LEWISVILLE TOWN COUNCIL BRIEF

OVERVIEW:

Municipal Engineering Services Co., PA has completed the Sanitary Sewer Master Plan and Feasibility Study for the Town of Lewisville, North Carolina. The Study is broken down in the Final Report, individual Drainage Basin Spreadsheets, individual Drainage Basin Maps, and a Key Map that shows all of the drainage basins that make up the Town of Lewisville and its zoning jurisdiction.

This overall study is broken down into two (2) Sections:

Study Section 1 – Collector Sewers and Assessments Inside the Town Limits

Study Section 2 – Collector Sewers, Outfalls, Pump Stations and Force Mains in the Town of Lewisville Growth Management Areas

STUDY SECTION 1:

Study Section 1 includes **every** street, road, cul de sac, drive and lane inside the Town Limits that are currently unsewered, including private drives and NC DOT roadways. The length of each of these streets was measured using Google Earth Maps. The street lengths were then used to determine the sewer assessment value, based on the CCUC assessment cost of $90/LF. If the CCUC installs collector sewers along any of these streets, each property owner on those streets will be assessed $45/front footage lot length ($45 on each side of the street for a total of $90/street footage length). This assessment would then be used to build or repay CCUC for the cost of the sewer line. By agreement between the Town of Lewisville and CCUC, 38% of the assessment value would be paid to Lewisville. Lewisville can use those funds to pay for other sewer lines, to upsize any outfalls, interceptors, pump stations and force mains needed to serve adjacent areas in the future.

Study Section 1 of the Project Report contains a list of every unsewered streets for each drainage basin. The collector sewer length needed to server each street and the assessment value that would be collected for each street when sewer is installed is also noted in each list. The drainage basin maps prepared for Study Section 2 also show the collector sewer lines on each of these streets.

STUDY SECTION 2:

Study Section 2 looks at the complete sewer improvements that would be needed to serve all areas inside and outside of the Town in each drainage basin, based on zoning. For areas inside of Town, the existing zoning was used. For areas outside of Town, the Growth Management Area

zoning was used. For the majority of the areas outside of Town, the Growth Management Area (GMA-4) is zoned R-20 (or 20,000 SF lots). If any zoning in the Growth Management Area outside of Town is more dense than R-20, the more dense zoning was used. For example, a large portion of the Growth Management Area (GMA-4) outside of Town in the Reynolds Creek basin is zoned R-9 (or 9,000 SF lots). For those areas, the zoning density of 9,000 SF lots was used. The Lewisville Utilities Committee made a decision to reduce the developable area in the outside GMA-4 R-20 zoning areas by a factor of 25%. That is, due to topography, expected streets, streams, creeks and other physical factors that would render certain areas non-developable, the actual developable area would be limited to 75% of the total area. Using these criteria, the number of developable lots for each zoning type was calculated. The square footage for each developable zoning type (taking into consideration the 75% development factor where applicable) was calculated in each drainage basin using GIS information on the Town's zoning maps. Knowing the total developable area of each zoning type led directly to the calculation of the number of lots in each zoning type.

CCUC indicated that residential units should be considered to contribute 80 gpd/bedroom. Therefore, a 3-bedroom home that would likely be built on a 20,000 SF lot would contribute 240 gpd of wastewater. For non-residential zoned areas, the expected flow was based on the NC Department of Environmental Quality design guidelines. Knowing the number of developable lots and the flow contribution from each type of development lot, a total wastewater flow could be calculated for each drainage basin.

CCUC also indicated that sewer lines should be designed to flow 63% full and that pump stations, where needed, should be sized using a 4.0 peaking factor. The Town's GIS zoning maps contain all of the major drainage basin information including streams, creeks and topography contour lines. Using those maps, each drainage basin was dissected into smaller sub-basin areas. Each zoning type area in each sub-basin was calculated and the number of lots determined. From the number of lots, the wastewater flow was determined. From the wastewater flow, the criteria that pipes were to flow 63% full and calculating the pipelines slope (as determined from the topographic contour lines), the size of the outfall sewers was determined. Outfall sewers flow into the major stream interceptor sewers. As flow progressed downstream, again using the topographic contour lines to determine the pipeline slopes, given the criteria that pipes were to flow 63% full, and accumulating flows from all contribution pipelines, the size of the interceptors, and in some cases, the increased size of outfall sewers was determined.

A spreadsheet for each major drainage basin is provided with the report. The spreadsheets call out (by ID#) each of the sub-basins, the outfall sewers and interceptor sewers for each sub-basin, the number of lots, the flow per sub-basin and, moving downstream, the accumulated flow. Again, moving downstream, the outfall and interceptor sizes increase as required to handle the

flow. Pump stations and force mains, where needed, are shown on the spreadsheets. Finally, the costs of the collector sewers, local outfalls, major outfalls, interceptors, pump stations, force mains, easements and the engineering costs are noted on each spreadsheet.

CONCLUSIONS:

1. Consideration should be given to working towards the installation of interceptors, as they become needed, at the sizes proposed in Section 2. It should be anticipated that interceptors may need to be paralleled sometime in the future (as is currently the case along the Reynolds Creek interceptor). Therefore, wider than normal easements (40' permanent easement plus 10' temporary construction easement – a total of 50' -rather than the normal 30' permanent easement plus 15' temporary construction easement – a total of 45') is recommended to be purchased when the interceptors are first constructed. It is likely that the recommended easement width could have a negotiated cost equal to that of the normal easement width.

2. Considerations should also be given to the design of pump station wetwells with a minimum turnover per hour, as required by the State, based upon the flows and pumping capacities proposed in Section 3. As flow increases within a basin, the pump capacities (i.e., the pumps) would need to be increased, but the wetwell sizes could be maintained for a longer period of time without any new construction. Pump station sites should be large enough to handle the initial wetwell and a second wetwell in the future. Consideration should also be given to working towards force main sizes as recommended in Section 2 of this Study.

3. Consideration should be given to immediately begin looking at the extension of the Tomahawk Creek Interceptor since at least one new school is expected to be built in the Robinhood area, upstream of the current end point of the Tomahawk Creek Interceptor. The existing Tomahawk Creek Interceptor, at its upper end consists of 20" pipe, likely ductile iron pipe. If this type of pipe was installed because of inadequate cover depth (less than 3' of cover), and if the expected cover depth cannot increase as the sewer moves upstream, then the same 20" pipe should be installed until adequate cover depth can be achieved. Once adequate pipe cover depth can be achieved, the extension of the Tomahawk Creek Interceptor should be continued with a 21" pipe.

4 If it is possible to dictate where development should occur, the Town may decide to look initially at the Ellison-3 Creek and Blanket Bottom Creek basins. The Town has purchased a 750,000 gpd capacity in the Harper Road Lift Station into which the Ellison-3 Creek basin pumped flow would discharge. The Harper Road List Station has been sized to handle the flow from the Blanket Bottom Creek basin and that flow is not included in the 750,000 gpd that Lewisville purchased. Since the flows from Blacks Creek Basin, Ellison Creek Basin and Ellison-3 Creek basin would all ultimately end up in the Blanket Bottom

Basin and its associated interceptor, the development of Ellison-3 Creek and Blanket Bottom Creek basins present themselves as potential first priorities.

The Blanket Bottom Creek interceptor should be sized as noted in Section 2 of this Study.

5. Although CCUC will not accept ownership or operational responsibility, the Lissara Partners Wastewater Treatment Plant could be given consideration as a potential end point for a portion of the wastewater flow generated in the Double Creek Basin.

6. Although CCUC will not accept ownership or operational responsibility, interim package wastewater treatment plants in Bashavia Creek Basin, Double Creek Basin and Mill Creek Basin would be viable alternatives. The location of these plants at the proposed pump station sites in each of these basins would allow for development without the need to install force mains pumping to the next basin. Since the size of the existing Tomahawk Creek Interceptor is already set at 20" at its most upstream point, and since the flows from Bashavia Creek Basin, Double /creek Basin and Mill Creek Basin are proposed to be pumped to the Tomahawk Creek Interceptor, installation of package wastewater treatment plants at the proposed Bashavia Creek, Double Creek and Mill Creek pump station sites would alleviate the need to parallel the Tomahawk Creek Interceptor sewer for an extended period of time.

7. The cost to sewer the Yadkin River Basin (Sattsgate) is substantial. It is not cost-effective to sewer this basin.