

# A Field Guide to the PHLI GPS Application

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October 1, 2010

**T**HIS GUIDE WILL HELP YOU record attributes for PHLI points as you collect GPS information in the field. You will be adding points to a custom PHLI shapefile using ArcPad, probably on a Trimble GPS unit. Each time you take a new point, you will be prompted to enter a large amount of attribute information about the point, which will eventually make its way into the master PHLI database.

## Startup

Turn on the GPS unit by pressing the power button briefly (do not hold the power button down). You should see a desktop with a Start button in the upper-left-hand corner. To launch ArcPad (the mobile GIS/GPS application we will be using) tap the Start button with your stylus (do *not* use anything metal like a ballpoint pen on the screen!) and tap ArcPad on the dropdown list. Be patient – it can take a while to launch.

You will be presented with either a startup screen or a blank ArcPad map. If you get the startup screen, tap cancel or the button that looks like an x in the red circle (it may look different depending on which version of ArcPad you are using) to close the startup screen. Then you should see the blank ArcPad map screen, which has buttons at the top and a blank white canvas that takes up most of the screen.

If the GPS unit came with a project loaded onto it (GIS staff would have mentioned this to you – a project holds background information for the area you are visiting) tap the Open button, which is in the upper-left-hand corner and looks like a manila envelope.<sup>1</sup> [ or ] Choose the project from the list that is presented to you – it should be obvious which one to choose. Typically the project will be named for the park or area you are visiting. You may need to tap the OK button after choosing the project. There may be a generic PHLI project if there is no custom one.

If the GPS unit doesn't contain a custom project, you can just add the PHLI shapefile by itself. To do so, tap the Add Data button. [ or 

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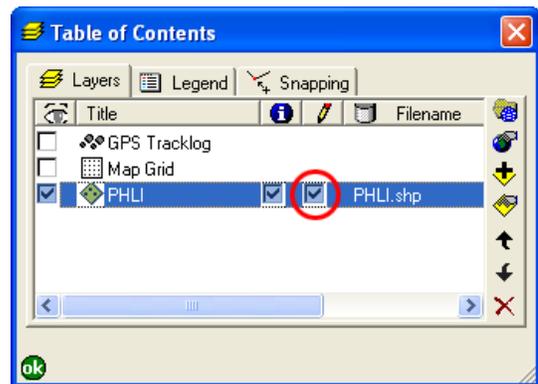
<sup>1</sup> Different versions of ArcPad use different icons. This document shows screenshots of icons from both ArcPad 8 and ArcPad 7. The icons in ArcPad 6 are the same as or similar to the icons in ArcPad 7.

To activate the GPS so that your GPS unit will start receiving positional information from satellites, tap the dropdown arrow [ ^ or v ] that is below (ArcPad 8) or to the right of (ArcPad 6 & 7) the Satellite button. [ 📶 or 📶 ] In the dropdown menu you will see a line that says “GPS Active” with an icon to the left of it. If the icon has a red box around it, the GPS is already active, so you can just tap the dropdown arrow again to make the dropdown menu go away. If there is no red box around the icon, tap it to activate the GPS.

Now you should see an icon like this 📶 in the map canvas. This icon indicates that the GPS is active but you don't have an accurate position fix at the moment. [in ArcPad 6, this icon may appear even if the GPS is not active] Eventually the GPS will acquire a position fix, and the icon will change to a crosshair icon 📶; the pointy part of this icon may point in different directions. It may take a few minutes to acquire a fix.

While you are waiting for a position fix, start editing the PHLI shapefile. You can do this in two ways: from the Layers dialog or by using the Edit button (ArcPad 6 does not have an Edit button).

Tap the Layers button [ 📄 or 📄 ] to bring up the Layers dialog (a.k.a. Table of Contents). You will see a list of the map layers in your project. To start editing the PHLI shapefile, check the checkbox in the PHLI row that is in the pencil (Edit) column. The image at right shows this checkbox with a red circle around it. Tap OK. You can also use this dialog to turn layers on and off, reorder layers, symbolize layers, and determine which layers the Identify tool works with. Instructions for these and many other functions are beyond the scope of this document but can be found in the ArcPad manual.



In ArcPad 7 or 8, you can start editing by tapping the Edit button. [ 📄 or 📄 ] A dropdown menu will appear showing a list of the shapefiles in your project. Editable shapefiles appear with a red box around their icon. If there is a red box around the PHLI icon, just tap the Edit button again to make the dropdown go away. If there is not, tap the PHLI icon to start editing the PHLI shapefile.

In either case, if you see multiple PHLI point shapefiles, that means you probably added the entire contents of the PHLI folder and its subfolders. Your best bet is to start over and be more careful when you add the PHLI shapefile to the project.

Once you are editing the PHLI shapefile and have a position fix, you are ready to take a new PHLI point.

## Create a new point

Stand as close to the feature you want to record as possible. Ideally, you will hold the GPS unit directly above the middle of the feature. When you are ready to start recording position data, tap the New GPS Point button. [  or  ] In ArcPad 6 & 7, this can be found on the third toolbar from the top (if you don't see this  toolbar, you need to start editing PHLI.shp). In ArcPad 8, the toolbars are presented in what Microsoft calls the "Ribbon," with one toolbar shown at a time, each accessible through a button above the Ribbon. Tap the Edit Toolbar button  at the top of the screen to show the Edit toolbar,  where you will find the New GPS Point button.

When you tap the New GPS Point button, a custom PHLI attribute form will appear on the screen (it might take a few seconds to pop up). At the top of the screen you will see a percentage number that increments as the GPS unit records 30 position readings, which it will average into an accurate position. Do not move the GPS unit until the number reaches 100% (at which time it will disappear). If you walk around while recording positions, you will decrease the accuracy of the point location. If the percentage number stops increasing, that means you have lost your GPS position fix. Be patient, it will probably come back (see the Troubleshooting section at the end of this document if it doesn't).

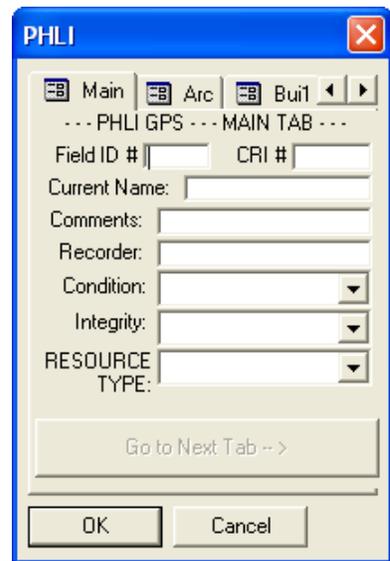
## Record attributes

The first tab of the attribute entry form looks like this. You will be entering nine or ten tabs (pages) of attributes for each point, using the buttons at the bottom of the form to advance from tab to tab. This first tab is the same for all Resource Types. Then you will enter a tab or two of Resource Type-specific information, followed by seven tabs of checklists (Cultural Resource Designations, Threats, and Recommendations).

### *Main Tab*

Enter a Field ID number in the box if you like – this should be a number that is unique for each point in your fieldwork for today (start with 1, then increment the number with each new point). It is not important unless you use it to correlate with additional notes you take on paper, in which case you should make sure to write this number on your paper notes so you can determine which GPS point they correspond to when you get back to the office.

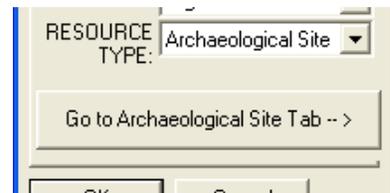
If this point represents a feature that is in the Cultural Resource Inventory (CRI) you should enter the existing CRI number in the CRI # box. The final, unique PHLI ID number will be



The screenshot shows a dialog box titled "PHLI" with a close button (X) in the top right corner. The dialog has a tabbed interface with three tabs: "Main", "Arc", and "Bui1". The "Main" tab is selected, and the title bar indicates "... PHLI GPS ... MAIN TAB ...". The form contains the following fields and controls:

- Field ID #:
- CRI #:
- Current Name:
- Comments:
- Recorder:
- Condition:
- Integrity:
- RESOURCE TYPE:
- Go to Next Tab -->
- OK
- Cancel

determined back in the office. Enter the name of the resource (Current Name), your initials (Recorder), and the Condition and Integrity of the resource in the appropriate boxes or dropdown lists. Now choose the resource type from the dropdown list.



The button at the bottom of the tab will become enabled and say "Go to [the resource type you chose] Tab -->". Tap this button to go to the Resource Type-specific tab. A description and pictures of each of these tabs follows.

*Note: On many of the form's tabs, there are data entry boxes that will appear and disappear in response to your actions on the forms. For instance, if you choose "Other" from a dropdown list or check a checkbox labeled "Other," you may be presented with a text box in which you can specify what you mean by "other." And if you check a checkbox stating that a feature is in a heritage landscape, you will be presented with a text box into which you can type the name of the landscape. Each tab is shown below in two versions: one as the tab appears before you enter any data, and one with all possible data entered (the gibberish word "asdf" was used to fill in the test boxes).*

## PHLI GPS Application Data Entry Tabs

### Tab Description

#### Archaeological Site Tab

As you can see from these two images, this tab has several checkboxes, dropdowns, and text boxes that may appear depending on what you enter.

When you are done with a tab, tap the "MORE →" button to continue.

### Appearance when empty

PHLI

Main Arc Bui1

--- ARCHAEOLOGICAL SITE ---

Resource Sub-Type: [Empty]

Feature is in a heritage landscape

Visible Disturbances:

Roots  Digging

Vehicle damage  Erosion

Other

< -- Return to Main Tab MORE -->

OK Cancel

### Appearance when filled in

PHLI

Main Arc Bui1

--- ARCHAEOLOGICAL SITE ---

Resource Sub-Type: [Prehistoric - confirmed]

Slope < 7%  Well-drained soils

< 1000 ft from water: [Unknown]

Feature is in a heritage landscape

Landscape name: [asdf]

Visible Disturbances:

Roots  Digging

Vehicle damage  Erosion

Other Other: [asdf]

< -- Return to Main Tab MORE -->

OK Cancel

### *Building Tab (1 of 2)*

The Building resource type has two tabs to fill in. Tap “Building Tab 2 →” to continue to the second tab.

PHLI Building Tab (1 of 2) form. The left screenshot shows the initial state with most options unchecked. The right screenshot shows the same form with several options checked, including Agricultural, Industrial, Recreational, Transportation, Civic/Institutional, and Military.

### *Building Tab (2 of 2)*

Second of two Building tabs. Tap “← Building Tab 1” to go back to the first Building tab if you forgot something; otherwise tap “MORE →”.

PHLI Building Tab (2 of 2) form. The left screenshot shows the initial state with most material options set to 'Other'. The right screenshot shows the same form with the 'Feature is in a heritage landscape' checkbox checked and a landscape name entered.

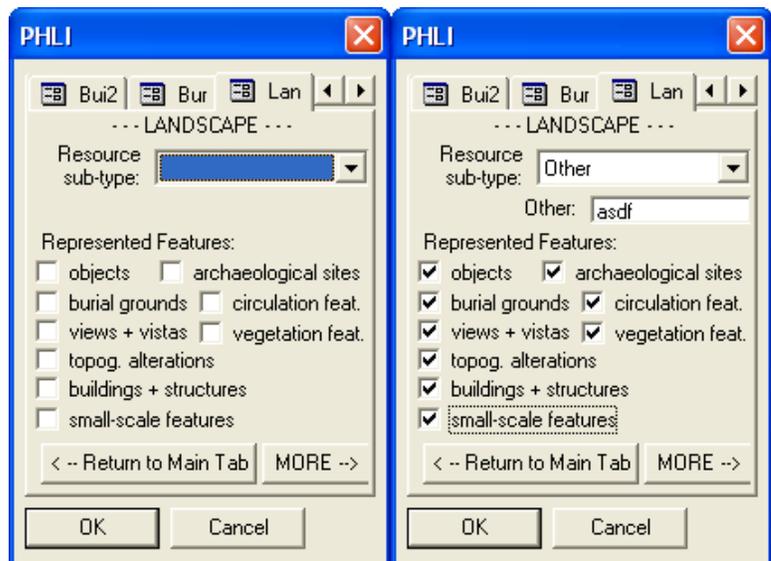
### *Burial Ground Tab*

For “1<sup>st</sup> birth year” and “Last death year,” type the 4-digit year that you see on the gravestones – the oldest birthdate and the latest death date. Tapping the “unknown” checkbox will enter “Unknown” into the corresponding text box.

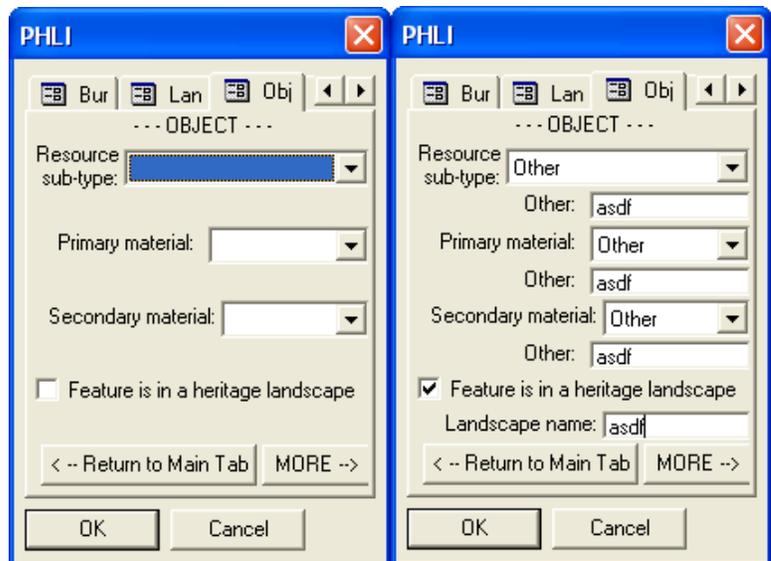
PHLI Burial Ground Tab form. The left screenshot shows the initial state with the number of visible stones set to 0. The right screenshot shows the same form with the number of visible stones set to 3 and the '1st birth year' and 'Last death year' checkboxes checked.

## Landscape Tab

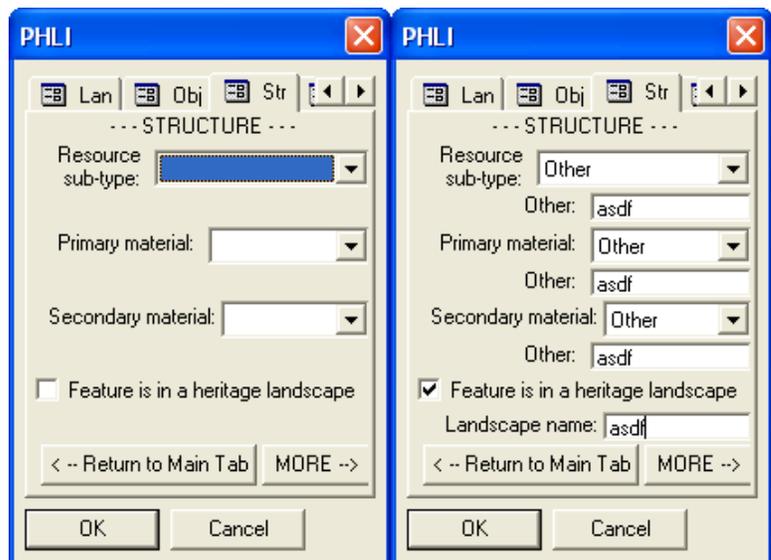
Whenever you see a number of checkboxes like this, you can check as many of them as are applicable.



## Object Tab



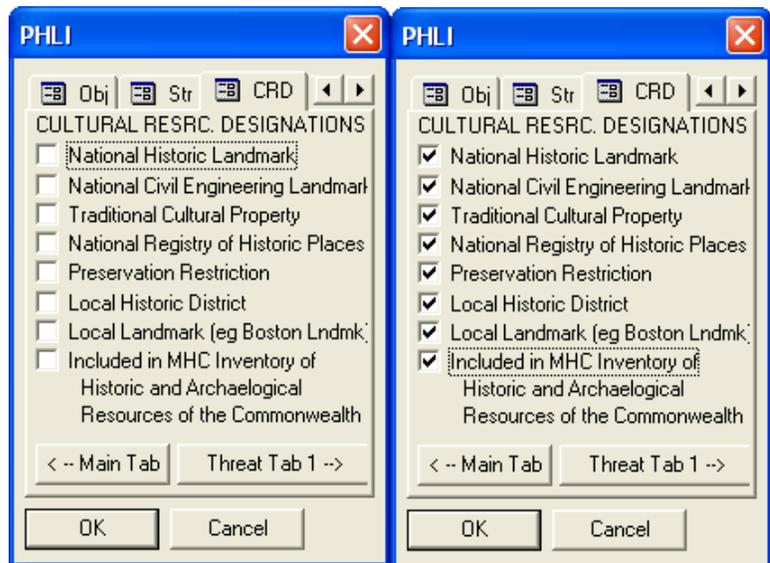
## Structure Tab



The remaining tabs should be filled out for all features.

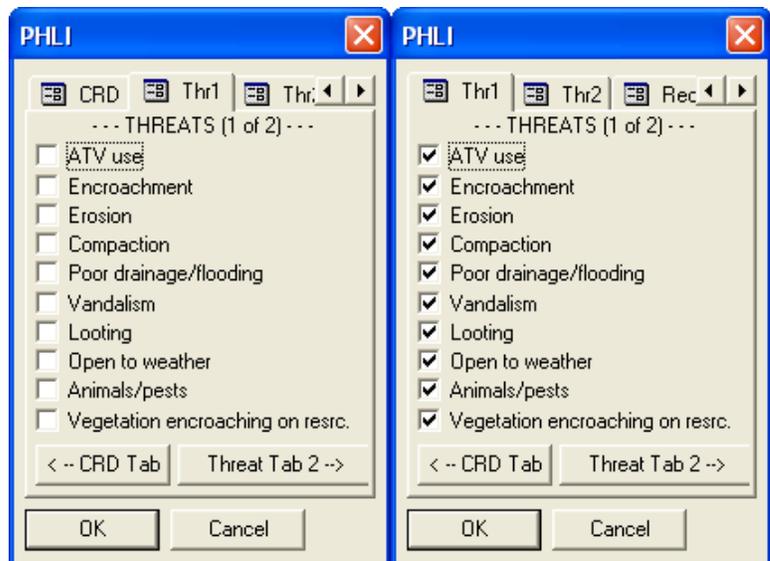
## Cultural Resource Designations Tab

Check as many checkboxes as are applicable for this feature. Tap "Threat Tab 1 →" to continue.



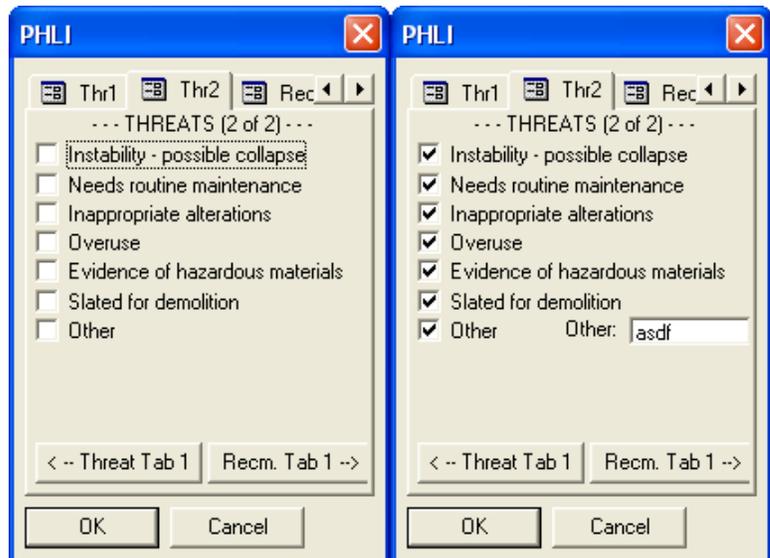
## Threats Tab (1 of 2)

On this and the next tab, you will check the box for every threat that applies to this feature.



## Threats Tab (2 of 2)

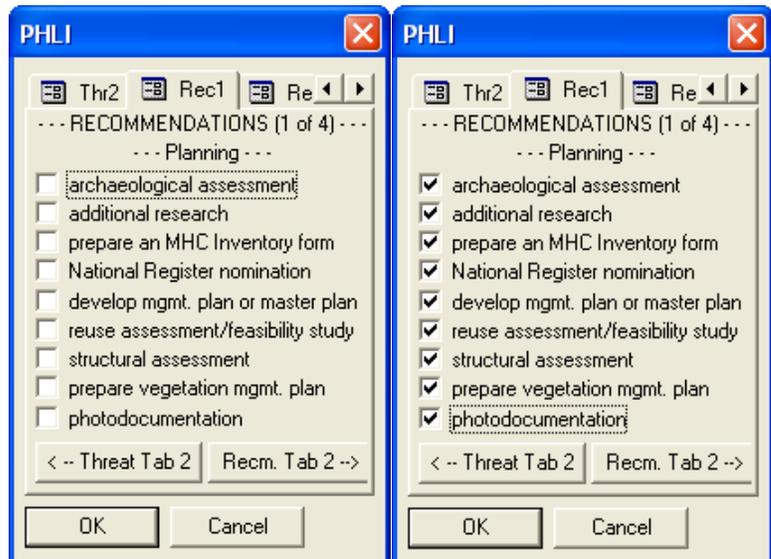
Check "Other" if you want to add an addition threat or threats.



### Recommendations Tab (1 of 4)

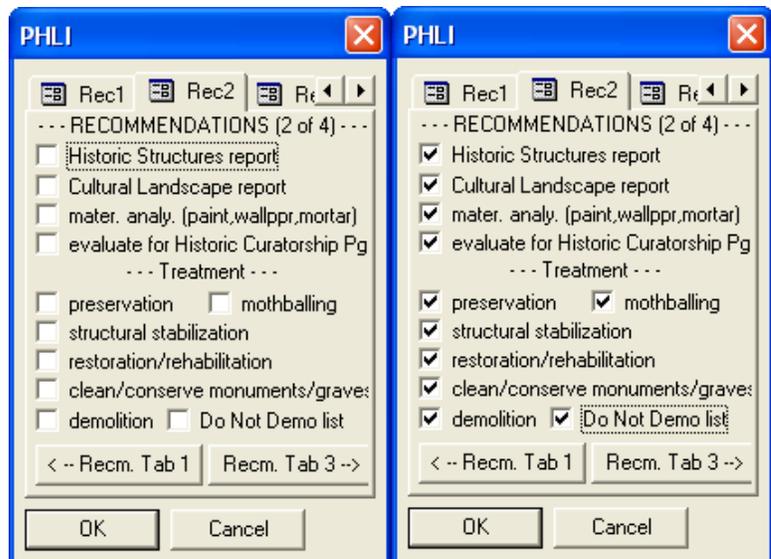
On this and the next three tabs, check the box for every Recommendation that is applicable for this feature.

This tab (and part of the next one) has Planning recommendations.



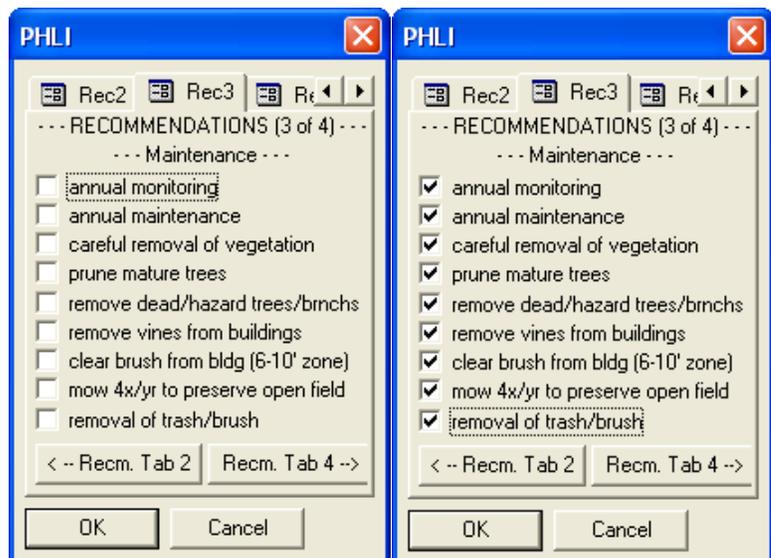
### Recommendations Tab (2 of 4)

This tab has Treatment recommendations as well as some Planning recommendations that didn't fit on the previous tab.



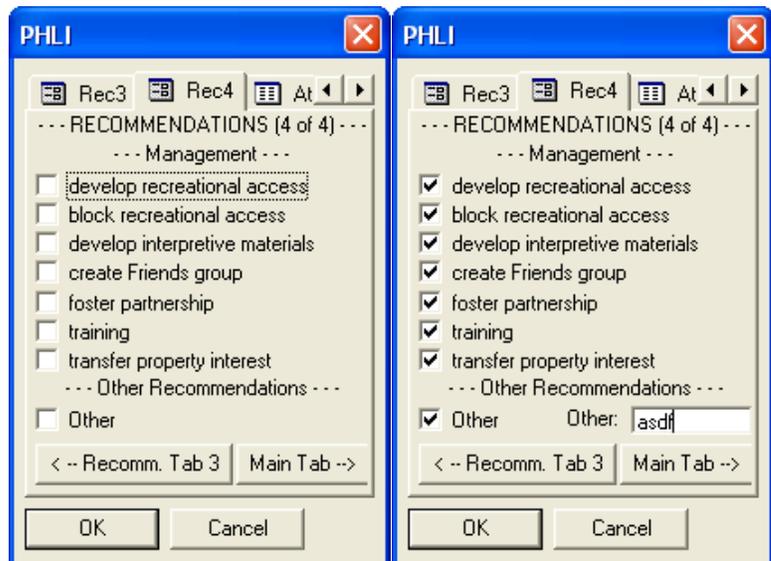
### Recommendations Tab (3 of 4)

This tab has Maintenance recommendations.



## Recommendations Tab (4 of 4)

This tab has Management recommendations as well as an “Other” checkbox that will allow you to enter additional recommendation(s).



Once you are done entering data on all the tabs, tap “OK” to save the point.

## Shutdown

Once you are done with all the data collection for the day, you can close ArcPad and turn off the GPS unit. Tap the dropdown arrow [  or  ] that is below (ArcPad 8) or to the right of (ArcPad 6 & 7) the Open button. [ or ] Choose Exit from the menu. If you are asked whether you wish to save the project or not, you can choose either yes or no – all that does is save the appearance of the map layers. The data you collected gets saved every time you finish a point and will not be lost if you say no. Wait several seconds for ArcPad to close, then briefly press the power button to turn the GPS unit off. Do not hold the power button down.

Make sure you either return the GPS unit to GIS staff or place it on its charging cradle overnight so the battery will be charged for another day of work. The GPS unit should be kept on its cradle at all times when not in use (or in transit). This will insure that the battery doesn't drain down.

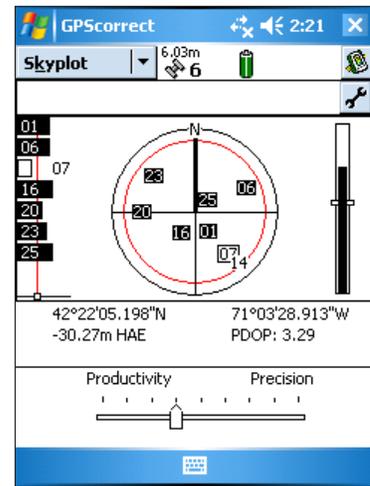
## Troubleshooting

If you are having trouble receiving GPS positions, go through the following checklist in order, trying each option until one works. In ArcPad, if you are receiving valid GPS locations you will see a red circle with a pointy end in the map window.  If you don't see this icon or it has a slash through it,  you are not receiving positions.

- 1) Make sure the GPS is active: tap the dropdown arrow to the right of (or below) the satellite icon on the top toolbar. There should be a red square around the icon next to “GPS Active”. If not, tap on “GPS Active”.



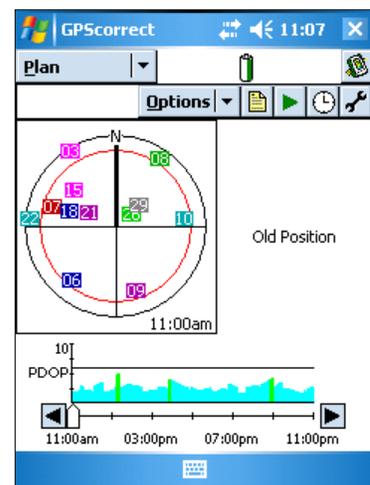
2) Open GPSCorrect and see if it is receiving GPS information. Tap on the same dropdown arrow mentioned in (1) and choose “Trimble GPSCorrect.” In GPSCorrect, make sure you are on the Skyplot screen (available from the upper left dropdown). You should see several solid black satellites in the circular skyplot. This screen will also show you the PDOP, your GPS position (if receiving data) and some other graphics that indicate various reception conditions. If you see a message that says “Attempting to connect to GPS receiver” you may need to adjust your settings in ArcPad and GPSCorrect; see the GeoXT Settings document. To return to ArcPad, tap the “X” at the upper right hand corner of the GPSCorrect screen.



3) If the GPSCorrect Skyplot screen says “Too few satellites,” you will need to either reposition yourself or wait for several minutes (if you just turned on the unit it may need to initialize itself for a few minutes—longer if it hasn’t been used in a while). If you think that the satellite signals are blocked by trees, hills, buildings, etc., try holding the unit up higher or moving around slightly. If absolutely necessary you can take a point nearby and make a note that the actual point is (for example) 10 meters north of the GPS point.

4) If you are getting enough satellites but your PDOP is too high (it is shown on the Skyplot screen - PDOP (Percentage Dilution of Precision) is a numerical measurement of the accuracy of the data you are getting, based on the “constellation,” or arrangement of satellites in the sky), you may need to wait a few minutes for the satellite constellation to change, move your location slightly to try to pick up some new satellites, or, if that doesn’t work, raise your PDOP mask. The default PDOP mask setting is 6 (any PDOP value below 6 will be accepted) but you can raise the mask to 7 or 8 (never above 10!) if the values you are getting are just slightly above 6. If the values are very high (above 10) you should not raise the PDOP mask to attempt to include them; you will sacrifice too much quality. Make sure you move the PDOP down to 6 or 7 again later to make sure you are getting high accuracy data. Most people prefer to use the quality slider rather than adjusting the PDOP mask and other settings manually. We usually keep the slider one notch to the left of center, or at the center if we are working in an open environment. You can move the slider one or two notches further left towards “Productivity” temporarily (move it back within half an hour), but never all the way to the left.

5) It is possible that you are trying to work during one of the rare times of day when the satellite constellation is poor. You can see a graph of these times on the Plan screen in GPSCorrect. Tap the dropdown (it usually says Skyplot) and choose Plan. A new screen will appear that can show you the positions of the satellites over the course of the entire day. At the bottom of the screen there is a graph that shows the hours of the day on the X-axis and the PDOP on the Y-axis. Most of the day should show a blue-green color with low PDOP values but there may be some



spikes colored green or red. At these times, you may find it impossible to get a decent position reading. Your only option is to wait; these spikes tend to last only 10 or 20 minutes, a good time to eat lunch!

- 6) Call GIS staff if you still can't figure out how to get data! Our phone numbers are listed at the end of this document.

### **Other problems:**

*I get a message saying something about another application using the COM port, and it won't let me connect to the GPS receiver.*

You will need to reset the GPS unit. Hold down the power button for 6 or 7 seconds to perform a soft reset. Then try running ArcPad again to see if the problem is resolved. If not, try a hard reset (make sure you are using a 2005-series unit first! These have 11 buttons on the front of the unit. If you do a hard reset on an older, 2-button unit, you will cause serious problems). Hold down the power button for more than 15 seconds (until the screen goes dark), then wait a few seconds and press the power button briefly to restart the unit. If this does not resolve the problem, you will have to return the GPS unit to GIS staff for further troubleshooting.

*Everything looks normal but when I try to tap on the screen, it just beeps and my taps don't do anything.*

You have probably inadvertently tapped the "lock" button. In ArcPad, this appears at the lower-left corner of the screen (it also appears near the middle of the desktop if the desktop is showing). Tap this button again to unlock the screen. If the screen is frozen and you do not get beeps when you tap, and tapping the lock icon doesn't do anything, the software may have crashed. Try a soft reset as detailed above, and if that doesn't work, try a hard reset.



*I tap in one location on the screen but my tap seems to register in another location.*

Try recalibrating the screen. Press the screen button (round blue button with star) and the Windows button (leftmost gray button with Windows flag logo) briefly at the exact same time to bring up the align screen. Follow instructions. Even when the touch screen is aligned properly, you can sometimes get misplaced taps. Make sure you tap firmly with a stylus (not with a regular pen or pencil!).

*The GPS unit won't turn on.*

If pressing the green power button firmly and briefly doesn't turn the GPS unit on, try placing it on the charger cradle overnight to recharge the battery. If it still won't turn on, return the GPS unit to GIS staff for further troubleshooting.

**If you have additional problems, don't hesitate to call GIS staff:**

**David Kimball: 617-626-1447**

**Nathanael Lloyd: 617-626-1381 or 617-259-0501**