Part 800 Construction Plans

Section 801 General

The roadway construction plans illustrate the necessary horizontal and vertical information to locate and build the new roadway and related elements. The roadway construction plans typically include:

- Mapping of existing features.
- Right-of-way boundaries including perm./temp. easements, plus their labels.
- Alignment(s) and associated tangent and curve data and line labels.
- Proposed construction features and items.
- Keyed notes (or bubble notes) to identify work items, provide detail, and reference other data sources and plan sheets.
- Identification of items proposed for removal, if any.
- Location and boundaries for construction hold-out areas and no work areas, if any.
- Proposed construction of diversion facility and/or temporary configurations, if any.
- Earthwork quantities and earthwork brackets or details, if needed.
- Proposed construction features in profile format (including existing ground line), if needed.
- Proposed temporary construction features in profile format (including existing ground line), if needed.

Depending on the complexity and/or density of the data on the sheet, the above information may be "combined" into fewer plan sheets or divided onto "separated" plan sheets to maintain clarity. See Section 804 for additional information on "combined" plan sheets and Section 805 for additional information on "separated" plan sheets.

This Part 800 provides instructions for how to develop the sheet series called "Construction Plans" within the sheet "C" series and "D" series. The construction plan sheets cover:

1. Alignment
2. General Construction and General Construction Notes
3. Drainage & Utilities and Drainage & Utilities Notes
4. Removal
5. Diversion Plan
6. Profile

For Geotechnical Data (see the GHE CAD Manual).

The roadway designers and CAD techs produce the construction plans, which include plan sheets, profiles and construction notes. The roadway designer is responsible for developing the design files. The designer is also responsible for communicating design revisions and additions to the CAD tech as the project progresses.

Throughout the development of the project, it is the responsibility of the CAD Tech, in coordination with the designer, to maintain ODOT drafting standards as defined in this manual and the ODOT CAD Manual.

Section 802 Reference Files

Although the construction plans are developed by the roadway designers and CAD techs, the plans require reference file basemaps from multiple sources which are developed by other designers and disciplines. Roadway designers develop the roadway design basemaps. The Survey Unit develops the existing features and topographic basemap. The Right-of-Way Engineering Unit produces the right-of-way basemaps, including existing alignments. All basemap files use the same coordinate system so all data is correctly located when the files are referenced together. Basemap files are referenced through container files and may include existing, right-of-way, drainage, bridge, and traffic base files, as necessary for the project.

802.1 Survey Reference

Coordination efforts should occur in the Project Initiation or Advanced Investigation phases of the project between the roadway designer and the Survey Unit to develop the existing topographic or 2D features basemap CAD file to a level of detail that will meet the project needs through the final submittal.

802.2 Right-of-Way Reference

The roadway designer should coordinate with the Right-of-Way Engineering Unit as the right-of-way basemap is developed. The existing right-of way information is generated by the Right-of-Way Engineering Unit from the surveyed field data, recovery survey of found monuments, existing right-of-way record drawings and descriptions and the topographic basemap. The Right-of-Way Engineering Unit is responsible to provide this information to the roadway designer or CAD tech in a CAD file containing the existing right-of-way basemap. Basemap files are provide to the CAD tech in container files placed in the “6_Civil_Data” project folder in ProjectWise.

After the roadway design has been well established, the roadway designer is responsible to make the design basemap CAD file available to the right-of-way designer or CAD tech, for right-of-way acquisition to be determined. This file should contain the proposed centerline alignment and proposed cut and fill limits of construction. At this time, the Right-of-Way Engineering Unit can begin property acquisition procedures and delineation of a final right-of-way line, which should be provided in an updated CAD file to the roadway designer.

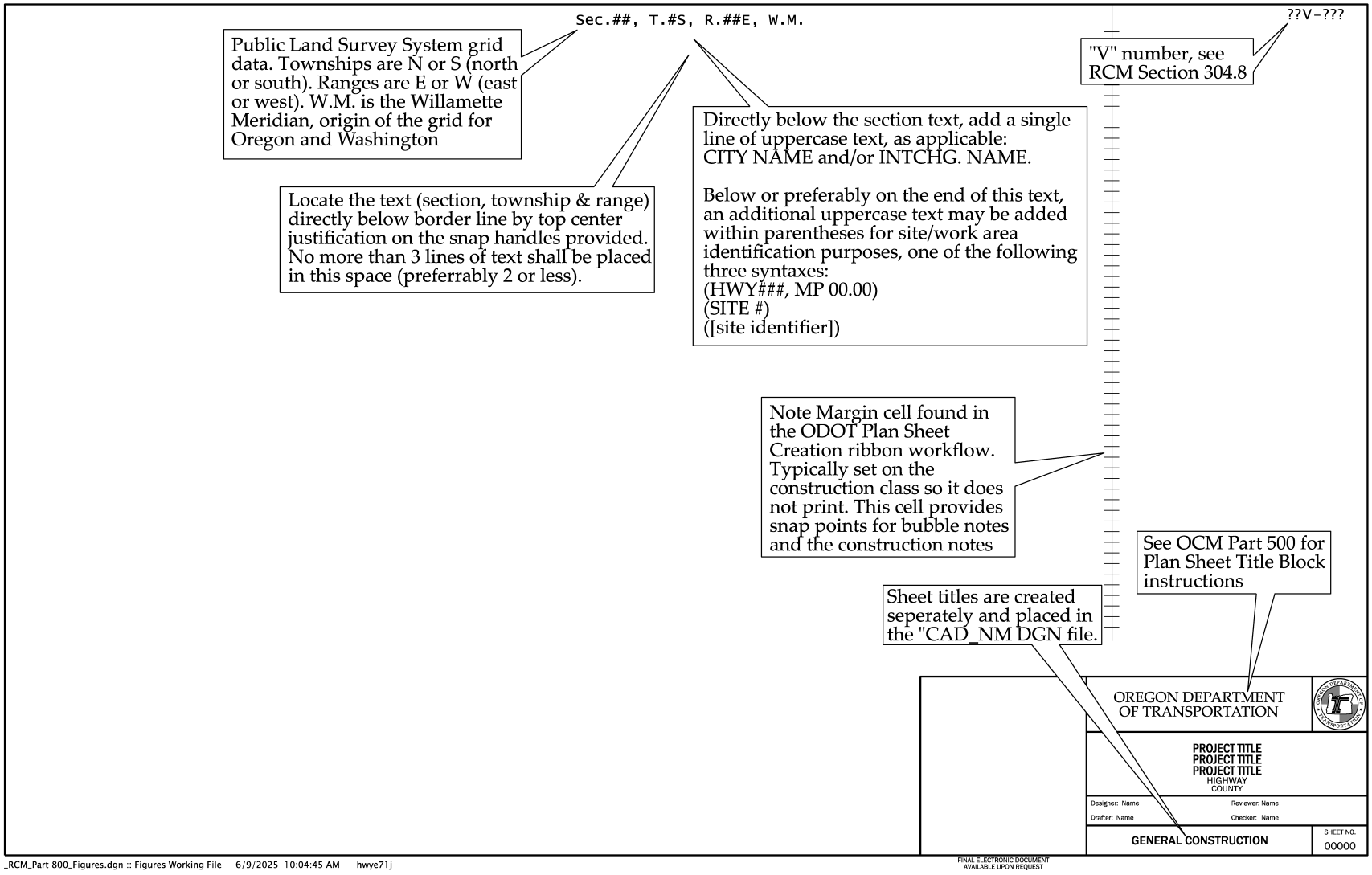
The right-of-way file is developed by the Right-of-Way Engineering Unit to their own discipline-specific standards that may vary from the Roadway Design Unit standards.

Once the right-of-way files has been released by the Right-of-Way Engineering Unit, file manipulation by the roadway designer or CAD tech is limited to moving of text to avoid conflicts with text or graphics in other reference files or the working file and moving an element to a different level for display purposes. Make changes to the appearance of right-of-way files by turning off elements in the referenced file (by level or masking), copying elements into the active file, and make changes on the copied elements.

Section 803 Plan Sheet Setup

Use the following guidance to begin development of the "combined" construction plans or the "separated" alignment, general construction, drainage and utilities or removal plans. Begin by following the steps in the "Create New DGNs" document on the ODOT EAST PDF List website to create a new DGN file in the **1_Design > 2_Plan_Sheets** folder in ProjectWise. Use "***CAD_Resources/Seed/Microstation/MicroStation_Seed2D.dgn***" as the seed file. See Figure 800-1 for the typical components of a construction plan sheet.

Figure 800-1: Components of Construction Plan Sheets



For plan or plan and profile sheets, add the section/township/range and the name of the city or interchange (whichever is appropriate) at the top of the plan sheet. If more than one section is represented on the plan sheet, the section data is labeled in the plan portion of the sheet instead of at the top of the sheet. The section text is oriented with its associated boundary line on the plan view.

Attach the appropriate existing topographic right-of-way file and design as reference files. Manipulate these files to the same parameters (move, rotate, scale, and clip boundary) that you used for the clip boundary file for the same plan sheet. For both "Combined" and "Separated" construction plan sheets, turn the appropriate levels on or off in the attached reference files.

Once the plan sheet(s) have been created and appropriate references attached, begin populating the content of each sheet. See the following section for guidance on creating each type of construction plan sheets.

803.1 Plan Sheet Scale

The plan sheet scale is chosen based on the level of detail that needs to be shown. In transition zones between rural and urban project areas, where roadway work items are positioned closer than rural areas, a scale of 1 inch equals 50 feet (1"=50' or sometimes 1"=40') may be needed to show a more appropriate level of detail. . In urban project areas, where roadway work items are usually most dense, a scale of 1 inch equals 30 feet (1"=30' or sometimes or 1"=20') is needed to show more detail, particularly when sidewalks are present or proposed for construction. When choosing a plan sheet scale, the extreme lateral offsets of work items, may be the determining factor. In other words, the plan sheet scale typically allow for the total width of the work area (perpendicularly out from the centerline) to be shown on a single plan sheet. However, match lines can be utilized to expand wide work areas onto other sheets. It is recommended that all plan sheets in a single series use the same scale, for the sake of consistency and ease of creation. If pairing a plan sheet with a separate profile sheet or a combining a profile with a plan sheet, see Section 805.5.1 Profile Sheet Scales.

803.2 Centerline Stationing

Stationing values usually increase along an alignment from the North to South on North/South routes and from the West to East on East/West routes (however, there are some exceptions). Each plan view must show stationing values placed at tics along the alignment, enough values (in each plan view) for the reader to understand the distances being conveyed. It is recommended to have at least two station tic values in each plan view (see Figure 800-2).

Milepoint "stationing" is an alternative to the common engineering centerline stationing using feet. Milepoint "stationing" follows the same logic as alignment stationing, but the line label

does not include an alignment name. Instead, the text "MP" is place before the milepoint value with two significant digits (to the hundredth of a mile). If the project has both milepoint 'stationing' and engineering alignment stationing, but the direction of increasing stationing is opposite, then the project team must determine which controls. For example: if the projects sites are numbered in the direction of increasing milepoints (but in the direction of decreasing alignment stationing), then the milepoint 'stationing' controls and is used to determines the orientation of the plan views. In this case the plan sheets are oriented from left to right in the direction of increasing milepoints. If alignment stationing is determined to control, plan sheets are oriented from left to right in the direction of increasing alignment stationing. (See 803.3.)

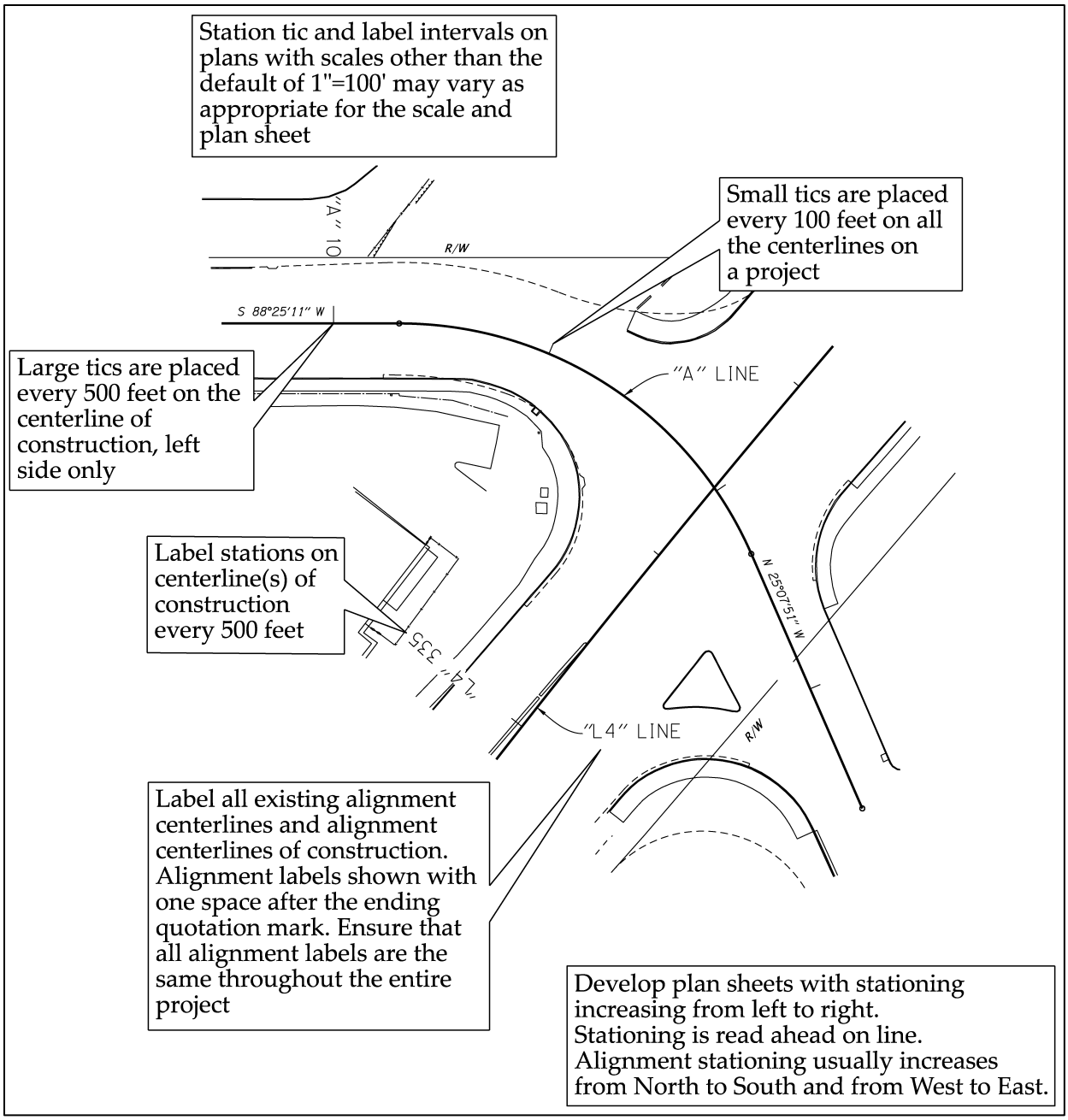
803.3 Plan View Orientation

Orient plan areas on the construction plan sheets so that the projects centerline stationing values are increasing from the left side of the sheet to the right side. When a plan view depicts a curved alignment, orientation may not allow increasing stationing from left to right on the sheet. For gentle curves this orientation might be achieved to some degree. Plan views depicting sharper curves may benefit from continuation notes placed at the edge of the plan view, to guide the reader to the next plan view. For plan views depicting a straight alignment only, then that plan view should orient that alignment parallel to the sheet. Multiple plan views may be depicted on one construction plan sheet, but not if there is a profile drawing on the same sheet or if there is a profile sheet associated with that plan sheet.

803.4 Horizontal Alignment Basics

See Figure 800-2 for the basic items shown on a horizontal alignment.

Figure 800-2: Basic Horizontal Alignment Items



803.5 Drawing Continuation

Drawings often need to be continued either onto another sheet or to another place on the same sheet. For plans sheets the three methods of performing these continuations of the drawing are break lines, match lines, and overlapping. All of these methods should be used in conjunction

with labeled alignment lines and stationing. These help the reader understand which drawing segment proceeds to the next segment, by using the numerical sequence of the alignment stationing.

803.5.1 Overlapping Method

The most common and preferable method of performing a continuation of drawing involves repeating a short portion of the end of the previous drawing segment as the beginning of the following drawing segment.

For example, the previous drawing segment depicts 0+25 to 5+25 and the following drawing segment depicts 4+75 to 9+75, creating a 50' overlap of depiction. The length of the overlap can vary, and best practice is that a station label (i.e., 5+00) or a landmark (existing or proposed feature) is contained within the overlap. A general rule is to provide ½" of plan sheet length as overlap (i.e., 25' overlap with a scale of 1"=50' or 50' of overlap with a scale of 1"=100'). A greater distance may be needed depending on what lies in the overlap area, or if the following drawing segment is at a different orientation causing an inconsistent overlap distance.

A continuation note at the beginning and end of each drawing segment can guide the reader to the previous or following drawing segment, but it is often not required for the reader to understand. Profile drawings also use this method of continuation.

803.5.2 Break Line Method

When little or nothing changes between two drawing segments, or no work is performed between to two segments, the break line method can be used to omit the portion between segments because it is unnecessary. This method involves adding linework to graphically break the drawing into pieces that are not immediately adjacent to one another. Best practice is that shown segment is long enough to display two station labels along the alignment.

For example, the previous drawing segment depicts 11+25 to 18+75 and the following drawing segment depicts 23+25 to 28+25, creating a 450' gap of depiction. In this example, both drawing segments are ample distance to show station labels (i.e. 12+00 to 18+00 and 24+00 to 28+00). Like the overlapping method, a continuation note at the beginning and end of each drawing segment can guide the reader to the previous/following drawing segment.

803.5.3 Match Line Method

Match lines are used to indicate the location where a previous drawing segment exactly stops and where the following drawing segment exactly starts. Both drawing segments must have the

same representation of the match line as a break in the drawing so readers can easily find the connecting match line.

For example: previous drawing segment depicts 1+00 to 2+18.43 and the following drawing segment depicts 2+18.43 to 6+75, with zero gap between them.

A match line continuation is often used when the following drawing segment diverges in some way from the previous one, such as in a different drawing/sheet series and/or a different orientation. A two-drawing segments on the same sheet may be connected via match line. In this case, the continuation note would indicate where the continuation is to be found on the sheet the (i.e., continues left, right, above, below) instead of indicating a page number. Match line continuations should not be used continuing drawings that follow the primary construction centerline run of plan sheets. Often match lines are suited for non-mainline construction centerlines that diverge from the primary and must be continued via another sheet series. See Figure 800-3 for an example of match lines on a general construction plan sheet.

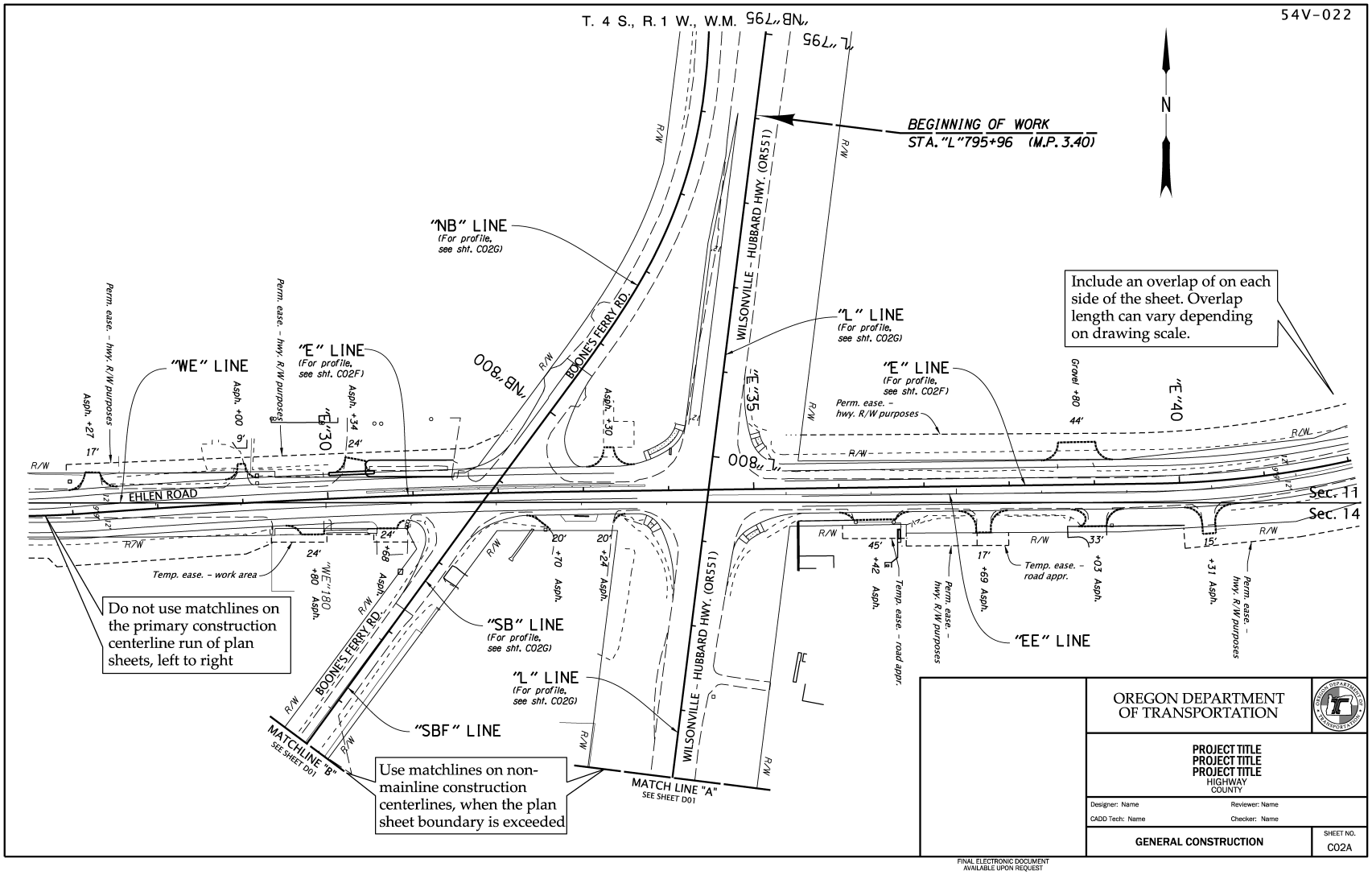
Do not use match lines on the primary construction centerline run of plan sheets (right or left edge of alignment as it is oriented on the plan sheet). Use match lines for non-mainline construction centerlines, when the alignment does not fit on a single plan sheet. See Figure 800-3 for an example of match lines on a general construction plan sheet.

If possible, avoid placement of match lines at:

- A location that causes repetitive annotation
- An approach or intersection
- A short structure
- A curb ramp area
- Along main line/primary centerline
- A location where a match line interferes with other annotations
- Places where an overlapping continuation can occur instead to fill out a drawing segment

Also avoid placing math lines or sheet breaks too frequently so that adequate stationing is not visible to locate features.

Figure 800-3: Match Lines and Drawing Overlap



Section 804 "Combined" Construction Plans

Combined plans are the most common format for showing the elements of roadway construction in plan view.

Begin developing construction plans with "combined" information, by turning the appropriate levels on or off in the attached basemap reference files. Table 800-1 lists the items that need to be shown on "combined" plans, which include all the alignment, construction, drainage and utility, and removal information.

Table 800-1: Combined Construction Plans Guide

Base Map Reference File	Show	Do Not Show
Existing Topography	Existing topography, existing drainage, existing utilities	Descriptive text, point numbers
Design Base	Construction centerline, curve data, new construction, travel lanes, new drainage, new utilities, removal of existing elements	Descriptive text, point numbers
Right-of-Way	R/W dimensions and lines	Miscellaneous text, point numbers

Section 805 "Separated" Construction Plans

When the complexity of a projects makes it difficult to clearly show all roadway construction elements on a "Combined" plan sheet, separate the elements from those sheets into groups of elements and show each group on a "Separated" plan sheet. The following "Separated" plan sheets may be developed to convey those element groups on separate sheets to make each sheet easier to understand:

- Alignment
- Removal
- Drainage and Utilities

When space on the plan sheet doesn't allow for construction notes, further separation is allowed for General Construction sheets and Drainage and Utilities sheets by breaking out construction notes into a General Construction Notes sheet and a Drainage & Utilities Notes sheet.

Separate diversion plan sheets from Construction plan sheets to help avoid confusion between temporary work and permanent work.

A profile sheet is often a separate sheet but can be integrated into a General Construction sheet or an Alignment sheet or a Drainage & Utilities sheet provide sheet when space allows. On projects using "Separated" plan sheets, use any of the following separated sheet titles for each segment along the length of the main alignment:

- Alignment
- General Construction
- Drainage and Utilities
- Removal plans
- Profiles

It is acceptable to use combined plan sheets for multiple sheet titles from the list above and separate only one sheet title along the alignment. It is also acceptable to vary which plan sheets are separated as the project progresses along the main alignment (i.e., a separate drainage and utilities sheet at only one location along the alignment).

The roadway designer and CAD tech should discuss the scope of the project to determine if separate plan sheets are needed. See Sections 805.1 through Section 805.4 for guidance on creating each type of separated construction plan sheet.

805.1 Roadway Alignment Plans

For projects in urban areas or projects with complex geometry or right-of-way needs, there may not be enough space on a single plan sheet to show all necessary alignment data. To avoid clutter and clearly show alignment data, create separate alignment plan sheets. Put the alignment plan as the first sheet in the series of plan sheets for the segment of alignment.

The alignment plans display the construction centerline, right-of-way lines, and existing topography. Drainage and utilities and new construction items are not shown on the alignment plans.

To begin developing alignment plans, turn the appropriate levels on or off in the attached basemap reference files. For a guideline of items for alignment plans, see Table 800-2.

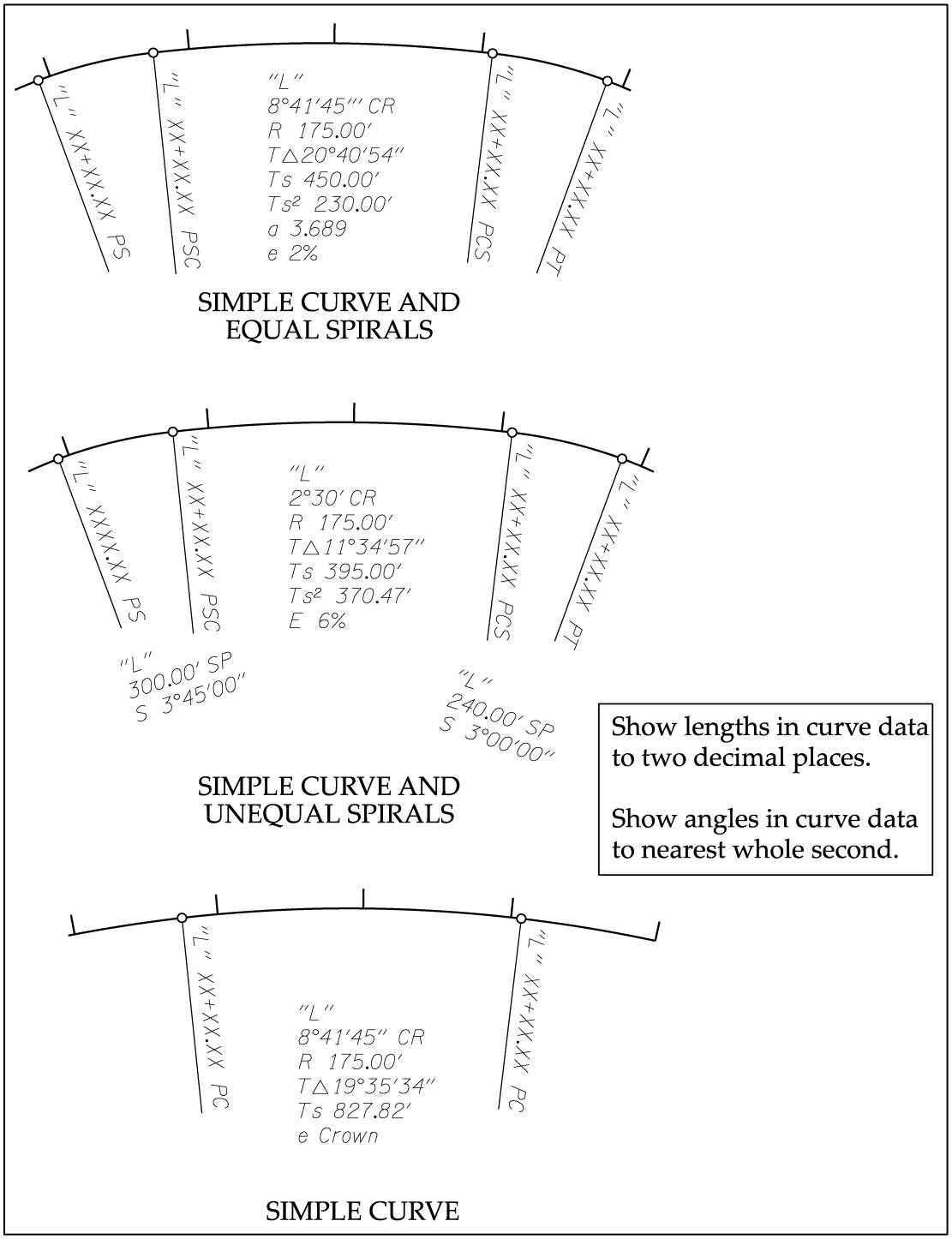
See Section 805.1.1 through Section 805.1.4 for guidance on the individual parts of alignment plans. See the checklist in Section 809 for a list of typically required items.

Table 800-2: Alignment Plans Guide

Base Map Reference File	Show	Do Not Show
Existing Topography	Existing topography	Existing drainage, existing utilities, descriptive text, point numbers
Design Base	Construction centerline, curve data, new edge of pavement	New drainage, travel lanes, new utilities, most new construction, descriptive text, point numbers
Right-of-Way	R/W dimensions and text	Miscellaneous text, point numbers

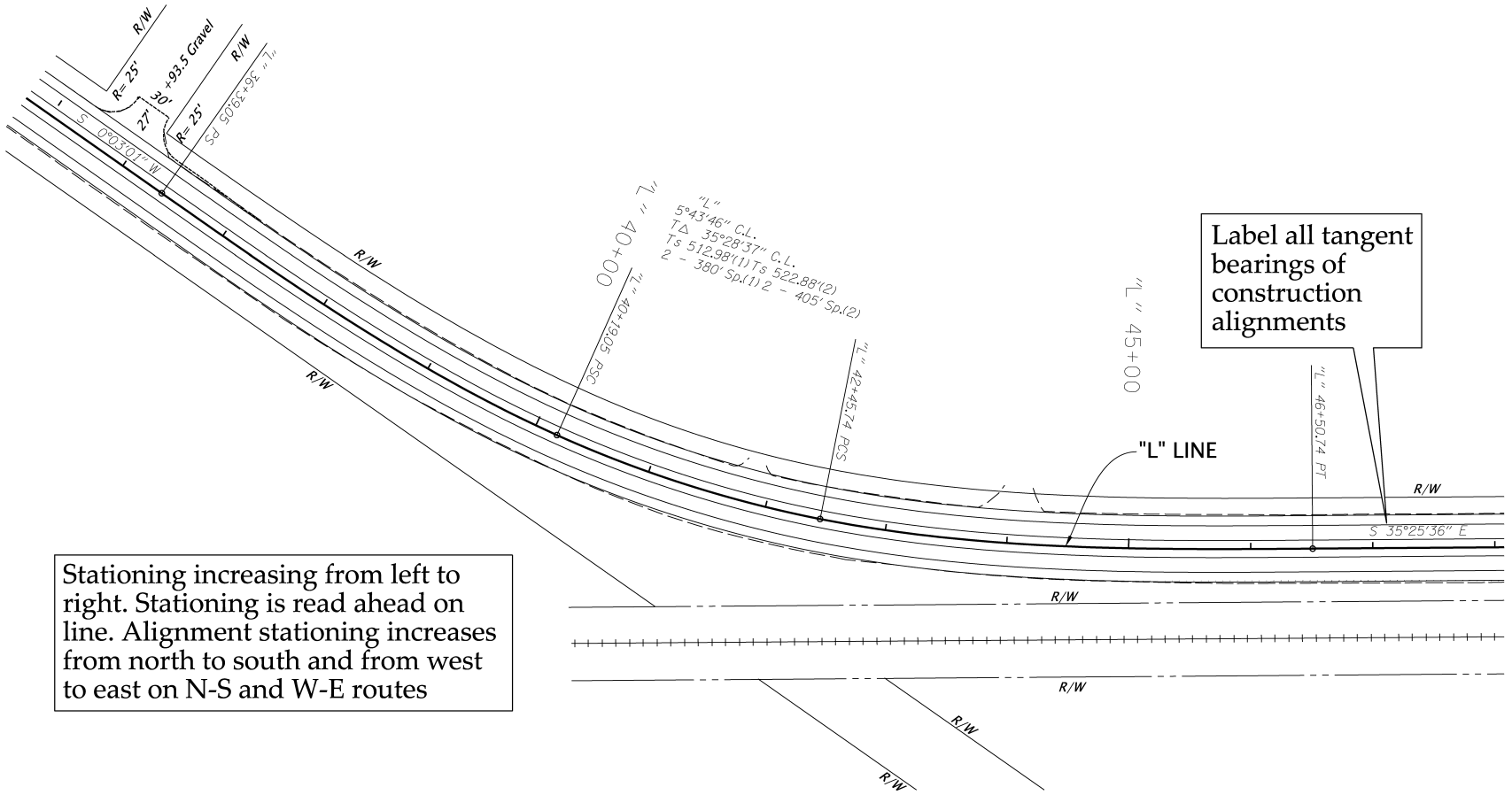
805.1.1 Curve Data

Figure 800-4: Curve Data and Flagged Control Points



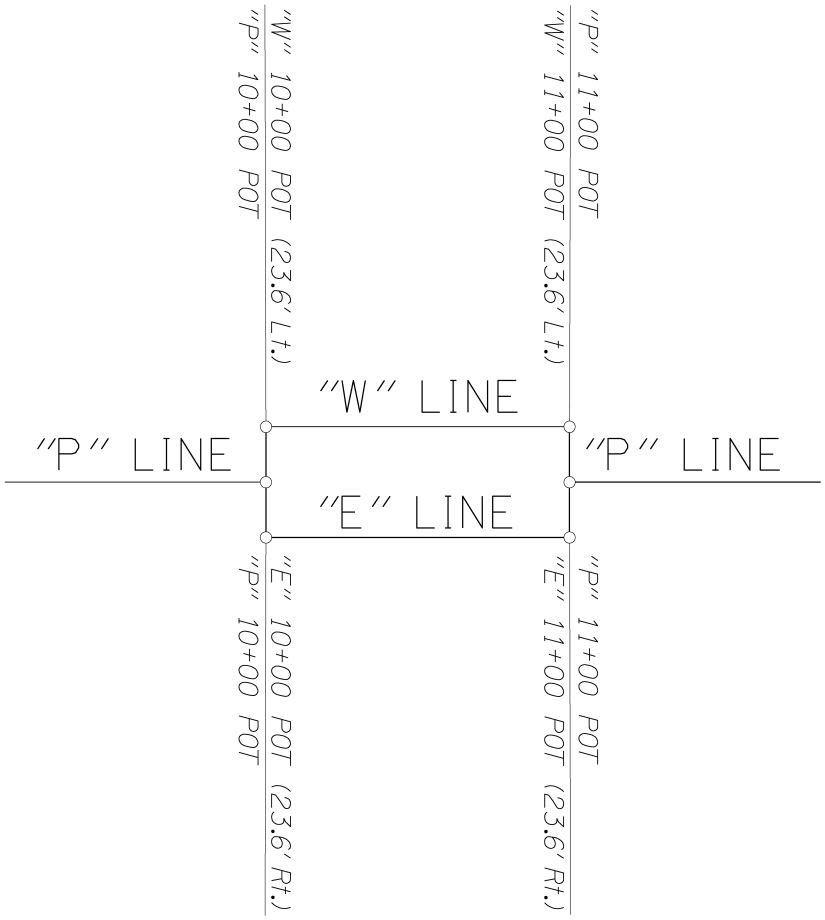
805.1.2 Bearings and Horizontal Curve Data

Figure 800-5: Bearings and Curve Data on Construction Alignment



805.1.3 Alignment Horizontal Offset

Figure 800-6: Alignment Horizontal Offset



805.1.4 Station Equations

A station equation indicates a gap, or overlap, generally created from realignment or intersection of the horizontal centerline stationing. The equation states the mathematical relationship of the centerline stationing back (Bk) or before the point of equation and the stationing ahead (Ah) or after the point of equation. The station equation is shown in both the plan view and the profile view.

Figure 800-7: Station Equations – Gap Equation

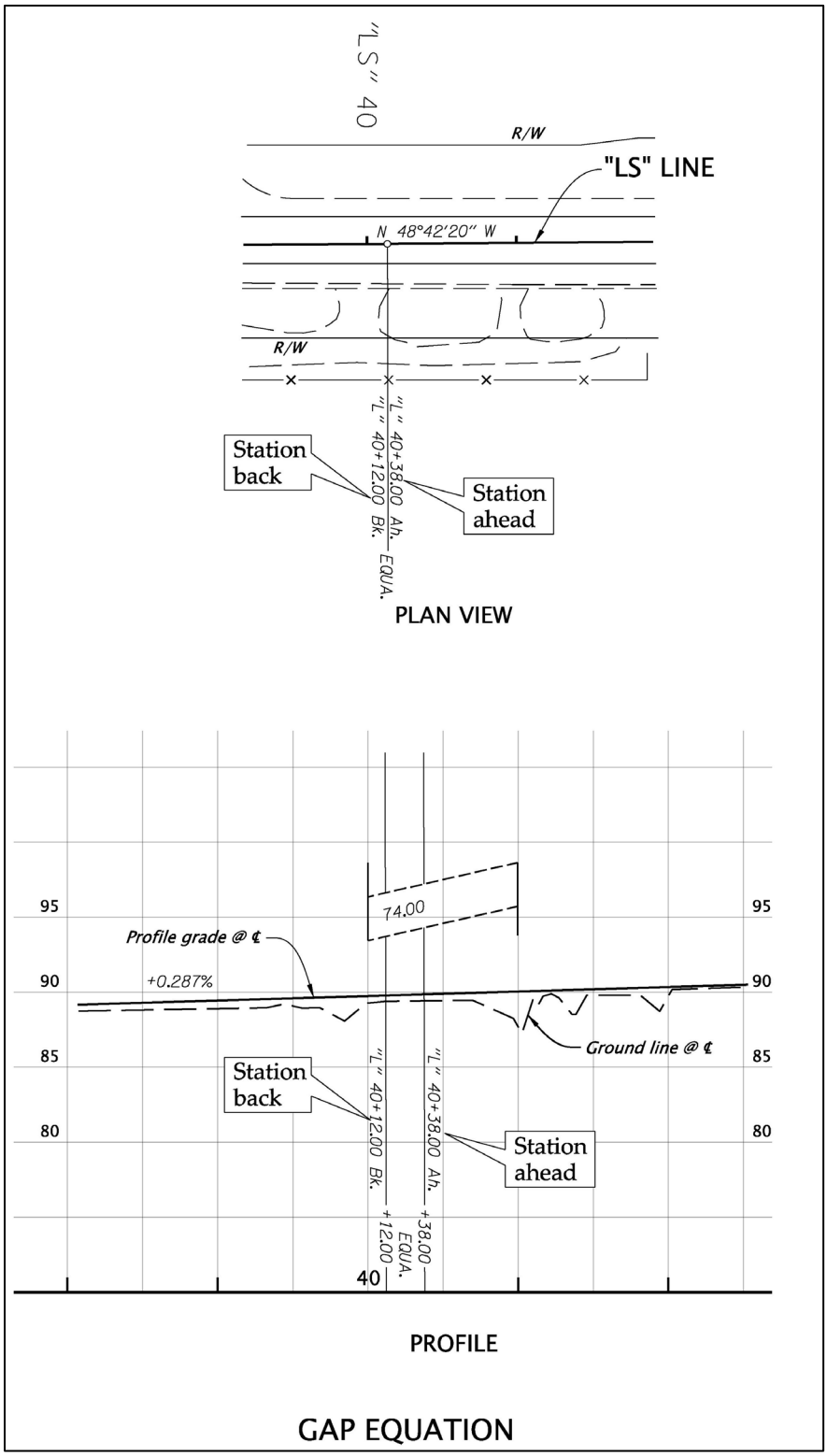
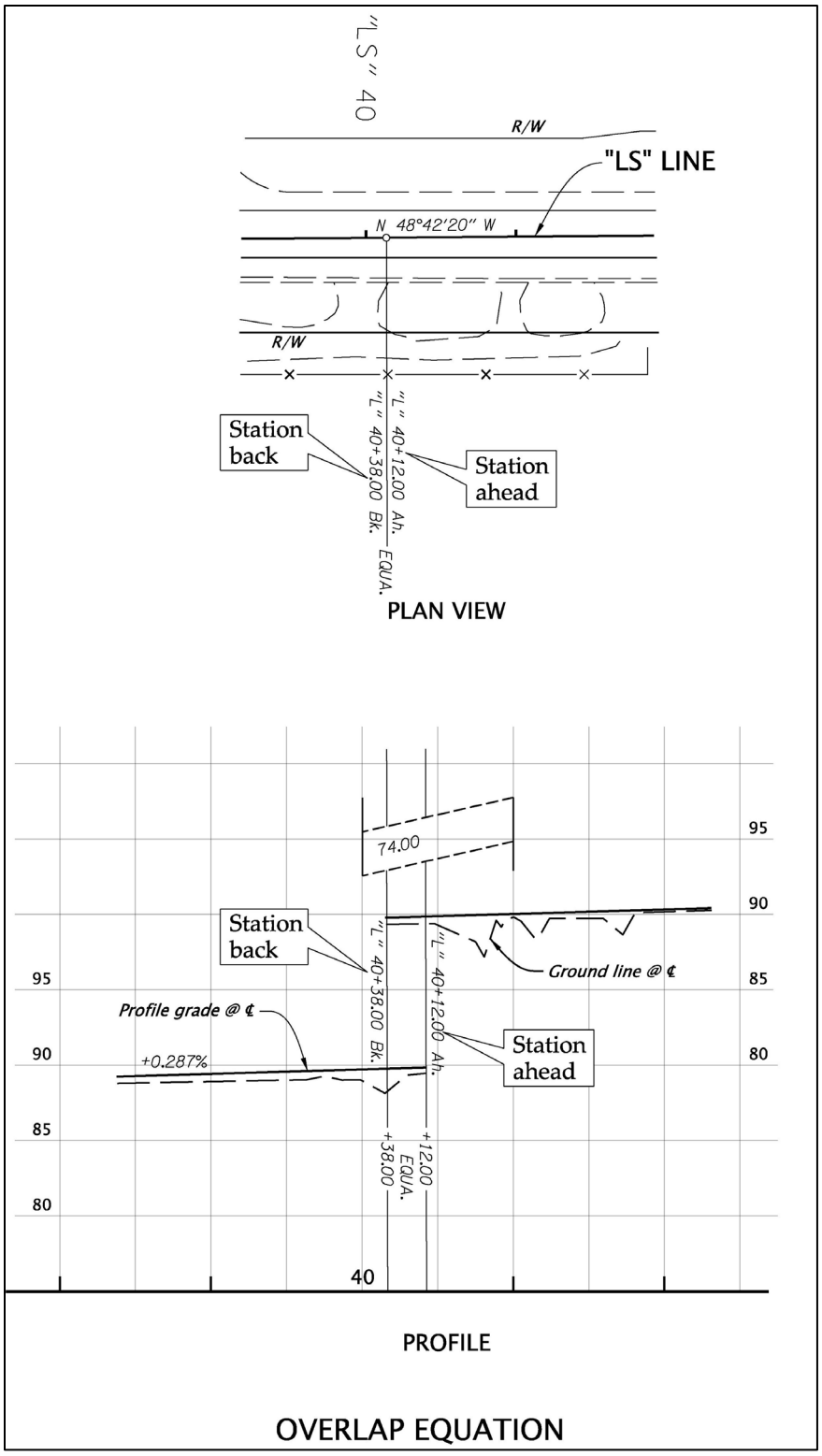


Figure 800-8: Station Equation - Overlap Equation



805.2 General Construction Plans

The general construction plans display:

Existing topography

right-of-way lines

All the new construction

Travel lanes

Construction centerline (not including curve data)

General construction plans do not display the new drainage and utilities.

To develop the general construction plans, turn the appropriate levels on or off in the attached reference files. For guidance on items to turn on or off for general construction plans, see Table 800-3. Use the MicroStation command “save settings” to maintain the levels on and off.

Add text and other project specific items as necessary. See Section 805.2.1 through Section 805.2.6 and the checklist in Section 809 for a list of typically required items.

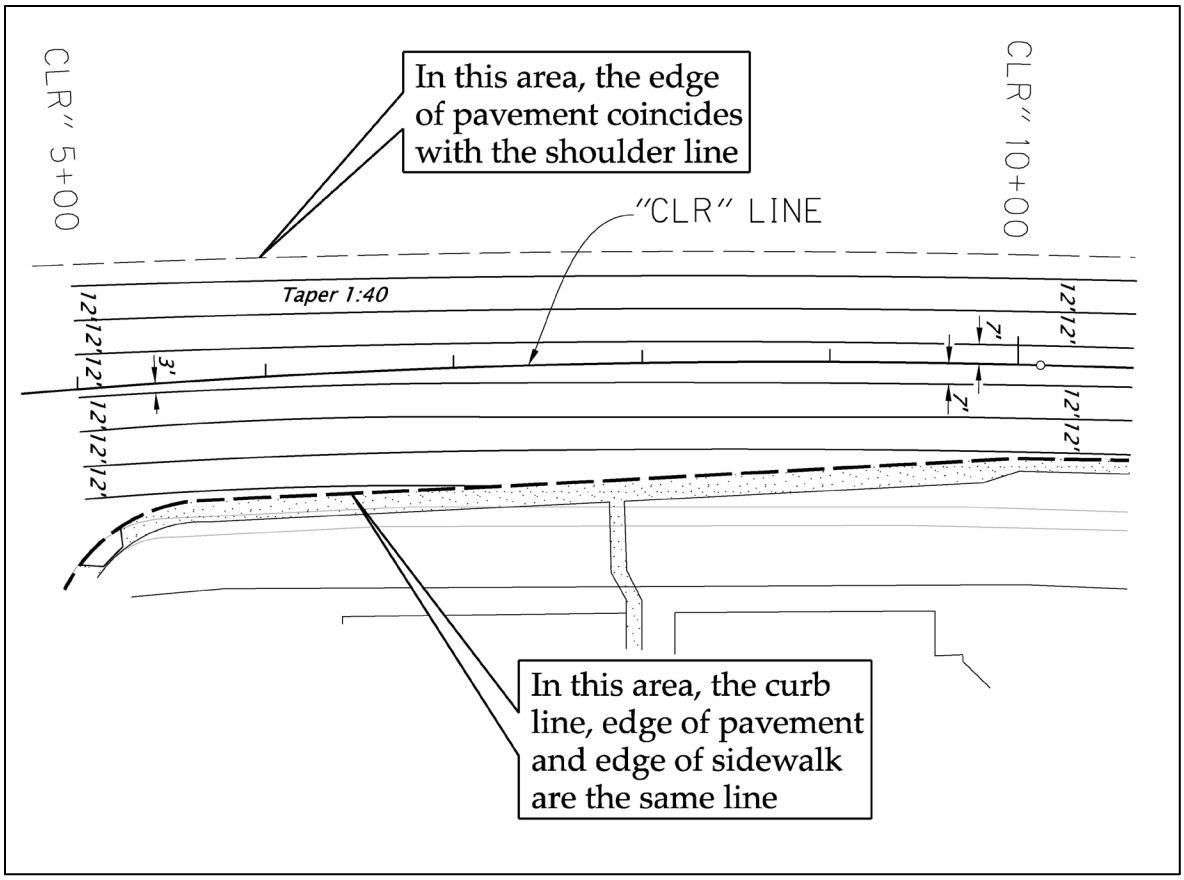
Table 800-3: General Construction Guide

Base Map Reference File	Show	Do Not Show
Existing Topography	Existing topography	Existing drainage, existing utilities, descriptive text, point numbers
Design Base	Construction centerline, most new construction, travel lanes	New drainage, new utilities, curve data, descriptive text, point numbers
Right-of-Way	R/W lines	R/W dimensions, miscellaneous text, point numbers

805.2.1 Edge of Pavement and Curbs

See Figure 800-9 for an example showing the edge of pavement and curbs. Note that separate lines may be used to show each individual feature (e.g., curb line, gutter apron/edge of pavement, back of curb/sidewalk, back of sidewalk, etc.), provided that the drawing scale allows each line to be clearly seen on the printed plan sheet. In general, a scale of at least 1"=30' is required to produce individually discernible line on the printed sheet when lines are spaced at least 6” (standard curb width) apart. However, clarity of lines in printed sheet should be verified before finalizing the plan sheet.

Figure 800-9: Edge of Pavement and Curbs



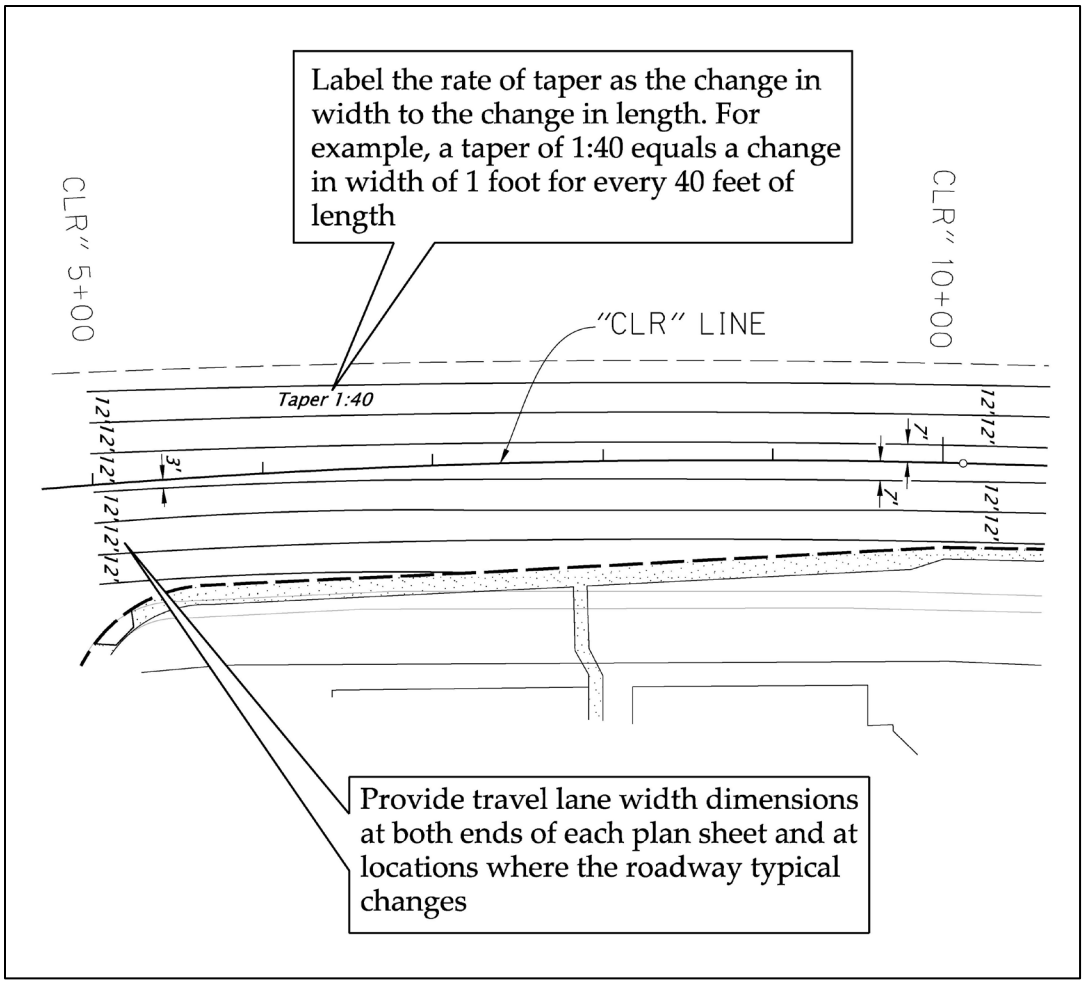
805.2.2 Travel Lanes and Tapers

Show travel lanes and tapers only on general construction sheets and diversion sheets. Lane line dimensions include all lane widths and the offset from centerline. Dimensions to lane lines may also include shoulder widths and distance to curb face. Lane width dimensions are typically shown to the nearest whole foot with no decimal places shown (e.g., 12′). When the lane width does not measure to a whole foot, show dimension to only one decimal place (e.g., 12.5′). Orient lane with dimension text to read in the same direction as the stationing labels. See Figure 800-10 for an example of lane lines shown on a plan sheet.

If there are no transitions depicted on plan view segment, either dimension the lane lines in the middle of each plan view segment or near the beginning and end of each plan view segment.

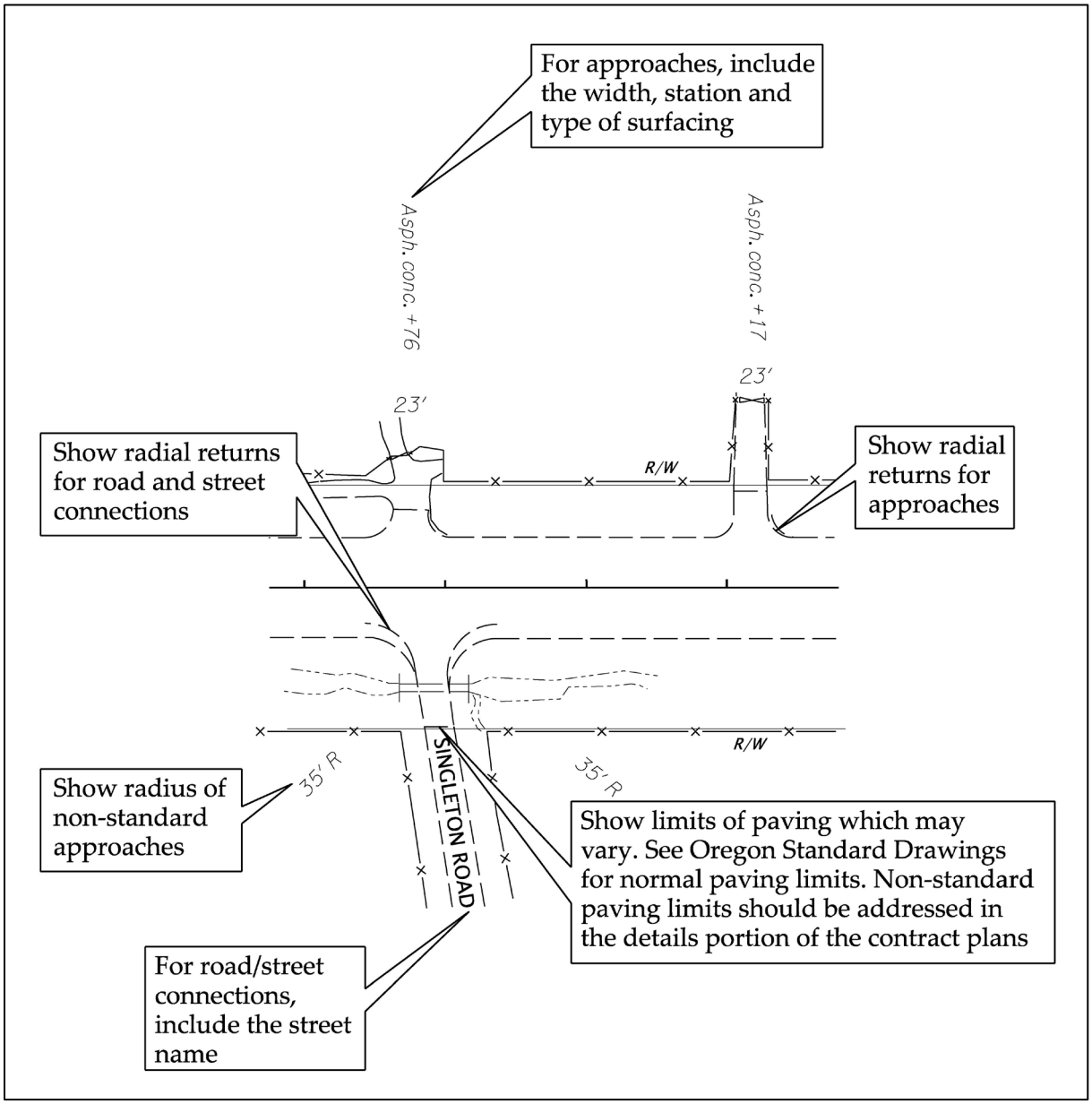
Travel lanes shown on general construction sheets are not intended to represent pavement markings. Do not show existing or proposed pavement markings on any C-series or D-series sheets.

Figure 800-10: Travel Lanes and Tapers



805.2.3 Approaches and Connections

Figure 800-11: Approaches and Road/Street Connections



805.2.4 Guardrail

Figure 800-12: Guardrail

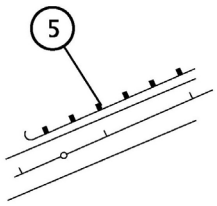
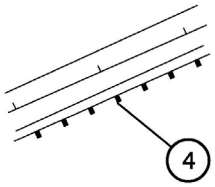
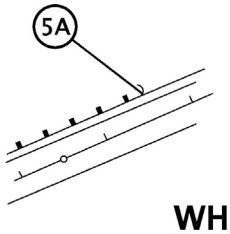
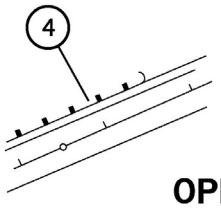
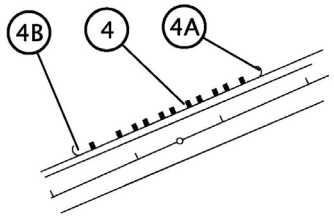
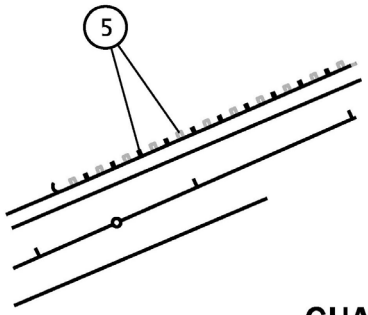
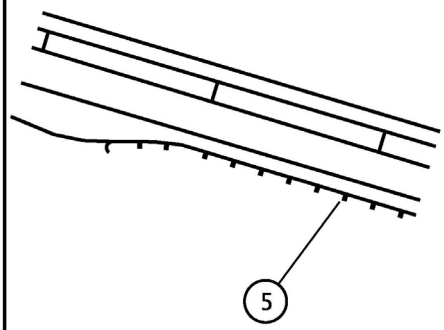
PLAN VIEW EXAMPLE	CONSTRUCTION NOTE EXAMPLE
	(5) *Sta. "DL" 446+95 to Sta "DL" 448+20* *Const. guardrail – 125.45' (Type 2A)* *Flare rate=0, W=0, E=0* *Const. anchor (Type 1 mod.)* *Inst. end piece (Type B)*
GUARDRAIL CONSTRUCTION	
	(4) *See sheet C03, note 5* *Const. guardrail*
GUARDRAIL EXTENDS ONTO ANOTHER PLAN SHEET	
	(5A) *Const. anchor (Type 1 mod.)* *Inst. one piece (Type B)*
WHEN END OF GUARDRAIL WITH END PIECE ON SAME PLAN SHEET	
	(4) *See sheet C03, note 5* *Const. anchor (Type 1 mod.)* *Inst. one piece (Type B)*
OPPOSITE END OF GUARDRAIL WITH END PIECE ON OTHER PLAN SHEET	

Figure 800-13: Guardrail (Continued)

PLAN VIEW EXAMPLE	CONSTRUCTION NOTE EXAMPLE
	(4) *Sta. "DL" 446+95 to Sta "DL" 448+20* *Const. guardrail – 125.45' (Type 2A)* (4A) *Const. guardrail terminal, non-flared* *Test Level 3* (4B) *Inst. end piece (Type B)*
WHEN END TREATMENT IS DIFFERENT ON SAME PLAN SHEET	
	(5) *Sta. "DL" 446+95 to Sta "DL" 448+20* *Remove extg. guardrail – 125.45'* *Const. guardrail – 125.45' (Type 2A)* *Flare rate=0, W=0, E=0* *Const. anchor (Type 1 mod.)* *Inst. end piece (Type B)*
GUARDRAIL REMOVAL AND CONSTRUCTION AT THE SAME LOCATION	
	(5) *Sta. "CR" 445+34 to Sta "CR" 448+53* *Const. guardrail – 306.25' (Type 2A)* *– 12.5' (Type 3)* *Const. guardrail transition* *Flare rate=15:1, W=18.5', E=0*
GUARDRAIL FLARE	

The following list provides guidelines for guardrail construction notes:

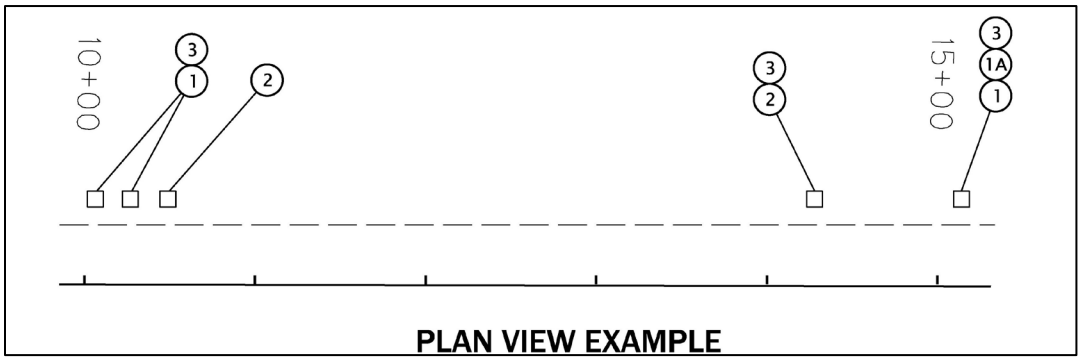
Guardrail notes are usually found on the first plan or construction note sheet that the guardrail appears.

List guardrail types in consecutive numerical order, i.e. 2A, 3, transition.

Treat median and shoulder barrier notes the same as guardrail notes.

805.2.5 Mailbox Installations

Figure 800-14: Mailbox Installation



When mailbox locations are known, follow the mailbox construction note format example in Figure 800-15.

Figure 800-15: Mailbox Construction Note Example - Known Location

GENERAL CONSTRUCTION NOTES:

(1) *Inst. single mailbox support – 3*
Inst. newspaper box – 3
(See drawing RD100)

(1A) *Const. conc. collar*
(See drawing RD100)

(1) *Inst. multiple mailbox support – 3*
Const. conc. collar – 2
(See drawing RD100)

(1) *Const. mailbox service turnout – 3*
(See drawing RD100)

When mailbox locations are not known, follow the mailbox construction note format example in Figure 800-16. This note should be placed on the first construction plan sheet.

Figure 800-16: Mailbox Construction Note Example - Unknown Location

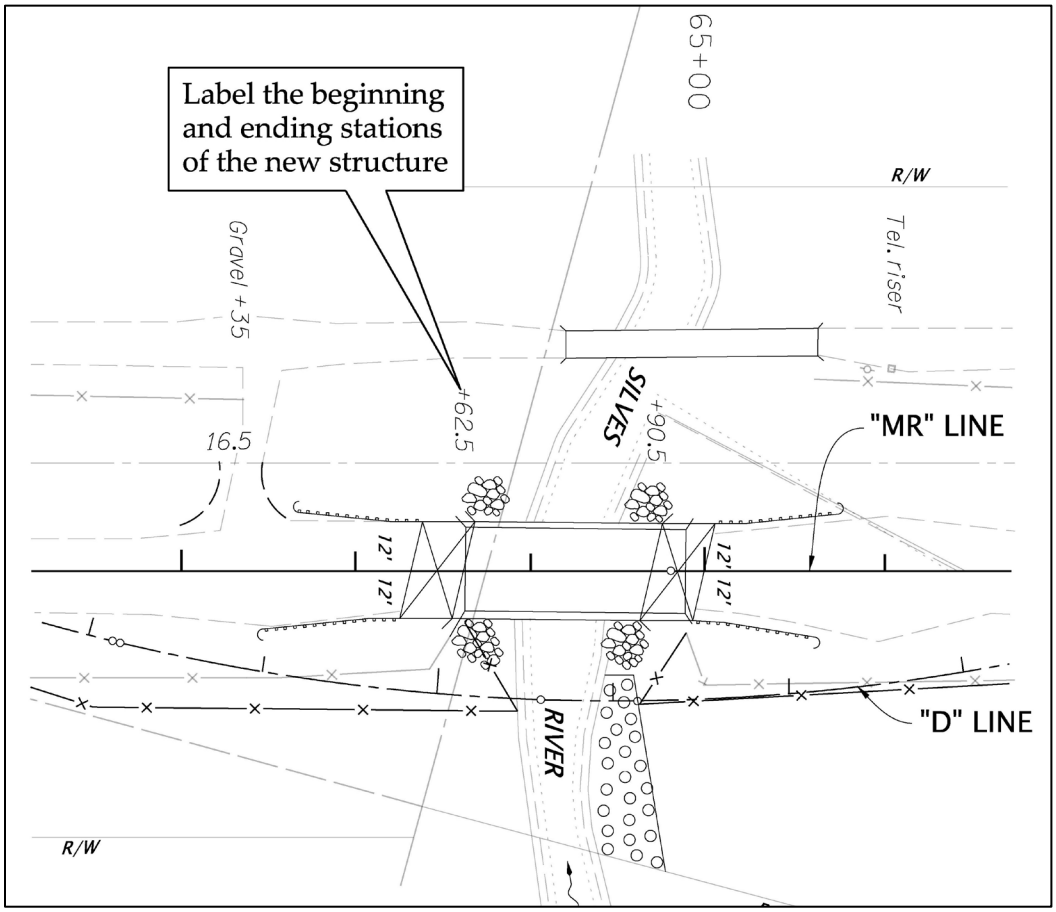
GENERAL CONSTRUCTION NOTES:

1. *Inst. single mailbox support – 8*
   Inst. multiple mailbox support – 6
   Const. mailbox service turnout – 8
   (Locate as directed)
   (See drawing RD100)

805.2.6 Structures

The structure information on the plan and profile must match the structure information on the bridge plan sheets.

Figure 800-17: Structures (Bridges, Box Culverts, and Walls)



805.3 Drainage and Utilities Plans

The drainage and utilities plans display all the new and existing drainage and utilities features, and applicable new construction, but do not display the travel lanes and curve data. Also shown are the right-of-way lines and existing topography.

The drainage and utilities sheets follow the general construction sheets in the series for the same segment of alignment. For a separate drainage and utilities sheet, the following table shows the specific levels to turn on when referencing different base files for drainage and utilities plan sheet creation.

Turn the appropriate levels on or off in the attached reference files. For a guideline of items to turn on or off for the drainage and utilities plans, see Table 800-4. Add text and other project specific items as necessary. See Figure 800-18 through Figure 800-20 and the checklist in Section 809 for a list of typically required items. Note that pipe lengths are measured from the center of a structure or symbol to the center of the next structure or symbol.

Table 800-4: Drainage and Utilities Guide

Base Map Reference File	Show	Do Not Show
Existing Topography	Existing drainage and utilities, curbs, most existing topography	Descriptive text, point numbers
Design Base	Construction centerline, new drainage and utilities, new curbs and barriers, drainage removal	Curve data, point numbers
Right-of-Way	R/W lines only	R/W dimensions, miscellaneous text, point numbers

Figure 800-18: Culverts

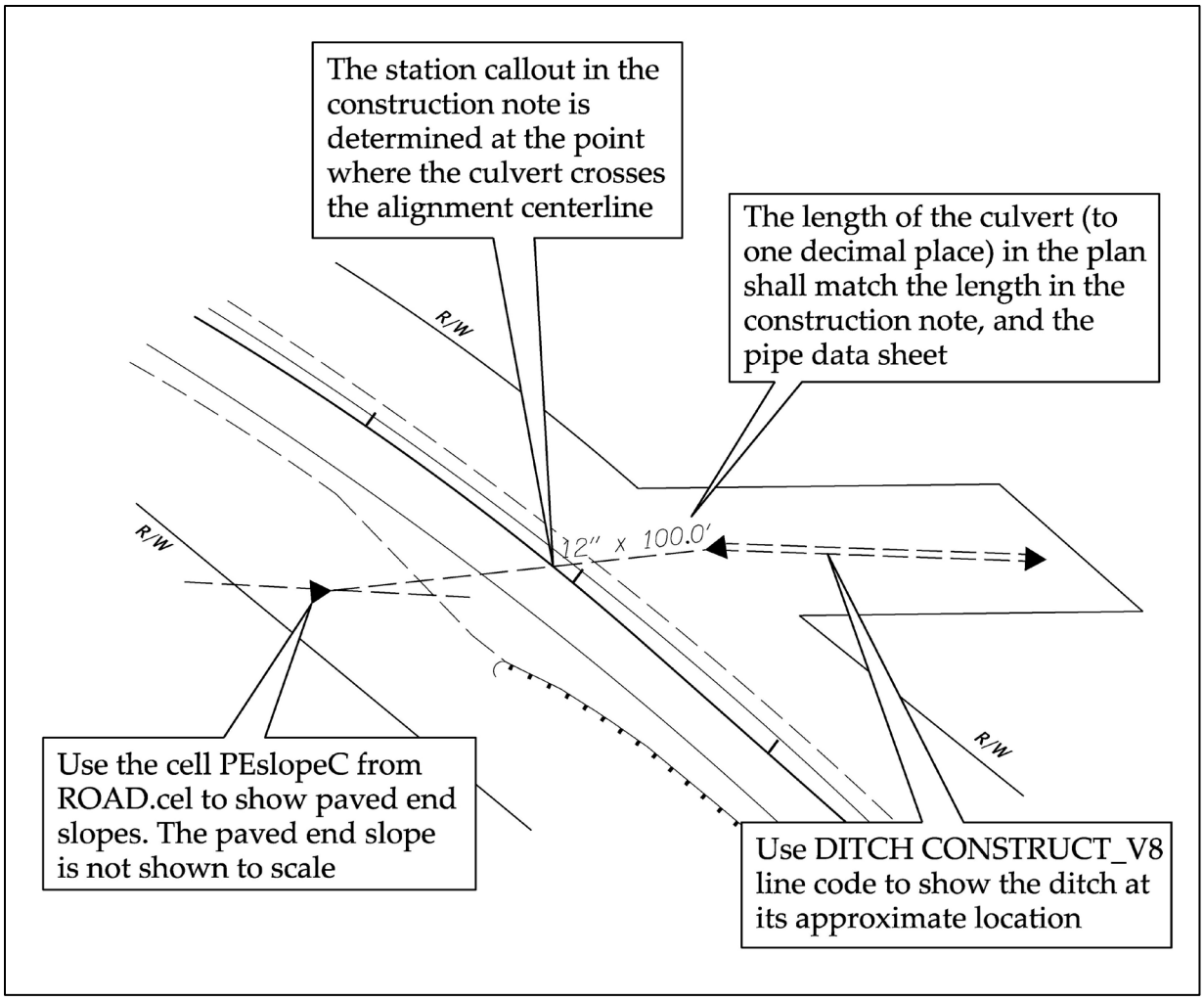


Figure 800-19: Manholes, Inlets, and Drainage Sewer Pipe Examples

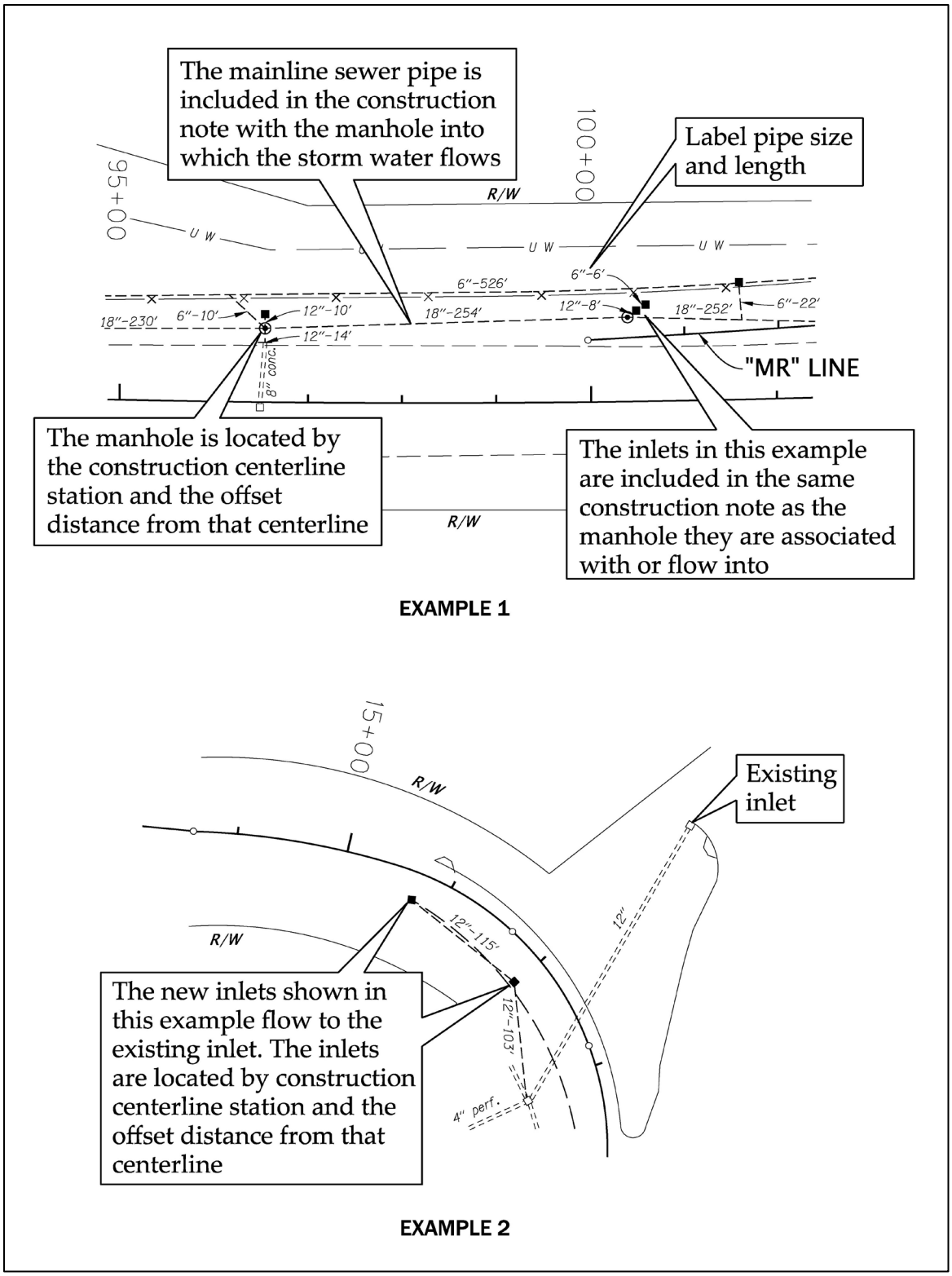
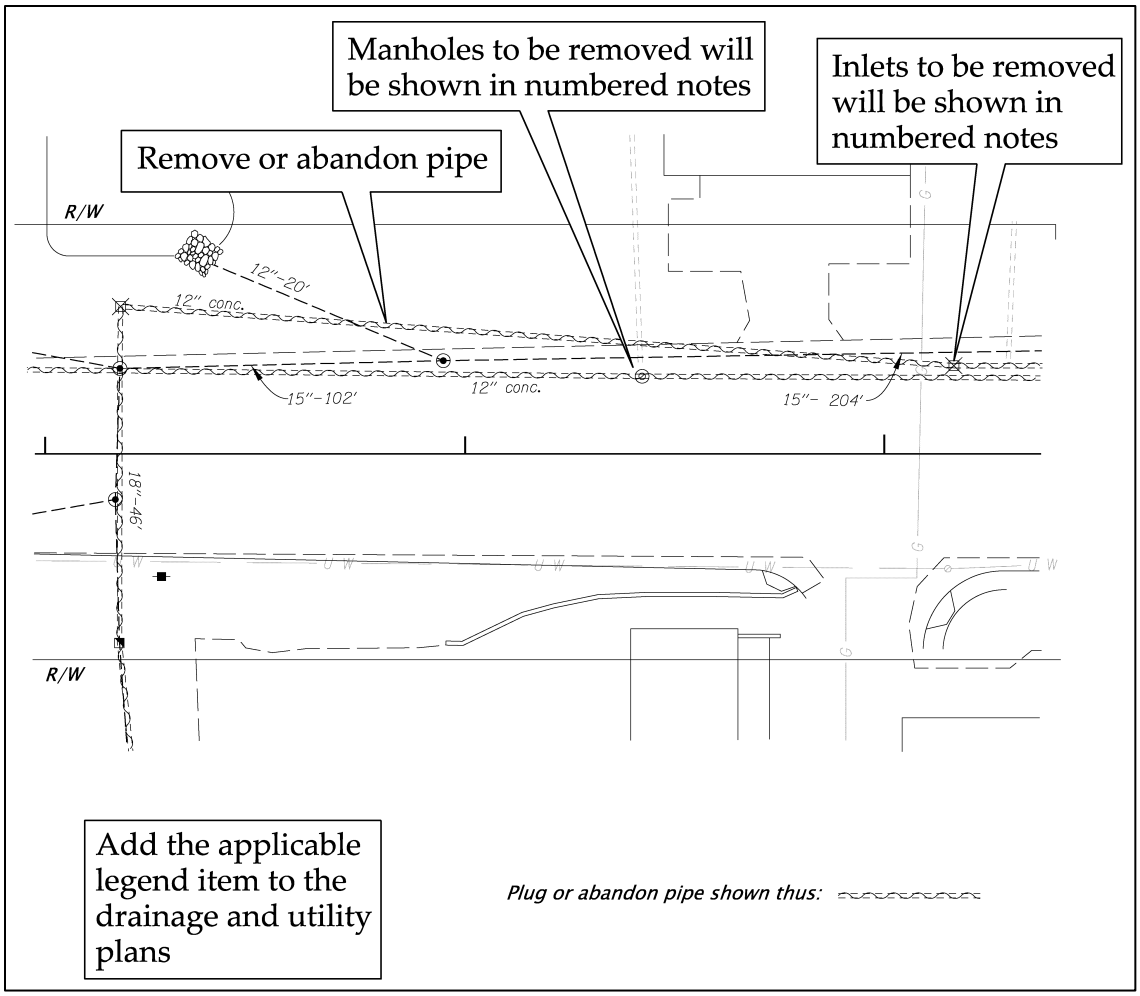


Figure 800-20: Drainage and Utility Removal



805.4 Removal Plans

Use removal plans when the contractor removes items, beyond normal clearing and grubbing. Identify items are as buildings and obscure general construction items. Removal plans are for use with both separated and combined styles of plan sheets and are placed at the end of the series of plan sheets for the segment of alignment, but before any profile sheets. For a separate removal plan sheet, the following table shows the specific levels to turn on when referencing different base files for plan sheet creation.

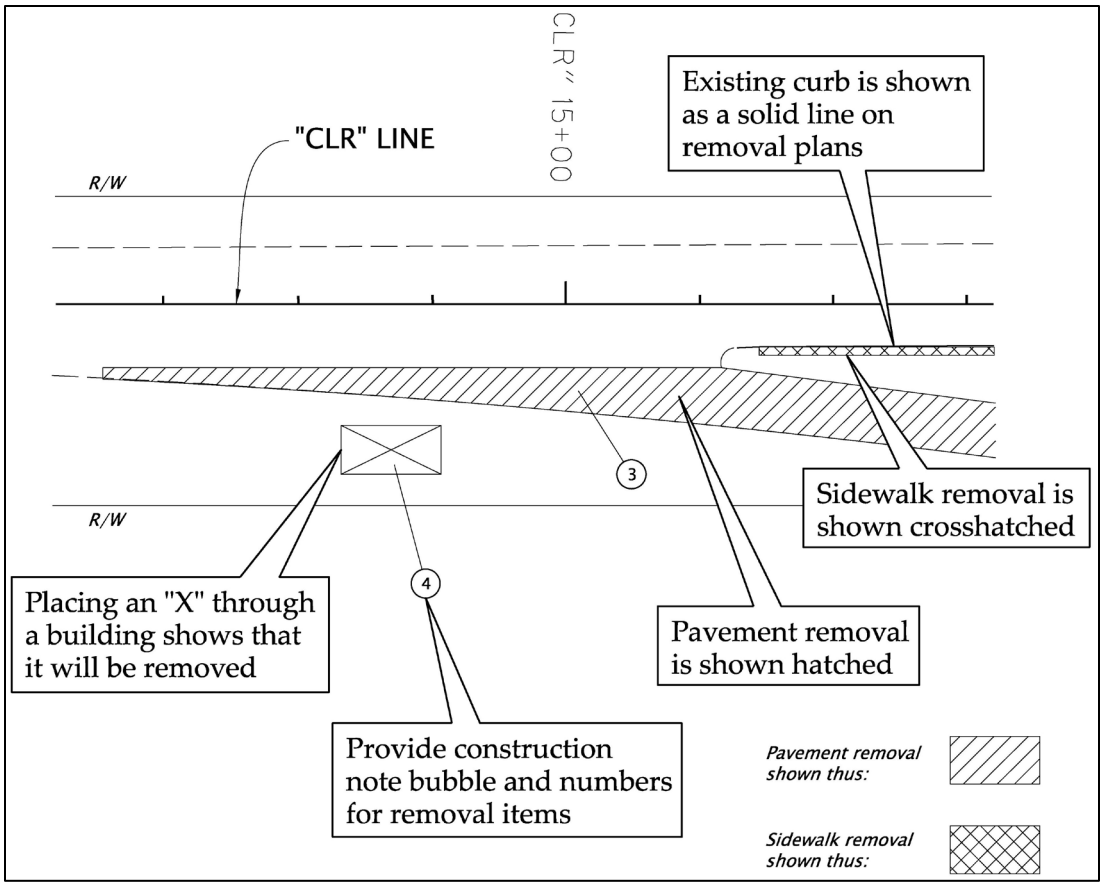
The removal plans display all the removal items except for drainage and utilities removal, which is shown on the drainage and utilities plans.

Turn the appropriate levels on or off in the attached basemap reference files. For a guideline of items to turn on or off for the removal plans, see Table 800-5. Add text and other project specific items as necessary.

Table 800-5: Removal Plans Guide

Base Map Reference File	Show	Do Not Show
Existing Topography	Existing curbs, most existing topography	Descriptive text, point numbers
Design Base	Construction centerline, curb removal, pavement removal, sidewalk removal, building removal	New construction, new drainage, new utilities, travel lanes, curve data, point numbers
Right-of-Way	R/W lines only	R/W dimensions, miscellaneous text, point numbers

Figure 800-21: Pavement, Sidewalk, and Building Removal



805.5 Profiles

The vertical alignment of a roadway is the progression of elevations, typically along the construction centerline. The existing ground profile line (ground line) is shown as well as the profile of the proposed vertical construction centerline alignment on a profile grid. Also shown within the profile grid is the depth of the new construction, the location of existing subsurface features, and any new proposed subsurface features such as sewer pipes, drain pipes, manholes and inlets. The profile grid is either just below the plan on the same sheet or displayed separately on a full profile sheet. See Figure 800-27.

On a plan-profile sheet, the profile should be aligned directly under the plan, by station. The station limits need to match the related plan station limits. Profiles are usually scaled with a vertical to horizontal ratio of 10 to 1. For every 10 feet measured horizontally, the vertical distance is 1 foot.

To begin development of the profile plan sheet, create a profile sheet in the appropriate ProjectWise folder using the Advanced Wizard. Once the drawing file is created, attach the

appropriate vertical profile base as a reference file. Normally, profile plan sheets are at 1”=50’ scale, which is 1200 feet per single plan sheet. Use the “Place Named Boundary” tool in the “Drawing” workflow, “View” tab, and “Named Boundaries” group to place named boundaries in the file. See Figure 800-22 and Figure 800-23.

Figure 800-22: Place Named Boundary Tool

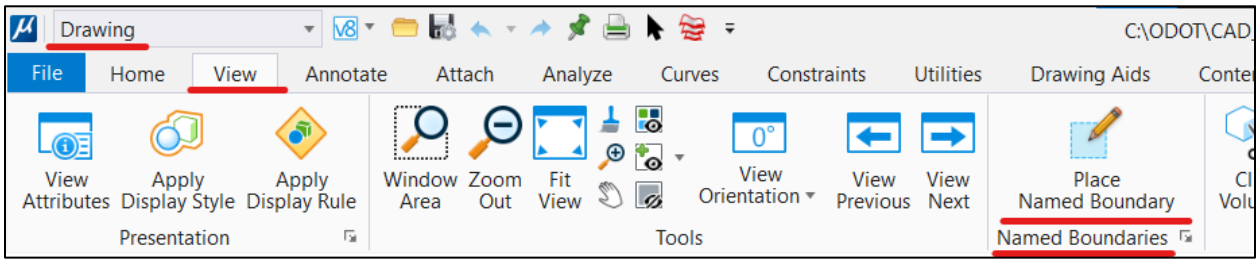
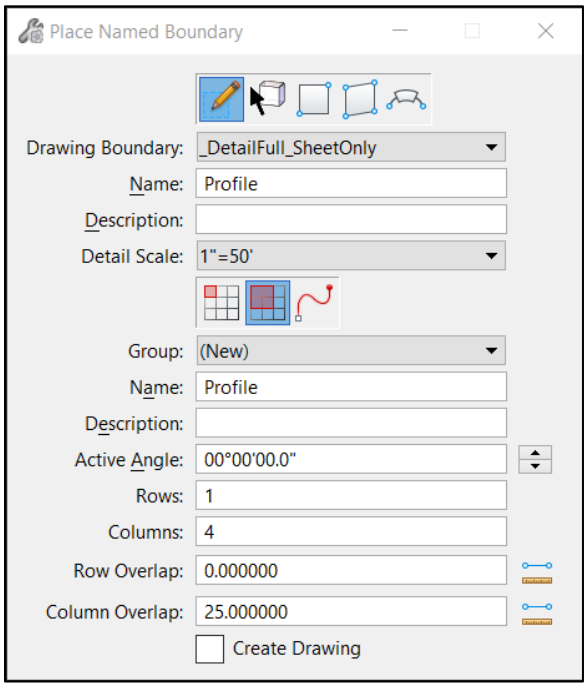


Figure 800-23: Place Named Boundary Dialogue



Once the named boundaries are placed, use the Named Boundaries tool to “Create Drawing” by right-clicking on the named boundaries group. See Figure 800-24 and Figure 800-25. Using the “Create Drawing” tool creates a separate sheet model for each named boundary in the group.

Figure 800-24: Open Named Boundaries

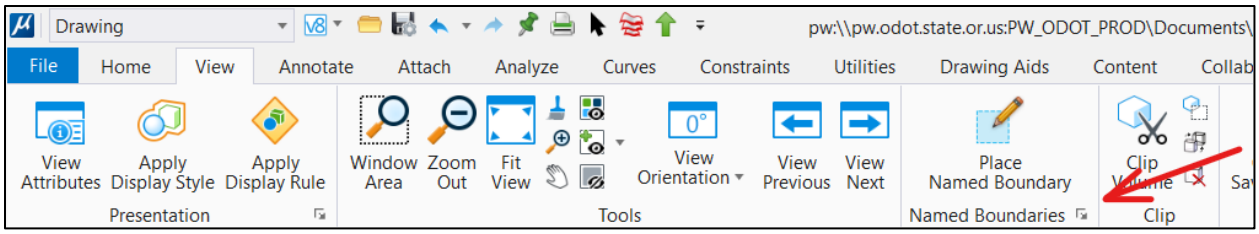
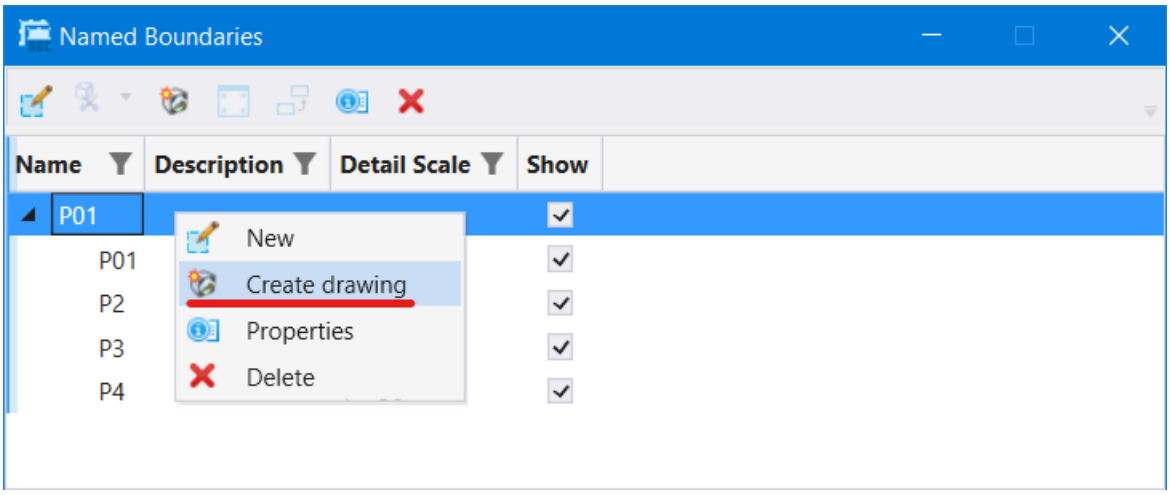
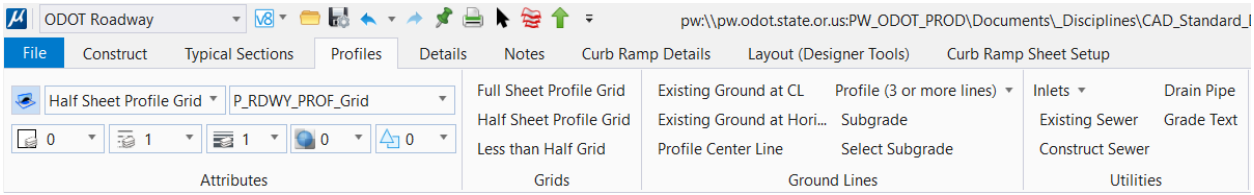


Figure 800-25: List of Named Boundaries



Within each profile sheet models, use the tools in the "ODOT Roadway" workflow, "Profiles" tab to complete the profile plan sheet. See Figure 800-26.

Figure 800-26: Profiles Workflow



Add text and other project specific items as necessary to the active file or the profile base file. Generally, only the items in Figure 800-27 through Figure 800-34 are added to the active file.

805.5.1 Profile Sheet Scale

Since profiles use a ½-inch grid as a background, the horizontal scales used for profiles should allow for 100 feet to align exactly with the profile grid. Scales that do not align with a ½-inch grid are 1"=15', 1"=30', 1"=60', and 1"=80'.

The horizontal scale of a profile should be the same as the scale used on the plan sheet that shows the plan view of the same segment. When the plan and profile are shown on the same plan sheet, both must be shown with the same horizontal scale so that the horizontal stationing can be aligned.

Since profiles use a 1/2-inch grid as a background, the vertical scales used for profiles should allow for 1 foot to align exactly with the profile grid. Scales that do not align with a ½-inch grid are 1″=2′, 1″=4′, 1″=10′, 1″=20′, 1″=40′ and 1″=50′.

805.5.2 Profile Components

See Figure 800-27 for the basic components structure of a profile plan sheet. Generally, elevation labels begin at two elevation numbers below the lowest grade point and ends at two elevation numbers above the highest grade point of the profile shown.

Figure 800-27: Basic Profile Sheet Item Placement

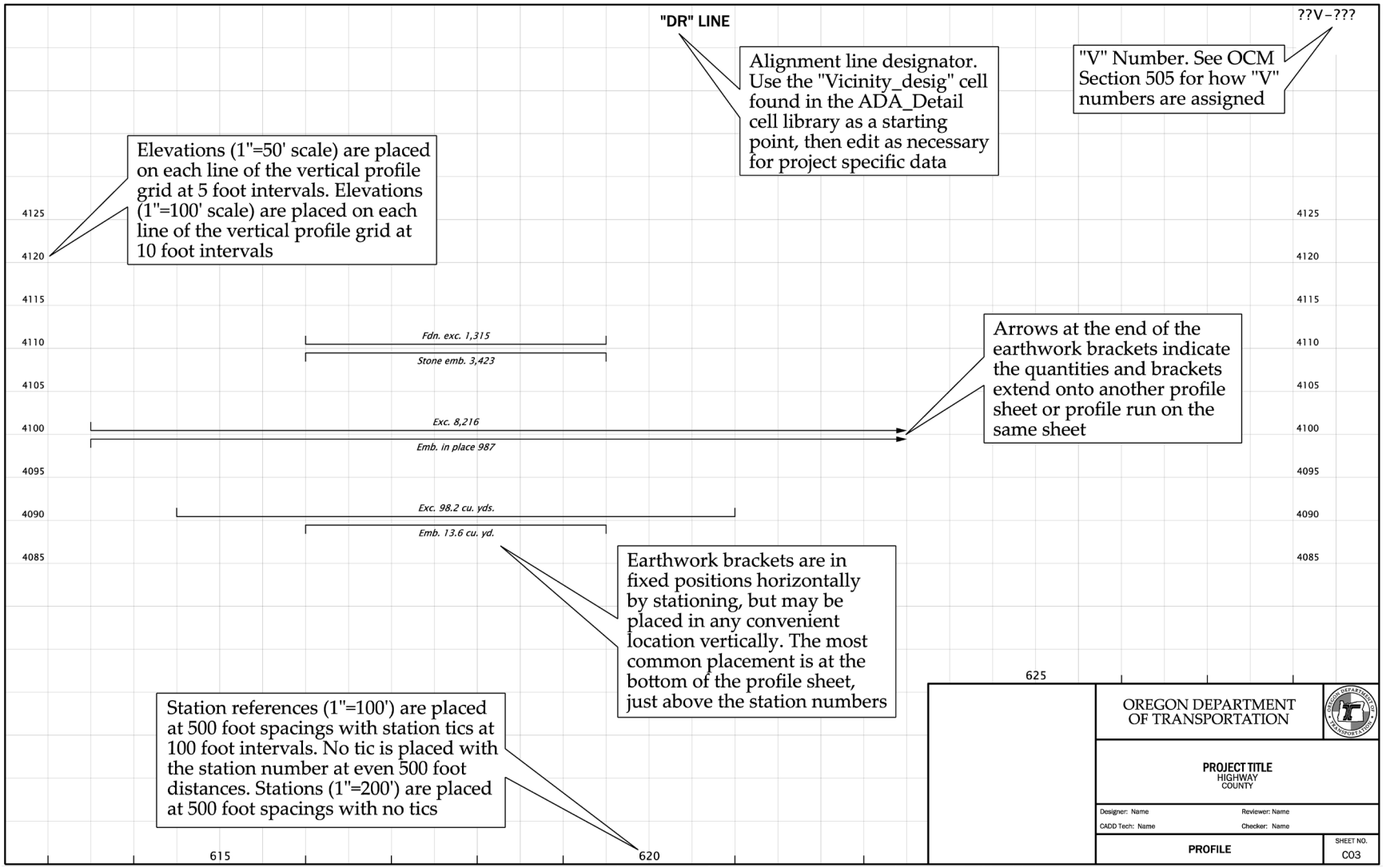


Figure 800-28: Vertical Alignment Item Placement

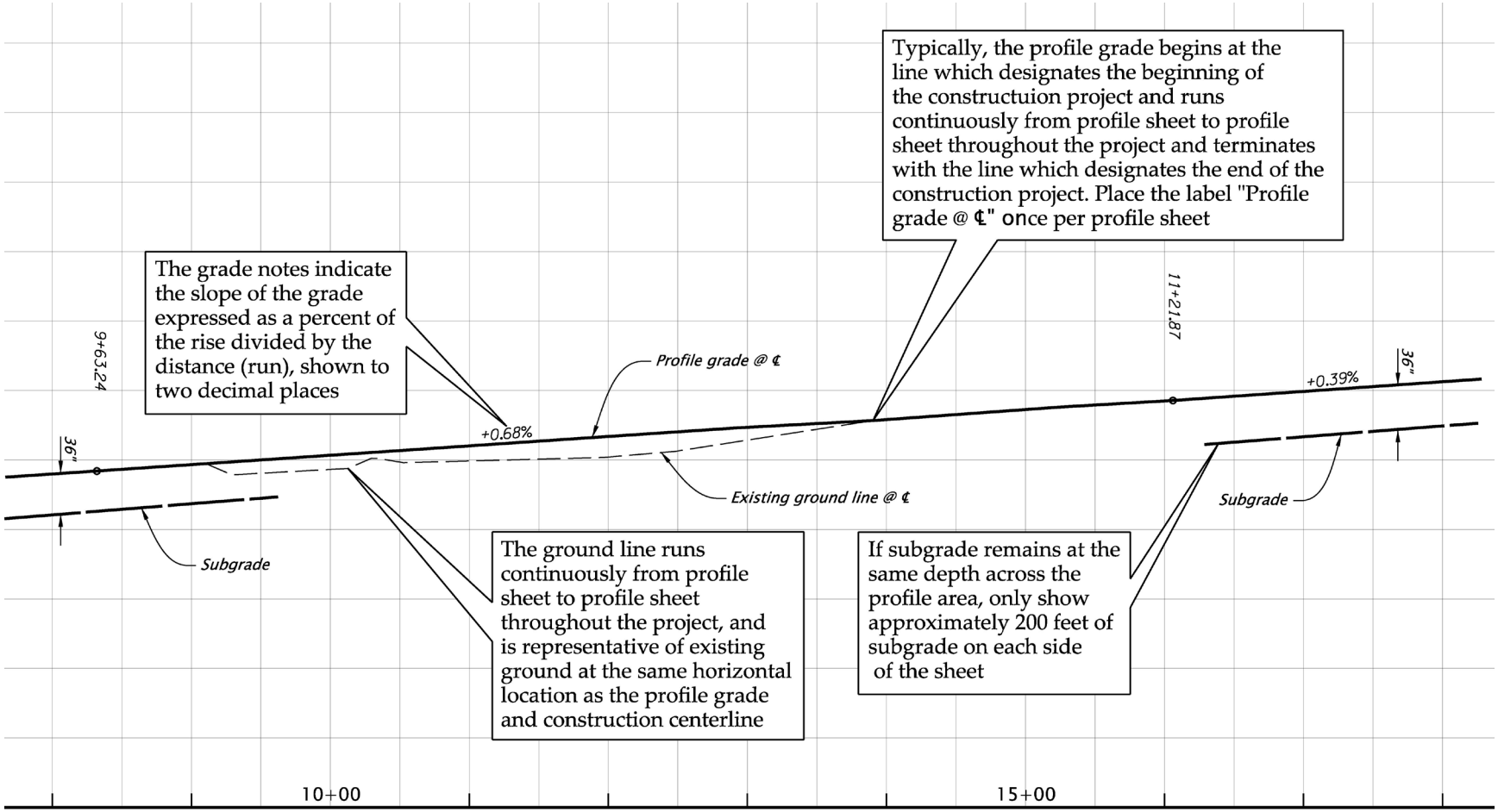
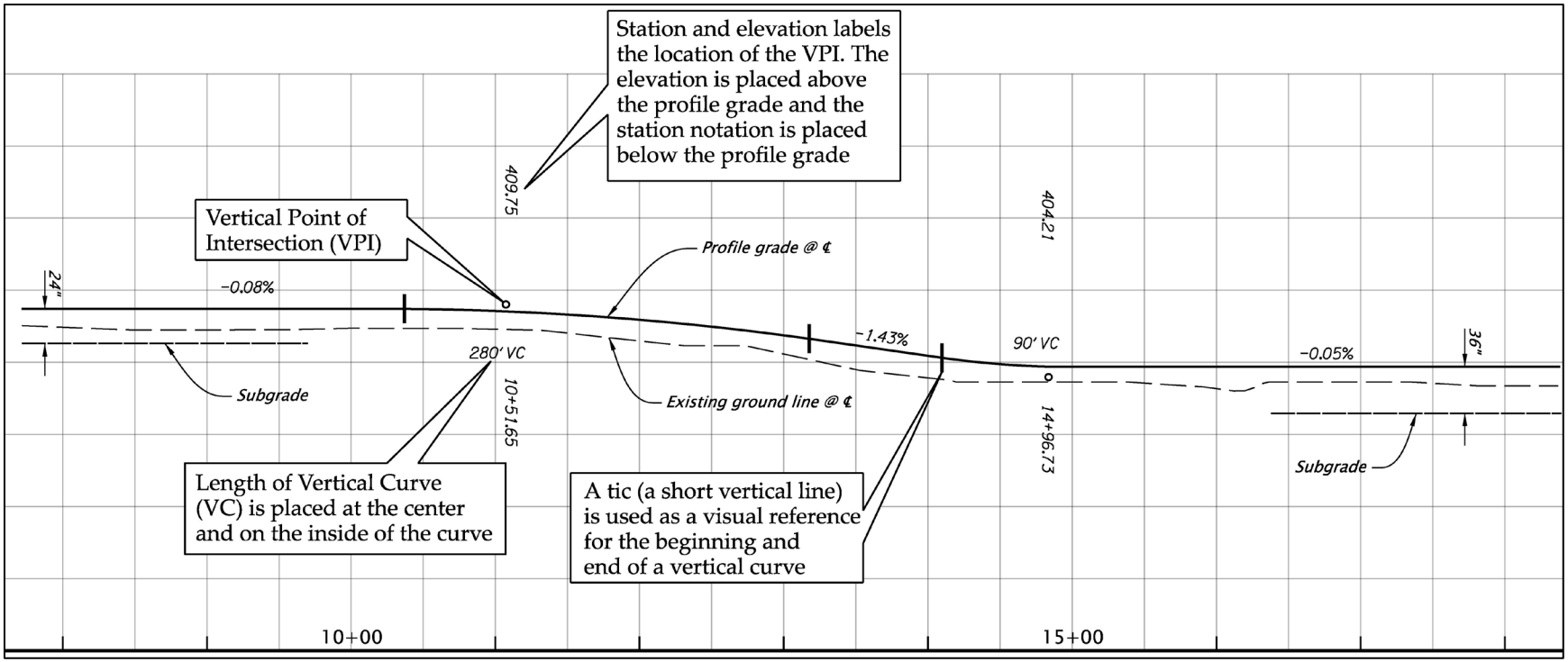
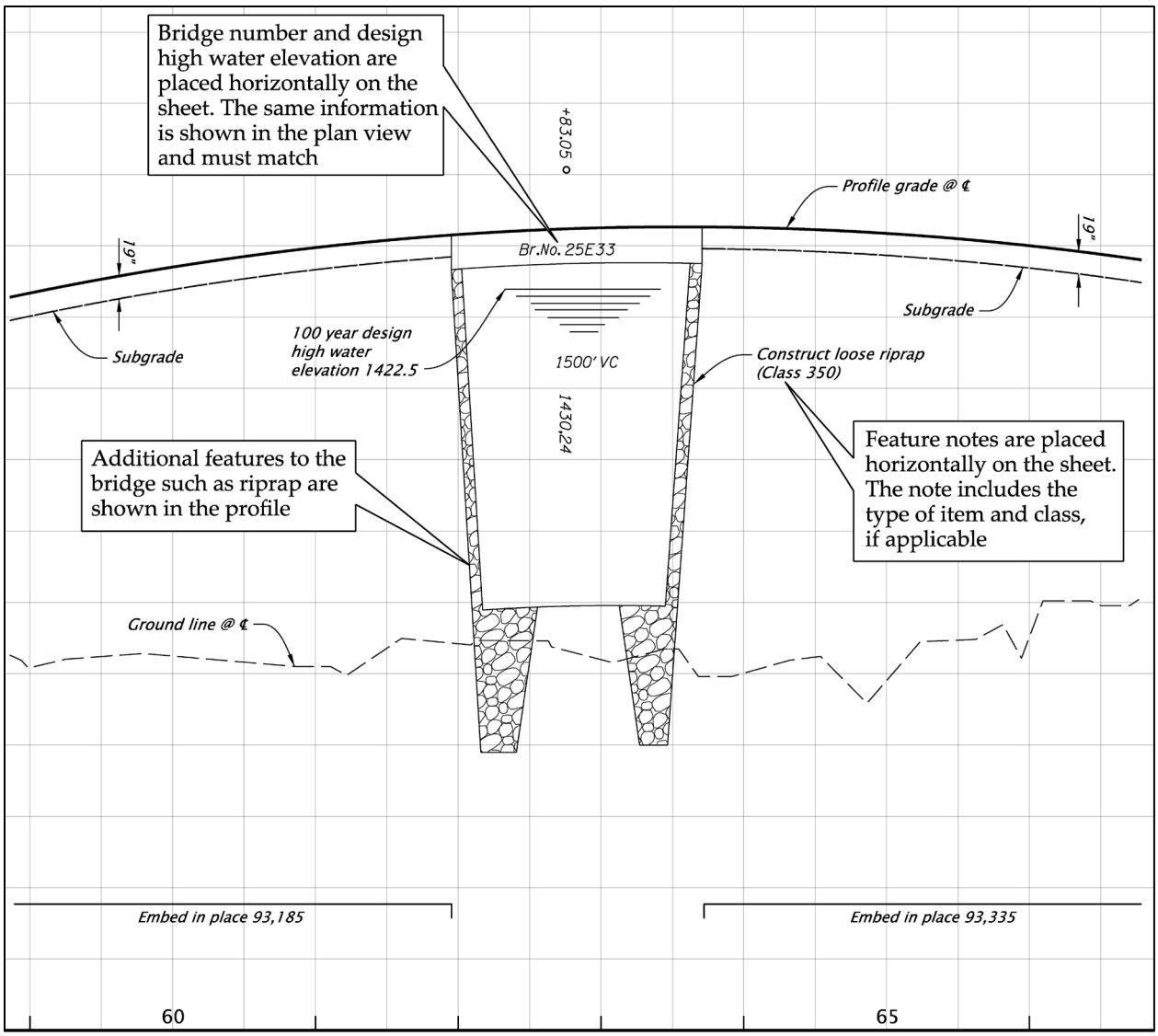


Figure 800-29: Vertical Curves and Data Item Placement



A vertical curve is used to connect two grade lines. The intersection point between the grade line and the vertical curve is called the B.V.C. (begin vertical curve) and the E.V.C. (end vertical curve). The intersection of the two grade lines is called the V.P.I. (vertical point of intersection).

Figure 800-30: Structures Item Placement



Bridge information, including the depth and length of the structure, can be found on the bridge drawings. The stations should be shown at the ends of the bridge or structure.

Figure 800-31: Box Culverts and Drainage Facilities

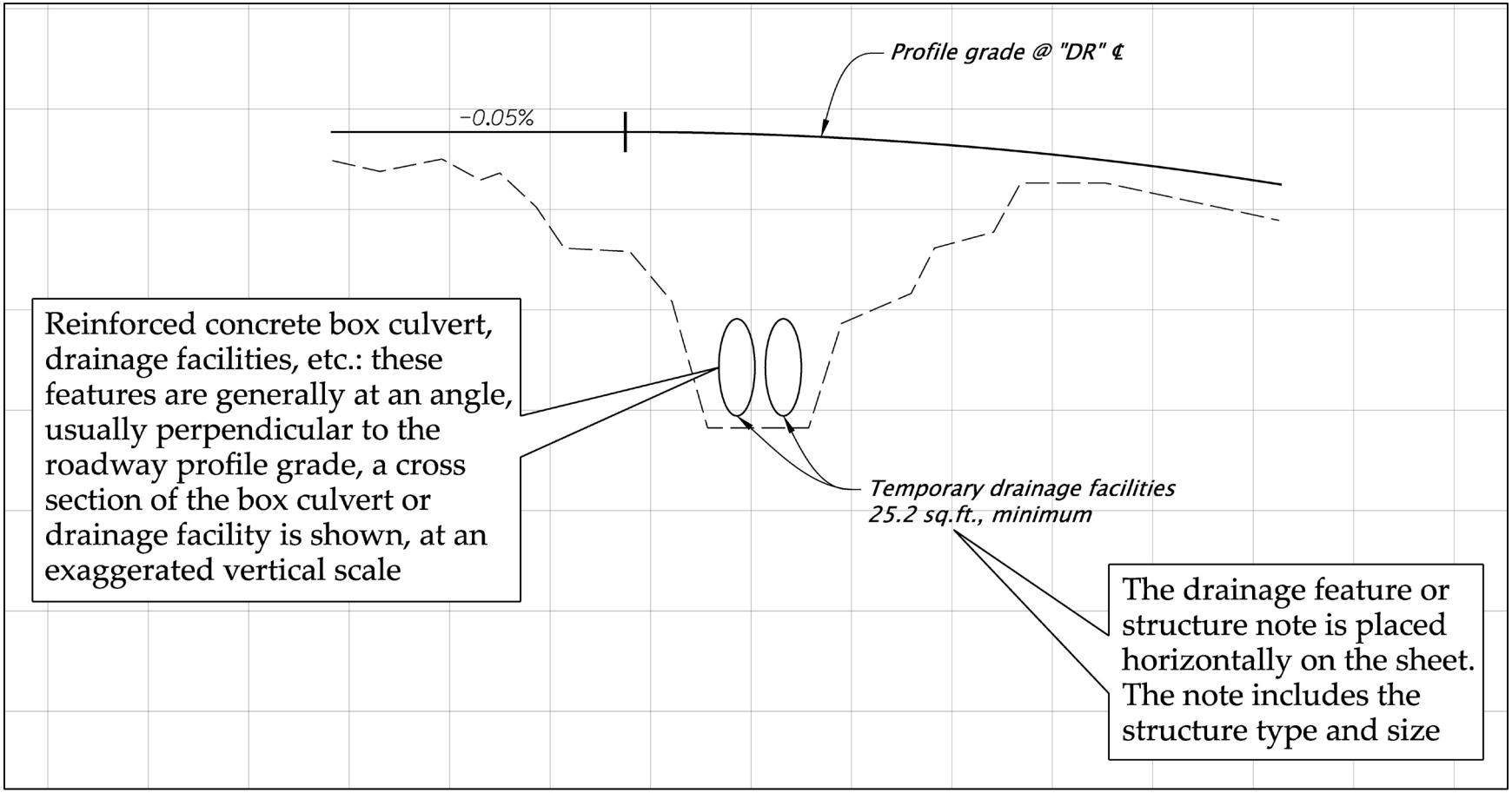
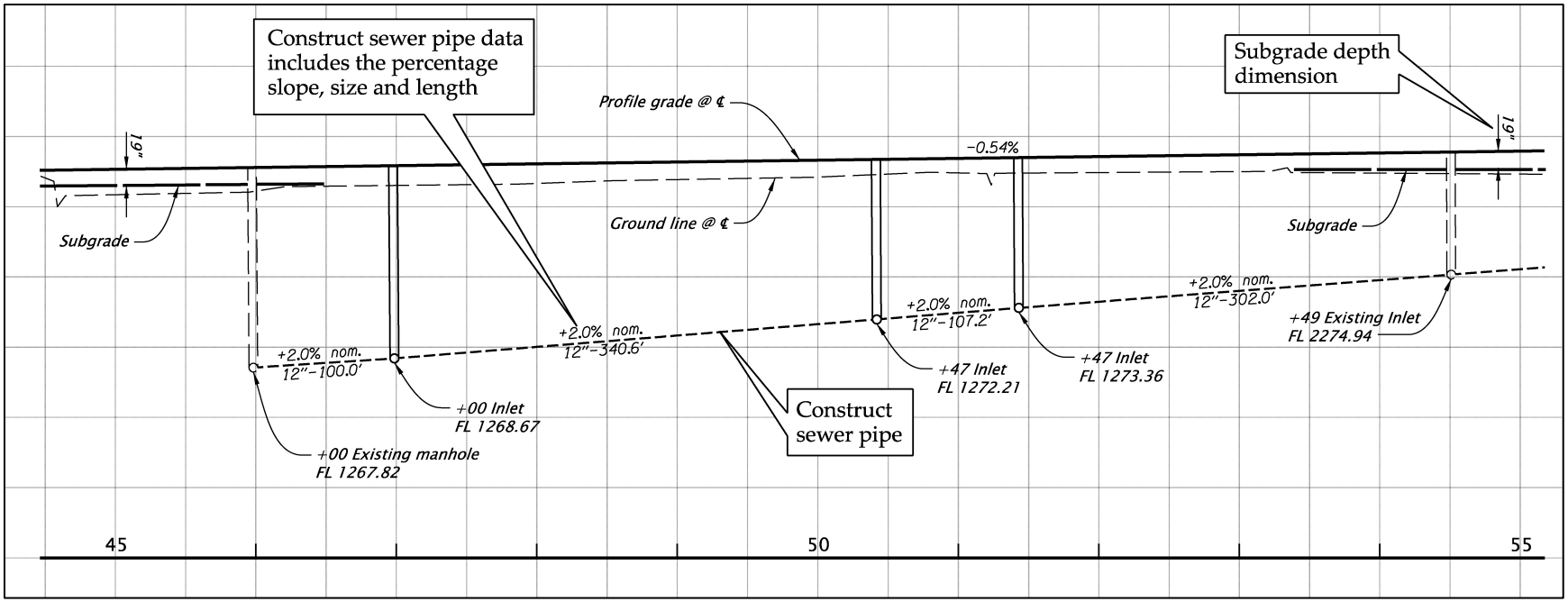
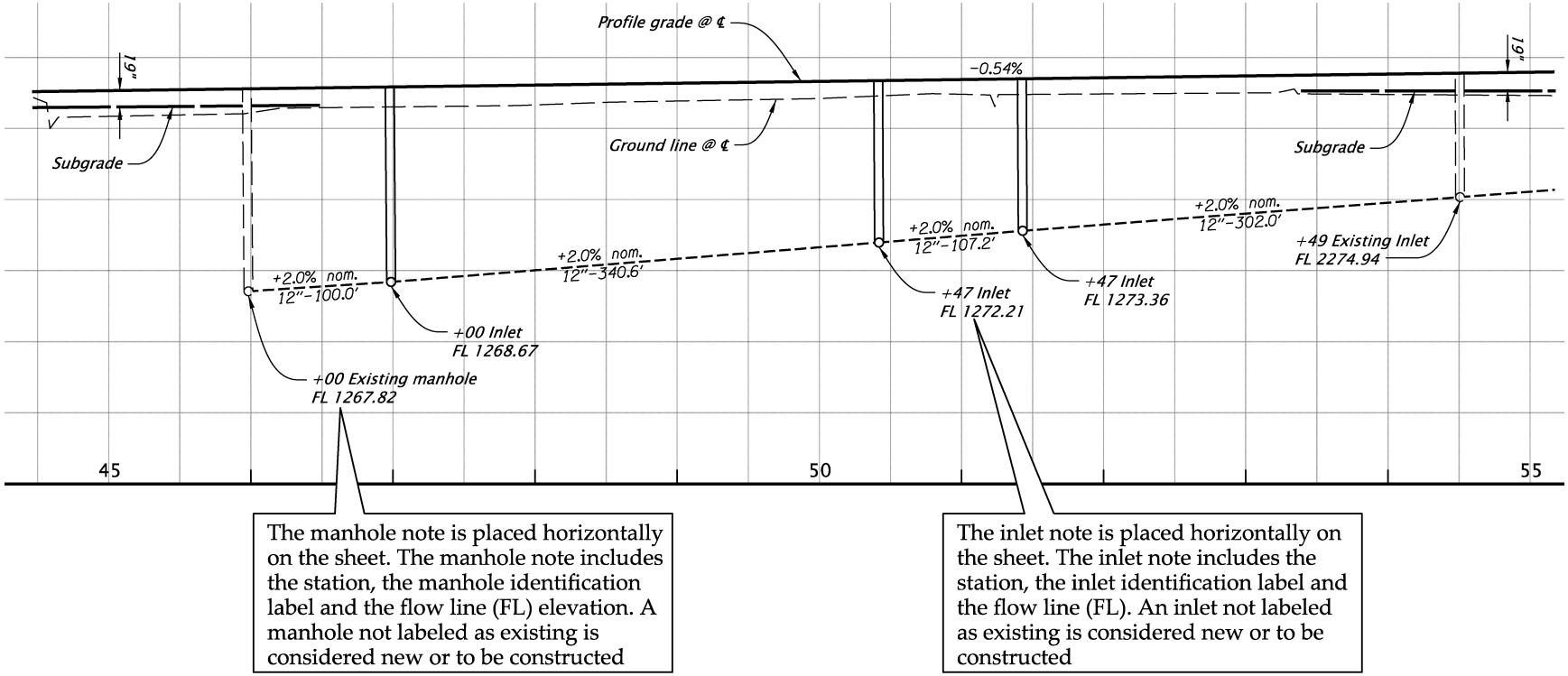


Figure 800-32: Sub-Surface Features



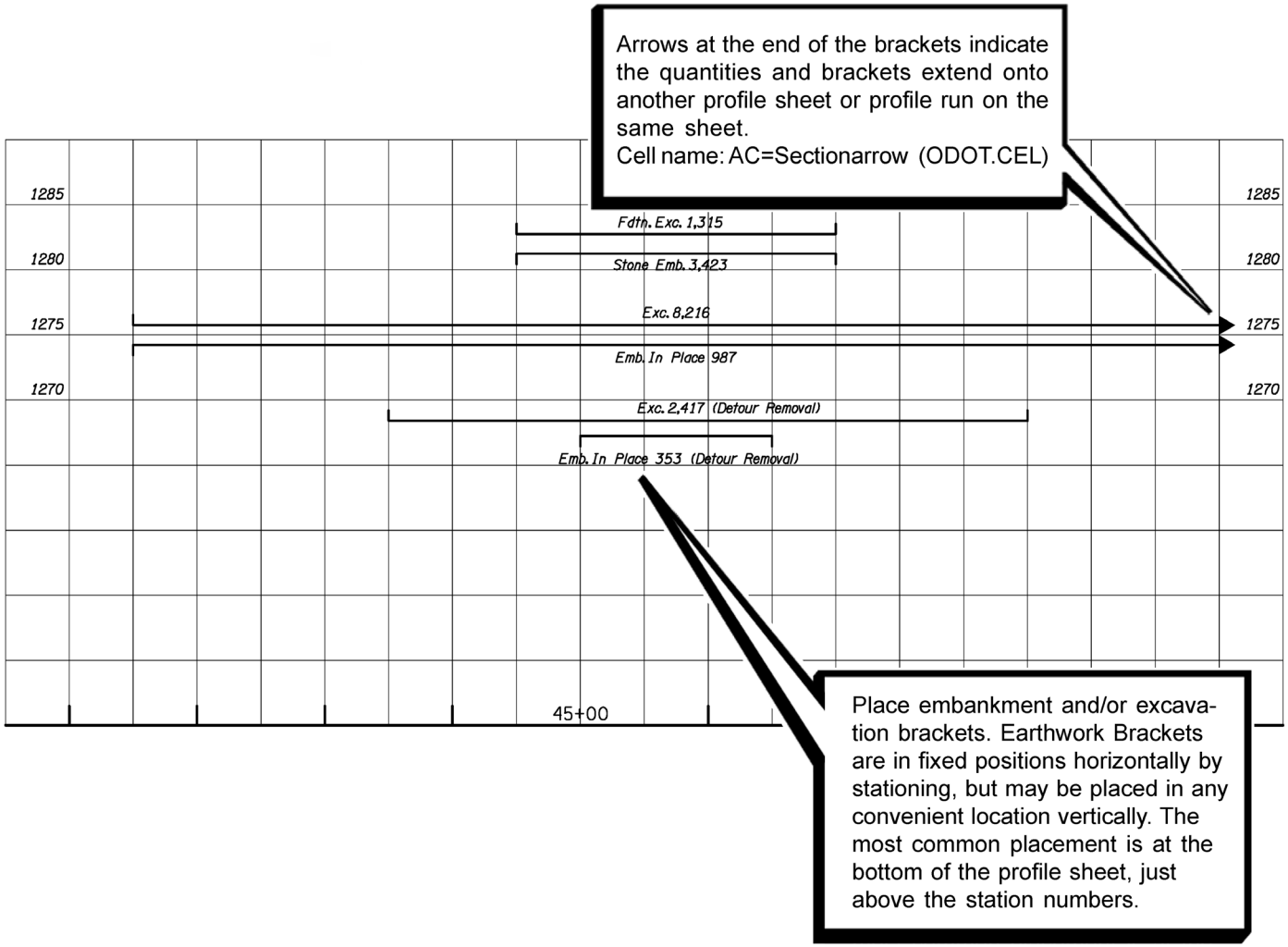
All the items shown can be accessed through the "ODOT Roadway" workflow, on the "Profiles" tab. All sub-surface features such as existing sewer and drain pipes, construct drain pipes, and existing and construct ditch lines are to be shown on the profile, as directed by the designer. (Not all common features that could be displayed are shown in this example.)

Figure 800-33: Manholes and Inlets Item Placement



The drainage structure and pipe information in the profile should match the construction notes on the plan or construction note sheets. Additional inlet and manhole information such as grate or rim elevation and distance left or right is recommended where additional clarity is wanted.

Figure 800-34: Earthwork Brackets



The earthwork brackets for stage construction in the profiles relate to the staging as shown in the traffic control portion of the contract plans.

805.5.3 Superelevation Runoff Charts

The purpose of the superelevation runoff chart is to show the superelevation grade relationship between the roadway construction centerline and the left and right edge of traveled way. A superelevation runoff chart displays multiple line profiles and should be used to check for any problems such as grade controls at road approaches, building elevations or interchange designs. For more information on superelevation, see the ODOT Highway Design Manual. Superelevation runoff charts can be developed with design software such as OpenRoads Designer and added to the profile sheets within the contract plans.

Section 806 Construction Notes

The purpose of the construction notes is to provide the additional information necessary for the contractor to construct the project elements. Construction notes can be located on either a plan sheet, plan and profile sheet, or a separate construction notes sheet.

Use the tools on the "ODOT Roadway" ribbon workflow, "Notes" tab to place note ladders for alignment of notes and , note text, and placement of bubble notes.

Note bubbles pair construction notes with specific elements on the plan sheet. Use the "Bubble Note Tool" ("ODOT Roadway" workflow, "Notes" tab, "Bubble Notes" group) to place numbered bubbles next to each note and corresponding numbered bubbles with leaders pointing to specific plan sheet elements. See Figure 800-35 and Figure 800-36 for the location of the tool in the ribbon and for the options in the bubble note tool dialogue box.

Figure 800-35: Bubble Note Tool Ribbon Button

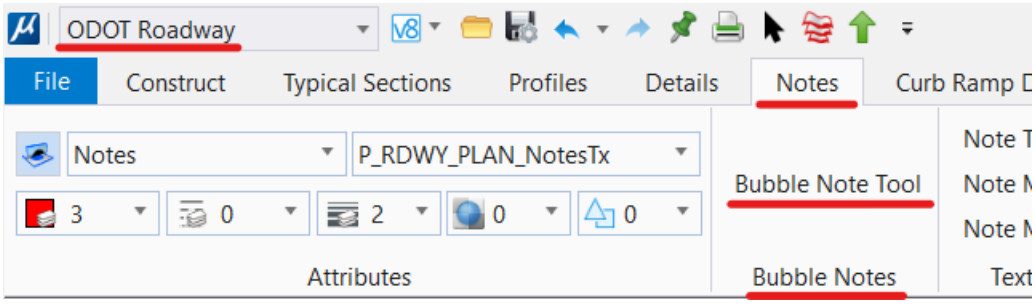
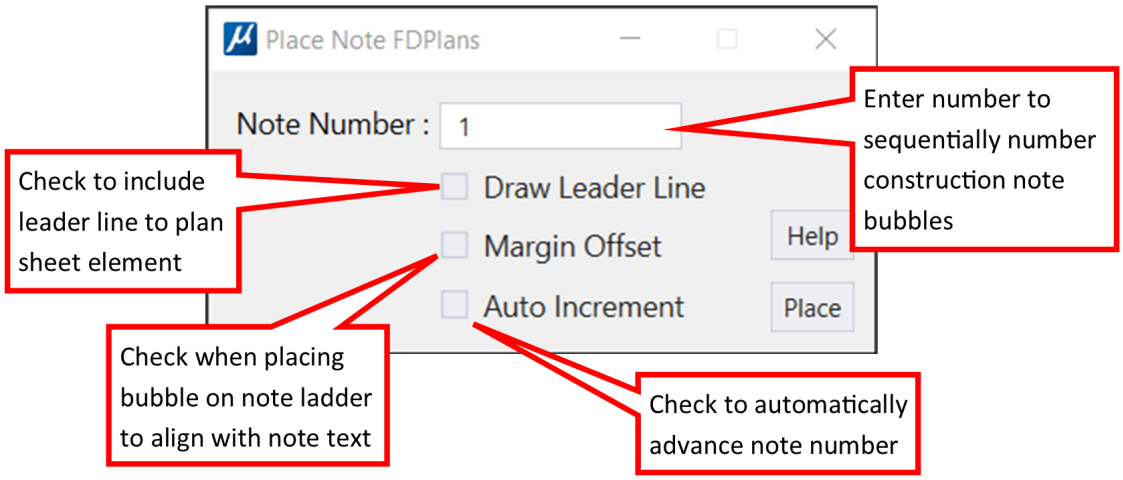


Figure 800-36: Bubble Note Tool Dialogue



Construction notes should be listed in the same order that the items occur in the Standard Specifications. Notes added later can be placed at the end of the sequence. Within individual notes, a standard must be followed for order of construction note composition. General guidelines for construction note composition are:

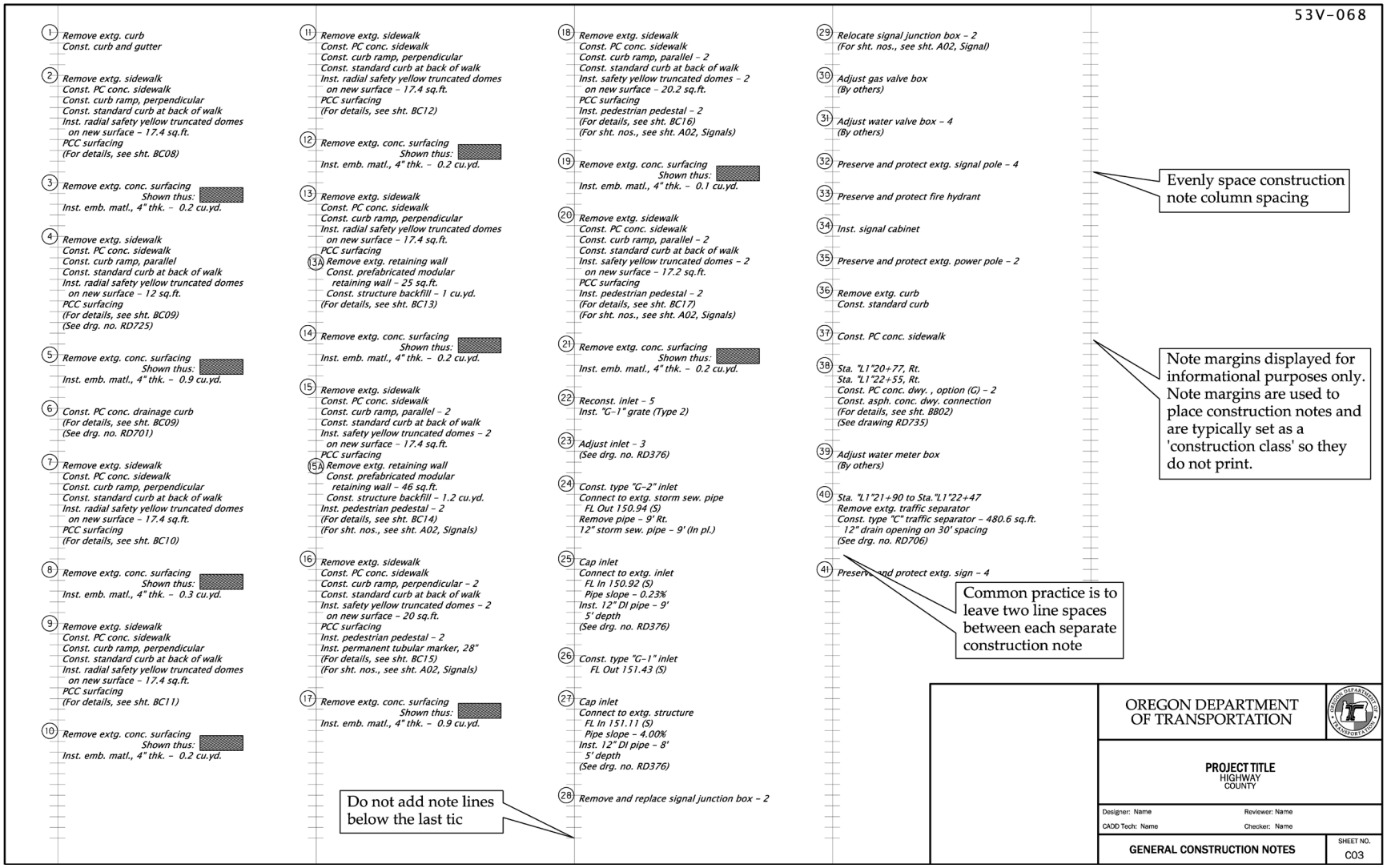
All notes are to be written for single application.

Give removal item first, then construction item, except in the case of temporary installation, i.e. detours.

Place one space between words, after comma and period, and on either side of a hyphen. No space is required on either side of the equal sign.

See Part 800 of the ODOT CAD Manual (OCM) and the standard order of construction note below in in this subsection. See Figure 800-37 for construction note placement and information.

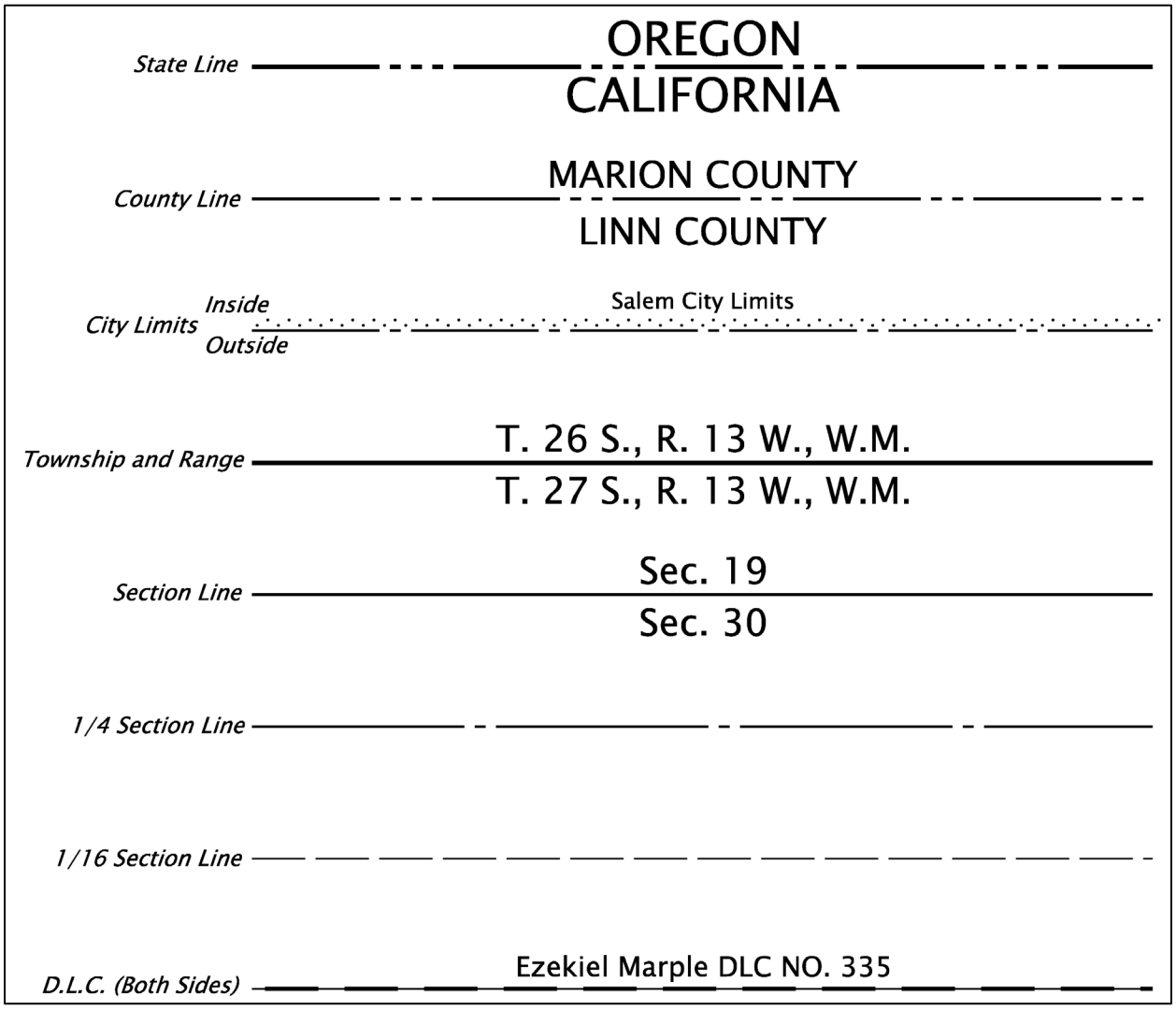
Figure 800-37: Construction Note Placement and Information



Section 807 Boundary and Right-of-Way Lines

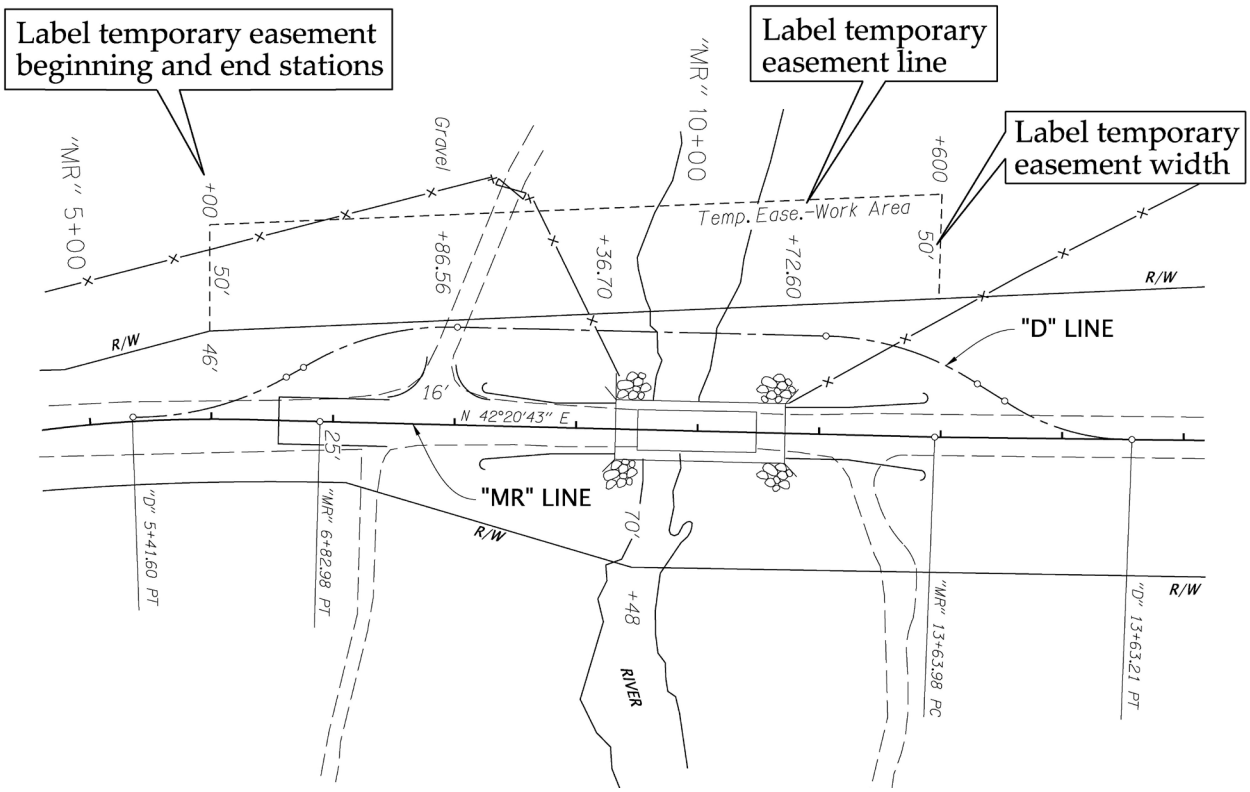
Figure 800-38 shows applicable line styles for government boundary, survey, and right-of-way lines.

Figure 800-38: Government Boundary Line Styles



Section 808 Temporary Easement

Figure 800-39: Temporary Easement



Section 809 Checklists

The roadway construction plan, profile and construction note sheets that are included in the contract plan documents should show any or all of the items in the following checklists.

809.1 General Construction Plan Sheet

See CAD Checklist – General Construction Plan Sheet (ODOT Form 734-5334).

809.2 Alignment Plan Sheet

See CAD Checklist – Alignment Plan Sheet (ODOT Form 734-5341).

809.3 Profiles

See CAD Checklist – Profile Sheet (ODOT Form 734-5337).

809.4 Drainage and Utilities Plan Sheet

See CAD Checklist – Drainage and Utility Plan Sheet (ODOT Form 734-5333).

809.5 "Combined" Construction Plan Sheet

When producing "combined" construction plan sheets, use the applicable checklists for each individual type of plan sheet being combined.