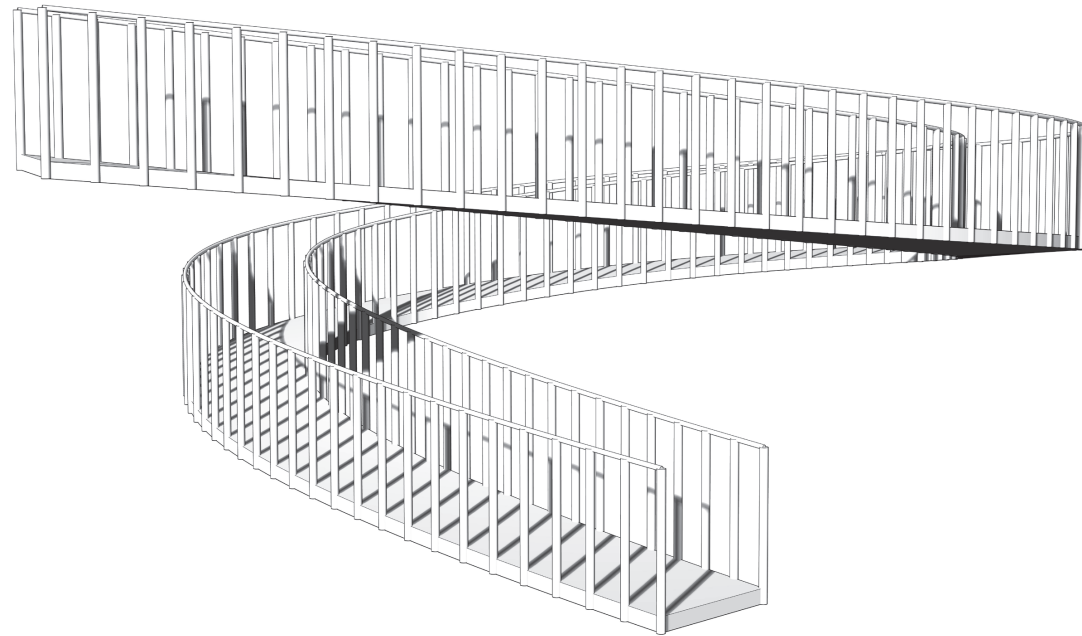


# **RHINO ADVANCED TUTORIAL**



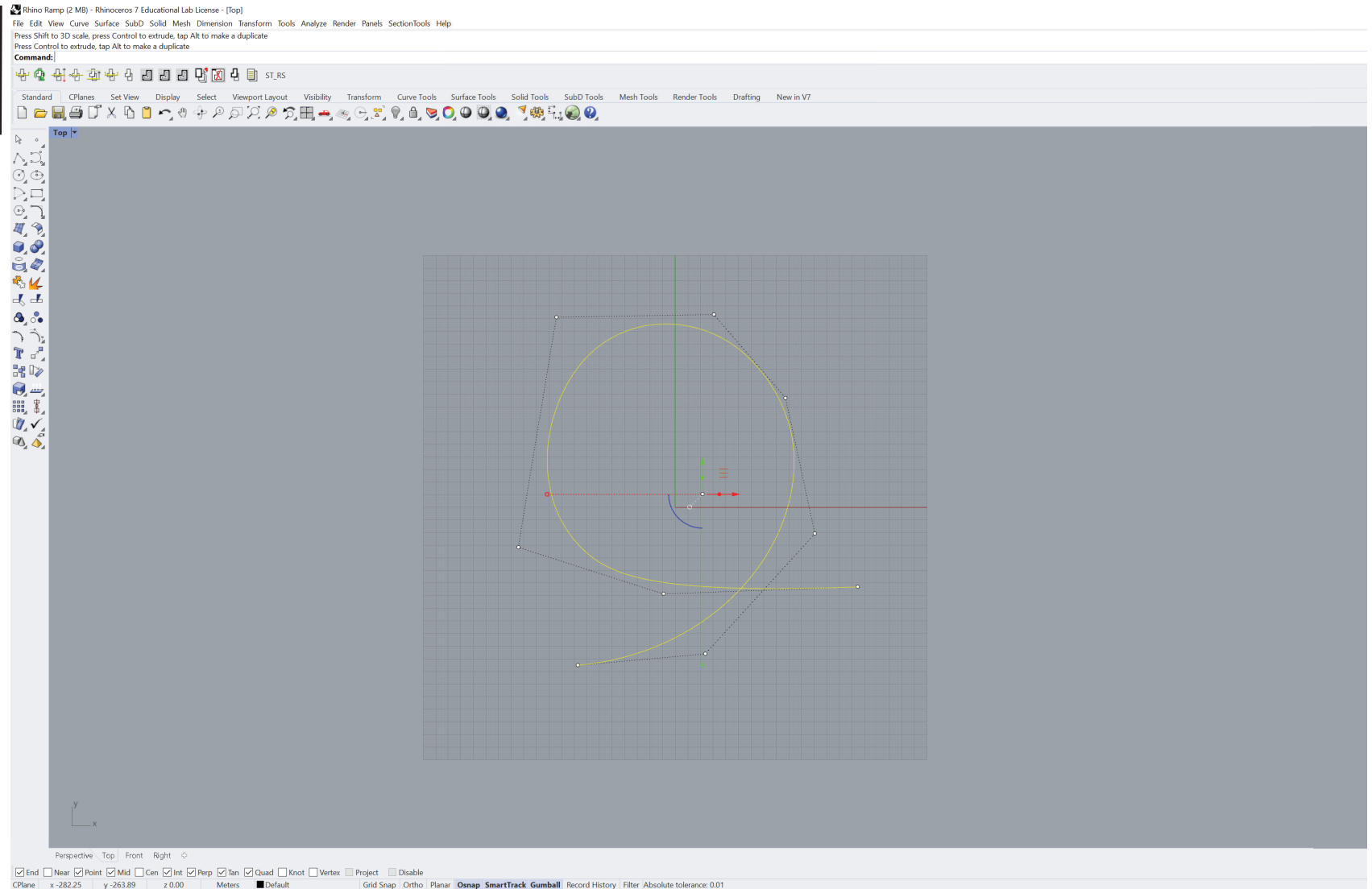
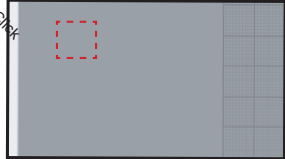
## **SPIRAL RAMP**

# CURVES

Draw an play-line on top view overlapping

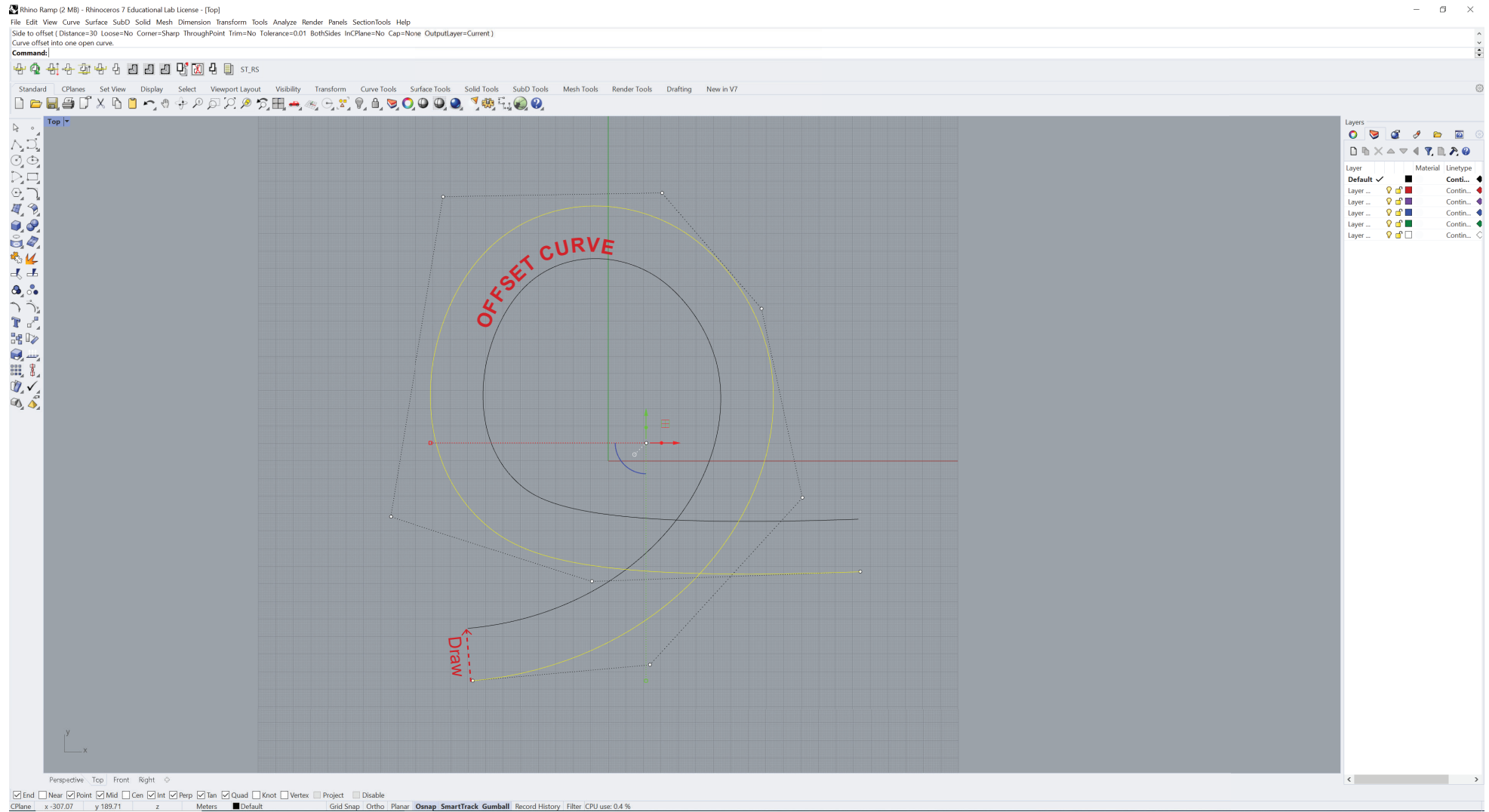


Click the triangle to bring up more options



# CURVES

Type “offset” into the command bar - Specify distances of offset  
Draw an polyline connecting the two Crvs

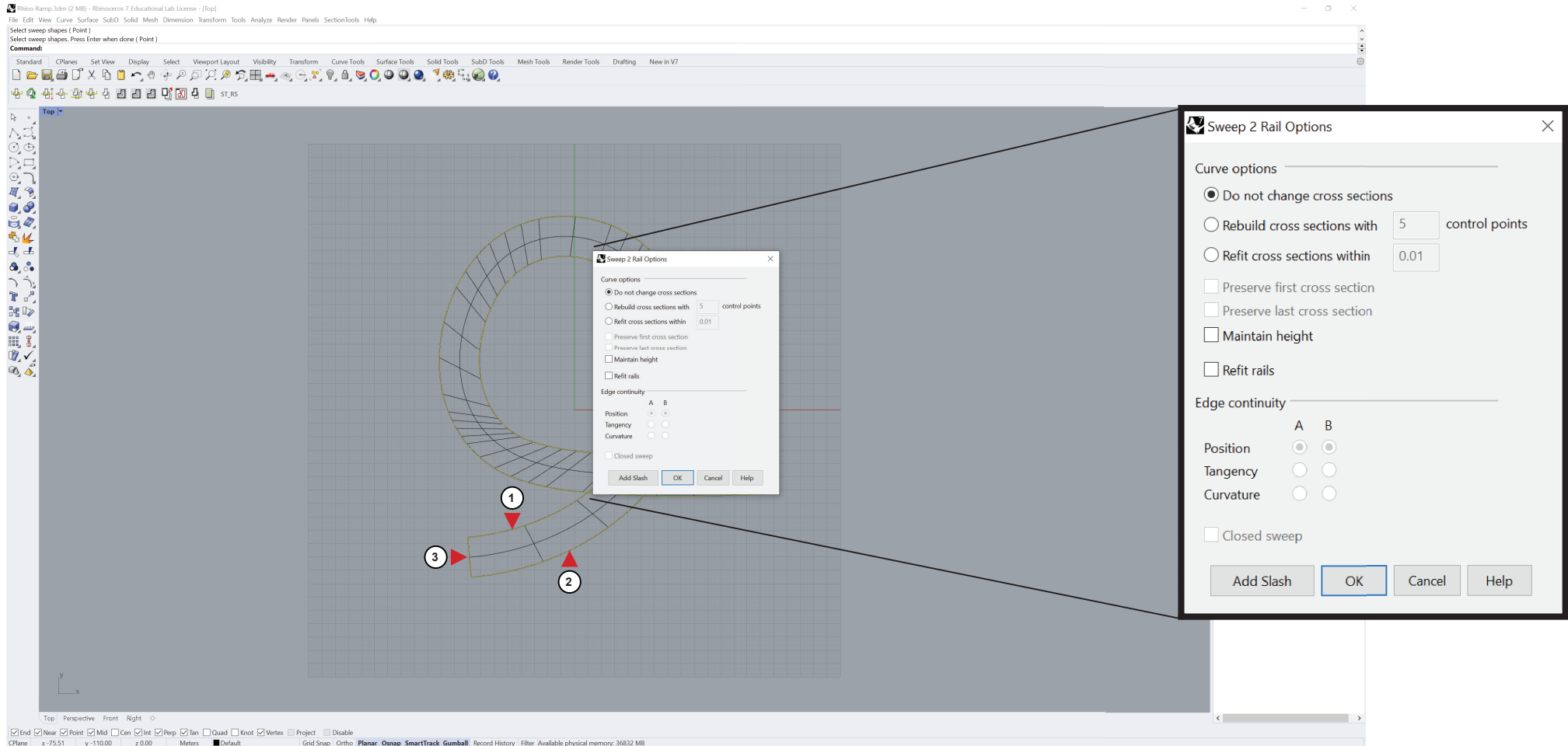


# SURFACE

Type “sweep2” into the command bar

Select the curves in order

Click “OK” when done

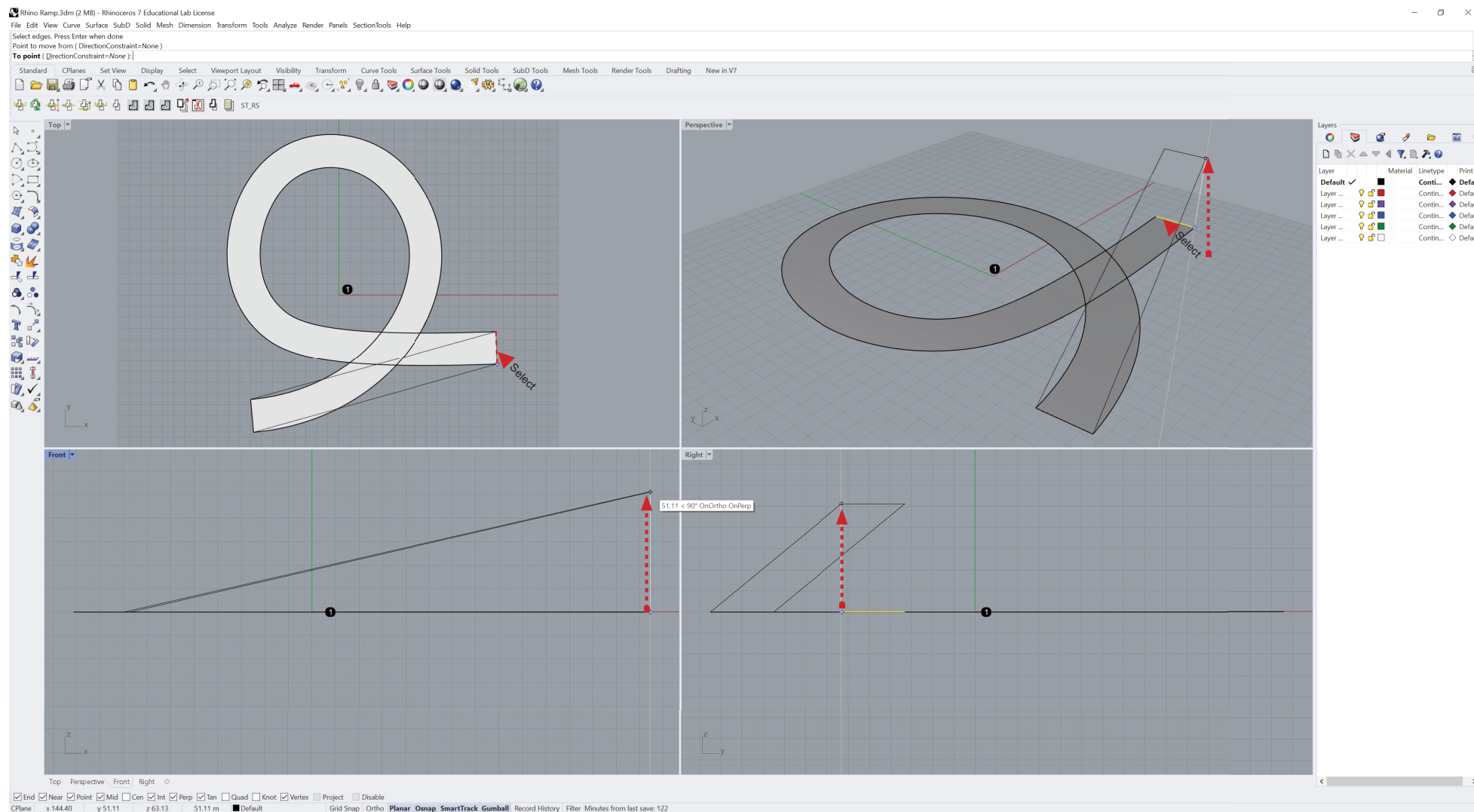




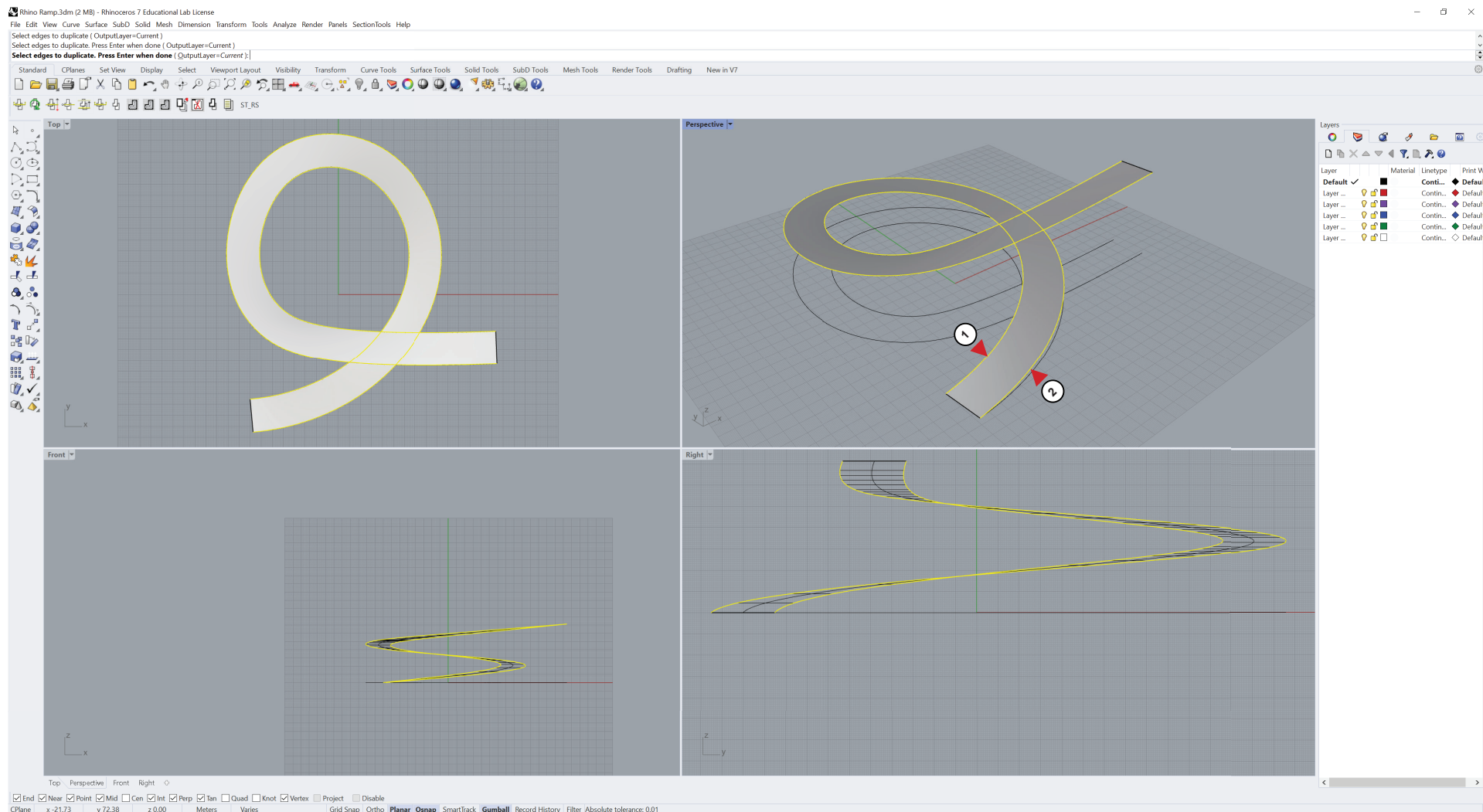
Type “MoveEdge” into the command bar

Select the edge of the surface to move

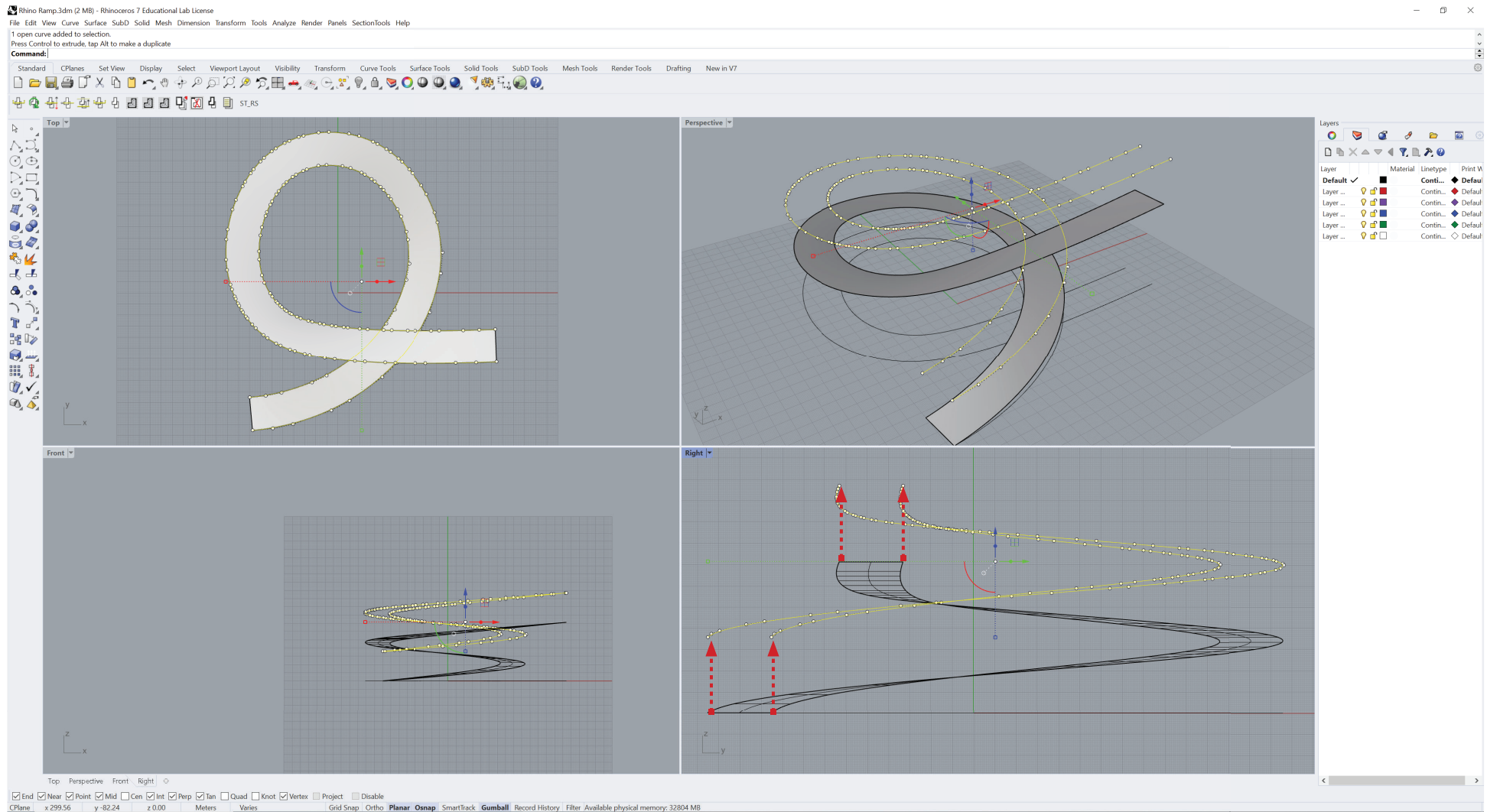
Use the front or right view port to move perpendicular



Type “DubEdge” into the command bar  
Select the edge to extract curve

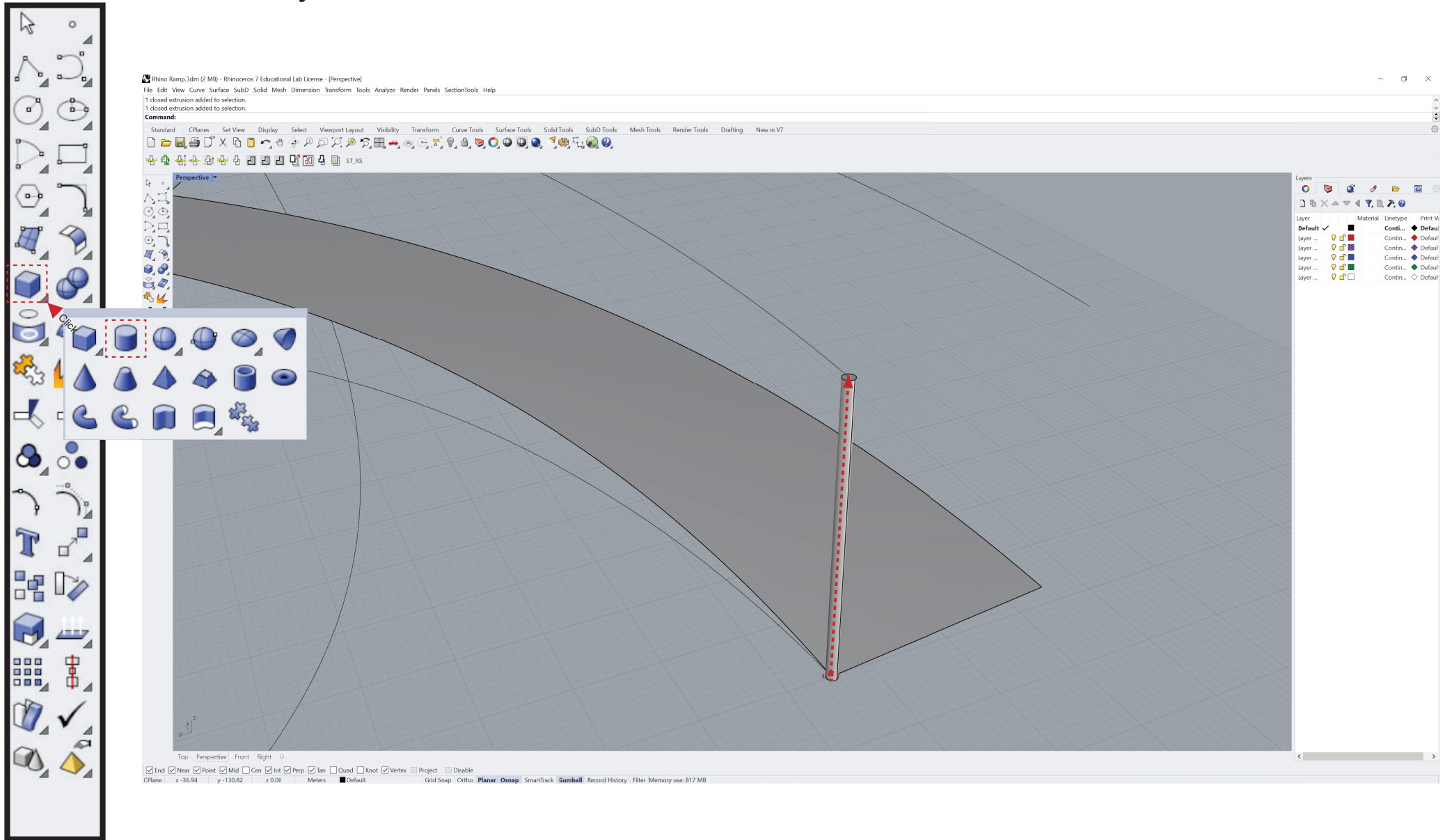


Select the extracted curves and move upwards





Use the cylinder tool to make a rail



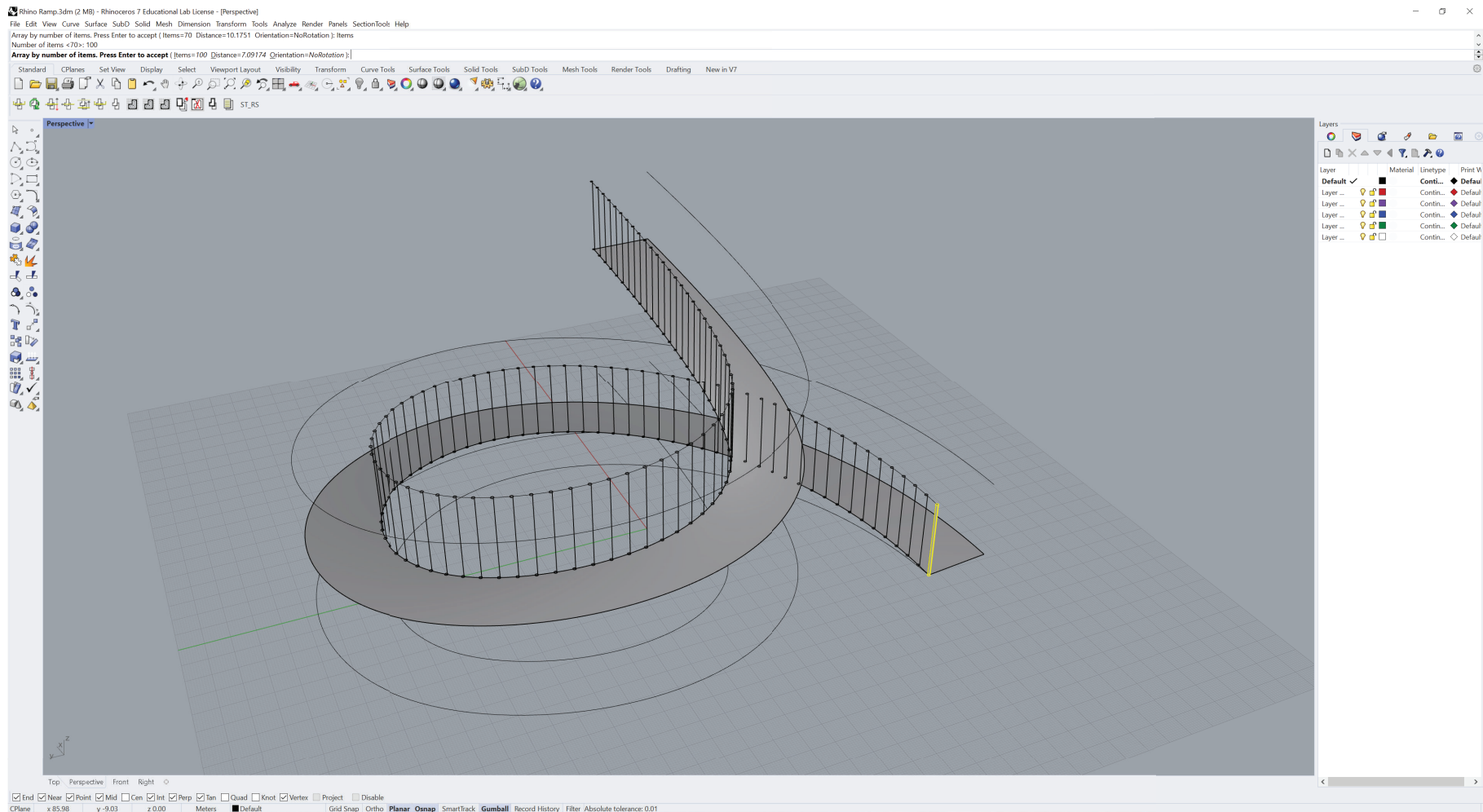
Type “Arraycrv” into the command bar

Specify number of items

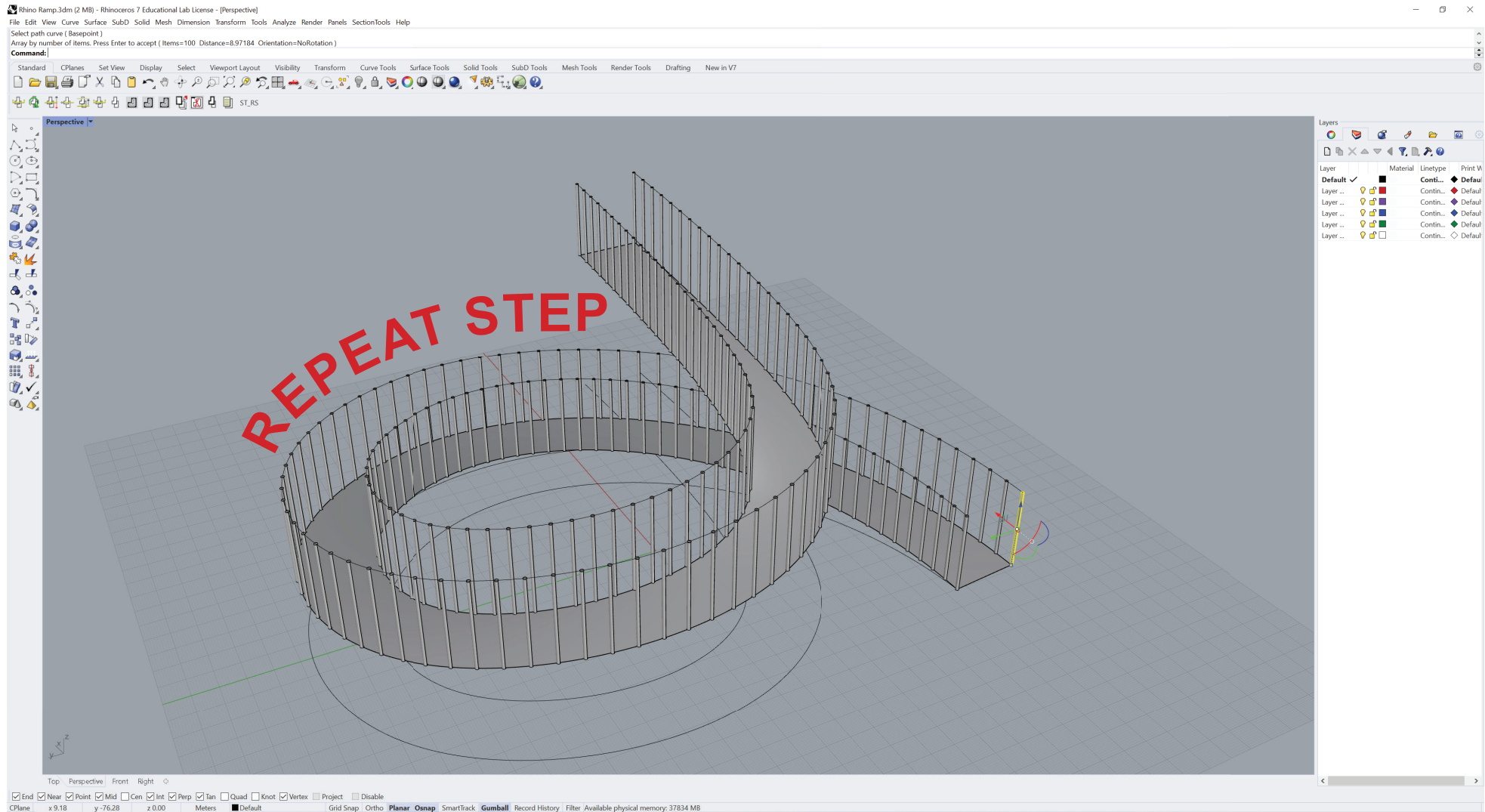
Array by number of items. Press Enter to accept (Items=100 Distance=7.09174 Orientation=NoRotation):

For Orientation change to no rotation

Orientation <NoRotation> (NoRotation Freeform Roadlike):



Repeat same process of the other side

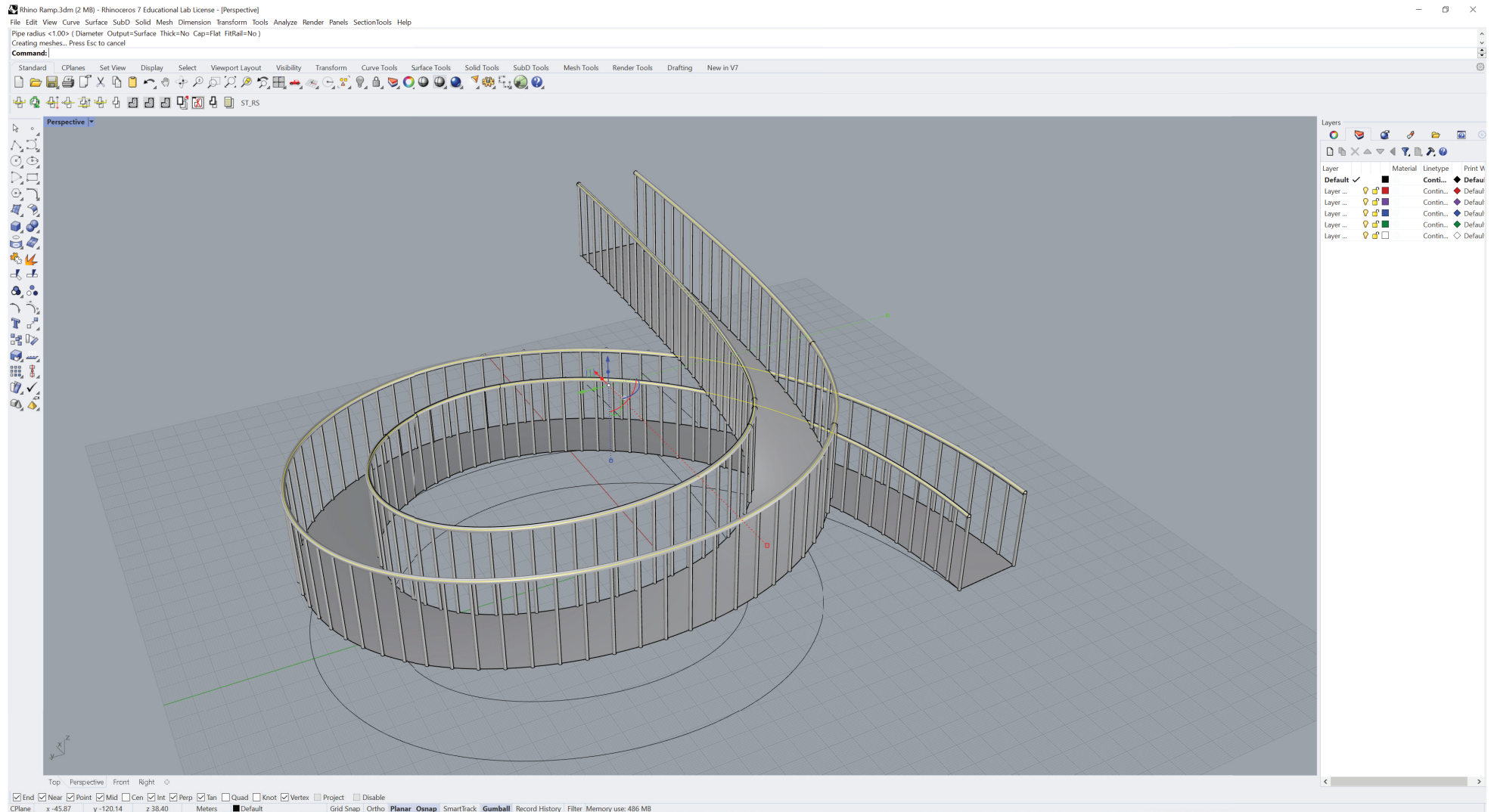




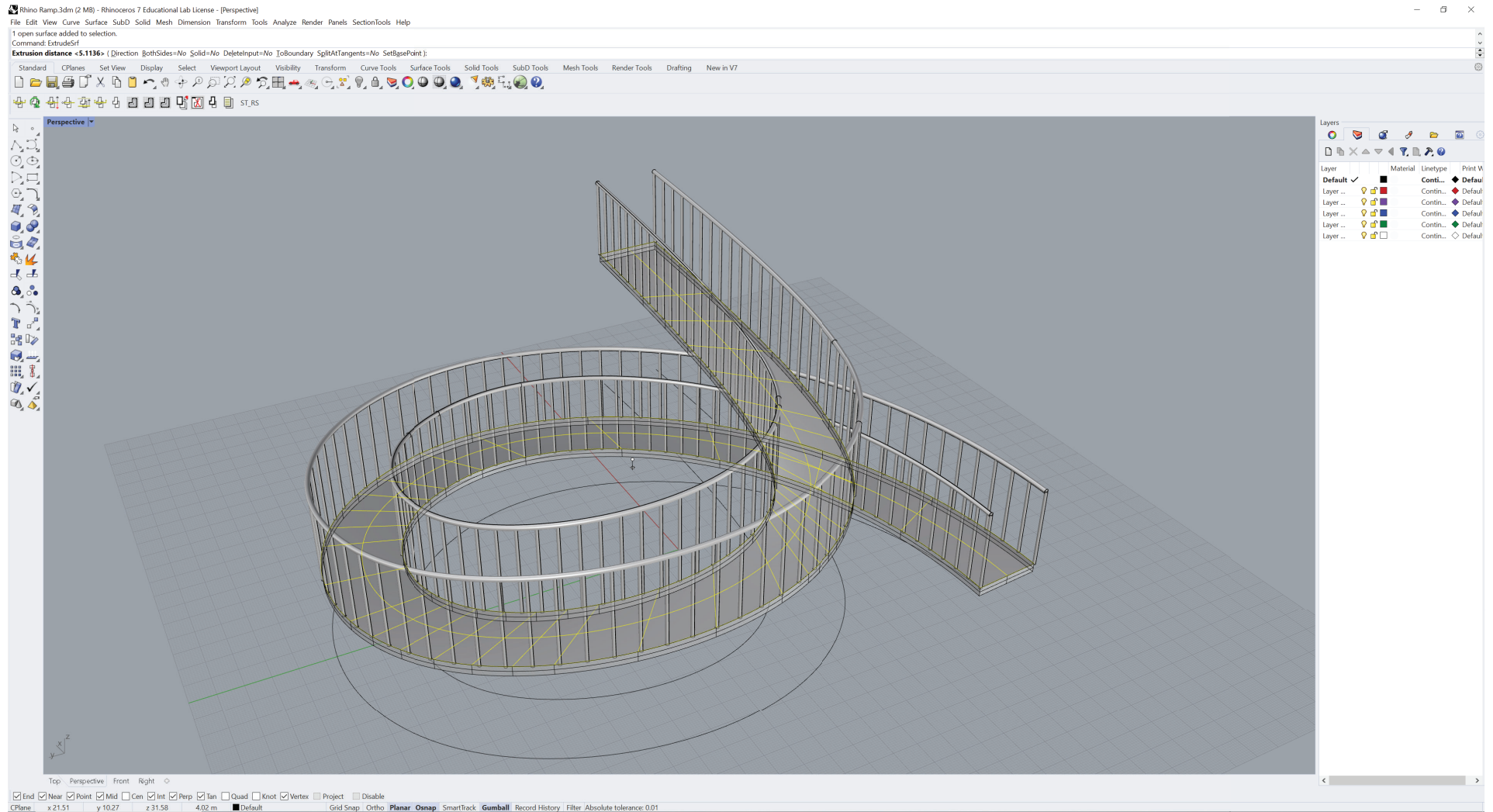
# RAILING

Type “Pipe” into the command bar  
Specify railing type

Pipe radius <1.00> (Diameter Output=Surface Thick=No Cap=Flat FitRail=No )



Type “ExtrudeSrf” into the command bar  
And give the ramp some thickness



END



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File Edit View Curve Surface SubD Solid Mesh Dimension Transform Tools Analyze Render Panels V-Ray Help

Error Reading Archive  
Successfully read file "C:\Users\Lasercutter\Downloads\Advanced Tutorial Part 1.3dm"

Command:

Standard CPlanes Set View Display Select Viewport Layout Visibility Transform Curve Tools Surface Tools Solid Tools SubD Tools Mesh Tools Render Tools Drafting New in V7

Perspective

**What you need from GIS:**

1. Contours
2. Building Footprint
3. Kerb Lines

After importing it into rhino, you would need to separate them into the following layers

BUILDING FOOTPRINT

KERB LINES

CONTOUR

BOUNDARY LINE

Layers

Layer	Material	Linetype	Print V
Base		Continuous	◆ Defau
Buildings		Continuous	◆ Defaul
Contour Li...		Continuous	◆ Defaul
Road		Continuous	◆ Defaul

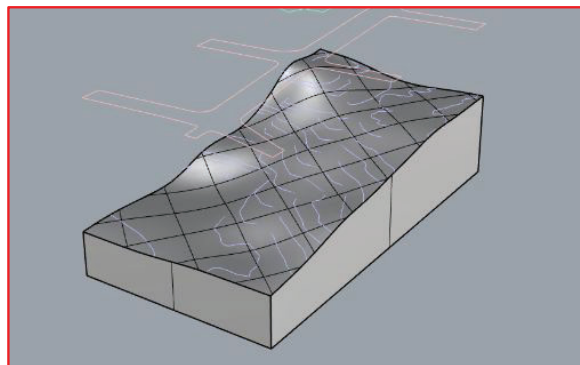
Perspective Top Front Right

☒ End ☒ Near ☒ Point ☒ Mid ☒ Cen ☒ Int ☐ Perp ☐ Tan ☐ Quad ☐ Knot ☒ Vertex ☐ Project ☐ Disable

CPlane x 545.722 y 161.499 z 0 Meters Base Grid Snap Ortho Planar Osnap SmartTrack Gumball Record History Filter Memory use: 731 MB



**First, we are going to  
make the base of the  
model which looks like  
this**







Advanced Tutorial Part 1.3dm (453 KB) - Rhinoceros 7 Educational Lab License - [Perspective]

File Edit View Curve Surface SubD Solid Mesh Dimension Transform Tools Analyze Render Panels V-Ray Help

File successfully saved as C:\Users\Lasercutter\Downloads\Advanced Tutorial Part 1.3dm.

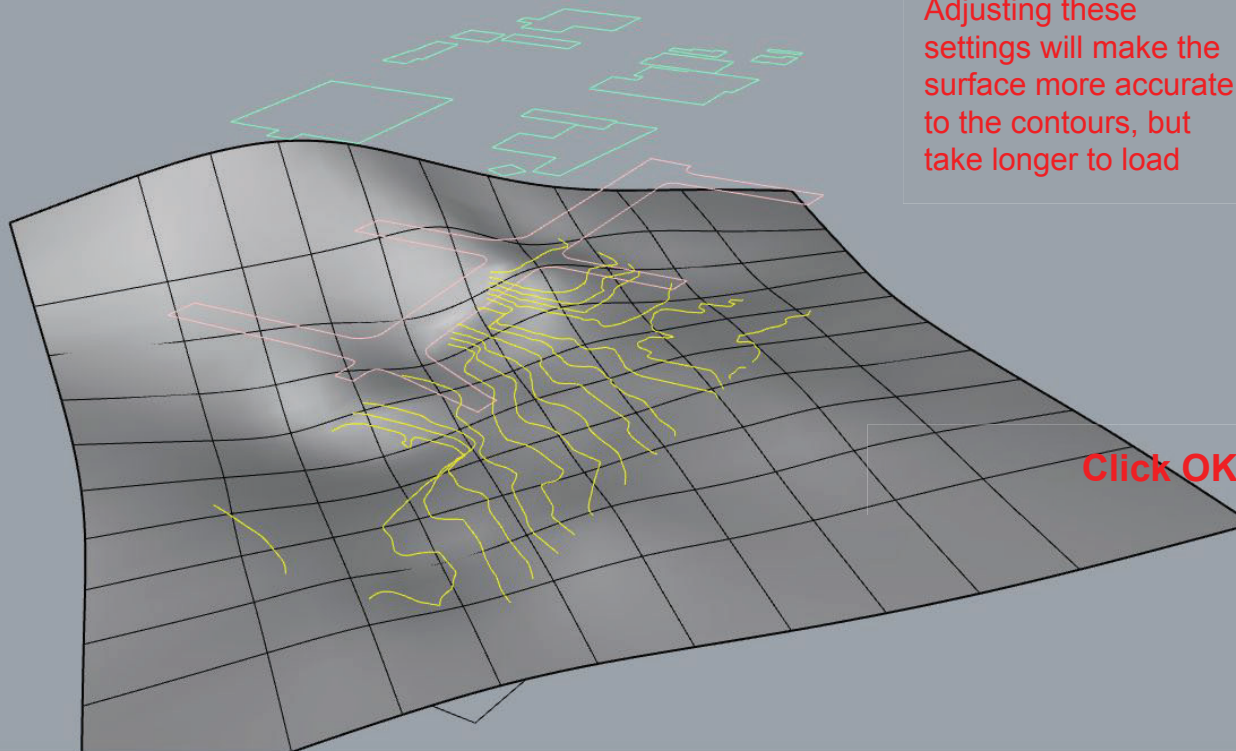
19 curves added to selection.

Command:

Standard CPlanes Set View Display Select Viewport Layout Visibility Transform Curve Tools Surface Tools Solid Tools SubD Tools Mesh Tools Render Tools Drafting New in V7



Perspective

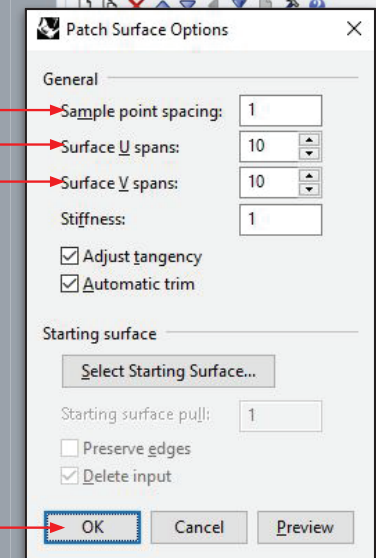


Adjusting these settings will make the surface more accurate to the contours, but take longer to load

Click OK

Select the **CONTOUR** and use the command **PATCH**

A tab will pop up like this



☒ End ☒ Near ☒ Point ☒ Mid ☒ Cen ☒ Int ☐ Perp ☐ Tan ☐ Quad ☐ Knot ☒ Vertex ☐ Project ☐ Disable

CPlane x 504.443 y 982.082 z 0.000 Meters ☒ Contour Lines ☒ Grid Snap ☒ Ortho ☐ Planar ☒ Osnap ☒ SmartTrack ☐ Gumball ☐ Record History ☐ Filter CPU use: 5.8 %





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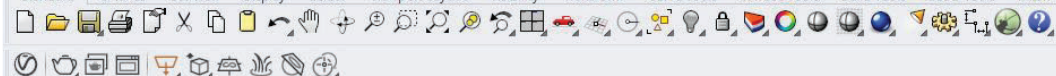
File Edit View Curve Surface SubD Solid Mesh Dimension Transform Tools Analyze Render Panels V-Ray Help

1 closed curve added to selection.

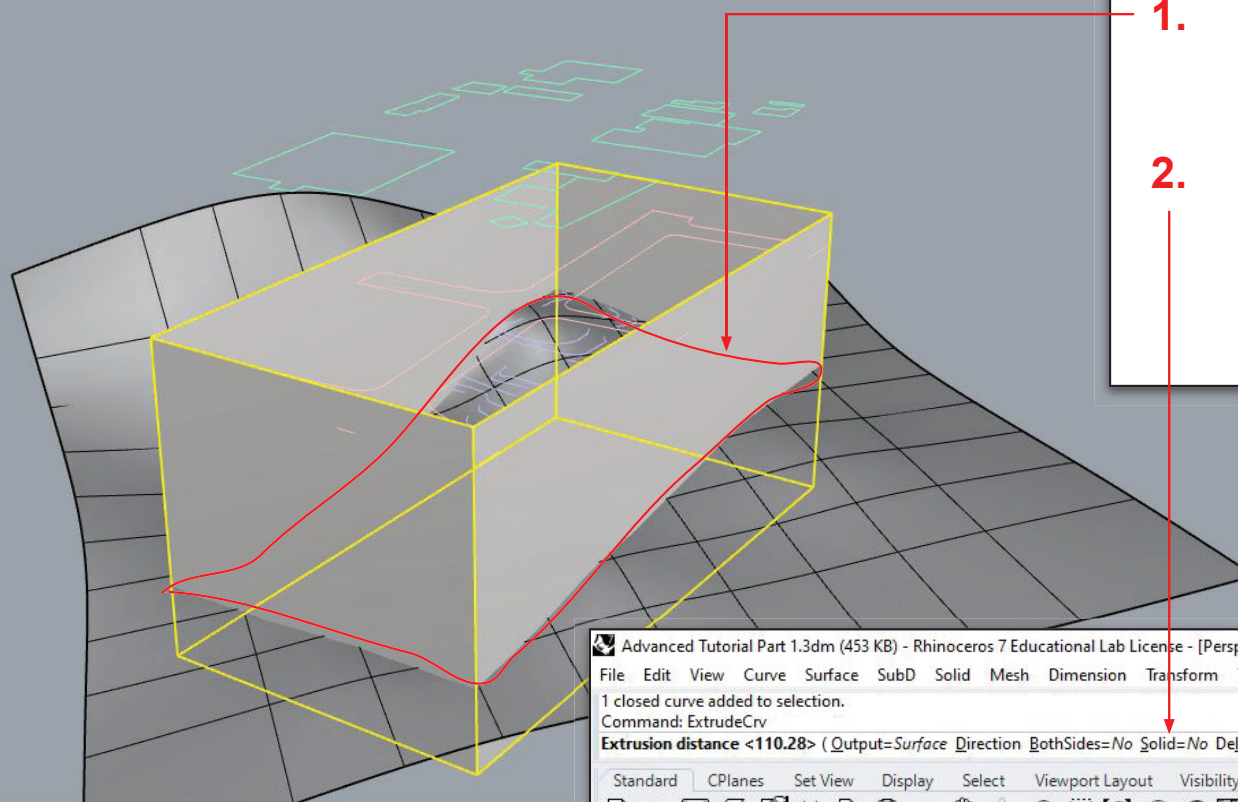
1 open extrusion added to selection.

Command:

Standard CPlanes Set View Display Select Viewport Layout Visibility Transform Curve Tools Surface Tools Solid Tools SubD Tools Mesh Tools Render Tools Drafting New in V7



Perspective



Select the **BOUNDARY LINE**, and use the command **EXTRUDECRV**

Make sure that:

1. The polysurface fully intersects the patched surface
2. “Solid=No” before you make the polysurface on the command bar

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File Edit View Curve Surface SubD Solid Mesh Dimension Transform Tools Analyze Render Panels V-Ray Help

1 closed curve added to selection.

Command: ExtrudeCrv

Extrusion distance <110.28> ( Output=Surface Direction BothSides=No Solid=No DeleteInput=No ToBoundary SetBasePoint ): |



Perspective Perspective Front Right

☒ End ☒ Near ☒ Point ☒ Mid ☒ Cen ☒ Int ☐ Perp ☐ Tan ☐ Quad ☐ Knot ☒ Vertex ☐ Project ☐ Disable

CPlane x 715.505 y 1393.370 z 0.000 Meters Base Grid Snap Ortho Planar Osnap SmartTrack Gumball Record History Filter Available physical memory: 4370 MB







Advanced Tutorial Part 1.3dm (453 KB) - Rhinoceros 7 Educational Lab License - [Perspective]

File Edit View Curve Surface SubD Solid Mesh Dimension Transform Tools Analyze Render Panels V-Ray Help

Splitting... Press Esc to cancel

Creating meshes... Press Esc to cancel

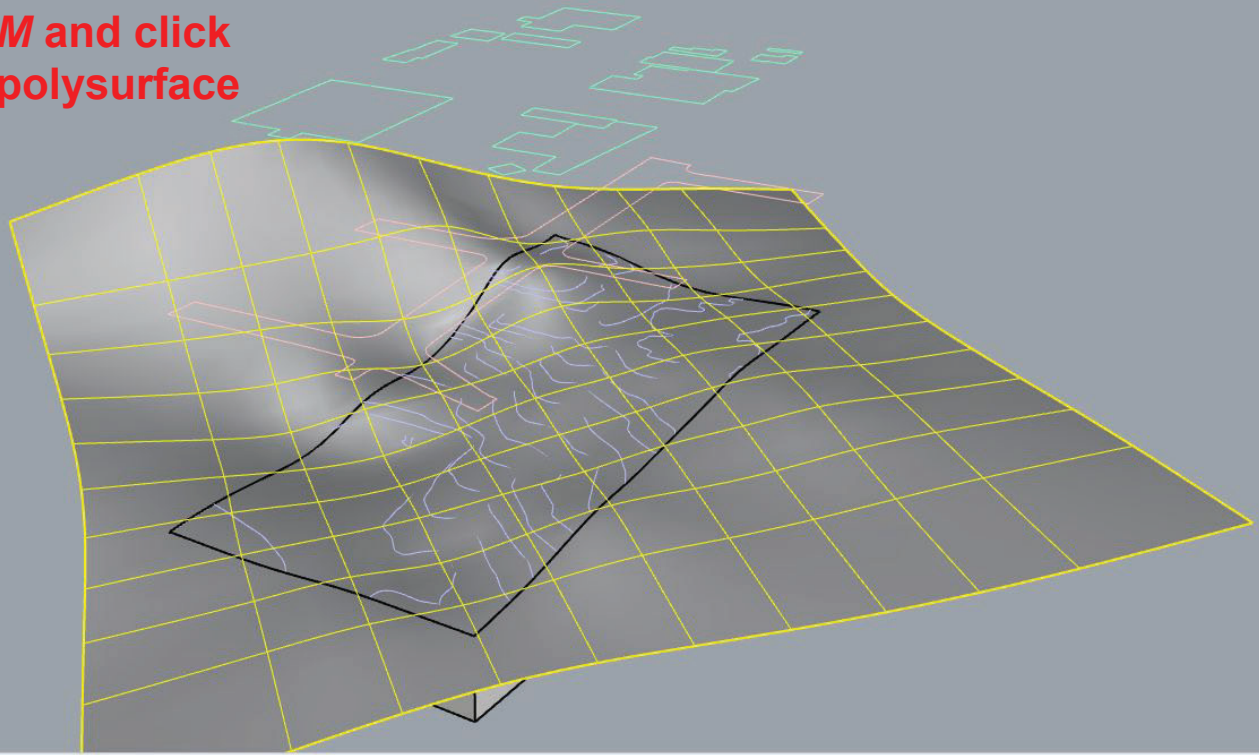
Select object to trim, select pressing Shift to extend. Press Enter when done (ExtendCuttingLines=No ApparentIntersections=Yes Undo):

Standard CPlanes Set View Display Select Viewport Layout Visibility Transform Curve Tools Surface Tools Solid Tools SubD Tools Mesh Tools Render Tools Drafting New in V7



Perspective

Select the patched surface, then use the command *TRIM* and click the top of the polysurface



Layers

Layer	Material	Linetype	Print V
Base		Continuous	Default
Buildings		Continuous	Default
Contour Li...		Continuous	Default
Road		Continuous	Default

☒ End ☒ Near ☒ Point ☒ Mid ☒ Cen ☒ Int ☐ Perp ☐ Tan ☐ Quad ☐ Knot ☒ Vertex ☐ Project ☐ Disable

CPlane x 197.746 y 44.844 z 0.000 Meters Base Grid Snap Ortho Planar Osnap SmartTrack Gumball Record History Filter Absolute tolerance: 0.001





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File Edit View Curve Surface SubD Solid Mesh Dimension Transform Tools Analyze Render Panels V-Ray Help

Splitting... Press Esc to cancel

Creating meshes... Press Esc to cancel

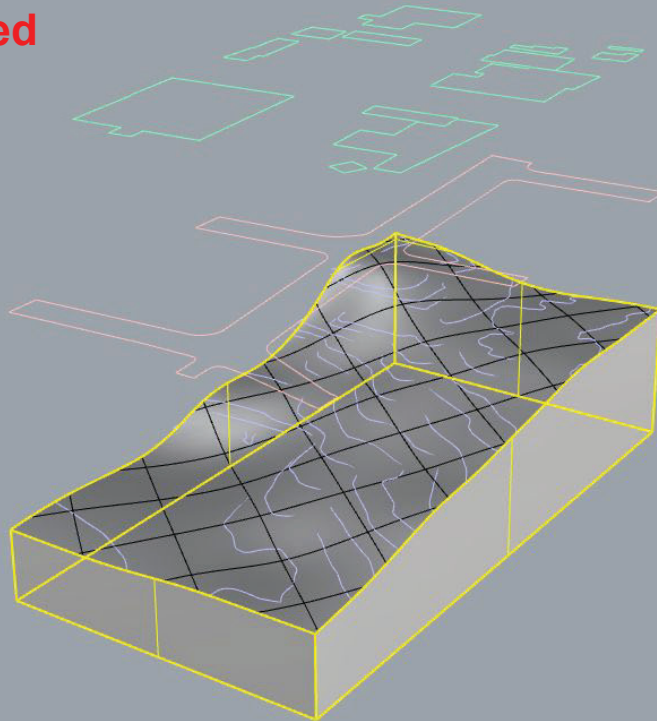
Select object to trim, select pressing Shift to extend. Press Enter when done (ExtendCuttingLines=No ApparentIntersections=Yes Undo):

Standard CPlanes Set View Display Select Viewport Layout Visibility Transform Curve Tools Surface Tools Solid Tools SubD Tools Mesh Tools Render Tools Drafting New in V7



Perspective ▾

Select the polysurface,  
then use **TRIM** and click  
the edge of the patched  
surface



Perspective Perspective Front Right ⌕

☒ End ☒ Near ☒ Point ☒ Mid ☒ Cen ☒ Int ☐ Perp ☐ Tan ☐ Quad ☐ Knot ☒ Vertex ☐ Project ☐ Disable

CPlane x 135.062 y -39.661 z 0.000 Meters Base Grid Snap Ortho Planar Osnap SmartTrack Gumball Record History Filter Available physical memory: 4155 MB

Layers

Layer	Material	Linetype	Print V
Base		Continuous	Default
Buildings		Continuous	Default
Contour Li...		Continuous	Default
Road		Continuous	Default





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File Edit View Curve Surface SubD Solid Mesh Dimension Transform Tools Analyze Render Panels V-Ray Help

2 surfaces or polysurfaces joined into one open polysurface.

Creating meshes... Press Esc to cancel

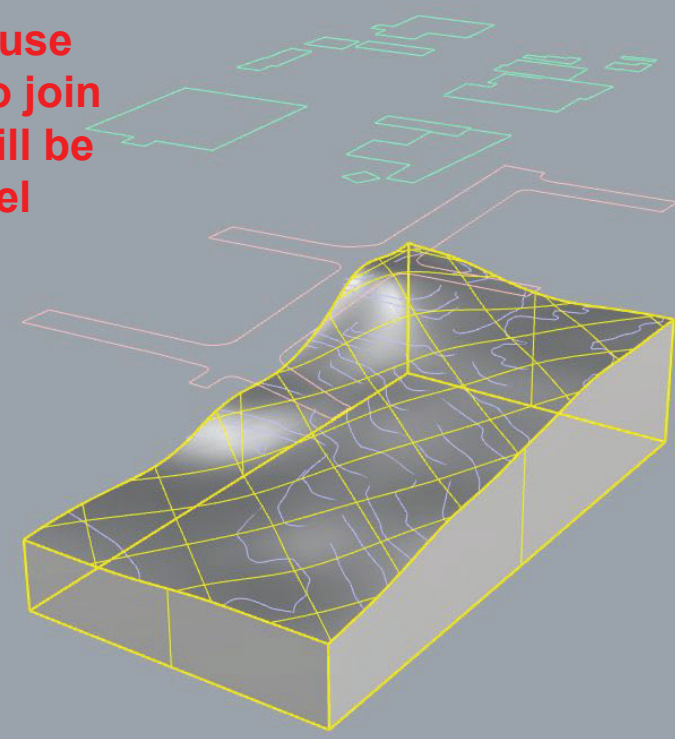
Command:

Standard CPlanes Set View Display Select Viewport Layout Visibility Transform Curve Tools Surface Tools Solid Tools SubD Tools Mesh Tools Render Tools Drafting New in V7



Perspective

Select both the  
polysurface and the  
patched surface and use  
the command *JOIN* to join  
both surfaces, this will be  
the **BASE** of the model



BASE



☒ End ☒ Near ☒ Point ☒ Mid ☒ Cen ☒ Int ☐ Perp ☐ Tan ☐ Quad ☐ Knot ☒ Vertex ☐ Project ☐ Disable

CPlane x 202.465 y 63.249 z 0.000 Meters Base Grid Snap Ortho Planar Osnap SmartTrack Gumball Record History Filter Memory use: 654 MB

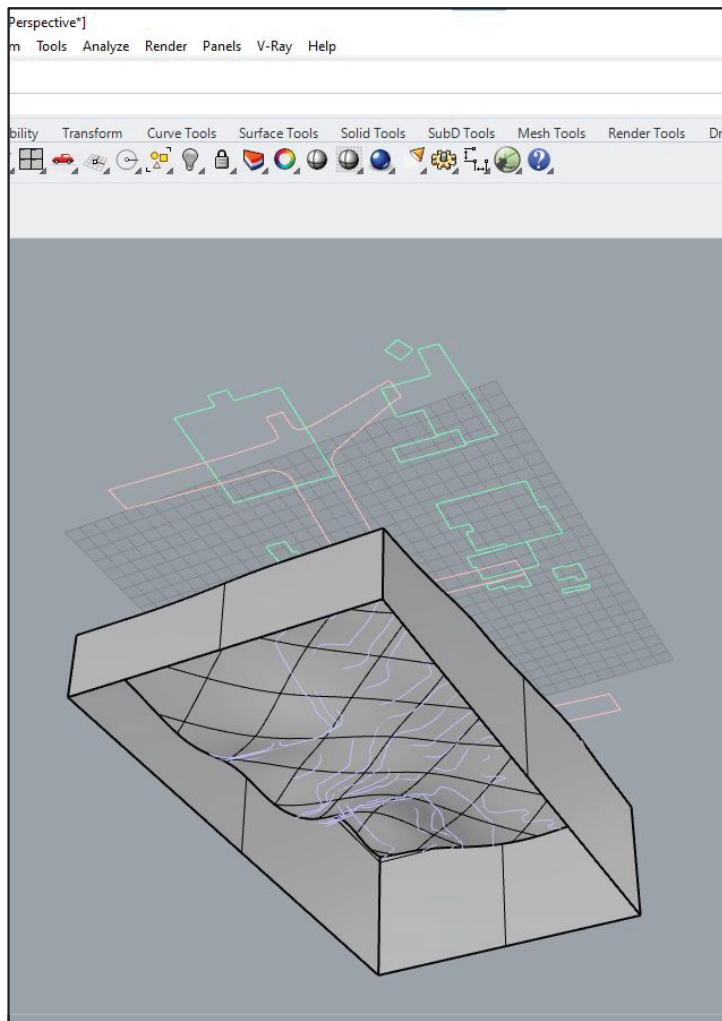


■ ■ ■

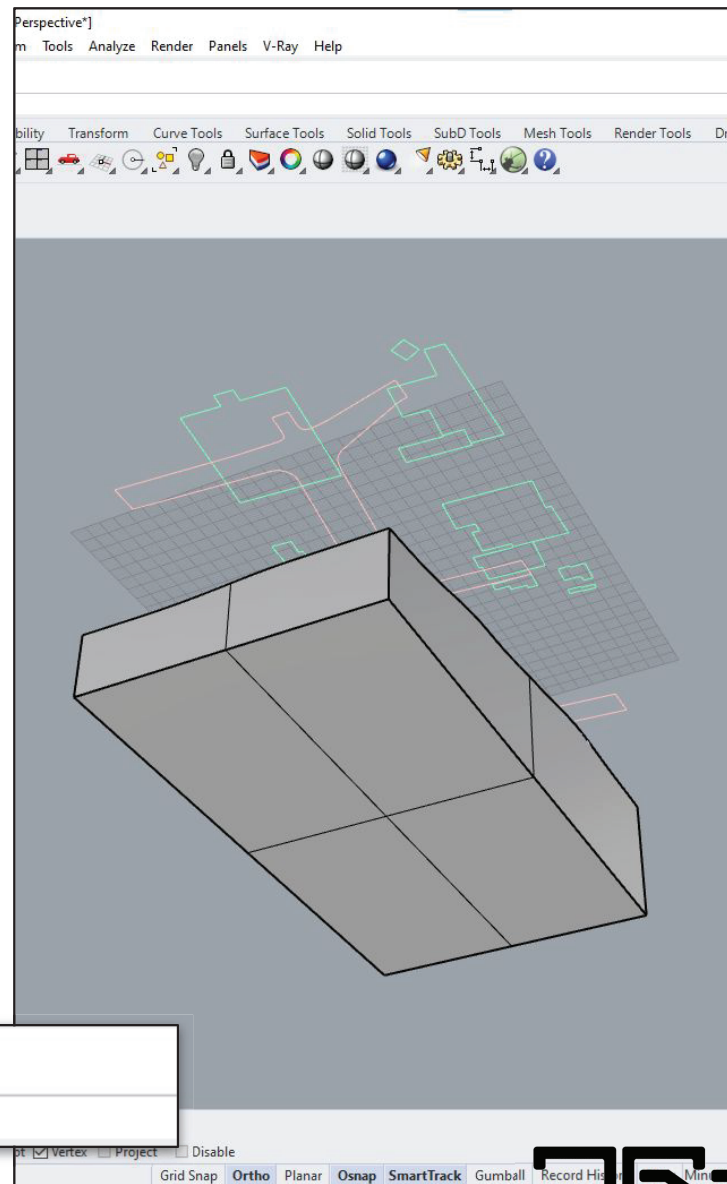
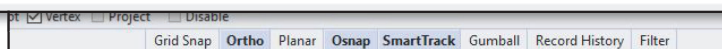
The bottom of the  
BASE will be hollow

To fix this use the  
command *CAP* to  
close it off

When you select the  
base again, it  
should be called a  
“closed  
polysurface” on the  
command bar



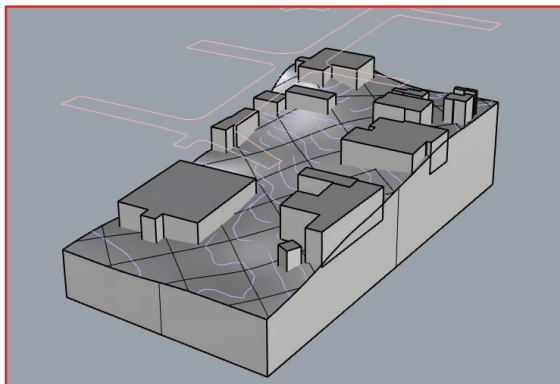
Creating meshes... Press Esc to cancel  
1 closed polysurface added to selection.  
Command:

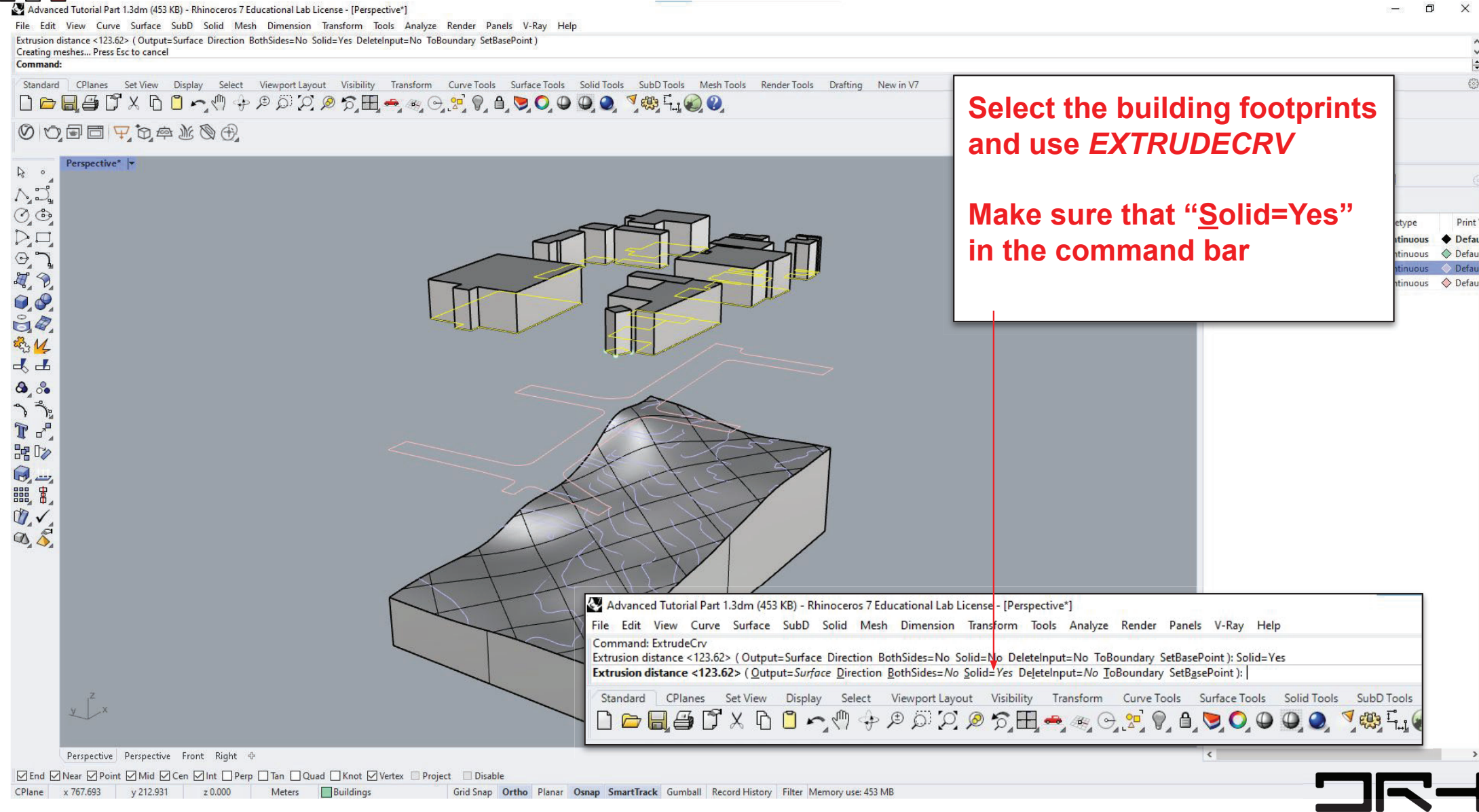






**Second, we are going to  
make the buildings on the  
base, which looks like this**









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File Edit View Curve Surface SubD Solid Mesh Dimension Transform Tools Analyze Render Panels V-Ray Help

Creating meshes... Press Esc to cancel  
1 closed extrusion added to selection.

Command:

Standard CPlanes Set View Display Select Viewport Layout Visibility Transform Curve Tools Surface Tools Solid Tools SubD Tools Mesh Tools Render Tools Drafting New in V7

Perspective\*

Turn on Gumball

Layers

Layer	Material	Linetype	Print V
Base		Continuous	Defau
Buildings		Continuous	Defau
Contour Li...		Continuous	Defau
Road		Continuous	Defau

Perspective Perspective Front Right

☒ End

☒ Near

☒ Point

☒ Mid

☒ Cen

☒ Int

☐ Perp

☐ Tan

☐ Quad

☐ Knot

☒ Vertex

☐ Project

☐ Disable

CPlane

x -1.791

y -19.686

z 0.000

Meters

Base

Grid Snap

Ortho

Planar

Osnap

SmartTrack

Gumball

Record History

Filter

Available physical memory: 4497 MB



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File Edit View Curve Surface SubD Solid Mesh Dimension Transform Tools Analyze Render Panels V-Ray Help

Press and hold Alt to temporarily toggle osnaps, tap Alt to make a duplicate

1 closed extrusion added to selection.

Command:

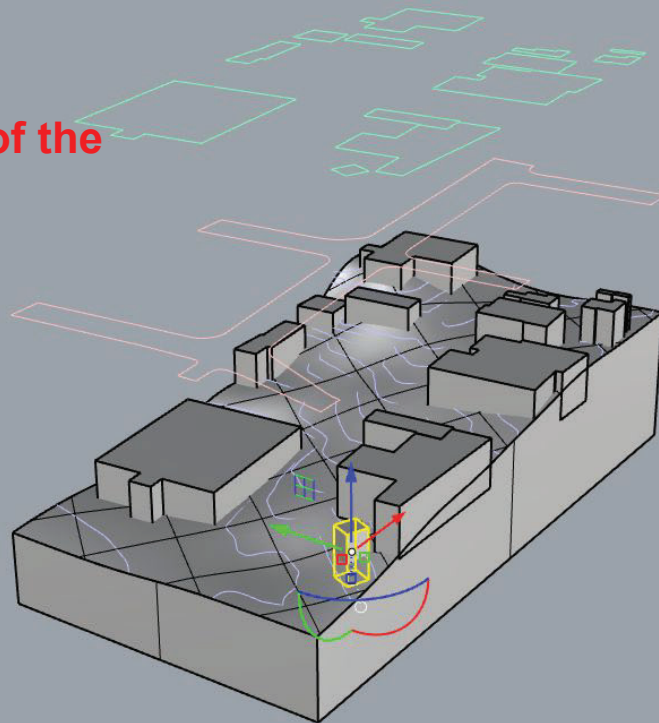
Standard CPlanes Set View Display Select Viewport Layout Visibility Transform Curve Tools Surface Tools Solid Tools SubD Tools Mesh Tools Render Tools Drafting New in V7



Perspective\*

**Drag each building down  
by selecting the blue  
arrow**

**Make sure that none of the  
buildings are floating  
above the BASE**



Layers

Layer	Material	Linetype	Print V
Base		Continuous	Default
Buildings		Continuous	Default
Contour Li...		Continuous	Default
Road		Continuous	Default

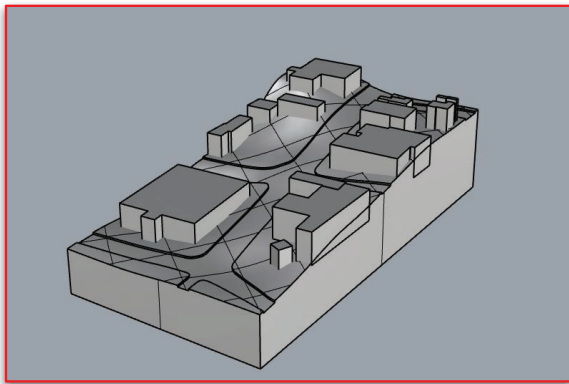
☒ End ☒ Near ☒ Point ☒ Mid ☒ Cen ☒ Int ☐ Perp ☐ Tan ☐ Quad ☐ Knot ☒ Vertex ☐ Project ☐ Disable

CPlane x 1187.863 y 741.682 z 0.000 Meters Base Grid Snap Ortho Planar Osnap SmartTrack Gumball Record History Filter CPU use: 1.8 %





**Third, is making the roads  
on the base, which will  
look like this**



**NOTE: make sure to make  
a copy of your current  
model, as the following  
steps cannot be reversed**



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File Edit View Curve Surface SubD Solid Mesh Dimension Transform Tools Analyze Render Panels V-Ray Help  
Autosaving file as C:\Users\LaserCutter\AppData\Local\McNeel\Rhinoceros\7.0\AutoSave\Advanced Tutorial Part 1 (984444) RhinoAutosave.3dm  
Autosave succeeded  
Command:

Standard CPlanes Set View Display Select Viewport Layout Visibility Transform Curve Tools Surface Tools Solid Tools SubD Tools Mesh Tools Render Tools Drafting New in V7

Perspective\*

Select the KERB LINE and  
use *Extrudecrv*

Make sure that this  
polysurface extrudes into  
the base

Perspective Perspective Front Right

☒ End ☒ Near ☒ Point ☒ Mid ☒ Cen ☒ Int ☐ Perp ☐ Tan ☐ Quad ☐ Knot ☒ Vertex ☐ Project ☐ Disable

CPlane x 927.845 y 1206.870 z 0.000 Meters Road Grid Snap Ortho Planar Osnap SmartTrack Gumball Record History Filter Minutes from last save: 43

Layers

Layer	Material	Linetype	Print V
Base		Continuous	Default
Buildings		Continuous	Default
Contour Li...		Continuous	Default
Road		Continuous	Default





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File Edit View Curve Surface SubD Solid Mesh Dimension Transform Tools Analyze Render Panels V-Ray Help

Boolean difference in progress... Press Esc to cancel

Creating meshes... Press Esc to cancel

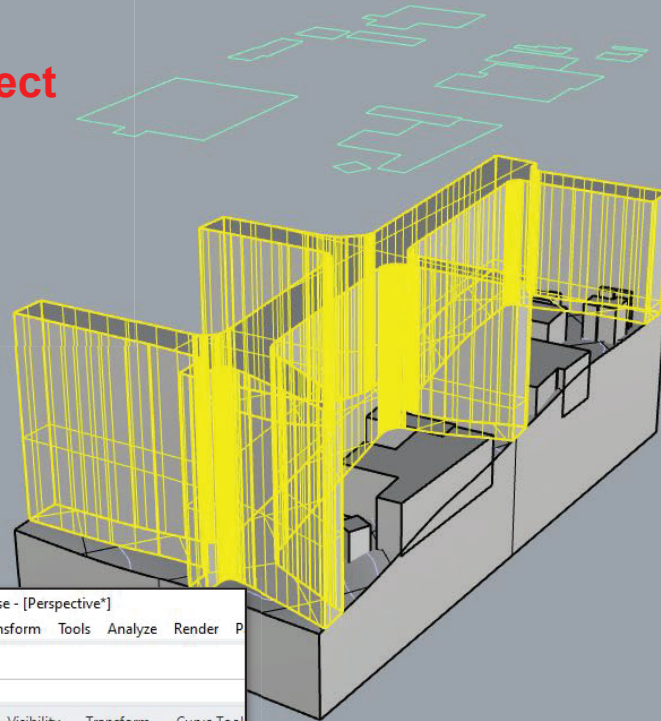
Command:

Standard CPlanes Set View Display Select Viewport Layout Visibility Transform Curve Tools Surface Tools Solid Tools SubD Tools Mesh Tools Render Tools Drafting New in V7



Select the road  
polysurface then use the  
command **BOOLEAN  
DIFFERENCE** and select  
the **BASE**

Make sure that  
"DeleteInput=No"



Layer	Material	Linetype	Print V
Base		Continuous	Default
Buildings		Continuous	Default
Contour Li...		Continuous	Default
Road		Continuous	Default

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File Edit View Curve Surface SubD Solid Mesh Dimension Transform Tools Analyze Render P

Command: Bd

Command: \_BooleanDifference

Select surfaces or polysurfaces to subtract with (DeleteInput=No):

Standard CPlanes Set View Display Select Viewport Layout Visibility Transform Curve Tool



☒ End ☒ Near ☒ Point ☒ Mid ☒ Cen ☒ Int ☐ Perp ☐ Tan ☐ Quad ☐ Knot ☒ Vertex ☐ Project ☐ Disable

CPlane x 33.887 y 13.445 z 0.000 Meters Base Grid Snap Ortho Planar Osnap SmartTrack Gumball Record History Filter Available physical memory: 4709 MB





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File Edit View Curve Surface SubD Solid Mesh Dimension Transform Tools Analyze Render Panels V-Ray Help

Command: \_Undo  
Undoing GumballTransform  
Command:

Standard CPlanes Set View Display Select Viewport Layout Visibility Transform Curve Tools Surface Tools Solid Tools SubD Tools Mesh Tools Render Tools Drafting New in V7

Perspective\*

Select the road polysurface, then click on to the blue arrow and type a number to set the depth of the road

Layers

Layer	Material	Linetype	Print V
Base		Continuous	◆ Defau
Buildings		Continuous	◆ Defaul
Contour Li...		Continuous	◆ Defaul
Road		Continuous	◆ Defaul

Perspective Perspective Front Right

☒ End ☒ Near ☒ Point ☒ Mid ☒ Cen ☒ Int ☐ Perp ☐ Tan ☐ Quad ☐ Knot ☒ Vertex ☐ Project ☐ Disable

CPlane x 115.977 y -17.658 z 0.000 Meters Base Grid Snap Ortho Planar Osnap SmartTrack Gumball Record History Filter CPU use: 0.3 %







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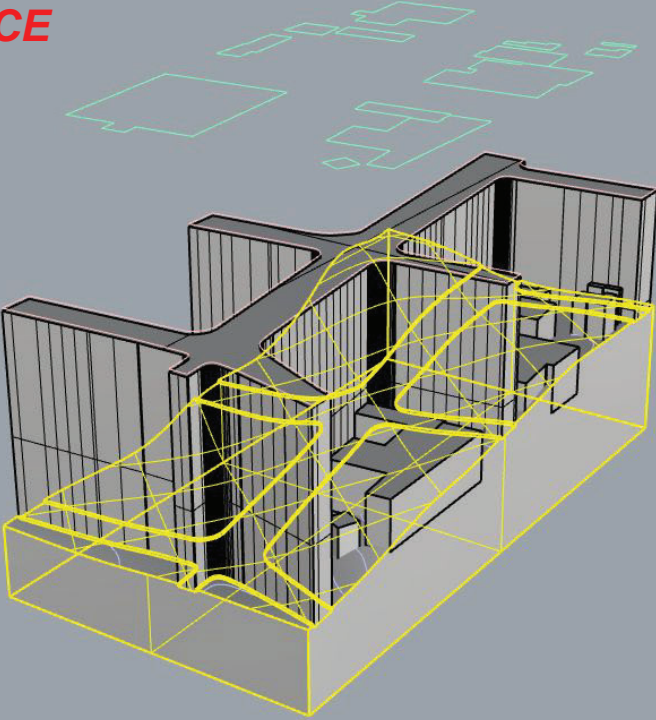
File Edit View Curve Surface SubD Solid Mesh Dimension Transform Tools Analyze Render Panels V-Ray Help

Boolean difference in progress... Press Esc to cancel  
Creating meshes... Press Esc to cancel  
Command:

Standard CPlanes Set View Display Select Viewport Layout Visibility Transform Curve Tools Surface Tools Solid Tools SubD Tools Mesh Tools Render Tools Drafting New in V7

Perspective\*

Select the BASE  
polysurface then use  
**BOOLEAN DIFFERENCE**  
and select the road  
polysurface



Layers

Layer	Material	Linetype	Print V
Base		Continuous	◆ Defau
Buildings		Continuous	◆ Defau
Contour Li...		Continuous	◆ Defau
Road		Continuous	◆ Defau

Perspective Perspective Front Right

☒ End

☒ Near

☒ Point

☒ Mid

☒ Cen

☒ Int

☐ Perp

☐ Tan

☐ Quad

☐ Knot

☒ Vertex

☐ Project

☐ Disable

CPlane

x 116.398

y 140.967

z 0.000

Meters

Base

Grid Snap

Ortho

Planar

Osnap

SmartTrack

Gumball

Record History

Filter

CPU use: 0.5 %





Advanced Tutorial Part 1.3dm (453 KB) - Rhinoceros 7 Educational Lab License - [Perspective\*]

File Edit View Curve Surface SubD Solid Mesh Dimension Transform Tools Analyze Render Panels V-Ray Help

1 closed polysurface added to selection.

Command: \_Delete

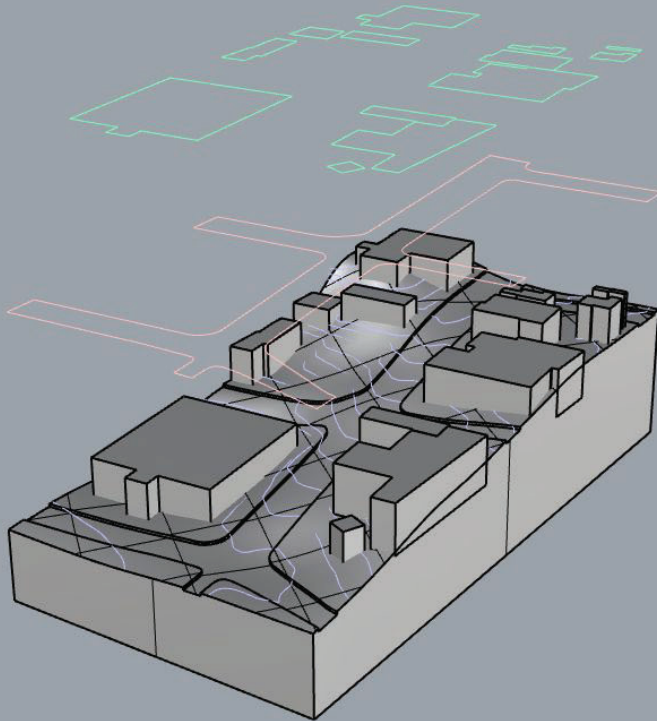
Command:

Standard CPlanes Set View Display Select Viewport Layout Visibility Transform Curve Tools Surface Tools Solid Tools SubD Tools Mesh Tools Render Tools Drafting New in V7



Perspective\*

Delete the road polysurface



Perspective Perspective Front Right

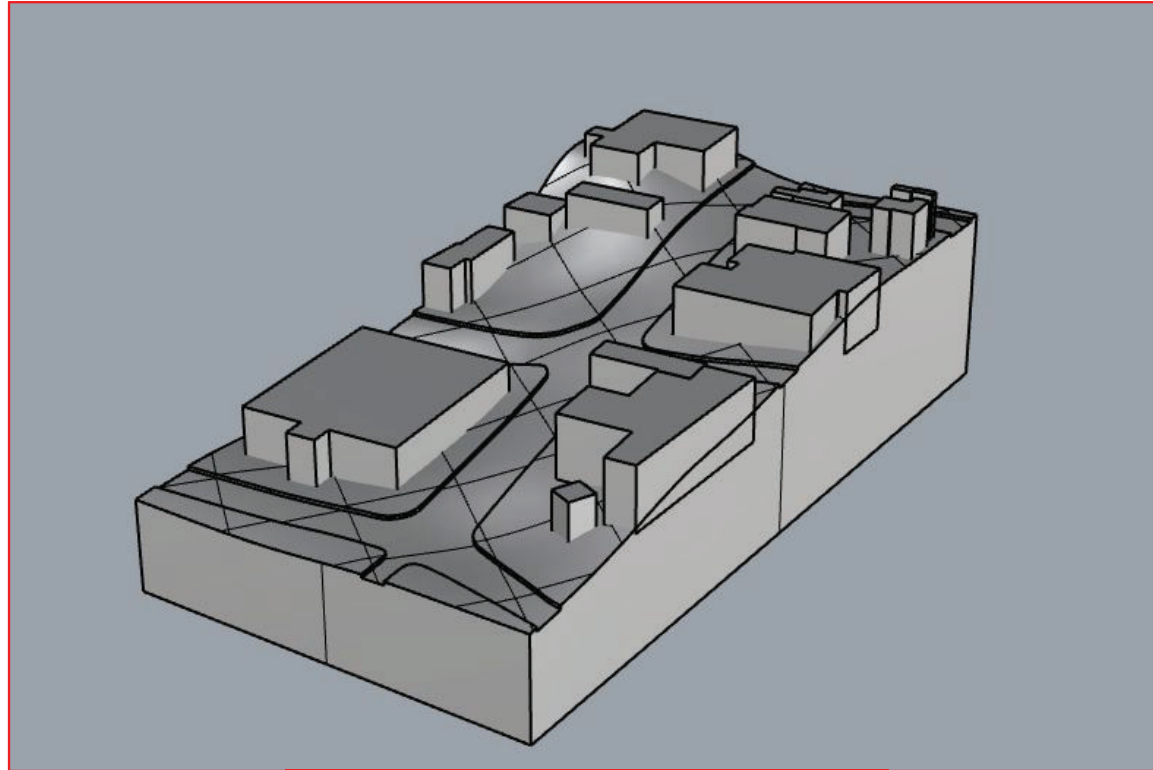
☒ End ☒ Near ☒ Point ☒ Mid ☒ Cen ☒ Int ☐ Perp ☐ Tan ☐ Quad ☐ Knot ☒ Vertex ☐ Project ☐ Disable

CPlane x 58.965 y 118.090 z -38.092 Meters Base Grid Snap Ortho Planar Osnap SmartTrack Gumball Record History Filter Available physical memory: 4621 MB

Layers

Layer	Material	Linetype	Print V
Base		Continuous	Default
Buildings		Continuous	Default
Contour Li...		Continuous	Default
Road		Continuous	Default





...and we're done :->