WorksOS

CIVIL CONSTRUCTION
SEPTEMBER 16, 2020

Data Exchange Workflows

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Supported Data Types

Many types of information can be brought into Trimble WorksOS (both automatically and manually) as files from a variety of office and field sources. These data types integrate into WorksOS:

1. Trimble Earthworks machine productivity data (.tag)
2. Trimble GCS/PCS/CCS900 machine productivity data (.tag)
3. Trimble Business Center (TBC) projects (job sites) for WorksOS
4. Project data from TBC and manual imports:
    a. Design surfaces (.ttm)
    b. Linework (.dxf)
    c. Alignments (.svl)
    d. Surveyed surfaces (.ttm)
    e. Calibration and coordinate system data (.dc, .cal)
5. Calibration and coordinate system data (.dc, .cal)
6. Project boundary (.dxf)

See details for each type below.
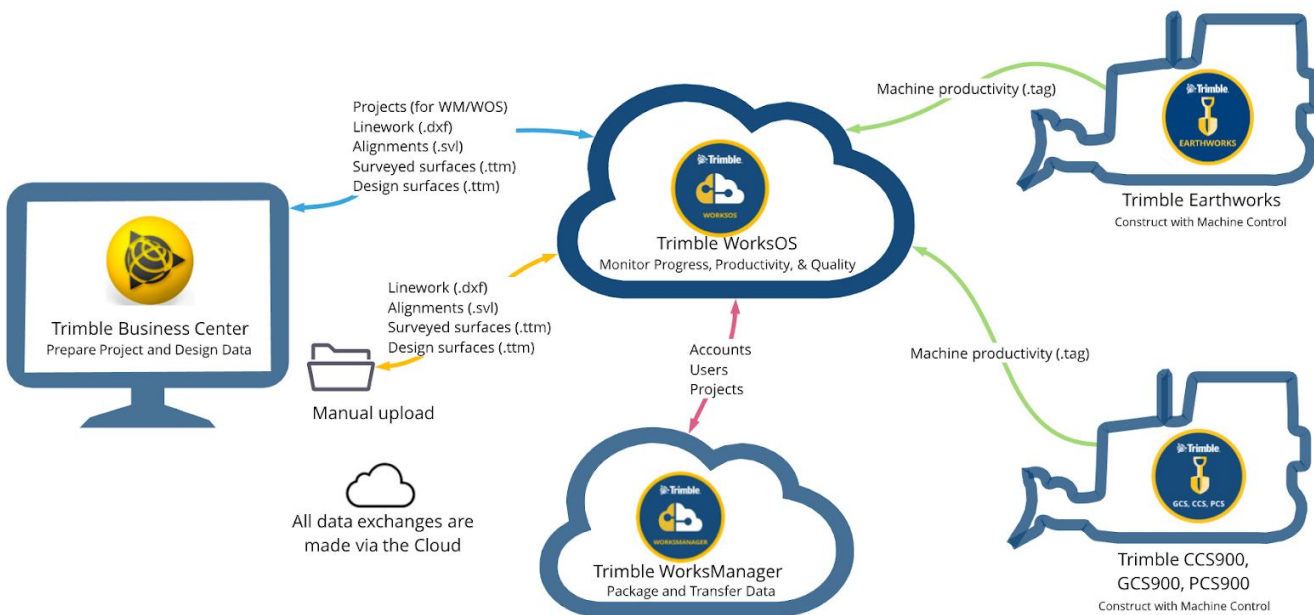
Terminology

- **3D-enabled** - A project type into which machine productivity data (.tag) files can be processed. 3D-enabled projects must have boundaries that do not overlap with other 3D-enabled projects. This type of project is fully functional in Trimble WorkOS and WorksManager. For details, see the WorksOS Guide - Creating, Editing, and Archiving Projects.

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- **Non-3D-enabled** - A project type into which machine productivity (.tag) files cannot be imported. Non-3D-enabled projects can have overlapping boundaries with other projects. These projects are only used in WorksManager.

- **Machine productivity data** - Progress, productivity, and quality (PPQ) metrics transmitted from machines on site to cloud and office apps via machine data files (.tag)

- **As-at state** - Ground truth at a specific moment in time, such as for the in-progress status of a surface

Bringing in data/files

Automatic method (processing)

Machine productivity data (.tag) from Earthworks and GCS/PCS/CCS900 automatically flows into WorksOS 3D-enabled projects and is immediately processed. This data can also be manually imported.

Manual method (importing)

Machine productivity files (above), as well as design surfaces, linework, alignments, and surveyed surfaces, can alternatively be imported manually into a project..

To import data manually

1. From either the Dashboard or Map Screens for the currently selected project, click the More (ellipses) icon and select 'Imports' in the menu.
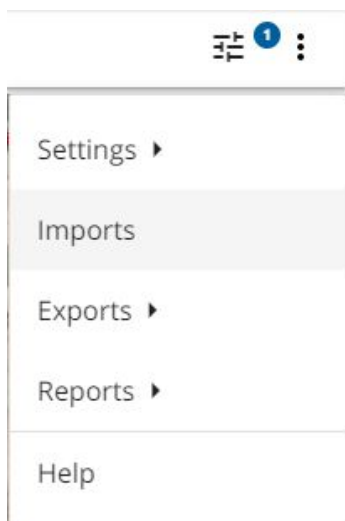
This will open the Imported Files screen which shows all currently uploaded files in the project.
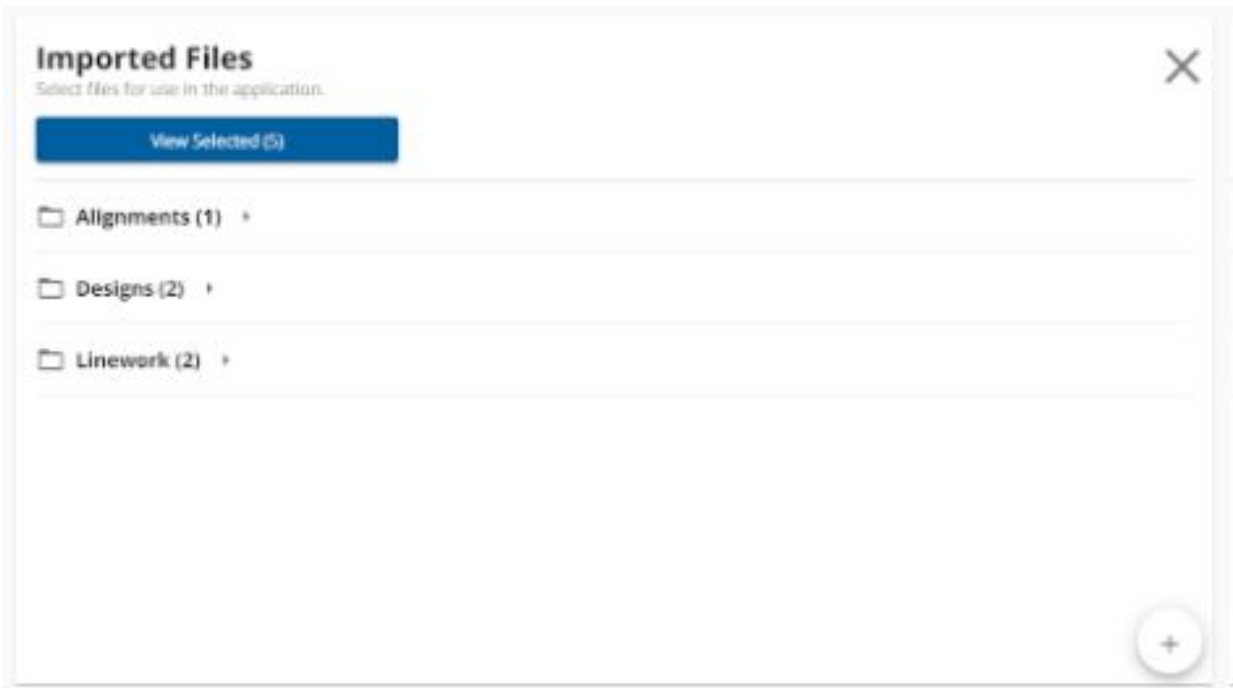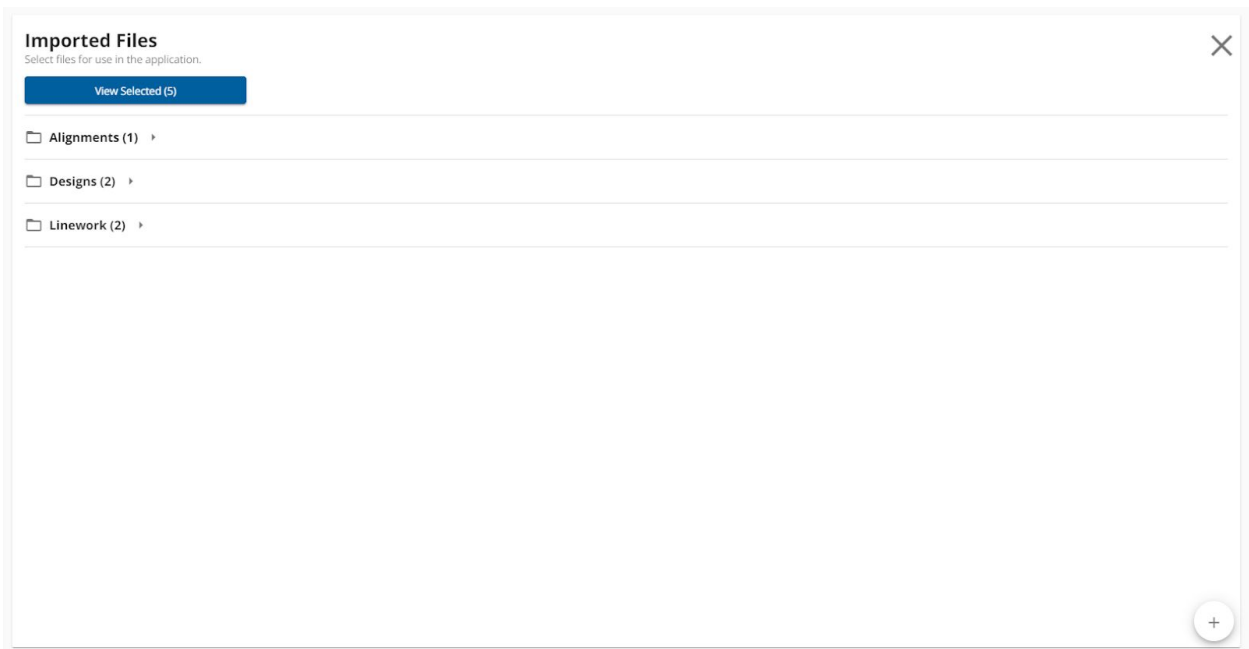
2. Click the **+** button to open the Import Files window. From here, you can manually browse or drag-and-drop each file type you want to import into the Project.

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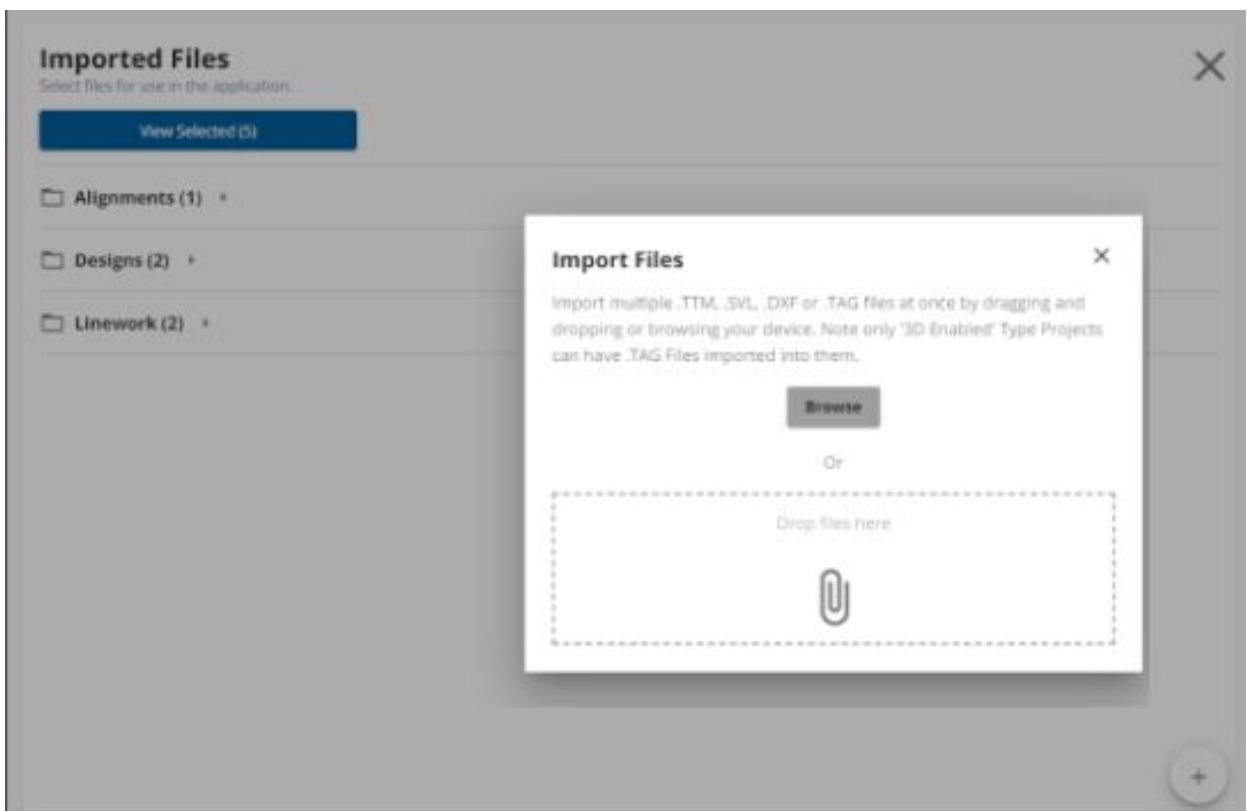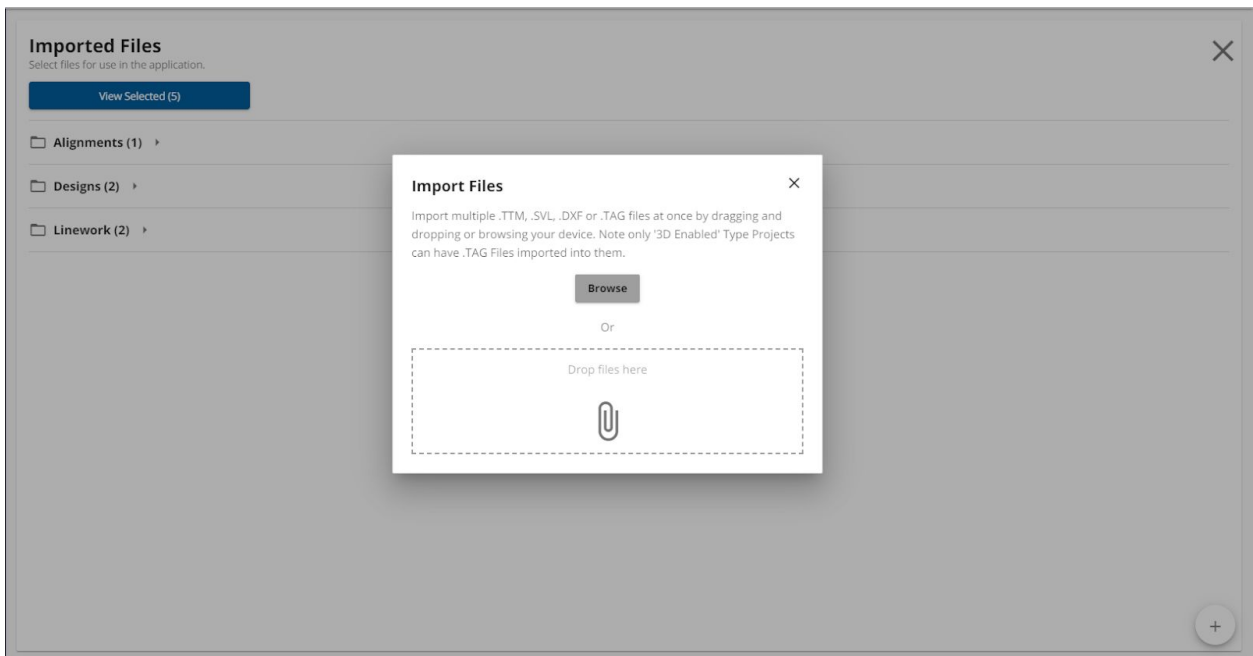
3. Select machine productivity files (.tag) to import them into the project. The imported data is checked to see that it lies within the spatial extents of the project boundary. Any data outside the boundary is not added.
4. Select design surfaces (.ttm), linework (.dxf), alignments (.svl), and surveyed surfaces (.ttm) to import into the project. Once imported, these files are displayed in the Import Files list where you can view them by file type and disable or remove them if needed.

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1. Earthworks Machine Productivity Data (.tag)

Earthworks machine productivity data can flow automatically into WorksOS and can also be manually imported into 3D-enabled types of projects.

Note: Tag files cannot be automatically or manually imported into non-3D-enabled projects.

For the data to flow into WorksOS, the Earthworks device (e.g., EC520) must have a device licence in WorksManager (in the same account used by the WorksOS project). See the WorksManager support/documentation on [how to set up a device in the WorksManager account](#).

Once your device(s) have been set up in WorksManager, the data will flow to WorksOS and be accepted or rejected based on the project requirements. A Trimble Connected Community (TCC) licence is not required to run Earthworks.

Data from Earthworks can also be manually imported into WorksOS if required. In the Imports sections, simply select or drag-and-drop a folder into the Import dialog. No further selections are required and the user can select import once all file(s) are selected.

# 2. GCS/CCS/PCS900 Machine Productivity Data (.tag)

Trimble GCS/CCS/PCS machine productivity data can flow automatically into WorksOS and can also be manually imported into 3D-enabled types of projects.

For the data to flow into WorksOS, the Earthworks devices (e.g., CB450, CB460) must have a device licence in WorksManager (in the same account used by the WorksOS project). See the WorksManager support/documentation on how to set up a device in the WorksManager account.

Once your devices have been set up in WorksManager, the data will flow to WorksOS and be accepted or rejected based on the project requirements

Note: A TCC licence is still currently required for Trimble GCS/CCS/PCS900.

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Data from Trimble GCS/CCS/PCS 900 can also be manually imported into WorksOS if required. In the Imports sections, simply select or drag-and-drop a folder into the Import window. No further selections are required and the user can select import once all files are selected.
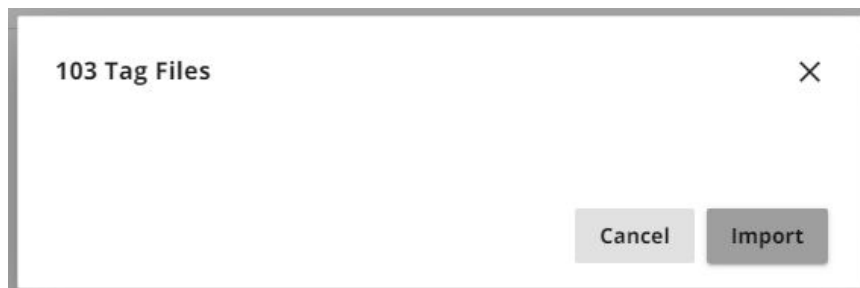
Note: Tag files cannot be automatically or manually imported into non-3D-enabled projects.

# 3. Project Data From Manual Import

3a. Design surfaces (.ttm)

Design surfaces can be manually imported into a WorksOS project as a Trimble Triangulated/Terrain Model (TTM/.ttm).

Ideally, the exact design prepared in WorksOS should be sent to the machine in the field so they have the same definition and can map progress and productivity consistently. Design surfaces use X,Y,Z coordinates for length, width, and height (elevations) dimensions.

Importing a design in the Imports window requires you to choose whether the TTM is a design surface or surveyed surface.

Once imported, a design appears as a blue, closed polygonal boundary on the Map screen. Boundary filtering can be used on a design to show only data inside the boundary. Design surfaces can also be used for Work Remaining cut/fill and volume calculations required to achieve the Finished Design surface.

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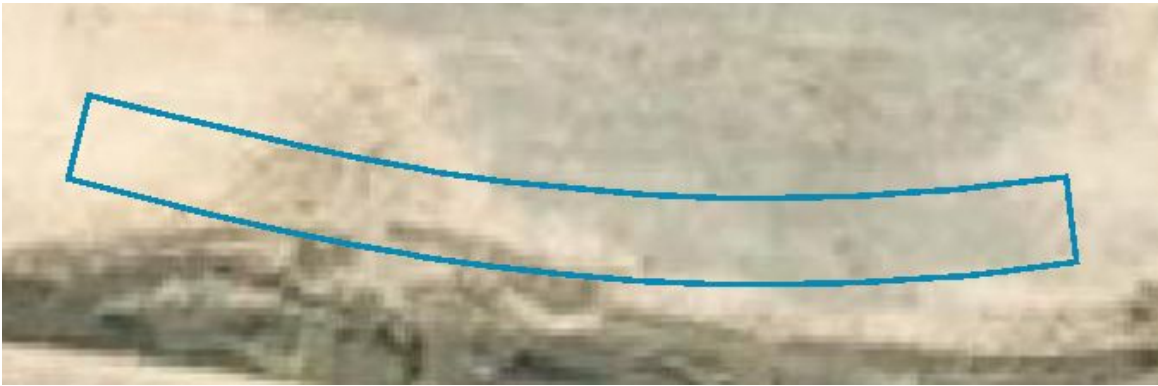
3b. Linework Files (.dxf)

Linework can be manually imported into a WorksOS project as a .dxf (a universal CAD exchange format) .

Linework provides you with visuals and guidelines for what a finished surface, structure, or area could look like when finished (or as a plan view while it is being built).

When importing a linework file through the Imports window, you must select the unit type in which the file was created in the source program (e.g., TBC). Selecting the wrong units for the data will cause linework to be displayed in the wrong place.

Once you have imported linework, it will appear on the Map screen in its original colors. Linework files can be large, varied, and detailed to render and upload. In WorksOS, they are for visualization purposes only, i.e., to show what a virtual finished surface/road/project could look like. You cannot filter or interact with the data in any way.

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3c. Alignment Files (.svl)

Alignments can be manually imported into a WorksOS project as an .svl (a native Trimble Sitevision linework format). An alignment file contains an alignment centerline plus stationing/chainage (distance) start and end values within it.

Once alignments are imported, they appear as red lines on the Map screen, complete with stationing/chainage labels. Alignments can be very long and typically represent one or more road centerlines, i.e., the center of a new road being built.

Alignments are used to spatially filter and report data for what is typically a road building project (as the alignment is the centerline of the new road).

The Alignment Filter allows you to select an alignment file and spatially filter the data for a set distance along it (which can be part or all). You can also specify how wide to sample left and ride of the centerline, e.g., to encompass one or more traffic lanes.

Example:

The Station & Offset Report uses the same spatial filtering method to select data and also to specify the frequency at which you want to sample it in the report.
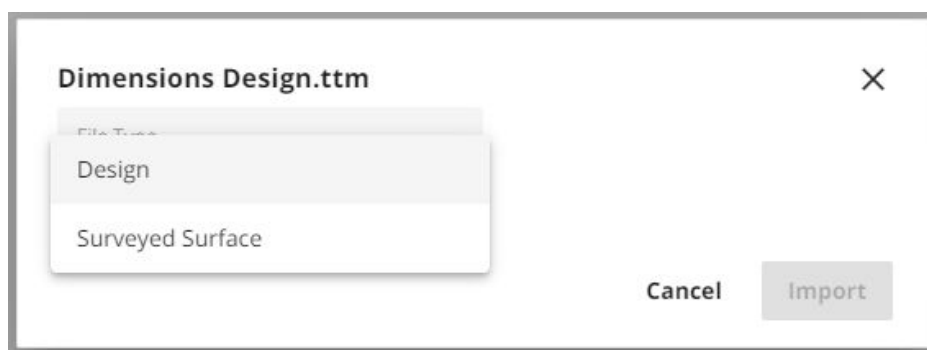
3d. Surveyed Surfaces (.ttm)

Surveyed surfaces can be manually imported into a WorksOS project as a .ttm file.

A surveyed surface may come from a survey device, data collector, or drone; it represents a surveyed area at a given point in time and is used as a source of truth for the 'as-at' state of the surveyed project area.

Surveyed surfaces combine with machine productivity data to form a composite surface where there are no spatial overlaps between the two. If machine productivity data and surveyed surfaces overlap spatially, then the most recent of the two supersedes the other in the composite surface. The date/time of the surveyed surface and the date/time for machine data are taken into account when producing the composite surface. There are data filter settings in WorksOS that can also control the two surface types.

Importing a surveyed surface in the Imports window requires you to select if the .ttm file as a Design Surface or Surveyed Surface.


Once you choose Surveyed Surface, you are prompted for a Survey Date/Time which determines the 'as-at' date/time for the surface. Any other data that overlaps spatially with this surveyed surface will either supersede or be superseded by it, depending on its own date/time.
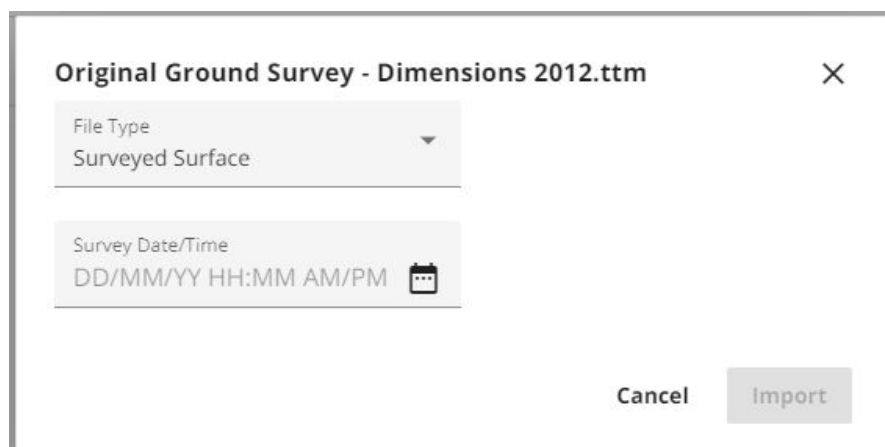
Once imported, surveyed surfaces only appear visible on Elevations, Cut/Fill Quality Metrics, and in Volumes Calculations. They contain no pass counts, compacted meter value (CMV), temperature, machine drive power (MDP), or speed values, so they are not visible in those quality metrics and the detailed data view (DDV) tool does not pick them up either (shows machine data only).

Surveyed surfaces are imported:
- For the original ground topo survey (a starting point of the ground in the project)
- For periodic surveys during the project to state the ground "as-at" a certain time.
- To improve bad or missing machine productivity data
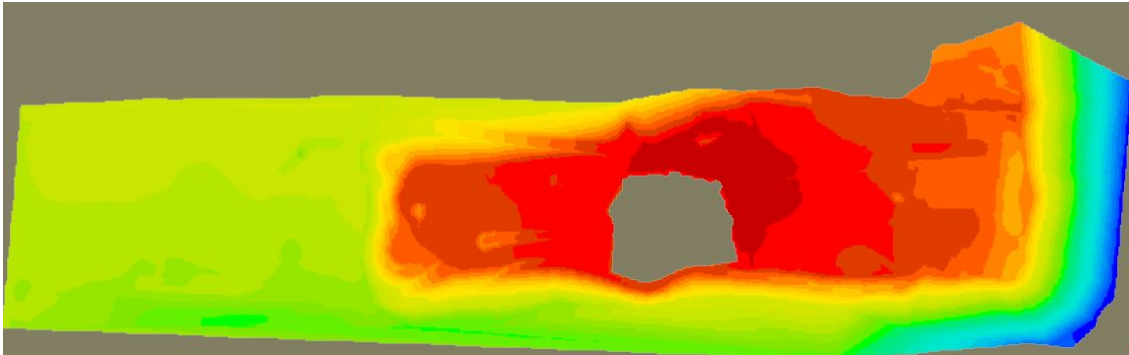
4. Calibration/Coordinate System Files (.dc, .cal)

Calibration/Coordinate system files can be published automatically through TBC's Publish to WorkOS command or manually imported into WorksOS at the time of project creation (or when you edit it in the CONFIG FILES tab as a .dc or .cal format).

The file should be the same file as used by the devices/machines submitting data from the field to ensure data accuracy. The coordinate system/calibration file can affect all other project files and machine productivity data.

> **Note:** Once you have device/machine productivity data for a project, it is recommended that you **do not** change its coordinate system.
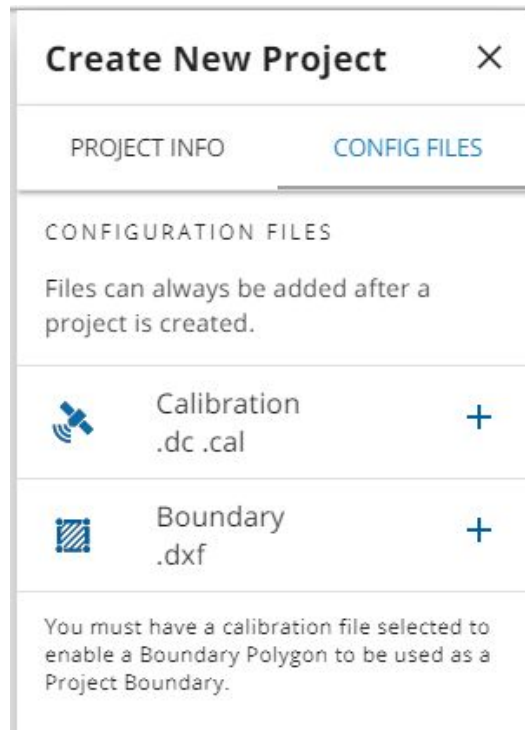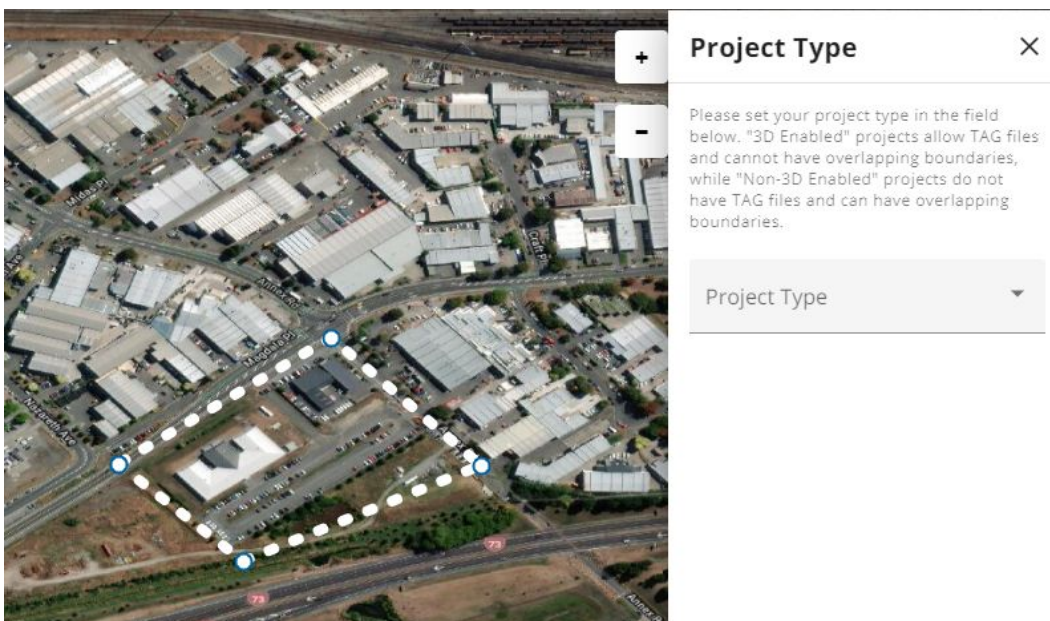
5. Project Boundary from a File (.dxf)

Project boundaries can be imported as a .dxf file when you create a project or edit its .dxf file in the CONFIG FILES tab.

The .dxf file must contain one closed polygon to create a valid project boundary. The calibration/coordinate system file must be uploaded before selecting the boundary .dxf file. In the Create/Edit Project > BOUNDARY step, the boundary contained within the .dxf is displayed on the Map before you finish creating the project.

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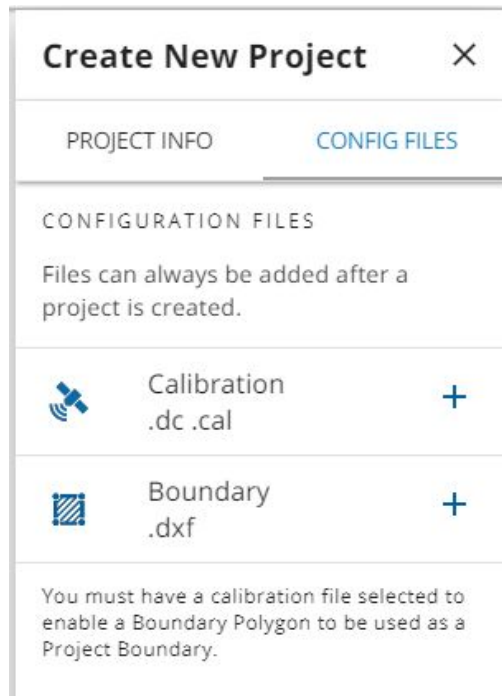
Once selected in the Create or Edit Project > CONFIG FIles step, the polygon in the .dxf file is displayed as the project boundary in the Project Type step. No further selections are needed once you have imported a project boundary.

Note: A boundary from a .dxf file cannot be edited once it is imported into WorkOS as the project boundary. To change a project boundary from a .dxf, you must correct the .dxf file in the source program or create a new one and upload it in the CONFIG FILES step of create and edit project workflows.

WorksOS

Getting Help and Support

For more helpful information, see [Reaching Sales, Support, and Community](#).