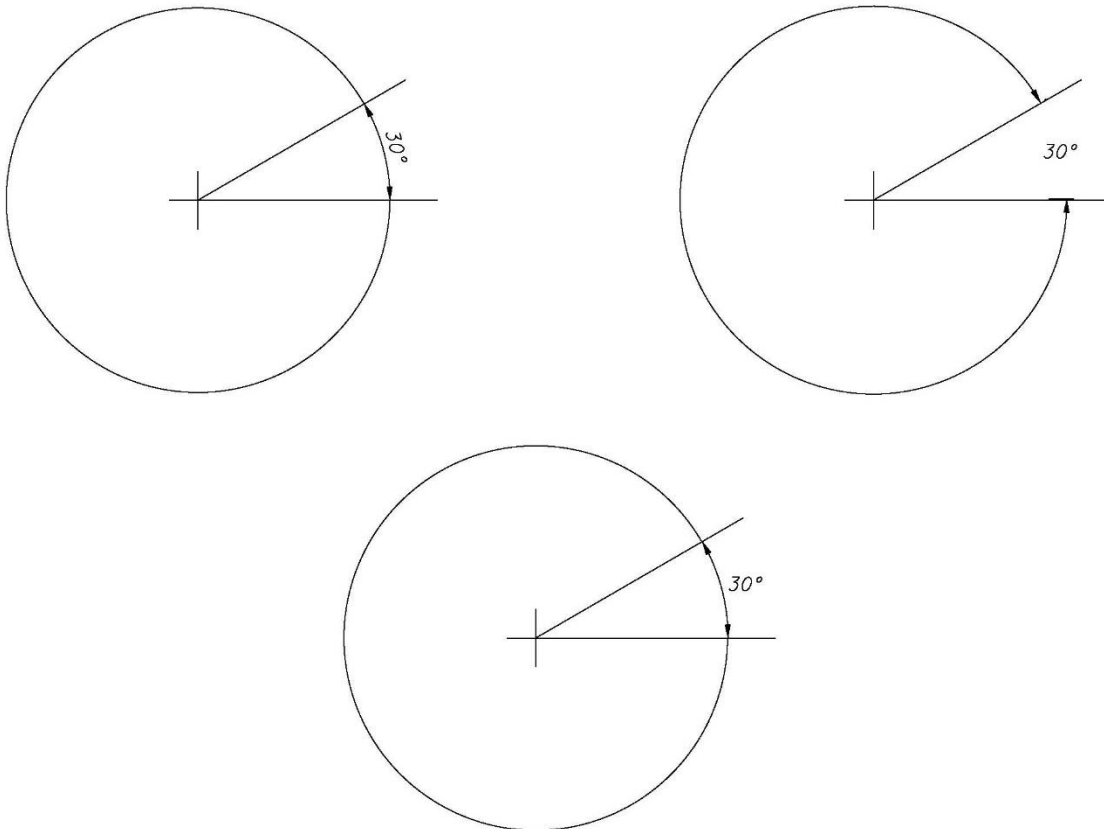
TRY TO AVOID THESE CONFIGURATIONS



1202.4.12 Angular Dimensions

Angular dimensions should be placed with an arc drawn from the vertex of the angle.

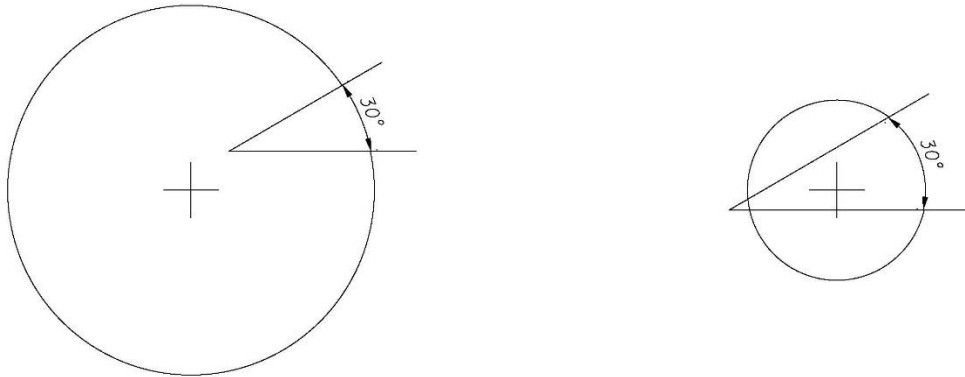
CORRECT



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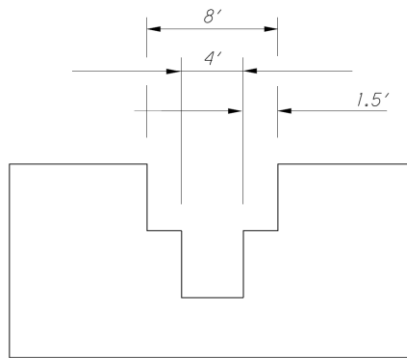
Plan Preparation

INCORRECT



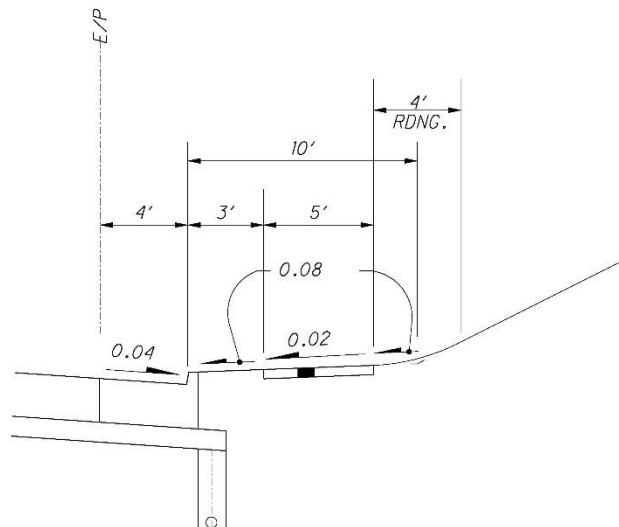
1202.4.13 Dimension in Crowded Conditions

In crowded conditions, gaps in extension lines near arrowheads may be left as shown below, in order to clarify the dimensions.



1202.4.14 Dimensioning with a Dot

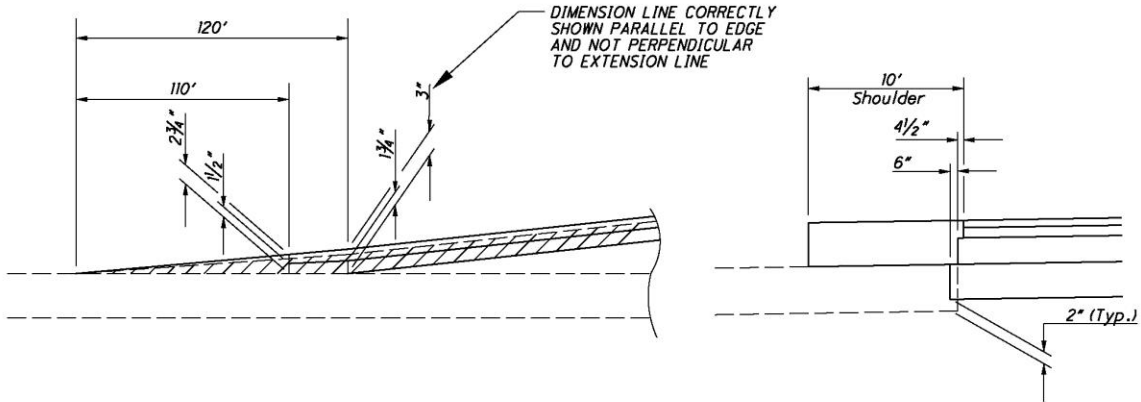
If the dimension cannot be placed on the dimension line, then a dot with a curved leader may be used as shown.



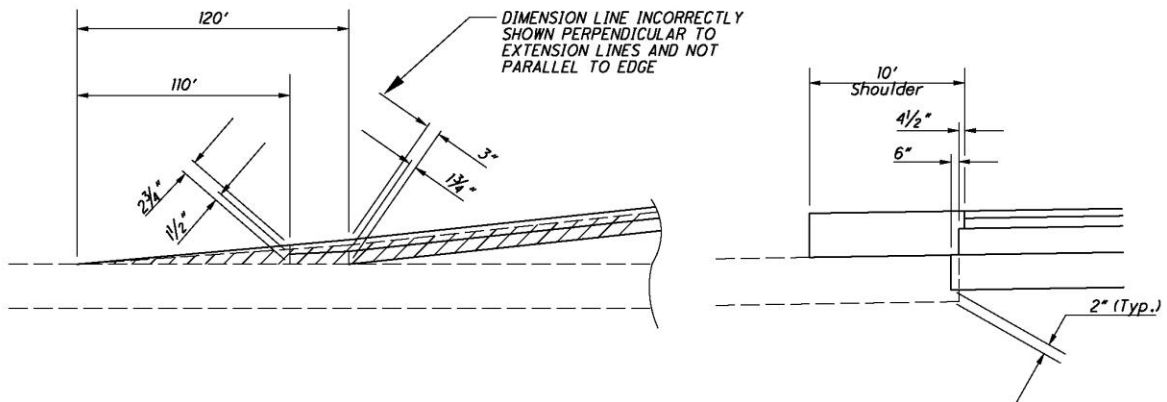
1202.4.15 Dimensioning at Angles

Dimension lines must always be drawn parallel to the edge being dimensioned. Extension lines are usually drawn at right angles to the edge being dimensioned: However, an exception may be made in the interest of clarity, as shown.

CORRECT



INCORRECT

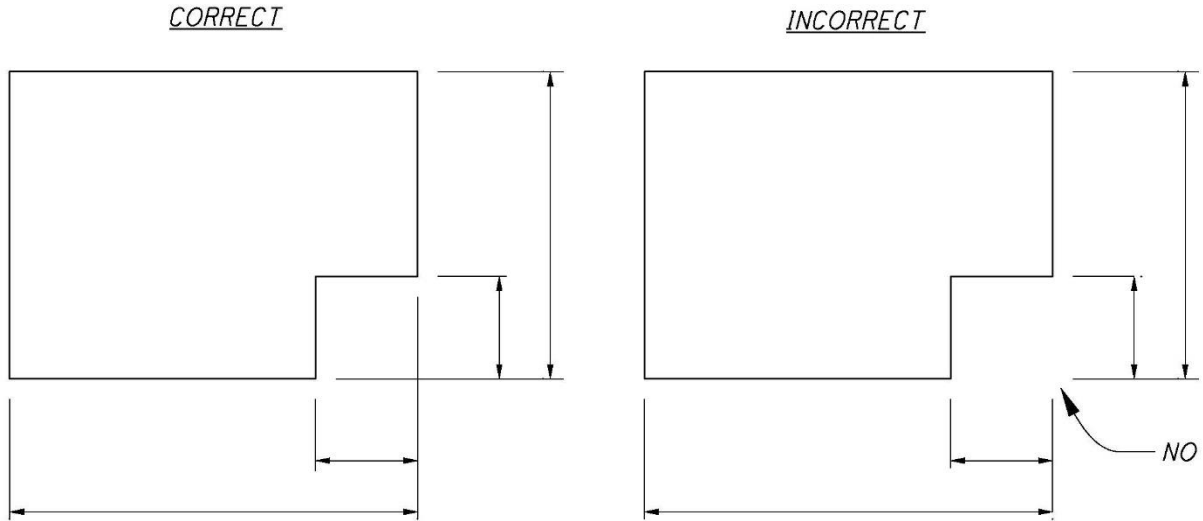


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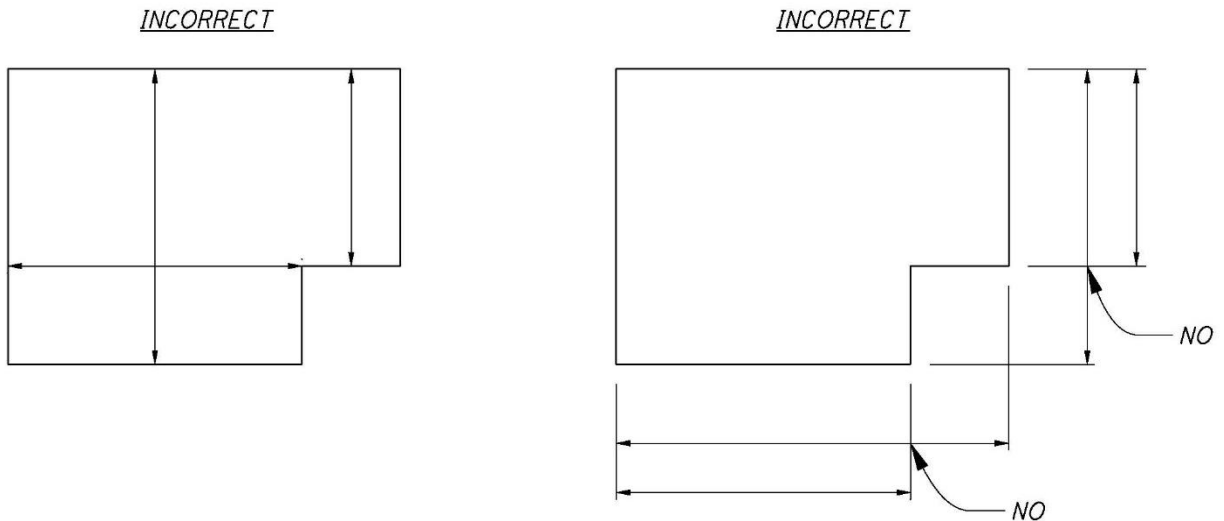
Plan Preparation

1202.4.16 Dimensioning an Object

Place shorter dimensions nearest to the object outline. As shown below, crossing the extension lines is acceptable. Dimension lines should not cross extension lines as a result of placing the shorter dimensions on the outside.



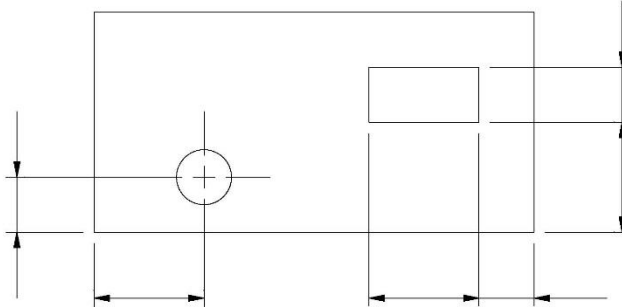
Extension lines should not be shortened. Also, a dimension line should never coincide with or form a continuation of any line of the drawing. If possible, dimensions should always be placed off the object.



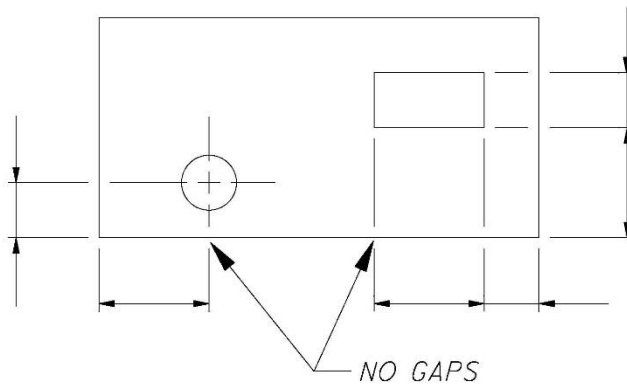
1202.4.17 Crossing Dimension Lines

Extension lines should not be broken. In addition, lines should not be centered at object edges.

CORRECT



INCORRECT

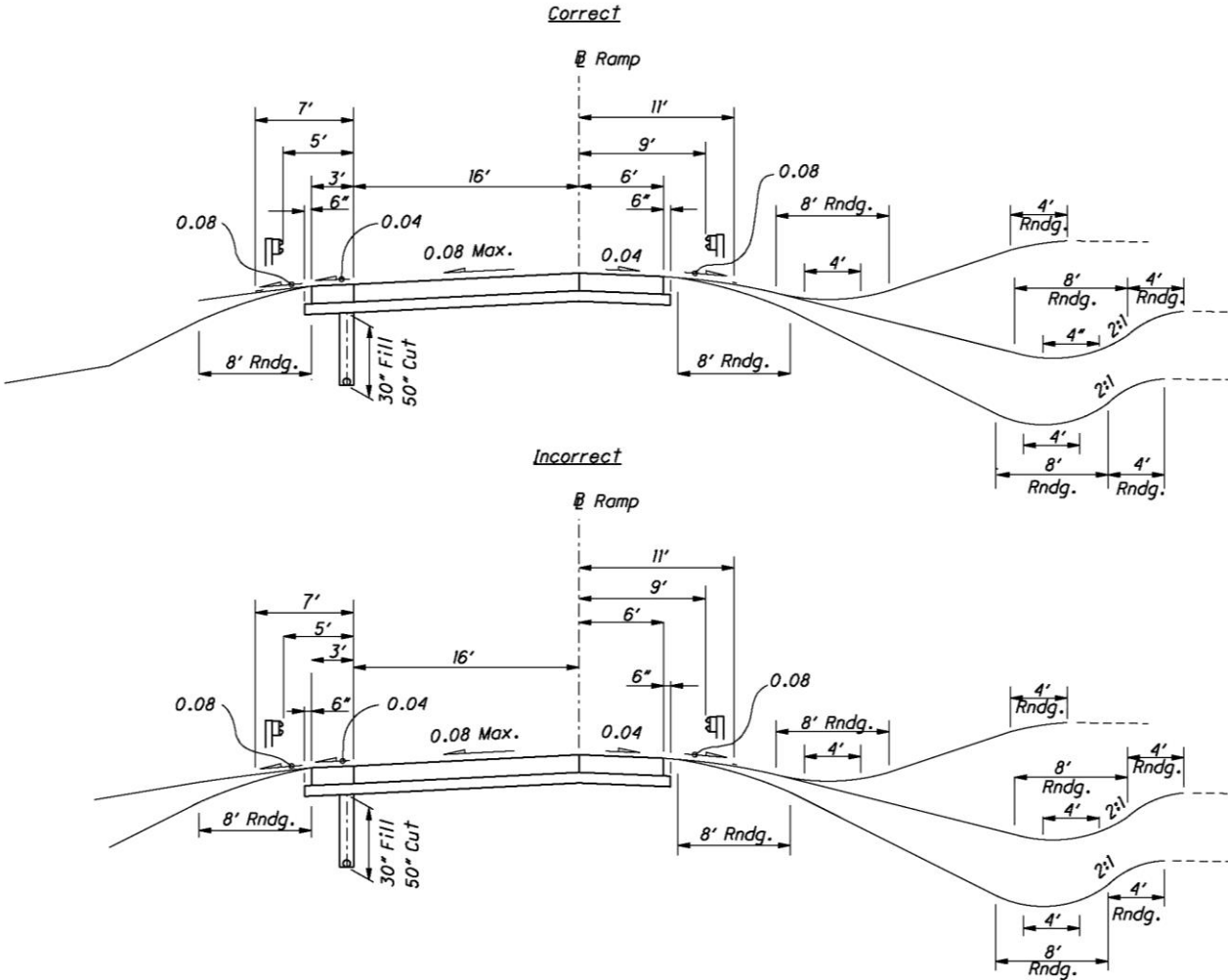


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1202.4.18 Grouped Dimensions

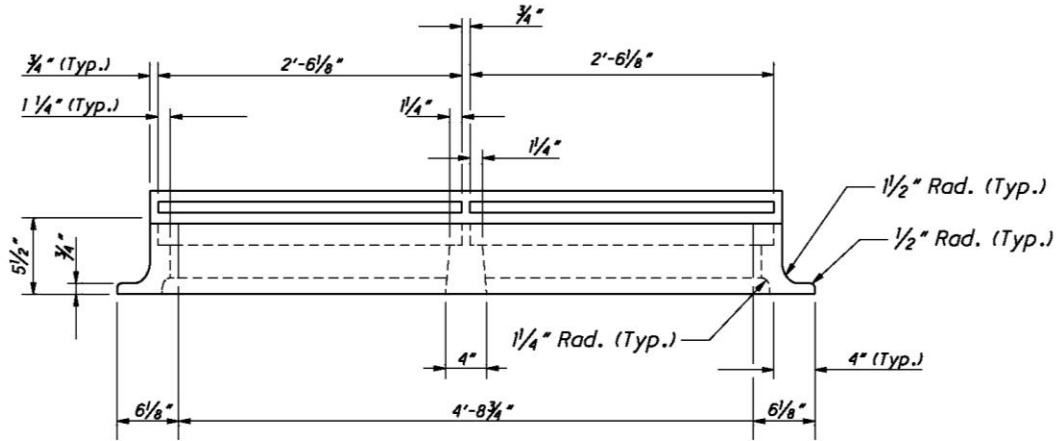
Grouped dimensions should be in line, evenly spaced and off the object being dimensioned.



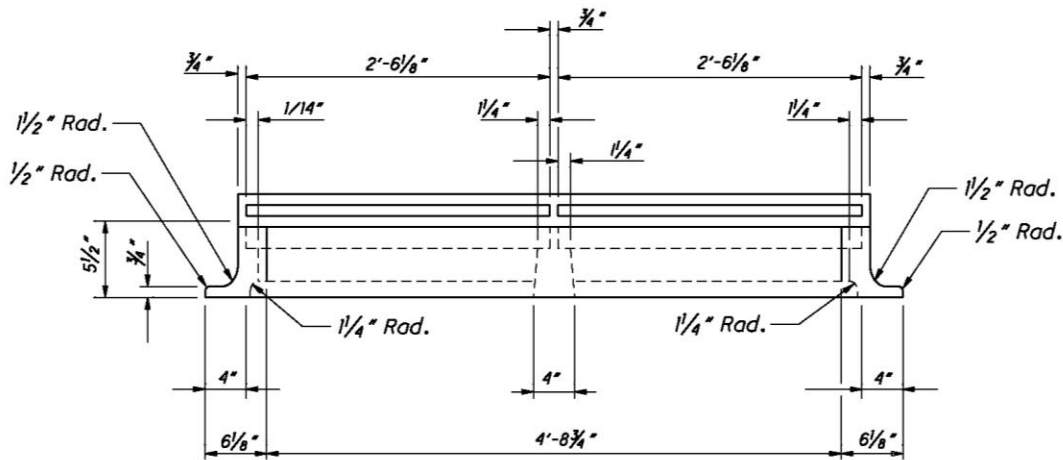
1202.4.19 Use of "Typical"

For symmetrical objects and repetitive dimensions, use the word "typical" to simplify dimensioning, as shown:

PREFERRED



AVOID DUPLICATING SYMMETRICAL DIMENSIONS



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1202.5 Computer-Aided Drafting and Design (CADD)

ODOT customizations and standards for CADD software are available from the **Office of CADD and Mapping Services**, CADD Services website:

http://www.dot.state.oh.us/Divisions/Engineering/CaddMapping/CADD_Services/Pages/default.aspx

For example:

- Seed files
- Font libraries
- Cell libraries
- Standard symbology (i.e., level, weight, line style and color)
- Standard directory structure
- File naming conventions

Although ODOT accepts electronic and printed deliverables generated from Autodesk tools, at this time ODOT provides no support, standards, documentation, or guidance of any kind with respect to design and delivery using Autodesk tools.

1203 Standard Drawings

1203.1 Standard Construction Drawings

Standard Construction Drawings are an integral part of the contract plans. They are used to show repetitive details such as: manholes, curbs, guardrail, and pavement joints. When referenced in the plans, these drawings, and their associated revision dates, must be listed on the Title Sheet.

1203.2 Plan Insert Sheets

Plan Insert Sheets are similar to Standard Construction Drawings but differ in the manner in which they are included in the plans. They often cover the design of standard items that are in the development stage. Plan Insert Sheets are included with the original set of construction plans. When included in a set of construction plans, project specific information must be added to these sheets. Refer to the Design Reference Resource Center (DRRC) website (<http://www.dot.state.oh.us/drrc/Pages/default.aspx>) for the most recent version of the Plan Insert Sheets.

List of Figures

<u>Figure</u>	<u>Subject</u>
1201-1	Plan Sheet Dimensions
1201-2	Title Sheet Block Examples for Roadway Plans
1202-1	Acceptable Grid Systems

List of Figures

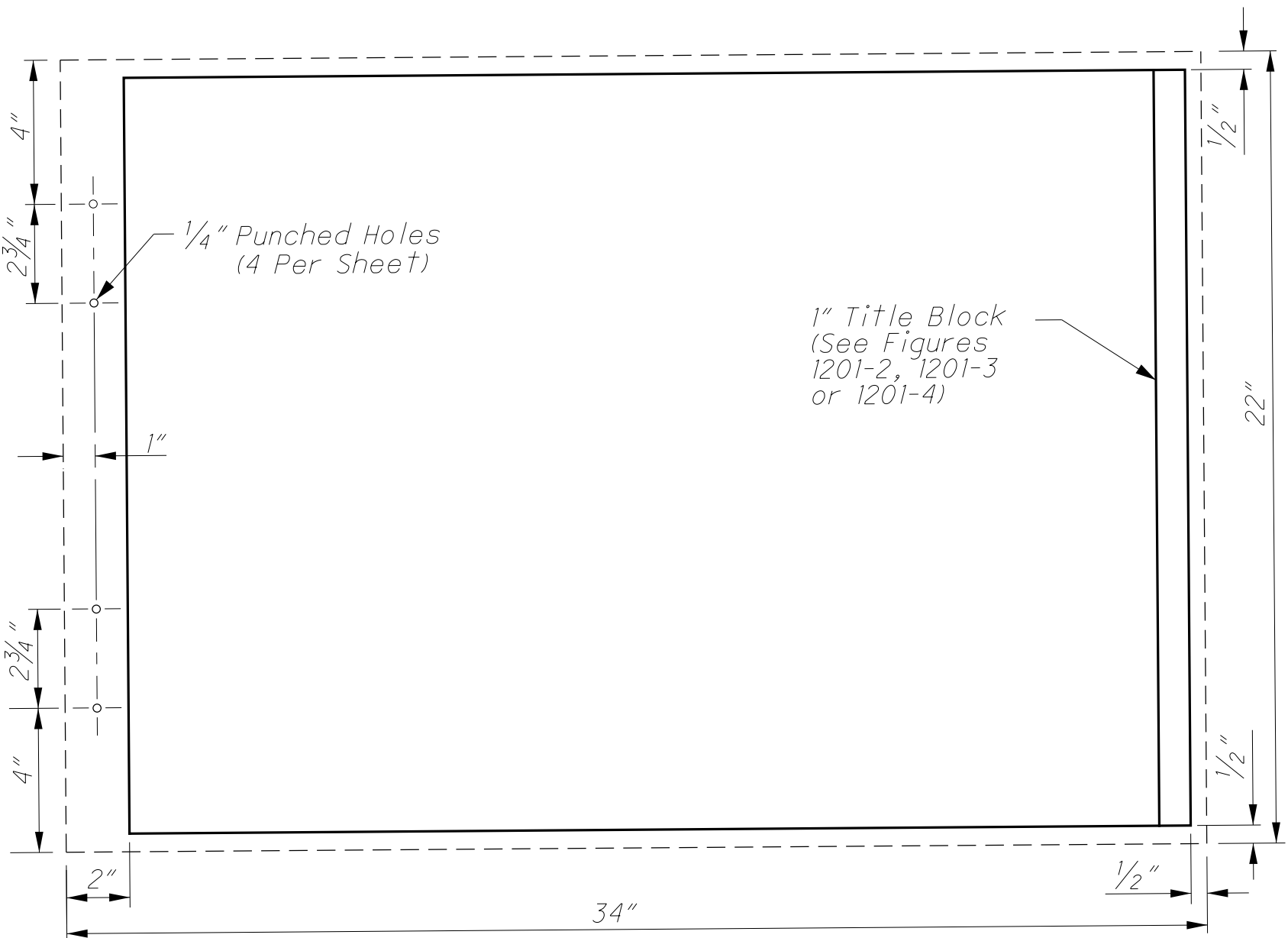
<u>Figure</u>	<u>Subject</u>
1201-1	Plan Sheet Dimensions
1201-2	Title Sheet Block Examples for Roadway Plans
1202-1	Acceptable Grid Systems

PLAN SHEET DIMENSIONS

1201-1

REFERENCE SECTION

1201.4, 1201.5



	WYA-30-2.67	RAILROAD INVOLVEMENT	CONSTRUCTION PROJECT NO.	PID NO.	FEDERAL PROJECT NO.
		NONE		23436	E033(838)

	WYA-30-2.67	GENERAL NOTES	CALCULATED
			CHECKED

DESIGN AGENCY	DESIGNER	REVIEWER	PROJECT ID 123456	SHEET TOTAL P.0 27
---------------	----------	----------	----------------------	-------------------------

TITLE BLOCKS WITHOUT NORTH ARROW & SCALE

	WYA-30-2.67	PLAN AND PROFILE - U.S. 30 STA. 170+00 TO STA. 175+00	CALCULATED		
			CHECKED		

DESIGN AGENCY	DESIGNER	REVIEWER	PROJECT ID 123456	SHEET TOTAL P.0 27	HORIZONTAL SCALE IN FEET 	
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TITLE BLOCKS WITH NORTH ARROW & SCALE

Structures and Right of Way Plan Title Block information may be found in the Bridge Design Manual and the Real Estate Policies and Procedures Manual, respectively.

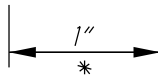
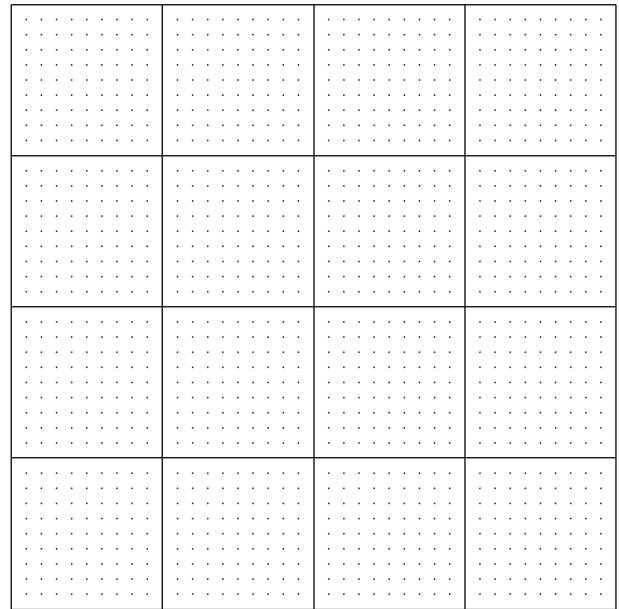
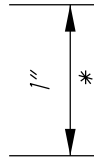
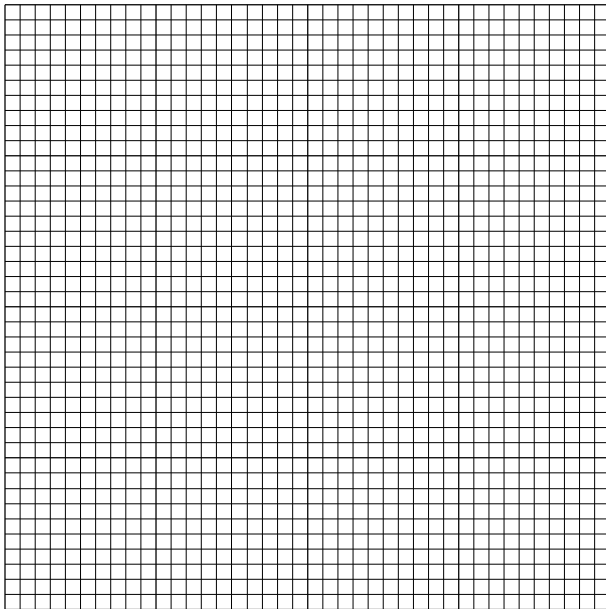
TITLE BLOCK EXAMPLES FOR ROADWAY PLANS	1201-2
	REFERENCE SECTION 1201.5

ACCEPTABLE GRID SYSTEMS

1202-1

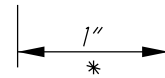
REFERENCE SECTION
1202.3

CROSS SECTIONS

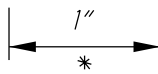
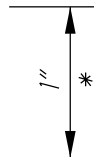
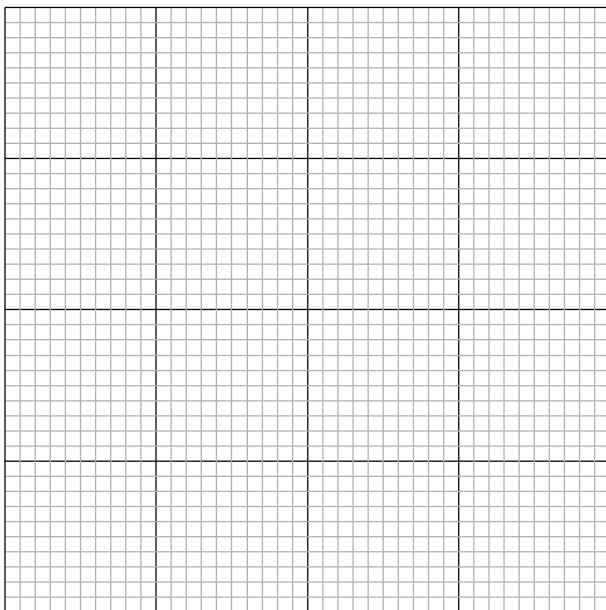


(TYPICAL GRID LINES)

**Equally subdivided, 10 parts each way.*

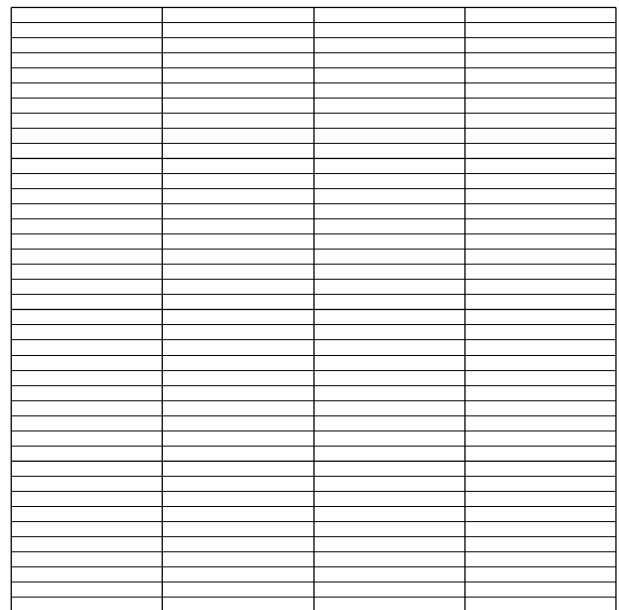


CROSS SECTIONS



(DITHERED GRID LINES)

PROFILES



The minimum allowable profile grid shall consist of the complete one-inch grid pattern with additional horizontal lines at 0.1 foot of elevation.

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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 tables, and diagrams, presenting plan sheet requirements and 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. 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 according to their respective manuals. References to the Sample Plans are shown with 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 components be required in a plan. However, when they are required, they should be placed 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
- Structure (20 Foot Span and Under)
- Structure (Over 20 Foot Span)
 - 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, Geotechnical Explorations (these sheets are not included in the sequential numbering of the construction plan and should be numbered separately). On the Title Sheet, state the type of Geotechnical Explorations performed (i.e., Soil Profile, Structure

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Foundation Exploration, etc.) in accordance with Section 700 of the [Specifications for Geotechnical Explorations](#), but do not include sheet numbers.

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 SPEDuP (Simplified Plan - Expedited Delivery Project) Plans

Simplified Plan Expedited Delivery Projects (SPEDuP) are considered to be fairly straight forward, with minimal design needed, no Federal funding, no right-of-way issues, no utility impacts, and no environmental impacts. The SPEDuP program expedites the delivery of these routine maintenance-type projects, while providing a reliable product for construction personnel.

SPEDuP plans are required when the proposed project meets the following criteria:

- PDP Path 1 project as identified by ODOT's Project Development Process (no right-of-way impacts, no impacted utilities, **typically C1 environmentally exempt**)
 - Link: <http://www.dot.state.oh.us/projects/pdp/Pages/default.aspx>
- Proposed work is simple and straightforward (i.e. - maintenance type project)
- 100 % State funded
- Maximum number of letter size (8 1/2" x 11") plan sheets = 30

Some examples of eligible projects could include: guardrail upgrading, pavement marking, herbicidal spraying, mowing, fencing, 2-lane resurfacing, signal installations, slide repairs, 2-lane and multi-lane pavement patching.

SPEDuP plans are NOT permitted when the proposed project involves any of the following:

- Right-of-Way involvement
- Utility involvement
- Federal funding

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- Local funding
- Maintenance of Traffic detailing required
- 4-lane divided Interstate or Interstate lookalike resurfacing
- Significant plan detailing required

SPEDuP plans must provide sufficient information necessary to minimally describe the type and location of the work. This information may be presented entirely in written format, without the use of drawings. Typically, such plans consist of the following components:

- Title Sheet [SP 1302-8]
- Typical Sections
- General Notes
- General Summary, Subsummaries, Calculations
- General plan, sketch, line drawing, or plan and profile
- Special Details

See [Section 1316](#) for additional information regarding SPEDuP plan content.

1301.4 Order of Precedence

As defined in the [Construction and Materials Specifications](#), the order of precedence for all contract documents is:

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 (except for SPEDuP Plans [SP 1302-8]), lists standard construction drawings, supplemental specifications, and special provisions, and contains the signature of approval by the proper officials.

Simplified Plan Expedited Delivery Projects (SPEDuP) have a more streamlined format than traditional plans. Therefore, the title sheet for a SPEDuP plan will not require the same amount of information as a traditional plan. For more information on SPEDuP plans, see [Section 1316.2.1 - SPEDuP Plan Sheet Templates](#).

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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**”.

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 (straight-line mileage). Following is an example [[SP 1302-4](#)] for a project in Wyandot County, on Route 30, beginning at straight-line mileage 9.11.

WYA-30-9.11

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

<u>County</u>	<u>Code</u>
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) at the point where the project begins, measured from the county line in miles 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.

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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 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

or

FRA/DEL-3-26.18/0.00

Work Limits Extend into Adjacent County

The adjoining county code letters are shown in parentheses.

TUS-77-10.64(STA)

More than One Route (Not Overlapping)

A separate project designation is used for each.

UNI-31-8.19, UNI-37-2.04

or

UNI-31/37-8.19/2.04

For projects with various work types on three or more routes and/or ramps that are all included in the work, the primary route number, and reference to the various routes, should be shown followed by the primary route SLM and reference to the secondary route(s) various SLMs, as shown:

MAH-224/VAR-13.62/VAR

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.

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Suspended Projects - A separate straight-line mileage section number is used at the point where the project limit is resumed. The example below and [\[SP 1302-2\]](#) shows a project limit that begins at SLM 21.73, is suspended for a distance, and then is resumed at SLM 22.83. For additional information on how to determine project limits, see [Section 1303.6](#)

DAR-121-(21.73) (22.33)

For instances where a project has numerous suspend/resume sections, 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

- 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.)

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 which 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. Following is an example project designation for a district-wide pavement marking plan, in District 4, that is scheduled to be awarded in the fiscal year 2016.

D04-PM-FY2016

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-FY2016(A)

and

D04-PM-FY2016(B)

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The following is a list of project types. Contact the [Office of CADD and Mapping Services](#) if another project type is needed.

ACPV	Asphalt Concrete Paving
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", 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
MCRO	Microsurface
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 (less than 1000' in length)
ST	Surface Treatment (spot locations)
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 (Statewide). For example: STW-ITS-FY2017.

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 within several political subdivisions and the work limits extend into the adjoining county.

TUS-77-0.00 (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 which include grade separations or any other railroad involvement, should list the railroad company's 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" in

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the Federal Project Number block. 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. For improvements with multiple design designations (e.g., more than one route), this information may be shown on a sheet other than the Title Sheet (i.e., Schematic Plan, specially designated sheet). However, the location of these sheet(s) must be noted in the Title Sheet's Index of Sheets [[SP 1302-5](#)].

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

DESIGN DESIGNATION (ENGLISH UNITS)

Current ADT (2012)	10,390
Design Year ADT (2032)	25,200
Design Hourly Volume (2032)	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	03 Principal Arterial (Urban)
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.

If the project design is based on 3R [[SP 1302-1](#)] values 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.

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Per the Ohio Department of Transportation Highway System Highway Functional Classification System - Concepts, Procedures, and Instructions, in addition to being classified as urban or rural, roadways are categorized as Principal Arterials, Minor Arterials, Collectors and Local Roads. Additionally, Principal Arterials and Collectors are further subcategorized, creating a total of seven (7) classifications or sub-classifications as shown in the table below:

#	Description
	Principal Arterial Roads
01	Interstates
02	Other Freeways or Expressways
03	Other Principal Arterial Roads
	Minor Arterial Roads
04	Minor Arterial Roads
	Collector Roads
05	Major Collector Roads
06	Minor Collector Roads
	Local Roads
07	Local Roads

For more information on the Design Functional Classification please refer to the [Location and Design Manual, Volume 1, Section 101](#), the [Ohio Department of Transportation Highway Functional Classification System - Concepts, Procedures and Instructions Manual](#), or contact the [Office of Roadway Engineering](#).

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, Guide For Showing Design Exceptions in Plan**, and on the Title Sheet [[SP 1302-1](#)] utilizing the following format:

DESIGN EXCEPTIONS

<u>Design Feature</u>	<u>Approval Dates</u>	<u>Sheet Numbers</u>
Lane Width	7/7/16	24
Bridge Width	7/7/16	46

If there are no design exceptions, indicate this by adding the words “None Required”. Contact the [Office of Roadway Engineering](#) with questions.

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1302.5 Index of Sheets

The Index of Sheets serves as the table of contents for the entire set of plans. Soil profile and structure foundation sheets should appear in the index without sheet numbers. Geotechnical data from geotechnical reports may be included as special provisions on 8 ½ “x 11” sheets.

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 the location of 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.

An Index of Sheets may be omitted from a SPEDuP plan. If utilized, it shall be located on page 2 of the plan set.

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.

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 within 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 sheets [\[SP 1302-1 through 1302-8\]](#) show 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 [\[SP 1302-1 through 1302-8\]](#).

1302.7 Underground Utilities Note

The “Before You Dig” warning note must be shown on the Title Sheet for all plans. The note is shown below and on the Sample Plan sheets [SP 1302-1 through 1302-8].



1302.8 Location Map

The Location Map [SP 1302-1 through 1302-8] shows the general area in which the project is located and the project limits. The map should be approximately 7" x 7", for a full-size plan, and 3 ¼ " x 3 ¼ ", for a simplified plan or a SPEDuP plan, with North pointing toward the top of the sheet. A scale of 1" = 1 mile 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" reduced set of plans.

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 when placing location maps. The application is available for download from the ODOT [CADD Services](#) 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.

The latitude and longitude shall be provided for all projects, shall be measured to the center of the project, and shall be accurate to the nearest 5 seconds of a degree. These geographic references are not only used to locate a project but are also used in the computer analysis of bid data, and in estimating software. Therefore, the latitude and longitude values must be presented accurately, because this information will affect the reliability of the results obtained by these applications.

On multiple segment contracts, the latitude and longitude used shall be the approximate center of the segments of work. The approximate center can be established by visual inspection.

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On district-wide contracts, the latitude and longitude used shall be the locations in the following table:

DISTRICT	LATITUDE	LONGITUDE
1	40°46'18"	84°05'34"
2	41°23'07"	83°38'48"
3	40°52'38"	82°17'41"
4	41°00'57"	81°29'30"
5	39°57'06"	82°24'41"
6	40°17'52"	83°02'58"
7	40°17'49"	84°09'40"
8	39°25'52"	84°17'03"
9	39°19'28"	82°57'47"
10	39°26'28"	81°27'36"
11	40°27'19"	81°24'29"
12	41°24'54"	81°36'54"
Statewide	39°57'21"	83°03'13"

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 is updated quarterly to include errata and other corrections to the Construction and Materials Specifications (CMS). It must be specified on all projects. In order to ensure that the most recent version of Supplemental Specification 800 is specified, the current revision date used on the Title Sheet should match the revision date that will be in effect when the Engineer's Estimate is completed by the [Office of Estimating](#).

The date when the Engineer's Estimate is completed by the **Office of Estimating** is approximately 8 weeks prior to the Sale Date for the project. The Letting Schedule, including Sale Dates, is established by the **Office of Estimating** and published on the [Office of Contracts](#) website.

A suffix indicating the applicable year of the specification book should be provided on the title sheet (i.e., when using the 2016 Construction and Material Specifications, Supplemental Specification 800-2016 should be used). The suffix is required because Supplemental Specification 800 will vary with each edition of the CMS.

1302.9.1 Special Provisions

When a special provision is needed for a project, the title and date of the special provision shall be listed on the Title Sheet [\[SP 1302-1\]](#). See [Section 1305.3 - Special Provisions](#).

1302.10 Standard Construction Drawings

A list of current 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

<u>Drawing Series:</u>	<u>Office:</u>
BP (Base Pavement)	Office of Pavement Engineering
BP (Base Pavement)	Office of Roadway Engineering
CB (Catch Basins)	Office of Hydraulic Engineering
DM (Drainage Miscellaneous)	Office of Hydraulic Engineering
F (Fence)	Office of Roadway Engineering
MGS (Guardrail)	Office of Roadway Engineering
HW (Headwalls)	Office of Hydraulic Engineering
I (Inlets)	Office of Hydraulic Engineering
LA (Landscaping)	Office of Roadway Engineering
MH (Manholes)	Office of Hydraulic Engineering
RM (Roadway Miscellaneous)	Office of Roadway Engineering
WQ (Water Quality)	Office of Hydraulic Engineering

2. Bridge Drawings

<u>Drawing Series:</u>	<u>Office:</u>
A (Abutments)	Office of Structural Engineering
AS (Approach Slabs)	Office of Structural Engineering
BD (Bearing Details)	Office of Structural Engineering
BR (Bridge Railing)	Office of Structural Engineering
CPA (Capped Pile Abutments)	Office of Structural Engineering
CPP (Capped Pile Piers)	Office of Structural Engineering
CS (Continuous Slabs)	Office of Structural Engineering
DBR (Deep Beam Railings)	Office of Structural Engineering
DS (Drip Strips)	Office of Structural Engineering
EXJ (Expansion Joints)	Office of Structural Engineering
FB (Fixed Bearings)	Office of Structural Engineering
GSD (General Steel Details)	Office of Structural Engineering
HW (Headwalls)	Office of Structural Engineering
ICD (Integral Construction Details)	Office of Structural Engineering
NBS (Noise Barrier Specifications)	Office of Structural Engineering
PCB (Portable Concrete Barrier)	Office of Structural Engineering
PSBD (Prestressed Concrete Box Beam Details)	Office of Structural Engineering
PSID (Prestressed Concrete I-Beam Details)	Office of Structural Engineering
RB (Rockers and Bolsters)	Office of Structural Engineering
SB (Single Span Slab Bridge)	Office of Structural Engineering
SBR (Single Slope Bridge Railing)	Office of Structural Engineering
SICD (Semi-Integral Construction Details)	Office of Structural Engineering

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TBR (Thrie Beam Retrofit)	Office of Structural Engineering
TST (Twin Steel Tube)	Office of Structural Engineering
VPF (Vandal Protection Fence)	Office of Structural Engineering

3. Traffic Drawings

<u>Drawing Series:</u>	<u>Office:</u>
HL (Highway Lighting)	Office of Roadway Engineering
ITS (Intelligent Transportation Systems)	Office of Roadway Engineering
MT (Maintenance of Traffic)	Office of Roadway Engineering
TC (Traffic Control)	Office of Roadway 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](#)].

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's length.

The project's length is the total distance between the Begin and End project points, adjusted for suspensions and station equations, and measured along the centerline of construction. It is calculated to the nearest hundredth of a mile. 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 routine maintenance projects, per [Location and Design Manual, Volume 2, Section 1112.2](#), the following items shall be included in the Project Description: [[SP 1302-7](#) and [SP 1302-8](#)]

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

For non-routine maintenance projects involving very little to no earthwork, such as light strain pole and weigh-in-motion device installation, the following descriptions apply:

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

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For non-routine maintenance projects involving some earthwork, but less than one acre of total earth disturbing activity (EDA) (e.g., small bridge replacement), provide the estimated Project and Contractor EDA, but indicate that a Notice of Intent (NOI) is not required. Use the approach shown in the following example description:

Project Earth Disturbed Area = 0.5 Acres
Estimated Contractor Earth Disturbed Area = 0.2 Acres
Notice of Intent (NOI) Earth Disturbed Area = N/A (NOI not required)

All other projects must list acreages for the following: [\[SP 1302-1\]](#)

Project Earth Disturbed Area
Estimated Contractor Earth Disturbed Area
Notice of Intent (NOI) Earth Disturbed Area

1302.12 Notes

1302.12.1 Limited Access

The following note shall 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 SUPPLEMENTAL SPECIFICATIONS LISTED IN THE PLANS AND CHANGES 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. [\[SP 1302-5\]](#)

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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.

1302.13 Plan Signatures

Approval spaces shall be provided for the following:

- District Deputy Director
- Director, Department of Transportation

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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.

During the design phase of a project that will use Combined Plans, two or more separate PIDs may be established to reference each Part of the project. However, the construction contract must utilize only one PID. Update Ellis to provide cross-references that correlate the design phase and construction PIDs.

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'. 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.

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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. Typically, the relationship is only shown on the Right-of-Way plan sheets.

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. The centerline stationing on a project should reflect the straight-line mileage shown on the “section” (County-Route-Section). Centerline stationing may also be established based on existing monumentation, bridges and prior projects. Stationing shall increase in the direction of the straight-line mileage.

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 [\[SP 1303-3\]](#).

If the basis for centerline stationing is unclear or there is a lack of monumentation, structures or prior project stationing documentation, the designer establishing the centerline stationing shall coordinate with the District Survey Section and/or District Real Estate Section to determine the appropriate basis for centerline stationing.

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 for when combining spirals between two simple curves. Curve data (except angles) should be shown to two 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. Project limits are generally defined as the beginning/ending of proposed full-depth, full-width pavement. 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).

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.

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1303.10 Waterways

All waterways (lakes, rivers, streams, jurisdictional ditches, creeks, ponds, etc.), crossing or adjacent to the proposed improvement, shall be shown, labeled, and the direction of flow shall be indicated. This includes any relocated waterways. See **Office of Environmental Services'** [Waterway Permits Manual](#) for more information on 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.

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. Participation splits are necessary when 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 whether 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 of the proposed construction limits shall be shown and labeled. Wetlands are located and delineated as per the [Office of Environmental Services Ecological Manual](#).

1303.22 Project Control and Reference Points

All necessary survey/mapping parameters should be conveyed in the General Notes as established in Sample Plan Note G105, in Appendix B. Points used to establish project control and reference points should be shown in the Schematic Plan [[SP 1303-1](#)] or listed in the General Notes [[SP 1305-1](#)].

The survey/mapping for all projects should be developed utilizing the ODOT [Survey and Mapping Specifications](#) which are available through the ODOT Design Reference Resource Center ([DRRC](#)) website, and the [Office of CADD and Mapping Services](#) website.

A table listing project control and reference information such as; the primary project control monuments, azimuth marks and/or temporary benchmarks (see the [Survey and Mapping Specification](#) for descriptions of these items) should be provided. The following information should be included:

- Point number
- Grid and scaled coordinates in U.S. Survey feet (northing/easting)
- Orthometric Height (Elevation)

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- Description (i.e. Primary Project Control - steel rod set in concrete)

See SP 1305-1 for an example of the project control table.

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 Drawings, 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.

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.

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.).

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1304.8 Subsurface Drainage

The location of pipe underdrains, aggregate drains, etc. should be shown on each typical section. Include slopes for aggregate drains. See the **Pavement Design Manual**, Section 205 - Subsurface Pavement Drainage for guidance.

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 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 are to 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 **are to** 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 Operations](#)**, 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 CADD and Mapping Services**, [CADD Services 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.

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In the case of Waterway Special Provisions, the **Office of Environmental Services (OES)** provides Special Provisions in the form of [Waterway Permit](#) conditions, which includes the conditions of the Section 404 permits and the OEPA Section 401 Water Quality Certifications. The actual 404/401 permits are sent by OES to the district office to be displayed on the project site.

The title and date of all Special Provisions 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 SP 1306-8](#)].

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 1306-8](#)], 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'.
- 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

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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 sheets.

For additional information regarding Maintenance of Traffic, contact the [Office of Roadway 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. 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 and includes the necessary pavement for the temporary road as per CMS 615.05. When the pavement build-up differs from that shown 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. Independent alignments 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, 441, and 616 which may also be included in the plans to be used for maintenance of traffic. Nor should it be 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. Sample Plan sheets [SP1307-1 through 1307-6](#) provide examples of Subsummary and General Summary formats.

The General Summary for all projects is required to be in an Excel format using the standard spreadsheet, [CTY-PID-GENSUM.xlsm](#), available on the **CADD Services'** external webpage and on the **Office of Estimating's** website. This excel spreadsheet is used to transfer all plan quantities directly into the

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Office of Estimating's AASHTOWare software. More information on the use of the spreadsheet can be found on the Office of Estimating's website, and in Section 502.1 of the ODOT CADD Engineering Standards Manual.

The spreadsheet can be copied, or linked, to a CADD file containing a standard sheet border for inclusion in the plan images set, or for printing purposes.

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 **are to** be included on all sheets of the General Summary.

In lieu of creating separate columns in the General Summary, the use of an asterisk to identify items with participation or funding splits is allowable for projects with one or two affected items. A note associated with the asterisk shall provide details regarding the participation or funding split.

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 construction item codes, their corresponding pay item descriptions, and units of measure. This list is continually updated and posted on the Office of Estimating's website. Questions regarding the ODOT Item Master should be directed to the Office of Estimating.

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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), and 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 - “Standard”, “As Per Plan”, “Miscellaneous”, and “Special” Pay Items](#). 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. Refer to the Item Master page on the Office of Estimating’s website for guidance.

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

Lump sum items shall show ”LS” in the Grand Total column with the Unit column left blank.

Supplemental descriptions are occasionally required for standard items and are always required for miscellaneous items. Refer to the “Special Instruction” column in ODOT’s [Item Master](#) for a list of items requiring a supplemental description. Spaces, colons, and/or semicolons are not to be placed before a supplemental description, nor is the supplemental description to be placed within quotation marks.

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

- Roadway
- Erosion Control
- Environmental / Remediation
- Drainage
- Pavement
- Water Work
- Sanitary Sewer
- Lighting
- Electrical
- Other Utilities
- Traffic Surveillance
- Traffic Control
- Traffic Signals
- Landscaping
- Retaining Walls (Identifying Information)

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Building Demolition

Noise Barriers

Structures:

Structure Repair (Bridge Number and SFN)

Structure 20 Foot Span and Under (Bridge Number and SFN)

Structure Over 20 Foot Span (Bridge Number and SFN)

Miscellaneous Structure

Maintenance of Traffic

Items of Work

Engineering and Surveying Services

Incidentals

Alternate, optional, and additive alternate bid items shall be listed under separate headings that are modified from the headings listed.

Alternate bid items shall be listed in the General Summary under a separate heading selected from the headings listed in this section, followed by the word "ALTERNATES" (e.g., ROADWAY ALTERNATES, DRAINAGE ALTERNATES, etc.), and placed directly after its corresponding heading section. For more information, see [Section 1307.2.7 - Alternate, Optional, and Additive Alternate Bid Items](#) and [Sample Plan Sheet SP1307-4](#).

ALT (X)	ITEM	ITEM EXT.	GRAND TOTAL	UNIT	DESCRIPTION
					ROADWAY
	202	23000	1000	SY	PAVEMENT REMOVED
	202	58700	12	EACH	MANHOLE ABANDONED
	202	75000	225	FT	FENCE REMOVED
	202	75250	1	EACH	GATE REMOVED
					ROADWAY ALTERNATES
X	606	98000	500	FT	GUARDRAIL, MISC.: TENSIONED CABLE (BRIFEN) (ALTERNATE 1)
X	606	98100	20	EACH	GUARDRAIL, MISC.: TENSIONED CABLE ANCHOR TERMINAL (BRIFEN) (ALTERNATE 1)
X	606	98000	500	FT	GUARDRAIL, MISC.: TENSIONED CABLE (TRINITY) (ALTERNATE 2)
X	606	98100	2	EACH	GUARDRAIL, MISC.: TENSIONED CABLE ANCHOR TERMINAL (TRINITY) (ALTERNATE 2)
X	606	98000	500	FT	GUARDRAIL, MISC.: TENSIONED CABLE (MARION STEEL) (ALTERNATE 3)
X	606	98100	2	EACH	GUARDRAIL, MISC.: TENSIONED CABLE ANCHOR TERMINAL (MARION STEEL) (ALTERNATE 3)

As with alternate bid items, optional bid items shall also be listed in the General Summary under a separate heading selected from the headings listed in this section, with each set of optional bid items grouped together and designated with an alphabetical label (e.g., OPTION A, OPTION B, etc.) added to the heading. The heading shall be followed by a brief description and placed in alphabetical order directly after its corresponding heading section. For more information, see [Section 1307.2.7 - Alternate, Optional, and Additive Alternate Bid Items](#) and [Sample Plan Sheet SP1307-3\(c\)](#).

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ITEM	ITEM EXT.	GRAND TOTAL	UNIT	DESCRIPTION	SP. 1307-3(c)	SEE SHEET NO.
					DATE: JULY 2018	
<i>RETAINING WALLS (WALL 1) OPTION A: REINFORCED EARTH WALL</i>						
203	20000	1710	CY	EMBANKMENT		
203	35000	3474	CY	GRANULAR EMBANKMENT		
503	11100	LS		COFFERDAMS AND EXCAVATION BRACING		
503	21101	1124	CY	UNCLASSIFIED EXCAVATION, AS PER PLAN		108
SPECIAL	61050010	4766	SF	RETAINING WALL, MISC.: REINFORCED EARTH WALL SYSTEM		190
<i>RETAINING WALLS (WALL 1) OPTION B: RETAINED EARTH WALL</i>						
203	20000	1636	CY	EMBANKMENT		
203	35000	3584	CY	GRANULAR EMBANKMENT		
503	11100	LS		COFFERDAMS AND EXCAVATION BRACING		
503	21101	1150	CY	UNCLASSIFIED EXCAVATION, AS PER PLAN		108
SPECIAL	61050010	4738	SF	RETAINING WALL, MISC.: RETAINED EARTH WALL SYSTEM		190

Additive alternate bid items shall be listed in the General Summary under an “ADDITIVE ALTERNATE” heading followed by a numerical label (e.g. 1, 2, etc.). The heading shall be followed by a brief description and placed in numerical order directly before the incidental pay items. For more information, see [Section 1307.2.7 - Alternate, Optional, and Additive Alternate Bid Items and Sample Plan Sheet SP1307-3\(d\)](#).

ITEM	ITEM EXT.	GRAND TOTAL	UNIT	DESCRIPTION	FIG. 1307-3(d)
					DATE: JANUARY 2019
<i>ADDITIVE ALTERNATE 1: SIDEWALK</i>					
608	10000	5985	SF	4" CONCRETE WALK	
608	52000	126	SF	CURB RAMP	
616	10000	5	MGAL	WATER	
659	00300	105	CY	TOPSOIL	
659	10000	940	SY	SEEDING AND MULCHING	
<i>ADDITIVE ALTERNATE 2: PEDESTRIAN CROSSWALK</i>					
630	02100	52	FT	GROUND MOUNTED SUPPORT, NO. 2 POST	
630	08600	1	EACH	SIGN POST REFLECTOR	
630	80100	27.8	SF	SIGN, FLAT SHEET	
630	84900	2	EACH	REMOVAL OF GROUND MOUNTED SIGN AND DISPOSAL	
630	86002	2	EACH	REMOVAL OF GROUND MOUNTED POST SUPPORT AND DISPOSAL	
631	92001	2	EACH	SIGN FLASHER ASSEMBLY, AS PER PLAN	
644	00500	13	FT	STOP LINE	
644	00600	200	FT	CROSSWALK LINE	

A Bridge Number is the SLM of the structure, written without the decimal point (i.e., MER-707-1692L&R or HIG-TR607-0168). The SFN is the Structure File Number that uniquely identifies a bridge.

Three-sided culverts must be listed as separate structures. Prefabricated structures with spans greater than or equal to 10 feet 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 subcontractor 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.

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Building Demolished is often considered a Roadway item when only a few buildings are involved. To facilitate the collection of data for reports required by FHWA, Structures are divided into four categories: Structure Repair, Structure 20 Foot Span and Under, Structure Over 20 Foot Span, and Miscellaneous Structure.

The General Summary shall be required in an Excel format using the standard spreadsheet, [CTY-PID-GENSUM.xlsm](#).

More information on the use of the CTY-PID-GENSUM.xlsm spreadsheet can be found in Section 1307.1 and on the Office of Estimating's website.

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, Portions of Structure Removed, Approach Slab Removed, and Building Demolished), 203 (except when used for mechanically stabilized earth walls), 204, 205, 206, 208, 209, 606 (except Noise Barrier), 607, 608, 622 (Concrete Barrier), 623 (except Construction Layout Stakes and Surveying), 625 (Ground Rod for Fence), 651, 652, 653, 654, 656, 690 (pertinent pay items), 862, 863, 871, 878.

Erosion Control - 601, 616 (when used for Erosion Control), 659, 660, 670, 671, 690 (pertinent pay items), 832, 836, 838.

The Department will furnish Item 832, Each, Erosion Control/Construction 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 Supplemental Specification 832.

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

Item 616, Water, must be added to all projects that require a 404/401 waterway permit. This quantity of water is used to comply with permit requirements regarding erosion and dust control near waterways. In addition, projects that include the Dust Control Plan note from the [Traffic Engineering Manual](#) should include this Item 616, Water, in the Maintenance of Traffic section of the General Summary.

Environmental / Remediation - 690 (pertinent pay items)

Drainage - 602, 605, 611 (except three-sided flat-top and arch structures, conduit for pull boxes, and when used for Sanitary Sewer or Other Utilities), 613, 690 (pertinent pay items), 833, 834, 837, 839, 841, 895.

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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. A figure in parentheses for 707.04 indicates the height of corrugation. A 1-inch corrugation should generally be noted for pipe diameters over 48 inches.

Small Diameter (Less than 36")

611 _____ 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.

611 _____ Ft. 24" Conduit, Type A 706.01, 706.02, 706.08, 707.33 with welded bell, SS 938 with welded bell or 30" 707.01 (0.138), 707.04, 707.05, 707.21.

Large Diameter (36" and over)

611 _____ Ft. 60" Conduit, Type A 706.02, 707.33 with welded bell, SS 938 with welded bell or 72" 707.02 (0.138), 707.03, 707.04 (1"), 707.07 (0.109), 707.22.

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

Pavement - 251, 252, 253, 254, 255, 256, 257, 258, 300, 301, 302, 304, 305, 320, 321, 400, 407, 408, 409, 411, 421, 422, 423, 424, 441, 442, 443, 450, 451, 452, 609, 617, 618, 690 (pertinent pay items), 803, 806, 822, 823, 826, 850, 851, 852, 857, 859, 860, 872, 874, 875, 880, 881, 882, 884, 886, 897.

Water Work - 638 (Item Special when local government specification is used), 690 (pertinent pay items).

Sanitary Sewer - 611 (when used for Sanitary Sewer), 690 (pertinent pay items).

Lighting - 625 (except Ground Rod for Fence and when used for Electrical, Other Utilities, Traffic Surveillance, or Traffic Signals), 690 (pertinent pay items), 818, 820.

Electrical - 625 (when used for Electrical), 690 (pertinent pay items).

Other Utilities - [611,625] (when used for Other Utilities), 690 (pertinent pay items).

Traffic Surveillance - [625, 630, 631, 632, 633,] (when used for Traffic Surveillance), 690 (pertinent pay items), 804 (when used for Traffic Surveillance), 809 (pertinent pay items).

Traffic Control - 620, 621, 626, [630, 631] (except when used for Traffic Surveillance), 640, 642, 643, 644, 645, 646, 647, 648, 690 (pertinent pay items), 814.

Traffic Signals - 611 (conduit for Pull Boxes), 625 (when used for Traffic Signals), [632, 633] (except when used for Traffic Surveillance), 690 (pertinent pay items), 804 (except when used for Traffic Surveillance), 805, 809 (pertinent pay items), 810, 815, 816, 819, 824, 828.

Landscaping - 657, 658, 661, 662, 666, 690 (pertinent pay items).

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Retaining Walls - 203 (when used for mechanically stabilized earth walls. See the [Bridge Design Manual](#) for additional information), [503, 504, 505, 506] (when used for Retaining Walls), 507 (pertinent pay items), [509, 510] (when used for Retaining Walls), [511, 512, 513, 514, 516, 517, 518, 519] (pertinent pay items), [520, 523, 524] (when used for Retaining Walls), 530 (pertinent pay items), 610, 690 (pertinent pay items), 840, [843, 844, 845, 855] (when used for Retaining Walls), 866, 867, **870**, 883 (when used for Retaining Walls), 885 (pertinent pay items).

Building Demolition - 202 (Building Demolished), 690 (pertinent pay items).

Noise Barriers - 606 (Noise Barrier), 690 (pertinent pay items).

Structures - 202 (Structure Removed, Portions of Structure Removed, and Approach Slab Removed), [503, 504, 505, 506] (except when used for Retaining Walls), 507 (pertinent pay items), [509, 510] (except when used for Retaining Walls), [511, 512, 513, 514] (pertinent pay items), 515, [516, 517, 518, 519] (pertinent pay items), 520 [except when used for Retaining Walls], 522, [523, 524] (except when used for Retaining Walls), 526, 530 (pertinent pay items), 611 (Three-sided flat-top and arch structures), 690 (pertinent pay items), 842, [843, 844, 845] (except when used for Retaining Walls), 846, 847, 848, 849, 855 (except when used for Retaining Walls), 856, 858, 869, 883 (except when used for Retaining Walls), 885 (pertinent pay items), 892.

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

1. Providing a separate general summary for each bridge by SFN within the bridge sheets with a reference from the General Summary to each Structure General Summary.
2. Providing a combined structure general summary that separates quantities for each bridge by SFN; also with a reference from the General Summary for each bridge.
3. Providing quantities for each bridge, broken out separately by SFN, on the General Summary.

Each Structure General Summary shall be combined with the General Summary in an Excel format using the standard spreadsheet, CTY-PID-GENSUM.xlsm. See [Section 1307.1 - General](#) for more information.

Maintenance of Traffic - 410, 502, 614 (except Maintaining Traffic), 615, 616 (except when used for Erosion Control), 622 (Portable Barrier), 690 (pertinent pay items), 808, 829, 831, 873, 896, any additional items used specifically for maintenance of traffic.

Items of Work - 680, 690 (pertinent pay items), 691, 692, 900, 950.

Engineering and Surveying Services - 107, 690 (pertinent pay items).

Incidentals - 108, 614 (Maintaining Traffic), 619, 623 (Construction Layout Stakes and Surveying), 624, 690 (pertinent pay items).

The following incidental pay items shall be provided on the General Summary:

Incidentals -

- | | |
|-----|------------------------------------|
| 614 | LS, Maintaining Traffic |
| 619 | MNTH, Field Office, Type A, B or C |

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- 623 LS, Construction Layout Stakes and Surveying
- 624 LS/Each, Mobilization

Building Demolition is a type of 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 and Surveying, or Mobilization.

The District Highway Management Administrator should be consulted when there is a question regarding the need for these incidental pay items.

The following guidelines are recommended when determining the type of Field Office to specify on a project:

<u>Estimated Project Construction Cost</u>	<u>Office Type</u>
Less than \$500,000	Type A
\$500,000 to \$5,000,000	Type B
Over \$5,000,000	Type C

The basis of payment for a Field Office should be MNTH, 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 to where they apply, should be completed and appropriate quantities 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.

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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. If the borrow cannot be measured due to settlement, or because the area is under water, then payment should be by the Ton.

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

There are four types of pay items in a construction plan, “Standard”, “As Per Plan”, “Miscellaneous”, 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, the **Construction and Material Specifications**, or **Supplemental Specifications**. Every “As Per Plan” item must have a corresponding plan note, Proposal Note, plan detail, or combination thereof which clearly and completely explains the deviation(s) from the standard item. The “As Per Plan” descriptor should not be included as part of a “Miscellaneous” or “Special” pay item description. The location of “As Per Plan” notes and details shall be cross-referenced in the “See Sheet No.” column on the General Summary.

A “Miscellaneous” item code is used for unique or infrequently performed items. These items shall be within the guidelines of the Standard Construction Drawings, the **Construction and Material Specifications**, **Supplemental Specifications**, or any other authoritative document. Every “Miscellaneous” item must have a corresponding plan note, proposal note, plan detail, or combination thereof to completely explain the item. The location of “Miscellaneous” notes and details shall be cross-referenced in the “See Sheet No.” column on the General Summary sheet. If the item is “Miscellaneous”, the word “MISC.,” will be part of the item description.

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 define 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, Optional, and Additive Alternate Bid Items

Alternate, optional, and additive alternate bid items are included in a plan when so dictated by the sponsoring agency.

Alternate bid items shall be listed in the General Summary under a separate heading selected from the headings listed in [Section 1307.2.3 - Item Code, Unit of Measure, and Description](#). This heading shall be modified by adding the word “ALTERNATES” (e.g., ROADWAY ALTERNATES, DRAINAGE ALTERNATES, etc.), and placed directly after its corresponding heading section. The description of individual alternate bid items shall include “ALTERNATE” followed by an appropriate numerical value, in parentheses, at the end. For each alternate bid item, an “X” shall be placed in the “ALT(X)” column in the General Summary [[SP 1307-4](#)].

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ALT (X)	ITEM	ITEM EXT.	GRAND TOTAL	UNIT	DESCRIPTION
ROADWAY					
	202	23000	1000	SY	PAVEMENT REMOVED
	202	58700	12	EACH	MANHOLE ABANDONED
	202	75000	225	FT	FENCE REMOVED
	202	75250	1	EACH	GATE REMOVED
ROADWAY ALTERNATES					
X	606	98000	500	FT	GUARDRAIL, MISC.: TENSIONED CABLE (BRIFEN) (ALTERNATE 1)
X	606	98100	20	EACH	GUARDRAIL, MISC.: TENSIONED CABLE ANCHOR TERMINAL (BRIFEN) (ALTERNATE 1)
X	606	98000	500	FT	GUARDRAIL, MISC.: TENSIONED CABLE (TRINITY) (ALTERNATE 2)
X	606	98100	2	EACH	GUARDRAIL, MISC.: TENSIONED CABLE ANCHOR TERMINAL (TRINITY) (ALTERNATE 2)
X	606	98000	500	FT	GUARDRAIL, MISC.: TENSIONED CABLE (MARION STEEL) (ALTERNATE 3)
X	606	98100	2	EACH	GUARDRAIL, MISC.: TENSIONED CABLE ANCHOR TERMINAL (MARION STEEL) (ALTERNATE 3)

The description for alternate bid 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 alternates. The bidder is required to bid on 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 shall be listed in the General Summary under a separate heading selected from the headings listed in [Section 1307.2.3 - Item Code, Unit of Measure, and Description](#), with each set of optional bid items grouped together and designated with an alphabetical label (e.g., OPTION A, OPTION B, etc.) added to the heading. The heading shall be followed by a brief description and placed in alphabetical order directly after its corresponding heading section [\[SP 1307-3\(c\)\]](#).

ITEM	ITEM EXT.	GRAND TOTAL	UNIT	DESCRIPTION	SP. 1307-3(c)	SEE SHEET NO.
					DATE: JULY 2018	
RETAINING WALLS (WALL 1) OPTION A: REINFORCED EARTH WALL						
203	20000	1710	CY	EMBANKMENT		
203	35000	3474	CY	GRANULAR EMBANKMENT		
503	11100	LS		COFFERDAMS AND EXCAVATION BRACING		
503	21101	1124	CY	UNCLASSIFIED EXCAVATION, AS PER PLAN		108
SPECIAL	61050010	4766	SF	RETAINING WALL, MISC.: REINFORCED EARTH WALL SYSTEM		190
RETAINING WALLS (WALL 1) OPTION B: RETAINED EARTH WALL						
203	20000	1636	CY	EMBANKMENT		
203	35000	3584	CY	GRANULAR EMBANKMENT		
503	11100	LS		COFFERDAMS AND EXCAVATION BRACING		
503	21101	1150	CY	UNCLASSIFIED EXCAVATION, AS PER PLAN		108
SPECIAL	61050010	4738	SF	RETAINING WALL, MISC.: RETAINED EARTH WALL SYSTEM		190

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 bidder deciding which option to bid on.

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Additive alternate bid items shall be listed in the General Summary under an “ADDITIVE ALTERNATE” heading followed by a numerical label (e.g. 1, 2, etc.). The heading shall be followed by a brief description and placed in numerical order directly before the incidental pay items [SP1307-3(d)].

Incidental pay items that incur additional costs due to the inclusion of the additive alternate shall be included in the bid items for the additive alternate.

ITEM	ITEM EXT.	GRAND TOTAL	UNIT	DESCRIPTION	FIG. 1307-3(d)
					DATE: JANUARY 2019
ADDITIVE ALTERNATE 1: SIDEWALK					
608	10000	5985	SF	4" CONCRETE WALK	
608	52000	126	SF	CURB RAMP	
616	10000	5	MGAL	WATER	
659	00300	105	CY	TOPSOIL	
659	10000	940	SY	SEEDING AND MULCHING	
ADDITIVE ALTERNATE 2: PEDESTRIAN CROSSWALK					
630	02100	52	FT	GROUND MOUNTED SUPPORT, NO. 2 POST	
630	08600	1	EACH	SIGN POST REFLECTOR	
630	80100	27.8	SF	SIGN, FLAT SHEET	
630	84900	2	EACH	REMOVAL OF GROUND MOUNTED SIGN AND DISPOSAL	
630	86002	2	EACH	REMOVAL OF GROUND MOUNTED POST SUPPORT AND DISPOSAL	
631	92001	2	EACH	SIGN FLASHER ASSEMBLY, AS PER PLAN	
644	00500	13	FT	STOP LINE	
644	00600	200	FT	CROSSWALK LINE	

Multiple sets of additive alternates are permissible. When multiple sets are used, the additive alternates are to be listed numerically in order of highest to lowest priority. The sponsoring agency will determine the order of priority. The bidder is required to bid on all additive alternate items.

Questions regarding the setup of alternate, optional, and additive alternate bid items on the General Summary 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 - Item Code, Unit of Measure, and Description](#).

Reference to a Proposal Note may be made at the end of a pay item description only if the pay item is new, or 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 are to 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 are to be carried to the General Summary and listed under a column entitled "Office Calcs." [[SP 1307-3\(a\)](#) and [1307-3\(b\)](#)].

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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 - Masonry
 - Square Feet - Signs
 - Feet - Ground Mounted Sign Supports
- Carried to the nearest foot
 - Feet - Conduit and Underdrains, Subdrainage piping (Structural)
- Carried to hundredths:
 - Miles - Pavement Marking
 - Feet - Bridge Deck Joints, Drip Strip, Prestressed Concrete Bridge Members
 - Tons - Commercial Fertilizer
 - Acres - Lime
- Nearest 100 Pounds
 - Pounds - Structural Steel

Guardrail quantities are normally determined in standard 12.5' panel lengths.

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 also those who performed the checking operations. These initials should be shown in the title block. SPEDuP plans shall show these initials in the page footing. 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 require the submittal of a Notice of Intent (NOI) or **post construction BMPs**, as explained in the **Location and Design Manual, Volume 2, Section 1112**. The Project Site Plan is prepared by the designer and provided as part of the contract documents. Electronic design files used to create the Project Site Plan are also a part of the contract documents and shall be provided. For more information, see the [ODOT Guidelines for Electronic Deliverables](#) document located on the Office of CADD & Mapping Services' website. A sample Project Site Plan is shown in the Sample Plan Sheets [[SP 1308-1](#)].

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For non-contiguous portions of projects sold under one contract, as described in [Location and Design Manual, Volume 2, Section 1112](#), provide a Project Site Plan for each individual site that exceeds one acre of earth disturbing activity.

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. **Projects that may have environmental impacts to habitat, or species, may also be required to prepare a SWPPP as determined by the District Environmental Coordinator.** 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. 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, Section 1114**.

1308.2 Requirements

The Project Site Plan shall consist of a schematic plan similar to that required in [Section 1303 - Schematic Plan](#). It will generally have a scale of 1"=200'. 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, including permanent easements).
- The total area of "Project Earth Disturbing Activities" that is expected to undergo earth disturbing activities as estimated from **Location and Design Manual, Volume 2, Figure 1112-1**.
- The area of "Contractor Earth Disturbing Activities" as estimated from **Location and Design Manual, Volume 2, Figure 1112-1**.
- The area of "NOI Earth Disturbing Activities" as estimated from **Location and Design Manual, Volume 2, Figure 1112-1**.
- 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.
- 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, ponds, wetlands, jurisdictional and regulated ditches, springs, etc. within 200' 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.

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- 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 storm water Best Management Practices (BMP) through a description, graphically, and in tabular form. Ensure all latitude and longitude positions are in units of decimal degrees, are scaled to the grid, and have 6 values after the decimal. Furnish a begin position and end position for the following linear BMPs: Vegetated Filter Strip and Vegetated Biofilter. Furnish just the outlet position of all other BMPs. Include a table that lists each individual BMP, the BMP type, the Begin Latitude/Longitude, the End Latitude/Longitude (if applicable), the BMP Width (strip width for Vegetated Filter Strips and bottom width for Vegetated Biofilters only), and the EDA Treatment Credit. In the same table, provide the summation of EDA Treatment Credit from all BMPs, as well as the EDA Treatment Credit Required for the project.

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'
- Urban (or Short Rural) Projects:
 - Horizontal: 1"=20'
 - Vertical: 1"=5' (preferred) or 1"=10'

The above scales will result in coverage on a typical sheet of 1500' at 1"=50' and 600' at 1"=20'. 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, Acceptable Grid Systems**.

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 for design speeds of 40 mph or less and 500 feet for design speeds over 40 mph. Horizontal and vertical alignments and all topography should be shown in these "extension" areas.

To avoid misinterpretations, the use of abbreviations in the plans, except those defined in the **Construction and Materials Specifications** or generally understood by engineers and contractors, should be minimized. If abbreviations are used, a legend explaining the abbreviations should be included.

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 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 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.

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- 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]. This information may be shown on the cross-sections if more convenient.

1309.3.3 Roadway Items

- Pavement, curbs, treated shoulder, drives.
- Guardrails, concrete barrier, fences.
- Profile of the ground line at the centerline of construction, with elevations every 50' 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**].
- 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

Following 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.

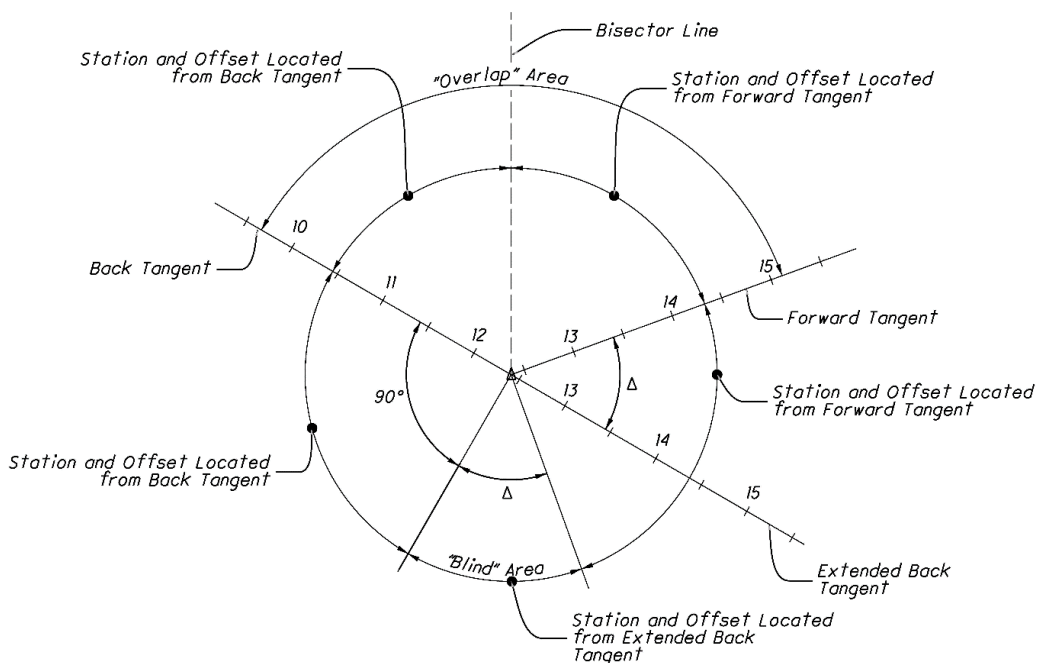
The centerline of construction should match the centerline of right-of-way. In those instances where it is not possible to match the two centerlines, a constant offset between the two centerlines is preferred. When the two centerlines differ, their relationship must be shown in the right-of-way plans.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

Stationing shall be designated in feet per the following examples:

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

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.

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.



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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'. The location of the profile grade elevation is shown on the Typical Sections.
- Elevations shall be expressed in feet 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.
- 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**].
- Concrete barrier – Label terminal stations, end anchorages, transitions, and end treatments like impact attenuators.
- Signs – Identify sign structures (i.e. cantilever and trusses), controllers and signal poles. Smaller traffic control signs (i.e. mounted on yielding posts) are normally shown on a separate traffic control plan sheet.

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- 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 shall be shown in both plan and profile [\[SP 1309-1\(a\), 1309-3, 1309-4, 1309-5, 1309-6\]](#). Label the conduit size and type (ex. 36” – Type C) in the plan view. 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 only
- Flow arrows showing direction of flow in ditches, streams, 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.

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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 (ft², yd³, mi., 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 Project Control and Reference Points

Points used to establish project control along with the associated reference points are more commonly shown on the Schematic Plan or General Notes. When a Schematic Plan is not provided or for other unique situations where the project control points and reference points cannot be shown in the Schematic Plan or General Notes, these points should be shown on the Plan sheets as described in Section 1303.2.2.

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.

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" grid system subdivided in accordance with the examples shown in **Figure 1202-1**. Horizontal and vertical scales are equal - usually 1"=5' or 1"=10'. Elevations are labeled along each side at the major grid lines. When a 1"=10' scale is used, the even elevations are located at the 1" 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'. Intervals of 25' 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 3 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. Existing features located between two cross-sections should be shown on the nearest cross section. For example, for a project using 50' cross section intervals with a catch basin located at Sta. 20+27, the catch basin should be depicted on the cross section at Sta. 20+50.

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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 and earthwork volumes (cubic yards 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 **[SP 1310-7]**. Adjustments must be made for drives, intersections, etc. When pavement is removed and is to be replaced with embankment material, the quantity of embankment must be included in the plans using the applicable 203 or 204 pay item.

End areas may be determined using computer programs, planimetry, 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.

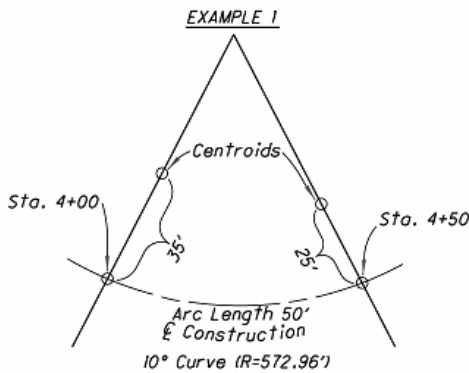
1310.3.2 Earthwork Corrections for Curvature

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 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.

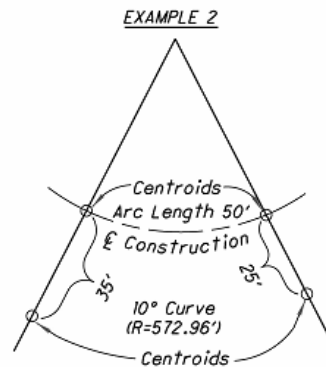
To adjust earthwork volumes for curvature, the corrected-arc-length method should be used. This method is simple and easy to understand and is easily adapted to computer programs for earthwork. An example of this method is shown in the following figure:

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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 = $50' \times 0.94764 = 47.38'$



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 = $50' \times 1.05236 = 52.62'$

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 **Item 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 and included for estimating purposes on the Office of Estimating's Estimated Quantities form which can be found in **Appendix D**. 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 and seeding areas (sq. yards) 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.

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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, 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. The elevation of the Ordinary High Water Mark (OHWM) should be identified for any waterway feature (i.e., streams, jurisdictional ditches, lakes, reservoirs, and ponds) being addressed through the Waterway Permit.

Drainage items are normally shown on the Plan & Profile Sheets and 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 where additional details can be found.

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's station, length and grade should be labeled. Separate drive profile sheets are not typically required, although they 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 are included in the following subsections.

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. intervals, elevations around the radius returns at 10 to 15 ft.

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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. 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**.

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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'. 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.
- Design-year and 100-year discharge in cfs.
- Design-year and 100-year velocity in ft/s.
- Design-year and 100-year headwater elevation to the nearest 0.1 ft.
- Elevation of the Ordinary High Water Mark (OHWM) or depth of flow associated with ordinary high water to the nearest 0.1 ft. for crossings that require a Waterway Permit.
- Amount of fill material below the OHWM for crossings that require a Waterway Permit. See the Office of Environmental Services' Waterway Permits Manual for more information.
- All existing structure data - size, type, length, date built.
- Design Service Life: 75 yr.
- Stream pH
- Abrasion Level: 1 - 6
- Culvert File Number (CFN). Required for Type A conduits having an opening, measured along the centerline of the roadway, of 12 inches or greater but less than 120 inches.

B. Plan View Information:

- Station to nearest 0.01 ft. 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 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:

- Culvert type, length and grade.
- Culvert grade to nearest hundredth of a percent.
- Inlet and outlet flowline elevations to the nearest 0.1 foot
- Profile grade elevation.
- Edge of pavement elevations.
- Minimum cover elevation to the nearest foot.
- Maximum cover elevation to the nearest foot.
- 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).

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.

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- **Pavement restoration.** All items that are required to restore the pavement after the installation of 611 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 611, or 605, item from being constructed require a 202 removal item (headwall removed, pipe removed, catch basin removed, etc.).

Provide the design live load (HL-93) with the future wearing surface load (60 psf) information on the Culvert Detail Sheet or Site Plan for precast reinforced concrete box culverts (spans 14 feet or greater), precast reinforced concrete three-sided flat-topped culverts, precast reinforced concrete arch culverts, and precast reinforced concrete round sections.

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 grade line for the check discharge.

A Culvert File Number (CFN) is required for Type B conduits having an opening, measured along the centerline of the roadway, of 12 inches or greater but less than 120 inches.

1312.4 Three-Sided Precast Culverts

In addition to the culvert details specified in [Section 1312.2 - Culvert Details](#), 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 611.

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

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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

Underdrains are typically shown in detail in the plan view of the Plan & Profile sheets. However, in cases where the Plan & Profile sheets are too congested, it is recommended to show underdrains on a separate sheet. 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](#)].

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 1314-4](#)], shall be prepared in accordance with the **Ohio Manual of Uniform Traffic Control Devices**, **Signal Design Reference Packet**, and the **Traffic Engineering Manual**. Additional information may be obtained by contacting the **Office of Roadway Engineering** and the **Office of Traffic Operations**.

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 Roadway Engineering** should be contacted for assistance in the preparation of plans involving highway lighting.

1314.3 Landscaping Plans

The **Office of Roadway Engineering** 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.

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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 Real Estate**.

1314.7 Soils Information Sheets

Soil profiles, foundation investigations, etc. should be prepared using the **Specifications for Geotechnical Explorations**. 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. Additional features located within 500 feet 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 the mapped mine. 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](#). High resolution tiff images, and their associated georeferencing files, of abandoned underground maps are available from the [Ohio Department of Natural Resources \(ODNR\)](#), Division of Geological Survey.

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 - **Section [1302.3](#)**
- Design Exceptions - **Section [1302.4](#)**
- Index of Sheets - **Section [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 – **Section [1302.11](#)**
- Notes - **Section [1302.12](#)**
- Plan Signatures - **Section [1302.13](#)**

Quarter size sheets should follow the format shown on **Figure 1302-1**.

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 - General Summary Sheet**.

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1316 SPEDuP (Simplified Plan - Expedited Delivery Project) Plans

1316.1 General

SPEDuP projects are straightforward, routine, maintenance-type, projects which require minimal design and have none of the complexities common to most construction projects. These expedited delivery projects are primarily developed using Microsoft Word and Microsoft Excel. Using this format reduces the time required to process, advertise, and bid a project.

SPEDuP plans are NOT permitted when the proposed project involves any of the following:

- Right-of-Way
- Utilities
- Federal funding
- Local funding
- Maintenance of Traffic (where detailing is required)
- 4-lane divided Interstate or Interstate lookalike resurfacing
- Significant plan detailing

SPEDuP plans are required when the proposed project meets all of the following criteria:

- ✓ Letter-size (8 ½"x11") plan sheet format
- ✓ PDP Path 1 project as identified by ODOT's Project Development Process (PDP). Visit the [Project Development Process](#) website for more information.
- ✓ Proposed work is simple and straightforward (i.e. - Maintenance-type project)
- ✓ 100% State funded
- ✓ Maximum number of letter size plan sheets = 30

Examples of some eligible project types include: guardrail upgrading, pavement marking, herbicidal spraying, mowing, fencing, 2-lane resurfacing, signal installations, slide repairs, and multi-lane pavement patching.

SPEDuP plans are not required to follow the format requirements described in the previous sections of this manual. However, they shall contain sufficient information to adequately describe the work so that the contractor can properly bid and construct the project. This information may be presented entirely in written format, without the use of drawings. Typically, such plans consist of the following components:

- Title Sheet (SPEDuP [Title Sheet template](#) is located on the **Office of CADD & Mapping Services** website)
- Typical Sections
- General Notes
- General Summary, Subsummaries, Calculations (SPEDuP [General Summary Template](#) is located on the **Office of CADD and Mapping Services** website)
- General Plan, sketch, line drawings, or plan and profile
- Special Details
- Index of Sheets (Optional. If utilized, it shall be located on page 2 of the plan set.)

Note: The entire SPEDuP plan shall be submitted in a single PDF file.

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See sections which follow for more information. Contact the Office of Alternate Project Delivery with questions.

1316.2 Plan Sheets

SPEDuP projects shall use a letter-size (8"x11") format, and are primarily developed using Microsoft Word and Microsoft Excel. As a minimum, all plan sheets shall have the following:

- ✓ Project Identifier - Provide the project identifier as a header.
- ✓ Sheet Number - Shall be located in the lower right of the page footer, using the (PAGE X of XX) format.
- ✓ Font - All font shall be capitalized and in Arial Bold, font size 10.
- ✓ Sheet Border - The border around all pages shall be 1/2 inch.

If necessary, drawings and maps may be embedded into the Word document as a graphics. If proper scaling is required, additional details can be included into the PDF version of the plan package on an 8 1/2" X 11" plan sheet. The plan developer may create the graphics in MicroStation and include the plotted PDF into the final plan package. Embedding these details into the seed Word and/or Excel document is preferred to ensure proper page numbering.

1316.2.1 SPEDuP Plan Sheet Templates

Templates for the SPEDuP logo, General Summary and Title sheets can be found here:

<http://www.dot.state.oh.us/Divisions/Engineering/CaddMapping/volume3/Pages/SPEDuP-Templates.aspx>

1316.2.2 Title Sheet

Simplified Plan Expedited Delivery Projects (SPEDuP) have a more streamlined format than traditional plans. Therefore, the Title Sheet for a SPEDuP plan will not require the same amount of information as a traditional plan. For example, Title Blocks are not required for SPEDuP plans. However, even though an actual Title block is not required, the information within a traditional Title Block is still required to be shown on the SPEDuP Title Sheet (See **Sample Plan Sheet SP1302-08** for details).

Following is the minimum information that shall be provided on the Title Sheet of a SPEDuP plan:

- Plan Title – **Section 1302.2**
- Design Designation – **Section 1302.3**
- Plan Preparer Identification – **Section 1302.6**
- Underground Utilities Note - **Section 1302.7**
- Location Map – Shall be 3 1/4"x3 1/4" in size. (See **Section 1302.8** for information)
- Supplemental Specifications – **Section 1302.9**
- Standard Construction Drawings – **Section 1302.10**
- Project Information – **Section 1302.11**
- Notes – **Section 1302.12**
- Plan Signatures – **Section 1302.13**

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Plan Components

The Title Sheet shall be created using the standard Excel [template](#) found on the [Office of CADD and Mapping Services'](#) website, and it shall be transmitted in the delivery of the Plan Package.

Letter-size (8"x11") sheets shall follow the format shown on [Figure 1302-2A](#). A SPEDuP plan sample Title Sheet is shown in the Sample Plans [\[SP 1302-8\]](#).

1316.2.2.1 SPEDuP Logo

The SPEDuP logo shall be included on the top left corner of the Title Sheet [\[SP 1302-8\]](#). A copy of the SPEDuP logo can be found on the [Office of CADD and Mapping Services'](#) website.



1316.2.3 General Summary

All SPEDuP plans must include a General Summary [\[SP 1307-6\]](#). The format of the General Summary shall be as per [Section 1307.2](#).

The General Summary must be created using the standard Excel spreadsheet [CTY-PID-GENSUM.xlsm](#) available on both the [Office of Estimating](#) and the [Office of CADD and Mapping Services'](#) websites. This Excel spreadsheet is used to transfer all plan quantities directly into the [Office of Estimating's](#) AASHTOWare software. The spreadsheet can be copied, or linked to a CADD file containing a standard sheet border for inclusion in the plan set. More information on the use of this spreadsheet can be found on the [Office of Estimating's](#) website, and in [Section 502.1](#) of the [ODOT CADD Engineering Standards Manual](#).

The General Summary spreadsheet (in Excel format) must also be transmitted in the delivery of the Plan Package.

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 quantities and those who performed the checking operations. SPEDuP plans shall show these initials in the page footing.

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<u>Figure</u>	<u>Subject</u>
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1302-2	Simplified Plan Title Sheet Layout: 11"x17" Size
1302-2A	SPEDuP Plan Title Sheet Layout: Letter Size
1302-3	Guide for Showing Design Exceptions in Plan
1303-1	Simple Curve Elements and Data
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Plan Components


List of Figures

<u>Figure</u>	<u>Subject</u>
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<h1 style="margin: 0;">STANDARD TITLE SHEET LAYOUT</h1>	<h2 style="margin: 0;">1302-1</h2>
	REFERENCE SECTION 1302

<input type="checkbox"/>	<i>Project Designation</i>	<i>Railroad Involvement</i>	<i>Constr. No.</i>	<i>PID No.</i>	<i>Federal Project No.</i>
(1302.11.1) <i>Project Description</i>	(1302.11.2) <i>Earth Disturbed Areas</i>	(1302.12) <i>Notes</i>	(1302.13) <i>Plan Signatures</i>	(1302.2) <i>Plan Title</i>	(1302.5) <i>Index of Sheets</i>
(1302.8) <i>Location Map</i>	(1302.3) <i>Design Designation</i>	(1302.4) <i>Design Exceptions</i>	(1302.6.1) <i>Engineer's Seal</i>	(1302.9) <i>Supplemental Specifications</i>	(1302.10) <i>Standard Construction Drawings</i>
(1302.6.2) <i>Design Firm Information</i>	(1302.7) <i>Underground Utilities Note</i>	(1302.9.1) <i>Special Provisions</i>			

<p>SIMPLIFIED PLAN TITLE SHEET LAYOUT: 11" X 17" SIZE</p>	<p>1302-2</p>
	<p>REFERENCE SECTION 1315.2.1</p>

	<i>Project Description</i>	<i>PID No.</i>	<i>Construction Project No.</i>	<i>Federal Project No.</i>
<p>(1302.11.1) <i>Project Description</i></p>	<p>(1302.11.2) <i>Earth Disturbed Areas</i></p>	<p>(1302.12) <i>Notes</i></p>	<p>(1302.13) <i>Plan Signatures</i></p>	
<p>(1302.2) <i>Plan Title</i></p>	<p>(1302.5) <i>Index of Sheets</i></p>	<p>(1302.9) <i>Supplemental Specifications</i></p>	<p>(1302.10) <i>Standard Construction Drawings</i></p>	
<p>(1302.8) <i>Location Map</i></p>	<p>(1302.3) <i>Design Designation</i></p>	<p>(1302.4) <i>Design Exceptions</i></p>	<p>(1302.6.1) <i>Engineer's Seal</i></p>	
	<p>(1302.7) <i>Underground Utilities Note</i></p>	<p>(1302.6.2) <i>Design Firm Information</i></p>		

**SPEDuP PLAN
TITLE SHEET LAYOUT:
LETTER SIZE**

1302-2A

REFERENCE SECTION

1316.2.1

<p>(1316.2.1) SPEDuP Logo</p>		<p>STATE OF OHIO, DEPARTMENT OF TRANSPORTATION (1302.2.1)</p>	
<p>(1302.8) Location Map</p>		<p>(1302.2.2) Project Designation</p>	
<p>(1302.11.2) Earth Disturbed Areas</p>		<p>Title Block (1302.2.5)</p>	
<p>(1302.3) Design Designation</p>		<p>(1302.11.1) Project Description</p>	
<p>(1302.4) Design Exceptions</p>		<p>(1302.12) Notes</p>	
<p>(1302.7) Underground Utilities Note</p>		<p>(1302.13) Plan Signatures</p>	
<p>(1302.6.2) Design Firm Information</p>			
<p>(1302.6.1) Engineer's Seal</p>	<p>(1302.10) Standard Construction Drawings</p>	<p>(1302.9) Supplemental Specifications</p>	
<p>CHECKED BY ---</p>		<p>PAGE 1 OF --</p>	

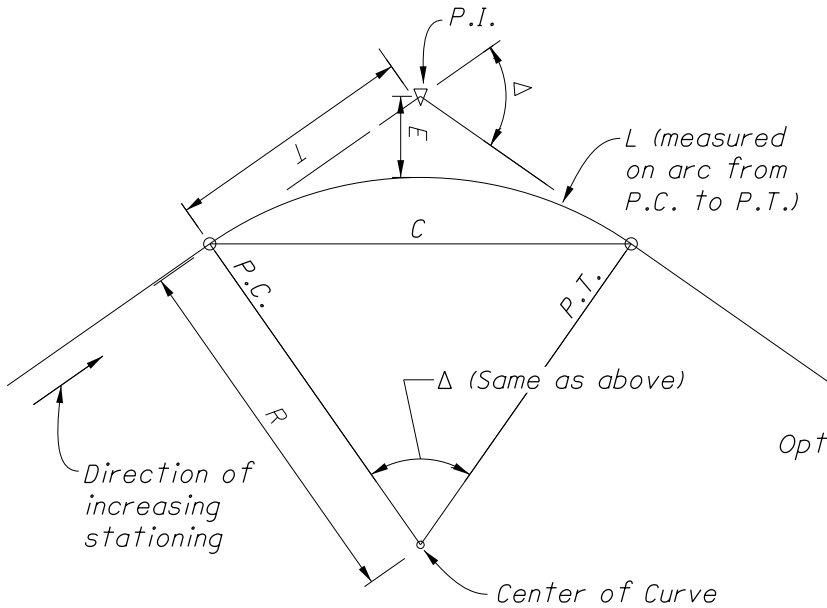
GUIDE FOR SHOWING DESIGN EXCEPTIONS IN PLAN	1302-3
	REFERENCE SECTION 1302.4

NDC = Normal Design Criteria

PLAN SHEET	DESIGN EXCEPTION	DESIGN FEATURE	EXAMPLE
Schematic (A)	Horizontal Curve Radius	Degree of Curve	D _c = 7°00' (NDC D _c = 6°00'MAX)
	Superelevation	Superelevation Rate	e _{max} = 0.075 (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 0.016)
Plan Sheet	Stopping Sight Distance	Horizontal SSD (B)(C)	SSD=381'(450' Min) Actual Design Speed 48 MPH
Profile Sheet	Stopping Sight Distance	Vertical SSD (C)	SSD=381'(450' Min) Actual Design Speed 48 MPH
	Maximum Grade	Grades	4.36% (NDC 4.00% MAX)
	Vertical Clearance	Vertical Clearance	15.5' (NDC 16.5' MIN)
	Horizontal Curve Radius	Degree of Curve	D _c = 7°00' (NDC D _c = 6°00')
	Superelevation	Superelevation Rate	e _{max} = 0.077 (NDC 0.08)
Bridge Plan Sheets	Design Loading Structural Capacity	Structural Capacity	(D)
Superelevation Sheets	Superelevation	Superelevation Rate	e _{max} = 0.077 (NDC 0.08)

- (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. **The Vertical SSD applies only to crest vertical curves.**
- (D) See Bridge Design Manual or contact the Office of Structural Engineering.

<h1 style="margin: 0;">SIMPLE CURVE ELEMENTS AND DATA</h1>	<h2 style="margin: 0;">1303-1</h2>
	<p>REFERENCE SECTION 1303.5, 1309.4.1</p>



CURVE DATA

P.I. = Sta.

$\Delta = \text{---}^\circ \text{---}' \text{---}''$ Lt. or Rt.

* $D_c = \text{---}^\circ \text{---}' \text{---}''$

R =

T =

L =

E =

e_{max}

C =

Optional { C.B. = $\text{---}^\circ \text{---}' \text{---}''$
P.C. = Sta.
P.T. = Sta. } 1

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

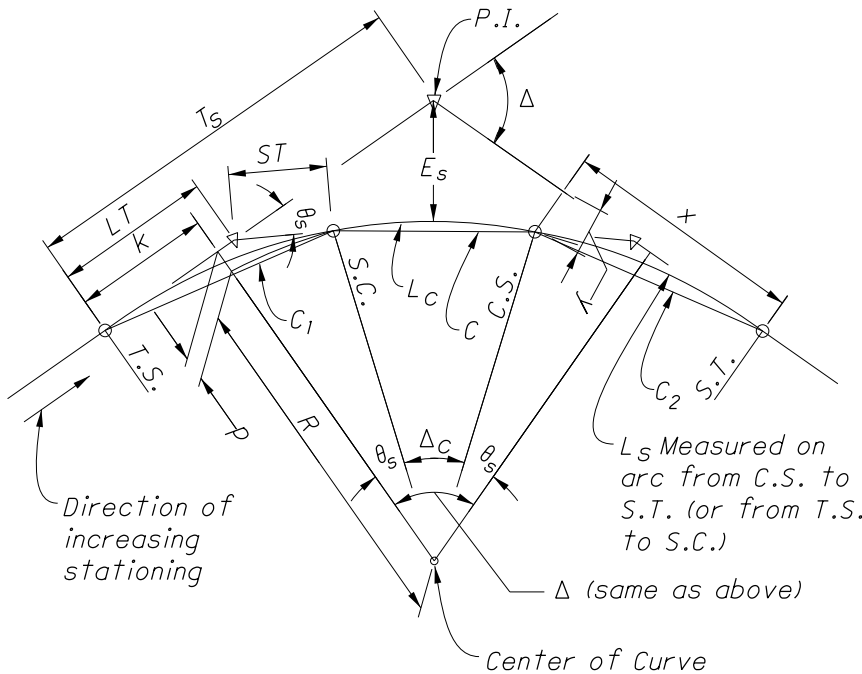
P.C.- Point of Curve

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 =
 L_c =
 T_s =
 E_s =
 e_{max} =

Optional {
①
Optional {
②
Optional {
Optional {

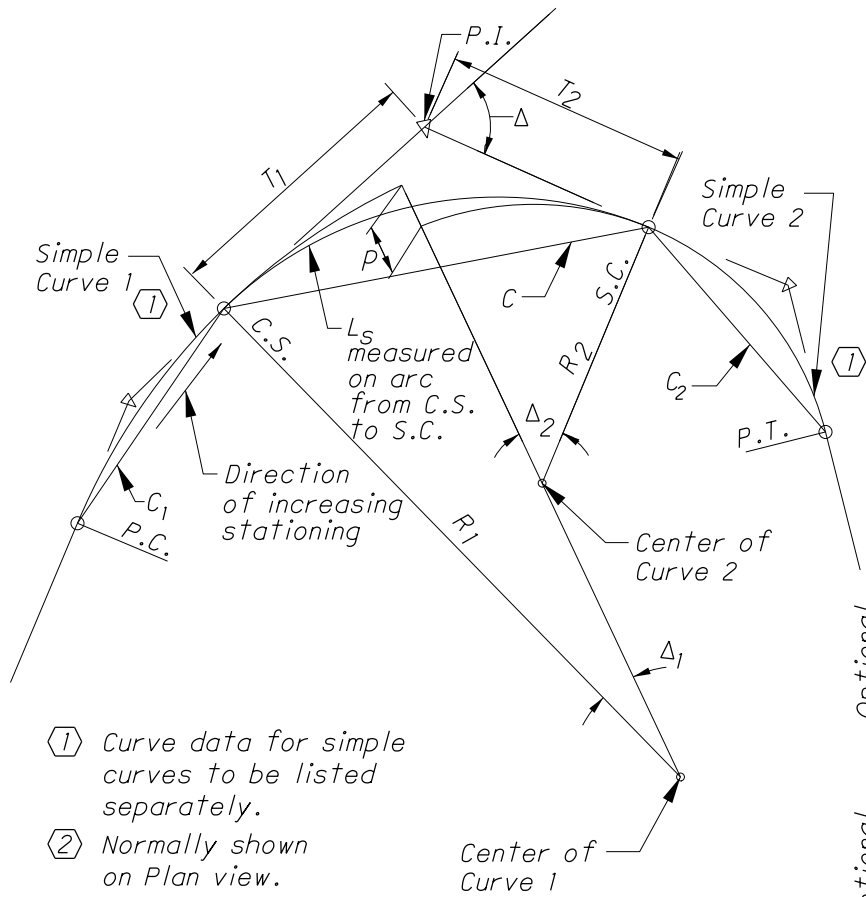
ELEMENTS

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

* 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.

Center of Curve 1

CURVE DATA

P.I. = Sta.

$\Delta = \text{---}^\circ \text{---}' \text{---}''$ Lt. or Rt.

* $D_1 = \text{---}^\circ \text{---}' \text{---}''$

$R_1 =$

* $D_2 = \text{---}^\circ \text{---}' \text{---}''$

$R_2 =$

$L_s =$

$p =$

$\Delta_1 = \text{---}^\circ \text{---}' \text{---}''$

$\Delta_2 = \text{---}^\circ \text{---}' \text{---}''$

$T_1 =$

$T_2 =$

$e_1 =$

$e_2 =$

Optional $\left\{ \begin{array}{l} C_1 = \\ C = \\ C_2 = \end{array} \right.$

C.S. = Sta.

S.C. = Sta.

Optional $\left\{ \begin{array}{l} C.B._1 = \text{---}^\circ \text{---}' \text{---}'' \\ C.B. = \text{---}^\circ \text{---}' \text{---}'' \\ C.B._2 = \text{---}^\circ \text{---}' \text{---}'' \end{array} \right.$ 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 P.C. to C.S.

C = Chord Length from S.C. to C.S.

C_2 = Chord Length from S.C. to P.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

SECTION 1400 Project Development

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1401 Design Review Process

1401.1 Introduction

Transportation projects originate from a wide variety of sources, including local governments or private entities requesting to construct improvements on roadways under the Department's control. In order to streamline project development and avoid unnecessary delays, these projects are required to follow ODOT's Project Development Process (PDP). ODOT's Project Development Process is a project management and decision-making process, which provides a team-oriented approach to developing a transportation project. It is the framework for project development and guides it from conception through completion. The PDP also establishes the scope of work for a project and its deliverables.

This section of the Location and Design Manual provides a general overview of plan development. It does not detail design standards, nor provide guidance on how to evaluate any particular design component or environmental issue. Design and environmental requirements are provided in various technical manuals and policies.

See the [Project Development Process Manual](#) and the [PDP website](#) for more information

1402 Project Phases



The [Project Development Process](#) (PDP) uses a phased approach as shown in the figure. The PDP consists of five phases that projects must advance through. These phases are: Planning (PL), Preliminary Engineering (PE), Environmental Engineering (EE), Final Engineering/ROW Phase (FE), and Construction (CO). Depending on the project's size, complexity, and/or potential impact to the environment, the amount of time spent in each phase will vary.

It is important to note that PDP phases represent conceptual groupings of activities. The activities from one phase do not necessarily need to be completed before advancing with activities in the next phase. For example, because certain environmental evaluations are time sensitive, these activities can affect a project's critical path, and it may be necessary to begin those environmental field studies prior to the selection of a preferred alternative. Under this scenario, elements of the Environmental Engineering phase occur while the project is still in the Preliminary Engineering phase.

A brief overview of project phases is detailed in the following sections.

1402.1 Planning Phase (PL)

Planning is the first phase of the PDP and provides a starting point for decision-making. It creates the foundation upon which the later PDP phases depend **and assumes that a transportation improvement is warranted to address a problem identified through a prioritization process. But it does not assume the specific project-level needs to be addressed, facility type or project to be constructed.**

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This phase utilizes a multi-disciplinary approach to:

- identify project specific needs & study area
- determine an operational or management solution to solve the identified transportation problem
- determine project phasing and location
- determine the scope, schedule and budget of the project

Planning efforts should balance the need to move people safely and efficiently while fostering transportation projects that preserve and enhance the natural and built environments, as well as the economic and social assets of the neighborhoods through which they pass.

More **detailed** information on the **Planning Phase (PL)** can be found in the **PDP Manual**.

1402.2 Preliminary Engineering (PE)

Preliminary Engineering begins the process of collecting more detailed information in order to develop and compare alternatives. This is done by conducting field investigations, performing technical studies, and developing preliminary engineering level of plans. This work builds upon, and refines, the information and analysis produced during the Planning Phase (PL). A primary product of Preliminary Engineering is the recommendation of the preferred alternative for the project. PE initiates the Stage 1 detailed design.

Although not an all-inclusive list, typical tasks performed during the PE phase are:

- Develop Feasibility Study and Alternative Evaluation Report
- Collect traffic data
- Conduct Safety Analysis
- Perform Environmental Field Studies
- Stakeholder consultation and public involvement for alternatives

More **detailed** information on the **Preliminary Engineering Phase** can be found in the **PDP Manual**.

1402.3 Environmental Engineering (EE)

In the **Environmental Engineering (EE)** phase, detailed environmental analysis of the preferred alternative is performed concurrently with detailed engineering, and other technical studies.

The **EE** builds upon and refines the information and analyses produced during the **Preliminary Engineering Phase (PE)**. The intent of the process is to have refined environmental studies and design work initiated concurrently on the preferred alternative, along with solid decision-making.

Based on the understanding of potential environmental impacts, a determination is made by the project team regarding the necessary level of environmental field studies and regulatory agency coordination needed for the project.

More detailed information on the **Environmental Engineering Phase** can be found in the **PDP Manual**, located on the Office of Environmental Services' website..

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1402.3 Final Engineering/ROW Phase (FE)

During the Final Engineering/ROW Phase, projects are advanced to full development.

The acquisition of any necessary right of way is finalized in this phase, but the process is flexible. Acquisition can occur early, before environmental review is completed, can occur piecemeal as part of a design-build project, or can occur traditionally after the environmental review is completed and the right of way plans are completed.

Stage 3 detailed design is also completed during this phase. Plans must contain all details and quantities required to bid and construct the proposed project, including a final cost estimate. A Stage 3 Detailed Design Review Submission must also be reviewed and approved by the District. It is recommended that a second Stage 3 Detailed Design Review be conducted if more than two years have elapsed since the first Stage 3 Detailed Design Review, and the Final Tracing Package has not been submitted to Central Office.

The Project Manager is responsible for ensuring:

- project has been fully developed,
- all necessary legislation has been completed,
- PS&E package has been finalized,
- performance of any other technical and engineering tasks,
- Plan Package meets all construction schedule deadlines.

Before the project can proceed to the next phase, the Final Plan Package is prepared and submitted to the ODOT Office of Estimating.

More information on the Final Engineering/ROW Phase can be found in the PDP Manual, located on the Office of Environmental Services' website.

1402.4 Construction (CO)

The **Construction Phase** can be defined as the execution and administration of the contract documents, and is the final step in the Project Development Process (PDP). It begins when the Final Plan Package has been submitted to Central Office. After the contract is awarded, ODOT monitors, manages, and documents the contractor's activities to ensure compliance with the plans, proposal, and specifications.

The Contractor is responsible for constructing the work as detailed in the contract documents. The Project Engineer is responsible for ensuring that the terms of the construction contract are fulfilled. The Contract is a written agreement between the Department and the Contractor, setting forth the obligations of the parties, including, but not limited to the performance of the work and the basis of payment. Requirements for the management of the contract after the award can be found in the Construction Administration Manual of Procedures and the ODOT Construction and Materials Specifications (CMS).

More information on the **Construction Phase** can be found in the PDP Manual, located on the Office of Environmental Services' website.

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1403 Project Classification

ODOT projects fall into one of five path categories (Path 1-5). Selection of the appropriate project path is based on the project's size, anticipated level of project complexity and/or potential impact to the environment. The project's path identifies the recommended level of analysis, amount of stakeholder involvement, and activities performed during each phase. **Therefore, it is the basis for scoping the project using the [Scope and Fee \(SAFe\) System](#).**

Since the initial path selected for a project is frequently based upon limited information, it is recommended that it be reevaluated at the conclusion of planning activities to determine if **the path designation is still applicable for scoping**. ODOT's **Project Development Process (PDP)** provides the flexibility to reclassify a project's path to fit unanticipated requirements which may develop. **While identifying a project's path is important for initiating the scoping process, Project Managers have the flexibility to customize a project scope by adjusting required tasks to address project needs. Thus, a project's identified path is a starting point, but since it's a dynamic process, the path designation may change as project modifications are needed.**

When trying to determine which path a project should follow, it may be difficult to determine if it fits better in one category versus another. When this situation arises, it is recommended that the higher category be selected.

All larger, more complex (Path 3, Path 4 and Path 5) PDP projects will have a dedicated Project Manager to oversee project development through all development phases of the PDP.

More information on Project Path categories can be found in the following sections, and in the **PDP Manual**.

1403.1 Path 1 Projects

Path 1 projects are defined as "simple" transportation improvements generated by traditional and preventative maintenance. They may involve structure and roadway work **which do not alter the basic highway cross section or geometry**, with no ROW, and **minimal utility impacts, if any**. From an environmental perspective, they are typically processed as low level Categorical Exclusion (CE) NEPA documents.

Examples of **Path 1** projects are:

- Simple guardrail replacements, where roadway ditches and backslopes will not be relocated
- Traffic signal maintenance, provided that no work occurs within any historic district and there is no likelihood of encountering contaminated materials
- Mowing, trimming, or brush removal
- General highway maintenance (i.e., filling potholes, crack sealing, joint repair, installation or maintenance of signs, pavement markings, raised pavement markers)
- Bridge painting and bridge deck overlays provided the project does not involve work within streams, rivers, scenic river corridors, or historic properties
- SPEDuP projects

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1403.2 Path 2 Projects

Path 2 projects are simple transportation projects which include minor structure and roadway work. They involve non-complex structure, or roadway work, but can involve utility impacts and/or non-complex ROW acquisition (i.e., strip takes, temporary easements). Path 2 projects are typically low-level Categorical Exclusion (CE) NEPA documents and will likely have one viable alternative.

Examples of Path 2 projects are:

- Bridge rehabilitation and in-kind bridge replacement
- Culvert rehabilitation/replacement
- Resurfacing and pavement widening (no capacity additions)
- Isolated intersection improvements including turn lane additions, roundabouts, restricted crossing U-turns, etc.

1403.3 Path 3 Projects

Path 3 projects are generally located on an existing alignment, although to improve geometric conditions small adjustments to the existing alignment and which do not result in significant environmental impacts may be involved. They involve moderate roadway and/or structure work, and may include capacity additions. They can also involve utility relocations and ROW acquisitions, including relocations. Due to the wide range of potential impacts, and the amount of right of way required, Path 3 projects can fall under a wide range of environmental document levels, from C2 through D3.

Examples of Path 3 projects are:

- Median widenings
- Geometric realignments
- Interstate reconstruction and/or median widening
- Auxiliary lane additions
- Interchange reconstructions

1403.4 Path 4 Projects

Path 4 are defined as mostly rural transportation improvements where the anticipated result of the improvement is expected to have a significant impact to the highway's public access, level of service, traffic flow, mobility patterns, or mode shares. They include roadway and structure work which could add capacity, affect existing horizontal/vertical alignments, and involve consideration of complex and competing interests.

Although typically located on new alignment, Path 4 projects could include any project type that might impact high-quality environmental resources, have substantial public controversy, require substantial right of way acquisition, regular agency coordination, and result in the examination of multiple alternatives as a necessary to aid in the systematic progression of selecting the preferred alternative.

The context and intensity of impacts should be considered when addressing the impact to environmental resources. Path 4 projects may typically require a higher-level CE, Environmental Assessment (EA), or Environmental Impact Statement (EIS) NEPA document.

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Path 4 example projects are those which:

- make significant changes to existing horizontal and/or vertical alignment, resulting in the examination of multiple alternatives
- are located on a new highway alignment in a rural setting
- may impact high-quality environmental resources

1403.5 Path 5 Projects

Mostly urban transportation improvements, Path 5 projects involve the highest complexity of design work; have a higher probability of public controversy, multiple alternatives, and complex utility and access management issues.

In addition to requiring a substantial financial investment, Path 5 projects can be expected to have a significant impact on the highway's level of service, traffic flow, mobility patterns, mode shares and right of way.

From an environmental standpoint, Path 5 projects include any project type in an urban setting that might impact a high-quality environmental resource or require agency coordination at several decision points in the PDP. They're typically higher level NEPA documents and require an Environmental Impact Statement (EIS) or an Environmental Assessment (EA) NEPA document, but in some instances could be processed as a high-level Categorical Exclusion (CE) NEPA document. The context and intensity of impacts should be considered when addressing an impact to an environmental resource. The District Environmental Coordinator or the Office of Environmental Services should be consulted if assistance is needed in determining the appropriate level of NEPA document that will be required for the project. Additional scoping reviews before acceptance may be required.

More information on Path 5 projects can be found in the PDP Manual.

1404 Review Process Determination

Every ODOT project must be reviewed. There are several review categories in which a project may fall:

- Staged Review
- Limited Review
- Design-Build
- Local-Let Development Process

The review process which may be applied to a project is based upon its path, and is determined by the District office. Irrespective of the number, or the detail of review submittals required, the designer is responsible for plan accuracy and adherence to all design and plan preparation requirements.

A description of each review process can be found in the sections which follow.

1404.1 Staged Review Process

The Staged Review Process consists of a series of review submissions at various stages of the design process. It develops an increasing level of design detail as the number of project alternatives is reduced.

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The Staged Review Process may be customized by combining review submissions and/or modifying the content of individual review submissions. Customizations of the **Staged Review Process** must be listed in the project's Scope of Services document.

Plans processed through the **Staged Review Process** should be thoroughly checked by the District to ensure compliance with current specifications, standards, policies and procedures.

1404.2 Limited Review Process

The **Limited Review Process** may be applied to Path 1, Path 2, and Path 3 projects which have a well-defined scope, limited environmental impact and utility involvement. Except for the Feasibility Study and Final Right of Way plans, ODOT will not review the plans for accuracy and adherence to design and plan preparation requirements.

Although design activities associated with Stage 1 Detailed Design, Stage 2 Detailed Design, Stage 3 Detailed Design, and Preliminary Right of Way must be performed, their review submittals may be omitted. If no temporary or permanent right of way is to be acquired, the Final Right of Way Plan review submission may also be omitted.

External agency approvals (e.g. FAA Notification/Clearance, Waterway Permits, LD-33 County Engineer Approval, Railroad Agreements), and Central Office approvals (e.g. Design Exceptions, Maintenance of Traffic Exceptions Committee, and Waterway Permit determination) must be obtained.

The District must approve any minor design decisions that occur after the Feasibility Study. The designer must notify the District with the description of each alternative and an assessment of the impacts of each alternative on project cost, traffic operation, right of way cost, utility relocations, environmental impacts and any other associated impacts.

Below are typical design review submittals required by the **Limited Review Process**:

- [Project Initiation Package](#)
- [Feasibility Study](#)
- [Final Right of Way](#)

It is important to note that the **Limited Review Process** cannot be applied to projects requiring Federal oversight. The Federal Highway Administration (FHWA) is responsible for ensuring that all federal-aid highway programs are delivered consistent with established requirements.

1404.3 Design-Build Review Process

Design-Build projects combine the detailed design and construction of a project into a single contract. The design firm and construction contractor form a team. They work concurrently on the design and construction phases of a project, which expedites project delivery.

For Path 1 projects, the **Design-Build** team will submit Stage 3 Detailed Design plans (without quantities) for review and approval. Other reviews are not normally required.

For higher path projects, the **Design-Build** team will submit Stage 1 and Stage 2 Detailed Design for review and approval. The **Design-Build** team may design and submit Stage 1 and Stage 2 information in phases consisting of buildable units (i.e., earthwork, pavement replacement, etc.) for review. The scope and design shall be coordinated with the District and authorization must be granted prior to submitting various plan components for review.

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All external agency approvals (e.g., FAA Notification/Clearance, Waterway Permits, LD-33 County Engineer Approval, Railroad Agreements) and Central Office approvals (e.g., Waterway Permit Determinations, Design Exceptions, Maintenance of Traffic Exceptions Committee) must be obtained.

Additional information on the **Design-Build** process can be found at the following link:

http://www.dot.state.oh.us/Divisions/ConstructionMgt/design-build/Pages/Design_Build.aspx

1404.4 Local-Let Local Public Agency (LPA) Project Review Process

LPA projects are transportation improvement or enhancement projects that are funded primarily with federal or state monies, and if required, matched with local resources. Traditional LPA projects are those administered by ODOT, whereas **Local-let LPA** projects are those in which the LPA assumes project administration duties.

To the extent practical and feasible, ODOT will minimize its direct involvement in the design and delivery of projects that are funded with local and federal monies, or local and state monies, which do not directly involve routes on the National Highway System. Local public agencies may voluntarily assume the responsibility for project management tasks as determined and in coordination with the ODOT District Office.

For these local-let LPA projects, review submittals shall be as detailed in the **Locally Administered Transportation Projects Manual of Procedures**. ODOT-Let LPA Projects will follow the **Project Development Process**.

1404.5 Customization of Review Requirements

The PDP's phased approach allows for the customization of a project's review process. It allows for more flexibility between project phases and allows the Project Manager to tailor the process to meet the project's individual needs.

The Staged Review Process may be customized by adding review submissions, combining review submissions and/or modifying the content of individual review submissions. Customizations of the Staged Review Process must be listed in the project's scope of services document. These customizations should be evaluated on a case-by-case basis by ODOT personnel prior to scoping. During the scoping process, Consultants are encouraged to submit suggestions for modifications that allow for more effective use of resources, while still providing adequate evaluation of design and environmental issues.

1404.5.1 Combined Reviews

Combined Review submissions are recommended for relatively straightforward projects. Elements from each involved submission must be included in the combined submission. It is not acceptable to disregard elements associated with earlier deliverables and focus only on elements from the later review when they are necessary in the evaluation of the combined review submission (e.g., Path 1 Preliminary Engineering) elements (e.g., Stage 1 Detailed Design).

1404.5.2 Modifications to Design Review Content

It is possible to make modifications to design review content by changing the order in which activities occur in the Staged Review Process. For instance, the timing of a design activity may be modified allowing it to occur earlier, or later, by moving it to another phase in the project development process. This may be justified when particular activities add significant cost to a project's design as

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a result of performing the task on multiple alternatives. The postponement of activities to a later phase must not diminish the designer's ability to evaluate alternatives, or to adequately determine the project's scope, schedule, and budget. Conversely, review elements should be moved forward in the process when they can be obtained at relatively low costs, and would add greatly to the designer's ability to evaluate alternatives or determine scope, schedule, and budget. For example, in order to identify the Preferred Alternative, a Path 3 project may require investigating a vertical profile during the development of the Feasibility Study, even though this task is listed under the Alternative Evaluation Report (AER) tasks. Alternatively, to avoid investigating structure details on alternatives which are eliminated, a Path 3 project considering multiple alignments for a stream crossing may delay the Structure Type Study until the AER.

There is a limitation on the modification of design review content. For instance, when federal funding is used for design work, the environmental document must be approved prior to the authorization of final design activities (i.e., Stage 3 Detailed Design) and/or any Right of Way acquisition.

1404.6 Scheduling

Good scheduling helps a project to run smoothly and helps to ensure it is completed in a timely manner. When developing schedules, particular attention must be paid to items that fall on the critical path (e.g., Right of Way acquisition, utility relocation, individual 404/401 permits, etc.) and items that must be completed during a particular time of year (e.g., aerial mapping, ecological studies, etc.)

In ODOT's **Project Development Process**, Gantt chart schedules are used to coordinate the various tasks associated with project development against time. Consultants are required to submit updated Gantt chart schedules each month which include baseline, actual, and current finish dates. The Project Manager must approve any modification to the schedule which alters commitment dates.

Projects which are behind schedule must include a recovery plan.

1405 Review Agencies

With the exception of external agency coordination performed by the **Office of Environmental Services**, all review submissions must be coordinated by, and are the responsibility of, the District. This ensures consistency of review comments, scope compliance, and project intent.

Submissions may be reviewed by the District Office, Central Office, an external agency, a resource agency, or one contracted by ODOT for all (or part) of the submission. External reviews may be necessary based upon agreement (i.e., Memorandums of Understanding (MOU), Memorandums of Agreement (MOA)). The determination of an external review will be made during the design Scope of Services meeting.

1405.1 Ohio Department of Transportation

The District Project Manager is the first point of contact for all review questions. The Project Manager:

- verifies required review information is submitted in accordance with the project schedule,
- ensures review comments are appropriately addressed,
- coordinates the appropriate and timely execution of reviews, not only within the District, but Central Office as well.

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1405.1.1 Technical Offices and Specialty Areas

Projects prepared by the District office may require a review by a technical office or specialty area. **Figure 1402-1** lists ODOT Central Office Technical Specialty Areas. At the District's request, these offices/specialty sections will assist in the review of unique or complex items.

1405.1.2 Central Office

Projects prepared by the District Office should be submitted by the Project Manager directly to each involved office, or technical specialty area, for review. **Figure 1402-1** lists ODOT Central Office Technical Specialty Areas. Reviews must be conducted by someone other than the project designer.

For projects developed by a consultant, there are two methods for sending review submissions to Central Office:

1. Documents are submitted directly to each involved office or technical specialty area. The consultant should provide a copy of all transmittals to the Project Manager.
2. Multiple copies of the review documents are submitted to the Project Manager for distribution to each involved technical office and/or specialty area.

The consultant Scope of Services document should address which method of submission is desired by the District.

1405.2 Federal Highway Administration

The **Federal Highway Administration (FHWA)** is accountable for ensuring that all Federal-aid highway programs are delivered consistent with established requirements. The **Federal-Aid Highway Program Stewardship and Oversight Agreement** outlines the respective roles and responsibilities of ODOT and the FHWA in administering the federal-aid program. **Figure 1402-8** outlines the Federal Oversight determination process.

At the time of programming, the District will determine the level of oversight required on a project and enter it into Ellis. On projects subject to federal oversight, the FHWA and ODOT should discuss which submissions should be sent to the FHWA. For federal oversight projects, a copy of all required review submittals must be furnished directly to the FHWA by the preparing agency, or local government. Due to fluctuations in workloads, the FHWA may request federal oversight on a project that would normally be State administered.

1405.3 Local Governments

When the design agency is working for a local government, the local government may either have review materials processed through its office or have the preparing agency make submittals directly to the District Office. In either case, unless otherwise notified, ODOT will assume the submittal reflects the intent and desires of the local government.

1405.4 Other Governmental Agencies

Review and approval from the **Federal Aviation Administration (FAA)**, **U.S. Army Corps of Engineers (USACE)**, **Federal Emergency Management Agency (FEMA)**, **U.S. Coast Guard**, **U.S. Fish and Wildlife Service**, **Ohio Department of Natural Resources (ODNR)**, **State Historic Preservation Office (SHPO)** and **Ohio Environmental Protection Agency (OEPA)** may be required.

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Other required environmental approvals and agency coordination are detailed in various manuals, and handbooks, published by the **Office of Environmental Services**.

Submissions to the environmental resource agencies (e.g., the **Bureau of Underground Storage Tank Regulation**, **Ohio Department of Natural Resources**, **Ohio Environmental Protection Agency**, **Ohio Department of Agriculture**, **National Park Service**, **State Historic Preservation Office**, **U.S. Army Corps of Engineers**, **U.S. Coast Guard**, **U.S. Department of the Interior**, **U.S. Fish and Wildlife Service** and **U.S. Environmental Protection Agency**) must be submitted through the **Office of Environmental Services**. Contact the Office of Environmental Services for more information.

1405.6 Railroads

When railroad property falls within the work limits of a proposed project, the possibility of railroad involvement exists. Rail companies must be informed at an early stage of plan development whenever their facilities may be affected in any manner. Some examples include; work on structures passing over a rail line, new grade separations, reconstruction or rehabilitation of existing grade separations, drainage work, removal of Right of Way encroachments, utility work, etc. In addition, projects with an intersection within the projects limits, located within 400 feet of an at-grade rail crossing, require coordination with the **Ohio Rail Development Commission** to determine the need for preemption.

All projects with rail involvement must be coordinated with the **Central Ohio Railroad Coordinator**, who is responsible for preparing and processing all railroad construction agreements. The construction agreement process is initiated at Stage 1 and finalized at Stage 3. The District is required to send a copy of the final plans to the affected railroad company.

For projects involving of rail Right of Way, the involved rail company will be allowed an opportunity to comment on the Right of Way plans and legal descriptions associated with acquisition of their property. The **Acquisition Support Section** in the **Office of Real Estate** coordinates the acquisition of Right of Way from rail companies.

1406 Design Review Submittals

Review submissions are designed to ensure that all projects are developed in accordance with ODOT standards and policies. The Project Manager is responsible for verifying that all required review information is submitted in accordance with the project's schedule, and that review comments are appropriately addressed. Information regarding the content requirements of each review submission can be found within the appropriate ODOT technical manuals and webpages (e.g., **Waterway Permits Manual**, **Right of Way Plan Manual**).

1406.1 General Requirements

Each review submission includes a list of design activities. Therefore, each project should be scheduled based on its required design activities and anticipated design development timeframes.

There may be instances where specific design recommendations may come from someone other than the engineer responsible for the overall project design. For example, a sub-consultant might prepare the Geotechnical Exploration Report whose recommendations are incorporated into the project's plans by the prime consultant. To ensure that their recommendations have been correctly interpreted and incorporated into the project's design, the sub-consultant should be given an opportunity to review the plans prior to their submission to ODOT.

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Unless otherwise noted in the Scope of Services document, all review submissions should be sent to the District office. Multiple copies and direct submittals to Central Office and external agency reviewers may be required. Care should be taken to ensure that each submission includes all information required to process the review. Review submissions that lack required information or contain inaccuracies which preclude meaningful review, will be rejected.

Since right of way acquisition is frequently on the critical path for overall project development, preliminary Right of Way plan preparation and Stage 2 Detailed Design should be developed concurrently. Final Right of Way plan development will normally occur immediately after preliminary Right of Way approval.

The following sections provide information for design review submission. No attempt has been made to either detail design standards or to provide guidance on how to evaluate any particular design component, or issue. Design standards are provided in the technical manuals and design policies listed in **Figure 1402-1**.

1406.1.1 General

All submissions must include the following in the letter of transmittal:

- Project identification: County, Route, Section (Street Name), PID number, Federal number or program (if known).
- Identification of the type of review submission
- Indication of any local government involvement along with any comments the local government may have regarding the submission
- Explanation of any special items, situations, or potential problem areas
- Disposition of previous review comments
- A current cost estimate factored up to the year the project will be awarded and indicating reasons for any significant increase or decrease in project cost
- Identification of all plan sheets, reports, and other materials

When both environmental and design documentation are required to complete a review, all documentation should be submitted at the same time. A sufficient number of copies of all submissions must be provided to allow for adequate review by all involved parties.

1406.1.2 Format

The format and number of copies required for all submissions is determined during the design Scope of Services meeting(s). For plan sets, quarter size 11" x 17" sheets are usually preferred. Plan sets must be bound. Calculations, reports, and other documentation should normally be submitted on 8 1/2" x 11" paper. Large size exhibits, or preliminary design work, may be needed for public involvement meetings. Multiple sets of documents may be required to facilitate the review.

Plan sheet image files shall be provided in PDF format. Text-based documents should be provided as searchable PDF files. With the exception of some local-let projects, plans shall be submitted in a PDF electronic image format in accordance with the requirements of the electronic image file submission procedures available on the Office of Contracts website.

The District may consider allowing electronic submittals in addition to, or as a replacement for, paper submittals. The number of paper or electronic copies required for a particular review should be addressed in the Scope of Services document and be based on previous project experience, existing inter-agency agreements, and/or information from the review agency.

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All projects requiring submittal of CADD files shall be developed using **Bentley** or Autodesk products, in accordance with the [ODOT Guidelines for Electronic Design Deliverables](#), [CADD Engineering Standards Manual](#) and the project's Scope of Services document. See [Section 1503.1](#) for more information.

Some external agencies do not allow submission of electronic images. In instances where hard copy (i.e., paper) documents are required, the District Planning and Engineering Administrator will determine whether the hard copy document will be created by the District or by the consultant.

1406.1.3 Engineers Seal

All final submissions must be sealed by a Registered Professional Engineer in accordance with the Ohio Revised Code Sections 4733.14, 4733.17, and 4733.23. This includes not just final plan sets, but also Access Point Request documents and Design Exceptions. If an Engineer has been hired to prepare plans through the Final Plan Package Submittal, then only the final plans and supporting documentation must be sealed.

Situations may occur where the detailed design will not be developed by the same engineer, or design firm, who prepared the preliminary engineering. In this case, the detailed design Engineers may rely on the preliminary development completed and sealed by the preliminary engineering consultant as the basis for their design. This information should be noted on the Title Sheet of the plans.

1406.2 Project Initiation Package

Developed and approved by the District, the [Project Initiation Package \(PIP\)](#) is a collection of information used to help define the necessary scope of work for a project. The PIP is produced early in the Planning Phase (PL) and is required for projects following Paths 2-5 of the PDP. Although it is unlikely that a project following Path 1 will require a PIP, it is possible that some technical and/or resource areas may need to be considered for some projects. In those cases, it is recommended that the PIP be utilized to document any issues.

The PIP **uses secondary source data and** is intended to provide a snapshot of potential issues and concerns that could cause major scope, schedule, or cost issues during project development. Specific points of concern are those which could cause revisions to any of the following: anticipated design and construction scope of work, proposed project development schedule, estimated project budget, or potential impacts of the project on the surrounding area.

Identification of areas of concern must be performed by qualified individuals with experience on similar projects. The PIP is generally prepared based on reasonable knowledge available at the time of project development. Existing data (e.g., old plans, USGS maps, Soil Conservation Maps) should be researched. In addition, the **Project Initiation Package** should include mapping overlaid on USGS or Aerial maps that identify environmental resources, and other areas of concern. A minimum of one site visit by qualified personnel to review the existing field conditions is mandatory.

Tasks associated with the completion of the PIP can be found in **ODOT's Scope and Fee (SAFe) System**. More information on the **Project Initiation Package** can be found at:

<http://www.dot.state.oh.us/projects/pdp/Pages/Resources.aspx>

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1406.3 Feasibility Study (FS)

1406.3.1 General

The **Feasibility Study (FS)** is part of the Preliminary Engineering Phase (PE) of the Project Development Process. It is used to analyze project alternatives with an ultimate goal of identifying a preferred alternative for a project. The positives and negatives of each alternative should be analyzed from a design and environmental perspective.

For Path 2 or Path 3, the **Feasibility Study** should result in the identification of a preferred alternative.

For Path 4 and Path 5 projects, the **Feasibility Study** should result in a limited number of alternatives for further analysis during the Alternative Evaluation Report. It may include development of corridors and associated horizontal alignments to avoid and/or minimize impacts to design and environmentally sensitive areas within the project study area.

The **Feasibility Study** is a combined design and environmental submission. Necessary tasks to complete a FS are detailed in the Scope and Fee (SAFe) System. If at the time of scoping additional detail beyond what is identified in the SAFe System is assumed to be necessary in order to make a decision on the preferred alternative, then adding tasks from the Alternative Evaluation Report (AER) is encouraged. **This however, does not mean that an AER is performed. The first level of alternatives analysis is always called a Feasibility Study.**

For more information on the format and review process for a Feasibility Study, refer to **Feasibility Studies and Alternative Evaluation Reports Guidance** at:

<http://www.dot.state.oh.us/projects/pdp/Pages/Resources.aspx>

1406.4 Alternative Evaluation Report (AER)

1406.4.1 General

The **Alternative Evaluation Report (AER)** is a combined design and environmental submission. Its purpose is to analyze alternatives developed in the Feasibility Study at a higher level of detail, prior to recommending a preferred alternative. Completion of an **AER** as the first, or only, study of alternatives is not correct.

An **AER** is not **typically** required for projects where the outcome of the Feasibility Study results in the identification of a preferred alternative. **However, on higher path projects, an AER may be needed to further analyze specific components of the preferred alternative. An example would be isolated intersection alternatives where the impacts may vary greatly depending upon the proposed build alternative. These situations may warrant further study and public involvement, and the project team may want to address these locations outside of the FS, based upon the project's scope. Typically, an AER should only be completed on more complex Path 3, Path 4 and Path 5 projects. Note that when the environmental documentation level for a project is anticipated to require an Environmental Evaluation or an Environmental Impact Statement, an AER is almost always required in order to provide a higher level of design upon which to identify impacts. Consult with the Office of Environmental Services for these types of projects when scoping the FS and AER.**

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Necessary tasks to complete an **AER** are detailed in the [Scope and Fee \(SAFe\) System](#). For more information on the format and review process for an **Alternative Evaluation Report**, refer to **Feasibility Studies and Alternative Evaluation Reports Guidance** at:

<http://www.dot.state.oh.us/projects/pdp/Pages/Resources.aspx>

1406.5 Stage 1 Detailed Design

1406.5.1 General

Stage 1 Detailed Design begins after the identification of a preferred alternative. It refines and builds upon the preliminary engineering design completed for the AER.

Stage 1 plans are developed to a sufficient level of design detail to ensure that **Preliminary** Right of Way plan development may begin immediately after completion. Construction limits should be accurate; with little or no changes anticipated due to Stage 2 development.

Stage 1 Detailed Design is part of the Preliminary Engineering (PE) Phase of the PDP. Path 1 and Path 2 projects do not typically require a **Stage 1 Detailed Design** submission. It is required for Path 4 and Path 5 projects, and for most Path 3 projects.

1406.5.2 Stage 1 Detailed Design Activities

Since each project is unique, Project Managers have the flexibility to determine which activities are necessary based on the project's scope. Therefore, there is no one-size-fits-all when it comes to the tasks necessary to complete a project's design.

Following are activities are typically part of a Stage 1 Detailed Design:

- Design Exception request
- **Driveway details**
- **BMP design**
- **Drainage calculations**
- **Utility coordination and documentation-**
- **Develop Retaining Wall plans**
- Complete LD-33 County Engineer approval form.
- **Detour Plan**
- **Traffic Control**
- **Signal plans**
- **Determine Right of Way costs**
- Refine construction limits.
- **Final Structure Site Plan**
- **Service Road Justification**
- **Railroad coordination**
- Complete Airway/Highway Clearance Analysis, if not completed previously.

For a complete listing of typical **Stage 1 Detailed Design** activities, see ODOT's [Scope and Fee System \(SAFe\)](#).

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1406.5.3 Stage 1 Detailed Design Review Submission

After **Stage 1 Detailed Design** is finalized for a preferred alternative, the project can be moved into the next phase of project development. The **Stage 1 Detailed Design** must be submitted to the District for review and approval.

Although each project is unique, there are certain key elements which are a part of the **Stage 1 Detailed Design Review Submission**:

- Title Sheet
- Schematic
- Typical Section sheets
- General Notes
- Plan and Profile sheets
- Cross Section sheets
- Superelevation table(s)
- Intersection Details sheets
- Driveway Detail sheets
- Culvert Detail sheets
- Channel Relocation Detail sheets
- Channel Section sheets
- Conceptual Maintenance of Traffic, if revised from previous submissions
- Preliminary Pavement Marking Plan
- Revised Systems Engineering Analysis for Intelligent Transportation System (ITS) projects
- Retaining Wall plans
- Geotechnical Reports
- Documentation of approved Interchange Justification Studies
- Documentation of approved Design Exception(s)
- Service Road Justification
- Drainage calculations
- LD-33 County Engineer Approval form
- Bridge Design report
- Retaining Wall plans
- Utility coordination and documentation
- Documentation of Airway/Highway Clearance Analysis, if not previously submitted
- Final Post Construction Storm Water Best Management Practices (BMP) Design Calculations and documentation of any BMP implementation issues

Refer to ODOT's [Scope and Fee System \(SAFE\)](#) task list for a complete list.

1406.6 Preliminary Right of Way Plan

1406.6.1 General

Preliminary Right of Way Plans are required for all projects that involve acquisition of temporary or permanent Right of Way, and should be prepared in accordance with the [Right of Way Plan Manual, Section 3100](#). They provide information to define the extent of the right of way required to construct and maintain a highway.

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Since acquisition of property can be a long process that in many cases dictates the overall schedule of a project prior to construction, preliminary right of way plans should be developed concurrently with Stage 2 detailed design. They should incorporate all Stage 2 review comments related to right of way issues.

1406.6.2 Preliminary Right of Way Plan Tasks

For a complete listing of tasks of which should be completed during the development of the Preliminary Right of Way Plan, consult the [SAFe Task List](#).

Refer to the **Office of Real Estate, Right-of-Way Manual, [Section 3100 Right of Way Plan Manual](#)**, for details regarding Preliminary Right of Way Plan development.

1406.6.3 Preliminary Right of Way Plan Review Submission

The following documents are required as part of the **Preliminary Right of Way Plan Review Submission**:

- Right of Way Review Checklist (See [Appendix H](#) of the **R/W Plan Manual**)
- Field Review Checklist (See Section 3110.3 and [Appendix I](#) of the **R/W Plan Manual**).
- Right of Way Description Checklist (See [Appendix J](#) of the **R/W Plan Manual**)

In addition to the Preliminary Right of Way Review Submission, a Conceptual Right of Way Review Submission may be requested by the District Real Estate Administrator as part of the project's Scope of Services document. The Conceptual Right of Way Review Submission will typically apply to large complex projects, and should not be considered a substitute for the Preliminary Right of Way Review Submission.

The **Preliminary Right of Way Plan Review Submission** must be reviewed and approved by the District.

For a complete list of Preliminary Right of Way Plan tasks, refer to the **Right of Way Plan Manual** or ODOT's [Scope and Fee \(SAFe\) System](#) task list. Contact the [Office of Real Estate](#) with questions.

1406.7 Stage 2 Detailed Design

1406.7.1 General

Stage 2 Detailed Design is part of the Environmental Engineering (EE) phase of the Project Development Process (PDP). Its primary purpose is to detail, and draft, the ideas and concepts set forth in the Preliminary Engineering and the Stage 1 Detailed Design. Stage 2 Detailed Design is typically where the majority of the design detailing and plan preparation takes place. At the end of the **Stage 2 Detailed Design**, all design issues of any significance should be resolved.

For more information on when **Stage 2 Detailed Design** occurs, see the [Project Development Process Manual \(PDP\)](#).

1406.7.2 Stage 2 Detailed Design Activities

The following is a list of typical **Stage 2 Detailed Design** activities:

- Add pavement elevations to Interchange Details. Develop grading plans.

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- For concrete pavements, determine locations of longitudinal and transverse joints. Show the locations of these joints on the Intersection Details and Interchange Details.
- Prepare reinforcing details for full height culvert walls.
- Submit designs for precast reinforced concrete box culverts, three-sided flat-topped culverts and precast reinforced concrete arch sections where the usual maximum height of cover is exceeded
- Complete retaining wall detail design.
- Update Signing Plan. Re-evaluate guardrail length of need if use to protect major guide signs.
- Lighting analysis to determine pole spacing and locations. Voltage drop calculations.
- Determine the disposition of all miscellaneous items (e.g., mailboxes).
- Prepare plan for fencing at Right of Way lines.
- Add proposed Right of Way lines to Plan and Profile, and cross section sheets.
- Evaluate railroad/railway responses to Stage 1 plans. Revise plans to incorporate responses, if warranted. Send copy of Stage 2 Detailed Design plans to the railroad/railway company.
- Obtain approval from the Design Aesthetics Committee for all aesthetic items (e.g., concrete textures, landscape design, color).
- Evaluate and incorporate recommendations from Detailed Design Phase Value Engineering Study.
- Prepare plans for Constructability Review.
- Update the construction cost estimate.

A complete list of **Stage 2 Detailed Design** activities can be found in ODOT's [Scope and Fee \(SAFe\)](#) System task list.

1406.7.3 Stage 2 Detailed Design Review Submission

Although each project is unique, there are certain key elements which are a part of the **Stage 2 Detailed Design Review Submission**. Following are items which are typically included as part of **Stage 2**:

- Title Sheet per **Section 1302**; except Engineer's seal, Supplemental Specifications, Special Provisions, Standard Construction Drawings, and Earth Disturbed Areas.
- Schematic Plan sheet per **Section 1303**
- Typical Sections sheets per **Section 1304**
- General Note sheet listing utility companies as per **Appendix B, Note G102**
- Maintenance of Traffic phasing plans, sequence of operations
- Detour map, notes, and County Engineer approval
- Plan and Profile sheets as per **Section 1309**. Estimated quantities are not required.
- Cross Sections sheets, as per **Section 1310**, except earthwork and seeding calculations.
- Intersection Details sheets
- Interchange Detail sheets
- Drive Detail sheets showing plan and profile information
- Culvert Detail sheets as per **Section 1312.2**, except estimated quantities.
- Headwall/wingwall details for those not covered by the Standard Construction Drawings.
- Channel section and relocation Detail sheets
- Storm Sewer Profile sheets
- Water work and sanitary sewer plans, if not covered by the Plan and Profile sheets
- Pavement Marking and Signing Plan sheets as per the **Traffic Engineering Manual**
- Revised Systems Engineering Analysis for Intelligent Transportation System (ITS) projects
- Signal Plan sheets as per the **Traffic Engineering Manual**
- Lighting plan as per the **Traffic Engineering Manual**; except estimated quantities

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- Landscaping Plan; except estimated quantities
- Noise wall details
- Bridge plans as per the **Bridge Design Manual**; except estimated quantities and reinforcing steel tables.
- Approval of aesthetic details
- Retaining Wall detail sheets
- Fencing Plan
- Detailed Right of Way Plan Sheets from the Preliminary Right of Way Review
- Copies of utility company correspondence
- Copies of railroad/railway company correspondence
- Disposition of Detailed Design Phase Value Engineering recommendations
- Plans for Second Constructability Review
- Cost estimate for construction and right of way acquisition. The District Utility Coordinator to provide revised utility reimbursement cost estimate, if necessary. Explain any significant increase or decrease in estimated cost from previous estimates.
- Disposition of Stage 1 Review comments

The **Stage 2 Detailed Design** must be reviewed and approved by the District.

1406.8 Final Right of Way Plan

1406.8.1 General

Final Right of Way plans are part of the **Final Engineering/ROW (FE)** phase of the Project Development Process (PDP). They incorporate comments generated during the Preliminary Right of Way Plan development, and any Stage 2 Detailed Design comments which affect the right of way plan, legal descriptions, and calculations. Stage 2 design issues affecting right of way must be resolved prior to submission of the Final Right of Way plans.

Section 3110.4 of the **Right of Way Plan Manual** contains more information on the **Final Right of Way Plan** submission.

1406.8.2 Final Right of Way Plan Review Submission

The Final Right of Way Submission should include:

- Legal descriptions.
- Closure calculations.
- Revisions from the Stage 2 Detailed Design Review.
- Disposition of Preliminary Right of Way Review comments.

Refer to ODOT's **Scope and Fee (SAFe) System** task list for a complete list.

Also as part of this submission, the Right-of-Way designer and/or reviewer are required to perform a field review. The Field Review Checklist ([Appendix I](#)) is to be completed prior to the preliminary right-of-way review submission, and then again within 15 working days of submitting the Final Right of Way Plans.

See **Section 3110.3** of the **Right-of-Way Plan Manual** for more information on the **Field Review Process**.

The **Final Right-of-Way Plan Review Submission** must be reviewed and approved by the District.

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1406.9 Stage 3 Detailed Design

1406.9.1 General

The **Stage 3 Detailed Design** should complete the design and detailing of the project. These plans must contain all details and quantities required to bid and construct the proposed work. Plans should be numbered and submitted as a complete set, and organized as per **Section 1301.1**.

Stage 3 Detailed Design is part of the Final Engineering/ROW (FE) phase of the Project Development Process (PDP). A **Stage 3 Detailed Design** review is required for all projects; except Limited Review and Design-Build Projects.

It is recommended that a second **Stage 3 Detailed Design** review be conducted if more than two years have elapsed since the first Stage 3 Detailed Design Review and the Final Plan Package has not been submitted to Central Office. The purpose of this review is to ensure that the plans reflect current field conditions, as well as all current design standards, policies and specifications.

1406.9.2 Stage 3 Detailed Design Activities

The preparation of a Stage 3 Detailed Design typically involves the following activities:

- Preparation of Simplified Plans
- Preparation of underdrain bends and branches list.
- Preparation of the Project Site Plan.
- Determination of all estimated quantities plan (i.e., pavement, drainage, earthwork, signing)
- Determination of appropriate notes (i.e., general notes, MOT notes, traffic control notes)
- Determination of any participation splits
- Preparation of the General Summary and Bridge Estimated Quantity sheets.
- Finalization of the Systems Engineering Analysis for Intelligent Transportation System (ITS) projects.
- Completion of Traffic Signal plans
- Completion of signing plans.
- Submission of plans to involved railroad/railway companies for approvals. Railroad agreement must be obtained prior to submission of Final Plan Package to Central Office.
- Preparation of **FAA Form 7460-1** for Airway/Highway Clearance.
- Revision of construction utility reimbursement cost estimates.

Refer to **ODOT's Scope and Fee (SAFe)** task list for a complete list of the activities required to complete the Stage 3 Detailed Design.

1406.9.3 Stage 3 Detailed Design Review Submission

Although not an all-inclusive list, the Stage 3 Detailed Design Review Submission should include:

- A complete set of construction and Right of Way plans
- Approval of non-standard plan notes.
- Systems Engineering Analysis for Intelligent Transportation System (ITS) projects
- Railroad Agreement
- Completed **FAA Form 7460-1** per **Section 1404.1.7**
- **ODNR** plan approvals
- Construction and utility reimbursement cost estimates

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- Disposition of Constructability Review comments
- Disposition of Stage 2 Detailed Design Review comments

The **Stage 3 Detailed Design Review Submission** must be reviewed and approved by the District.

Refer to [ODOT's Scope and Fee \(SAFe\) System](#) task list for a complete list of the activities required to complete the **Stage 3 Detailed Design**.

1406.10 Final Plan Package

Submission of the Final Plan Package is part of the **Final Engineering/ROW (FE)** phase of the **Project Development Process (PDP)**. ODOT has established uniform procedures and criteria for the submission of plan packages to the **Office of Estimating**. The Final Plan Package for a project is to be submitted in accordance with the schedule prepared by Central Office and the Districts. It must include documentation that confirms the project is eligible and ready to be advertised for bids.

The project's plan final plan package contains all files and information relevant to the project, such as the:

- Design Estimate
- [Proposal Note List](#)
- Construction Plans
- [Electronic files](#) (i.e., CADD files, Excel files, alignment files, etc.)
For more information, see the [ODOT Guidelines for Electronic Deliverables](#) document located on the [Office of CADD & Mapping Services'](#) website.
- Estimated Quantities Form

Project Managers are required to create and submit plan package documentation in electronic format, as a single PDF. All ODOT-let projects shall be submitted to **Project Coordination** via the ODOT Plan Package Submittal internal SharePoint site located here:

<http://portal.dot.state.oh.us/Divisions/Planning/estimating/PlanSubmittal/default.aspx>

The submission of completed plans to the District from a consultant should follow **Section 1505** of this manual.

1407 Miscellaneous Studies

1407.1 Airway/Highway Clearance Analysis

1407.1.1 Introduction

The purpose of an Airway/Highway Clearance Analysis is to determine if a proposed project will encroach into the theoretical approach or traverse surfaces of an airport or heliport. When a project is identified as being within 20,000 feet of a public-use or military airport or heliport, an analysis must be performed to determine if **FAA** notification is required. The initial determination whether or not a project is within the 20,000 foot distance is to be made at the time of programming, and it should be so noted on the programming forms and in ODOT's project management system.

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The Airway/Highway Clearance Analysis procedures contained in this manual are based on the “Federal Aviation Regulations, Part 77 - Objects Affecting Navigable Airspace.” Information on the location of airports and lengths of runways may be obtained from the “Ohio Airport Directory,” as published by the Ohio Department of Transportation, Office of Aviation.

1407.1.2 Notification Surfaces

The following conditions need to be examined to determine if notification is required.

- Any construction or alterations of more than 200 feet in height above ground level.
- Any construction or alteration of greater height than an imaginary surface extending outward and upward at the following slopes:
 - 100:1, for horizontal distance of 20,000 feet from the nearest point of the nearest runway, for any airport with at least one runway with a length of more than 3,200 feet, excluding heliports.
 - 50:1, for a horizontal distance of 10,000 feet from the nearest point of the nearest runway, for any airport where the length of the longest runway does not exceed 3,200 feet, excluding heliports.
 - 25:1, for a horizontal distance of 5,000 feet from the nearest point of the nearest landing and takeoff area, for a heliport.

See Figure 1404-1 for a graphical depiction of these surfaces.

1407.1.3 Traverse Way Adjustments

In determining whether any roadway or other traverse way (e.g., railroad, waterway, bikeway, etc.) will violate the limits described in the previous section, it is necessary to include an additional upward height above the traverse way elevation for vehicles that might travel on the facility. The adjustments are as follows:

- 17 feet for Interstate highways, other freeways, and expressways.
- 15 feet for all other public roadways and commercial driveways.
- 10 feet for all private roads and driveways.
- 23 feet for railroads.
- An amount equal to the height of the highest mobile object that would normally traverse the facility, for a waterway or for any other traverse way not previously mentioned.

This additional height must be considered to apply over the full width of the traveled portion and the shoulders of the roadway. Figure 1404-1 includes examples of several traverse way adjustments.

1407.1.4 Exceptions to Notification Requirements

FAA notification is not required where one or more of the following applies to the object penetrating the notification surface:

- The object is shielded by existing structures of a permanent and substantial character or by natural terrain or topographic features, of equal or greater height.
- The object is located in the congested area of a city, town, or settlement where it is evident beyond all reasonable doubt that there could be no adverse effect on safe air navigation.
- The object is an antenna of 20 feet or less in height, except one that would increase the height of another antenna structure.

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Figure 1404-2 includes examples of locations where FAA notification is₁ and is not₂ required.

1407.1.5 Temporary Structures and Construction Equipment

It is possible that a project located within 20,000 feet of an airport will not require FAA notification for permanent features, but will require notification for temporary structures or construction equipment. Figure 1404-3 contains height allowances for equipment or structures associated with various types of construction. These allowances should be used to determine if the notification surface will be penetrated. For short projects (100 feet or less in length), any applicable heights should be considered to apply over the entire length of the project.

Judgment must be used when applying these heights to longer projects. For example, the allowance for equipment used to construct a bridge would only be needed in the vicinity of the bridge; however, the allowance for earth moving and paving equipment should be applied over the entire length. When any doubt exists, consult the Office of Aviation.

1407.1.6 Controlled Areas

Figure 1404-4 displays cross-sectional and profile views of imaginary surfaces that exist above the notification surface. Figure 1404-5 depicts an area at the end of a runway called the runway protection zone (RPZ). Figure 1404-6 contains dimensions defining the sizes of RPZ's for different facilities. Projects should be designed so that these controlled areas are not penetrated by any features, as the FAA will not normally permit violations.

1407.1.7 FAA Notification/Clearance Procedures

Whenever a project is located within 20,000 feet of a public-use or military airport or heliport, an Airway/Highway Clearance Analysis must be performed. Documentation which provides the information contained in Figure 1404-7 must be supplied. The District will use this information to complete FAA Form 7460-1. The FAA requires the use of English units.

The District will submit the following information to the FAA for approval:

- Two completed **FAA Form 7460-1's**. One form is for the proposed project and the other form is for the construction equipment and/or temporary structures.
 - Latitude, longitude (NAD), and elevation (above mean sea level) of the following points:
 - For short bridge projects, 100 feet or less in length:
 - i. Highest point of the superstructure of the bridge.
 - For all other projects:
 - i. Beginning of the project.
 - ii. End of the project.
 - iii. Highest point of the project.
 - iv. Closest point to the runway.
 - v. Any other points that may be important to the study (e.g., various high points throughout the project that may penetrate the imaginary surface).
 - vi. Each light tower or signal pole. In addition, include: structure number, latitude, longitude, ground elevation, structure height and overall height.
 - vii. Highest point of the superstructure of each bridge.
- Accuracy of points should be within 50 feet horizontally and 20 feet vertically.
- A **USGS** map of the project location relative to the airport showing a reference for each point listed above.

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Instructions on how to file the 7460-1 form with the FAA can be found on the Office of Aviation's website at:

<http://www.dot.state.oh.us/Divisions/Operations/Aviation/Pages/FAAandStateNotificationRequirements.aspx>

When approval (or comments) is received from the **FAA**, the District will retain the original correspondence and distribute copies to the **Office of Aviation** and the **FHWA** (for federal oversight projects only). Submit FAA approvals to the Office of Aviation electronically at the following web address:

Ohio.Airport.Protection@dot.state.oh.us

FAA comments will generally relate to certification of the coordinates submitted or the submission of **Form 7460-2, Supplemental Notice**. The **FAA** may also request that a light pole or other similarly tall structure be visibly marked or possibly reduced in height.

Approvals are valid for a period of eighteen (18) months. The District Production Administrator will monitor project status (sale date) relative to the approval expiration date and submit a request for extension to the **FAA** at least two (2) weeks prior to the expiration date.

When construction equipment is expected to penetrate the notification surface of a public-use or military airport or heliport, note **G118A** should be added to the plans. When construction equipment is not expected to penetrate the notification surface, but the project is within the influence area of a public-use or military airport or heliport, note **G118B** should be used.

1407.1.8 Private Facilities

An Airway/Highway Clearance Analysis is required for private airports and heliports. The notification surfaces detailed in [Section 1404.1.2 - Notification Surfaces](#) shall apply to both public and private facilities. If there are any penetrations into the notification surfaces that impact a private facility, coordination with the private owner, and the Office of Aviation, shall be made and note **G118C** should be added to the plans. Coordination with the **FAA** is not required.

1407.2 Retaining Wall Justification

A **Retaining Wall Justification** compares the impacts and costs (both right-of-way and construction) of the project with and without retaining walls. Estimated right-of-way costs are to be provided or verified by the **Office of Real Estate**.

A **Retaining Wall Justification** should include:

- Plan sheets showing wall and no-wall alternatives, including:
 - Approximate construction limits.
 - Right of Way parcels affected.
- Cross sections showing wall and no-wall alternatives.
- Economic analysis comparing right of way and construction costs, with and without the wall.
- Discussion of environmental impacts with and without the wall (optional).

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1407.3 Service Road Justification Study

Service roads (sometimes called access or frontage roads) are used to: reduce the number of existing access points, connect roads cut off by highway relocation and to provide access to parcels that would otherwise be landlocked by a highway relocation. The decision to use a service road to decrease the number of existing access points is usually made for safety or capacity reasons, although in some cases it could be based on economics. Using a service road to connect roads cut off by a relocation is done primarily to provide needed traffic circulation. Providing access via a service road to otherwise landlocked parcels is primarily an economic decision.

Maintenance of service roads by the State is not desirable because, in many cases, these facilities are not readily accessible from a state highway. It is therefore necessary that a statement of acceptance of routine maintenance by a local government agency be obtained.

A **Service Road Study Form** (see **Appendix D**) must be completed. In preparing the analysis, maintenance costs related to the service road must be considered. Estimated right of way costs are to be provided or verified by the **Office of Real Estate**. For information and guidance on preparing the **Service Road Study Form** contact the **Office of Roadway Engineering**.

1407.4 Pedestrian Overpass Justification

A **Pedestrian Overpass Justification** compares the impacts and costs of a project with and without a pedestrian overpass. A statement of acceptance of routine maintenance responsibility of the structure and approaches by a local government agency must be obtained. Routine maintenance includes: clearing debris from the deck, sweeping, snow and ice removal, minor wearing surface patching, clearing bridge drainage systems, marking decks for traffic control, minor and emergency repairs to railing and appurtenances, emergency patching of deck and maintenance of traffic signal and lighting systems, including the supply of electrical power. For information on **Pedestrian Overpasses**, refer to **Location and Design Manual, Volume 1, Section 306.5**.

1407.5 Value Engineering (VE) Studies

Value Engineering (VE) is a systematic analysis by a multi-discipline team which identifies the functions of a project, establishes the worth of that function, generates alternatives through the use of creative thinking, and identifies ways to provide the needed functions at the lowest overall cost, without sacrificing safety, quality, and the environmental attributes of the project.

The Department requires that **Value Engineering studies** be performed on federally funded projects meeting the following criteria:

- ✓ All projects on the federal-aid system with an estimated total cost in excess of fifty (50) million dollars (including design, right of way, and construction)
- ✓ All bridge projects located on the federal-aid system with an estimated cost in excess of forty (40) million dollars (including design, right of way, and construction)
- ✓ Any other project selected by FHWA

Appropriate timing of **VE studies** will ensure that there is sufficient information to analyze during the **Value Engineering Session** and that accepted recommendations can be successfully implemented without impeding the overall project development schedule.

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The criteria used to determine if a project qualifies for Value Engineering can be found in ODOT's Standard Procedure No. 414-001(SP), Design Value Engineering Standard Procedures. The Design Value Engineering Policy can be found in Policy No. 21-006(P).

It is the District's responsibility to review projects currently programmed in the Planning, Preliminary Engineering, and/or Final Engineering/ROW phase to determine if a project qualifies for **Value Engineering**. The District Value Engineering Coordinator is also responsible for monitoring project schedules and contacting the **Office of Roadway Engineering Value Engineering Coordinator (COVEC)** to schedule a **Value Engineering Study**.

The COVEC oversees ODOT's VE program, provides assistance to the Districts, ensures that all VE recommendations are fully evaluated, and that all accepted recommendations of the VE team are implemented.

Since each project is unique, there may be instances where multiple value engineering studies may be required. Typically, Path 3, and some Path 4, projects that qualify for **Value Engineering** require only one **Value Engineering Study** to be performed. More complex Path 4 and Path 5 projects, with extensive impacts, will likely require two Value Engineering studies.

Contact the **Office of Roadway Engineering** for more information on **Value Engineering**.

1407.6 Constructability Review

The intent of a **Constructability Review** is to check the plans for potential construction strategies, techniques and logistical issues. It is an evaluation of the project plans, sometimes supplemented by a site visit, conducted by an individual familiar with construction techniques, to evaluate construction means and methods. The **Constructability Review** also checks construction durations, and alternative designs. It identifies labor and material availability, access for large equipment, project phasing, and the conceptual maintenance of traffic.

The Project Manager will determine if a **Constructability Review** will be conducted concurrent with the Preliminary Engineering Phase.

To ensure an independent evaluation, constructability reviews should not be conducted by the design consultant who prepared the plans. Designers should routinely consider constructability issues during the normal course of project development.

Refer to the Project Development Process Manual for more information, and the **Office of Construction Administration** with questions regarding conducting a Constructability Review.

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1404-2	Examples of Factors Affecting the Imaginary Surface
1404-3	Maximum Operating Height of Construction Equipment
1404-4	Cross-Sectional and Profile Views of Imaginary Surfaces
1404-5	Runway Protection Zone
1404-6	Dimensions for Runway Protection Zone
1404-7	Sample Letter of Airway/Highway Clearance Analysis

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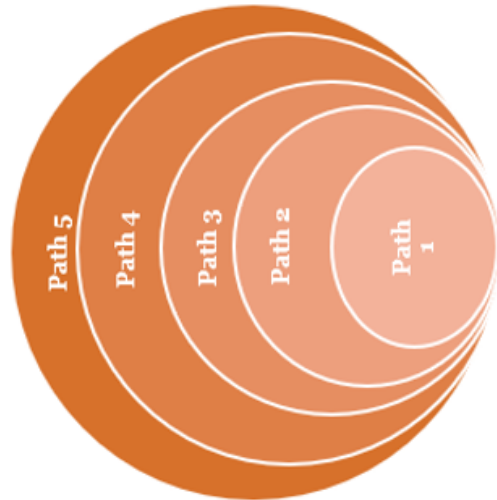
PROJECT DEVELOPMENT PROCESS PROJECT PHASES AND PATHS	1401-1
	REFERENCE SECTION 1401.2


ODOT's Project Development Process (PDP) – Phased Approach



All ODOT projects must advance through the five sequential phases shown above.

PDP Project Paths



Depending on the size, complexity, and/or potential impact to the environment, all ODOT transportation projects are categorized as following one of five categories (Path1 - Path 5). Consult the PDP Manual or contact the Office of Environmental Services directly with questions.

A project's path identifies:

- Recommended level of analysis
- Amount of stakeholder involvement
- Activities performed during each phase

The selection of the appropriate project path is based on the anticipated level of project complexity. The higher the path level, the more complex the project.

More information on project paths and phases can be found in ODOT's Project Development Process (PDP) manual. ODOT's Scope and Fee (SAFe) System provides a listing of tasks associated with each phase of project development. Contact the Office of Consultant Services with questions regarding the SAFe System.

DESIGN INFORMATION SOURCES	1402-1
	REFERENCE SECTION 1402.1

OFFICE/ SPECIALTY AREA	CENTRAL OFFICE DESIGN AREA OF EXPERTISE	DESIGN MANUALS, STANDARD DRAWINGS AND POLICIES
Alternative Project Delivery	<ul style="list-style-type: none"> Design Build Value Based Contracting 	<ul style="list-style-type: none"> Design-Build Manual ODOT Design-Build Value-based Selection Policy (#27-022 (P)) Implementation and Administration of Warranty Provisions Policy (#27-015(P)) Innovative Contracting Policy (#27-013(P))
Aviation	<ul style="list-style-type: none"> Airports and Heliports Airway/Highway Clearance Analysis Flight Operations Unmanned Aerial Systems (UAS) 	<ul style="list-style-type: none"> Airspace Protection Federal Aviation Regulations, Part 77-Safe, Efficient Use, and Preservation of the Navigable Airspace
CADD and Mapping Services	<ul style="list-style-type: none"> Aerial mapping Lidar Ground surveys CADD (MicroStation and GEOPAK) GIS 	<ul style="list-style-type: none"> Survey and Mapping Specifications Location and Design Manual, Volume 3 Sample Plan Sheets CADD Engineering Standards Manual ODOT Guidelines for Electronic Design Deliverables
Construction Administration	<ul style="list-style-type: none"> Specification Development Supplemental Specifications Proposal Notes Change Orders Warranties LPA Construction Contract Administration 	<ul style="list-style-type: none"> Construction and Material Specifications Supplemental Specifications Proposal Notes ODOT Design Build Value-based Selection Policy (#27-022(P)) Innovative Contracting Policy (#27-013(P)) Manual of Procedures
Environmental Services	<ul style="list-style-type: none"> Ecological Resources and Permits Coast Guard Permits Cultural Resources Environmental Policy & NEPA Noise walls Aesthetic Design Environmental Commitments Environmental Site Assessment Project Development Process 	<ul style="list-style-type: none"> Cultural Resources Manual Ecological Manual Regulated Materials Review Manual ODOT Environmental Justice Guidance ODOT NEPA Assignment Categorical Exclusion Guidance Environmental Commitments Guidance ODOT Floodplain Management Guidelines Noise Manual

Figure 1402-1 Sheet 1 of 5

DESIGN INFORMATION SOURCES	1402-1
	REFERENCE SECTION 1402.1

OFFICE/ SPECIALTY AREA	CENTRAL OFFICE DESIGN AREA OF EXPERTISE	DESIGN MANUALS, STANDARD DRAWINGS AND POLICIES
		<ul style="list-style-type: none"> • ODOT Aesthetic Design Guidelines • Project Development Process (PDP) Manual • Project-Level Air Quality Manual 2015 • ODOT Underserved Populations Guidance • Section 4(f) Manual • Waterway Permits Manual
Estimating	<ul style="list-style-type: none"> • Application of design related proposal notes • Historical cost data • Items numbers and Item Extensions • Bid analysis and review • Construction cost estimating • General Summaries (GenSum) • Project Coordination 	<ul style="list-style-type: none"> • Item Master • Summary of Contracts Awarded
Geotechnical Engineering	<ul style="list-style-type: none"> • Roadway and Geohazards • Foundations and Retaining Walls • Field Explorations 	<ul style="list-style-type: none"> • Manual for Abandoned Underground Mine Inventory and Risk Assessment (AUMIRA) • Rock Slope Design Guide • Specifications for Geotechnical Explorations (SGE) • Geotechnical Engineering Design Checklists • Geotechnical Bulletins • Manual for Rockfall Inventory • Manual for Landslide Inventory
Hydraulic Engineering	<ul style="list-style-type: none"> • Roadway hydraulics (storm sewers, culverts) • Post-Construction Storm Water BMP's • Channels • Floodplain Management • Storm Water Management Program (SWMP) 	<ul style="list-style-type: none"> • Hydraulic Standard Construction Drawings • Culvert Management Manual • Location and Design Manual, Volume 2 - Drainage Design • MS4 Storm Water Outfall Inventory Manual

DESIGN INFORMATION SOURCES	1402-1
	REFERENCE SECTION 1402.1

OFFICE/ SPECIALTY AREA	CENTRAL OFFICE DESIGN AREA OF EXPERTISE	DESIGN MANUALS, STANDARD DRAWINGS AND POLICIES
<u>Pavement Engineering</u>	<ul style="list-style-type: none"> Pavement Design Subsurface drainage (underdrains, aggregate drains) 	<ul style="list-style-type: none"> <u>Pavement Design Manual</u> <u>Pavement Standard Construction Drawings</u> <u>Usage Guidelines Trackless Tack</u> Safety Edge
<u>Policy</u>	<ul style="list-style-type: none"> Policy 	<ul style="list-style-type: none"> <u>Policies and Procedures</u>
<u>Program Management</u>	<ul style="list-style-type: none"> Traffic Data Crash Data & Analysis <u>Major Programs</u> <u>Highway Safety</u> Capital Reporting 	<ul style="list-style-type: none"> <u>ODOT Highway Functional Classification System Concepts, Procedures and Instructions</u> <u>Major Bridge Policy</u> <u>Safety Study Guidelines</u> <u>Highway Safety Improvement Program Procedures Manual</u>
<u>Rail Development Commission</u>	<ul style="list-style-type: none"> Railroad coordination Railroad agreements 	<ul style="list-style-type: none"> Design manuals published by individual railroad/railway companies
<u>Real Estate</u>	<ul style="list-style-type: none"> Acquisition Utilities Relocation Subsurface Utility Engineering (SUE) Right-of-Way certification and appraisal Right-of-Way Property Management Oil and Gas Wells 	<ul style="list-style-type: none"> <u>Right of Way Plan Manual</u>
<u>Roadway Engineering</u>	<ul style="list-style-type: none"> Americans with Disabilities Act (ADA) Crash Analysis Design Exceptions Geometric features (alignments, profiles, typical sections, drives, slopes, guardrail, barrier wall) Landscaping Lighting Maintenance of Traffic Preliminary Design 	<ul style="list-style-type: none"> Appropriate Design Criteria Guide <u>Location and Design Manual, Volume 1 - Roadway Design</u> <u>Standard Construction Drawings</u> <u>Plan Insert Sheets</u> (Roadway, Traffic) Curb Ramps Required in Resurfacing Plans (<u>Policy #21-003(P)</u>) Traffic Management in Work Zones (<u>Policy #21-008(P)</u>) (Standard Procedure # 123-001(SP)) Design Value Engineering Standard Procedure (414-001(SP))

Figure 1402-1 Sheet 3 of 5

DESIGN INFORMATION SOURCES	1402-1
	REFERENCE SECTION 1402.1

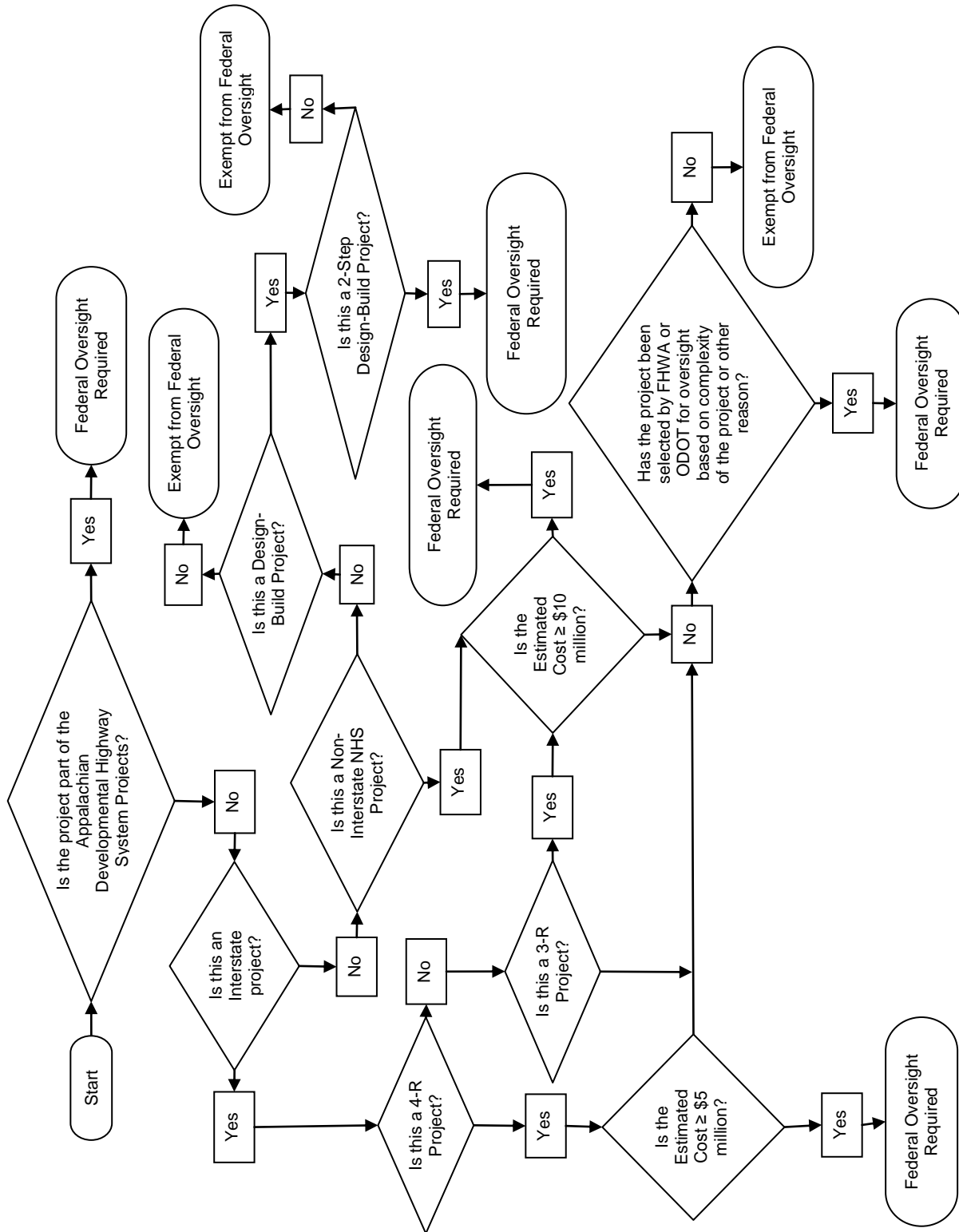
OFFICE/ SPECIALTY AREA	CENTRAL OFFICE DESIGN AREA OF EXPERTISE	DESIGN MANUALS, STANDARD DRAWINGS AND POLICIES
	<ul style="list-style-type: none"> • Signal Warrants • Signing • Studies and Access Management • Traffic Control • Traffic Sign Models (Synchro) • Value Engineering • Work Zones 	<ul style="list-style-type: none"> • Ohio Manual of Uniform Traffic Control Devices (OMUTCD) • Sign Design and Markings Manual (SDMM) • Temporary Traffic Control Manual (TTCM) • Traffic Engineering Manual (TEM)
Statewide Planning & Research	<ul style="list-style-type: none"> • Certified Traffic • Bike & Pedestrian Design • Statewide & regional planning • Modeling & Forecasting (Air Quality, Travel Demand Modeling) • Research • Maritime & Freight program • Metropolitan Planning 	<ul style="list-style-type: none"> • AASHTO Guide for the Development of Bicycle Facilities • Ohio Certified Traffic Manual • Ohio MPO Administration Manual • Ohio Traffic Forecasting Manual • Research, Development & Technology Transfer (RD&T2) Manual of Procedures
Structural Engineering	<ul style="list-style-type: none"> • Bridges (structural design & detailing) • Retaining walls (structural design & detailing) • Mechanically Stabilized Earth (MSE) Retaining Walls • Headwalls 	<ul style="list-style-type: none"> • Bridge Design Manual 2007 • Bridge Design Manual 2004 • Standard Bridge Drawings • Plan Insert Sheets • Bridge Maintenance Manual • Bridge Inspection Manual
Systems Planning and Program Management	<ul style="list-style-type: none"> • Major Programs • Crash Analysis • GIS Analysis 	<ul style="list-style-type: none"> • ODOT Highway Functional Classification System Concepts, Procedures and Instructions • Functional Classification Maps
Technical Services	<ul style="list-style-type: none"> • Transportation Information Mapping System (TIMSO) • Asset Management • Traffic Monitoring • Infrastructure Transportation Management 	<ul style="list-style-type: none"> • County Maps • Digital Photo Log • Traffic Counts (Traffic Survey Reports & Maps) • Straight Line Diagrams
Traffic Operations	<ul style="list-style-type: none"> • Incident Management Programs • Signals • Signing Programs • Intelligent Transportation Systems (ITS) 	<ul style="list-style-type: none"> • Signal Design Reference Packet • Office of Traffic Operations Handbook

DESIGN INFORMATION SOURCES	1402-1
	REFERENCE SECTION 1402.1

NOTES:

- This is not an all-inclusive list of manuals published by each technical office. Only those manuals containing design standards and policies are shown.
- Design manuals, specifications and standard drawings can be found in ODOT's [Design Reference Resource Center](#).
- The **Policies and Procedures** website can be found at the following link:
<http://portal.dot.state.oh.us/Groups/policies/default.aspx>

<h2 style="margin: 0;">FEDERAL OVERSIGHT DETERMINATION PROCESS</h2>	<h3 style="margin: 0;">1402-8</h3>
	<p style="margin: 0;">Reference Section 1402.2</p>

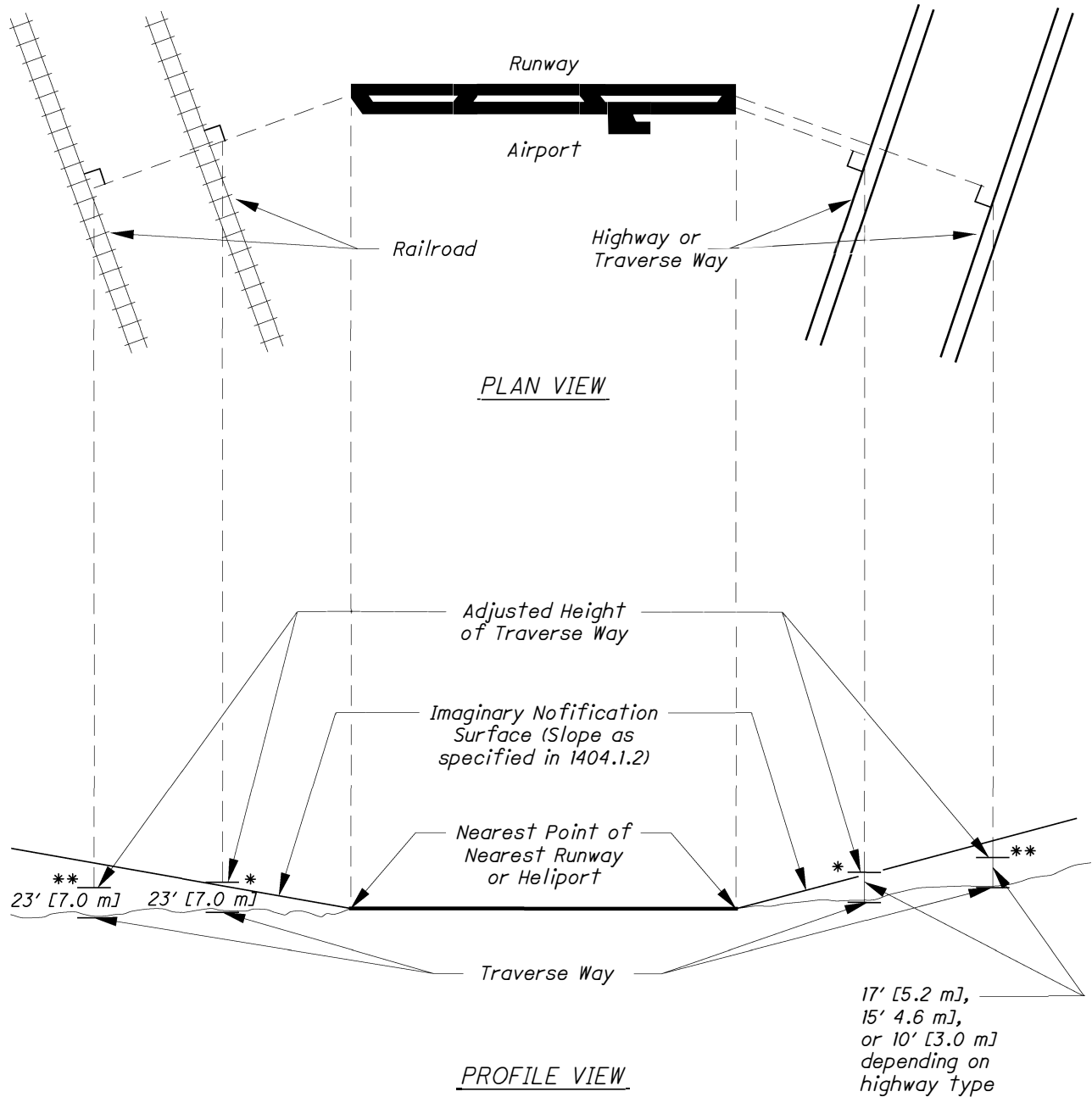


RELATIONSHIP OF TRAVERSE WAYS TO THE IMAGINARY NOTIFICATION SURFACE

1404-1

REFERENCE SECTION

1404.1

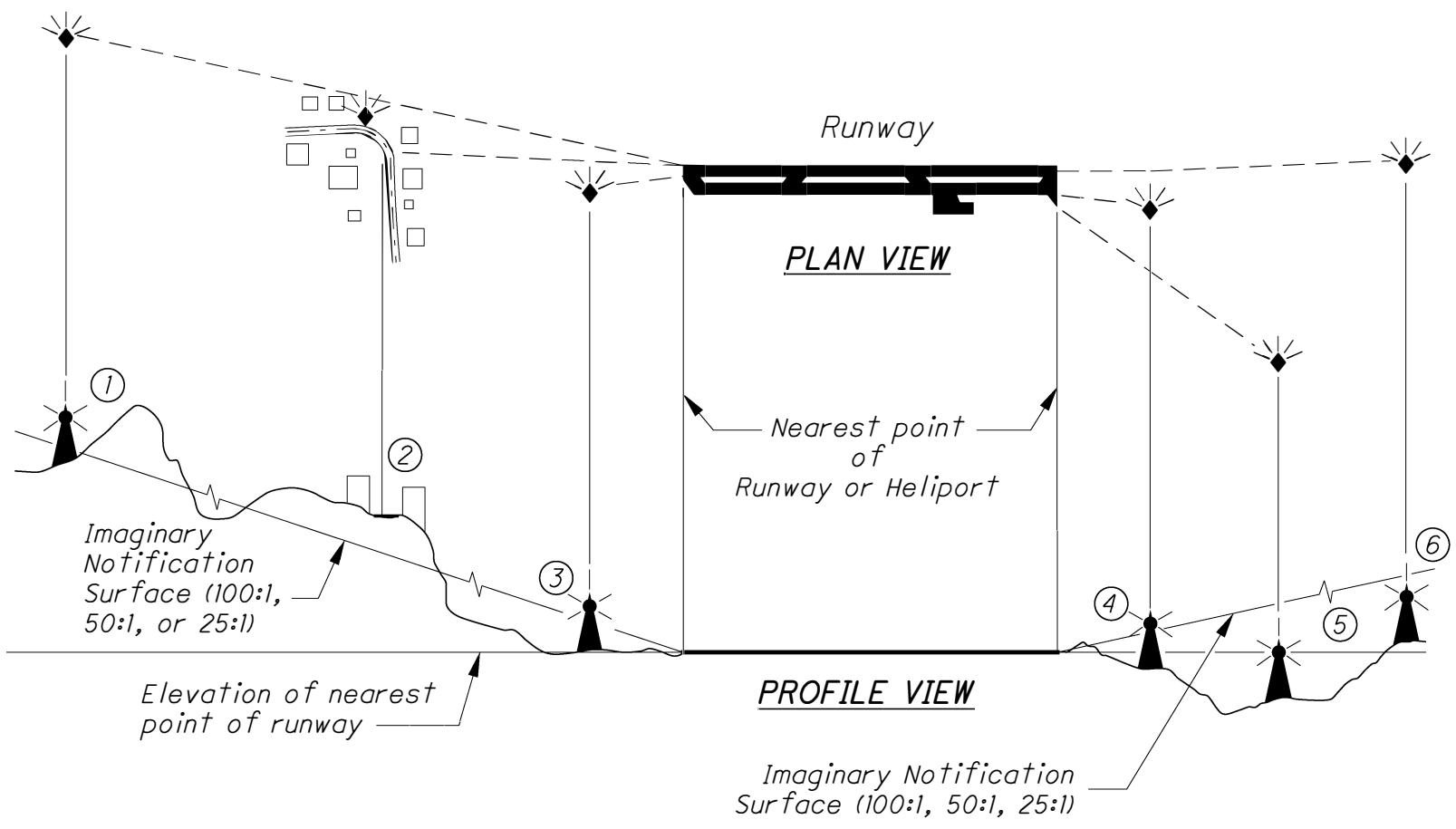


* Notification required
** Notification not required



**EXAMPLES OF FACTORS
AFFECTING THE
IMAGINARY SURFACE**

1404-2
REFERENCE SECTION
1404.1.4

January, 2006



- ① Notification not required - object is shielded by natural topographic features
- ② Notification not required - roadway is shielded by existing structures of permanent and substantial character
- ③ Notification required - penetrates notification surface
- ④ Notification required - penetrates notification surface
- ⑤ Notification not required - below notification surface
- ⑥ Notification not required - below notification surface

 = Project Location
 = Project Location

MAXIMUM OPERATING HEIGHT OF CONSTRUCTION EQUIPMENT	1404-3
	REFERENCE SECTION 1404.1.5

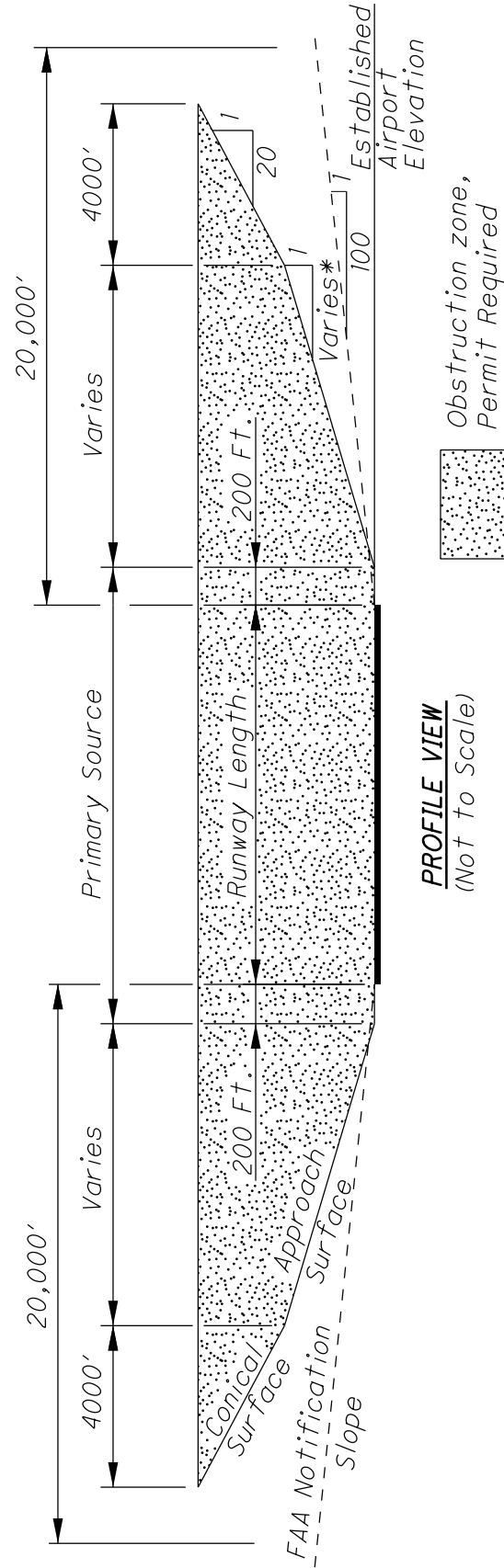
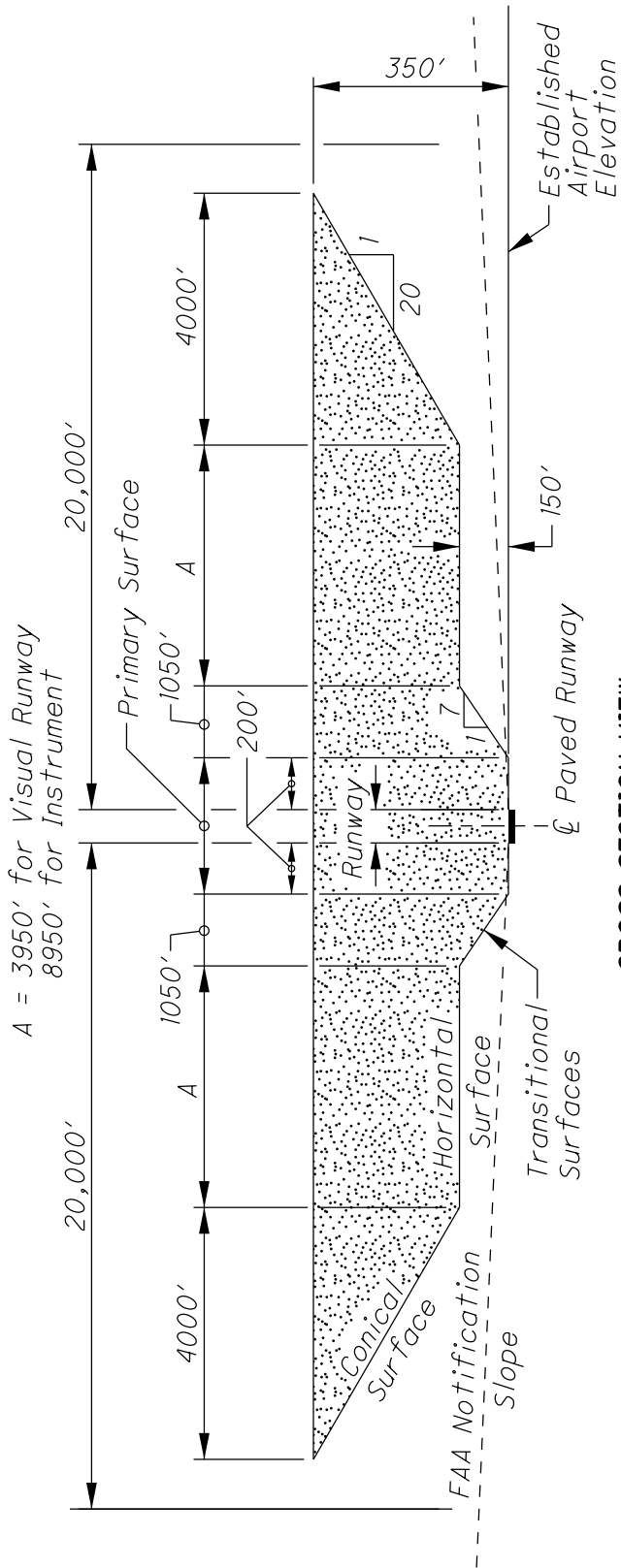
<u>WORK TYPE</u>	<u>HEIGHT</u>	<u>CONTROLLING CRITERIA</u>
Barrier Construction	50 Ft.	Crane
Bikeways	25 Ft,	Truck
Bridge Painting	Bridge Height + 10 Ft.	Containment Structure
Culverts	50 Ft.	Crane
Deck Overlays	25 Ft.	Truck
Earthwork	25 Ft.	Truck
Guardrail	25 Ft.	Auger
Highway Lighting	Pole Height	Pole Height
House Demolition	25 Ft.	Excavator
Large Bridges	100 Ft.	Crane
Mowing/Landscaping	10 Ft.	Mower
Noise Walls	25 Ft.	Crane
Pavement Marking	12 Ft.	Truck
Pavement Repair	25 Ft.	Raised Dump Truck
Pile Driving	50 Ft.	Crane
Resurfacing	25 Ft.	Raised Dump Truck
Rest Areas	50 Ft.	Crane
Slope Repair	25 Ft.	Excavator/Grader
Small Bridges	60 ft.	Crane
Traffic Signals	50 Ft.	Cherry Picker
Trash Collection	25 Ft.	Truck

The heights given are an average height for the specific types of projects. These heights should be adjusted, as necessary, for any project.

CROSS-SECTIONAL AND PROFILE VIEWS OF IMAGINARY SURFACES

1404-4

REFERENCE SECTION
1404.1.6



--- NOTIFICATION SLOPES
—— OBSTRUCTION SLOPE

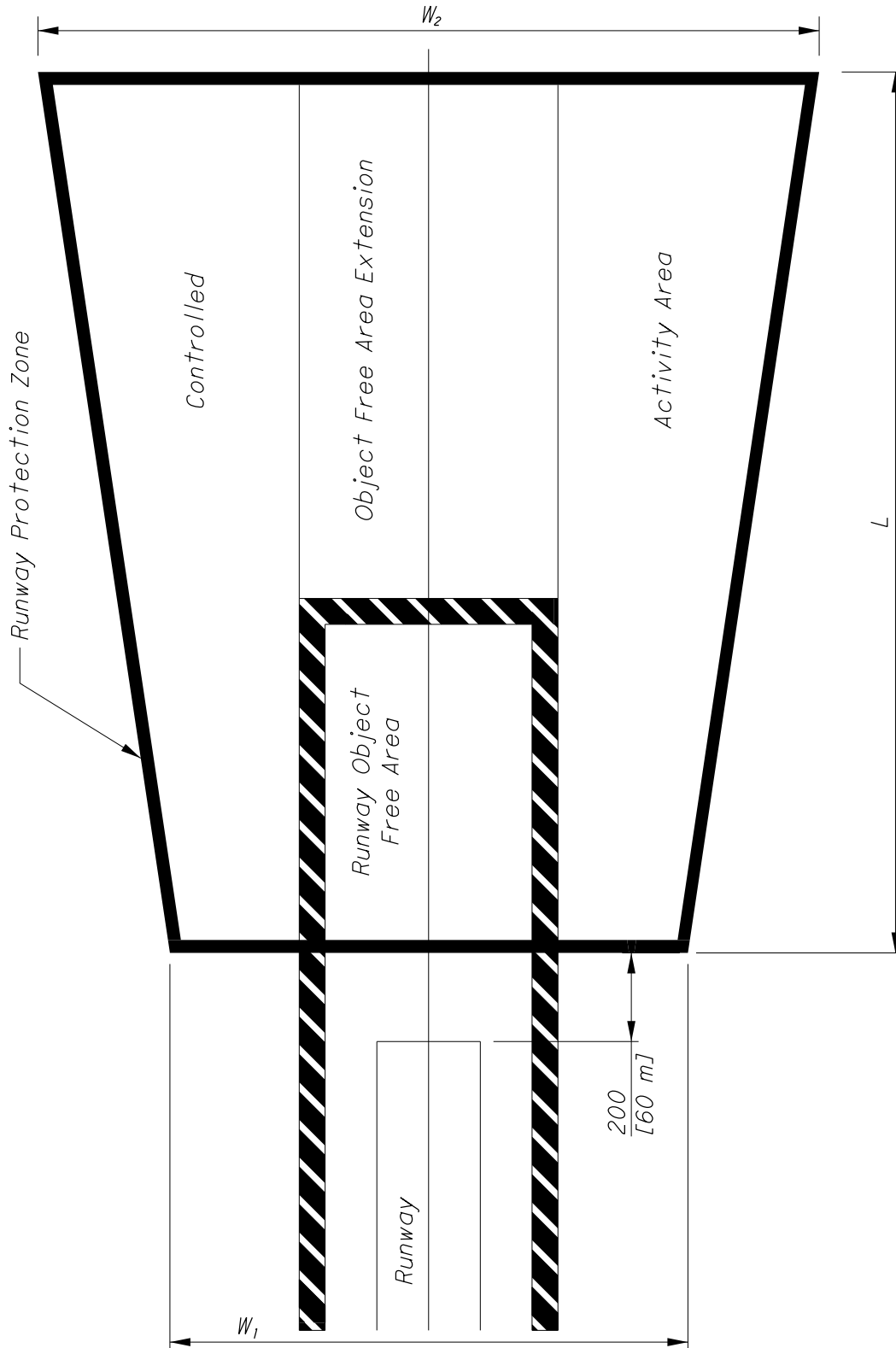
* Contact the Office of Aviation for information regarding approach surface

RUNWAY PROTECTION ZONE

1404-5

REFERENCE SECTION

1404.1



For Dimensions L , W_1 , and W_2 see Figure 1404-6.

DIMENSIONS FOR RUNWAY PROTECTION ZONE	1404-6
	REFERENCE SECTION 1404.1

FACILITIES EXPECTED TO SERVE	RUNWAY END		DIMENSIONS FOR APPROACH END		
	APPROACH END	OPPOSITE END	LENGTH L	INNER WIDTH W ₁	OUTER WIDTH W ₂
			Ft.	Ft.	Ft.
ONLY SMALL AIRPLANES	V	V	1000	250	450
		NP	1000	500	600
		NP ³ / ₄ P	1000	1000	1050
	NP	V NP	1000	500	800
		NP ³ / ₄ P	1000	1000	1200
LARGE AIRPLANES	V	V NP	1000	500	700
		NP ³ / ₄ P	1000	1000	1100
	NP	V NP	1700	500	1010
		NP ³ / ₄ P	1700	1000	1425
ALL	NP ³ / ₄	V NP NP ³ / ₄ P	1700	1000	1510
	P	V NP NP ³ / ₄ P	2500	1000	1750

- V** = Visual approach
NP = Nonprecision instrument approach with visibility minimums not more than ³/₄ statute mile
NP ³/₄ = Nonprecision instrument approach with visibility minimums as low as ³/₄ statute mile
P = Precision instrument approach

For locations of L, W₁, and W₂ see Figure 1404-5.

SAMPLE LETTER OF AIRWAY/HIGHWAY CLEARANCE ANALYSIS	1404-7
	REFERENCE SECTION 1404.1.7

District Production Administrator
Title
ODOT-District Office
Address
City, State & Zip

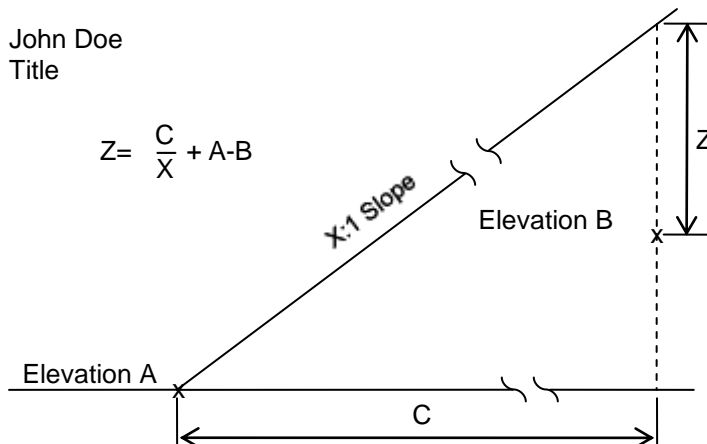
Re: Airway/Highway Clearance Analysis
County-Route-Section
PID:

Dear Mr. /Ms. :

We have reviewed the above mentioned project and have determined that the project (will/will not) not encroach into the (X:1) notification surface. This determination is based on an airport elevation of (A) feet, a project elevation of (B) feet, with a distance of (C) feet between the airport and the project locations. The attached diagram will provide a detailed analysis of the study. The study has also determined that a height of (Z) feet exists between the (X:1) notification surface and the project. Therefore, based on this height and the heights from Figure 1404-3, plan note [G119A: Use note G119A when the construction equipment penetrates the notification surface of a public use airport or heliport; G119B: Use note G119B when the construction equipment does not penetrate the notification surface of a public airport or heliport; or G119C: Use note G119C when the construction equipment penetrates the notification surface of a private use airport.] (will/will not) be required.

Respectfully,

John Doe
Title



$$Z = \frac{C}{X} + A - B$$

- X:1 – Notification Slope [See Section 1404.1.2 to determine Notification Slope]
A – Airport Elevation
B – Project Elevation
C – Distance between Project and Airport
Z – A positive value of Z is the amount of clearance.
A negative value of Z will require notification.

[The Z value should be calculated at critical points for projects of considerable length and variable heights (i.e. closest point, highest point, etc.).]

[Positive Z values are inserted into Plan Note G119B or G119C, unless the heights from Figure 1404-3 exceed the Z value calculated.]

Section 1500
Plan Related Actions

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- 1503 CADD File Requirements for Design and Construction..... 2**
 - 1503.1 CADD Software Requirements 2
 - 1503.2 CADD File Requirements 2
 - 1503.2.1 Typical Requirements for Projects Following Path 1 of the Project Development Process (PDP) 3
 - 1503.2.2 Typical Requirements for Projects Following Paths 2, 3, 4, and 5 of the Project Development Process (PDP) 3
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Section 1500

Plan Related Actions

1501 Introduction

There are several actions that are required to complete the processing of a highway construction plan. Section 1500 includes a discussion of these related actions.

1502 Documentation of Environmental Commitments

Environmental commitments are any agreed upon actions to mitigate (i.e., restore, enhance, avoid, minimize, and/or replace) impacts to the human environment. ODOT must document environmental comments to ensure follow-through of commitments made to stakeholders. Environmental Commitments are the link between the Environmental (EE) phase of the project and the Final Engineering/Right-of-way (FE/RW) and Construction (CO) phases of the **Project Development Process (PDP)**, and become part of the environmental document.

To ensure environmental commitments are carried out appropriately, an Environmental Consultation Form (ECF) is to be completed, signed by the District Environmental Coordinator, and submitted with the Plan Package to ODOT's **Office of Contracts**. The District Environmental Coordinator will communicate all applicable environmental commitments to designers. Environmental commitments must be incorporated into a plan's design and/or plan notes so that they can be implemented during construction.

For more information, contact the **Office of Environmental Services** or see the **Office of Environmental Services' Environmental Commitments Guidance**.

1503 CADD File Requirements for Design and Construction

1503.1 CADD Software Requirements

All projects requiring submittal of CADD files shall be developed using **Bentley** or Autodesk **products**, in accordance with the **CADD Engineering Standards Manual, the Guidelines for Electronic Design Deliverables**, and the project's scope of services. Although ODOT will accept CADD files developed using Autodesk software, no support, standards, documentation, or guidance of any kind with respect to design and delivery using Autodesk tools will be provided. For more information, see the ODOT CADD Engineering Standards Manual, Section 101.

1503.2 CADD File Requirements

Unlike electronic image files (i.e. PDF images) that are part of the contract documents, CADD files (i.e., basemap files) provided to contractors are for reference purposes only. In the event that there is a conflict between the CADD files and the bidding documents, the bidding documents shall take precedence.

CADD files, and a Project Index File, shall be provided in accordance with the requirements for Electronic Submittals described in the **ODOT Guidelines for Electronic Design Deliverables**, located on the **Office of CADD and Mapping Services** website, and included in the **Final Plan Package submittal**.

Section 1500 Plan Related Actions

1503.2.1 Typical Requirements for Projects Following Path 1 of the Project Development Process (PDP)

For projects scoped to Path 1 of the PDP, the following files are typically required for reference purposes only:

- Existing Plans (Roadway and Bridge)
- Designer Office Calculations (such as Pavement, Earthwork, and Structure Quantities)

Most Path 1 projects are simple transportation improvements **generated by traditional maintenance and preventative maintenance. They may involve structure or roadway resurfacing and have no right-of-way or utility impacts.** However, there are some projects which require more detail in their design than a “typical” Path 1 project but still meet the criteria of a Path 1 project. For these projects, electronic design files (i.e., .gpk, triangle model, ASCII text files, etc.), if generated, shall be submitted with the project’s Plan Package. For example, on projects requiring a Project Site Plan, electronic design files generated during the project’s design are required in the final plan submission. These files will be made available to contractors during ODOT’s construction contract bidding process.

Information to be made available to bidders should be determined, and documented, in the project’s Scope of Services document.

For more detailed information on electronic files required to be submitted with the Final Plan Submission, see the ODOT Guidelines for Electronic Design Deliverables.

1503.2.2 Typical Requirements for Projects Following Paths 2, 3, 4, and 5 of the Project Development Process (PDP)

The PDP provides Project Managers with the flexibility to tailor the requirements of a project to meet its individual needs. Therefore, the requirements for each project are based upon the path it is following. Electronic Files (i.e., CADD files, alignment files, basemap files, etc.) shall be in accordance with the requirements for electronic submittals described in the ODOT Guidelines for Electronic Design Deliverables. Contact the Office of CADD and Mapping Services, CADD Services section with questions.

Although not all-inclusive, following is a listing of files which, if available, shall be made available to bidders:

- Plan and Profile Sheets
- Cross Section Sheets and cells
- Intersection/Interchange Details
- Project Site Plan
- Reference basemap files

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Plan Related Actions

- Excel files containing the project's General Summary (ODOT Guidelines for Electronic Design Deliverables)
- GEOPAK (.gpk) file
- Existing Ground Triangle Model (.tin file)
- ASCII text file(s) listing:
 - Chain data for existing and proposed horizontal alignments; including the centerline of construction, centerline of right-of-way, and ramp baselines
 - Vertical alignment data for existing and proposed profiles
 - Northing, easting, station, offset and elevation, for all monuments to be used during construction

The ODOT Guidelines for Electronic Design Deliverables, provides specific requirements for the content of the required ASCII reports and provides directions on how to create them using GEOPAK software.

- LandXML files for:
 - The existing ground triangle model (.tin file)
 - All existing and proposed horizontal alignments and vertical profiles

The ODOT Guidelines for Electronic Design Deliverables, provides direction on how to create these reports directly from GEOPAK software.

- Files for reference purposes only:
 - Existing Plans (Roadway and Bridge)
 - Designer Office Calculations (such as Pavement, Earthwork, and Structure Quantities)

Other files may be required at the District's discretion, but this should be documented in the project's scope.

- **Proposed Digital Terrain Models (DTM):**
All proposed surfaces, if created, shall be submitted in LandXML format. The native format used to generate the surfaces is also required. For projects using Bentley GEOPAK and which cannot create LandXML for proposed conditions, a ".GEN" file shall be submitted. This file shall be submitted with the project's Final Plan Package.

Chapter 4.3 of the ODOT Guidelines for Electronic Design Deliverables provides specific guidance on how to **generate a .GEN** file.

The District Planning and Engineering Administrator may elect to waive all, or a portion, of the CADD file requirements (except for the submittal of existing plans and designer office calculations) for projects that have less than 1.0 (one) acre of earth disturbed area. Waiver of these requirements shall be noted in the Scope of Services document.

Since each project is unique, Information to be made available to bidders should be determined, and documented, in the project's Scope of Services document.

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Plan Related Actions

1503.3 Submission of Files to the District

CADD and electronic image files shall be supplied to ODOT via CD, DVD, or other media as approved by the District, pursuant to the project Scope of Services document.

For detailed information on the electronic files required to be submitted to ODOT, see the [ODOT Guidelines for Electronic Design Deliverables](#).

1503.4 Submission of Files to Central Office

The plan package for a project is to be submitted in accordance with the schedule prepared by Central Office and the Districts. The plan package must include documentation confirming that the project is eligible and ready to be advertised for bids.

Submission of the Final Plan Package is part of the **Final Engineering /Right-of-Way (FE/RW) Phase of ODOT's Project Development Process (PDP)**. Project Managers are required to create and submit the final plan package documentation in electronic format as a single PDF. To reduce the size of PDF files, vectorized elements are preferred to raster PDF, with the exception of the Title Sheet. The Title Sheet is the only document which can be a raster PDF. The District shall review the electronic documents for completeness to ensure that all required files are transmitted to Central Office.

A project's CADD files, if created, are required to be submitted with the Final Plan Package. ODOT provides CADD files to contractors for reference purposes only. For more details on the electronic files required to be submitted to ODOT, see the [ODOT Guidelines for Electronic Design Deliverables](#).

All ODOT-let projects shall be submitted to Project Coordination via the ODOT Plan Package Submittal internal SharePoint site located here:

<http://portal.dot.state.oh.us/Divisions/Planning/estimating/PlanSubmittal/default.aspx>

1504 Submission of Completed Plans to District

1504.1 General

When a design agency other than ODOT prepares the construction plans, the final plan shall be submitted to the District Office. The final plan submittal shall include information described in the sections which follow.

1504.1.1 Projects Administered by ODOT

Pursuant to the requirements of the project's Scope of Services document, below are items and information the final plan submission should contain:

Section 1500

Plan Related Actions

- Completed Right-of-Way plans and final construction plans, including soil profile or foundation exploration sheets in an electronic image file format (i.e. PDF images). Electronic image files **shall** be provided in accordance with the requirements of the [ODOT Guidelines for Electronic Design Deliverables](#), and the [PDF Submission Procedure](#) available on the [Office of Contracts](#) website.
- Completed Standard Forms:
 - [Estimated Quantiles Form](#) - Formerly the LD-4 form, this electronic form is a summation of a project's specific quantities, and cost information, used in developing the official Engineer's Estimate. This form shall be submitted to ODOT Districts as part of the Plan Package Submittal process. See [Appendix D](#) of the [Location and Design Manual, Volume 3](#) for a PDF copy of this form.

ODOT Districts shall transfer estimated quantity information electronically via the [ODOT Plan Package Submittal SharePoint](#) website.
 - LD-33 County Engineer Approval Form (including signature) - This form is required per Ohio Revised Code 6131.631. See [Location and Design Manual, Volume Two](#) for a copy of this form.
- Marked review plans (if retained by the design agency) and the disposition of all review comments
- Excel file containing project's General Summary (**CTY-PID-GENSUM.xlsm**)
- Quantity calculations not typically included in the plans (i.e. structure calculations and pavement calculations)
- Cost estimates for items and/or services, or other special items furnished by the local government
- Documents/Records (i.e., photography, survey data, reports, studies, drawings, maps, computations, plans, specifications, estimates)
- Electronic Files (i.e., CADD files, alignment files, basemap files, etc.) in accordance with the requirements for electronic submittals described in the [ODOT Guidelines for Electronic Design Deliverables](#). The electronic image file requirement applies to all ODOT-Let projects. However, Local-Let projects may elect to waive the electronic image file requirement with specific submittal guidance provided in the project Scope of Services document.

1504.1.2 Projects Administered through the Local Public Agency (LPA) Policy

ODOT may qualify a LPA to administer its own project, with the exception of those projects that are part of the National Highway System (NHS). ODOT shall retain all administration and management duties for the delivery of these projects. Any exception to this rule requires written approval from ODOT's Division of Planning, **Office of Local Programs**.

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Plan Related Actions

The LPA Manager for the ODOT District office whose jurisdiction includes the LPA's project, shall be the Department's point of contact to the LPA. The LPA Manager will routinely provide guidance and coordination throughout the project's entire development process, including actively tracking and facilitating project progress to the extent practicable. Other District personnel, including but not limited to the District Real Estate Administrator (REA) and the District Environmental Coordinator (DEC) or their designees, will also provide guidance as necessary.

Local-let LPA projects shall include the applicable information required by the Scope of Services document, and be in accordance with the [Locally Administered Transportation Projects Manual of Procedures](#). Project submittal checklists for Local-Let LPA projects are available on the [Office of Local Programs](#)' website.

1505 Review of Completed Plans

1505.1 Plan Checking

The District office shall determine the review process to be followed and shall assume responsibility for determining when a plan is complete and ready for sale. It is the Project Manager's responsibility to ensure that:

- plans are thoroughly checked,
- all of the proper reviews have been performed,
- all review comments have been resolved and documented,
- plans are in compliance with the Scope of Services document and the ODOT [Guidelines for Electronic Design Deliverables](#).

1505.1.1 Projects Administered by ODOT

Plans should be thoroughly checked by District and/or Central Office personnel to ensure the following:

- the proposed design is in compliance with the Scope of Services document, current specifications, design standards, policies, procedures, environmental commitments, and mitigation plans.
- accurate depiction of topographic and construction features
- plans contain all details, and quantities, required to bid and construct the proposed project
- existing topographic features are adequately and properly designated on the plans
- right-of-way certification is complete, including coordination of encroachment removals and utility relocations
- **electronic files are included as per the [ODOT Guidelines for Electronic Design Deliverables](#)**
- Geotechnical final plan review certification is complete.

Section 1500

Plan Related Actions

The District Office shall determine the review process to be followed and shall assume responsibility for determining when the plan is complete and ready for sale.

1505.1.2 Projects Administered through the Local Public Agency (LPA) Policy

ODOT may qualify a LPA to administer its own project, with the exception of those which are part of the National Highway System (NHS). ODOT shall retain all administration and management duties for the delivery of these projects. Any exception to this rule requires written approval from ODOT's Division of Planning, Office of Local Programs.

The LPA Manager for the ODOT District office whose jurisdiction includes the LPA's project, shall be the Department's point of contact to provide guidance and coordination to the LPA throughout the project's entire development. Other District personnel including, but not limited to, the District Real Estate Administrator (REA) and the District Environmental Coordinator (DEC) or their designees will also provide guidance as necessary.

Local-let projects must be reviewed at least on a quarterly basis. At any time, the LPA Manager can request additional reviews or special meetings to ensure the project is consistent with the established schedule and environmental commitments are being addressed.

Plans shall be checked to ensure compliance with the project's Scope of Services document, and that they are in accordance with the [Locally Administered Transportation Projects Manual of Procedures](#) located on the [Office of Local Programs](#) website.

1505.2 Field Verification

District representatives should conduct a field verification to ensure that conditions have not materially changed before filing the plans with Central Office.

1506 Submission of Completed Plans to Central Office

1506.1 General

After the District Office completes its review of the construction plans, and any supplemental information, the project's **Plan Package** shall be prepared. Information regarding the **Plan Package**, its contents, and submission procedure, can be found in the [Electronic Plan Package Submittal Help Guide](#) document on the [ODOT Plan Package Submittal](#) SharePoint site. Contact the [Office of Estimating](#) with questions.

1506.1.1 Projects Administered by ODOT

Once plans are ready to be advertised for bid, the project must follow ODOT's electronic plan submittal process which requires all ODOT Districts to submit a plan package. The project's plan package, used by both the **Office of Estimating** and the **Office of Contracts**, contains all relevant files and documentation confirming that the project is eligible and ready to be advertised for bids. The plan package for a project is to be submitted in accordance with the schedule prepared by Central Office and Districts.

Section 1500 Plan Related Actions

Submission of the **Final Plan Package** is part of the **Final Engineering /ROW (FE) Phase** of ODOT's **Project Development Process (PDP)**. Project Managers are required to create and submit the plan package documentation in electronic format as a single PDF. **To efficiently use PDF plan sets in construction, all pages of the PDF, with the exception of the Title Sheet, shall be in vector format. PDF files shall not be rasterized.** The District shall review the electronic documents for completeness to ensure that all required files are transmitted to Central Office.

A project's CADD files, if created, are required to be submitted with the Final Plan Package. ODOT provides CADD files to contractors for reference purposes only. For more information on the electronic files which are required to be submitted with the Final Plan Package, see the **ODOT Guidelines for Electronic Design Deliverables** located on the **CADD Services** website.

All ODOT-let projects shall be submitted to **Project Coordination** via the ODOT Plan Package Submittal Internal SharePoint site located here:

<http://portal.dot.state.oh.us/Divisions/Planning/estimating/PlanSubmittal/default.aspx>

1506.1.2 Projects Administered through the Local Public Agency Policy

ODOT may qualify a LPA to administer its own project, with the exception of those which are part of the National Highway System (NHS). ODOT shall retain all administration and management duties for the delivery of these projects. Any exception to this rule requires written approval from ODOT's Division of Planning, **Office of Local Programs**.

The **Locally Administered Transportation Projects Manual of Procedures** can be found on the **Office of Local Programs** website. It provides information on the requirements and procedures for projects administered through Local Public Agencies (LPA's).

1507 Record of Plans

After the project has been awarded, the District Office shall provide permanent storage in accordance with **the Department's** records retention policy and shall make arrangements to return completed plans for off-system projects to the originating agency.

Appendix B

Sample Plan Notes

The Sample Plan notes included in this Appendix are those most frequently used. Each note is accompanied by a “Designer Note” in an attempt to provide guidance on how to apply the note (i.e., when the note should be used, how to estimate quantities for some of the items where the methods for quantity calculations are not obvious).

The following note categories are included:

CATEGORY	LETTER PREFIX	SHEET NUMBER
General Notes	G	B1-B14
Pavement Notes	P	B15-B20
Environmental Notes	V	B21-B26

Additional notes may be found in the following manuals:

[Traffic Engineering Manual](#)
[Bridge Design Manual](#)
[Location and Design Manual, Volume 1](#)
[Location and Design Manual, Volume 2](#)

None of these notes should be used unless the situation is known, or is considered likely, to occur on the project involved. All sub-paragraphs and parenthetical phrases that do not apply to the project involved shall be excluded. If quantities are provided in the notes, participation splits shall be shown when required.

Appendix B

Sample Plan Notes

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GENERAL

<u>NUMBER</u>	<u>NAME</u>
<u>G101</u>	<u>ROUNDING</u>
<u>G102</u>	<u>UTILITIES</u>
<u>G103</u>	<u>EXISTING PLANS</u>
<u>G104</u>	<u>CONSTRUCTION NOISE</u>
<u>G105</u>	<u>SURVEYING PARAMETERS</u>
<u>G106</u>	<u>WORK LIMITS</u>
<u>G107</u>	<u>PROTECTION OF RIGHT-OF-WAY LANDSCAPING</u>
<u>G108</u>	<u>CLEARING AND GRUBBING</u>
<u>G109</u>	<u>BENCHING OF FOUNDATION SLOPES</u>
<u>G110</u>	<u>MONUMENT ASSEMBLIES</u>
<u>G111</u>	<u>ITEM 204 - PROOF ROLLING</u>
<u>G112</u>	<u>ITEM 601 - DUMPED ROCK FILL, TYPE _____, AS PER PLAN /</u> <u>ITEM 203 - GRANULAR MATERIAL, TYPE _____, AS PER PLAN</u>
<u>G113</u>	<u>ITEM 203 - EMBANKMENT USING NO. 8 AGGREGATE</u>
<u>G114</u>	<u>ADDITIONAL SOIL INFORMATION</u>
<u>G115</u>	<u>CHANNEL EMBANKMENTS</u>
<u>G116</u>	<u>BORROW MATERIAL</u>
<u>G117</u>	<u>ITEM 607 - FENCE REBUILT, TYPE _____</u>
<u>G118</u>	<u>AIRWAY/HIGHWAY CLEARANCE FOR AIRPORTS AND HELIPORTS</u>
<u>G119</u>	<u>FENCE LENGTHS</u>
<u>G120</u>	<u>ITEM SPECIAL - SOIL STERILANT</u>
<u>G121</u>	<u>ITEM 204 - SUBGRADE COMPACTION AND PROOF ROLLING</u>
<u>G122</u>	<u>NATIONAL GEODETIC SURVEY (NGS) BENCHMARKS</u>

Appendix B

Sample Plan Notes

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G101 - ROUNDING

THE ROUNDING AT SLOPE BREAKPOINTS SHOWN ON THE TYPICAL SECTIONS APPLIES TO ALL CROSS-SECTIONS, EVEN THOUGH OTHERWISE SHOWN.

Designer Note: When appropriate, the Typical Sections should show rounding at the slope breakpoints in accordance with the [Location and Design Manual, Volume 1](#). Since rounding is not shown on the cross-sections, the above plan note should be used on all plans where rounding is called for on the Typical Sections.

G102 - UTILITIES

Designer Note: Note G102A is used on all plans where utilities presently exist within the construction limits of the project. The second paragraph (G102A1, A2, or A3) is in reference to the location of existing underground utilities. The specific paragraph shall be determined as follows:

Note G102A1 is used when all known underground utilities are shown in the plan.

Note G102A2 is used when the existing underground utilities will not be adversely affected because of the nature of the proposed work (no excavation, other ground penetration, etc.).

Note G102A3 is used only if there are no existing underground utilities within the construction limits.

Note G102B is used only if no underground, or overhead, utilities exist within the construction limits.

G102A

LISTED BELOW ARE ALL UTILITIES LOCATED WITHIN THE PROJECT CONSTRUCTION LIMITS TOGETHER WITH THEIR RESPECTIVE OWNERS:

(List all sanitary, telephone, electric,
gas, water, cable TV, etc.)

(Name of Owner, Street or P.O. Box,
City, State, Zip Code, and Emergency
Telephone Number.)

G102A1

THE LOCATION OF THE UNDERGROUND UTILITIES SHOWN ON THE PLANS ARE AS OBTAINED FROM THE OWNERS AS REQUIRED BY SECTION 153.64 O.R.C.

G102A2

THERE ARE NO UNDERGROUND UTILITIES SHOWN ON THIS PLAN. THE NATURE OF THE WORK REQUIRED BY THIS PROJECT WILL NOT AFFECT ANY KNOWN UNDERGROUND UTILITIES THAT EXIST UNDER, OR ADJACENT TO, THE WORK AREA.

G102A3

THERE ARE NO KNOWN UNDERGROUND UTILITIES ON THIS PROJECT.

G102B

THERE ARE NO KNOWN UNDERGROUND, OR OVERHEAD UTILITIES, WITHIN THE PROJECT CONSTRUCTION LIMITS.

Appendix B

Sample Plan Notes

G103 - EXISTING PLANS

EXISTING PLANS ENTITLED _____ MAY BE INSPECTED IN THE ODOT DISTRICT ____ OFFICE IN _____.

Designer Note: Use this note when existing plans are available.

G104 - CONSTRUCTION NOISE

ACTIVITIES AND LAND USE ADJACENT TO THIS PROJECT MAY BE AFFECTED BY CONSTRUCTION NOISE. IN ORDER TO MINIMIZE ANY ADVERSE CONSTRUCTION NOISE IMPACTS, DO NOT OPERATE POWER-OPERATED CONSTRUCTION-TYPE DEVICES BETWEEN THE HOURS OF _____ AND _____. IN ADDITION, DO NOT OPERATE AT ANY TIME ANY DEVICE IN SUCH A MANNER THAT THE NOISE CREATED SUBSTANTIALLY EXCEEDS THE NOISE CUSTOMARILY AND NECESSARILY ATTENDANT TO THE REASONABLE AND EFFICIENT PERFORMANCE OF SUCH EQUIPMENT.

Designer Note: The above note should be used when work is to be accomplished in noise-sensitive areas. Times are usually normal sleeping hours, however, other time periods may be used depending upon the area.

G105 - SURVEYING PARAMETERS

Designer Note:

Use note G105, unless otherwise directed by the District Survey Operations Manager. Projects should have utilized the Department's Survey and Mapping Specifications which can be found on the Office of CADD and Mapping Services' website. Specify primary project control parameters and provide a table in the plans with the following information for primary project control monuments, including azimuth marks and temporary benchmarks: Point Number, Grid Coordinates (Northing, Easting), Scaled Coordinates (Northing, Easting), Elevation, and Description of Monument. At a minimum, the Description of Monument in the table shall indicate the type of monument (i.e. iron pin, concrete monument, etc.) and whether the monument is for project control or traverse purposes. If a Monument, Type B, is used for project control, do not provide an elevation in the Elevation column of the table. Use of a Monument, Type B, establishes horizontal control only. A separate vertical benchmark (i.e. aluminum disc on bridge abutment) will need to be included in the table. Project control is typically established prior to construction. If the designer determines that the location of the monuments associated with project control may be disturbed by the Contractor's construction activities, provide quantities for resetting the monuments in the plans according to the Construction and Material Specifications (C&MS), Item 623, Construction Layout Stakes and Survey Monuments. Standard Construction Drawing RM-1.1 and the Department's Survey and Mapping Specifications provide further information regarding project control.

G105

PRIMARY PROJECT CONTROL MONUMENTS GOVERN ALL POSITIONING ON ODOT PROJECTS. SEE SHEET ____ OF THE PLANS FOR A TABLE CONTAINING PROJECT CONTROL INFORMATION.

USE THE FOLLOWING PROJECT CONTROL, VERTICAL POSITIONING, AND HORIZONTAL POSITIONING PARAMETERS FOR ALL SURVEYING:

PROJECT CONTROL

POSITIONING METHOD: _____

MONUMENT TYPE: _____

VERTICAL POSITIONING

ORTHOMETRIC HEIGHT DATUM: _____
GEOID: _____

HORIZONTAL POSITIONING

REFERENCE FRAME: _____
ELLIPSOID: _____
MAP PROJECTION: _____
COORDINATE SYSTEM: _____
COMBINED SCALE FACTOR: _____
ORIGIN OF COORDINATE
SYSTEM: _____

USE THE POSITIONING METHODS AND MONUMENT TYPE USED IN THE ORIGINAL SURVEY TO RESTORE ALL MONUMENTS RELATED TO PRIMARY PROJECT CONTROL THAT ARE DAMAGED OR DESTROYED BY CONSTRUCTION ACTIVITIES. RESTORE THE DAMAGED OR DESTROYED MONUMENTS IN ACCORDANCE WITH CMS 623.

UNITS ARE IN U.S. SURVEY FEET.

G106 - WORK LIMITS

THE WORK LIMITS SHOWN ON THESE PLANS ARE FOR PHYSICAL CONSTRUCTION ONLY. PROVIDE THE INSTALLATION AND OPERATION OF ALL WORK ZONE TRAFFIC CONTROL AND WORK ZONE TRAFFIC CONTROL DEVICES REQUIRED BY THESE PLANS WHETHER INSIDE OR OUTSIDE THESE WORK LIMITS.

Designer Note: Use the above note on projects where temporary traffic control devices are located outside normal work limits.

G107 - PROTECTION OF RIGHT-OF-WAY LANDSCAPING

PRIOR TO BEGINNING WORK, THE CONTRACTOR, THE PROJECT ENGINEER, AND A REPRESENTATIVE OF THE MAINTAINING AGENCY WILL REVIEW AND RECORD ALL LANDSCAPING ITEMS WITHIN THE RIGHT-OF-WAY (BOTH WITHIN AND OUTSIDE THE CONSTRUCTION LIMITS). A RECORD OF THIS REVIEW WILL BE KEPT IN THE PROJECT ENGINEER'S FILES. PRIOR TO FINAL ACCEPTANCE, A FINAL REVIEW OF LANDSCAPING ITEMS WILL BE MADE.

CONSTRICT ALL ACTIVITIES, EQUIPMENT STORAGE, AND STAGING TO WITHIN THE CONSTRUCTION LIMITS. UNLESS OTHERWISE IDENTIFIED IN THE PLANS OR PROPOSAL, THE CONSTRUCTION LIMITS ARE IDENTIFIED AS 30 FEET FROM THE EDGE OF PAVEMENT.

SUBMIT A WRITTEN REQUEST TO THE PROJECT ENGINEER TO USE ANY AREA OUTSIDE THESE LIMITS. THE DOCUMENT SUBMITTED MUST CLEARLY IDENTIFY THE AREA AND EXPLAIN THE PROPOSED USE AND RESTORATION OF THE AREA. EXCEPT AS INDICATED ON SHEET _____, USE OF THESE AREAS FOR DISPOSAL OF WASTE MATERIAL AND CONSTRUCTION DEBRIS, EXCAVATION OF BORROW MATERIAL AND PLACEMENT OF PORTABLE PLANTS IS PROHIBITED. THE REQUEST MUST BE APPROVED, IN WRITING, BEFORE THE CONTRACTOR HAS PERMISSION TO USE THE AREA.

ANY ITEMS DAMAGED BEYOND THE CONSTRUCTION LIMITS, AS DEFINED ABOVE, WILL BE REPLACED IN KIND OR AS APPROVED BY THE PROJECT ENGINEER.

Appendix B

Sample Plan Notes

Designer Note: This note should be used on all interstate projects. On non-interstate projects, the District will decide if this note should be included in the plan. Edit note to provide locations where disposal of waste material and construction debris, excavation of borrow material and placement of portable plants is permitted.

G108 - CLEARING AND GRUBBING

Designer Notes: Note G108A should be used when Item 201, Clearing and Grubbing is in the plan and no trees or stumps have been specifically marked for removal.

Note G108B should be used when Item 201, Clearing and Grubbing, is in the plan and individual trees and stumps to be removed are clearly shown on the plan. If there are no trees or stumps to be removed greater than 12 inches in diameter, use note G108A. See Section 201.05 of the [Construction and Material Specifications \(C&MS\)](#) for conversion from actual size to size to be used in the note.

Note G108C should be used on heavily wooded projects where an accurate count of trees is not practical. Where feasible, individual trees and stumps should be shown in the plans. In areas where it is difficult to survey the locations of individual trees, the limits of heavily wooded areas should be shown. All trees within the construction limits which are to remain must be shown and labeled as "Do Not Disturb" on the Plan and Profile and the Right-of-Way Plan sheets. All projects must list an estimate of the number of trees and stumps to be removed on the Office of Estimating's **Estimated Quantities form** (formerly the LD-4 form). In heavily wooded areas, in lieu of actual count on the entire area, a representative area may be counted and the results used to calculate the count for the entire area.

G108A

ALTHOUGH THERE ARE NO TREES OR STUMPS SPECIFICALLY MARKED FOR REMOVAL WITHIN THE LIMITS OF THE PROJECT, A LUMP SUM QUANTITY IS INCLUDED IN THE GENERAL SUMMARY FOR ITEM 201, CLEARING AND GRUBBING. ALL PROVISIONS AS SET FORTH IN THE SPECIFICATIONS UNDER THIS ITEM ARE INCLUDED IN THE LUMP SUM PRICE BID FOR ITEM 201, CLEARING AND GRUBBING.

G108B

REMOVE ALL TREES AND STUMPS SPECIFICALLY MARKED FOR REMOVAL WITHIN THE CONSTRUCTION LIMITS UNDER THE LUMP SUM BID FOR ITEM 201, CLEARING AND GRUBBING. THE FOLLOWING IS AN APPROXIMATE ESTIMATE OF THE NUMBER OF TREES AND STUMPS TO BE REMOVED.

<u>SIZES</u>	<u>NO. TREES</u>	<u>NO. STUMPS</u>	<u>TOTAL</u>
18"			
30"			
48"			
60"			

G108C

THE DEPARTMENT HAS NOT MARKED INDIVIDUAL TREES AND STUMPS FOR REMOVAL. UNLESS SPECIFICALLY DESIGNATED AS "DO NOT DISTURB" IN THE PLANS, REMOVE ALL TREES AND STUMPS WITHIN THE CONSTRUCTION LIMITS UNDER THE LUMP SUM BID FOR ITEM 201 CLEARING AND GRUBBING.

G109 - BENCHING OF FOUNDATION SLOPES

ALTHOUGH CROSS-SECTIONS INDICATE SPECIFIC DIMENSIONS FOR PROPOSED BENCHING OF THE EMBANKMENT FOUNDATIONS IN CERTAIN AREAS, NO WAIVER OF THE SPECIFICATIONS IS INTENDED. BENCH ALL OTHER SLOPED EMBANKMENT AREAS AS SET FORTH IN SECTION 203.05 OF THE CONSTRUCTION AND MATERIAL SPECIFICATIONS (C&MS). NO ADDITIONAL PAYMENT WILL BE MADE FOR BENCHING REQUIRED UNDER THE PROVISIONS OF SECTION 203.05

Designer Note: Use this note in conjunction with special embankment slope foundation benching.

G110 - MONUMENT ASSEMBLIES

CONSTRUCT MONUMENT ASSEMBLIES IN ACCORDANCE WITH THE DETAILS SHOWN ON THE STANDARD CONSTRUCTION DRAWINGS AND AT THE LOCATIONS SHOWN ON SHEET NO. _____.

Designer Note: This note should be used when monument assembly construction is included in the plan.

G111 - ITEM 204 - PROOF ROLLING

THE FOLLOWING QUANTITY IS PROVIDED IN THE GENERAL SUMMARY TO ADDRESS LOCATIONS REQUIRING PROOF ROLLING. SEE PLAN SHEET NO _____ FOR ADDITIONAL INFORMATION.

ITEM 204 - PROOF ROLLING _____ HOUR.

Designer Note: The estimate should be based on one hour of roller time for each 2000 Sq. Yd. of Item 204, Subgrade Compaction for reconstruction projects and 3000 Sq. Yd. of Item 204, Subgrade Compaction for new construction. Proof Rolling is recommended on all projects where subgrade compaction is required, except very short projects such as bridge approaches.

**G112 - ITEM 601 - DUMPED ROCK FILL, TYPE, AS PER PLAN /
ITEM 203 - GRANULAR MATERIAL, TYPE, AS PER PLAN**

IN THE AREA BETWEEN STATIONS _____ AND _____, DUMPED ROCK FILL, TYPE _____/GRANULAR MATERIAL, TYPE _____, AS SHOWN ON THE CROSS-SECTIONS, MAY BE PLACED BY THE METHOD OF END DUMPING IF SURFACE WATER IS PRESENT AT THE TIME OF CONSTRUCTION. END DUMPING METHODS MAY BE USED UP TO AN ELEVATION 2 FEET ABOVE THE WATER LEVEL. ABOVE THIS ELEVATION, EMBANKMENT CONSTRUCTION METHODS WILL BE IN ACCORDANCE WITH SECTIONS 203.05 TO 203.07 OF THE CONSTRUCTION AND MATERIAL SPECIFICATIONS (C&MS), INCLUSIVELY. DURING NORMAL CLEARING AND GRUBBING, WHERE END DUMPING IS PERMITTED, THE REQUIREMENTS OF C&MS 201.04 FOR SCALPING SHALL BE WAIVED.

Designer Note: Use this note for placement of embankment through standing water. Granular Materials Type C, D, or E may be used where water depth is less than 5.0 feet and displacement of soft soils is not anticipated. Dumped Rock may be used where water depths are greater than 5.0 feet and/or soft soil displacement is anticipated. Larger sizes are to be used for greater depths.

G113 - ITEM 203 - EMBANKMENT USING NO. 8 AGGREGATE

FURNISH DURABLE, NATURAL AGGREGATE NO. 8 SIZE. PLACE THE AGGREGATE AT THE THICKNESS AND SLOPE AS SHOWN ON THE CROSS-SECTIONS.

Designer Note: This note is used where a drainage blanket is placed on the slope before placing embankment.

Appendix B

Sample Plan Notes

G114 - ADDITIONAL SOIL INFORMATION

THE SOIL PROFILE AND/OR STRUCTURE FOUNDATION **EXPLORATION** SHEETS CONTAIN ALL AVAILABLE SOIL AND BEDROCK INFORMATION WHICH CAN BE CONVENIENTLY SHOWN. ADDITIONAL SUBSURFACE INVESTIGATION INFORMATION IS AVAILABLE FROM _____.

Designer Note: All soil information obtained for a project should normally be provided with the plans. Use this note ONLY when some portion of the information will not be provided with the plan. The note should be edited to give the location where soils information can be obtained (e.g. District Office, [Office of Geotechnical Engineering](#), etc.).

This note should appear on the first soil profile sheet or first structure foundation **exploration** sheet. In the event that no soil sheets accompany the plan, the note should be placed in the General Notes.

G115 - CHANNEL EMBANKMENTS

FILL AND SLOPE PORTIONS OF THE EXISTING CHANNEL TO DRAIN AS SHOWN IN THESE PLANS. IN CHANNEL EMBANKMENT AREAS WHICH WILL NOT SUPPORT ANY PORTION OF THE NEW ROAD BED OR STRUCTURAL EMBANKMENTS, THE CONTRACTOR MAY UTILIZE EMBANKMENT METHODS MEETING THE FOLLOWING REQUIREMENTS:

CLEAR ALL WEEDS AND BRUSH IN AREAS WHERE CHANNEL EMBANKMENTS ARE TO BE PLACED. THE REQUIREMENTS FOR MOISTURE, DENSITY CONTROL, BENCHING AND SUITABLE MATERIALS IS WAIVED. PLACE THE MATERIAL IN 8-INCH LOOSE LIFTS. THE ENGINEER MAY INCREASE THE LIFT THICKNESS IN ORDER TO BRIDGE THE SOFT OR WET FOUNDATIONS DEPENDING ON THE STABILITY OF THE FOUNDATION. THE ENGINEER MAY INCREASE THE LIFT THICKNESS UP TO 24 INCHES TO OBTAIN STABILITY AT THE TOP OF THE LIFT.

PAYMENT FOR ALL OF THE ABOVE SHALL BE INCLUDED IN THE CONTRACT PRICE FOR ITEM 203, EMBANKMENT.

Designer Note: This note should be used whenever there is considerable channel embankment outside roadway or structure earthwork areas.

G116 - BORROW MATERIAL

IDENTIFICATION OF BORROW AREAS ON THE PLANS DOES NOT INDICATE THAT THE MATERIAL AVAILABLE FROM THESE AREAS MEETS THE REQUIREMENTS OF C&MS 203.

Designer Note: Use this note when borrow areas are indicated on the plans.

G117 - ITEM 607 - FENCE REBUILT, TYPE ()

CAREFULLY RECONDITION AND RE-ERECT FENCE AND COMPONENT PARTS AS DETAILED ON THE PLANS. DO NOT DAMAGE THE FENCE OR COMPONENT PARTS. ANY NEW PARTS WHICH ARE NEEDED, AS DETERMINED BY THE ENGINEER, WILL BE SUPPLIED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE STATE.

THE AMOUNT OF REBUILT FENCE TO BE PAID FOR WILL BE THE NUMBER OF FEET REBUILT, COMPLETE IN PLACE, AND MEASURED AS PROVIDED FOR IN SECTION 607.09 OF THE CONSTRUCTION AND MATERIAL SPECIFICATIONS (C&MS)

PAYMENT FOR THE ABOVE WILL BE PAID FOR AT THE CONTRACT PRICE PER FOOT FOR ITEM 607, FENCE REBUILT, TYPE _____.

Designer Note: Fence which is to be rebuilt shall be removed under Item 202, Fence Removed for Reuse. The length removed for reuse should equal the length rebuilt.

G118 - AIRWAY/HIGHWAY CLEARANCE FOR AIRPORTS AND HELIPORTS

G118A

THIS PROJECT HAS BEEN IDENTIFIED AS BEING WITHIN THE INFLUENCE AREA OF A PUBLIC USE AIRPORT OR HELIPORT. NO TEMPORARY STRUCTURES OR CONSTRUCTION EQUIPMENT AT MAXIMUM OPERATING HEIGHT SHALL EXCEED A HEIGHT OF ____ FT. IF ANY TEMPORARY STRUCTURES OR CONSTRUCTION EQUIPMENT WILL EXCEED THIS HEIGHT, FURTHER COORDINATION WITH THE [FEDERAL AVIATION ADMINISTRATION \(FAA\)](#), AND THE [ODOT OFFICE OF AVIATION](#), WILL BE NECESSARY PRIOR TO ERECTING SUCH TEMPORARY STRUCTURES OR OPERATING SUCH EQUIPMENT ON THE PROJECT. THE CONTRACTOR WILL BE REQUIRED TO FILE A NEW FAA FORM 7460-1, ADVISING THE FAA THAT AERONAUTICAL STUDY NO. ____ IS BEING RESUBMITTED AND THAT AN ALTERATION TO THE ORIGINAL SUBMISSION IS REQUESTED.

NOTIFY THE ODOT [OFFICE OF AVIATION](#) WHEN RESUBMITTING [FAA FORM 7460-1](#). NO TEMPORARY STRUCTURES OR CONSTRUCTION EQUIPMENT SHALL EXCEED THE PERMISSIBLE HEIGHT, UNTIL A COPY OF THE FAA APPROVAL AND THE ODOT [OFFICE OF AVIATION](#) PERMIT HAS BEEN FURNISHED TO THE PROJECT ENGINEER.

FAA APPROVAL MAY TAKE UP TO 45 DAYS. ALL SUBMISSIONS SHALL BE DIRECTED TO THESE OFFICES:

Express Processing Center
The Federal Aviation Administration
Southwest Regional Office
Air Traffic Airspace Branch ASW-520
2601 Meacham Blvd.
Fort Worth, TX 76137-4298

Ohio Department of Transportation
Office of Aviation
2829 West Dublin-Granville Road
Columbus, Ohio 43235
614-387-2358

Designer's Note: Use note G118A when the construction equipment penetrates the notification surface of a public-use airport or heliport. The omitted height shall be that which is determined by the FAA in its letter of response, or approval to Form 7460-1, regarding the elevations that were submitted. If the FAA approves the original submission, then the maximum height included in the original submission shall be entered in the note. However, if the FAA approves contingent upon a lesser elevation, then that elevation shall be entered. The Aeronautical Study No. is set by the FAA when the Form 7460-1 is originally submitted.

G118B

THIS PROJECT HAS BEEN IDENTIFIED AS BEING WITHIN THE INFLUENCE AREA OF A PUBLIC USE AIRPORT OR HELIPORT. NO TEMPORARY STRUCTURES OR CONSTRUCTION EQUIPMENT AT MAXIMUM OPERATING HEIGHT SHALL EXCEED A HEIGHT OF ____ FT. IF ANY TEMPORARY STRUCTURES OR CONSTRUCTION EQUIPMENT WILL EXCEED THIS HEIGHT, FURTHER COORDINATION WITH THE [FEDERAL AVIATION ADMINISTRATION \(FAA\)](#), AND ODOT [OFFICE OF AVIATION](#), WILL BE NECESSARY PRIOR TO ERECTING SUCH TEMPORARY STRUCTURES OR OPERATING SUCH EQUIPMENT ON THE PROJECT. THE CONTRACTOR WILL BE REQUIRED TO SUBMIT [FORM 7460-1](#) TO THE FAA. NOTIFY THE ODOT [OFFICE OF AVIATION](#) WHEN SUBMITTING FAA FORM 7460-1.

NO TEMPORARY STRUCTURES OR CONSTRUCTION EQUIPMENT SHALL EXCEED THE PERMISSIBLE HEIGHT, UNTIL A COPY OF THE FAA APPROVAL AND THE ODOT [OFFICE OF AVIATION](#) PERMIT HAS BEEN FURNISHED TO THE PROJECT ENGINEER.

Appendix B

Sample Plan Notes

EXPRESS PROCESSING CENTER
THE FEDERAL AVIATION ADMINISTRATION
SOUTHWEST REGIONAL OFFICE
AIR TRAFFIC AIRSPACE BRANCH ASW-520
2601 MEACHAM BLVD.
FORT WORTH, TX 76137-4298

OHIO DEPARTMENT OF TRANSPORTATION
OFFICE OF AVIATION
2829 WEST DUBLIN-GRANVILLE ROAD
COLUMBUS, OHIO 43235-2786
614-387-2358

Designer's Note: Use note G118B when the construction equipment does not penetrate the notification surface of a public airport, or heliport. The omitted height shall be the available clearance below the notification surface.

G118C

THIS PROJECT HAS BEEN IDENTIFIED AS BEING WITHIN THE INFLUENCE AREA OF A PRIVATE-USE AIRPORT OR HELIPORT. NO TEMPORARY STRUCTURES OR CONSTRUCTION EQUIPMENT, AT MAXIMUM OPERATING HEIGHT, SHALL EXCEED A HEIGHT OF ____ FT. IF ANY TEMPORARY STRUCTURES OR CONSTRUCTION EQUIPMENT WILL EXCEED THIS HEIGHT, COORDINATION WITH THE AIRPORT OWNER AND THE ODOT OFFICE OF AVIATION WILL BE NECESSARY PRIOR TO ERECTING SUCH TEMPORARY STRUCTURES OR OPERATING SUCH EQUIPMENT ON THE PROJECT. FOR PRIVATE USE AIRPORTS OR HELIPORTS, COORDINATE WITH THE AIRPORT OWNER AND THE ODOT OFFICE OF AVIATION. NO TEMPORARY STRUCTURES OR CONSTRUCTION EQUIPMENT SHALL EXCEED THE PERMISSIBLE HEIGHT, UNTIL COORDINATION IS MET AND DOCUMENTATION HAS BEEN FURNISHED TO THE PROJECT ENGINEER. IF COORDINATION IS NOT OBTAINED, THEN THE PROJECT ENGINEER WILL HAVE THE AUTHORITY TO PROVIDE RESTRICTIONS AS REQUIRED.

The Private Airport
The Private Airport Owner
Address of Airport
City, State, Zip Code
(Area Code) - Phone Number

Designer's Note: Use note G118C when the construction equipment penetrates the notification surface of a private-use airport. The omitted height shall be the available clearance below the notification surface.

G119 - FENCE LENGTHS

THE LENGTHS OF FENCE SHOWN IN THE PLANS ARE HORIZONTAL DIMENSIONS. MEASUREMENTS OF THE FINAL QUANTITIES WILL BE IN ACCORDANCE WITH ITEM 607.

Designer's Note: This note should be used on every project that includes fence quantities.

G120 - ITEM SPECIAL - SOIL STERILANT

USE ONE OF THE SOIL STERILANT PRODUCTS LISTED BELOW, OR AN APPROVED EQUAL. APPLY THE SOIL STERILANT TO LOCATION(S) WHERE IN-ROAD VEGETATION EXISTS AS DETERMINED BY THE ENGINEER. THIS SHOULD BE DONE IMMEDIATELY PRIOR TO PLACING THE PROPOSED (ROAD SURFACE).

PRAMITOL 25 E
MCINTOSH, ALABAMA 36553

ROUNDUP PRO L
MONSANTO COMPANY
800 N. LINDBERGH BLVD.
ST. LOUIS, MO 63167

HYVAR XL
DUPONT CORPORATION
1007 MARKET STREET
WILMINGTON, DELAWARE 19898

COMPACT THE SITE FOLLOWING PLOWING OR DISKING. APPLY THE SOIL STERILANT AT THE SUGGESTED MANUFACTURER'S RATE.

THE PREFERRED TIME FRAME TO APPLY THE SOIL STERILANT IS BETWEEN JUNE 15 AND OCTOBER 15. VERY DRY SOIL CONDITIONS MAY RESULT IN POOR WEED CONTROL. DO NOT APPLY THE SOIL STERILANT TO SOIL OR BALLAST MATERIAL WHICH IS SATURATED WITH WATER. CONSULT WITH MANUFACTURER IN REGARD TO THE HANDLING AND PHYSICAL CHEMICAL HAZARDS ASSOCIATED WITH THE SOIL STERILANT.

PAYMENT FOR THE ABOVE REFERENCED ITEM IS INCLUDED IN THE PRICE PER SQUARE YARD OF ITEM SPECIAL, SOIL STERILANT. A QUANTITY OF _____ SQUARE YARDS IS INCLUDED IN THE GENERAL SUMMARY TO BE USED AT LOCATIONS AS DETERMINED BY THE ENGINEER.

EACH SUCCESSFUL BIDDER MUST BE LICENSED BY THE STATE OF OHIO, [DEPARTMENT OF AGRICULTURE](#), AS A COMMERCIAL APPLICATOR. IN ADDITION, ALL PERSONS INVOLVED IN THE ACTUAL SPRAYING OF HERBICIDE WILL BE LICENSED AS COMMERCIAL OPERATORS IN THE APPROPRIATE SPRAY CATEGORY. SUBMIT APPROPRIATE LICENSES TO THE PROJECT ENGINEER, PRIOR TO COMMENCING WORK, FOR VERIFICATION.

Designer's Note: This note should be used on all projects using soil sterilant.

G121 - ITEM 204 - SUBGRADE COMPACTION AND PROOF ROLLING

CONSTRUCT THE SUBGRADE AS FOLLOWS AND IN THE FOLLOWING SEQUENCE:

1. SHAPE THE SUBGRADE TO WITHIN 0.2 FEET OF THE PLAN SUBGRADE ELEVATION.
2. EXCAVATE AND REPLACE UNSUITABLE SUBGRADE BEFORE PROOF ROLLING. THE EXCAVATION LIMITS ARE SHOWN AND LABELED ON THE CROSS SECTIONS AS UNSUITABLE SUBGRADE. UNSUITABLE SUBGRADE INCLUDES UNSUITABLE SOIL (A-4B, A-2-5, A-5, A-7-5, AND SOIL WITH A LIQUID LIMIT GREATER THAN 65) AND ANY COAL, SHALE, OR ROCK WHICH NEEDS TO BE REMOVED ACCORDING TO SECTION 204.05 OF THE CONSTRUCTION AND MATERIAL SPECIFICATIONS (C&MS).

IF THERE IS UNSUITABLE SUBGRADE IN A SHALLOW FILL LOCATION, EXCAVATE AND REPLACE THE UNSUITABLE SUBGRADE BEFORE CONSTRUCTING THE SHALLOW FILL AND SHAPING THE SUBGRADE.

3. COMPACT THE SUBGRADE ACCORDING TO C&MS 204.03.
4. APPROXIMATE LIMITS FOR EXCAVATION OF UNSTABLE SUBGRADE ARE SHOWN AND LABELED ON THE CROSS SECTIONS AS UNSTABLE SUBGRADE. THE ENGINEER WILL IDENTIFY THE ACTUAL LIMITS OF EXCAVATION FOR UNSTABLE SUBGRADE BASED ON THE PROOF ROLLING RESULTS AND VISUAL OBSERVATIONS.

PROOF ROLL THE COMPACTED SUBGRADE ACCORDING TO C&MS 204.06.

5. EXCAVATE UNSTABLE SUBGRADE AS DIRECTED BY THE ENGINEER AND STABILIZE BY REPLACING WITH THE SPECIFIED MATERIALS ACCORDING TO C&MS 204.07. EXCAVATIONS WILL EXTEND 18 INCHES BEYOND THE EDGE OF THE SURFACE OF THE PAVEMENT, PAVED SHOULDERS, OR PAVED MEDIANS.
6. PROOF ROLL THE STABILIZED AREAS ACCORDING TO C&MS 204.06 TO VERIFY STABILITY.
7. FINE GRADE THE SUBGRADE TO THE SPECIFIED GRADE.

Appendix B

Sample Plan Notes

THE QUANTITIES FOR EXCAVATING THE UNSUITABLE SUBGRADE AND UNSTABLE SUBGRADE ARE BOTH PAID UNDER ITEM 204, EXCAVATION OF SUBGRADE.

Designer's Note: Use this note when subgrade stabilization by excavating and replacing is required. Label the unsuitable subgrade and/or unstable subgrade on the cross sections. Add the two quantities, unsuitable subgrade and unstable subgrade, together and have one pay item as Excavation of Subgrade.

In shallow fills, unsuitable soils must be removed to a depth of three feet below proposed subgrade (refer to C&MS 203.03). Coal, shale and rock must be removed to a depth of two feet below bottom of pavement (refer to C&MS 204.05).

Base the subgrade compaction quantity on the total subgrade area, plus the area that will require stabilization, estimated according to [Geotechnical Bulletin 1 \(GB1\)](#). Base the proof rolling quantity on the total quantity of subgrade compaction, converted to hours, according to GB1, Section E. Provide quantities and types of replacement materials according to GB1.

G122 - NATIONAL GEODETIC SURVEY (NGS) BENCHMARKS

NOTIFY THE DISTRICT SURVEYOR, BY PHONE AT _____ AT LEAST THREE (3) WEEKS PRIOR TO REMOVAL OF THE STRUCTURE THAT THE NATIONAL GEODETIC SURVEY (NGS) DISK WILL BE REMOVED. REMOVE THE NGS DISK WITHOUT DAMAGING THE FACE AND SUBMIT IT TO THE DISTRICT SURVEYOR. ALL COSTS ASSOCIATED WITH THE REMOVAL AND SALVAGE OF THE NGS DISK ARE INCLUDED IN THE PAYMENT FOR ITEM 202 STRUCTURE REMOVED, OR ITEM 202, PORTIONS OF STRUCTURE REMOVED.

Designer's Note: Use this note if the structure being replaced contains a Federal government (NGS or USGS) benchmark disk.

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Appendix B

Sample Plan Notes

PAVEMENT

<u>NUMBER</u>	<u>NAME</u>
<u>P101</u>	PAVING AT RAILROAD CROSSING
<u>P102</u>	PROFILE AND ALIGNMENT
<u>P103</u>	CONTRACTION AND/OR EXPANSION JOINTS
<u>P104</u>	CONTRACTION JOINTS IN CONCRETE PAVEMENT OR BASE WIDENING
<u>P105</u>	PART-WIDTH CONSTRUCTION
<u>P106</u>	MEDIAN AND/OR CURBING ON APPROACH SLABS
<u>P107</u>	ITEM 880 - ASPHALT CONCRETE WITH WARRANTY
<u>P108</u>	PAVEMENT RESTORATION FOR PIPE INSTALLATIONS AND/OR REMOVALS
<u>P109</u>	PAVEMENT RESTORATION FOR DRAINAGE STRUCTURE INSTALLATIONS
<u>P110</u>	PAVEMENT RESTORATION FOR MONUMENT ASSEMBLY INSTALLATIONS

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Appendix B

Sample Plan Notes

P101 - PAVING AT RAILROAD CROSSING

WORK THE CROWN OUT OF THE PROPOSED PAVEMENT ON EACH SIDE OF THE RAILROAD CROSSING, BEGINNING 50 FEET FROM THE NEAREST RAIL, BY RAISING THE EDGES OF THE NEW PAVEMENT TO MEET THE PLATFORM ELEVATION.

Designer's Note: Use this note on resurfacing projects involving at-grade railroad crossings.

P102 - PROFILE AND ALIGNMENT

PLACE THE PROPOSED PAVEMENT TO FOLLOW THE ALIGNMENT AND PROFILE OF THE EXISTING PAVEMENT. (PREVIOUS CONSTRUCTION PLANS, PROJECT NO. _____, SHOWING THE ORIGINAL ALIGNMENT AND PROFILE, ARE AVAILABLE FOR INSPECTION AT THE ODOT DISTRICT _____ OFFICE). PLACE THE PROPOSED ASPHALT CONCRETE OVERLAY (WITH A UNIFORM THICKNESS OF _____ INCHES (VARYING IN THICKNESS FROM _____ INCHES AT THE CROWN TO _____ INCHES AT THE PAVEMENT EDGE)(AS SHOWN ON THE TYPICAL SECTIONS).

Designer's Note: Use this note on resurfacing projects where the profile and alignment are not shown on the plan. Eliminate the second sentence if old plans are not available.

P103 - CONTRACTION AND/OR EXPANSION JOINTS

ALTHOUGH SPECIFIC LOCATIONS OF CERTAIN CONTRACTION AND EXPANSION JOINTS HAVE BEEN DETAILED ON THIS PLAN, NO WAIVER OF THE SPECIFICATIONS IS INTENDED. IN ALL CASES, THE PROVISION OF EXPANSION JOINTS AT ALL MAJOR STRUCTURES INCLUDING THE MAXIMUM SPACING BETWEEN CONTRACTION JOINTS IS IN ACCORDANCE WITH STANDARD CONSTRUCTION DRAWING BP-2.2 AND THE SPECIFICATIONS.

Designer's Note: Use this note with concrete pavement or base.

P104 - CONTRACTION JOINTS IN CONCRETE PAVEMENT OR BASE WIDENING

P104A

WHERE NEW CONCRETE IS PLACED ADJACENT TO EXISTING CONCRETE, PROVIDE CONTRACTION JOINTS IN THE NEW CONCRETE TO FORM CONTINUOUS JOINTS WITH THOSE IN THE EXISTING CONCRETE.

THE MAXIMUM DISTANCE BETWEEN THE JOINTS IN THE NEW CONCRETE ARE IN ACCORDANCE WITH STANDARD CONSTRUCTION DRAWING BP-2.2, IF NECESSARY, ADDITIONAL JOINTS MAY BE PROVIDED IN THE NEW CONCRETE AT APPROXIMATELY EQUAL INTERVALS BETWEEN EXISTING JOINTS THAT EXCEED THE MAXIMUM SPACING.

Designer's Note: Use this note with concrete pavement or concrete base widening that is not tied to the existing concrete.

P104B

WHERE NEW CONCRETE IS PLACED ADJACENT TO AND TIED TO EXISTING CONCRETE, THE CONTRACTION JOINT SPACING REQUIRED IN STANDARD CONSTRUCTION DRAWING BP-2.2 WILL BE WAIVED. CONSTRUCT CONTRACTION JOINTS IN THE NEW CONCRETE PAVEMENT TO FORM A CONTINUOUS LINE WITH ALL CONTRACTION JOINTS IN THE EXISTING CONCRETE PAVEMENT. INSTALL EXPANSION JOINTS IN THE NEW CONCRETE PAVEMENT TO FORM A CONTINUOUS LINE WITH ALL EXPANSION JOINTS IN THE EXISTING CONCRETE PAVEMENT.

Designer's Note: Use this note with concrete pavement or concrete base widening that is tied to the existing concrete. The concrete placed using this note shall be an "As Per Plan" item on the General Summary.

P105 - PART-WIDTH CONSTRUCTION

BECAUSE OF THE NECESSITY TO BUILD THIS PROJECT UNDER TRAFFIC AND TO CONSTRUCT THE FULL PAVEMENT WIDTH IN STAGES, EXERCISE CARE TO PREVENT THE CONSTRUCTION OF A BUTT JOINT IN THE BASE COURSES. LAP LONGITUDINAL JOINTS AS SHOWN ON STANDARD CONSTRUCTION DRAWING [BP-3.1](#).

Designer's Note: Use this note only on projects with flexible pavement requiring part-width construction.

P106 - MEDIAN AND/OR CURBING ON APPROACH SLABS

WITHIN THE LIMITS OF THE APPROACH SLAB, TRANSITION THE SHAPE OF THE MEDIAN AND/OR CURBING ON APPROACH SLABS FROM THE STANDARD SECTION ON THE APPROACHES TO THE SECTION USED ON THE BRIDGE.

Designer's Note: Use this note when the height, width, or shape of a median or curb changes from the approach to the bridge.

P107 - ITEM 880 - ASPHALT CONCRETE WITH WARRANTY

INDIVIDUAL LIFT THICKNESSES AND STEP WIDTHS SHOWN IN THE PLAN ARE THE PLAN LINES AND DIMENSIONS USED FOR QUANTITY CALCULATION. THEY ARE NOT THE REQUIRED LIFTS OR STEPS FOR ACTUAL CONSTRUCTION, BUT NO ADJUSTMENT WILL BE MADE TO THE PLAN QUANTITY DUE TO DIFFERENT LIFT THICKNESSES AND/OR STEP WIDTHS WHEN A UNIFORM THICKNESS IS SPECIFIED.

Designer's Note: Add this note whenever Item 880, Asphalt Concrete Pavement with Warranty is specified.

P108 - PAVEMENT RESTORATION FOR PIPE INSTALLATIONS AND/OR REMOVALS

THE FOLLOWING QUANTITY HAS BEEN PROVIDED FOR PAVEMENT RESTORATION FOLLOWING INSTALLATION AND/OR REMOVAL OF PIPES.

ITEM 301 - ASPHALT CONCRETE BASE, PG64-22 _____ CU. YDS.

THE ABOVE QUANTITY IS BASED ON A 301 THICKNESS OF _____ INCHES AND A PAVEMENT RESTORATION WIDTH THAT INCLUDES THE TRENCH WIDTH PLUS TWO FEET ON EACH SIDE OF THE TRENCH.

PROVIDE ANY MATERIALS USED OUTSIDE THE LIMITS STATED ABOVE AT NO ADDITIONAL COST.

Designer's Note: Use this note whenever pipe is removed under Item 202 and/or Item 611, 605, or 638 and will require pavement restoration not otherwise covered in the plans. Edit note to call out Item 605 or 638, when these items are included in the plans. Include 301 thickness used in the quantity calculations. Add additional items such as 441 or 609 when they are needed for repairs. Revise note if a different method of calculation was used to determine the pavement restoration quantity (e.g., for very deep pipes an additional width might be needed). For projects with full-depth pavement work, pavement removal associated with pipe installations shall be included under the applicable pay item used for pavement removal or excavation (Item 202 Pavement Removed, Item 202 Pavement Removed, Asphalt or Item 203 Excavation). For projects without other pavement work, the designer shall add a quantity of Item 202 Pavement Removed, Item 202 Pavement Removed, Asphalt, or Item 203 Excavation.

Appendix B

Sample Plan Notes

Assume a trench width of 1.5 times the span length (1.5 X Span).

P109 - PAVEMENT RESTORATION FOR DRAINAGE STRUCTURE INSTALLATIONS

THE FOLLOWING QUANTITY IS PROVIDED FOR PAVEMENT RESTORATION FOLLOWING INSTALLATION OF ITEM 611, DRAINAGE STRUCTURES.

ITEM 301, ASPHALT CONCRETE BASE, PG64-22 _____ CU. YDS.

THE ABOVE QUANTITY IS BASED ON A 301 THICKNESS OF _____ INCHES AND A WIDTH OF TWO FEET AROUND THE PERIMETER OF THE DRAINAGE STRUCTURE.

PROVIDE ANY MATERIALS USED OUTSIDE THE LIMITS STATED ABOVE AT NO ADDITIONAL COST.

Designer's Note: Use this note whenever 611 or 638 items are specified and will require pavement restoration not otherwise covered in the plans. Edit note to call out Item 638 when included. Include 301 thickness used in the quantity calculations. Add additional items such as 441 or 609 when they are needed for repairs. Revise note if a different method of calculation was used to determine the pavement restoration quantity.

P110 - PAVEMENT RESTORATION FOR MONUMENT ASSEMBLY INSTALLATIONS

THE FOLLOWING QUANTITY IS PROVIDED FOR PAVEMENT RESTORATION FOLLOWING INSTALLATION OF ITEM 623, MONUMENT ASSEMBLIES.

ITEM 301, ASPHALT CONCRETE BASE, PG64-22 _____ CU. YDS.

THE ABOVE QUANTITY IS BASED ON A 301 THICKNESS OF _____ INCHES AND A WIDTH OF TWO FEET AROUND THE PERIMETER OF THE MONUMENT ASSEMBLIES.

PROVIDE ANY MATERIALS USED OUTSIDE THE LIMITS STATED ABOVE AT NO ADDITIONAL COST.

Designer's Note: Use this note whenever Item 623, Monument Assembly, is specified and will require pavement restoration not otherwise covered in the plans. Include 301 thickness used in the quantity calculations. Add additional items such as 441, or 609 when they are needed for repair. Revise note if a different method of calculation was used to determine the pavement restoration quantity.

ENVIRONMENTAL

<u>NUMBER</u>	<u>NAME</u>
<u>V101</u>	<u>CONTRACTOR'S USE OF ODOT RIGHT-OF-WAY</u>
V102	NOT USED
<u>V103</u>	<u>ARCHAEOLOGICAL SITES ADJACENT TO RIGHT-OF-WAY</u>
V104	NOT USED
<u>V105</u>	<u>ENDANGERED BAT HABITAT REMOVAL</u>

Appendix B

Sample Plan Notes

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V101 - CONTRACTOR'S USE OF ODOT RIGHT-OF-WAY

Designer's Note: This note should be used when waste and borrow areas are shown on the plans. The note should be edited to include one note from each of the following sets.

Note V101A1 should be used when waste and borrow areas shown on the plans have been investigated for water quality requirements (e.g., wetlands, 404/401 permits, etc.).

Note V101A2 should be used when the contractor is required to hire an environmental consultant to investigate water quality requirements.

Note V101B1 should be used when waste and borrow areas shown on the plans have been investigated for archeological requirements. Use this note in conjunction with note V103, Archeological Sites Adjacent to Right-of-Way, when there are archeological sites on the plan.

Note V101B2 should be used when the contract documents require a cultural resource investigation be performed by the Contractor. Contact the **Office of Environmental Services** for guidance on using this note. Use this note in conjunction with note V103, Archeological Sites Adjacent to Right-of-Way.

Note V101C1 should be used when waste and borrow areas shown on the plans have been determined not to be in a [Federal Emergency Management Agency \(FEMA\)](#) floodplain zone.

Note V101C2 should be used when the waste and borrow areas shown on the plans have been determined to be in a [Federal Emergency Management Agency \(FEMA\)](#) floodplain zone. The contractor is required to obtain FEMA clearances.

Note V101D1 should be used when there might be suspect borrow areas having contaminated soil or water.

V101A1

THE WASTE AND BORROW AREAS SHOWN IN THE PLANS HAVE BEEN PREVIOUSLY INVESTIGATED FOR ECOLOGICAL RESOURCES. IT IS NOT NECESSARY TO HIRE AN ECOLOGICAL ENVIRONMENTAL CONSULTANT AS PER CONSTRUCTION AND MATERIAL SPECIFICATION 105.16 TO INVESTIGATE THESE AREAS. ALL OTHER REQUIREMENTS OF C&MS 105.16 APPLY.

V101A2

HIRE AN ECOLOGICAL ENVIRONMENTAL CONSULTANT TO CERTIFY THAT THE PROPOSED BORROW AND WASTE OPERATIONS WILL NOT IMPACT "THE WATERS OF THE UNITED STATES", OR AN ISOLATED WETLAND(S), OR TO OBTAIN AN U.S. ARMY CORPS OF ENGINEERS 404 PERMIT AND AN OHIO EPA 401 PERMIT, PER THE REQUIREMENTS OF CONSTRUCTION AND MATERIAL SPECIFICATIONS 105.16.

V101B1

THE WASTE AND BORROW AREAS SHOWN IN THE PLANS HAVE BEEN INVESTIGATED BY A CULTURAL RESOURCE CONSULTANT. IT IS NOT NECESSARY TO HIRE A CULTURAL RESOURCE CONSULTANT AS PER CONSTRUCTION AND MATERIAL SPECIFICATION 105.16 TO INVESTIGATE THESE AREAS. ALL OTHER REQUIREMENTS OF C&MS 105.16 APPLY.

Appendix B

Sample Plan Notes

V101 - CONTRACTOR'S USE OF ODOT RIGHT-OF-WAY (CONTINUED)

V101B2

HIRE A CULTURAL RESOURCE ENVIRONMENTAL CONSULTANT, PER SECTION 105.16 OF THE CONSTRUCTION AND MATERIAL SPECIFICATIONS, TO PERFORM A CULTURAL RESOURCE INVESTIGATION FOR ALL WASTE AND BORROW AREAS OUTSIDE THE RIGHT-OF-WAY LIMITS.

V101C1

THE WASTE AND BORROW AREAS SHOWN ON THE PLANS HAVE BEEN INVESTIGATED AND ARE NOT IN THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOODPLAIN ZONE.

V101C2

THE WASTE AND BORROW AREAS SHOWN ON THE PLANS ARE WITHIN FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOODPLAIN ZONE. WORK WITH ODOT DISTRICT OFFICE TO OBTAIN THE REQUIRED APPROVAL FROM THE LOCAL FLOODPLAIN COORDINATOR BEFORE WORKING IN THESE AREAS.

V101D1

THE CONTRACTOR SHALL NOT BORROW FROM A SITE KNOWN, OR SUSPECTED OF HAVING, CONTAMINATED SOIL OR WATER.

V102 - NOT USED

V103 - ARCHAEOLOGICAL SITES [HISTORIC PROPERTIES] ADJACENT TO RIGHT-OF-WAY

AS A RESULT OF A CULTURAL RESOURCE SURVEY, ARCHAEOLOGICALLY [OR HISTORICALLY] SENSITIVE AREAS HAVE BEEN IDENTIFIED ADJACENT TO THE PROPOSED RIGHTS-OF-WAY. THESE ARCHAEOLOGICALLY [OR HISTORICALLY] SENSITIVE AREAS HAVE BEEN DENOTED ON MAPPING THAT IS AVAILABLE FOR REVIEW AT THE [STATE HISTORIC PRESERVATION OFFICE](#), (OHIO HISTORICAL SOCIETY, 800 EAST 17TH AVENUE, COLUMBUS, OHIO 43211-2474), ODOT'S [OFFICE OF ENVIRONMENTAL SERVICES](#), AND THE DISTRICT _____ OFFICE (LOCATION). THESE IDENTIFIED AREAS CANNOT BE USED FOR BORROW AREAS, WASTE, OR ANY OTHER PROJECT RELATED ACTIVITIES, SUCH AS TEMPORARY OFF-SITE STORAGE OR FIELD OFFICE PLACEMENT, PORTABLE PLANT LOCATIONS, ETC., UNLESS PRIOR APPROVAL IS OBTAINED, IN WRITING, FROM THE OHIO HISTORIC PRESERVATION OFFICE IN COLUMBUS.

Designer's Note: Use this note when there are known archaeological sites, or historically significant properties, on a project that will be protected as a result of a formal agreement between ODOT and the [Ohio Historic Preservation Office](#).

V104 - NOT USED

V105 - ENDANGERED BAT HABITAT REMOVAL

THIS PROJECT IS LOCATED WITHIN THE KNOWN HABITAT RANGES OF THE FEDERALLY LISTED AND PROTECTED INDIANA BAT, AND NORTHERN LONG-EARED BAT. NO TREES SHALL BE REMOVED UNDER THIS PROJECT FROM APRIL 1 THROUGH SEPTEMBER 30. ALL NECESSARY TREE REMOVAL SHALL OCCUR FROM OCTOBER 1 THROUGH MARCH 31. THIS REQUIREMENT IS NECESSARY TO AVOID AND MINIMIZE IMPACTS TO THESE SPECIES AS REQUIRED BY THE [ENDANGERED SPECIES ACT \(ESA\)](#). FOR THE PURPOSES OF THIS NOTE, A TREE IS DEFINED AS: A LIVE, DYING, OR DEAD WOODY PLANT, WITH A TRUNK 3 INCHES OR GREATER IN DIAMETER AT A HEIGHT OF 4.5 FEET ABOVE THE GROUND SURFACE, AND WITH A MINIMUM HEIGHT OF 13 FEET.

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Appendix D

Reproducible Forms

Service Road Study Form..... D-1
(For more information on Service Roads, contact the [Office of Roadway Engineering](#) or see the [Location and Design Manual, Volume 1, Section 506.](#))

Estimated Quantities Form (formerly the LD-4 Form)D-2
(This [Estimated Quantities](#) form is for use by external users only. ODOT districts shall transfer estimated quantity information via the [ODOT Plan Package Submittal](#) SharePoint site. Contact the **Office of Estimating** with questions.)

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Estimated Quantities

Instructions

The requested information on this form is necessary the creation of the official Engineer's Estimate. If any of the following items are listed as "Lump Sum" in the construction plans, specific quantities must be provided. This form is for Consultant use only. Districts shall input this information into the ODOT Plan Package Submittal SharePoint site.

CRS

PID

Item 201 - Tree and Stump Removals (*List by Size*):

Item 202 - Structure(s)/Portions of Structure(s) Removed (*List Structures & Associated Quantities*):

Item 502 - Structure(s) for Maintaining Traffic (*List Structures & Associated Quantities*):

Item 503 - Unclassified Excavation (*Cubic Yards*):

Item 509 - Reinforcing Steel (List Structure(s), Item (*i.e., Wall, Deck, Parapet*), & Pounds of Steel):

Item 513 - Structural Steel (List Structure(s), Item (*i.e., Wall, Deck, Parapet*), & Pounds of Steel):

Item 514 - Steel Surfaces to be Painted (*List Structures & Square Footage of Steel*):

Item 518 - Porous Backfill (*Cubic Yards*):

Item 615 - Roads and Pavement for Maintaining Traffic (*Earthwork & Pavement Cubic Yards*):

Miscellaneous Items: