



Chapter 5: Implementation

Chapter Outline:

1. Overview
2. Action Steps to Implementation
3. Phasing Plan
4. Land Acquisition

1. Overview

The text in this chapter describes how the Town of Carrboro can turn the goal of the Bolin Creek Greenway into a reality. The design recommendations in the previous chapter provide the framework for the plan while the implementation strategy provides a guide for taking action. It is important for positive, successful action to take place in order to build momentum and support throughout the Town of Carrboro. A dedicated effort towards implementation will be necessary to create the envisioned corridor along Bolin and Jones Creek. This chapter contains action steps, project prioritization and phasing, land acquisition strategies, and potential renovation recommendations.

2. Action Steps to Implementation

The following action steps will be key to kicking off the implementation process of the Bolin Creek Greenway:

1. *Adopt the Bolin Creek Greenway Master Plan*

Through adoption, the Bolin Creek Greenway Conceptual Master Plan becomes an official planning document of the Town of Carrboro. The Town of Carrboro can then use this document to receive funding.

2. *Create the Necessary Governance and Administrative Capability to Oversee Plan Implementation and Prioritize Next Steps*

Part of this effort could include broadening the capabilities of the Carrboro Greenways Commission so that the goals of this Plan are carried out. For example, during construction documentation, the Commission could help with public outreach in soliciting feedback. Additionally, Carrboro Recreation and Parks could incorporate a Trails Coordinator position to oversee day-to-day operations and management of trails.

3. *Seek Multiple Funding Sources*

A multi-pronged approach should be taken to support greenway facility development, operations, and programming. A combination of bonds, grants and other types of financing (discussed further in Appendix B) should be sought to develop the Bolin Creek Greenway that will allow the community to incrementally complete the trail over a 5-10 year period.

4. *Coordinate with Stakeholders, Including Neighboring Jurisdictions and Utilities*

In order to develop a connected trail network as proposed in this Plan, a cooperative planning effort will need to be made with trail stakeholders, utility owners and neighboring jurisdictional boundaries. Coordinate phasing and construction costs to implement an achievable project.

5. *Begin Top Priority Project Design*

Once the master plan has been adopted, begin the process of hiring a design consultant to develop construction contract documents for Phase 1 of the Bolin Creek Greenway Conceptual Master Plan. Include the services of a land surveyor to perform a metes and bounds sur-

vey of the project corridor. Work closely with the design consultant to ensure the contract documents are being developed according to master plan goals, state and local permitting issues, design specifications, and budget costs.

6. *Begin the Land Acquisition Process*

Begin acquiring land and easements necessary to complete the greenway corridor, especially in future phases of the master plan. Build partnerships by scheduling meetings with adjacent property owners, provide information and education, and begin negotiations with land owners along the corridor to ensure a connected system.

7. *Begin Top Priority Project Construction*

With existing available funds, award a construction contract for Phase 1 of the Bolin Creek Greenway Conceptual Master Plan. Develop a predetermined timeline for construction completion. The design consultant can provide assistance to the Town by helping to facilitate the bidding process. Depending on funding sources, the contractor may need to be selected through a formal bidding process in which the project scope and parameters are publicly defined.

8. *Construction Administration*

The design consultant can also act as construction administrator, to ensure the project is developed per the drawings and specifications. The construction administrator ensures the project is built according to the timeline and can handle payment schedules between the Town and the contractor.

9. *Trail Programming*

Once trail construction is complete, work with project stakeholders and partners to develop programs that encourage use of the trail. Examples of such programs can be found in Appendix C: Operations and Management.

10. *Create a Signage System*

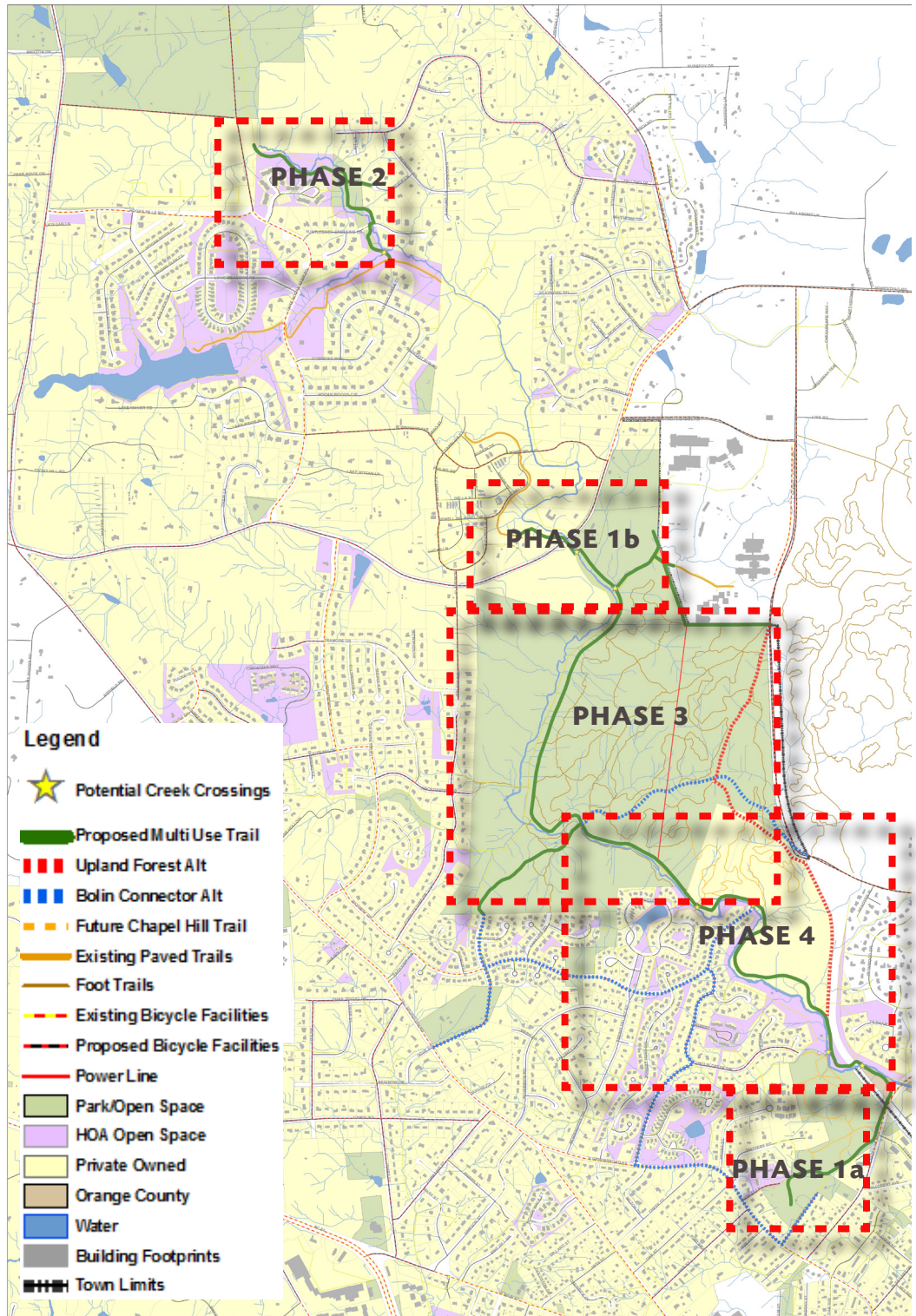
Consult with a graphic designer specializing in wayfinding, interpretive, and regulatory signage to develop a network signage system for Carrboro's Bolin Creek Greenway. Partner with local organizations to raise funds for trail signage.

11. *Operations and Maintenance*

Working with Carrboro Public Works, Carrboro Recreation and Parks, and Carolina North staff, develop a maintenance schedule for the Bolin Creek Greenway. Ensure all stakeholders' goals are being met in providing a safe, high quality user experience. See Appendix C: Operations and Maintenance for more information.

3. Phasing Plan

There are more than 4.5 miles of greenway (including spur trails) along the Bolin Creek Greenway. Regardless of available funds, it is necessary to prioritize the construction of the trail segments. Input from the public, availability of funding, existing land ownership, permitting issues, engineering constraints, destination points and existing improvements projects were considered in the development of the phasing plan and are broken down on the following pages.



Phase 1a: Wilson Park to Railroad

The first phase of trail begins at Wilson Park and terminates just before the railroad across Estes Dr. for a total of .4 miles. Prior to design development, the Town should meet with OWASA and NCDOT to discuss the proposed alignment.

Opportunities:

- All parcels are Town-owned
- Wilson Park provides existing trailhead facility
- 1,220 linear feet of trail have already been budgeted for construction
- Phase 1a will provide safe off-road alternative to steep roadway segment on Estes Dr. between Estes Park Apartments and Greensboro St.
- Phase 1a supported by the public

Constraints:

- May require encroachment agreement with NCDOT along Estes Dr., depending on land survey
- Traffic on Estes Dr. means increased trail costs for safe trail buffering and engineering

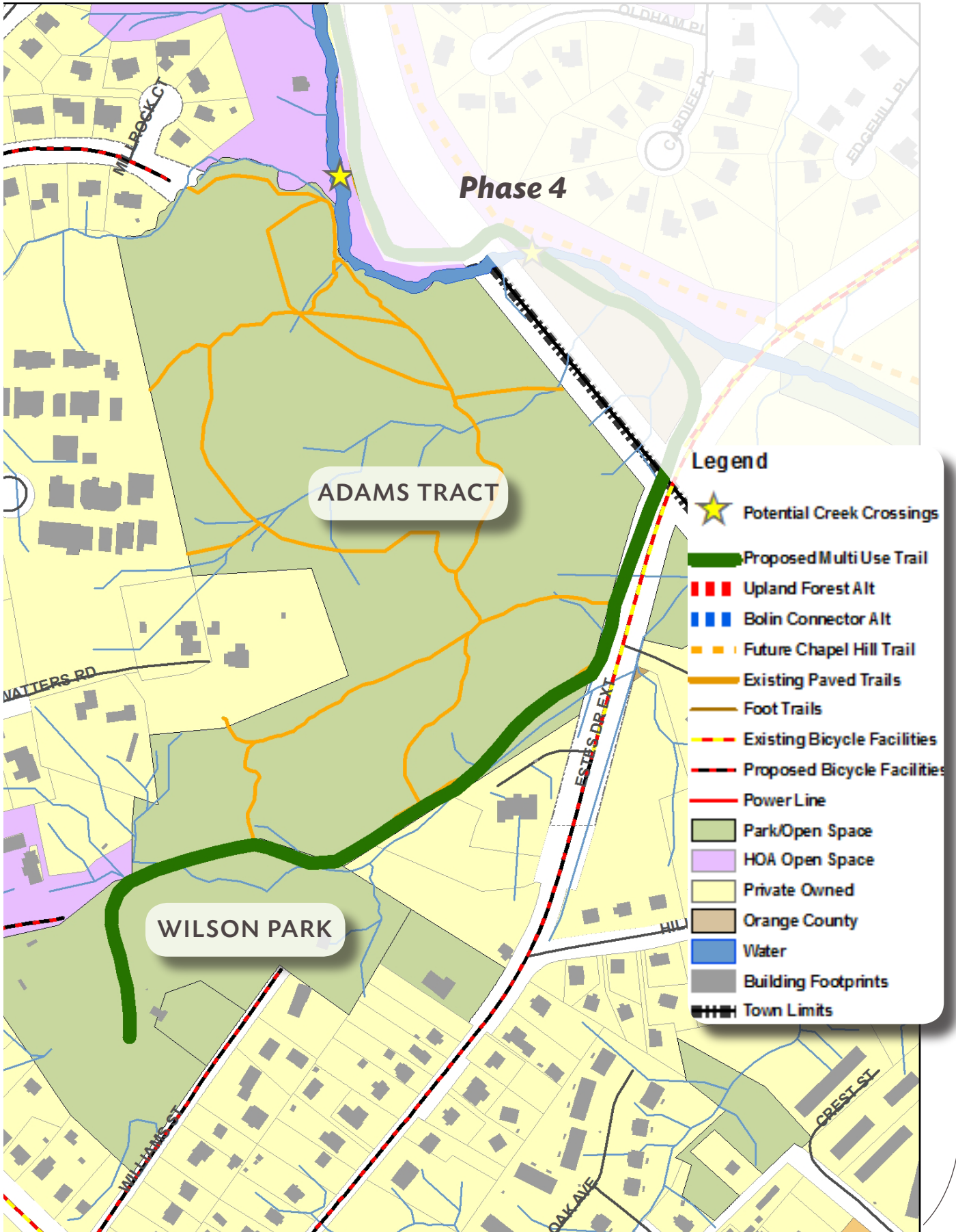
Bolin Creek Greenway - Phase 1A

Probable Estimate of Construction Costs, 2009
2088.48 linear feet (0.40 miles)

Demolition	Quantity	Cost	Unit	Subtotal
Clearing and grubbing understory (20' wide)	18,000	\$0.25	sf	\$4,500.00
Dumping Fees @ 6% of Demolition total			6%	\$270.00
			<i>Subtotal</i>	\$4,770.00
Trail Development	Quantity	Cost	Unit	Subtotal
Construction Entrance	2	\$1,900.00	ea	\$3,800.00
Temporary Rock Silt Check Type A	6	\$425.00	ea	\$2,550.00
Stabilization (Seeding: Temporary and Permanent)	20,885	\$0.25	sf	\$5,221.25
Straw with netting	500	\$4.50	lf	\$2,250.00
Temporary tree protection fence	3,050	\$4.00	lf	\$12,200.00
Temporary silt fence	2,350	\$5.00	lf	\$11,750.00
Temporary Diversion Ditch	300	\$3.00	lf	\$900.00
Temporary pipe inlet protection	1	\$900.00	ea	\$900.00
Trail initial grading (0-5 cu ft/lf)	525	\$3.30	lf	\$1,732.50
Trail fine grading (pavement)	2,088	\$3.30	lf	\$6,890.40
Trail fine grading (shoulders and ditch)	1,900	\$3.30	lf	\$6,270.00
10' wide multi-use asphalt trail	2,088	\$35.00	lf	\$73,080.00
2' wide gravel shoulder (both sides)	2,088	\$6.60	lf	\$13,780.80
Class B Rip Rap with filter fabric	15	\$42.00	ton	\$630.00
RCP Drainage Pipes	105	\$35.00	lf	\$3,675.00
Seeding or mulching trail edges (5' both sides)	20,880	\$0.13	sf	\$2,714.40
Estes Drive Intersection Signalization	1	\$25,000.00	ls	\$25,000.00
Concrete Curb and Gutter along Estes Drive	400	\$25.00	lf	\$10,000.00
Street Trees along Estes Drive	19	\$750.00	ea	\$14,250.00
Boardwalk bridges for neighborhood access	12	\$75.00	lf	\$900.00
			<i>Subtotal</i>	\$215,524.35
Signage				
Mile Markers	2	\$400.00	ea	\$800.00
Trail and street regulatory/warning signs	11	\$220.00	ea	\$2,420.00
Directional signs	3	\$220.00	ea	\$660.00
Educational signs	2	\$400.00	ea	\$800.00
Site Amenities				
Benches (2 per mile recommended)	3	\$900.00	ea	\$2,700.00
Bicycle rack (at Wilson Park trailhead)	1	\$800.00	ea	\$800.00
Drinking fountains, with pet fountain (1 per mile)	1	\$2,000.00	ea	\$2,000.00
Picnic tables/ tables (at trailheads)	1	\$550.00	ea	\$550.00
Trash receptacles (32-gallon, steel-at trailheads)	3	\$300.00	ea	\$900.00
Bollards (3 per trail/road intersection)	9	\$600.00	ea	\$5,400.00
			<i>Subtotal</i>	\$30,317.92
Design	Quantity	Cost	Unit	Subtotal
Wetlands and Stream Delineation (\$3,500/mile avg.)	0.13	\$3,500.00	mi	\$455.00
Surveying (\$10,000/mile avg.)	0.40	\$10,000.00	mi	\$4,000.00
Construction Documents @ 12 % of Dev. Cost			12%	\$25,862.92
			<i>Subtotal</i>	\$30,317.92
Subtotals				
Demolition				\$4,770.00
Trail Development				\$215,524.35
Design				\$30,317.92
SUBTOTAL (Demolition, Trail Development, Design)				\$250,612.27
Contingency (15% of total)			15%	\$37,591.84
TOTAL				\$288,204.11

Note: Does not include the following: land acquisition, potential rock and unsuitable soils excavation, permitting fees, mobilization, utility coordination, and taxes.

Phase 1a: Wilson Park to Railroad



Phase 1b: Carolina North Forest to Claremont

Phase 1b will tie into the trails at Claremont, cross beneath Homestead Rd., and cross Bolin Creek, where it will span for a total of .78 miles (including spurs to CHCCS). Prior to design development, the Town should meet with the following stakeholders: Claremont developers to obtain a greenway easement north of Homestead Rd.; NCDOT to approve the trail underpass at Homestead Rd.; NC state agencies for the permitting of a proposed bridge crossing over Bolin Creek; OWASA, and CHCCS to discuss the proposed alignment and all tie-ins.

Opportunities:

- Large state-owned parcel along Bolin Creek presents public facility opportunity
- Existing sewer easements provide feasible conditions for trail development
- Underpass beneath Homestead Rd. provides vertical and horizontal clearance, will not encroach on roadway bridge overpass
- Trail tie-ins on CHCCS campus
- Public-supported tie-in at CHCCS

Constraints:

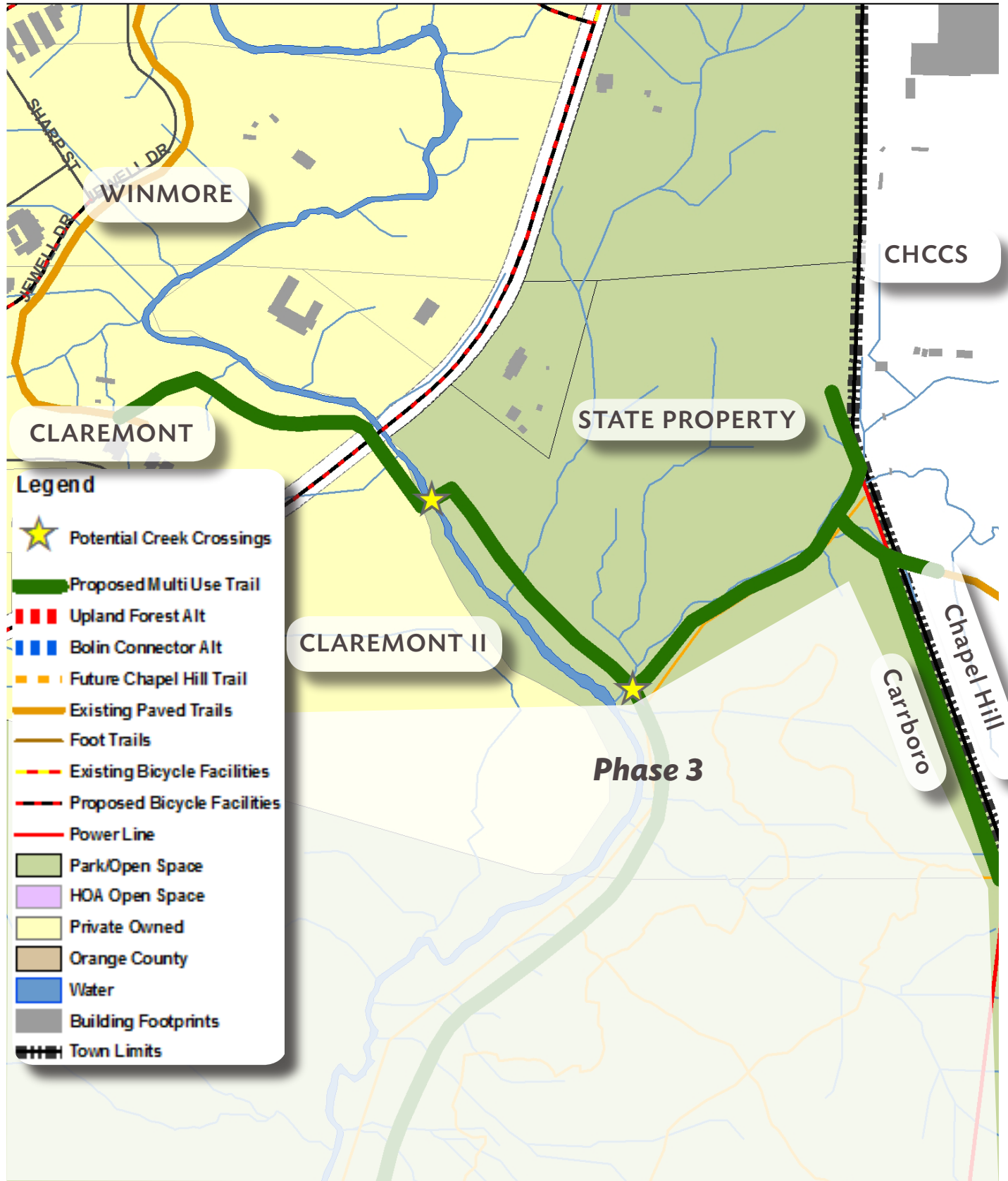
- Requires NCDOT approval for proposed trail underpass
- Bridge crossing at Bolin Creek must span the floodway, which may present delays in project permitting
- Clearing and mitigation will be required for some areas not already within sewer easement
- Topography north of Homestead Rd. presents engineering concerns and costs constraints

Bolin Creek Greenway - Phase 1B
 Probable Estimate of Construction Costs, 2009
 4137.25 linear feet (0.78 miles)

Demolition	Quantity	Cost	Unit	Subtotal
Clearing and grubbing understory (20' wide)	44,100	\$0.25	sf	\$11,025.00
Dumping Fees @ 6% of Demolition total			6%	\$661.50
			Subtotal	\$11,686.50
Trail Development	Quantity	Cost	Unit	Subtotal
Construction Entrance	2	\$1,900.00	ea	\$3,800.00
Temporary Rock Silt Check Type A	2	\$425.00	ea	\$850.00
Stabilization (Seeding; Temporary and Permanent)	33,320	\$0.25	sf	\$8,330.00
Straw with netting	600	\$4.50	lf	\$2,700.00
Temporary tree protection fence	6,100	\$4.00	lf	\$24,400.00
Temporary silt fence	5,580	\$5.00	lf	\$27,900.00
Temporary Diversion Ditch	300	\$3.00	lf	\$900.00
Trail initial grading (0-5 cu ft/lf)	600	\$3.30	lf	\$1,980.00
Trail fine grading (pavement)	3,332	\$3.30	lf	\$10,995.60
Trail fine grading (shoulders and ditch)	600	\$3.30	lf	\$1,980.00
10' wide multi-use concrete trail	2,872	\$75.00	lf	\$215,400.00
10' wide multi-use asphalt trail	1,265	\$35.00	lf	\$44,275.00
2' wide gravel shoulder (both sides)	3,182	\$6.60	lf	\$21,001.20
Class B Rip Rap with filter fabric	30	\$42.00	ton	\$1,260.00
RCP Drainage Pipes	135	\$35.00	lf	\$4,725.00
Seeding or mulching trail edges (5' both sides)	28,720	\$0.13	sf	\$3,733.60
Pre-Fab Bridge over Bolin Creek	1	\$175,000.00	ea	\$175,000.00
Tributary Crossing with boardwalk bridge	20	\$300.00	lf	\$6,000.00
Homestead Road Underpass	1	\$10,000.00	ls	\$10,000.00
Retaining Walls near Claremont II Development	100	\$30.00	lf	\$3,000.00
			Subtotal	\$585,660.40
Signage				
Mile Markers	3	\$400.00	ea	\$1,200.00
Trail and street regulatory/warning signs	16	\$220.00	ea	\$3,520.00
Directional signs	8	\$220.00	ea	\$1,760.00
Educational signs	2	\$400.00	ea	\$800.00
			Subtotal	
Site Amenities				
Benches (2 per mile recommended)	2	\$900.00	ea	\$1,800.00
Bicycle rack (at CHCCS spur)	2	\$800.00	ea	\$1,600.00
Drinking fountains, with pet fountain (1 per mile)	1	\$2,000.00	ea	\$2,000.00
Picnic tables/ tables (at trailheads)	1	\$550.00	ea	\$550.00
Trash receptacles (32-gallon, steel-at trailheads)	2	\$300.00	ea	\$600.00
Bollards (3 per trail/road intersection)	6	\$600.00	ea	\$3,600.00
			Subtotal	\$78,329.25
Design	Quantity	Cost	Unit	Subtotal
Wetlands and Stream Delineation (\$3,500/mile avg.)	0.50	\$3,500.00	mi	\$1,750.00
Surveying (\$10,000/mile avg.)	0.63	\$10,000.00	mi	\$6,300.00
Construction Documents @ 12 % of Dev. Cost			12%	\$70,279.25
			Subtotal	\$78,329.25
Subtotals				
Demolition				\$11,686.50
Trail Development				\$585,660.40
Design				\$78,329.25
SUBTOTAL (Demolition, Trail Development, Design)				\$675,676.15
Contingency (15% of total)			15%	\$101,351.42
TOTAL				\$777,027.57

Note: Does not include the following: land acquisition, potential rock and unsuitable soils excavation, permitting fees, mobilization, utility coordination, and taxes.

Phase 1b: Carolina North Forest to Claremont



Phase 1b: Carolina North Forest to Claremont (Alternatives)

The desire to make greenway connections to CHCCS was expressed during work sessions with the Greenways Commission as well as during public workshops. Upon exiting the Carolina North Forest along Bolin Creek, the existing sewer easement continues for several hundred feet before it splits in several directions. The western line crosses Bolin Creek and extends north to Homestead Rd.; the other extends laterally to the east toward CHCCS. Both corridors were examined as opportunities for trail development, and the results are shown as several trail alternatives. Phase 1b encounters other constraints such as landowner greenway development preference and environmental permitting. Direct connections, environmental impact and disturbance, and costs were considered while developing the alternatives.

Alternative 1 (red)

This alignment will continue along eastern Bolin Creek and extend east along the existing sewer easement to make a connection to CHCCS. For trail users continuing north, the trail will split to the west and meander through the understory while maintaining a consistent grade. The alignment stays outside the floodway which will minimize permitting constraints due to the reduced amount of cleared trees. South of Homestead Rd., the alignment continues, crossing Bolin Creek where the floodway narrows to less than 200 feet, decreasing bridge costs.

Advantages to Alternative 1: low impact bridge crossing; relative ease of trail construction; direct connection to schools; minimal tree removal; reduced permitting implications, reasonable construction costs

Constraints to Alternative 1: will require some disturbance within the floodplain, therefore flood study will be required; grading will be necessary

Alternative 2 (blue)

Alternative 2 utilizes the northern-extending existing sewer easement west of Bolin Creek that provides a direct connection to CHCCS via the existing sewer easement along Jolly Branch stream. The proposed Bolin Creek crossing is located at a sanitary sewer ductile iron pipe (SSDIP), which is located within the special flood hazard area (SFHA). The SFHA is approximately 600 feet wide, and to adequately span the floodway a bridge crossing of 500-600 feet will be necessary. This span length will have significant cost and permitting constraints on Phase 1b.

Advantages to Alternative 2: utilizes existing disturbed corridors; provides direct connection to CHCCS

Constraints to Alternative 2: cost-prohibitive bridge crossing; complex/rigorous permitting and flood studies; complicated engineering design work may be necessary for bridge crossing

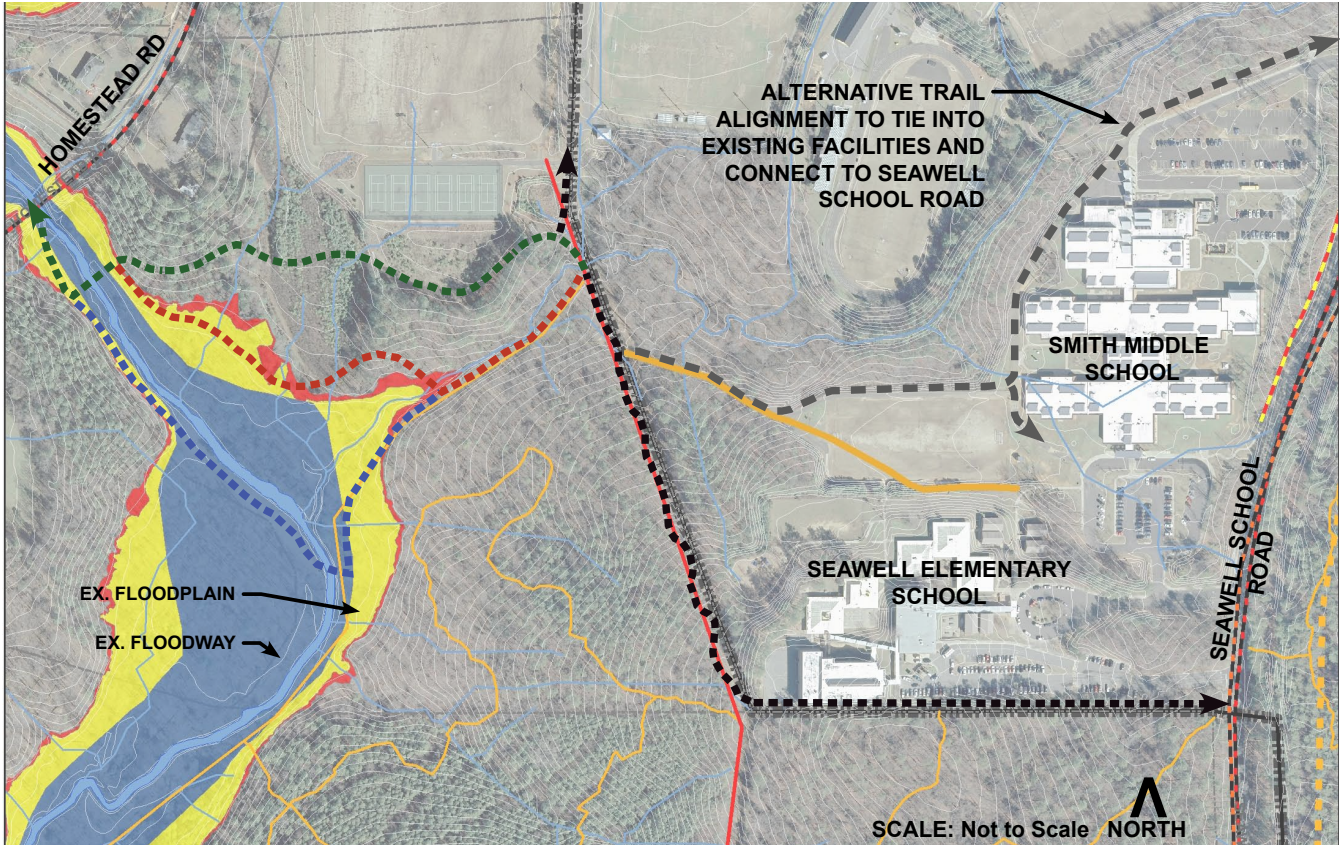
Alternative 3 (green)

Alternative 3 provides tie-ins to CHCCS and nearby athletic fields. Alternative 3 remains outside the floodplain and utilizes open areas of the understory where possible. Trail users not bound for CHCCS will be directed north and then south, increasing mileage along the corridor. Although requiring the least amount of tree removal, Alternative 3 provides the least-direct route from Bolin Creek to Homestead Rd. The proposed crossing will occur where the floodway narrows, approximately 200 feet south of Homestead Rd.

Advantages to Alternative 3: minimizes tree clearing; follows existing grade; provides multiple tie-ins at CHCCS

Constraints to Alternative 3: increased trail costs associated with augmented trail mileage; least direct connection to Homestead Rd. of all the alternatives, least complicated with regards to flood study

Phase 1b Alternatives



■■■■■■■	Proposed Bolin Creek Greenway		
■■■■■■■	Alternative Route 1	1365 linear feet (0.26 miles)	Estimated Cost = \$211,318.31 + \$175,000.00 Bridge = \$386,318.31
■■■■■■■	Alternative Route 2	1821 linear feet (0.34 miles)	Estimated Cost = \$277,909.20 + \$1,200,000.00 Bridge = \$1,477,909.20
■■■■■■■	Alternative Route 3	1285 linear feet (0.24 miles)	Estimated Cost = \$198,696.96 + \$175,000.00 Bridge = \$373,696.96

Phase 2: Jones Creek

Phase 2 is intended to tie into the trails at LHF with connections made at the future trail to Morris Grove Elementary. Phase 2 is .61 miles in length and presents several land acquisition constraints, requiring greenway easements with LHF HOA and OWASA property. Meetings should be scheduled with LHF HOA, OWASA, and Orange County.

Opportunities:

- Large county-owned parcel near Fox Meadow
- Trail tie-in with LHF trails
- Has potential to close gap between Morris Grove Elementary/Twin Creeks Park and LHF

Constraints:

- May require greenway easements with OWASA and LHF HOA
- 2 bridge crossings may delay project permitting
- At-grade crossing is required at Turtleback Crossing Dr. and will require engineering study
- Clearing and grubbing will be required along majority of the corridor
- Adjacent homes are very close in some areas to proposed trail

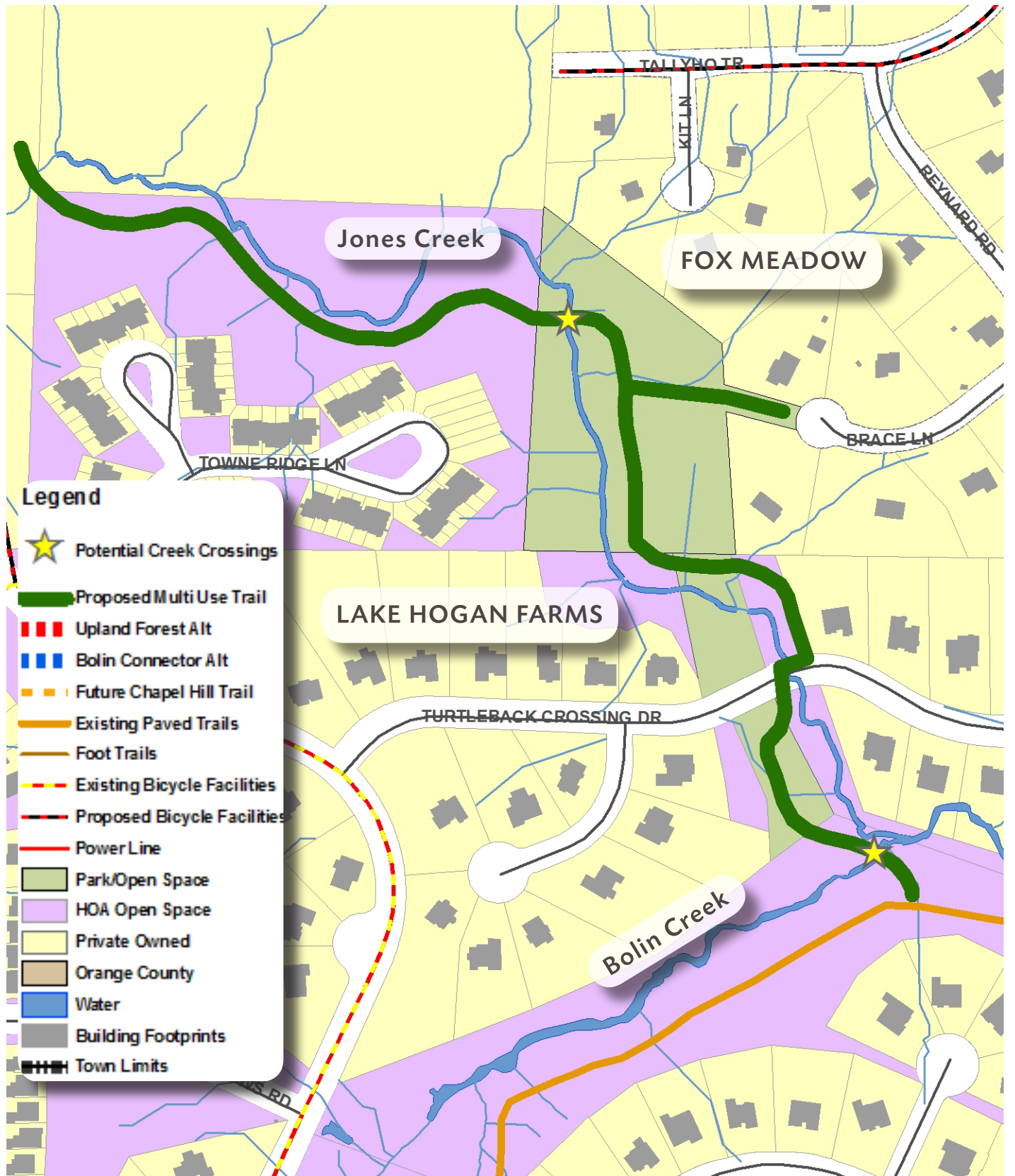
Bolin Creek Greenway - Phase 2

Probable Estimate of Construction Costs, 2009
3223.21 linear feet (0.61 miles)

Demolition	Quantity	Cost	Unit	Subtotal
Clearing and grubbing understory (20' wide)	53,600	\$0.25	sf	\$13,400.00
Dumping Fees @ 6% of Demolition total			6%	\$804.00
			<i>Subtotal</i>	\$14,204.00
Trail Development	Quantity	Cost	Unit	Subtotal
Construction Entrance	5	\$1,900.00	ea	\$9,500.00
Temporary Rock Silt Check Type A	8	\$425.00	ea	\$3,400.00
Stabilization (Seeding: Temporary and Permanent)	32,232	\$0.25	sf	\$8,058.00
Straw with netting	750	\$4.50	lf	\$3,375.00
Temporary tree protection fence	4,395	\$4.00	lf	\$17,580.00
Temporary silt fence	4,500	\$5.00	lf	\$22,500.00
Temporary Diversion Ditch	300	\$3.00	lf	\$900.00
Temporary pipe inlet protection	2	\$900.00	ea	\$1,800.00
Trail initial grading (0-5 cu ft/lf)	300	\$3.30	lf	\$990.00
Trail fine grading (pavement)	3,223	\$3.30	lf	\$10,635.90
Trail fine grading (shoulders and ditch)	1,500	\$3.30	lf	\$4,950.00
10' wide multi-use concrete trail	2,640	\$75.00	lf	\$198,000.00
10' wide multi-use asphalt trail	460	\$35.00	lf	\$16,100.00
2' wide gravel shoulder (both sides)	3,100	\$6.60	lf	\$20,460.00
Class B Rip Rap with filter fabric	25	\$42.00	ton	\$1,050.00
RCP Drainage Pipes	105	\$35.00	lf	\$3,675.00
Seeding or mulching trail edges (5' both sides)	26,400	\$0.13	sf	\$3,432.00
Low Water Bridge over Bolin Creek	1	\$45,000.00	ls	\$45,000.00
Low Water Bridge over Buckhorn Branch	1	\$30,000.00	ls	\$30,000.00
Low Water Bridge over Jones Creek	1	\$40,000.00	ls	\$40,000.00
Allowance for Screening Trees/Privacy Fencing	1	\$25,000.00	ls	\$25,000.00
Turtleback Crossing Intersection Improvements	1	\$25,000.00	ls	\$25,000.00
Signage				
Mile Markers	2	\$400.00	ea	\$800.00
Trail and street regulatory/warning signs	11	\$220.00	ea	\$2,420.00
Directional signs	6	\$220.00	ea	\$1,320.00
Educational signs	2	\$400.00	ea	\$800.00
Site Amenities				
Benches (2 per mile recommended)	3	\$900.00	ea	\$2,700.00
Bicycle rack (at one educational sign location)	1	\$800.00	ea	\$800.00
Trash receptacles (32-gallon, steel-at trailheads)	3	\$300.00	ea	\$900.00
Bollards (3 per trail/road intersection)	9	\$600.00	ea	\$5,400.00
			<i>Subtotal</i>	\$506,545.90
Design	Quantity	Cost	Unit	Subtotal
Wetlands and Stream Delineation (\$3,500/mile avg.)	0.44	\$3,500.00	mi	\$1,540.00
Surveying (\$10,000/mile avg.)	0.61	\$10,000.00	mi	\$6,100.00
Construction Documents @ 12 % of Dev. Cost			12%	\$60,785.51
			<i>Subtotal</i>	\$68,425.51
Subtotals				
Demolition				\$14,204.00
Trail Development				\$506,545.90
Design				\$68,425.51
SUBTOTAL (Demolition, Trail Development, Design)				\$589,175.41
Contingency (15% of total)			15%	\$88,376.31
TOTAL				\$677,551.72

Note: Does not include the following: land acquisition, potential rock and unsuitable soils excavation, permitting fees, mobilization, utility coordination, and taxes.

Phase 2: Jones Creek



- Legend**
- ★ Potential Creek Crossings
 - Proposed Multi Use Trail
 - Upland Forest Alt
 - Bolin Connector Alt
 - Future Chapel Hill Trail
 - Existing Paved Trails
 - Foot Trails
 - Existing Bicycle Facilities
 - Proposed Bicycle Facilities
 - Power Line
 - Park/Open Space
 - HOA Open Space
 - Private Owned
 - Orange County
 - Water
 - Building Footprints
 - Town Limits

Phase 3: Carolina North Forest

Phase 3 consists of 1.77 miles of trail, including lateral connectors. Phase 3 provides the majority of centralized east/west connections from the Bolin Creek Greenway corridor to nearby neighborhoods. Greenway easements/rights of entry will need to be obtained with UNC, and the Town should meet with OWASA and adjacent homeowners and HOA's prior to design development. During the planning process, UNC met with the Town of Carrboro to review and comment on the proposed alignment. UNC comments are presented in Chapter 4: Proposed Design.

Opportunities:

- Existing sewer easements provide wide, cleared corridor
- Largest tract of land within the corridor allows for multiple connection points
- Sole land owner cooperation
- Wildlife habitat restoration opportunities
- Future connections to Carolina North development
- General ease of construction

Constraints:


















- Consider development agreement between UNC and Chapel Hill
- Numerous tributary crossings create potential for delays in permitting
- Northern stretch may require clearing and grubbing
- Need OWASA, CHCCS, and UNC cooperation for proposed trailheads

Bolin Creek Greenway - Phase 3
 Probable Estimate of Construction Costs, 2009
 9352.30 linear feet (1.77 miles)

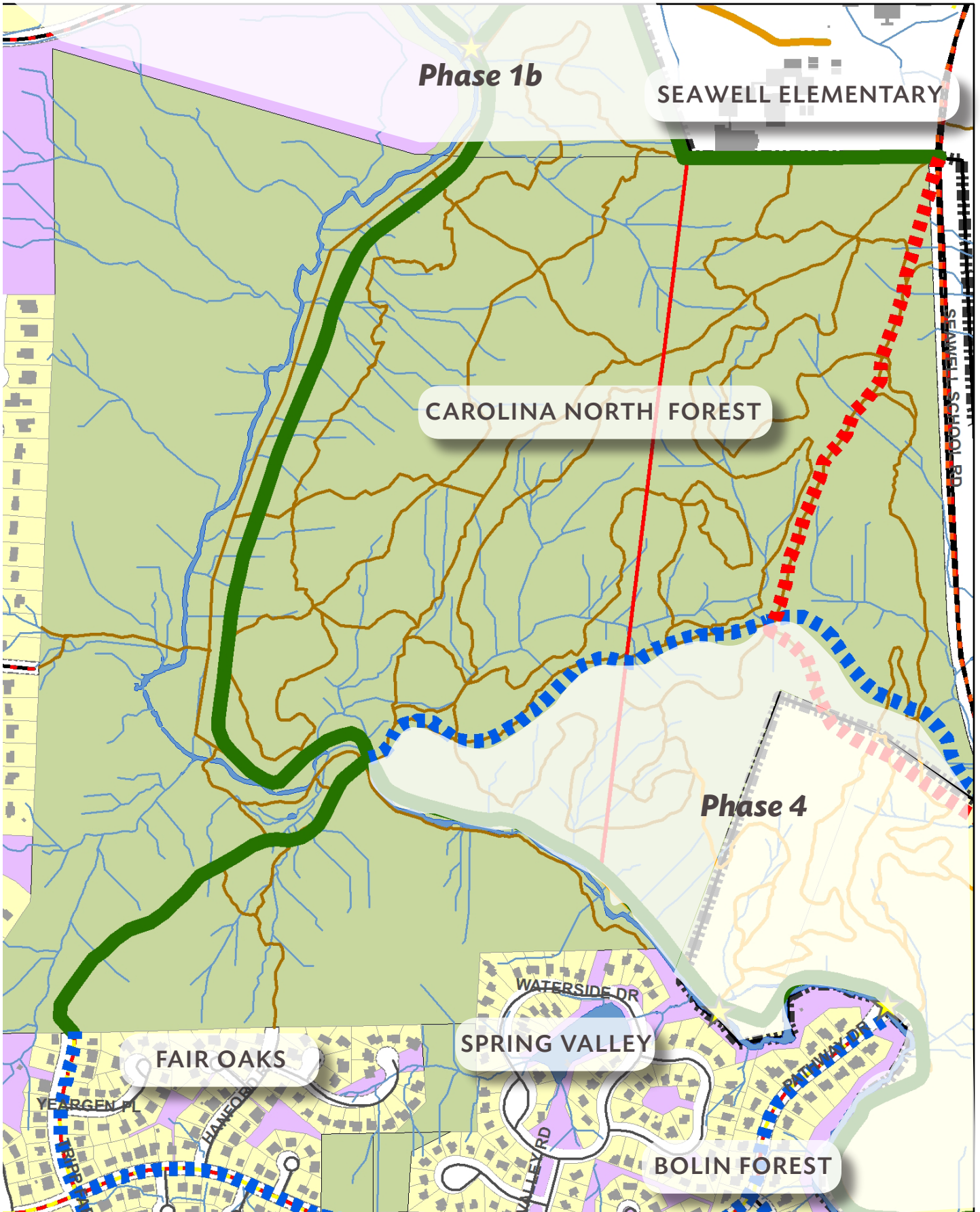
Demolition	Quantity	Cost	Unit	Subtotal
Clearing and grubbing understory (20' wide)	161,190	\$0.25	sf	\$40,297.50
Dumping Fees @ 6% of Demolition total			6%	\$2,417.85
			Subtotal	\$42,715.35
Trail Development	Quantity	Cost	Unit	Subtotal
Construction Entrance	2	\$1,900.00	ea	\$3,800.00
Temporary Rock Silt Check Type A	10	\$425.00	ea	\$4,250.00
Stabilization (Seeding: Temporary and Permanent)	107,460	\$0.25	sf	\$26,865.00
Straw with netting	2,500	\$4.50	lf	\$11,250.00
Temporary tree protection fence	20,400	\$4.00	lf	\$81,600.00
Temporary silt fence	13,700	\$5.00	lf	\$68,500.00
Temporary Diversion Ditch	1,500	\$3.00	lf	\$4,500.00
Temporary pipe inlet protection	2	\$900.00	ea	\$1,800.00
Trail initial grading (0-5 cu ft/lf)	2,000	\$3.30	lf	\$6,600.00
Trail fine grading (pavement)	10,746	\$3.30	lf	\$35,461.80
Trail fine grading (shoulders and ditch)	2,500	\$3.30	lf	\$8,250.00
10' wide multi-use concrete trail	3,697	\$75.00	lf	\$277,275.00
10' wide multi-use asphalt trail	2,736	\$35.00	lf	\$95,760.00
10' wide gravel trail	2,919	\$25.00	lf	\$72,975.00
2' wide gravel shoulder (both sides)	10,746	\$6.60	lf	\$70,923.60
Class B Rip Rap with filter fabric	30	\$42.00	ton	\$1,260.00
RCP Drainage Pipes	495	\$35.00	lf	\$17,325.00
Seeding or mulching trail edges (5' both sides)	36,970	\$0.13	sf	\$4,806.10
Tripp Farm Road Trailhead (5 cars)	1	\$25,000.00	ls	\$25,000.00
Seawell School Trailhead (10 cars)	1	\$35,000.00	ls	\$35,000.00
Bolin Creek Reforestation Plantings	80	\$750.00	ea	\$60,000.00
Signage				
Mile Markers	6	\$400.00	ea	\$2,400.00
Trail and street regulatory/warning signs	11	\$220.00	ea	\$2,420.00
Directional signs	10	\$220.00	ea	\$2,200.00
Educational signs	4	\$400.00	ea	\$1,600.00
Site Amenities				
Benches (2 per mile recommended)	6	\$900.00	ea	\$5,400.00
Bicycle rack (at one educational sign location)	3	\$800.00	ea	\$2,400.00
Trash receptacles (32-gallon, steel-at trailheads)	6	\$300.00	ea	\$1,800.00
Bollards (3 per trail/road intersection)	6	\$600.00	ea	\$3,600.00
Drinking fountains, with pet fountain (1 per mile)	2	\$2,000.00	ea	\$4,000.00
Picnic tables/ tables (at trailheads)	2	\$550.00	ea	\$1,100.00
			Subtotal	\$940,121.50
Design	Quantity	Cost	Unit	Subtotal
Wetlands and Stream Delineation (\$3,500/mile avg.)	1.25	\$3,500.00	mi	\$4,375.00
Surveying (\$10,000/mile avg.)	2.04	\$10,000.00	mi	\$20,400.00
Construction Documents @ 12 % of Dev. Cost			12%	\$112,814.58
			Subtotal	\$137,589.58
Subtotals				
Demolition				\$42,715.35
Trail Development				\$940,121.50
Design				\$137,589.58
SUBTOTAL (Demolition, Trail Development, Design)				\$1,120,426.43
Contingency (15% of total)			15%	\$168,063.96
TOTAL				\$1,288,490.39

Note: Does not include the following: land acquisition, potential rock and unsuitable soils excavation, permitting fees, mobilization, utility coordination, and taxes.

Legend

-  Potential Creek Crossings
-  Proposed Multi Use Trail
-  Upland Forest Ait
-  Bolin Connector Ait
-  Future Chapel Hill Trail
-  Existing Paved Trails
-  Foot Trails
-  Existing Bicycle Facilities
-  Proposed Bicycle Facilities
-  Power Line
-  Park/Open Space
-  HOA Open Space
-  Private Owned
-  Orange County
-  Water
-  Building Footprints
-  Town Limits

Phase 3: Carolina North Forest



Phase 4: Railroad to Carolina North Forest

Phase 4 continues from the railroad tracks at the end of Phase 1a through the PH Craig tract. Greenway easements will be necessary along the OWASA property across the tracks, Bolin Forest HOA property, and PH Craig property. Permission will need to be obtained for the at-grade crossing and underpass beneath the railroad. Meetings should be scheduled with all parties as well as the Town of Chapel Hill (where trail crosses jurisdictional boundaries) to discuss the proposed trail alignment. Additional meetings with adjacent homeowners may be necessary to determine bridge crossing locations for access, which was requested at the public workshops.

Opportunities:

- Sewer easements provide wide, cleared corridor along Bolin Creek
- Bridge crossing over Bolin Creek is a candidate for low-water option
- Potential to tie into Chapel Hill trails

Constraints:

- Requires easement agreement with private property owner
- Engineering constraints from Estes Dr. down to Bolin Creek
- Multiple property owners will have different concerns/needs
- Requires permission from railroad operators

Bolin Creek Greenway - Phase 4

Probable Estimate of Construction Costs, 2009
6676.30 linear feet (1.26 miles)

Demolition	Quantity	Cost	Unit	Subtotal
Clearing and grubbing understory (20' wide)	40,000	\$0.25	sf	\$10,000.00
Dumping Fees @ 6% of Demolition total			6%	\$600.00
			<i>Subtotal</i>	\$10,600.00
Trail Development	Quantity	Cost	Unit	Subtotal
Construction Entrance	2	\$1,900.00	ea	\$3,800.00
Temporary Rock Silt Check Type A	6	\$425.00	ea	\$2,550.00
Stabilization (Seeding: Temporary and Permanent)	53,250	\$0.25	sf	\$13,312.50
Straw with netting	500	\$4.50	lf	\$2,250.00
Temporary tree protection fence	10,600	\$4.00	lf	\$42,400.00
Temporary silt fence	10,500	\$5.00	lf	\$52,500.00
Temporary Diversion Ditch	400	\$3.00	lf	\$1,200.00
Temporary pipe inlet protection	1	\$900.00	ea	\$900.00
Trail initial grading (0-5 cu ft/lf)	600	\$3.30	lf	\$1,980.00
Trail fine grading (pavement)	5,250	\$3.30	lf	\$17,325.00
Trail fine grading (shoulders and ditch)	800	\$3.30	lf	\$2,640.00
10' wide multi-use concrete trail	6,601	\$75.00	lf	\$495,075.00
2' wide gravel shoulder (both sides)	5,250	\$6.60	lf	\$34,650.00
Class B Rip Rap with filter fabric	15	\$42.00	ton	\$630.00
RCP Drainage Pipes	150	\$35.00	lf	\$5,250.00
Seeding or mulching trail edges (5' both sides)	66,010	\$0.13	sf	\$8,581.30
Estes Drive RR Crossing (at grade)	1	\$15,000.00	ls	\$15,000.00
RR Underpass at Bolin Creek	1	\$30,000.00	ls	\$30,000.00
Neighborhood Water Crossings (boardwalk bridge)	40	\$300.00	lf	\$12,000.00
Low Water Bridge over Bolin Creek	1	\$75,000.00	ls	\$75,000.00
Signage				
Mile Markers	2	\$400.00	ea	\$800.00
Trail and street regulatory/warning signs	6	\$220.00	ea	\$1,320.00
Directional signs	4	\$220.00	ea	\$880.00
Educational signs	2	\$400.00	ea	\$800.00
Site Amenities				
Benches (2 per mile recommended)	2	\$900.00	ea	\$1,800.00
Trash receptacles (32-gallon, steel-at trailheads)	2	\$300.00	ea	\$600.00
Bollards (3 per trail/road intersection)	3	\$600.00	ea	\$1,800.00
			<i>Subtotal</i>	\$825,043.80
Design	Quantity	Cost	Unit	Subtotal
Wetlands and Stream Delineation (\$3,500/mile avg.)	0.91	\$3,500.00	mi	\$3,185.00
Surveying (\$10,000/mile avg.)	1.01	\$10,000.00	mi	\$10,100.00
Construction Documents @ 12 % of Dev. Cost			12%	\$99,005.26
			<i>Subtotal</i>	\$112,290.26
Subtotals				
Demolition				\$10,600.00
Trail Development				\$825,043.80
Design				\$112,290.26
SUBTOTAL (Demolition, Trail Development, Design)				\$947,934.06
Contingency (15% of total)			15%	\$142,190.11
TOTAL				\$1,090,124.16

Note: Does not include the following: land acquisition, potential rock and unsuitable soils excavation, permitting fees, mobilization, utility coordination, and taxes.

Phase 4: Railroad to Carolina North Forest

