As of the publication date of this specification all project control and mapping will be surveyed and mapped on NAD83 (2011) & Geoid 18. Ensure all project control and mapping performed for ODOT meets the following positioning parameters unless otherwise directed by the District Survey Operations Manager.

**301 Vertical Positioning**
- Furnish vertical positions using the following:
  - Orthometric Height Datum – NAVD88
  - Geoid Model – Geoid 18
- For purposes of this document, the term “elevation” refers to the orthometric height.
SECTION 300: DATUMS, COORDINATE SYSTEMS AND POSITIONING PARAMETERS

302 Horizontal Positioning
Furnish horizontal positions using the following:
- Coordinate System - Ohio State Plane:
  - North or South Zone as appropriate
  - Project Adjustment Factor (1/Combined Scale Factor) from grid to ground as appropriate (Refer to Section 502.2k)
- Use 0,0 for the origin of the coordinate system
- North Zone Lati/Long origin point: Lat,Long = 0,0
  - N 39º 27' 01.76097" / W 89º 28' 32.98476"
- South Zone Lat/Long origin point: Lat,Long = 0,0
  - N 37º 47' 45.30621" / W 89º 19' 00.02517"
- Map Projection - Lambert Conformal Conic: 2 Standard Parallel
- Reference Frame - NAD83(2011) (epoch 2010.0)
- Ellipsoid - GRS80

SECTION 400: UNITS OF MEASUREMENT

401 U.S. Survey Foot Definition
The U.S. Survey foot is defined as 1 meter = 39.37 inches. Use the following conversion factor: 1 meter = 3937/1200 U.S. Survey feet.

407 Horizontal/Vertical Positions
Furnish state plane coordinates for all survey control points, Right-of-Way, Centerline, and boundary monuments that will be shown on any recorded documents and scaled using a project adjustment factor or in an ODOT approved alternate projection in both metric and U.S. survey feet. Meters shall be shown to the nearest thousandth (i.e. 0.001) of a meter. U.S. survey feet shall be shown to the nearest thousandth (i.e. 0.001) of a foot. The format for reporting all Horizontal and Vertical positions in state plane or scaled shall be: Point Number/Northing coordinate/Easting coordinate/Elevation/Code/Attribute (if applicable) (P,N,E,Z,D,A1).
SECTION 500: TYPES OF SURVEYS

502 Control Surveys

502.1 General
Control Surveys consist of establishing positions (e.g. northings, eastings, and elevations) on strategically located monuments to govern all survey work that follows.

502.2 Project Control

502.2a General (continued)
For projects where no ODOT geodetic/primary control survey has been completed, the District Survey Operations Manager shall be contacted, and a determination made if a geodetic/primary control survey is to be completed prior to the aerial control survey. ODOT discourages the practice of performing any aerial control survey without a previously established geodetic/primary control survey already in place as this causes accuracy and coordinate conversion problems later in the progression of the project.

Position all monuments in accordance with this specification. Previously established monuments may be used if those monuments were constructed, positioned, and verified according to this specification. Ensure existing monuments are in good condition and stable.

502.2b Geodetic Control (for path 4 or 5 projects)
Geodetic Control will govern the positioning for all ODOT path 4 or 5 projects that require aerial mapping tying them to the National Spatial Reference System (NSRS). Geodetic Control monuments should be set prior to the establishment of any aerial photo or lidar control. All ODOT projects will be positioned based on the most current horizontal and vertical datum established by the National Geodetic Survey (NGS) or as scoped. Path 4 & 5 projects greater than 1 mile in length but less than 5 miles in length shall have a minimum of 5 Geodetic Control monuments that are separate of the Primary Project Control. Additional Geodetic Control monuments will be required for projects greater than 5 miles long. All Path 1 thru 3 projects and Path 4 & 5 projects less than 1 mile in length will not require Geodetic Control monuments.
SECTION 500: TYPES OF SURVEYS

502.2b Geodetic Control (for path 4 or 5 projects)(continued)

Geodetic Control monuments shall be set approximately ½ mile outside of and encompassing the project limits. One Geodetic Control monument will be set near the center of, but outside of, the area where construction activity is expected to take place. This monument will be used to calculate the Project Adjustment Factor as well as serve as the primary benchmark for all leveling (see following diagram for example).

Geodetic Control monuments should be of sufficient design, material, and construction to maintain their horizontal and vertical position throughout the life span of the project. The project surveyor may use existing monuments (e.g. NGS horizontal control or benchmarks, County Geodetic Control monuments or PLSS monuments) or set their own type A monuments if no other options are available.

SECTION 500: TYPES OF SURVEYS

502.2c Primary Project Control (for all projects)

Primary Project Control Monuments are monuments set along the project corridor that are used exclusively to collect topographic, boundary, and utility data as well as control construction activities. Primary Project Control should be established with a minimum of three monuments set outside the construction limits of the project. Primary project control shall be constructed to remain stable and last the duration of the project. Primary Project Control shall be constructed to remain stable and last the duration of the project. Construct Primary Project Control Monuments flush to the ground according to details shown in Appendix H. Preferably, Primary Project Control Monuments should be positioned to have a clear view of the sky and to reduce the potential for GNSS multipath signals. Placement of Primary Project Control Monuments is dependent upon the project length. Furnish Primary Project Control Monuments per the following table:

<table>
<thead>
<tr>
<th>Project Category**</th>
<th>Type of Control</th>
<th>Monument Type*</th>
<th>Horizontal Positioning Methods**</th>
<th>Vertical Positioning Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Path 4 &amp; 5</td>
<td>Geodetic &gt; 1 mile Primary</td>
<td>A Horizontal &amp; Vertical</td>
<td>Static GNSS, PPK, Conventional Traverse</td>
<td>Differential Levelling</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PPK, Conventional Traverse</td>
<td></td>
</tr>
<tr>
<td>Path 4 &amp; 5</td>
<td>Geodetic &lt; 1 mile Primary</td>
<td>A Horizontal &amp; Vertical</td>
<td>Static GNSS, PPK, Conventional Traverse</td>
<td>Differential Levelling</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PPK, Conventional Traverse</td>
<td></td>
</tr>
<tr>
<td>Path 1-3++</td>
<td>Primary Only</td>
<td>A or B</td>
<td>Static GNSS, PPK, ODOT VRS, RTK, Conventional Traverse</td>
<td>Differential Levelling</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RTK, Conventional Traverse</td>
<td></td>
</tr>
</tbody>
</table>
SECTION 500: TYPES OF SURVEYS

Primary Project Control Monument Placement

<table>
<thead>
<tr>
<th>Project Length</th>
<th>Beginning &amp; End of Project Limits (Excluding MOT)</th>
<th>Approx. Interval Distance along Alignment</th>
<th>At locations Specified by District</th>
<th>Minimum # of Monuments Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1 mile</td>
<td>X 0.5 Miles</td>
<td>X</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>≥1 mile</td>
<td>X 0.5 Miles</td>
<td>X</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

*See diagrams below for examples of project control monument placement.

If site geology or site conditions do not permit placement of the monument, contact the District Survey Operations Manager.

** Project Category is defined in the Project Development Process Manual.

*** Contact the District Survey Operations Manager if GNSS positioning is not feasible. See 502.2d for positioning methods.

++ Consider using type A monuments for Path 1-3 projects that may expect to be delayed in project development.

SECTION 500: TYPES OF SURVEYS

502.2d Observation Methods to Establish Geodetic Control on Path 4 and 5 Projects

- Static GNSS Surveys (Required on Path 4 and 5 projects, Recommended on Path 3 projects)

  All control points need a minimum of 3 GNSS sessions observed on 3 separate days within a 4-week period. Use survey grade GNSS receivers and antennas in accordance with Section 600. Use one of the following methods:

  a. OPUS Solution for all Control Points
   - Collect a minimum of 3 sessions of static GNSS data following NGS requirements for all OPUS static sessions for each Geodetic Control Monument. Use a survey grade GNSS receiver, ensure proper GNSS survey planning to achieve the required data quality as outlined in this specification. Consider the following when planning the GNSS survey: positional dilution of precision (PDOP), number of satellites, mask angle, collection rate, multipath, solar activity, etc.

  b. Base Receiver Setup/CORS with Rover unit collecting PPK data
   - Establish a base receiver by collecting the Geodetic Control Monument near the center of the project using a minimum of 3 static GNSS sessions as described above or use a nearby CORS as a base. Simultaneously collect fast-static data at each Geodetic Control point using a GNSS rover collecting fast-static data. Collect 3 individual sessions on each Geodetic Control and/or Primary Control point using fast-static data for a minimum of 20 minutes plus 1 minute per kilometer over 15 kilometers of baseline between the occupied control points.

---

(Images of diagrams and text sections)
502.2d Observation Methods to Establish Geodetic Control on Path 4 and 5 projects (continued)

- **Traversing**
  - Conduct a conventional survey traverse using an Electronic Total Station defined in 602.2. A minimum of 2 direct/2 reverse angles and 5 distance measurements shall be observed and averaged for the final observation of each control point.
  - Closed loop traverses or ties to known control points at the beginning and end of each project should be used to adjust the traverse for errors.
  - Note: at least two monuments need to be tied to the NSRS and the traverse transformed and adjusted to their positions.

502.2e Observation Methods to Establish Control on Path 1 thru 3 projects

- **ODOT VRS Surveys** (For use on Path 1-3 projects only, not to be used on Path 4 or 5 projects)
  - For use on Path 1-3 projects only collect the Northing, Easting, and Elevation coordinates using 5 second observations at a 1 second epoch rate. Collect a minimum of 12 observations for each project control monument.
    - Note: If more than 20 observations are needed to meet the minimum RMSE requirements consider changing location of control and contact district Survey Operations Manager. Collect 4 observations rotating the rod 90 degrees between each observation, remove the rod and break initialization, repeat observation procedures until 12 positions have been recorded. Consider the following when planning and performing VRS surveys: positional dilution of precision (PDOP), number of satellites, mask angle, multipath, solar activity, etc. A minimum of 9 observations are required to be included in the RMSE calculations that meet the required accuracy.

- **RTK Surveys** (For use on Path 1-3 projects only, not to be used on Path 4 or 5 projects)
  - Establish a base receiver by collecting 3, 4-hour static sessions on one control point. While the receiver is collecting static data perform an RTK survey on the remaining control points. Repeat with each static data collection session so every control point has a minimum of 3 RTK/static positions.
  - **Traversing**
    - Conduct a conventional survey traverse using an Electronic Total Station defined in section 602.2. A minimum of 2 direct/2 reverse angles and 5 distance measurements shall be observed and averaged for the final observation of each control point.
    - Closed loop traverses or ties to known control points at the beginning and end of each project should be used to adjust the traverse for errors.
    - Note: at least two monuments need to be tied to the NSRS and the traverse transformed and adjusted to their positions.
502.2f Static GNSS Data Processing

- OPUS Solution for all Control Points
  - Process the collected data to determine the Northing, Easting, and Elevation (Orthometric height) for each session using National Geodetic Survey's OPUS (Online Positioning User Service). Use the rapid or precise ephemeris only. Ensure the correct antenna height, make, and model are utilized. Use the three nearest CORS base stations and standard logging rates when processing a primary project control point in OPUS. The user must manually select the CORSs to be used in the OPUS processing.

- Base Receiver Setup with Rover unit collecting PPK data
  - Establish the base station coordinates to post process GNSS baselines by submitting the GNSS data RINEX files to OPUS as described for OPUS Static solutions. Process the collected GNSS data by importing into a GNSS post processing software such as Trimble Business Center, Leica Infinity, or MAGNET, post process the GNSS baselines thru the appropriate post processing software. Calculate the positions of three observations per point and calculate the RMSE value to insure the control point meets the ODOT Survey and Mapping Specifications for a type A monument.

502.2g Coordinate Statistical Analysis

Calculate the Root Mean Square Error (RMSE) for each coordinate component (Northing, Easting, and Elevation) at each Primary Project Control Monument as shown in Appendix D:

Ensure the RMSE for the Northing, Easting, and Elevation components do not exceed the maximum allowable RMSE for all project control monuments according to the following:

<table>
<thead>
<tr>
<th>Coordinate Component</th>
<th>Maximum Allowable RMSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northing</td>
<td>0.029 feet (0.0088 meters)</td>
</tr>
<tr>
<td>Easting</td>
<td>0.029 feet (0.0088 meters)</td>
</tr>
<tr>
<td>Elevation</td>
<td>0.039 feet (0.0119 meters)</td>
</tr>
</tbody>
</table>
SECTION 500: TYPES OF SURVEYS

502.2h Geodetic/Primary Project Control Monument Horizontal Coordinates
The Northing and Easting of the Geodetic/Primary Project Control Monument coordinates are determined by taking the average of each coordinate component from the solutions that meet the RMSE requirements as specified in Section 502.2g.

502.2i Geodetic/Primary Project Control Monument Vertical Coordinates
Establish the elevations of Geodetic/Primary Project Control Monuments or their associated project benchmarks by differential leveling. Refer to section 502.5 for leveling procedures. Differential leveling for Geodetic/Primary Project Control Monuments and project benchmarks will originate from, and close on, the Geodetic Control Monument (Path 4 or 5) at the center of the project or the Primary Project Control Monument (Path 1-3) with the lowest Elevation RMSE value nearest to the center of the project. Level through all Geodetic and/or Primary Project Control Monuments as well as project benchmarks. Hold the elevation values established by differential leveling for all Geodetic and Primary Project Control Monuments as a check, compare the leveled elevations to the GNSS determined elevations from Section 502.2g. Highlight any differences that exceed 0.10 U.S. Survey Foot.

SECTION 500: TYPES OF SURVEYS

502.2j Intermediate Project Control
Intermediate project control for surveying purposes are to be positioned relative to the Geodetic/Primary Project Control.

502.2k Project Adjustment Factor (Grid to Ground multiplier)
- The Project Adjustment Factor shall be documented and used for all work on the project. The Project Adjustment Factor shall be calculated by taking the inverse of the combined scale factor (1/coordinate scale factor x ellipsoid height scale factor). Scale the project about the origin of the Zone of the State Plane Coordinate System (0, 0). Provide Project Adjustment Factor to the 8th decimal place. If a Project Adjustment Factor is required, use one of the following methods for establishing the combined scale factor:
  - The Latitude of the center Geodetic Control Monument or Primary Project Control Monument closest to the center of the project shall be used to calculate the Project Adjustment Factor for all projects regardless of the method used to locate the monument or method used to determine the Project Adjustment Factor. An ellipsoid height that is a good representation of the average height of the project site shall be used to calculate the ellipsoid height scale factor.
  - Project Adjustment Factor may be derived by other means with approval of the District Survey Operations Manager (i.e. Data Collector solution, TBC, Infinity, Magnet tools) based on GNSS data collected for any individual point. The control point used should meet the RMSE requirements.
  - As reported by OPUS or OPUS-RS

SECTION 500: TYPES OF SURVEYS

504 Mapping Surveys

504.1 General
A mapping survey is the collection of points to define the features (natural, man-made, or both) of a physical surface. Examples may include topographic surveys, hydrographic surveys, Aerial mapping surveys, Mobile mapping surveys, etc. Any mapping survey must be accurately tied to ground control and meet the DTM accuracy as set forth in this document. All ground control work shall be directly supervised and certified by a professional surveyor licensed in the State of Ohio.

504.2 Accuracies
All mapping surveys are required to abide by the following accuracy classes outlined in the sections below:

504.2a DTM Accuracy
Check points to verify remotely sensed mapping products should be dispersed throughout the entire project. To determine the minimum amount of check points, use the following formula:
SECTION 500: TYPES OF SURVEYS

Minimum Number of Class A points = 20+2*x at 5 foot spacing in two or more locations

AND

Minimum Number of Class B, C or D points = 20+2*x at 5 foot spacing in two or more locations

Note: X is equal to the distance of project in miles

<table>
<thead>
<tr>
<th>DTM Accuracy Class</th>
<th>Classification Area</th>
<th>Maximum Allowable Average Dz (ft.)</th>
<th>Maximum Allowable RMSE (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class A</td>
<td>Paved areas</td>
<td>± 0.07</td>
<td>0.16</td>
</tr>
<tr>
<td>Class B</td>
<td>Vegetation areas that are maintained at a minimum biannual frequency (i.e.: farm fields, residential yards, road right-of-way, etcetera)</td>
<td>± 0.25</td>
<td>0.32</td>
</tr>
<tr>
<td>Class C</td>
<td>Vegetation areas that are not maintained</td>
<td>± 0.50</td>
<td>0.50</td>
</tr>
<tr>
<td>Class D</td>
<td>Areas where vertical accuracy is not critical or warranted</td>
<td>± 1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Planimetric Features

<table>
<thead>
<tr>
<th>Planimetric Features Listed in Appendix A</th>
<th>Maximum Allowable Horizontal RMSE (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planimetric Features</td>
<td>0.30</td>
</tr>
</tbody>
</table>

504.2b Horizontal Planimetric Accuracy

This specification covers collection of existing planimetric features and all known underground utilities. Remote sensing products are included with this specification and may be required in the scope of services. Ensure positioning is performed relative to geodetic/primary project control.

Collect planimetric check points along well defined planimetric features shown in the delivered mapping. Check points collected for the vertical DTM accuracy test may be utilized if they are on a planimetric feature (example: painted edge line). Check points should be dispersed throughout the entire project. To determine the minimum amount of check points, use the following formula and table:

Number of Planimetric check points = 20+2*x, where x is equal to the distance of project in miles

504.3 Ground Control

Collect coordinates and elevations at the center of the aerial target or selected picture point. All ground control (Targets and Photo Points) shall be furnished with a survey nail except on private property. Ensure all photo control is positioned relative to the Geodetic Control and meets the RMSE tolerances as set forth in 502.2g. A professional surveyor licensed in the State of Ohio will document the accuracies, survey procedures and methods used.

If a geodetic/primary control survey will not be performed, all aerial control horizontal surveys shall be referenced to and tied into the National Spatial Reference System (NSRS) as defined by the National Geodetic Survey (NGS) or through the project scoping process.
SECTION 500: TYPES OF SURVEYS

504.4a Surveyor's Certification Statement
Any control established and verification of a mapping survey must be done under the direct supervision of a professional surveyor licensed in the State of Ohio (i.e. Primary Control, Ground Control Points etc.).

504.4b Quality Control Report
When applicable the following is required:
- DTM Accuracy Report
- Horizontal (Hearth's) Accuracy Report
- Aero Triangulation Report
- Control Report (Survey Master Sheet)

504.4c Equipment Calibration/Certifications
Any equipment used in the creation of project deliverables must meet the calibration requirements as specified in section 600. Include the following as applicable:
- Boresight alignment calibration parameters for any airborne sensors utilized for mapping
- Camera calibration certificate
- GNSS/INS system lever arms for any airborne sensors
- Documentation confirming the calibration of all survey equipment used
- Any calibration/certificates for equipment required to adjust the data set

QUESTIONS

AGENDA
- SurveyMaster Spreadsheet
  - Update Overview
  - Basic Functionality
  - Demo Project
- ORD
  - Transition Timeline update
  - CAD Manual Update
- ODOT Website
- ODOT Bentley Communities Page
- Aerial Archive
- OHROW (ODOT’s Right-of-Way Web Application)
  - Brief Overview
  - Demo of the Interface
TOPICS

- What is the SurveyMaster Excel Sheet
- Why we use it
- How to use it
  - Video Walkthrough

WHAT IS THE SURVEYMASTER EXCEL SPREADSHEET???
### SURVEYMASTER EXCEL SHEET

- Document for Survey Control
  - Checks for RMSE
  - Creates a CSF
  - Final Grid Coordinates in Meters
  - Final Ground Coordinates in US Survey Feet

### HOW LONG IT HAS EXISTED

- Creators
  - District 3 Survey
  - Created in 2005

### UPGRADES

- Upgraded by John Drsek
  - Included a graph
  - Information is populated automatically
WHY YOU SHOULD BE USING IT
- Is a part of our survey specifications
- Extremely easy to use
  - Thanks to JD

REPORT TAB
- Location for Project Information
  - Project Name
  - PID
  - Coordinate System
  - Grid to Ground Multiplier (CSF)
    - Get from CSF tab
  - GPS Antenna Used
  - Who Submitted/Checked Report

COMBINED SCALE FACTOR TAB
- Coordinate System
  - Ohio North or Ohio South drop down
  - Input Project Mean Latitude (DMS)
  - Input Ellipsoid Height (ft)
- Data taken from control in center of project
GPS IMPORT TAB

- Select Blue Button
  - Import a comma delimited csv file (P,N,E,Elv,C)
  - Once imported a PointTemplate tab will be created for each point shot it multiple times
  - Will not create tab if only one shot with same name (ex. Topo shot)
  - Have to choose what coordinates you are importing and how you want them outputted

CHECK EACH NEW TAB

- Go through checking to make sure RMSE passes
- Check grid and ground coordinates
- Add photos of control shots if needed

VIDEO WALKTHROUGH
OPENROADS DESIGNER
WHERE ARE WE NOW
Kolton Wilson, E.I. and Kyle Ince, P.E., S.I.

ORD UPDATES
- Transitioning Timeline
- Licensing and Software Updates

DATES TO REMEMBER

<table>
<thead>
<tr>
<th>SUPPORT STATUS</th>
<th>CONTINUOUS SUPPORT</th>
<th>FULL SUPPORT</th>
<th>UPGRADING SUPPORT</th>
<th>SUPPORT DISCONTINUED</th>
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</table>
BENTLEY SOFTWARE SUPPORT TIMELINE

- **GEOPAK v8i SS10 Support:**
  - **January 1, 2021 Support Status:** "EXPIRING SUPPORT"
    - No longer available for download
    - No OS compatibility or maintenance updates
    - No access to support analysts

- **GEOPAK v8i SS4 Support:**
  - **July 2020 Support Status:** "SUPPORT DISCONTINUED"
    - No service request submittals
    - No online knowledge base
    - No online learning content

ODOT’S ORD TRANSITION IMPLEMENTATION

- Transition Timeline for ORD Implementation
  - December 16, 2020: ORGP - Actionable items for each component project
  - December 22, 2020: ORGP - Actionable items for each component project
  - December 30, 2020: ORGP - Actionable items for each component project

- Transition Timeline for ORD Implementation
  - December 16, 2020: ORGP - Actionable items for each component project
  - December 22, 2020: ORGP - Actionable items for each component project
  - December 30, 2020: ORGP - Actionable items for each component project
TRANSITION PLAN

OpenRoads Designer

CRUCIAL DATES TO REMEMBER

Key Dates       Event
April, 2019     ODOT Standards for Connect Edition were Released
May, 2019       Survey Training Started
July, 2019      Design Training Started
January 1, 2020 Optional to Start New Projects in ORD
April 1, 2020   All New Projects are Required to be in ORD
July 1, 2020    All of ODOT will be updated from SS4 to SS10 for projects not in ORD
December 1, 2020 All Waivers should be Submitted by this Date
January 1, 2023 Department Fully Implemented

DECISION FLOW CHART (INTERNAL)
OPENROADS DESIGNER LICENSING & UPDATES
- MicroStation Connect Edition (CE)
  - Released Sept. 2015
  - 64 bit version
- OpenRoads Designer (ORD)
  - Built on MicroStation Connect Edition
  - Next generation of Bentley Civil products
    - Replaces InRoads, GEOPAK, MX Road
  - ORD can be installed simultaneously with SS4

OPENROADS DESIGNER LICENSING & UPDATES
- OpenBridge Modeler
  - ODOT is not using it at this time
- OpenRail Designer
  - ODOT is not using it at this time
- Consultants may choose to use these applications

OPENROADS DESIGNER LICENSING & UPDATES
- ORD Software Updates
  - Updated Quarterly
  - Updates to the ORD Standards (DGNLIBs) may not be backwards compatible with previous versions of the software
  - Current Version:
    - 2019 Release 2 Update 7 - Version 10.07.03.18
    - Keeping all users on the same version is essential!
OPENROADS TECHNOLOGY VS. ORD

- **OpenRoads Technology (SS2/SS3/SS4/SS10)**
  - Refers to the OpenRoads Functions embedded in SELECTseries Products
  - Introduced in SS2
  - Included with InRoads, GEOPAK, and MX Road
  - Common tools across all platforms
  - Geometry, Survey, Terrains, and 3D Modeling
  - Rely on legacy software for plan production functions

- **OpenRoads Designer (ORD)**
  - Refers to a new 64 bit version of the software built on MicroStation Connect Edition
  - Removes the legacy software (InRoads, GEOPAK, MX Road)
  - Adds new plan production tools
    - Sheet clipping
    - Labeling
    - Earthworks
    - etc...

- **OpenRoads Designer (ORD)**
  - Everything is DGN based
    - No GPK file
    - No DDB file
    - No SMD file
    - No TIN file
I have a project already started in SS4. Can I convert it to ORD?

### ODOT CADD Standards Version

<table>
<thead>
<tr>
<th>ODOT CADD Standards Version</th>
<th>Corresponding Bentley Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>V7std</td>
<td>V7</td>
</tr>
<tr>
<td>ODOTstd</td>
<td>SS1/SS2/SS3</td>
</tr>
<tr>
<td>ODOTcadd</td>
<td>SS4/SS10</td>
</tr>
<tr>
<td>OHDOT</td>
<td>ORD/CE</td>
</tr>
</tbody>
</table>

SS4/SS10 to ORD

- SS4/SS10 Civil Data is not forward compatible with ORD
- SS4/SS10 DGN files can be referenced by ORD
- Referenced SS4/SS10 Terrains can be leveraged with limited value
- In general, migrating SS4/SS10 data to ORD is a conversion process
  - Not impossible, but difficult
  - Could be time consuming
SOFTWARE COMPATIBILITY

- I’m working in ORD, but my sub-consultant is working in SS4/SS10. Can the sub use my ORD data?

- ORD data with SS4/SS10
  - ORD Civil Data is not backwards compatible
  - Your team should be on the same platform
  - ODOT does not want mismatched sources of data

ODOT WEBSITE
CADD AND MAPPING SERVICES
Kyle Ince, P.E., S.I.
One place to organize all available training content

3 main sections
- Training Guides
  - This section contains links to the different training guides and the sections that make up the training guides
  - It also contains video solutions for all the exercises within the training guide. Training guides also have a dataset to go with them
- Supplemental Videos
  - This section contains several short videos that can be used to supplement sections from the training guide. The intent here is to not have a thr+ long videos going through the training guide page by page but multiple shorter videos to explain different tools/topics/workflows that are presented within the training guide.
- Custom Applications Videos
  - This section will contain how to videos on the custom applications that have been written
The intent is to continually add training content to this wiki as things are identified. Smaller workflow things we can quickly make a video and post a wiki page. For bigger things we will add not only videos but also sections into the training guide.

Wiki Page Demo
UPCOMING MEETINGS

- CADD User Group Meetings
  - 2/27/2020 - Auditorium
  - 6/22/2020 - Auditorium
  - 9/2/2020 - Auditorium
  - 12/2/2020 - Auditorium
  - 3/3/2021 - Auditorium
  - 6/2/2021 - Auditorium
  - 9/8/2021 - Auditorium
  - 12/8/2021 - Auditorium

New ODOT Website

AERIAL ARCHIVE
Kyle Ince, P.E., S.I.
AERIAL ARCHIVE

- All film is scanned, compressed, and georeferenced
- Over 500k images
- Current Status
  - Utilizing Google Earth for visualization and "web interface"

INTERMEDIATE STEPS

- Downloading imagery on demand
- Not Ortho Photos!
- Accessible through Google Earth
- Contacts
  - Austin Korte
    Austin.Korte@ohio.gov
  - Tim Burkholder
    Timothy.Burkholder@ohio.gov

http://www.dot.state.oh.us/Divisions/Engineering/CaddMapping/Pages/Public-Aerial-Image-Requests.aspx
OHROW (ODOT’S RIGHT-OF-WAY WEB APPLICATION)

Kyle Ince, P.E., S.I.

- OHROW: Searchable Web-Based App to look for and download Right-of-way plans for State, US, and Interstate Routes in Ohio.
  - If available District Monuments*
  - Plans will be hosted in ProjectWise
  - Controlled by individual districts
  - Importing data is a work in progress
  - If we have record of it, it will be on the webmap