

**BURNT STORE DRAINAGE STUDY
CHARLOTTE COUNTY
NOVEMBER 2, 2024**

PROJECT UNDERSTANDING

The scope of services and fees described herein are based upon the following assumptions and project understanding.

1. Charlotte County ("County" or "Client") currently operates stormwater management facilities and programs within the Burnt Store drainage area. To address flood protection for its residents, the Client seeks to identify and address critical issues through the creation of a Drainage Study. This project helps to address these needs by identifying limits of flooding during the 100-year, 24-hour design storm event based on the most up-to-date development information and topographic data.
2. The Drainage Study will consist of the collection of hydrologic and hydraulic data, an existing conditions stormwater model, and evaluation of conceptual improvements to the existing stormwater management system within the Burnt Store drainage area.
3. The completed model and findings of this project may be leveraged in future projects, such as construction-level infrastructure projects, water quality analyses, FEMA map revisions, and grant applications. These projects are not included under this scope of work.

SCOPE OF SERVICES

Kimley-Horn and Associates, Inc. (Kimley-Horn or the Consultant) will provide the services specifically set forth below.

Task 1: Project Meetings

1.1 Kickoff Meeting

- A. The Consultant will attend a kickoff meeting with the County to introduce team members, discuss the scope and timeline of work, establish communication preferences, and discuss project administration and invoicing. During the Kickoff Meeting, the Client will identify historic flooding locations and other areas and items of interest.

1.2 Progress Meetings:

- A. Kimley-Horn will attend up to twelve (12) regularly-scheduled progress meetings throughout the duration of the project. It is anticipated that up to six (6) of these meetings will be held in person, while the remainder of the meetings will be held via Teams. These project meetings will be in addition to other milestone meetings described further in this scope of work. Kimley-Horn will prepare a meeting agenda and meeting notes for each progress meeting and will provide these to the County.

Deliverable(s):

- 1) Meeting Agenda and Notes for Kickoff Meeting – one (1) electronic copy in .pdf format
- 2) Meeting Agenda and Notes for each progress meeting – one (1) electronic copy in .pdf format for each of 12 meetings.

Task 2: Data Collection

2.1 Existing Data Collection

- A. The Consultant will identify and obtain available data concerning the existing drainage/stormwater management systems within the study area. This data will include but is not limited to existing reports/studies, drainage plans, certified as-builts, topographic data in the form of a project area digital elevation model (DEM), NRCS soils data, land use data, gauge data, NEXRAD data, and past flooding documentation as available. It is anticipated much of this information will be provided by the County or downloaded from readily available public sources such as Southwest Florida Water Management District (SWFWMD). The DEM will be downloaded from the USGS (2018 – 2020 USGS Lidar Florida Peninsular FDEM, cell size 1 meter and units of feet) and will be the basis of much of the model development.

2.2 Basin Delineation and Initial Drainage Mapping:

- A. The Consultant will delineate preliminary basins and major conveyance systems based on data collected in Task 2.1. These preliminary basins and identification of major conveyance systems will be used to develop the model scale for the study area to help identify any additional data needed for model refinement. The model scale will be based on both collected data and the scale needed to reflect the historic flooding discussed in the project kick-off meeting. Refined basins and therefore model basins will be limited to no more than 175 total basins. It is anticipated that more model detail will be included in communities along and west of Burnt Store Road, while the area east of Burnt Store will be to a broader model scale. The areas with additional refinement are shown in Figure 1.

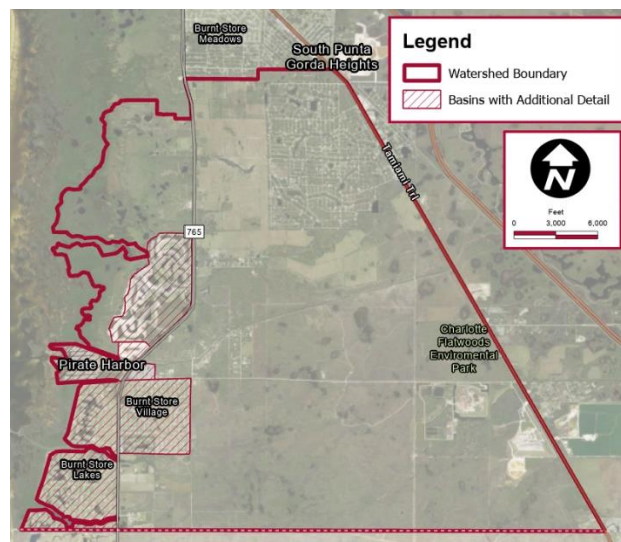


Figure 1: Watershed Boundary and Areas with Finer Model Scale

2.3 Data Gaps Exhibit

- A. The Consultant will review the available data collected in Task 2.1 and identify data gaps and locations where field or survey data needs to be collected to obtain the information needed to perform the existing conditions analysis. The Consultant will prepare a data gaps exhibit for the

Client that will identify the needed additional information and needed measures for specific data acquisition (field visit or survey).

2.4 Field Visit:

- A. Within the selected areas of interest, the Consultant will visit the Drainage Study area to verify local drainage patterns and drainage structures. The Consultant will photograph and document the size and material of the accessible major conveyance stormwater structures visited. This documentation will be limited to those structures that are anticipated to be modeled and noted as needing additional information during the Data Gaps task. This information will also be logged using GIS. It is anticipated that areas and structures that have already been visited in past studies or are already to the desired level of detail will only be visited as needed. This total subtask is limited to 5 days of field work.

2.5 Survey Coordination

- A. The Consultant will coordinate with the surveyor (County or 3rd Party) to identify survey needs and provide requested information to the surveyor. It is anticipated that survey needs will be identified for some areas ahead of others.
- B. Cost associated with Task 2.5 will only be for the Consultant's coordination efforts and one (1) review of provided survey information. Cost for the survey work will be approved under a separate contract amendment or will be contracted directly with the County.

2.6 Summary of Collected Information

- A. The Consultant will create a summary document of data obtained during Task 2. The summarized data will be limited to data relevant to model development.

Deliverable(s):

- 1) Data Gaps Exhibit – one (1) electronic copy in .pdf format.
- 2) List of Survey Needs – one (1) electronic copy in .pdf format.
- 3) Summary of Collected Information – one (1) pdf copy.

Task 3: Public Involvement

3.1 Public Involvement Plan

- A. Kimley-Horn will prepare a brief Project Involvement Plan to include defined goals, measurable objectives, strategies and techniques, key messaging, team responsibilities, and rules for public engagement for each phase of the project. Kimley-Horn will coordinate with County staff on communications and protocols and/or standards.

3.2 Public Meeting/s

- A. Kimley-Horn will hold three (3) public meetings during the project. It is anticipated each public meeting will be 3 hours in length each. Kimley-Horn will coordinate with major homeowner associations within the study area and invite them to the meetings. County staff will assist in noticing the public meetings. Kimley-Horn will prepare a PowerPoint summarizing the key project goals, project tasks, and key project information at the time of the public meeting. Kimley-Horn will provide up to 2 boards with maps for each meeting. Kimley-Horn will prepare

meeting notes to summarize each public meeting. It is anticipated one meeting will be held during model development, one following model calibration, and one at the end of the project.

3.3 Public Engagement Website

- A. Kimley-Horn will create a mobile-responsive project website using an online platform. This online platform will allow for the public meeting PowerPoint presentations to be posted for each of the three meetings so that the public can view this information outside of the public meetings.
- B. Ahead of the first public meeting, the website will host an interactive map that will allow residents to post comments and photos of known flooding and areas of concern. This functionality will end after the first public meeting. Kimley-Horn will create a GIS database of all comments received through the interactive map.

Deliverable(s):

- 1) Public Involvement Plan – one (1) electronic copy in .pdf format
- 2) Public Meeting Presentation – one (1) electronic copy in .ppt format for each meeting
- 3) Informational Map Boards – two per public meeting
- 4) Public Meeting Notes – one (1) electronic copy in .pdf format from each meeting
- 5) Public Comments Database – one (1) electronic copy in .gdb format

Task 4: Existing Condition Analysis

4.1 Existing Condition Stormwater Hydraulic and Hydrologic (H&H) Model

- A. The Consultant will use Stormwise, by Streamline Technologies, Inc. to conduct the hydraulic/hydrologic stormwater modeling for this task. The model will be developed using 1D methodologies. Kimley-Horn will model the 100-year, 24-hour design storm event.
- B. The Consultant will utilize the preliminary basins from Task 2 to create refined basins and other model features including nodes, links, and cross-sections.
- C. The Consultant will develop an existing conditions stormwater hydraulic and hydrological model based on data collected in Task 2 and the refined drainage basins and other drainage features. The model will be developed based on the following approach:
 - Infiltration will be calculated using the curve number methodology. Percent imperviousness and directly connected impervious area (DCIA) will be assigned for each land use type.
 - Stage-storage relationships will be developed based on the available project DEM.
 - Overland weirs will be developed based on the available project DEM.
 - Pipes, control structures, and channels (if applicable) will be modeled based on the best available data (survey data or as-built data when available or based on engineering judgement/assumptions when survey or as-built data is not available).
 - Tailwater will be based on a review of the Port Manatee – 8726384 and Fort Myers – 8725520 tidal gauges. For each tidal gauge, the daily maximum tidal elevation will be pulled for the past 5 years. Based on this data, Kimley-Horn will calculate the 90th percentile of each dataset and use the higher value of the two 90th percentiles as the existing tailwater.

4.2 Existing Conditions H&H Model Calibration/Verification:

- A. The Consultant will model a calibration event to simulate in the existing conditions model. The calibration event will be agreed upon by the Client and Consultant. The Consultant will utilize NEXRAD data for a chosen event to simulate the calibration event rainfall. The Consultant will review the calibration model results to available flood stage data or observational information from the calibration event. The Consultant may refine the model based on this review. This task is limited to a total of 70 hours of effort. If additional effort is required to calibrate the model, it can be done as an additional service.

4.3 Floodplain Exhibit

- A. Based on results from the calibrated model, the Consultant will prepare level-pool floodplains and an exhibit that includes the level-pool floodplains and refined basins for the 100-yr 24-hr storm event.

Deliverable(s):

- 1) Existing Conditions Floodplain Exhibit – one (1) electronic copy in .pdf format

Task 5: Future Condition Model

5.1 Build Out Condition Model

Kimley-Horn will modify the existing conditions model to include proposed conditions for future development areas within the study area. These future development areas will include:

- a. Developments that have been permitted or are under permitting through a SWFWMD Environmental Resource Permit (ERP) but have not been constructed yet. For this type of future development, Kimley-Horn will update the modeled land use, storage, routing, and infrastructure associated with construction plans, stormwater modeling, or other relevant documents for that development's ERP application. The parameters from the ERP application will be used to develop the model, even if it is determined that SWFWMD design criteria are not met in the model. These areas will be modified in the model and select GIS data as needed but will not include updates to topographic data or other source information.
- b. Developments that are included in the County Burnt Store Road Area Plan. For this type of future development, Kimley-Horn will update the modeled land use and storage based on the conceptual plans shown in the Burnt Store Road Area Plan. All control elevations will be based on USGS lidar and water table data unless specified through documentation from the County or SWFWMD. For any of these areas that have specified infrastructure data, Kimley-Horn will update the model parameters to reflect those values. For any of these areas that do not have specified infrastructure data, Kimley-Horn will develop model parameters that represent the infrastructure data based on meeting the SWFWMD 25yr-24hr discharge criteria. Kimley-Horn will update modeled infrastructure and routing data to include bypass for offsite flows and other means to maintain historic flow patterns. These areas will be modified in the model and select GIS data as needed but will not include updates to topographic data or other source information.
- c. Additional specific development areas provided by the County that are anticipated to be developed within the study area. The County will provide a list of additional

development areas as well as a schematic of the anticipated landuse, conveyance, and storage features of each development area. All control elevations will be based on USGS lidar and water table data unless specified through documentation from the County or SFWMD. For any of these areas that have specified infrastructure data, Kimley-Horn will update the model parameters to reflect those values. For any of these areas that do not have specified infrastructure data, Kimley-Horn will develop model parameters that represent the infrastructure data based on meeting the SFWMD 25yr-24hr discharge criteria. Kimley-Horn will update modeled infrastructure and routing data to include bypass for offsite flows and other means to maintain historic flow patterns.

- d. Other future development areas included in the County's future landuse map that are not specified in a.-c. above. For these areas, Kimley-Horn will determine the approximate control levels within each of these development areas based on USGS lidar and water table data. Kimley-Horn will split the development based into multiple basins if needed to reflect differences in the approximate control water levels. Kimley-Horn will develop a stage-area and landuse relationship for each basin and update the model accordingly. Kimley-Horn will develop model parameters that represent proposed infrastructure data based on meeting the SFWMD 25yr-24hr discharge criteria and bypassing all offsite runoff to maintain existing flow patterns. Kimley-Horn will update modeled infrastructure and routing data to include bypass for offsite flows and other means to maintain historic flow patterns.
- e. These development areas will be agreed upon by the Consultant and Client. Kimley-Horn will run the model for the 100-year 24-hour storm once to understand the impact these proposed developments have on the overall system prior to incorporating other future conditions. Kimley-Horn will update the Floodplain Exhibit created in Task 4 with level pool floodplains from the buildout condition model.

5.2 Baseline Future Condition Model

- A. Kimley-Horn will take the build out condition model and apply future condition boundary condition tailwater and rainfall amounts to represent sea level rise and storm intensification. The future condition model will therefore include buildout conditions future development, anticipated sea level rise, and anticipated storm intensification and will be used as the baseline for comparison to alternatives. Sea level rise will consider a future planning year of 2100 and use the intermediate-high curve from NOAA's 2022 Sea Level Rise Technical Report to estimate sea level rise associated with the future condition. The difference between current mean sea level and this future mean sea level will be added to the existing tailwater value. Kimley-Horn will apply a change factor of 1.53 (based on the 83rd percentile of the CORDEX dataset from the FIU Updating the Statewide Extreme Rainfall Projections report published by Obeysekera dated June 1, 2021) to the existing rainfall (multiply the 100-year 24-hour rainfall in inches by 1.53) to represent the future rainfall value. The Consultant will run the model and update the Floodplain Exhibit created in Task 4 with level pool floodplains from the baseline future conditions model.

Deliverable(s):

- 1) Buildout Conditions Floodplain Exhibit – one (1) electronic copy in .pdf format
- 2) Baseline Future Conditions Floodplain Exhibit – one (1) electronic copy in .pdf format

Task 6: Alternatives Analysis

6.1 Alternatives Analysis

- A. Alternative Selection: The Consultant will meet with the County to review the results of the build out conditions and future conditions model results and areas of potential project alternatives. Based on this meeting, the Consultant will three identify three (3) potential project alternative locations that will serve as the basis for the Alternatives Analysis. The Consultant will discuss with the County the goals for flood reduction.
- B. Alternative Refinement: Utilizing the baseline future conditions model, the Consultant will create an updated model that incorporates each proposed alternative. The Consultant will run up to five (5) iterative model runs for the selected projects to better understand the model behavior under various scenarios (i.e. these model runs may include such items as upsizing a pipe, adding improved conveyance, adding storage, and variations of these improvements). The modeled iterations will be reviewed, and the most effective iteration will be chosen as the Refined Alternative. The Consultant will create updated level pool floodplains from the Refined Alternatives for the 100-year 24-hour storm. The Consultant will prepare exhibits showing the proposed layout of each Refined Alternative, the level-pool floodplains from the baseline future conditions and Refined Alternative models, and the modeled stage change at each node within the area of the Refined Alternative.
- C. Level of Service Analysis:

The Consultant will utilize the following Level of Service (“LOS”) criteria:

- Crown of road below the 100-year, 24-hour stage
- Estimated building elevation 1 foot above the 100-year, 24-hour stage

The Consultant will determine the length of road and number of buildings that do not meet this LOS for the existing condition, build out condition model, baseline future conditions model, and the three Refined Alternatives. To do this, the Consultant will assign crown of road and building elevations from the DEM. The County will provide the building footprint layer and road centerline layer if available or open-source data will be utilized. If finished floor elevations by parcel ID are provided by the County, these can be incorporated into this analysis. The Consultant will compare the assigned building and roadway elevations to the 100-year, 24-hour storm event elevations to identify areas where LOS criteria is not being met in for the calibrated existing model, baseline future conditions and for each of the three Refined Alternative model. The Consultant will then prepare maps showing all portions of the modeled area that are not meeting LOS criteria in existing conditions and the level of LOS improvement for each Refined alternative.

Deliverable(s):

- 1) Refined Alternatives Layouts – one (1) electronic copy in .pdf format
- 2) Level of Service Maps – one (1) electronic copy in .pdf format

Task 7: Benefit-Cost Analysis

7.1 Preliminary Opinions of Probable Construction Cost

- A. The Consultant will prepare preliminary opinions of probable construction cost (OPCC) (Class II level) for the three Refined Projects. The preliminary OPCC should be developed using current

industry information. The information will be used to compare the Refined Alternatives and general anticipated cost and is not suitable to bid these projects.

7.2 Benefit-Cost Analysis

- A. The Consultant will prepare an overall benefit-cost analysis. The benefits will be based on the overall drainage improvements (level of service improvement) in baseline future conditions vs the Refined Alternatives. The cost will be based on the prepared cost estimate for each Refined Alternative developed in Task 6.1. The Consultant will compare the benefits to the cost and create a ranking of the Refined Alternatives for review with the County. This task will not include a monetary estimation of benefits.

7.3 Decision-Support Matrix and Ranking

- A. The Consultant will prepare a decision support matrix that compares the benefits and anticipated cost of each alternative, as well as additional considerations provided by the County. The Consultant will meet with the County to obtain any additional input and will add additional potential categories for use in a decision support matrix (such as qualitative consideration of operation and maintenance considerations, lifespan of project, water quality benefit, etc.). The County will also provide input if each category should be weighted. The Consultant will update the decision support matrix based on the input from the County. The Consultant will create an updated ranking based on the information from the decision support matrix.

Deliverable(s):

- 1) Opinion of Probable Construction Cost Table— one (1) OPC for each of the three (3) Refined Alternatives
- 2) Benefit-Cost Ranking Table – one (1) electronic copy in .pdf format
- 3) Decision Support Matrix and Ranking Table – one (1) electronic copy in .pdf format

Task 8: Final Memorandum

8.1 Final Memorandum

- A. The Consultant will prepare a draft memorandum that describes the methodology used to create the existing conditions model, the development of the Refined Alternatives and Benefit-Cost-Analysis, and recommendations for future analysis.
- B. The County will review the draft memorandum and provide comments.
- C. The Consultant will incorporate County comments and will provide a final memorandum for the County's future reference and use. The final memorandum will include a physical copy of the memorandum and appendices that include all exhibits and tables from prior tasks.

Deliverable(s):

- 1) Draft Memorandum (.pdf) – one (1) electronic copy in .pdf format
- 2) Final Memorandum, signed and sealed with appendices (.pdf) – one (1) electronic copy in .pdf format and one (1) physical copy

SCHEDULE

After the contract is executed, the County will issue Kimley-Horn a Notice to Proceed. The Notice to Proceed will be the project start date. The following table summarizes the anticipated project schedule. It is assumed that schedule dependent items to be provided by the Client (i.e. survey data) will be provided in a timely manner in accordance with the anticipated schedule.

Task No.	Task Description	Duration (days)	Complete (days from NTP)
	Notice to Proceed		0
1	Project Meetings	540	540
2	Data Collection	180	180
3	Public Involvement	540	540
4	Existing Conditions Analysis	140	300
5	Future Condition Model	70	360
6	Alternatives Analysis	85	440
7	Benefit-Cost Analysis	60	500
8	Final Memorandum	70	540

FEE AND BILLING

Kimley-Horn will perform the services in Tasks 1-8 for the total lump sum labor fee below. Individual task amounts are informational only. In addition to the lump sum labor fee, direct reimbursable expenses such as express delivery services, fees, air travel, and other direct expenses will be billed at 1.15 times cost. All permitting, application, and similar project fees will be paid directly by the Client.

Task No.	Task Description	Labor Fee
1	Project Meetings	\$32,600
2	Data Collection	\$52,300
3	Public Involvement	\$48,000
4	Existing Conditions Analysis	\$66,200
5	Future Condition Model	\$76,200
6	Alternatives Analysis	\$66,700
7	Benefit-Cost Analysis	\$28,800
8	Final Memorandum	\$28,900
Total		\$399,700

Lump sum fees will be invoiced monthly based upon the overall percentage of services performed. Reimbursable expenses will be invoiced based upon expenses incurred. Payment will be due within 25 days of your receipt of the invoice and should include the invoice number and Kimley-Horn project number.