



Engineer Research and
Development Center

Overview of GenCade in SMS 11.1

Ashley Frey

GenCade Webinar

16-18 October 2012



US Army Corps
of Engineers®



Overview of Presentation

- Introduction to GenCade in the SMS
 - Conceptual model
 - Set up shorelines, waves, and structures in real-world coordinates
 - GenCade model
 - All features are referenced to grid cell numbers
 - GenCade input files are created
 - Set up model control
 - Run GenCade
 - View results

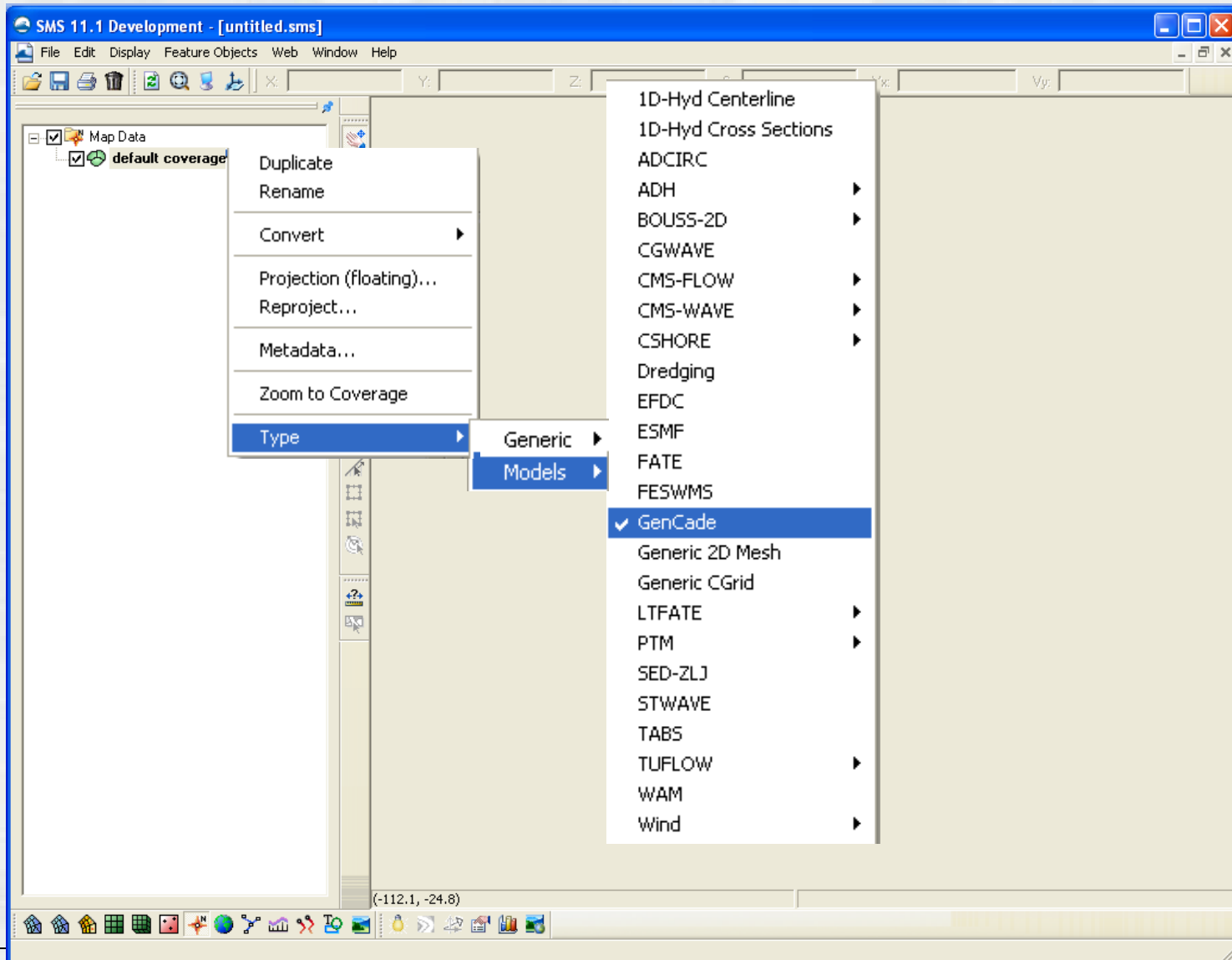


BUILDING STRONG®



Innovative solutions for a safer, better world

Define as GenCade

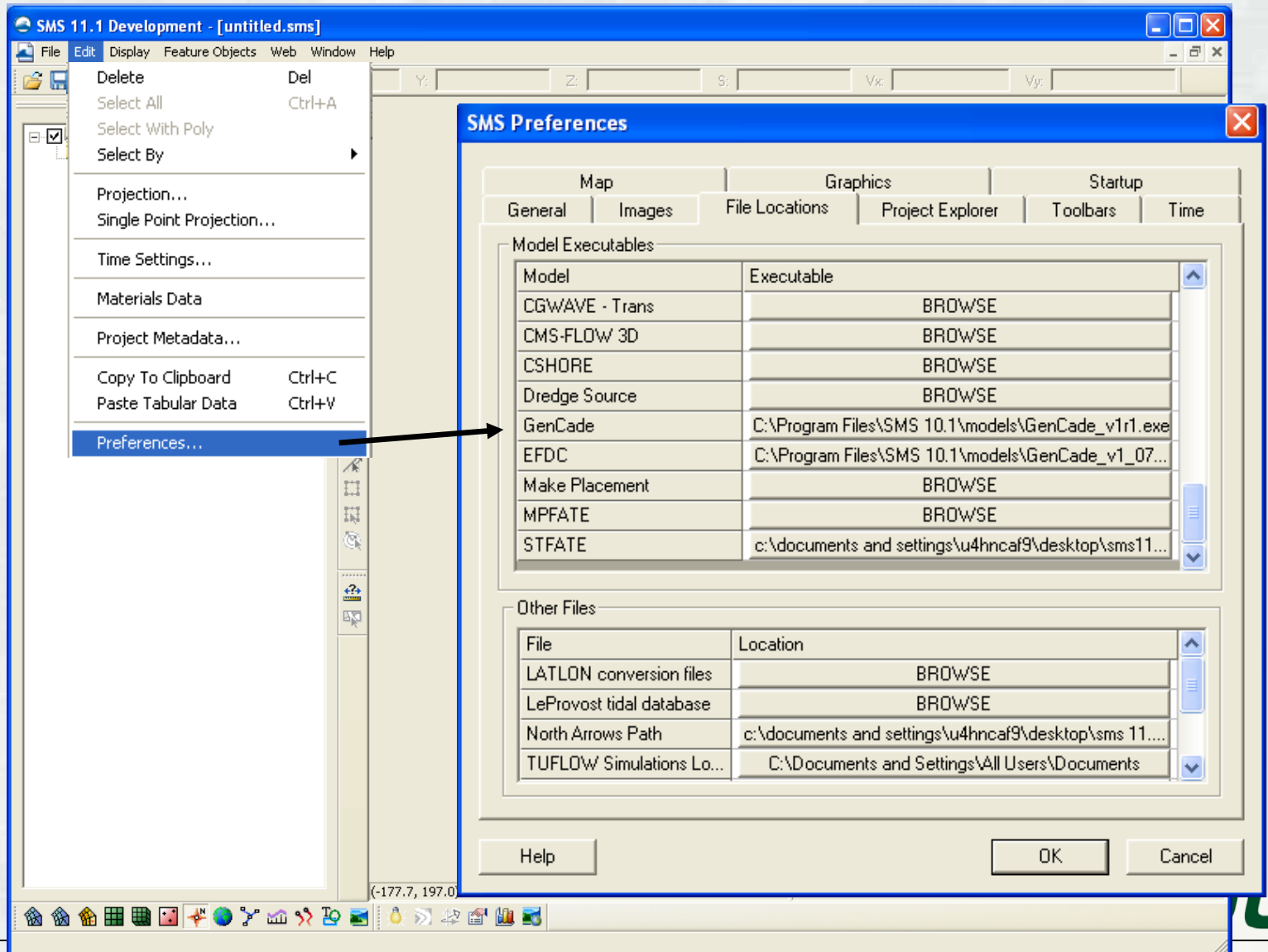


BUILDING STRONG®

Innovative solutions for a safer, better world



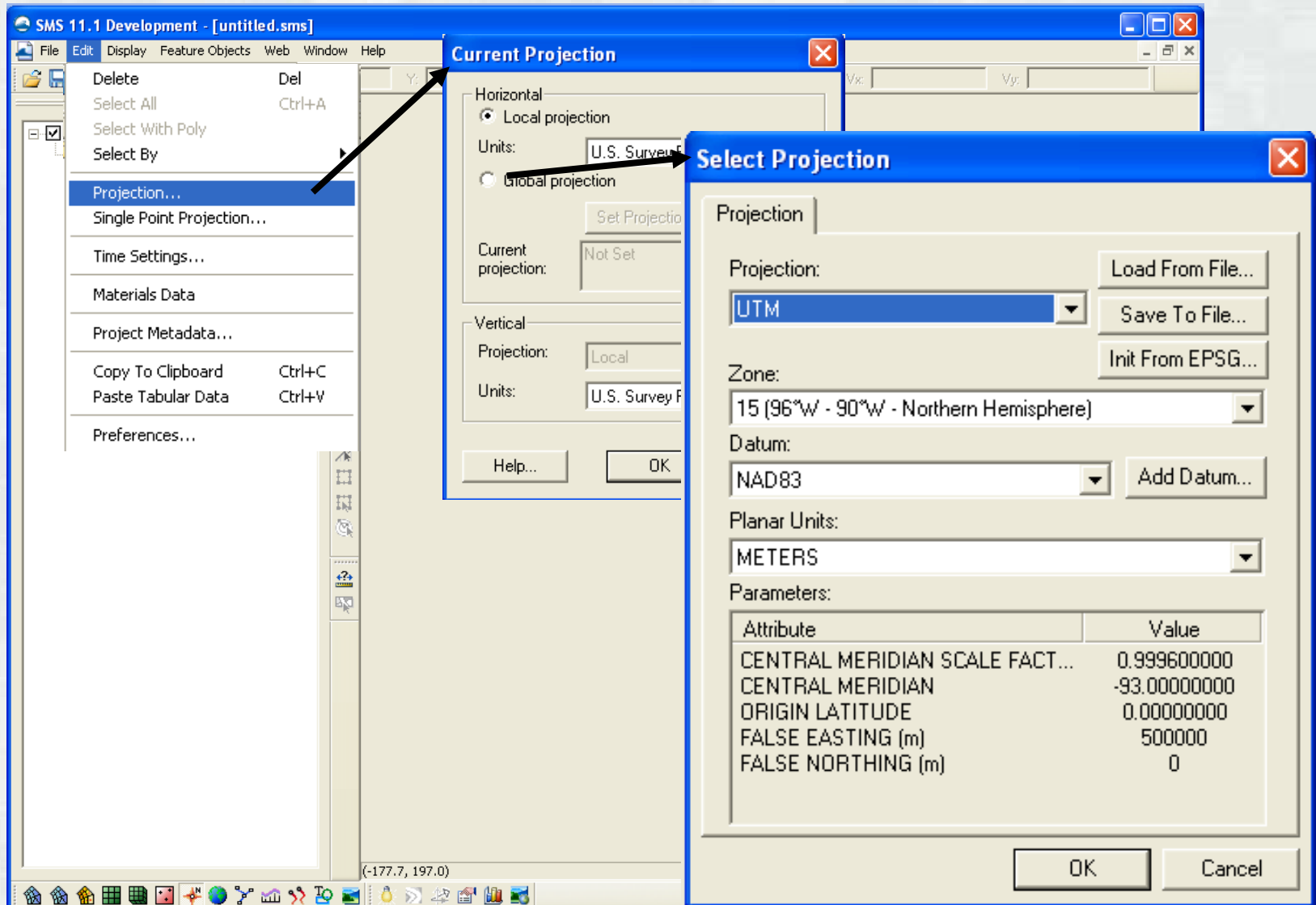
Location of Executable



BUILDING STRONG®

Innovative solutions for a safer, better world

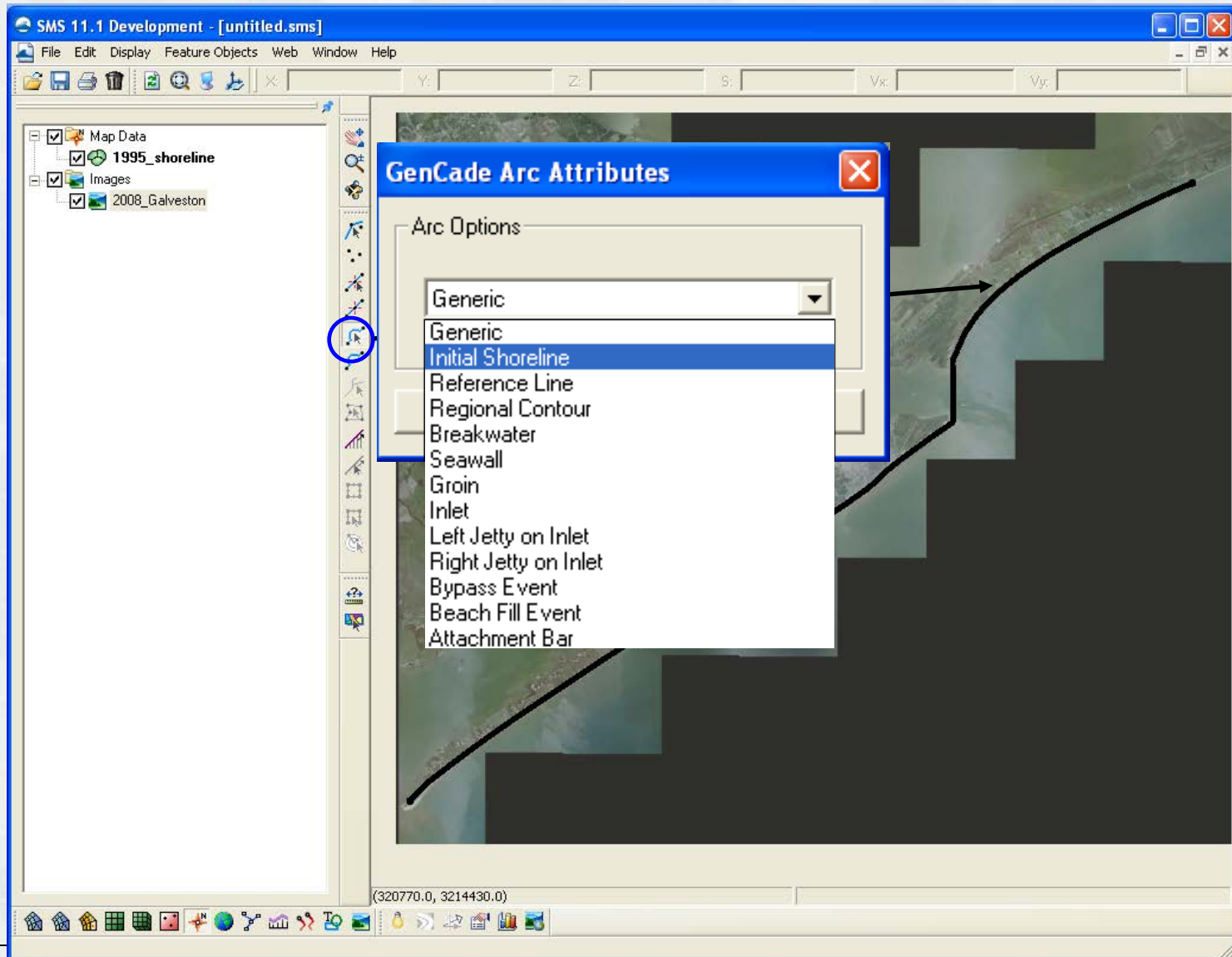
Define Projection



BUILDING STRONG®

Innovative solutions for a safer, better world

Define Initial Shoreline

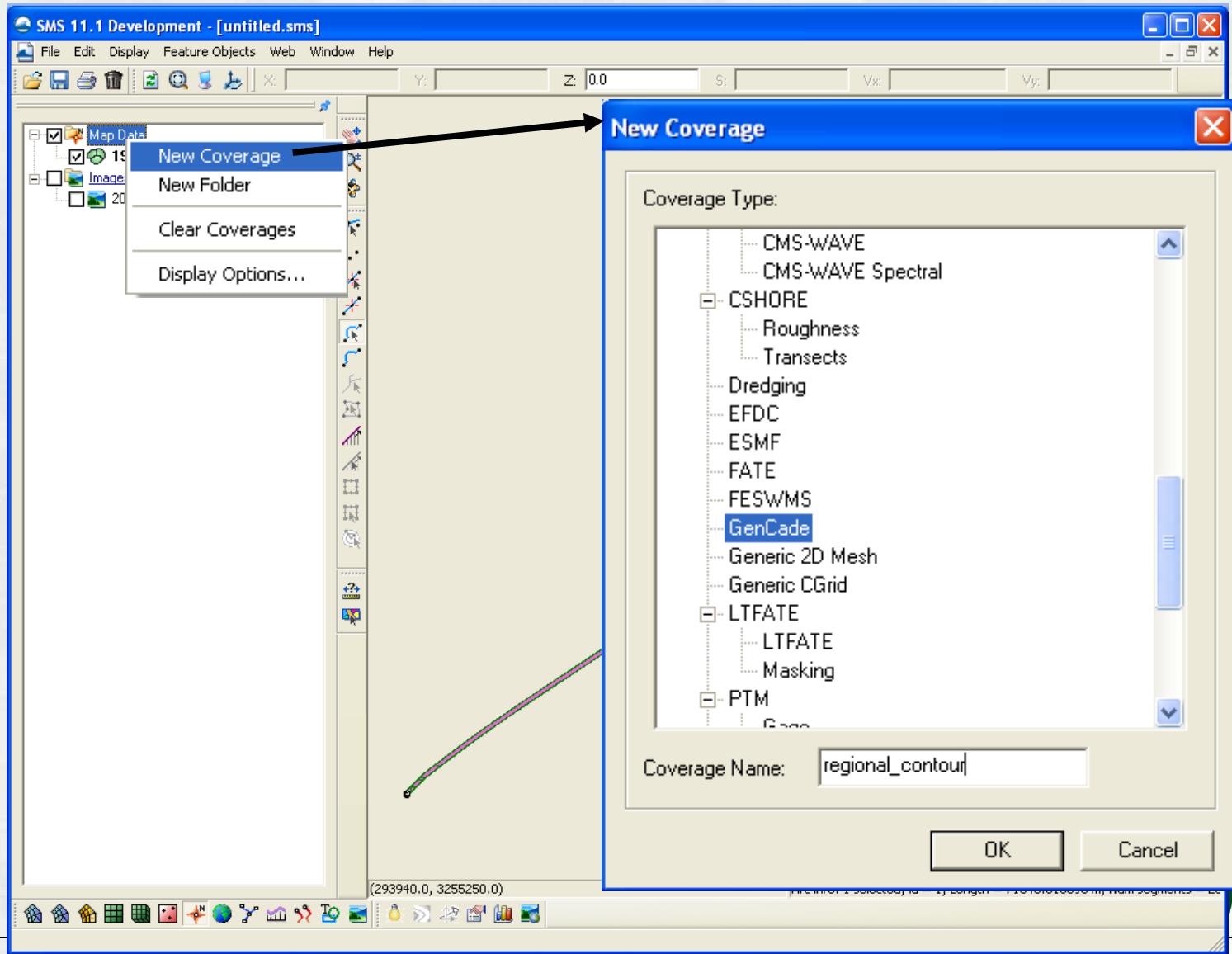


BUILDING STRONG®

Innovative solutions for a safer, better world



Add New Coverage

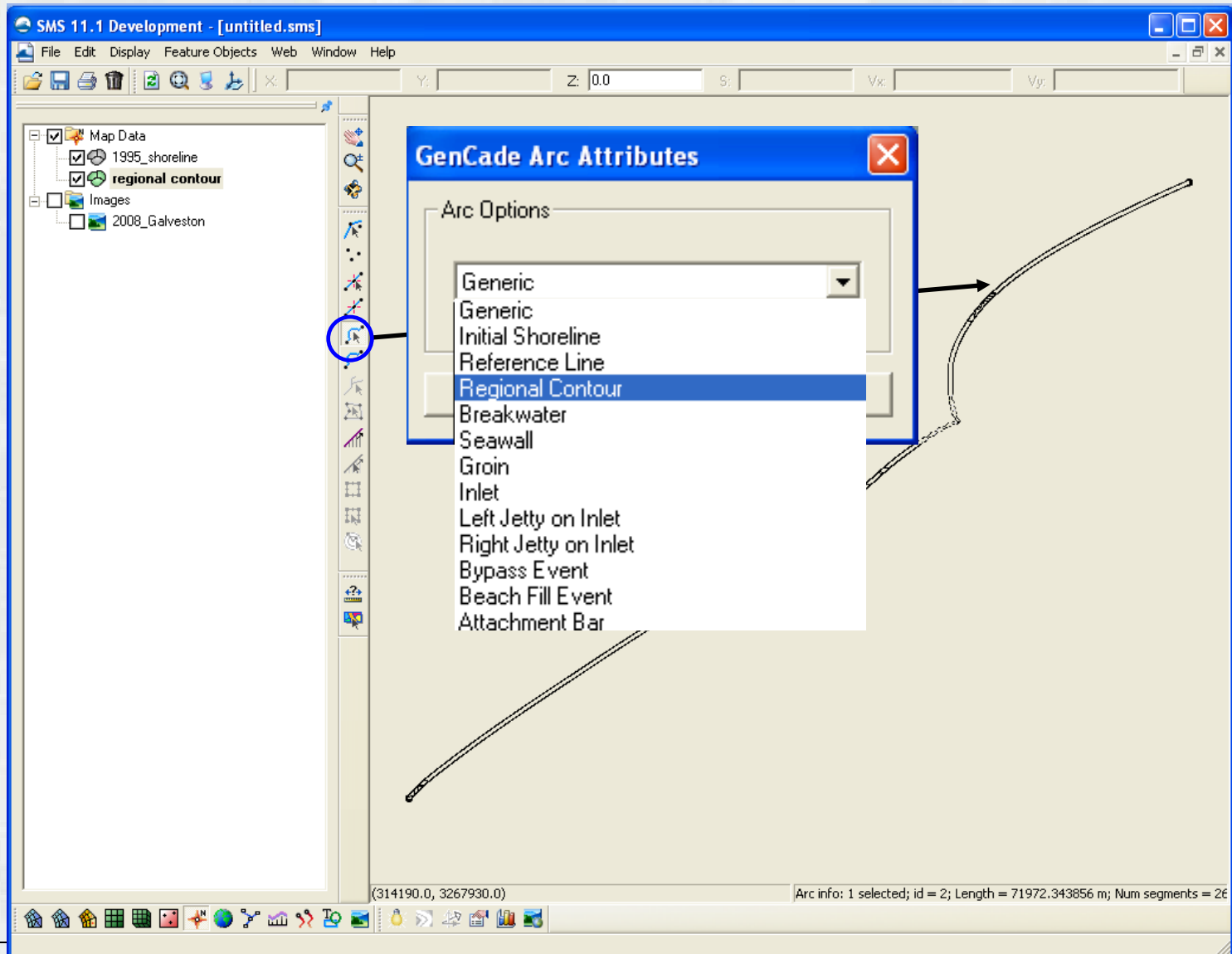


BUILDING STRONG®

Innovative solutions for a safer, better world



Define Regional Contour

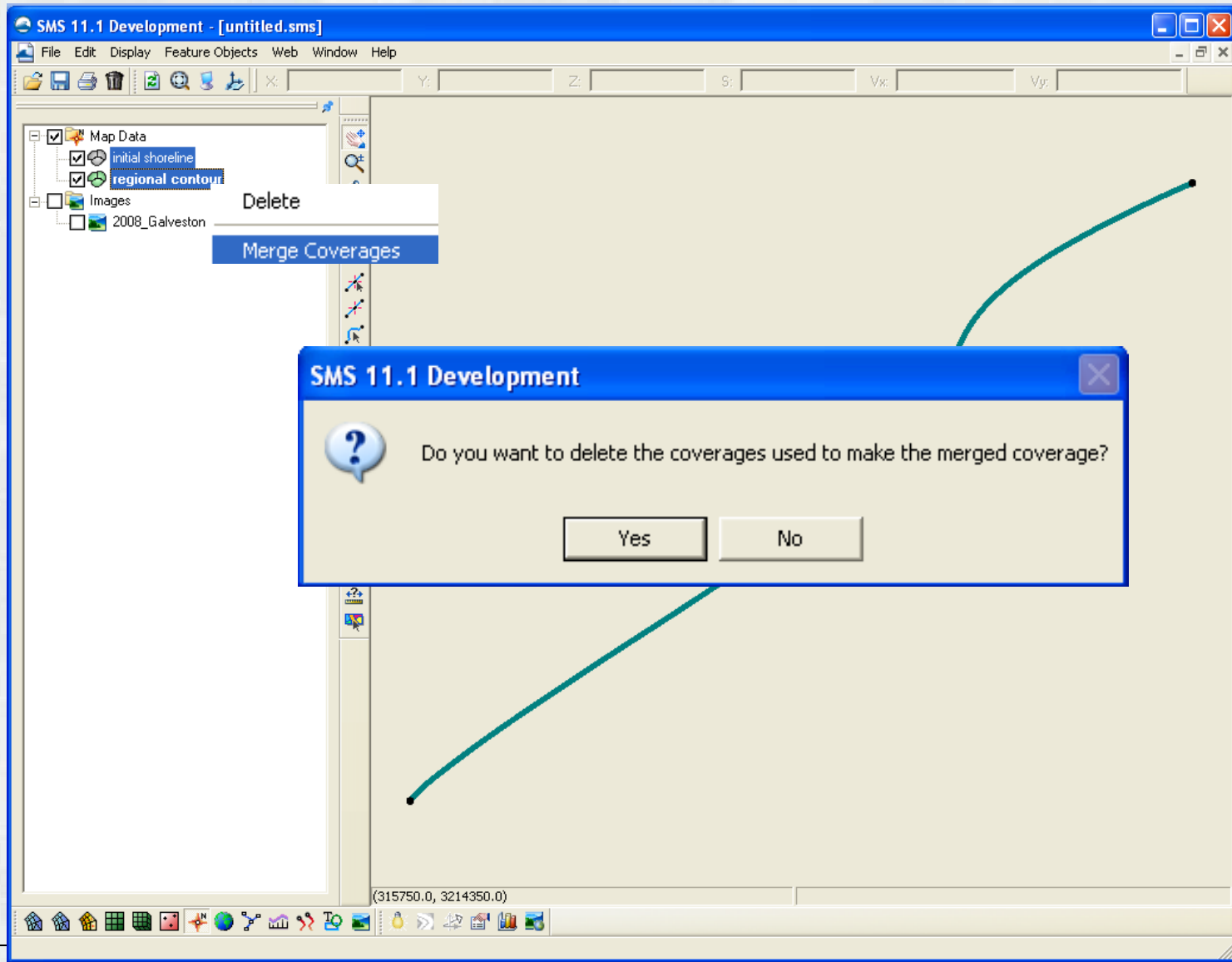


BUILDING STRONG®

Innovative solutions for a safer, better world



Merge Coverages

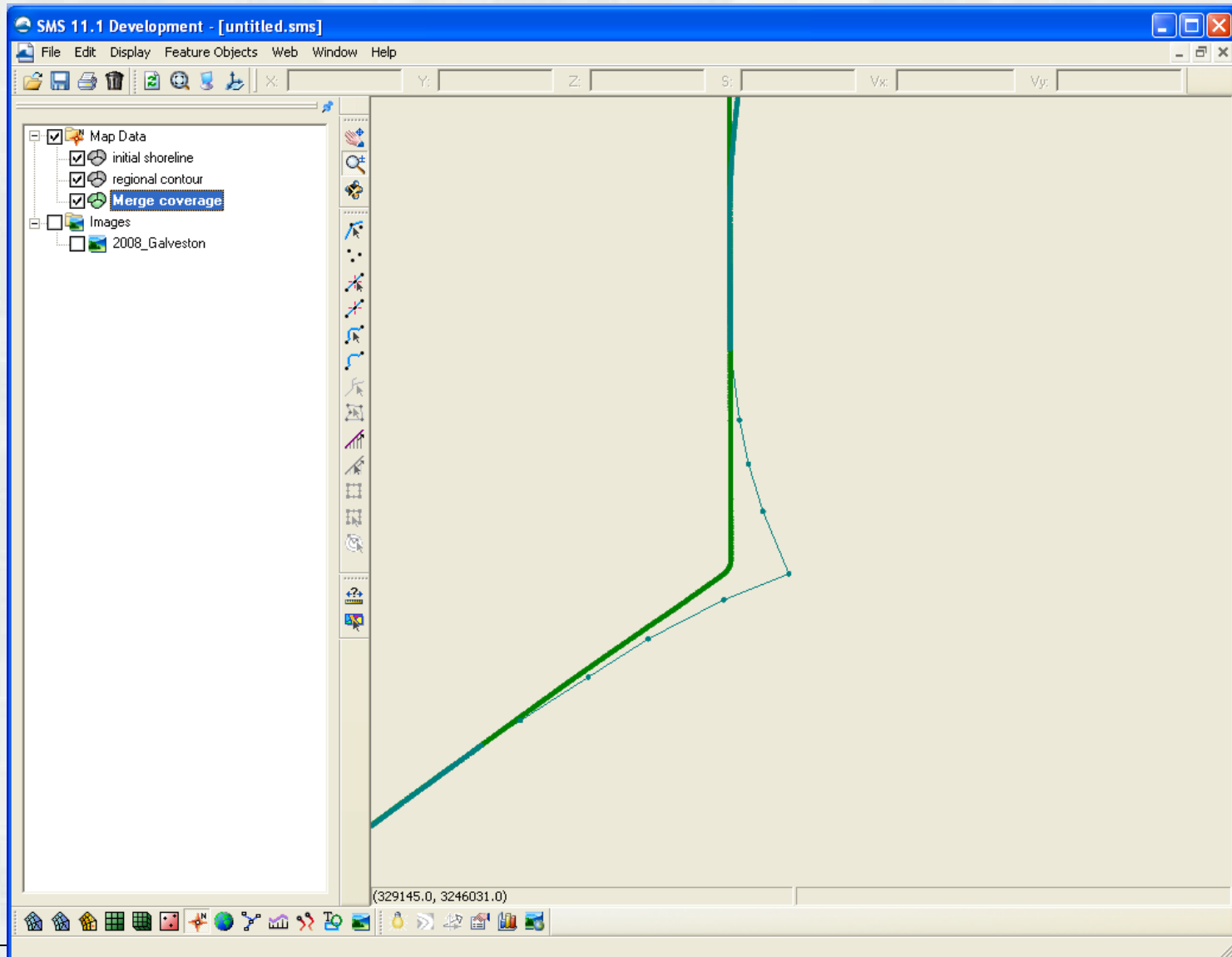


BUILDING STRONG®

Innovative solutions for a safer, better world



Merged Coverages

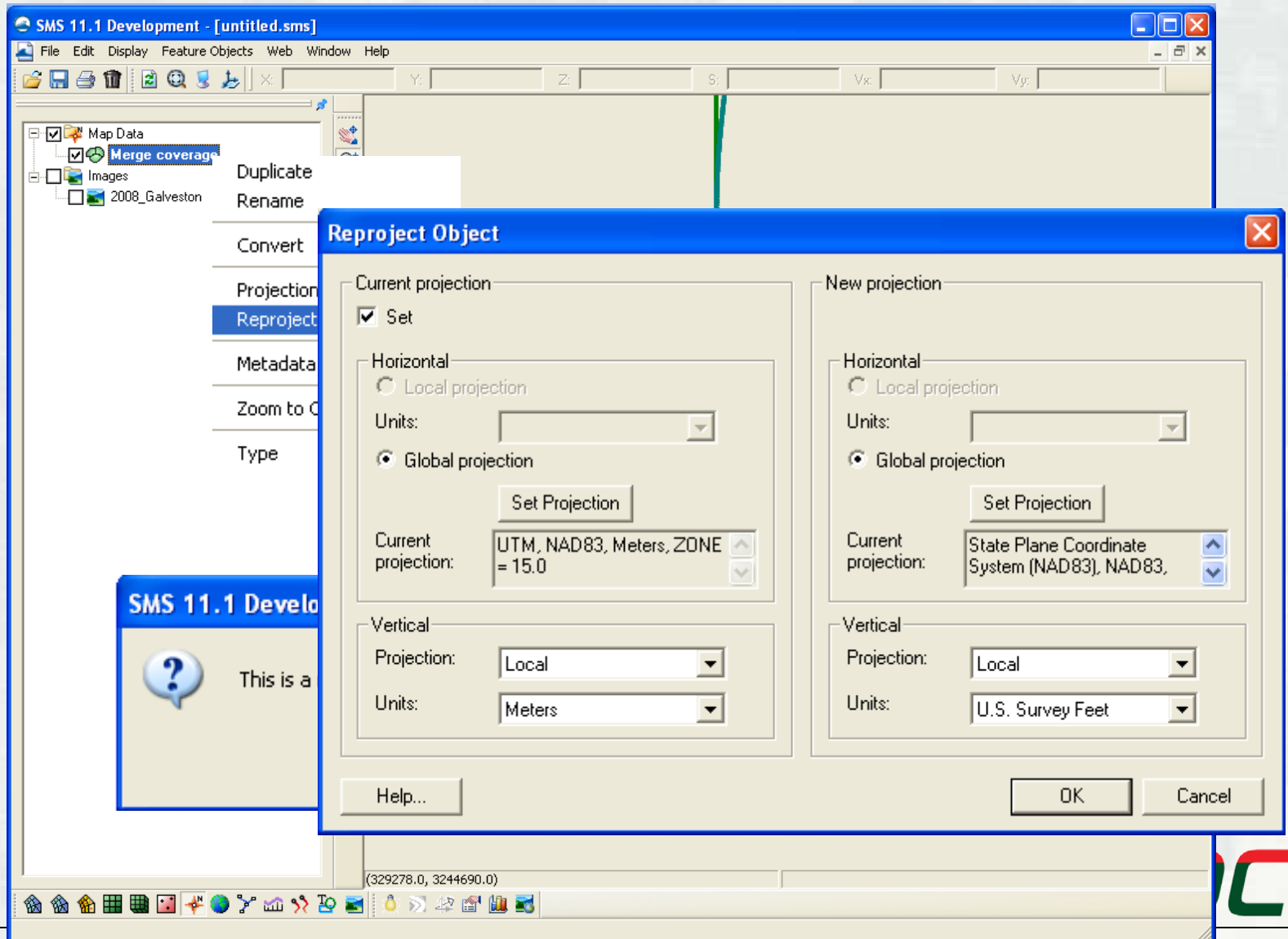


BUILDING STRONG®

Innovative solutions for a safer, better world



Convert to New Projection

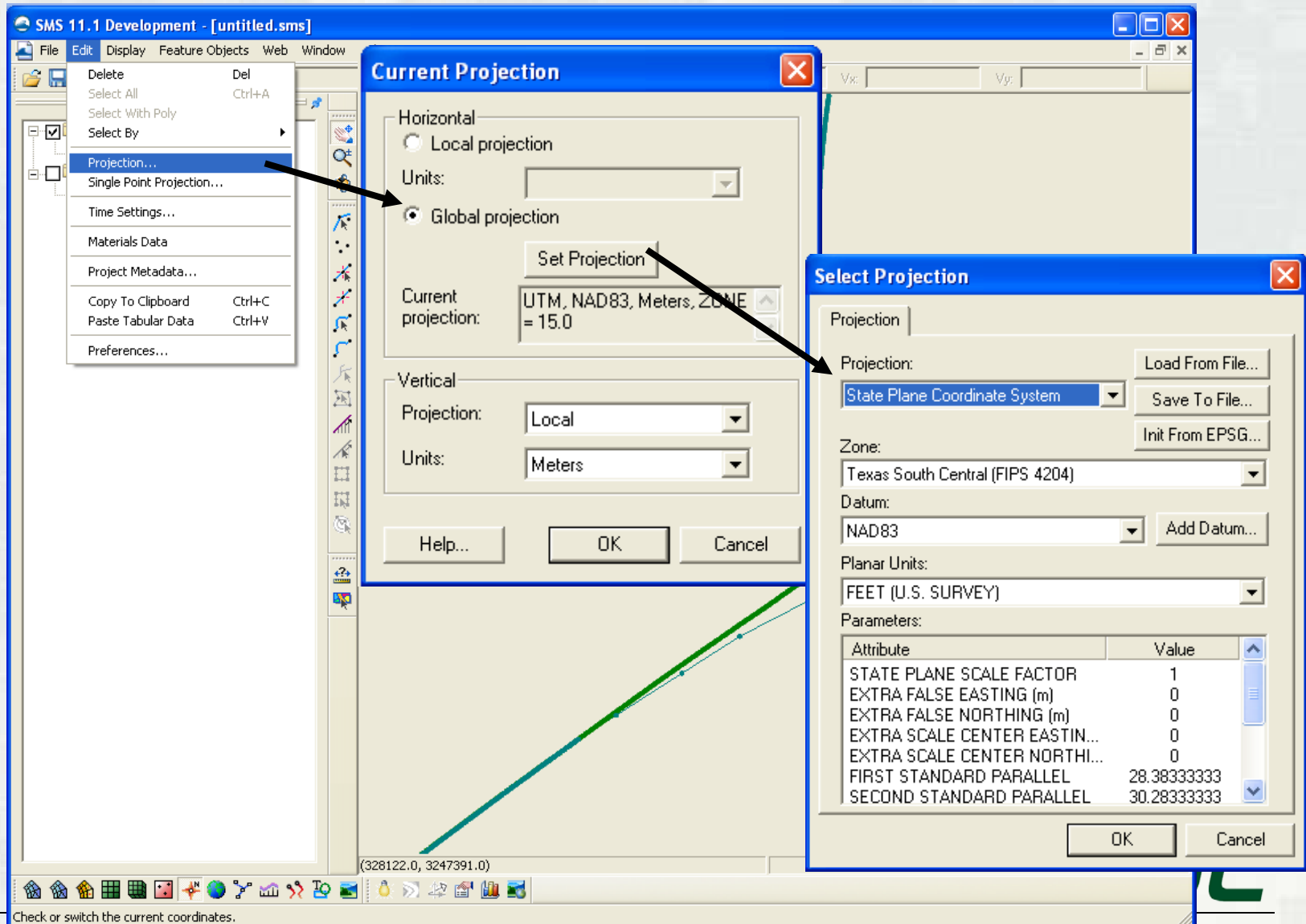


BUILDING STRONG®

Innovative solutions for a safer, better world



Convert to New Projection



BUILDING STRONG®

Innovative solutions for a safer, better world

Inlets

GenCode Arc Attributes

Arc Options

Inlet

Attributes...

Help... OK Cancel

Inlet Shoal Volumes

	Initial	Equilibrium
Ebb	5000000.0	5000000.0
Flood	1000000.0	1000000.0
Left Bypass	1000000.0	1000000.0
Left Attachment	500000.0	500000.0
Right Bypass	1000000.0	1000000.0
Right Attachment	500000.0	500000.0

Help... OK Cancel

Inlets (Reservoir Model and Jetties)

	Name of Inlet	Cell	(yd³)	Control	Manage	Left Bypass Coef	Right Bypass Coef
1	Galveston	Position...	Volume...	Jetties...	Dredging...	1.0	1.0

Dredging Events

	Begin Date	End Date	Shoal to Be Mined	Volume (yd³)
1	01-Jan-1996	01-Mar-1996	Ebb	1000000.0
2	25-Sep-2012	25-Sep-2012		

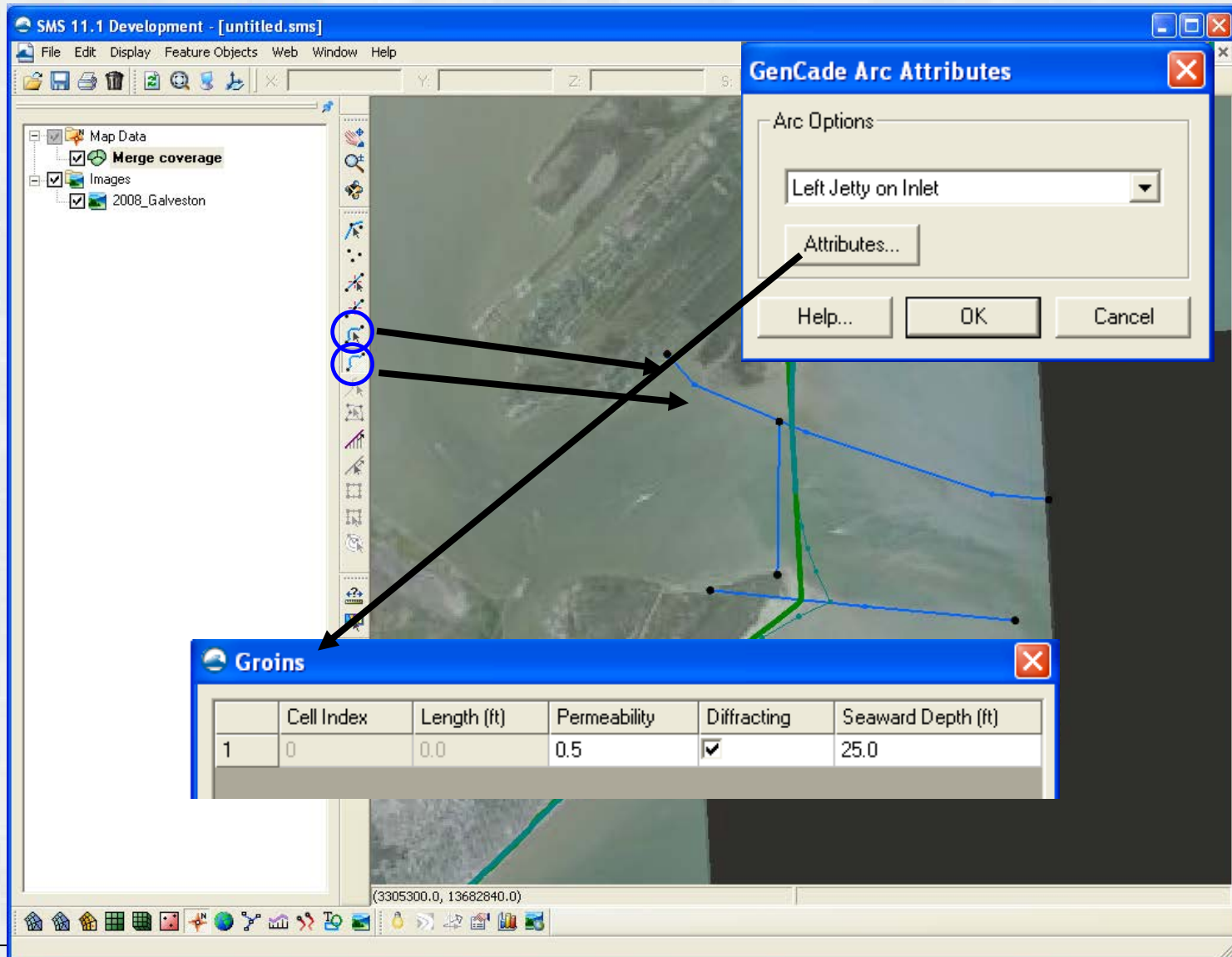


BUILDING STRONG®

Innovative solutions for a safer, better world



Jetties

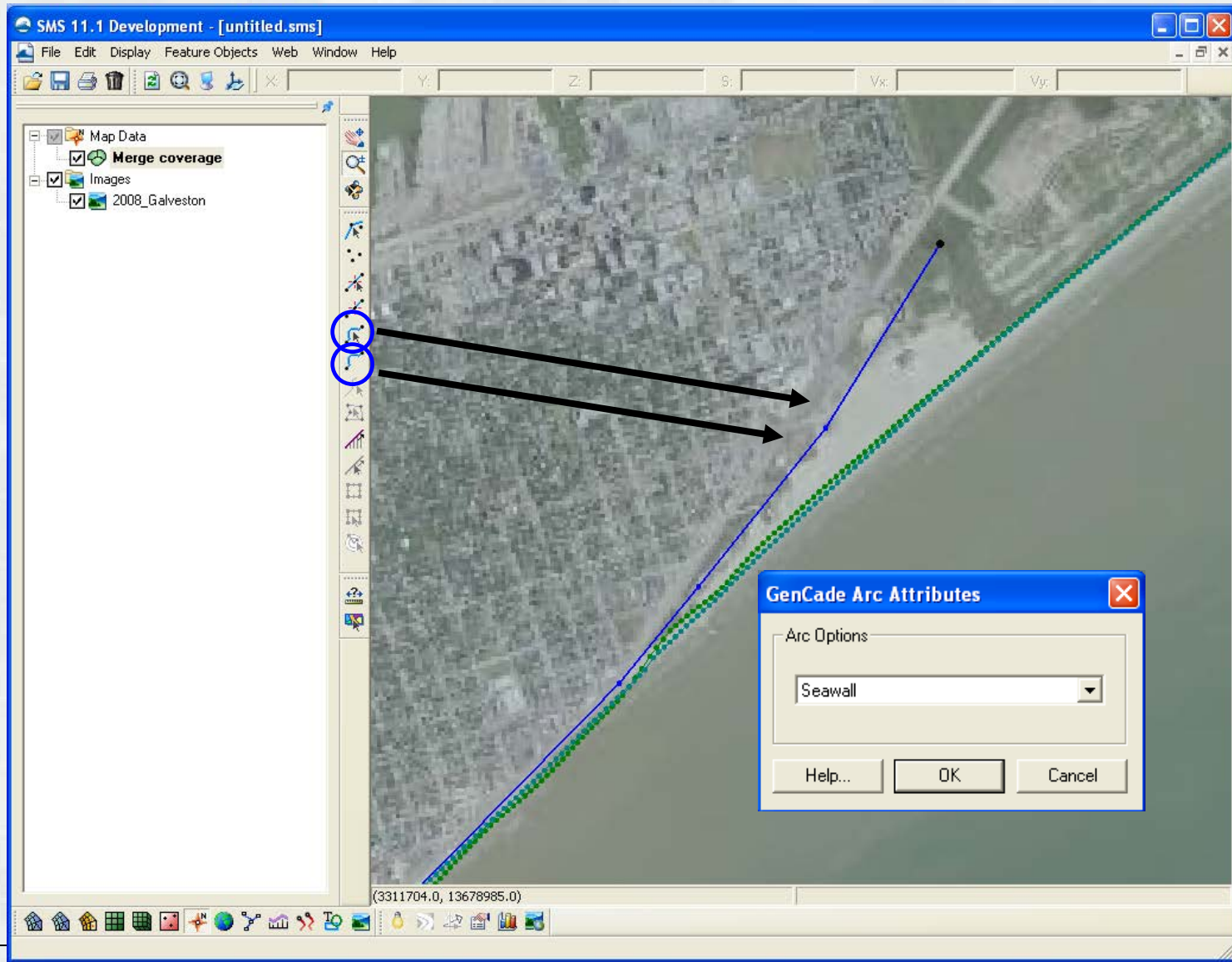


BUILDING STRONG®

Innovative solutions for a safer, better world



Seawall



BUILDING STRONG®

Innovative solutions for a safer, better world



Groins

The screenshot displays the SMS 11.1 Development software interface. The main window shows a map of a coastal area with a blue line representing a groin structure. Two dialog boxes are open:

- GenCode Arc Attributes**: This dialog box is titled "GenCode Arc Attributes" and contains a section for "Arc Options". A dropdown menu is set to "Groin", and there is an "Attributes..." button. At the bottom are "Help...", "OK", and "Cancel" buttons.
- Groins**: This dialog box is titled "Groins" and contains a table with the following data:

	Cell Index	Length (ft)	Permeability	Diffracting	Seaward Depth (ft)
1	0	0.0	0.1	<input checked="" type="checkbox"/>	8.0

Arrows indicate the workflow: one arrow points from the "Attributes..." button in the "GenCode Arc Attributes" dialog to the "Groins" dialog, and another arrow points from the "OK" button in the "GenCode Arc Attributes" dialog to the "Groins" dialog. A third arrow points from the "Groins" dialog to the map area.



BUILDING STRONG®

Innovative solutions for a safer, better world



Beach Fill

SMS 11.1 Development - [untitled.sms]

File Edit Display Feature Objects Web Window Help

Map Data
Merge coverage
Images
2008_Galveston

GenCode Arc Attributes

Arc Options
Beach Fill Event
Attributes...
Help... OK Cancel

Beach Fill

	Begin Date	End Date	Start Cell	End Cell	Added Berm Width (ft)
1	01-Jan-1995	01-Mar-1995	0	0	30.0
2	25-Sep-2012	25-Sep-2012	0	0	

(3290721.0, 13663961.0)



BUILDING STRONG®

Innovative solutions for a safer, better world

Detached Breakwater

The screenshot shows the SMS 11.1 Development interface. The main window displays a map with a breakwater structure. Two dialog boxes are open:

- GenCode Arc Attributes**: This dialog is used to configure the breakwater. It has a dropdown menu set to "Breakwater" and an "Attributes..." button. Arrows point from the "Attributes..." button to the "Detached Breakwaters" table.
- Detached Breakwaters**: This dialog contains a table with the following data:

	Start Cell	Y1 (ft)	Depth 1 (ft)	End Cell	Y2 (ft)	Depth 2 (ft)	Transmission	Coeff/Perm/Atts
1	0	0.0	5.0	0	0.0	5.0	Ahren's	0.0

The "Transmission" dropdown menu is open, showing the following options: Constant, Ahren's, Seabrook & Hall, and d'Angremond.

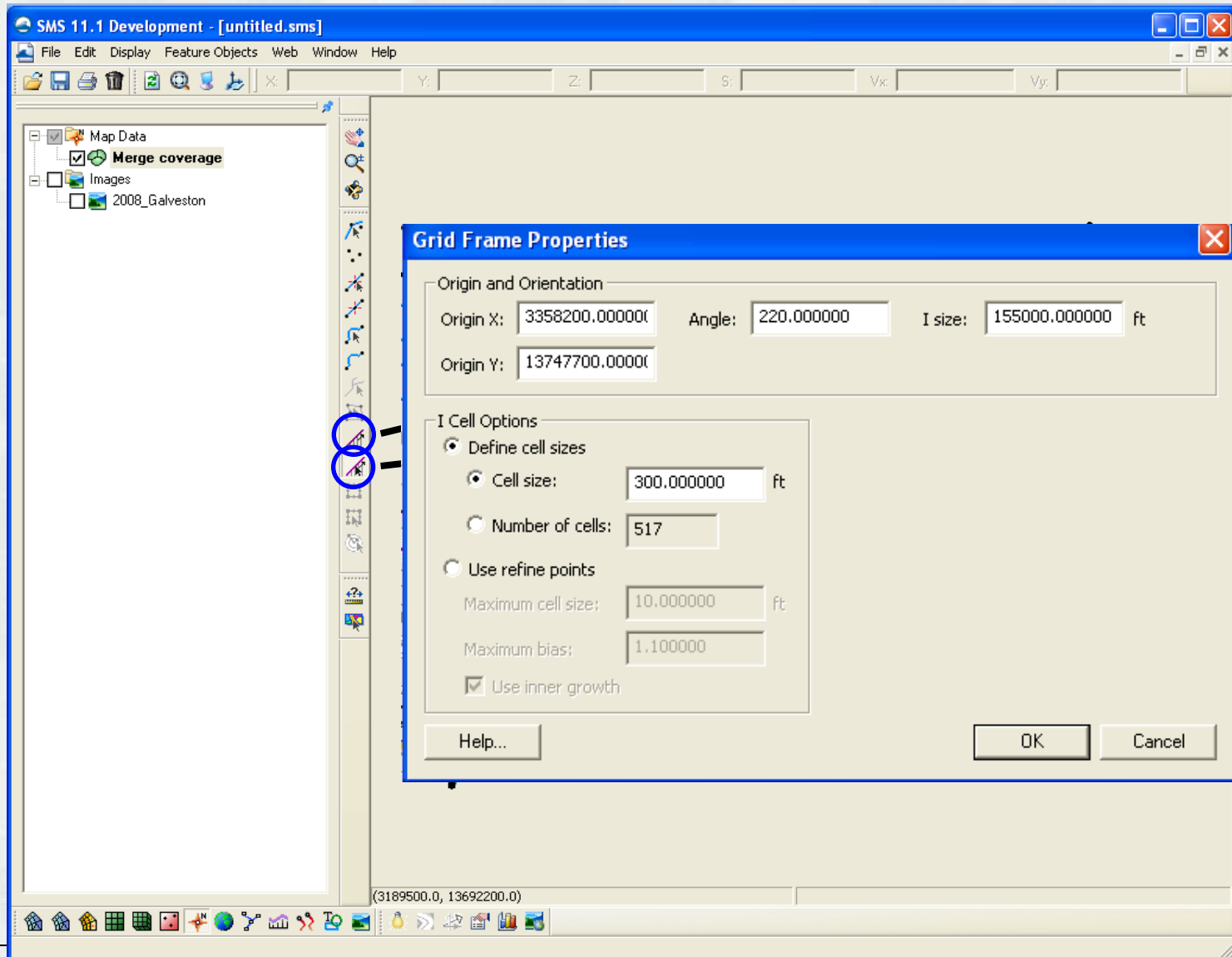


BUILDING STRONG®

Innovative solutions for a safer, better world



Grid Setup



BUILDING STRONG®

Innovative solutions for a safer, better world



Wave Gauges

The screenshot displays the SMS 11.1 Development software interface. The 'Refine Point' dialog box is open, showing the 'Attributes' section with the 'Wave gage' checkbox checked. An arrow points from this checkbox to the 'Wave Gages' dialog box. The 'Wave Gages' dialog box contains a table with the following data:

	Cell	Depth (ft)	
1	258	50.0	Data...

An arrow points from the 'Data...' button in the 'Wave Gages' dialog box to the 'Wave Events' dialog box. The 'Wave Events' dialog box shows a table of wave data for January 1, 1995, from 0:00 to 19:00. The 'Interpret Directions As' section is also visible, with a dropdown menu set to 'Shore Normal'.

Refine Point Dialog Box:

- Attributes:
- ☐ Refine grid in I direction
- Base cell size: 1.0
- ☒ Wave gage
- Options...
- Help... OK Cancel

Wave Gages Dialog Box:

	Cell	Depth (ft)	
1	258	50.0	Data...

Wave Events Dialog Box:

	Date	H0 (m)	Period (sec)	Direction (deg)
1	01-Jan-1995 0:00	1.0	5.0	10.0
2	01-Jan-1995 1:00	1.0	5.0	10.0208
3	01-Jan-1995 2:00	1.0	5.0	10.0417
4	01-Jan-1995 3:00	1.0	5.0	10.0625
5	01-Jan-1995 4:00	1.0	5.0	10.0833
6	01-Jan-1995 5:00	1.0	5.0	10.1042
7	01-Jan-1995 6:00	1.0	5.0	10.125
8	01-Jan-1995 7:00	1.0	5.0	10.1458
9	01-Jan-1995 8:00	1.0	5.0	10.1667
10	01-Jan-1995 9:00	1.0	5.0	10.1875
11	01-Jan-1995 10:00	1.0	5.0	10.2083
12	01-Jan-1995 11:00	1.0	5.0	10.2292
13	01-Jan-1995 12:00	1.0	5.0	10.25
14	01-Jan-1995 13:00	1.0	5.0	10.2708
15	01-Jan-1995 14:00	1.0	5.0	10.2916
16	01-Jan-1995 15:00	1.0	5.0	10.3125
17	01-Jan-1995 16:00	1.0	5.0	10.3333
18	01-Jan-1995 17:00	1.0	5.0	10.3541
19	01-Jan-1995 18:00	1.0	5.0	10.375
20	01-Jan-1995 19:00	1.0	5.0	10.3958

Interpret Directions As:

Convention: Shore Normal

Shore Normal
Oceanographic
Meteorologic
Cartesian

Help... Import... OK Cancel

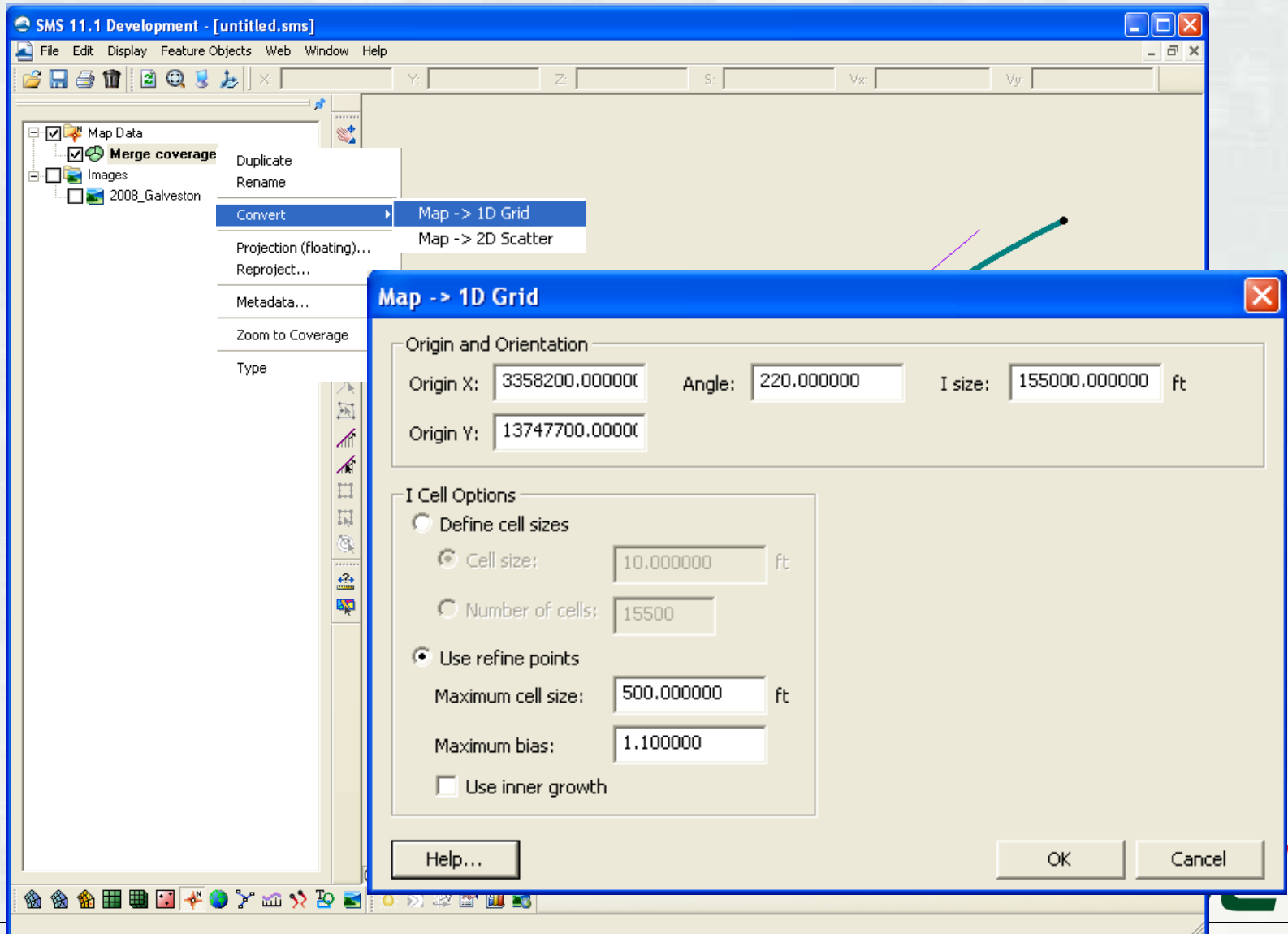


BUILDING STRONG®



GenCade for a safer, better world

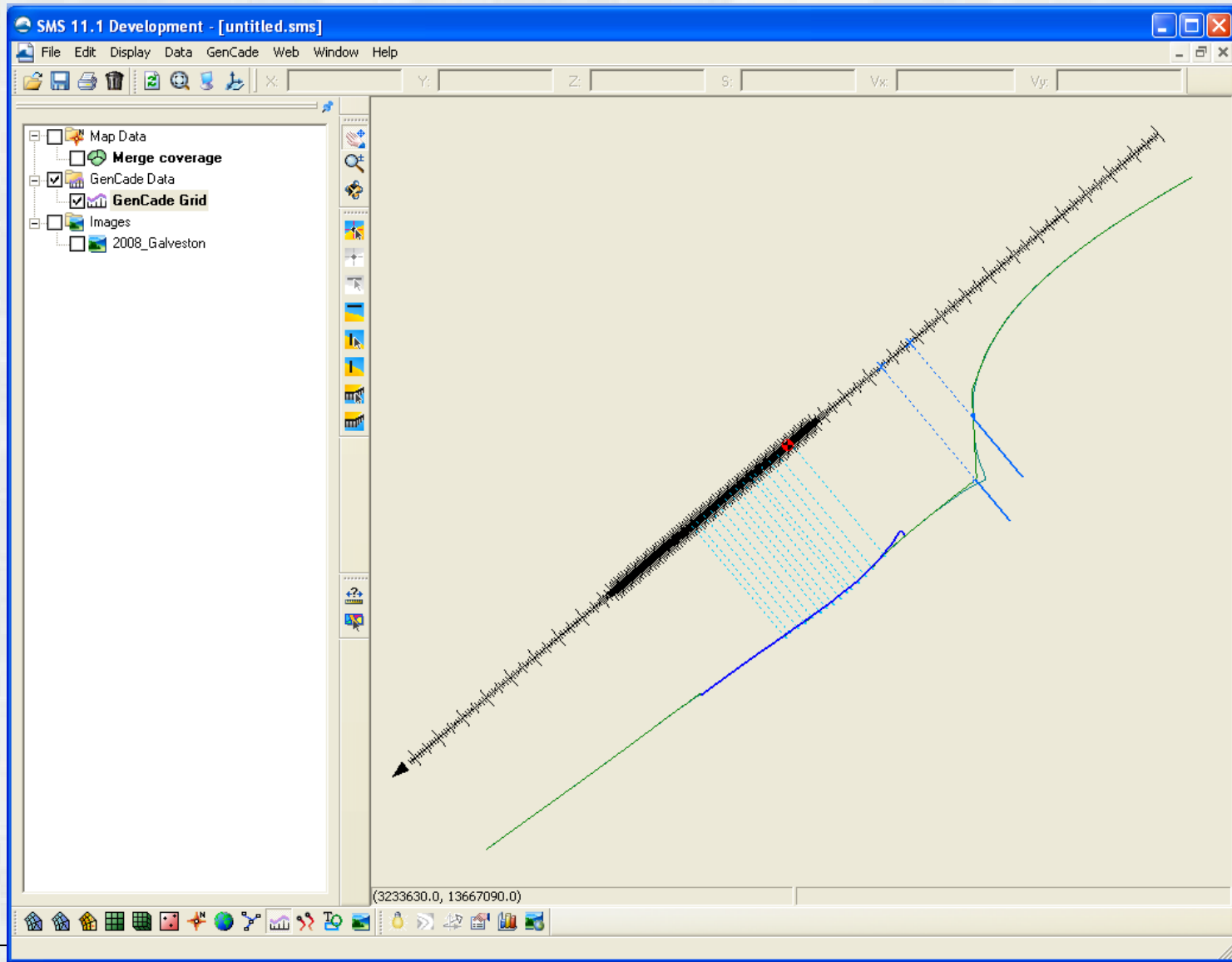
Convert to 1D Grid



BUILDING STRONG®

Innovative solutions for a safer, better world

GenCade Model

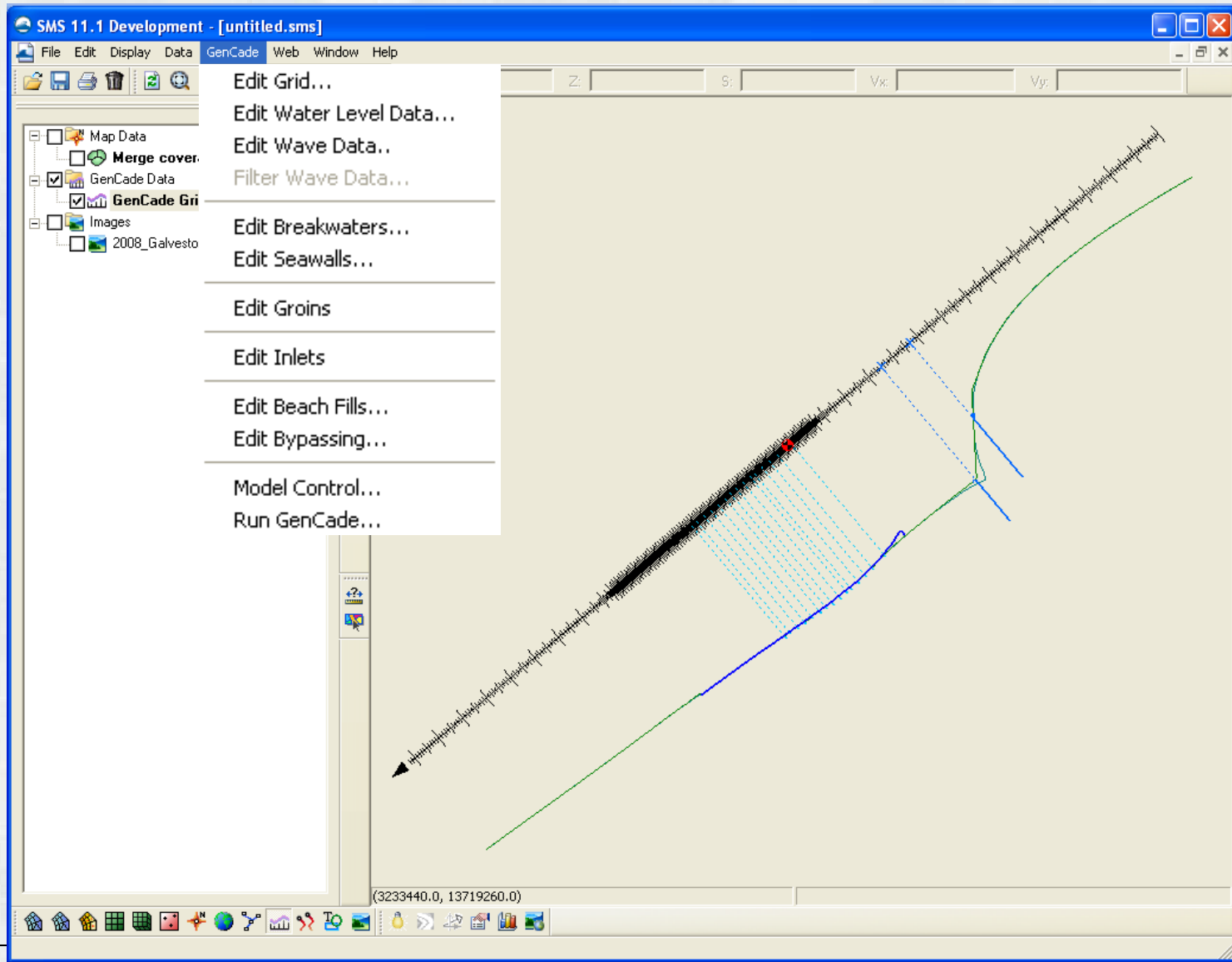


BUILDING STRONG®

Innovative solutions for a safer, better world



GenCade Model

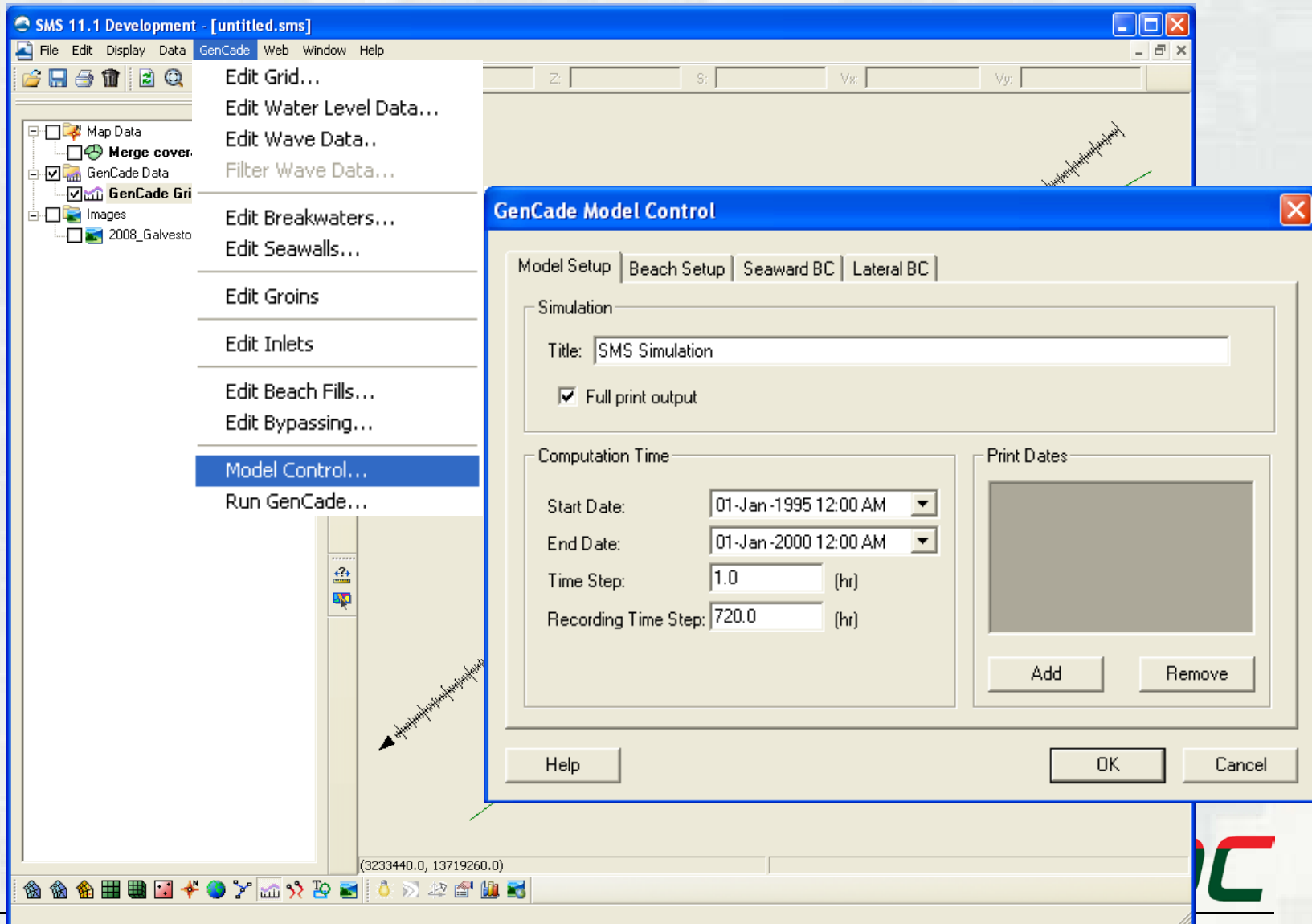


BUILDING STRONG®

Innovative solutions for a safer, better world



GenCade Model Control

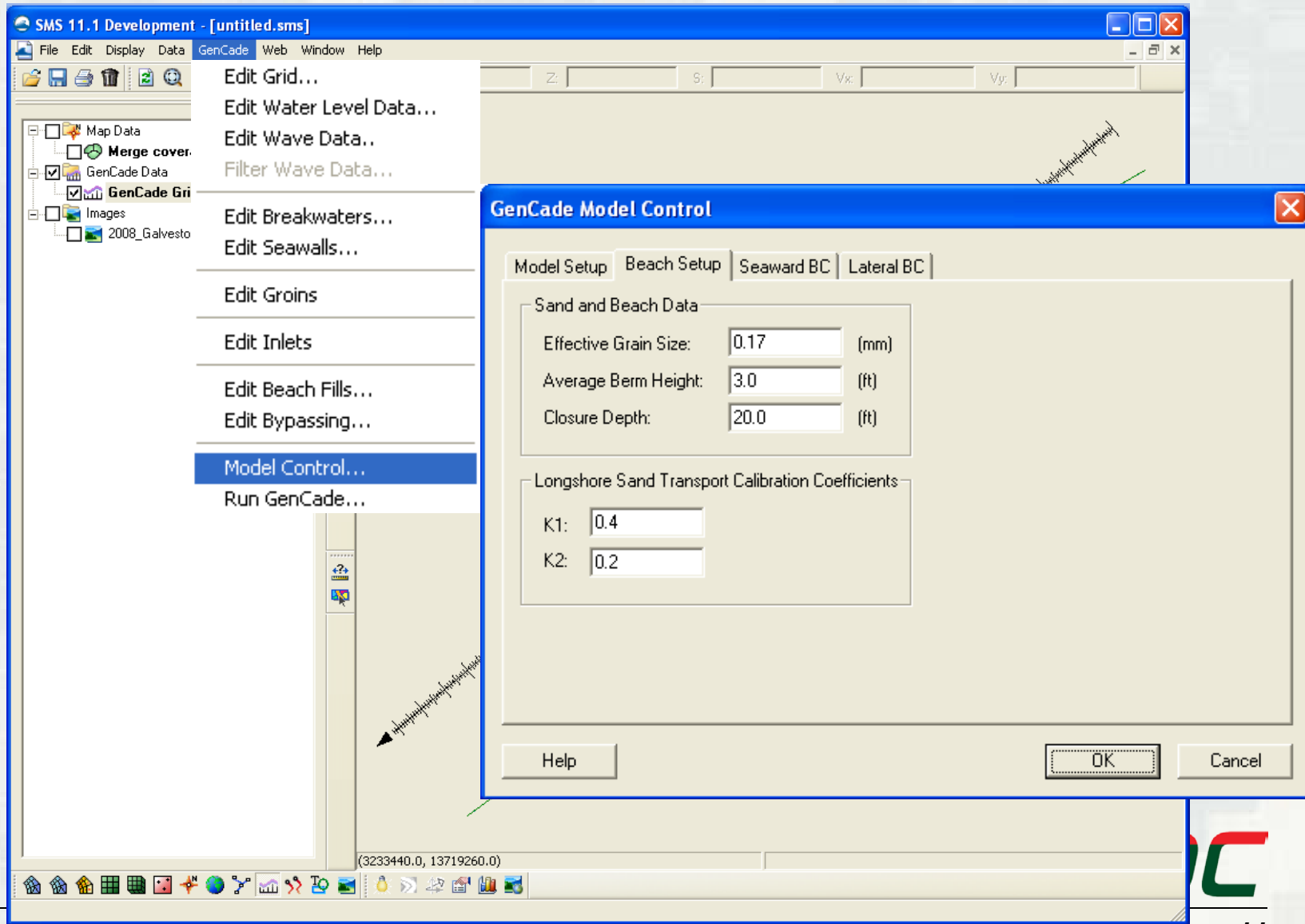


BUILDING STRONG®

Innovative solutions for a safer, better world



GenCade Model Control

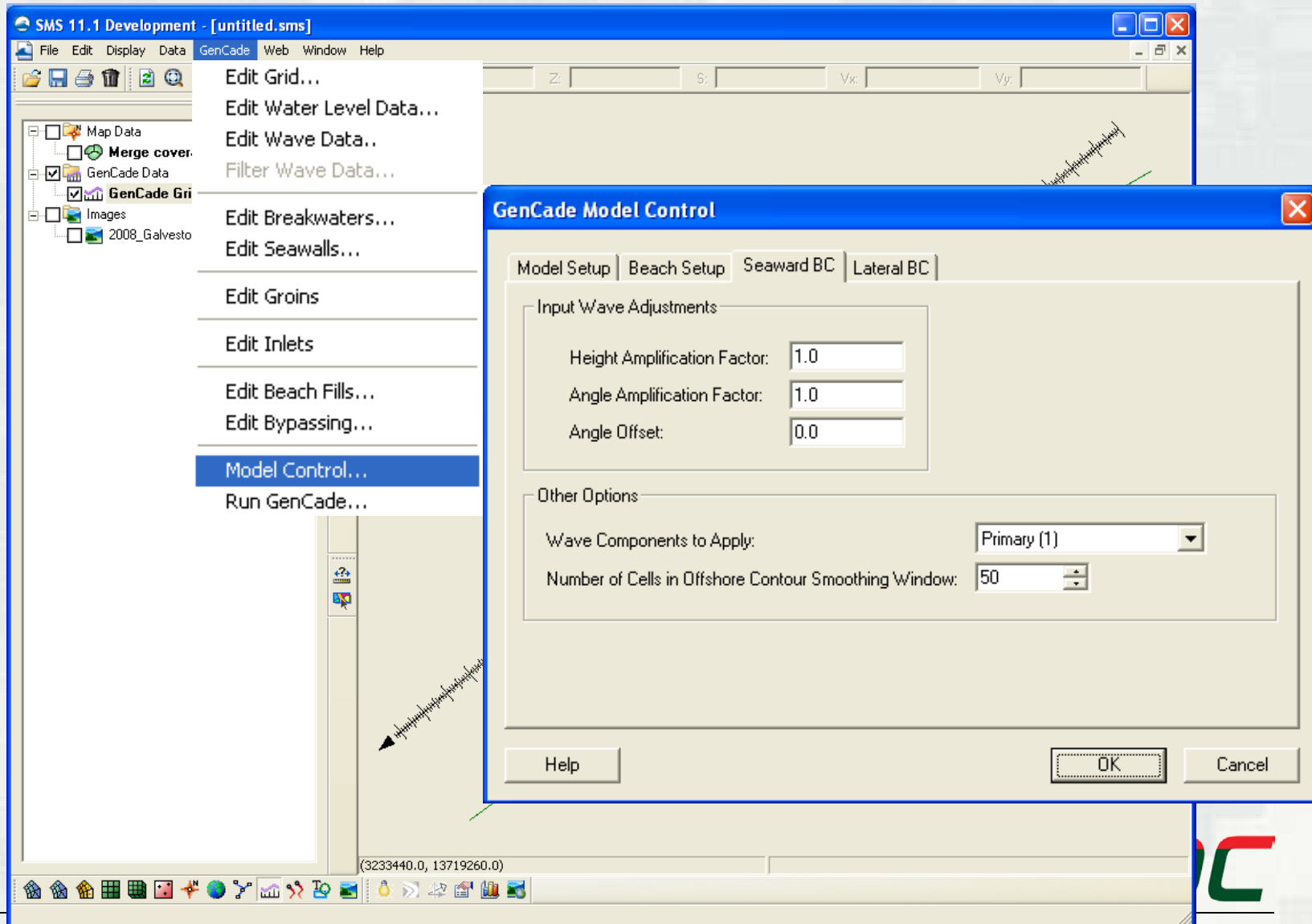


BUILDING STRONG®

Innovative solutions for a safer, better world



GenCade Model Control

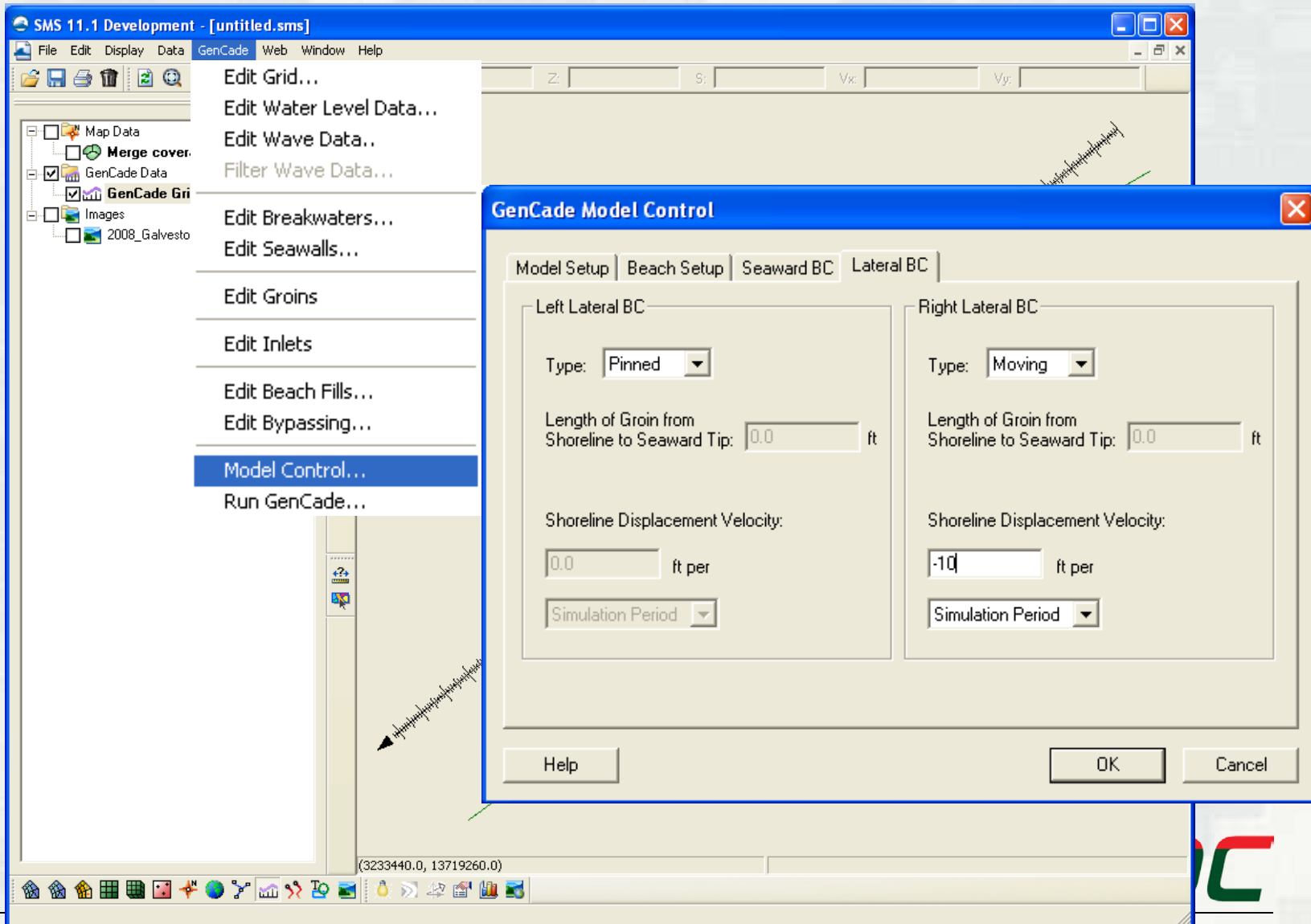


BUILDING STRONG®

Innovative solutions for a safer, better world



GenCade Model Control

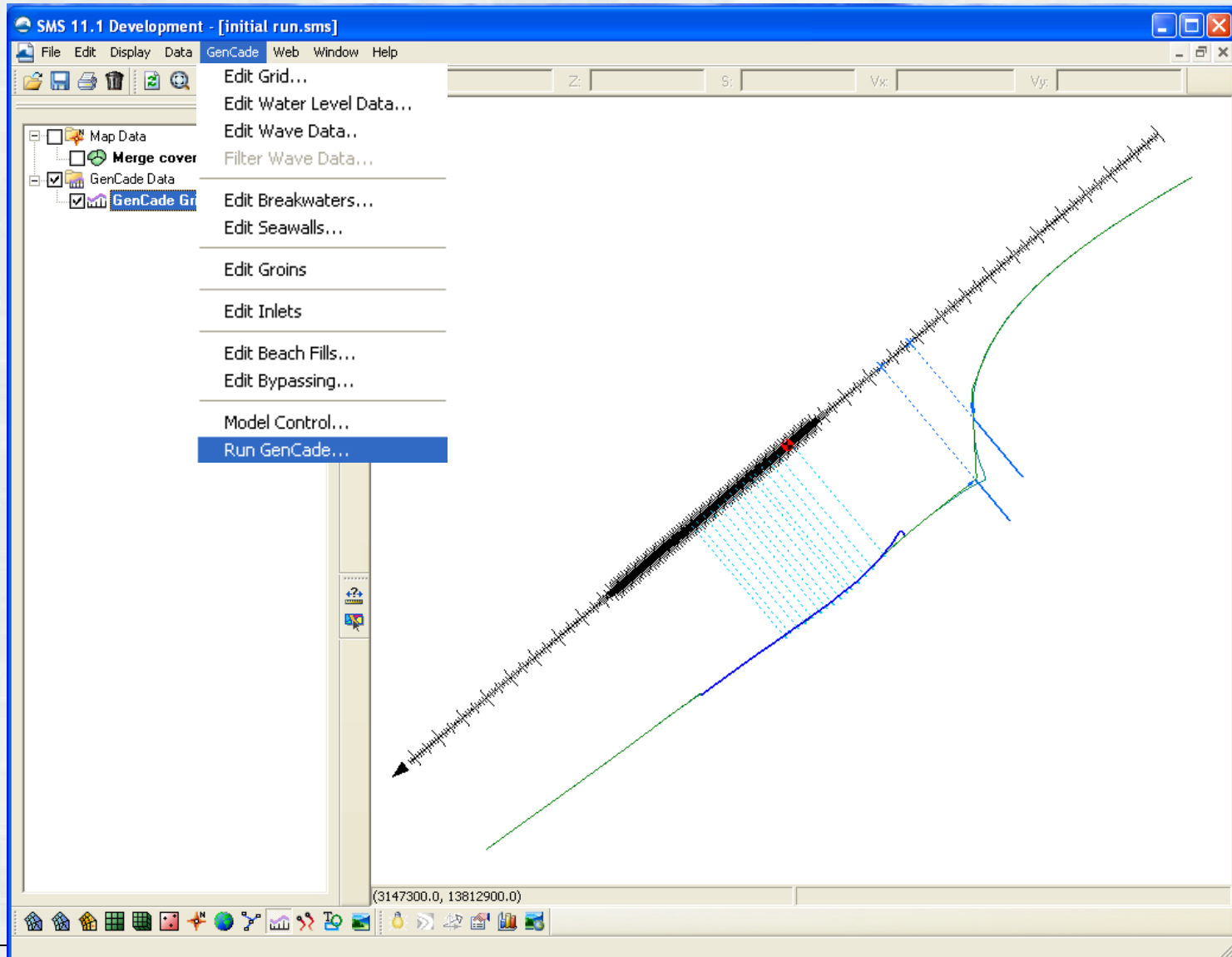


BUILDING STRONG®

Innovative solutions for a safer, better world



Run GenCade

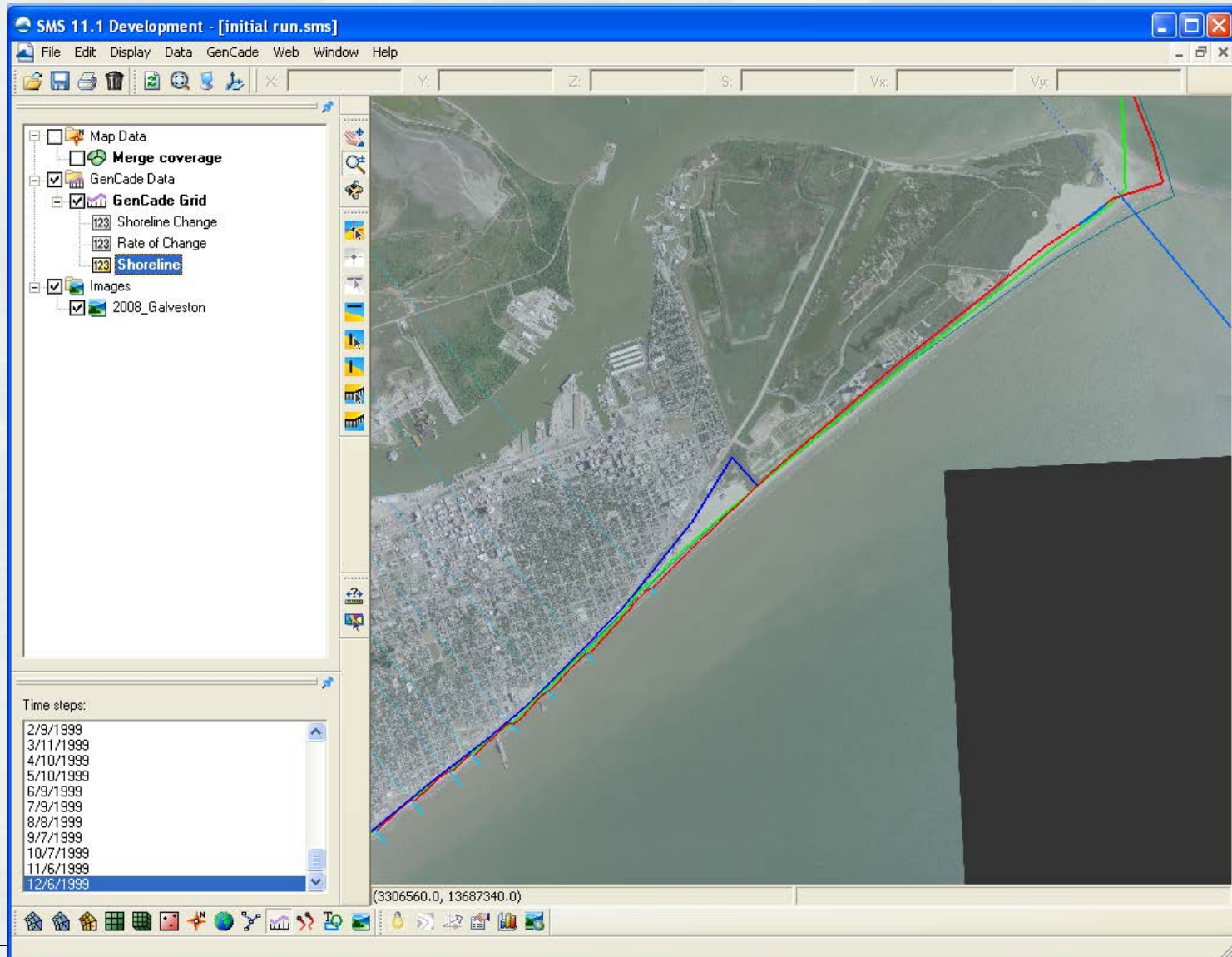


BUILDING STRONG®

Innovative solutions for a safer, better world



GenCade Results

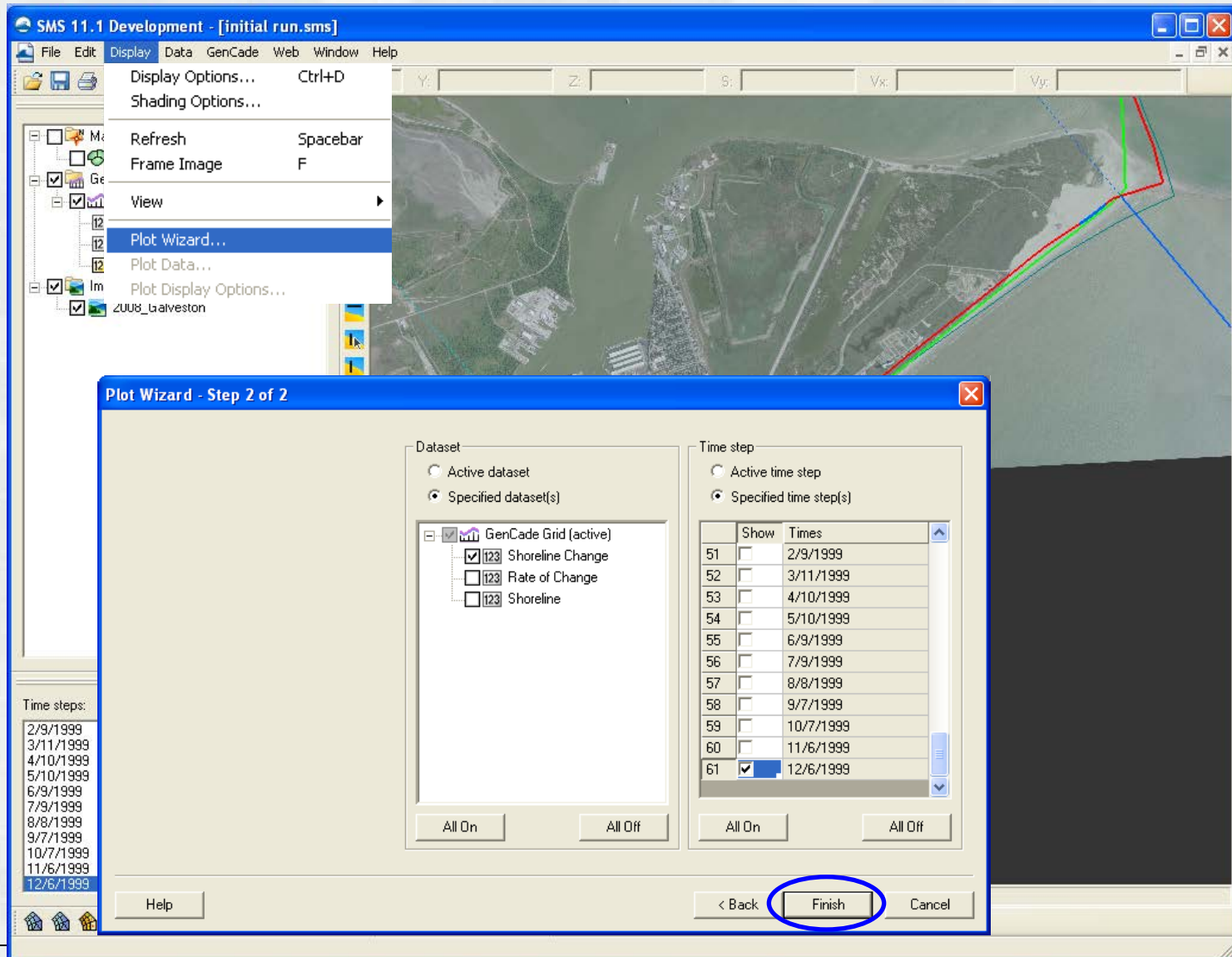


BUILDING STRONG®

Innovative solutions for a safer, better world



GenCade Results

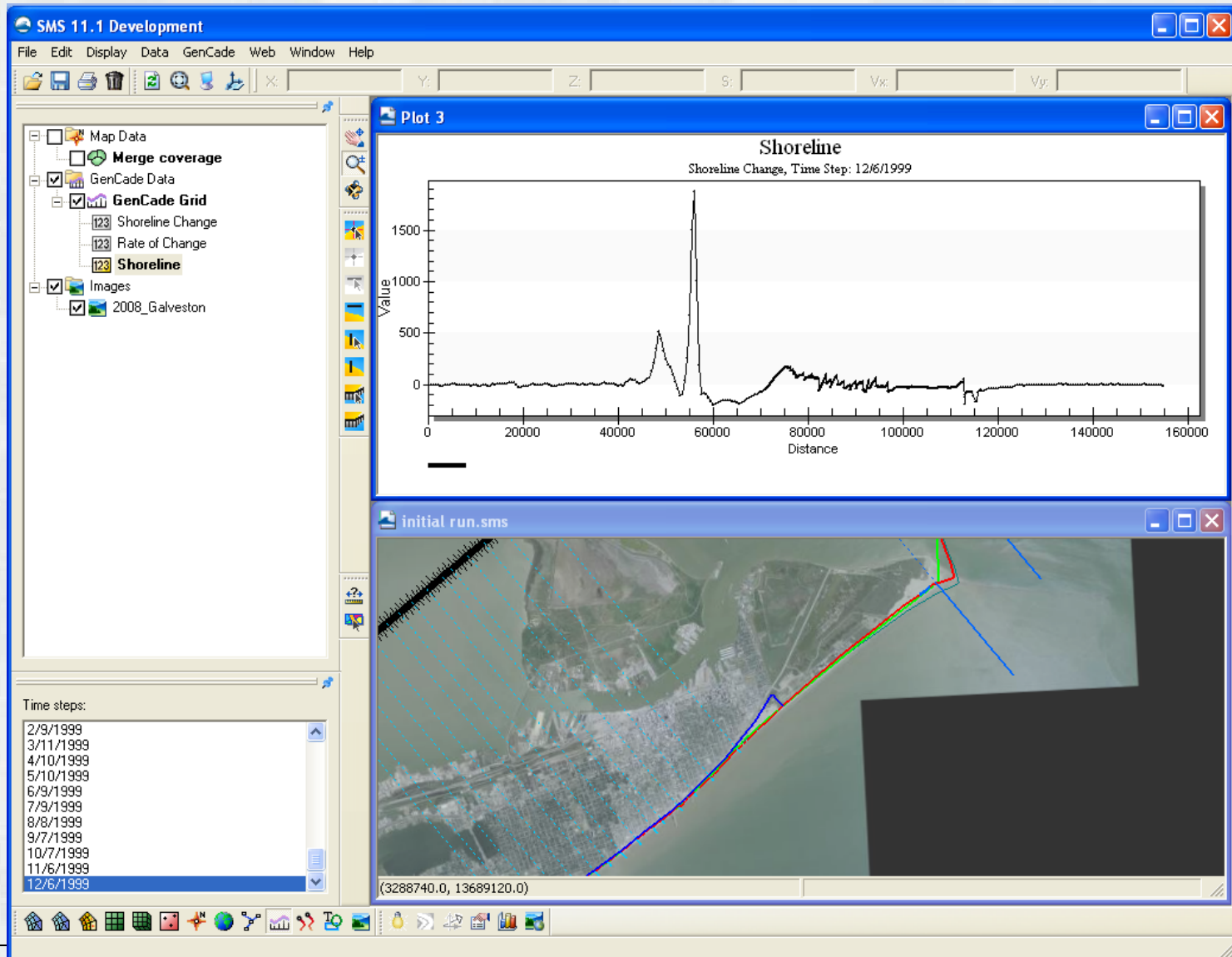


BUILDING STRONG®

Innovative solutions for a safer, better world



GenCade Results

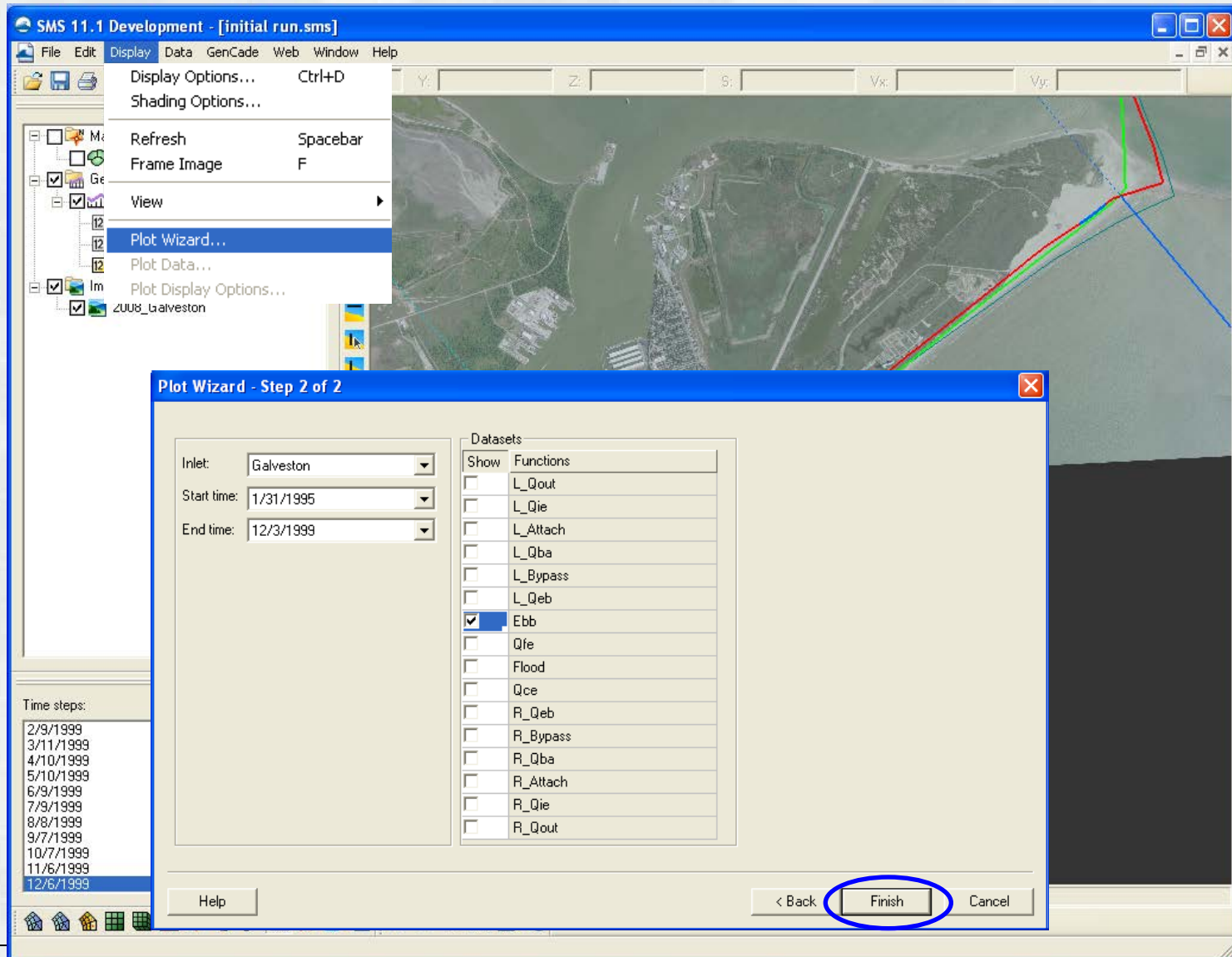


BUILDING STRONG®

Innovative solutions for a safer, better world



GenCade Results

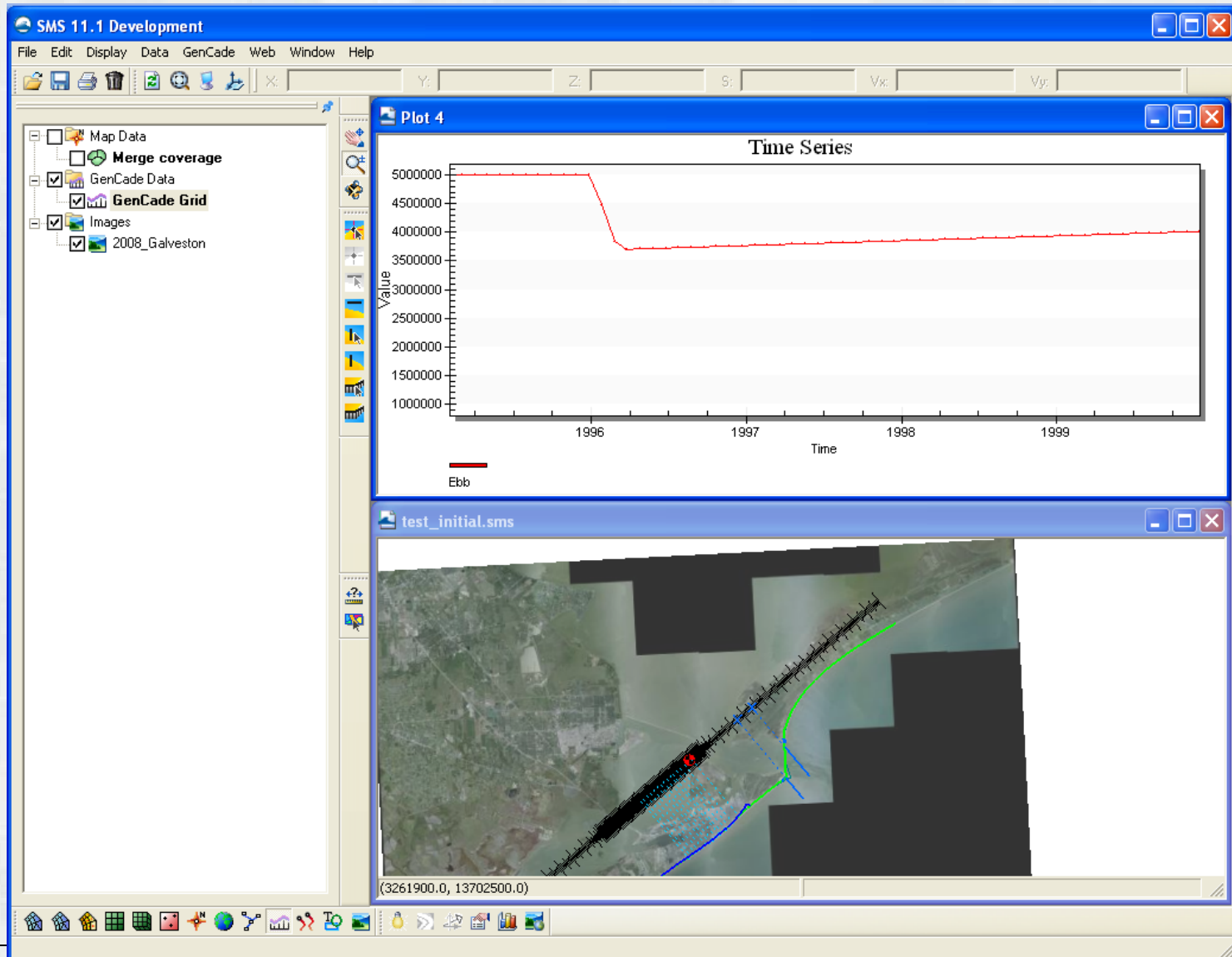


BUILDING STRONG®

Innovative solutions for a safer, better world



GenCade Results



BUILDING STRONG®

Innovative solutions for a safer, better world

