



US INFRASTRUCTURE OF CAROLINA, INC.
CONSULTING ENGINEERS

January 25, 2016

Mr. Scott J. Kaufhold, P.E.
Town of Indian Trail
P.O. Box 2430
Indian Trail, North Carolina 28079

RE: Ashe Croft Drive Drainage Study
Fee Proposal
USI Project #160202

Dear Mr. Kaufhold:

USInfrastructure of Carolina, Inc. (USI) is pleased to submit our fee proposal for engineering services for the Ashe Croft Drive Drainage Study. The project was identified due to citizen flooding concerns of the future development, north of Unionville Indian Trail, tying to the existing system to the south. The initial planning phase of the project will consist of an analysis of the existing storm drain system and potential proposed improvement options for the system shown on Exhibit A. Estimated costs to complete the study are shown on Exhibit B. This fee proposal includes survey and engineering costs to perform a planning level analysis of the existing storm drainage system, and develop viable proposed system replacement alternatives. The following represents the scope of work associated with the planning phase of the project.

SCOPE OF WORK

The planning phase of the project involves survey, existing system analysis, proposed system alternatives, and a summary of the findings. Our proposal is based on the following assumptions:

1.0 Survey

- A physical survey shall be performed by Lawrence Associates for the project area along the existing drainage system from Unionville Indian Trail Road to the outfall located approximately 1,200' to the south. The survey scope, mapping, and fees are shown in Exhibit C.
- Vertical locates shall not be performed as part of this proposal. Depth assumptions of existing underground utilities shall be made based upon typical depths found under normal field conditions.

- A field review of the survey shall be performed by USI.
- Includes 10% markups for sub-consultant fee.

2.0 Existing System Analysis

- The existing drainage system consists of approximately 500' of pipe extending from the north side of Unionville Indian Trail Road to the outfall near the intersection of Ashe Croft Drive and Brookforest Lane. At the pipe outfall, a channel system continues approximately 700' southward through the western backyards of the properties along Brookforest Lane.
- The Rational Method shall be utilized to develop existing landuse and future (built-out) landuse flows for five (5) storm events (2-year, 10-year, 25-year, 50-year, and 100-year). Assume 9 drainage basins are required. Future flows may be derived based upon the review of the development plans (described below) if 100-year detention is present.
- A review of the upstream development plans (north of Unionville Indian Trail Road) will be necessary to determine appropriate future flow conditions. The review of the plans and calculations will help determine if the on-site detention would be adequate to detain the 25-year storm event (per Town Ordinance) or if the developer elected to detain the 100-year storm event to equal the pre-construction conditions of the site. Plans and calculations shall be provided by Town personnel.
- A Manning's pipe capacity and hydraulic gradeline computation shall be performed for the existing pipe system for the five storm events for existing and future landuse conditions.
- Inlet capacity analysis shall be performed for the existing catch basins and drop inlets.
- The existing channel analysis (700'+/-) shall be performed for existing and future flow scenarios using HEC-RAS due to the 100-year FEMA floodplain tailwater conditions. This will help us to understand if the floodplain is impacting channel performance.
- A detailed overflow analysis shall not be performed as part of this proposal.
- A table shall be prepared identifying potential house flooding locations along the channel segment. The table shall include but not limited to the address, storm event, WSEs, etc.



3.0 Proposed Improvements System Analysis

- Future condition flows shall be utilized as determined in the existing system analysis.
- Three proposed system alternatives shall be provided for the project as follows.
- Proposed improvements shall provide 100-year WSE protection for the houses along the existing channel unless unknown elements (e.g. FEMA WSE impacts) change the dynamics of the proposed improvements. If this is the case, we will coordinate with the Town prior to completing the effort.

3.1. Alternative 1

- The proposed system improvements shall mimic the existing systems horizontal alignment. Pipe shall be replaced for pipe and channel shall be replaced for channel. The hydraulic analysis shall be based on Manning's, HGL's, and HEC-RAS computations and shall be performed for the proposed improvements. Each storm event shall be considered for potential house flooding. A detailed overflow analysis will not be performed. A cost estimate shall be supplied including potential easements costs associated with the proposed improvements.
- A working plan and profile will be developed to ensure viability of this option but will not be considered part of the deliverable.

3.2. Alternative 2

- The proposed system improvements shall mimic the existing systems horizontal alignment and the channel shall be piped in with a swale remaining on top of the proposed system for the extents of the existing channel. The hydraulic analysis shall be based on Manning's, HGL's, and HEC-RAS computations and shall be performed for the proposed improvements. Each storm event shall be considered with potential house flooding. A detailed overflow analysis will not be performed. A cost estimate shall be supplied including potential easements costs associated with the proposed improvements.
- A working plan and profile will be developed to ensure viability of this option but will not be considered part of the deliverable.
- There is potential for stream permitting impacts due to piping in the channel. It is uncertain at this time if the stream is jurisdictional. Permitting and forward procedure shall be discussed in the summary for this alternative.



3.3. Alternative 3

- After review of the future development plans (as described above) and discussion with the Town, an alternative shall be considered to alleviate potential downstream flooding with “in-construction” improvements to the development site.
- It is uncertain what this alternative may entail until review of the development plans is complete and the existing LOS is determined. An understanding of the erosion control and post construction measures must be considered for validity of the alternative. For fee estimate purposes, we shall assume modeling required to upsize or retrofit an existing detention basin on the project site.
- A meeting and/or discussion with Town staff regarding Alternative 3 may be warranted.
- A sketch of the potential “in-construction” alternative and cost estimate shall be prepared.
- Assume existing downstream drainage system to remain.
- Assume improvements will be on the development property.

4.0 Summary Report

- A brief 2-5 page summary memo shall be prepared to provide a description of the existing system analysis, proposed system alternatives, and recommended improvements. Assume two hardcopies shall be provided to the Town.
- Drainage calculations, cost estimates, and exhibits (Existing and Future drainage area maps, three alternative improvement maps) shall be included in the appendix of the report.

REIMBURSABLES

Fees shall include all expenses necessary to complete the project including mileage, reproduction costs, plotting costs, etc.

FEES FOR SERVICES

Engineering fees to complete the above-mentioned services shall be a not to exceed hourly amount of \$28,180.00.



SCHEDULE

USI will provide the services as described above within 90 working days of notice to proceed.

ADDITIONAL SERVICES

Upon request by the Town of Indian Trail, USI may provide engineering services beyond the scope of the original contract agreement. Costs for additional services will be determined upon establishment of the scope of the extra work. Additional services may include work such as additional proposed alternatives, underground utility locates, or other related work not in the previously described scope of services.

We look forward to working with you and Town staff on the project. Should you have any questions concerning the proposal, please do not hesitate to contact me. We will begin work on the project immediately upon Notice to Proceed and completion of the necessary contracting documents.

Sincerely,

USInfrastructure of Carolina, Inc.



Robby J. Wayne, P.E.
Project Manager

Attachments

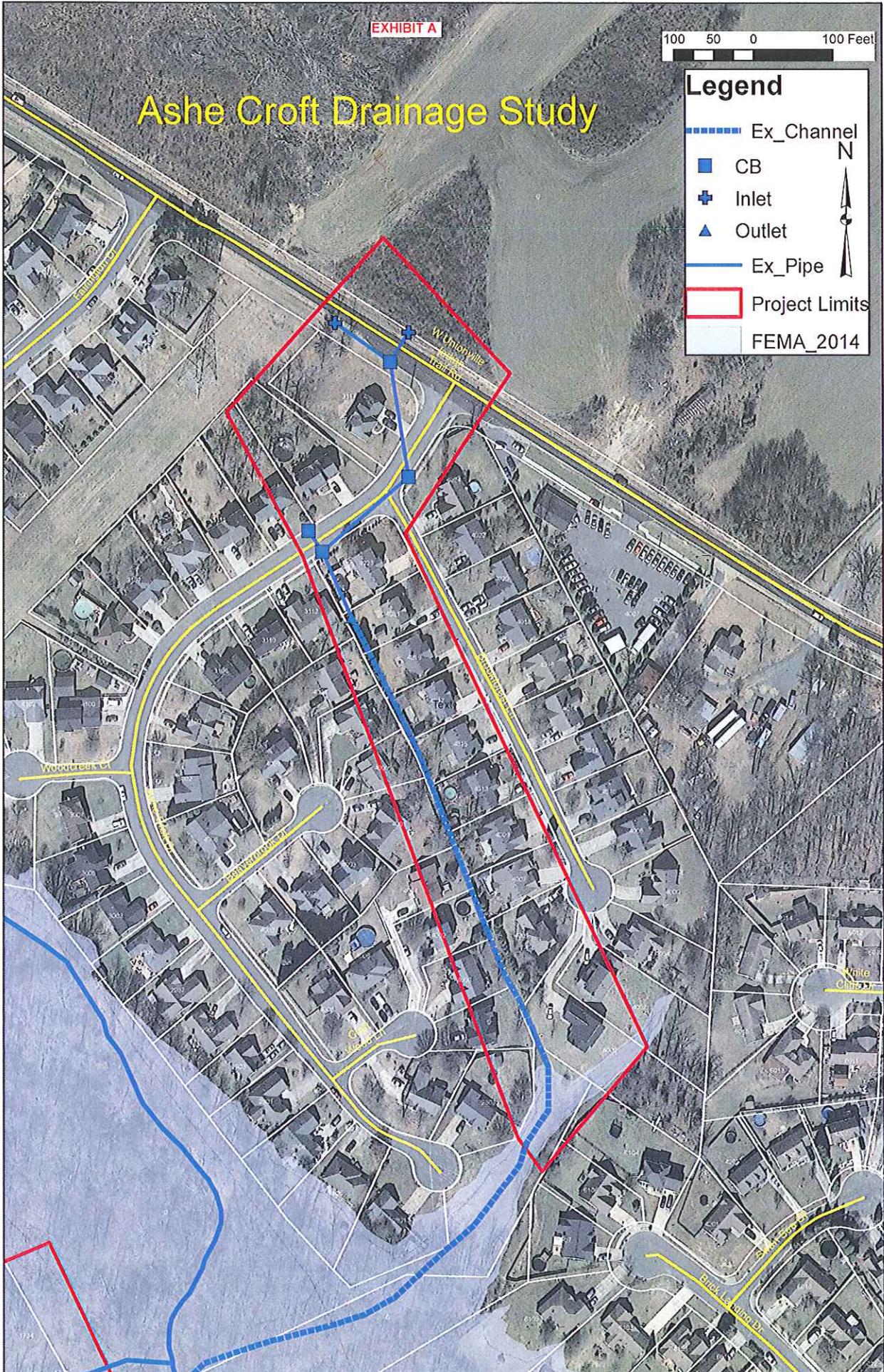


Ashe Croft Drainage Study

Legend

- Ex_Channel (dashed blue line)
- CB (blue square)
- Inlet (blue plus sign)
- Outlet (blue triangle)
- Ex_Pipe (solid blue line)
- Project Limits (red outline)
- FEMA_2014 (light blue shaded area)

N



Planning Phase Tasks

Hourly Basis Fees	Principal	Project Manager	Senior Engineer	Team Leader	Project Engineer	Design Engineer	ACAD Technician	Clerical	Subcontract Fee	USI Total	Task Total
	\$170	\$155	\$155	\$155	\$115	\$110	\$90	\$67			
1. Field Surveys											
Design Survey									\$6,800.00	\$680.00	\$7,480.00
Final Field Survey Submittal											
Field Survey Project Administration			4.0			4.0				\$1,060.00	\$1,060.00
1. Field Surveys Totals			4.0			4.0			\$6,800.00	\$1,740.00	\$8,540.00
2. Existing System Analysis											
Existing Drainage Areas, c value, and Tc Delineation (9 DAs)			1.0			8.0				\$1,035.00	\$1,035.00
Future Drainage Areas, c value, and Tc Delineation (2 adjust)			2.0			4.0				\$750.00	\$750.00
Manning's and HGL Calculations			2.0			8.0				\$1,190.00	\$1,190.00
Inlet Capacity Calculations			1.0			2.0				\$375.00	\$375.00
HECRAS Existing Channel			2.0			6.0				\$970.00	\$970.00
Mapping Existing and Future Conditions Map (2)			1.0			4.0				\$515.00	\$515.00
Reported flooding table			2.0			4.0				\$750.00	\$750.00
Review of Development Plan (Detention Review)			4.0							\$620.00	\$620.00
2. Existing System Analysis Totals			15.0			32.0	4.0			\$6,205.00	\$6,205.00
3. Proposed Improvements Analysis											
3.1 Alternative 1											
Manning's and HGL Calculations			2.0			4.0				\$750.00	\$750.00
HECRAS Proposed Channel			1.0			4.0				\$595.00	\$595.00
Cost Estimate			1.0			6.0				\$815.00	\$815.00
Mapping and working plan and profile			2.0			4.0	6.0			\$1,290.00	\$1,290.00
3.1 Alternative 1 Totals			6.0			18.0	6.0			\$3,450.00	\$3,450.00
3.2 Alternative 2											
Manning's and HGL Calculations			2.0			6.0				\$970.00	\$970.00
HECRAS Proposed Channel (N/A)			1.0			6.0				\$815.00	\$815.00
Cost Estimate			2.0			4.0	4.0			\$1,110.00	\$1,110.00
Mapping and working plan and profile			5.0			16.0	4.0			\$2,895.00	\$2,895.00
3.2 Alternative 2 Totals			10.0			38.0	8.0			\$5,190.00	\$5,190.00
3.3 Alternative 3											
Investigate Potential Alternative on Development Site			2.0			6.0				\$970.00	\$970.00
Meeting concerning alternative investigation			2.0			2.0				\$530.00	\$530.00
Cost Estimate			2.0			6.0				\$970.00	\$970.00
Mapping and working plan and profile			2.0			4.0	4.0			\$1,110.00	\$1,110.00
3.3 Alternative 3 Totals			8.0			18.0	4.0			\$3,580.00	\$3,580.00
3. Proposed Improvements Analysis Totals			19.0			52.0	14.0			\$9,925.00	\$9,925.00
4. Summary Report											
Response to report comments and resubmittal			2.0			4.0				\$750.00	\$750.00
4. Summary Report Totals			2.0			4.0				\$750.00	\$750.00
Hourly Basis Effort Total			10.0			16.0				\$3,310.00	\$3,310.00
Hourly Basis Fees Total	\$0.00	\$0.00	\$7,440.00	\$0.00	\$0.00	\$11,440.00	\$1,620.00	\$0.00	\$6,800.00	\$21,180.00	\$27,980.00
Reimbursable Expenses Allowance										\$200.00	\$200.00
Totals	\$0.00	\$0.00	\$7,440.00	\$0.00	\$0.00	\$11,440.00	\$1,620.00	\$0.00	\$6,800.00	\$21,380.00	\$28,180.00
Billing Rates	\$170	\$155	\$155	\$155	\$115	\$110	\$90	\$67			

NOTE: For Subcontract Services, the USI Total includes a 10% fee for the subcontractor costs.

SAY

\$28,180.00

January 22, 2016

Mr. Robby Wayne
US Infrastructure of the Carolina, Inc.
1043 E. Morehead Street
Suite 203
Charlotte, NC 28204

Reference: Proposal for Ashe Croft Drainage Survey
Lawrence Associates Job No. 4162

Dear Robby,

Lawrence Associates (LA) is pleased to submit this proposal to provide surveying services for the Ashe Croft drainage study. Lawrence Associates understanding of the proposed scope of services is provided herein.

Scope of Services

Surveying Services

- Physical and topographic survey along Unionville Indian Trail Road.
- Physical survey, topographic survey, and cross sections for the identified area at the rear of properties 4023-4000 Brookforest Lane (+/-700').
- Cross section at main channel confluence.
- Locate visible utilities and utilities marked by 811.
- See exhibit of detailed area of survey.

Fee Schedule

Lawrence Associates proposes to provide the above surveying services for the following fee:

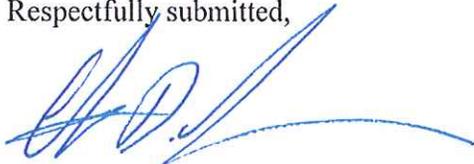
Not to Exceed \$6,800

EXHIBIT C

Elements and Assumptions

- Construction staking is not included in this proposal. All services will be provided at an hourly rate.
- This proposal does not include any boundary surveys or easement map preparation.
- Town is to notify property owners prior to survey crew accessing the properties.
- This proposal does not include a private utility locator.

Respectfully submitted,



Clint Lawrence, PE, PLS
Principal

The scope of services, terms and conditions of this Letter Agreement are accepted:

Print (Type) Individual, Firm, or Corporate Name

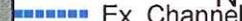
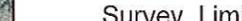
Signature of Authorized Representative

Date

Print (Type) Name of Authorized Representative and Title

Ashe Croft Drainage Study

Legend

-  Ex_Channel
-  CB
-  Inlet
-  Outlet
-  Ex_Pipe
-  Survey_Limits
-  Project Limits
-  FEMA_2014

Provide physical survey along Unionville Indian Trail Road within the right of way limits and/or to the back of the roadside ditch within the area shown. Locate and provide all utilities including but not limited to sewer (minimal one manhole beyond existing drainage system at crossings), power, water, gas, telephone, etc.

Provide physical survey along Ashe Croft Drive within the right of way limits and/or along the existing drainage pipe path. Locate and provide all utilities including but not limited to sewer (minimal one manhole beyond existing drainage system at crossings), power, water, gas, telephone, etc.

Proposed limits of survey to be approved by USI.

Provide physical survey along the 700'+/- channel along the back property lines. Survey shall include all physical features, trees, house LAG and FFE, and any utilities. Provide cross sectional survey between the ex. channel banks at approximately 50' to 100'. In addition to cross section data, provide data on physical features/ structures that encroach on the existing channel.

Provide an additional cross section survey approximately 100' downstream of the secondary and main channel confluence.

