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Geology 157 Lab 2

GPS and UCR Campus Infrastructure (Part 1)

a)

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| --- | --- | --- | --- | --- | --- |
| Physical Location | Waypoint Name | Immediate or Average | Positional Accuracy | Latitude | Longitude |
| Sproul Hall A | 001 | Immediate |  | 33° 58.335’ | 117° 19.784’ |
| Sproul Hall B | 002 | Average | Was | 33° 58.336’ | 117° 19.783’ |
| University Theatre A | 003 | Immediate | Not | 33° 58.292’ | 117° 19.702’ |
| University Theatre B | 004 | Average | Told | 33° 58.295’ | 117° 19.703’ |
| Bell Tower A | 005 | Immediate | To | 33° 58.378’ | 117° 19.690’ |
| Bell Tower B | 006 | Average | Record | 33° 58.380’ | 117° 19.691’ |
| HUB A | 007 | Immediate |  | 33° 58.423’ | 117° 19.703’ |
| HUB B | 008 | Average |  | 33° 58.423’ | 117° 19.703’ |
| Pierce A | 009 | Immediate |  | 33° 58.424’ | 117° 19.686’ |
| Pierce B | 010 | Average |  | 33° 58.419’ | 117° 19.633’ |

b) Average waypoints provide more accuracy than immediate waypoints by taking a large number of calculations and averaging them, thereby evening out any deviations. The points at Sproul Hall are almost the same, the tall trees nearby had little negative effect. The points at University Theatre are almost identical as well, the courtyard where they were taken is fairly clear. The points at the Bell Tower are accurate, the Tower had little effect on satellite accuracy. Points at the H.U.B. are precisely the same, no deviation. Finally the points taken at Pierce Hall are significantly different, perhaps from the building, but more likely from error in the point taking process.

1) GPS waypoint accuracy is effected differently depending on where the points are taken. Tall buildings in cities can impede satellite signal reception, accuracy is best in rural areas and places with little to block view of the sky. Special instances where of satellite inaccuracy may occur at the Earth’s poles where standing slightly off the pole in any direction causes drastic changes in coordinate readings since the poles are where points of longitude meet.

c) see attached

d) For the first part of the exercise we walked around marking coordinate waypoints at specific locations and then imported them into a GIS. After importing the points a coordinate system was selected and applied to the points to give them structure in the plane of the map. In part two we converted Riverside County Shapefiles(boundaries and roads) to a specific projection type.

e) 1. The CA Plane projection is created by dividing the state into zones based on the NAD83 in order to maintain less than 1:10,000 scale distortion. The North American Datum 1983 was created by the public first being given access to satellite technology and improving on the 1927 North American Datum

2. The NAD1983 is a geocentric horizontal control datum for North America it focuses on projecting coordinates on North America as a whole. The CA Plane projection is based on the North American Datum, but focuses on a much smaller area. It was designed to maintain scale accuracy to a ration of 1:10,000

3) The NAD1983 should be used for projects focusing on large scale applications such as plotting national infrastructure like pipelines and roads, whereas the CA Plane projection should be used to plot localized data such as local police jurisdictions.

**Sources**

<http://wvgis.wvu.edu/resources/standardsGuidelines/wv_coordinate_systems_2002.htm>

http://geology.isu.edu/geostac/Field\_Exercise/topomaps/state\_plane.htm