



# APPENDICES

2012 PARKS, RECREATION, TRAILS & OPEN SPACE  
VISIONING MASTER PLAN

# APPENDIX A

## SUMMARIZED

### Focus Group

### MEETING NOTES

Three focus group meetings were held, each catering to different user groups as follows:

- **Meeting 1: March 29, 2011** – Representatives from various government and public agencies (Best Southwest Cities, Cedar Hill State Park, Dallas County, CHISD, and the Dogwood Canyon Audubon Center).
- **Meeting 2: March 29, 2011** – Representatives from various non-profit organizations and local businesses (Northwood University, Friends of the Library, Rotary Club, Boy Scouts of America, Tourism Committee, Main Street Board, and Uptown Village)
- **Meeting 3: March 31, 2011** – Representatives from special interest groups (Senior Center, Homeowners Associations, and Sports Associations).

The results of the discussions are as follows.

#### ***Meeting 1 Results (Government / Public Agencies)***

What issues and goals are shared between your organization and the City?

- Coordinated event planning and programming between the Best Southwest Cities.
- Have the facility capacity to attract tournaments that will drive tourism.
- Provide trail connectivity between cities and with the State Park.
- Have local indoor aquatics.
- To protect natural and cultural resources.
- To get kids and families outdoors and to have family programming.

How can we improve upon existing partnerships between your organization and the City?

- Joint efforts to construct and maintain multi-use trails.
- Coordinate efforts to manage and preserve open space and wildlife habitat.
- Expand environmental education programs and make them more accessible.
- Work together to attract more environmental tourism to the area.

**What strategies or partnerships can we adopt to address our common issues and achieve our common goals?**

- Work together with the State Park, USACE, and other cities to develop a multi-use trail around Joe Pool Lake.
- Tie together the streetscape systems of each city through tree planting programs, the use of native and drought-tolerant plants, etc.
- Construct a dog park as a joint venture between the Best Southwest cities.
- Consider joint funding and project coordination for gateways and landmarks at the City limits and major destinations (such as the State Park and the Audobon Center).
- Find ways to ensure that new schools are true “neighborhood schools” by integrating them into residential areas.

### ***Meeting 2 Results (Non-Profit and Local Businesses)***

**What partnerships exist between the business and nonprofit community and the City?**

- The Cedar Hill Bike Rally.
- Friends of the Library.
- Country Day on the Hill.
- Historic preservation.
- Walkability/bikeability (Downtown and Uptown Village).
- Attracting tourism.
- Build the City’s image and atmosphere.

**Which existing partnerships can we improve upon and how?**

- Improve connectivity and accessibility for bicycles and pedestrians.
- Develop additional gateway signage to signify entry into Cedar Hill to enhance tourism efforts.
- Become a more prominent outdoor destination for activities such as cycling.
- Improve people’s access to transportation, cultural activities, sports, performing arts, etc.
- Share information regarding Cedar Hill’s demographics and life-style characteristics.
- Encourage additional displays of public art throughout the City.

**What are opportunities for future partnerships to enhance quality of life and make Cedar Hill a better place to live, work and play?**

- Develop trails of city-wide importance through Northwood University and a trailhead at their entrance on FM 1382.
- Connect historic properties/areas by trails.
- Provide small venues (for visual or performing arts) that will help establish an arts and entertainment culture in Cedar Hill.
- Attract a sports event facility (i.e., minor league baseball) to attract tourism and promote Northwood University's athletics program.

### ***Meeting 3 Results (Special Interest Groups)***

**What outcomes do you aspire for the group that you represent?**

- The trails along Lakeridge Parkway completed, connected, and family-friendly.
- Enhance beautification and develop a sense of community togetherness.
- Maximize the use of the City's land and resources, partially by clustering compatible recreation facilities and increasing the variety of amenities offered.
- Neighborhoods should be linked via trails.
- Parks on the east side should have the same level of quality as those on the west side.
- Trails that are safe, connected, and have wayfinding aids.

**How can the City and/or this Master Plan help you achieve your goals?**

- Build a new, larger senior center to allow more senior activities.
- Provide an aquatic center that allows water aerobics (located with the Senior Center or elsewhere in the City).
- Improve the appearance of US-67 by screening unsightly buildings.
- Develop great facilities and use them to show that Cedar Hill is a great place.
- Have enough sport fields to host additional tournaments (soccer specifically).
- Develop neighborhood parks along the Cedar Trails Greenbelt
- Require non-residents to pay higher user fees for facility use.

- Four to eight lighted tennis courts (eight courts desirable to allow league play).
- Provide more multi-use nature trails that accommodate hiking and equestrian use.

**What future partnerships or opportunities exist to improve the experience of the end user?**

- Create a large community park on the east side of town.
- Enhance Virginia Weaver Park with adequate restrooms that are large enough to change in.
- Create a fishing area with deep water and charge user fees.
- Make the State Park accessible to Cedar Hill citizens by charging lower fees and improving the number and location of entrances.
- Provide a place for gymnastics.
- Explore the use of the ISD sport fields if Parkerville Park goes away.

## **APPENDIX B**

### **TELEPHONE SURVEY**

### **CUMULATIVE RESULTS**

Raymond Turco & Associates conducted the City's 2011 Parks and Recreation Needs Assessment Survey, which is a key component of the development of this Master Plan. This public opinion poll captured attitudes on parks, recreation, open space, trails, and streetscapes in the community from respondents randomly selected from phone-matched households. The full sample of 328 respondents was interviewed with a comprehensive questionnaire that collected attitudinal data on a variety of recreational issues including frequency of participating in various activities as well as whether or not certain ones should be provided or expanded, the need for constructing various amenities and satisfaction with recreational characteristics. Questions also sought to gauge support for a potential indoor aquatic expansion to the Recreation Center, as well as features to include if a facility was constructed. A portion of the survey addressed ideas about potential City actions and gathered general opinions in terms of agreement or disagreement. Several questions were duplicated from previous surveys implemented by Raymond Turco & Associates for prior master plan updates (1998 and 2005) in order to compare findings over a prolonged period of time.

The information gathered in this survey will allow City Council members, City staff, and concerned individuals to better understand how Cedar Hill residents view the issues surrounding these subjects. It will also provide citizen input into the on-going planning process for parks, recreation, open space, trails, and streetscapes.

It is important to understand that a survey is an attitudinal "snap-shot" of the community during the time of the survey and has not been influenced by either positive or negative publicity. The telephone survey included the responses of 328 individuals, which equates to an overall error rate of +/- 5.6%, at a 95% confidence level.

The following pages include the cumulative results of the telephone survey. These pages illustrate each question and how it was asked, as well as the overall response to each question. In addition to the cumulative results, a detailed report that includes analyses of each question was prepared and provided to the City.

# 2011 CEDAR HILL PARKS AND RECREATION NEEDS ASSESSMENT SURVEY CUMULATIVE RESULTS

PROJECT 02102011

RAYMOND TURCO & ASSOCIATES

MAY 2011

MY NAME IS \_\_\_\_\_ AND I'M WITH RAYMAR RESEARCH. WE ARE NOT A DIRECT MARKETING FIRM AND THIS IS NOT A SALES CALL. OUR FIRM IS CONDUCTING A SURVEY ON PARKS AND RECREATION IN YOUR COMMUNITY. MY QUESTIONS SHOULD ONLY TAKE ABOUT 10 MINUTES, AND YOUR RESPONSES WILL BE CONFIDENTIAL. WOULD YOU CARE TO PARTICIPATE?

AREA	(HWY 67 E; BELTLINE RD S) (NORTH OF 1382) (HWY 67 W; S ON 1382)	AREA I . . . . .	39%
DATE	SHEET NO.	AREA II . . . . .	38%
SEX		AREA III . . . . .	23%
		MALE . . . . .	48%
		FEMALE . . . . .	52%

1. HOW SATISFIED OR DISSATISFIED ARE YOU WITH THE QUALITY OF PARKS AND RECREATION HERE?

VERY SATISFIED . . .	24%
SATISFIED . . . .	60%
DISSATISFIED . . . .	9%
VERY DISSATISFIED . .	1%
NO OPINION . . . . .	6%

2. AND HOW LONG HAVE YOU LIVED AT YOUR PRESENT LOCATION?

UNDER 1 YEAR . . . . .	3%
1 - 4 YEARS . . . . .	20%
5 - 7 YEARS . . . . .	16%
8 - 10 YEARS . . . . .	17%
OVER 10 YEARS . . . . .	44%

3. HOW FREQUENTLY DO YOU OR ANY MEMBER OF YOUR HOUSEHOLD PARTICIPATE IN THE FOLLOWING ACTIVITIES . . . . .

	A	O	S	N	NO
A) INDOOR FITNESS/EXERCISE LIKE RUNNING, WALKING, ZUMBA, YOGA ETC.	21%	36%	23%	20%	0%
B) TEAM SPORTS, LIKE BASEBALL, SOCCER ETC.	10%	13%	14%	63%	0%
C) INDIVIDUAL SPORTS LIKE TENNIS, BOXING, ETC	3%	11%	11%	75%	0%
D) FINE ARTS OR CRAFTS LIKE PAINTING, DRAWING, POTTERY, WEAVING, ETC	5%	17%	19%	59%	0%
E) PERFORMING ARTS LIKE MUSIC, DRAMA ETC.	9%	22%	20%	48%	1%
F) EXCURSIONS, LIKE TOURS, TRIPS THAT INCLUDE OVERNIGHT STAY	9%	34%	25%	31%	1%
G) OUTDOOR RECREATION LIKE CAMPING, FISHING, BOATING ETC.	8%	23%	33%	35%	1%
H) SOCIAL ACTIVITIES LIKE DANCES, COOKING, CARD PLAYING ETC.	10%	32%	27%	31%	0%
I) OUTDOOR AQUATICS LIKE SWIMMING OR SPRAY PARKS	7%	27%	26%	40%	0%
J) INDOOR AQUATICS LIKE WATER AEROBICS OR LAP SWIMMING	3%	11%	19%	67%	1%

	A	O	S	N	NO
K) EXTREME SPORTS LIKE BMX, SKATEBOARDING, RAPELLING, ETC.	0%	4%	6%	89%	1%
L) TRAIL AND CYCLING ACTIVITIES LIKE WALKING, BICYCLING, JOGGING, ETC.	13%	48%	19%	20%	0%
M) FAMILY EVENTS LIKE PICNICS, GET-TOGETHERS	14%	45%	27%	13%	0%
N) NATURE EXPERIENCES/OBSERVATION/BIRD AND WILDLIFE WATCHING	6%	20%	27%	46%	1%
O) INDOOR ROCK OR WALL CLIMBING	1%	3%	14%	81%	1%

4. WHAT ONE RECREATIONAL FACILITY WOULD YOU SAY CEDAR HILL IS LACKING?  
 Indoor pool/natatorium/indoor aquatic center (36%), Outdoor pool/pool/outdoor aquatic center/water park (20%), Trails/bike lanes on roads (11%) . . .

	YES	NO	DON'T REM
A) VISITED OR USED A CITY PARK OR PARK FACILITY	85%	15%	0%
B) VISITED OR PARTICIPATED IN SENIOR ACTIVITIES AT THE COMMUNITY SENIOR CENTER	10%	90%	0%
C) PARTICIPATED IN A YOUTH ATHLETIC LEAGUE ON A CEDAR HILL FIELD	24%	76%	0%
D) PARTICIPATED IN AN ADULT ATHLETIC LEAGUE ON A CEDAR HILL FIELD	6%	94%	0%
E) PARTICIPATED IN ANY OTHER CLASS OR PROGRAM OFFERED BY CEDAR HILL PARKS & RECREATION DEPT.	22%	78%	0%
F) VISITED OR USED THE DISC GOLF COURSE	13%	87%	0%
G) VISITED OR USED THE CITY'S CRAWFORD PARK POOL	29%	71%	0%
H) VISITED OR USED THE CEDAR HILL RECREATION CENTER	66%	34%	0%
J) VISITED THE STATE PARK AT JOE POOL LAKE	69%	31%	0%
K) VISITED ANY OF THE NATURE PRESERVES IN CEDAR HILL	37%	62%	1%
L) WATCHED A CONCERT OR EVENT AT THE CITY'S AMPHITHEATER/PAVILION	29%	71%	0%

6. THE UPDATED MASTER PLAN WOULD MAKE RECOMMENDATIONS FOR ATHLETIC FACILITIES AS WELL AS ITEMS THAT ALLOW ONE TO ENJOY PARKS WITHOUT BEING ATHLETIC. LET'S FIRST TALK ABOUT OUTDOOR COMPETITIVE SPORTS FACILITIES. PLEASE TELL ME HOW IMPORTANT OR UNIMPORTANT YOU THINK IT WOULD BE TO EITHER BUILD OR CONSTRUCT ADDITIONAL FACILITIES OF THE FOLLOWING TYPES IN CEDAR HILL?

	VI	I	U	VU	NO
A-01) ADULT SOFTBALL FIELDS	6%	36%	41%	12%	4%
B-02) YOUTH BASEBALL FIELDS	16%	46%	27%	7%	3%
C-03) YOUTH SOFTBALL FIELDS	16%	47%	27%	6%	4%
D-04) YOUTH SOCCER FIELDS	19%	45%	26%	6%	3%
E-05) ADULT SOCCER FIELDS	7%	34%	46%	9%	5%
F-06) TENNIS COURTS	14%	49%	30%	4%	3%
G-07) YOUTH FOOTBALL FIELDS	16%	45%	27%	7%	5%
H-08) ADULT FLAG FOOTBALL FIELDS	6%	26%	54%	10%	5%
I-09) ADULT KICKBALL FIELDS	3%	22%	59%	10%	6%
J-10) OUTDOOR BASKETBALL COURTS	21%	47%	23%	5%	4%
K-11) IN-LINE SKATING RINK	12%	39%	36%	7%	6%
L-12) SKATE PARK	11%	46%	34%	5%	5%
M-13) BMX PARK	10%	32%	43%	8%	7%
N-14) CRICKET FIELD	1%	13%	62%	17%	6%
O-15) SQUASH FIELD	1%	12%	61%	17%	9%
P-16) LACROSSE FIELD	2%	19%	57%	15%	7%
Q-17) RACQUETBALL OR HANDBALL COURTS	10%	46%	31%	8%	4%
R-18) SAND VOLLEYBALL COURTS	11%	52%	26%	6%	5%

7. THESE NEXT ITEMS FOCUS ON FACILITIES THAT ADDRESS NON-COMPETITIVE RECREATION ACTIVITIES THAT ARE TYPICALLY ENJOYED OUTDOORS. AGAIN, PLEASE TELL ME HOW IMPORTANT OR UNIMPORTANT YOU THINK IT WOULD BE TO EITHER BUILD OR CONSTRUCT ADDITIONAL IN CEDAR HILL?

	VI	I	U	VU	NO
A-19) HORSESHOE PITS	5%	31%	47%	14%	2%
B-20) DISC GOLF COURSE	5%	30%	48%	13%	5%
C-21) MULTI-USE TRAILS FOR WALKING/JOGGING	40%	47%	9%	3%	2%
D-22) MOUNTAIN BIKING TRAILS	21%	48%	23%	5%	3%
E-23) EVENT PICNIC/REUNION PAVILIONS	28%	56%	11%	3%	2%
F-24) PLAYGROUNDS	32%	49%	15%	3%	2%
G-25) FAMILY PICNIC AREAS	33%	51%	12%	3%	2%
H-26) LAKE ACCESS	30%	51%	13%	3%	2%
I-27) NATURAL HABITAT/NATURE AREAS	27%	47%	19%	4%	3%
J-28) BIRD WATCHING FACILITY	11%	39%	38%	9%	3%
K-29) EQUESTRIAN TRAILS	8%	35%	46%	7%	4%
L-30) EXERCISE STATIONS ALONG TRAILS	19%	48%	24%	5%	4%
M-31) OUTDOOR FESTIVAL AREA	20%	54%	19%	4%	3%
N-32) A DOG PARK	20%	44%	27%	5%	3%
O-33) INDOOR POOL	35%	44%	16%	3%	2%
P-34) OUTDOOR POOL	17%	47%	29%	5%	2%
Q-35) A CHILDREN'S WATER SPRAY PARK	23%	48%	21%	4%	3%
R-36) SCENIC OVERLOOK	16%	50%	26%	5%	4%

8. NOW I WOULD LIKE TO READ YOU THE ENTIRE LIST OF INDOOR AND OUTDOOR RECREATION ITEMS. THIS TIME, PLEASE TELL ME (01-36) WHAT YOU WOULD YOU CONSIDER TO BE THE MOST IMPORTANT RECREATIONAL FACILITY TO CONSTRUCT?  
 Indoor pool (30%), Multi-use trails for walking/jogging (13%), A children's water spray park (10%), . . .

9. PLEASE TELL ME HOW STRONGLY YOU AGREE OR DISAGREE WITH THE FOLLOWING STATEMENTS . . .

	SA	A	D	SD	NO
A) THE ESCARPMENT (THE HILLY AREA ON THE WEST SIDE OF THE CITY) IS VERY VALUABLE FEATURE OF CEDAR HILL AND NEEDS TO BE PROTECTED	53%	34%	4%	1%	7%
B) I WOULD SUPPORT EVENTS AND ACTIVITIES THAT WOULD ENCOURAGE ADDITIONAL TOURISM TO THE AREA	32%	56%	9%	1%	2%
C) ANY INCREASE IN PROGRAMMING SHOULD BE FUNDED THROUGH CITY TAXES	10%	54%	24%	7%	5%
D) PROGRAMS THAT SERVE A GREATER PUBLIC GOOD (LEARN TO SWIM, ETC) SHOULD BE OFFERED TO ALL RESIDENTS AT NO CHARGE	23%	40%	33%	3%	1%
E) THE MONEY I PAY (AS TAXES OR FEES) COMPARED TO THE PARKS AND RECREATION PROGRAMS THAT THE CITY PROVIDES IS A GOOD VALUE	16%	62%	13%	2%	7%
F) I RECEIVED A PARKS AND RECREATION ACTIVITIES PUBLICATION THIS SPRING CONTAINING A LISTING OF ALL THE CITY'S SUMMER PROGRAM OPPORTUNITIES	16%	57%	16%	4%	7%
G) I AM SATISFIED WITH HOW STREETS AND INTERSECTIONS ARE LANDSCAPED IN CEDAR HILL	10%	64%	18%	8%	0%
H) I BELIEVE THE CITY SHOULD PLANT MORE TREES AND LANDSCAPING ALONG STREETS AND INTERSECTIONS	17%	45%	33%	3%	2%

	SA	A	D	SD	NO
I) I WOULD SUPPORT THE CITY DEVELOPING LOCATIONS WHERE RESIDENTS COULD ACCESS CREEK AREAS	14%	55%	24%	2%	5%
J) I SUPPORT THE CITY ENHANCING ITS "GATEWAYS TO THE CITY" SO THAT PEOPLE KNOW THEY ARE COMING INTO CEDAR HILL	21%	64%	13%	2%	1%
K) THE CITY SHOULD CREATE A PROGRAM THAT ENCOURAGES ENVIRONMENTAL TOURISM	15%	64%	15%	2%	5%
L) I AM SATISFIED WITH THE RECREATIONAL FACILITIES IN CEDAR HILL	7%	69%	20%	2%	3%
M) I HAVE ADEQUATE AVENUES TO VOICE MY OPINIONS AND CONCERNs ABOUT PARKS & RECREATION	12%	69%	13%	2%	4%
N) NATURAL AREAS ARE IMPORTANT AND SHOULD BE PRESERVED WHERE IT IS AVAILABLE	28%	69%	2%	0%	1%

10. THE CITY IS ESTABLISHING A SERIES OF PRIORITIES TO DIRECT FUTURE PARK DEPARTMENT ACTIONS. PLEASE TELL ME HOW STRONGLY YOU AGREE OR DISAGREE WITH THE FOLLOWING STATEMENTS: I THINK CEDAR HILL SHOULD . . .

	VI	I	U	VU	NO
A) ACQUIRE LAND FOR FUTURE PARK AND OPEN SPACE DEVELOPMENT	27%	51%	12%	3%	7%
B) EXPAND THE CITY'S TRAIL SYSTEM	26%	52%	14%	2%	6%
C) ACQUIRE LAND TO PRESERVE THE HILLS ALSO CALLED THE ESCARPMENT IN CEDAR HILL	25%	52%	13%	2%	8%
D) ACQUIRE LAND TO PRESERVE ENVIRONMENTALLY SENSITIVE AREAS SUCH AS NATURAL CREEK CORRIDORS	21%	59%	13%	1%	5%
E) PURCHASE LAND FOR A LARGE PARK SIMILAR TO VALLEY RIDGE PARK	16%	42%	24%	4%	14%
F) CONSTRUCT AN INDOOR AQUATIC CENTER	25%	49%	18%	5%	3%
G) INCREASE THE AMOUNT OF PUBLIC OPEN SPACE	12%	58%	21%	2%	7%
H) RENOVATE AND EXPAND ITS EXISTING PARKS	15%	67%	13%	2%	4%
I) MEET THE NEEDS OF NEW RESIDENTS IN TERMS OF PARK AND RECREATION LANDS, FACILITIES, PROGRAMS, AND SERVICES	16%	65%	12%	2%	4%

11. THE CITY IS STUDYING THE NEED FOR CONSTRUCTING ADDITIONAL PARK FACILITIES. HOW STRONGLY WOULD YOU SUPPORT OR OPPOSE THE FOLLOWING BEING CONSTRUCTED OR FINANCED . . .

	SS	S	O	SO	NO
A) A CITY-WIDE HIKE AND BIKE TRAIL SYSTEM	29%	48%	16%	4%	2%
B) AN INDOOR WATER FACILITY, WITH POOLS AND WATER SLIDES	33%	46%	13%	6%	1%
C) SMALL NEIGHBORHOOD PARKS	19%	62%	16%	2%	1%
D) THE PURCHASE OF LAND TO PRESERVE NATURAL HABITAT ESPECIALLY ALONG THE ESCARPMENT	25%	53%	13%	3%	6%
E) "LINEAR PARKS" THAT RUN ALONG CREEKS OR STREAMS, HELP PRESERVE FLOOD PLAINS OR OTHER NATURAL AREAS, AND PROVIDE ROOM FOR TRAILS	22%	60%	11%	3%	4%
F) A SCENIC OVERLOOK ALONG THE ESCARPMENT	19%	52%	20%	4%	5%
G) THE PURCHASE OF ADDITIONAL LAND FOR FUTURE PARKS OR OPEN SPACE	15%	57%	20%	3%	5%

12. NOW LET'S TALK ABOUT AQUATICS. ONE AREA THE CITY IS STUDYING IS HOW TO ADDRESS THE OUTDOOR POOL AT CRAWFORD PARK. LET ME READ YOU THREE OPTIONS. PLEASE TELL ME HOW STRONGLY YOU WOULD SUPPORT OR OPPOSE THE CITY DOING THE FOLLOWING . . .

	SS	S	O	SO	NO
A) KEEP THE POOL AS IT IS	7%	37%	24%	13%	20%
B) REVAMP AND MODERNIZE THE POOL TO BETTER MEET THE NEEDS OF RESIDENTS	34%	35%	10%	2%	18%
C) DO AWAY WITH THE POOL	3%	3%	49%	27%	18%

13. NOW PLEASE TELL ME HOW STRONGLY YOU WOULD SUPPORT OR OPPOSE THE CITY CONSTRUCTING AN INDOOR AQUATIC CENTER THAT WOULD CONTAIN BOTH ADULT AND YOUTH AQUATIC FEATURES, AS AN ADD-ON TO CEDAR HILL'S EXISTING RECREATION CENTER?

STRONGLY SUPPORT . . .	55%
SUPPORT . . . . .	26%
OPPOSE . . . . .	10%
STRONGLY OPPOSE . . .	7%
NO OPINION . . . . .	2%

14. HOW STRONGLY WOULD YOU SUPPORT OR OPPOSE THE FOLLOWING INDOOR AQUATIC FEATURES BEING INCLUDED IN AN AQUATIC CENTER . . .

	SS	S	O	SO	NO
A) WATER EXERCISE AREA	44%	40%	9%	5%	2%
B) DIVING AREA	24%	47%	20%	5%	4%
C) ZERO-DEPTH ENTRY POOL (SLOPES LIKE A BEACH)	29%	45%	16%	4%	7%
D) FAMILY CHANGING ROOMS	33%	48%	11%	4%	4%
E) WATER SLIDES	27%	48%	14%	6%	4%
F) SAUNA	22%	44%	24%	5%	5%
G) FITNESS/LAP LANE POOL	29%	53%	10%	4%	3%
H) SMALL LAZY RIVER OR CURRENT CHANNEL	21%	39%	27%	5%	7%
I) CHILDREN'S PLAY FEATURES/ WATER PLAY AREAS	31%	52%	9%	4%	3%
J) WHIRLPOOL	23%	39%	26%	5%	6%

15. LET'S TALK ABOUT TRAILS. HOW STRONGLY DO YOU AGREE OR DISAGREE WITH THE FOLLOWING STATEMENTS: "TRAILS SHOULD BE DEVELOPED . . ." (ALL BUT #M AND #N)

	SA	A	D	SD	NO
A) ALONG GREENBELTS, CREEKS AND DRAINAGE WAYS	22%	46%	20%	6%	6%
B) ALONG UTILITY RIGHT OF WAY CORRIDORS	11%	39%	34%	5%	12%
C) NEAR NEIGHBORHOODS	17%	59%	16%	4%	4%
D) ALONG RAILROAD CORRIDORS	5%	24%	56%	11%	5%
E) ALONG MAJOR ROADS	4%	29%	53%	12%	2%
F) CLOSE TO WHERE I LIVE	16%	53%	23%	5%	4%
G) IN OR NEAR SCENIC AREAS	23%	65%	9%	2%	1%
H) SO AS TO CONNECT TO SCHOOLS	12%	49%	33%	4%	3%
I) SO AS TO CONNECT TO HISTORIC DOWNTOWN	16%	61%	20%	2%	2%
J) SO AS TO CONNECT TO UPTOWN VILLAGE	13%	55%	27%	2%	2%
K) SO AS TO CONNECT TO OTHER RETAIL CENTERS SCENIC AREAS	9%	55%	33%	2%	2%
L) SO AS TO CONNECT TO NEIGHBORING CITIES	7%	45%	41%	2%	4%
M) THE CITY SHOULD HAVE ON-STREET BIKE ROUTES ON SOME ROADWAYS	16%	57%	22%	3%	2%
N) IF CEDAR HILL HAD TRAILS AND BIKE ROUTES CONNECTING THROUGHOUT THE CITY, I WOULD CONSIDER USING THEM INSTEAD OF DRIVING	16%	44%	31%	5%	4%

16. PLEASE TELL ME HOW STRONGLY YOU AGREE OR DISAGREE WITH THE FOLLOWING STATEMENTS . . .

	SA	A	D	SD	NO
A) PROGRAMS THAT OFFER EXCLUSIVE USE OF FACILITIES SHOULD CHARGE FEES TO BE SELF-SUFFICIENT	20%	57%	15%	4%	4%
B) THE DECISION TO USE TAX FUNDING OR USER FEES FOR OPERATING FACILITIES, PROGRAMS AND SERVICES SHOULD DEPEND ON THE PUBLIC BENEFIT DERIVED	14%	70%	7%	2%	7%
C) I AM WILLING TO PAY ADDITIONAL CITY TAXES TO SEE THE QUALITY OF PARKS UPGRADED	10%	50%	29%	7%	5%
D) THE EXISTING PARK SYSTEM IS ADEQUATE	4%	54%	37%	2%	2%
E) THE CITY SHOULD IMPROVE THE EXISTING PARKS AND NOT DEVELOP OR ADD ANY NEW ONES	5%	40%	47%	2%	6%
E) THE CITY SHOULD PURCHASE LAND NOW WHILE LAND COSTS ARE LOWER	13%	59%	14%	2%	11%

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17. WHAT DO YOU GENERALLY DO WHEN YOU GO TO A CITY PARK? IF YOU DON'T GENERALLY GO TO PARKS, PLEASE TELL ME THAT ALSO. (CIRCLE ALL THAT APPLY)

TAKE KIDS TO PLAY . . .	61%	PARTICIPATE IN ORGANIZED SPORTS . . .	32%
PICNIC . . . . .	60%	PARTICIPATE IN NONORGANIZED SPORTS . . .	39%
WALK, HIKE OR JOG . . .	80%	APPRECIATE THE VIEW . . . . .	81%
BIKE . . . . .	39%	ATTEND SPECIAL EVENT/PROGRAM . . . . .	56%
WALK PETS . . . . .	44%	DON'T GO TO PARKS . . . . .	6%
FISHING . . . . .	32%	BOATING . . . . .	22%
OTHER . . . . .			5%

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18. THESE LAST FEW QUESTIONS ARE JUST FOR CLASSIFICATION PURPOSES. HOW FREQUENTLY DO YOU VOTE IN CITY-RELATED ELECTIONS, LIKE CITY COUNCIL OR CITY BOND ELECTIONS?

ALWAYS . . . . .	45%
OFTEN . . . . .	31%
SELDOM . . . . .	14%
NEVER . . . . .	9%
NO OPINION . . . . .	1%

19. WHICH OF THE FOLLOWING AGE GROUPS DO YOU FALL UNDER?

25 YEARS OR UNDER . . .	2%
26 - 35 YEARS . . .	9%
36 - 45 YEARS . . .	20%
46 - 55 YEARS . . .	32%
56 - 65 YEARS . . .	20%
OVER 65 YEARS . . .	15%
REFUSED TO ANSWER . .	1%

20. DO YOU BELONG TO AN ATHLETIC ASSOCIATION IN THE CITY OF CEDAR HILL?

YES . . . . .	13%
NO . . . . .	87%

21. AND FINALLY, PLEASE TELL ME IF YOU HAVE CHILDREN AGE 18 OR UNDER AT HOME? (IF YES: IN WHICH OF THE FOLLOWING GROUPS DO THEY COME UNDER?)

(CIRCLE ALL THAT APPLY)	NO CHILDREN . . . . .	48%
	UNDER 6 . . . . .	12%
	6 - 12 . . . . .	20%
	13 - 18 . . . . .	19%
	REFUSE TO ANSWER . .	1%

THAT'S THE END OF OUR SURVEY BUT COULD I CHECK TO SEE IF I DIALED THE  
CORRECT NUMBER. I DIALED                   . AND COULD I HAVE YOUR FIRST NAME,  
ONLY IN CASE MY SUPERVISOR HAS TO VERIFY THIS  
INTERVIEW?                                   . THANK YOU AND HAVE A NICE EVENING.

CALLER INT.                   

SURVEY LENGTH

# APPENDIX C

## LEAGUE RFI

### RESPONSES

**Table A.1 – Summarized Sports Organization RFI Responses**

Name	Cedar Hill Tennis Association	Cedar Hill Baseball Association
Contact Info	David Boatwright 972-291-5550; 972-979-4178; chten-nisa@hotmail.com	John Hurst 214-789-4639 john.hurst67@sbcglobal.net
Current Number of Members/ Participants	Current Membership: 55 Annual Participation in Leagues: 95; Tournaments: 75; Open Tennis: 175	Recreation: 452 players Select: 208 players Total: 660
Current Number of Groups/ Teams		Recreation: 35 teams Select: 16 teams Total: 51 teams
How many participants are from Cedar Hill? Other?	Cedar Hill: 47 Other Cities: 8	Recreation Cedar Hill: 263 Other Cities: 189 Select Cedar Hill: 125-135 Other: 45-55
5-10 Year Growth Projection	5% per year	3 to 5% per year
What is your need to meet future requirements?	An 8+ court lighted facility	Keep all current facilities Additional fields in the future to match growth projections (currently at 60% capacity for practice and game fields)
What city and non-city facilities do you currently use?	Crawford Park (2 lighted courts) Bessie Coleman Middle School (4 lighted courts) 9th Grade Center (6 unlighted courts)	<u>Practice</u> Spring: Dot Thomas Park, Community Center Park, Parkerville Park. Fall: Valley Ridge Park Baseball Fields and sometimes Softball Fields <u>Games</u> Valley Ridge Park Baseball Fields and sometimes Softball Fields
Are the current facilities you use adequate? If not, why and what should be done to correct it?	No - current facilities do not provide lighting and capacity to hold full membership activities and limit growth.	Yes, but practice fields need renovation and there is a lack of shade at Valley Ridge Park. The association has \$60,000 saved to put toward shade structures over bleachers.
When does each season begin and end?	Spring season: April to May Summer season: June to July Fall season: September to November Open Tennis: year round	Recreation: Mid to late February to June Select: January to July
How does your organization fit into a regional context in terms of facilities used within Cedar Hill?	CHTA has not held any regional functions due to limited court capacity.	Numerous state/national level tournaments. Third year hosting the USSSA "A" World Series. Tournaments bring visitors from across the state/nation that stay in Cedar Hill hotels and dine and shop in the city.

<b>Cedar Hill Youth Football and Cheerleading Association</b>	<b>Cedar Hill Girls Softball Association</b>	<b>Cedar Hill Soccer Association</b>
James Charles 972-670-3468	Dean Jarvis 972-880-0088	Larry Kennard (972) 804-2647; (972) 291-5633 cedarhillsoccer.org
575	unknown (registration still open at the time the RFI was submitted)	Spring: 620 Fall: 670
	unknown (registration still open at the time the RFI was submitted)	Spring: 51 Fall: 54 (3 select teams)
Cedar Hill: 546 Glenn Heights and Ovilla: 29	unknown (registration still open at the time the RFI was submitted)	Cedar Hill: 558 Duncanville, DeSoto, Midlothian, Red Oak, Grand Prairie, Dallas: 62
Continued use of the Recreation Center Lobby for registration on Saturdays.	100% increase	Grow to 1,500+ players as the City grows
Recreation Center, Valley Ridge Park Football Fields, Parkerville Park Baseball Fields	Two additional softball fields	18 additional full-sized lighted fields. Valley Ridge Park: 4 additional lighted fields with piggy-back lighting for one field. Premier full-sized field with fencing, bleachers, and custom goals for championship games.
Yes	Yes	Yes
Late April to late November	Spring: March to May Fall: September to October	Spring: Late February to May Fall: Mid August to November
For tournaments, the facilities would be the same.	We consider our facilities to be the best in our area. Tournaments have been and will be held at Valley Ridge Park.	Host five state tournaments currently and hope to add two more in the near future. Hope to bring a big club to Cedar Hill soon.

# APPENDIX D

## TRAIL & BIKEWAY DESIGN AND MAINTENANCE STANDARDS

### Design Standards

The following set of design standards has been developed in order to ensure that Cedar Hill's trail and bikeway systems are developed with a high level of safety, quality, and comfort for trail and bikeway users. These standards are in addition to mandated national and state standards (AASHTO, ADAAG/TAS, and MUTCD). In some cases, such as when a certain component of the trail system cannot be standardized (cross-walks, for example), the following recommendations are provided as guidelines rather than standards.

#### ***Trails – Hard Surface***

##### Design Objectives

- The alignment should follow the contours of the land and its natural drainage patterns. The trail should not appear to be carved out of the terrain.
- Trails should be gentle, curvilinear, and may include a combination of curving and straight segments. Excessively serpentine or unnecessarily winding trail alignments are not desirable and should be limited to instances where tree preservation necessitates such alignments.
- Meanders in trails should appear to have a purpose and should not be haphazard or irregular.
- Create functional and efficient trail alignments that present and preserve the natural terrain and vegetation to the greatest extent possible.
- Locate intersections at natural focal points such as scenic vistas and convenient access points.
- Where conditions apply, trails shall align with existing or future crosswalks at streets. These intersections shall incorporate handicap accessible ramps that meet the design criteria of ADAAG/TAS.

##### Design Standards

- a. Width & Clearance: The core trails within the City's system, which will include a mix of bicycle, pedestrian, other non-motorized transportation, and maintenance vehicles, shall be 12' in width. The minimum width of a multi-use linear trail shall be 10' to accommodate maintenance access and passing room for cyclists (if the maintenance vehicles will navigate steep grades, the minimum width shall be 12'). See Figure A.1 – Standard Hike & Bike Trail Section.

The optimum vertical clearance of obstructions over a trail is 10' or higher, which accommodates maintenance, patrol, and emergency vehicle access. All underpasses and tunnels should be a minimum of 10' in height. If vertical clearances under bridges and other structures are less than 10', the clearance shall be clearly posted with warning signage to alert approaching trail users.

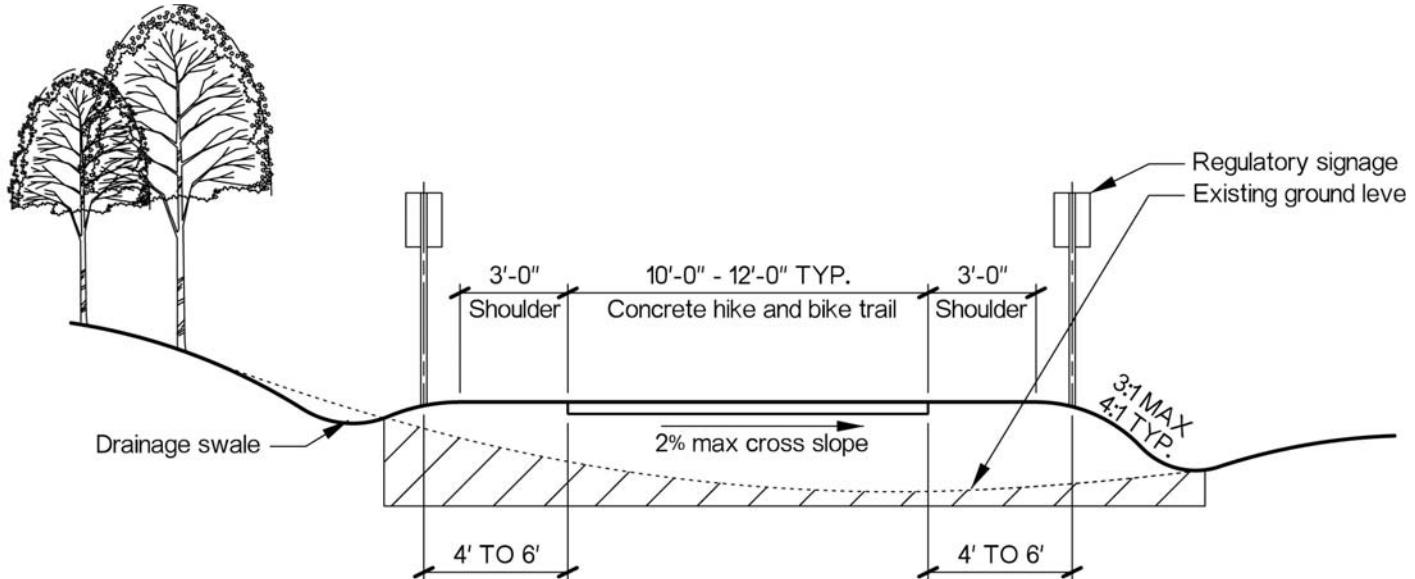


Figure A.1 – Standard Hike & Bike Trail Section

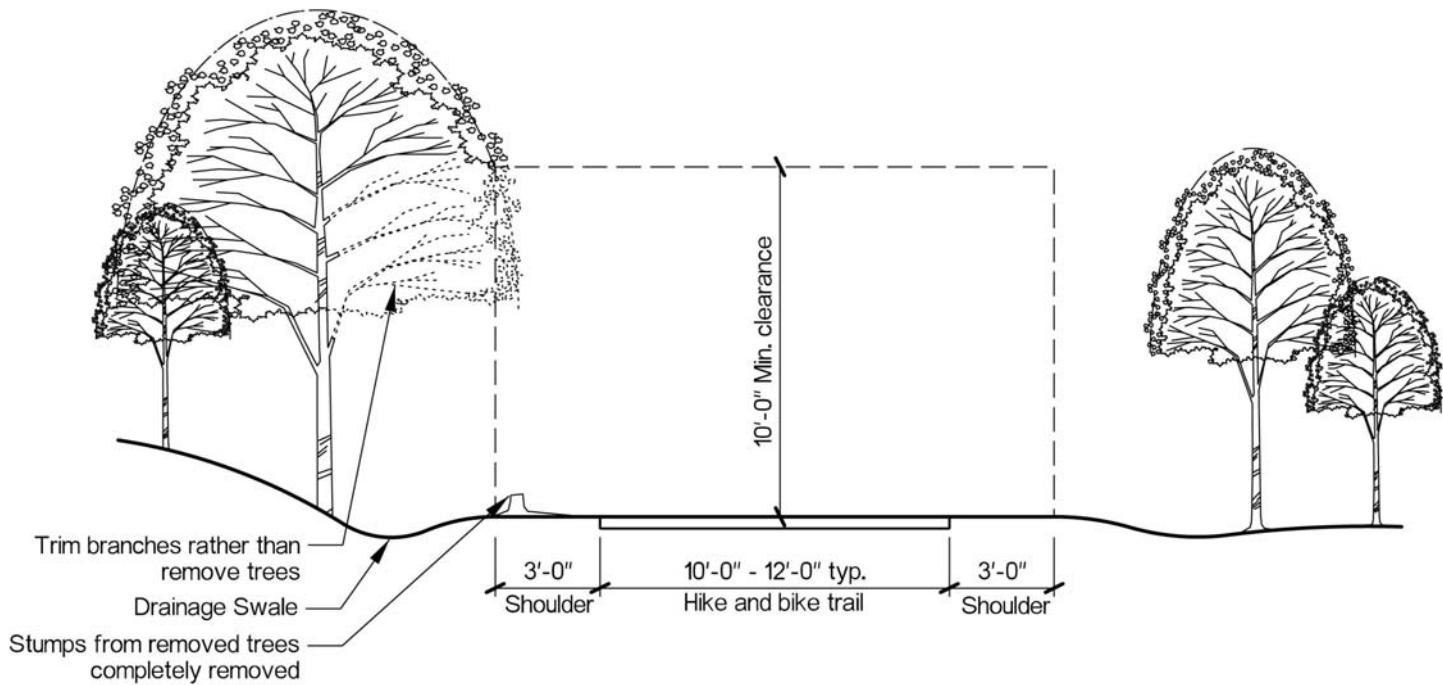


Figure A.2 – General Construction Limits

A minimum 3' wide graded soft shoulder should be constructed and maintained on both sides of the trail (in addition to any adjacent graded areas for steep inclines). Shoulders must be constructed with a constant grade (4:1 typical, 3:1 maximum). Shoulders should be clear of trees, stumps, drainage, poles, walls, fences, guardrails, and other vertical or lateral obstructions whenever possible. In instances where trees or other obstacles may encroach within this space, warning signage should be provided. A 5' lateral separation is necessary from any vertical embankment or drop-off. If this is not possible, safety railing, walls, or fencing shall be provided. All barrier material shall conform to City of Cedar Hill standards. See Figure A.2 – General Construction Limits.

- b. Design Speed: In general, a minimum design speed of 20 mph should be used when trail grades do not exceed 5%. In those instances where strong prevailing tail winds exist or trail grades may exceed 5%, a design speed of 30 mph is advisable. Speed bumps or similar surface obstructions intended to slow down cyclists would pose a trip hazard for other trail users and should never be used. In instances where it is desirable to slow the speed of cyclists, chicanes or short curves should be used (see Figure A-12 on page A-31).
- c. Alternate Routes: It is the intent of the plan to provide accessible routes linking all destinations and nodes within the city. It is at the discretion of the City to allow for the creation of alternate routes to destinations which do not meet standards established by ADAAG/TAS.
- d. Grade: Longitudinal grades on trails shall not exceed 5% except in unusual circumstances. In cases where the minimum grade must be exceeded, an alternate route must be constructed to meet ADAAG/TAS standards. The absolute maximum grade for a trail intended for bike usage is 8%.

Grades between 2% and 5% are acceptable for trails where a leveling off at the base of the incline permits adequate recovery before an intersection or other conflict point. Bridges constructed with a wood surface shall not exceed a 2% slope with the exception of the camber on pre-fabricated bridges. Concrete surfaces on bridges can exceed 2% to a maximum of 5% if the exit off of the bridge has an adequate deceleration area prior to encountering an intersection of any kind or a curve in the alignment of the trail.

e. Horizontal Alignment & Super-Elevation: The use of super-elevated trails shall be limited to instances where they are needed in order to help alleviate drainage issues or in other special circumstances such as challenging topography. Trails shall not exceed a 2% cross-slope. The City may allow for the construction of additional and alternate routes that do not meet the standards established within ADAAG/TAS so long as the super-elevation does not exceed a 5% slope. Minimum radius varies depending on cross-slope.

When curves of lesser radii than those recommended must be used on multi-use trails because of limited right-of-way, topography, or other considerations, standard curve warning signs and supplemental pavement markings should be installed in accordance with the TMUTCD. It is advisable to widen the trail in order to increase the lateral space available to cyclists as they lean to the inside of the turn. The amount of widening should be limited to a maximum of 4'.

Cyclists frequently ride two abreast on trails. On narrow trails, cyclists have a tendency to ride near the middle of the path. For these reasons and because of the serious consequences of a head-on bicycle collisions, lateral clearances on horizontal curves should be widened through the curve, a non-skid yellow center stripe should be installed, and a “curve ahead” warning sign should be installed in accordance with the TMUTCD.

f. Drainage: The cross-slope of areas adjacent to trails should be a minimum of 1% to provide for drainage. Trail pavement surfaces shall not exceed a cross slope of 2% in order to maintain compliance with ADAAG/TAS standards. See Figure A.1 – Standard Hike & Bike Trail Section.

Sloping in one direction instead of crowning is preferred because it simplifies drainage, surface construction, and maintenance. An even surface is essential to prevent water ponding and ice formation. Culverts and other drainage and piping should be extended laterally at least 10' from the downhill side of a trail or path.

In floodplains, trail rights-of-way or easements shall be located on the highest elevation within the designated floodplain while maintaining a 3' soft shoulder on both sides.

Where a trail is constructed on the side of a hill, a ditch or sizable swale of dimensions suitable for the safety of cyclists and for the volume of water expected shall be constructed on the uphill side to intercept the hillside drainage. Where necessary, catch

basins with cross culverts (pipe structures built underneath the trail) shall be provided to convey the intercepted water under the trail. The length of cross culverts should be extended to include the clear zone as well as the trail width and should be backfilled to provide an uninterrupted clear zone. Drainage grates and man-hole covers should be located outside of the travel path of bicyclists and wheelchair users. To assist in draining the area adjacent to the trail, the design should include considerations for preserving the natural ground cover. Seeding, mulching, and sodding of adjacent slopes, swales, and other erosion-prone areas shall accompany trail construction and shall be implemented by the trail builder. Where trails pass underneath highway bridges, existing deck drain discharges must be routed or reconstructed so that deck runoff will not discharge upon or flow across the trail (such drainage can create ice and algae on the pavement as well as erode the pavement surface).

g. Intersection Treatment: Intersections are important locations from a traffic flow and aesthetic point of view. The corner radius for 90 degree intersections should typically be 15' though larger or smaller radii (10' minimum) may be appropriate in special circumstances such as at non-right-angle intersections and when trails intersect at planting beds, signage or other focal points. "Stop" or "yield" signs should be utilized on trails with high

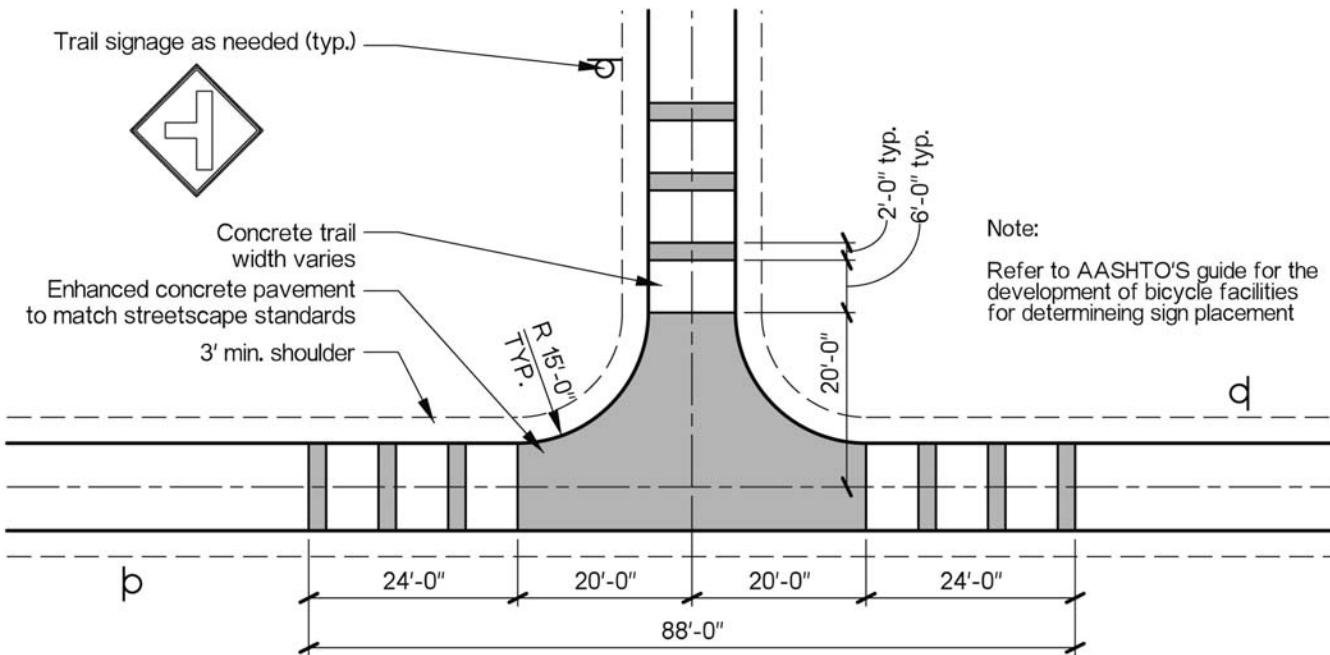


Figure A.3 – Typical Intersection Treatment

traffic volumes and at intersections with limited sight lines to denote right-of-way. At a minimum, intersection warning signs shall be placed on each intersection approach per AASHTO and TMUTCD guidelines. Major intersections shall have patterned concrete as indicated in Figure A.3 – Typical Intersection Treatment.

## ***Trails – Soft Surface***

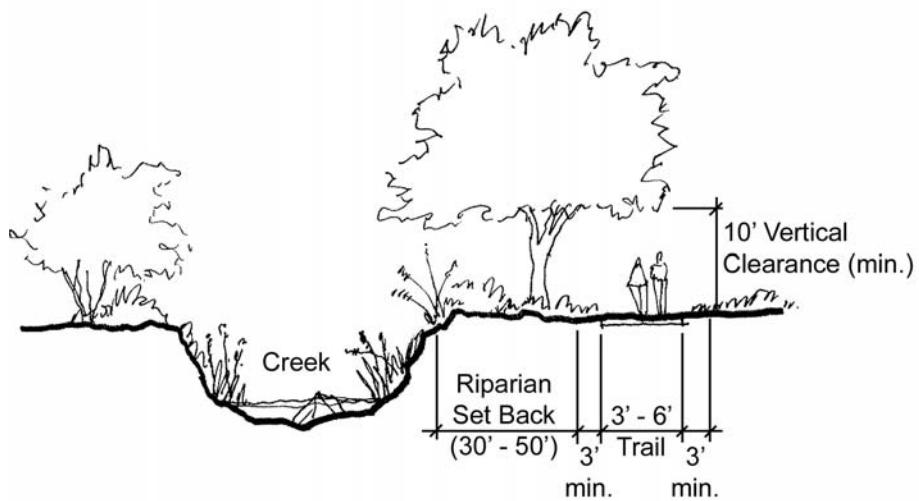
### **Design Objectives**

- Materials should provide a stable surface and be permeable.
- Color should be earth tone to blend with the natural environment and to minimize visual impact.
- Design for wheelchair accessibility wherever practical, with trail widths no less than 48". In cases where a 48" wide trail is designed, ensure that adequate wheelchair passing areas are provided per ADAAG/TAS requirements.
- Minimize erosion of surface material at side drainage locations to limit washing, i.e., provide concrete pans or other erosion mitigating devices as approved by the city.

### **Design Standards**

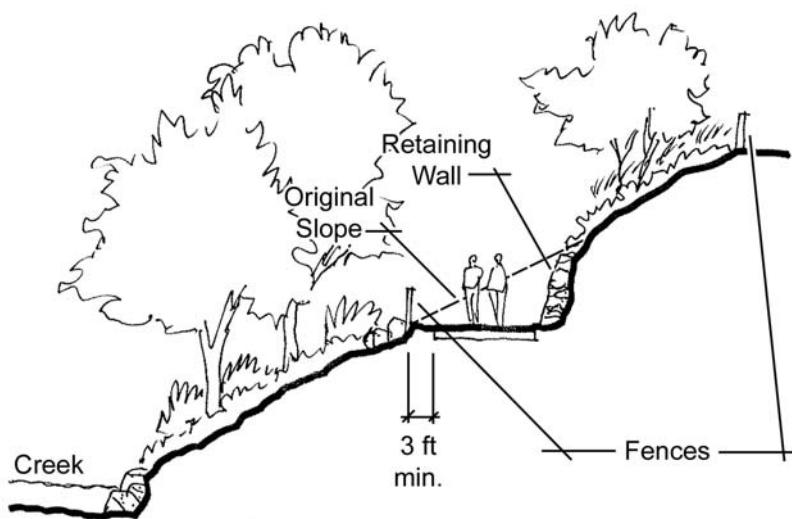
- a. Prepared Sub-grade: Compact on-site material where approved by the City Engineer. Over-excavate if unstable sub-soils are encountered and replace with City-approved fill material. Compact all fill areas to 95% standard proctor at 0% to +6% optimum moisture content. Remove all topsoil prior to subgrade preparation. The use of a geotextile fabric under the aggregate fines where installed in wet or unstable areas is recommended.
- b. Trail Surface: 3/8" diameter compacted aggregate fines, such as decomposed granite with adequate binder, minimum 4" depth.
- c. Width & Clearance: Standard width for two-way trails is 6' with a minimum width of 3'.
- d. Grade, Sight Distance, Drainage: Refer to hard-surface trail design guidelines.

Figure A.4 – Trails Near Creeks



- e. Sensitive Areas: For natural surface trails that will be located in environmentally sensitive areas, several measures are recommended to lessen the impact of the trail and trail users on the area (see Figure A.4 – Trails Near Creeks):
  1. The riparian setback should be as wide as possible. A minimum of 30' to 50' is recommended.
  2. Slope the trail away from the waterway or pre-treat trail runoff with a trail-side swale.
  3. Limit vegetation removal but remove invasive plant species.
  4. Use the trail as an opportunity to restore and enhance the waterway or environmentally sensitive area.
- f. Other Considerations: Trails can vary in width and type depending on the existing topographic and environmental constraints. Soft surface trail design should take into account issues like drainage, erosion, slope/grade, presence of waterways, vegetation, riparian and habitat areas, and environmental requirements and regulations. In some cases the proposed trails will have to address slope concerns during design and construction (see Figure A.5 – Trails Along Steep Slopes).
- g. Accessibility: Areas with earthen walking trails (i.e., parks and natural areas) should also provide an alternate route that meets or exceeds ADAAG/TAS standards.

Figure A.5 – Trails Along Steep Slopes



h. Steep Slopes: In areas of steep slopes, it is often not possible for trails to meet ADAAG/TAS requirements. Figure A.5 illustrates a typical earthen trail design that is appropriate for steep and inclined areas. This type of trail is typically 3' to 6' wide and is designed to accommodate walkers, hikers, runners, and mountain bikers, depending on available space. Skilled volunteer-built earthen trails, reinforced with locally-sourced stone, are often the least impactful. In addition to the earthen surface of these trails, the steep slopes that they pass through negate the ability to meet ADAAG/TAS requirements. The trails should be designed with adequate drainage to prevent channeling and erosion.

## **Bikeway Facilities**

### **Design Objectives**

- Provide safe, quick, and direct travel along corridors with high bicycle demand.
- Provide a common route for cyclists through a high demand corridor.
- Connect discontinuous segments of shared-use trails.
- Provide extensions along local neighborhood streets and collectors that lead to commercial areas, places of employment, educational facilities, parks and other community facilities.
- Provide striped bike lanes or cycle tracks where possible. Provide shared lanes where these other facility types are not possible due to limited right-of-way.

Figure A.6- Shared Bike Lane

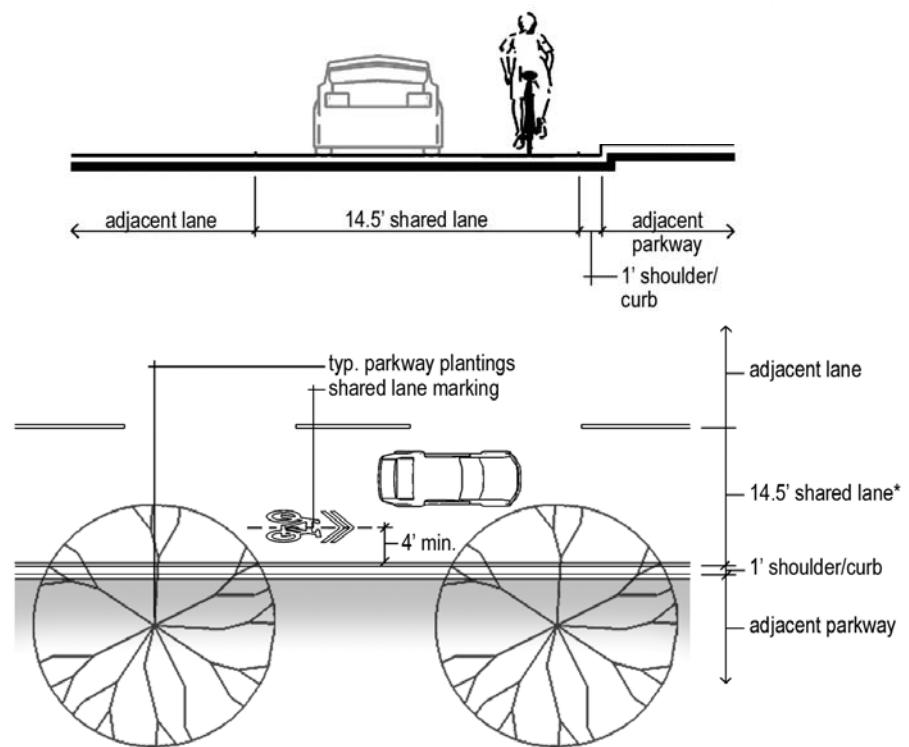
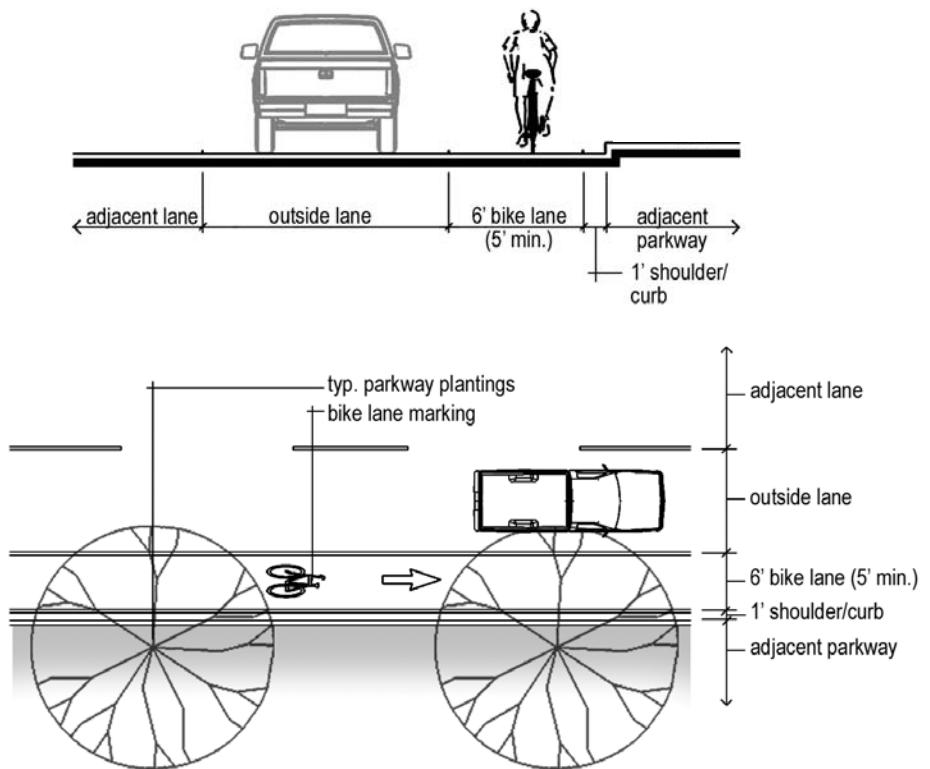


Figure A.7 – Standard Bike Lane

Refer to part 9 of the Texas Manual on Uniform Traffic Control Devices for more guidance.



## Design Standards

- a. **Signage:** Bike route signs shall be used on streets with bike routes, shared lanes, bike lanes, and cycle tracks as well as on shared-use trails where applicable. Route signs should include route number and destination information, yet be legible to moving cyclists. Route signs shall be located at all intersections where the bike route changes direction. Additional route signs should be located in accordance with AASHTO and TMUTCD standards.
- b. **Pavement Surface:** The pavement surface shall match the roadway surface; pavement seams should be minimized and placed outside of the bicycle facility where possible. Adjust utility covers to grade, install bicycle safe drainage grates, and fill potholes to provide a smooth surface.
- c. **Shared Bike Lanes:** Outside lanes for shared lane facilities shall meet or exceed a width of 14.5' (not including curb and gutter) for streets without on-street parking and 12' for streets with on-street parking. Shared lane markings shall be used on all shared lanes and shall be of reflective, non-skid material. They shall be placed a minimum of 5' from the face of curb on roads without on-street parking and a minimum of 5' from the outside edge of the parking lane on roads with on-street parking. In both cases, placement at the lane centerline is optional in order to extend the life of the marking. A minimum of two shared lane markings per block face shall be used and shall be located 50' toward midblock from the intersection at both ends of the block. If the block face is over 300' in length, an additional shared lane marking should be placed at midblock. See Figure A.6 – Shared Bike Lane. (Note: The traffic control devices shown on this detail are not currently approved by the Texas Manual on Uniform Traffic Control Devices (TMUTCD). However, they are being considered for inclusion in the next revision of the MUTCD and have been successfully implemented in Austin, Texas.)
- d. **Standard Bike Lanes:** Standard bike lanes shall be at minimum 5' wide (6' is recommended) not including curb and gutter. Bike lanes are one-way and should be indicated as such through pavement markings per TMUTCD. Bike lane markings should be placed at the bike lane centerline and should be of reflective, non-skid material. A minimum of two sets of bike lane markings (which consists of a bicycle outline and directional arrow) per block face shall be used and shall be located 50' toward midblock from the intersection at both ends of the block. If the block face is over 300' in length, an additional set of bike lane markings should be placed at midblock. See Figure A.7 - Standard Bike Lane.

Figure A.8 – Buffered Bike Lane

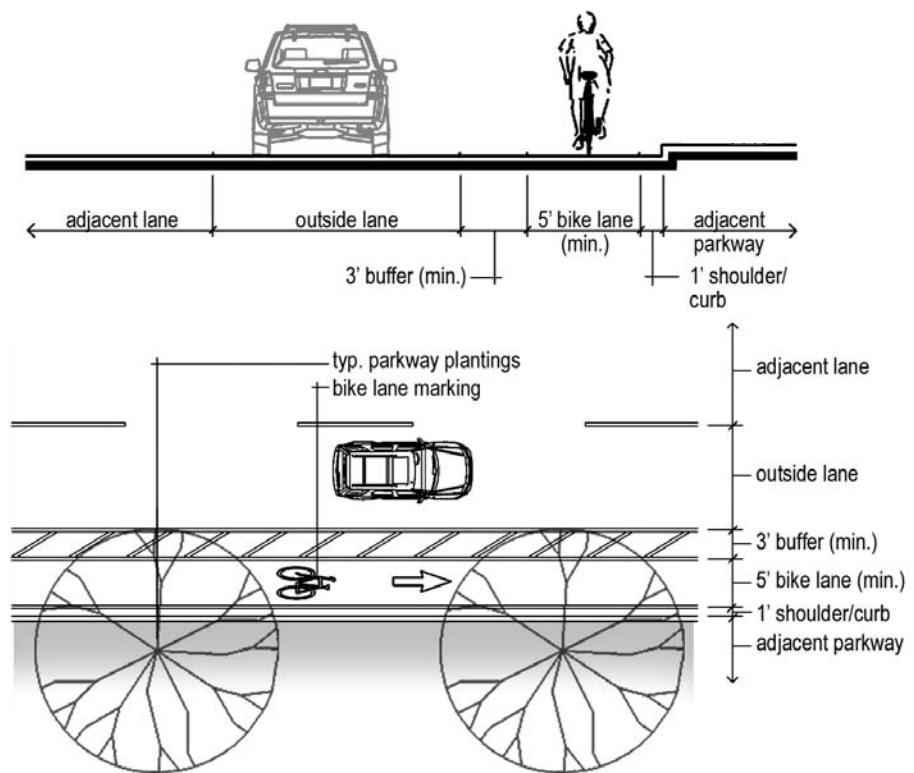
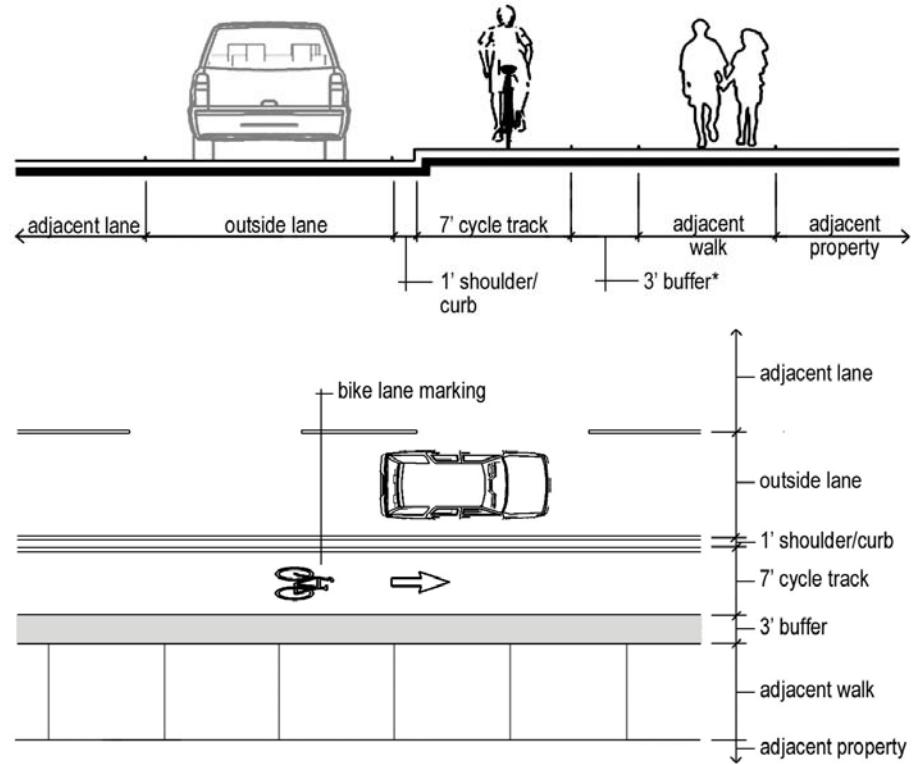


Figure A.9 – Cycle Track



- e. **Buffered Bike Lanes:** Buffered bike lanes shall be a minimum 5' wide with a minimum 3' buffer zone. Buffer zones shall be striped per TMUTCD. Bike lane marking shall be consistent with standard bike lane markings. See Figure A.8 - Buffered Bike Lane.
- f. **Cycle Tracks:** Cycle tracks shall be at minimum 7' with a minimum 3' buffer between it and any adjacent pedestrian facility. Cycle tracks shall be elevated above the vehicular travel surface, as shown, for additional delineation. Cycle track lanes are one-way and should be indicated as such through pavement markings per TMUTCD. Cycle track marking shall be consistent with standard bike lane markings. See Figure A.9 - Cycle Track
- g. **Side Paths:** Side path widths shall correspond with the Trails Master Plan. Two options exist for side paths. Option 1 (Figure A.10) allows for two-way multipurpose traffic and requires a side path on only one side of the roadway. This option should be utilized where the right-of-way is limited. Option 2 (Figure A.11) allows for two-way pedestrian traffic and one-way bicycle traffic. This option requires a side path on both sides of the roadway to account for bicycle traffic in each direction.
- h. Bikeways should be continuous along a corridor and should not terminate at major intersections. On major roads, bikeways should terminate into off-street trails or bikeways on intersecting streets. On minor roads, bikeways may terminate with the addition of a "Share the Road" warning sign.

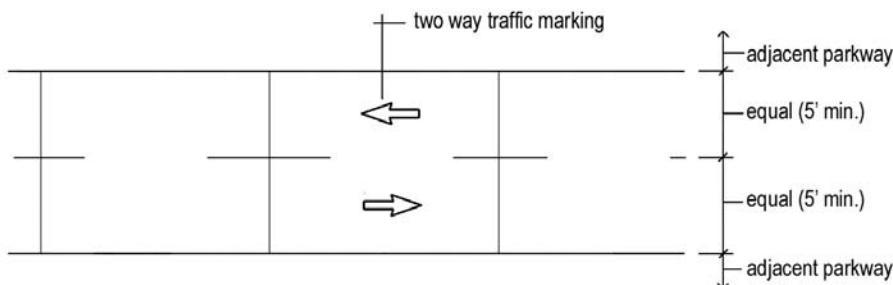


Figure A.10 – Two-Way Multipurpose Traffic

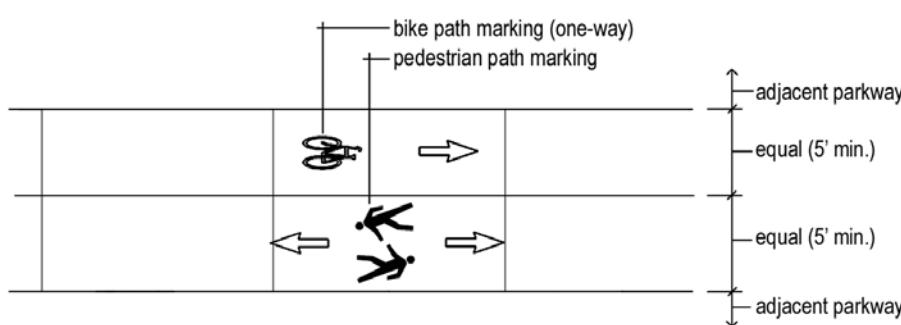


Figure A.11 – Two-Way Pedestrian, One-Way Bicycle Traffic

***Trail/Roadway Crossings***

Trail/roadway crossings may be at-, below-, or above-grade. Designing safe crossings is crucial to the safety of a trail design. Trail/roadway crossings should comply with AASHTO, TxDOT, and TMUTCD standards. Evaluation of trail crossings involves analysis of vehicular and trail user traffic patterns, travel speeds, street width, traffic volumes (average daily traffic, peak hour traffic), and line of sight. The most appropriate trail/roadway crossing option should be based on the best available information and must be verified and/or refined through the actual engineering and construction document stages. Engineering studies should be done to determine the appropriate level of traffic control and design. There are four primary types of trail/roadway crossings:

- Type 1 – Unprotected/Marked: Unprotected/marked crossings include trail crossings of residential, collector, and sometimes major arterial streets or railroad tracks.
- Type 2 – Existing Intersections: Trails that emerge near existing intersections may be routed to these locations, provided that sufficient protection is provided at the existing intersection.
- Type 3 – Signalized/Controlled: These trail crossings include signals or other traffic control measures due to traffic volumes, speeds and trail usage.
- Type 4 – Grade-separated: Bridges or under-crossings provide the maximum level of safety but also generally are the most expensive and have rights-of-way, maintenance and other security considerations.

**Table A.2 – Recommendations for Installing Marked Crosswalks and Other Needed Pedestrian Improvements at Uncontrolled Locations\***

Roadway Type (Number of Travel Lanes and Median Type)	Vehicle ADT** <9,000			Vehicle ADT 9,000 to 12,000			Vehicle ADT 12,000 to 15,000			Vehicle ADT >15,000		
	Posted Speed Limit <sup>†</sup>			Posted Speed Limit			Posted Speed Limit			Posted Speed Limit		
	< 30 mph	35 mph	40 mph	< 30 mph	35 mph	40 mph	< 30 mph	35 mph	40 mph	< 30 mph	35 mph	40 mph
Two Lanes	C	C	P	C	C	P	C	C	N	C	P	N
Three Lanes	C	C	P	C	P	P	P	P	N	P	N	N
Multilane (four or more lanes) with raised median <sup>‡</sup>	C	C	P	C	P	N	P	P	N	N	N	N
Multilane (four or more lanes) without raised median	C	P	N	P	P	N	N	N	N	N	N	N

Source: modified from: Federal Highway Administration. Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations. FHWA Publication Number: HRT-04-100. September 2005.

\* These guidelines include intersection and midblock locations with no traffic signals or stop signs on the approach to the crossing. They do not apply to school crossings. A two-way center turn lane is not considered a median.

\*\* ADT = Average daily trips

† Where the speed limit exceeds 40 mph, marked crosswalks alone should not be used at un-signalized locations.

‡ The raised median or crossing island must be at least 1.2 m (4 ft) wide and 1.8 m (6 ft) long to serve adequately as a refuge area for pedestrians in accordance with TMUTCD and AASHTO guidelines.

**C = Candidate sites for marked crosswalks.** Marked crosswalks must be installed carefully and selectively. Before installing new marked crosswalks, an engineering study is needed to determine whether the location is suitable for a marked crosswalk.

**P = Possible increase in pedestrian crash risk may occur if crosswalks are added without other pedestrian facility enhancements.** These locations should be closely monitored and enhanced with other pedestrian crossing improvements, if necessary, before adding a marked crosswalk.

**N = Marked crosswalks alone are insufficient, since pedestrian crash risk may be increased by providing marked crosswalks alone.** Consider using other treatments, such as traffic-calming treatments, traffic signals with pedestrian signals where warranted, or other substantial crossing improvement to improve crossing safety for pedestrians.

### Design Guidelines – Unprotected/Marked Crossings (Type 1)

An unprotected crossing is a midblock crossing or a crossing at an intersection without traffic signals or stop signs that consists only of a crosswalk and signing. The approach to designing crossings at mid-block locations depends on an evaluation of vehicular traffic, line of sight, trail traffic, use patterns, vehicle speed, road type and width, and other safety issues such as the proximity of schools. Table A.2 indicates where unprotected crossings (crossings without traffic signals or stop signs) may be acceptable. Figure A.12 – Typical Unprotected/Marked Crossing illustrates the typical layout and signage scheme for this crossing type.

In addition to considering traffic volume and speed, it is important to consider line of sight. Per the Texas Department of Transportation Roadway Design Manual (March 2009), the minimum line of sight for unprotected crossings (on level grade) should be based on the speed at which vehicles travel as follows:

- 25 mph zone: 155 feet
- 35 mph zone: 250 feet
- 45 mph zone: 360 feet

Wherever unprotected crossings are necessary, crosswalks and warning signs (“Bike Xing”) should be provided to warn motorists. Stop signs and slowing techniques (bollards/geometry) should be used on the trail as it approaches the crossing. Care should be taken to keep vegetation and other obstacles out of the sight line for motorists and trail users. Engineering studies should be performed to determine the appropriate level of traffic control and design for each individual crossing.

The top of the crosswalk should be flat and typically made of asphalt, patterned concrete, or brick pavers. Brick or unit pavers should be discouraged because of potential problems related to pedestrians, bicycles and ADAAG/TAS requirements for a continuous, smooth, vibration-free surface. Tactile treatments are needed at the sidewalk/street boundary so that visually impaired pedestrians can identify the edge of the street. Costs can range from \$5,000 to \$20,000 per crosswalk, depending on the width of the street, the drainage improvements required, and the materials used for construction.

A flashing yellow beacon costing between \$15,000 and \$30,000 (preferably one that is activated by the trail user rather than operating continuously) may be used. Some cities have successfully used a flashing beacon activated by motion detectors on the trail, triggering the beacon as trail users approach the intersection. This equipment, while slightly more expensive, helps alert motorists to trail traffic (see Design Guidelines – Signalized/Controlled Crossings).

Crossings of higher volume arterials over 15,000 average daily vehicle trips (ADT) may be unprotected in some circumstances. For example, if they have 85th percentile speeds of 30 mph or less and have only two lanes of traffic. Such crossings would not be appropriate if a significant number of school children used the trail.

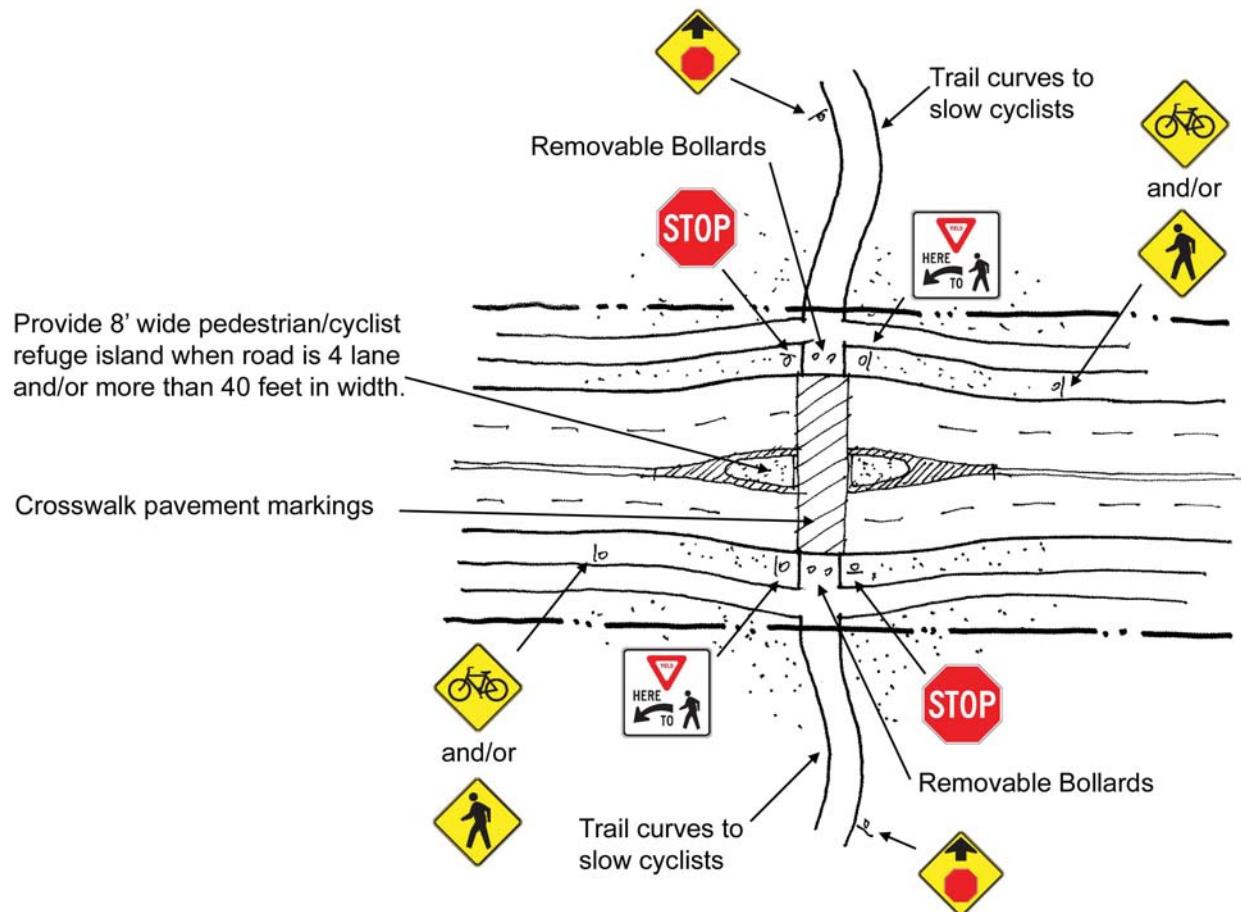


Figure A.12 – Typical Unprotected/Marked Crossing

**Design Guidelines – Existing Intersections (Type 2)**

When a trail approaches a street within 500' of an existing signalized intersection with pedestrian crosswalks, users are typically diverted to the signalized intersection for safety and traffic control purposes. For this option to be effective, barriers and signage are needed to direct trail users to the signalized crossings. In most cases, signal modifications would be made to add pedestrian detection and to comply with ADAAG/TAS. In many cases, pedestrian crossings are simply part of the existing intersection and are adequate for most trail users. However, it may be necessary to provide wider curb ramps and crosswalk striping depending on existing conditions and the volume of trail users anticipated. See Figure A.13 – Typical Existing Intersection Treatment.

**Design Guidelines – Signalized/Controlled Crossings (Type 3)**

New signalized crossings are recommended for crossings more than 500' from an existing signalized intersection, where speed limits are 40 mph and above, and/or ADT exceeds 15,000 vehicles (see Table A.2 for information regarding situations in which an unprotected crossing might be insufficient). Each crossing, regardless of traffic speed or volume, requires additional review by a registered Texas professional engineer to identify sight lines, potential impacts on traffic flow, timing with adjacent signals, capacity, and safety.

There are generally two types of signalized/controlled crossings: partially signalized (which include flashing yellow warning beacons for motorists and stop signs for trail users) and fully signalized (which include red/yellow/green signals for motorists and walk/don't walk signals for trail users). These two types are illustrated in Figure A.14 and A.15, respectively.

Trail signals are normally activated by push buttons, but may also be triggered by motion detectors. The maximum delay for activation of the signal should be one minute, with minimum crossing times determined by the width of the street. The signals may rest on flashing yellow or green for motorists when not activated and should be supplemented by standard advanced warning signs. Typical costs for a signalized crossing range from \$150,000 to \$250,000.

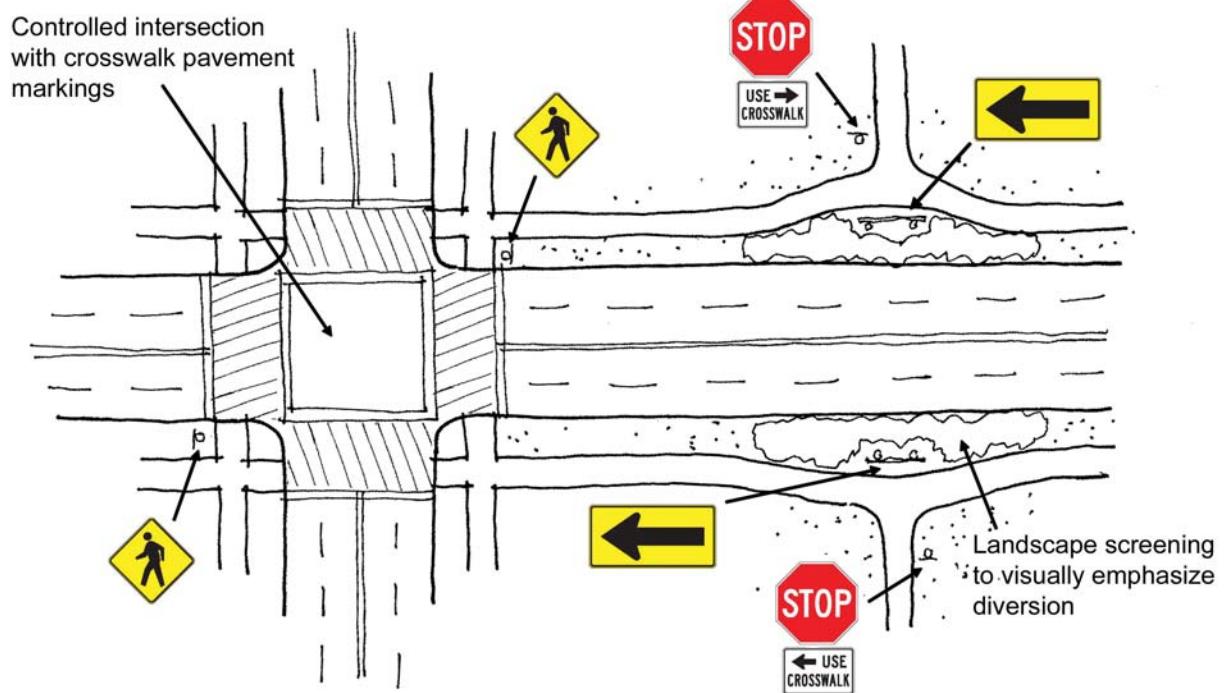


Figure A.13 – Typical Existing Intersection Treatment

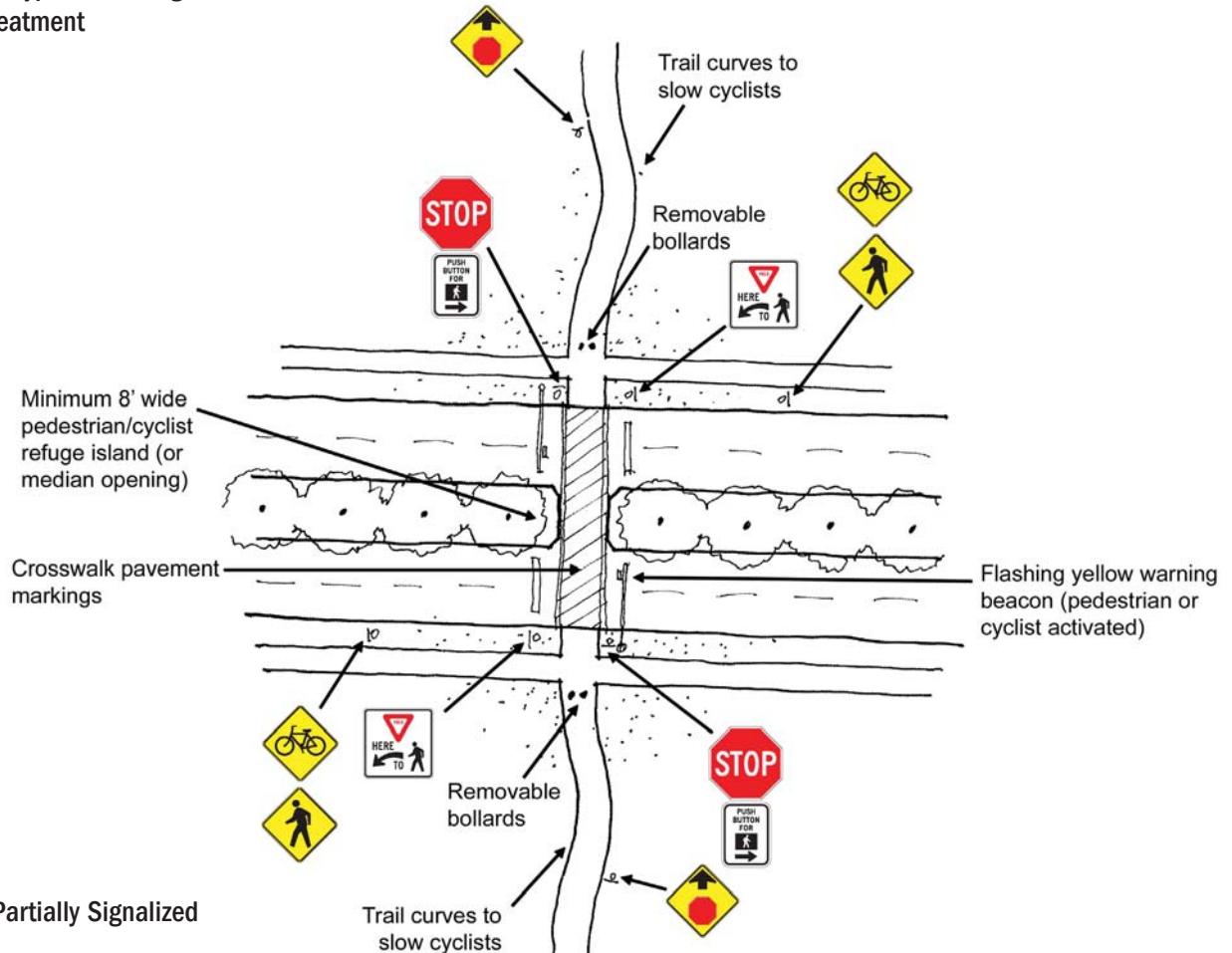
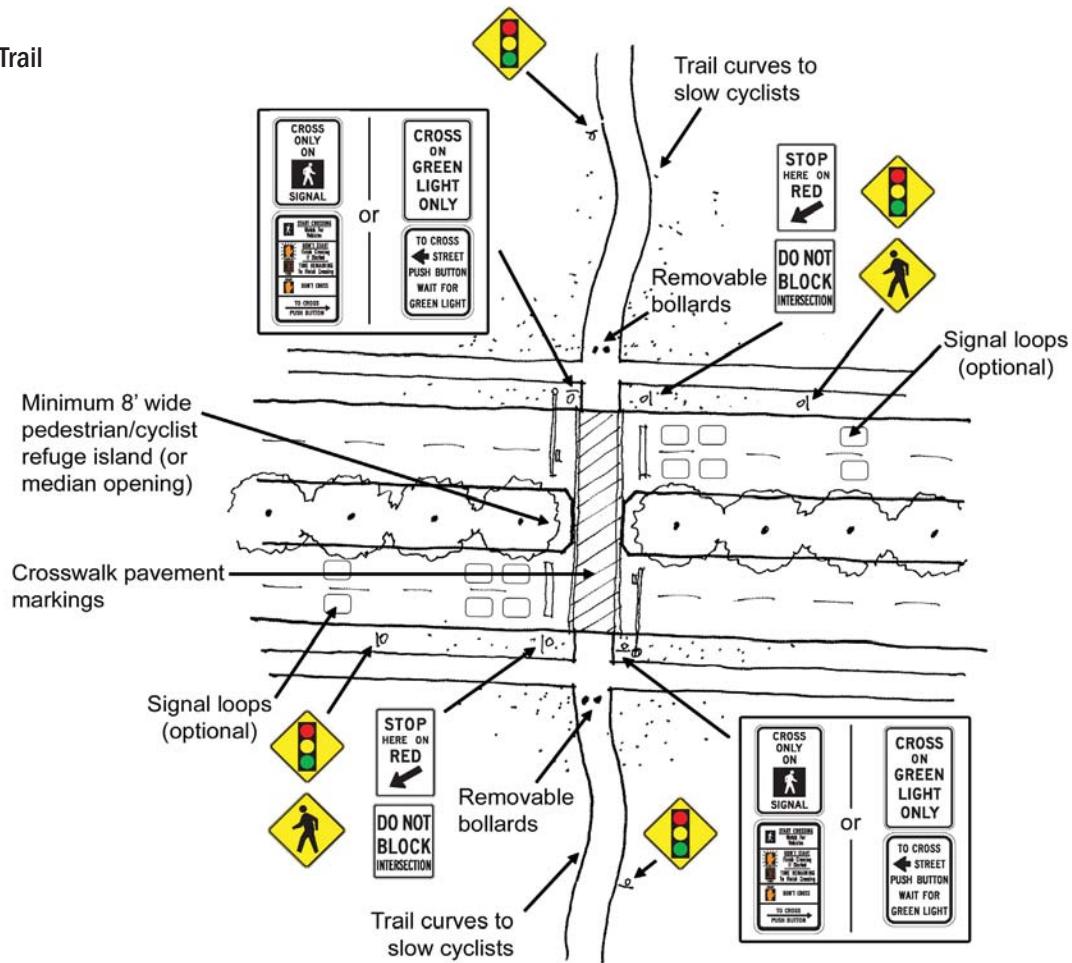


Figure A.14 - Partially Signalized Trail Crossing

Figure A.15 - Fully Signalized Trail Crossing



#### Design Guidelines – Grade-separated Crossings (Type 4)

Grade-separated crossings may be needed where ADT exceeds 25,000 vehicles and 85th percentile speeds exceed 45 mph. Security is a major concern with both over-crossings and under-crossings. In both cases, trail users may be temporarily out of sight from public view and may themselves have poor visibility. Under-crossings, like parking garages, have the reputation of being places where crimes occur. Most crime on trails, however, appears to have more in common with the general crime rate of the community and the overall usage of the trail than any specific design feature.

Design and operation measures are available which can address trail user concerns. For example, an under-crossing should be designed to be spacious, well lit, and completely visible for its entire length prior to entering. Emergency phones or call boxes located near grade-separated crossings are encouraged. Other potential problems with under-crossings include conflicts with utilities, drainage, flood control, and maintenance requirements. Over-crossings pose potential concerns about visual impact, functional appeal, and cost. Even so, the visual nature of pedestrian/bicycle crossings allow for the creation of iconic features.

## ***Underpass Structures***

### **Design Objectives**

- Underpasses provide safety and continuity by eliminating the need for users to interact with and/or cross busy streets.
- Design underpasses with security and comfort in mind by increasing site distances, providing lighting, and providing increased vertical clearance.

### **Design Guidelines**

- a. Underpasses shall be constructed according to minimum vertical and horizontal clearances per AASHTO and ADAAG/TAS standards. All modified underpasses should meet these requirements. In situations where the underpass is straight (allowing clear visibility) two-way traffic can be accommodated.

## ***Trail Signing and Traffic Control***

### **Design Objectives**

Crossing features for all roadways include warning signs both for vehicles and trail users. Type, location, and other criteria are identified in the TMUTCD. Adequate warning distance is based on vehicle speeds and line of sight. Signage should be highly visible; catching the attention of motorists accustomed to roadway signs may require additional alerting devices such as flashing warning beacons, roadway striping, or changes in pavement texture. Signing for trail users must include a standard stop sign and pavement marking; these traffic control devices are sometimes combined with other features such as bollards or chicanes in the trail to slow cyclists. Care must be taken not to place too many signs and other traffic control devices at crossings as they tend to overwhelm the user and lose their impact.

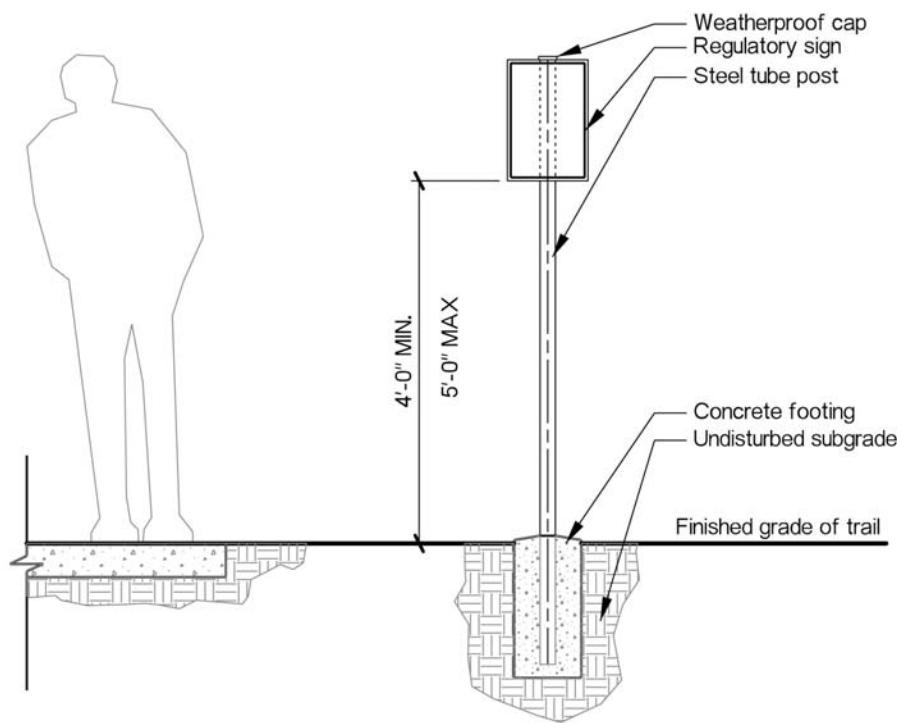
Directional signing may be useful for trail users and motorists alike. For motorists, a sign reading “Bicycle Trail Xing” along with a Cedar Hill trail emblem or logo helps both warn motorists and promote use of the trail. For trail users, directional signs and street names at crossings help direct people to their destinations.

A number of striping patterns have emerged over the years to delineate trail crossings. A median stripe on the trail approach will help to organize and warn trail users. The actual crosswalk striping is a matter of local and State preference, and may be accompanied by pavement treatments to help warn and slow motorists. The effectiveness of crosswalk striping is highly related to local customs and regulations. In communities where motorists do not typically yield to pedestrians in crosswalks, additional measures may be required. Table A.3 notes some of the most common signs that may be required on the Cedar Hill Trails system.

#### Design Standards

- a. Trail Regulatory Signs: All regulatory signs shall be mounted on a black powdercoat-finished 2-3/8" outside diameter round steel post mounted in a concrete footing placed between 4' and 6' on-center from the trail's edge of pavement. Signs shall be mounted such that the bottom edge of the sign is between 4' and 5' from finished trail grade. See Figure A.16 – Typical Regulatory Signage and Figure A.1 – Standard Hike & Bike Trail Section.

Figure A.16 – Typical Regulatory Signage



**Table A.3 – Typical Trail Signage**

Sign	Location	Color*	TMUTCD** Designation	Minimum Dimensions (for trails)
No Motor Vehicles	Entrances to trail	B on W	R5-3	24"x24"
Use Pedestrian Signal	At crosswalks	B on W	R9-5	12"x18"
Bicycle Yield to Pedestrians	At crosswalks	B on W	R9-6	12"x18"
Bike Route	At the beginning of each route and at intersections	W on G	D11-1	24"x18"
Bike Route Supplemental Plaques	Where bike lanes begin, end, or change direction	W on G	M4-11,12, 13 M7-1,2,3,4,5,6,7	12"x4" 12"x9"
Stop Yield	At trail intersections and crossings	W on R	R1-1 R1-2	18"x18" 18"x18"x18"
Bicycle Warning Pedestrian Warning	Oriented toward motorists at trail crossings	B on Y	W11-1 W11-2	18"x18"
Turn and Curve Warning	At turns and curves which exceed design speed criteria	B on Y	W1-1,2,3,4,5	18"x18"
Trail Intersection Warning	At trail intersections where no stop or yield sign is required; locations with limited sight lines	B on Y	W2-1,2,3,4,5	18"x18"
Stop Ahead Yield Ahead Signal Ahead	Where stop/yield sign or traffic signal visibility is obscured	B,R on Y B,R on Y B,R,G on Y	W3-1 W3-2 W3-3	18"x18"
Directional Signs	At intersections where access to destinations is available	W on G	D1-1b, D3-1	24"x6"
Trail Regulations/ Rules of the Trail	Entrances to trail	varies	n/a	18"x18"
Multi-purpose Trail: Bikes Yield to Pedestrians	Entrances to trail	varies	n/a	18"x18"
Please Stay On Trail	In environmentally-sensitive areas or where the trail travels near private property	varies	n/a	12"x18"
Trail Closed: No Entry Until Made Accessible & Safe for Public Use	Where trail or access points closed due to hazardous conditions	varies	n/a	18"x18"

\*B=black, W=white, G=green, R=red, Y=yellow

\*\*Texas Manual of Uniform Traffic Control Devices

## **Bridges & Low Water Crossings**

### **Design Objectives**

- Trail crossings over creeks and drainage ways generally shall be by bridge.
- Bridges shall be designed to be sturdy, safe, vandal-resistant, and easily maintained.
- Deck surface shall have good skid resistance.
- Deck shall be stabilized to minimize vibrations.
- Wooden railing should be free of splinters and provide a smooth, clean surface to the touch.
- Railing design should allow views to creeks for persons of all heights, yet ensure user safety.
- Scale of bridge should be in keeping with its context.
- Bridge color should blend with the natural environment or tie into the color scheme of adjacent development.
- Design should be integrated with other elements throughout the corridor.
- Low water crossings may be used at small stream crossings with the approval of the City Engineer.

### **Design Standards**

- a. General: All bridge designs to be sealed by a registered Texas professional engineer and approved by the City. Low water crossings shall not exceed 4' from path to low flow water elevation of the waterway or ravine unless approved by the City Engineer. Low water crossings shall have a widened shoulder to 5' on both sides of the trail. The headwall structure under the trail shall have gently sloping wingwalls constructed with the headwall no steeper than 8:1. The pipe ends shall be finished at the same repose of slope as the wingwalls. Any crossing exceeding this 4' separation to permit the construction of ADAAG/TAS-compliant trail approaches to the crossing shall require a bridge.
- b. Bridge Type: Prefabricated bridges require approval by the City. Bridges shall be of an arched truss design and in compliance with ADAAG/TAS longitudinal slope criteria. The minimum width of clear deck shall equal the width of the widest approaching trail (all bridges should be at minimum 10' wide). All bridge foundation and abutment designs shall be sealed by a registered Texas professional engineer and approved by the City. Prefabricated

arched truss bridges should generally be used unless the bridge's location requires a unique design because of physical constraints or aesthetic opportunity.

c. **Bridge Approaches:** Bridge approaches shall be designed in accordance with Figure A.17 – Typical Trail Bridge Approach Section and Figure A.18 – Typical Trail Bridge Approach Plan.

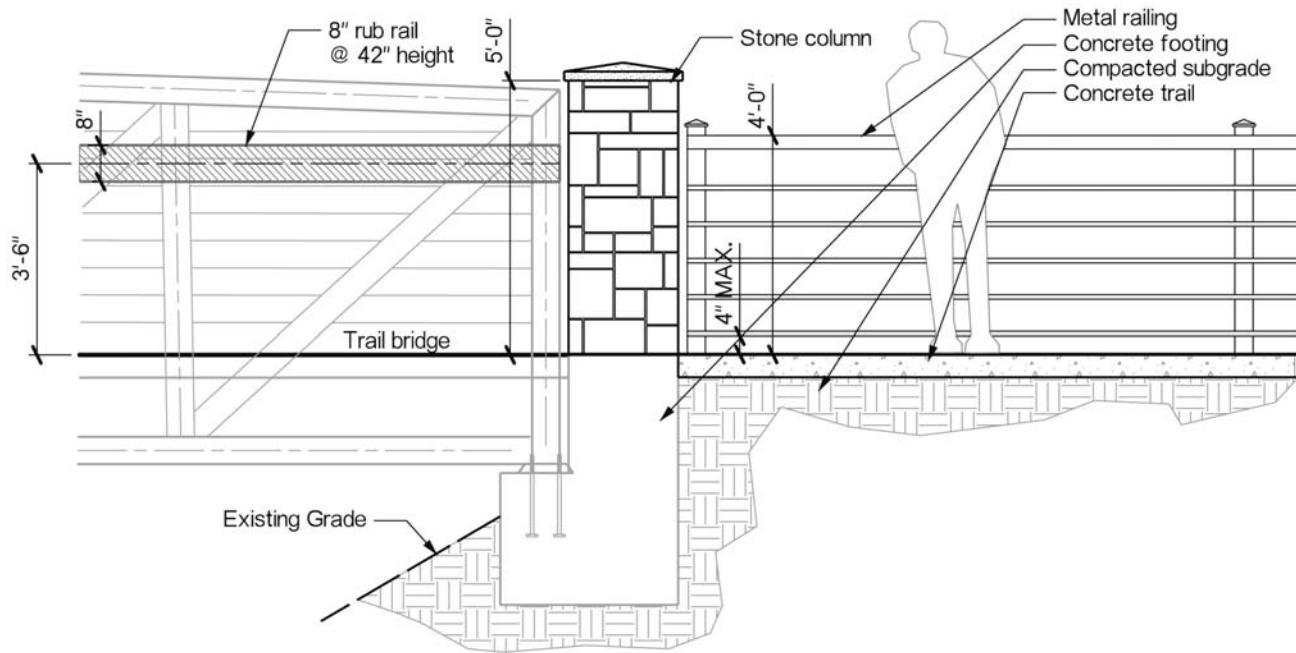


Figure A.17 – Typical Trail Bridge Approach Section

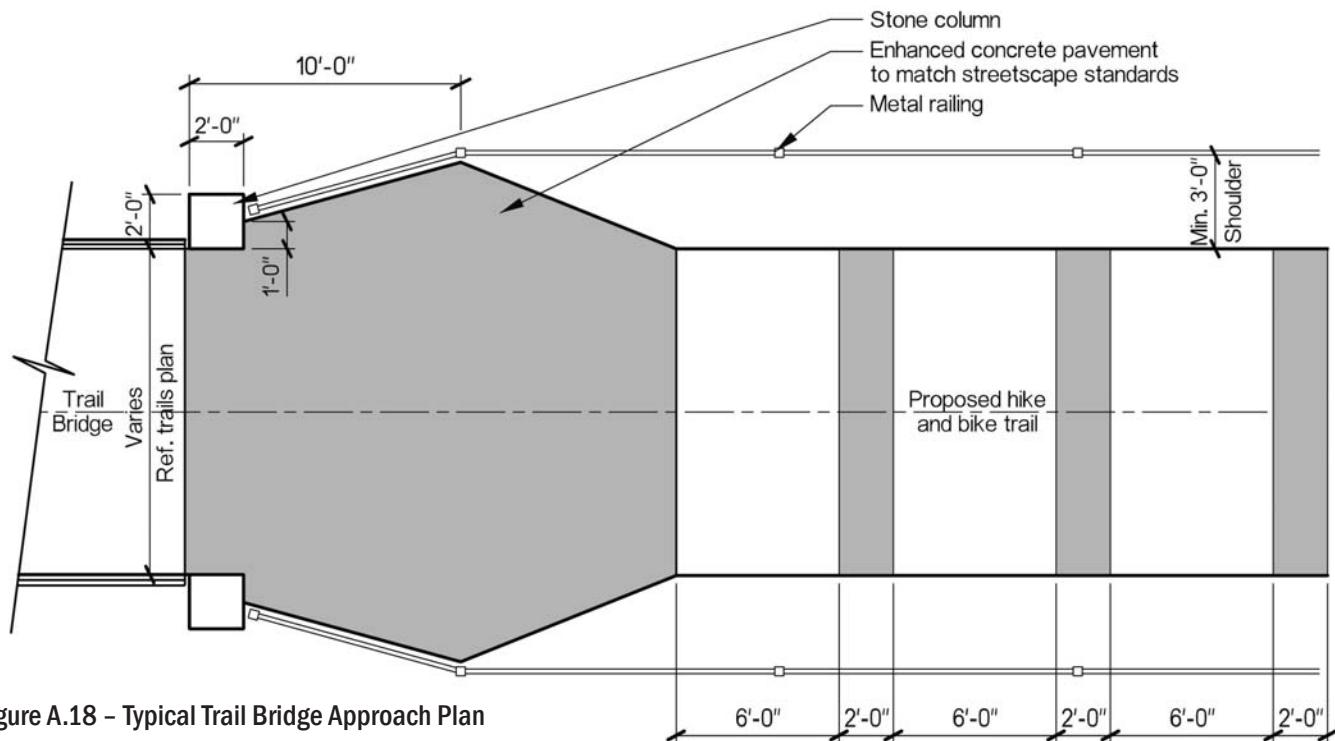


Figure A.18 – Typical Trail Bridge Approach Plan

### ***Culvert Outfall Structures***

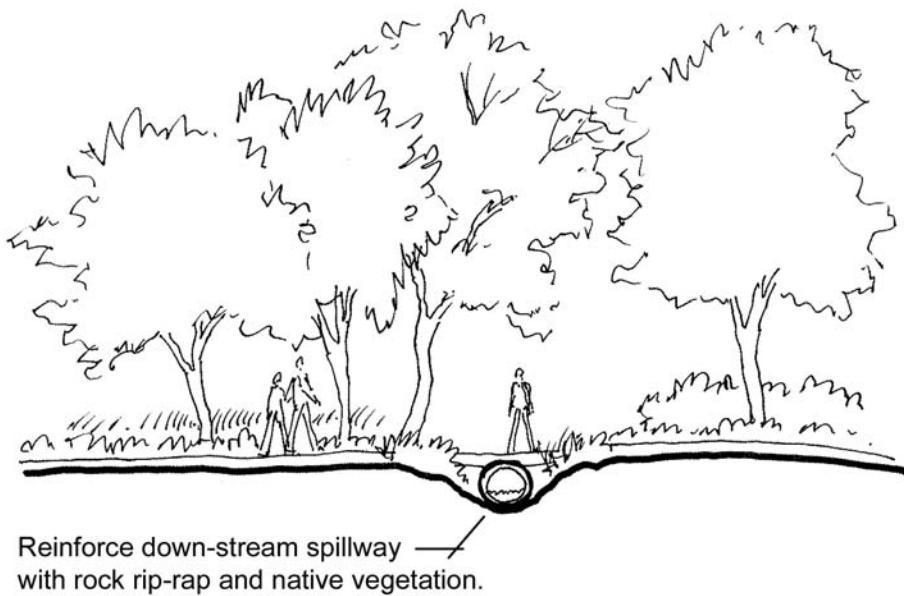
#### **Design Objectives**

- Existing culvert pipe structures may need modification to meet trail safety and aesthetic standards. Culvert outfalls shall occur on the downhill side of trails.
- Outfall structures shall feature stone veneer or concrete form liners to provide a more aesthetically pleasing appearance.

#### **Design Guidelines**

- a. Design: A registered Texas professional engineer shall design and size all outfall pipes.

Figure A.19 – Typical Culvert Outfall



## **Trail Safety Railing**

### **Design Objectives**

- Railings should provide a safety barrier without being visually imposing or limiting visibility.
- Railings should be higher than the average cyclist's center of gravity but low enough to not feel imposing to pedestrians.

### **Design Guidelines**

- a. **Railing Placement:** Railings should be placed between the trail and embankments or other vertical displacements when such topographical features are within 5' of the trail shoulder.
- b. **Railing Design:** The top of railings, fences, or barriers on either side of a trail structure shall be 4' higher than the trail surface. Railing ends shall be angled downward and flared away from the trail at both ends to prevent cyclist and pedestrian injury. Railing rungs should be horizontal in orientation so as not to catch bicycle handlebars. The bottom rung of a railing shall be 4" from the finished trail grade. See Figure A.17 – Typical Trail Bridge Approach Section and Figure A.18 – Typical Trail Bridge Approach Plan.
- c. **Rub Rails:** On bridges, railing shall have 8" wide rub rails attached on-center at handlebar height (3'-6") made of smooth metal or similar material. See Figure A.17 – Typical Trail Bridge Approach Section.

## ***Trail Features & Amenities***

### **Design Objectives**

- Create and maintain a unique aesthetic and quality for Cedar Hill's trail system.
- Use aesthetic treatments and visual cues to provide an identity to the trail system and create familiarity for trail users.

### **Mile Marker Design Guidelines**

- a. Placement: Mile markers should be placed every 1/8 mile. Ideally, locate mile markers where they do not conflict with intersections or other trail features.
- b. Design: Mile markers shall be designed in accordance with Figure A.20 - Typical Trail Mile Marker. Design shall include an 18" wide enhanced paving band than spans the entire width of the trail. Inset letters shall be placed flush within the band and be oriented for traffic coming in either direction.

### **Rest Area Design Guidelines**

- a. Placement: Rest areas should be placed every half to one mile and at major trail intersections. Ideally, locate rest areas overlooking attractive vistas or in other physically attractive locations.
- b. Design: Rest areas shall be designed in accordance with Figure A.21 – Typical Rest Area. Ideally, the bench and ADA space should not be located within 5' of a significant downward grade change; however, if such a location is chosen, railing must be provided at the grade change.

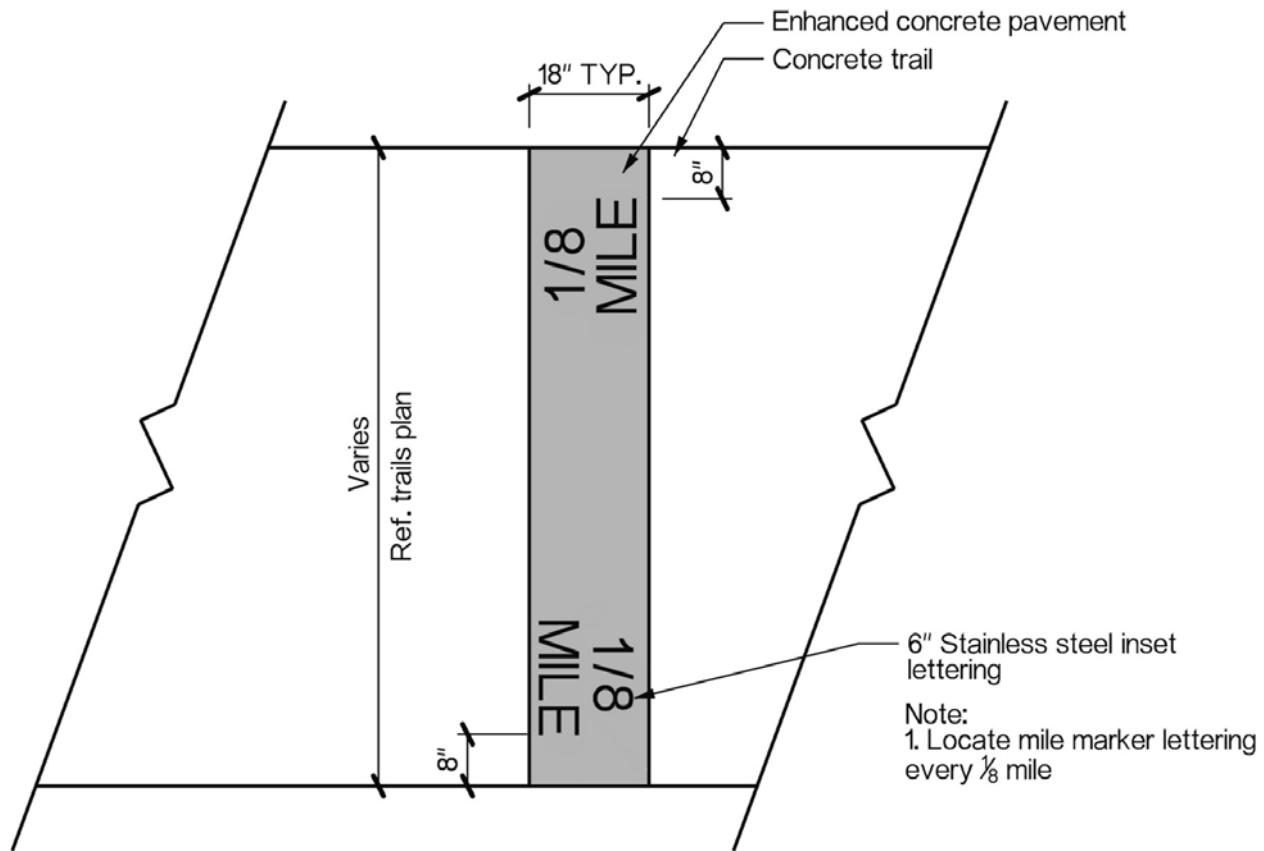


Figure A.20 – Typical Trail Mile Marker

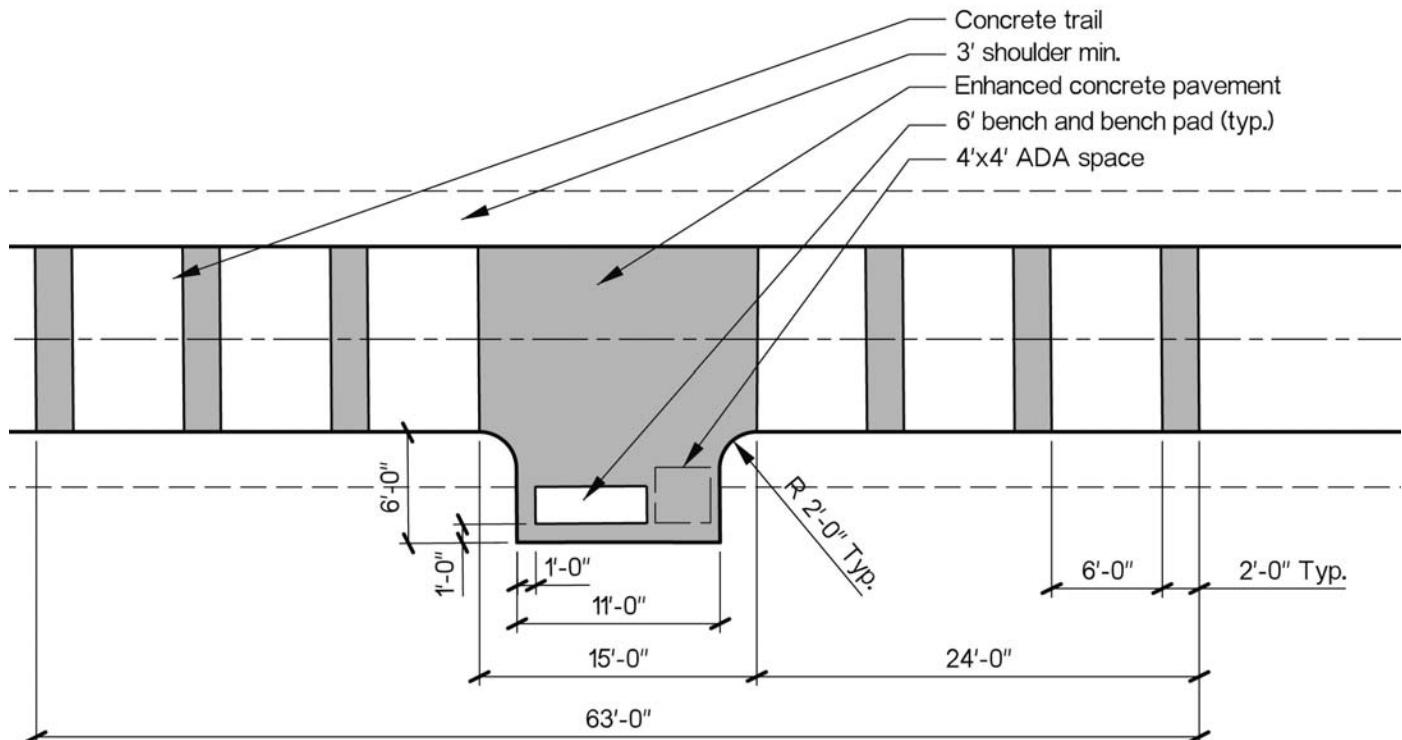


Figure A.21 – Typical Rest Area

## ***Trailheads & Access Points***

### **Design Objectives**

- Provide transition between motorized and non-motorized transportation and recreational systems.
- Create a unique entry to the trail system through hardscape and landscape features that support aesthetic guidelines established in these standards.
- Encourage use of trail and bicycle routes as alternative transportation paths within the city.
- Provide access to a variety of destinations, streets, and trails.
- Utilize existing facilities such as schools, civic facilities (library, city hall, etc.) and parks as trailheads.
- Establish a hierarchy of major trailheads, minor trailheads, and access points.
- Encourage shared use of parking when appropriate and when such shared use would not have a negative impact on the parking availability of the primary parking lot user.

### **Trailhead Design Standards**

- a. **Trail Markers**: A minimum of one (1) trail marker shall be provided at each major and minor trailhead located such that it indicates the primary trail access point.
- b. **Parking**: A minimum of ten (10) parking spaces and one (1) handicap space shall be provided at major trailheads. A minimum five (5) spaces and one (1) handicap space shall be provided at minor trailheads. In both instances, the handicap parking space must be van accessible. Sidewalks shall connect handicap spaces to the trails and the parking lot shall be signed for trailhead usage.
- c. **Bike Racks**: Bike racks approved by the City shall be provided at a ratio of one (1) bike space for every two (2) car parking spaces. No less than five (5) bike spaces shall be provided in a rack at any trailhead.
- d. **Drinking Fountains**: One (1) drinking fountain approved by the City shall be provided within 30' of benches and bike racks. Drinking fountains shall be per the City of Cedar Hill's standard, or approved equal. Drinking fountains shall comply with City standard specifications.

- e. Benches: One (1) bench approved by the City for every three (3) parking spaces shall be provided, with minimum four (4) benches provided at major trailheads and two (2) benches provided at minor trailheads.
- f. Lighting: Parking lots and trail intersections shall be lighted to a minimum of  $\frac{1}{2}$  footcandle with appropriate commercial light fixtures and no spillover to adjacent property.
- g. Trail Termination: Trails that terminate at trailheads shall receive landscape traffic control measures for buffering and guiding the direction of pedestrian and bicycle traffic.
- h. Trees: Trailheads shall provide one (1) canopy tree per two (2) parking spaces with a minimum of five (5) trees required. Three (3) ornamental trees shall equal one (1) canopy tree. (See Landscape Ordinance for minimum sizes and specifications for shade and ornamental trees).
- i. Identification: Trailheads shall be identified by trail markers.
- j. Signage: Directional and wayfinding signage shall be provided at each major and minor trailhead and shall at a minimum include a map of the City's trail system.

#### Trail Access Point Design Standards

- a. Trail Markers: One (1) trail marker shall be provided at each access point.
- b. Parking: Off-street parking is not required at trail access points.
- c. Bike Racks: One (1) bike rack (holding capacity of five bikes) shall be provided at any trail access points.
- d. Drinking Fountains: No drinking fountains are required at access points.
- e. Benches: One (1) bench approved by the City shall be provided.
- f. Trail Termination: Trails that terminate at trail access points shall receive landscape traffic control measures for buffering and direction of pedestrian and bicycle traffic.

## Maintenance Standards

In order to ensure the long-term sustainability and continued enjoyment of Cedar Hill's trail system, it is imperative that the City's maintenance program be effective and thorough. In general, trail maintenance activities most often include pavement stabilization, landscape maintenance, facility upkeep, sign replacement, mowing, litter removal, and painting. A successful maintenance program requires vigilance, continuity, and the involvement of citizens in maintaining and informally policing the trails (such as a neighborhood watch program applied to a trail corridor). Routine maintenance on a year-round basis will not only improve trail safety, but will also prolong the life of the trail. Apart from its capacity to continually attract users, a good trail maintenance program has the following benefits:

- A high standard of maintenance is an effective advertisement to promote the trail as a city, regional, and state recreational resource
- Good maintenance deters vandalism, litter, and encroachments
- Good maintenance promotes positive public relations between the adjacent land owners and managing agency
- Good maintenance makes enforcement of regulations on the trail more efficient. Local clubs and interest groups will take pride and ownership of "their" trail and will be more apt to assist in its protection
- A proactive maintenance policy improves safety along the trail
- Good maintenance protects the tax payers' investments

The following section illustrates the framework of an effective maintenance program that the City of Cedar Hill should use as a model for its maintenance practices. The first section (General Considerations) describes common trail maintenance issues and strategies. After that, a typical trail maintenance schedule is provided.

These maintenance standards do not apply to bikeways and sidepaths along roadways. Those facilities should be maintained as per the City's current roadway maintenance practices.

## **General Considerations**

The following describes common trail maintenance issues and strategies to consider in order to address these issues.

### **Quality Control**

Establishing a quality control program for the trail maintenance is an important responsibility of the City. The City must provide appropriate equipment, material, and labor to achieve good maintenance on an ongoing basis.

### **Trail and Soil Stabilization**

It is crucial to protect trail stability by maintaining proper levels of backfill, profile, and contours of the subgrade. Continually maintain soil surfaces suitable for turf establishment and repair and re-establish grades in settled, eroded, and damaged areas as necessary. The grade of the soil adjacent to the edge of the trail should be maintained no higher than flush to the surface of the trail and no lower than a half-inch from the surface of the trail. Soil levels and grades adjacent to trail surfaces shall comply with ADAAG standards. Maintenance should be performed periodically and often enough to assure safety of the trail user and to maximize the life of the trail (see Table A.4).

### **Vegetation**

Off-street trails require an unobstructed soft shoulder along both sides of the trail primarily to preclude any obstructions or hazards to cyclists (see Trail Design Standards). These soft shoulders also provide space for people to step off the trail if necessary. In order to maintain their effectiveness, shoulders must be unobstructed to maintain good visibility and to reduce hazards along the edges of trails. Vegetation is encouraged beyond the shoulder in order to provide visual interest and shade. Under-story vegetation within the shoulders of a trail should not be allowed to grow higher than 6". Vegetation along sidewalks can be allowed to grow up to 24" in height since these facilities are intended for pedestrians only.

Basic measures should be taken to protect the trail investment. This includes mowing along both sides of the trail to prevent invasion of plants into the pavement area. The standards for mowing shall be the same for like areas of similar public spaces. Tree species selection and placement should minimize vegetative litter on the trail and root uplifting of pavement. Vertical clearance along the trail should be checked on a reoccurring schedule, and any overhanging branches must be pruned

to a minimum vertical clearance of 10'. Vegetation control should be accomplished by mechanical means or hand labor. Some species may require spot application of State-approved herbicide.

#### **Surfacing**

Concrete is the recommended surface material for paved off-street trails. Cracks, ruts, and water damage to the concrete surface shall be repaired periodically and often enough to maintain barrier-free access required by ADAAG. Where drainage problems exist along the trail, ditches and drainage structures shall be kept clear of debris to prevent washouts along the trail and maintain positive drainage flow. Inspections for erosion along the trail shall be made on a reoccurring schedule and immediately after any storm that brings flooding to the local area. Natural and soft surface trails, such as those constructed with decomposed granite or earth, should closed to users during wet conditions.

The trail surface shall be kept free of debris, broken glass and other sharp objects, loose gravel, leaves, and stray branches. Trail surfaces shall be swept on a routine basis and as soon as practical after a storm event. Soft shoulders should be well maintained to assure safety and maximize their usability.

#### **Litter and Illegal Dumping**

Staff or volunteers should remove litter along the trail. Litter receptacles and dog waste stations should be placed at access points such as trail heads, rest areas and picnic areas. Illegal dumping should be controlled by vehicle barriers, regulatory signage, and fines where applicable. When illegal dumping does occur, it shall be removed as soon as possible in order to prevent further dumping. Neighborhood volunteers, friends groups (i.e. “Friends of \_\_\_\_ Trail”), “Adopt a Trail” groups, alternative community service crews, and inmate labor should be considered in addition to paid maintenance staff.

#### **Signage**

Directional, informational, and safety signage shall be replaced along the trail as signs become damaged or missing. Missing, damaged, or vandalized signs serve as clear, obvious indicators of ineffective maintenance practices. Considering James Q. Wilson and George L. Kelling’s “Broken Windows Theory,” which basically states that a broken window left unrepaired encourages vandalism, creates a sense of abandonment, and gives an impression of apathy, it is important to replace these signs before they become symbolic “broken windows.” As a related issue, it is important to immediately remove graffiti as it is discovered.

### **Recommended Maintenance Schedule**

The following table summarizes a recommended maintenance schedule for the proposed trails in Cedar Hill. These guidelines address maintenance for off-street trails. On-street facilities, such as sidewalks and bike lanes, should be maintained per the City of Cedar Hill's current practices.

**Table A.4 – Recommended Maintenance Schedule**

Action	Frequency
Inspections	Scheduled on a routine basis
Sign replacement	Immediately upon damage, deterioration, or are missing
Pavement marking replacement	Immediately upon damage, deterioration, or are missing
Major damage response (fallen trees, washouts, or flooding)	Schedule as soon as practical
Pavement sealing and pothole repair	As needed to maintain ADA accessibility standards and a smooth surface
Introduce new tree / shrub plantings, tree trimming	Scheduled on a routine basis
Culvert inspection	Scheduled on a routine basis and after major storms
Cleaning ditches	As needed
Trash/litter pick-up	Weekly during high use; twice monthly during low use
Lighting luminary repair	Immediately upon damage, deterioration or are missing
Pavement sweeping/blowing	Scheduled on a routine basis and after major storms
Maintaining culvert inlets	Scheduled on a routine basis and after major storms
Shoulder plant trimming (weeds, trees, or brambles)	Scheduled on a routine basis
Water barrier maintenance (earthen trails)	Annually
Site furnishings, replace damaged components	Immediately upon damage, deterioration or are missing
Graffiti removal	Immediately upon notification
Fencing repair	Immediately upon damage, deterioration or are missing
Shrub/tree irrigation for introduced planting areas	Weekly during summer months until plants are established
Trail and soil stabilization	Scheduled on a routine basis.

## APPENDIX E

### RECOMMENDED

### PLANT PALETTE

The following plant list is recommended for the planting plans as required by the City landscape ordinance, as well as City plantings in parkways and medians. The plants were chosen because they are native or are adapted to this region. The appropriate plant for the specific location shall be selected by a registered landscape architect based on its mature size, growth habit, and soil, light, and water requirements.

The use of native plant material ensures the following:

- Creates and maintains the unique character of Cedar Hill
- Ensures a native plant legacy
- Limits water use
- Reduces maintenance requirements
- Promotes civic responsibility to support indigenous materials of the local ecology

Of special note is to consider why the use of certain exotic plants (even though climatically adapted) may not be encouraged in Cedar Hill. As an illustration, reference is made to a specific small tree used extensively in the DFW metroplex.

One of the most successfully used ornamental trees used in the landscape industry today is the small crape myrtle tree (*Lagerstroemia indica*), which is an exotic plant, native to India. The very fact of this being a practical, drought tolerant small tree with many blossoms and colorful bark has caused this tree to be overused extensively as the ornamental tree of choice from the eastern states of Florida and the Carolinas, across the country to California, making the planted landscapes of this immense area uniform and somewhat boring. In fact, it may be argued that this is one of many contributing factors that have affected and essentially diluted the uniqueness of communities. After all, it is the natural surroundings, including native plants that determine the unique and special quality of a place. Small ornamental trees, also referred to as “Understory Trees” are a necessary component of the landscape. Table A.7 lists a number of small trees native to Texas including Eve’s necklace, Indigo Bush, Mexican Buckeye, Mexican Plum trees, Possumhaw Holly, Texas Red Bud, and Rusty Black Haw Viburnum.

**Table A.5 – Canopy Trees**

Plant Image	Common Name	Scientific Name	Minimum Spacing	Typ. Mature Height/Width
	Shumard Red Oak	<i>Quercus shumardii</i>	30' O.C.	60'-80'/40'-50'
	Live Oak	<i>Quercus virginiana</i>	40' O.C.	60'-80'/60'-120'
	Cedar Elm	<i>Ulmus crassifolia</i>	30' O.C.	50'-70'/40'60'
	Big Tooth Maple	<i>Acer grandidentatum</i>	20' O.C.	20'-30' High & Wide
	Bald Cypress	<i>Taxodium distichum</i>	20' O.C.	60'-80'/25'-30'
	Bur Oak	<i>Quercus macrocarpa</i>	30' O.C.	40'-60/30'-40'

**Table A.6 – Canopy Trees**

Plant Image	Common Name	Scientific Name	Minimum Spacing	Typ. Mature Height/Width
	Red Maple 'October Glory"	<i>Acer rubrum</i> 'October Glory'	20' O.C.	30'-35'/25'-30'
	Chinquapin Oak	<i>Quercus muhlenbergii</i>	30' O.C.	40'-60/30'-40'
	Lacebark Elm	<i>Ulmus parvifolia</i>	20' O.C.	30'-50/25'-35'
	Texas Ash	<i>Fraxinus texensis</i>	20' O.C.	35'-45'/25'-35'
	Red Maple 'October Glory"	<i>Acer rubrum</i> 'October Glory'	20' O.C.	30'-35'/25'-30'

**Table A.7 – Understory Trees**

Plant Image	Common Name	Scientific Name	Minimum Spacing	Typ. Mature Height/Width
	Possumhaw Holly	<i>Ilex decidua</i>	10' O.C.	15'-20'/10'-15'
	Texas Redbud	<i>Cercis canadensis</i> var. <i>texensis</i>	15' O.C.	20'-30'/15'-30'
	Flameleaf Sumac	<i>Rhus lanceolata</i>	10' O.C.	12'-15'/10'-12'
	Vitex	<i>Vitex angus-castus</i>	10' O.C.	15'-20'/10'-15'
	Shantung Maple	<i>Acer truncatum</i>	15' O.C.	20'-25'/15'-20'
	Desert Willow	<i>Chilopsis linearis</i>	15' O.C.	12'-15'/15'-20'

**Table A.8 – Understory Trees**

Plant Image	Common Name	Scientific Name	Minimum Spacing	Typ. Mature Height/Width
	Chitalpa/Chitalpa tashkentensis	<i>Chitalpa tashkentensis</i>	20' O.C.	15'-20'/20'-30'
	Mexican Buckeye	<i>Ungnadia speciosa</i>	10' O.C.	12'-15'/12'-15'
	Yaupon holly	<i>Ilex vomitoria</i>	10' O.C.	12'-15'/10'-12'
	Wax Myrtle	<i>Myrica cerifera</i>	8' O.C.	12'-15'/8'-10'
	Eve's Necklace	<i>Sophora affinis</i>	15' O.C.	15'-35'/10'-20'
	Indigo Bush	<i>Amorpha fruticosa</i>	10' O.C.	10'-12'/10'-12'

**Table A.9 – Understory Trees**

Plant Image	Common Name	Scientific Name	Minimum Spacing	Typ. Mature Height/Width
	Mexican Plum	<i>Prunus mexicana</i>	15' O.C.	15'-35'/10'-20'
	Rusty Blackhaw	<i>Viburnum rufidulum</i>	15' O.C.	15'-20'/10'-20'
	Western Soapberry	<i>Sapindus saponaria</i> var. <i>drummondii</i>	15' O.C.	10'-50'/10'-30'

**Table A.10 – Evergreen Trees**

Plant Image	Common Name	Scientific Name	Minimum Spacing	Typ. Mature Height/Width
	Cherry Laurel	<i>Prunus caroliniana</i>	10' O.C.	20'-25'/12'-18'
	Savannah Holly	<i>Ilex opaca X attenuata 'Savannah'</i>	8' O.C.	30'-40'/10'-15'
	Nellie R. Stevens Holly	<i>Ilex X 'Nellie R. Stevens'</i>	4' O.C.	20'-30'/15'
	Eastern Red Cedar	<i>Juniperus virginiana</i>	10' O.C.	40'-50'/10'20'

**Table A.11 – Large to Medium Shrubs**

Plant Image	Common Name	Scientific Name	Minimum Spacing	Typ. Mature Height/Width
	Abelia 'Edward Goucher'	<i>Abelia x grandiflora</i> 'Edward Goucher'	36" O.C.	4'-6'/4'-5'
	Common Buttonbush	<i>Cephalanthus occidentalis</i>	6' O.C.	6'-12' High & Wide
	Soft Leaf Yucca	<i>Yucca recurvifolia</i>	48" O.C.	6' Tall & Wide
	Texas Sage	<i>Leucophyllum frutescens</i> 'Compacta'	36" O.C.	5' High & Wide
	Dwarf Wax Myrtle	<i>Myrica cerifera</i> var. <i>pumila</i>	36" O.C.	3'-6' High & Wide
	American Beautyberry	<i>Callicarpa americana</i>	48" O.C.	3'-5' High & Wide

**Table A.12 – Large to Medium Shrubs**

Plant Image	Common Name	Scientific Name	Minimum Spacing	Typ. Mature Height/Width
	Common Elderberry	<i>Sambucus nigra</i> ssp. <i>Canadensis</i>	12' O.C.	12'/10'-12'
	Smooth Sumac	<i>Rhus glabra</i>	12' O.C.	10-20'/10'-15'
	Green Cloud Texas Sage	<i>Leucophyllum frutescens</i> 'Green Cloud'	6'	6' High & Wide
	Swamp Rose	<i>Rosa palustris</i>	6'	6'-8' High and Wide
	Yellow Bells	<i>Tecoma stans</i>	6'	3'-6' High and Wide
	Texas Lantana	<i>Lantana urticoides</i>	6'	3'-6' High and Wide

**Table A.13 – Medium to Small Shrubs**

Plant Image	Common Name	Scientific Name	Minimum Spacing	Typ. Mature Height/Width
	Autumn Sage	<i>Salvia greggii</i>	24" O.C.	3' High & Wide
	Red Yucca	<i>Hesperaloe parviflora</i>	36" O.C.	3' High & Wide

**Table A.14 – Tall to Medium Ornamental Grass**

Plant Image	Common Name	Scientific Name	Minimum Spacing	Typ. Mature Height/Width
	Miscanthus 'Adagio'	<i>Miscanthus sinensis</i> 'Adagio'	36" O.C.	3'-6'/3'-4'
	Indian Grass	<i>Sorghastrum nutans</i>	5' O.C.	5'-6'/2'-3'
	Lindheimer's Muhly	<i>Muhlenbergia</i> <i>lindheimeri</i>	36" O.C.	3'-5' High & Wide
	Gulf Muhly	<i>Muhlenbergia</i> <i>capillaris</i>	2' O.C.	3' High & wide

**Table A.15 – Medium to Low Ornamental Grasses**

Plant Image	Common Name	Scientific Name	Minimum Spacing	Typ. Mature Height/Width
	Bushy Bluestem	<i>Andropogon glomeratus</i>	36" O.C.	2'-5'/ mostly vertical growth
	Mexican Feather Grass	<i>Stipa tenuissima</i>	36" O.C.	24"-30"/24"-30"
	Weeping Love Grass	<i>Eragrostis curvula</i>	12" O.C. for 1 gallon	24"-30"/18-24"
	Inland Sea Oats	<i>Chasmanthium latifolium</i>	N/A	24"-48"/18-24"
	Little Bluestem	<i>Schizachyrium</i>	N/A	18"-24"/18-24"
	Sideoats Grama	<i>Bouteloua curtipendula</i>	N/A	24"-36"/18-24"

**Table A.16 – Turf Grasses**

Plant Image	Common Name	Scientific Name	Minimum Spacing	Typ. Mature Height/Width
	Buffalo Grass	<i>Buchloe dactyloides</i>	n/a	n/a
	Common Bermuda Grass	<i>Cynodon dactylon</i>	n/a	n/a

**Table A.17 – Groundcovers and Vines**

Plant Image	Common Name	Scientific Name	Minimum Spacing	Typ. Mature Height/Width
	Coral Honeysuckle	<i>Lonicera sempervirens</i>	24" O.C.	n/a
	Virginia Creeper	<i>Parthenocissus quinquefolia</i>	36" O.C.	n/a
	Purple Wintercreeper	<i>Euonymus fortunei</i> 'Coloratus'	18" O.C.	n/a
	Crossvine	<i>Bignonia capreolata</i>	24" O.C.	n/a
	Texas Wisteria	<i>Wisteria frutescens</i>	24" O.C.	n/a

**Table A.18 – Perennials**

Plant Image	Common Name	Scientific Name	Minimum Spacing	Typ. Mature Height/Width
	Fall Aster	<i>Aster oblongifolium</i>	36" O.C.	2'-3'/3'
	Maximilian Sunflower	<i>Helianthus maximiliani</i>	6"-12" O.C.	3'-10' High
	Mealy Blue Sage	<i>Salvia farinacea</i>	6"-12" O.C.	2'-3' High

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# APPENDIX F

## PARK LAND

### DEDICATION

### ORDINANCE

### METHODOLOGY

The Master Plan recommends revising the Park Land Dedication Ordinance so that the fees and land conveyance required are proportionate to the impact of new development (see Chapter 7, Section 7.3). This appendix summarizes the current ordinance and describes a recommended method for calculating conveyance of land, fees in lieu of land, and park development fees.

#### ***Current Ordinance***

The current ordinance contains the following requirements:

1. ***Conveyance of land requirements:***
  - a. 1 acres/133 dwelling units for residential development.
  - b. At least 5 acres must be above the 100-year floodplain. If the dedication is greater than 10 acres, less than 50% should be included in the 100-year floodplain. In terms of acreage requirements, there is no differentiation between floodplain and out-of-floodplain land (i.e., floodplain is accepted at a 1:1 ratio).
  - c. No dedication of less than 5 acres accepted
2. ***Payment in lieu of land:*** \$250 per dwelling unit
3. ***Park Development fee:*** \$250 per dwelling unit

#### ***Recommended Calculation Methodology (Example)***

The following methodology illustrates a defensible manner in which to calculate land conveyance requirements, fees in lieu of land, and park development fees:

1. ***Conveyance of land requirements:***
  - a. Current level of service can be maintained by increasing the conveyance of land requirement to 1 acre per 37.2 dwelling units
    - i. Current population is 45,260
    - ii. Current household size is 3.24 people/household
    - iii. Current number of households is 13,976
    - iv. Current park level of service is 8.3 acres per 1,000 population (1 acre per 120.5 population)<sup>1</sup>
    - v. 8.3 acres per 1,000 population = 1 acre per 37.2 dwelling units.
  - b. Requiring that no more than 50% of the required land dedicated be within the 100-year floodplain (with at least

<sup>1</sup> Includes neighborhood and community parks only.

5 acres out of floodplain) ensures adequate dry land for a neighborhood park. Accept floodplain land at a 1:2 ratio (floodplain to non-floodplain) increases public access to undevelopable land for recreational purposes.

- i. If a developer is required to dedicate 7 acres, he may either:

- 1. dedicate 7 acres out-of-floodplain, or
- 2. dedicate at least 5 acres out-of-floodplain and 4 acres in-floodplain.

- ii. If a developer is required to dedicate 12 acres, he may either:

- 1. dedicate 12 acres out-of-floodplain, or
- 2. dedicate at least 6 acres (50% of the total) out-of floodplain and 12 acres in-floodplain.

- c. Continuing to require a minimum dedication size of 5 acres for neighborhood/suburban areas<sup>2</sup> maintains the City's standards for neighborhood park size.

- 2. **Payment in lieu of land:** Basing this figure on the true cost of land ensures the payment in lieu is relative to the actual cost to purchase property. Assuming land value at \$60,000 per acre results in a figure of \$1,613 per dwelling unit:

- a. Cost of land<sup>3</sup> = \$60,000/acre; conveyance = 1 acre/37.2 dwelling units; then \$60,000/37.2 = \$1,613 per dwelling unit.

- b. Alternatively, the developer may, at his/her own expense, obtain an appraisal by a State of Texas certified real estate appraiser, mutually agreed upon by the City and the developer.

- 3. **Park Development Fee:** Increasing the fee to \$4,468 per dwelling unit (single and multi-family) reflects the actual cost to develop the new neighborhood and community parks that will be necessitated by future development.

- a. Neighborhood Park Development Fee: \$1,461/dwelling unit

- i. Cost to develop an average neighborhood park in the Metroplex = \$1.2 million;
- ii. Current neighborhood parks serve 2,662 people on average (current population of 45,260 divided by 17 existing neighborhood parks).

<sup>2</sup> More densely urbanized areas (such as Downtown) may warrant parks and plazas as small as 1 acre.

<sup>3</sup> Land costs can range from \$20,000 to over \$100,000 per acre. An average cost of \$60,000 per acre is used in these calculations

- iii. Cost per person served to develop an average neighborhood park:  $\$1.2 \text{ million}/2,662 = \$451/\text{person}$ .
- iv. The average household in Cedar Hill contains 3.24 persons;
- v. Neighborhood park development fee is calculated as:  $\$451 \times 3.24 = \$1,461/\text{dwelling unit}$

b. Community Park Development Fee:  $\$3,007/\text{dwelling unit}$

- i. Cost to develop an average community park in the Metroplex = \$7 million;
- ii. One community park generally serves 7,543 people (current population of 45,260 divided by 6 existing community parks).
- iii. Cost per person served to develop an average community park:  $\$7 \text{ million}/7,543 = \$928/\text{person}$ .
- iv. The average household in Cedar Hill contains 3.24 persons;
- v. Community park development fee is calculated as:  $\$928 \times 3.24 = \$3,007/\text{dwelling unit}$



