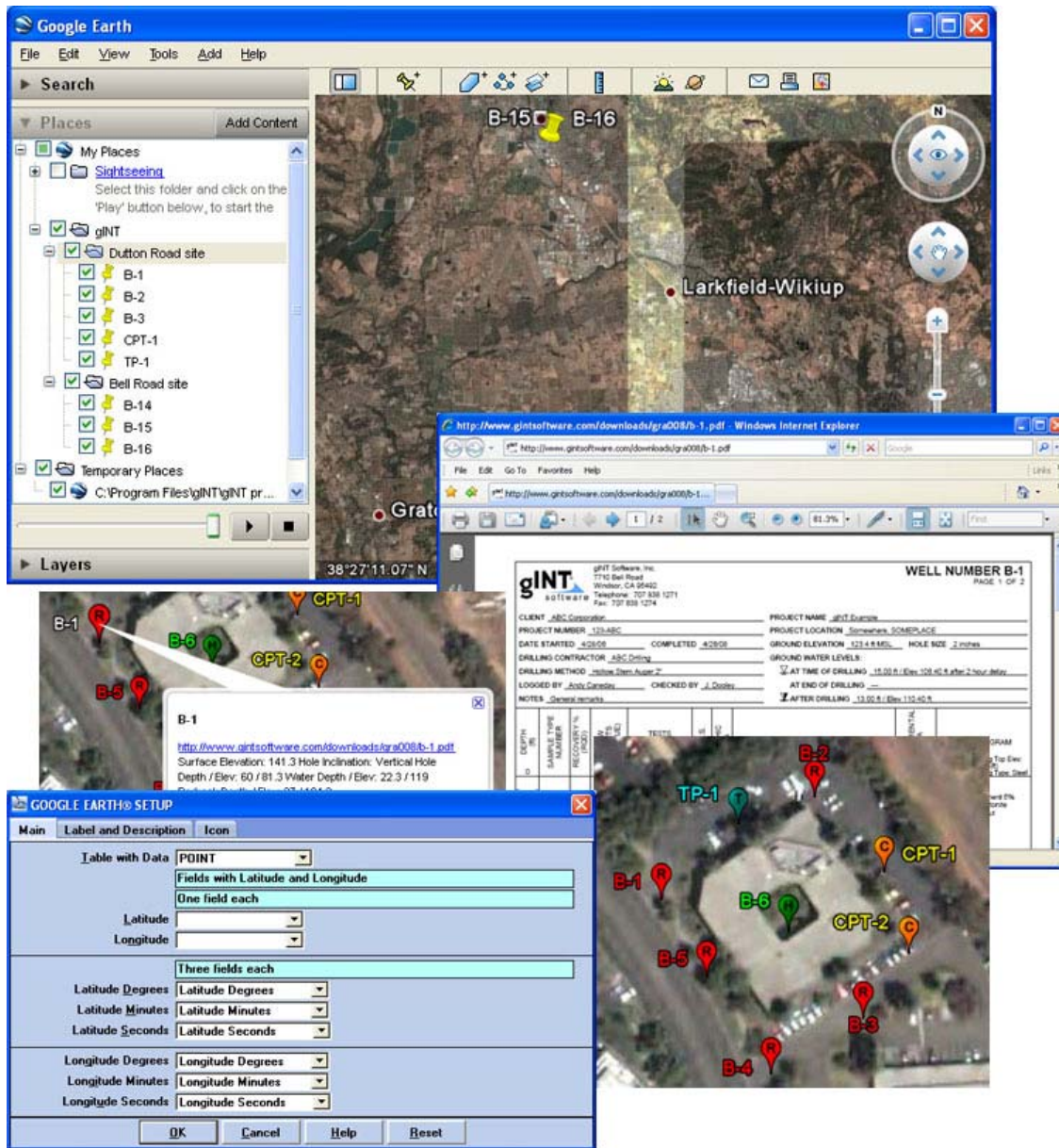


gINT Tutorial

Using Google Earth[®] with gINT



The screenshot displays the Google Earth interface with a project site overlaid. The 'Places' sidebar on the left shows a hierarchy: My Places > Sightseeing > gINT > Dutton Road site > B-1, B-2, B-3, CPT-1, TP-1. A 'Layers' panel at the bottom shows coordinates: 38°27'11.07" N.

An inset window shows a 'WELL NUMBER B-1' data table with the following information:

gINT software		WELL NUMBER B-1	
CLIENT	ABC Corporation	PROJECT NAME	gINT Example
PROJECT NUMBER	123-ABC	PROJECT LOCATION	Somewhere, SOMEPLACE
DATE STARTED	4/20/08	COMPLETED	4/20/08
DRILLING CONTRACTOR	ABC Drilling	GROUND ELEVATION	121.48 METERS
DRILLING METHOD	Surface Drilling	GROUND WATER LEVEL	2 notes
LOGGED BY	Andy Carpenter	CHECKED BY	J. Dooley
NOTES	General remarks	AT TIME OF DRILLING	11.00 A / Elev. 120.40 ft after 2 hour delay
		AT END OF DRILLING	
		AFTER DRILLING	11.00 A / Elev. 110.40 ft

A 'GOOGLE EARTH SETUP' dialog box is open, showing the 'Label and Description' tab. It is configured for a 'POINT' table with 'Fields with Latitude and Longitude' and 'One field each' for Latitude and Longitude.

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Table of Contents

Using this Tutorial.....	1
Setting up Sample Files	1
Overview of gINT Integration with Google Earth®	2
Latitude and Longitude Fields in the gINT Database.....	2
Google Earth Setup in the Additional Modules Menu	4
Generating the Borehole Points Display in Google Earth	6
The Places Explorer in Google Earth	8
Exporting a Second Project to Google Earth	10
Manipulating the Folder Structure in the Places Explorer.....	12
Adding Display Options.....	14
Label Text Color and Icon Color	16
Popup Text Description	17
Icon Selection	17
Advanced Example using gINT Rules	26

Using this Tutorial

This tutorial is designed for intermediate level gINT users, and is intended for self-study. It explores the interface features in gINT that enable export of coordinates (and some data) from borehole points to Google Earth for viewing in the context of satellite imagery. The tutorial has you perform step-by-step instructions in gINT, using sample data files that you download.

You should be familiar with gINT data entry and basic output (including preview and printing, and the zoom tools) before working through this tutorial. We recommend you work through the *Performing Data Entry* tutorial or take the gINT University class *gINT 001 - Introduction to gINT: Data Entry and Basic Output* if you do not have that familiarity.

Setting up Sample Files

Before starting the tutorial, you need the following:

- gINT Version 8.2 installed on your computer
 - ☞ **Important:** Google Earth integration will not run in prior versions of gINT.
- Google Earth installed on your computer. You can obtain the software download at <http://earth.google.com>.
- Sample files installed in the appropriate subfolders of the \gINT\ installation folder (usually C:\Program Files\gINT\)

To obtain and install the sample files, do the following:

1. Go to www.gintsoftware.com/support_doc.html.
2. Click on the link 'Data Files for Google Earth Integration Tutorial'.
3. Extract the following files to the indicated locations:

File	Destination
training google earth.gpj	\gINT\projects\
training google earth 2.gpj	\gINT\projects\
training google earth.glb	\gINT\libraries\
two new projects.kmz	\gINT\auxiliary files\

Overview of gINT Integration with Google Earth®

Google Earth integration is provided in gINT 8.2. With this feature, you can view the borehole points in a gINT project as Google Earth *places*, and visualize your site layout using all of Google Earth's tools. You can have the borehole points represented with custom place labels, label colors, icons, and popup descriptions, all obtained from fields in the POINT table or tables with 1-to-1 relationships with POINT.

Latitude and Longitude Fields in the gINT Database

For gINT point data to be interpreted as Google Earth place data, fields must be present in the POINT table (or a table with a 1-to-1 relationship to POINT) that supply the latitude and longitude coordinates. A field or set of fields to hold a latitude or longitude value can be set up in any of the following forms:

- As three separate numeric fields, one each to hold degrees, minutes and seconds, as shown:

PointID	Latitude Degrees	Latitude Minutes	Latitude Seconds
B-1	38	26	50.84
B-2	38	26	51.58
B-3	38	26	51.85

☞ **Important:** These fields must be numeric, namely 'Integer' or 'Single' types. Otherwise gINT will not recognize them.

- As a single numeric field holding degrees in decimal format:

PointID	<= Latitude Decimal (deg)
B-1	38.44745556
B-2	38.44766111
B-3	38.44773611

☞ **Important:** This field must be type 'Double'.

☞ **Note:** You can select **North** and **East** as your numeric latitude and longitude fields, although we strongly recommend against doing this. If your current version of gINT does not support this feature, perform an update to the latest version. **North** and **East** have very different purposes from latitude and longitude, and will make fences and site maps unusable if they contain latitude/longitude values. It is far better to create additional fields for latitude and longitude.

- As a single text field holding degrees, minutes and seconds separated by appropriate characters (°, ', and ")

PointID	<= Latitude Text
B-1	38°26'50.84"
B-2	38°26'51.58"
B-3	38°26'51.85"

Let's see how the latitude-longitude fields in one of these three formats look in a gINT project. Do the following:

1. Open gINT, and go to the **INPUT** tab.
2. Open the 'training google earth.gpj' project (**File ► Open Project**, then browse to the project file and click **Open**).
 ☞ You do not need to open a special library; your current library will suffice.
3. Click the **Borehole** tab.
4. Notice the **Latitude Minutes**, **Latitude Degrees**, and so on, columns in the data entry grid. There are six fields altogether.

gINT Software, Inc. www.gintsoftware.com											
INPUT OUTPUT DATA DESIGN REPORT DESIGN SYMBOL DESIGN DRAWINGS UTILITIES											
Project Borehole Lithology Sample Water Levels Well											
											Table Help
Borehole ID	Total Depth (ft)	Date Started	Date Completed	Surface Elevation (ft)	Latitude Degrees	Latitude Minutes	Latitude Seconds	Longitude Degrees	Longitude Minutes	Longitude Seconds	
B-1	45	4/28/2008	4/29/2008	126	38	26	50.84	-122	43	51.59	
B-2	45	4/28/2008	4/29/2008	129.8	38	26	51.58	-122	43	50.62	
B-3	25	4/30/2008	5/1/2008	117.6	38	26	51.85	-122	43	49.66	
CPT-1	46.9	11/21/2007	11/24/2007	122	38	26	51.11	-122	43	48.79	
TP-1	13	11/21/2007	11/25/2007		38	26	50.32	-122	43	48.48	
*											

5. Notice that all five points have a negative value (-122) for **Longitude Degrees**. This is because these are longitude west values. Longitude west and latitude south values are entered as negative numbers; longitude east and latitude north values are positive.

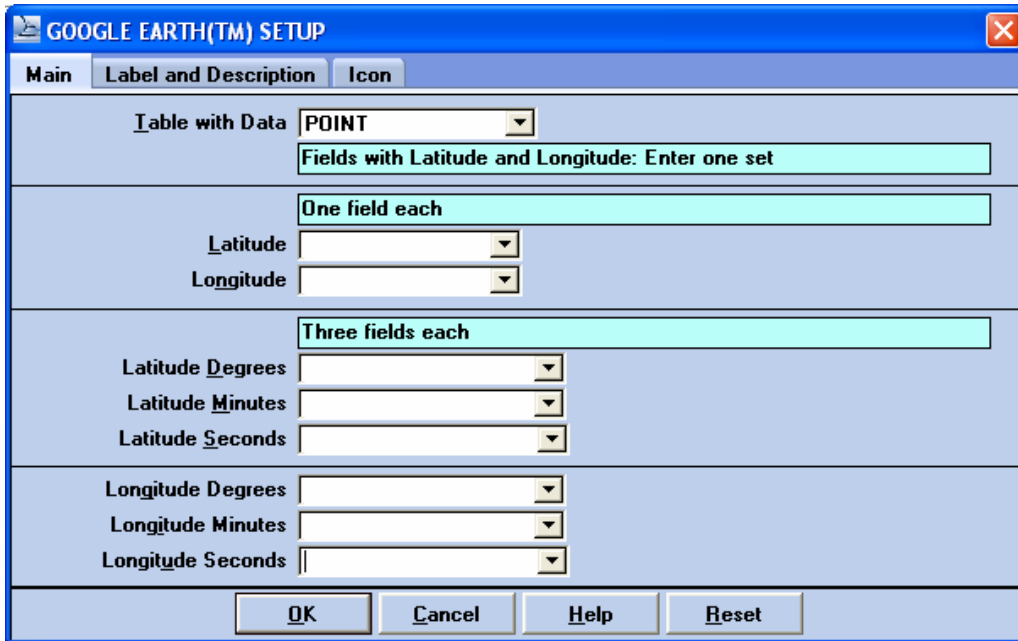
Any POINT records that lack latitude and longitude data are ignored when the data is exported to Google Earth.

☞ **Note:** You have to include latitude/longitude fields in each project file that you plan to use with Google Earth, ideally with consistent field types and consistent field naming between projects. The simple way to accomplish this is to add these fields to your standard data template, and use that template for creating future projects. A template file also stores the Google Earth Setup parameters that we will see in the next section, so that you do not have to re-enter that information either. The new fields and setup parameters can also be applied from the data template to older projects using **UTILITIES ► Convert Projects** (if all of your projects have a uniform structure) or **DATA DESIGN ► Merge All Tables and Fields** (if there is any diversity in project structures).

Google Earth Setup in the Additional Modules Menu

Once a project has latitude and longitude data in one of the required formats, you can export the data to Google Earth. You can also configure additional fields in the POINT table to provide other information about your boreholes to Google Earth, as we shall see in subsequent sections. However, gINT does not automatically know which fields serve which purposes until you specify that information in a setup window called GOOGLE EARTH SETUP, located in the Additional Modules menu in INPUT. Do the following:

1. Select Additional Modules ► Google Earth ► Google Earth Setup. The Main tab of the GOOGLE EARTH SETUP dialog box appears:



The Main tab is where the fields providing latitude and longitude are specified.

2. Ensure that 'POINT' is selected in the Table with Data property.
3. Under the section entitled Three fields each, select the following values from the corresponding drop-down lists:

Property	Value
Latitude Degrees	Latitude Degrees
Latitude Minutes	Latitude Minutes
Latitude Seconds	Latitude Seconds
Longitude Degrees	Longitude Degrees
Longitude Minutes	Longitude Minutes
Longitude Seconds	Longitude Seconds

Notice that we've created fields in the POINT table with the same name as the properties that will use them. This is not a requirement, as you could give the fields any names you want.

Note that if you had created one field each for latitude and longitude (rather than three fields each), you would use the pair of properties in the upper part of the dialog box.

4. Click the **Label and Description** tab. In the **Field with Icon Label** property, select 'PointID'.

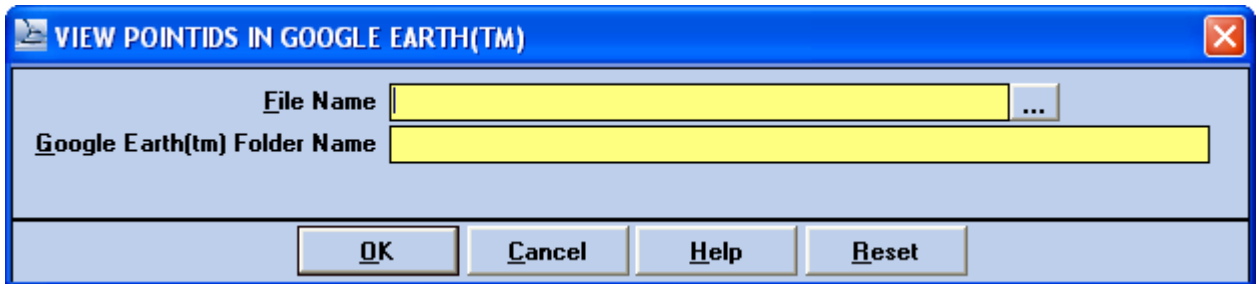
This specifies the source field in gINT of the point label text. In other words, the point in gINT with PointID 'B-1' will be labeled 'B-1' in Google Earth. We will describe the contents of the **Label and Description** tab in greater detail shortly. For now, just assign this one value because it makes the relationship between the Google Earth display and the gINT project easier to see.

5. Click **OK**. Note that you can revisit and change your setup values for this project at any later time by selecting **Additional Modules ► Google Earth ► Google Earth Setup**.

Generating the Borehole Points Display in Google Earth

Now that the required field mappings are specified in the GOOGLE EARTH SETUP dialog box, we can demonstrate the Google Earth integration feature. Do the following:

1. Select **Additional Modules ► Google Earth ► View PointIDs in Google Earth**, or press F9. The VIEW POINTIDS IN GOOGLE EARTH dialog box appears.




2. Enter the following values:

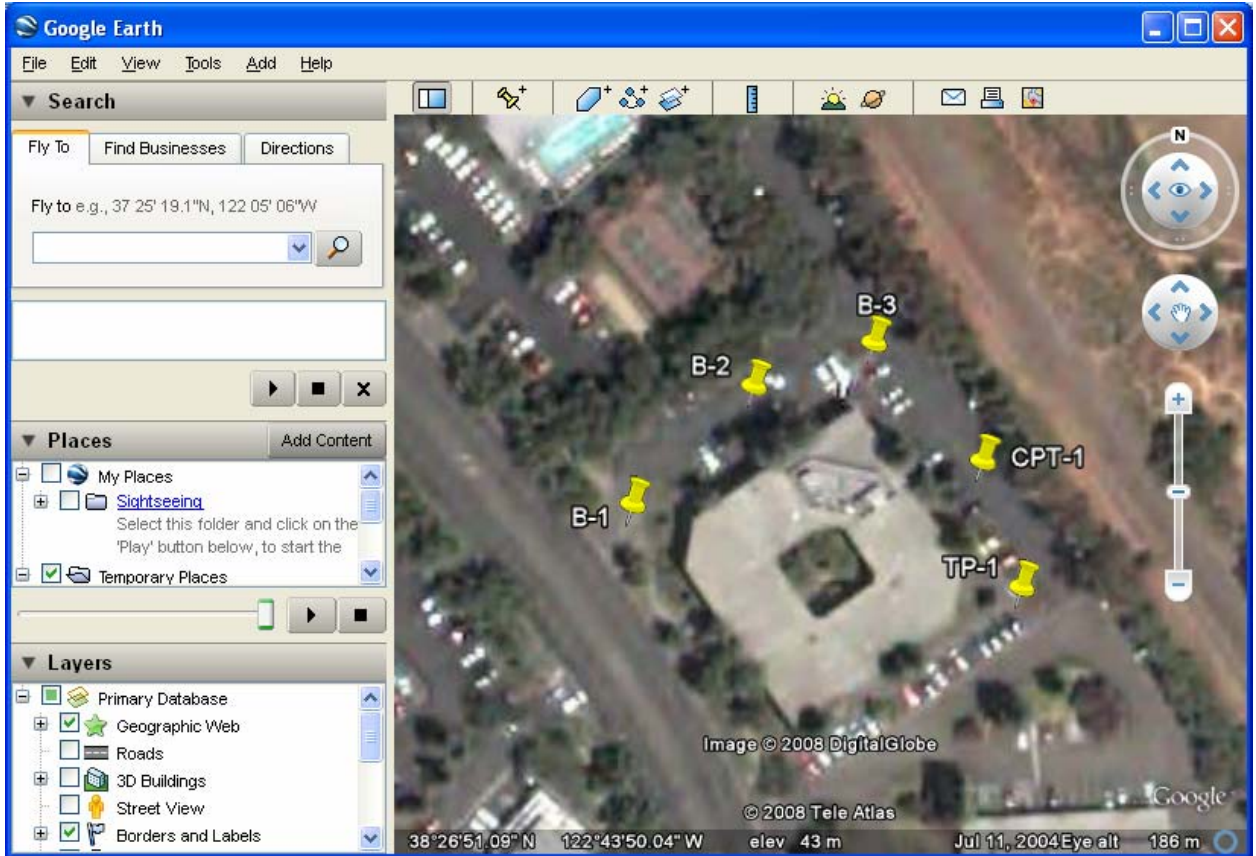
Property	Value	Comments
File Name	\\gINT\gINT projects.kml	Specifies the name of the “Keyhole Markup Language” file that will hold Google Earth “placemarks” (points) for a logical collection of multiple gINT projects (such as a region or a client name). Click the Browse icon then specify ‘gINT projects’ for the filename.
Google Earth Folder Name	Dutton Road site	Specifies a logical ‘folder’ to be created within Google Earth. This will hold data just for the one project we are currently exporting.

A .kml (Keyhole Markup Language) file stores all the information necessary to regenerate a set of points on any Google Earth user’s computer, including various attributes of the points such as color, icon, description, and label. A .kml file generated from gINT will open up the set of points, with all their attributes, on any computer with Google Earth, even if they don’t have gINT.

Points are organized by Google Earth folder names in the **Places** explorer in Google Earth, described in the next section. A Google Earth Folder Name is a logical way to keep the points from a single gINT project together within the multiple-project .kml file.

 **Note:** Technically, the name for points in Google Earth is *placemarks* or *places*. However, we will continue to call them points for consistency with gINT.

- Click OK. Google Earth opens with the project's borehole points identified with pushpin icons and the borehole numbers alongside each.



You have just exported the borehole points from a gINT project for viewing in Google Earth. In the next section we will explore the Google Earth interface in greater detail, and see how your gINT points are displayed and organized there. We will also see how to load the points from multiple gINT projects into Google Earth.

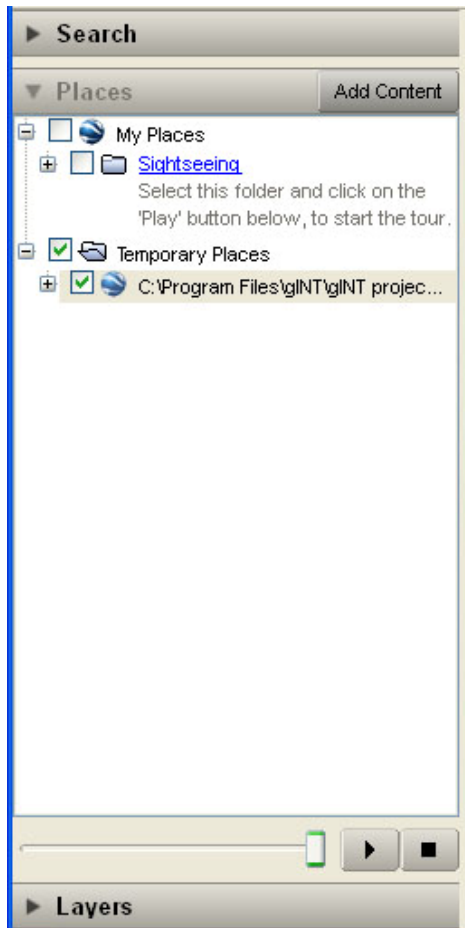
The Places Explorer in Google Earth

Next we explore the left column of the Google Earth window. Do the following:

1. Notice that the left column contains three windowpanes labeled **Search**, **Places**, and **Layers**, respectively, each with an “explorer” hierarchical structure. Each of these can be hidden or shown by clicking the show/hide arrow to the left of each explorer name. A hidden explorer is indicated by the “▶” symbol, and a shown explorer is indicated by the “▼” symbol.

Initially all three explorers are shown, but we are particularly interested in the **Places** explorer because it provides a way to navigate to particular borehole points. We will hide the other two explorers and see how the **Places** explorer is used.


2. Hide the **Search** and **Layers** explorers by clicking their show/hide symbols. The **Places** explorer enlarges to fill the column.

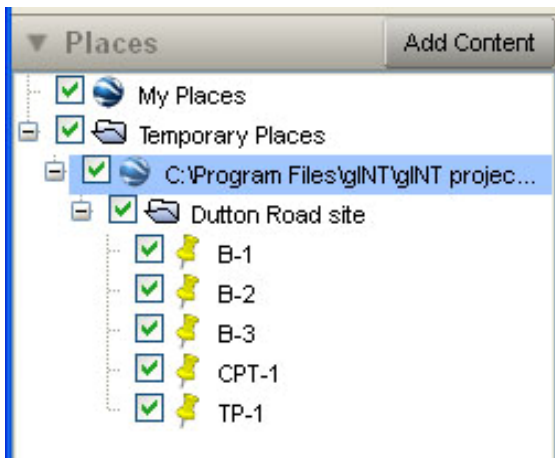


3. Optionally right-click on the **Sightseeing** link and select **Delete**. This removes a folder which clutters up the display of gINT points, and we will do this for the sake of the pictures in this tutorial. However you may want to keep the link, at least until you have viewed the **Sightseeing** demo.

4. Notice that the .kml file that you generated from gINT is displayed under the heading **Temporary Places**. Its full path and filename are displayed (in this case it's 'C:\Program Files\gINT\gINT Projects.kml').

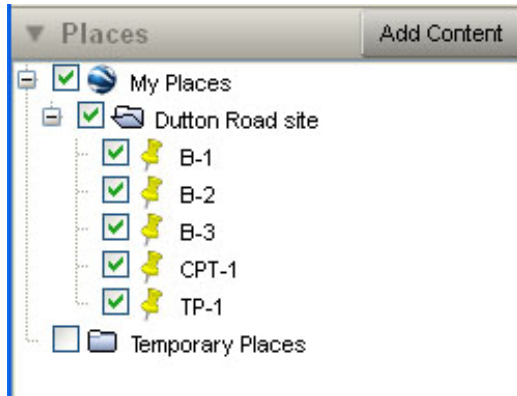
The **Places** explorer contains two main folders:

- o **My Places** is essentially permanent storage for points. If you were to close Google Earth and reopen it, all the points in **My Places** would still be present.
 - o **Temporary Places** displays the contents of the .kml file (or files) you currently have open. In our case, this is the .kml file that gINT generated from the current project. If you were to close Google Earth and reopen it without first saving the contents of **Temporary Places** to **My Places**, the contents of **Temporary Places** would be lost.
5. Click the Expand  icon to the left of the 'C:\Program Files\gINT\gINT Projects.kml' pathname. Notice that the Google Earth folder name that we specified, 'Dutton Road site', appears with a folder icon to its left. This indicates a folder that can hold points.
 6. Uncheck the checkbox to the left of the 'Dutton Road site' folder name. Notice that all the borehole markers disappear that you just imported from gINT. Check the checkbox again to re-display these borehole points.
 7. Click the Expand icon to the left of the 'Dutton Road site' folder name. Notice that the borehole points we exported from the gINT project now are listed as subsidiary to the folder.



8. Uncheck and recheck one of the points in this list. Notice that it disappears and reappears from the viewer.
9. Highlight the 'Dutton Road site' folder (by clicking on the text) and select **File ► Save ► Save to My Places**. Notice that this folder has moved from the **Temporary Places** heading to the **My Places** heading.
 - ☞ **Note:** Alternately you can just drag the 'Dutton Road site' folder up to the top of the **Places** explorer and drop it on the **My Places** folder. Or you can right-click 'Dutton Road site' and select **Save to My Places** from the popup menu.
10. Click the Expand icon to the left of the 'Dutton Road site' folder. Notice that all the borehole points moved with the folder.
11. Close Google Earth. When prompted to save the contents of **Temporary Places**, click **No** (because we've already saved what we need).

12. Reopen Google Earth. Notice that the 'Dutton Road site' folder still appears in the Places explorer under My Places.
13. Click the Expand icon next to the 'Dutton Road site' folder (if not already expanded). Notice that the corresponding set of borehole points is displayed.



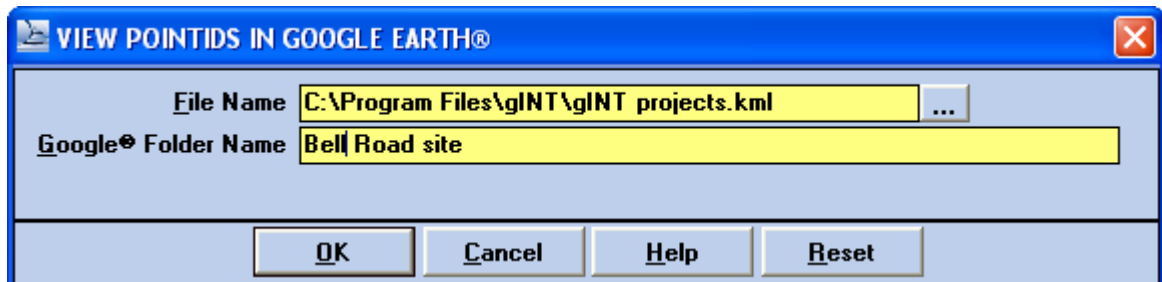
14. Double-click the 'B-1' point in the list under this folder name. Notice that the center of the aerial view display relocates to the 'B-1' borehole location.
15. Close Google Earth.

Exporting a Second Project to Google Earth

It is possible to add points from multiple gINT projects to My Places, stored under separate folders. There is essentially no limit on the number of points Google Earth can hold, so you can copy data from as many gINT projects as you want. To demonstrate multiple project transfer, we have provided you with a second project file called **training google earth 2.gpj** with the same structure as **training google earth.gpj**. In it we have entered some borehole points for a second site (called 'Bell Road site'), including latitude and longitude information in the same fields where this information was entered for the first project.

Let's see what happens when we export the new project's borehole points to Google Earth. Do the following:

1. Open the **training google earth 2.gpj** project in INPUT in gINT.
2. Select **Additional Modules ► Google Earth ► View PointIDs in Google Earth**. The **VIEW POINTIDS IN GOOGLE EARTH** dialog box appears.

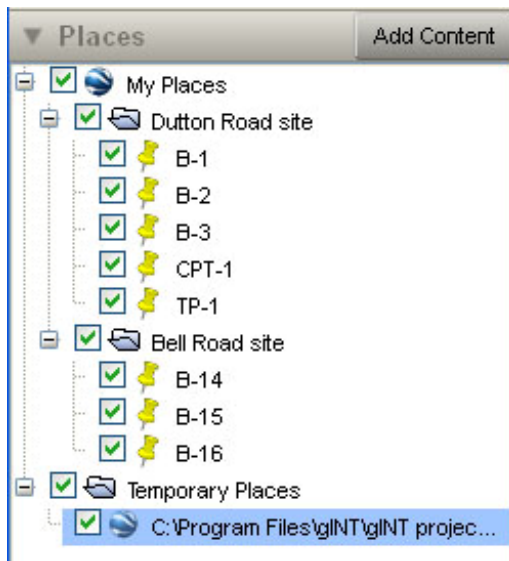


3. This time, keep the same File Name, but change the Google Folder Name to one that reflects the project being exported. Click OK.

4. You are asked by a prompt window whether or not you want to overwrite the .kml file. Answer Yes. The 'gINT projects.kml' file is a temporary means of getting points from gINT to Google Earth, and can be overwritten as often as needed.

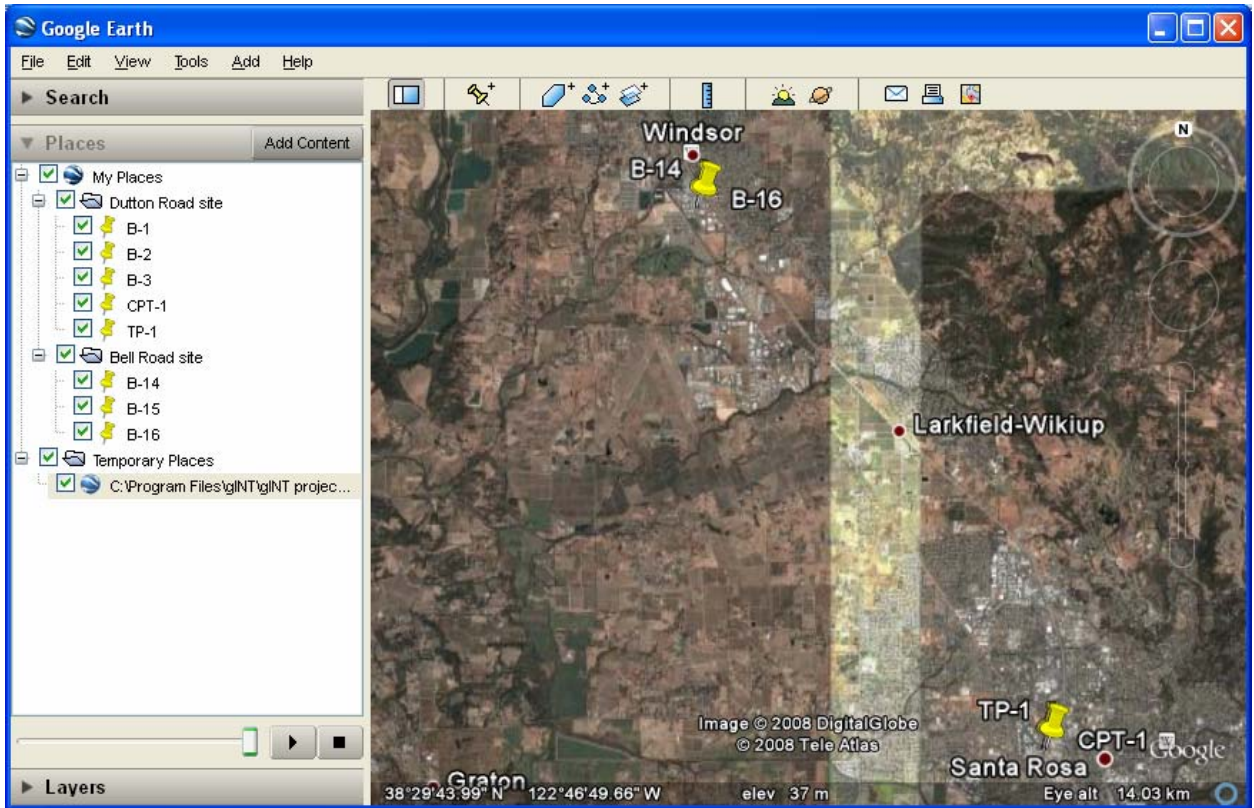
Google Earth opens, displaying the points from the new project.

5. In the Places explorer, expand the .kml pathname level (beneath Temporary Places), then the 'Bell Road site' folder beneath that. Notice that new points reside in this folder.
6. Highlight the 'Bell Road site' folder, then select **File ► Save ► Save to My Places**. Notice that the 'Bell Road site' folder is now located in My Places.
7. Expand the 'Bell Road site' folder to see the points contained there. Notice that points from two projects now exist in My Places under separate, appropriately named folders.



You can add the points from as many projects as you need to by following the same procedure.

8. Zoom out until you can see both sets of points by repeatedly clicking the minus sign icon at the bottom of the zoom bar (at right). As you can see, both groups of points are displayed.

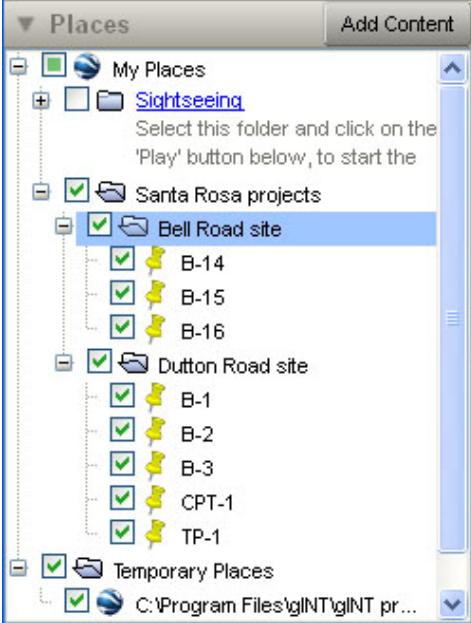


9. Double-click on a point in the Places explorer. Notice that the viewer windowpane zooms in on that point.
10. Select File ► Save ► Save My Places.

Manipulating the Folder Structure in the Places Explorer

The folder structure in the Places explorer can be manipulated as needed, including creation of new folders, movement of points between folders by drag and drop, and deletion of points or folders. To illustrate this, do the following:

1. Click the My Places text at the top of the folder hierarchy to highlight it.
2. Select Add ► Folder. The New Folder window opens.
3. In the Name field, enter 'Santa Rosa projects', then click OK. A new folder of this name is added to the hierarchy.
4. Drag the 'Dutton Road site' folder name onto the 'Santa Rosa projects' folder name, and release the mouse button. Notice that the 'Dutton Road site' folder is now contained in the 'Santa Rosa projects' folder.
5. Drag the 'Bell Road site' folder name onto the 'Santa Rosa projects' folder name, and release the mouse button.
6. Expand the two site folders, and notice now how you have restructured the hierarchy.



- 7. Select File ► Save ► Save My Places.
- 8. Close Google Earth.

Adding Display Options

You can customize certain features of how the borehole points are displayed in Google Earth, either by specifying literal values or taking values from fields in the POINT (or POINT-level) table. (A POINT-level table is one that has a one-to-one relationship with POINT.) In particular the following features can be configured:

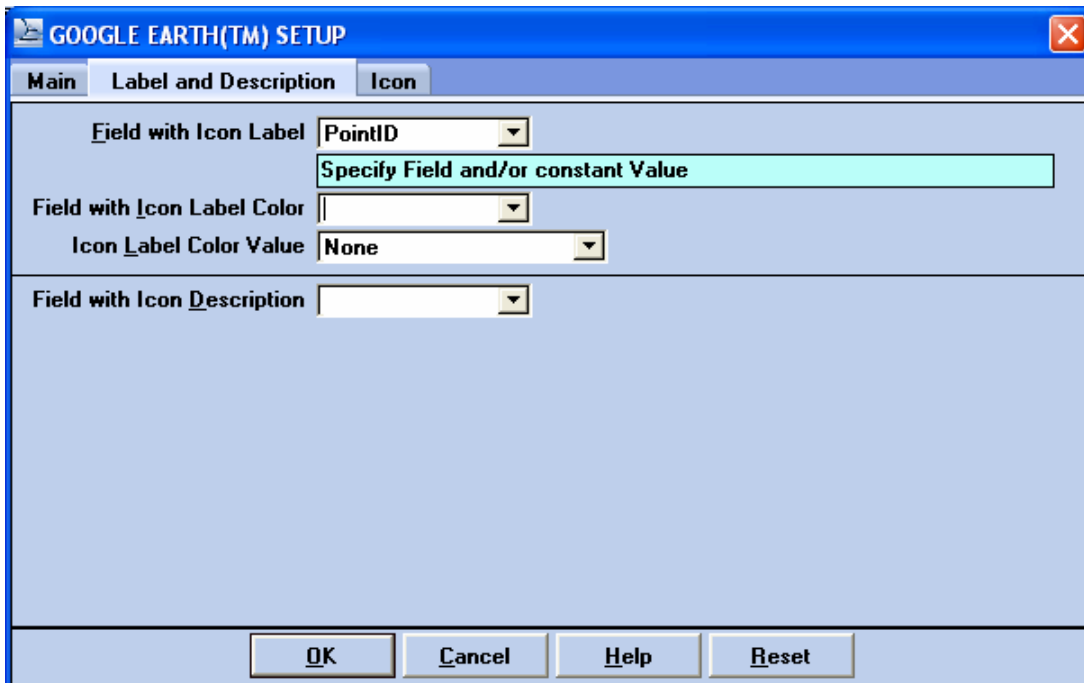
- The contents of the point label
- The text description in the popup that appears when you click a borehole point
- The icon associated with borehole points
- The color of the PointID text label

These features are configured in the **Label and Description** and **Icon** tabs in the **GOOGLE EARTH SETUP** dialog box. They are described in greater detail below.

Important: All gINT fields utilized for Google Earth integration must be in one table, and this must either be the POINT table or a table with a one-to-one relationship with POINT.

Let's view the **Label and Description** tab first. Do the following:

1. In gINT, go to **INPUT**. Open the 'training google earth.gpj' project, and select the **Borehole** tab.
2. Select **Additional Modules** ► **Google Earth** ► **Google Earth Setup**.
3. Click the **Label and Description** tab.

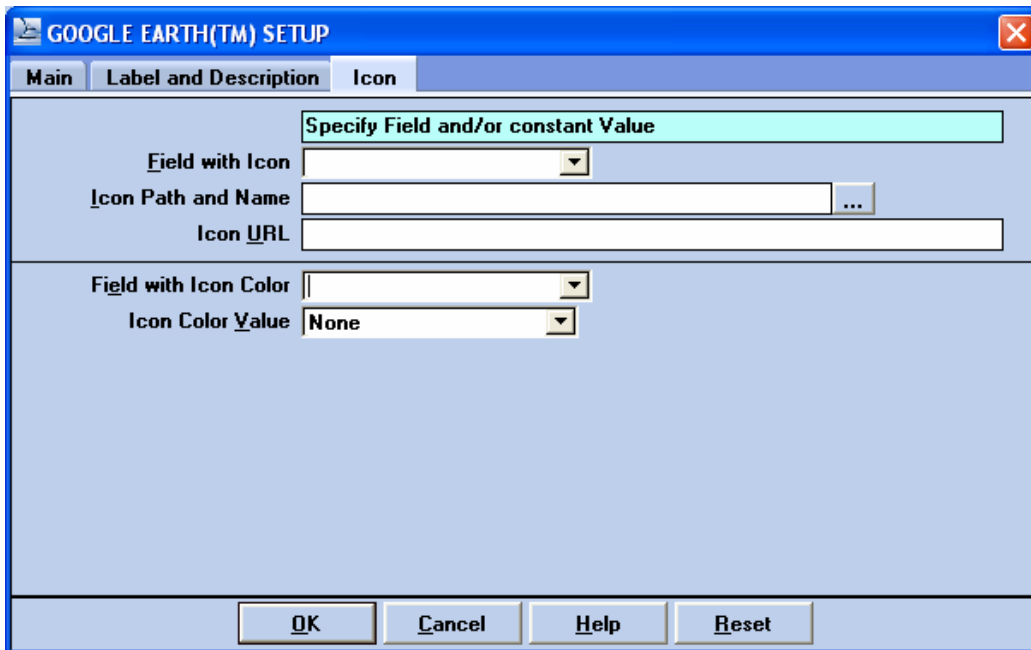


These property settings have the following purposes:

Property	Description
Field with Icon Label	Specifies the text field in the POINT (or POINT-level) table that provides the label appearing next to the borehole icon. Typically the PointID is used here. However, for a project with a large number of points, you may prefer to choose 'blank' from the Field with Icon Label drop-down. This eliminates the icon label.
Field with Icon Label Color	Specifies a field that supplies the color of the label. We'll create a field for this shortly (we'll also use it for the icon color).
Icon Label Color Value	This hard-codes a label color if you don't want to obtain this color from a field in POINT.
Field with Icon Description	Specifies a field that supplies a popup description when you click on the borehole point icon. Described in greater detail below.

We'll implement fields for two of these properties: Field with Icon Label Color and Field with Icon Description.

- Click the Icon tab.



- These property settings have the following purposes:

Property	Description
Field with Icon	Enables you to specify a POINT (or POINT-level) field containing the URL or pathname of a custom icon graphic located either on a website or a network server.
Icon Path and Name	Enables you to hard-code the pathname of a custom icon graphic located on a network server for all points.
Icon URL	Enables you to hard-code the URL of a custom icon graphic located on a website for all points
Field with Icon Color	Enables you to specify a POINT (or POINT-level) field containing the name of the color to apply to the icon.
Icon Color Value	Enables you to hard-code the name of the color to apply to the icon for all points.

We will demonstrate the **Field with Icon** and **Field with Icon Color** properties.

- Click **Cancel** to close the **GOOGLE EARTH SETUP** dialog box.

Label Text Color and Icon Color

The borehole numbers can be configured to be displayed in a custom text color on a borehole-by-borehole basis. Any field in the POINT table with color selection values can be used to set the text color. Similarly, the pushpin icon (or any custom icon or icons we specify) can be assigned a color on a borehole-by-borehole basis. We will set up a field called **Icon Color** that we will use for both the label text color and icon color (although you could have separate fields for each if you wanted). Do the following:

- In the **Borehole** tab, select **Tables ► Add Field**.
- Enter the following property settings, then click **OK**:

Property	Value
Name	Icon and Label Color
Type	Text
Lookup	GRAPHIC!Colors


- Scroll to the new **Icon and Label Colors** field at the far right of the table grid. Enter 'Very Light Red' in each of the first three rows ('B-1' through 'B-3'), 'Very Light Yellow' for the fourth row ('CPT-1'), and 'Very Light Green' for the fifth row ('TP-1').
- Select **Additional Modules ► Google Earth ► Google Earth Setup**.
- Click on the **Label and Description** tab. In the **Field with Icon Label Color** property, select 'Icon and Label Color'.
- Click on the **Icon** tab. In the **Field with Icon Color** property, select 'Icon and Label Color'. Click **OK**.

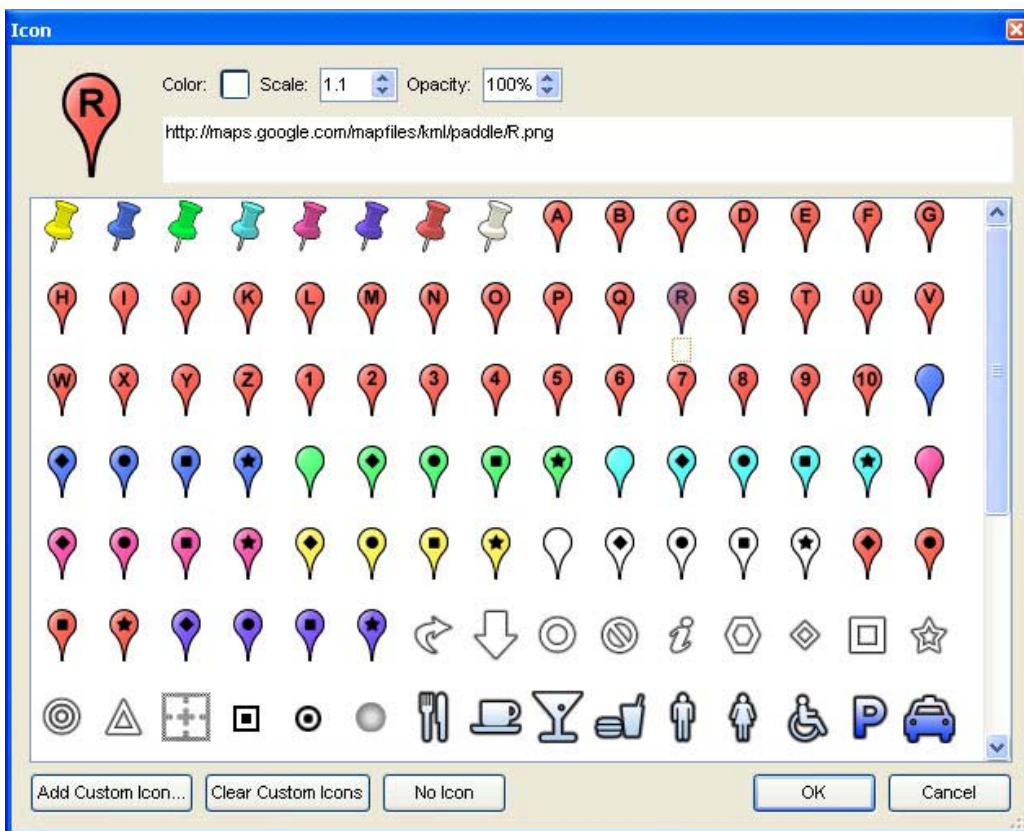
We will view the changes in Google Earth after we configure icon selection.

Icon Selection

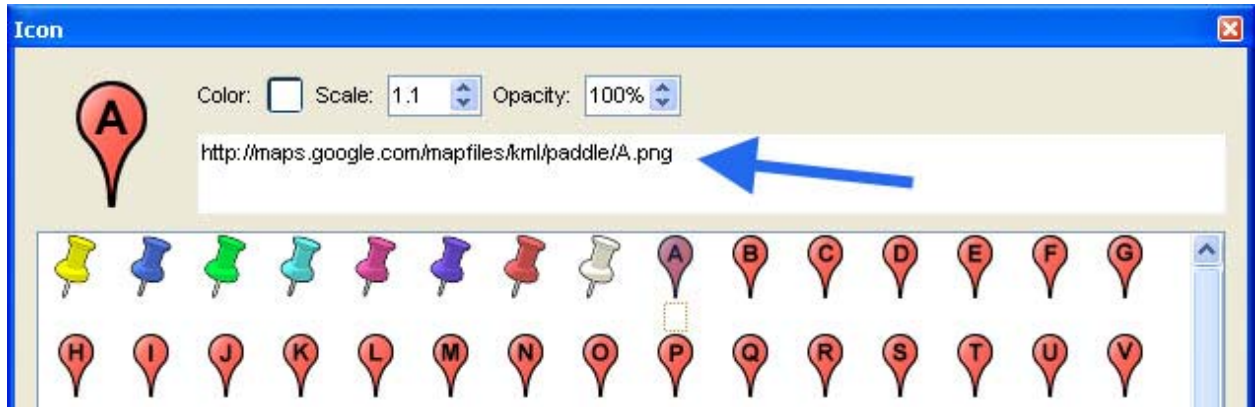
You can specify icons other than the default yellow pushpin on a borehole-by-borehole basis. This can be a useful way to visually identify different kinds of borehole points. Icon configuration is accomplished in the **Icon** tab of the **GOOGLE EARTH SETUP** window. You can point to icon files (such as .JPG, .BMP or .GIF images) either on your computer or server using pathnames, or on a Web site using URLs. Also, Google provides a basic set of icons that you can access, which saves you the effort of creating your own icons and posting them on a website or local server.

Do the following:

1. Open Google Earth. Select **Add ► Placemark**.
2. Click the yellow pushpin  icon. The following dialog box for icon selection appears:



Click on the letter 'A' paddle icon in the middle of the first row. Notice that the URL for that icon appears in the text box near the top.




The URL can be highlighted, copied, and pasted into gINT. We'll see how these are used shortly.

In this example, standard icons containing letters (from Google's website) will be used to identify different borehole types: a red 'R' for rotary core, a green 'T' for test pit, and a yellow 'C' for CPT. Although the icons we are interested in only appear in red on Google's website, we can specify a color property to change the icon's color.

3. Click **Cancel** twice to exit the **Add Placemark** windows, and close Google Earth.
4. In gINT, ensure that the 'training google earth.glb' library is the current library.
5. Go to **DATA DESIGN ► Library Data** and open the 'ICON URLS' library table. Notice that we have created the library table to map one of Google's icons to each of four (in this case) hole types. The **Hole Type** is just for identification in the popups; it isn't actually used anywhere.

Icon URL	Hole Type
http://maps.google.com/mapfiles/kml/paddle/R.png	Rotary Core
http://maps.google.com/mapfiles/kml/paddle/H.png	HSA
http://maps.google.com/mapfiles/kml/paddle/C.png	CPT
http://maps.google.com/mapfiles/kml/paddle/T.png	TP

 **Note:** We've set up the URLs for a relatively limited set of icons, and you are not restricted to the set of icons used here. You can map any publicly available icon (on the Google server or your own web server) to any point type you want.

6. Click the **INPUT** tab, go to the **Borehole** tab and select **Tables ► Add Field**. Add the following field:

Name	Type
Icon URL	Text
Lookup	LIBTBL!icon urls
Must Use Lookup	checked

By setting up this lookup, the user only has to select a hole type such as 'rotary core', and the URL value will be supplied. It would be impractical for users to enter long file paths or URLs pointing to the appropriate icons.

- Perform data entry into the **Icon URL** field in the data entry grid for POINT so that the first three rows are assigned the 'Rotary Core' URL, the fourth row is assigned the 'CPT' URL, and the fifth row is assigned the 'TP' URL. Notice that when you click in the **Icon URL** field, a drop-down list appears for selection of the value, and contains a legend value to the right telling you which hole type you are selecting for.

Icon URL		Icon and Label Color
http://maps.google.com/mapfiles/kml/paddle/R.png		Very Light Red
http://maps.google.com/mapfiles/kml/paddle/C.png	CPT	Light Red
http://maps.google.com/mapfiles/kml/paddle/H.png	HSA	Light Red
http://maps.google.com/mapfiles/kml/paddle/R.png	Rotary Core	Light Yellow
http://maps.google.com/mapfiles/kml/paddle/T.png	TP	Very Light Green

- Select **Additional Modules** ► **Google Earth** ► **Google Earth Setup**. Click the **Icon** tab.
- In the **Field with Icon** property select 'Icon URL'. Click **OK**.
- Select **Additional Modules** ► **Google Earth** ► **View PointIDs in Google Earth**.
- Enter the following in the **VIEW POINTIDS IN GOOGLE EARTH** window. Notice that we have changed the name of the .kml file to not overwrite our previous example, but kept the folder name because it's the same set of points as before.

Property	Value
File Name	\gINT\gINT projects.kml
Google Earth Folder Name	Dutton Road project

- Click **OK**. Google Earth opens, and navigates to the set of points from the project.
- Notice that there are two sets of points overlaying each other in the aerial view. This is because there are two sets of points for the Dutton Road site with the same coordinates, but different color and icon settings. We need to delete the older set in **My Places**.
- In **My Places** (not **Temporary Places**), highlight and delete the Dutton Road site folder.

15. Notice now that there is only one set of points for Dutton Road. Also, the pushpin icons and the point ID labels are colored corresponding to the values you set in the gINT project.



16. Close Google Earth. Answer **No** to the prompt for saving temporary data to My Places, since we will re-import the same points with some new settings.

Popup Text Description

When you click a borehole point, a popup window appears near the point, displaying a text description associated with that point. However, if you have specified the minimum setup described above, nothing will appear in this popup except the **PointID** of the borehole, as shown:



You can configure Google Earth integration to obtain the description for each borehole's popup from a field in the POINT (or POINT-level) table. Let's create a **Description** field in the table, map it to the appropriate Google Earth Setup property, and see the result.


1. In the Borehole tab, select Tables ► Add Field.

- Enter the following property settings, then click OK:

Property	Value
Name	Description
Type	Memo

- Scroll to the new **Description** field at the far right of the table grid. Enter any text in the 'B-1' row you want, but we will enter the following:
 Depth 45, elevation 120, hollow stem auger, drilled 3/28/08
 We will not enter data in the other rows for purposes of the example, but normally you would enter a description for each borehole.
- Select **Additional Modules ► Google Earth ► Google Earth Setup** in gINT. The **GOOGLE EARTH SETUP** window appears.
- Click the **Label and Description** tab.
- Click the drop-down arrow to the right of the **Field with Icon Description** property and select 'Description'.
- Click **OK**. Select **Additional Modules ► Google Earth ► View PointIDs in Google Earth**, and click **OK** in the **VIEW POINTIDS IN GOOGLE EARTH** window (to select the same values in the two properties as before). Answer 'Yes' to the Overwrite prompt.
- Click on the 'B-1' point marker, and notice that the description is now displayed.



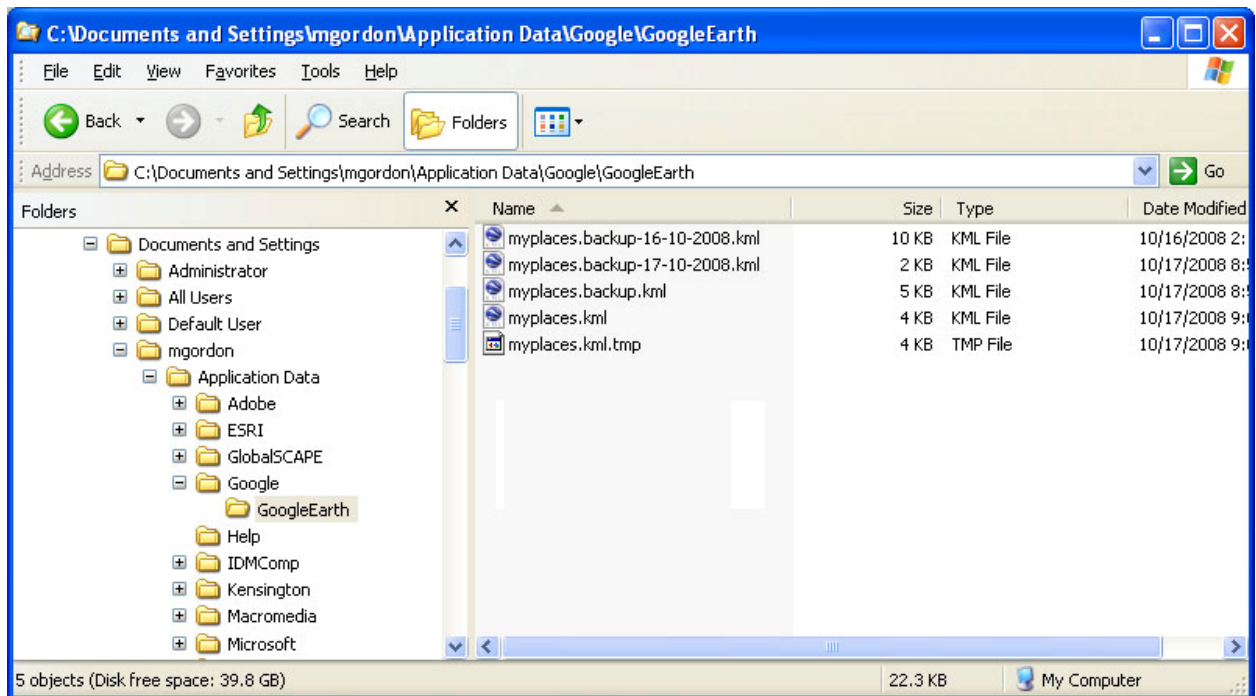
- Click the Close  icon in the popup.
- Highlight the 'Dutton Road site' folder and save it to **My Places**.
- Leave Google Earth open for now.

Note that entering these descriptions for all borehole points in all projects you wish to export is cumbersome and time-consuming. A better solution is to automatically populate the each Google Earth popup description with data from multiple fields in the project such as depth, elevation, water depth and depth to bedrock. This can include data from tables other than POINT, such as the bedrock level from the LITHOLOGY table. This capability requires programming in gINT Rules. For an example of this kind of custom implementation, see "Advanced Example using gINT Rules" on page 26.

Saving and Transferring Google Earth Data

As previously mentioned, the points in My Places and its subfolders are stored, and do not disappear between Google Earth sessions. Actually, My Places is stored in its own .kml file. We'll see where the My Places data is stored, then look at ways to generate custom files of your points to send to others.

1. Open Windows Explorer.
2. Go to C:\Documents and Settings\\Application Data\Google\GoogleEarth\, where <user> is your username on your computer.
3. Notice that there is a 'myplaces.kml' file in this folder on your computer. You may also see backup files that Google Earth has automatically created. These may be useful if you need to recover Google Earth data from a previous day.



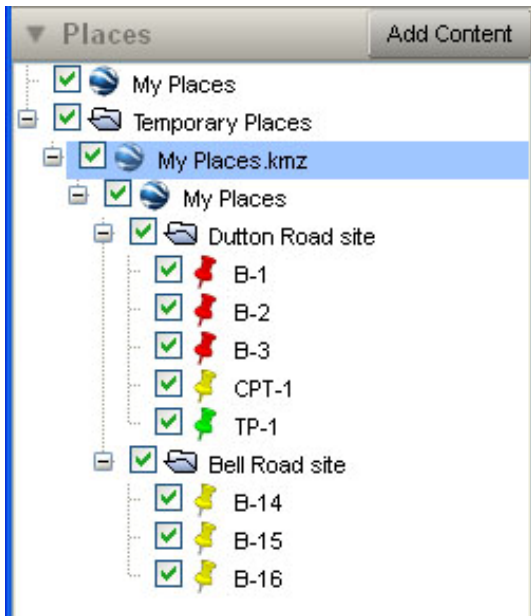
You can email this file to another user, and they can open it in Google Earth (using **File ► Open**) and see all of your points. The user would see the same folder structure, icons, colors and popup descriptions as you. However, there is a more selective (and more convenient) way to generate files of Google Earth points.

4. Close Windows Explorer. Restore or maximize your Google Earth window.
5. Ensure that you have two folders under My Places: 'Dutton Road site' and 'Bell Road site'.
6. Highlight the My Places folder line and select **File ► Save ► Save Place As**. (Alternately you could right click on the folder line and select **Save Place As** from the popup menu).
7. In the file browser window, select an appropriate destination folder and click **Save**. The filename defaults to the same name as the folder you selected in Google Earth ('My Places' in this case). The filename extension is .kmz, which is exactly the same kind of file as .kml, but compressed. Either .kml or .kmz files can be opened in Google Earth using the **File ► Open** menu option. Both file types store Google Earth folders, points, and point formatting.

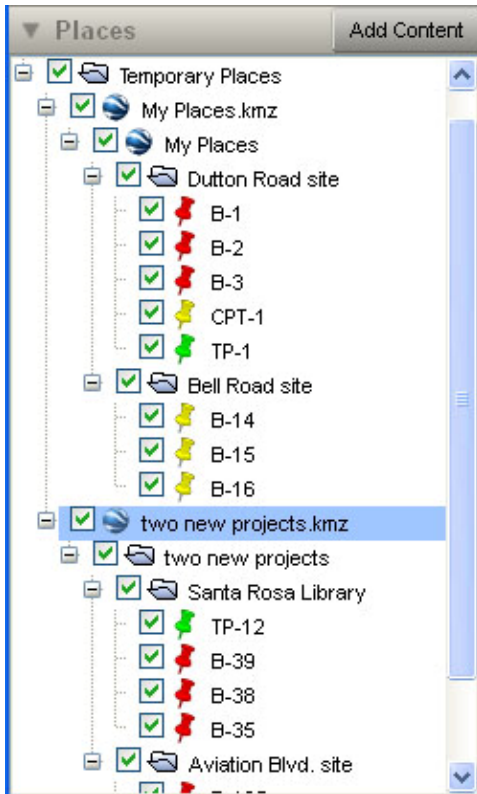
8. Highlight and delete (using the Delete key) first the 'Dutton Road site' folder, then 'Bell Road site'. Your My Places is now empty.
9. Close Google Earth then reopen it. No points are shown.



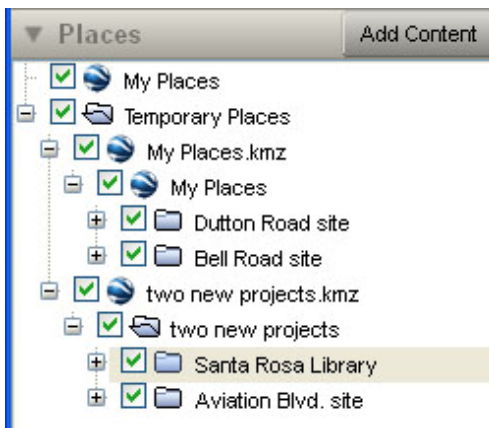
10. Select **File ► Open**. Select 'My Places.kmz' and click **Open**.
11. Double-click on the 'My Places.kmz' folder line in **Temporary Places**. The contents of the 'My Places.kmz' file are displayed. This includes 'Dutton Road site' and 'Bell Road site'.



12. Select **File ► Open**. Browse to and open the 'two new projects.kmz' file that you downloaded with the other sample files for the tutorial. This adds folders for two additional sites. Expand the 'two new projects.kmz' folder line to see them.



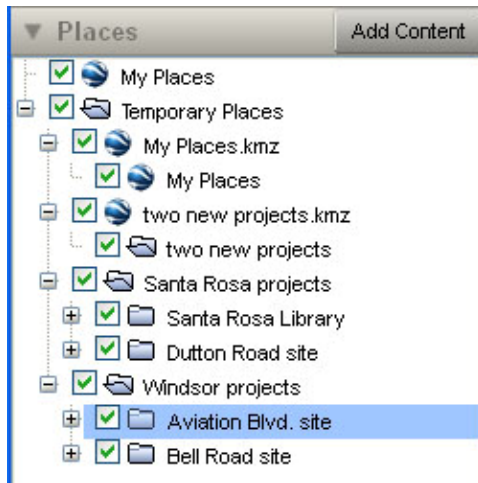
13. To make them easier to manipulate, collapse the 'Dutton Road site', 'Bell Road site', 'Santa Rosa site' and 'Aviation Blvd. site' folders.



We will copy the site files into two new .kmz files, organized by city.

14. Click on the **Temporary Places** row and select **Add ► Folder** from the popup menu.
15. Enter a Name of 'Santa Rosa projects' and click **OK**.
16. Click on **Temporary Places** again and select **Add ► Folder**.
17. Enter a Name of 'Windsor projects' and click **OK**.

18. Drag and drop 'Dutton Road site' and 'Santa Rosa library' onto 'Santa Rosa projects'.
19. Drag and drop 'Bell Road site' and 'Aviation Blvd. site' onto 'Windsor projects'. The result should appear as shown:



20. Highlight the 'Santa Rosa projects' folder and select **File ► Save ► Save Place As**. Accept the default name ('Santa Rosa projects.kmz') and location, then click **Save**.
21. Highlight the 'Windsor projects' folder and select **File ► Save ► Save Place As**. Accept the defaults and click **Save**.
 You now have two .kmz files into which the points have been sorted by city.
22. Close Google Earth, and do not save the temporary data to **My Places**.
23. Reopen Google Earth. It should be empty.
24. Select **File ► Open** and open 'Windsor projects.kmz'. Expand down the tree to see that you now only are showing points from the two Windsor projects.

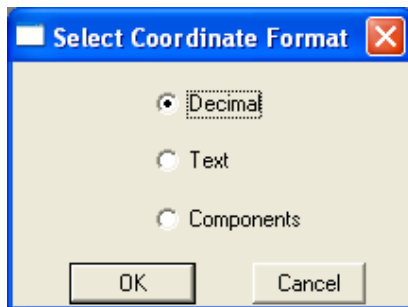
While you can create, remove, and save folders within either **My Places** or **Temporary Places**, the two have somewhat different purposes:

- Use **My Places** for points you are regularly viewing. The contents of **My Places** reappear with each new Google Earth session, and you don't have to reload them from .kml or .kmz files.
- Use **Temporary Places** for points and folders you are organizing prior to saving them to .kmz files. Everything in **Temporary Places** is discarded after you close Google Earth. This eliminates the need to manually delete all the folders that you don't need to keep.

Advanced Example using gINT Rules

As has been shown above, there is a certain amount of functionality that can be achieved in Google Earth integration using standard configuration techniques in the **INPUT** and **DATA DESIGN** tabs. However, the full power of the interface is unavailable without programming in gINT Rules. gINT Software provides a sample application that demonstrates these advanced Google Earth integration capabilities. We recommend you download the sample application and try it, as described here. This will give you a good idea of what can be achieved with gINT-Google Earth integration using gINT Rules programming, performed either internally by your own staff or by gINT Software, Inc. on a consulting basis. Do the following:

1. In your web browser, go to http://www.gintsoftware.com/support_gintrules.html.
2. Click on the link for 'gra008.zip'.
3. Extract the .glb file to your '\gINT\libraries\' folder and the project to your '\gINT\projects\' folder.
4. Open gINT, go to **INPUT**, and open the 'gra008.gpj' project and 'gra008.glb' library.
5. Select **Add Ins ► GRA008 ► View PointIDs in Google Earth**. An automated sequence of actions in gINT is initiated.
6. The first dialog box that appears is prompting for the source fields for the latitude and longitude values. This automates the configuration we previously did manually in the **GOOGLE EARTH SETUP** window. Select any radio button, and click **OK**.



Note: This dialog box appears in the GRA008 rule to demonstrate the use of the three kinds of latitude-longitude fields. In a real-life gINT-Google Earth integration rule, this step would not be present.

7. In the file browser window that appears, specify the name and location of the .kml file and click **Save**.

The Google Earth window opens with the same site displayed as previously and nine borehole point markers.



Notice that the icon symbols and colors, and text colors, have been specified similarly to what we previously set up in our own database.

- Click on the B-1 borehole icon. Notice the contents of the popup window for this borehole.



Notice that a description has been automatically assembled consisting of various POINT table fields (including elevation, depth, water level, and hole inclination) and even some LITHOLOGY table data (bedrock depth and elevation).

- Click on the hyperlink for a .pdf file near the top of the popup window. An Adobe Acrobat window appears displaying the borehole log for borehole B-1.

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WELL NUMBER B-1
PAGE 1 OF 2

CLIENT ABC Corporation PROJECT NAME gINT Example
 PROJECT NUMBER 123-ABC PROJECT LOCATION Somewhere, SOMEPLACE
 DATE STARTED 4/28/08 COMPLETED 4/28/08 GROUND ELEVATION 123.4 ft MSL HOLE SIZE 2 inches
 DRILLING CONTRACTOR ABC Drilling GROUND WATER LEVELS:
 DRILLING METHOD Hollow Stem Auger 2" AT TIME OF DRILLING 15.00 ft / Elev 108.40 ft after 2 hour delay
 LOGGED BY Andy Caneday CHECKED BY J. Dooley AT END OF DRILLING ---
 NOTES General remarks AFTER DRILLING 13.00 ft / Elev 110.40 ft

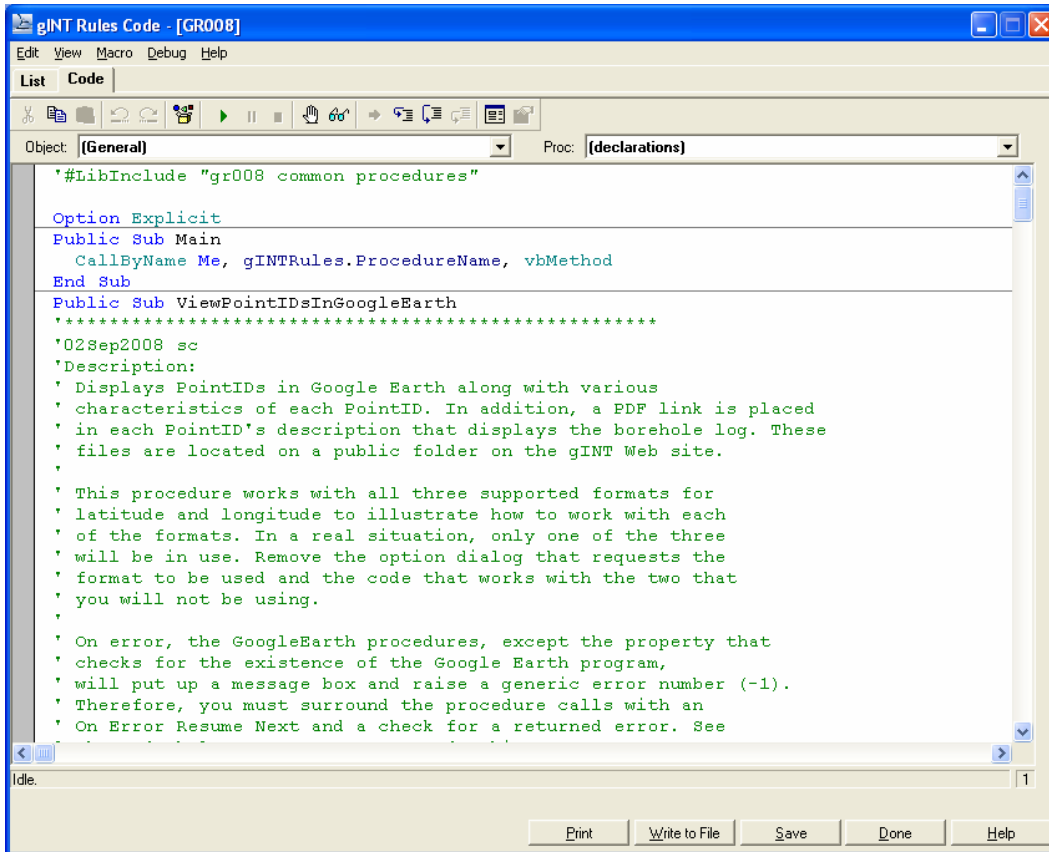
DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S. GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
0					1.0	CLAY		Casing Top Elev: 128.4 (ft) Casing Type: Steel
5					SW-SM	WELL GRADED SAND WITH SILT, SILTY SAND, (SW-SM) 10 % gravel, 80 % sand, 10 % fines, green, well graded, rounded, fine to medium grained, moist, very loose, trace chert		Cement 5% Bentonite Grout

Done Unknown Zone

Note that the borehole log reports for the borehole points are not automatically generated. For this feature to work you would have had to generate these PDFs in **OUTPUT** and stored them on a web server or network server, and included the paths or URLs to them in the code or in the database.

10. Close the PDF window. Close Google Earth.

11. In gINT select **gINT Rules** ► **gINT Rules Code**. Click the **Code** tab at the top.



Notice that a rather complex programming module (over 400 lines of code) has been written to implement the functionality you just saw. However, it is accessible for you or your programming staff to modify, or you can contract with gINT Software to implement the capabilities you need.

12. Click the **Done** button to close the **gINT Rules Code** window.

13. Reopen your standard library and project.

Note that additional information on how to customize Google Earth integration using gINT Rules code can be found in the online help by selecting **Help** ► **Search** and searching on 'Google Earth'. Also, an introduction to programming in gINT Rules is provided in the gINT tutorial *Introduction to gINT Rules*, and the details of the language and programming environment are in the *gINT Rules Manual for Version 8*. Both can be obtained from the gINT website at http://www.gintsoftware.com/support_doc.html.