

**UC-win/Road**

# Future Development – VR-Studio

Peter Simmons  
Forum 8 New Zealand Ltd

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## Research Areas

already investigated

Multi-user editing  
Flexible terrain creation

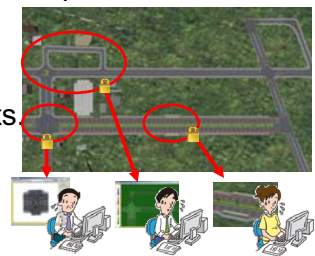
- Large terrain areas

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## Multi-user Editing

Single-user and team versions.  
Simultaneous editing of different parts of a project by different users.  
Lock-based system.  
Roads split into multiple parts  
Full history of changes.

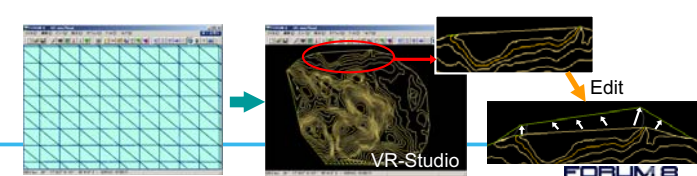


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## Flexible Terrain Creation

Terrain becomes collection of points and contours.  
Arbitrary shape (no longer based on 50m grid).  
Initially a single collection, can be sub-divided to allow multi-user editing.  
Terrain easily extendable.




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## Large Terrain Areas

Proof of Concept  
South Island NZ

850 km long, 210 km wide  
at Banks Peninsula,  
275 km at widest.



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## Procedural Texturing


Level	No. of files	disc space	representing
7	69	0.83 Mb	64km x 64km
6	219	2.56 Mb	32km x 32km
5	740	8.67 Mb	16km x 16km
4	2697	31.60 Mb	8km x 8km
3	10,258	120 Mb	4km x 4km
2	39,957	468 Mb	2km x 2km
1	157,114	1.79 Gb	1km x 1km
0	621,223	7.10 Gb	500m x 500m

High resolution aerial photos - ~ 1 Terrabyte of data

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Blending of parts of a large resolution texture file. The image shown at any location depends on elevation and slope



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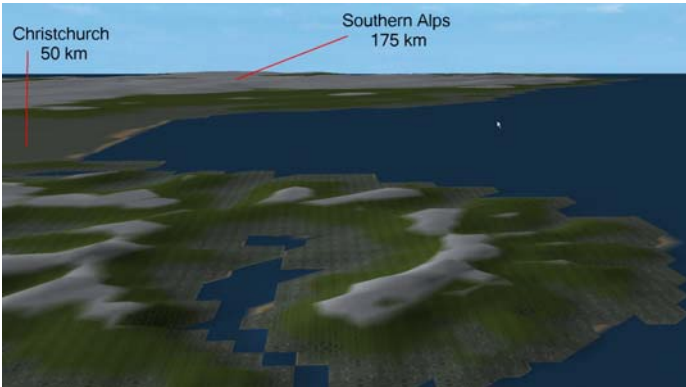
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Banks Peninsula looking North

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Forum 8 Terrain Prototype

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## Fly Through

Across Banks Peninsula towards Christchurch.

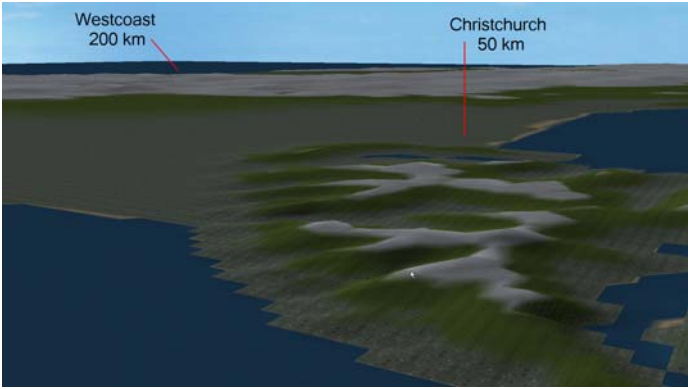
Note how terrain levels and texturing become more defined as you get closer to the terrain.

This can be seen by keeping an eye on Quail Island.



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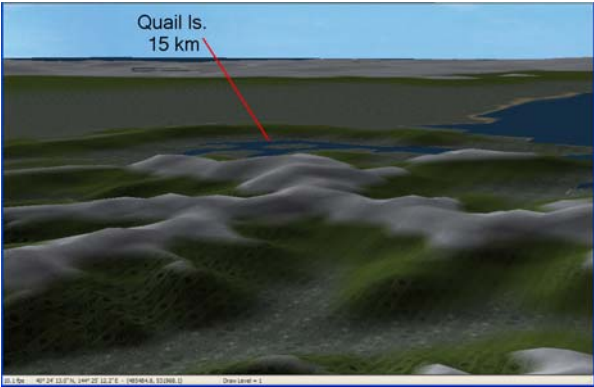


Westcoast  
200 km

Christchurch  
50 km

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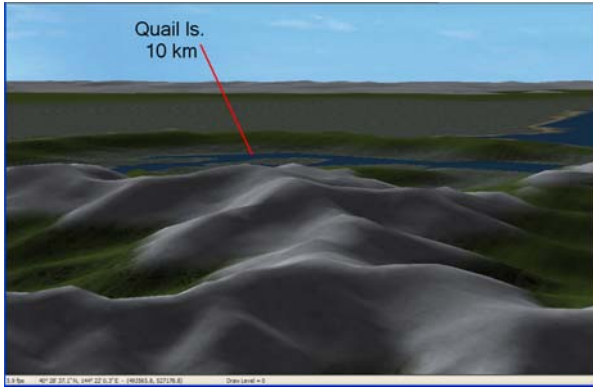
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Quail Is.  
15 km

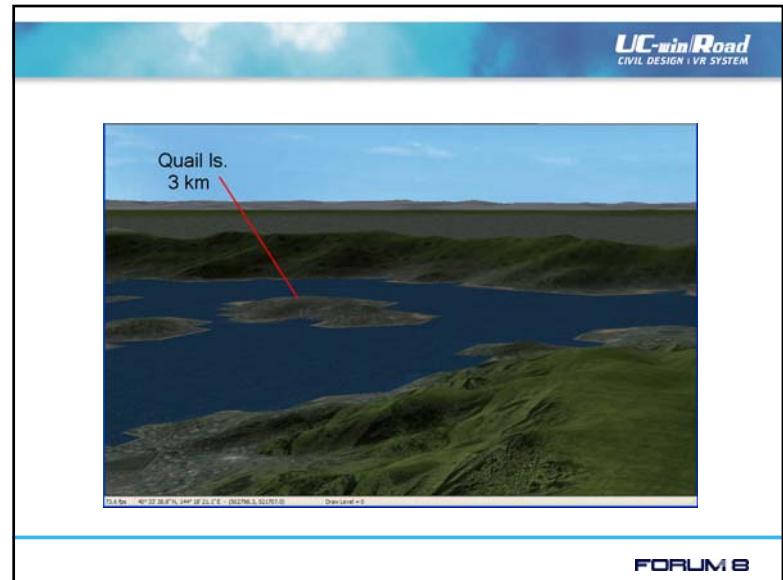
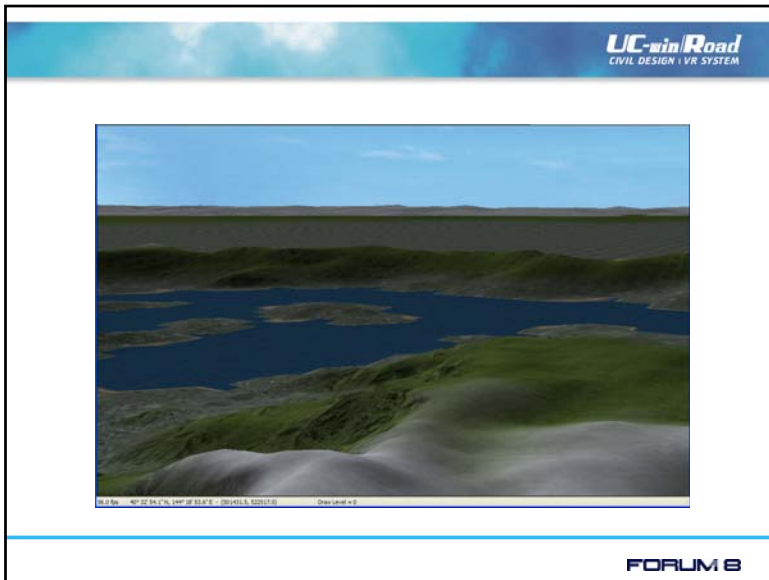
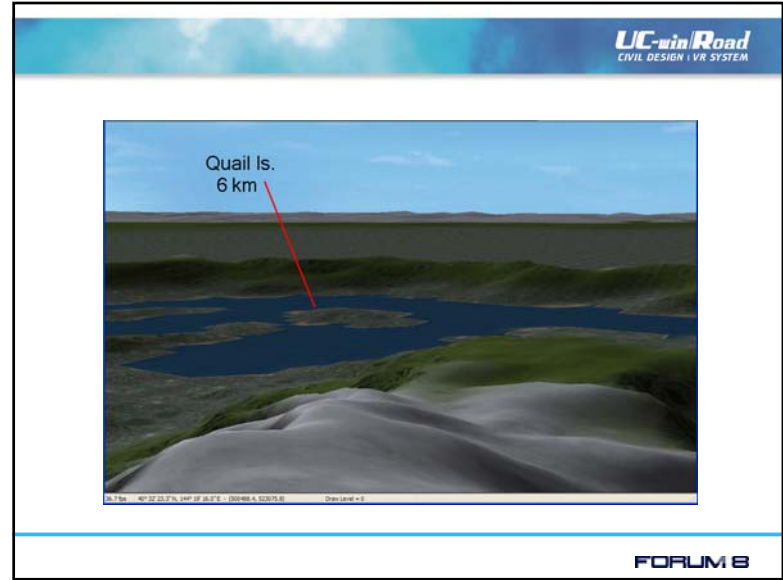
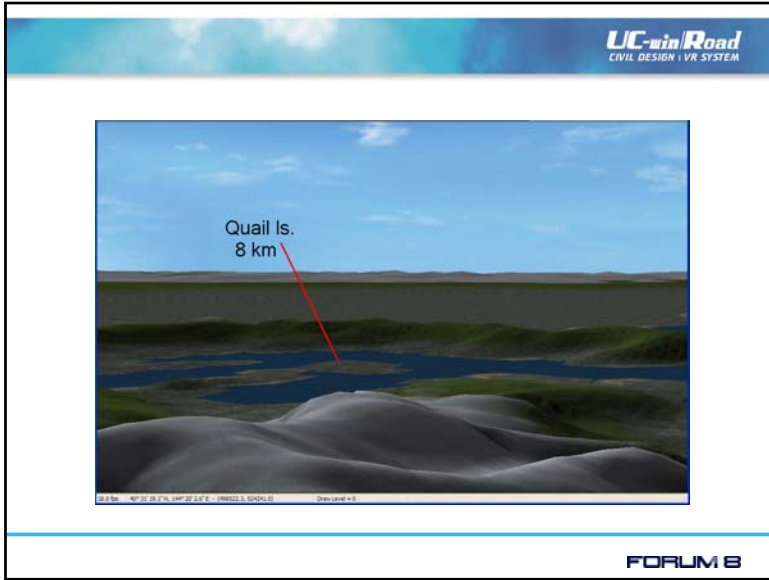
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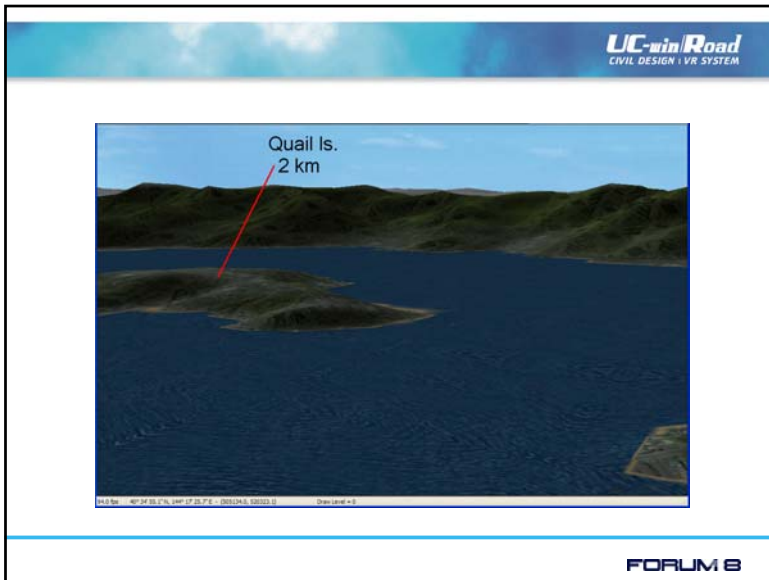
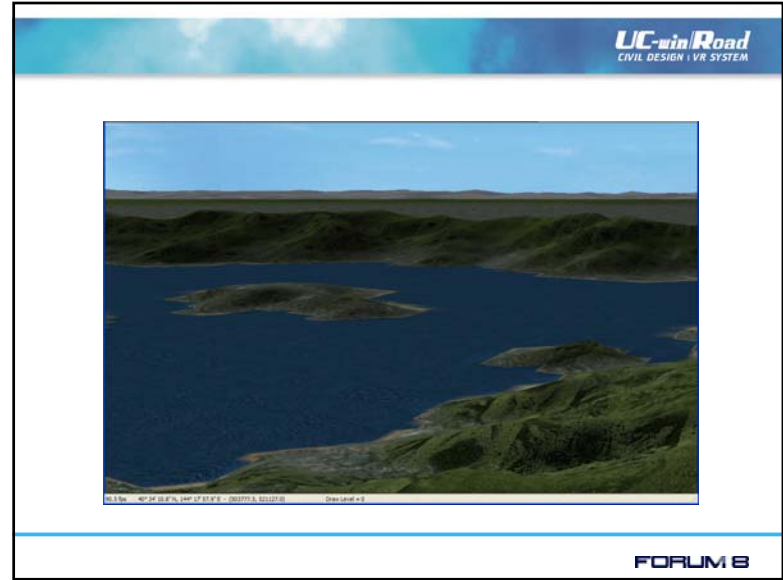
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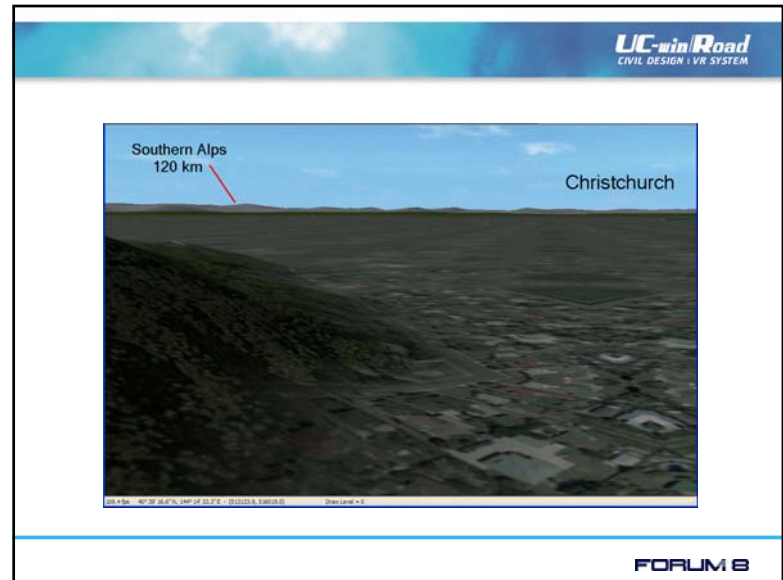
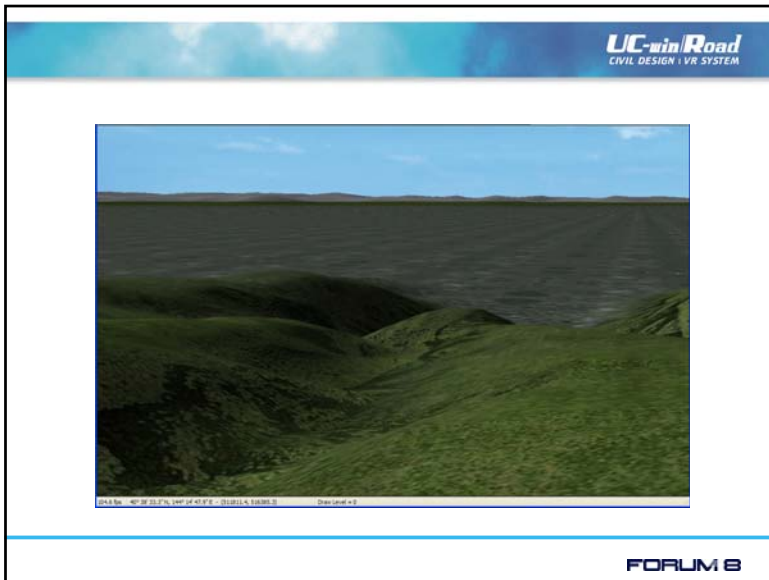
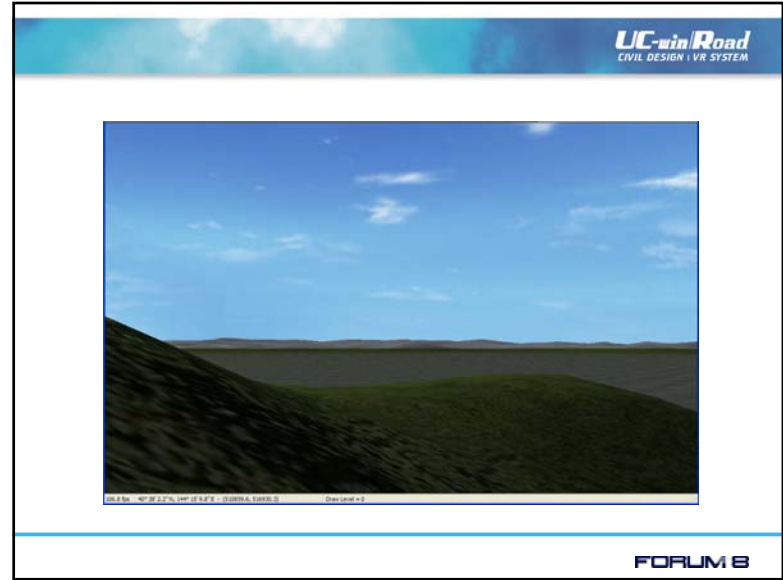


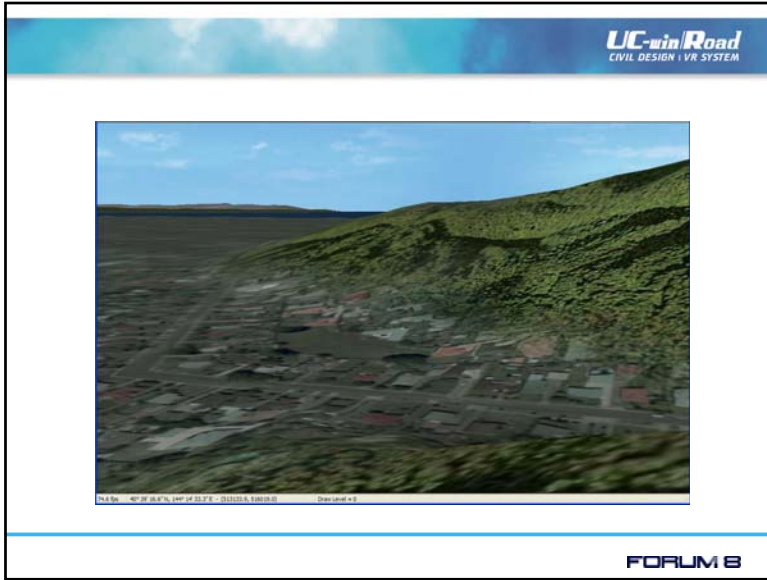
Quail Is.  
10 km

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## VR-Studio so far

- Similar concepts to UC-win/Road.
- Cad Style User Interfaces.
- Multi Modal Editors / Tabulated Data / Display Managers.
- Drag and Drop between forms.
- Materials to allow future combining of textures with vibration and sound characteristics.
- Section Parts
- Sections
- Paths
- Modifiers
- Ramps

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## Main Form

- Tree View.
- Docking Tables.
- 3D View.

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## Materials

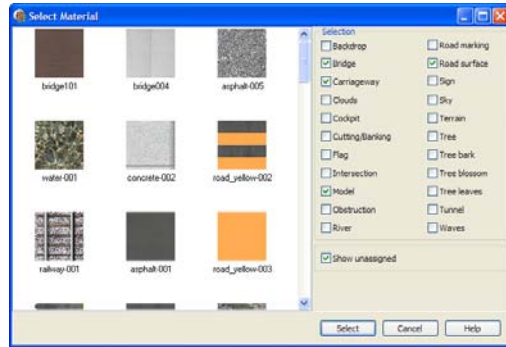
Enhanced availability.  
Categories for selection filtering.  
Manager to allow drag and drop.

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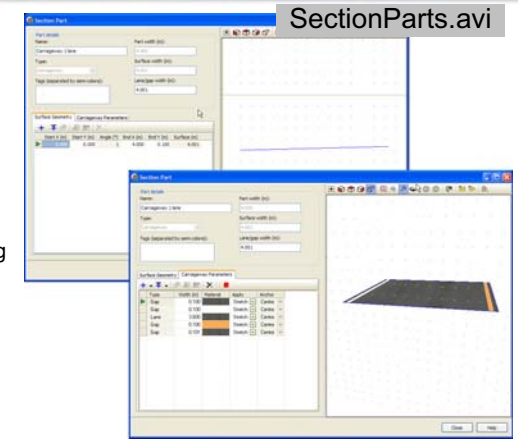
## Materials

Selector available from editors.



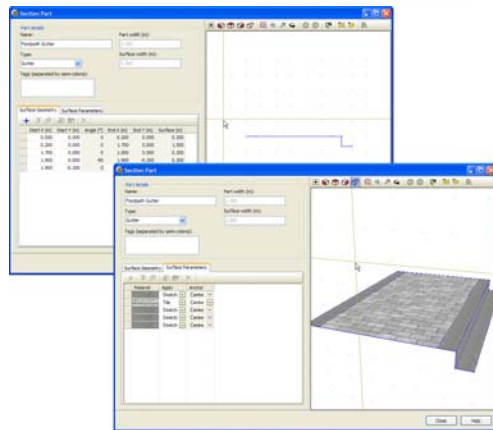
## Section Parts

Reuse. Categories. Separate Geometric surfaces and texturing for carriageways.



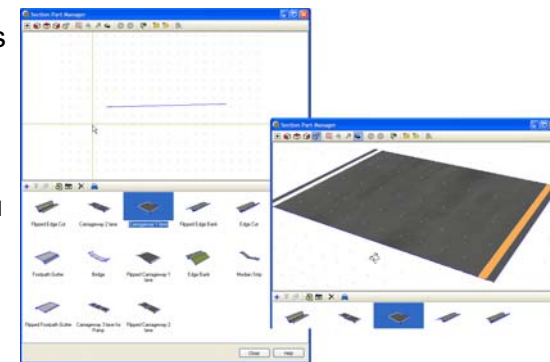
## Section Parts

2D / 3D display. Materials can drag and drop.



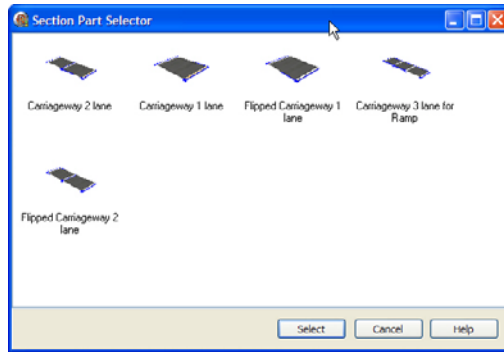
## Section Parts

Manager to allow drag and drop. 2D / 3D preview. Generate mirrored versions.



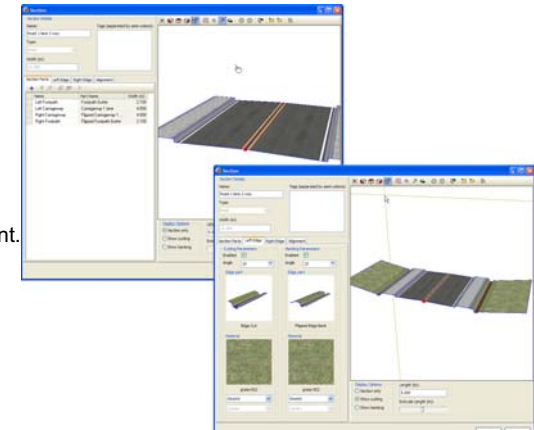
### Section Parts

Selector available from editors.



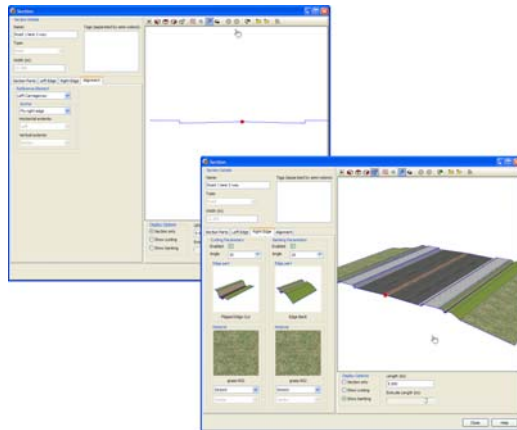
### Sections

Build from Section Parts (Drag and drop or Selector). Define Edge treatment. Preview Cutting and Banking.



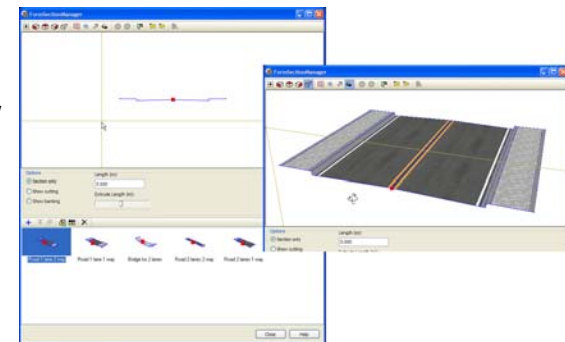
### Sections

Define connection point to path alignment.



### Sections

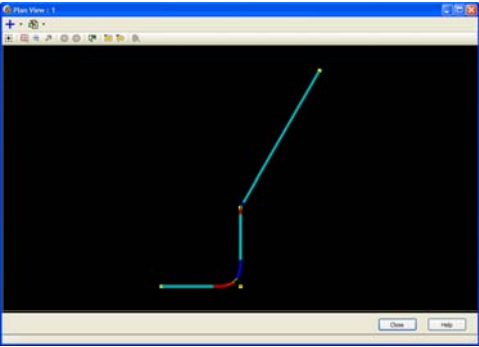
Manager to allow drag and drop. 2D / 3D preview.



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## Plan View

Define Horizontal alignment.  
Turning Points.  
Station Points.



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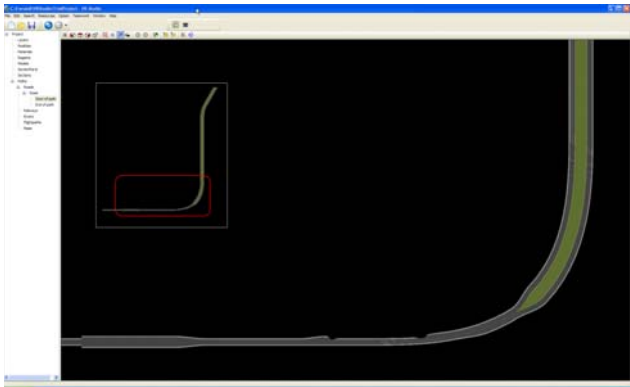
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## Multi Modal Editing

- Edit properties from either Form editors or dockable tabulated data displays.
- Views continuously updated.

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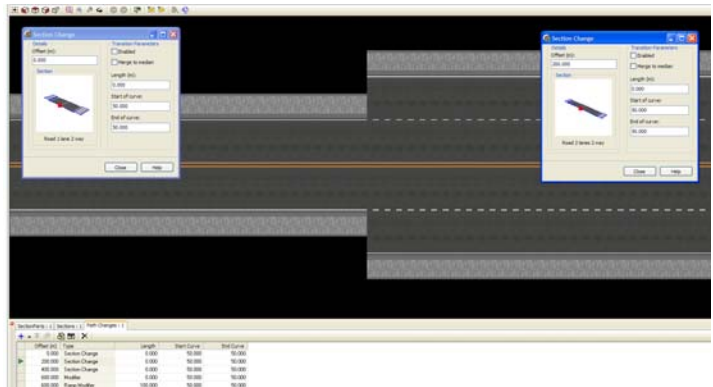
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**Road Alignment with Section Changes and Modifications**

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**Sudden Section Changes**

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VRS005.avi

Station	Section	Length	Start/End	Start/End
0+000	Section Change	2.000	0+000	0+002
0+002	Section Change	2.000	0+002	0+004
0+004	Section Change	2.000	0+004	0+006
0+006	Section Change	2.000	0+006	0+008
0+008	Section Change	2.000	0+008	0+010
0+010	Section Change	2.000	0+010	0+012
0+012	Section Change	2.000	0+012	0+014
0+014	Section Change	2.000	0+014	0+016
0+016	Section Change	2.000	0+016	0+018
0+018	Section Change	2.000	0+018	0+020
0+020	Section Change	2.000	0+020	0+022
0+022	Section Change	2.000	0+022	0+024
0+024	Section Change	2.000	0+024	0+026
0+026	Section Change	2.000	0+026	0+028
0+028	Section Change	2.000	0+028	0+030
0+030	Section Change	2.000	0+030	0+032
0+032	Section Change	2.000	0+032	0+034
0+034	Section Change	2.000	0+034	0+036
0+036	Section Change	2.000	0+036	0+038
0+038	Section Change	2.000	0+038	0+040
0+040	Section Change	2.000	0+040	0+042
0+042	Section Change	2.000	0+042	0+044
0+044	Section Change	2.000	0+044	0+046
0+046	Section Change	2.000	0+046	0+048
0+048	Section Change	2.000	0+048	0+050
0+050	Section Change	2.000	0+050	0+052
0+052	Section Change	2.000	0+052	0+054
0+054	Section Change	2.000	0+054	0+056
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0+058	Section Change	2.000	0+058	0+060
0+060	Section Change	2.000	0+060	0+062
0+062	Section Change	2.000	0+062	0+064
0+064	Section Change	2.000	0+064	0+066
0+066	Section Change	2.000	0+066	0+068
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0+084	Section Change	2.000	0+084	0+086
0+086	Section Change	2.000	0+086	0+088
0+088	Section Change	2.000	0+088	0+090
0+090	Section Change	2.000	0+090	0+092
0+092	Section Change	2.000	0+092	0+094
0+094	Section Change	2.000	0+094	0+096
0+096	Section Change	2.000	0+096	0+098
0+098	Section Change	2.000	0+098	0+100

Section Changes with Transitions

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## Modifications

Defined at locations along the road alignment.  
 Allows a smaller number of sections to build.  
 Insert, replace or remove individual Section Parts at the location.  
 Locations defined relative to Station Points.

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## Angled On/Off-Ramps

Required for Railway support,  
 and useful for roads as well.  
 A modifier creates an on or off-ramp Point and defines the ramp angle.

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Modifications – Off Ramp Connector, sudden removal of Footpath Section Part , reintroduce Footpath with transition.

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Modifications – Removal of Footpath Section Part with transition, Off Ramp Connector, suddenly reintroduce Footpath Section Part

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Modification – replace single lane Section Part with 2 lane.

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Modification – insert a new Section Part

3DTerrain.avi

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### Other New Functions

Still to be integrated


- Vista support.
- Improved Undo/Redo.
- Stereo display.
- Railway support.
- Script enhancements.
- Assorted other enhancements.

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## Vista Support

New UI appearance.  
New security model.



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## Undo/Redo

Current Undo/Redo is limited to within Plan View.  
Extend to work throughout application.

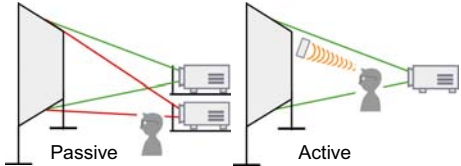
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## Stereo Display



Active or Passive display.  
Needs nVidia Quadro graphics for active stereo.  
Passive display using 2 projectors and polarising filters.




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## Railways

Railway definition similar to roads.  
Separate list of sections.  
Railway sections will have a single carriageway, with a single lane.  
Trains travel in either direction on a given track.  
Intersections between Railways and Roads to create at-grade crossings.  
Interaction between cars and trains.



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## Script Enhancements

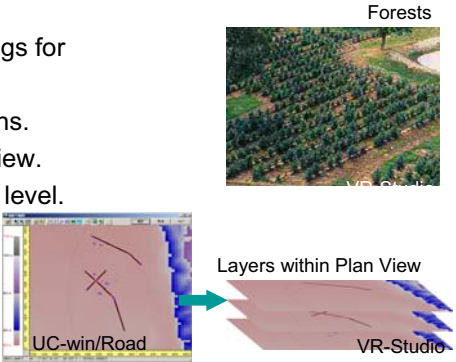
Sub-scripts.  
Fast-forward.  
Scenarios.

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## Assorted Enhancements

Forests (rows/spacings for plantations).  
Intersection drivepaths.  
Layers within Plan View.  
Key Editor at Project level.



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## Research Areas

Still being investigated

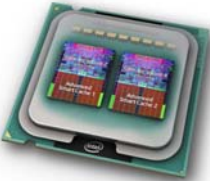
Performance enhancements.  
Improved traffic simulation.

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## Performance Enhancements

Make use of multi-processor/multi-core PC's  
Improve build times  
for projects.  
Improve performance  
of traffic simulation.

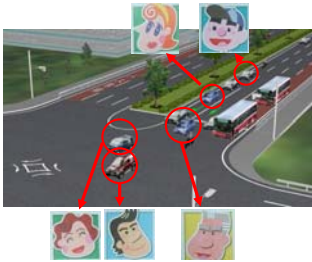


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## Improved Traffic Simulation

Improving driver behaviour.  
More configurable parameters for drivers.  
Traffic generators/sinks/sources defined per lane.  
Two-way roads (on a single carriageway).



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## Schedule

Alpha Release – VR Contest November 2008.

Product Release – Conference 2009.

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Forum 8 New Zealand  
18/78 St William Pickering Drive  
20 Bux 20000 (Marsden, Christchurch, New Zealand, 8143)  
Tel: +64-3-337-9088  
Fax: +64-3-337-9093  
Email: [info@forum8.co.nz](mailto:info@forum8.co.nz)  
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