



## Roadmap to a Sustainable Public Right of Way (SPROW)

### Purpose and Use

This Roadmap is intended to be a resource that both public officials and private developers may use to improve the sustainability of their projects constructed within the public rights-of-way. It is a collection of ideas, examples, reference material, and memory joggers that may be used to create more sustainable public rights-of-way for both new construction and rehabilitation/revitalization projects.

### Introduction

The North Central Texas Council of Governments established a Sustainable Public Rights of Way Committee in order to look at how this region manages public rights of way and how that management could be more sustainable. Some of the key resources for the Roadmap include:

- The [New York City High Performance Infrastructure Guidelines](#)
- The [Complete Streets](#) initiative
- The [Institute for Sustainable Infrastructure's Envision Rating System](#)
- [Sustainable Transportation Performance Measures](#), USEPA
- [Greenroads](#)

### The 10 principles of a SPROW

1. Meet the needs of today without compromising the ability of future generations to meet tomorrow's needs
2. Create environmentally friendly, economically feasible, and socially acceptable public rights of way
3. Involve stakeholders and coordinate from start to finish
4. Improve air quality
5. Improve water quality
6. Create pedestrian and bicycle friendly communities
7. Improve performance and reduce lifecycle and maintenance costs
8. Ensure regulatory compliance
9. Promote economic development
10. Provide safer and healthier neighborhoods

## Planning

Proper planning requires asking the right questions, ensuring all stakeholders are involved and identifying existing elements needing to be included in the process. Planning occurs on many different levels and throughout design, construction and maintenance. This guide focuses on local planning activities ranging from city master planning to site plans.

### Planning Fact Sheets

City and Regional Planning

Project Planning

## City and Regional Planning

City and Regional planning efforts should consider all your community has to offer. Plans must reflect the important goals and challenges from community officials and citizens alike.

General considerations when conducting general planning on this level include zoning, overlay districts, new development, re-development, stakeholders, types of master plans (thoroughfares, parks and trails, utilities, etc.), fees, codes and ordinances. Planning efforts should incorporate future growth predictions.

City and Regional planning efforts can be limited by availability and accuracy of information about existing facilities as well as future development. These plans should be updated often to incorporate new data. Successful planning efforts can be limited by poor stakeholder participation. Early and ongoing coordination with all the stakeholders including neighboring communities and other city departments is extremely important.

### Resources and Important Considerations

- Sustainability in Project Planning
  - [Institute for Sustainable Infrastructure's Envision Rating System](#)
  - [Sustainable Transportation Performance Measures](#), USEPA
  - [Greenroads](#)
  - Becoming Part of the Solution, The Engineer's Guide to Sustainable Development, Bill Wallace, ASCE (Can purchase on ASCE website)
  - FIDIC Project Sustainability Management Guidelines (2004), International Federation of Consulting Engineers
- Complete Streets
  - [City of Dallas Complete Streets Design Manual](#)
  - [National Complete Streets Coalition](#)
- Context Sensitive Design
  - <http://www.nctcog.org/trans/sustdev/landuse/css/>
  - <http://www.ite.org/css/>
  - <http://www.contextsensitivesolutions.org/>
- Urban Zoning / Form based Code

- Form Based Codes
    - [http://www.nctcog.org/trans/sustdev/landuse/formbased\\_codes.asp](http://www.nctcog.org/trans/sustdev/landuse/formbased_codes.asp)
    - <http://www.smartcodecentral.org/> (login required)
- Transit Oriented Design
  - <http://www.nctcog.org/trans/sustdev/landuse/funding/tod.asp>
  - [Transit Oriented Development Institute](#)
  - Reconnecting America [Center for Transit-Oriented Development](#)
  - See [Greenroads Manual](#) for information on Transit/HOV access issues (login required)
- Master Planning
  - Land Planning
    - Land planning directly corresponds with anticipated transportation needs.
  - Example: <http://www.forwarddallas.org/>
  - Thoroughfares
    - [NCTCOG Regional Thoroughfare Plan](#)
  - Roadways
    - Create street interconnectivity to create alternate routes to decrease congestion
  - Bike and pedestrian facilities – [Draft NCTCOG Regional Bicycle and Pedestrian Design Guidelines](#)
  - Public transportation – work within your community and with other communities to master plan public transportation in order to maximize its efficiency and ridership
  - Utilities
    - Cities should map (GIS/GPS) all city-owned utility lines if possible
    - Coordinate with franchise utilities
    - Require submittals of as-built information
  - Keeping Current and Coordinated
    - Ask what has changed since last master planning occurred
    - Ask who needs to be involved in the process and hold regular meetings
    - Work with other entities around you to coordinate shared corridors
- Historical Sites
  - [The Handbook of Texas Online](#) (an encyclopedia of Texas history, geography and culture)
  - [Texas History portal at UNT](#)
  - [The Texas Historical Society Atlas](#)
  - [National Register of Historic Places in Texas](#)
- Building Guidelines
  - <http://www.nyc.gov/html/ddc/downloads/pdf/guidelines.pdf>
  - [Green Alleys](#), City of Chicago
- Easements vs right-of-way
  - Types (access, utility, maintenance, visibility, sidewalk, conservation, etc)
  - In fee (ownership vs. usage rights)
  - Utility – communicate in master planning efforts with utilities such as Oncor and Atmos
  - Utility “rights and rules” within public rights of way
  - <http://www3.apwa.net/ResourceCenter/Category/Utility-and-Public-Right-of-Way>
- Districts
  - Special Districts

- Overlay districts - a common tool for establishing development restrictions, or extending development incentives, on land within a defined geographic area or characterized by specific physical features or site conditions
- Brownfields
  - <http://www.nctcog.org/trans/sustdev/landuse/brownfields/index.asp>
- Greenfields and Other Open Spaces
  - [Regional Veloweb](#)
  - [NCTCOG BikeWeb](#)
  - Bicycle and pedestrian funding opportunities
    - [NCTCOG funding opportunities](#)
  - other helpful links
    - <http://www.nctcog.org/trans/sustdev/bikeped/links.asp>
    - [The Trust for Public Land and Greenprinting](#) (the development of conservation scenarios to help communities make conservation decisions)
    - Find a local land trust through the [Land Trust Alliance](#)
    - [Rethinking the Street Space: Why Street Design Matters](#), Planetizen, 2009
- Fees
  - Texas Local Government Code; Title 12; Subtitle C; Chapter 395 (<http://www.statutes.legis.state.tx.us/>)
  - Roadway impact
  - Water and Sewer impact
  - Permitting
- Ordinances
  - Landscaping
  - Tree Preservation
    - Example: [Fort Worth Urban Forestry Ordinance](#)
  - Floodplain/drainage
    - Require SWPPP to be signed by PE who has visited site
    - Structure pay items for erosion and sediment control to promote effective usage (ie separate pay items for bmps such as final vegetation)
  - Subdivision/unified Development Code/Form Based Code
    - Examples: [Dallas](#)
    - [Smart Code](#)
    - Require As-built submittals
  - Create other hardscape/softscape requirements
    - An arborist should be used when designing/selecting street trees
- Incentives
  - Fee reductions
  - Tax abatements or reimbursements
  - Requirement reductions
  - Cost participation
    - Joint contracts between cities and utilities could be used to share costs
  - Energy rebates
  - Variances to city ordinances
  - Performance bonds should be used for design and landscaping

- Coordination
  - Keep current and coordinated with other cities and counties in region, state government and federal agencies.
  - Require submittals of as –build for projects to stay coordinated with other local projects (both concurrent and in the future)
  - Regularity train inspectors to ensure uniform construction standards
  - Regularly attend events that allow your community to learn about what other communities are doing and about new resources for information

## Project Planning

Project planning depends greatly on master planning efforts and city/county regulations, but also includes much more specific issues. Projects can range from roadways to parks and trails to utilities. Project planning has more immediate results than city and regional planning and can be limited due to funding issues, project team communication, communication with stakeholders, and other variables such as permits.

General Considerations include involving stakeholders and agencies that may have a better understanding of the project requirements. This sort of involvement can save time during design and construction when stakeholders can start to demand changes that may significantly affect the project. Project planning must also take existing master plans, regulations and conditions into account.

### Resources and Important Considerations

- Pre-Project
  - Possible incentives for sustainable development  
(<http://www.nctcog.org/trans/sustdev/landuse/funding/index.asp>)
  - Research master plans from cities and utility companies
    - Including existing lines and future planned lines
  - Research all applicable ordinances and regulations
    - Tree Preservation
    - Stormwater
    - Subdivision regulations
    - Parking
    - Building heights
    - Overlay zones
    - Easements
    - Noise mitigation
    - Waste management
  - Going Green
    - Use recycled materials
    - Reuse and recycle construction waste such as crushing concrete onsite or mulching existing vegetation
    - LEED Certification; [Green Building Council](#)
    - [Greenroads Manual](#)
- Site Inventory

- Perform a tree survey
- Retrieve traffic counts for the area (<http://www.nctcog.org/trans/data/tcins/> or TXDOT District offices)
- Perform an Environmental Site Assessment
- Perform site inventory by visiting site in person- take pictures!
- Review available aerial photography
  - <http://www.dfwmaps.com>
  - [Dallas County Appraisal District](#) (DCAD)
  - [Google Earth](#)
- Retrieve relevant floodplain information ([FEMA Map Service Center](#))
- Threatened and endangered species ([http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered\\_species/](http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species/))
- Retrieve historical or archeological information in area
  - [The Handbook of Texas Online](#) (an encyclopedia of Texas history, geography and culture):
  - [Texas History portal at UNT](#)
  - [The Texas Historical Society Atlas](#)
  - [National Register of Historic Places in Texas](#)
- Subsurface Utility Investigation
  - US Department of Transportation Federal Highway Administration [brochure](#)
- Research existing easements in area
  - Example: [Dallas County Clerk](#)
- Design Considerations
  - Current and proposed ADA facilities and needs
    - [Texas Accessibility Standards](#)
    - Consider ADA Transition Plan if applicable
  - Life cycle costs (<http://www.fhwa.dot.gov/infrastructure/asstmgmt/lcca.cfm>)
  - [EPA Framework for Responsible Environmental Decision-Making](#) (FRED), a methodology to evaluate environmental costs integrated with material cost and performance
  - Research necessary city, state and federal permits
    - USACE: [404 permits](#)
    - TCEQ: 401 Certifications
    - [Texas Water Development Board](#)
    - City permits
  - Consider if new utilities lines will be necessary
  - Underground or overhead electrical and communication lines?
    - Consider safety
    - Consider community needs and neighborhood character
    - Consider community and right of way density
  - Relocation of existing utility lines might be necessary
  - Co-location of utilities in dense rights of way or use of duct banks
- Coordination
  - Consider and coordinate with different types of utilities
    - Water
    - Sanitary Sewer

- Storm Sewer
- Electrical
- Gas
- Communication
- City Utility Coordinator
- Identify all stakeholders and involved them early and often
  - Permitting entities
  - Adjacent property owners
  - Utilities
  - Cities/counties/regional/state and federal entities and various departments

## Design

Design requires looking at the project from every angle and creating facilities that meet the needs of project stakeholders. Design occurs after planning has occurred and continues through construction. This guide focuses on best practices for design in public corridors.

### Design Fact Sheets

Streets & Roadways

Bikeways & Pedestrian Facilities

Landscapes & Streetscapes

Utilities

## Streets and Roadways

Street and roadway design includes horizontal and vertical design of roadways as well as intersections, parking, pavement, medians, illumination, signage and many other issues. Streets and roadways provide a place for vehicles, bicycles, pedestrians and many other types of transportation. Roadway design can be limited by the available funding for the road, the purchased right of way for the roadway, and city/county specifications.

General Considerations include safety of all roadway users, previous master and roadway planning efforts, involved city, state and federal agencies (depending on roadway classification, requirements by the users of the roadway and the context of the roadway's surroundings). Other design elements such as utilities can also affect roadway design.

### Resources and Important Considerations

- Overall Design
  - National Association of City Transportation Officials (NACTO) [Urban Street Design Guide](#)
  - [National Complete Streets Coalition](#)
  - [City of Dallas Complete Streets Design Manual](#)
- Bicycle Facilities
  - NACTO [Urban Bikeway Design Guide](#)
  - [Draft NCTCOG Regional Bicycle and Pedestrian Design Guidelines](#)
- Intersections
  - Sight distances – consider low growing vegetation at intersections and take into account sight distances for pedestrians, bicyclists and motorists.



- Decrease congestion by first looking at improving operations at intersections rather than looking first to increase the number of through lanes in the roadway. In many cases the level of service of a corridor is controlled by the intersections. By improving lane assignments and operations at intersections, often the designer can avoid widening the roadway to provide additional through lanes.



- Where possible, minimize crossing section for pedestrian safety by using small radii at intersections and bump-outs that can create on street parking

- Pavement Design

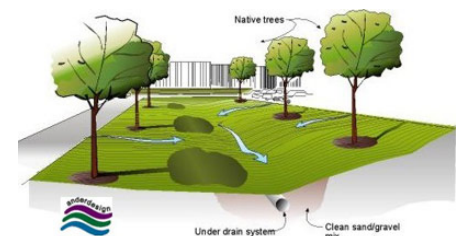
- Types of pavement
  - [apwa.net/Resource Center](http://apwa.net/ResourceCenter)
  - Concrete
    - [National Ready Mix Concrete Association](#)
    - [American Concrete Pavement Association](#)
  - Asphalt
    - National Asphalt Paving Association – [Porous Asphalt](#)
    - [Asphalt Institute](#)
  - Permeable pavement
    - [Interlocking Concrete Pavement Institute](#)
    - Use pervious pavements properly (can be used as a type of detention in this area) and more often in parking areas
- Geotechnical investigation is best way to determine proper pavement design for individual roadways

- Traveled-way design

- Perform traffic studies in areas of redevelopment
- Use speed limits and lane sizes that fit the neighborhood to create community atmosphere (>35mph use 12 ft lanes, 25 to 35 mph use 10 or 11 ft lanes, and <25 mph use 9 ft lanes)
- Consider vehicle mix and specified bike lanes
- Access management / Access limits
- Sight Distances
- Manual on Uniform Traffic Control Devices ([MUTCD](#) and [Texas MUTCD](#))

- Roadway Cross Section

- Incorporate context sensitive design into street cross section design
  - <http://www.nctcog.org/trans/sustdev/landuse/css/>
  - <http://www.ite.org/css/>
  - <http://www.contextsensitivesolutions.org/>
- Medians can be used to treat storm water runoff
  - Vegetated medians
  - Bioswales
  - Rain gardens



- Use the *integrated* Stormwater Management ([iSWM™](#)) [Technical Manual](#) to incorporate stormwater controls to manage water quality and quantity
  - Consider bike lanes, bike trails for speeds under 27 mph where bicycles can generally share traffic lanes
  - See “Utilities” fact sheet
  - ADA Compliant sidewalks
- Explore best ways to conserve water within rights of way (drip irrigation for instance, capturing runoff in tree wells)
- Future Expansion Opportunities
  - Turn bay provision
  - Bridge expansions
  - Coordinate master plans with neighboring entities
  - Medians at least 14 ft in width allow for future roadway expansion
  - Conduits for future signalization
- Street Lighting
  - [International Dark Sky Association](#)
- Construction
  - Consider temporary traffic control and project phasing
- Technical resources:
  - [TxDOT Design Guidance and Details](#)
  - [American Association of State Highway and Transportation Officials \(AASHTO\)](#)
- Other Resources:
  - [Smart Growth](#), USEPA
  - [New Urbanist Street Design](#) , Urban Land Institute
  - “Residential Streets”, third Edition, ULI, NAHB, ASCE and ITE
  - [Heat Islands](#), USEPA
  - [Bioswales/Vegetated Swales](#), Florida Field Guide to Low Impact Development, 2008
  - [NE Siskiyou Green Street](#), Portland, Oregon, Kevin Robert Perry

## Bikeways & Pedestrian Facilities

Bike and pedestrian design includes those facilities that accommodate public facility users not traveling in vehicles on roadways such as pedestrians and bicyclists. Elements within bikeway and pedestrian way design are sidewalks, trails, roadway and other intersection crossings, and accessibility. Bike and pedestrian features are often limited by funding, community support, safety issues and available right of way.

General Considerations include accommodating all types of pedestrians while coordinating their public space with roadways, utilities and the surroundings that draw them to that space.

### Resources and Important Considerations

- [NACTO Urban Bikeway Design Guide](#)
- [Draft NCTCOG Regional Bicycle and Pedestrian Design Guidelines](#)

- AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition (GPF-1) - [https://bookstore.transportation.org/category\\_item.aspx](https://bookstore.transportation.org/category_item.aspx)
- Type of surface – ie; concrete; asphalt; crushed granite, etc
- Types of traffic
- Pedestrian Mixed use Types of users
  - Commuters – bike and pedestrian ways can be used as alternative commuting options to reduce congestion and pollution
  - Recreational users
- Locations
  - Buffers
  - Aesthetically pleasing
  - Regional and local connectivity
    - [NCTCOG BikeWeb](#)
    - City master trail plans
- Safety
  - Trees close to pathways
  - Proximity to roadway traffic
  - Protection at roadway crossings
  - Lighting – consider LED and solar lighting
  - ADA requirements ([Texas Accessibility Standards](#))
  - [MUTCD standards](#)
- Amenities
  - Shade trees
  - Benches
  - Water availability
  - Waste receptacles
  - Restrooms

## Landscapes & Streetscapes

Landscaping, streetscaping and other non-roadway design elements such as signage and amenities promote and instill a sense of community and safety within a public right of way. Landscape and Streetscape designs are mostly limited by funding and available space within the right of way.

General Considerations include lighting, water conservation, plant types, safety, aesthetics, and surrounding property uses.

### Resources and Important Considerations

- Vision for long term appearance
- Trees
  - Types relevant to locations(do adult heights interfere with utility poles/wires)
  - Consider street trees for their impact on slowing traffic when placed in medians and behind the curb
  - Consider shade tree's impact on lowering paved surface temperature (-40°) and ambient temperature (-7° to 11°)

- Mitigation requirements
- Tree survey should be performed prior to design
- Trees must be considered at their mature age to ensure sustainability of pavement and utilities and to minimize effect on traffic and safety
- An arborist should be used when designing street trees if the City has not set specific guidelines for street trees
- Consider ongoing maintenance issues
- Compatibility w/ utilities
- Vegetation
  - Conventional
  - Xeriscape to minimize water usage
  - Buffalo grass to reduce mowing
  - Landscape Water Conservation information from design to plant selection to best maintenance practices for north central Texas ([www.txsmartscape.com](http://www.txsmartscape.com))
  - [Native Plant Database](#) (Wildflower Center) search for native plants by common or botanical name
  - [Recommended native plant lists](#) for selected plant areas. (Wildflower Center)
  - [Gateway to Texas Horticulture](#) information from plants and designs to crop and marketing, Texas A&M
  - [Texas Urban Landscape Guide](#), Texas A&M
  - [Native Plant Society of Texas](#)
- Irrigation methods
  - Conventional
  - Drip
  - [Texas ET](#) - Extension and TAMU Department of Biological and Agricultural Engineering Irrigation Technology Center ET site contains weather information, current and average evapotranspiration data, and irrigation watering recommendations
  - Information about irrigation training conducted by Texas AgriLife (<http://irrigation.tamu.edu>)
- Lighting
  - Types of lighting
    - Solar
    - LED
    - New technologies
  - Heights
  - Specific to cross section elements
- Safety
  - Create buffers between transportation modes when speeds exceed 20 mph
  - Consider intersection and approach surface treatments to signal to vehicles possible pedestrian and bike crossing
- Signage
  - Way-finding
  - Entry and area markings

- Facilities
  - Benches
  - Transit stops
  - Trash
  - Bicycle parking
- Vandalism vulnerability
  - Theft vulnerability
  - Anti graffiti paint

## Utilities

Utility design includes public facilities such as storm drain systems, water distribution, sewer collection, natural gas lines, and electric lines as well as private facilities. Utility design can be severely limited by a lack of upfront coordination between utility owners.

General Considerations include overall coordination between utilities, cities/counties, and project designers. Easements must also be considered when designing utilities.

### Resources and Important Considerations

- Regularly scheduled or project specific meetings
  - Get utilities involved early on for needed relocations
  - Above or underground?
  - Cover and separation
  - Easements
  - Shared conduit banks
  - Coordinate closely with all utilities (city, franchise, etc) from beginning of project
- Design
  - Always take future service estimates into account when designing utilities
  - Consider distances between certain utilities (water and sanitary sewer, gas and electric, ect.)
  - Consider water absorption techniques such as Stormwater retention areas
  - Only place utilities that do not require frequent maintenance (such as storm water) under pavement if possible
- Electric
  - Oncor provides a significant online resource including contact information, design standards, service territory, and vegetation management:  
<http://www.oncor.com/community/default.aspx>
  - Other Electric Coops include: Co-Serve, United, Tri County, Brazos, Hillco, other
- Gas
  - [Atmos Energy](#) provides online contact information
- Franchise
  - Communication utilities include Verizon, Time Warner, Charter, AT&T and others
- Placement
  - Consider the maintenance and upgrade requirements of utilities when designing their placement within the public right of way.

- Utilities that will require frequent maintenance should be not be placed under pavement if possible
- [Subsurface Utility Investigation](#)
- Municipal, electric and gas utilities should be placed in easements outside of ROW when possible so only franchise utilities are located in the public right of way
- Consider use of boxes or chases can be used under roadways for future franchise utility installation
- Include proposed locations for other utilities in plans
- Submit as built information after project completion if city allows
- Easements
  - Easements can be used for placement of these items in areas not underneath roadways, plants or sidewalks
  - Easements can be pre-assigned when platted to ensure proper use
- Water & Sanitary Sewer
  - Water & Sanitary Sewer Guidelines (TCEQ):  
<http://www.tceq.com/rules/indxpdf.html>
- Stormwater
  - [integrated Stormwater Management Program](#)
    - Transportation Integrated Stormwater Management
  - Stormwater / Watershed master plans
  - SWP3 Implementation
    - Consider recognition awards for contractors who do it right
  - Check MS4 (TCEQ Municipal Separate Storm Sewer System ) permit in project jurisdiction

## Disclaimer

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