Aquaterra
by CGS Labs

CROSS-SECTIONS DESIGN

CGS LABS

CGS Labs d.o.o.

Brnčičeva ulica 13

1000 Ljubljana

Cross-sections Design Tutorial

Title: **Cross-sections Design Tutorial**

Document date: 30. 09. 2020

Version: 1.0.

Printing: CGS Labs d.o.o.

T: +386 1 235 06 00

E: info@cgs-labs.com

Internet: www.cgs-labs.com

Table of Contents

INTRODUCTION

This step-by-step instructions will lead you through the workflow procedure in order to get familiar with the software environment. »Aquaterra Cross-sections.dwg« files should be used. You will learn how to draw cross section views in the drawing and how to design cross sections of a channel with typical cross sections elements such as dykes, embankments, channel lining, etc. Additionally, you will learn how to edit typical cross section elements and how to label them.

1. DRAW CROSS SECTION VIEW

This command reads the data from the source DWG files (Layout and Profile) and draws terrain lines and symbols in a desired number of consecutive cross sections. You can insert and label the vertical alignment with the same command.

Open the drawing »Aquaterra Cross-sections.dwg«.

1. Your alignment »RIVER« should be set as active (right click on the axis in the Alignment Manager and select »Active axis«).

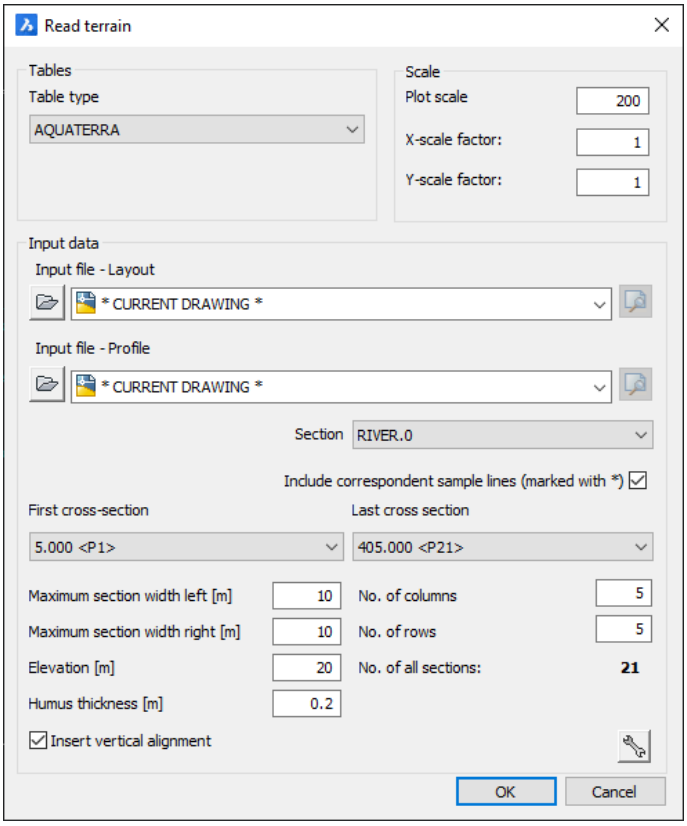
2. From the Ribbon under *Cross Sections* tab, on the **Initial setup** panel click *Draw CS View*. 

3. In *Read terrain* dialog box specify:

   Table type: AQUATERRA
   Plot scale: 200
   X-scale factor: 1
   Y-scale factor: 1

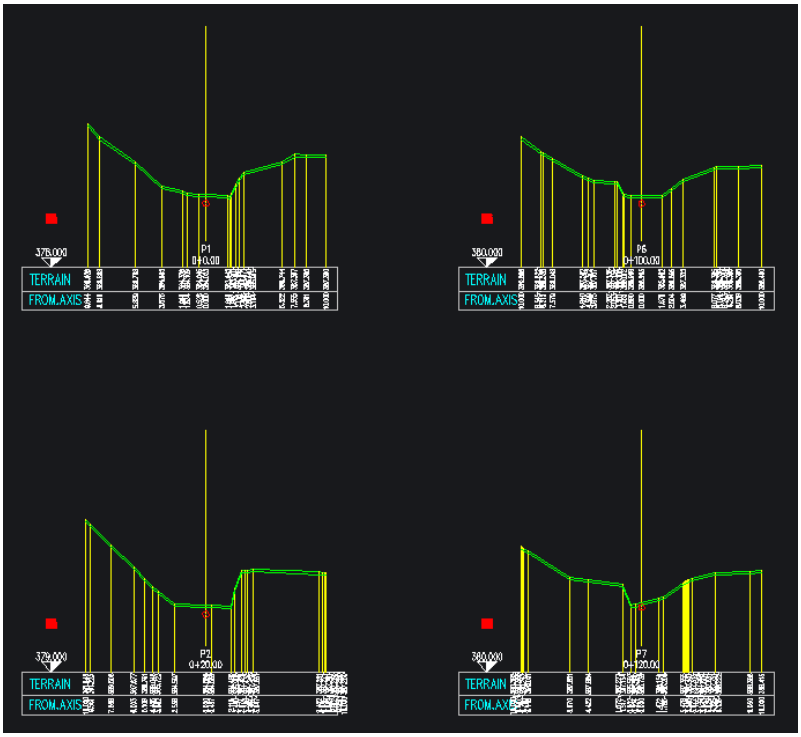
   Input Data: - Input file - Layout: *current drawing*
   - Input file - Profile: *current drawing*

   First cross section: P1
   Last cross section: P21
   Maximum section width left [m]: 10
   Maximum section width right [m]: 10
   Elevation [m]: 20
   Humus thickness [m]: 0.2
   No. of colums: 5
   No. of rows: 5
   Check: Insert vertical alignment.



4. Confirm with *OK*.

5. Select insertion point for upper left corner.



2. TYPICAL CROSS SECTION ELEMENTS

The typical cross section elements (TSC) group of commands contains commands with which it is possible to draw individual TCS elements such as dykes, embankments, channel lining, etc. Furthermore, it is possible to insert TCS elements such as blocks, lines, points, etc.

2.1 Draw channel

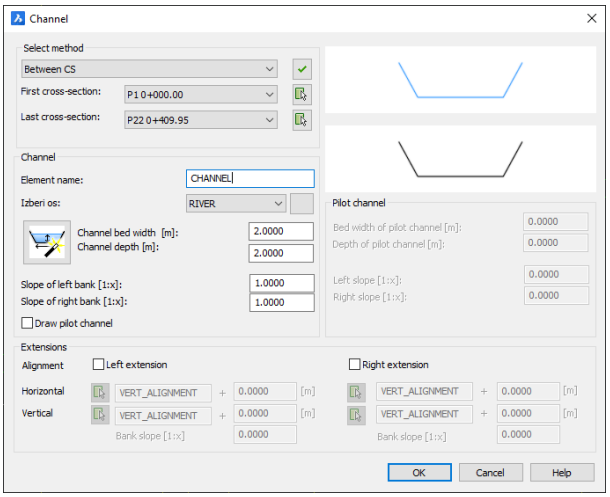
1. From the Ribbon under *Cross Section* tab, on **Draw TCS Elements** panel click on the icon Channel 

2. In Embankment dialog box define a set of cross sections, where embankment should be inserted. Press  button to select all cross sections.

3. Define element label : CHANNEL

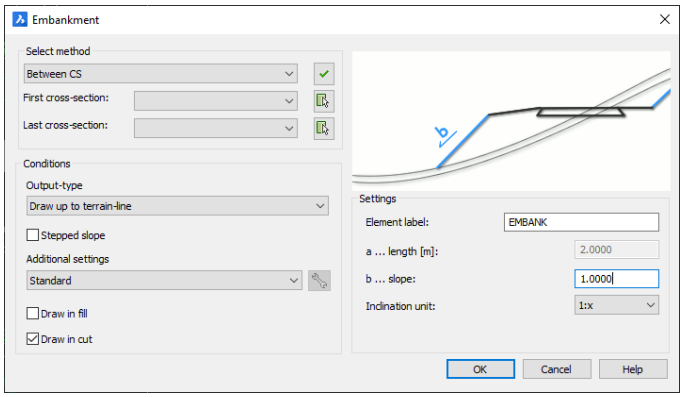
4. Define channel bed width: 2m
   Channel depth: 2m
   Slope of left and right bank: 1m

5. Confirm with *OK*.



2.2 Draw embankment

1. From the Ribbon under *Cross Section* tab, on **Draw TCS Elements** panel click on icon Embankment.



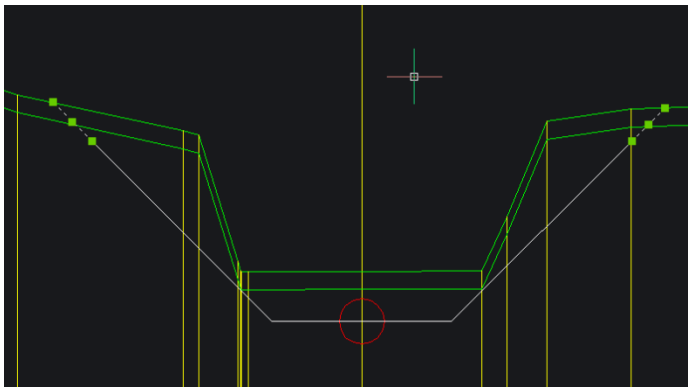
2. In Embankment dialog box define a set of cross sections, where embankment should be inserted.
   Press button to select all cross sections.

3. Specify output type *Draw up to terrain-line.*
   Check only *Draw in cut*.

4. Define element label: EMBANK (or any other preferred name).
   Uncheck:
   Stepped slope
   Draw in fill
   Slope: 1.000
   Inclination unit: 1:x

5. Confirm with *OK*.

6. Select element and insertion point in the drawing: click on the left edge of *left bank of the channel*.



7. Repeat the same procedure on the right side. Click on the Embankment icon, define the same parameters as for the left side, confirm with OK and click on the right edge of *right bank of the channel*.

2.3 Draw dyke

1. From the Ribbon under *Cross Section* tab, on **Draw TCS Elements** panel click on icon Dyke.

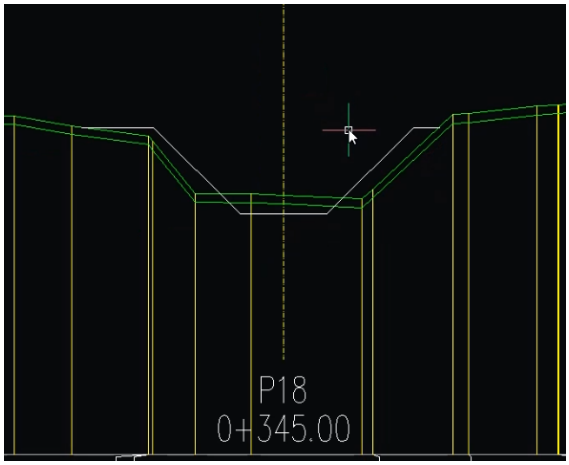
2. In the Dyke dialog box define a set of cross sections, where pavement should be inserted.
   Press button to select all cross sections.

3. Element type: Connected

4. In properties define the element name: DYKE
   Crown width: 4m
   Outer slope: 3 (=1:3)

5. Confirm with *OK*.

6. Select element and insertion point in the drawing: click on the left edge of the *left bank of the channel*.
   The dyke will only be drawn in »fill«.



7. Repeat the same on the right side. Click on the Dyke icon 

, define the same parameters as for the left side, confirm with OK and click on the right edge of the *right bank of the channel*.

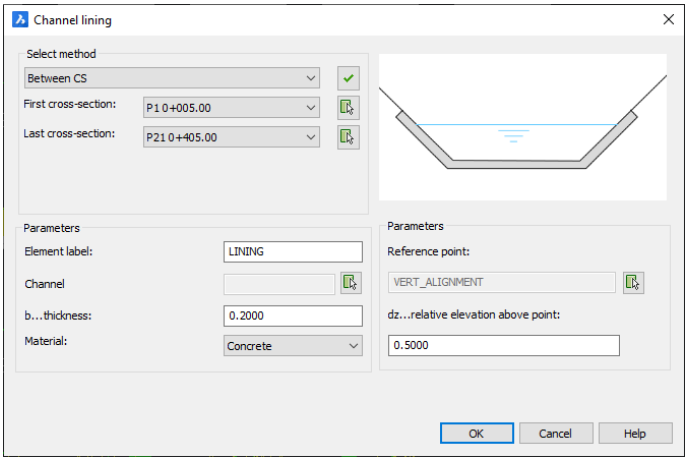
2.4 Draw channel lining

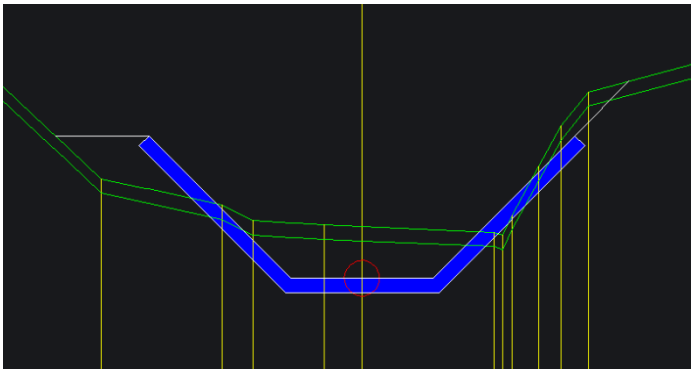
1. From the Ribbon under *Cross Section* tab, on **Draw TCS Elements** panel click on the icon Channel lining. 

2. In Channel lining dialog box define a set of cross sections, where substructure should be inserted. Press  button to select all cross sections.

3. In Settings, define element label: LINING (or any other preferred name).
   Thickness: 0.2m
   *Material: Concrete
   dz…relative elevation above point: 0.5m

   *Material with the name *Concrete* is not added by default. To add a material, click on the *Edit materials* icon in the Cross Sections ribbon. Add a material by clicking on the  button. Define a material name: *Concrete*, type of the quantity: *Area*, type of hatch: *SOLID* and color: *Blue*. Confirm with OK.





4. Confirm with *OK*.

3. EDIT TCS ELEMENTS

With this command group it is possible to edit designed cross sections. To edit TCS elements only Aquaterra commands should be used (not standard AutoCAD/BricsCAD editing commands).

3.1 Edit

Assume that inclination of the embankment should be changed from 1:1.0000 to 1:1.5000.

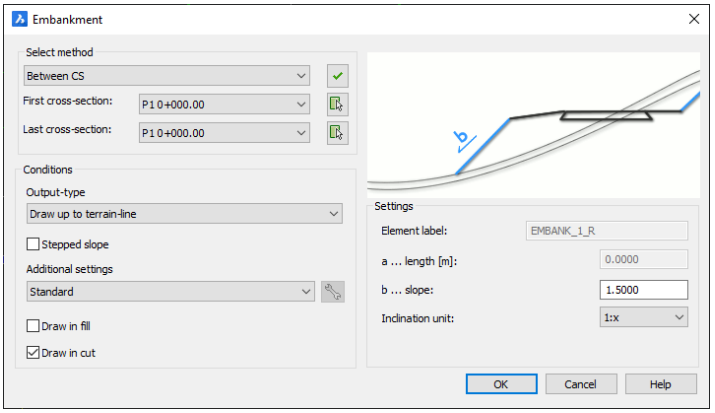
1. From the Ribbon under *Cross Section* tab, on **Edit TCS Elements** panel click on icon Edit. 

2. Pick TCS element in the drawing: left or right embankment.

3. In the Embankment dialog box define a set of cross sections, where change should be applied.
   Press  button to select all cross sections.

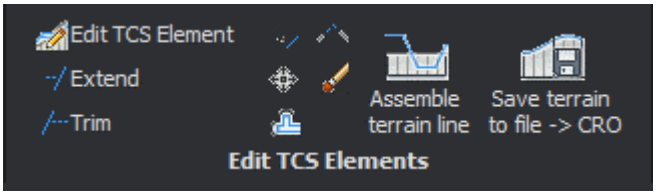
4. Slope: 1.5000
   Inclination unit: 1:x

5. Confirm with *OK*.



3.2 Other commands

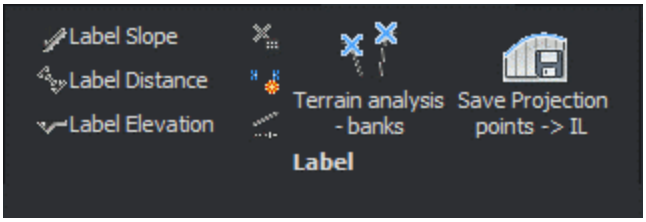
There are bunch of commands, available for editing TCS elements:



- **Trim**: to trim selected TCS element s
- **Extend**: to extend selected TCS elements
- **Erase**: to erase selected TCS elements
- **Move**: to move selected TCS elements
- **Offset**: to parallel copying selected TCS elements
- **Join**: to join selected TCS elements

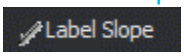
4. LABEL TCS ELEMENTS

With this command group it is possible to label designed cross sections.



4.1 Label slope

1. In the Cross Section tab, on the **Label** panel click on the Label Slope icon.

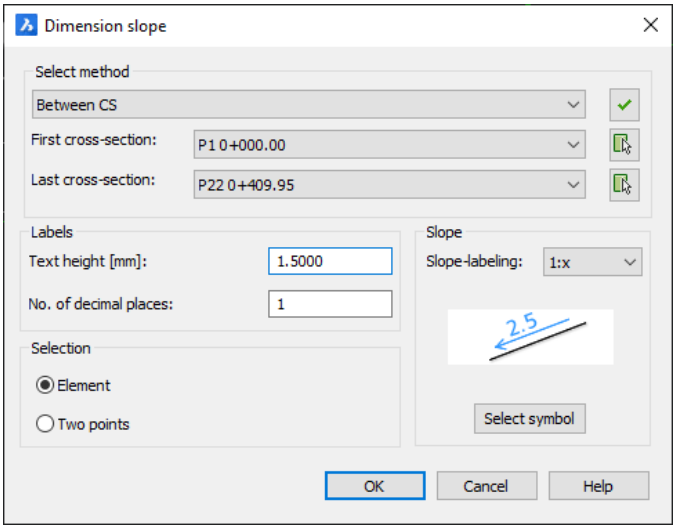
   

2. In Dimension slope dialog box define a set of cross sections, where change should be applied.

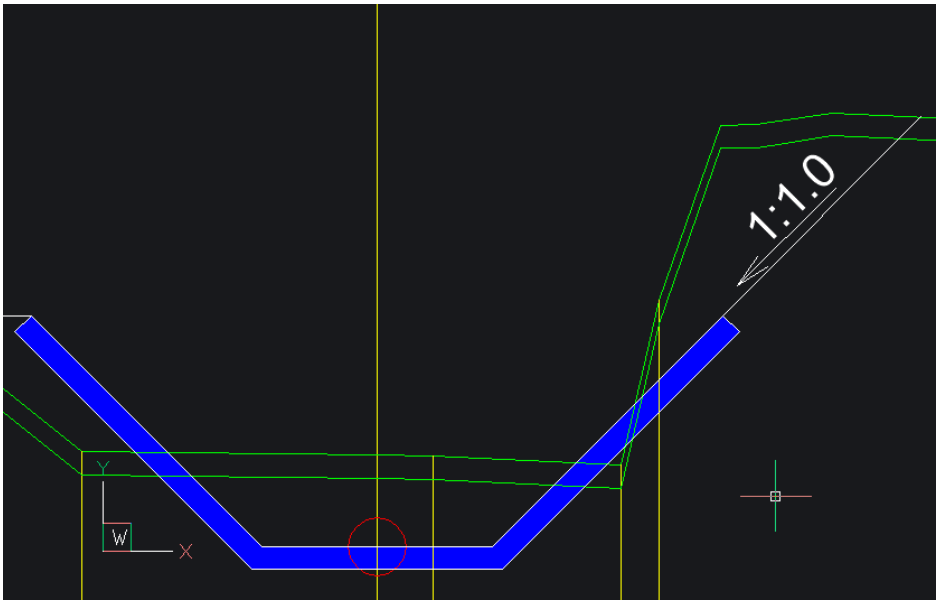
   Press  button to select all cross sections.

3. Labels: Text height [mm]: 1.5
   No. of decimal places: 1
   Selection: *Element.*
   Slope labelling: 1:x.

4. Confirm with *OK*.

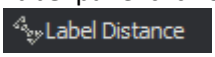


5. Select the element in the drawing you want to label.



4.2 Label distance

1. From Ribbon under Cross Section tab, on **Label** panel click on icon Label Distance.



2. In Dimension distance dialog box define a set of cross sections, where change should be applied.
   Press  button to select all cross sections.

3. Selection: check *Select element.*
   Dimensioning type: check *Horizontal.*
   Dimensioning style: Standard

4. Confirm with *OK*.

5. Select the element that you want to label in the drawing.