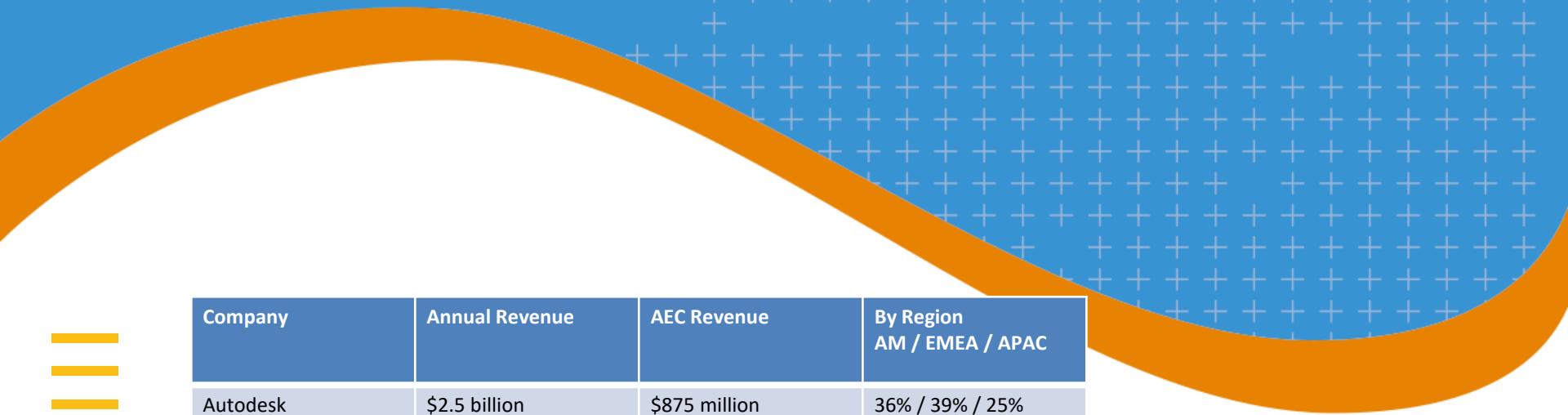


Takes You There

Michel Rives
Gwenaelle Manifeste

Vianova Systems France – Groupe Trimble

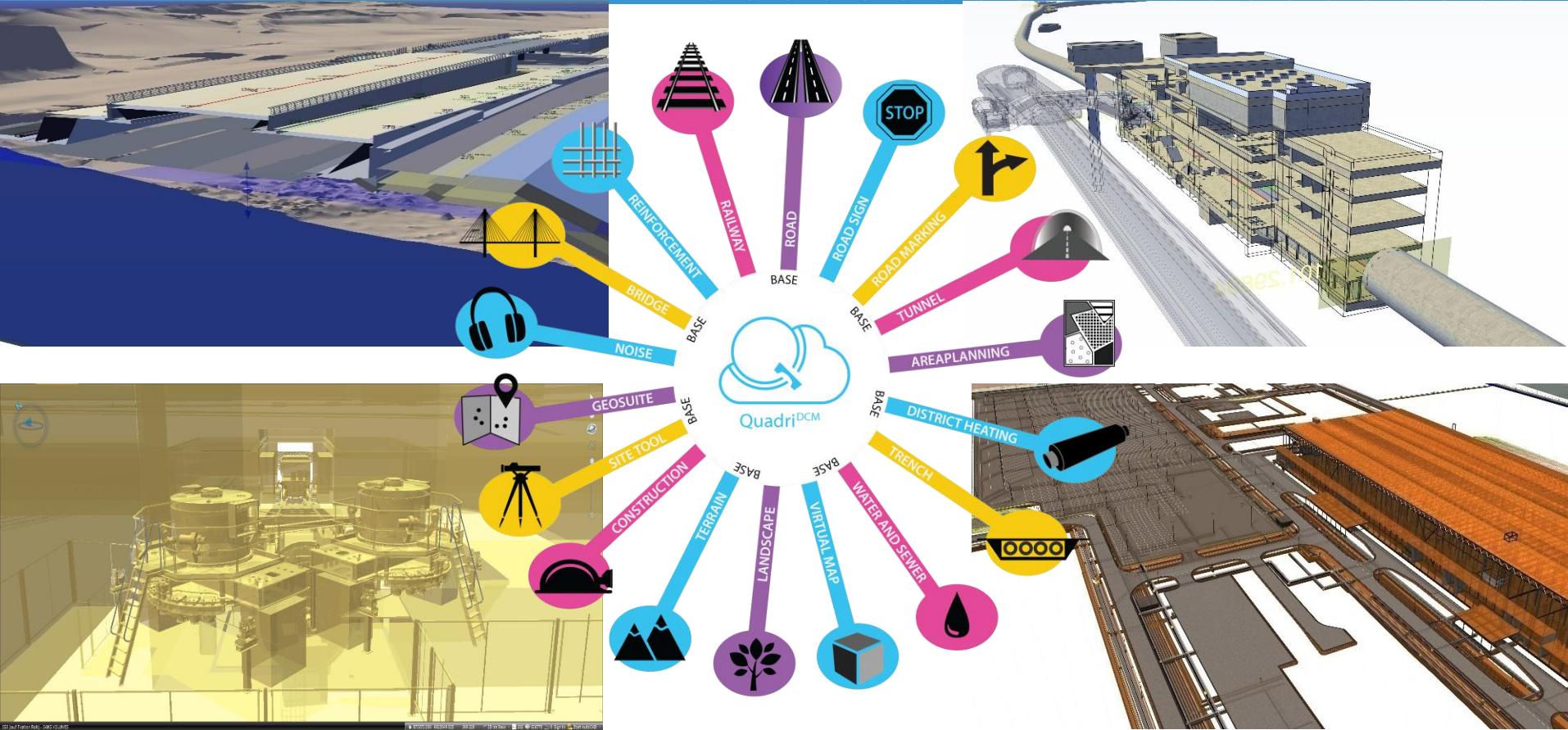




Company	Annual Revenue	AEC Revenue	By Region AM / EMEA / APAC
Autodesk	\$2.5 billion	\$875 million	36% / 39% / 25%
Bentley	\$625 million	Est. \$470 million	44% / 37% / 19%
Trimble	\$2.3 billion	\$1.3 billion	50% / 24% / 14%

Information Extracted from 2015 Annual Reports

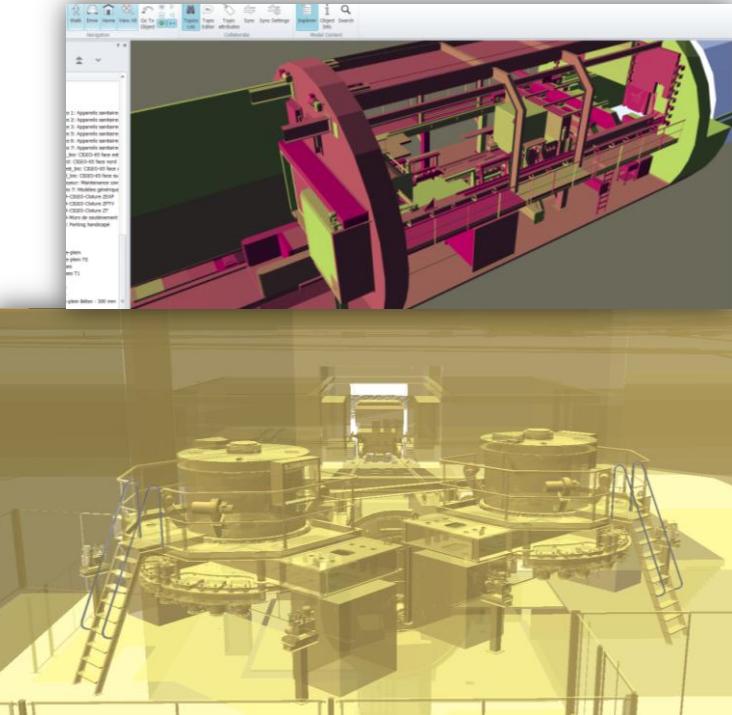
Collaborative Design Solution: Novapoint®



Contribution to bSI (InfraRoom / BCF) & MINnD (UC3/UC4/UC7/UC8/Rail/BEP)

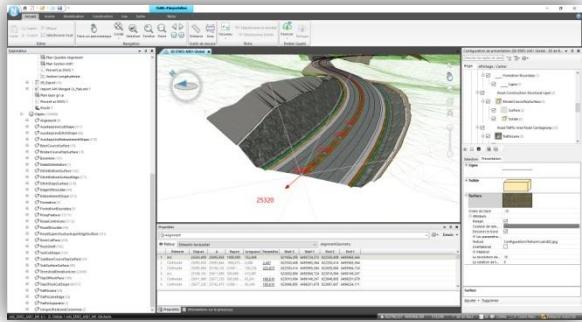


- **BuildingSmart**
 - InfraRoom (IFC4.1/IFCAlignment)
 - BCF (Trimble Tekla)
- **MINnD :**
 - UC3 (IFC Bridge)
 - UC4 (Project review)
 - UC7 (O&M)
 - UC8 (IFC Tunnel)
 - MINnD4Rail (IFC Railway)
 - BEP (BIM Execution Plan)



BIM Infra Collaborative Solution – Novapoint / Quadri

BIM Coordinator Novapoint Base

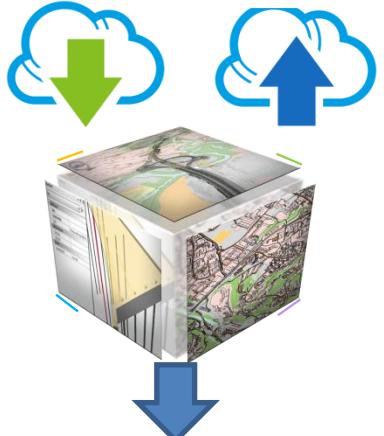


Objets

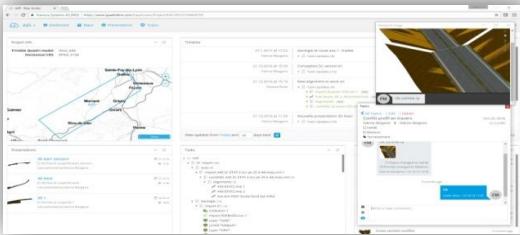


- ✓ ISO 19107 Geometry
- ✓ ISO 19109 Feature Catalogue
- ✓ ISO 19111 Coord. Reference System
- ✓ ISO 19148 Linear Reference System

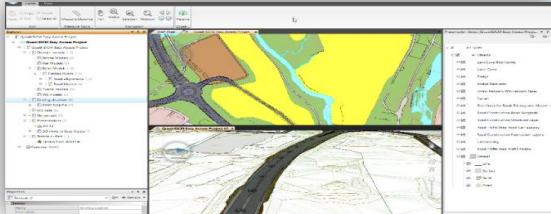
Share model's changes
Receive model's changes



BIM Consultation Quadri Easy Access



Novapoint Viewer



Project alignment LandXML/InfraGML/IFC Alignment

Corridor optimization

(GIS, DTM, Geology, ...)

Properties

Alignment

Vertical elements

Element	From	To	Radius	Length	Parameter	Start Height	End Height
1 Straight...	20751,581	21303,051	0	551,470		31,095	40,658
2 Arc	21303,051	21400,145	5600,000	97,094		40,658	41,500
3 Straight...	21400,145	21453,695	0	53,550		41,500	41,500
4 Straight...	21453,695	21512,745	0	59,050		41,500	41,500
5 Arc	21512,745	21544,575	5600,000	31,830		41,500	41,409
6 Straight...	21544,575	23295,545	0	1750,971		41,409	31,457
7 Arc	23295,545	23361,701	5600,000	66,156		31,457	30,690
8 Straight...	23361,701	23709,838	0	348,137		30,690	24,598
9 Arc	23709,838	23835,823	5600,000	125,985		24,598	23,810
10 Straight...	23835,823	24201,699	0	365,876		23,810	25,640
11 Arc	24201,699	24229,698	5600,000	28,000		25,640	25,710
12 Straight...	24229,698	24450,628	0	220,930		25,710	25,710
13 Arc	24450,628	24481,960	5600,000	31,332		25,710	25,797
14 Straight...	24481,960	25189,874	0	707,914		25,797	29,758
15 Arc	25189,874	25214,539	5600,000	24,666		29,758	29,950
16 Straight...	25214,539	25768,466	0	553,926		29,950	35,490
17 Arc	25768,466	25824,463	5600,000	55,997		35,490	35,770
18 Straight...	25824,463	25878,152	0	53,689		35,770	35,770
19 Straight...	25878,152	25932,274	0	54,122		35,770	35,770
20 Arc	25932,274	25960,274	5600,000	28,000		35,770	35,840
21 Straight...	25960,274	27046,678	0	1086,404		35,840	41,272
22 Arc	27046,678	27130,675	5600,000	83,997		41,272	41,062
23 Straight...	27130,675	27324,067	0	193,392		41,062	39,128
24 Arc	27324,067	27588,935	5600,000	264,868		39,128	42,744
25 Straight...	27588,935	28113,014	0	524,079		42,744	62,305
26 Arc	28113,014	28144,937	5600,000	31,923		62,305	63,406

The figure displays a comprehensive view of a civil engineering project. On the left, a detailed 3D model of a corridor is shown with various cross-sections and alignment parameters. A central window provides an 'Alignment Summary' for a specific section, detailing item quantities, source information, and costs. To the right, a satellite map shows the physical location of the alignment, overlaid with a red line representing the optimized corridor path. Below the map, a table lists the vertical elements of the alignment, including straight segments and arcs, with their respective start and end heights, radii, and lengths. The overall interface is designed for efficient corridor planning and optimization.

WebServices (WMS/WMTS) mapping & geology

WMS

Url: <http://geoservices.brgm.fr/geologie?>

Layers: No layers selected

Quadri Model CRS: EPSG:3949: RGF93 / CC49

WMS CRS: Please select a CRS

Select Layers

Refresh Data

WMS Settings

Data Settings

Draping

WMS Layer Selection

WMS Layer Selection - GéoServices : géologie, hydrogéologie et gravimétrie

WMS Service Url: <http://geoservices.brgm.fr/geologie?>

Connect

Select Layers:

- GéoServices : géologie, hydrogéologie et gravimétrie
 - Cartes géologiques
 - Carte géologique image de la France au million
 - Carte géologique image de la France au 1/250000
 - Carte géologique image de la France au 1/50 000e
 - Carte d'assemblage des cartes géologiques au 1/50 000e
 - Carte d'assemblage des cartes géologiques au 1/250 000
 - Carte géologique 50 000e - harmonisé
 - Périmètre de la carte géologique 50 000e - harmonisé
 - Carte d'assemblage des cartes géologiques harmonisées au 1/50 ...
 - Carte géologique 50 000e - MNT harmonisé
 - Périmètre de la carte géologique 50 000e - MNT harmonisé
 - Carte d'assemblage des cartes géologiques au 1/50 000e - MNT ...
 - Carte lithologique simplifiée au 1/1 000 000
 - Ouvrages de la banque du sous-sol
 - BSS: Semis de points BSS > 4 000 000e

GEOSERVICES_GEOLOGIE

GEOLOGIE

SCAN_F_GEOL1M

SCAN_F_GEOL250

SCAN_D_GEOL50

SCAN_F_GEOL50_CATALOG

SCAN_F_GEOL50_CATALOG

SCAN_H_GEOL50

SCAN_H_GEOL50_PERIMETRE

SCAN_H_GEOL50_SCAN

SCAN_H_RELIEF_GEOL50

SCAN_H_RELIEF_GEOL50_PERIMETRE

SCAN_H_RELIEF_GEOL50_SCAN

LITHO_1M_SIMPLIFIEE

BSS

BSS_SEMIS_2

OK Cancel

Properties

WMS

Internal System Attributes

- Task TypeId
- Guid

General

- Name
- Description
- Type
- Creation Date
- Last Execution Time
- Subtask of
- Model
- Predecessors
- Successors
- Version

Specific

- WMS Url
- WMS Layers
- WMS CRS
- Target Features
- WMS Supported CRS Set

VIANOVA Systems
A TRIMBLE COMPANY

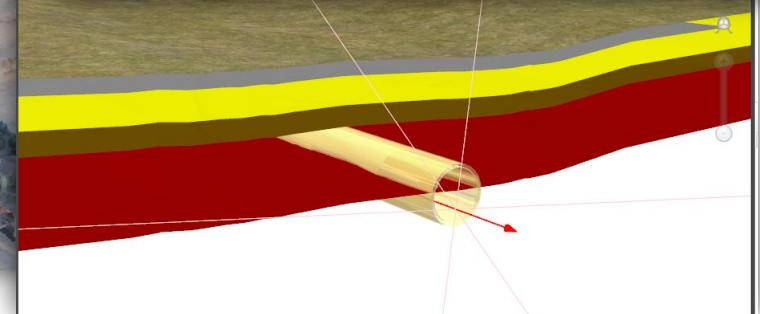
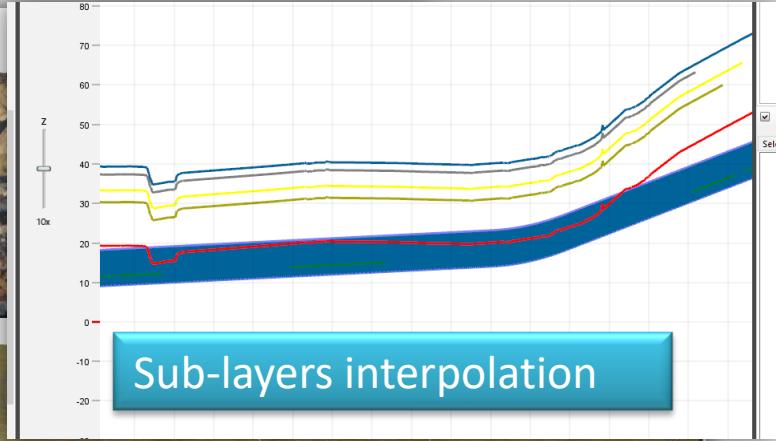
GIS/Cadastral (SHP/E00/Tables & ArcGISServer) & urban models (CityGML)

The screenshot shows a GIS application interface with two main windows. The top window is titled 'File(s) Preview' and displays a map of a metro line with various features highlighted. A teal box with the text 'Data integration' is overlaid on the left side of this window. The bottom window is also titled 'File(s) Preview' and shows a 'Coordinate Reference System (CRS) Settings' dialog. This dialog has sections for 'Select CRS for the input data' and 'Coordinate Reference Systems'. It lists 'Horizontal' and 'Vertical' CRS options, including 'RIGF93 / Lambert_93' and 'NGF-IGN89 height'. A teal box with the text 'CRS transformations' is overlaid on the right side of this window.





DTM & geological layers



3D geological model integrated in central database

Top Left Window: Coupe NE - SE - Tombé openBIM Tour

Top Right Table:

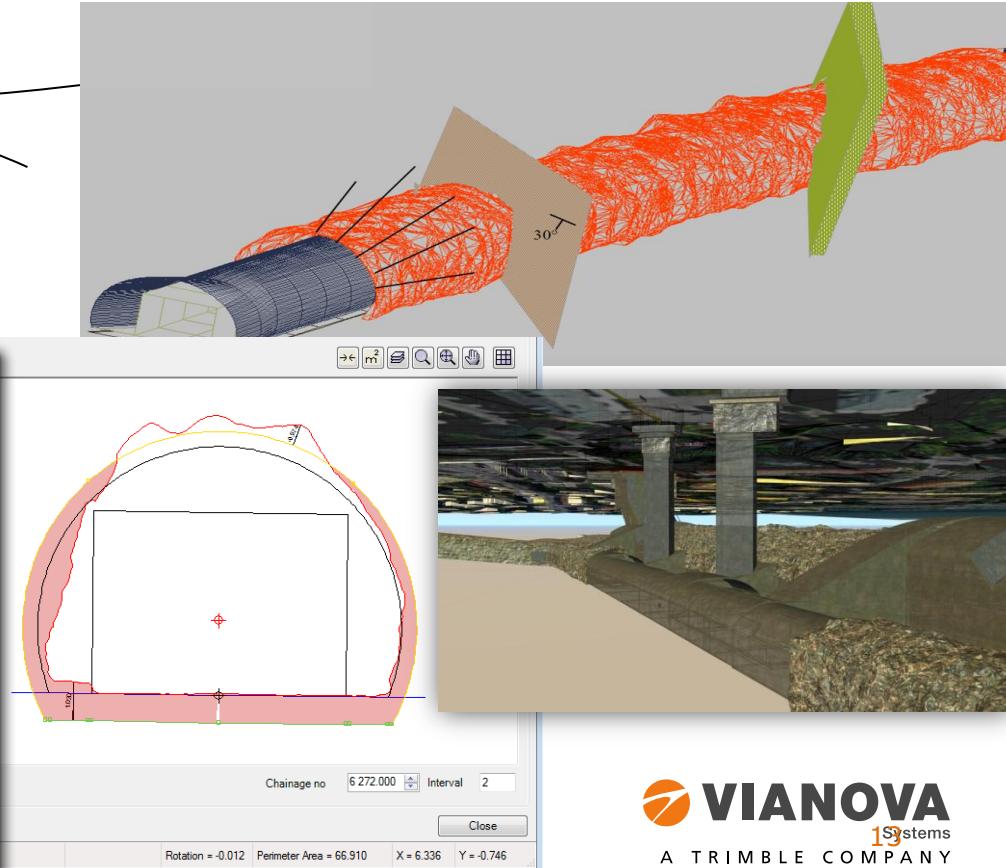
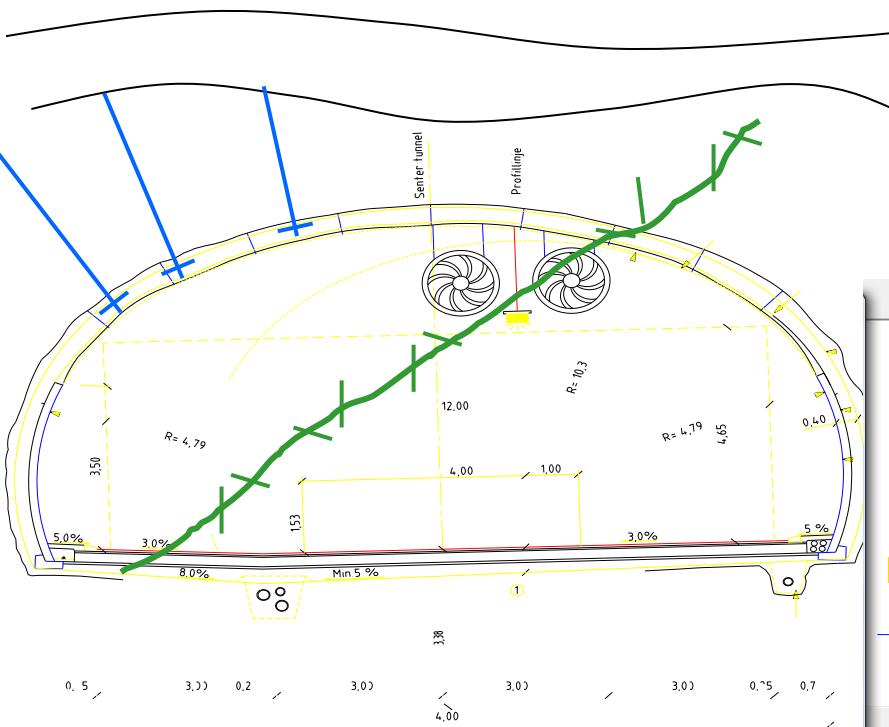
No.	Element	Type	Radius	Hor. Length	Slope %	Slope Dir.	Chainage 1	Elevation 1	Chainage 2	Elevation 2
1	Line	X-K	-3600.000		-3.950	Varying	31996.637	21.706		
2	Arc	→	-5600.000				32364.545	7.174		
3	Line	X-K	5600.000	0 500	Varying		33795.815	14.330		
4	Arc	→					33864.941	14.330		
5	Line	X-K		-0.000	Varying		33864.941	14.330		
6	Line	X-K		-0.000	Varying		34043.293	14.330		
7	Arc	→	5600.000		-0.587	Varying		34673.807	10.629	
8	Line	X-K		-5600.000	Varying			35897.013	16.745	
9	Arc	→								
10	Line	X-K		0 500	Varying					
11	Arc	→	-5600.000							
12	Line	X-K			3.865	Varying				

Bottom Left Table:

Task	Feature Type Name	Count	Feature Name	Attribute	Value	Unit
N4215.CPT				sleeveLengthCorrection	0.0860	m
				boringLength	12.5000	m
				pointAreaFactor	1.000	
				countryCode	Not specified	
				classificationSystem	SGF 84	
				inclination	90.000	°

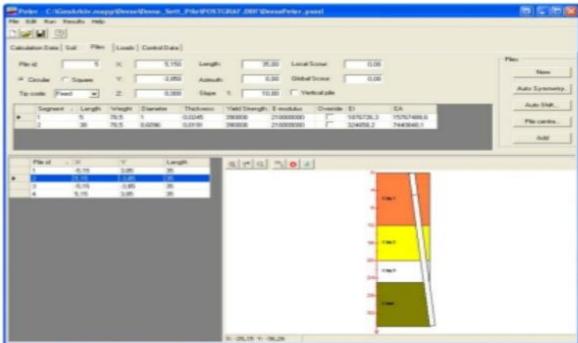
Bottom Right Logo: VIANOVA Systems A TRIMBLE COMPANY

Integration of TBM data



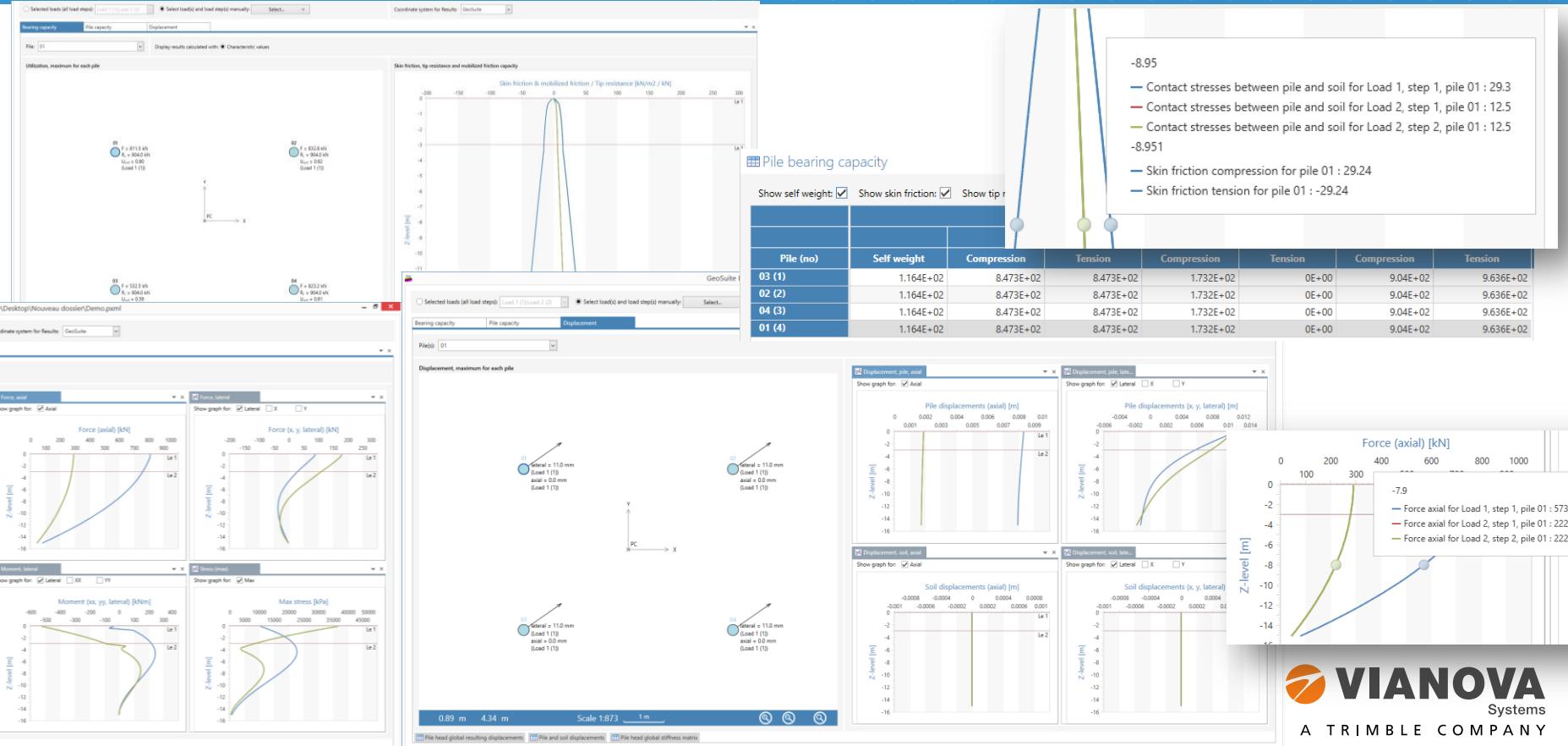
Geotechnical calculation modules

Novapoint GeoSuite Toolbox GS Pile Group



- GS Toolbox User Interface
- 3D pile group
- Different soil models
- Piles with various cross sections
- Graphical presentation of input/result
- Structural loads applied at pile centre
- Pile usage diagram
- Integration with Novapoint Terrain
- Superstructure modelling is possible

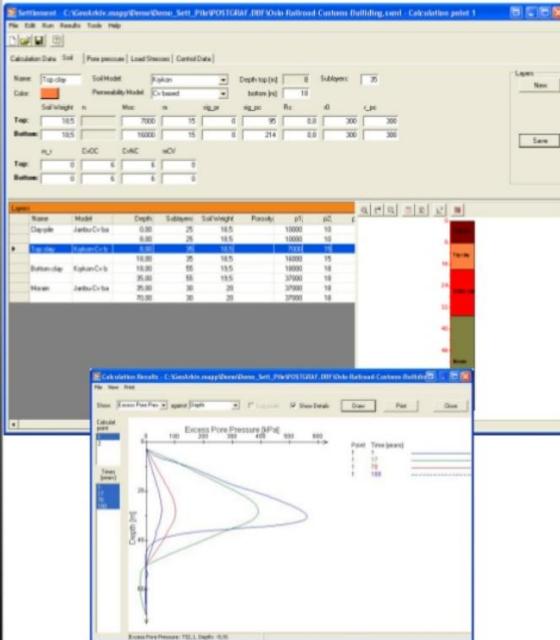
Geotechnical calculation modules



Geotechnical calculation modules

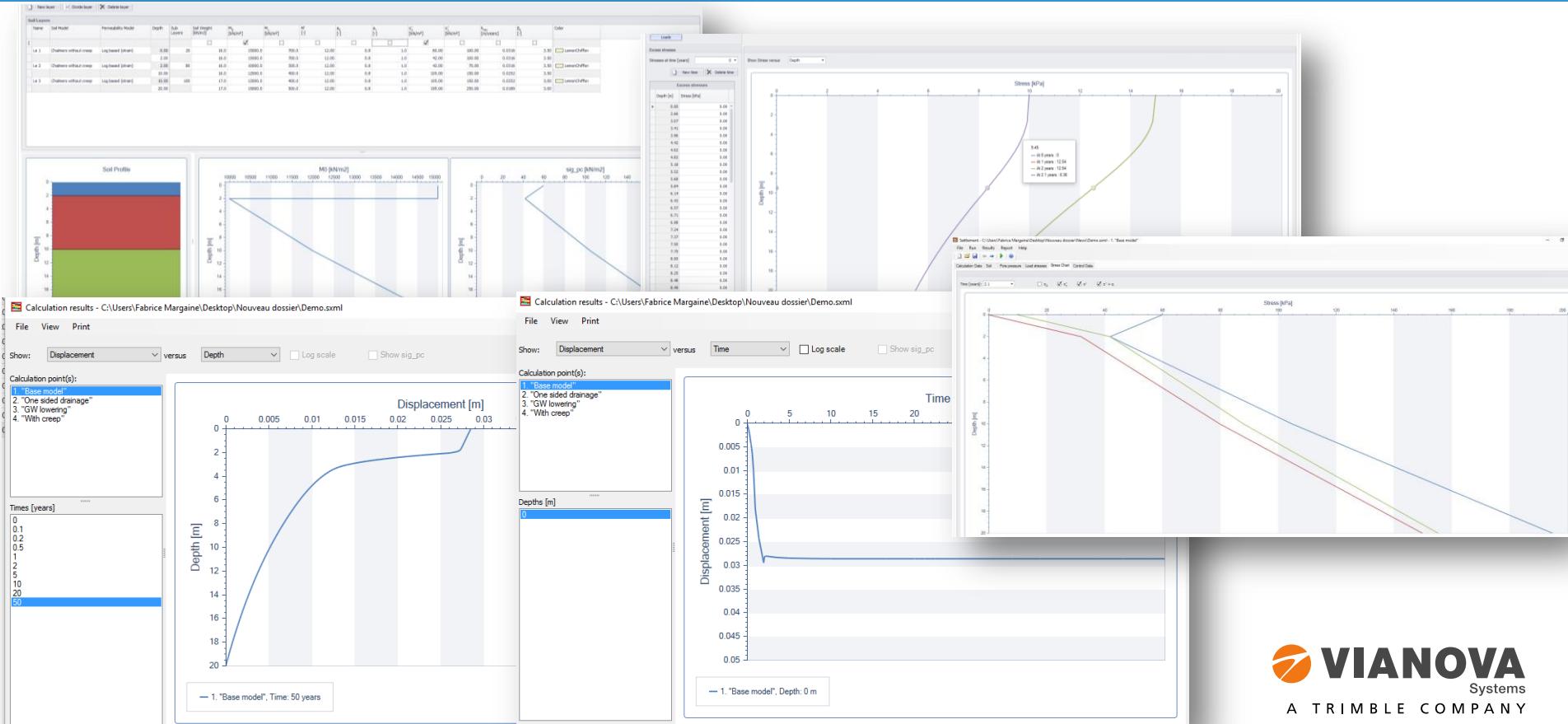
Novapoint GeoSuite Toolbox

GS Settlement



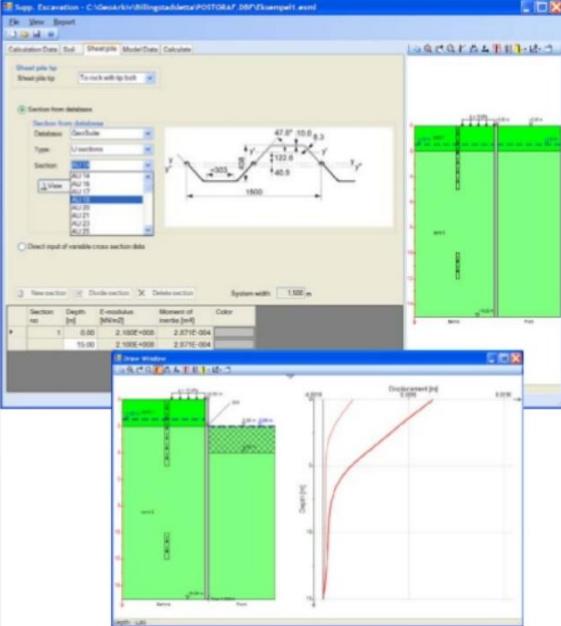
- GS Toolbox User Interface
- 1D calculations, 2D simulation
- Krykon, Janbu, Chalmers and User defined model – creep settlement
- Graphical presentation of input data in Novadraw
- Load distribution according to 1:n and Boussinesq
- History for loads and pore pressure
- Integration with Novapoint Terrain

Geotechnical calculation modules



Geotechnical calculation modules

Novapoint GeoSuite Toolbox
GS Supported Excavation



GeoSuite PROJECT

- GS Toolbox User Interface
- Effective- and total stress soil models can be combined in layers
- Sheet pile wall data from database
- Anchor/strut data from database, and pre-tensioning relative to capacity
- Graphical presentation of input and result
- Water pressure from stationary water flow, or other distribution
- Step by step definition and examination of excavation phases
- Editable phase definition setup for optimization
- Re-calculation of some or all phases for variation of wall depth or other parameters
- A number of result graphs showing displacement, bending moment etc. at every phase

Geotechnical calculation modules

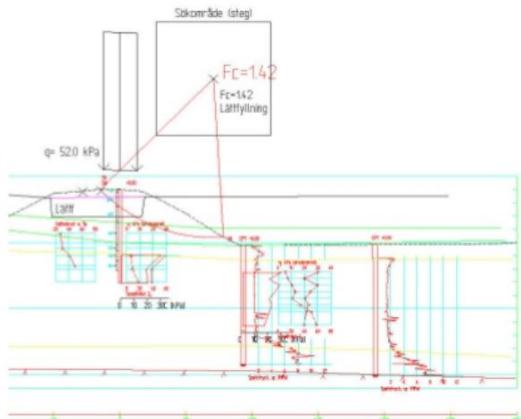
The image displays three windows illustrating geotechnical calculation modules:

- Left Window:** A screenshot of a software interface titled "Supp. Excavation - C:\GEOARKY\SupportedExc\POSTGRAF.DBF\Example 1.xml". It shows a cross-section diagram of an excavation with a sheet pile at the bottom. The soil layers are labeled: Fill (top), Clay, Granular soil, and Till (bottom). A vertical column on the left provides parameters for each layer. At the bottom, there is a table with columns for Section no., Depth [m], E-modulus [kNm²], Moment of inertia [m⁴], and Color.
- Middle Window:** A plot showing two graphs of soil mobilization factors versus depth. The left graph is for "Soil mobilization, behind [-]" and the right graph is for "Soil mobilization, front [-]". Both graphs show a red curve starting at depth 0 and increasing to a plateau at approximately 0.5. The x-axis ranges from -0.5 to 0.5, and the y-axis ranges from 0 to 10 m.
- Right Window:** A detailed table of soil properties for the four layers defined in the first window. The columns include Name, Model, Depth [m], Soil Weight [kN/m³], c [kPa], Phi [deg], K₀_eff [-], E-modulus [kPa], and Color. The table shows the following data:

Name	Model	Depth [m]	Soil Weight [kN/m³]	c [kPa]	Phi [deg]	K₀_eff [-]	E-modulus [kPa]	Color
Fill	ESS - Effective stress simplified	0.00	18.00	0.01	40.00	0.36	50000.00	NA
		1.00	18.00	0.01	40.00	0.36	50000.00	NA
Clay	TSA - Total stress automatic	1.00	17.00	33.00	18.00	0.70	2315.00	90.78
		5.50	17.00	33.00	18.00	0.70	2315.00	90.78
			Soil Weight [kN/m³]	c [kPa]	Phi [deg]	K₀_eff [-]	G [kPa]	G/Cu-ratio [-]
Granular soil	ESS - Effective stress simplified	5.50	18.00	0.01	38.00	0.38	30000.00	NA
		6.70	18.00	0.01	38.00	0.38	30000.00	NA
			Soil Weight [kN/m³]	c [kPa]	Phi [deg]	K₀_eff [-]	E-modulus [kPa]	
Till	ESS - Effective stress simplified	6.70	23.00	58.00	30.00	0.50	100000.00	NA
		11.70	23.00	58.00	30.00	0.50	100000.00	NA

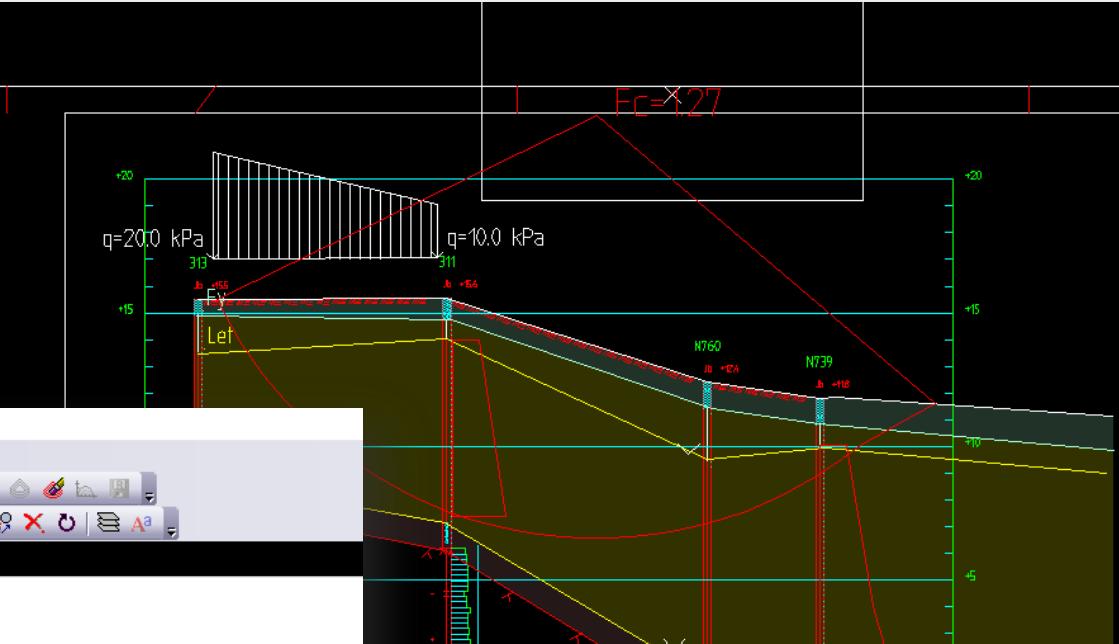
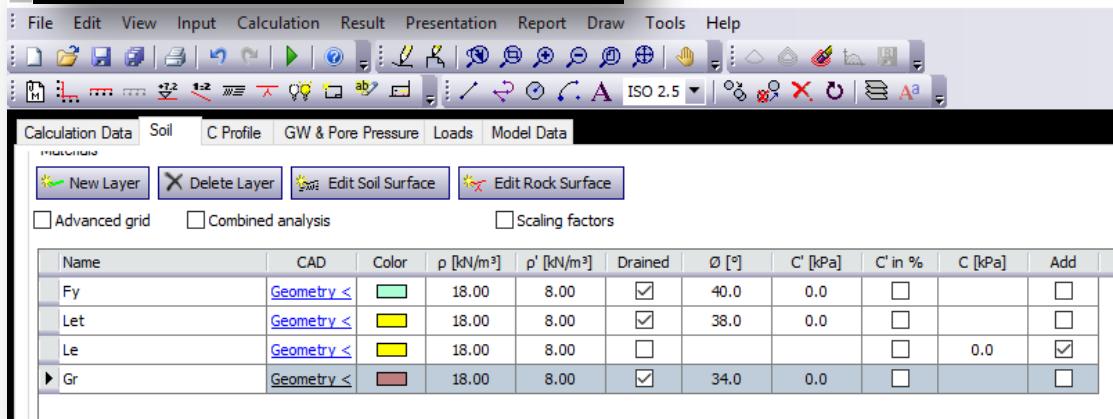
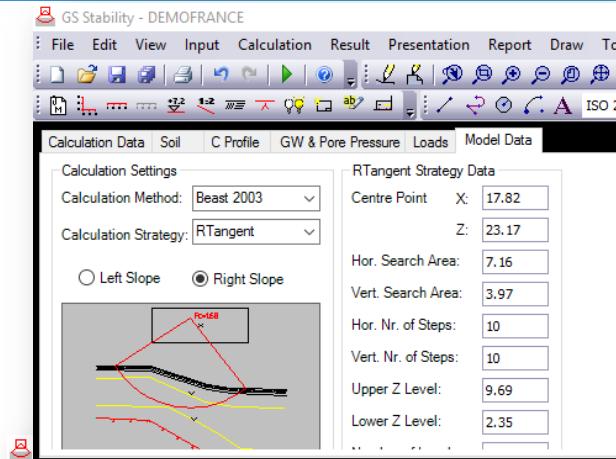
Geotechnical calculation modules

Novapoint GeoSuite Toolbox GS Stability



- GS Toolbox User Interface (soon)
- Integration – cross sections
- Easy user interface – rapid to use
- Undrained shear strength profiles
- Iso lines
- Soil nails
- Automatic procedures for excavation/banking
- Different calculation methods

Geotechnical calculation modules



Takes You There

☰ Thank you for your attention

