MDOT – Civil Cell Reference Information

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General Information

This document is an index of all MDOT civil cells. It contains the editing and placement notes contained in the DGNLib files for easier access. Please note the following for all MDOT civil cells:

- MDOT Civil Cells are DGNLib files and are located in the MDOT workspace folder \MDOT_02 Workspace\Projects\MDOT_02\Civil Standards\Civil Cells (M:\Drive for MDOT staff)
- The Features found on the CivilCell RefLine Secondary Level will need to be modified to fit the actual project dimensions according to the MDOT Standard.
- Each feature of the civil cells listed include layout, slope, override feature names, default values and specific requirements necessary for successful placement
- Some civil cells require a specific order of reference flipping when placing on the opposite side of the primary feature, reference flipping diagrams are provided in those cases.
- The required primary reference line placement directions are provided in the diagrams.
- Civil Cell reference lines (located on the CC RefLine Secondary level) are control lines and must not exceed the limits of the primary placement line place holders in any civil cell, however they must extend beyond the limits of any feature used in the civil cell or the civil cell will fail. These features are commonly edge of widening features in intersection and cross over civil cells and edge of pavement features in all civil cells.
- Civil Cell Clip lines represent the location of an arbitrary clip shape. The offset distance of the shape from the edge of pavement can be adjusted as needed. It should match the overall distance of the civil cell along the edge of pavement and extend beyond the farthest offset distance of the proposed civil cell from the associated edge of pavement. The clip shape should be added a as clipping boundary to the associated corridor model to remove any overlap between the civil cell and the corridor model.
- When Civil Cell reference flipping is required for a cell on the left side of a roadway (determined from the up-station direction). Flipping should be completed as indicated in diagrams provided.

Crossovers:

MDOT_BoulevardCrossRoad: Intersecting Roadway passing through a Boulevard.

Intended Purpose: To create the roadway within a median area for roadways crossing boulevards per MDOT Geometric Design Guide GEO-670.

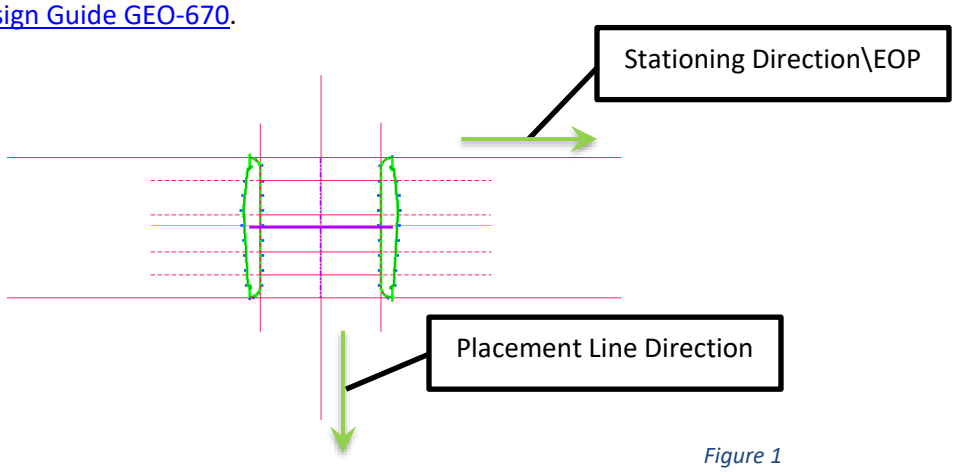

Figure 1

General Placement Notes:

Layout

- BlvdXRoad_LtEOP_Ref and BlvdXRoad_RtEOP_Ref Control the Crossover width
- Each Radius is controlled independently.

Slopes

- BlvdXRoad_LtEOP_Ref and BlvdXRoad_RtEOP_Ref Control the Cross Road edge of pavement cross slopes as projected slopes from the centerline (Default = -2.0%)
- Each Radius uses parabolic reverse curves to transition between the ML EOP and Cross Road edge of pavement slopes.

Overrides

- The profiles for features BlvdXRoad_LtEOP_Comp and BlvdXRoad_RtEOP_Comp can be modified to override all the defined projected cross slopes for the BlvdXRoad.
- The BlvdXRoad edge linear templates and the BlvdXRoad pavement terrain and surface template will adjust accordingly. The features can be found on the CivilCell RefLine Breakline level.

Misc

- This Civil Cell is setup with a Conc surface template. To change the plan view appearance to a different material, change the surface and linear templates to the appropriate material.
- All features located on the CivilCell RefLine Breakline level should not be included in the associated overall top surface terrain model(s) and 3D Line String DGN file(s) submitted as RID.
- The joint line (Jt) features located on the Corridor Terrain Breakline level are included to improve the pavement terrain model triangulation. These features can be adjusted as needed to provide a smooth pavement surface terrain model and should be included in any overall top surface terrain model(s) and 3D Line String DGN file(s) submitted as RID.

MDOT_MaintanceCrossOver: Freeway Maintenance Crossover

Intended Purpose: To create the roadway within a median area for maintenance purposes, used on highways. The curbed and uncurbed details are included in this library per section 12.09.04 of the MDOT Road Design Manual.

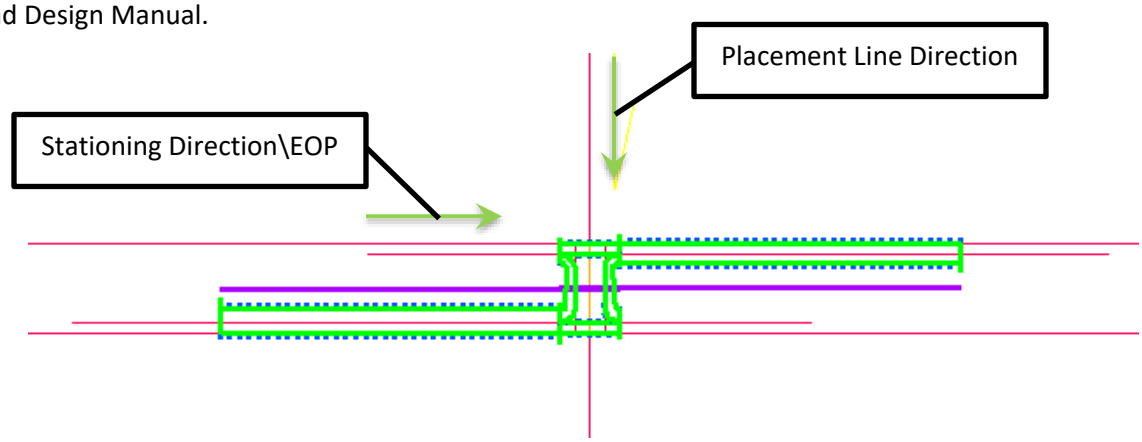

Figure 2

General Placement Notes:

Layout

- ML_LtShldr_Ref and ML_RtShldr_Ref Control the overall shoulder widths.
- ML_LtSide_DecelLn and ML_RtSide_DecelLn Control the Decel Lanes Length and Shape
- XOver_LtEOP_Ref and XOver_RtEOP_Ref Control the Cross Over Width
- Each Radius is controlled independently

Slopes

- ML_LtShldr_Ref and ML_RtShldr_Ref Control the overall shoulder cross slopes (Default = -4.0%)
- ML_LtSide_DecelLn and ML_RtSide_DecelLn are independently assigned slope transitions from the ML Edge but should match the ML shoulder cross slopes assigned on the features above.
- XOver_LtEOP_Ref and XOver_RtEOP_Ref Control the Cross Over edge of pavement cross slopes (Default = -2.0%)
- Each Radius uses parabolic reverse curves to transition between the ML shoulder and Cross Over edge of pavement slopes.

Overrides

- The profiles for features XOver_LtEOP_Comp and XOver_RtEOP_Comp can be modified to override all the defined cross slopes for the XOver pavement. The XOver edge linear templates and the XOver pavement terrain will adjust accordingly. The features can be found on the breakline level.

Misc

- All features located on the CivilCell RefLine Breakline level should not be included in the associated overall top surface terrain model(s) submitted as RID.
- This Civil Cell are setup with a HMA surface templates. To change the plan view appearance to another material, change the surface and linear templates to the appropriate material.

MDOTMiLeft_MedianCrossOver: Michigan Left for Boulevard roadways.

Intended Purpose: To create the roadway within a median area for Michigan left turns used with boulevard roadways. The DGN library contains both curbed and uncurbed details. See MDOT Geometric Design Guide GEO-670 for specifics on editing the cell dimensions to match actual project conditions.

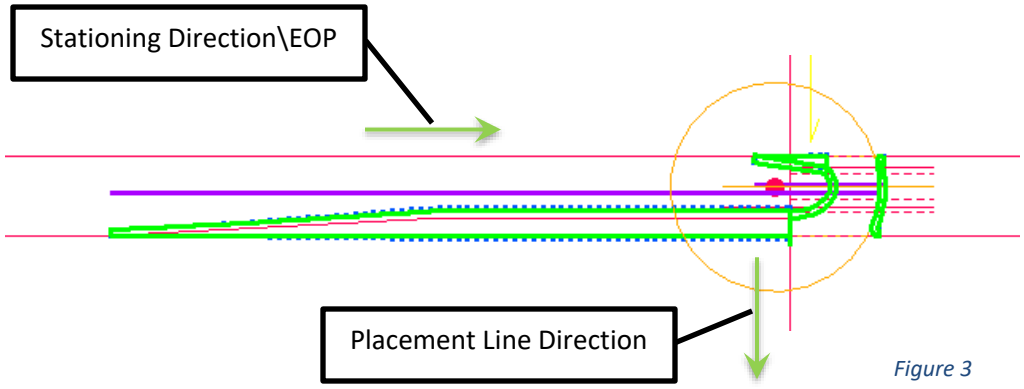

Figure 3

General Placement Notes:

Layout

- Point Feature BkRad_Ref = (-)m (default -43)
- Crossover X width = ConstrLine_XOverWidth_Ref (default is 30')
- The features MiLeft_Rad1 (43.0') and MiLeft_Rad (17.2') must also be adjusted individually.

NOTE: In median sections wider than 100’ it will be necessary to increase the length of the ConstLine_mDiv2_Ref feature (Default is 100') to >100’. The feature is located on the Do Not Edit Level.

Slopes

- ConstrLine_XOverWidth_Ref controls the Crossover cross slope (default is 0.8% Curbed and 0.5% Uncurbed with the high side on the outside edge)
- The ConstLine_ExitTaperOffest and ExitTaper feature slopes must always equal the same slope. (Default =1.0% Curbed; -2.0% Uncurbed)

Overrides

- The profiles for features MiLeft_LtEOP_Comp and MiLeft_BkEOP_Comp can be modified to override all the defined cross slopes for the XOver pavement. The XOver edge linear templates and the pavement terrain will adjust accordingly. The features can be found on the CC breakline level.

Misc

- All features located on the CivilCell RefLine Breakline level should not be included in the associated overall top surface terrain model(s) submitted as RID.
- The joint line (Jt) features located on the Corridor Terrain Breakline level are included to improve the pavement terrain model triangulation. The spacing of these features can be adjusted as needed to provide a smooth terrain model for the pavement surface.
- These Civil Cells are setup with a Conc surface templates. To change the plan view appearance to another material change the surface and linear templates to the appropriate material.

Drive Approaches without Curb and Gutter:

MDOT_Dr_atEOP: Drive Approach at the edge of pavement.

Intended Purpose: To create a drive approach connected to the edge of the roadway or shoulder with radial connections. This civil cell requires at least some tangent before the tie down Limit Line to function. See MDOT Standard Plan R-29 and Administrative Rules regulating Driveways, Banners and Parades.

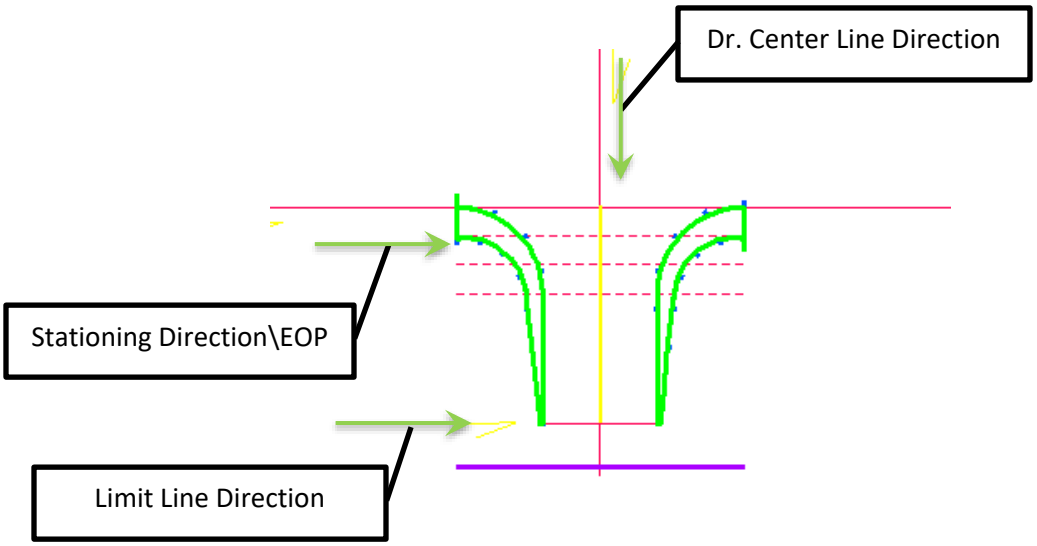

Figure 4

General Placement Notes:

Layout

- The Dr Limit Line provided by the user for cell placement controls the overall width of the Drive Approach.
- Each Radius is controlled independently.

Slopes

- Dr_LtEOP_Comp and Dr_RtEOP_Comp control the Drive Approach edge of pavement slopes as straight line transitions from the ML Edge of Pavement to the tie down Limit Line. These features are located on the CivilCell RefLine Breakline level.
- The Dr Limit Line utilizes the Active Terrain as the active profile to determine the drive elevation at the tie down location.

Misc

- This Civil Cell is setup with a HMA surface template. To change the plan view appearance to a Conc or Agg approach change the feature using the P_Dr_HMA_Limit feature style to the appropriate material type in addition to changing the surface and linear templates. The Dr Const Limit level is off by default to facilitate easier civil cell recreation.
- All features located on the CivilCell RefLine Breakline level should not be included in the associated overall top surface terrain model(s) submitted as RID.

- The joint line (Jt) features located on the Corridor Terrain Breakline level are included to improve the pavement terrain model triangulation. These features can be adjusted as needed to provide a smooth pavement surface terrain model.

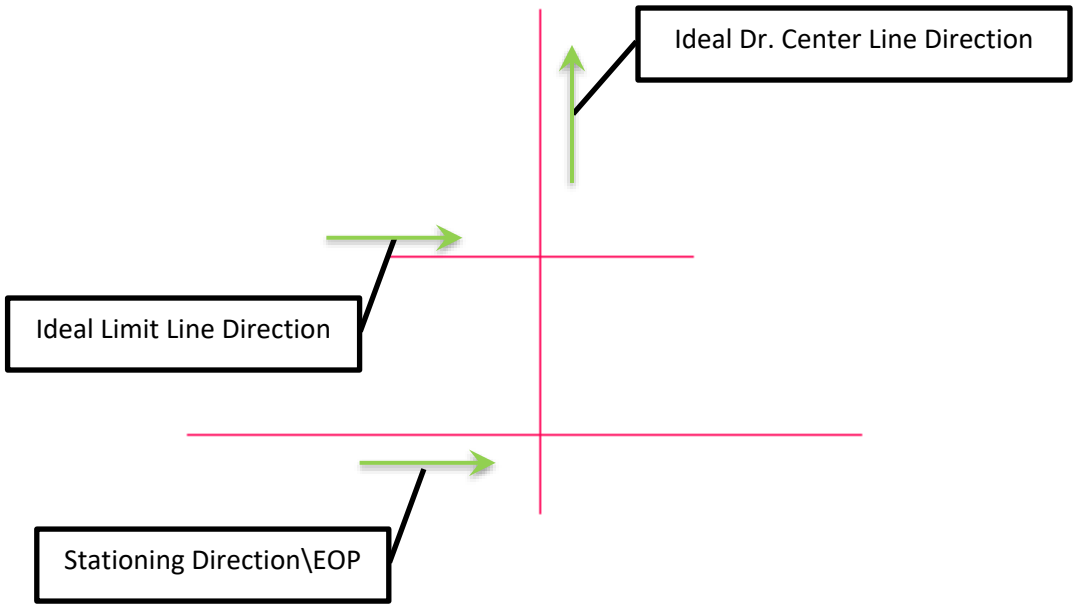

Figure 4 Ideal Left Side Reference Line Placement (Above)

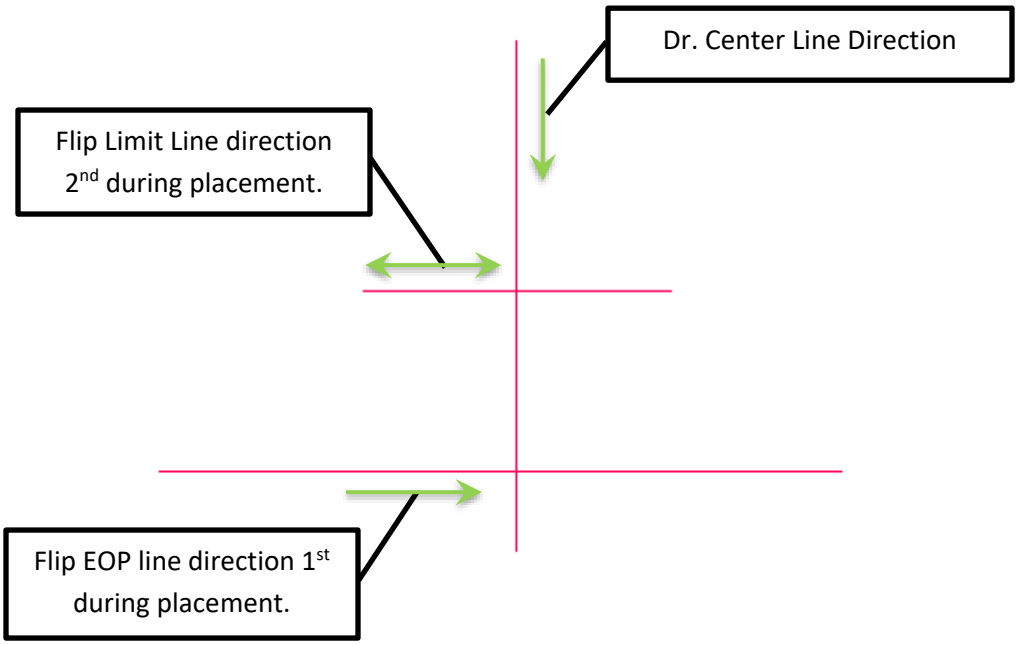

Figure 4 Alternate Left Side Reference Line Placement (Above)

MDOT_Dr_atEOP_NoTangent: Drive Approach at the edge of pavement without a tangent.

Intended Purpose: To create a drive approach connected to the edge of the roadway or shoulder with radial connections. This civil cell does not incorporate any length of tangent before the tie down location. See MDOT Standard Plan R-29.

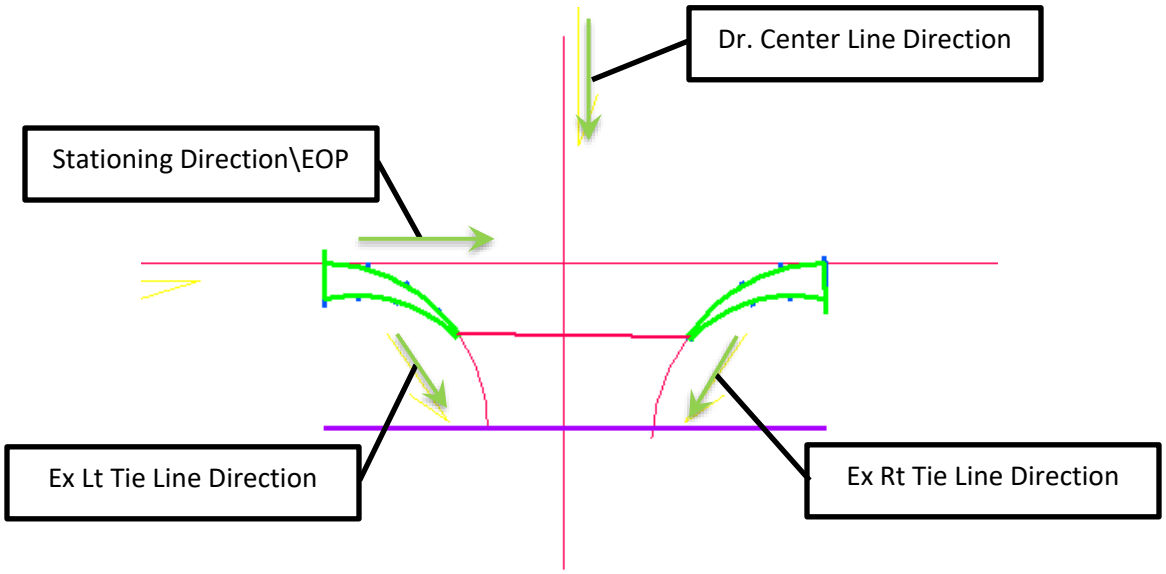

Figure 5

General Placement Notes:

NOTE: Tie down is determined by the user and requires the use of four placement lines in order for this cell to function.

Layout

- The Ex Dr Lt Edge Ref and Ex Dr Rt Edge Ref provided by the user for cell placement control the overall width of the Drive Approach. No limit line is required for this cell.
- Each Radius is controlled independently.

Slopes

- Dr_Lt_Rad and Dr_Rt_Rad control the Drive Approach slopes as straight line transitions between the from the ML edge of pavement to the Ex Rt and Lt Tie Down Lines.
- The Ex Dr Lt Edge Ref and Ex Dr Rt Edge Ref provided by the user require the either a defined profile or the Active Terrain as an active profile to determine the drive elevations at the tie down locations.

Misc

- This Civil Cell is setup with a HMA surface template. To change the plan view appearance to a Conc or Agg approach change the feature using the P_Dr_HMA_Limit feature style to the appropriate material type in addition to changing the surface and linear templates.

MDOT_Dr_Res_atEOP: Residential Drive Approach at the edge of pavement without radii.
Intended Purpose: To create a residential drive approach connected to the edge of the roadway. This civil cell is best used for Drive Approaches in shoulder sections which are in a constant slope and not within a superelevation transition section. See MDOT Standard Plan R-29 and Administrative Rules regulating Driveways, Banners and Parades.

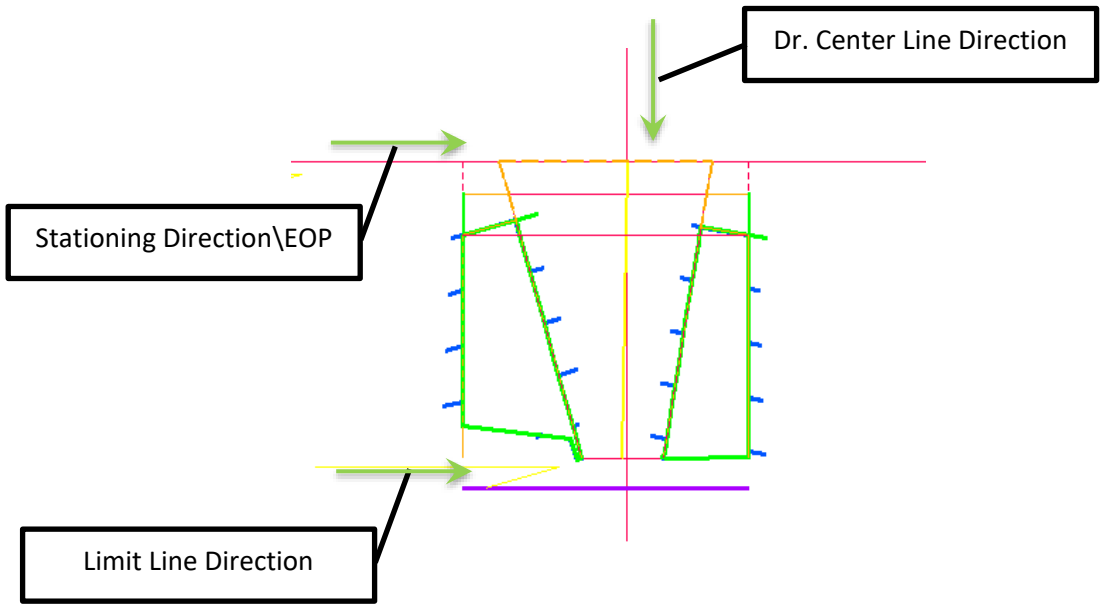

Figure 6

General Placement Notes:

Layout

NOTE: The width of the approach at the edge of pavement must always be greater than the width of the pavement at the limit line or the cell will fail. Additionally, the edge of pavements of the approach can never be exactly perpendicular to the mainline edge of pavement or the cell will fail.

- ML_EOS_Ref controls the overall shoulder width (Default = 4')
- The Dr Limit Line provided by the user for cell placement controls the overall width of the Drive Approach
- Width_0.6R and Width_0.4R at the edge of pavement on the sides of the approach control the approach side widths independently. (The default values are 15.6 and 10.4 respectively.)
- ML_SlopeTie_Ref controls the width of the side slope terrain models behind the main line back of curb (The default value = 5' and controls the terrain models that allow for this drive approach to connect at any angle to the main line road way. The default value may need to be increased based upon the severity to which the approach angle varies from 90 degrees)
- ML_DrLtTie and ML_DrRtTie controls the width of the parallel section of shoulder on each side of the drive approach (The default values are 4.5'. The values may need to be modified based upon the severity to which the approach angle varies from 90 degrees.)

Slopes

- ML_LtTie_Ref and ML_RtTie+Ref control the shoulder cross slope connections and should be modified to match the slope of the adjacent main line shoulder.
- Dr_LtEOP and Dr_RtEOP control the Drive Approach edge of pavement slopes as straight line transitions from the ML Edge of Shoulder to the tie down Limit Line. The profile does not take into account the shoulder slope by default. These features are located on the CivilCell RefLine Breakline level.
- The Dr Limit Line utilizes the Active Terrain as the active profile to determine the drive elevation at the tie down location.
- Lt_SlopeTie and Rt_SlopeTie are tie down features used to connect the linear template end conditions to the terrain models for the edge of pavement. The active profile is the active terrain model.

Misc

- This Civil Cell is setup with an Aggregate surface template. To change the plan view appearance to a Conc or HMA approach change all features using the P_Dr_Agg_Edge or P_Dr_Agg_Limit feature styles to the appropriate material type in addition to changing the surface and linear templates. The Dr Const Limit level is off by default to facilitate easier civil cell recreation.

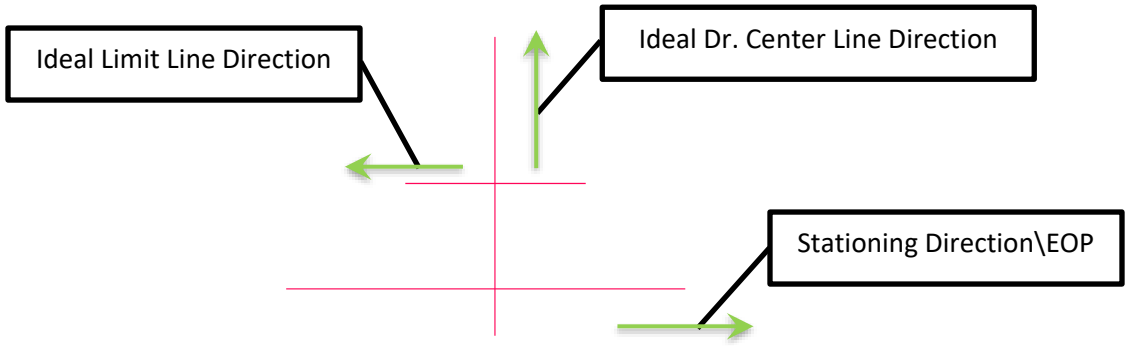

Figure 6 Ideal Left Side Reference Line Placement (Above)

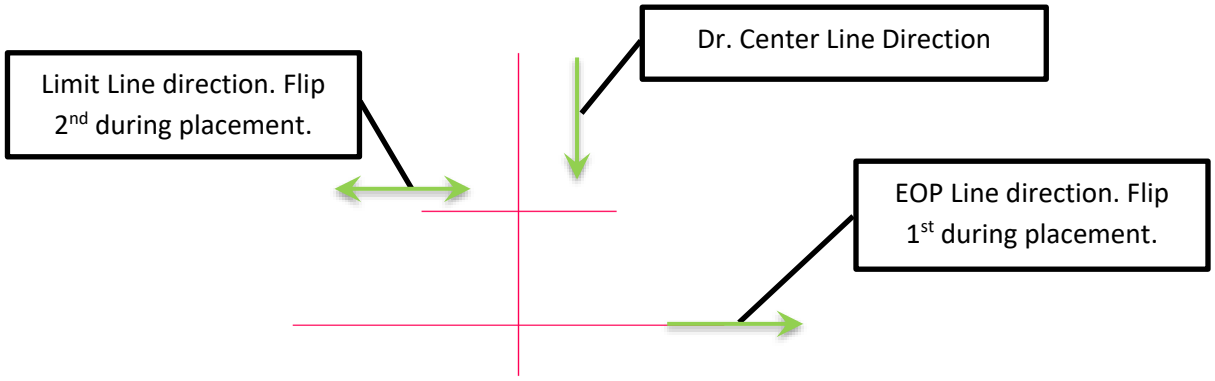

Figure 6 Alternate Left Side Reference Line Placement (Above)

MDOT_Dr_wShldr: Drive Approach with shoulder at the edge of pavement.

Intended Purpose: To create a drive approach with shoulder connected to the edge of the pavement with radial connections. This civil cell requires at least some tangent before the tie down Limit Line to function. See MDOT Standard Plan R-29 and Administrative Rules regulating Driveways, Banners and Parades.

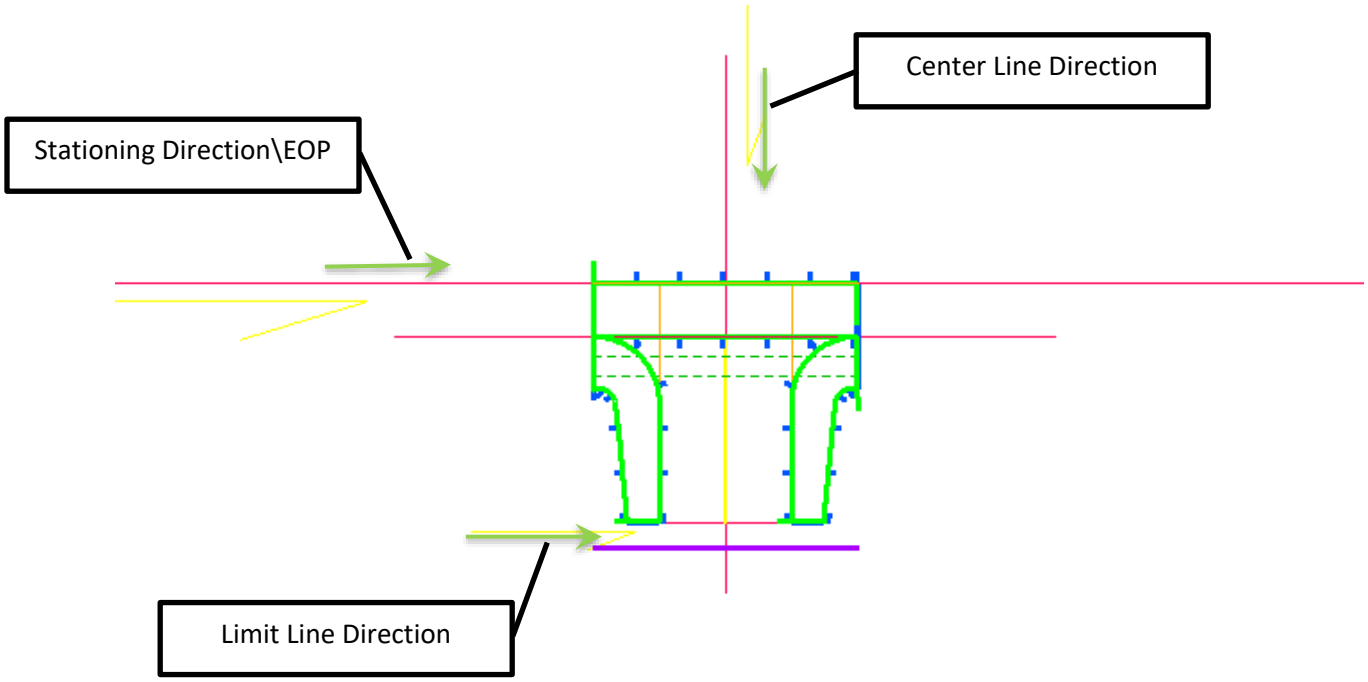

Figure 7

General Placement Notes:

Layout

NOTE: The Features found on the CivilCell RefLine Secondary Level will need to be modified to fit the actual project dimensions according to the MDOT Standard. This civil cell is best used for Drive Approaches when the shoulder has a constant slope and not within a superelevation transition section.

- ML_EOS_Ref controls the overall shoulder width
- The Dr Limit Line provided by the user for cell placement controls the overall width of the Drive Approach
- Each Radius is controlled independently

Slopes

- ML_EOS_Ref controls the overall shoulder cross slope (while it can be variable, the cell works best with a constant slope)
- Dr_LtEOP_Comp and Dr_RtEOP_Comp control the Drive Approach edge of pavement slopes as straight line transitions from the ML Edge of Shoulder to the Tie Down Limit. These features are located on the CivilCell RefLine Breakline level.
- The Dr Limit Line utilizes the Active Terrain as the active profile to determine the drive elevation at the tie down location

Misc

- This Civil Cell is setup with a HMA surface template. To change the plan view appearance to a Conc or Agg approach change the feature using the P_Dr_HMA_Limit feature style to the appropriate material type in addition to changing the surface and linear templates. The Dr Const Limit level is off by default to facilitate easier civil cell recreation.
- All features located on the CivilCell RefLine Breakline level should not be included in the associated overall top surface terrain model(s) submitted as RID.
- The joint line (Jt) features located on the Corridor Terrain Breakline level are included to improve the pavement terrain model triangulation. These features can be adjusted as needed to provide a smooth pavement surface terrain model.

Drive Approaches with MDOT F Type Curb and Gutter

A 2D only feature has been added to each cell to represent the Detail L or Detail M where applicable for quantity purposes. The features are located on the CurbGut_Std_Pr_All_Det(L or M)_Back levels.

MDOT_Dr_CnG_wDetL: Residential Detail L Drive Approach

Intended Purpose: To create a residential drive approach connected to the edge of the roadway. See MDOT Standard Plan R-29 and Administrative Rules regulating Driveways, Banners and Parades.

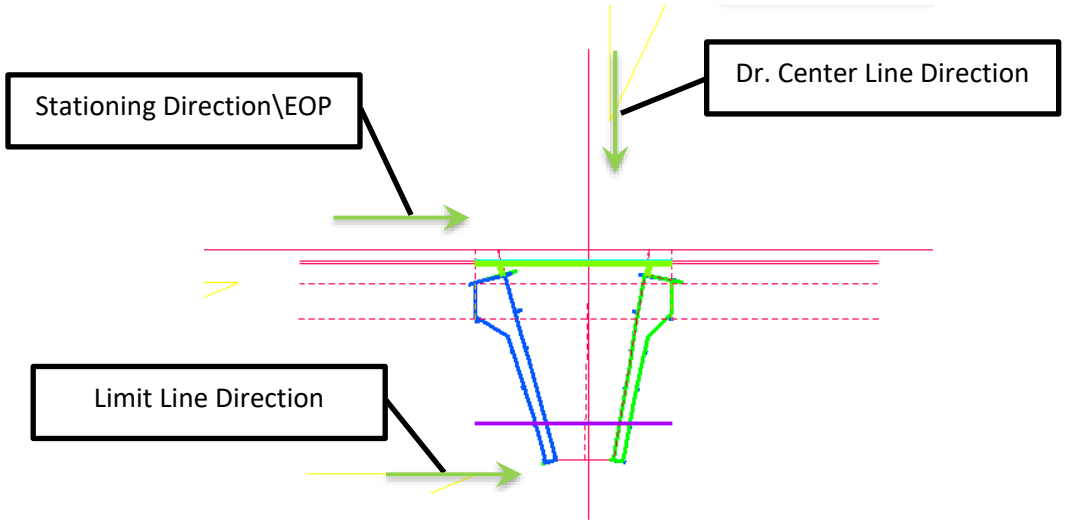

Figure 8

General Placement Notes:

Layout

NOTE: The width of the approach at the edge of pavement must always be greater than the width of the pavement at the limit line or the cell will fail. Additionally, the edge of pavements of the approach can never be exactly perpendicular to the mainline edge of pavement or the cell will fail.

- ML_BOC_Ref controls the overall curb width along the L Detail (Default = 2.5')
- ML_Gutter_Ref and ML_FOC_Ref control the other main line curb dimensions and should be adjusted to match the project curb dimensions as needed (Default is MDOT R-30 Type F Curb)
- The Dr Limit Line provided by the user for cell placement controls the overall width of the Drive Approach
- Width_0.6R and Width_0.4R at the edge of pavement on the sides of the approach control the approach side widths independently. (The default values are 15.6 and 10.4 respectively.)
- The pairs ML_LtSlopeTie_Surf1\Dr_LtSLope_Surf1 an ML_RtSlope_Surf1\Dr_RtSlope_Surf1 control the widths of the side slope terrain models behind the main line back of curb. (The default values = 10' and control the terrain models that allow for this drive approach to connect at any angle to the main line road way. The default values may need to be increased based upon the severity to which the approach angle varies from 90 degrees). These values should never be set to zero.

- ML_DrLtTie and ML_DrRtTie control the width of the parallel section of shoulder on each side of the drive approach (The default values are 4.0'. The values may need to be modified based upon the severity to which the approach angle varies from 90 degrees.) The values should never be set to zero.

Slopes

- Dr_LtEOP and Dr_RtEOP control the Drive Approach edge of pavement slopes as a complex transition between the from the ML edge of pavement, the gutter line and the back of curb drop to the tie down Limit. The profile if adjusted should only be modified between the back of curb and the tie down line. These features are located on the CivilCell RefLine Breakline level.
- The Dr Limit Line utilizes the Active Terrain as the active profile to determine the drive elevation at the tie down location.
- Lt_SlopeTie and Rt_SlopeTie are tie down features used to connect the linear template end conditions to the terrain models for the edge of pavement. The active profile is the active terrain model.

Misc

- This Civil Cell is setup with an Aggregate surface template. To change the plan view appearance to a Conc or HMA approach change all features using the P_Dr_Agg_Edge or P_Dr_Agg_Limit feature styles to the appropriate material type in addition to changing the surface and linear templates. The Dr Const Limit level is off by default to facilitate easier civil cell recreation.
- See the Video "Editing the Detail L Approach" for more information on changing the curb type of this cell.
- All features located on the CivilCell RefLine Breakline level should not be included in the associated overall top surface terrain model(s) submitted as RID.
- The joint line (Jt) features located on the Corridor Terrain Breakline level are included to improve the pavement terrain model triangulation. These features can be adjusted as needed to provide a smooth pavement surface terrain model.

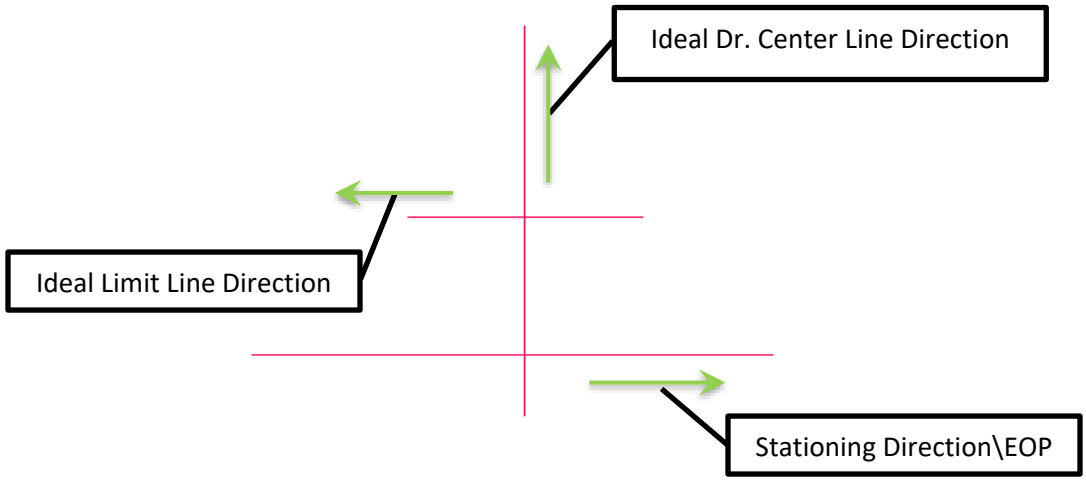

Figure 8 Ideal Left Side Reference Line Placement (Above)

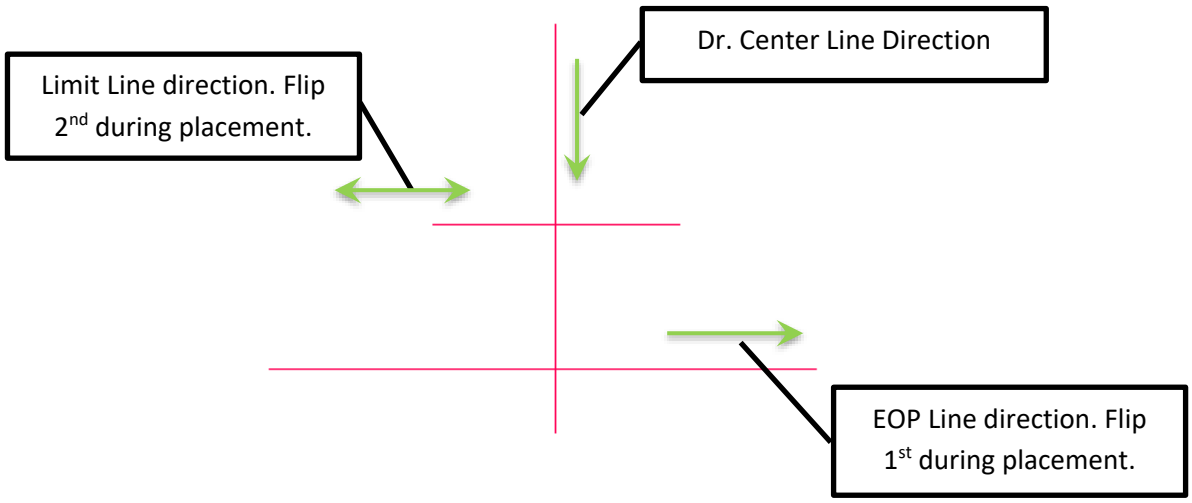

Figure 8 Alternate Left Side Reference Line Placement (Above)

MDOT_Dr_CnG_wDetM: Detail M Drive Approach

Intended Purpose: To create a drive approach connected to the edge of the roadway or shoulder with radial connections. This civil cell requires at least some tangent before the tie down Limit Line to function See MDOT Standard Plan R-29 and Administrative Rules regulating Driveways, Banners and Parades.

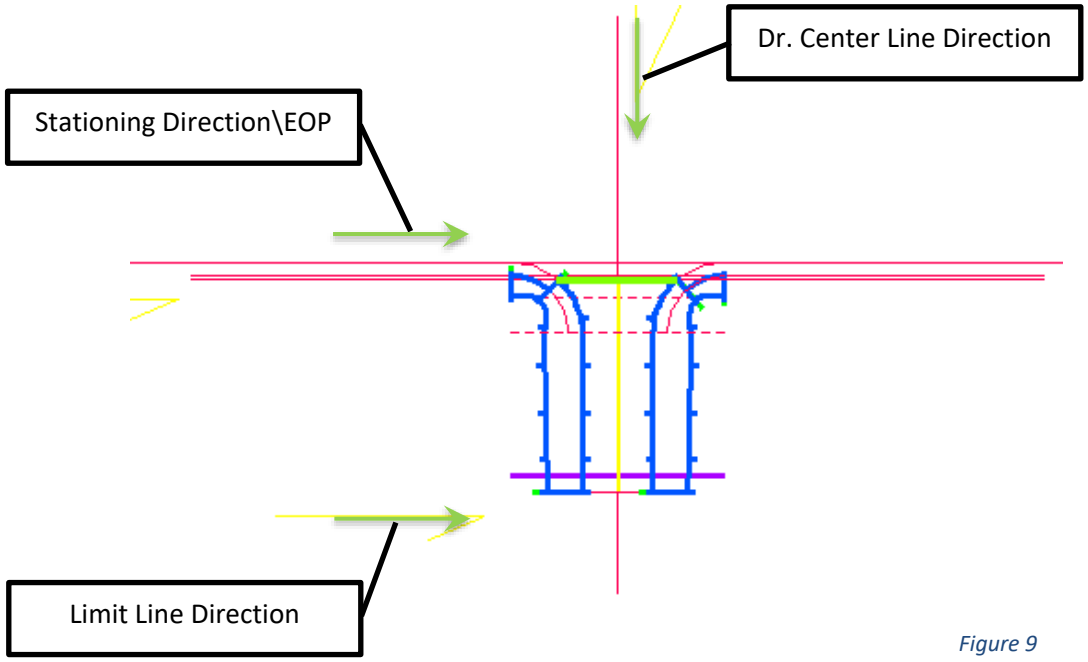

Figure 9

General Placement Notes:

Layout

- ML_BOC_Ref controls the overall curb width along the L Detail (Default = 2.5')
- ML_Gutter_Ref controls the main line gutter dimension and should be adjusted to match the project curb dimension as needed (Default is MDOT R-30 Type F Curb)
- The Dr Limit Line provided by the user for cell placement controls the overall width of the Drive Approach.
- Dr_LtGutter_Ref and Dr_RtGutter_Ref control the gutter width of the drive approach curb. Default is (MDOT R-30 Type F Curb)
- Each Radius is controlled independently

Slopes

- Dr_LtEOP and Dr_RtEOP control the Drive Approach edge of pavement slopes as a complex transition between the from the ML edge of pavement, the gutter line and the back of curb drop to the tie down Limit Line. The profile if adjusted should only be modified between the back of curb and the tie down line. These features are located on the CivilCell RefLine breakline level.
- ML_Gutter_Ref controls the vertical offset of the gutter (N depth) from the ML edge of pavement (Default = MDOT R-30 Type F Curb)

- Dr_LtGutter_Ref and Dr_RtGutter_Ref control the vertical offset of the gutter (N depth) from the Dr edges of pavement (Default = MDOT R-30 Type F Curb) These must match the ML gutter along the M Detail and the gutter vertical offset in the curb used in the Dr edge Linear Templates.
- The Dr Limit Line utilizes the Active Terrain as the active profile to determine the drive elevation at the tie down location.
- Dr_LtInSeam_Ref and Dr_RtInSeam_Ref are features used to control the slope of the M Detail gutter to connect the surface template to the linear template. (Default is set to a 1.5% slope)

Misc

- The ML_BOC feature controls the height of the curb drop. (Default = a vertical offset of 1" above the gutter profile)
- This Civil Cell is setup with a Conc surface template. To change the plan view appearance to a HMA or Agg approach change the feature using the P_Dr_Conc_Limit feature style to the appropriate material type in addition to changing the surface and linear templates. The Dr Const Limit Level is off by default to facilitate easier civil cell recreation.
- All features located on the CivilCell RefLine Breakline level should not be included in the associated overall top surface terrain model(s) submitted as RID.
- The joint line (Jt) features located on the Corridor Terrain Breakline level are included to improve the pavement terrain model triangulation. These features can be adjusted as needed to provide a smooth pavement surface terrain model.

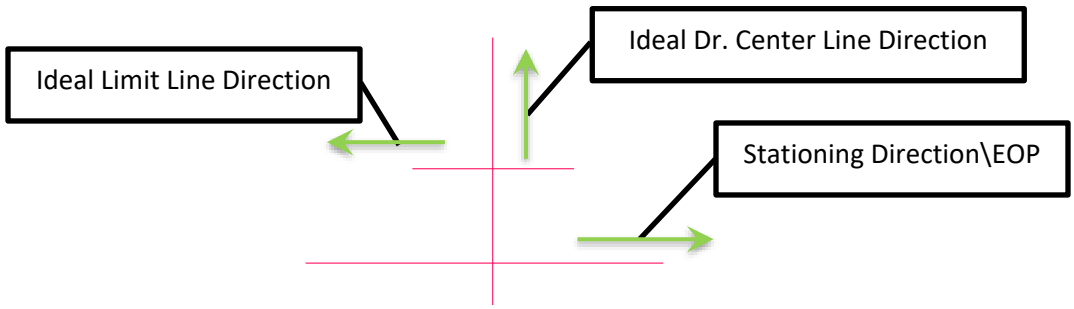

Figure 9 Ideal Left Side Reference Line Placement (Above)

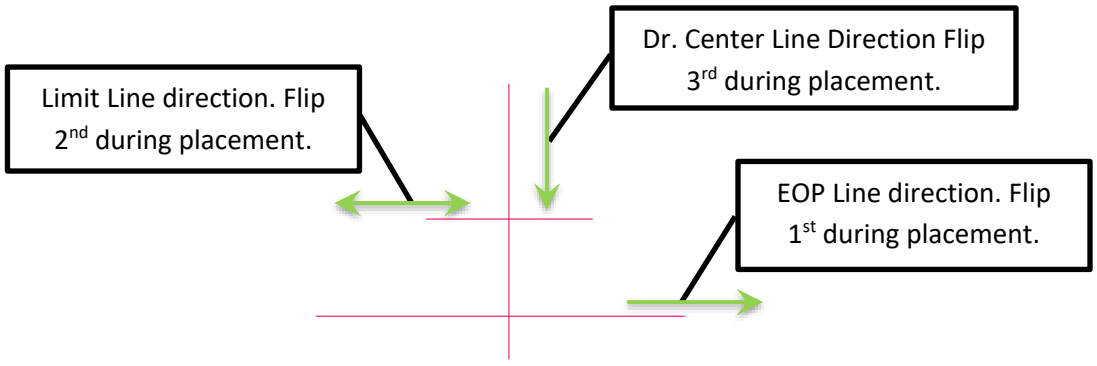

Figure 9 Alternate Left Side Reference Line Placement (Above)

MDOT_Dr_CnG_wDetM_NoTangent: Detail M Drive Approach without a Tangent.

Intended Purpose: To create a drive approach connected to the edge of the roadway or shoulder with radial connections. This civil cell does not incorporate any length of tangent before the tie down location. See MDOT Standard Plan R-29.

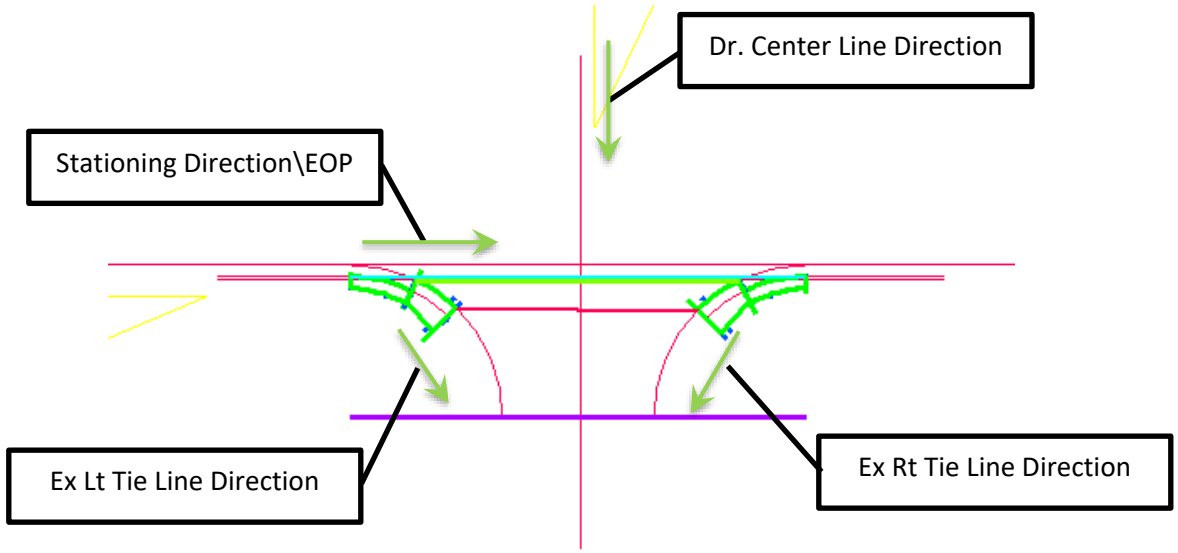

Figure 10

General Placement Notes:

Layout

- ML_BOC_Ref controls the overall curb width along the L Detail (Default = 2.5')
- ML_Gutter_Ref controls the main line gutter dimension and should be adjusted to match the project curb dimension as needed (Default is MDOT R-30 Type F Curb)
- The Ex Dr Lt Edge Ref and Ex Dr Rt Edge Ref provided by the user for cell placement control the overall width of the Drive Approach
- Dr_LtGutter_Ref and Dr_RtGutter_Ref control the gutter width of the drive approach curb. Default is (MDOT R-30 Type F Curb)
- Each Radius is controlled independently.

Slopes

- Dr_Lt_Rad and Dr_Rt_Rad control the Drive Approach slopes as straight line transitions between the ML back of curb to the tie down Limit Lines.
- ML_Gutter_Ref controls the vertical offset of the gutter (N depth) from the ML edge of pavement (Default = MDOT R-30 Type F Curb)
- Dr_LtGutter_Ref and Dr_RtGutter_Ref control the vertical offset of the gutter (N depth) from the Dr edges of pavement (Default = MDOT R-30 Type F Curb) These must match the ML gutter along the M Detail and the gutter vertical offset in the curb used in the Dr edge Linear Templates.
- The Ex Dr Lt Edge Ref and Ex Dr Rt Edge Ref provided by the user require the Active Terrain as the active profile to determine the drive elevations at the tie down locations.

- Dr_LtInSeam_Ref and Dr_RtInSeam_Ref are features used to control the slope of the M Detail gutter to connect the surface template to the linear template. (Default is set to a 1.5% slope)
- Dr_LtBOC_Tie and Dr_RtBOC_Tie have profiles set from the active terrain.

Misc

- The ML_BOC feature controls the height of the curb drop. (Default = a vertical offset of 1" above the gutter profile)
- This Civil Cell is setup with a HMA surface template. To change the plan view appearance to a Conc or Agg approach change the feature using the P_Dr_HMA_Limit feature style to the appropriate material type in addition to changing the surface and linear templates.
- All features located on the CivilCell RefLine Breakline level should not be included in the associated overall top surface terrain model(s) submitted as RID.
- The joint line (Jt) features located on the Corridor Terrain Breakline level are included to improve the pavement terrain model triangulation. These features can be adjusted as needed to provide a smooth pavement surface terrain model.

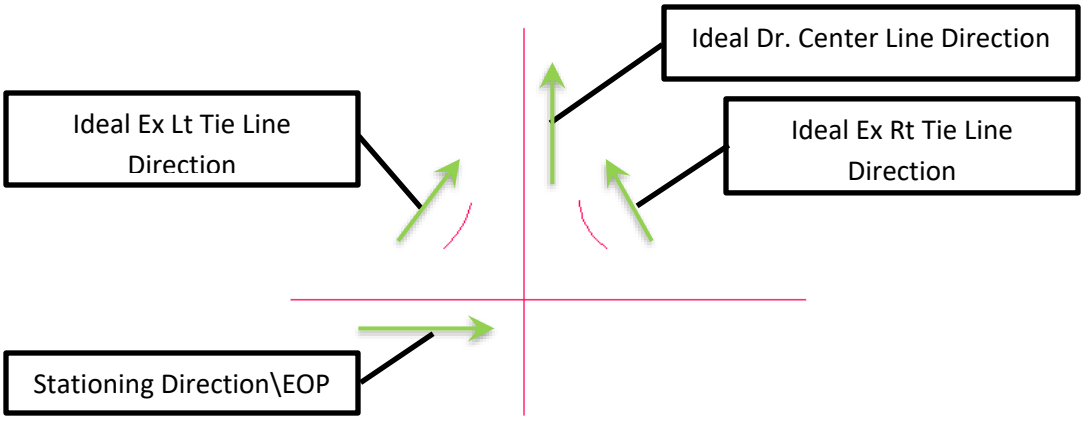

Figure 10 Ideal Left Side Reference Line Placement (Above)

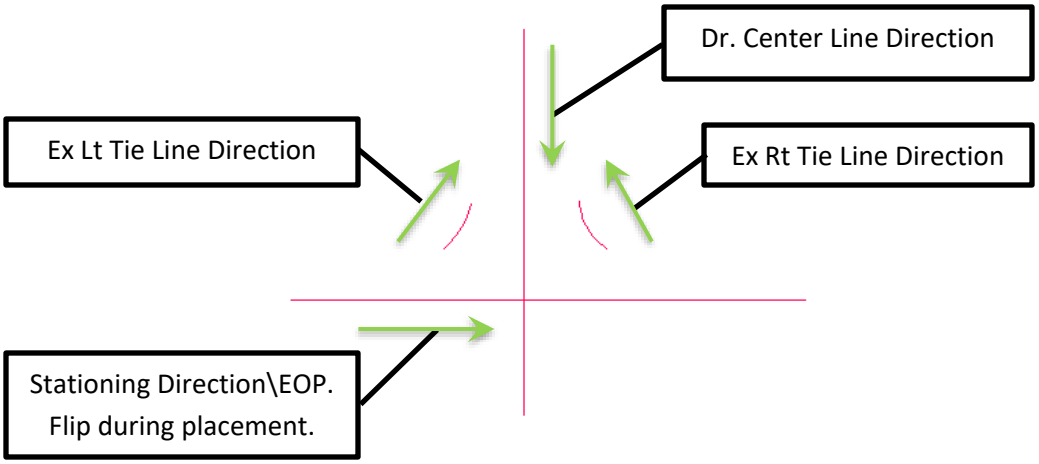

Figure 10 Alternate Left Side Reference Line Placement (Above)

MDOT_Dr_CnG_wShldr: Drive Approach with Curb and shoulder at the edge of pavement.
Intended Purpose: To create a drive approach with shoulder connected to the edge of the pavement with radial connections. This civil cell requires at least some tangent before the tie down Limit Line to function. See MDOT Standard Plan R-29 and Administrative Rules regulating Driveways, Banners and Parades.

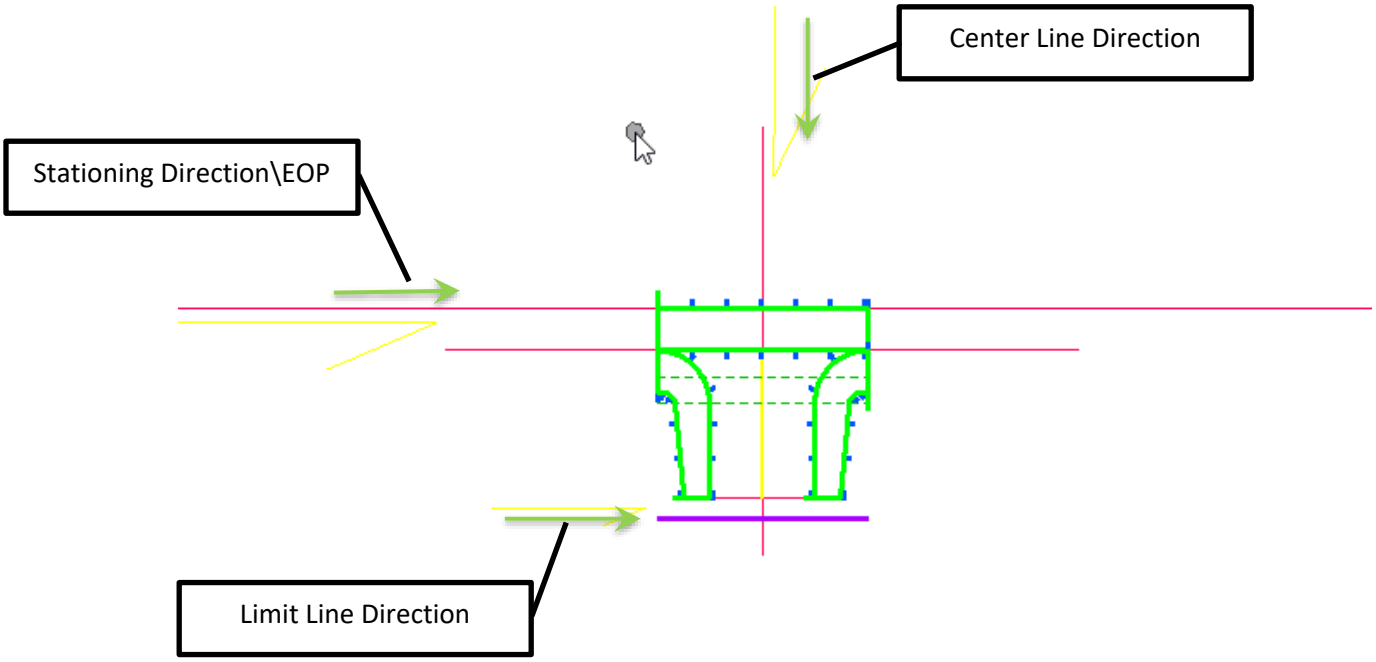

Figure 11

General Placement Notes:

Layout

NOTE: The Features found on the CivilCell RefLine Secondary Level will need to be modified to fit the actual project dimensions according to the MDOT Standard. This civil cell is best used for Drive Approaches when the shoulder has a constant slope and not within a superelevation transition section.

- ML_EOS_Ref controls the overall shoulder width
- The Dr Limit Line provided by the user for cell placement controls the overall width of the Drive Approach
- Each Radius is controlled independently

Slopes

- ML_EOS_Ref controls the overall shoulder cross slope (while it can be variable, the cell works best with a constant slope)
- Dr_LtEOP_Comp and Dr_RtEOP_Comp control the Drive Approach edge of pavement slopes as straight line transitions from the ML Edge of Shoulder to the Tie Down Limit. These features are located on the CivilCell RefLine Breakline level.
- The Dr Limit Line utilizes the Active Terrain as the active profile to determine the drive elevation at the tie down location

Misc

- This Civil Cell is setup with a HMA surface template. To change the plan view appearance to a Conc or Agg approach change the feature using the P_Dr_HMA_Limit feature style to the appropriate material type in addition to changing the surface and linear templates. The Dr Const Limit level is off by default to facilitate easier civil cell recreation.
- All features located on the CivilCell RefLine Breakline level should not be included in the associated overall top surface terrain model(s) submitted as RID.
- The joint line (Jt) features located on the Corridor Terrain Breakline level are included to improve the pavement terrain model triangulation. These features can be adjusted as needed to provide a smooth pavement surface terrain model.

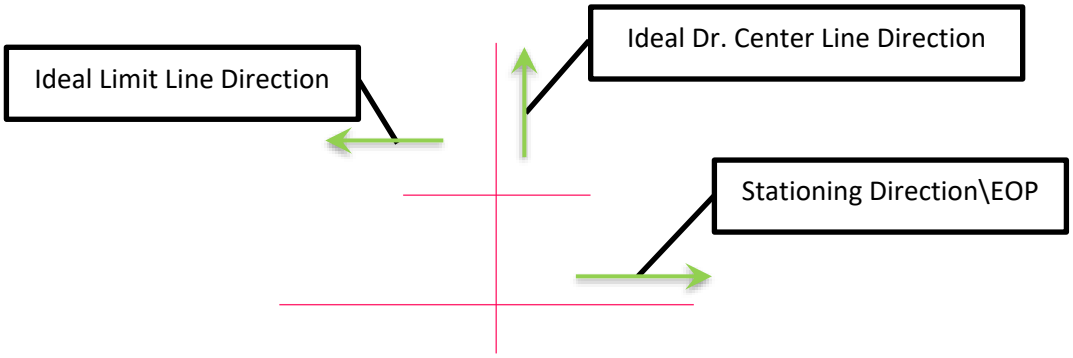

Figure 11 Ideal Left Side Reference Line Placement (Above)

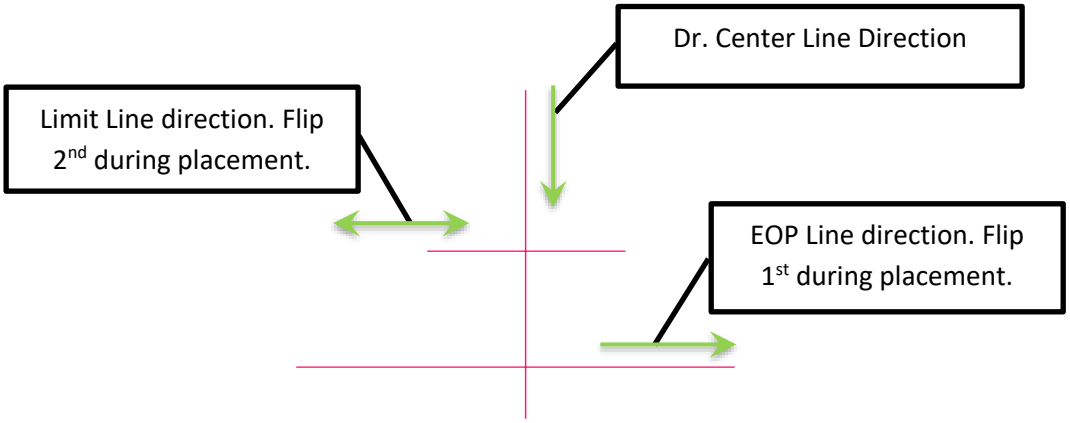

Figure 11 Alternate Left Side Reference Line Placement (Above)

Drive Approaches Tying to a User Defined Limit Line Profile

A 2D only feature has been added to each cell to represent the Detail L or Detail M where applicable for quantity purposes. The features are located on the CurbGut_Std_Pr_All_Det(L or M)_Back levels.

MDOT_Dr_atEOP_wLLProfReqd: Drive Approach at the edge of pavement tying to a profile.
Intended Purpose: To create a drive approach connected to the edge of the roadway or shoulder with radial connections and tied to a user defined profile at the limit line. This civil cell requires at least some tangent before the tie down Limit Line to function. See MDOT Standard Plan R-29 and Administrative Rules regulating Driveways, Banners and Parades.

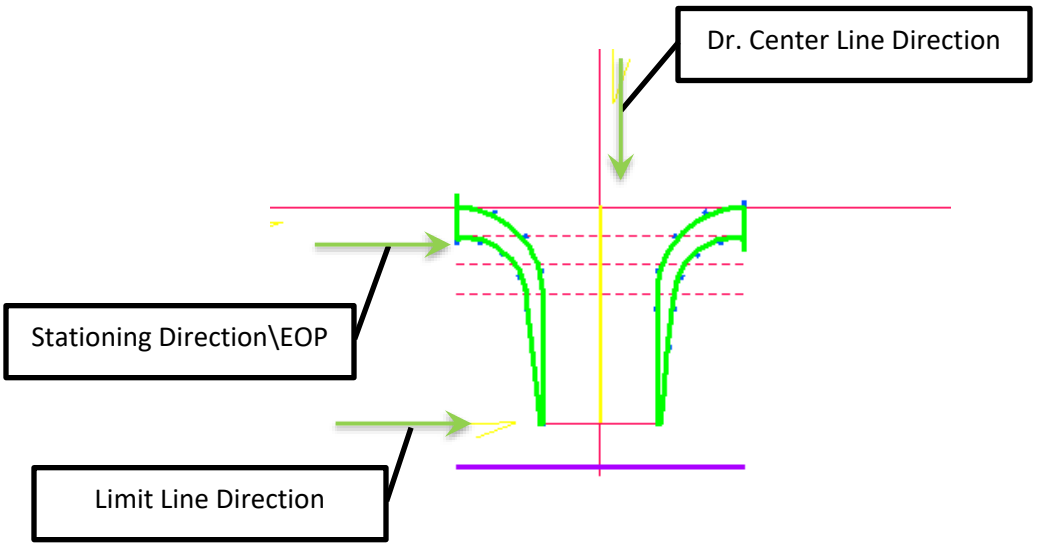

Figure 12

General Placement Notes:

Layout

- The Dr Limit Line provided by the user for cell placement controls the overall width of the Drive Approach and the elevation.
- Each Radius is controlled independently.

Slopes

- Dr_LtEOP_Comp and Dr_RtEOP_Comp control the Drive Approach edge of pavement slopes as straight line transitions from the ML Edge of Shoulder to the user defined profile at the Limit Line. These features are located on the CivilCell RefLine Breakline level.
- The Dr Limit Line requires an active profile to determine the define elevation at the tie down location.

Misc

- This Civil Cell is setup with a HMA surface template. To change the plan view appearance to a Conc or Agg approach change the feature using the P_Dr_HMA_Limit feature style to the appropriate material type in addition to changing the surface and linear templates. The Dr Const Limit level is off by default to facilitate easier civil cell recreation.

- All features located on the CivilCell RefLine Breakline level should not be included in the associated overall top surface terrain model(s) submitted as RID.
- The joint line (Jt) features located on the Corridor Terrain Breakline level are included to improve the pavement terrain model triangulation. These features can be adjusted as needed to provide a smooth pavement surface terrain model.

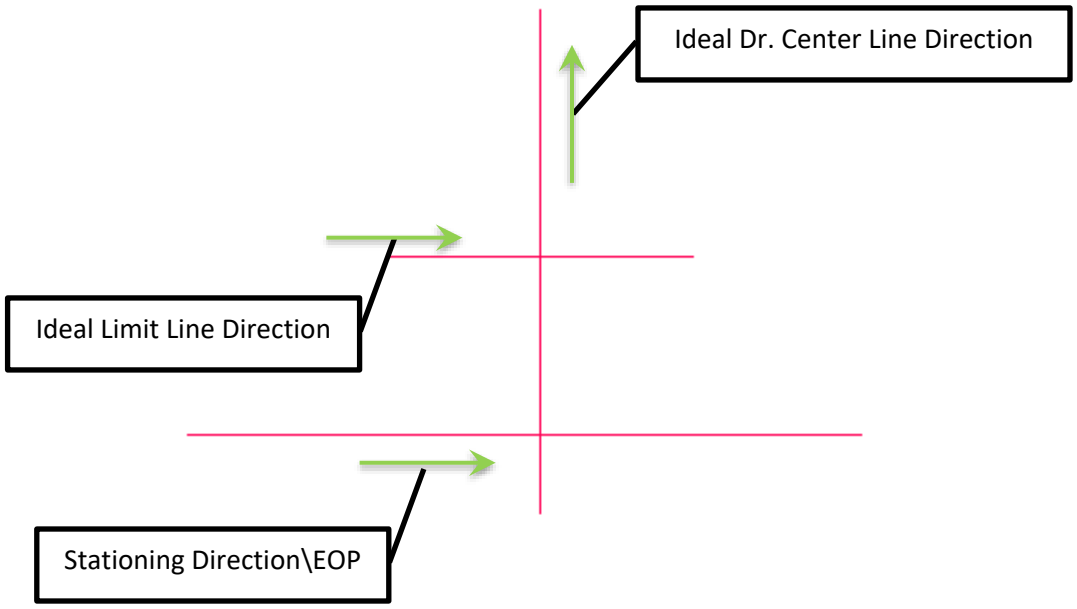

Figure 12 Ideal Left Side Reference Line Placement (Above)

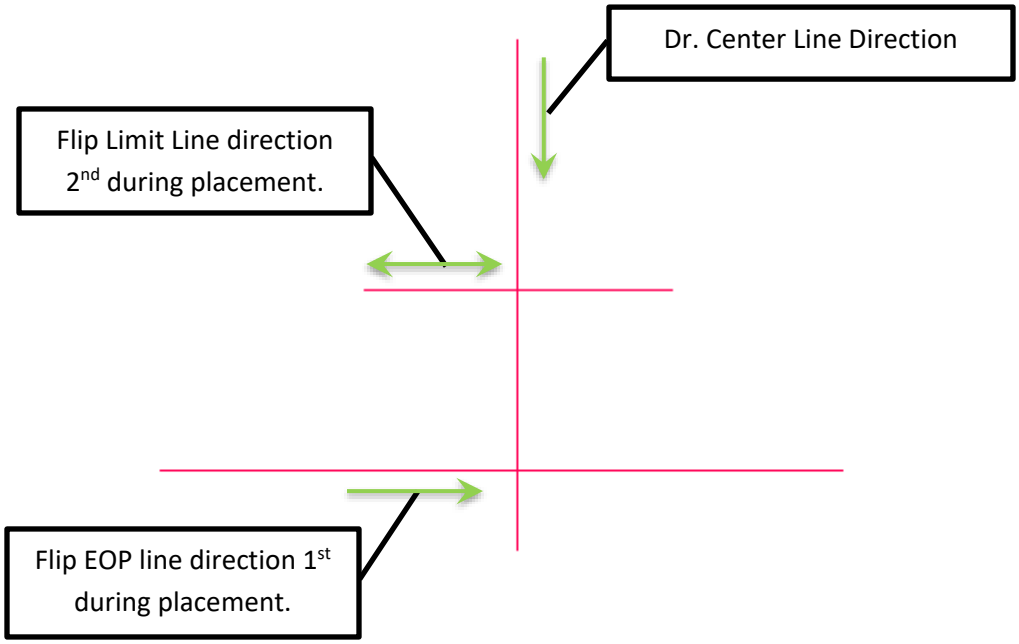

Figure 12 Alternate Left Side Reference Line Placement (Above)

MDOT_Dr_Res_atEOP_wLLProfReqd: Residential Drive Approach at the edge of pavement without radii tying to a profile.

Intended Purpose: To create a residential drive approach connected to the edge of the roadway with shoulder connected to a user defined profile at the limit line. This civil cell is best used for Drive Approaches in shoulder sections which are in a constant slope and not within a superelevation transition section. See MDOT Standard Plan R-29 and Administrative Rules regulating Driveways, Banners and Parades.

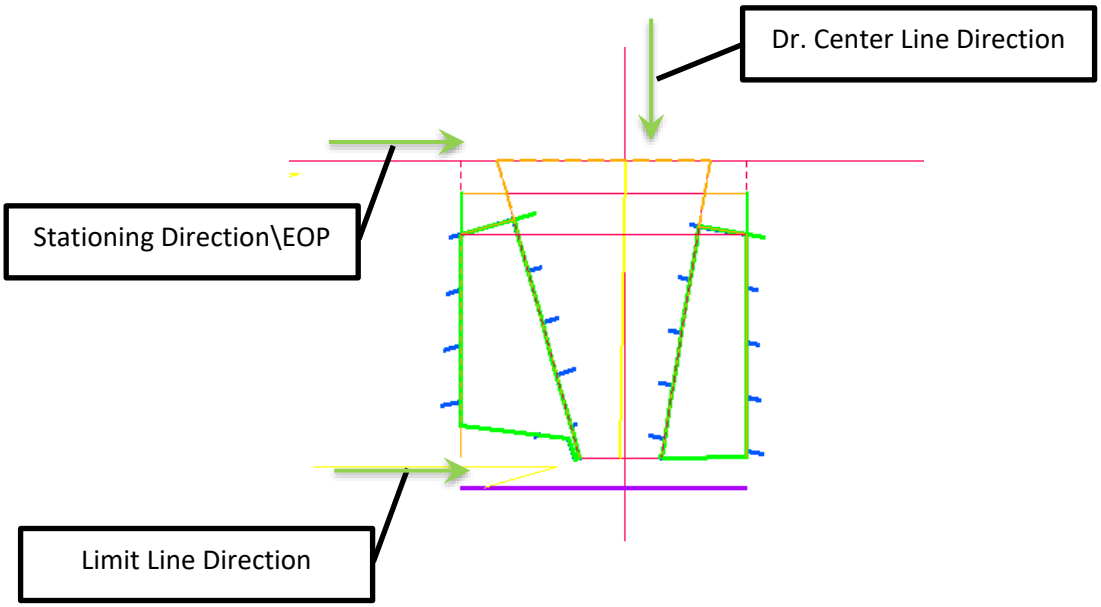

Figure 13

General Placement Notes:

Layout

NOTE: The width of the approach at the edge of pavement must always be greater than the width of the pavement at the limit line or the cell will fail. Additionally, the edge of pavements of the approach can never be exactly perpendicular to the mainline edge of pavement or the cell will fail.

- ML_EOS_Ref controls the overall shoulder width (Default = 4')
- The Dr Limit Line provided by the user for cell placement controls the overall width of the Drive Approach
- Width_0.6R and Width_0.4R at the edge of pavement on the sides of the approach control the approach side widths independently. (The default values are 15.6 and 10.4 respectively.)
- ML_SlopeTie_Ref controls the width of the side slope terrain models behind the main line back of curb (The default value = 5' and controls the terrain models that allow for this drive approach to connect at any angle to the main line road way. The default value may need to be increased based upon the severity to which the approach angle varies from 90 degrees)
- ML_DrLtTie and ML_DrRtTie controls the width of the parallel section of shoulder on each side of the drive approach (The default values are 4.5'. The values may need to be modified based upon the severity to which the approach angle varies from 90 degrees.)

Slopes

- ML_LtTie_Ref and ML_RtTie+Ref control the shoulder cross slope connections and should be modified to match the slope of the adjacent main line shoulder.
- Dr_LtEOP and Dr_RtEOP control the Drive Approach edge of pavement slopes as straight line transitions from the ML Edge of Shoulder to the tie down Limit Line. The profile does not take the shoulder slope into account by default. These features are located on the CivilCell RefLine Breakline level.
- The Dr Limit Line requires an active profile to determine the drive elevation at the tie down location.
- Lt_SlopeTie and Rt_SlopeTie are tie down features used to connect the linear template end conditions to the terrain models for the edge of pavement. The active profile is the active terrain model.

Misc

- This Civil Cell is setup with an Aggregate surface template. To change the plan view appearance to a Conc or HMA approach change all features using the P_Dr_Agg_Edge or P_Dr_Agg_Limit feature styles to the appropriate material type in addition to changing the surface and linear templates. The Dr Const Limit level is off by default to facilitate easier civil cell recreation.

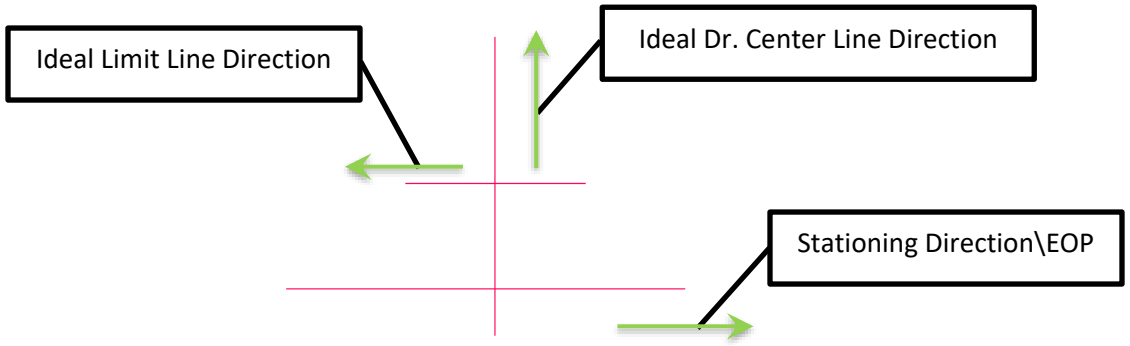

Figure 13 Ideal Left Side Reference Line Placement (Above)

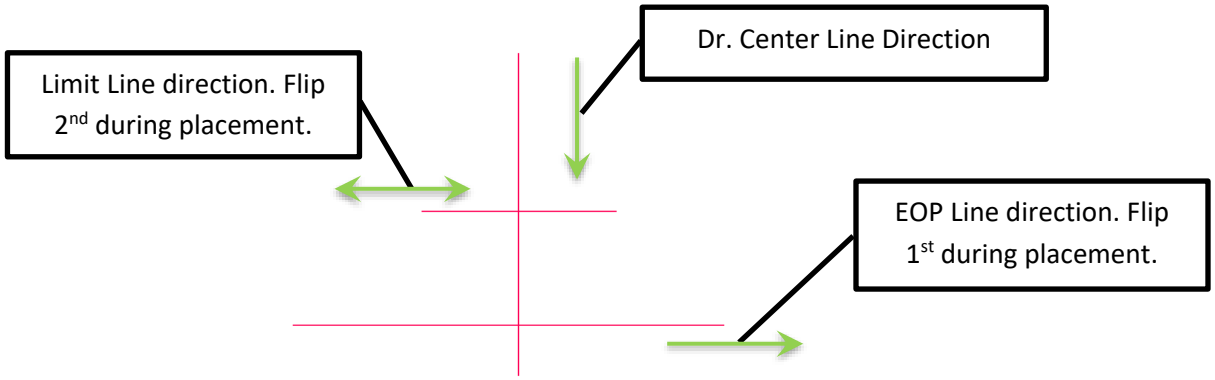

Figure 13 Alternate Left Side Reference Line Placement (Above)

MDOT_Dr_CnG_wDetM_wLLProfReqd: Detail M Drive Approach tying to a profile.

Intended Purpose: To create a drive approach connected to the edge of the roadway or shoulder with radial connections and a user defined profile at the limit line. This civil cell requires at least some tangent before the tie down Limit Line to function See MDOT Standard Plan R-29 and Administrative Rules regulating Driveways, Banners and Parades.

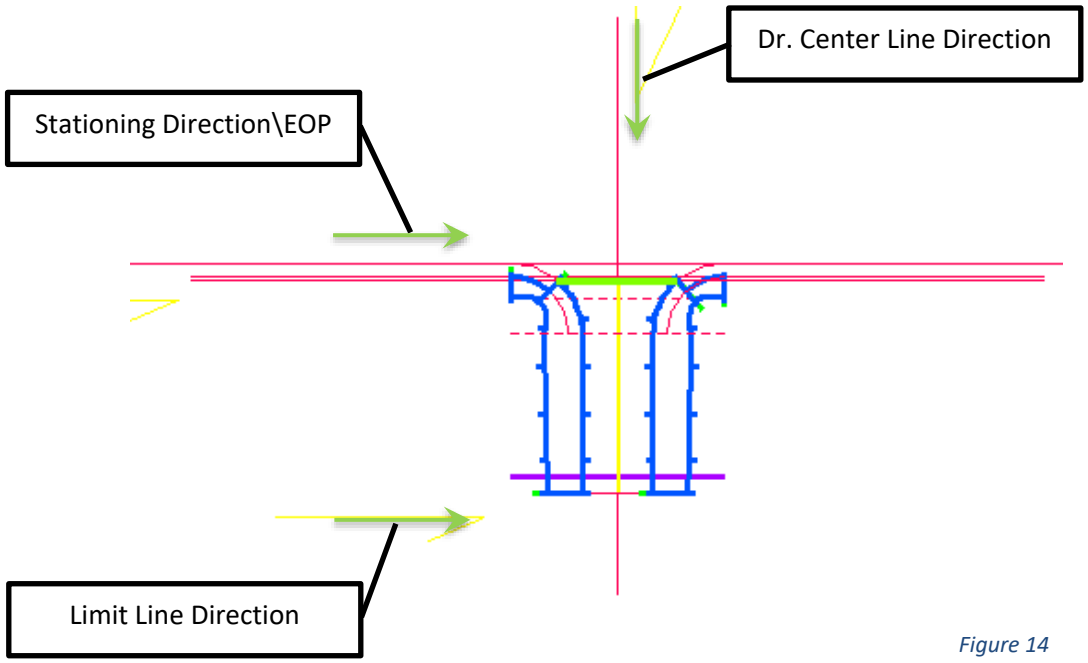

Figure 14

General Placement Notes:

Layout

- ML_BOC_Ref controls the overall curb width along the L Detail (Default = 2.5')
- ML_Gutter_Ref controls the main line gutter dimension and should be adjusted to match the project curb dimension as needed (Default is MDOT R-30 Type F Curb)
- The Dr Limit Line provided by the user for cell placement controls the overall width of the Drive Approach and the elevation.
- Dr_LtGutter_Ref and Dr_RtGutter_Ref control the gutter width of the drive approach curb. Default is (MDOT R-30 Type F Curb)
- Each Radius is controlled independently

Slopes

- Dr_LtEOP and Dr_RtEOP control the Drive Approach edge of pavement slopes as a complex transition between the from the ML edge of pavement, the gutter line and the back of curb drop to the tie down Limit Line. The profile if adjusted should only be modified between the back of curb and the tie down line. These features are located on the CivilCell RefLine breakline level.
- ML_Gutter_Ref controls the vertical offset of the gutter (N depth) from the ML edge of pavement (Default = MDOT R-30 Type F Curb)

- Dr_LtGutter_Ref and Dr_RtGutter_Ref control the vertical offset of the gutter (N depth) from the Dr edges of pavement (Default = MDOT R-30 Type F Curb) These must match the ML gutter along the M Detail and the gutter vertical offset in the curb used in the Dr edge Linear Templates.
- The Dr Limit Line requires an active profile to determine the drive elevation at the tie down location.
- Dr_LtInSeam_Ref and Dr_RtInSeam_Ref are features used to control the slope of the M Detail gutter to connect the surface template to the linear template. (Default is set to a 1.5% slope)

Misc

- The ML_BOC feature controls the height of the curb drop. (Default = a vertical offset of 1" above the gutter profile)
- This Civil Cell is setup with a Conc surface template. To change the plan view appearance to a HMA or Agg approach change the feature using the P_Dr_Conc_Limit feature style to the appropriate material type in addition to changing the surface and linear templates. The Dr Const Limit Level is off by default to facilitate easier civil cell recreation.
- All features located on the CivilCell RefLine Breakline level should not be included in the associated overall top surface terrain model(s) submitted as RID.
- The joint line (Jt) features located on the Corridor Terrain Breakline level are included to improve the pavement terrain model triangulation. These features can be adjusted as needed to provide a smooth pavement surface terrain model.

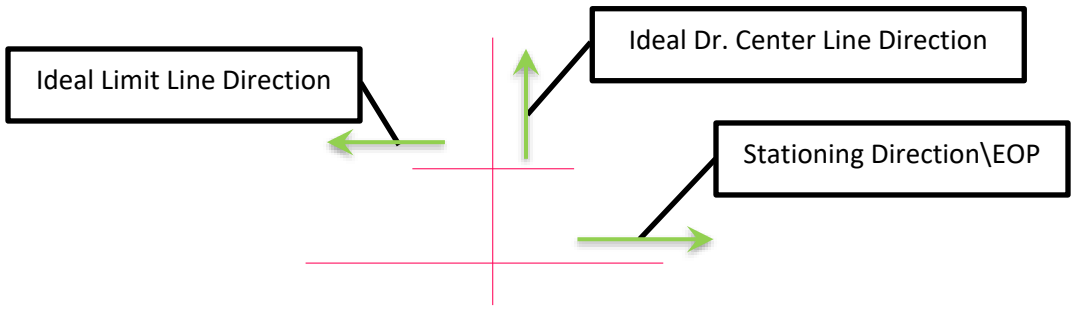

Figure 14 Ideal Left Side Reference Line Placement (Above)

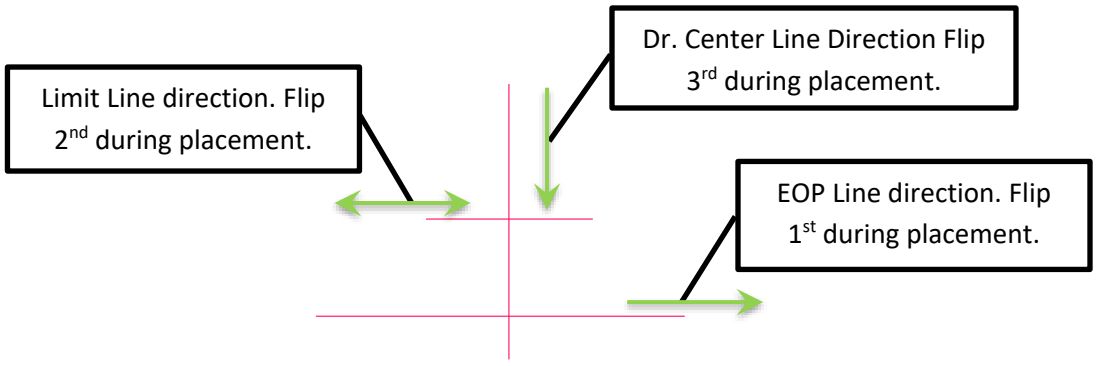

Figure 14 Alternate Left Side Reference Line Placement (Above)

MDOT_Dr_wShldr_LLProfReqd: Drive Approach with shoulder at the edge of pavement typing to a profile.

Intended Purpose: To create a drive approach connected to the edge of the pavement with radial connections at the shoulder and a user defined profile at the limit line. This civil cell requires at least some tangent before the tie down Limit Line to function. See MDOT Standard Plan R-29 and Administrative Rules regulating Driveways, Banners and Parades.

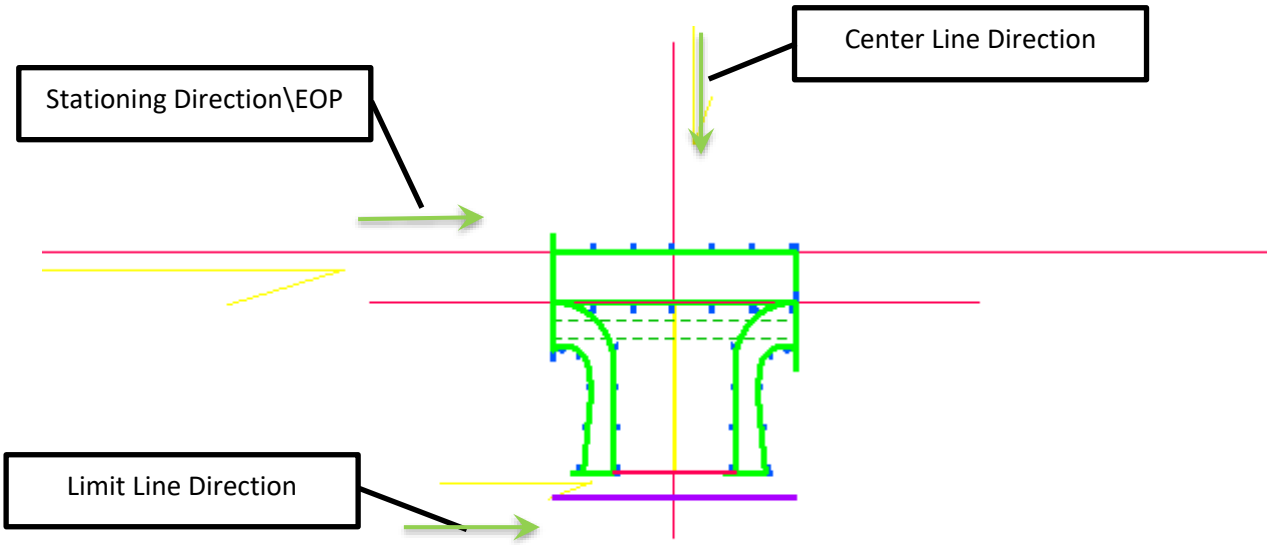

Figure 15

General Placement Notes:

Layout

NOTE: The Features found on the CivilCell RefLine Secondary Level will need to be modified to fit the actual project dimensions according to the MDOT Standard. This civil cell is best used for Drive Approaches when the shoulder has a constant slope and not within a superelevation transition section.

- ML_EOS_Ref controls the overall shoulder width
- The Dr Limit Line provided by the user for cell placement controls the overall width of the Drive Approach
- Each Radius is controlled independently

Slopes

- ML_EOS_Ref controls the overall shoulder cross slope (while it can be variable, the cell works best with a constant slope)
- Dr_LtEOP_Comp and Dr_RtEOP_Comp control the Drive Approach edge of pavement slopes as straight line transitions from the ML Edge of Shoulder to the Tie Down Limit. These features are located on the CivilCell RefLine Breakline level.
- The Dr Limit Line utilizes the Active Terrain as the active profile to determine the drive elevation at the tie down location

Misc

- This Civil Cell is setup with a HMA surface template. To change the plan view appearance to a Conc or Agg approach change the feature using the P_Dr_HMA_Limit feature style to the appropriate material type in addition to changing the surface and linear templates. The Dr Const Limit level is off by default to facilitate easier civil cell recreation.
- All features located on the CivilCell RefLine Breakline level should not be included in the associated overall top surface terrain model(s) submitted as RID.
- The joint line (Jt) features located on the Corridor Terrain Breakline level are included to improve the pavement terrain model triangulation. These features can be adjusted as needed to provide a smooth pavement surface terrain model.

MDOT_Dr_CnG_wShldr_LLProfReqd: Drive Approach with shoulder at the edge of pavement.
Intended Purpose: To create a drive approach connected to the edge of the pavement with radial connections at the shoulder and a user defined profile at the limit line. This civil cell requires at least some tangent before the tie down Limit Line to function. See MDOT Standard Plan R-29 and Administrative Rules regulating Driveways, Banners and Parades.

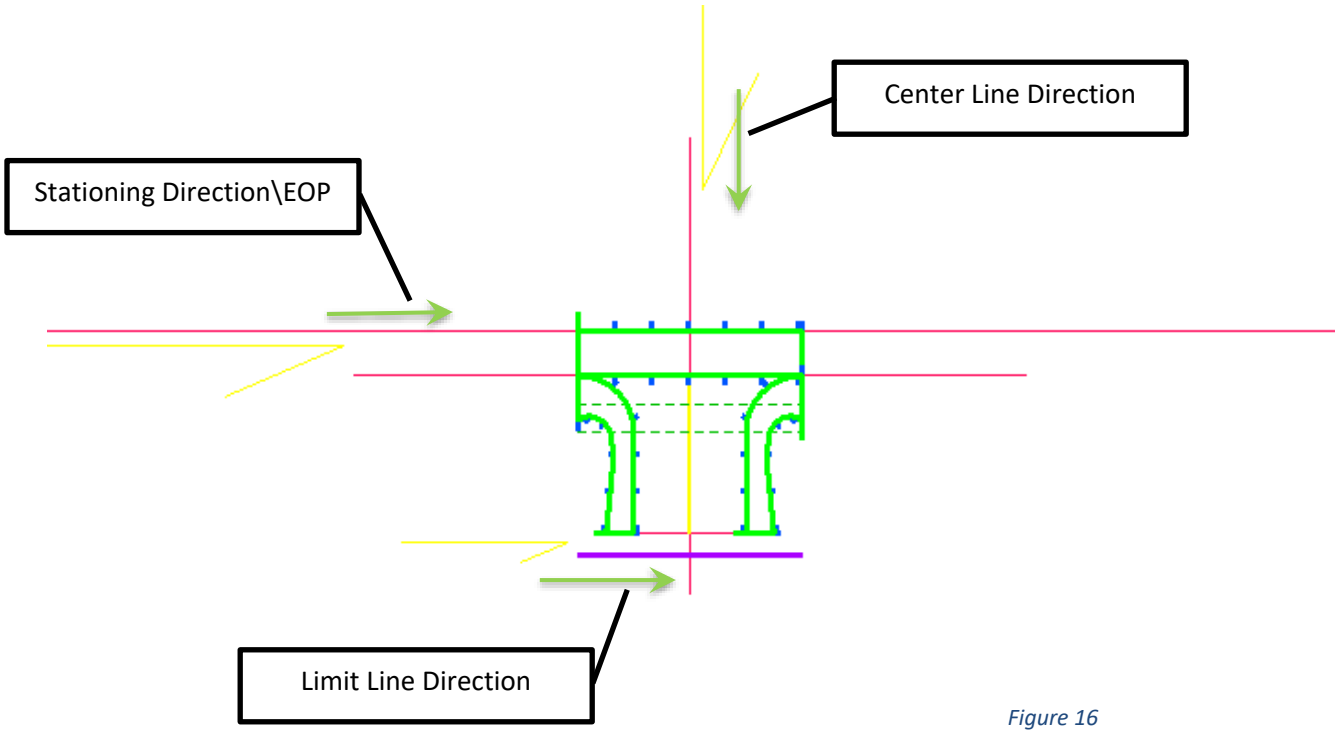

Figure 16

General Placement Notes:

Layout

NOTE: The Features found on the CivilCell RefLine Secondary Level will need to be modified to fit the actual project dimensions according to the MDOT Standard. This civil cell is best used for Drive Approaches when the shoulder has a constant slope and not within a superelevation transition section.

- ML_EOS_Ref controls the overall shoulder width
- The Dr Limit Line provided by the user for cell placement controls the overall width of the Drive Approach
- Each Radius is controlled independently

Slopes

- ML_EOS_Ref controls the overall shoulder cross slope (while it can be variable, the cell works best with a constant slope)
- Dr_LtEOP_Comp and Dr_RtEOP_Comp control the Drive Approach edge of pavement slopes as straight line transitions from the ML Edge of Shoulder to the Tie Down Limit. These features are located on the CivilCell RefLine Breakline level.
- The Dr Limit Line utilizes the Active Terrain as the active profile to determine the drive elevation at the tie down location

Misc

- This Civil Cell is setup with a HMA surface template. To change the plan view appearance to a Conc or Agg approach change the feature using the P_Dr_HMA_Limit feature style to the appropriate material type in addition to changing the surface and linear templates. The Dr Const Limit level is off by default to facilitate easier civil cell recreation.
- All features located on the CivilCell RefLine Breakline level should not be included in the associated overall top surface terrain model(s) submitted as RID.
- The joint line (Jt) features located on the Corridor Terrain Breakline level are included to improve the pavement terrain model triangulation. These features can be adjusted as needed to provide a smooth pavement surface terrain model.

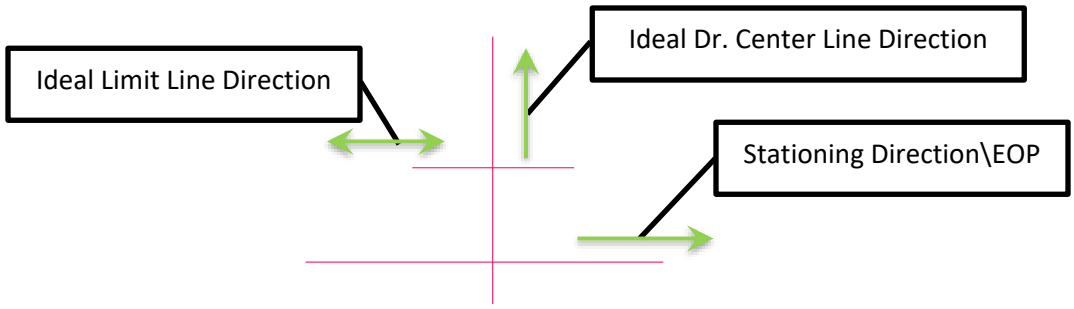

Figure 16 Ideal Left Side Reference Line Placement (Above)

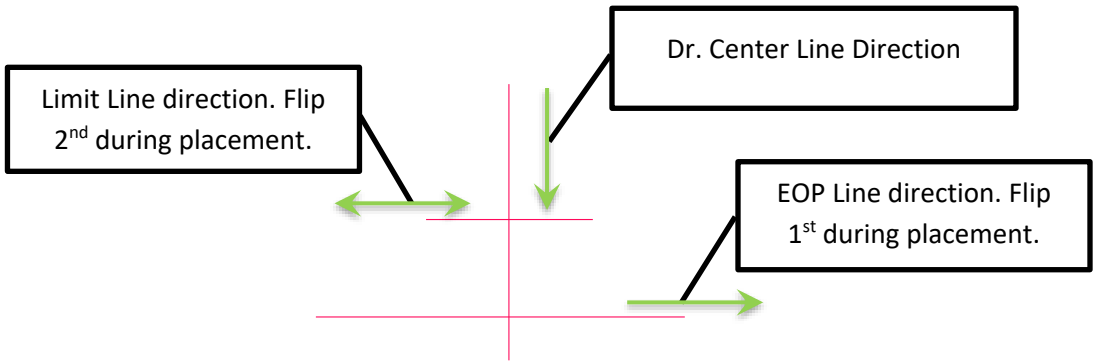

Figure 16 Alternate Left Side Reference Line Placement (Above)

Intersections without a Proposed Profile

MDOT_SideRd_CnG_wAltTypAShldrandTaperedTie: Intersection with tapered connections and Alt Type A widening.

Intended Purpose: To create an intersection approach connected to the edge of the roadway or shoulder with radial connections with a tapered connection at the side road terminus. This civil cell requires some tangent prior to the side road tie down Limit Line or the cell will fail. Four civil cells are included in the library including one with no turn lanes, one with a mainline only right turn lane, one with a side road only right turn lane and one with both mainline and side road right turn lanes per MDOT Geometric Design Guide GEO-650.

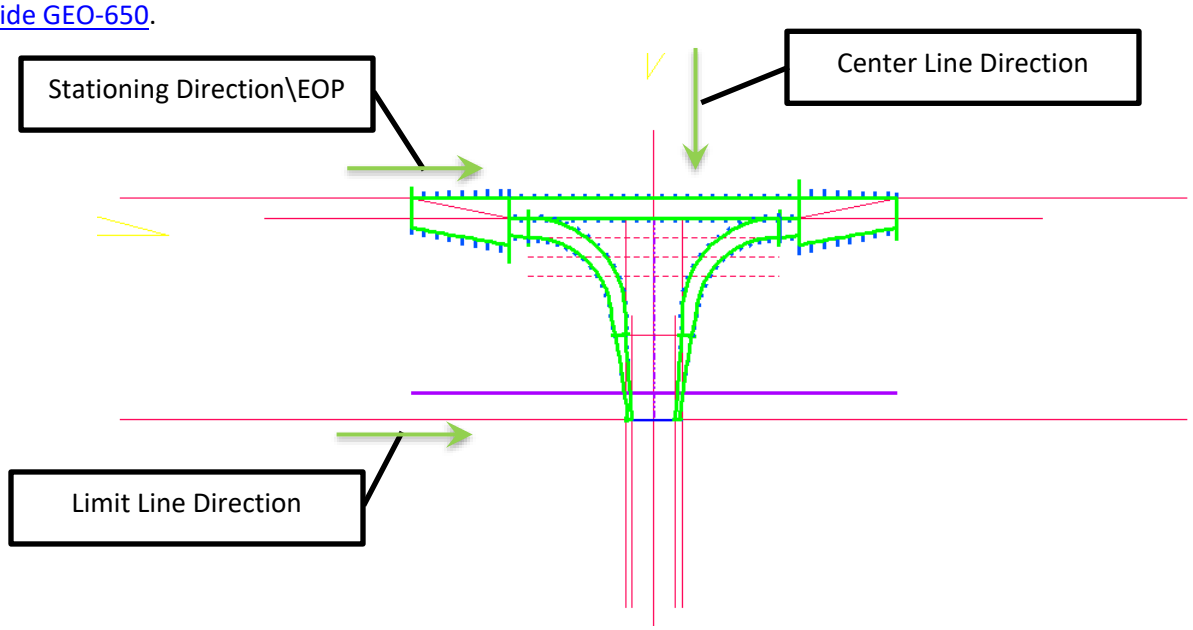

Figure 17

General Placement Notes:

Layout

- ML_EOWid_Ref controls the overall widening width. It must be longer than the limits of the approach tapers but not longer than the limits of the mainline edge of pavement it is referenced to or the cell will fail.
- ML_LtTan, ML_LtCurbTan_Ref, and ML_RtTan control the curb tangent length along the ML edge (Default = 10')
- ML_LtTurn_Taper and ML_RtTurn_Taper control the tapers along the ML Edge (Default = 50')
- ML_RtTurnLn_Ref controls the ML right turn ln length (Default = 250')
- ML_RtTurnLn_Taper controls the Rt Turn lane taper (Default = 225')
- SideRd_LtEOP_Ref and SideRd_RtEOP_Ref controls the side road width.
- SideRd_LtTaperTie_Ref and SideRd_RtTaperTie_Ref controls the side road taper width.
- SideRd_LtTan_Ref and SideRd_RtTan_Ref control the side road curb tangent length (Default = 10')
- SideRd_RtTurnLn_Ref controls the length of the side road turn lane (Default = 25')
- Each Radius is controlled independently.

Slopes

- ML_EOWid_Ref controls the overall widening cross slope (Default = -2.0%)
- ML_LtTurn_Taper and ML_RtTurn_Taper are independently assigned slope transitions from the ML Edge but should match the ML_EOWid_Ref cross slopes assigned on the feature above.

Overrides

- The profiles for features SideRd_LtEOP_Comp and SideRd_RtEOP_Comp can be modified to override all the defined cross slopes for the side road pavement. The side road edge linear templates and the side road pavement terrain will adjust accordingly. The features can be found on the CivilCell RefLine Breakline level.
- The SideRd_Limit feature has a profile set as the active Terrain. The profile can be modified to tie to any terrain or profile to have the Civil Cell tie at the limit line to any defined elevation.

Misc

- These Civil Cells are setup with a Conc surface templates. To change the plan view appearance to another material change the features using the P_Trvl_Conc_Appr_Limit feature styles to the appropriate material type in addition to changing the surface and linear templates.
- All features located on the CivilCell RefLine Breakline level should not be included in the associated overall top surface terrain model(s) submitted as RID.
- The joint line (Jt) features located on the Corridor Terrain Breakline level are included to improve the pavement terrain model triangulation. These features can be adjusted as needed to provide a smooth pavement surface terrain model.
- Paved Shoulders and Curb Linear Templates contain parametric constraints to tie the slopes at the shoulder\\curb connetion locations. These constraints will need to be modified if the slope of the widening is adjusted in any way from 2%.

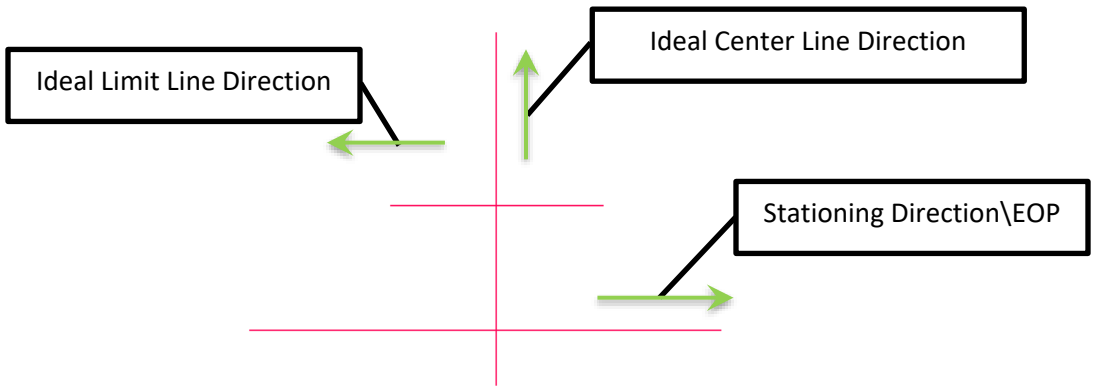

Figure 17 Ideal Left Side Reference Line Placement (Above)

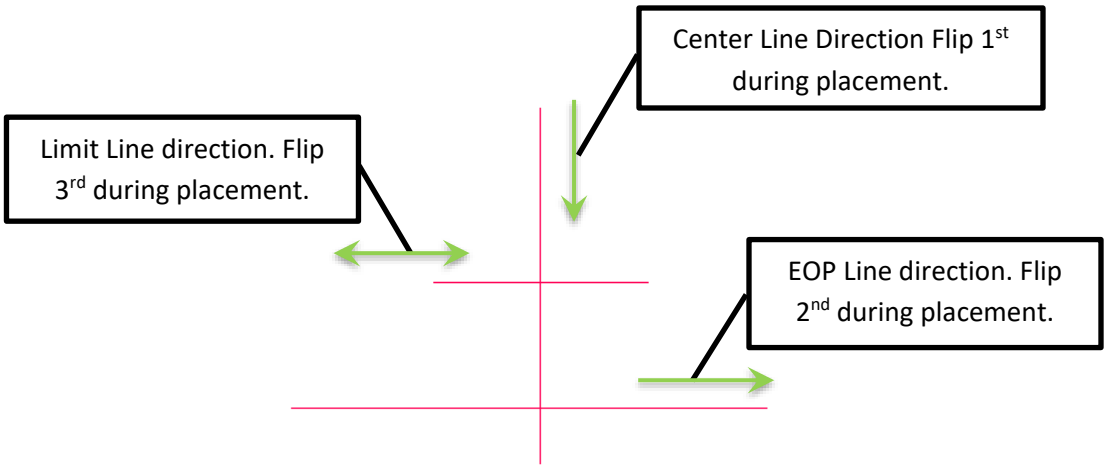

Figure 17 Alternate Left Side Reference Line Placement (Above)

MDOT_SideRd_CnG_wTypAShldrandTaperedTie: Intersection with tapered connections and Type A widening.

Intended Purpose: To create an intersection approach connected to the edge of the roadway or shoulder with radial connections with a tapered connection at the side road terminus. This civil cell requires some tangent prior to the side road tie down Limit Line or the cell will fail. Four civil cells are included in the library including one with no turn lanes, one with a mainline only right turn lane, one with a side road only right turn lane and one with both mainline and side road right turn lanes per MDOT Geometric Design Guide GEO-650.

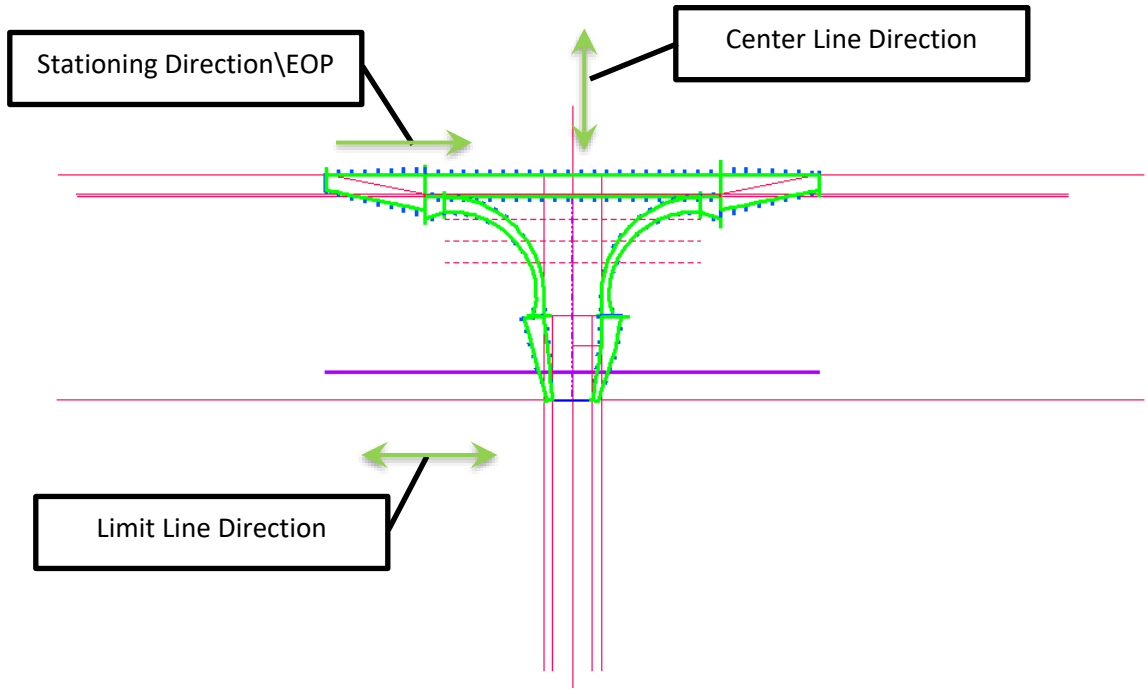

Figure 18

General Placement Notes:

Layout

- ML_EOWid_Ref and ML_EOP_AltOffset_Ref control the overall widening width. They must be longer than the limits of the approach tapers but not longer than the limits of the mainline edge of pavement it is referenced to or the cell will fail.
- ML_LtTan and ML_RtTan control the curb tangent length along the ML edge (Default = 10')
- ML_LtTurn_Taper and ML_RtTurn_Taper control the tapers along the ML Edge (Default = 50')
- ML_RtTurnLn_Ref controls the ML right turn ln length (Default = 250')
- ML_RtTurnLn_Taper controls the Rt Turn lane taper (Default = 225')
- SideRd_LtEOP_Ref and SideRd_RtEOP_Ref Control the side road width.
- SideRd_LtTaperTie_Ref and SideRd_RtTaperTie_Ref Control the side road taper width.
- SideRd_LtTan_Ref and SideRd_RtTan_Ref control the side road curb tangent length (Default = 10')
- SideRd_RtTurnLn_Ref controls the length of the side road turn lane (Default = 25')
- Each Radius is controlled independently.

Slopes

- ML_EOWid_Ref and ML_EOP_AltOffset_Ref control the overall widening cross slope and must match (Default = -2.0%)
- ML_LtTurn_Taper and ML_RtTurn_Taper are independently assigned slope transitions from the ML Edge but should match the ML_EOWid_Ref cross slopes assigned on the features above.

Overrides

- The profiles for features SideRd_LtEOP_Comp and SideRd_RtEOP_Comp can be modified to override all the defined cross slopes for the side road pavement. The side road edge linear templates and the side road pavement terrain will adjust accordingly. The features can be found on the CivilCell RefLine Breakline level.
- The SideRd_Limit feature has a profile set as the active Terrain. The profile can be modified to tie to any terrain or profile to have the Civil Cell tie at the limit line to any defined elevation.

Misc

- These Civil Cells are setup with a Conc surface templates. To change the plan view appearance to another material change the features using the P_Trvl_Conc_Appr_Limit and P_Trvl_HMA_Appr_Edge feature styles to the appropriate material type in addition to changing the surface and linear templates.
- All features located on the CivilCell RefLine Breakline level should not be included in the associated overall top surface terrain model(s) submitted as RID.
- The joint line (Jt) features located on the Corridor Terrain Breakline level are included to improve the pavement terrain model triangulation. These features can be adjusted as needed to provide a smooth pavement surface terrain model.
- Paved Shoulders and Curb Linear Templates contain parametric constraints to tie the slopes at the shoulder\\curb connection locations. These constraints will need to be modified if the slope of the widening is adjusted in any way from 2%.

Intersections with a Proposed Profile

MDOT_SideRd_CnG_SideRdProfReqd_NoTaper: Intersection connection with radii and a defined side road profile.

Intended Purpose: To create an intersection approach connected to the edge of the roadway or shoulder with radial connections and a constant width at the side road terminus. This civil cell will create a 150' tangent before the side road terminus. The tangent length can be adjusted but some tangent must remain or the cell will fail. Two civil cells are included in the library including one with no turn lanes, and one with a mainline only right turn lane per MDOT Geometric Design Guide GEO-650.

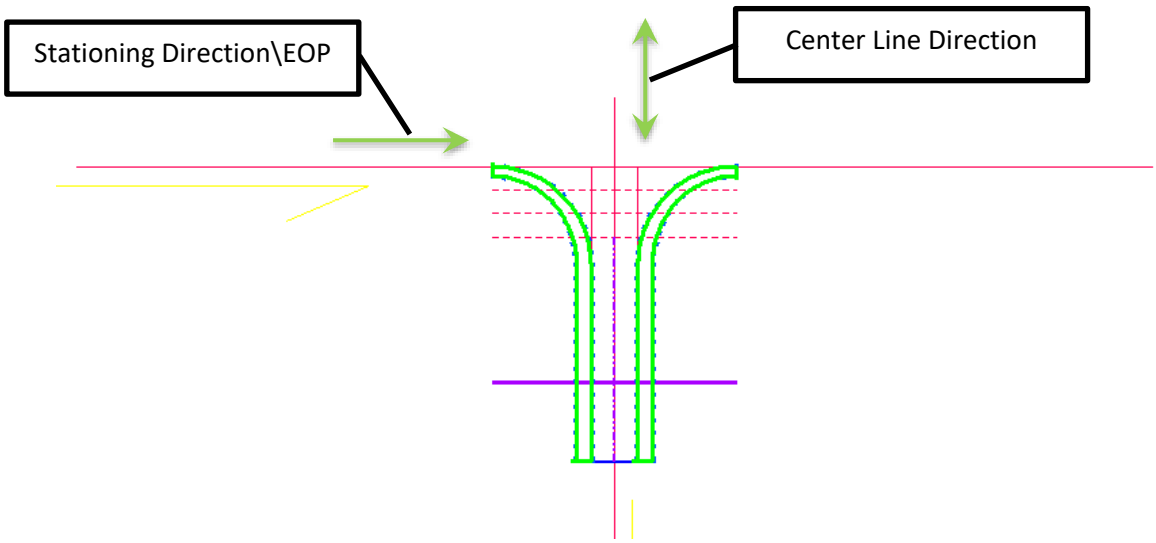

Figure 19

General Placement Notes:

Layout

- ML_RtTurnLn_Ref controls the ML right turn ln length (Default = 250')
- ML_RtTurnLn_Taper controls the Rt Turn lane taper (Default = 225')
- SideRd_LtEOP_Ref and SideRd_RtEOP_Ref Control the side road width.
- Each Radius is controlled independently.

Slopes

- ML_EOWid_Ref controls the overall widening cross slope (Default = -2.0%)
- ML_RtTurnLn_Taper is an independently assigned slope transition from the ML Edge but should match the ML_EOWid_Ref assigned cross slope.
- SideRd_LtEOP_Ref and SideRd_RtEOP_Ref control the Side Rd edge of pavement cross slopes as fixed slopes from the Side Rd CL profile (Default = -2.0%)
- Each Radius uses parabolic reverse curves to transition between the ML_EOP or the ML_EOWid_Ref and Side Rd edge of pavement slopes.

Overrides

- The profiles for features SideRd_LtEOP_Comp and SideRd_RtEOP_Comp can be modified to override all the defined cross slopes for the side road pavement. The side road edge linear templates and the side road pavement terrain will adjust accordingly. The features can be found on the CivilCell RefLine Breakline level.

Misc

- These Civil Cells are setup with a Conc surface templates. To change the plan view appearance to another material change the features using the P_Trvl_Conc_Appr_Limit feature style to the appropriate material type in addition to changing the surface and linear templates.
- All features located on the CivilCell RefLine Breakline level should not be included in the associated overall top surface terrain model(s) submitted as RID.
- The joint line (Jt) features located on the Corridor Terrain Breakline level are included to improve the pavement terrain model triangulation. These features can be adjusted as needed to provide a smooth pavement surface terrain model.

MDOT_SideRd_CnG_SideRdProfReqd_wAltTypAShldr_NoTaper: Intersection connection with radii, Alt. Type A Widening, no side road tapers and a defined side road profile.

Intended Purpose: To create an intersection approach connected to the edge of the roadway or shoulder with radial connections and a constant width at the side road terminus. This civil cell will create a 10' tangent before the side road terminus on each radius. The tangent length can be adjusted but some tangent must remain or the cell will fail. Two civil cells are included in the library including one with no turn lanes, and one with a mainline only right turn lane per MDOT Geometric Design Guide GEO-650.

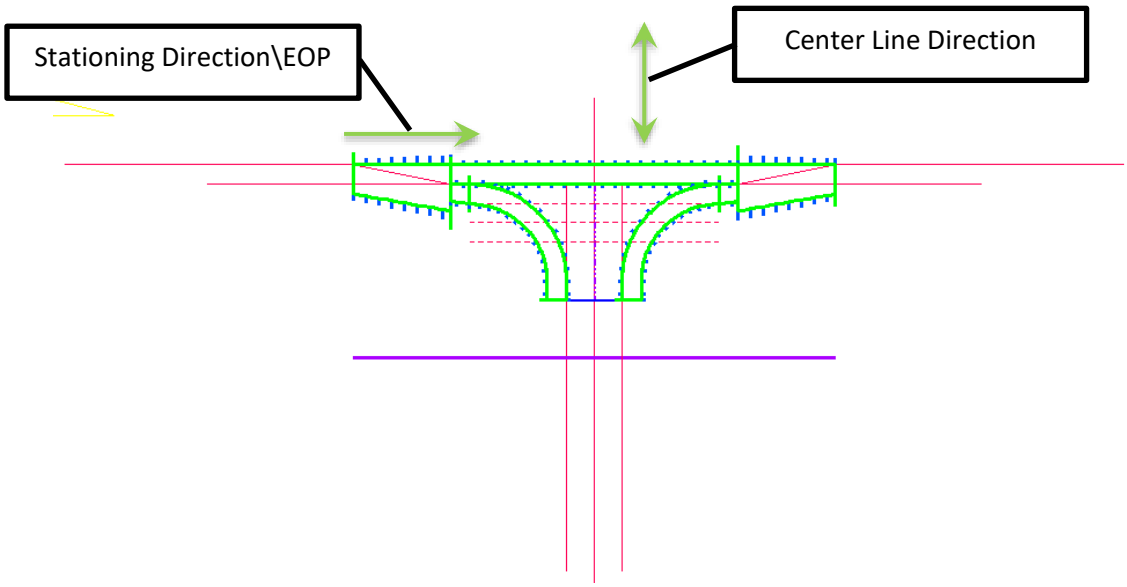

Figure 20

General Placement Notes:

Layout

- ML_EOWid_Ref controls the overall widening width. It must be longer than the limits of the approach tapers but not longer than the limits of the mainline edge of pavement it is referenced to or the cell will fail.
- ML_LtTan and ML_RtTan control the curb tangent length along the ML edge (Default = 10')
- ML_LtTurn_Taper and ML_RtTurn_Taper control the tapers along the ML Edge (Default = 50')
- ML_RtTurnLn_Ref controls the ML right turn ln length (Default = 250')
- ML_RtTurnLn_Taper controls the Rt Turn lane taper (Default = 225')
- SideRd_LtEOP_Ref and SideRd_RtEOP_Ref Control the side road width
- SideRd_LtTan_Ref and SideRd_RtTan_Ref control the side road curb tangent length (Default = 10') On skewed intersections the value of either can be adjusted to create a uniform (straight at the Tie) approach by measuring the distance between the features at the CL and adjusting the shorter side value accordingly.
- Each Radius is controlled independently.

Slopes

- ML_EOWid_Ref controls the overall widening cross slope (Default = -2.0%)
- ML_LtTurn_Taper, ML_RtTurn_Taper and ML_RtTurnLn_Taper are independently assigned slope transitions from the ML Edge but should match the ML_EOWid_Ref cross slope assigned on the feature above.
- SideRd_LtEOP_Ref and SideRd_RtEOP_Ref control the Side Rd edge of pavement cross slopes as fixed slopes from the Side Rd CL profile (Default = -2.0%)
- Each Radius uses parabolic reverse curves to transition between the ML_EOWid_Ref and Side Rd edge of pavement slopes.

Overrides

- The profiles for features SideRd_LtEOP_Comp and SideRd_RtEOP_Comp can be modified to override all the defined cross slopes for the side road pavement. The side road edge linear templates and the side road pavement terrain will adjust accordingly. The features can be found on the CivilCell RefLine Breakline level.

Misc

- These Civil Cells are setup with a Conc surface templates. To change the plan view appearance to another material change the features using the P_Trvl_Conc_Appr_Limit feature styles to the appropriate material type in addition to changing the surface and linear templates.
- All features located on the CivilCell RefLine Breakline level should not be included in the associated overall top surface terrain model(s) submitted as RID.
- The joint line (Jt) features located on the Corridor Terrain Breakline level are included to improve the pavement terrain model triangulation. These features can be adjusted as needed to provide a smooth pavement surface terrain model.
- Paved Shoulders and Curb Linear Templates contain parametric constraints to tie the slopes at the shoulder\curb connection locations. These constraints will need to be modified if the slope of the shoulder is adjusted in any way from -4%.

MDOT_SideRd_CnG_SideRdProfReqd_wAltTypAShldrandTaperedTie: Intersection connection with radii, Alt. Type A Widening, side road tapers and a defined side road profile.

Intended Purpose: To create an intersection approach connected to the edge of the roadway or shoulder with radial connections with a tapered connection at the side road terminus. This civil cell requires some tangent prior to the side road tie down Limit Line or the cell will fail. Four civil cells are included in the library including one with no turn lanes, one with a mainline only right turn lane, one with a side road only right turn lane and one with both mainline and side road right turn lanes per MDOT Geometric Design Guide GEO-650.

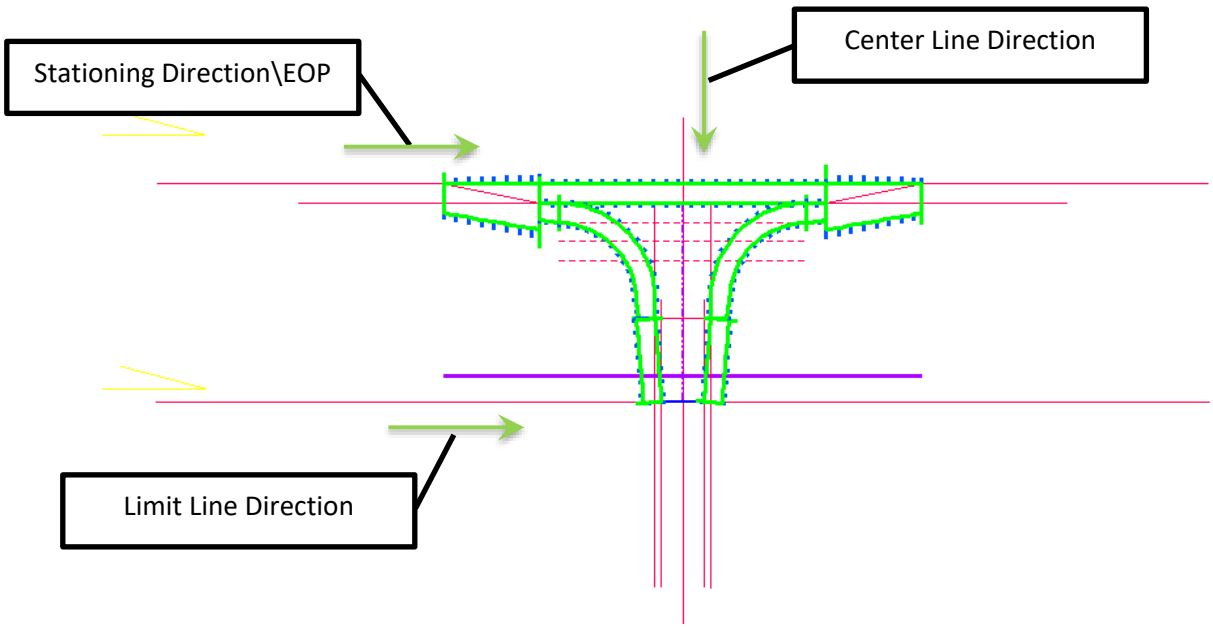

Figure 21

General Placement Notes:

Layout

- ML_EOWid_Ref controls the overall widening width. It must be longer than the limits of the approach tapers but not longer than the limits of the mainline edge of pavement it is referenced to or the cell will fail.
- ML_LtTan and ML_RtTan control the curb tangent length along the ML edge (Default = 10')
- ML_LtTurn_Taper and ML_RtTurn_Taper control the tapers along the ML Edge (Default = 50')
- ML_RtTurnLn_Ref controls the ML right turn ln length (Default = 250')
- ML_RtTurnLn_Taper controls the Rt Turn lane taper (Default = 225')
- SideRd_LtEOP_Ref and SideRd_RtEOP_Ref Control the side road width.
- SideRd_LtTaper_Ref and SideRd_RtTaper_Ref Control the side road taper width.
- SideRd_LtTan_Ref and SideRd_RtTan_Ref control the side road curb tangent length (Default = 10')
- SideRd_RtTurnLn_Ref controls the length of the side road turn lane (Default = 25')
- Each Radius is controlled independently.

Slopes

- ML_EOWid_Ref and ML_EOP_AltOffset_Ref Control the overall widening cross slope and must match (Default = -2.0%)
- ML_LtTurn_Taper, ML_RtTurn_Taper and ML_RtTurnLn_Taper are independently assigned slope transitions from the ML Edge but should match the ML_EOWid_Ref cross slopes assigned on the features above.
- SideRd_LtEOP_Ref and SideRd_RtEOP_Ref control the Side Rd edge of pavement cross slopes as fixed slopes from the Side Rd CL profile (Default = -2.0%)
- SideRd_LtTaper and SideRd_RtTaper are independently assigned slope transitions from the Side Rd CL but should match the appropriate Side Rd edges of pavement cross slopes assigned on the features above.
- Each Radius uses parabolic reverse curves to transition between the ML_EOWid_Ref and Side Rd edge of pavement slopes.

Overrides

- The profiles for features SideRd_LtEOP_Comp and SideRd_RtEOP_Comp can be modified to override all the defined cross slopes for the side road pavement. The side road edge linear templates and the side road pavement terrain will adjust accordingly. The features can be found on the CivilCell RefLine Breakline level.

Misc

- These Civil Cells are setup with a Conc surface templates. To change the plan view appearance to another material change the features using the P_Trvl_Conc_Appr_Limit feature styles to the appropriate material type in addition to changing the surface and linear templates.
- All features located on the CivilCell RefLine Breakline level should not be included in the associated overall top surface terrain model(s) submitted as RID.
- The joint line (Jt) features located on the Corridor Terrain Breakline level are included to improve the pavement terrain model triangulation. These features can be adjusted as needed to provide a smooth pavement surface terrain model.
- Paved Shoulders and Curb Linear Templates contain parametric constraints to tie the slopes at the shoulder\curb connection locations. These constraints will need to be modified if the slope of the widening is adjusted in any way from 2%.

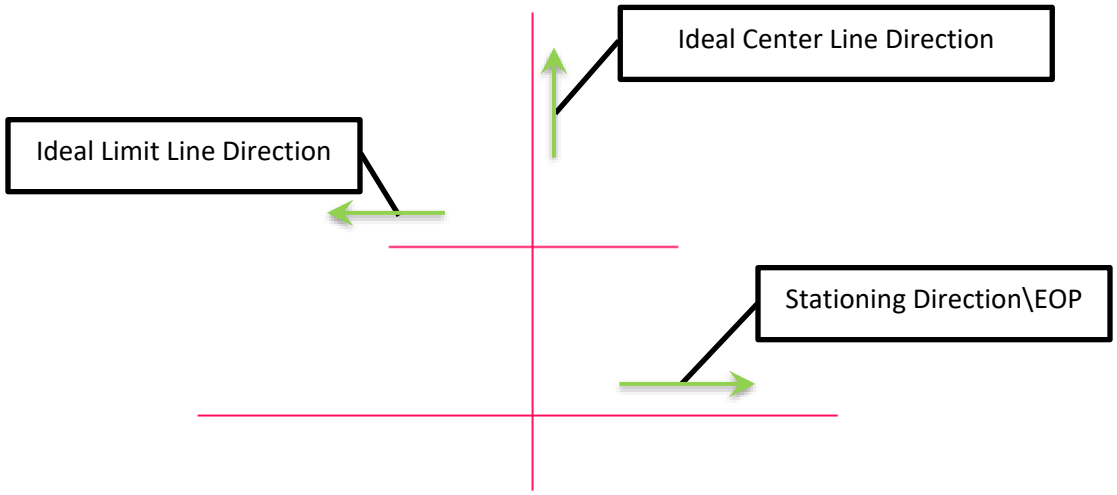

Figure 21 Ideal Left Side Reference Line Placement (Above)

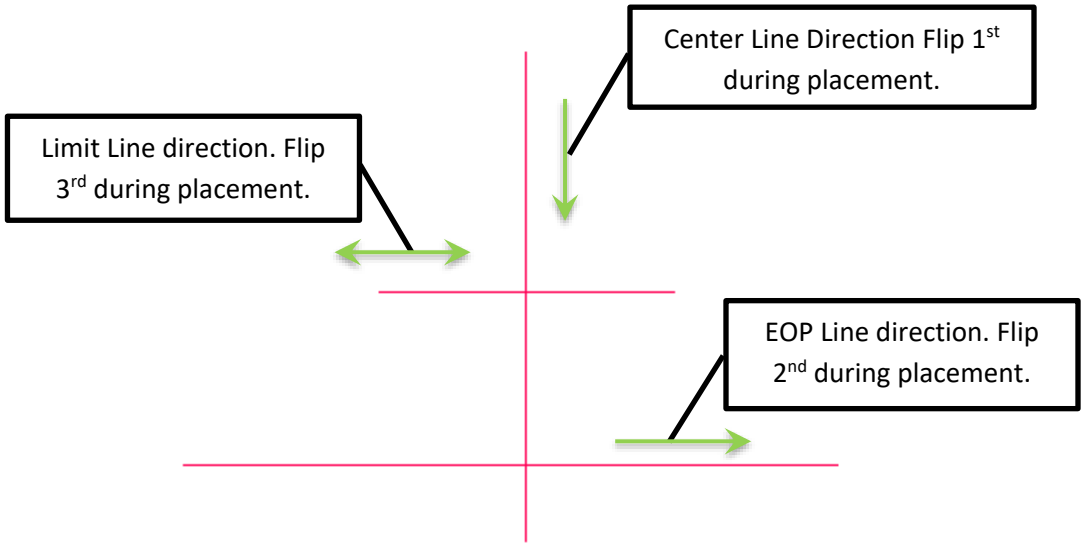

Figure 21 Alternate Left Side Reference Line Placement (Above)

MDOT_SideRd_CnG_SideRdProfReqd_wTypAShldr_NoTaper: Intersection connection with radii, Type A Widening, no side road tapers and a defined side road profile.

Intended Purpose: To create an intersection approach connected to the edge of the roadway or shoulder with radial connections and a constant width at the side road terminus. This civil cell will create a 10' tangent before the side road terminus on each radius. The tangent length can be adjusted but some tangent must remain or the cell will fail. Two civil cells are included in the library including one with no turn lanes, and one with a mainline only right turn lane per MDOT Geometric Design Guide GEO-650.

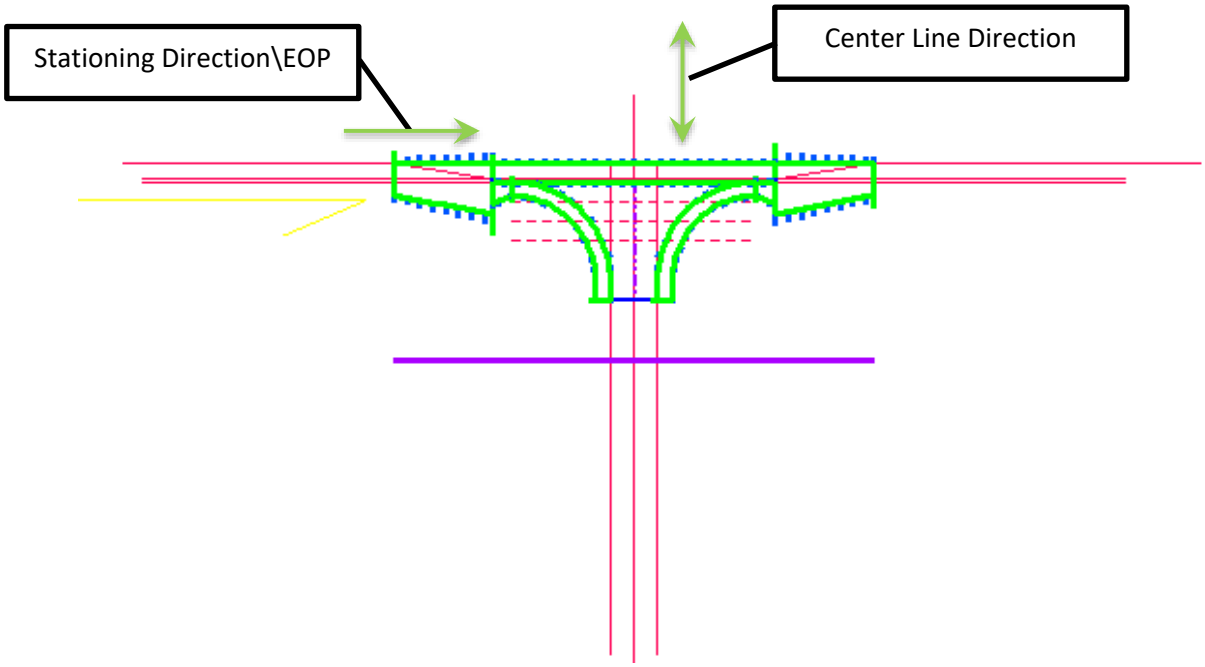

Figure 22

General Placement Notes:

Layout

- ML_EOWid_Ref and ML_EOP_AltOffset_Ref control the overall widening width. They must be longer than the limits of the approach tapers but not longer than the limits of the mainline edge of pavement it is referenced to or the cell will fail.
- ML_LtTan and ML_RtTan control the curb tangent length along the ML edge (Default = 10')
- ML_LtTurn_Taper and ML_RtTurn_Taper control the tapers along the ML Edge (Default = 50')
- ML_RtTurnLn_Ref controls the ML right turn ln length (Default = 250')
- ML_RtTurnLn_Taper controls the Rt Turn lane taper (Default = 225')
- SideRd_LtEOP_Ref and SideRd_RtEOP_Ref Control the side road width
- SideRd_LtTan_Ref and SideRd_RtTan_Ref control the side road curb tangent length (Default = 10')
- On skewed intersections the value of either can be adjusted to create a uniform (straight at the Tie) approach by measuring the distance between the features at the CL and adjusting the shorter side value accordingly.
- Each Radius is controlled independently.

Slopes

- ML_EOWid_Ref and ML_EOP_AltOffset_Ref Control the overall widening cross slope and must match (Defaut = -2.0%)
- ML_LtTurn_Taper, ML_RtTurn_Taper and ML_RtTurnLn_Taper are independently assigned slope transitions from the ML Edge but should match the ML_EOWid_Ref cross slopes assigned on the features above.
- SideRd_LtEOP_Ref and SideRd_RtEOP_Ref control the Side Rd edge of pavement cross slopes as fixed slopes from the Side Rd CL profile (Default = -2.0%)
- Each Radius uses parabolic reverse curves to transition between the ML_EOWid_Ref and Side Rd edge of pavement slopes.

Overrides

- The profiles for features SideRd_LtEOP_Comp and SideRd_RtEOP_Comp can be modified to override all the defined cross slopes for the side road pavement. The side road edge linear templates and the side road pavement terrain will adjust accordingly. The features can be found on the CivilCell RefLine Breakline level.

Misc

- These Civil Cells are setup with a Conc surface templates. To change the plan view appearance to another material change the features using the P_Trvl_Conc_Appr_Limit and P_Trvl_Conc_Appr_Edge feature styles to the appropriate material type in addition to changing the surface and linear templates.
- All features located on the CivilCell RefLine Breakline level should not be included in the associated overall top surface terrain model(s) submitted as RID.
- The joint line (Jt) features located on the Corridor Terrain Breakline level are included to improve the pavement terrain model triangulation. These features can be adjusted as needed to provide a smooth pavement surface terrain model.
- Paved Shoulders and Curb Linear Templates contain parametric constraints to tie the slopes at the shoulder\curb connection locations. These constraints will need to be modified if the slope of the shoulder is adjusted in any way from -4%.

MDOT_SideRd_CnG_SideRdProfReqd_wTypAShldrandTaperedTie Intersection connection with radii, Type A Widening, side road tapers and a defined side road profile.

Intended Purpose: To create an intersection approach connected to the edge of the roadway or shoulder with radial connections with a tapered connection at the side road terminus. This civil cell requires some tangent prior to the side road tie down Limit Line or the cell will fail. Four civil cells are included in the library including one with no turn lanes, one with a mainline only right turn lane, one with a side road only right turn lane and one with both mainline and side road right turn lanes per MDOT Geometric Design Guide GEO-650.

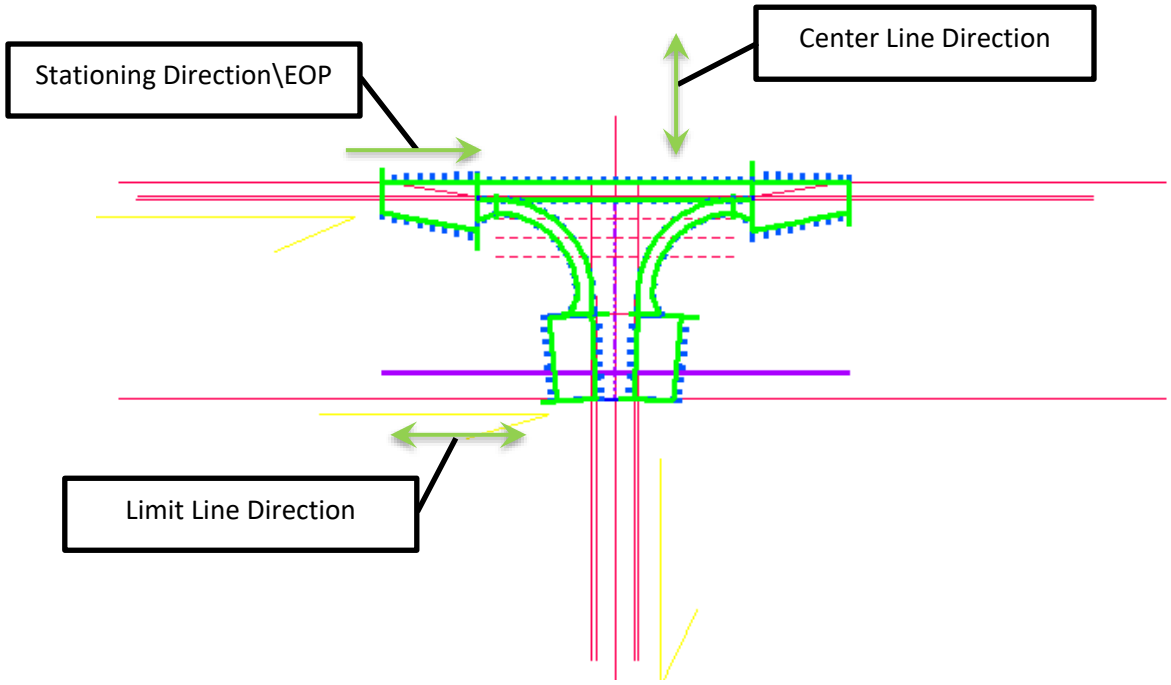

Figure 23

General Placement Notes:

Layout

- ML_EOWid_Ref ML_EOP_AltOffset_Ref control the overall widening width. They must be longer than the limits of the approach tapers but not longer than the limits of the mainline edge of pavement it is referenced to or the cell will fail.
- ML_LtTan and ML_RtTan control the curb tangent length along the ML edge (Default = 10')
- ML_LtTurn_Taper and ML_RtTurn_Taper control the tapers along the ML Edge (Default = 50')
- ML_RtTurnLn_Ref controls the ML right turn Ln length (Default = 250')
- ML_RtTurnLn_Taper controls the Rt Turn lane taper (Default = 225')
- SideRd_LtEOP_Ref and SideRd_RtEOP_Ref Control the side road width.
- SideRd_LtTaper_Ref and SideRd_RtTaper_Ref Control the side road taper width.
- SideRd_LtTan_Ref and SideRd_RtTan_Ref control the side road curb tangent length (Default = 10')
- SideRd_RtTurnLn_Ref controls the length of the side road turn lane (Default = 25')
- Each Radius is controlled independently.

Slopes

- ML_EOWid_Ref and ML_EOP_AltOffset_Ref Control the overall widening cross slope and must match (Default = -2.0%)
- ML_LtTurn_Taper, ML_RtTurn_Taper and ML_RtTurnLn_Taper are independently assigned slope transitions from the ML Edge but should match the ML_EOWid_Ref cross slopes assigned on the features above.
- SideRd_LtEOP_Ref and SideRd_RtEOP_Ref control the Side Rd edge of pavement cross slopes as fixed slopes from the Side Rd CL profile (Default = -2.0%)
- SideRd_LtTaper and SideRd_RtTaper are independently assigned slope transitions from the SideRd CL but should match the appropriate Side Rd edges of pavement cross slopes assigned on the features above.
- Each Radius uses parabolic reverse curves to transition between the ML_EOWid_Ref and Side Rd edge of pavement slopes.

Overrides

- The profiles for features SideRd_LtEOP_Comp and SideRd_RtEOP_Comp can be modified to override all the defined cross slopes for the side road pavement. The side road edge linear templates and the side road pavement terrain will adjust accordingly. The features can be found on the CivilCell RefLine Breakline level.

Misc

- These Civil Cells are setup with a Conc surface templates. To change the plan view appearance to another material change the features using the P_Trvl_Conc_Appr_Limit and P_Trvl_Conc_Appr_Edge feature styles to the appropriate material type in addition to changing the surface and linear templates.
- All features located on the CivilCell RefLine Breakline level should not be included in the associated overall top surface terrain model(s) submitted as RID.
- The joint line (Jt) features located on the Corridor Terrain Breakline level are included to improve the pavement terrain model triangulation. These features can be adjusted as needed to provide a smooth pavement surface terrain model.
- Paved Shoulders and Curb Linear Templates contain parametric constraints to tie the slopes at the shoulder\\curb connection locations. These constraints will need to be modified if the slope of the widening is adjusted in any way from 2%.

Ramp Terminals

MDOT_RampTerm_ProfReqd_wAltTypeA: Ramps terminals details 1-4 and 6 according to Geometric Design Guide GEO-370 with Alt. Type A widening and a defined ramp profile.
Intended Purpose: To create a ramp terminal approach connected to the edge of the roadway or shoulder with radial connections with a constant width at the side road terminus. This civil cell requires some tangent prior to the ramp terminal ending or the cell will fail. Four civil cells are included in the library including one for the MDOT Geometric Guide GEO-370 Details 1, 2, 3, 4 and 6.

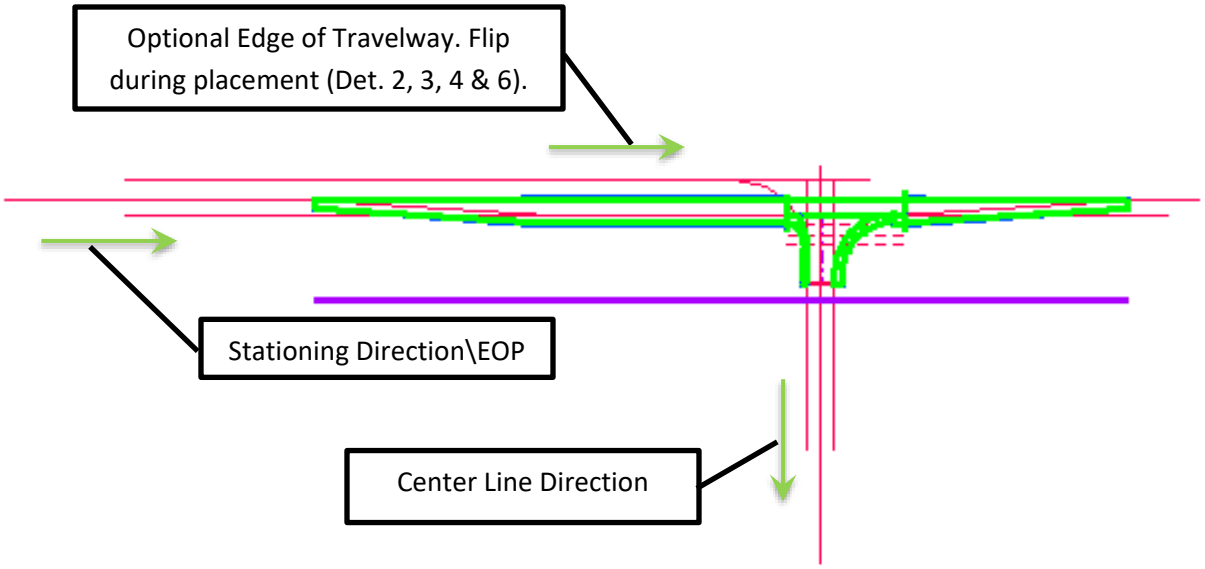

Figure 24: Detail 3 Shown

General Placement Notes:

Layout

- ML_EOWid_Ref controls the overall widening width. It must be longer than the limits of the approach tapers but not longer than the limits of the mainline edge of pavement it is referenced to or the cell will fail.
- ML_LtTan and ML_RtTan control the curb tangent length along the ML edge (Default = 10')
- ML_LtTurn_Taper and ML_RtTurn_Taper control the tapers along the ML Edge (Default = 50' or 225')
- ML_RtTurnLn_Ref controls the ML right turn lane length (Default = 250')
- ML_RtTurnLn_Taper controls the Rt Turn lane taper (Default = 225')
- RampTerm_LtEOP_Ref and RampTerm_RtEOP_Ref Control the side road width.
- RampTerm_Limit_Ref controls the Ramp Terminal tangent length on the typical Rt Side of traffic flow. (Default = 10'). On skewed intersections adjust the limit location by adjusting the value to compensate for the shorter side. The terminal limit can't be staggered at the limit line.
- Each Radius is controlled independently.

- ML_ETrvlWay_Ref is a placeholder for a user defined edge of travel way civil geometry feature. If one is not provided by the user, a default offset of 20' is applied. Roadways with center turn lane widening or not in a tangent section require a user defined feature identifying the edge of travel way for the cell to place correctly. The user is prompted to supply the optional reference during placement. The ML_ETrvlWay_Ref feature should be selected as an optional reference during cell recreation.

Slopes

- ML_EOWid_Ref controls the overall widening cross slope (Default = -2.0%)
- ML_LtTurn_Taper, ML_RtTurn_Taper and ML_RtTurnLn_Taper are independently assigned slope transitions from the ML Edge but should match the ML_EOWid_Ref cross slope assigned on the features above.
- RampTerm_LtEOP_Ref and RampTerm_RtEOP_Ref control the Ramp Terminal edge of pavement cross slopes as fixed slopes from the Ramp Terminal CL profile (Default = 2.0% or -2.0% depending on the normal ramp alignment location with respect to the direction of traffic and location within the interchange.
- Each Radius uses parabolic reverse curves to transition between the ML_EOWid_Ref and Side Rd edge of pavement slopes.

Overrides

- The profiles for features RampTerm_LtEOP_Comp and RampTerm_RtEOP_Comp can be modified to override all the defined cross slopes for the Ramp Terminal pavement. The Ramp Terminal edge linear templates and the Ramp Terminal pavement terrain will adjust accordingly. The features can be found on the CivilCell RefLine Breakline level.

Misc

- These Civil Cells are setup with a HMA surface templates. To change the plan view appearance to another material change the features using the P_Trvl_HMA_Appr_Limit feature styles to the appropriate material type in addition to changing the surface and linear templates.
- All features located on the CivilCell RefLine Breakline level should not be included in the associated overall top surface terrain model(s) submitted as RID.
- The joint line (Jt) features located on the Corridor Terrain Breakline level are included to improve the pavement terrain model triangulation. These features can be adjusted as needed to provide a smooth pavement surface terrain model.
- Paved Shoulders and Curb Linear Templates contain parametric constraints to tie the slopes at the shoulder\\curb connection locations. These constraints will need to be modified if the slope of the widening is adjusted in any way from 2%.

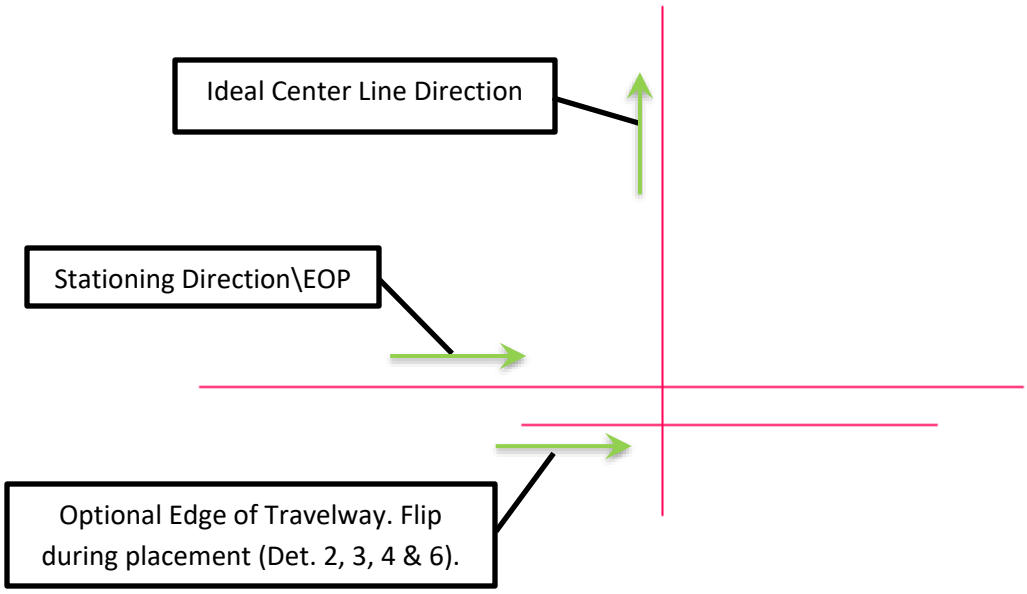

Figure 24 Ideal Left Side Reference Line Placement (Above)

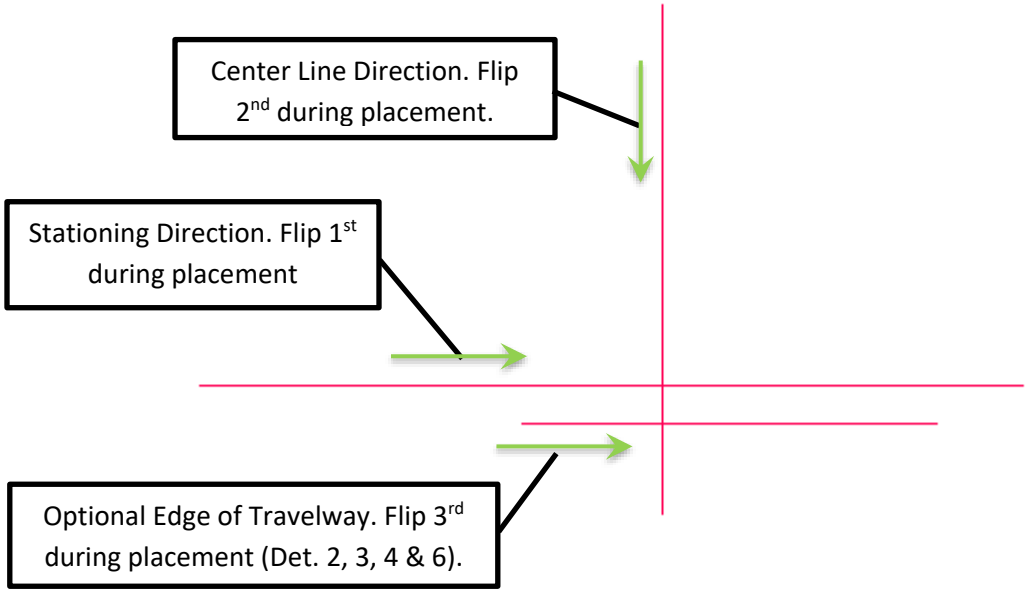

Figure 24 Alternate Left Side Reference Line Placement (Above)

MDOT_RampTerm_ProfReqd_wTypeA: Ramps terminals details 1-4 and 6 according to Geometric Design Guide GEO-370 with Type A widening and a defined ramp profile.

Intended Purpose: To create a ramp terminal approach connected to the edge of the roadway or shoulder with radial connections with a constant width at the side road terminus. This civil cell requires some tangent prior to the ramp terminal ending or the cell will fail. Four civil cells are included in the library including one for the MDOT Geometric Guide GEO-370 Details 1, 2, 3, 4 and 6.

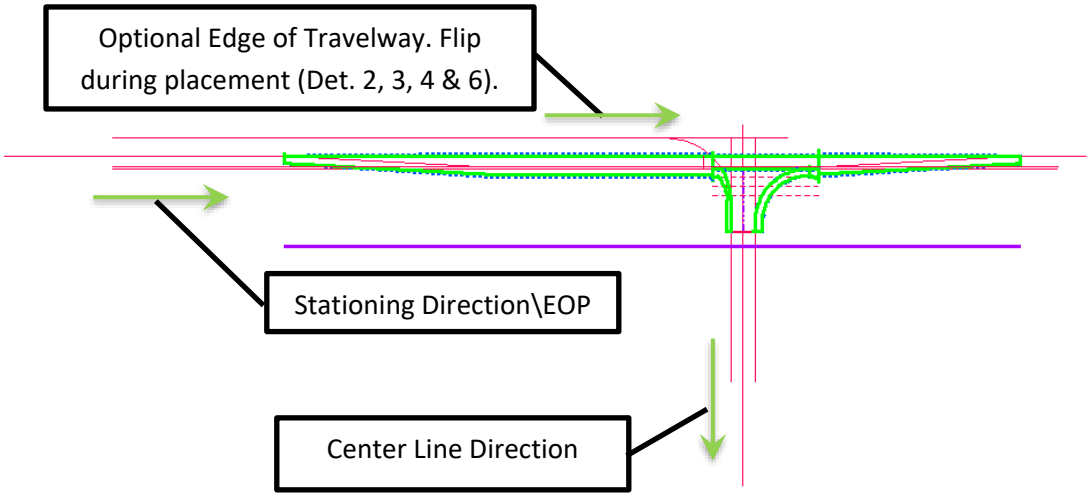

Figure 25: Detail 3 Shown

General Placement Notes:

Layout

- ML_EOWid_Ref and ML_EOP_AltOffset_Ref control the overall widening width. They must be longer than the limits of the approach tapers but not longer than the limits of the mainline edge of pavement it is referenced to or the cell will fail.
- ML_LtTan and ML_RtTan control the curb tangent length along the ML edge (Default = 10')
- ML_LtTurn_Taper and ML_RtTurn_Taper control the tapers along the ML Edge (Default = 50' or 225')
- ML_RtTurnLn_Ref controls the ML right turn lane length (Default = 250')
- ML_RtTurnLn_Taper controls the Rt Turn lane taper (Default = 225')
- RampTerm_LtEOP_Ref and RampTerm_RtEOP_Ref Control the side road width.
- RampTerm_Limit_Ref controls the Ramp Terminal tangent length on the typical Rt Side of traffic flow (Default = 10'). On skewed intersections adjust the limit location by adjusting the value to compensate for the shorter side. The terminal limit can't be staggered at the limit line.
- Each Radius is controlled independently.
- ML_ETrvlWay_Ref is a placeholder for a user defined edge of travel way civil geometry feature. If one is not provided by the user, a default offset of 20' is applied. Roadways with center turn lane widening or not in a tangent section require a user defined feature identifying the edge of travel way for the cell to place correctly. The user is prompted to supply the optional reference during placement. The ML_ETrvlWay_Ref feature should be selected as an optional reference during cell recreation.

Slopes

- ML_EOWid_Ref and ML_EOP_AltOffset_Ref Control the overall widening cross slope and must match (Defaut = -2.0%)
- ML_LtTurn_Taper, ML_RtTurn_Taper and ML_RtTurnLn_Taper are independently assigned slope transitions from the ML Edge but should match the ML_EOWid_Ref cross slope assigned on the features above.
- RampTerm_LtEOP_Ref and RampTerm_RtEOP_Ref control the Ramp Terminal edge of pavement cross slopes as fixed slopes from the Ramp Terminal CL profile (Default = 2.0% or -2.0% depending on the normal ramp alignment location with respect to the direction of traffic and location within the interchange.
- Each Radius uses parabolic reverse curves to transition between the ML_EOP_AltOffset_Ref and Side Rd edge of pavement slopes.

Overrides

- The profiles for features RampTerm_LtEOP_Comp and RampTerm_RtEOP_Comp can be modified to override all the defined cross slopes for the Ramp Terminal pavement. The Ramp Terminal edge linear templates and the Ramp Terminal pavement terrain will adjust accordingly. The features can be found on the CivilCell RefLine Breakline level.

Misc

- These Civil Cells are setup with a HMA surface templates. To change the plan view appearance to another material change the features using the P_Trvl_HMA_Appr_Limit and P_Trvl_HMA_Appr_Edge feature styles to the appropriate material type in addition to changing the surface and Linear templates.
- All features located on the CivilCell RefLine Breakline level should not be included in the associated overall top surface terrain model(s) submitted as RID.
- The joint line (Jt) features located on the Corridor Terrain Breakline level are included to improve the pavement terrain model triangulation. These features can be adjusted as needed to provide a smooth pavement surface terrain model.
- Paved Shoulders and Curb Linear Templates contain parametric constraints to tie the slopes at the shoulder\\curb connection locations. These constraints will need to be modified if the slope of the widening is adjusted in any way from 2%.

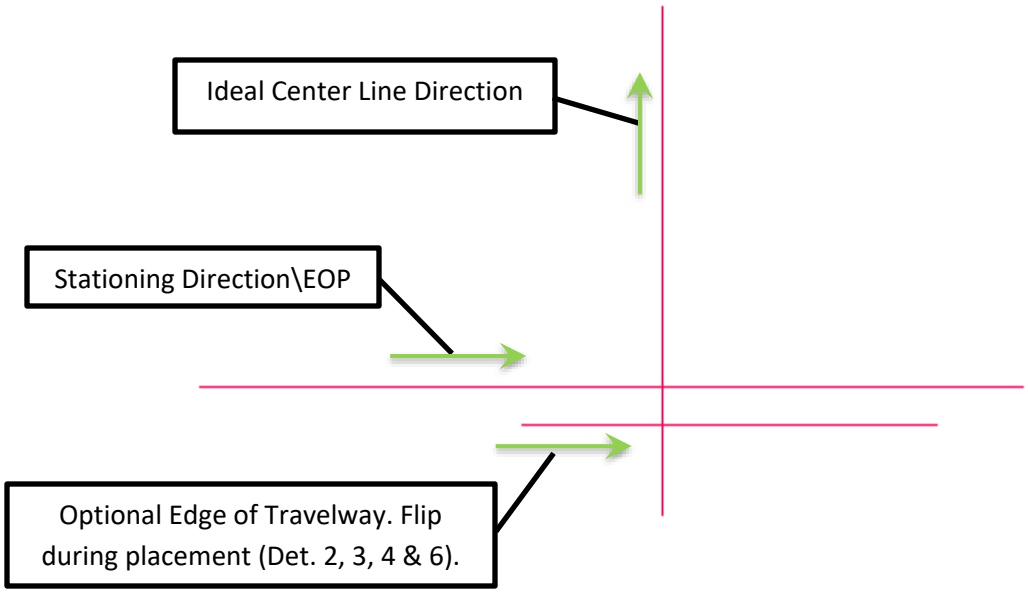

Figure 25 Ideal Left Side Reference Line Placement (Above)

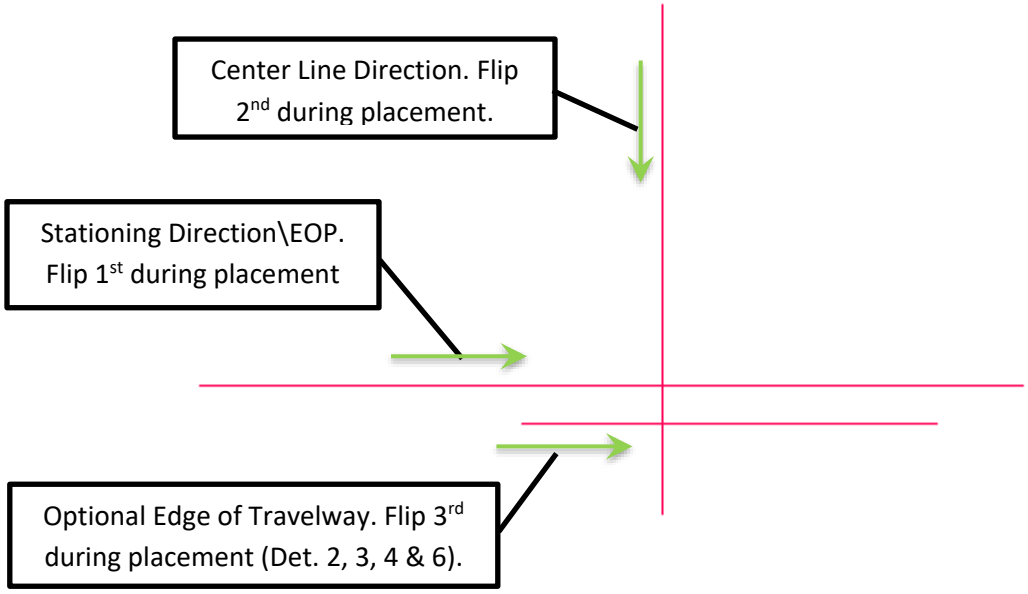

Figure 25 Alternate Left Side Reference Line Placement (Above)

Technical Support

Please email any questions, issues or problems associated with this document to:

MDOT-EngineeringSupportTraining@Michigan.gov

Additional Design Services Help and Support can also be obtained through the following email resources:

MDOT-BridgeDesignSupport@Michigan.gov – For help with bridge design software, cells, levels, and workspace tools.
MDOT-Drainage-Utility@Michigan.gov – For help with GEOPAK Drainage, drainage cells and other subsurface utility modeling tools.
MDOT-CaddSupport@Michigan.gov – For help with cells, levels, line styles, dimensions, and other CADD and workspace tools.
MDOT-RoadwayModelingSupport@Michigan.gov – For help with roadway modeling, modeling templates, civil cells and workspace tools.
MDOT-Survey_Support@Michigan.gov – For help with survey data, workflows and processes.