



Crump Road – Convenience Store Stormwater Narrative

February 18, 2014

The subject project is proposed on a 2.0 acre portion of the 6.58 acre parent parcel (1204200180000). The proposed site is located just north of the northeast corner of the intersection of Miccosukee Road and Crump Road in Leon County, FL. The proposed project involves the construction of a 2,904 SF convenience store, 10 fueling stations, and a self-contained car wash along with the associated parking, sidewalks, and a retention stormwater management facility. The developer and owner of the property is William Glen Brown.

Pre-Development Site Conditions:

From review of Leon County GIS, NFWMD GIS and surveyed data the site is located at the crest of a hill on Crump Road and the runoff within the right-of-way discharges to the north and south. The remainder of the runoff from the site is contained within the confinements of a “closed basin” and only discharges via a saddle condition to the northeast during 25yr24hr, 50yr24hr and 100yr24hr storm events. The runoff that discharges at the saddle location then cascades through a system of depressions and into a tributary that feeds the St. Marks River. The site is located within the Bird Sink Basin, more particularly within the Apalachee Bay-St. Marks Watershed. According to the NRCS web soil survey, the predominant soil type for the site is Norfolk loamy sand, clayey substratum. There are several scattered permit size trees located on the property as shown on the survey. No significant wildlife or listed species were observed on the site.

Post-Development Site Conditions:

The proposed site development is the construction of a 2,904 sf convenience store with ten (10) regular off-street and one (1) ADA parking spaces. The proposed total impervious area is 26,380 sf. Due to the topography of the site, the proposed method of stormwater management is a shallow retention stormwater management facility (SWMF). The SWMF is located to the east/rear of the building in the existing low area. The site is graded such that the vehicular use area and interior islands in the front of the building drains to four (4) concrete flumes, two (2) to the north and two (2) to the south, and into swales that are sized to convey the runoff to the proposed SWMF. The remaining vehicular use areas and interior islands drain to two (2) concrete flumes which discharge directly into the SWMF. The contributing runoff for the flumes and swales is calculated per the sub-basin areas provided within the stormwater calculations and drainage area map and were sized using Bentley Flowmaster V8i. The provided FlowMaster calculations are for a flume with a minimum 1.0% slope, normal depth of 0.45 ft and critical depth of 0.49 ft which discharges a maximum allowable flow rate of 1.97 cfs. All of the proposed flumes have 25yr/24hr design flows less than that of the above mentioned conceptual model and are steeper than the minimum 1.0% slope and are therefore are considered adequate. Runoff generated by the pump canopy and building is to be piped directly to the south swale and SWMF using 8” roof drains. The roof drains were modeled in

FlowMaster using a minimum 2.0% slope and the maximum 25yr/24hr design storm flow rate of 0.81 cfs. The proposed roof drains from the building have considerably less contributing drainage area than the pump canopy and therefore were not redundantly modeled given the previously calculated capacity. The sum of the contributing sub-basin flows was used to size the north and south swales using triangular shaped open channel simulations in FlowMaster with the 25yr/24hr design flows. The designed minimum 1' deep north and south swales resulted in normal depths of 0.57' and 0.55' respectively. The SWMF is designed with 4H:1V side slopes and does not discharge post-development runoff generated by storms up to and including the 100yr24hr design storm.

Pre-Post Stormwater Analysis:

For the purposes of pre-development and post-development consistent comparison, the total 3.40 acre area of the closed basin was evaluated. The pre-development basin included a small amount of existing impervious area combined with the existing HSG B, Norfolk loamy sand to produce a 61.39 CN. The stage/storage for the pre-development area was calculated using a combination of survey topography and NFWMD Lidar contours. The post-development basin included the proposed impervious area and HSG B, Norfolk loamy sand to produce a weighted 67.44 CN. The post-development stage/storage area was calculated using a combination of the proposed contours in the disturbed area and NFWMD Lidar in the undisturbed area.

Per Leon County LDC 10-4.301(2)(iii) and using the total basin area of 3.40 ac., the treatment volume was calculated to be 8,492 cf. By interpolation, a treatment volume depth was calculated to be 6.74 inches within the proposed SWMF. Using the provided geotechnical recommendation of 0.28 in/hr a treatment volume recovery time of 24.51 hours was determined which is well within the required 72 hour timeframe.

The volume control, peak stage of the low area, and rate control were analyzed using ICPR V3.10 simulations for all design storms up to and including the 100yr24hr storm. After review of the ICPR output reports and provided Pre-Post Comparison Table, the SWMF discharges in the 50yr24hr and 100yr24hr design storm events. However, the pre-post comparison table demonstrates that the peak stage, volume of discharge off-site (“Node Total Inflow”), and maximum outflow (“Channel Max. Outflow”) are all reduced in the post development condition. Therefore, the proposed SWMF exceeds the requirements of the closed basin standards for volume control per Leon County LDC 10-4.301(3)(b). Also, the comparison table confirms that the peak stage of the on-site “semi” closed basin is reduced due to the added storage volume of the proposed SWMF.

The construction plans require silt fence to be placed by the contractor along the north perimeter of the site prior to construction to prevent erosion and silt from entering the adjacent properties. These controls are required to be maintained by the contractor throughout the life of the project and removed once the site has been stabilized.

In conclusion, the proposed development’s stormwater management system has been designed so that no off-site adverse impacts are anticipated.