Title
Evaluating current and potential clinical sites: a spatial analysis of the UCSD Student-Run Free Clinic Project: a student's guide

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A Student's Guide

Introduction:
After 18 years of service in the same location, the UCSD Free Clinic Project (Free Clinic) had to close one its four clinic sites. Several hundred patients were faced with the challenge of commuting long distances to another clinic, and even losing access to care. Although unfortunate, this became an opportunity for the Free Clinic to examine where its patients live, the distances they travel to clinic, and determine new locations for a clinic. To complete this examination, the Free Clinic performed a spatial analysis—mapping patients and clinic locations—using specialized Geographic Information Systems (GIS) software.

Spatial analyses have been used previously to help place new medical facilities, and evaluate patient populations, however little has been reported on the use of such analyses by free clinics, and the practical approach to selecting a new clinic location. The ultimate importance of spatial analyses lies in the fact that "primary health care clinics are bound to the patients they serve by geography," and this 'geography' is not limited to merely the shape of the land but encompasses the whole of the lived environment.[1] This 'geography' can be so many things from air quality, or school districts, to bus routes and crime rates; in order to provide efficient and effective care, providers must examine this 'geography'. Therefore, what follows is a document that intends to describe the process and tools used in the Free Clinic's analysis so that other students might be able to take up their own spatial analysis project.

Getting Started:
The examination reported here focused on geography by means of distance and travel times, however any number of factors (street lights, crime, bus routes, schools, etc) could be evaluated in a spatial analysis, as mentioned above. For any 'geography' being analyzed, the strength of a spatial analysis is in examining relationships in space, and to that end starts with creating a map.

The Free Clinic serves a vulnerable population of immigrants, many of whom are undocumented. When creating the map, it was decided that it should be created in a way that keeps its contents protected. The mapping software, ArcMap (10.4, ESRI, Redlands, CA), was chosen as it was available through UCSD, free for students, has numerous tools and resources to complete this project, and being desktop-based limits the possibilities for inadvertent exposure of patient information. There are a variety of other GIS software packages that could be used, ranging from free online resources like QGIS, GRASS, uDIG, Google Maps, and Google Earth,

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[1] Bazemore A, Diller P, Carrozza M. The Impact of a Clinic Move on Vulnerable Patients with Chronic Disease: A Geographic Information Systems (GIS) Analysis. *J Am Board Fam Med*. 2010; 23:128-130

to other commercial alternatives.[2, 3, 4, 5] The following information pertains specifically to the usage of ArcMap by UCSD students.

The ArcGIS software, only for *Windows Platforms,* is available through UCSD's Educational Technology Services.[6] UCSD Students must fill out a verification form with their name, campus email address, and Student ID #; after verifying students' eligibility, Educational Technology Services will issue an install code.[7] You can check the system requirements with the software developer (Esri); all of the work of this project was performed on a desktop PC.[8] With the install code, the software can be download from the developer's website.[9] ArcGIS is a very complex system (entire courses and certifications are offered in various GIS software systems) and this guide is intended to only cover basic usage; for most problems the GIS forums and the software tutorials will likely yield an answer.

Using ArcMap:

ArcMap utilizes layers to display a variety of data. Layers typically store their data in shapefiles, and shapefiles are made up of several different files (.cpg, .dbf, .prj, .sbn, .sbx, .shp) combined to create the data displayed in ArcGIS (see Appendix A). Shapefiles can be downloaded from numerous sources of GIS data, and many basic shapefiles are available through Esri. This project was focused specifically on the Free Clinic in San Diego, so the shapefiles used were obtained from the city of San Diego which publishes a multitude of GIS information online through SanGIS and their Regional Data Warehouse. Information and shapefiles available through SanGIS include files such as zoning, land use, parcels, bike paths and roadways, even the location of lamp posts.[10] Shapefiles of road and transit data were used predominantly for this analysis.

ArcMap requires data be loaded into the software before it can be analyzed. As mentioned, data is commonly in the form of shapefiles, but other formats such as Excel tables can also be used. For the analysis performed, the data was patient addresses collected from their electronic medical record which were extracted to an Excel spreadsheet stored on a secured server. The Excel data containing the addresses was loaded into ArcMap (See Appendix B for more information on how to add data into ArcMap, see Appendix C for an example). While the data is stored in ArcMap, it is not displayed on the map because the software can't plot street level addresses yet. To actual plot the addresses requires a process called geocoding which takes the street number format in the table and turns it into plottable coordinates akin to latitude, longitude coordinates or (X, Y) that can be plotted on a map.

Geocoding:

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[2] https://www.qgis.org/en/site/
[3] https://www.google.com/maps
[4] https://grass.osgeo.org/
[5] http://udig.refractions.net/
[6] https://acms.ucsd.edu/services/software/available-software/esri-arcgis.html
[7] https://software-web.ucsd.edu/contact_us.php#Contact%20UCSD%20Software%20Distribution
[8] https://desktop.arcgis.com/en/arcmap/10.4/get-started/setup/arcgis-desktop-system-requirements.htm
[9] https://acms.ucsd.edu/_files/services/software/ArcGIS_Student_Version%2010.pdf
[10] http://www.sangis.org/download/index.html

Geocoding is the process of taking street addresses and converting to geographic coordinates akin to latitude and longitude that can be used to place markers on a map. An Address Locator is the main tool behind geocoding and uses GIS or other datasets containing reference information necessary for this process. There are commercial services that will geocode addresses, but most GIS software can also geocode addresses. ArcMap is capable of geocoding and because of the vulnerabilities of our patient population and the prices associated with many geocoding services, the Free Clinic opted to create an address locator and geocode the addresses within ArcMap.

Building an Address Locator is the first step in this geocoding process and is relatively straight forward in ArcMap. Obtain the reference data that will be used to build the locator. For the Free Clinic's analysis a shapefile of all San Diego roads was used as it contained all the necessary reference data for a simple data locator. Multiple shapefiles can also be used to build a composite Address Locator. Depending on the level of detail and accuracy required, more or less reference data may be needed, e.g., analyses looking at a state level vs county level vs zip codes vs street addresses will require different information (See Appendix D for more information on resolution and GIS data security).

To begin building an address locator, open the "Create Address Locator" tool and fill out the required fields (ArcToolbox > Geocoding Tools > Create Address Locator). As mentioned previously, there are several styles of locators that can be used based on the reference data available, and the resolution needed. The sensitivity of the Address Locator can be adjusted, which controls the parameters of matching addresses. Strict parameters will require more exact matches, and loose parameters will allow more partial matches. After successfully creating an Address Locator it can be used for a variety of different analyses, particularly geocoding (see Appendix E for more information on building an address locator). For troubleshooting and other help visit ArcGIS Desktop online for support.[11]

For the Free Clinic's analysis, the table of patient addresses was geocoded using an address locator within ArcMap. This limited exposure of patient data to outside parties and helped maintain confidentiality. Given that the Free Clinic was looking at street level information in the form of addresses, a Dual Range Address Locator capable of finding the street and determining where along its length the address is located was used. This locator did not contain enough data to determine where an apartment might be located within a complex, but could determine the location of the complex along the street, and overall has a modest error of several feet.

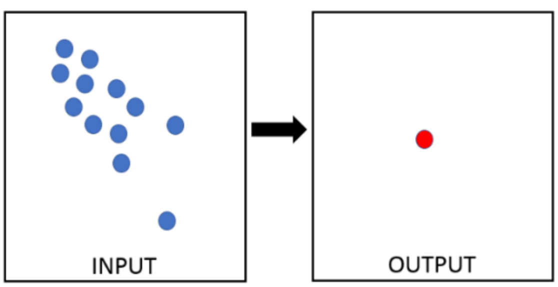
Basic tools:
Once geocoded data is loaded into the map, it can now be manipulated and analyzed. Many tools are available for different types of analysis; this guide is not intended to be comprehensive, but merely a starter for individuals using ArcMap software. For basic analysis of things such as distance; nearest neighbor; measures of geographic distribution such as geographic mean and median, Standard distance, and directional distribution; and point density there are several tools that will be helpful.

[11] http://desktop.arcgis.com/en/arcmap/10.4/manage-data/geocoding/creating-an-address-locator.htm

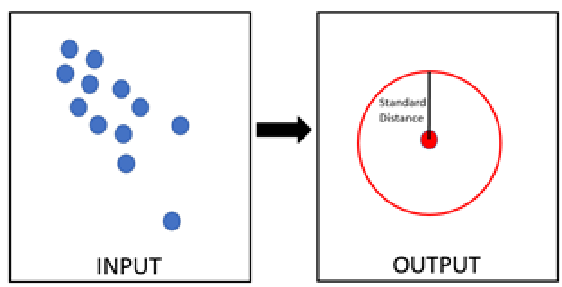
Distance between two points can be calculated as Euclidean distance (i.e. as the crow flies) or along a route (i.e. as someone would drive). For route distance see the section on Network Analyst Tools. Euclidean distance can be calculated for any inputs to either a single feature or several features. The Point Distance tool (ArcToolbox > Analysis Tools > Proximity > Point Distance) calculates the straight-line distance between two features and can be used for multiple inputs. When calculated, the distance is recorded in the attribute table of the input feature.

Nearest neighbor tools may be useful when trying to determine which hospital, grocery store, school, or other point of interest is nearest to an input point. The Near Tool (ArcToolbox > Analysis Tools > Proximity > Near) will calculate the straight-line distance between input features and the *nearest feature* in another layer of interest. When calculated, the distance and the identity of the nearest feature are recorded in the attribute table of the input feature.

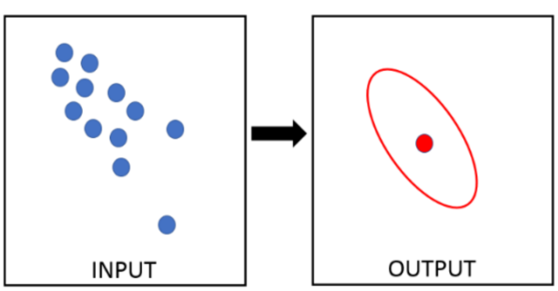
For measures of geographic distribution, the Spatial Statistics Toolbox will be helpful. The tools here (ArcToolbox > Spatial Statistics Tools > Measuring Geographic Distributions > Mean Center, Median Center, Standard Distance, Directional Distribution) will allow determination of the geographic mean center and the median center (the average location and median location of where the points on a map are located), See A below. Standard Distance replaces standard deviation for points on a map and can be used to determine the distribution of points around the center with 68% of points being contained within one standard distance of the center, see B below. If the points are not normally distributed around the center a Directional Distribution tool may be more applicable and will give standard distance ellipses that contain directional information as well, see C below.



A: Example of Geographic Mean Output; the output point is not a point existing in the input layer

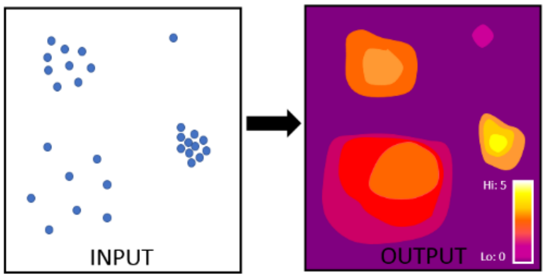


B: Example of Standard Distance output, contains roughly 68% of points when normally distributed around the center.



C: Example of Directional Distribution ellipse output, contains about 68% of points and preserves directional information

Point Density (ArcToolbox > Spatial Analyst Tools > Density > Point Density) can be a very useful tool for visualizing 'hot spots' in the data. By dividing the number of points in a cell of defined area, a density value can be calculated and represented on the map, see D below.



D: Example of Point Density Function with multiple inputs

For further information on different tools and functions in ArcMap please refer to the software help guide by right-clicking any tool and selecting "Help" or refer to online support with ArcMap's "Tool Reference".[12]

Building a Network Dataset:

The tools discussed above are useful for many things, however when trying to analyze more complex interactions between feature points, a Network Dataset can be helpful. For features connected by a network such as streets or transit networks, the Network Dataset stores the connections within the network(e.g. which streets are connected to each other, what transit routes are connected, what rivers are connected, etc…) and allows the software to analyze different routes and paths through the network to solve problems and further analyze features. A Network Dataset is created from source data and stores the connectivity of the source data, as well as a variety of other information such as traffic information, speed, tolls, etc. which can be used for various analyses and problem solving with Network Analyst Tools (see next section).

Building a Network Dataset or having a Network Dataset are prerequisites for using Network Analyst tools. The complexity of the Network Dataset is dependent on the requirements of the questions being asked. What are the driving directions, what is the shortest/longest route, and similar questions would only need simple networks to answer, however adding in public transit with its different timetables, ability to walk between stops, and multiple connections between different modalities (Bus, trolley, train, bike paths, etc…) adds increasing complexity and increasing skill to build such a network. What follows is a simple guide to building a Network Dataset from available road data, to answer simple route questions, many of which will be covered in the following Network Analyst Tools section.

To begin, collect the reference data that will be used to construct the dataset, often shapefiles, and ensure that the data contains information pertinent to the questions asked. For example, trying to evaluate travel time along a route requires knowing the speed limit and distance of the route. While shapefiles might have distance and speed limit data, they may not contain travel time data and will need to have this calculated. This can be done by adding a field to the shapefile attribute table and calculating the required data by dividing the distance values by speed values (be certain to pay attention to the units used).

[12] http://desktop.arcgis.com/en/arcmap/10.4/tools/main/a-quick-tour-of-geoprocessing-tool-references.htm

With the reference data properly prepared, open the “Catalog” window and navigate to the reference data to be used; right click on the reference data and select “New Network Dataset”. If unavailable, ensure that Network Analyst is enabled under Customize > Extensions > Network Analyst. Multiple reference files can be used to construct the Network Dataset, please refer to the Network Analyst Tutorial published by ESRI for more information.[13] Selecting New Network Dataset will launch a creation Wizard to guide the process. See Appendix G for further information with an example.

If a previously created Network Dataset is available, this can always be loaded into the map same as other data files and can be used for Network Analyst Tools right away.

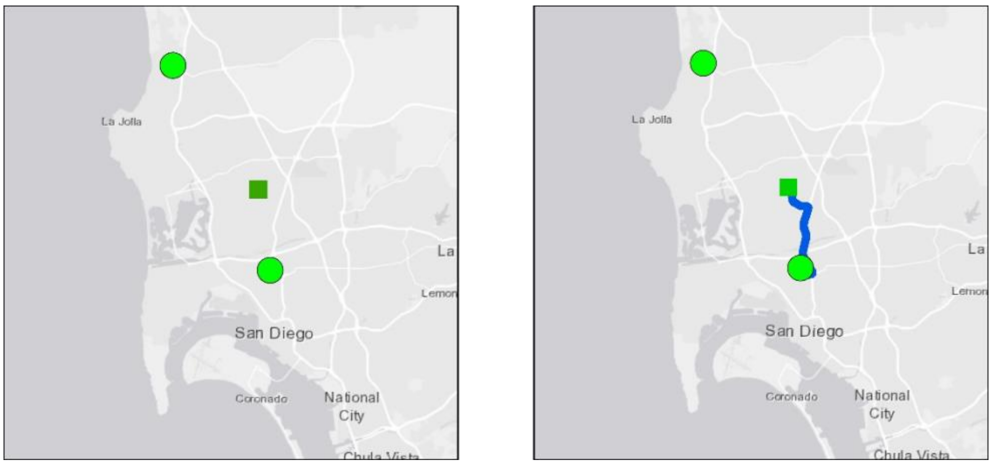
Network Analyst Tools:
The Network Analyst Toolset is used for analyzing a network and offers solutions to several different types of problems. They are well suited for analyses involving a transportation network. The main problem-solving tools are Route, Closest Facility, Service Layer, and Location-Allocation.

A Route Layer (ArcToolbox > Network Analyst Tools > Analysis > Make Route Layer) helps determine the best route between network locations dependent on specific ‘costs’ in the network. Costs are classically some kind of impedance to use such as time or distance (i.e., the route layer can be set up to solve for shortest route, shortest time, etc…). Selecting the Make Route Layer tool will open a wizard requesting information on what Network Dataset to use, and what ‘costs’ to evaluate. Once completed this will place an empty route layer into the map’s table of contents. To create a route, ‘stops’ will need to be added to the route; use the Add Locations tool in this toolbox, or use the Network Analyst window to add ‘stops’. Once the stops are added, the Route Layer can be solved, and if successful will provide route information in the attribute tables.

Example of Route Analysis between Hillcrest and UCSD Campus; the route chosen minimizes the drive time

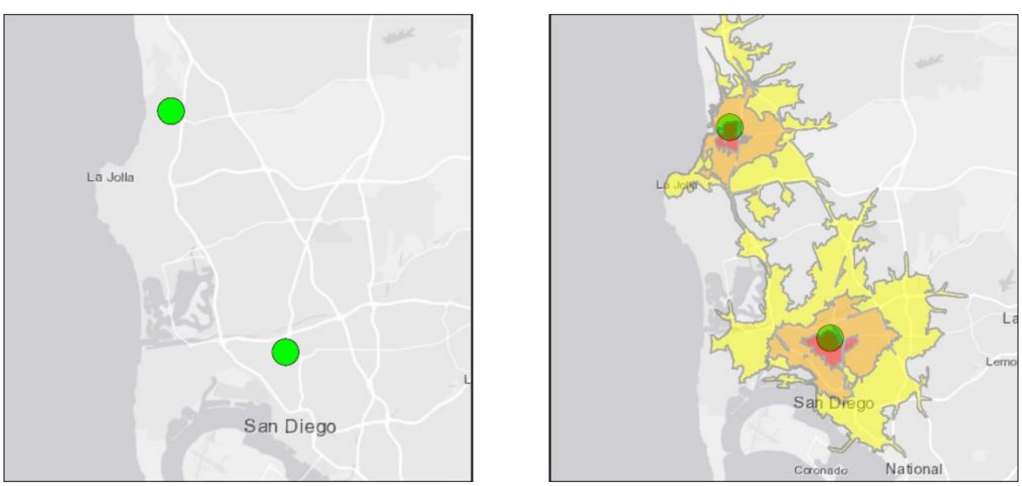
[13] http://help.arcgis.com/en/arcgisdesktop/10.0/pdf/network-analyst-tutorial.pdf

A Closest Facility Analysis (ArcToolbox > Network Analyst Tools > Analysis > Make Closest Facility Layer) is designed to find the closest facility to a specified starting point. Similar to the Route Layer, selecting this tool opens a wizard to select parameters. In this analysis, add the incident locations to be used, as well as all the potential facilities to be evaluated for the closest. The analysis can be set to solve using several different costs such as distance or time. Once solved, the attribute table will contain the closest facility pairings and route information.



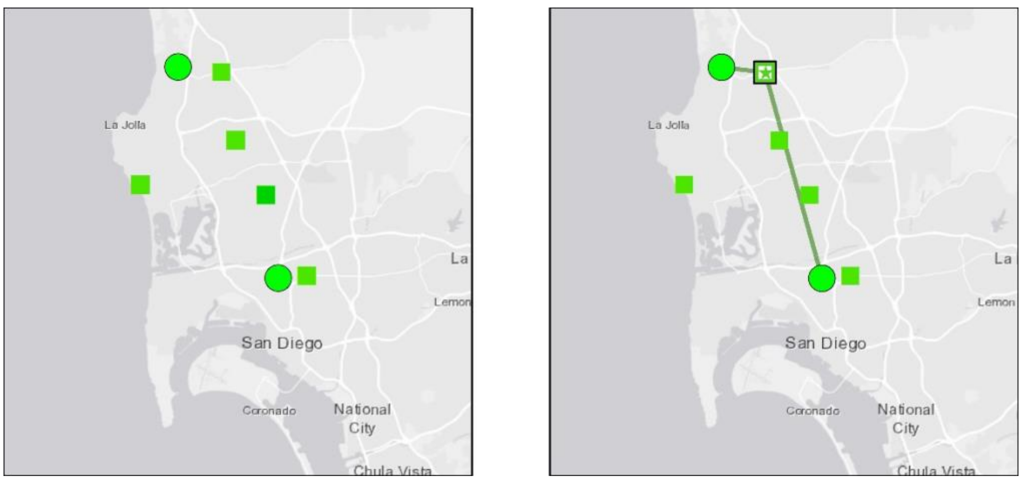
Example of a Closest Facility Analysis; an incident location is represented by the square, and the closest facility by distance is represented by the route in blue

A Service Area Layer (ArcToolbox > Network Analyst Tools > Analysis > Make Service Area Layer) is useful for determining the accessibility of areas given a cutoff cost from a facility. This type of tool is commonly used in setting service areas for things like fire and police departments; this defines the areas that can be reached from the station in x-minute or x-distance cutoffs, or other cost units. To create a Service Layer, load the locations and indicate the impedance costs to be used as well as how many cutoffs to create (e.g. 1 minute, 5 minutes, 10 minutes, etc…). When solved, the Service Layer will display a series of polygons around the facilities representing the area that is accessible within the cutoff.



Example of Service Areas generated around two points with 3, 6, 9 and minute polygons

A Location-Allocation Layer (ArcToolbox > Network Analyst Tools > Analysis > Make Location-Allocation Layer) is useful for picking several facilities from candidate facilities so that demand for facilities is optimally distributed. For the analysis performed by the Free Clinic, this was used to determine an optimal location for a new clinic; several thousand grid squares were analyzed against where Free Clinic patients live to come up with an ideal location. There are many more uses for this kind of analysis, and there are several problem types that can be used to alter the analysis such as “Minimize Impedance,” “Maximize Coverage,” “Maximize Attendance,” etc. For more information on these problem types please refer to ArcGIS Desktop Tools.[14]



Example of a Location Allocation Analysis; several candidate squares are shown, by minimizing travel time from the two circles, a single candidate square is identified with a star

Summary:

Spatial Analyses are a vital part of evaluating patient care. Despite the availability of resources for performing such analyses, they continue to remain an underutilized aspect of clinical care. For the Free Clinic, and many others who care for marginalized populations, spatial analysis is an easily repeatable, and adaptable tool for improving care. Using these tools, the Free Clinic was able to determine a new location to move a clinic of more than 235 regular patients. As well, the analysis highlighted an opportunity to reassign patients to different clinic sites to reduce travel times and issues of access, which has become an ongoing project at the Free Clinic with implementation of trials of patient transfers between clinics.

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[14] http://desktop.arcgis.com/en/arcmap/10.4/tools/network-analyst-toolbox/make-location-allocation-layer.htm

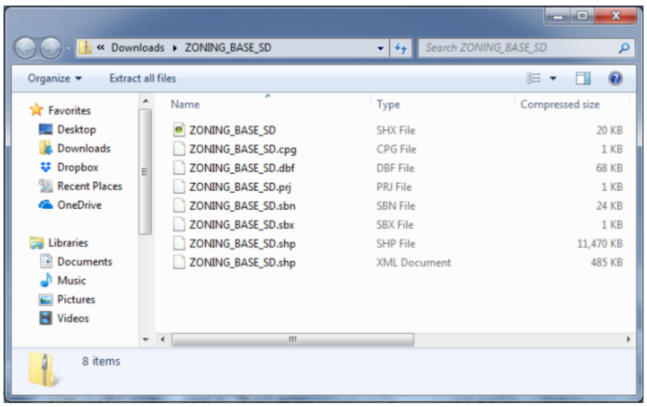
Given the wide adaptability of spatial analyses there are several different future directions for this work. One great area to apply this work is in health profiling; public health applications have made great strides in this use of GIS, and this has far reaching implications for clinicians. On a smaller scale this can be applied to create profiles of Free Clinic populations to help describe the relationships between health and setting; for example, profiles could be developed examining diabetes or blood pressure control based on where patients live which might help target clinic efforts. A second application involves the allocation of resources. Patients at the Free Clinic receive a variety of care from primary to specialty medical services as well as, dental, legal, social work, nutritional and other care. The resources required for these services are not equally distributed and future applications may desire to quantify where the need for these services is located, and how best to distribute limited resources to match. Further applications abound in the realm of questions regarding how place affects health and applies broadly to health and patient care from the neighborhoods where patients live to national and even global levels.

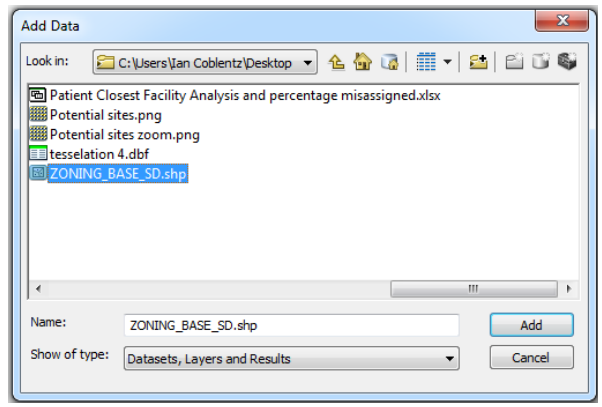
The rise of “big data” and informatics are transforming lives. In contrast, the rise of health-related GIS applications has been slower, however its potential is tremendous. It is imperative then that the healthcare providers be knowledgeable in GIS techniques and uses as this will likely be pivotal in transforming patient care into the future. While by no means definitive, hopefully this guide can be leveraged as a resource for those students interested in the applications of GIS and improving patient care.

Appendix

Appendix A: Shapefiles

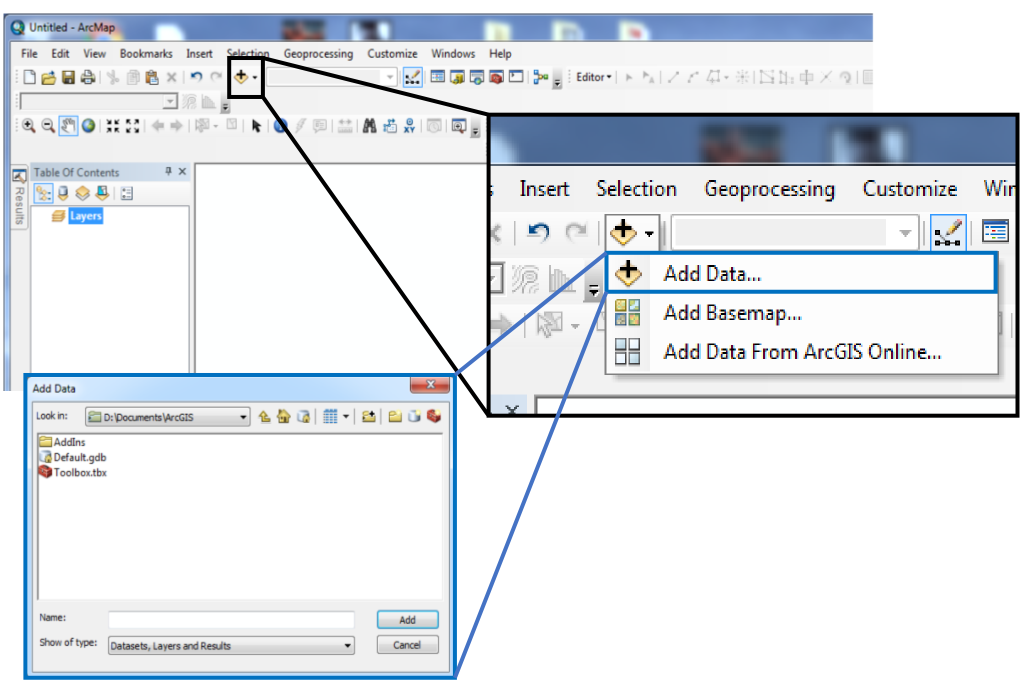
Most Shapefiles are downloadable as a Zip file which contains all the subfiles necessary to use the shapefile. If one of the subfiles is missing or damaged the entire shapefile may not work. On the left is a Zip file containing all the subfiles in a shapefile. When accessed in ArcGIS, these files will appear as in the picture on the right.





Appendix B: Adding Data/Shapefiles

When a new ArcMap is opened there is a blank screen that you can add layers onto to begin. In the toolbar at the top, select add data. This will open a file browser where you can connect to files stored on the PC, or on a separate drive like a flash drive. Use this file browser to locate the shapefiles you would like to add as layers. You may need to “connect to a folder” to find the files you want to add.

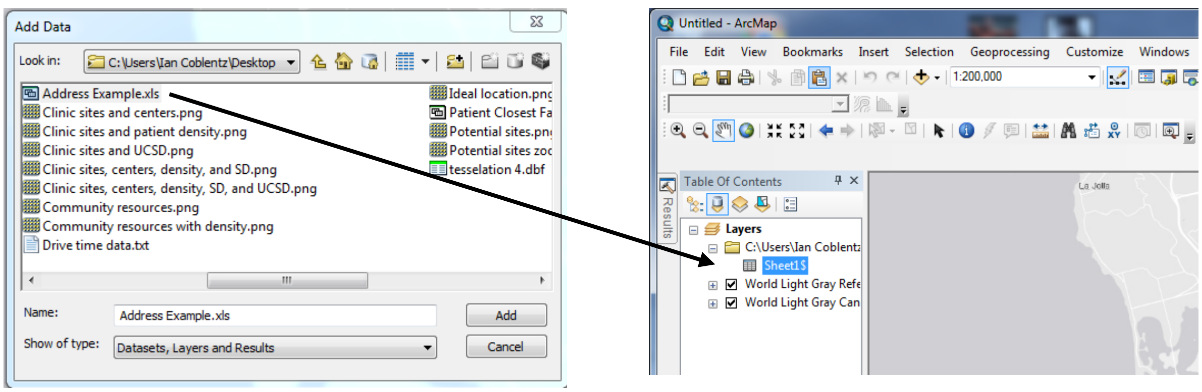


Appendix C: Adding Excel data into ArcMap

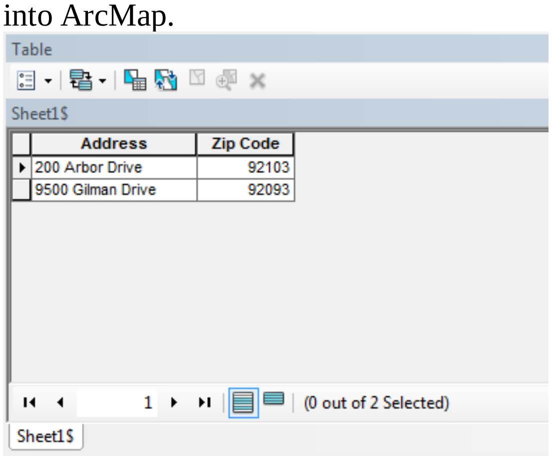
Adding a table of data into ArcMap can be done in several ways. A simple way is to use the Add Data function that was discussed in Appendix B. Excel sheets can be added directly into ArcMap, but keep data organized under simple headings to prevent syntax errors when uploading an Excel sheet. Of note, .xlsx files may not be recognized by the software and may need to be converted to .xls format. For this example, we have an Excel table with two University addresses representing Hillcrest Hospital (200 W. Arbor Dr.) and the UCSD campus (9500 Gilman Dr.).

	A	B	C
1	Address	Zip Code	
2	200 Arbor Drive	92103	
3	9500 Gilman Drive	92093	
4			

Click Add Data and navigate to the Excel document and specific sheet that you would like to add. The sheet will appear in your data layers.



Right click on the sheet you added and select "Open," which will open the datasheet you just added at the bottom of the window. You can see that you have successfully imported your data into ArcMap.



Appendix D: Resolution and GIS data security

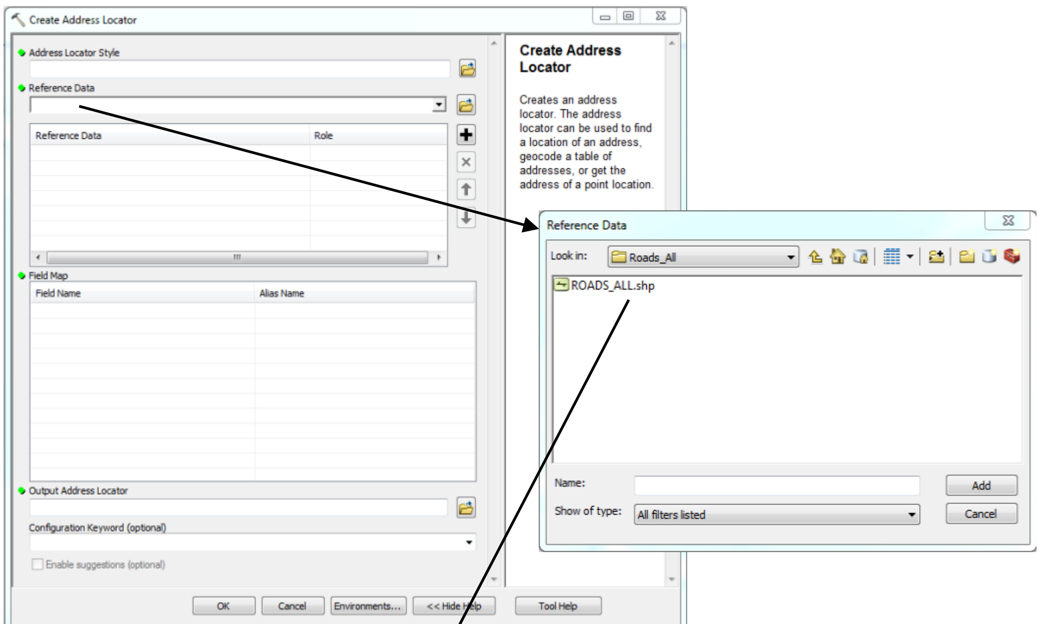
Resolution is the big concern when it comes to protecting patient and other health care data. Its relatively harmless to provide information about how many patients might live in each zip code as that provides relative anonymity, but to provide street address level data about where patients live makes it much easier to identify those patients. Therefore, it is important that steps be taken to control who has access to the maps created, and the data they obtain. There are several ways to mask or “jitter” data to make it more difficult to identify individuals and these are widely accepted methods in a variety of geomapping applications.[15] Heat maps can be a great way to visually mask where individuals live, but allow a density or clustering effect to still be apparent, just be aware if sharing/publishing maps in certain software formats that the underlying data to create the heat map is often still attached and could be accessed to extract individual addresses and locations. Exporting maps as .pdf, or other image formats should alleviate this risk.

[15] Paul A. Zandbergen, “Ensuring Confidentiality of Geocoded Health Data: Assessing Geographic Masking Strategies for Individual-Level Data,” Advances in Medicine, vol. 2014, Article ID 567049, 14 pages, 2014. doi:10.1155/2014/567049

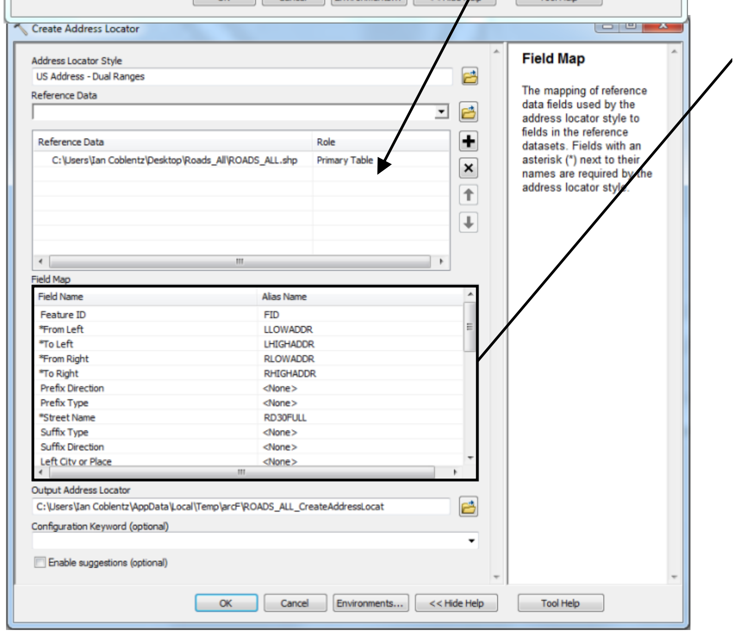
Appendix E: Building an Address Locator

Access the Create Address Locator tool at Geoprocessing > ArcToolbox > Geocoding Tools > Create Address Locator. This will open the tool as seen below. Select the type of address locator you would like to use such as single or dual range, streetname, zipcode, state, etc… With the type selected, load the reference data you will use, see A below. In this example the data is street information provided from a SanGIS shapefile; other sources could be based on census tract information, zipcode, or city/state files. With the reference data loaded, the address locator will need to have certain fields associated with the fields of the reference data; select the corresponding headers as shown in B. Chose a location to save the Address Locator (output) and click ok to generate the locator. If successful, the locator can be used to geocode addresses and locations.

A.



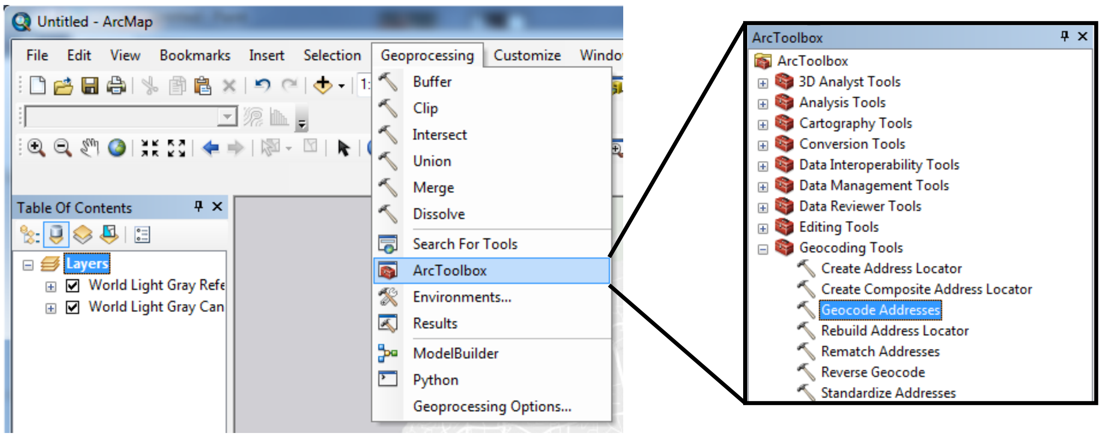
B.



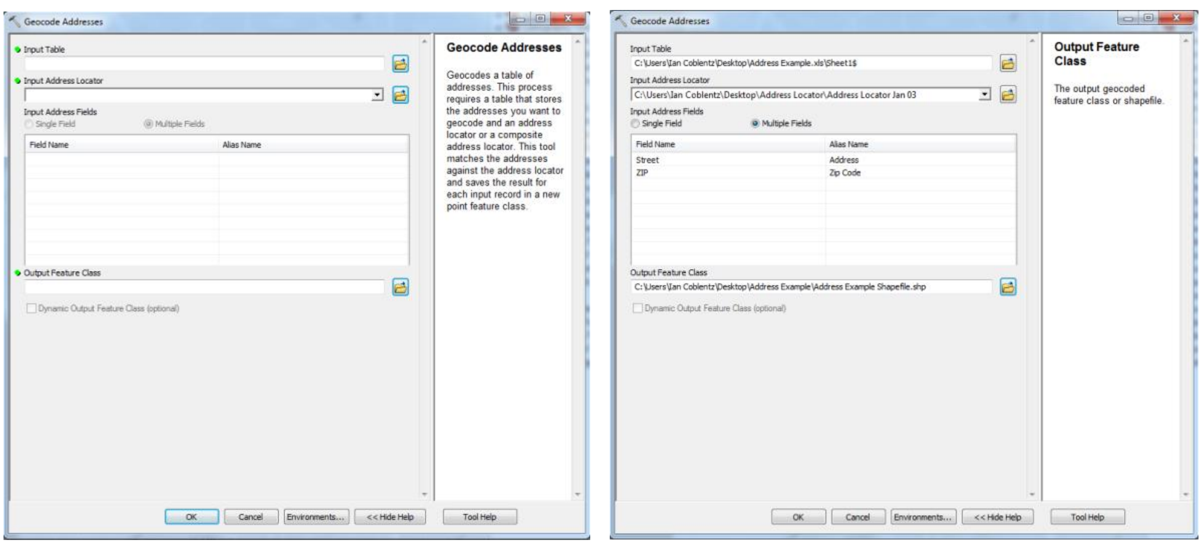
The field names required are marked with an asterisk. They need to be associated with an alias name that exists in the reference data. The more associations provided the more accurate the Address Locator, but not every field is necessary depending on the application.

Appendix F: Geocoding Addresses

This can be done with an Excel Sheet uploaded into ArcMap already or available on the computer. Open the Geoprocessing Toolbar > ArcToolbox > Geocoding Tools > Geocode Addresses.

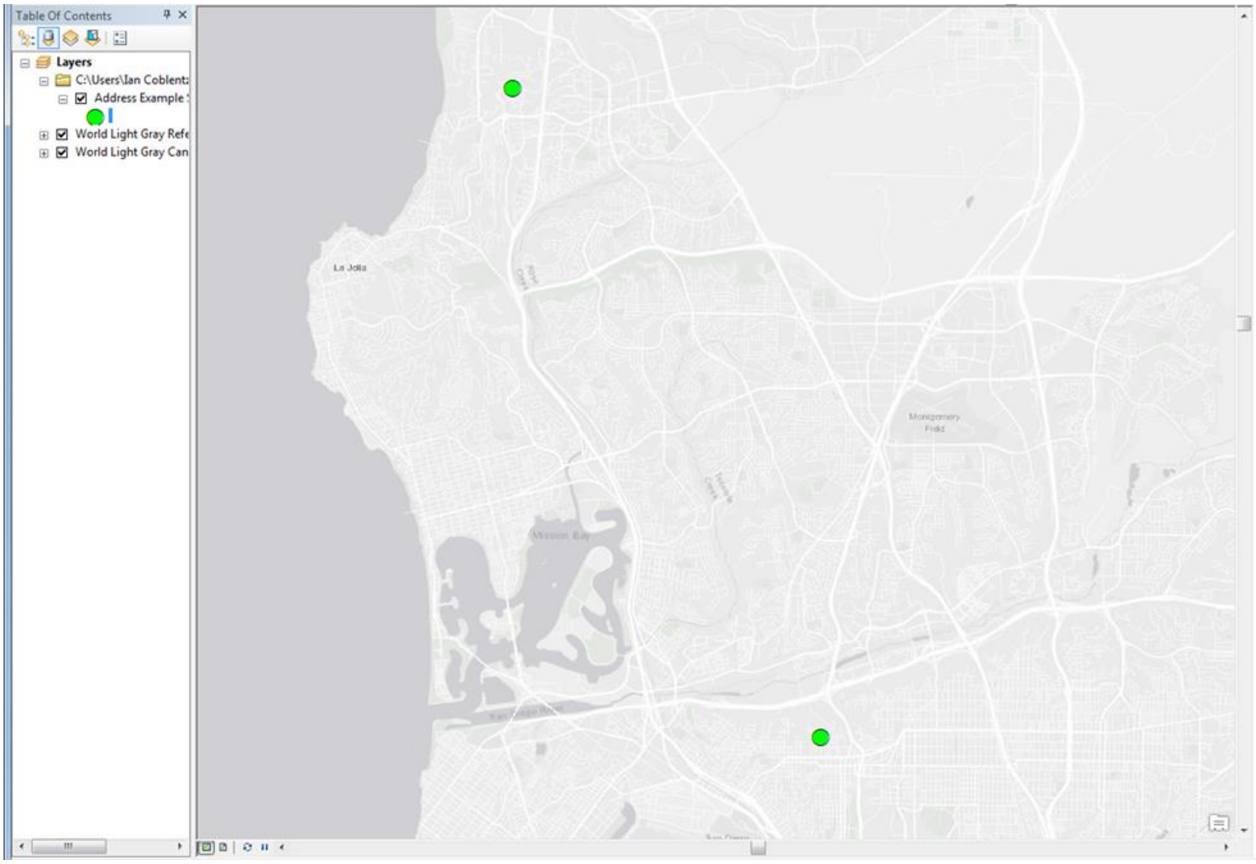


This will open the Geocode Addresses Dialog box, which is filled out with an example below. The example is using the Address Example.xls table containing UCSD's main campus address, and Hillcrest Hospital's address, and using an Address Locator to geocode these addresses.



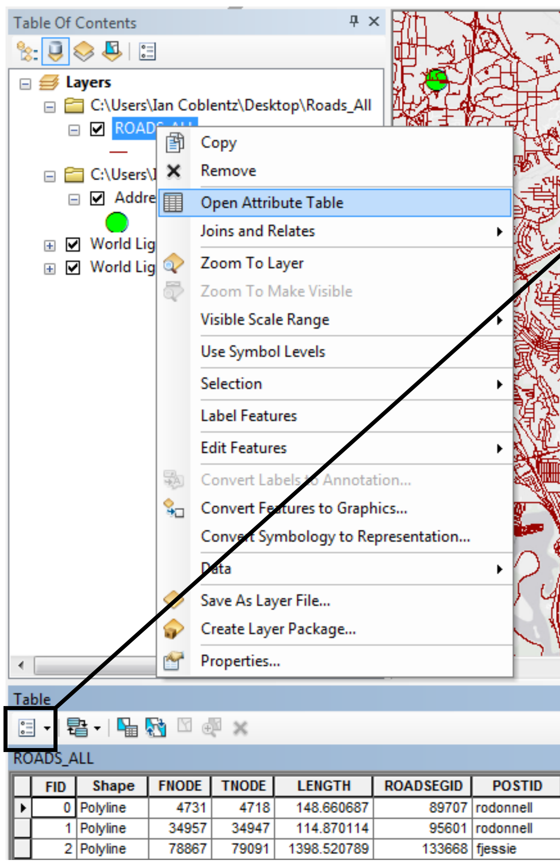
Selecting OK in the dialog box will run the geocoding process and will automatically output a shapefile of the addresses that were geocoded.

Addresses that fail to geocode will still be in the data table but will not be displayed on the map; it is possible to go in and edit the addresses in the data table for things like spelling errors, or incorrect zip codes and try to re-geocode them. In this example there is a base layer map of La Jolla, and you can see the two green dots overlaid on the map representing the addresses we wanted to geocode (UCSD, and Hillcrest Hospital).

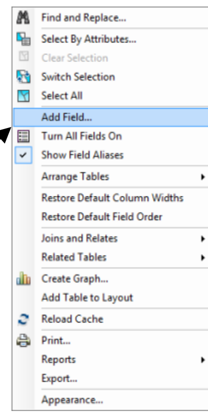


Appendix G: Building a Network Dataset Example:

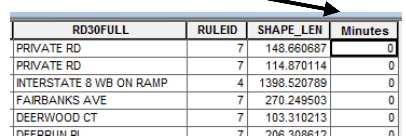
For this example, a shapefile containing all roads in San Diego (All_Roads.shp, available from SanGIS) is used. Drive time data is not available in the reference data, and therefore calculations of drive time will be difficult in the final dataset. To correct this the drive time in minutes was calculated for each road segment by dividing the [distance] / [speed].

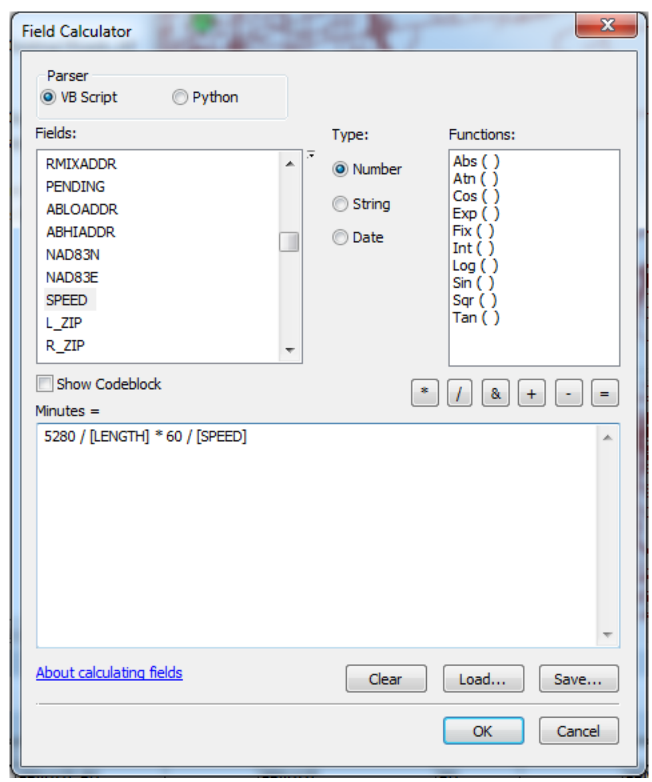


With the Roads_All shapefile loaded, right-click and open the Attribute Table to edit the fields.



Name the new field and set the value, usually "Double." In this example it was named Minutes.

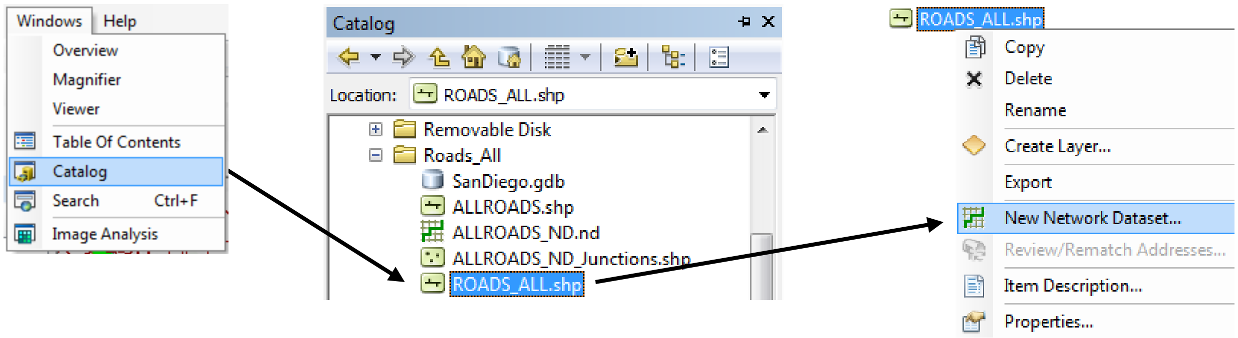




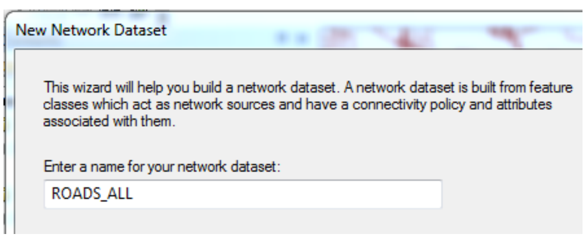
The value of the field defaults to 0, and must be calculated or provided. Right-click on the Minutes header and select "Field Calculator". This will open a syntax calculator (see right); the correct syntax must be written to get the values desired for drive time in minutes. For drive time divide [distance] / [speed], ensure the units are correct. In this case distance is in feet, speed is miles per hour, and drive time is desired in minutes therefore the syntax is "5280/[distance]*60/[speed]". Select OK, and all fields will be calculated with the drive time for that segment in minutes.

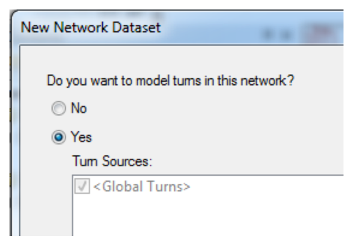
With the Minutes field calculated to represent drive time, save the data as a shapefile by right-clicking the file in the table of contents, Data > Export Data. The newly saved shapefile is now ready to create a Network Dataset.

Open the Catalog window, found under the Windows tab, and locate the shapefile being used as reference data. Right-click and select "New Network Dataset".

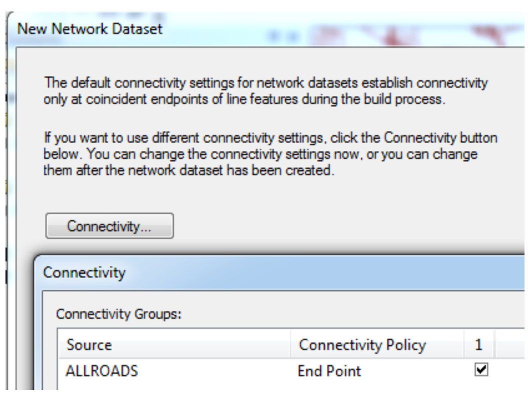


This will open the New Network Dataset Wizard, which will guide users through the process. Begin with naming the new Network Dataset. Select "Yes" for model turns in network.

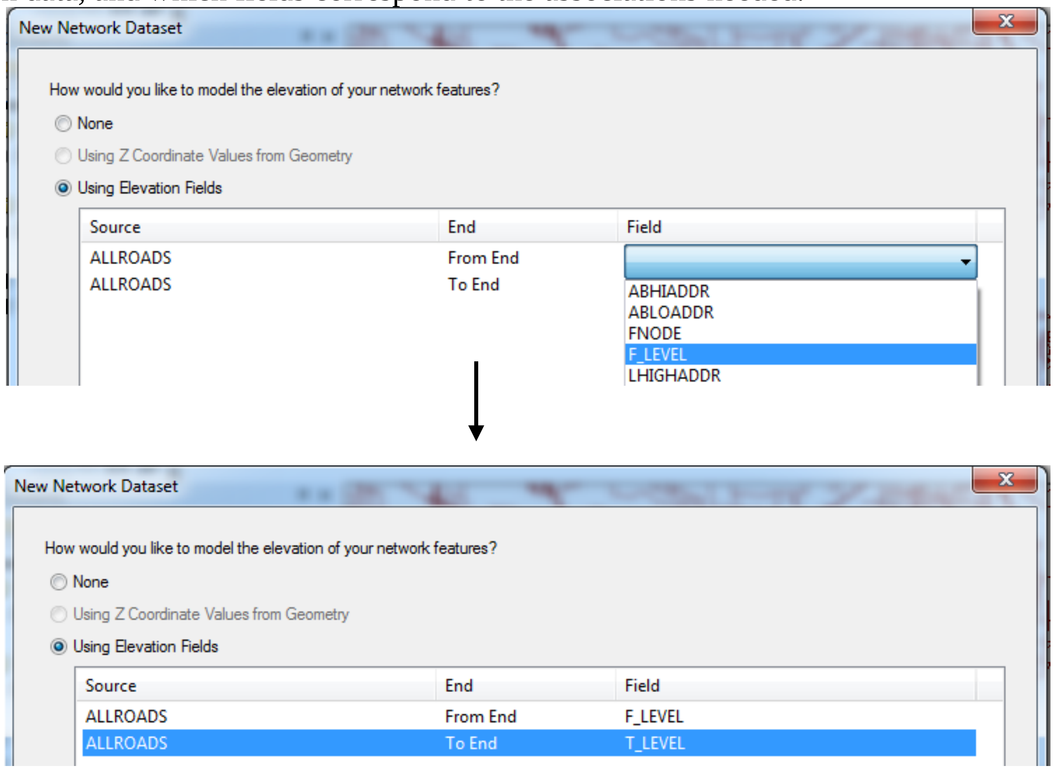




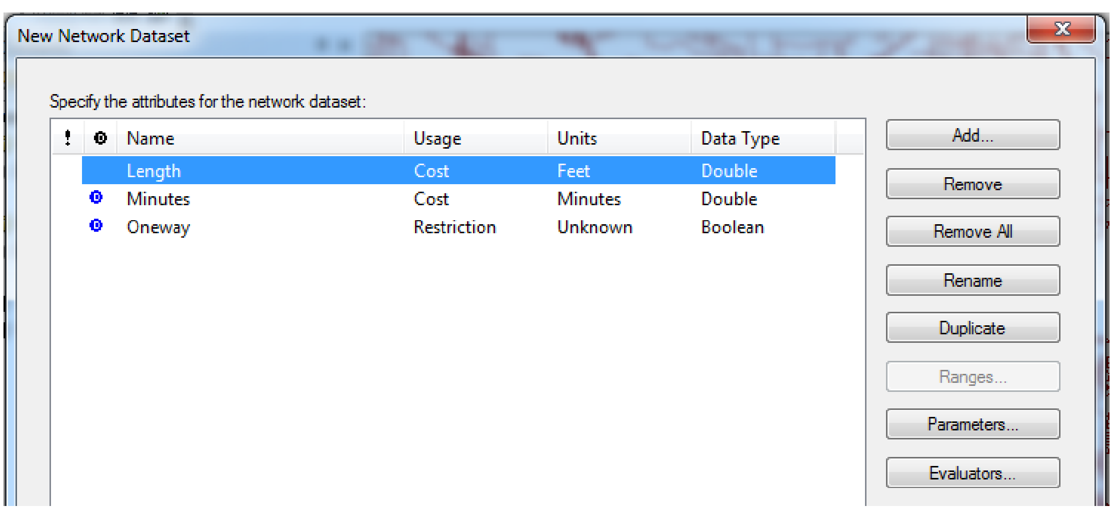
Connectivity, i.e., where do all of the lines connect in this network, can be changed by selecting the connectivity button, however the default settings are typically sufficient.



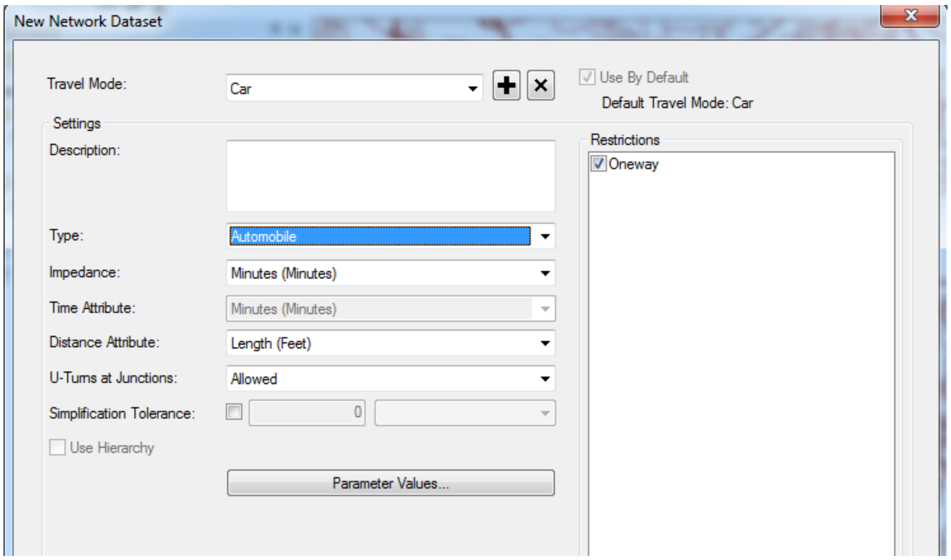
Elevation should be determined in the network to ensure that proper connections are made, for example freeway overpasses look like they intersect with the lower roadway on a map, however in reality there is no connection between the two and this must be modeled. If the reference data contains elevation fields, these should be used to model elevation in the network. Select the "Using Elevation Fields" button and associate the "From End" elevation with the corresponding field in the reference data, repeat for the “To End”. Reference the source data regarding elevation data, and which fields correspond to the associations needed.



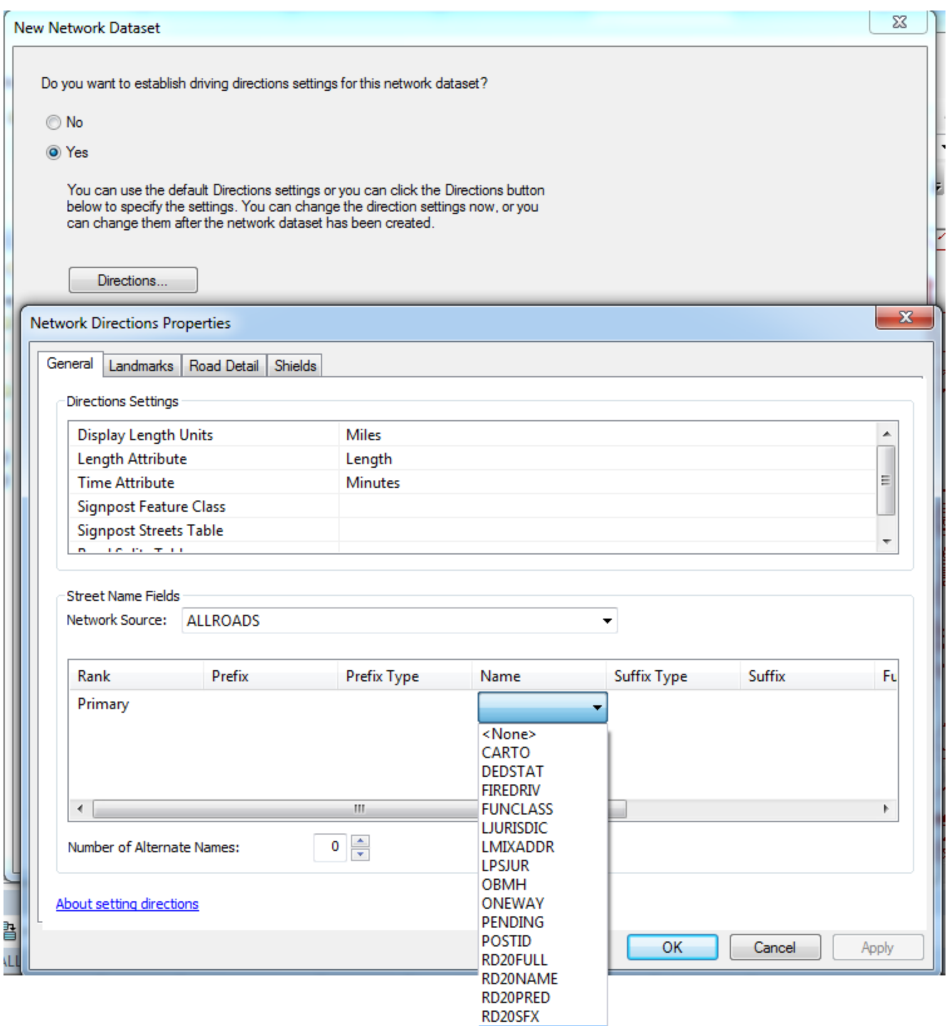
The next page of the wizard allows for attributes of the network to be set; the software is able to recognize these fields in the data and will often attempt to self-populate, but additional attributes can be added and used. These attributes are important as they are used for calculating solutions to Network Analyst problems. If solving for the shortest route, or the fastest route it is important to have time and distance attributes specified and how they will be calculated. Use the Add button to Add new attributes, and Evaluators to change how the attributes are calculated.



After specifying the necessary attributes, specify the travel mode for the network. This is useful when trying to model different modes of traveling the network. For example, cars are bound to follow one-way restricted roads, but a pedestrian is not required to follow such restrictions, and therefore changes the way that the network might be travelled. Travel modes can be added and removed, and basic modes like car or pedestrian are already modelled.



Following this, the wizard will ask to establish driving directions. This can be done as needed for the analysis being performed. Simply associate the "Name" field with the reference data field containing name data.



Following the directions, the wizard will display a summary page. Click “Finish” when done and the wizard will prompt with an option to build the Network Dataset and then add its parts to the map. Once this is completed successfully, the Network Dataset is available to used with Network Analyst Tools.