

# CDOT ORD 10.12 – Drainage & Utility Update Readme

## General Configuration Notes

- All D&U files have been updated to use the 10.12 schema, development was finalized on the 10.12.03.2 version.
- Civil Settings used for "MicroStation" Properties Utility information have been set and aligned with settings used in the Drainage & Utility Project as appropriate.
- Added HYDR\_Text Level
  - CO: 2
  - LS: 0
  - LW: 2

## Drainage and Utility Project Settings

- Option Updates
  - Compact Database set to 99 by default to reduce frequency of Compact Database prompt. Users are welcome to compact the database at any point as desired.
  - Units have been updated to match design file settings, notably all available length options that support US Survey Foot have been set, percent content set to two decimal places and pipe slope has been set to use percent with two decimal places by default.
- Prototypes

*Significant effort was put into cleaning up and aligning the prototypes to more accurately and clearly present the analytical properties for design elements. This included purging unused prototypes, renaming and aligning many prototypes to more closely match the Features used to generate the digital physical model, and correction and updates for the values within the prototypes. Some notable actions are note here for user awareness*

  - Conduit Prototypes were updated to include a "CDOT" prefix. Many of these were recreated to address an error arising from the file version upgrade.
  - Conduit prototypes for use with culverts (CULV) were created to permit default settings of the culvert settings in the Drainage Properties
    - Design Start Invert >> False
    - Design Stop Invert >> False
    - Is Culvert? >> True
    - Upstream Headwall Definition Type >> Use Conduit
    - Downstream Headwall Definition Type >> Use Conduit
    - Has Overtopping Weir >> False
    - Set Invert to Start? >> True
    - Set Invert to Stop? >> True
  - Prototypes were created for the STM MH BOX \* structures that reflect the nature of these structures.
  - Catchment prototypes have been aligned with Table 7.4 of the Drainage Manual and set to use scaled area by default.
  - Created Surface Polygon Prototypes for use with Land Use Areas to match Drainage Manual Table 7.4. Set only C value as User defined component
  - Catch Basin and Manhole prototypes have been updated to reference the Item Code Book names as the default note (which is used for annotation).
  - Updated Type 16 Double 6.66 x 2.5 to use 6.66' for default grate length
  - Updated Inlet - Type 16 - Single to correct Length & Width

- Catalogs
  - The following changes were made to the Inlet Catalog
    - TYPE R-[5,10,15] and TYPE R-[10,15] Drop Box
      - Curb Opening Height > 6.0"
      - Local Depression > 3.0"
      - Depression Width > 24.0"
    - Type 16 \*
      - Local Depression > 2.0"
      - Depression Width > 24.0"
  - Changed RCP ELP Labels to run Span x Rise to be consistent with remainder of configuration for Arch and ELP Conduits
 

*NOTE: These changes may give cause separate Feature Definitions being used for the same type objects in upgraded files. Users are advised to only use this content as exists in the file as the updated catalog is not brought forward. Please contact CDOT support before using the "Update Standards From DGNLIB" if these features are present.*
  - Set "Design Inlet" to True for catch basins and confirmed no design options are available beyond the default value to prevent errant capacity calculations.
  - Created CDOT\_CMN - Circular catalog to remove "RCP" label from ByClass elements, corresponding prototype was also created.
  - Updated Default Design Constraint Velocity settings to 3 fps min and 10 fps max.
  - Added Project Specific table holder for inclusion in rainfall runoff alternatives
  - Added Design and Analysis Scenarios for 2, 5, 10, 25, 50 and 100 year calculation options
  - Added Engineering standards checks
    - FES/HW confirms connected conduit matches end section size.
    - Conduit Length check for large and small diameter conduit max lengths.
  - Added CDOT Physical and Labels Only Tool Tips; CDOT Physical set active.

## Nodes

- INLT Vane & Inlet Vane DBL (M-604-25)
  - Updated Location point to align with M&S Standard. This structure will now place on the edge of the structure
  - The elevation point for grate/rim has also been aligned to this location.
  - *NOTE: Upgraded files with these inlets will update to this new behavior when changes are made to the physical location of the structure. Users should force these updates and adjust node placement as necessary.*
- INLT Type R (M-604-12)
  - The existing INLT Type R 10' and 15' structures, both proposed and existing, have been updated to model with the full width box.
    - Location content remains at center of opening, hydraulic center (invert elevation point) has been moved to the center of the expanded box.
    - This new bottom configuration was chosen for existing as it is the most conservative option if conflict detection is performed.
  - Four new INLT Type R[10,15] DBX-[LT,RT] inlets have been created. These are drop box inlets for use when inlet height exceeds 5'. The left/right modifiers indicate the location of the drop box as seen when facing the opening of the inlet.
  - *NOTE: Upgraded files with Type R inlets will update to the new bottom cell when changes are made to the physical location of the structure. Users should force these*

*updates, swap any structure that should remain drop box to the new Feature Definitions and then confirm / update conduit placement as necessary.*

- STM MH [4,5,6]FT - Ex
  - Updated the existing storm manholes to use the respective flat top cell to provide potential for shallower manholes with existing content.
- STM MH BOX \* (M-604-20)
  - Updated connection regions for all sizes to permit full connection at any point on all four sides from centered restriction on long side only.
  - *NOTE: Upgraded files with box manholes will update to the new connection regions when changes are made to the physical location of the structure. Users needing these connection regions should force these updates and then confirm / update conduit placement as necessary. Users not needing the additional condition need not take any action, the update should have not impact on existing layouts.*
- Additional clean up and correction of nodes was performed. This work included correction of errors in modeling (Cells), discrepancies and errors in configuration settings (Feature Definitions, Feature Symbolologies, and Element Templates), and correction, update and revision of utility properties. Notable items have been collected in other respective sections of the readme.
- Element Templates were added to utility node point Feature Symbolologies to properly display node linework in profiles.
- Updated Feature Definition Folder naming for consistency; Adjusted configuration as needed.
  - Telephone > TEL
  - Television > TV
  - Channel > CHAN
  - Culvert > CULV
  - Gutter > GUTR
  - Electric > ELEC
  - Water > WTR

*NOTE: These changes may give the impression of duplicated content if new elements are created in upgraded design files. The user is encouraged to use only one of the Feature Definitions hierarchies for consistency using the existing Feature Definitions stored locally in the design or updating content in the upgraded design file to use the "new" Feature Definition folder structure.*

## Conduits

- Resources to leverage new HGL/EGL Feature based display have been created and applied to conduits as appropriate
  - Feature Definition, Feature Symbolologies and Element Templates have been created for HGL and Element Templates created for EGL display
    - Proposed conduits will display both EGL/HGL by default, existing conduits will show HGL only by default.
    - Three symbolologies have been developed for each grade line with different line style scales. These include Base (0.01), Narrow (0.0067) and Wide (0.015)
    - EGL Element Templates are set to Construction class by default.
  - Level Changes to accommodate HGL/EGL
    - Updated Level HYDR\_HGL
      - Renamed: HYDR\_Profile-HGL
      - CO: 134
      - LS: (Phantom)
      - LW: 2
    - Created HYDR\_Profile-EGL

- CO: 54
  - LS: (Center)
  - LW: 2
- Conduit Profile Display
  - Existing STM and CULV conduit content has been updated to display dashed (LS = 3) in profile views.
  - Feature Definitions for STM and CULV have been updated to display wall thickness in profile view (this moves to Feature based from user preferences). "Utility" content (non-gravity flow systems) will display only inside wall.
- Feature Definitions were cleaned up and aligned for consistency. This included the addition of "- Ex" to a number of items where it was missing and removal of extra spaces at the end of Feature Definition names.
  - *NOTE: These changes may give the impression of duplicated content if new elements are created in upgraded design files. The user is encouraged to use only one of the Feature Definitions for consistency using the existing Feature Definition stored locally in the design or updating content in the upgraded design file to use the "new" Feature Definition*

### Drainage Areas

- Aligned Catchment content to Table 7.4 in the Drainage Manual
- Added "\_Land Use Based" Catchment type to leverage newly available Land Use Areas
- Created Surface Polygon Features for Land Use areas (LND \*). These mimic the catchments and allow the creation of "weighted" catchment runoff properties based on the percentage of areas within the catchment.

### Plan Production / Annotation

*Significant improvements have been made for annotation and labeling in the evolution of ORD to the 10.12 version. These improvements have made annotation more stable and capable. The CDOT 10.12 Configuration begins to implement these and many improvements have been made. All annotation content that existed has been reviewed and updated as appropriate and additional annotation content has also been added. Where available, default Annotation Group have been assigned to Features, primarily conduits. The ability for this automated annotation for nodes as performed by CDOT is limited and users will need to annotate many of these elements individually selecting the appropriate label for the number of inverts present. Notable changes and additions to the annotation content are included here for User Awareness, but this listing is not a complete listing of available annotation.*

- Text Favorites for D&U Annotation have been updated to use the MicroStation Properties Utility Link property descriptions where available.
- Cross Section Annotation
  - Cross Section Annotation Groups have been created for existing utility content and can be annotated using the group at Cross Section > Drawing > Flags > Drainage and Utility > XS - Flag - Existing DrainUtil ALL
  - Supplemental Linear Utility content used for cross section display of non-modeled utility content have been updated to leverage XS flag cells.
  - Created Annotations for proposed conduit content and can be annotated using the groups at Cross Section > Drawing > Labels > Drainage and Utility.
- Created Civil Labeler Label Definitions
  - Area - Catchment Name
  - Area - Land Use Type
  - Conduit - Diameter
  - Conduit - Flow

- Conduit - Length Size Slope
- Conduit - Size Class
- Conduit - Size Material (Description)
- Conduit - Span Rise
- Pln - CMN Node - NameStaOffType **[1-8]** Inv In
- Pln - CMN Node - NameStaOffType Inv InOnly
- Pln - CMN Node - NameStaOffType Inv Out
- Pro - CMN Node - **[1-8]** Inv In
- Pro - CMN Node - Inv InOnly
- Pro - CMN Node - Inv Out
- Pln - HW - NameStaOffType
- Nodes are now assigned an item type (Nodes - CMN) on creation to facilitate advanced labeling including properly formatted station and offset as well as directional (N, S, E, W) labels for inverts.
  - Invert directional labels read this Item Type and will label up to eight incoming inverts and an out going invert.
  - *NOTE: Station and offset labels are read from the reference baseline in the utility properties. For this annotation, nodes will need to be assigned a baseline reference. This workflow chosen versus a dual input civil label so that station and offset content in the drainage properties and as labeled are consistent.*
  - *NOTE: Labels leveraging this item type content appear to be most consistently applied when the node's connection region is used for the element selection prior to label placement.*
  - *NOTE: The development team has had recurring experience where the invert annotation will not properly populate until the file has been closed and reopened, if this content is not appearing as expected, please exist and reopen the file.*

## Exclusions

***A number of enhancements available now in the 10.12 version of ORD are not configured or included in the CDOT's 10.12 configuration. These items have either been evaluated and determined to be not applicable, practical or useful or are allocated for future evaluation and inclusion. Notable items that are not included in the release are noted here for user awareness.***

- **Plan View Conduit Width/Wall Thickness** - ORD is now capable of displaying conduit thickness in the plan view without referencing the 3D model content. While this information is incredibly valuable for design users, the implementation of this feature is lacking the flexibility to manage these width and wall thickness elements well. (Specifically, they do not inherit the Levels assigned them in the associated Element Templates meaning that users can only display all the conduit content or none.) This may be added in future releases if proper control can be provided for display of these components.
- **Center Point Connection Regions** - Nodes can now include a "connection point" for conduit connection. The advantage to this workflow is that the conduits are connected to this "center" point and then trimmed to the first connection region they cross (if configured in the cell) removing the movement of conduits around a structure as it is rotated. While promising the center point connection effectively negates the construction length property and is at this time poorly rendered in the profile view (conduits show connecting through the structure to the center point).

# Configuration Development Change Tracking - D&U

*NOTE: This is a collection of notes used by the development team during the update and enhancement of the Drainage and Utility content within the CDOT configuration for the ORD 10.12 release of the configuration. No clean up, organization or formatting has been performed, but it is offered here for user information. Please direct any questions to [steven.litzau@envisioncad.com](mailto:steven.litzau@envisioncad.com).*

## 10.12 - Development Tracking

- Updated 10.11 files to 10.12
  - CDOT\_DU-Levels\_Element Temp\_Features\_Text Favorites\_Annotations.dgnlib
  - CDOT\_DU-Supplemental-Element Temp\_Features\_Annotations.dgnlib
  - Drainage-Utills - Hydraulics.cel
  - Drainage-Utills - Labeling.cel
  - Drainage-Utills - Utilities.cel
- Updated Design File Settings > Civil Formatting
  - Updated
    - CDOT\_DU-Supplemental-Element Temp\_Features\_Annotations.dgnlib
  - Civil Settings
    - Coordinate Settings
      - X,Y
      - 0.123
    - Ratio
      - 1:D
      - 0.12
    - Station Settings
      - sss+ss.ss
      - +
      - 0.12
      - By Name
    - Radius Settings
      - Arc
      - 100.000'
      - d
    - Spiral
      - Clothoid
    - Profile Settings
      - 0.12
      - Percentage
      - 0.12
      - Run:Rise
      - .012
      - Kvalue
    - Speed Settings
      - mph
      - .123 >> 0
    - Acceleration
      - Inpsps >> ftpsps

- 0.123 >> 0.12
  - Drainage Results Settings
    - Flow: cfs / 0.123 >> 0.1
    - Slope: cm/m / 0.123 >> % / 0.12
    - Velocity: in/h / 0.123 >> ft/s / 0.12
    - Intensity: in/min / 0.123 >> in/h / 0.123
    - Area: m2 / 0.123 >> acres / 0.12
- Updated Design File Settings > Civil Formatting
  - Updated as above
    - CDOT\_DU-Supplemental-Element Temp\_Features\_Annotations.dgnlib
- CDOT\_DU-Supplemental-Element Temp\_Features\_Annotations.dgnlib
  - Updated Options
    - Drainage
      - Global > Compact Database >> 99
      - Units
        - All Ft >> US Survey Feet
        - Percent > Display precision >> 2
        - Pipe Slope >> % // DP >> 2
    - Utilities
      - Global > Compact Database >> 99
      - Units
        - All Ft >> US Survey Feet
        - Percent > Display precision >> 2
        - Pipe Slope >> % // DP >> 2
    - Project Properties
      - Company >> Colorado Department of Transportation
- Conduit - Prototype & Catalog Clean Up
  - Prototypes
    - Removed
      - Corrugated Metal Pipe
      - Trap Channel - Concrete
      - Trap Channel - Grass
      - V Channel - Concrete
      - V Channel - Grass
    - Renamed
      - RCP - Circular >> CDOT\_RCP
      - Cast Iron Pipe >> CDOT\_CIP
      - CSP - Arch >> CDOT\_CSP ARCH
      - CSP - Circular >> CDOT\_CSP
      - Corrugated Plastic Pipe >> CDOT\_CULV CORR PLST
      - Ductile Iron Pipe >> CDOT\_DIP
      - PVC >> CDOT\_PVC
      - RCP - Elliptical - Horiz >> CDOT\_RCP ELP
      - Vitrified Clay Pipe >> CDOT\_CLY
      - Box Culvert >> CDOT\_CULV CONC BOX
      - CDOT\_CONC - Trapezoidal >> CDOT\_CHAN CONC TRAP
      - CDOT\_GRSS - Trapezoidal >> CDOT\_CHAN GRSS TRAP
      - CDOT\_CONC - V Channel >> CDOT\_CHAN CONC V

- CDOT\_GRSS - V Channel >> CDOT\_CHAN CONC V
    - CDOT\_USER - Irregular >> CDOT\_CHAN USER IRR
    - CDOT\_HDPE >> CDOT\_CORR HDPE
    - CDOT\_PP >> CDOT\_CORR PP
  - Working - Left for further evaluation, "WRK\_" prefix added.
    - RCP - Elliptical - Vert
  - Created
    - CDOT\_CULV CSP
    - CDOT\_CULV CSP ARCH
    - CDOT\_CULV RCP
    - CDOT\_CULV RCP ELP
    - CDOT\_CULV PVC
    - CDOT\_CULV CORR HDPE
    - CDOT\_CULV CORR PP
  - Set CDOT\_CULV \* to the follow properties
    - Design Start Invert >> False
    - Design Stop Invert >> False
    - Is Culvert? >> True
    - Upstream Headwall Definition Type >> Use Conduit
    - Downstream Headwall Definition Type >> Use Conduit
    - Has Overtopping Weir >> *False*
    - Set Invert to Start? >> *True*
    - Set Invert to Stop? >> *True*
  - Updated CULV \* Conduits to leverage updated CDOT\_CULV \* prototypes to use settings above.
- Updated SU\_CMN BX[1,2] - Top from parametric to Smart Solids (for display when placed in 3D model)
- Conduit - Prototype & Catalog Clean Up
  - Prototypes
    - Updated CDOT\_PVC to 12" PVC default value
  - Conduit Catalog
    - Removed
      - Box Culvert
      - Circle - CMP
      - Circle - Concrete
      - Circle - HDPE
      - Circle - PVC
      - Elliptical H Concrete
      - Elliptical V Concrete
      - Trap Conc Channel
      - Trap Grass Channel
      - Triangular Conc Channel
      - Triangular Grass Channel
      - V Ditch Concrete
      - V Ditch Grass
    - Updated Diameter for
- Feature Definition Updates
  - Renamed SAN CLY \* to place " - " before quality level modifier.



- Removed embedded materials in CDOT\_DU-Levels\_Element Temp\_Features\_Text Favorites\_Annotations.dgnlib
- Updated SU\_STM INLT Type 16 DBL - Btm cell to align top of cell to Alignment Cell/Line
- SAN MH 8FT - Sol - Updated Top Template to point to SAN MH 8FT - Top
- Name updates as part of revised configuration
  - CDOT\_DU-Levels\_ElemTemp\_Feat\_TextFav\_Annot.dgnlib
  - CDOT\_DU-Supplemental-ElemTemp\_Feat\_Annot.dgnlib
- Updated CULV FES CSP ARCH 28"x30" - Ex > CULV FES CSP ARCH 28"x20" - Ex
- Updated CULV Generic \* Utility properties from User defined to common values
- Created prototypes for STM MH BOX \*
- Verified RCP wall thicknesses
- Updated for Vane Grate Inlets (Drainage-Utills - Hydraulics.cel)
  - Location point:
    - SU\_STM INLT Vane - Pln
    - SU\_STM INLT Vane DBL - Pln
  - Top elevation point for:
    - SU\_STM INLT Vane - Top
    - SU\_STM INLT Vane DBL - Top
- Type R Changes (Drainage-Utills - Hydraulics.cel)
  - SU\_STM INLT Type **[R10,R15]** - Btm
    - Updated to be full length vault
    - Aligned height to facilitate 3' minimum height
  - SU\_STM INLT Type **[R10,R15]** - Pln
    - Added second frame circle
  - SU\_STM INLT Type **[R10,R15]** - Top
    - Removed modeled bottom
  - Created new "DBX" Top and Btm cells for Drop Box structure.
    - SU\_STM INLT Type **[R10,R15]** DBX - Btm
    - SU\_STM INLT Type **[R10,R15]** DBX - Top
- Updated Ex Type R for full vault (most conservative for conflict detection)
  - SU\_STM INLT Type **[R10,R15]** Ex - Btm
    - Updated to be full length vault
    - Aligned height to facilitate 3' minimum height
  - SU\_STM INLT Type **[R10,R15]** Ex - Pln
    - Added second frame circle
  - SU\_STM INLT Type **[R10,R15]** Ex - Top
    - Removed modeled bottom
- Removed Prototype Curb Inlet - Type R 5 ft - Large Vault
- Add "0" to Type R 5 ft FD.
- CDOT\_DU-Levels\_ElemTemp\_Feat\_TextFav\_Annot.dgnlib
  - Updated Level HYDR\_HGL
    - Renamed: HYDR\_Profile-HGL
    - CO: 134
    - LS: (Phantom)
    - LW: 2
  - Created HYDR\_Profile-EGL
    - CO: 54
    - LS: (Center)

- LW: 2
- Created Element Templates: **[EGL, HGL] - [Base, Narrow, Wide]**
  - Symbology by level except Line Style Scale
    - Base: 0.01
    - Narrow: 0.006667
    - Wide: 0.015
- For all CHAN, CULV and STM conduits, set HGL and EGL Element Templates to newly created "Base" elements
  - Proposed conduits are set to display both HGL and EGL by default
  - Existing conduits are set to display only HGL by default.
- CDOT\_DU-Levels\_ElemTemp\_Feat\_TextFav\_Annot.dgnlib
  - Created HGL **[Base, Narrow, Wide]** Feature Definitions and Symbologies
  - Updated EGL **[Base, Narrow, Wide]** Element Templates to Class = Construction
  - Updated HYDR\_Profile-Pipes - Existing to LS = 3
  - Updated Element Templates to LS = ByLevel
    - CULV Ex - Pro
    - STM Ex - Pro
  - Updated Feature Definitions CULV [\*] and STM [\*] to use inner and outer templates for wall thickness.
    - **[CULV, STM]** - Pro
    - **[CULV, STM] Ex** - Pro
- CDOT\_DU-Levels\_ElemTemp\_Feat\_TextFav\_Annot.dgnlib
  - Updated ET STM RGD PLST - 3D material to Plastic - offwhite
  - Update Catchment Prototypes to match Drainage Manual Table 7.4. Toggled to use scaled area by default.
- CDOT\_DU-Levels\_ElemTemp\_Feat\_TextFav\_Annot.dgnlib
  - Created Surface Polygon Prototypes to match Drainage Manual Table 7.4. Set only C value as User defined component
  - Adjusted and created FD/FS/ET to align Catchment and Land Use Features to Drainage Manual Chapter 7
  - Updated Default Design Velocity settings to 3 fps min and 10 fps max.
- CDOT\_DU-Levels\_ElemTemp\_Feat\_TextFav\_Annot.dgnlib
  - Updated Text Favorites to reference Utility Link Properties as needed.
- Updated 2D Linear Utility elements to properly leverage XS Flag cells
- Created Cross Section Annotation Definitions for existing utility elements. Group into an "ALL" Annotation Group
- Updated Prototypes to leverage Code Book names for structures.
- Added " - Ex" to TV UG Cable and TV UG F/O Cable folders for Feature Definitions.
- Removed last character "space" from ELEC UG Line ABN and folder and FD for CULV CORR PLST - Ex and CULV CSP ARCH - Ex
- Removed Default ET from Profile Feature Symbologies; verified remaining Inside/Outside Templates.
  - Utility content is showing only inside in profile view.
  - Hydraulic/Gravity flow systems show inside and outside.
- Added Profile Element Templates to Point FS for utility content.
- Updated FD Folder naming for consistency; Adjusted configuration as needed.
  - Telephone > TEL
  - Television > TV

- Channel > CHAN
- Culvert > CULV
- Gutter > GUTR
- Electric > ELEC
- Water > WTR
- Generated Existing & Proposed Utility Cross Section content
  - Element Templates for note Level placement
  - Text Favorite pulling Description
  - Annotation Groups for Proposed content.
- Confirmed Existing XS Annotation content reflected folder naming clean up
- Added HYDR\_Text Level
- Added Engineering standards checks
  - FES/HW confirms connected conduit matches size
  - Conduit Length check for large and small diameter
- Movement of Annotation Groups to Drainage and Utility Folder per Bentley Request.
- Added ET to Connection Region FS
- Updated TV FO UG Ex - 3D FS to use proper ET
- Confirmed Linear AGs set to Manage Modifications
- Rebuilt DU - Cnd - Diameter
- Added "@" to DU - Cnd - Length Size Slope
- Corrected DU - Pln - STM Dia - Ex AG to use proper suffix "STM"
- Created/Updated TF, AD, AG for Land Use areas and Catchments
- Updated Type 16 Double 6.66 x 2.5 to use 6.66' for default grate length
- Updated Inlet - Type 16 - Single to correct Length & Width
- Updated offset for plan conduit annotations, existing > .004167, prop > .005833
- Corrected DU - Pln - SizeMat AG
- Updated CMN - Null - Pln to default level so it matches design network.
- Created missing CMN - Cylinder cells
- Added TF & AG for annotation of Span X Rise content specifically for existing conduits. Updated Feature Symbolologies to properly call new AGs
- Changed RCP ELP Labels to run Span X Rise to be consistent with remainder of configuration for Arch and ELP
- Added New Text Style DU Labels - Center Center - Conduit Span for use in the ByClass annotation
- Updated material on CSP and PP elements to use appropriate
- Created CDOT\_DU-ItemTypes.dgnlib
  - CDOT-DrainUtility
    - Nodes - CMN
      - NodeOffsetSide (LT / RT)
      - NodeOffsetValue (Absolute value of Baseline.Offset)
    - This Item type has been added to all proposed nodes for Culvert and Storm
    - Text Favorites set to read station and offset have been updated to pull these new item types.
- Added CDOT Physical and Labels Only Tool Tips; CDOT Physical set active.
- Added Invert content to CDOT\_DU-ItemTypes.dgnlib
  - CDOT-DrainUtility
    - Nodes - CMN
      - InvDir-1

- InVDir-2
    - InVDir-3
    - InVDir-4
    - InVDir-5
    - InVDir-6
    - InVDir-7
    - InVDir-8
    - InVDir-Out
  - Text Favorites set to include directional modifier where inverts are called out. Hopefully this will also facilitate the reduction of separate MH/INLT TFs
- Drainage-Utills - Labeling.cel - Updated SU\_ANNO Name - Cap assigned DRAFT\_Text-Notes to all elements.
- Drainage-Utills - Utilities.cel
  - Removed cells for SU\_VOID\_MISC\_\* (x4)
  - Set color on top and bottom cells for most content to use by level.
- CDOT\_DU-Levels\_ElemTemp\_Feat\_TextFav\_Annot.dgnlib
  - Created Civil Label Definitions
    - Area - Catchment Name
    - Area - Land Use Type
    - Conduit - Diameter
    - Conduit - Flow
    - Conduit - Length Size Slope
    - Conduit - Size Class
    - Conduit - Size Material (Description)
    - Conduit - Span Rise
    - Pln - CMN Node - NameStaOffType **[1-8]** Inv In
    - Pln - CMN Node - NameStaOffType Inv InOnly
    - Pln - CMN Node - NameStaOffType Inv Out
    - Pro - CMN Node - **[1-8]** Inv In
    - Pro - CMN Node - Inv InOnly
    - Pro - CMN Node - Inv Out
    - Pln - HW - NameStaOffType
  - Added Project Specific table holder for inclusion in rainfall runoff alternatives
  - Added Design and Analysis Scenarios for 2, 5, 10, 25, 50 and 100 year calculation options
- CDOT\_DU-Levels\_ElemTemp\_Feat\_TextFav\_Annot.dgnlib
  - Updated missing HGL/EGL element templates for all hydraulic conduits.
  - Confirmed/added Element Templates for profile Feature Symbolologies
  - Repatched DU\_GenNotes ET to AG/AD
- CDOT\_DU-ItemTypes.dgnlib
  - Turned off display for invert directional Item Types...no needed user input for use.
- ~~Mapped missing drainage area Ets~~
- Removed Point Based Profile content for Nodes
- Increased profile conduit offset by .0025
- Modified NE Text Favorite to use Generic Node Location
- CDOT\_DU-Levels\_ElemTemp\_Feat\_TextFav\_Annot.dgnlib
  - Replaced missing Element Templates on STM \* Ex - Sol Feature Symbolologies (Solid and Point)

- Corrected *DU - Pro - CULV DialInv – Ex* and *DU - Pro - STM DialInv – Ex* Annotation referenced Element Templates
- Recreated CDOT\_DU-ItemTypes.dgnlib to remove D&U Project
- CDOT\_DU-Levels\_ElemTemp\_Feat\_TextFav\_Annot.dgnlib
  - Updated Text Favorites **[\*]7** Inv In & **[\*]8** Inv In to correct suffix symbol
- CDOT\_DU-Levels\_ElemTemp\_Feat\_TextFav\_Annot.dgnlib
  - Updated Inlet Catalog :
    - TYPE R-**[5,10,15]** and TYPE R-**[10,15]** Drop Box
      - Curb Opening Height > 6.0"
      - Local Depression > 3.0"
      - Depression Width > 24.0"
    - Type 16 \*
      - Local Depression > 2.0"
      - Depression Width > 24.0"
  - Corrected STM STR GEN Ex - **[Btm, Top]** to point to proper cells.
  - Updated STM MH [4, 5, 6]FT Ex - Top to use manhole flat top cell.
  - Set "Design Inlet" to True for all Inlet/Catch Basin prototypes.
    - *This is a reversal of a previous effort, but with design toggled off, we do not have the ability to specify local constraints for ponding. The local constraints are still set to default to "False" but can be more easily toggled.*
    - *Confirmed that no design options were present beyond the default values to prevent inconsistencies between the analytical and physical models.*
  - Set "Local Pipe Matching Constraints" to False for all inlet/catch basin prototypes.
- CDOT\_DU-Levels\_ElemTemp\_Feat\_TextFav\_Annot.dgnlib
  - Created CDOT\_CMN - Circular Conduit Catalog, mimics RCP without material inclusion.
  - Created CDOT\_CMN Prototype pointed to new CDOT\_CMN - Circular catalog.
  - Updated STM Generic - **[Ex, QLB, QLC, QLD]** Prototype to new CDOT\_CMN.
  - Added ETs to GUTR - Lin and GUTR - Pro Feature Symbologies
  - Changed STM ByClass Prototype to use new CDOT\_CMN
- CDOT\_DU-Levels\_ElemTemp\_Feat\_TextFav\_Annot.dgnlib
  - Corrected Conduit type for STM Generic - **[Ex, QLB, QLC, QLD]** > Conduit
  - Added missing Annotation group to STM Generic - Ex
  - Updated ETs for STM Generic - **[Ex, QLB, QLC, QLD]** - Lin
- Updated Feature Symbologies > Profile > Utilities > \* - Pro and \* Ex - Pro (non gravity elements) by removing Default Element Template (removes center line on profiles)
- Added Lt/Rt Options for Type R DBX inlets
  - CDOT\_DU-Levels\_ElemTemp\_Feat\_TextFav\_Annot.dgnlib
  - Drainage-Utills - Hydraulics.cel
- Updated connection regions for SU\_STM MH BOX \* - Btm to permit connections to all four sides.