

CE 3354 Engineering Hydrology Exercise Set 2

Exercises

Figure 1 is a map of Harden Branch Creek area in Concho County, Texas. The **Assessment Point** on the map, coincides with the red circle below on Figure 2, which is centered on the bridge on US 87 just west of Eden Texas.¹

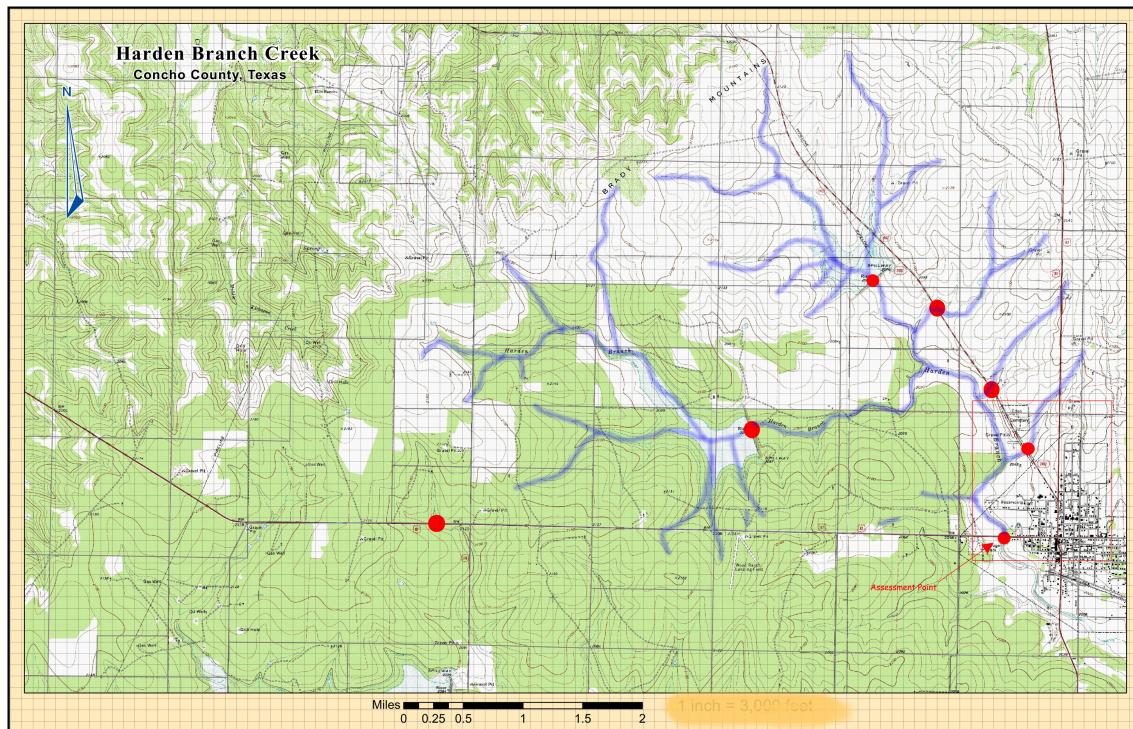


Figure 1: Texas Training Watershed Map (annotated)

1. Using a GIS (i.e. QGIS) load an OpenStreetMap layer and locate the “Assessment Point” in the GIS. Use the coordinate capture plug-in to capture the DD.DDD (decimal degrees) coordinates of the bridge. Screen capture the GIS to demonstrate the determination of the coordinates.²

¹This watershed is the subject of the semester design project, PR-1.

²The DD.DDD coordinates are mostly for this assignment only; A typical coordinate capture will report the coordinates as an ordered pair of degrees East (negative if West of the prime meridian, which Texas is) and degrees North (negative if south of the Equator). Answers of (-100.00-ish, 30.00-ish) are about right for this bridge. (precise values are for you to determine)

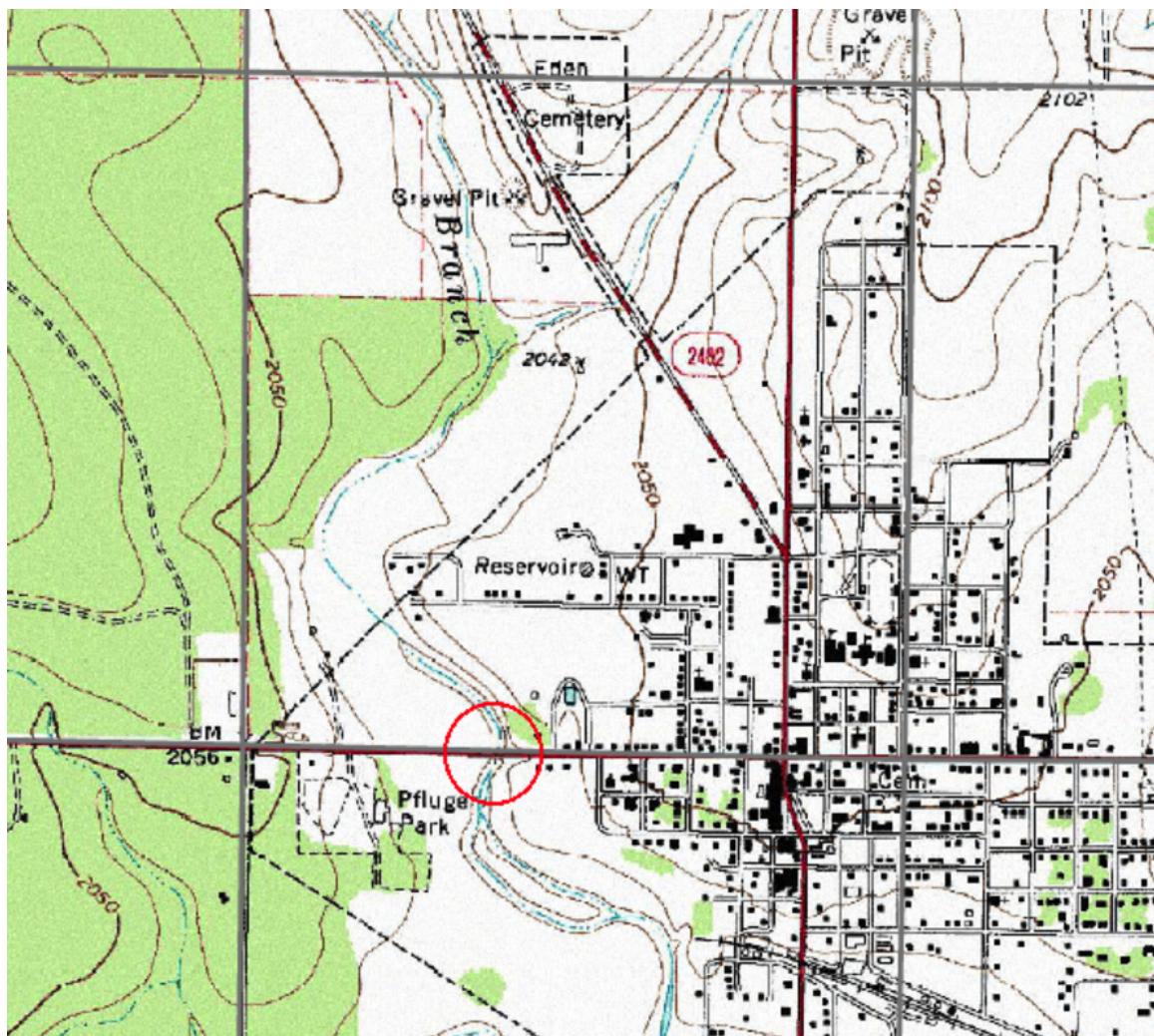


Figure 2: Close-up of map West of Eden, Texas

2. Draw the boundary of the entire watershed area (i.e delineate the watershed)³ that drains to the red circle in Figure 2. Be sure to include the area of the two regulating structures (the earth berms/dams with riser pipe outlets) which also contribute to the outlet.
3. Determine the drainage area of the watershed in square miles.

³You can use GIS tools such as System for Automated Geoscientific Analyses (SAGA) <https://saga-gis.sourceforge.io/en/index.html> or simply generate a map with contours, and by-hand delineate the watershed. Use the Shuttle Radar Topography Mission (SRTM) <https://pubs.usgs.gov/publication/fs07103> as your source of elevation data. QGIS has plug-in for both items; these are the same as demonstrated in class.

4. Draw the main channel in the watershed (you will have to use some hydrologic judgement). In GIS the main channel is the path from the highest elevation onthe boundary to the outlet.
5. Determine the length of the main channel in miles.