



Hillsborough TPO
Transportation
Planning Organization



Hillsborough
County Florida

APPENDIX F – BALM RIVERVIEW ROAD CORRIDOR DESIGN CONCEPTS



BICYCLE NETWORK PLAN: CORRIDOR DESIGN CONCEPTS

Hillsborough County

Balm Riverview Rd. – Boyette Rd. to McMullen Rd.

January 2023

PREPARED BY:



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INTRODUCTION

Committed to improving the mobility and safety of all residents, Hillsborough County, and the Transportation Planning Organization (TPO) have identified, evaluated, and prioritized bicycle facility needs along the County’s roadway transportation network. The data-driven methodology addresses the mobility and safety needs of people on bicycles. The resulting plan will assist Hillsborough County in realizing the commitment and desire to provide a safe, connected, and inviting network of bicycle facilities.

The planning process identified four high priority corridors that are geographically dispersed across the county for further evaluation. Review and analysis of each corridor yielded a range of potential project opportunities to add or improve bicycle facilities. The recommended improvements have been grouped into tiers based on priority and screened for feasibility. This design report introduces conceptual design plans, cost estimates, and implementation considerations to construct the recommendations for Balm Riverview Rd. between Boyette Rd. and McMullen Rd.

Balm Riverview Rd. in the project corridor is a two-lane roadway in the community of Riverview. The corridor is primarily residential with open drainage and piecemeal sidewalks. School campuses are at each end of the corridor with sections of curb and gutter. The 1.9 miles long segment has a posted speed limit of 40 mph and intermittently widened sections to add turn lanes at intersections and destinations. There are no dedicated bicycle facilities and no transit service along the corridor.

RECOMMENDATIONS

The primary recommendation to improve conditions for bicyclists is to build a continuous asphalt shared use path along the east side of the roadway. The recommendations are supportive of the new pathway and safety for all roadway users through elements that encourage a reduction of traffic speeds. The recommendations improve access to the new pathway with the addition of enhanced crossings. Additional recommendations add elements to improve the overall safety and comfort of roadway users including updated pavement markings, signage, landscaping, and lighting.

The recommendations have been split into three tiers and are summarized in the tables below. Conceptual design plans showing the recommendations are included in Appendix A.

Table 1: Tier 1 Recommendations

	Recommendation	Implementation Notes	Cost Estimate
A	Install high visibility pedestrian crossing markings at all intersections, midblock crossings, and major driveways.	Locations shown on design plans.	\$39,900
B	Install school zone beacons, markings, and signage to include Riverview High School and Kids Community College Southeast at 200 ft from school grounds per the applicable County and MUTCD standards.	Sign assembly content and placement to be determined during final design. Planning-level cost estimate included.	\$81,100

C	Realign Tucker Rd. intersection to reduce crossing distance and introduce a safer intersection angle.	Elements include concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	\$25,900
D	Identify and repair areas of sidewalk damage and ADA compliance issues.	Quantities and locations to be determined following ADA inventory. Planning-level cost estimate included. Not shown on design plans.	\$90,000

Table 2: Tier 2 Recommendations

	Recommendation	Implementation Notes	Cost Estimate
A	Install enhanced crosswalk with RRFB and median refuge at Black Forest Trl.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include median refuge, RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	\$139,500
B	Install enhanced crosswalk with RRFB at Shady Ln.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	\$50,200
C	Install enhanced crosswalk with RRFB and median refuge at Irish Moss Ave., including removal of extended right turn only lane.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include median refuge, RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	\$231,300
D	Install enhanced crosswalk with RRFB and median refuge at Symmes Rd., including removal of extended right turn only lane.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include median refuge, RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	\$274,000
E	Install asphalt shared use path along the east side of the corridor.	Estimate includes concrete approaches at intersections, concrete driveway aprons, 12 ft wide asphalt pathway, utility relocations, curb and gutter, grading, drainage, sod, and removal of existing sidewalk. Narrow right-of-way and open drainage will require property owner coordination.	\$10,324,500

F	Install bike lane markings through intersection at Boyette Rd., including green through conflict areas.	Typical configuration is to continue the bike lane width through the intersection with 2 ft-4 ft skip through conflict areas, adding green within those skips and 40 ft solid green before and after conflict areas. These modifications are likely to be done at the time of resurfacing, though not included in cost estimate.	\$41,300
G	Install wayfinding signage at Boyette Rd, Symmes Rd., and McMullen Rd.	Sign assembly content and placement to be determined during final design. Planning-level cost estimate included.	\$123,100
H	Install landscaping with trees where possible.	Feasible areas shown on plans. Tree placement to be determined during final design.	\$170,500
I	Install bike detection at signal-controlled intersection with Boyette Rd.	Planning-level cost estimate for microwave detection equipment.	\$41,600

Table 3: Tier 3 Recommendations

	Recommendation	Implementation Notes	Cost Estimate
A	Install lighting at each end and at all crossings.	Planning-level cost estimate for lighting at all intersections and crossings added in Tier 2. Not shown on design plans.	\$1,230,700
B	Install pedestrian-scale lighting throughout the corridor.	Planning-level cost estimate for pedestrian-scale lighting on both sides, spaced at 50' on center. Additional right-of-way or easements to be acquired prior to final design. Not shown on design plans.	\$2,787,900
C	Install raised crosswalk at Shady Ln.	Posted speed limit to be reduced to 30 mph and warrant analysis completed prior to raised crosswalk installation. Cost estimate based on FDOT Developmental Standard D520-30.	\$62,800

D	Modify specified driveways to decrease radii and extend median noses to roadway edge to provide pedestrian refuge areas.	Safety elements for new shared use path on east side. Locations: Paddock Manor Ave., Whispering Creek Rd., and KCC school entrance.	\$33,700
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COST ESTIMATES SUMMARY

Cost estimates for each recommendation are included above in Tables 1-3. The estimates have been developed using pay items and expected unit costs sourced from District 7 of the Florida Department of Transportation, the Department’s Long Range Estimating (LRE) system, and engineering judgement. The planning-level estimates include percentage-based multipliers applied to the construction costs as shown in Table 4. Any needed right-of-way acquisition is not included in the estimates. An overview of the cost estimates aggregated by tier are shown in Table 5. Cost estimate details for each recommendation are provided in Appendix B.

Table 4: Cost Estimates Assumptions

Cost Element	Multiplier
Maintenance of Traffic (MOT)	20%
Mobilization (MOB)	15%
Contingency	30%
Design	25%
CEI	15%

Table 5: Cost Estimates by Tier

Implementation Tier	Cost Estimates
Tier 1	\$236,900
Tier 2	\$11,396,000
Tier 3	\$4,115,100
Corridor Total	\$15,748,000

IMPLEMENTATION GUIDANCE

The recommendations for bicycle facilities on the corridor were developed in collaboration with Hillsborough County staff and subsequently screened for feasibility. The screening for feasibility and development of design plans included conformance with the applicable local, state, and federal design standards and guidance. The designs applied engineering judgement and contemporary best practices for the safety of all users within the right-of-way. Implementation notes are included for each recommendation in the tables above. The following content identifies general issues and considerations to be addressed along the entire corridor as the recommendations are advanced through the forthcoming stages of design and implementation.

RIGHT-OF-WAY, DRAINAGE, AND UTILITIES

The right-of-way information used to develop the design concept is based on Hillsborough County's GIS data and field investigation. The next stage of project development will require survey to verify property lines, topography, and utilities.

The unconstrained minimum width for a shared use path parallel to a roadway is 19 ft including the following elements: 5 ft sod or landscaped buffer from the roadway edge, 12 ft pathway, and 2 ft clear zone to the outside. That width is not available for most of the corridor, so while the pathway alignment shown minimizes the encroachment outside the public right-of-way, additional right-of-way acquisition or easements will be required. The width of right-of-way needed will be greater than shown where required for the relocation of impacted utilities or to tie the outside pathway shoulder to the existing grade, otherwise additional grading and railings will be required.

The following elements are included in the conceptual design to minimize the footprint of the pathway: a decreased buffer width, curb and gutter, and replacement of open drainage ditches with enclosed pipes and inlets. Decreasing the buffer width to less than 5 ft requires the installation of curb and gutter and technically classifies that segment of the pathway as a wide sidewalk, though that is preferable to no facility. Where 5 ft buffer width can be provided, the design still includes curb and gutter to deter encroachment by vehicles for the improved safety and comfort of path users.

Utility relocations, adjustment, or additions may be required to install the recommended RRFBs and lighting.

ADDITIONAL CONSIDERATIONS

ADA-compliant curb ramps are to be included at all crosswalks. They are not specifically shown on the conceptual design plans, though they are included in the cost estimate for the corresponding recommendation. The width of each curb ramp and detectable warning pads are to match the corresponding path or sidewalk width.

A speed study will be required prior to advancing the recommendation to lower the posted speed limit. Relatedly, the posted speed limit must be reduced to 35 mph or lower prior to installation of RRFBs as a part of the recommended crossings.

Field assessment of ADA compliance is required to identify any needed associated modifications.

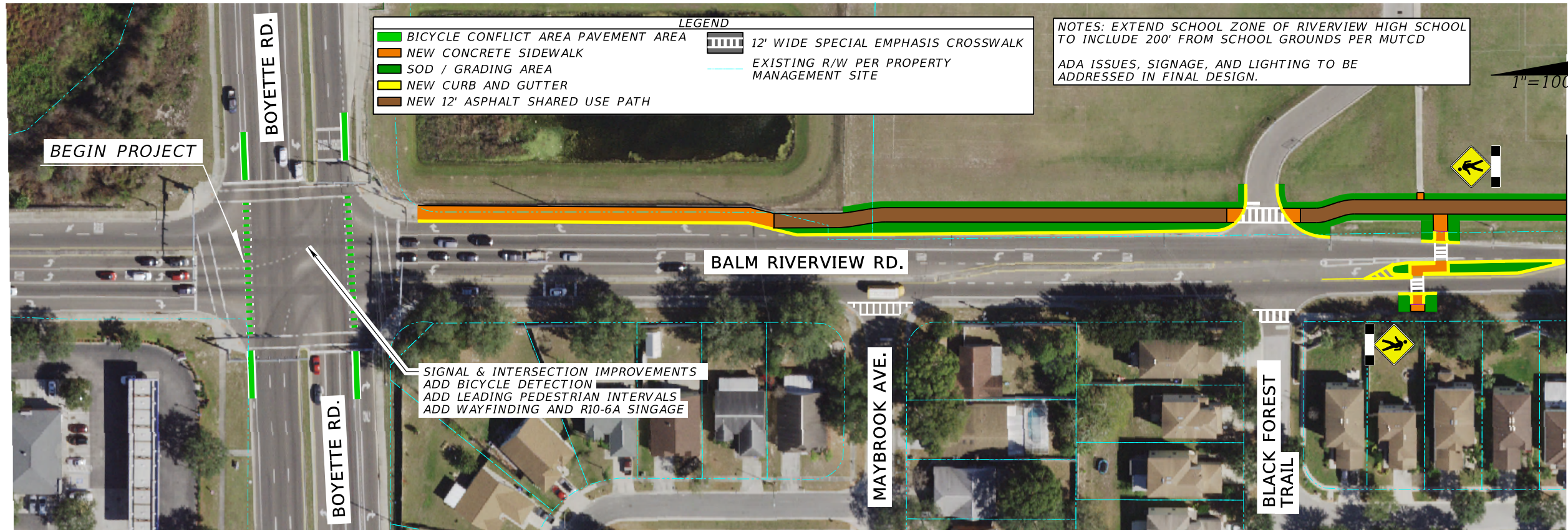
The addition of Leading Pedestrian Intervals (LPI) and bicycle detection equipment to intersections with existing traffic signals may require replacement of the traffic controller cabinet if required to enable that capability.

The recommended lighting will require assessment of existing lighting conditions and impacts to trees.

All pavement markings should be thermoplastic.



Appendix A
Design Concept Plans

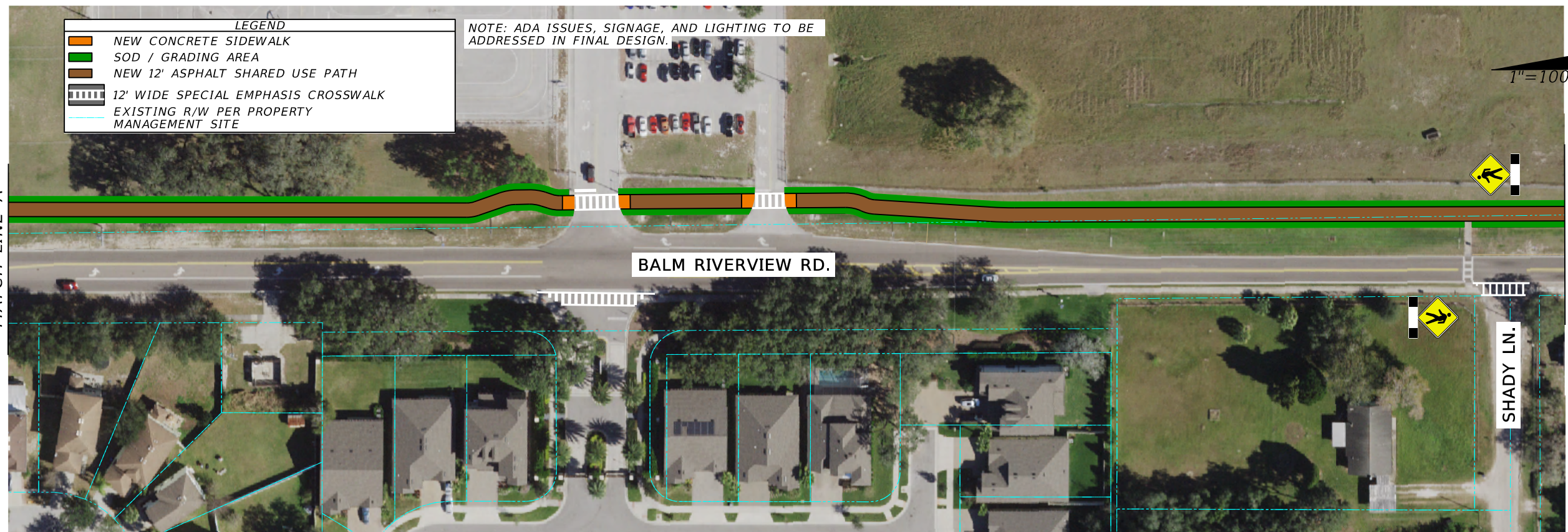


LEGEND

	BICYCLE CONFLICT AREA PAVEMENT AREA		12' WIDE SPECIAL EMPHASIS CROSSWALK
	NEW CONCRETE SIDEWALK		EXISTING R/W PER PROPERTY MANAGEMENT SITE
	SOD / GRADING AREA		
	NEW CURB AND GUTTER		
	NEW 12' ASPHALT SHARED USE PATH		

NOTES: EXTEND SCHOOL ZONE OF RIVERVIEW HIGH SCHOOL TO INCLUDE 200' FROM SCHOOL GROUNDS PER MUTCD
 ADA ISSUES, SIGNAGE, AND LIGHTING TO BE ADDRESSED IN FINAL DESIGN.

SIGNAL & INTERSECTION IMPROVEMENTS
 ADD BICYCLE DETECTION
 ADD LEADING PEDESTRIAN INTERVALS
 ADD WAYFINDING AND R10-6A SIGNAGE



LEGEND

	NEW CONCRETE SIDEWALK
	SOD / GRADING AREA
	NEW 12' ASPHALT SHARED USE PATH
	12' WIDE SPECIAL EMPHASIS CROSSWALK
	EXISTING R/W PER PROPERTY MANAGEMENT SITE

NOTE: ADA ISSUES, SIGNAGE, AND LIGHTING TO BE ADDRESSED IN FINAL DESIGN.

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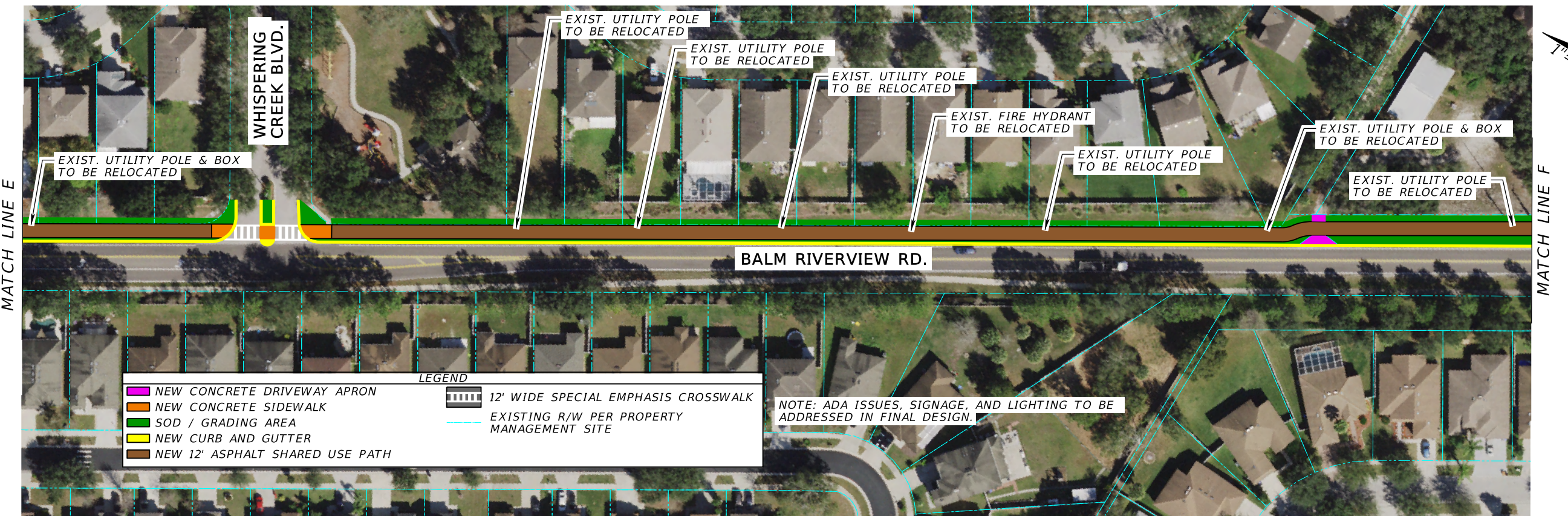
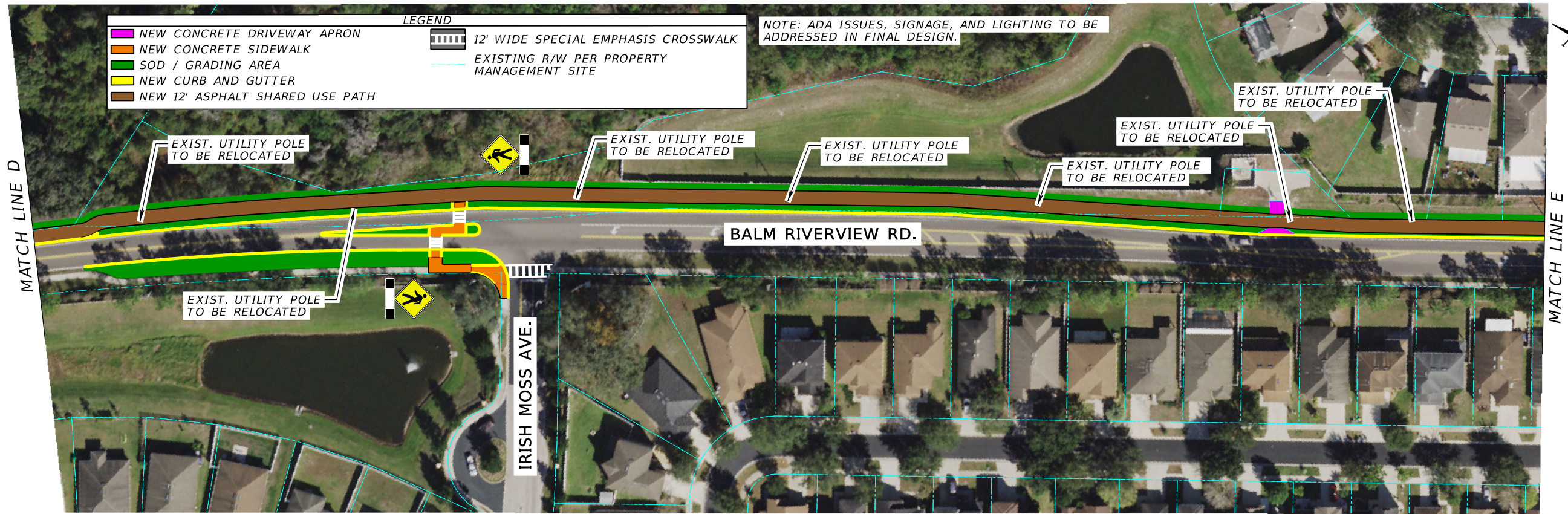
REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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BICYCLE NETWORK PLAN
 BALM RIVERVIEW RD. PLANS

SHEET NO.
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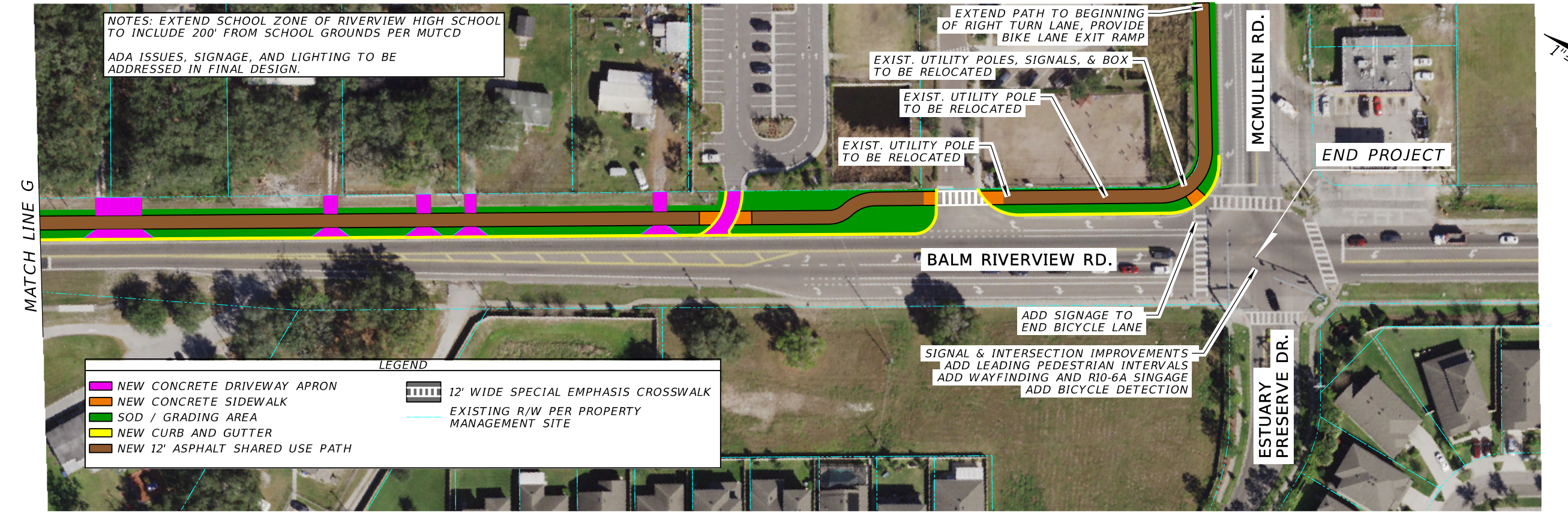
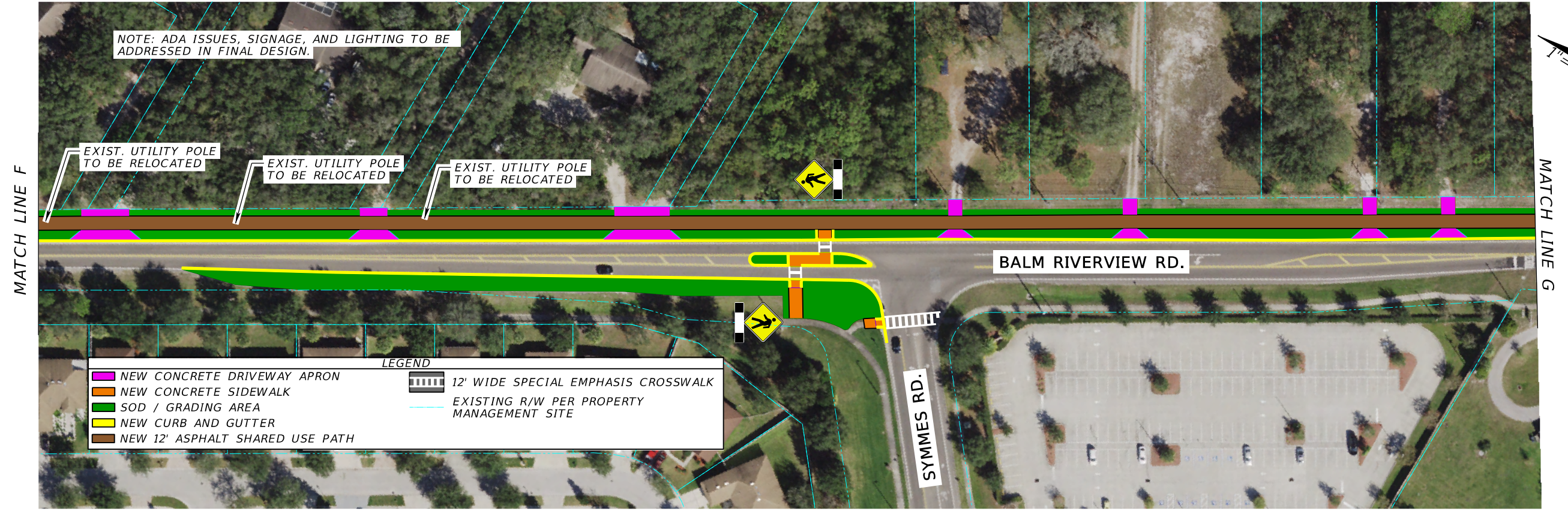
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BICYCLE NETWORK PLAN
 BALM RIVERVIEW RD. PLANS

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BICYCLE NETWORK PLAN
BALM RIVERVIEW RD. PLANS

SHEET NO.
4



Appendix B
Cost Estimates Details

Hillsborough County Bike Network - Conceptual Design Notes
 Balm Riverview Rd - Boyette Rd to McMullen Rd

Tier 1	Implementation Notes	Final Cost Estimate	Construction Cost		CONTINGENCY			DESIGN (25%)	CEI (15%)	Total Cost	Cost Estimate Notes			
			Cost	MOT (20%)	Sub-Total	MOB (15%)	Sub-Total					(30%)	Sub-Total	
A	Install high visibility pedestrian crossing markings at all intersections, midblock crossings, and major driveways.	Locations shown on design plans.	\$ 39,900	\$ 15,880	\$ 3,176	\$ 19,056	\$ 2,858	\$ 21,914	\$ 6,574	\$ 28,489	\$ 7,122	\$ 4,273	\$ 39,884	Obtained the construction cost from the design file.
B	Install school zone beacons, markings, and signage to include Riverview High School and Kids Community College Southeast at 200 ft from school grounds per the applicable County and MUTCD standards.	Sign assembly content and placement to be determined during final design. Planning-level cost estimate included.	\$ 81,100	\$ 32,304	\$ 6,461	\$ 38,765	\$ 5,815	\$ 44,580	\$ 13,374	\$ 57,953	\$ 14,488	\$ 8,693	\$ 81,135	Beacons \$20,000, six signs assemblies (700 1 12) \$1,634 ea., and \$2,500 for pavement markings.
C	Realign Tucker Rd. intersection to reduce crossing distance and introduce a safer intersection angle.	Elements include concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	\$ 25,900	\$ 10,300	\$ 2,060	\$ 12,360	\$ 1,854	\$ 14,214	\$ 4,264	\$ 18,478	\$ 4,620	\$ 2,772	\$ 25,869	Obtained the construction cost from the design file.
D	Identify and repair areas of sidewalk damage and ADA compliance issues.	Quantities and locations to be determined following ADA inventory. Planning-level cost estimate included. Not shown on design plans.	\$ 90,000	\$ 35,838	\$ 7,168	\$ 43,006	\$ 6,451	\$ 49,456	\$ 14,837	\$ 64,293	\$ 16,073	\$ 9,644	\$ 90,011	Assumed 5% of project length. Project length is 19,536ft in both directions with a 5 ft width. 6" concrete is 66 dollars a SY.
Total Costs for Tier 1:			\$ 236,900	\$ 94,322	\$ 18,864	\$ 113,186	\$ 16,978	\$ 130,164	\$ 39,049	\$ 169,214	\$ 42,303	\$ 25,382	\$ 236,899	

Tier 2	Implementation Notes	Final Cost Estimate	Construction Cost		CONTINGENCY			DESIGN (25%)	CEI (15%)	Total Cost	Cost Estimate Notes			
			Cost	MOT (20%)	Sub-Total	MOB (15%)	Sub-Total					(30%)	Sub-Total	
A	Install enhanced crosswalk with RRFB and median refuge at Black Forest Trl.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include median refuge, RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	\$ 139,500	\$ 55,549	\$ 11,110	\$ 66,659	\$ 9,999	\$ 76,658	\$ 22,997	\$ 99,655	\$ 24,914	\$ 14,948	\$ 139,517	Obtained the construction cost from the design file. \$20,000 for RRFB equipment.
B	Install enhanced crosswalk with RRFB at Shady Ln.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	\$ 50,200	\$ 20,000	\$ 4,000	\$ 24,000	\$ 3,600	\$ 27,600	\$ 8,280	\$ 35,880	\$ 8,970	\$ 5,382	\$ 50,232	\$20,000 for crossing with RRFB and no median.
C	Install enhanced crosswalk with RRFB and median refuge at Irish Moss Ave., including removal of extended right turn only lane.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include median refuge, RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	\$ 231,300	\$ 92,081	\$ 18,416	\$ 110,497	\$ 16,575	\$ 127,072	\$ 38,122	\$ 165,193	\$ 41,298	\$ 24,779	\$ 231,271	Obtained the construction cost from the design file. \$20,000 for RRFB equipment.
D	Install enhanced crosswalk with RRFB and median refuge at Symmes Rd., including removal of extended right turn only lane.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include median refuge, RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	\$ 274,000	\$ 109,082	\$ 21,816	\$ 130,898	\$ 19,635	\$ 150,533	\$ 45,160	\$ 195,693	\$ 48,923	\$ 29,354	\$ 273,970	Obtained the construction cost from the design file. \$20,000 for RRFB equipment.
E	Install asphalt shared use path along the east side of the corridor.	Estimate includes concrete approaches at intersections, concrete driveway aprons, 12 ft wide asphalt pathway, utility relocations, curb and gutter, grading, drainage, sod, and removal of existing sidewalk. Narrow right-of-way and open drainage will require property owner coordination.	\$ 10,324,500	\$ 4,110,707	\$ 822,141	\$ 4,932,848	\$ 739,927	\$ 5,672,776	\$ 1,701,833	\$ 7,374,608	\$ 1,843,652	\$ 1,106,191	\$ 10,324,452	Obtained the construction cost from the design file.
F	Install bike lane markings through intersection at Boyette Rd., including green through conflict areas.	Typical configuration is to continue the bike lane width through the intersection with 2 ft-4 ft skip through conflict areas, adding green within those skips and 40 ft solid green before and after conflict areas. These modifications are likely to be done at the time of resurfacing, though not included in cost estimate.	\$ 41,300	\$ 16,457	\$ 3,291	\$ 19,748	\$ 2,962	\$ 22,711	\$ 6,813	\$ 29,524	\$ 7,381	\$ 4,429	\$ 41,333	Obtained the construction cost from the design file.
G	Install wayfinding signage at Boyette Rd, Symmes Rd., and McMullen Rd.	Sign assembly content and placement to be determined during final design. Planning-level cost estimate included.	\$ 123,100	\$ 49,020	\$ 9,804	\$ 58,824	\$ 8,824	\$ 67,648	\$ 20,294	\$ 87,942	\$ 21,985	\$ 13,191	\$ 123,119	Using 700 1 12 assembly. Original Cost of Sign = \$1,634. 30 total signs.
H	Install landscaping with trees where possible.	Feasible areas shown on plans. Tree placement to be determined during final design.	\$ 170,500	\$ 67,900	\$ 13,580	\$ 81,480	\$ 12,222	\$ 93,702	\$ 28,111	\$ 121,813	\$ 30,453	\$ 18,272	\$ 170,538	Used a lump sum pay item 580 1 2 Landscape Complete - Large Plants. This covers the entire project limits. The construction cost was determined from the FDOT Historical Averages.
I	Install bike detection at signal-controlled intersection with Boyette Rd.	Planning-level cost estimate for microwave detection equipment.	\$ 41,600	\$ 16,583	\$ 3,317	\$ 19,900	\$ 2,985	\$ 22,885	\$ 6,865	\$ 29,750	\$ 7,437	\$ 4,462	\$ 41,650	Use 1 (660 3 11) at a cost of \$4,252 and 2 (660 3 12) at a cost of \$12,331 pay items per intersection. 1 intersection
Total Costs for Tier 2:			\$ 11,396,000	\$ 4,537,379	\$ 907,476	\$ 5,444,855	\$ 816,728	\$ 6,261,583	\$ 1,878,475	\$ 8,140,058	\$ 2,035,014	\$ 1,221,009	\$ 11,396,081	

Tier 3	Implementation Notes	Final Cost Estimate	Construction Cost		CONTINGENCY			DESIGN (25%)	CEI (15%)	Total Cost	Cost Estimate Notes			
			Cost	MOT (20%)	Sub-Total	MOB (15%)	Sub-Total					(30%)	Sub-Total	
A	Install lighting at each end and at all crossings.	Planning-level cost estimate for lighting at all intersections and crossings added in Tier 2. Not shown on design plans.	\$ 1,230,700	\$ 490,000	\$ 98,000	\$ 588,000	\$ 88,200	\$ 676,200	\$ 202,860	\$ 879,060	\$ 219,765	\$ 131,859	\$ 1,230,684	\$70,000 for lighting at each crossing based on a previous LRE. 7 crossings.

B	Install pedestrian-scale lighting throughout the corridor.	Planning-level cost estimate for pedestrian-scale lighting on both sides, spaced at 50' on center. Additional right-of-way or easements to be acquired prior to final design. Not shown on design plans.	\$ 2,787,900	\$ 1,110,000	\$ 222,000	\$ 1,332,000	\$ 199,800	\$ 1,531,800	\$ 459,540	\$ 1,991,340	\$ 497,835	\$ 298,701	\$ 2,787,876	\$300,000 per mile based on a previous LRE. 3.7 miles.
C	Install raised crosswalk at Shady Ln.	Posted speed limit to be reduced to 30 mph and warrant analysis completed prior to raised crosswalk installation. Design to comply with FDOT Developmental Standard D520-30.	\$ 62,800	\$ 25,000	\$ 5,000	\$ 30,000	\$ 4,500	\$ 34,500	\$ 10,350	\$ 44,850	\$ 11,213	\$ 6,728	\$ 62,790	\$25,000 for raised crossing.
D	Modify specified driveways to decrease radii and extend median noses to roadway edge to provide pedestrian refuge areas.	Safety elements for new shared use path on east side. Locations: Paddock Manor Ave., Whispering Creek Rd., and KCC school entrance.	\$ 33,700	\$ 13,431	\$ 2,686	\$ 16,117	\$ 2,418	\$ 18,535	\$ 5,560	\$ 24,095	\$ 6,024	\$ 3,614	\$ 33,733	Obtained the construction cost from the design file. 3 locations.
Total Costs for Tier 3:			\$ 4,115,100	\$ 1,638,431	\$ 327,686	\$ 1,966,117	\$ 294,918	\$ 2,261,035	\$ 678,310	\$ 2,939,345	\$ 734,836	\$ 440,902	\$ 4,115,083	
Total Costs for All Tiers:			\$ 15,748,000	\$ 6,270,132	\$ 1,254,026	\$ 7,524,158	\$ 1,128,624	\$ 8,652,782	\$ 2,595,835	\$ 11,248,617	\$ 2,812,154	\$ 1,687,293	\$ 15,748,064	

Adjacent & Supplemental Projects		Implementation Notes
A	Modify configurations of Boyette Rd, McMullen Rd, and SymmesRd to include buffered or separated bike lanes.	N/A
B	Identify additional speed management and traffic calming treatments throughout the corridor to facilitate the desired Target Speed of 35 MPH	Recommend one permanent Speed Feedback Sign in each direction
C	Encourage and fund installation of bicycle racks at major commercial, civic, schools or service destinations within the corridor	N/A
D	Where sidepaths are installed or planned, remove keyhole bike lanes where the bike lanes do not exist to either side of the intersection and end bike lanes with proper transitions. For example, reconstruct the north leg at McMullen Rd to remove bike lanes that will not continue, moving the curbs in and adding buffer to the sidewalk with the reclaimed space.	N/A