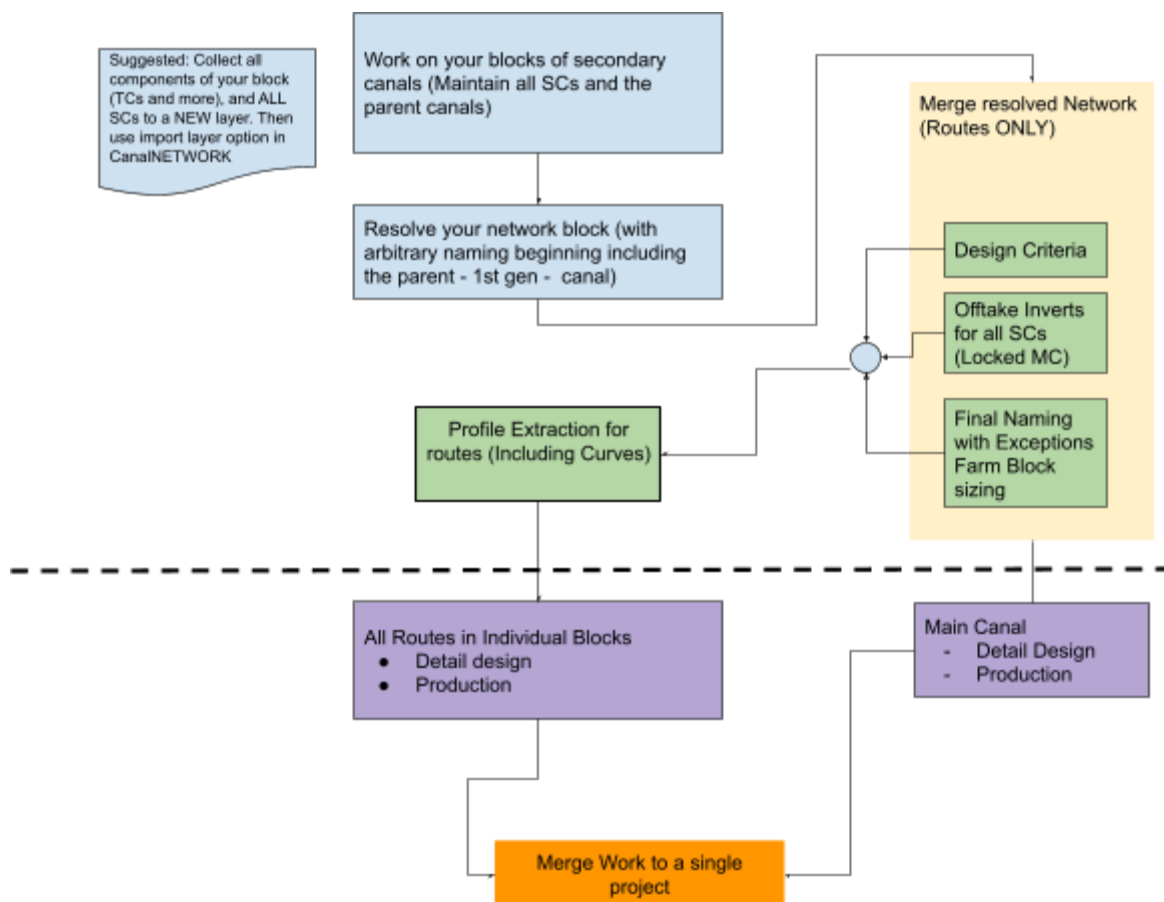


Collaborating on Large projects

There is no software limit to the number of canal routes or the size of irrigable area that can be handled using CanalNETWORK software. However, as the size of the network increases, higher performance computers will become a requirement in order to get different steps done within reasonable time. Particularly, below processes require significant processing resource:

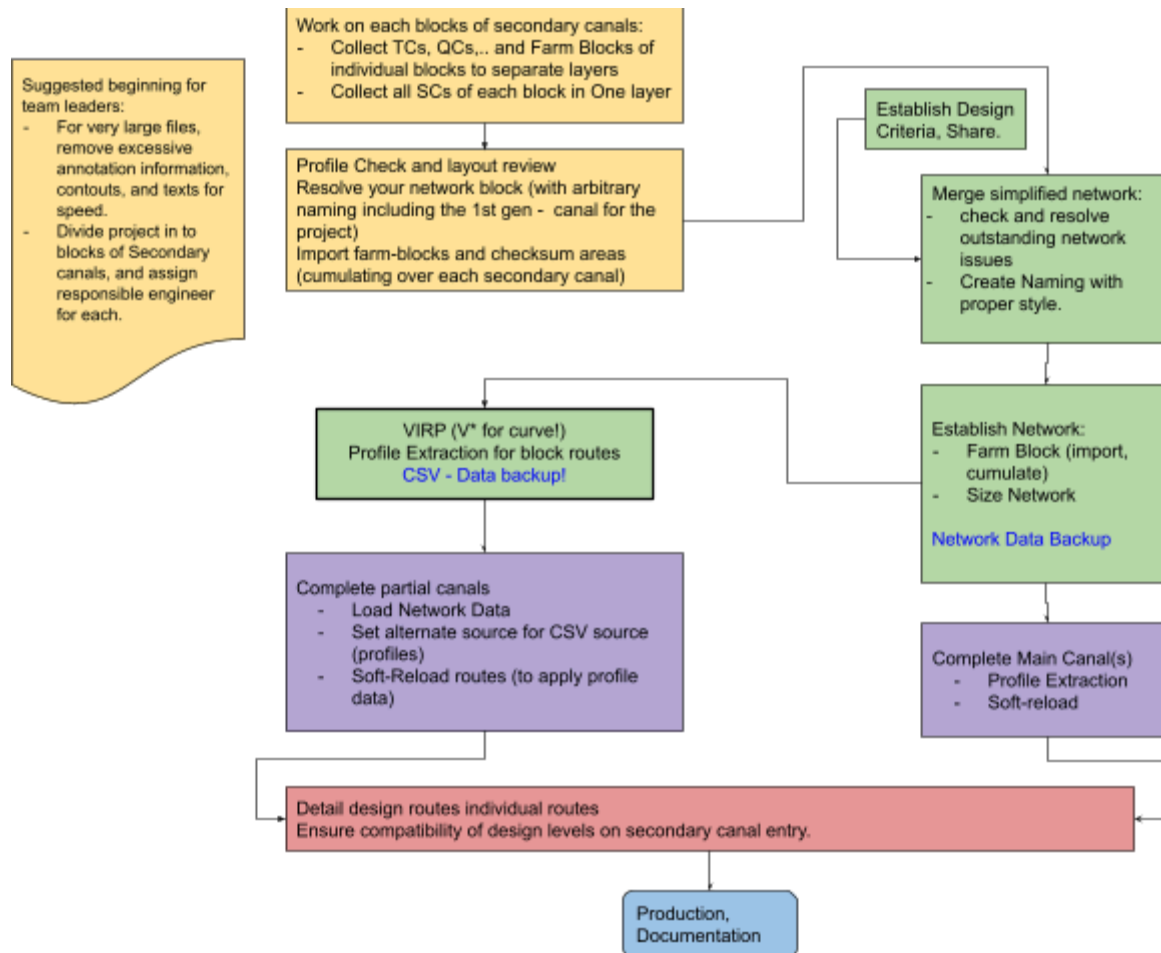
- Profile extraction
- Node identification

In addition, detailed design of individual canal routes can require significant time. Memory errors will also be an issue forcing the software to get stuck or shut down prematurely. These reasons call for a setup that can involve a team of engineers working parallelly towards the completed product of the final project.

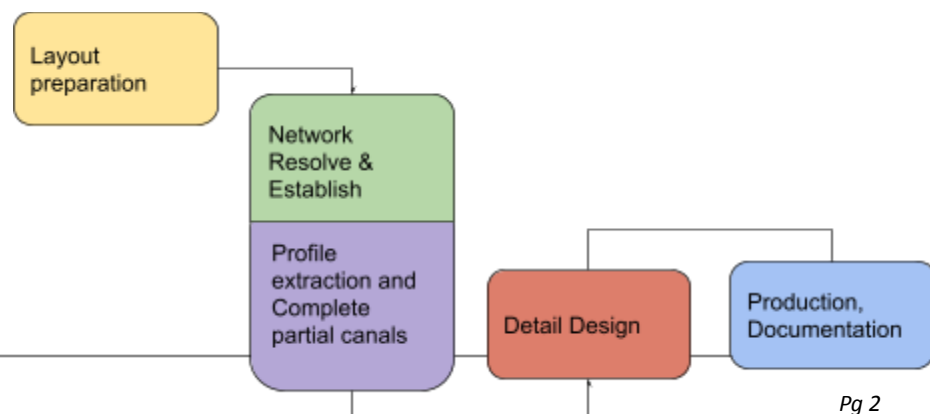


While there are many different ways to achieve this, the recommended workflow for such collaborative work on a single project is shown below. The intention is to maximize efficiency in information flow, data exchange, and streamlined production.

The above workflow was tested for implementation in a large project of about 10,000 Has with a team of four engineers. The lessons learned are documented in the workflow below as the best practice recommendation.



In this diagram the following zones (colored) are obvious, from Yellow, Green/Purple, Red, Blue zones.



Each of these zones are described below.

The details of the approach are discussed here under.

Definitions:

Blocks of network: a division of an area of the entire network consisting groups of a set of consecutive Secondary canals and their subnetwork to be assigned to one engineer,

VIRP: A sort for Vertexing, Instancing, Referencing and Profile Extraction summarizing the key sequential steps that must be followed for use in profile data collection.

Team Leader: A lead engineer responsible for the guidance of the overall design process, also tasked with detailed design and documentation of the canal generations upstream of secondary canals, such as main and primary canals.

Member Engineers: a member of the team of engineers working under the guidance of the lead engineer (team leader), working on blocks of network including and downstream of secondary canals.

Preparing the project

Collaborating on large projects in any platform requires a set of common guidelines to be followed by all participating members of the team. In CanalNETOWRK as well this is essential.

As you may recall, CanalNETWORK and iCAD products create, store and manage data for AutoCAD objects using the unique ID of those objects. These IDs are found in the drawing objects database within AutoCAD. Changes in these IDs would mean data stored using earlier ID values is no more accessible, which is a serious issue and the main cause of inefficiency in our experience so far.

The team leader can, and must avoid this, by ensuring that each member engineer is working on a similar copy of a drawing file obtained from him/her alone. This will ensure that each canal route in the network retains the same ID value generated in the team leader's AutoCAD workspace.

Note: Although AutoCAD claims that ID values for each object are persistent, that means they don't change once assigned, we have - in rare cases - experienced that these may indeed change. As a fall back mechanism we recommend back up of both AutoCAD (.dwg) file and iCAD data (.xsd) file at key junctures as teams progress in the project design.

Team Leader Prep task:

The first task for the team leader is, therefore, to prepare the project for distribution to the team members. To do this we recommend

Suggested beginning for team leaders:

- For very large files, remove excessive annotation information, contours, and texts for speed.
- Divide project in to blocks of Secondary canals, and assign responsible engineer for each.

creating a copy of the master drawing file and making the following changes to the copy, as applicable.

If AutoCAD file size is too large (above 30MB) the transaction time between iCAD / CanalNETWORK products can be very significant, and delay progress substantially. Often point, contour and annotation data are responsible for the increase in size. These objects are not used in any way in both CanalNETWORK and iCAD products, and can be removed safely from the drawing.

The other important task is defining as many blocks of networks as may be needed to tackle the project as a team. The number of blocks depends on the team size available, and the turn-around time for the project.

- In general, fewer blocks of network, and hence teams, are preferred to ease communication and ensure quality.
- To maintain a fair distribution of tasks among members, area based block division can be used. Area based division attempts to delineate blocks of networks such that the area of each block is similar.

Here, the team leader can share the resulting AutoCAD file to members and clearly indicate their assigned blocks of network.

While the members are working on the above task, the team leader shall work on developing a comprehensive design criteria with an appropriate naming style for the project, and saving it to an .dcf file that can be shared to others.

Members Prep Task:

The members start work on their blocks as follows:

- Collect canal routes or alignments of similar generation in to a layer. This will simplify a number of organizational tasks downstream. This is only necessary for secondary canals and their subroutes. Main canals and primary canals are few in number, and direct handling should be ok.
- Check the profiles of similar generation canals for consistency and suitability to design tasks. Where changes in route alignment are needed, make these changes early on rather than later in the design process.
- Then, import ALL routes in the block(s) of the network, and the parent canal feeding these blocks, to the CanalNETWORK environment as partial alignments. (See Partial Import workflow for details).
- Proceed with resolving the network using the three step process of (1) Node Identification,

Work on each blocks of secondary canals:

- Collect TCs, QCs,.. and Farm Blocks of individual blocks to separate layers
- Collect all SCs of each block in One layer

Profile Check and layout review

Resolve your network block (with arbitrary naming including the 1st gen - canal for the project)
Import farm-blocks and checksum areas (cumulating over each secondary canal)

(2) Converting EoC Nodes and (3) Diagnosing for Multiple Parent issue.

Note: The sole purpose of network resolution is to ensure that each Route has ONLY one parent.

- Once resolved, import farm areas to the network and ensure areas cumulated are accurate.

At this stage, the members can share their resolved blocks of networks to the team leader.

Note: All the above work does is refine the AutoCAD layout drawing to meet specific requirements of successful node resolution. Hence, only the AutoCAD file should be shared with the team leader. No data file or host objects are needed for the next stage of work by the Team leader.

Network Establishing by Team Leader

The next stage is to merge the work of the members into a single file and re-process the entire network. After the members shared their work, with a different AutoCAD file name (perhaps including their initials and date), the team leader performs the following tasks:

- Copy all components of blocks of networks (canal routes only) from each file, and paste to a freshly opened new drawing, and save the drawing. This will bring layer information along with the objects to the new drawing.

Tip: Use Paste to Original Coordinates.

- Import the network elements for the entire project by selecting each layer, as defined by respective member engineers, in to CanalNETWORK space.
- Proceed with node identification, and resolving any outstanding connectivity issues that may exist.

Tip: Use the three stage process highlighted above for efficient node issue resolution .

- Apply the naming style and design criteria developed to the workspace, and generate Route Names, set exceptions, and ensure the naming generated is desirable/ workable.

Tip: Any inconsistencies are opportunities to refine the network and streamline proceeding tasks, Thus must be addressed accordingly.

- The final stage in network establishing is working with farm blocks and sizing the entire network of canals. Import Farm clocks as organized by each member engineer. Cumulate areas to primary canals and evaluate if acceptable net irrigable area is captured.
- Then. size the network.
- Save the sized network data to a Host object in AutoCAD, and create a backup file for the data.

Merge simplified network:

- check and resolve outstanding network issues
- Create Naming with proper style.

Establish Network:

- Farm Block (import, cumulate)
- Size Network

Network Data Backup

The AutoCAD file, along with the data file (not the backup), is now ready for sharing to the member engineers again.

Warning: This drawing file must be maintained across the teams without much manipulation except tasks needed by iCAD / CanalNETWORK. As mentioned earlier, actions that may cause change in the drawing database (example WBLOCK command) may result in inability to access data prepared by the team leader.

Profile Extraction and Alternate file preparation

At this stage, individual members of the team can proceed with working on the final stages of the preparation before beginning actual design of canals - namely, profile extraction. This task is handled in iCAD product environment.

Before starting extraction, backup the data file for the project and delete the data file. This is important to efficiently handle data, because we want to separate CSV data and network data for large projects.

To reiterate, member engineers will work only on their designated blocks of network. The subtasks at this stage are:

- Vertexing: creating vertex at each junction point for every route
- Instancing: collecting canals of the same generation in to instance objects to facilitate referencing and profile data extraction.
- Referencing of members of the subnetwork to a common reference axes
- Finally, conducting the actual profile extraction task.

Important Tip: Use the techniques and tools presented in the Article 'Profile Work for Network of Canals' to efficiently manage this task.

Once extraction is complete, create a back up of the existing data file from within CanalNETWORK, and edit its name to indicate that it is a CSV data file. Also delete the data file.

Longitudinal Design

At this stage everything is taking shape to entertain actual design of canal routes. Using the below steps bring alive the network data by linking the resolved and established network from the team lead, and the profile data just extracted.

- Restore the backup data file for the network shared by the team lead, and open the saved network from the host object.
- Link the backup file for CSV data to the current workspace of CanalNETWORK, and
- Soft Reload all routes.

Complete partial canals

- Load Network Data
- Set alternate source for CSV source (profiles)
- Soft-Reload routes (to apply profile data)

The above tasks will ensure that the profile data for the blocks of the network are linked and loaded to respective canal routes in the workspace, and ready for the design task.

Tip: Other parts of the network remain as partial canal route objects, which is OK.

From this point onwards, individual members of the team, as well as the team lead, can proceed with longitudinal design of each route in their assignment. They can also generate reports and drawings independently.

END.