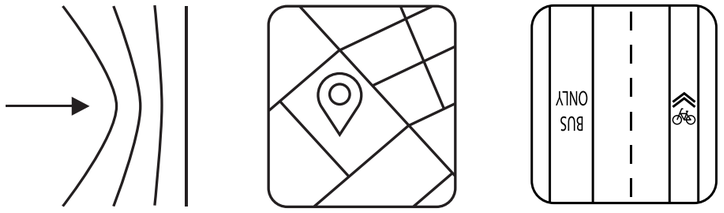
2021

Urban Planning Portfolio

Tanvi Sharma



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Land Development

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Resilience

Malden River Works

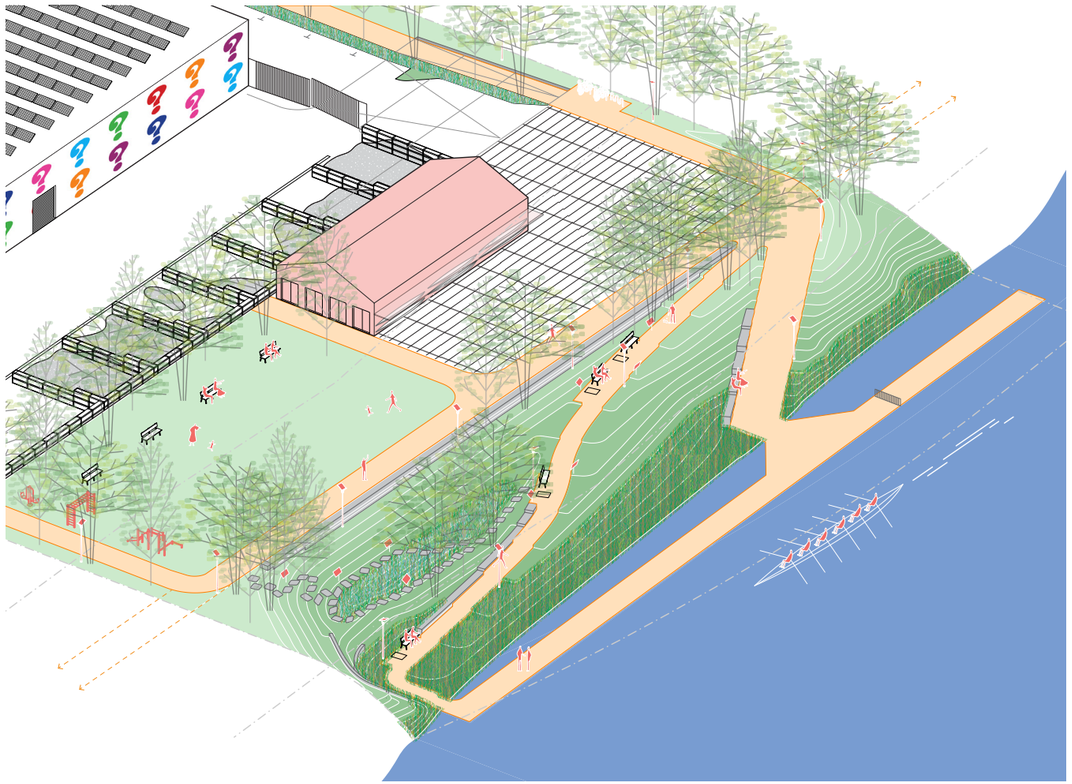
Location Malden, Massachusetts
Dates September 2019 - October 2020
School Massachusetts Institute of Technology
Team Marie Law Adams, Xio Alvarez, Tanvi Sharma

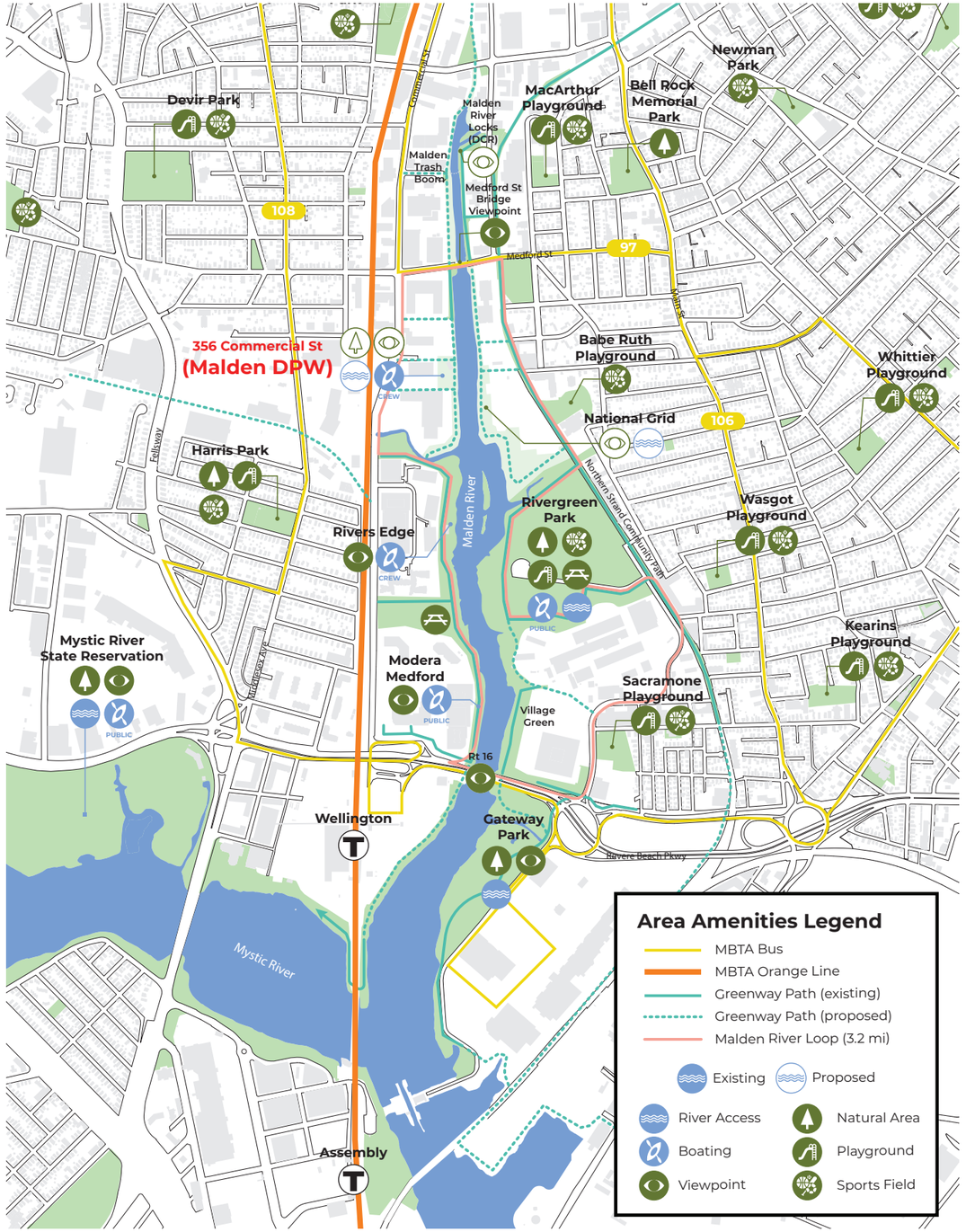
The Malden River Works project was the 2019 recipient of the Norman B. Leventhal City Prize for Resilience and Equity. The core project team included MIT faculty, Mystic River Watershed Association, City of Malden, Friends of the Malden River, and a resident expert. As a member of this team, I worked closely with a Steering Committee, composed of 10 residents including people of color, women, and youth. Together, the project team and Steering Committee set goals and design criteria for the Department of Public Works (DPW) site in Malden. The design process included four public meetings, including two conducted online due to COVID restrictions.

In addition to creating an equitable process to amplify under-represented voices, this project produced a future flood resilient site plan for a 5-acre portion of the DPW along the river. The DPW yard hosts many city operations including salt storage, waste collection, construction debris, and dead trees. The concept design proposes a more space efficient reorganization of this yard, allowing five acres along the waterfront to be available for a public park.

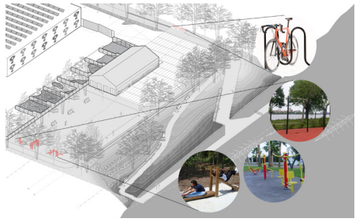
Using 2070 sea level rise projections, we proposed an elevated park with a path connecting to future parks on adjacent properties. Based on the priorities of residents, this park included a multi-use space, access to the river, and reintroduced natural ecology of the area. Flood resilience was acheived using green infrastructure such as bioswales, bioretention ponds, and permeable pavers. Increased tree canopy is also proposed to mitigate rising urban temperatures.

Overall view of proposed park

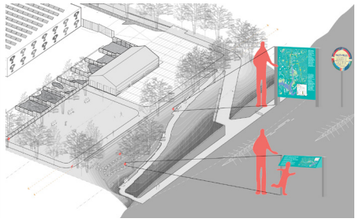




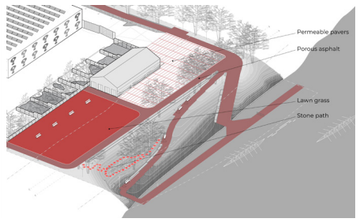
Park Furniture and Equipment



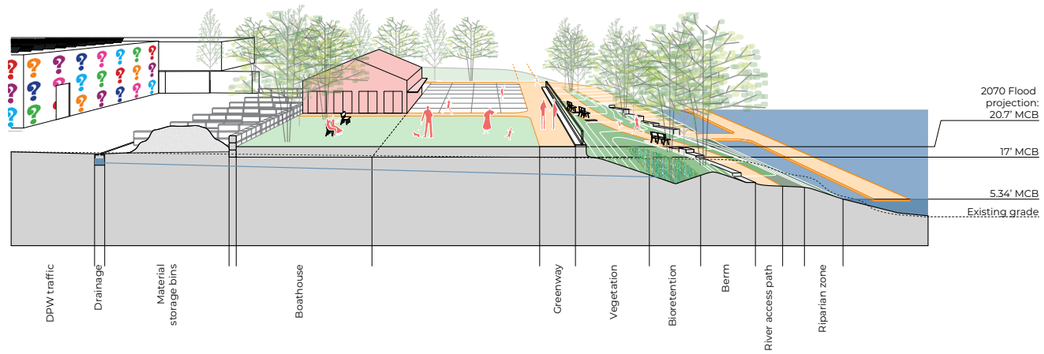
Wayfinding and Interpretive Signage



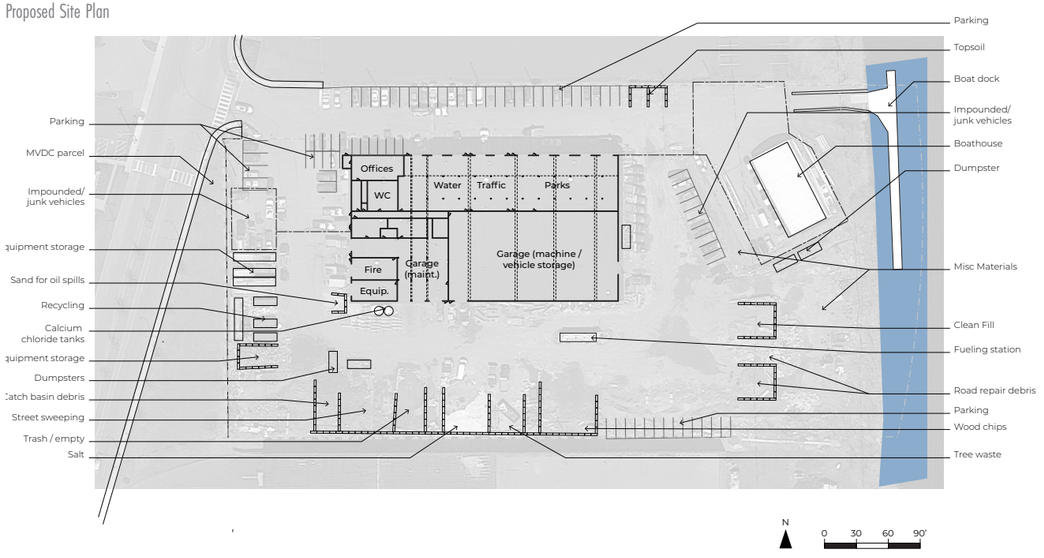
Paving Materials



East-West Section



Proposed Site Plan



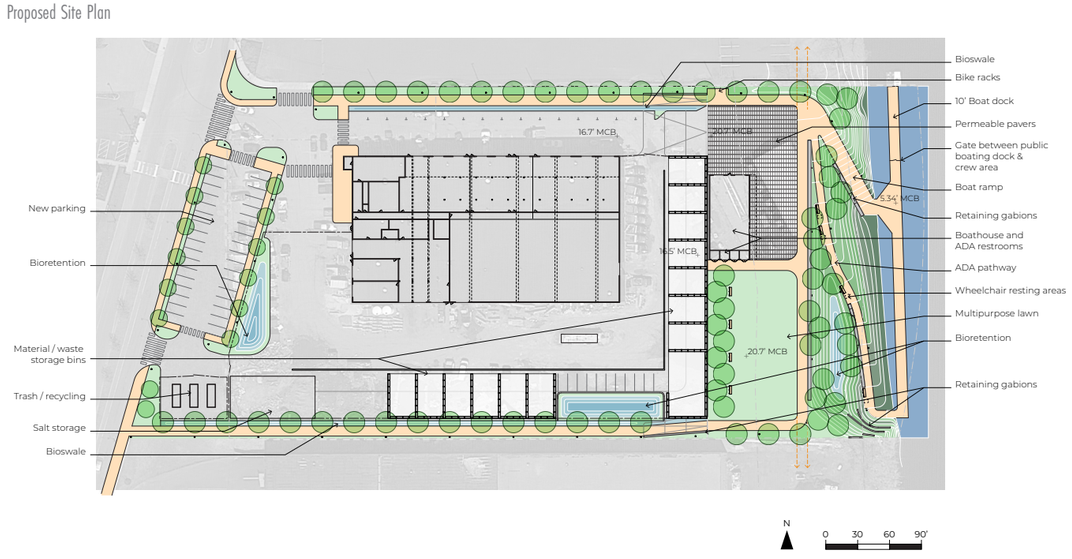
Entrance to DPW

Bioretention Pond

Greenway Paths

Multi-use Park

Proposed Site Plan



Resilience

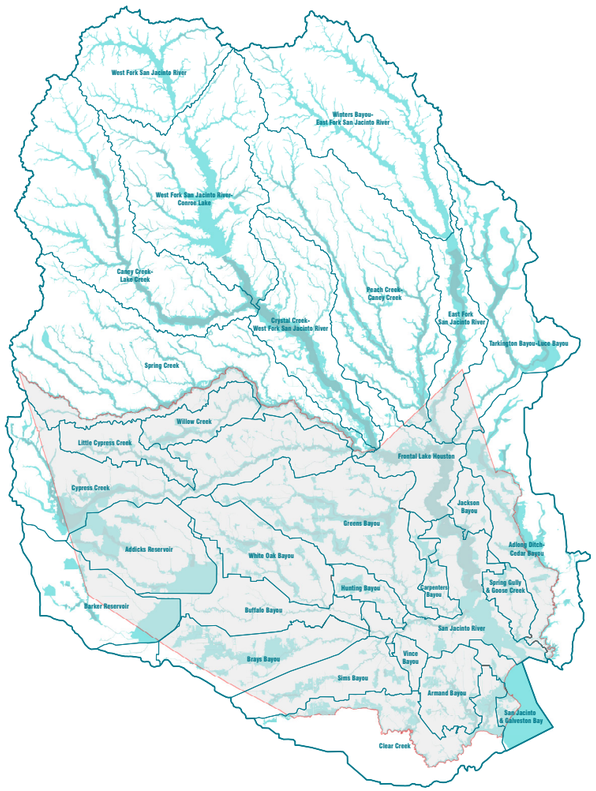
Greater Houston Flood Mitigation Consortium

Location Greater Houston, Texas
Dates October 2017 - April 2019
Firm Huitt-Zollars
Team Christof Spieler, Armandina Chapa, Tanvi Sharma, David Copeland, Corey Phelps

The Consortium was founded by three philanthropic foundations in Houston after Hurricane Harvey to consolidate, analyze, and disseminate the best flood mitigation research available to the public and regional decision-makers. As a member of the project management team at Huitt-Zollars, I was the prime point of contact for coordinating academic researchers and non-profit organizations and translating their work into publicly accessible fact sheets and briefing documents.

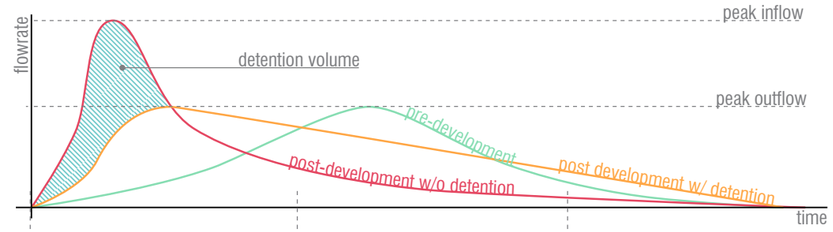
The geographic scope of the research spread as far as the San Jacinto basin, because hydraulics and hydrology do not respect jurisdictional boundaries. However, the Consortium faced a challenge with creating a buy-in from several upstream municipalities so the strategies and recommendations primarily focused on Harris County, as highlighted in red below.

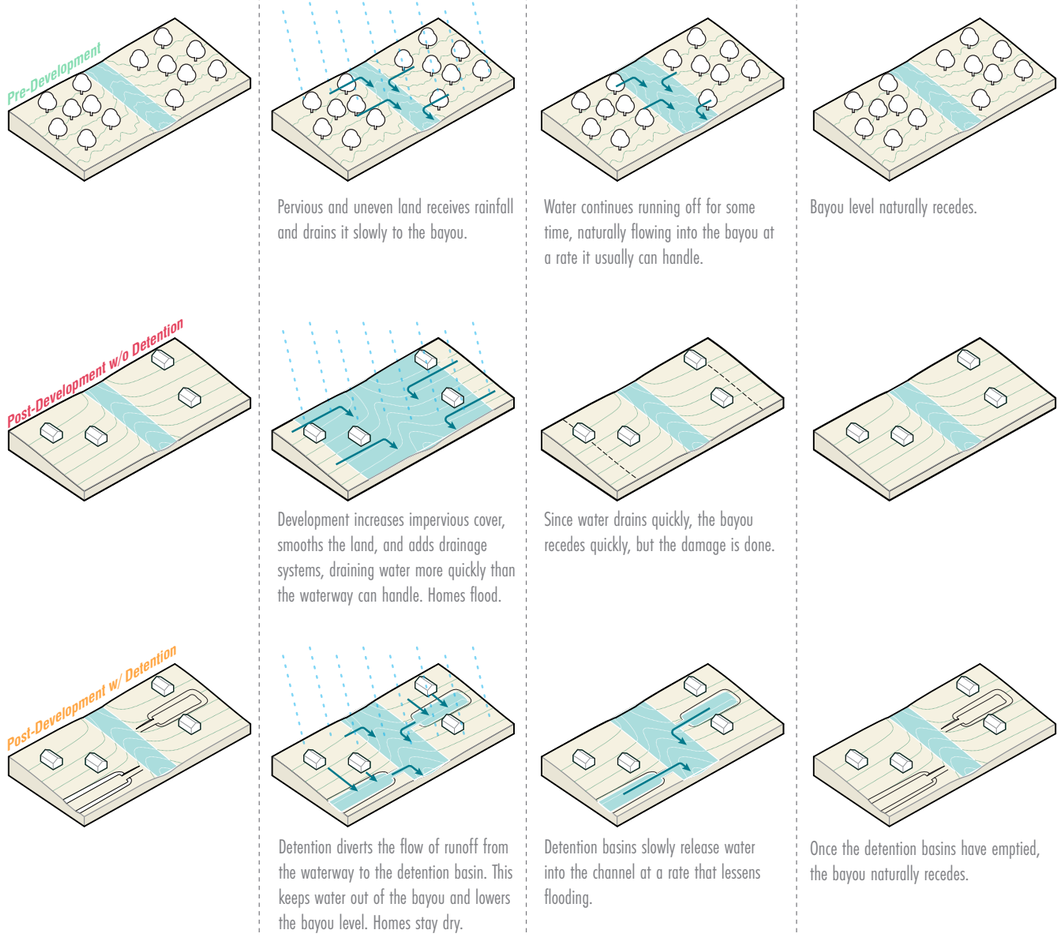
I handled all communication among researchers and experts, coordinated the project schedule and bi-weekly meetings, and engaged with the foundations directly. Additionally, I interviewed the experts to produce over ten fact sheets, five briefing documents, and two reports (with a third one in progress). All documents are geared toward allowing a lay-person to understand flooding issues so that the public can push for solutions that work best for their families and communities, and public officials can make the best-informed decisions for the region. Included in this section of the portfolio are samplings of graphics and ideas conveyed in these documents.



How Detention Works

Fact Sheet #3 explained how detention works through showing the correlation between hydrographs of pre- and post-development, as well as how detention can help mitigate the flowrate and volume of additional runoff from increased development.





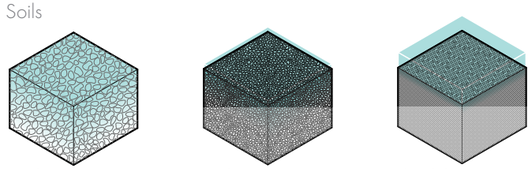
Detention Regulations

Briefing documents on detention regulations within the region explained what our current regulations do and do not address. The diagrams below show the many variables affecting runoff, and thus flooding, and yet, the regions regulations only account for one of these: added impervious cover.

High infiltration/absorption
Low Runoff

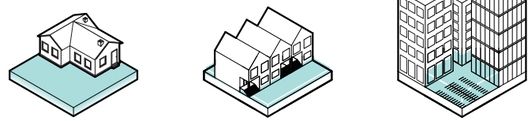
Low infiltration/absorption
High Runoff

Soils



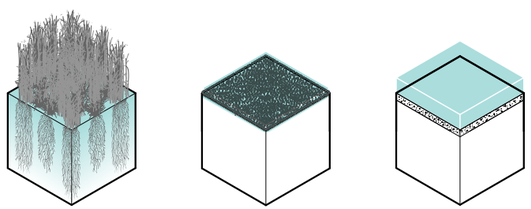
Gravels | Sands | Clays/Silts

Land Use



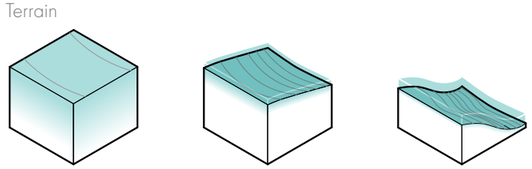
Low density | Medium density | High density

Land Cover



Prairie roots | Grass | Concrete

Terrain



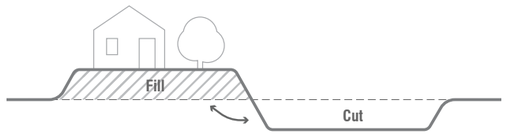
No slope | Medium slope | Steep slope

Development Regulations

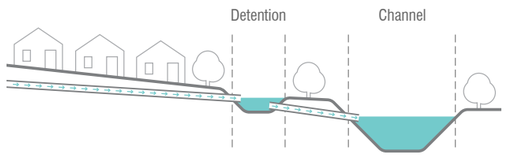
Briefing documents on development regulations within the region explained what our current regulations address. The diagrams below show the various aspects of development that our regulations are aimed at controlling. The underlying idea is to prevent adverse impacts of additional development.

Finish Floor Elevation

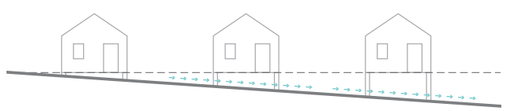
Balancing Fill



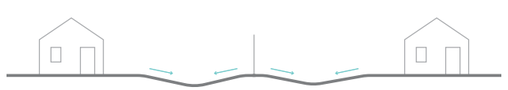
Detention



Foundation Types



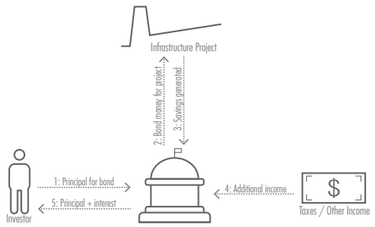
Site Drainage



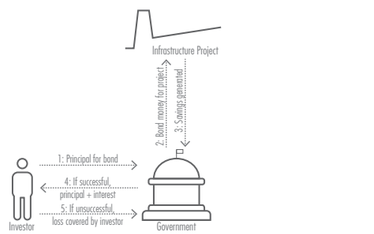
Innovative Funding

This Fact Sheet explained the innovative funding method created by Re:Focus Partners, Resilience Bonds. These bonds combine money from investors and an insurance-like premium by the government to fund flood mitigation projects.

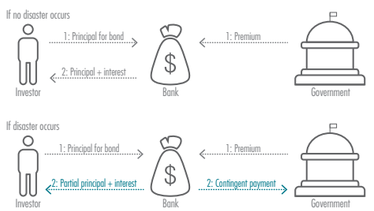
Typical Bonds



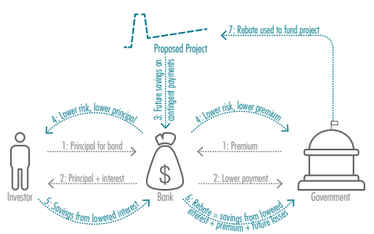
Environmental Impact Bonds



Catastrophe Bonds



Resilience Bonds

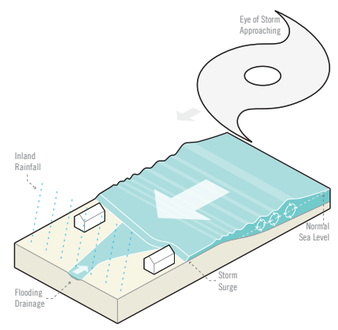


Other Fact Sheets

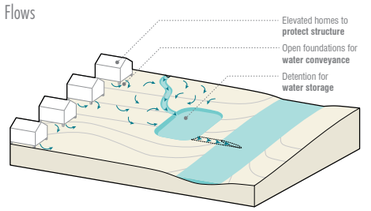
These diagrams are snippets from some other Fact Sheets produced by the Consortium.

Checkerboard Effect with Buyouts

Storm Surge



How Water Flows



Land Development

Industrial Remix

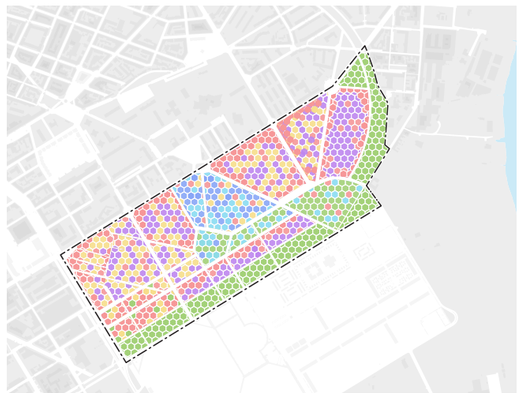
Location Torino, Italy
Dates January - August 2020
School Massachusetts Institute of Technology
Team Eran Ben-Joseph, Mary Anne Ocampo, Class team

Industrial remix was a semester-long practicum class project in collaboration with the Politecnico di Torino's Future Urban Legacy Lab. As a city with a rapidly changing landscape of economy, industry has transformed from large manufacturing to more urban-friendly industrial spaces, such as, food labs and maker spaces. In the midst of this change, Parco Regio sits outside of the heart of the city but still with dense residential and immigration offices and services surrounding it.

The class of twelve conducted existing conditions research during a visit to the city, interviews with academics, manufacturers, and residents, and culminated the studio with a proposal for new ways to imagine zoning regulations and a potential site plan. I was part of the open space planning team and the overall coordinator for the final report. We proposed new zoning and land uses methods, an sustainable green space network, and new transportation network and street cross sections for a post-industrial site on the fringes of Torino.

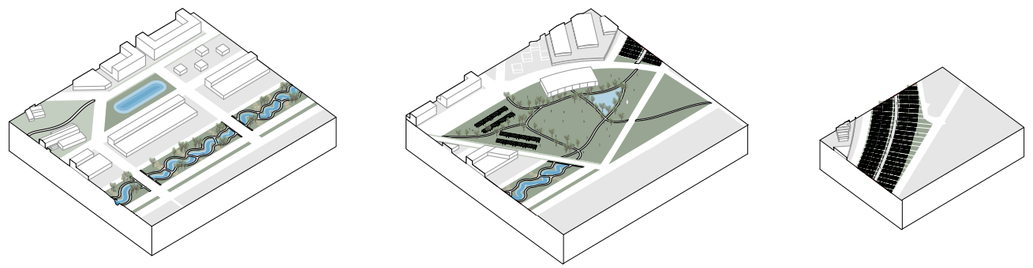
Half-way through the semester, COVID restrictions halted any efforts to engage in-person with the underrepresented communities in this area and our work was completed remotely from Cambridge, MA.

Pixelated Zoning



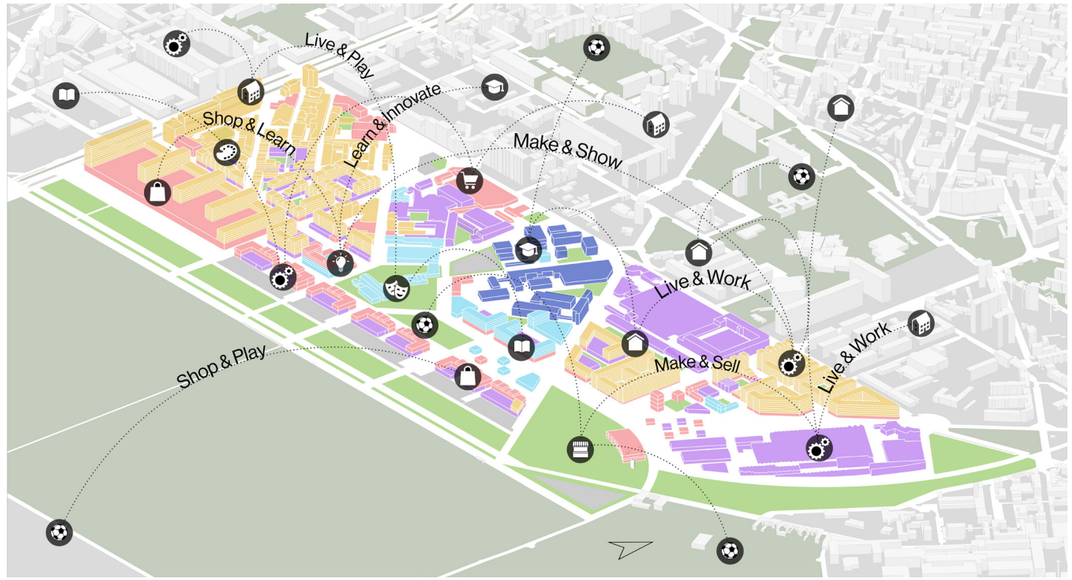
Green Network

Green Network Details



Overall Site Plan

Zoning Concept Diagram



Land Development

City of Denison Comprehensive Plan

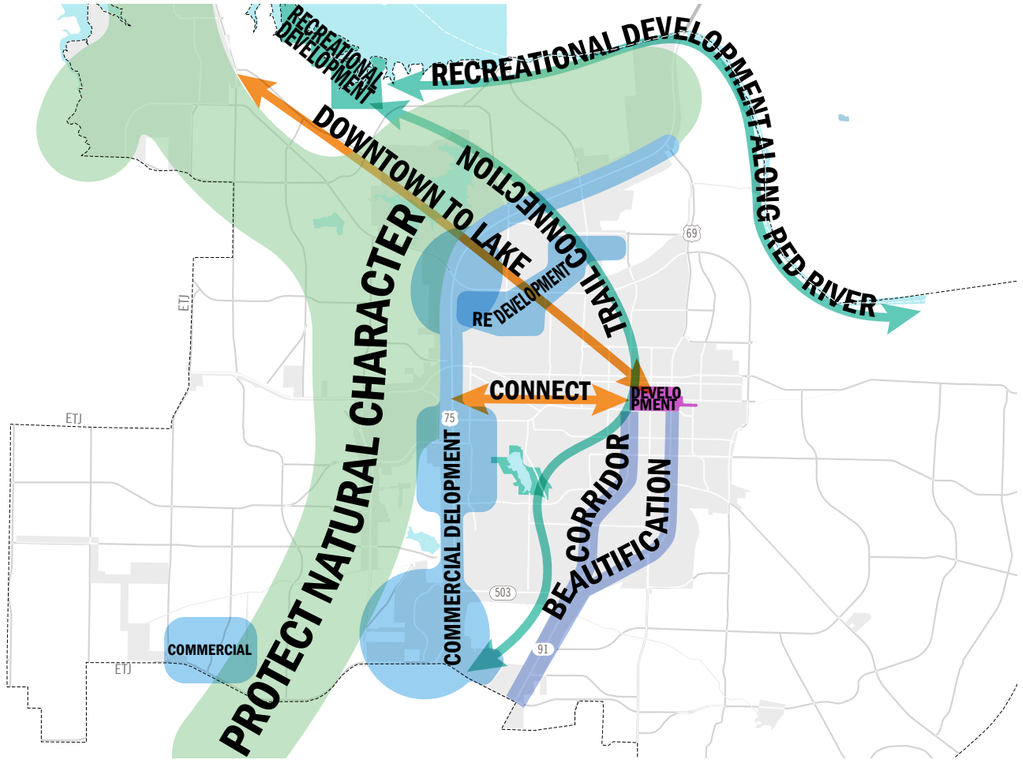
Location Denison, Texas
Dates April 2017 - April 2019
Firm Huitt-Zollars
Team Christof Spieler, Armandina Chapa, Tanvi Sharma, David Copeland

The City Planning department from the City of Denison hired my team to update their 2002 Comprehensive Plan. This involved an analysis of existing conditions, several meetings with a volunteer task force and the public, developing a set of vision and goals, identifying action items and projects for the City to implement in the short- and long-term, a Future Land Use Map, and a Future Thoroughfare Plan.

City of Denison, located one hour north of Dallas and at the Texas-Oklahoma border, has around 20,000 residents. Our kick-off meetings with the task force and the public revealed that the majority of residents enjoyed the small-town community feel of the city and highly valued their history, as the birthplace of Eisenhower and a key connection for the Missouri-Kansas-Texas Rail. Residents also indicated their largest concerns for the city included an inadequate variety of housing options, especially for seniors, and lack of tourism and entertainment options.

Over the next several meetings, our team drafted and redrafted a set of goals, which also helped develop a broader vision. I organized and helped conduct meetings for public feedback, and then translated these goals into a high level moves diagram for the city, including preserving its natural character and identifying major thoroughfares and future development. I eventually developed this big moves diagram into a finer grain Future Land Use Plan and Future Thoroughfare Masterplan that were in line with the residents' desires for their city.

Big Moves Diagram



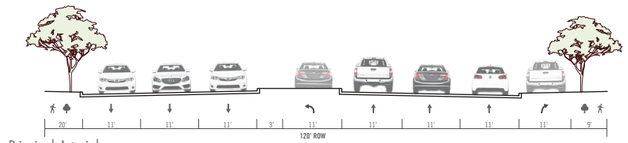
Vision

Denison will retain its home-town feel and historic character, improving its neighborhoods and downtown, while attracting new businesses, residents and visitors through a great quality of life.

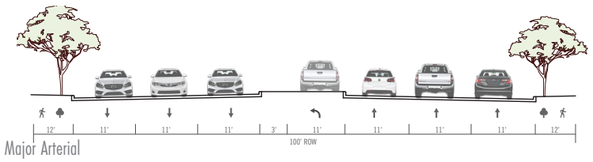
Goals

- Community
- History
- Housing
- Transportation
- Infrastructure
- Downtown
- Development & Redevelopment
- Economy
- Tourism & Recreation
- Landscape & Open Space
- Education

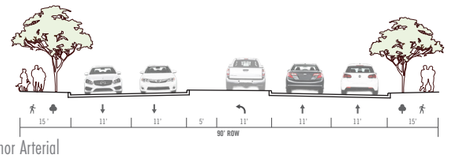
Thoroughfare Sections



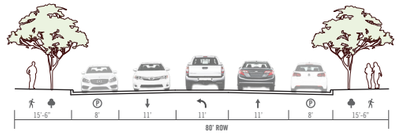
Principal Arterial



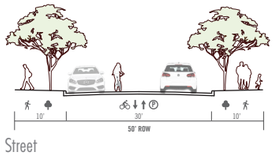
Major Arterial



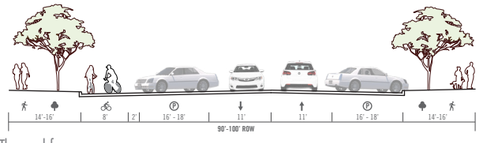
Minor Arterial



Major Collector

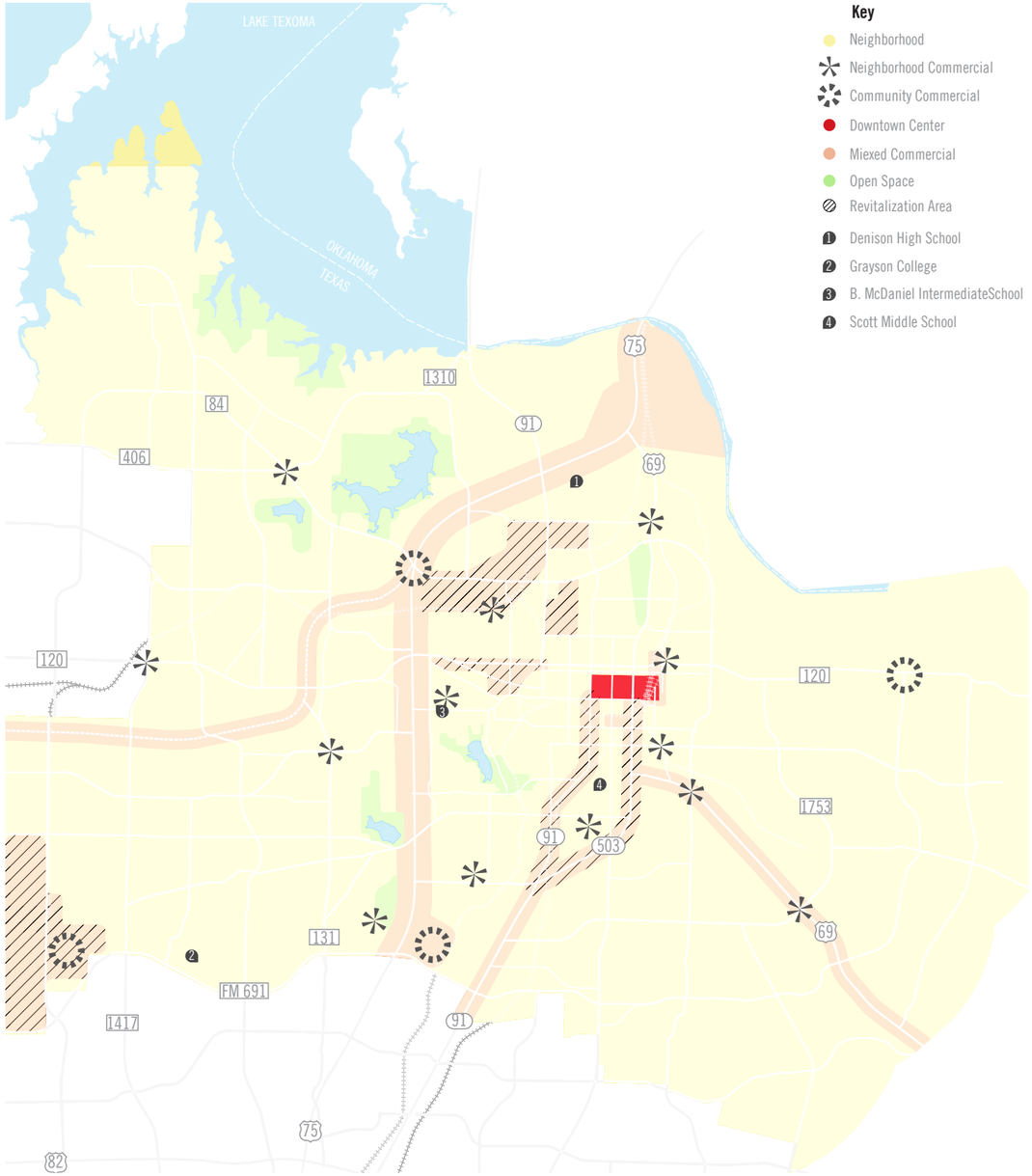


Local Street



Town Thoroughfare

Future Land Use Plan



Key

- Neighborhood
- Neighborhood Commercial
- Community Commercial
- Downtown Center
- Miexed Commercial
- Open Space
- Revitalization Area
- 1 Denison High School
- 2 Grayson College
- 3 B. McDaniel IntermediateSchool
- 4 Scott Middle School

The final Comprehensive Plan included a high-level Future Land Use Plan that designated areas for future commercial, retail, and recreational spaces, as well as future nodes of neighborhood or community activity.

Master Thoroughfare Plan

Key

- Expressway
- Principal Arterial
- A Major Arterial
- B Minor Arterial
- C Major Collector
- Town Thoroughfare
- Note: Street grid in City to maintain charm and character on Collectors

The final Comprehensive Plan also included a Master Thoroughfare Plan in collaboration with the Grayson County Thoroughfare plan that identified streets by functional classification (per TxDOT).

Transportation

East Metro Strong Transit Network Redesign

Location Ramsey, Washington, Dakota Counties
Dates March 2018 - April 2019
Firm Huitt-Zollars
Team Christof Spieler, Tanvi Sharma

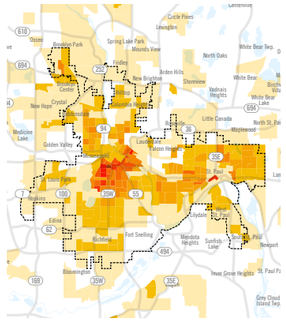
This report for East Metro Strong analyzes existing conditions, current transit service, and future improvement opportunities in Ramsey, Dakota, and Washington Counties. As part of the larger six county Metro Transit network, these eastern counties have suffered from being lower priority than the western counties, which incorporate the City of Minneapolis. The East Metro Strong organization hired my firm to identify short- and long-term projects that could improve and increase transit service in the eastern counties.

The initial existing conditions and transit analysis revealed some low-hanging opportunities for the region, such as simplifying the system legibility for users, increasing frequent service to key destinations and job centers, and transitioning from a highly radial network focused around downtown Saint Paul to a more gridded network across the counties.

Further discussions with stakeholders and county commissioners led to disagreements between political agendas, such as justifying the renovation costs of Union Depot by increasing its use as a transit center, even if its location disadvantages it as a sensible hub.

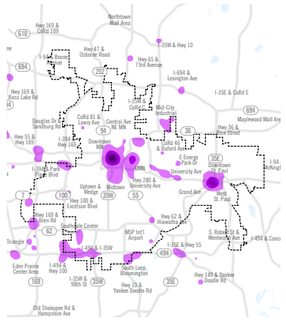
Eventually, the report laid out goals that the majority of stakeholders agreed on, strategies to help achieve these goals, and actionable projects the region could implement. This section of my portfolio showcases pieces of the report I compiled including GIS maps, goals, strategies, projects, and photographs taken by me during a stakeholder meeting in Saint Paul.

Existing Conditions: Demographics



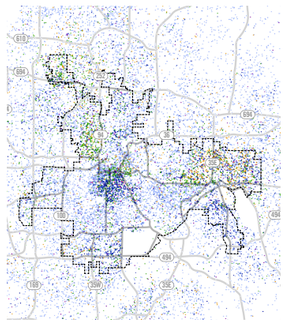
Population Density

Low — High



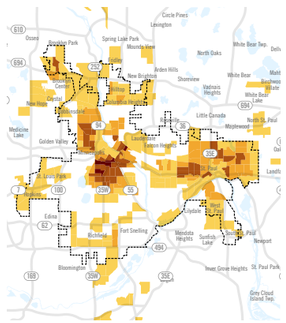
Job Density

Low — High



Racial Density

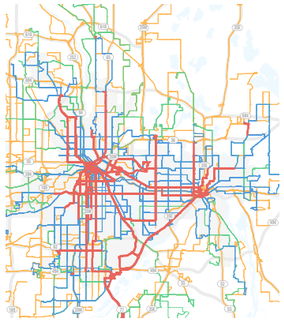
White Black Asian Other Hispanic



Areas of Concentrated Poverty

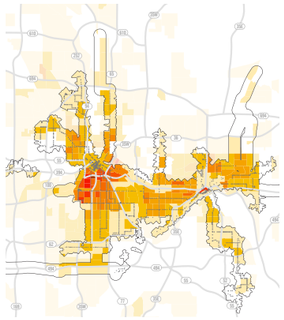
Low — High

Existing Conditions: Transit Network

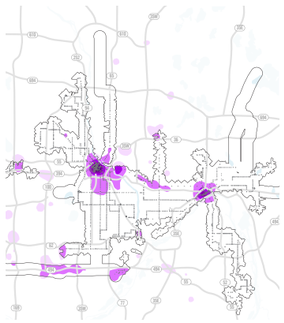


Transit Frequency

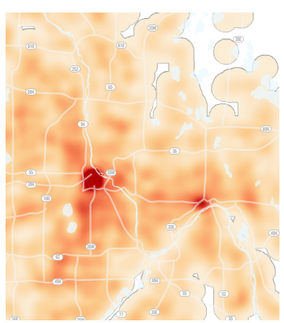
- 1 - 15 minutes
- 16 - 30 minutes
- 31 - 60 minutes
- > 60 minutes



Population Density within 1/2 mile of Frequent Transit



Job Density within 1/2 mile of Frequent Transit



Bus Boardings

Goals and Strategies

Following a thorough analysis of the existing demographic and transit conditions and an interactive stakeholder meeting, my team and I identified the following goals that the stakeholders agreed on. We also introduced a set of strategies, varying combinations of which would help achieve the stated goals.

Goals

Increase Connectivity and Decrease Travel Time

Build a strong network in the densest parts of the region so that transit is a convenient option all-day for all daily needs, such as work, school, and short errands.

Improve Reliability

Improve public transit infrastructure and signal priority for buses and trains to reduce wait times and make transit more predictable.

Increase Service to Suburban Job Destinations

Connect employment centers, transit centers, and intersect key routes, using convenient, comfortable, safe, secure, and reliable transit service.

Increase Service to Suburban Residential Areas

Add reverse commute service that connects the core to suburban employment, with a particular focus on connecting low-income residents to service jobs.

Better Legibility and Navigability

Improve legibility of the network so that it is easy to use for first time users and for riders who make a variety of trips to a variety of destinations.

Increase Safety and Comfort

Improve the transit experience so that riders feel safe and comfortable from door to door.

Improve Usefulness and Convenience of Connections Between Modes

Extend the usefulness of public transportation by facilitating people using it together with walking, biking, and car share.

Strategies

Route Restructure

Redesign the network and routes to be simpler and to improve service.

High-Frequency Network

Add more routes that operate every 15 minutes or better through most of the days, offering riders flexibility to travel without planning ahead and making transfers more seamless.

Transitways

Build new light rail or bus rapid transit routes with dedicated lanes and high quality stations.

Arterial BRT

Create routes with less frequent stops than a local buses and some traffic priority.

Transit Center

Build new transit centers as hubs for bus transfers, starting and ending routes, break areas for bus drivers, and safe waiting places for riders.

Express Bus

Create routers that use freeway corridors to connect commuters to key destinations with few intermediate stops.

First & Last Mile

Improve pedestrian and bike facilities on either end of a transit trip to make it easier, safer, and more comfortable for people to access transit.

All-Day Service

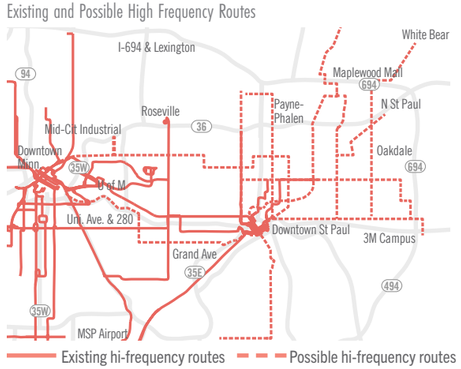
Add local bus routes that run from early morning to late evening, 7 days a week, serving areas that either currently have no transit or that currently have only peak hour service.

Projects

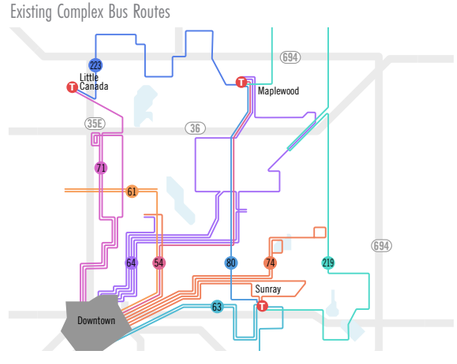
These are a sample of five projects, out of a total suggested fifteen, from the report. The suggested projects in the report are concrete actions the region can take to achieve the identified goals.

Possible Projects

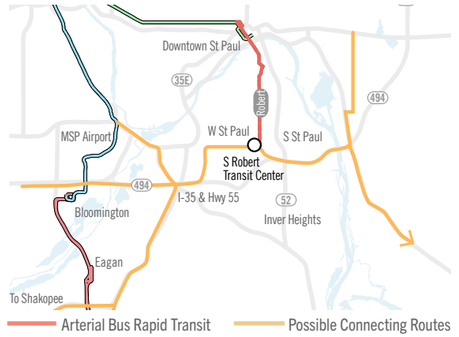
Existing and Possible High Frequency Routes



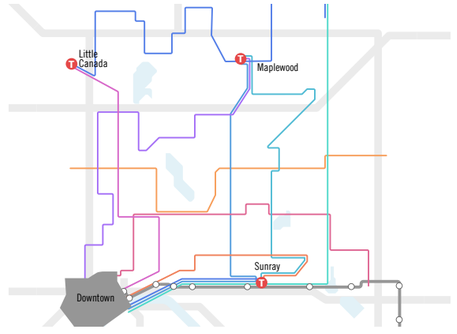
Existing Complex Bus Routes



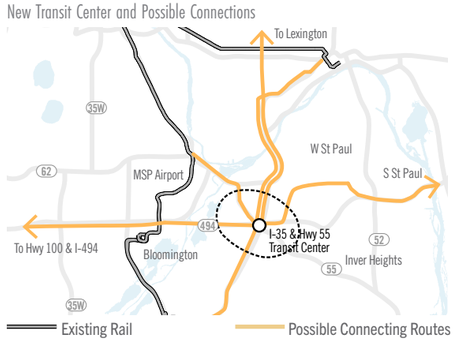
New Transit Center and Possible Connections



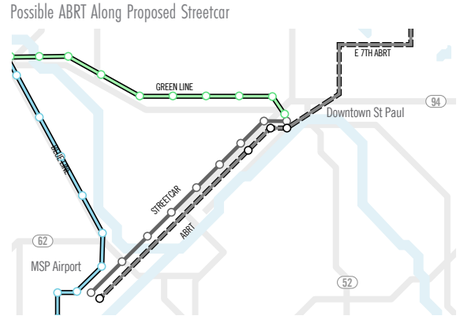
Possible Simplified Bus Routes



New Transit Center and Possible Connections



Possible ABRT Along Proposed Streetcar



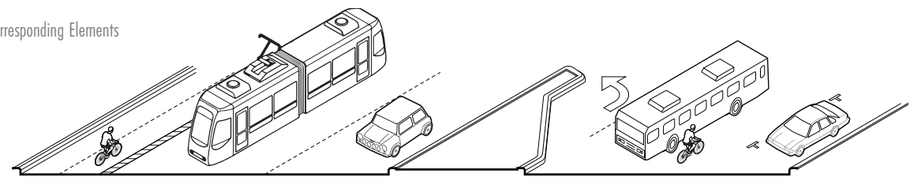
City of Dallas Street Design Manual

Location Dallas, Texas
Dates March 2017 - April 2019
Firm Huitt-Zollars
Team Christof Spieler, Armandina Chapa, Tanvi Sharma, David Copeland, Corey Phelps

This project faced major setbacks as a change in city staff led to heated debates over the function of streets in a city. While many on the city staff wanted the traditionally car-oriented streets to begin prioritizing pedestrians, bicycles, and transit, several others were opposed to such a "complete streets" vision.

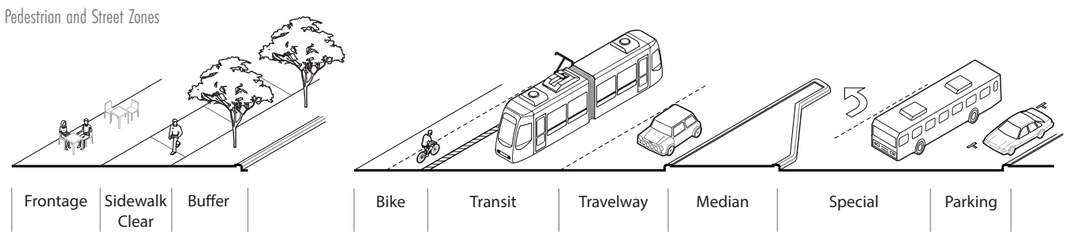
I researched, wrote, and created graphics for the first draft of Dallas' Street Design Manual, updating Dallas' 1993 manual with new complete streets design principals. Other disciplines at Huitt-Zollars and sub-consultants updated the contents of the Drainage Design Manual and the Street Process Manual, while my team compiled all three with matching graphics and formatting.

Street Types and Corresponding Elements

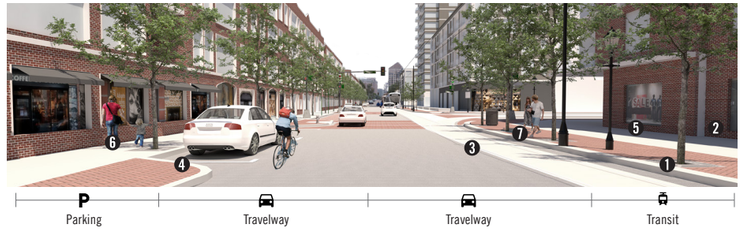


	Bike		Transit		Travelway		Median*		Special Use		Parking	
	Min	Pref	Min	Pref	Min	Pref	Min	Pref	Min	Pref	Min	Pref
Mixed-Use	4'	6'	11'	12'	10'	11'	6'	15'	11'	12'	7'	8'
Commercial	4'	6'	11'	12'	10'	11'	6'	15'	11'	12'	-	-
Residential	4'	6'	11'	12'	10'	10'	6'	15'	11'	12'	7'	8'
Industrial	4'	6'	11'	12'	11'	12'	6'	15'	11'	12'	7'	8'
Parkways	4'	6'	11'	12'	10'	11'	6'	20'	11'	12'	-	-
Woonerf	5' Shared		11'	12'	10' Shared		-	-	12' Shared		7' Shared	
Alleys	-	-	-	-	9'	10'	-	-	-	-	-	-

Pedestrian and Street Zones

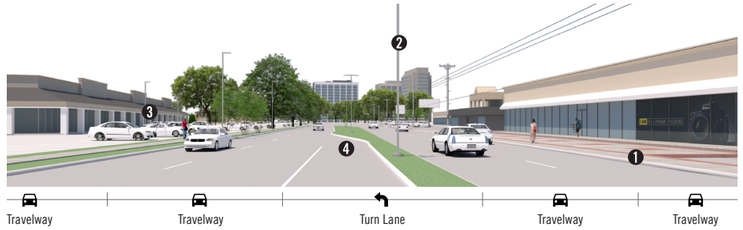


Mixed Use Street



❶ Wide pedestrian zones for high pedestrian traffic.
❷ Engaging frontages for pleasant pedestrian experience.
❸ Alternative modes of transportation for flexibility of use.
❹ On-street parking to provide buffer from pedestrian zone.
❺ Street & pedestrian lighting for safety & comfort.

Commercial Street

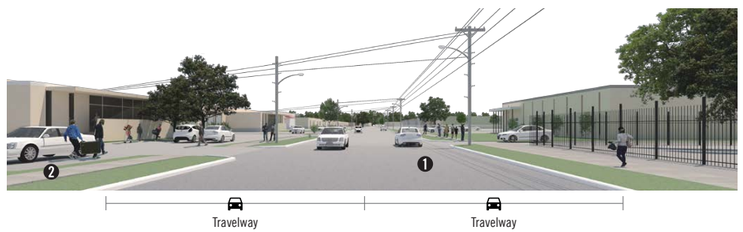


❶ Continuous sidewalks with access to all businesses
❷ Uniform street lighting for safety and comfort.
❸ Trees and landscaping for overall aesthetics.
❹ Optional median for access control and as refuge area for pedestrian crossings.

Residential Street

❶ Continuous sidewalks connecting homes to schools and other neighborhood destinations.
❷ Transit stops throughout allowing alternative transportation.
❸ Optional on-street parking to slow down traffic.
❹ Street lighting for safety and comfort.

Industrial Street



❶ Wide travel lanes for larger design vehicles.
❷ Continuous sidewalks accessing all properties.
Optional median as refuge area for pedestrian crossing.

Parkway

❶ Trees and landscaping, especially on optional medians, as an extension of the surrounding greenery.
❷ Continuous pedestrian zones or shared-use paths for pedestrians and bicycles, integrated with landscaping.
❸ Safe crossings for park access.