Review comments regarding the Estancia Ranch development

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The plan contains many objectives and goals but lacks accountability. For example, little if any discussion is presented regarding inspections, maintenance, or monitoring for the construction activities, the pollution abatement structures, or the pipeline integrity. As written, it is unknown if the commitments will be achieved thus the plan should be revised to address these deficiencies. Additionally, many of the presented strategies are inadequate for controlling sediment and for pollution abatement. Finally, conclusions are reached that recharge could occur through the geologic features. A few streamflow-discharge measurements, on the other hand, would provide verification of this, and, if occurring, would document the amount of recharge.

Construction

The plan identifies a few sediment-control measures such as silt fences and rock berms. These structures are known to be ineffective in attenuating sediment and often fail during storms. Water-quality ponds are effective in controlling sediment and should be used during construction. Below is a list of other proven controls that should be considered.

1. Minimize Clearing
2. Protect Waterways
   buffers and special crossings for waterways
3. Stabilize Drainageways
   checkdams, sod, erosion control blankets, rip rap
4. Phase Construction
5. Rapid Soil Stabilization
   hydroseed, mulch, erosion control blankets
6. Protect Steep Slopes
7. Perimeter Controls
   earth dikes, diversions, silt fences, stabilize construction entrance
8. Employ Advance Settling Devices
   sediment traps & sediment basins

The most effective and easiest-to-implement measures are probably minimizing clearings and, in particular, phased construction. The National Stormwater Center provides details on these and other effective controls at www.npdes.com. Although it is unlikely that one will be found, a Texas Licensed Professional Engineer should certify in writing that the sediment controls will function as intended.

Each sediment control should be inspected for integrity after each storm.

A list of all materials including fluids, adhesives, paints, cleaners, masonry, and cement to be used during construction should be made available, along with how they will be stored and disposed.

Back-up power sources should be provided if pipeline lift stations are required, and the stations should not be located near sensitive karst features. Finally, each end of the pipeline should be gaged or metered to document sewage losses.

Pollution abatement

The development will include two batch detention basins and one designed vegetative filter strip. However, the structures will be designed in accordance with TCEQ guidelines for the Edwards aquifer, which solely examine the removal efficiency for total-suspended solids. Additionally, detention basins do not usually remove contaminants other than suspended solids. Best Management Practices (BMPs) that are effective at eliminating pollutants should be considered.

Below is a list of such strategies and summaries of their effectiveness.

Type of BMP	Removal efficiencies
Public information program	5-10% for most water-quality constituents
Wetlands	Up to 90%; best for nutrients, some metals increased
Wet ponds	60-80%; best for sediment-related constituents
Dry ponds	30-70%; best for sediment-related constituents
Filters	30-70%; most are horizontal; best for sediment-related constituents; Efficiency dependent upon maintenance
Grassy swells	10-20%; more efficient for specific sites
Street sweeping	0-10%; some evidence that sweepers can increase water-quality loads

Detailed information on BMPs are presented online at www.bmpdatabase.org

Sensitive environmental features

Five geologic features, all located in Cibolo Creek, were found and listed below. Although each is identified as being in the Glen Rose Limestone, the TCEQ Edwards Aquifer Map Viewer shows the features to be in the Edwards aquifer recharge zone. For each but S-6, the statement is made that “due to the location of the fractures within the intermittent drainage path, it can be inferred that the potential of direct and/or rapid infiltration does exist”. However, with the exception of S-1, all are deemed non-sensitive. Regardless, Google Earth and 1-foot contours from LIDAR data indicate that there are at least 7 depression areas in the stream within the project area, 5 of which are highly faulted.

Such areas on the Edwards almost always provide large recharge volumes. The depressions range from about 100 to 230 feet in length with depths from 1 to more than 3 feet.

Additionally, a streamflow gain-loss study conducted by the U.S. Geological Survey (USGS) in January 1958 discovered that 4.3 million gallons per day (mgd) was being lost as recharge in Cibolo Creek along a 1.7-mile reach that includes the study area (Slade and others, 2002, p. 28 and 128-129). The study was conducted during low-flow conditions thus it is probable that more recharge occurs during high-flow. Based on data from a USGS streamflow-gaging station on Cibolo Creek near Specht Road, the mean flow in Cibolo Creek is 4.1 mgd (USGS, n.d.) thus the stream sometimes carries large flows. The flow loss, if any, attributed to the features is unknown, but it is likely that at least some loss occurs in the study area.

Additionally, the stream is no flow about 90% of the time, thus during most storms, the only runoff to the features will come from within the project area, and there will be little, if any, dilution of this urban runoff. There is no direct evidence that the features loose flow, but this should be tested. This could be done by measuring and comparing the streamflow discharge at each feature's upstream and downstream ends. Because the stream has flow about 10% of the time, there are periods when the study could be done. As an alternative, pool loses to the subsurface could be monitored by delivering water to the depressed feature areas mentioned above.

As a result of development, any recharge through the features would probably be degraded thus contaminate water in the Edwards aquifer.

Specific information for the geologic and other features are presented below.

PRF S-1 represents a fracture zone 100 feet wide and 150 feet long. These long fractures appear to be parallel to Cibolo Creek thus could be providing substantial recharge volumes.. A buffer area will be used to protect the feature. However, such likely won't be sufficient for reducing runoff pollutants in route to the feature. Steep slopes and lack of vegetation and soil limit pollutant loads that could be attenuated in a buffer zone. Consideration should be given to erecting a berm that would route flow around the fracture area.

PRF S-2 is defined as an outcrop of fractured rock in Cibolo Creek. The fractured rock is 300 feet long and the fractures are up to 6 inches wide thus could be providing recharge through this feature.

PRF S-6 is an apparent fault about 120 feet in length in Cibolo Creek and within an outcrop of fractured rock. The fractures are up to 6 inches wide and have a density as small as 1 foot.

PRF S-7 and S-8 are also outcrops of fractured limestone and up to 200 feet long in the Cibolo Creek channel.

PRF numbers S-3, S-9, S-10 and S-14 are "apparent" water-wells. Well S-9 is the only one in use. The wells are rated as having low sensitivity to the Edwards but this cannot be substantiated without site inspections at each well. Bores around wells can transfer water to the subsurface, thus the surface seal and protective casing around each well should be verified to be intact.

The drainage boundary for each geologic feature should be mapped and development should avoid these areas. Additionally, any recharge feature discovered during construction should be fully evaluated for recharge potential and consideration should be given to sealing the feature before the pipeline is installed.

Floodplains

The floodplain analysis is based on FEMA Flood Insurance Rate Maps dated September 29, 2010 and September 2, 2009. However, those maps are out of date. As documented by NOAA Atlas 14, flood risks have increased thus the floodplain analysis should be based on this updated data.

Floodplains are not mapped for small creeks but should be developed for each creek in the area.

References

Slade, R.M., Jr., Bentley, T., and Michaud, D., 2002, Results of streamflow gain-loss studies in Texas, with emphasis on gains from and losses to major and minor aquifers: U.S. Geological Survey Open-File Report 02-068. http://pubs.usgs.gov/of/2002/ofr02-068/

U.S .Geological Survey, "USGS Water Data for the Nation" https://waterdata.usgs.gov/nwis/inventory?agency_code=USGS&site_no=08183978

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