



September 14, 2009

Mr. Terry Maher, President
Woodlands Subdivision HOA
PO Box 5489
Concord, NC 28026

Subject: Stoney Creek Flood Plain
Field Observation and Guidance
Woodlands Subdivision, Concord, North Carolina

Mr. Maher:

As authorized by your acceptance of our proposal dated July 14th 2009 and in accordance with our field inspection on July 13th 2009, CESI offers the following observations and suggestions with respect to the flood plain along Stoney Creek particularly that section east of Stony Creek Drive and south of Monticello Drive.

Existing Flood Plain Mapping

Within the last year, Cabarrus County has adopted revised flood plain mapping. The current mapping shows a substantial flood plain extending up to and slightly past Stoney Creek Drive NW where a double barrel culvert with head walls is located. The flood plain extends to the confluence of Stoney Creek and Coddle Creek. Please refer to the flood plain maps attached as exhibits at the end of this document. It is clear from the flood plain mapping that the majority of the property along this reach of the creek are impacted by flood plain to different degrees. During peak storm events a major portion of the rear yards are within the subject flows. Many homes maybe required based on elevation and location to carry flood insurance.

Field Observations

Field Inspection began at the confluence of Stoney Creek and Coddle Creek. Stoney Creek exhibits several tight bends as it joins Coddle Creek, these bend in the creek's centerline help to impede flows, or to slow flow as it enters Coddle Creek. In addition Coddle Creek makes a long sweeping bend away from the confluence; this serves to increase the velocity of the Coddle Creek along the outside edge of the flow. Erosion of the southwest bank of the confluence point is evident, it appears that the slowing of Stoney Creek flows coupled with the velocity of Coddle Creek at the confluence serves to further slow flow from Stoney Creek. Evidence of this slowing is shown by the deposition of debris and sediment along the reach of stream just upstream from the confluence. It was also noted that Coddle Creek has a very well defined channel at this location that as well serves to speed flows and actually to lower flood plain levels in the overall system, which is a positive for the flood plain along Stoney Creek. If Coddle Creek slowed in this area, the water from Stoney Creek would be impeded more from entering Coddle Creek and thus the flood plain would be enlarged from its current size due to the inability of Stoney Creek to empty itself. These are general observations about the flows and how they act; a more detailed flood study would need to be performed in order to quantitatively analyze the actual flood plain and its reaction to current or any proposed change to the topography and confluence point.

The field inspection continued upstream along Stoney Creek, appropriately named due to the large boulders both visible and evident in the local topography. Due to this rocking terrain, the creek exhibits a very sinuous nature, or in other terms, it has many bends and curves along its centerline. There are very few straight reaches of stream bed, as such debris and sediment can deposit along these bends and can serve to slow flows which add to the inundation of the high peak storm events. In examining these bends there is evidence of sediment deposition within the stream. Also noted, where several fences which were built to the top of the stream bank. In storm events, these fences could catch or hold debris which would slow storm flows along the creek. Any structures long the stream which are within the flood plain can as well impede flows and cause debris to be held or become a part of the debris being transported by a storm flow.

As we approached Stoney Creek Drive, the creek makes a hard turn to the south and at that point a storm drainage pipe enters the creek from Monticello Drive. The existing head wall and outlet protection slab appears to be undermined, probably due to the heavy flows of water trying to make the sharp bend, thus causing erosion of the soil around the pipe outlet. As the water comes under Stoney Creek Drive the culverts tend to speed flow slightly and

the hard bend can be quickly overcome as flows exceed the elevation of the adjacent bank, basically straighten the flow during these heavier storms. It was noted that a structure had been lost in this specific area due to this type condition.

In examining the culvert crossing at Stoney Creek Drive, I found the crossing to have naturally converted to what we are at presently required to build by the NCDENR DWQ at stream crossings. One culvert handles the majority of storm water, the other pipe has a built up bench of sediment which is 1-2 feet higher than the normal creek flow, in heavier storms this pipe helps to convey the excess water that can not be handled by the primary pipe. These pipes appear to be functioning normally. It was noted by Mr. Maher that removal of the sediment and vegetation around the secondary pipe had been discussed in order to alleviate some of the flooding upstream of the crossing. While removing this sediment will reduce the flooding upstream, it should be noted that this would be an ongoing maintenance concern as sediment and vegetation will reestablish itself over time since that is a natural state. I would suggest that removing this sediment and vegetation will not substantially improve the flow of the stream and may in fact not be in the best interest of the overall environmental consideration for the creek.

Measures to Benefit flow of Stoney Creek

Develop a system to limit sediment and debris from entering the creek. While it does not seem that a fully built out subdivision would have sediment issues, it is an ongoing issue which needs to be dealt with by setting up a program of education and control. Even small disturbance to stabilized properties can cause sediment production which within the drainage area of the creek ends up in the creek transported by storm flows across the ground and thru pipe systems. As well debris should be controlled and handled as dictated by the City of Concord Solid Waste Department. Debris typically found in streams; grass clipping, yard waste, or heavier wood limbs and trees.

Limit development of yards and structure within the flood plain. That gazebo could potentially impact your neighbor during storm events, either by slowing flows or in heavier storms as becoming debris. Understand that anything within the flood plain is subject to the flows of that flood plain, limit your damage by limiting what you build or improve within it.

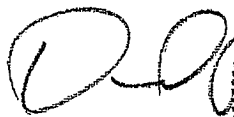
Set up a program to inspect and maintain the creek on a regular basis. Remove excess sediment and debris. Keep vegetation along the creek bank maintained this will help storm flows. Look for over development within the flood plain and help property owners understand the impact of their actions.

Finally, know where the flood plain is on your property. Understand that in heavier storm events that there will be flooding on your property; while you can not prevent it you can prevent its impact on you and your property.

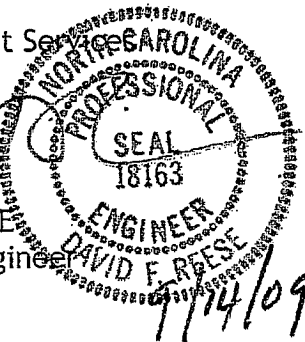
Conclusions

Overall Stoney Creek is in good condition, some minor maintenance items can be undertaken to slightly better its overall condition as noted above. However, even these measures will only make the flood plain act as shown on the exhibits attached. The flood plain can not be eliminated from these properties and very little can be done to lower that flood plain within existing regulations by altering Stoney Creek. The best scheme going forward is to keep the creek channel maintained and understand what the impacts of development are to the flood plain. CESI hopes this report has been helpful and please do hesitate to contact us should you need additional information or have questions.

CESI, Inc.
Land Development Services



David F. Reese, PE
Principal Civil Engineer



Attachments

Cc: Margaret Pearson, City of Concord, Flood Plain Administrator



Map Printed On August 13, 2009

Disclaimer Cabarrus County shall not be held liable for any errors in the data represented on this map. This includes errors of omission, commission, concerning the content of the data, and relative positional accuracy of the data. The data cannot be construed to be a legal document. Primary sources from which this data was compiled must be consulted for verification of information represented on this map document.



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Comments Woodlands Subdivision

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