Fort Hood
Sustainability Initiatives

Jennifer Rawlings and Steven Caparco

5 March 2018

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Agenda

- Livability and Sustainability Connection
- Area Development Planning Process
- Visual Preference Survey
- Districts, Streets and Parking
- Sustainability Component Plan
    - Energy
    - Water
    - Waste
    - Stormwater
- Key Findings

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Why Livibility?

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Sustainability Connect People to Places

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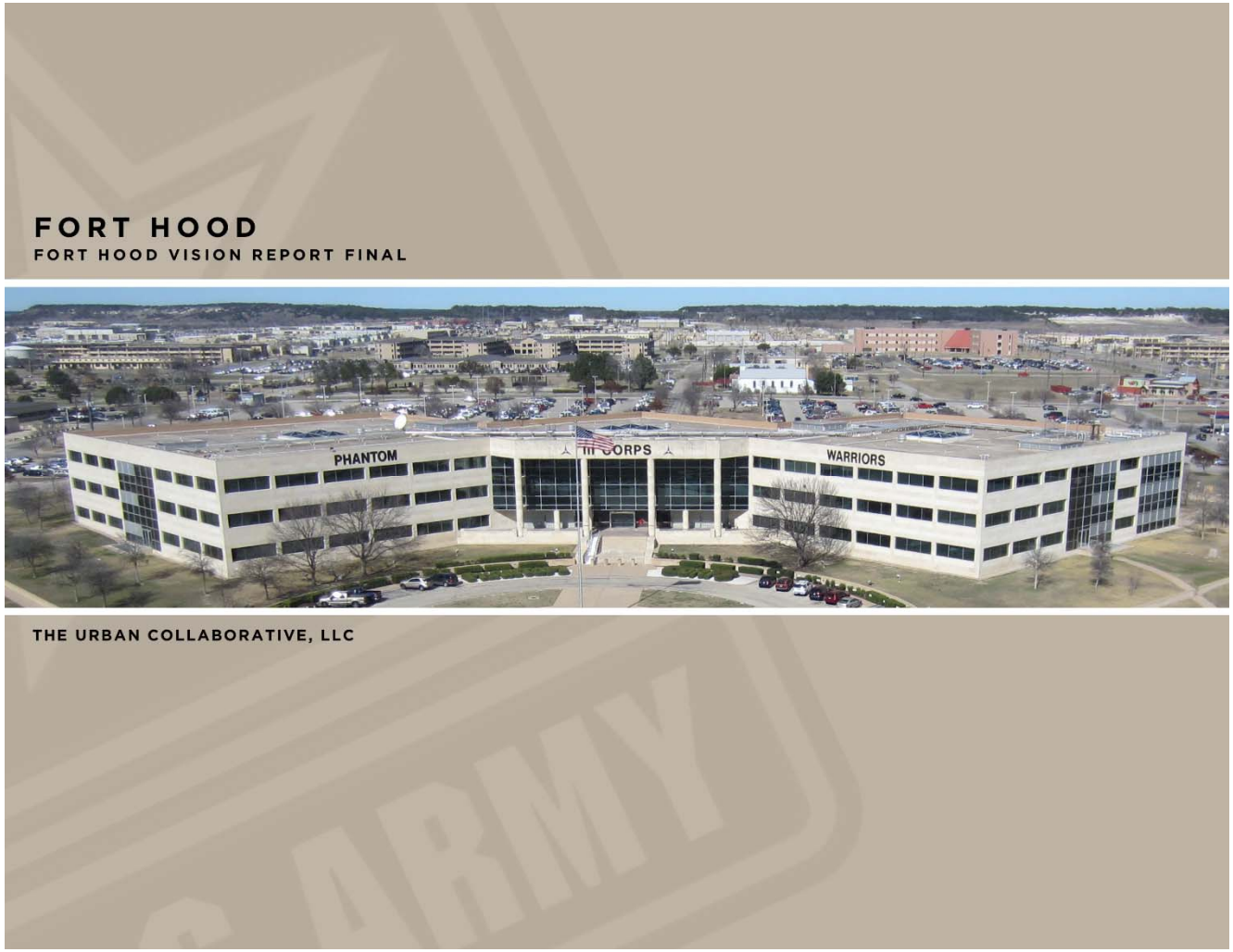
Fort Hood's Vision



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Area Development Planning Process

Phase 1: Visioning Workshop
Develop Vision, Goals, Objectives

Phase 2: Area Development and Execution Plan Workshops

Phase 3: Installation Development Plan

Phase 4: Sustainability Component Plan

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Planning Vision and Goals

Fort Hood Master Plan Vision:

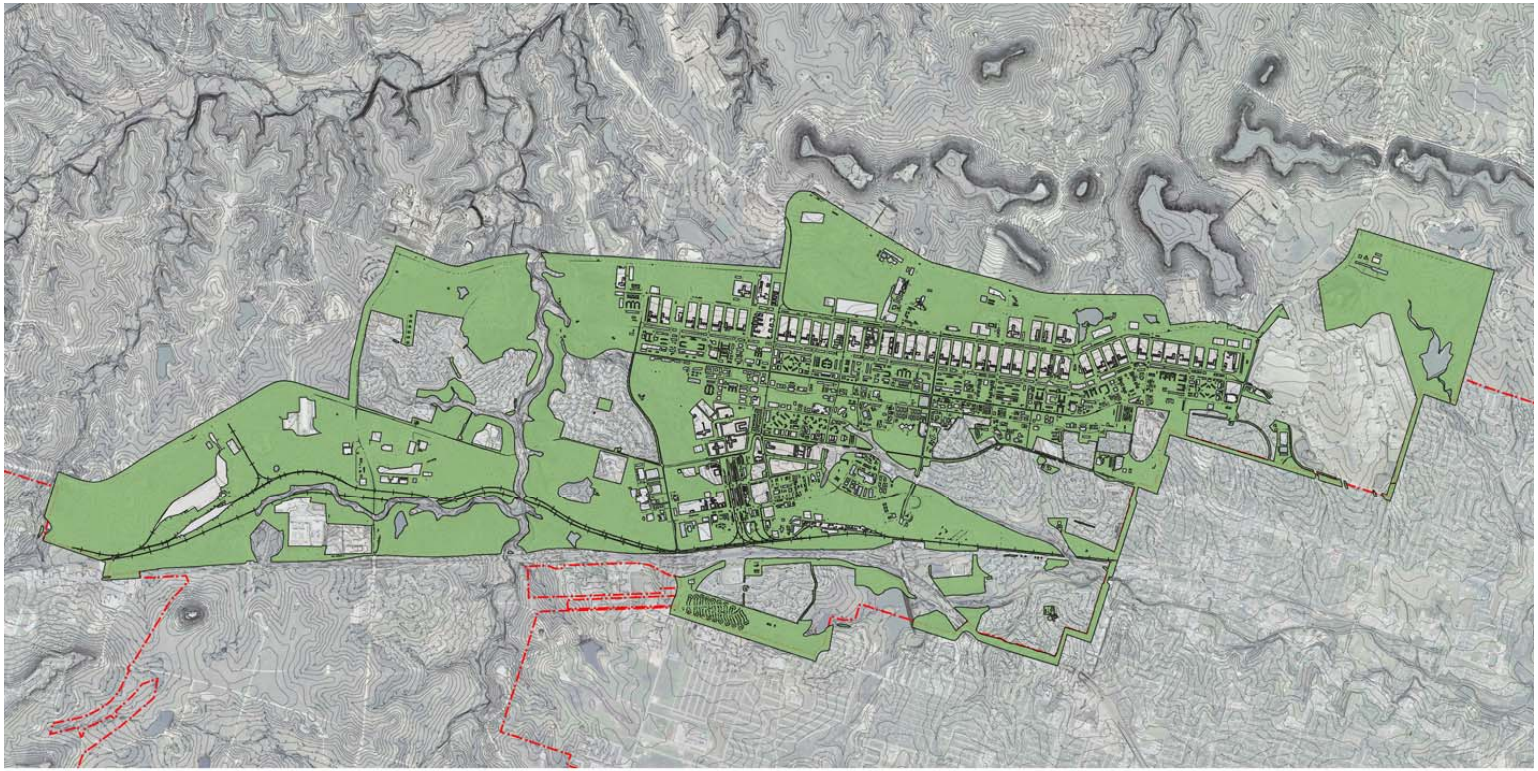
The Great Place with **Accessible Campuses, Walkable Small-Towns,** and **Modern Energy Efficient Infrastructure.**

Goal 1: Accessible Campuses.
Create connected neighborhoods that are self-sustaining with a mix of uses, and flexible facilities, and defined centers of support for quality of life and resilience.

Goal 2: Walkable Small-Towns.
Provide safe, convenient and comfortable walks within identifiable districts that reflect historic Texas.

Goal 3: Modern Energy Efficient Infrastructure.
Create utilities and road networks that support state of the art technologies, communications, and vehicles.

Main Cantonment Developable Area Plan



Fort Hood
Developable Areas

Vision
Fort Hood: The Great Place with accessible campuses, walkable small towns, and modern infrastructure.

Legend
Installation Boundary
Topography
Potential Developable Areas

IMCOM
US Army Corps of Engineers

1800' 1800' 1800'

The Urban Collaborative, LLC

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Visual Preference Survey

SUPPORTED PRINCIPLES:
Walkable Main Streets

QUALITIES:
Walkable
Multi-model
Mixed-Use
Improved Traffic Flow
Shaded
High Density
Human-Scale
Complete Street
Stormwater BMP

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Visual Preference Survey

SUPPORTED PRINCIPLES:
Sustainable Parking

QUALITIES:
Low-Impact Development
Shaded Parking
Maximize Trees and Grass (Green Space)

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Visual Preference Survey

SUPPORTED PRINCIPLES:
Market Village

QUALITIES:
Mixed-Use
Retail/Residential
Enhanced Storefronts
Effective Use of Natural Light
Aesthetic Roofing
Low-Density Vehicle Traffic

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Visual Preference Survey

SUPPORTED PRINCIPLES:
Park-Scape at Transition

QUALITIES:
Family Friendly
Walkable
Smart Density, Vertical Green
Quiet, but still Urban

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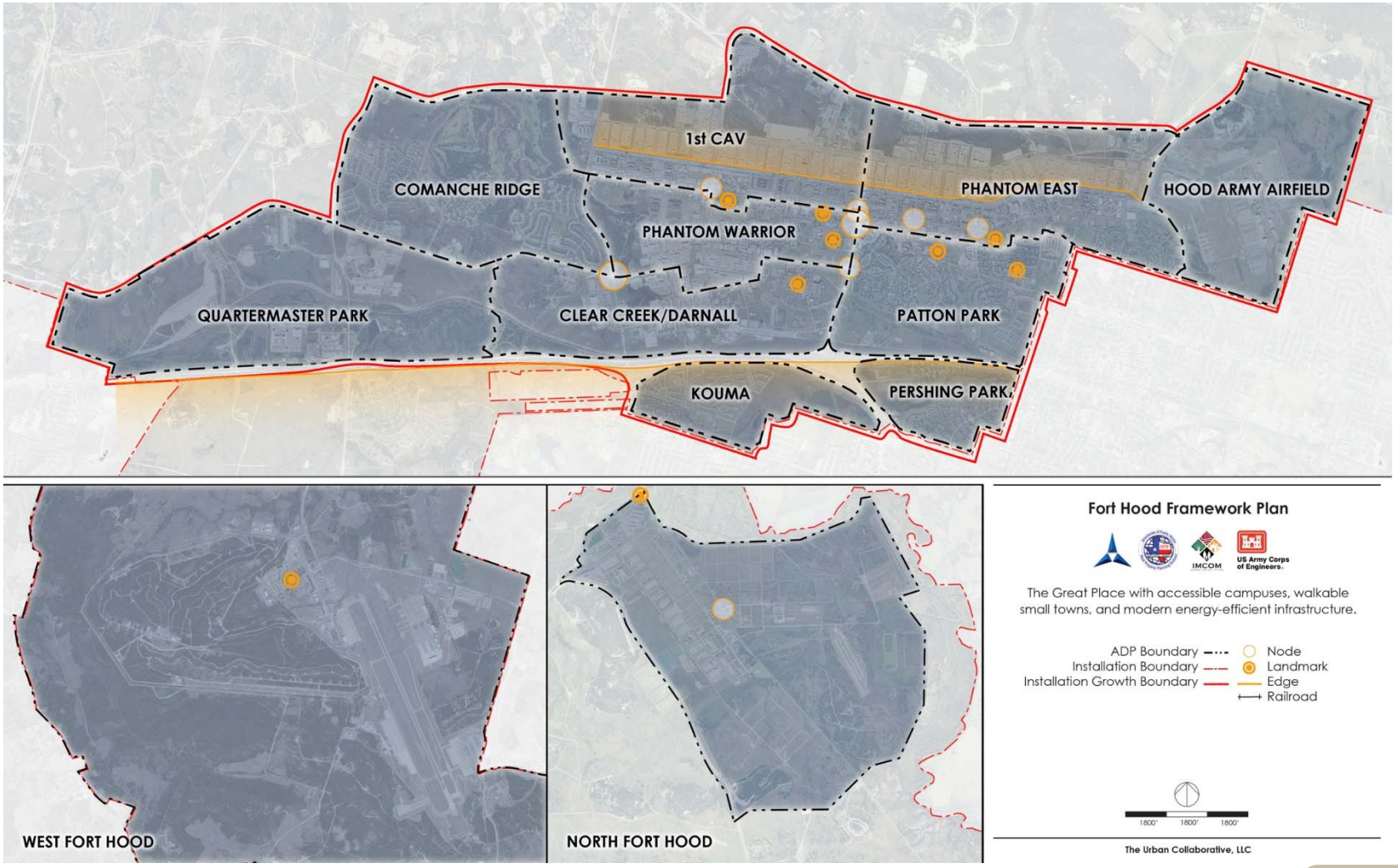
Framework Plan



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District

10-Minute Walk

- Walk ten minutes (1/2 mile) to go to school and work or to access retail and services.
- Workplaces, schools, homes, and shopping located in horizontal mixed-use areas within a 10-minute radius support a pedestrian-focused environment.
- Less dependent on cars, which positively impacts the environment and creates opportunities for increased neighborhood cohesion.

Transit-Oriented Development

- Bus stops, metro stops, or light rail stops
- Includes vertical and horizontal mixed-use development, residential development, and car parks.
- These development opportunities concentrate desirable activities within a 10-minute walk from transit stops

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District

Compact Development with Mixed Use

- Compact development combines stores, homes, and working places with public facilities within a 10-minute walk.
- Creates active community environments where people can live, work, shop and play.
- The benefits of compact development include reducing infrastructure costs, reducing vehicular traffic, preserving open space, and supporting economic vitality

Places to Gather

- Places to gather create opportunities for people to meet for a conversation, share ideas, and create community bonds.
- Gathering spaces can provide a space to host public gatherings, or for private conversations to occur.

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District Example

Mueller, Austin

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Streets

Bike Lanes

Traffic Calming

- Provide design elements that naturally cause a driver to slow.
- Intersections, **traffic circles, on-street parking, street trees, connected sidewalks, bike lanes, and storefronts**
- Narrow through lane width is another major contributor to traffic calming. The through lanes in an area should be narrower than that of free-flow streets.
- Typically 8 or 9 feet with on-street parking on both sides is ideal.

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Streets

Street Grids

- People typically do not like walking along congested arterials, they simply do not walk.
- The preffered grid is 200' x 200,' which maximizes the number of valuable corners and gives people many options for accessing various parts of the city.

Multiway Boulevards

The key attributes of a multiway boulevard include:

- Dedicated through lanes with median protected left/right turn lanes
- Median isolated local access lanes with parallel on-street parking on one or both sides
- Continuous bike lanes within the access lanes,
- Continuous street trees
- Wide connected sidewalks at each edge
- Dedicated transit lanes

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Streets

Street Trees

- Trees create a pleasant axes and focal points, provide shade, and lend shape to a street network.
- Street trees should be planted at regular intervals, 25-35’ on center, along as many streets on the installation as possible.
- They should be placed in a planting strip between curbs and sidewalks.
- The canopies can help shade both the street and sidewalk and the rhythm of trunks slows traffic and can protect pedestrian access.

Connected Sidewalks

- Residents want **pedestrian access** – a walk that is safe, pleasant, directionally clear, and shopping-accessible
- Sidewalks should be a minimum of five feet wide, shaded by street trees, and separated from the road with a planting strip at least four feet wide.

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Streets

Main Streets

- Perpendicular to the flow of through traffic.
- Bisect the main arterial.
- This pattern keeps the heaviest traffic off of the main street but also keeps the main street visible from the heaviest traffic.
- Main streets can also be split around a town square..

Neighborhood Streets

- Five to six foot planting strips on both sides, street trees 25-35 feet on center, connected sidewalks, two-way traffic, and on-street parking on one or both sides.
- Provide traffic calming by creating a visually narrower street that causes vehicles to slow
- Street widths for two-way neighborhood streets with parking on one side can be as **wide as 20' and, with parking on both sides, 26.'**

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Streets and Landscape

Medians

- Streets with the appropriate volumes should have a median at least 20 feet wide, with street trees planted 25-35 feet on center.
- The trees provide shade, street definition, a safety buffer and create a pleasant driving environment.
- Median-divided roads are typically located at the perimeter of districts and act as arterials. Medians can also buffer incompatible land uses.

Planting Strips

- Planting strips add aesthetic value of a great street
- Create a safety buffer for pedestrian access
- Planting strips should be located along every major street
- Four feet wide and placed between the road and the sidewalk.

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Parking

Car Parks

- Trees planted closely enough that their branches will provide a canopy and create a car park.
- On-site runoff can be treated more effectively in the islands within the car park.
- Twenty foot wide medians replace the storm-water retention facilities usually present in parking lots and do not change the overall area required.
- In order to create a walkable setting with a campus quad, parking should be located at the perimeter of an installation

Hidden Parking

- Parking should be hidden whenever possible, located to the rear or side of homes and buildings.
- With cars to the side or rear of homes, the fronts can be devoted to front porches.
- When parking is accessed off of an alley, there is no need for curb cuts in the front of homes, which makes the connected sidewalk system safer (pedestrians do not have to compete with cars) and it allows for more on-street parking.

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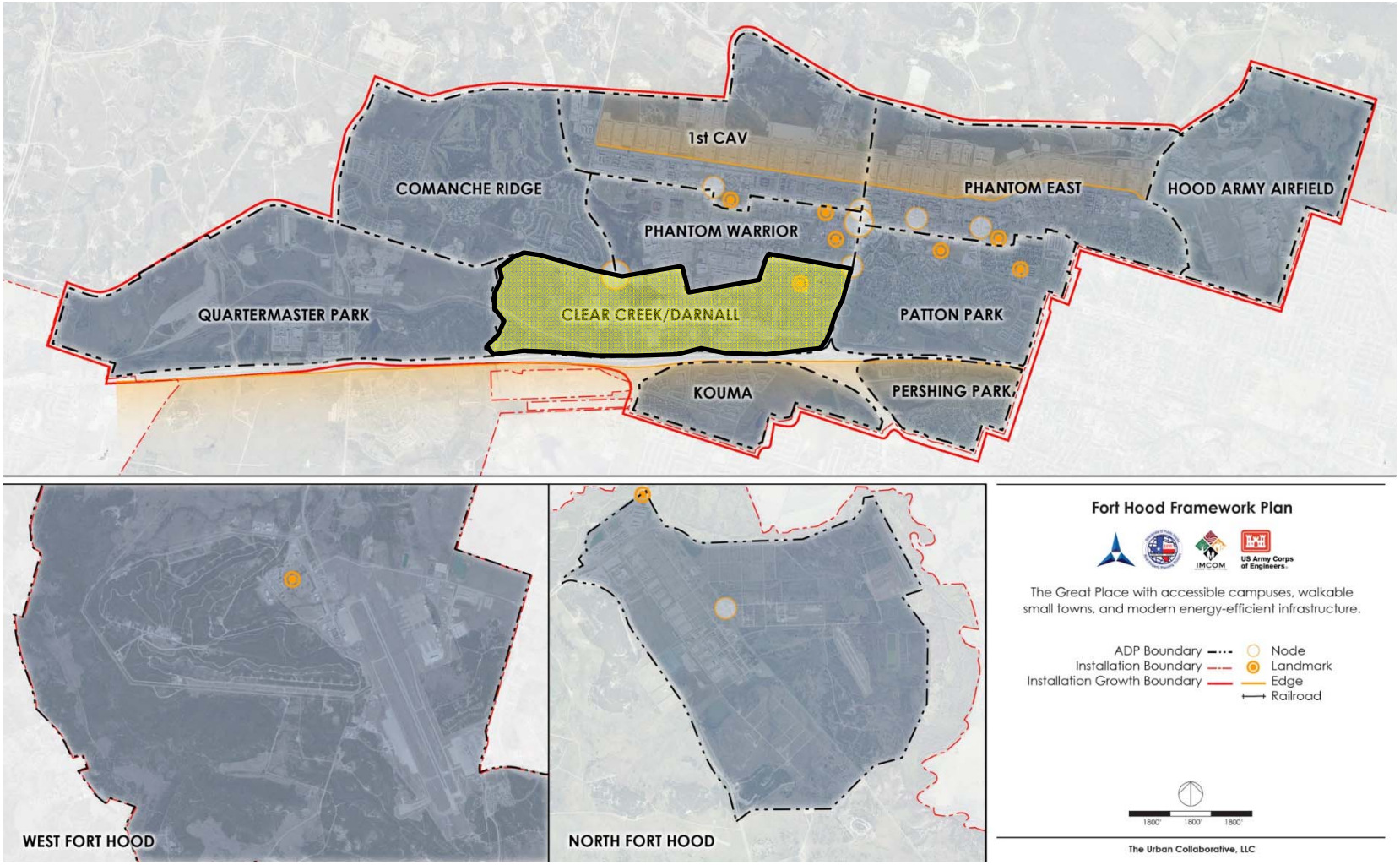
Framework Plan

Clear Creek/Darnall District



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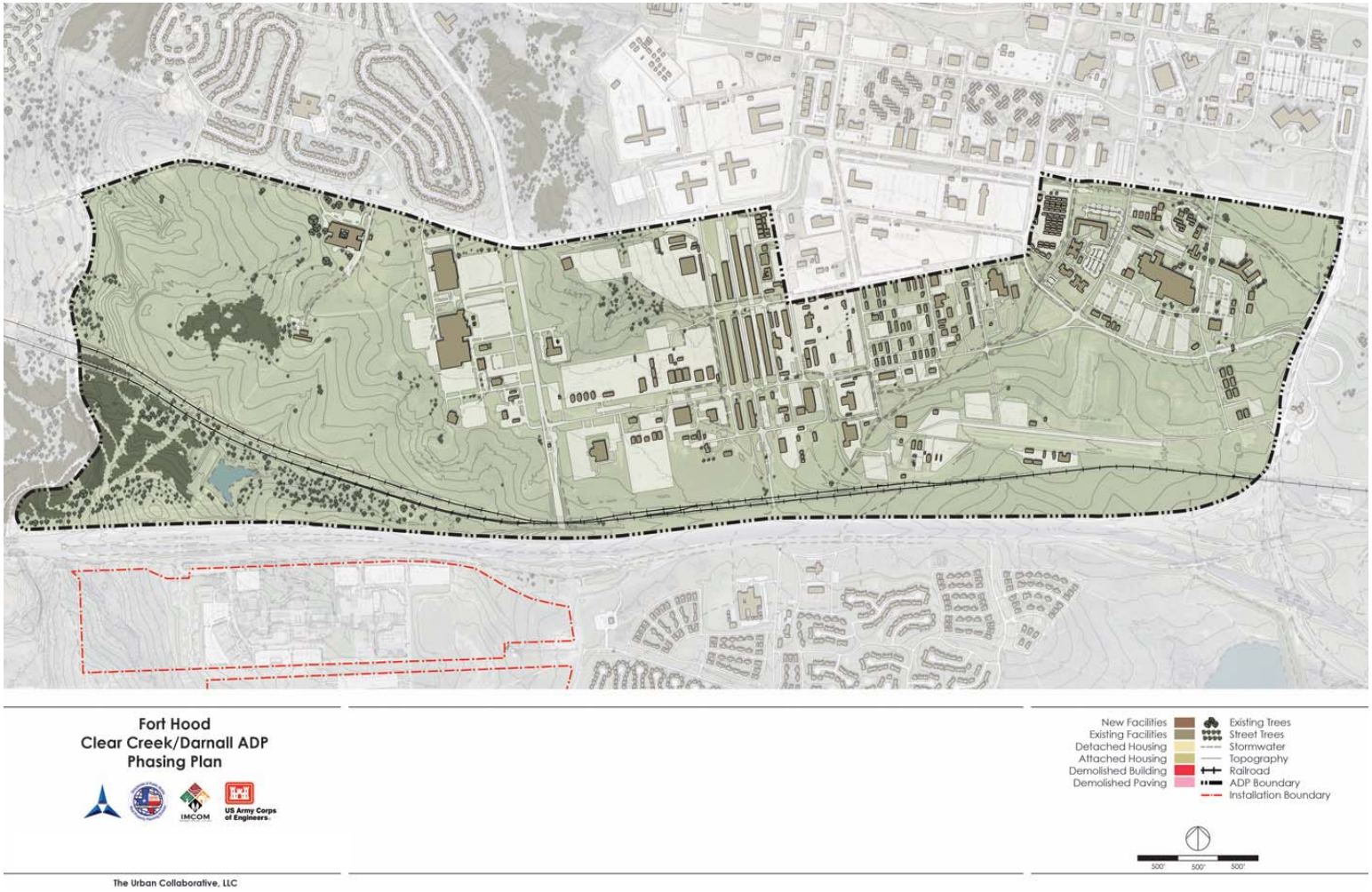
Existing Conditions

Clear Creek/Darnall District (2011)



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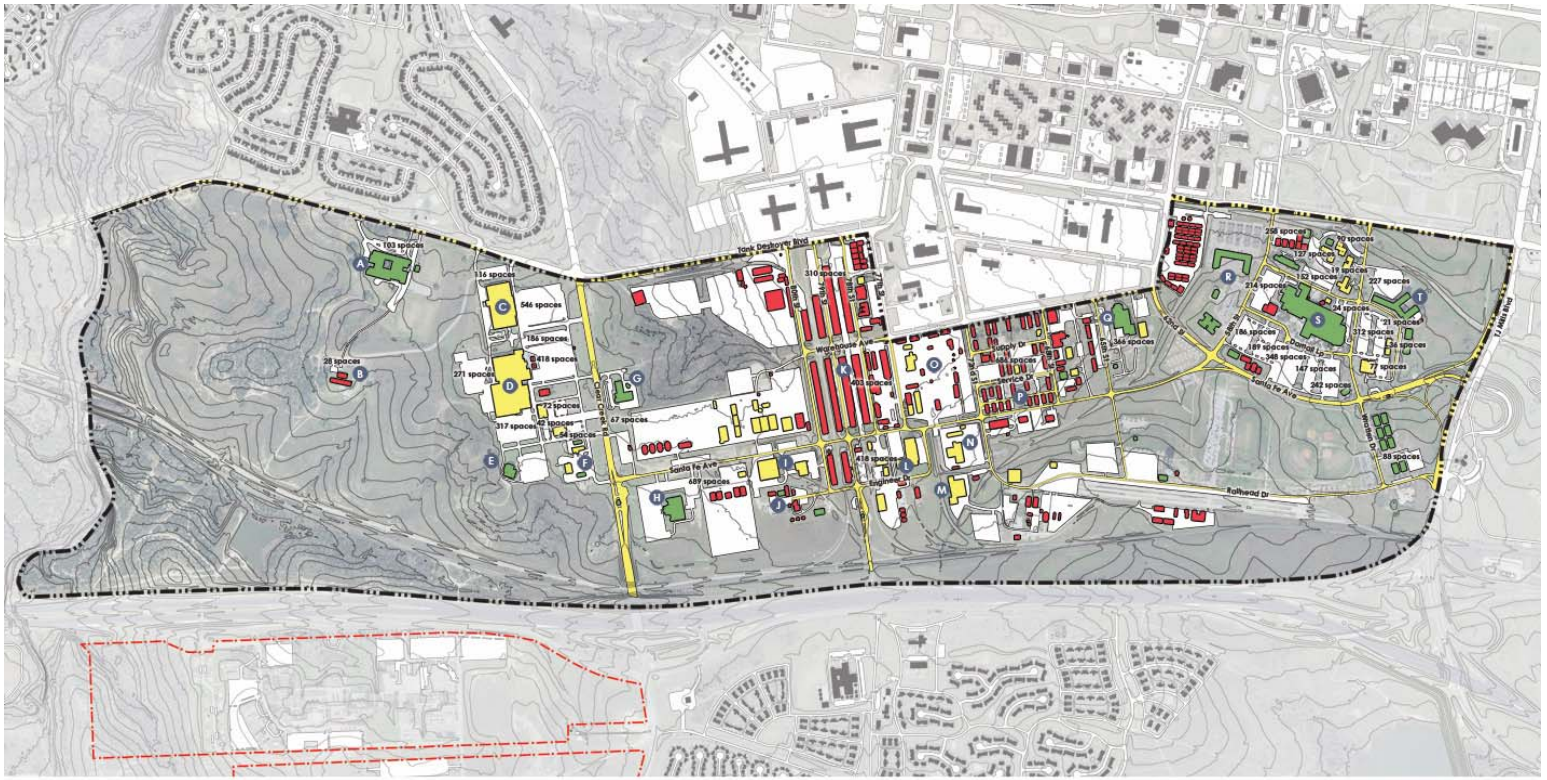
Site Conditions

Clear Creek/Darnall District



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Developable Area Map

Clear Creek/Darnall District

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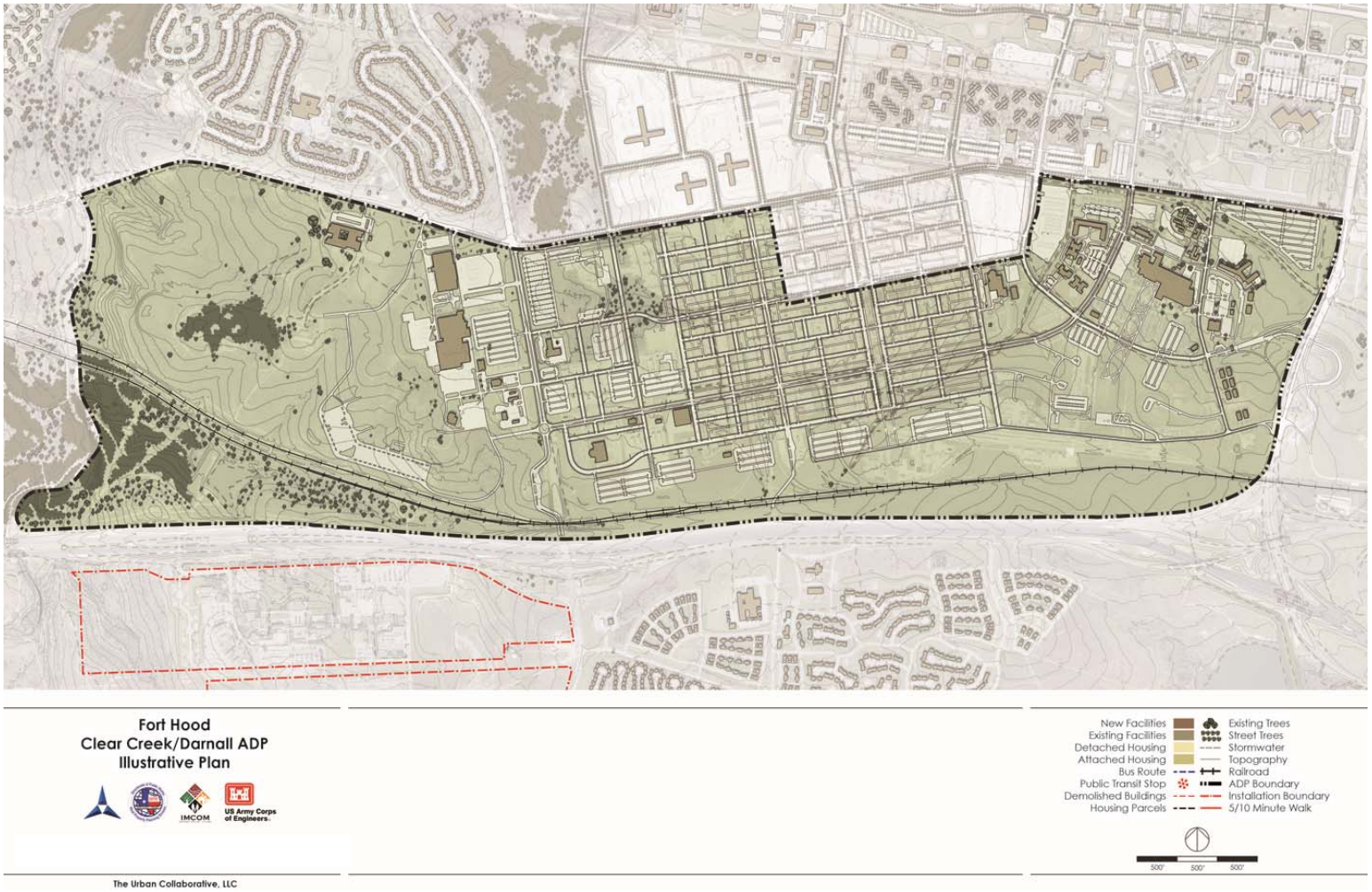
Streets and Parking

Clear Creek/ Darnall District



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Parks & Open Spaces

Clear Creek/ Darnall District

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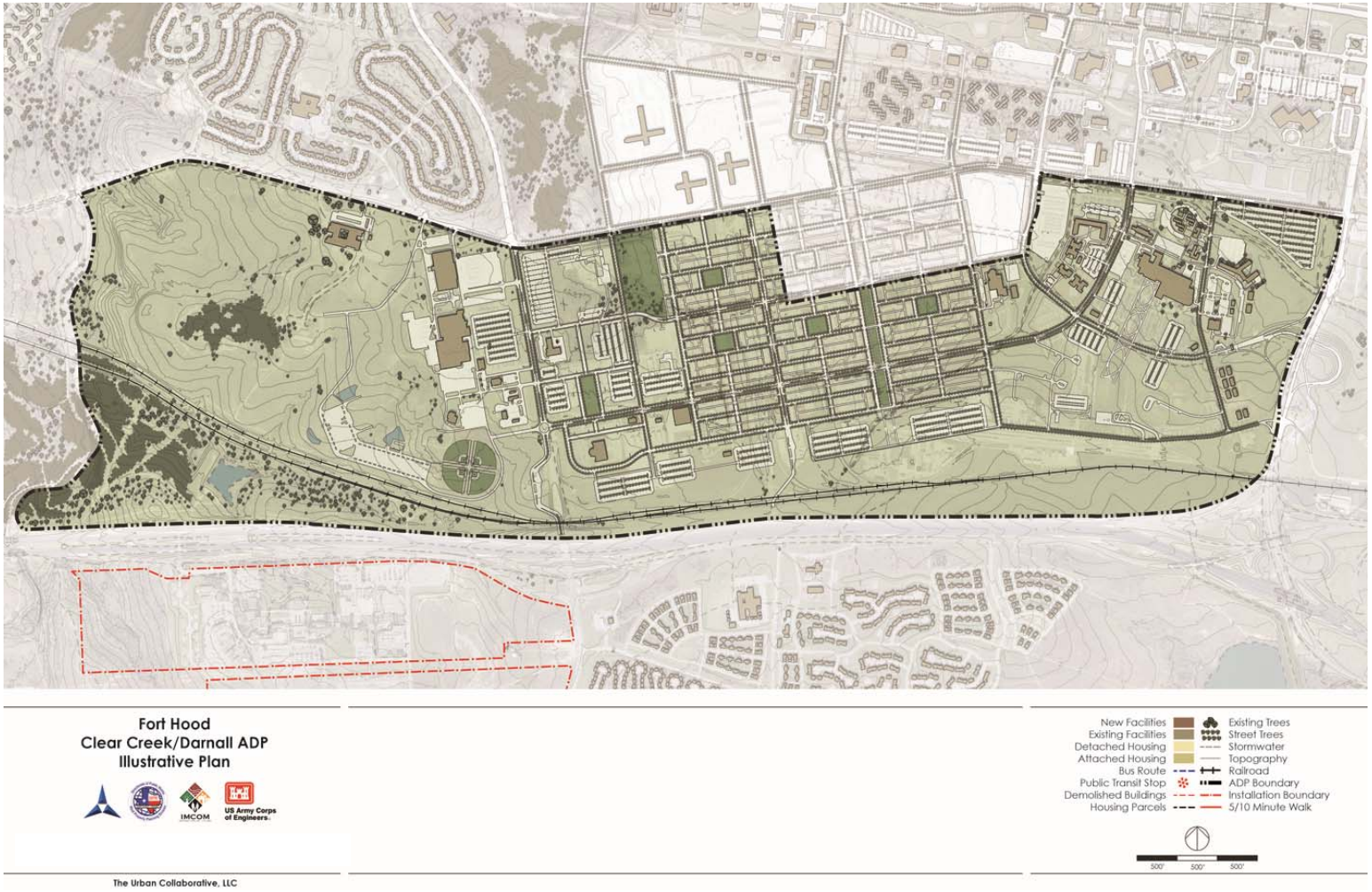
Landscaping

Clear Creek/ Darnall District



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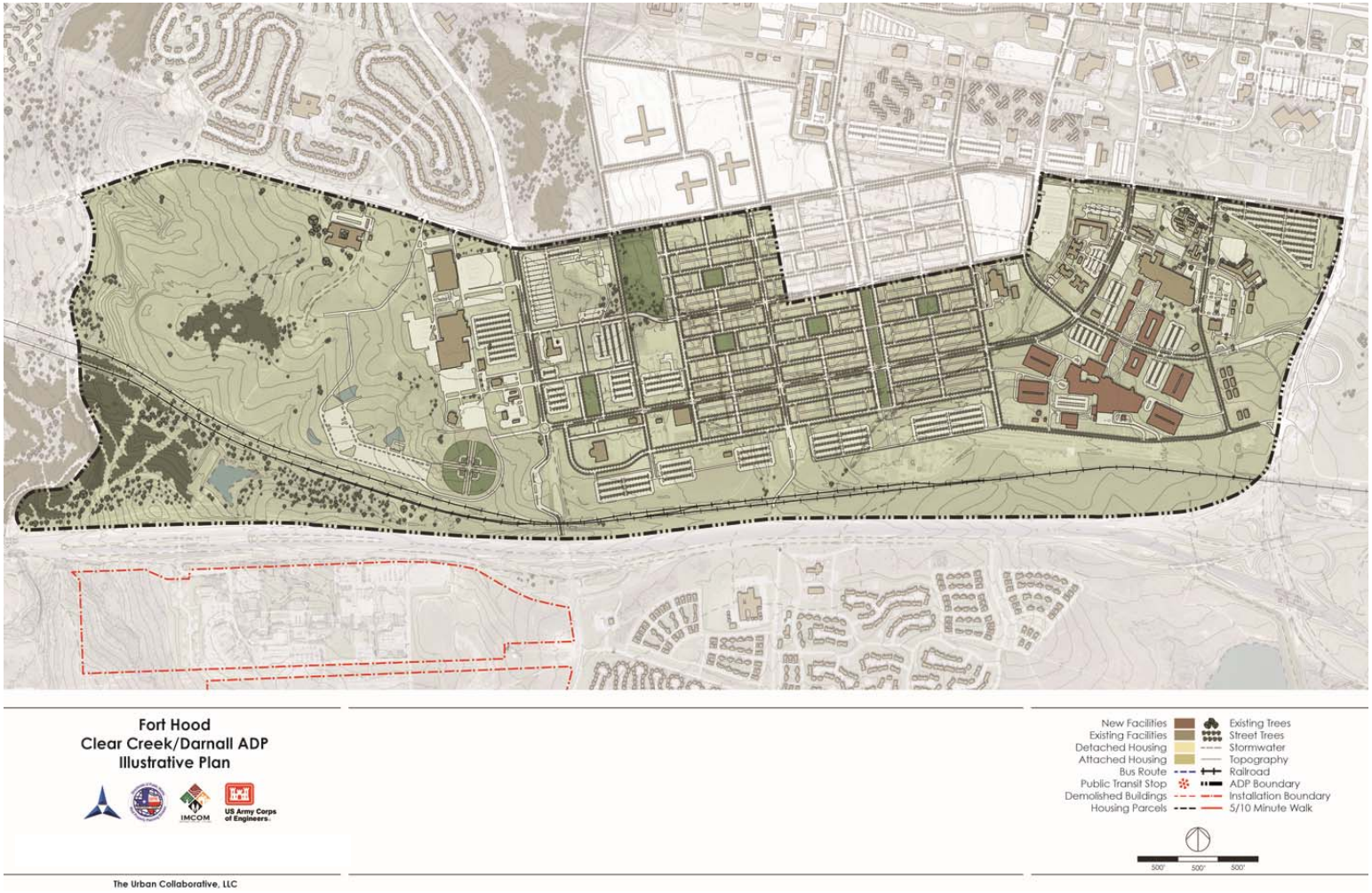
Medical Campus

Clear Creek/ Darnall District



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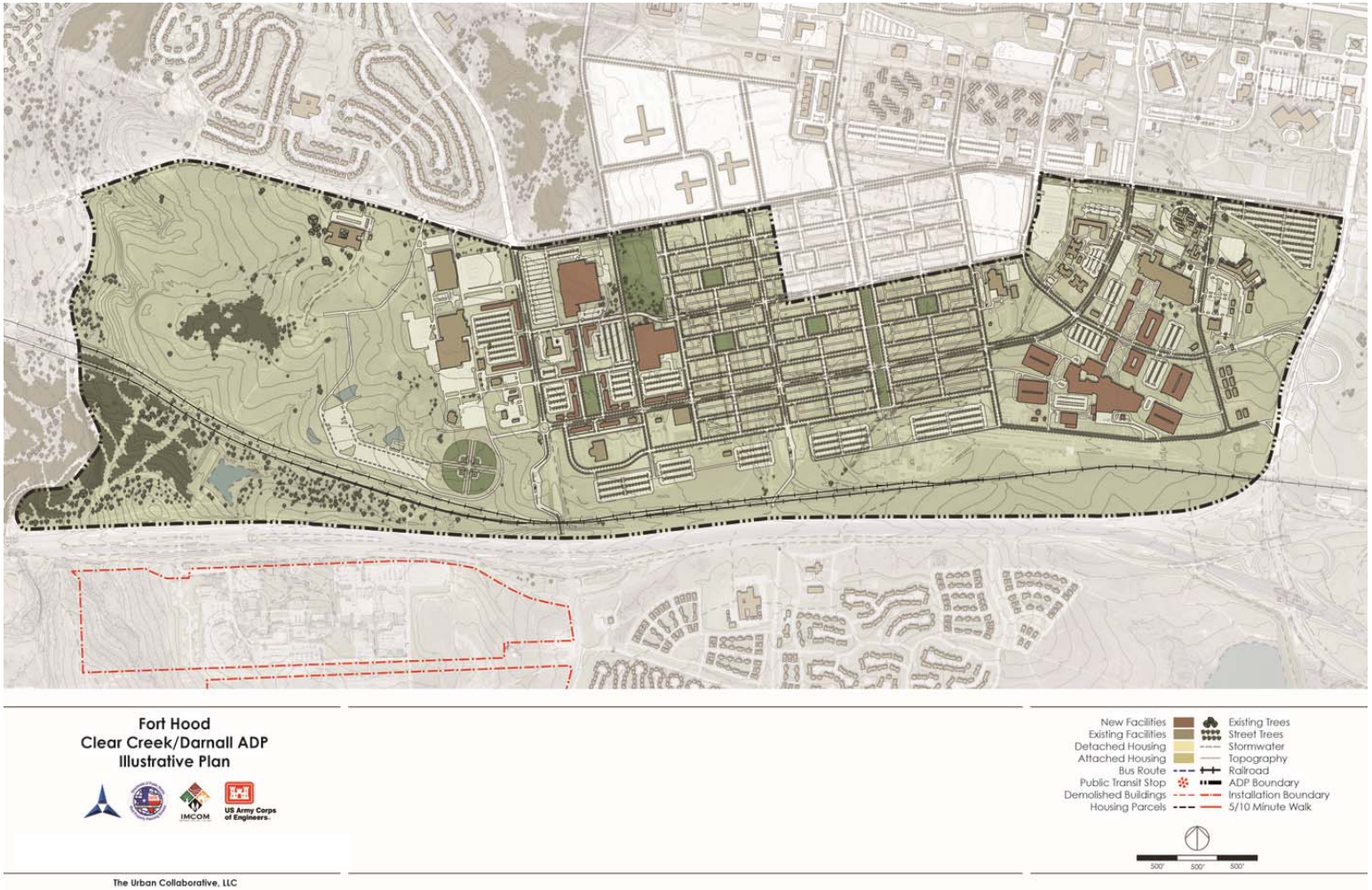
Retail & Mixed Use

Clear Creek/ Darnall District



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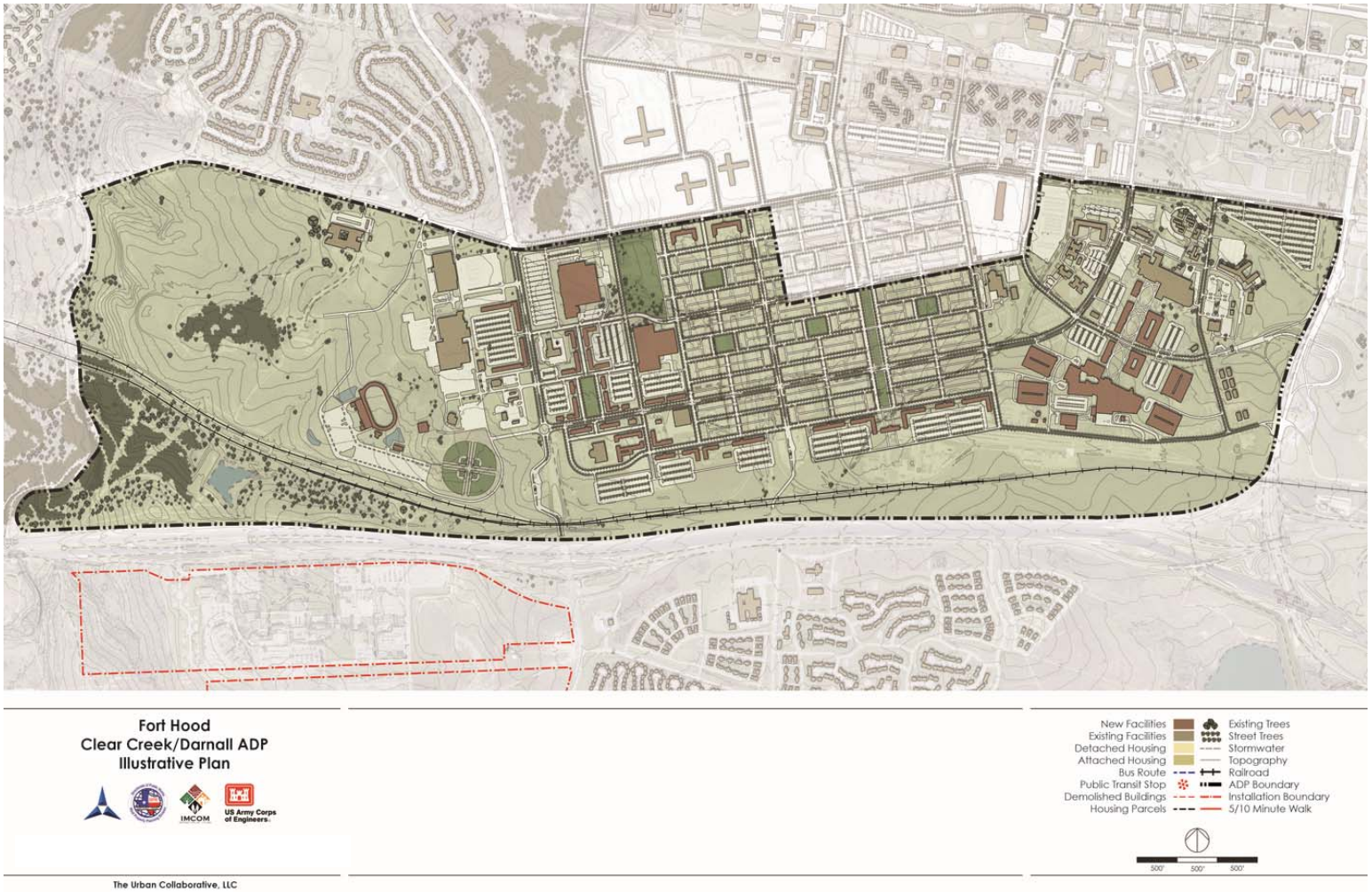
Administration & Support

Clear Creek/ Darnall District



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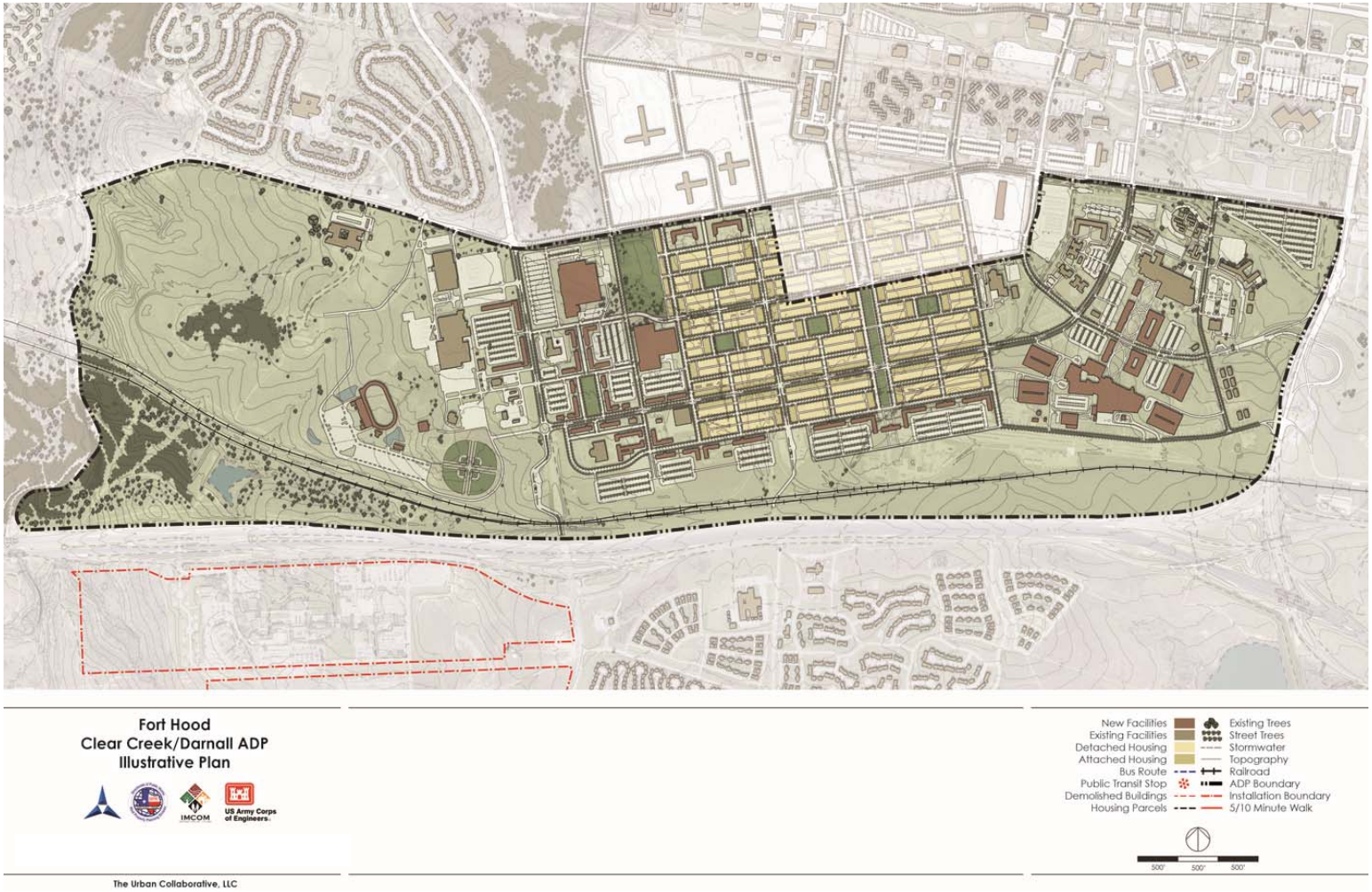
Family Housing

Clear Creek/Darnall District



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Preferred Alternative

Clear Creek/ Darnall District

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Fort Hood Parking


Post Exchange


Carl R. Darnall Medical Center

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Fort Hood Bike Lanes and Housing

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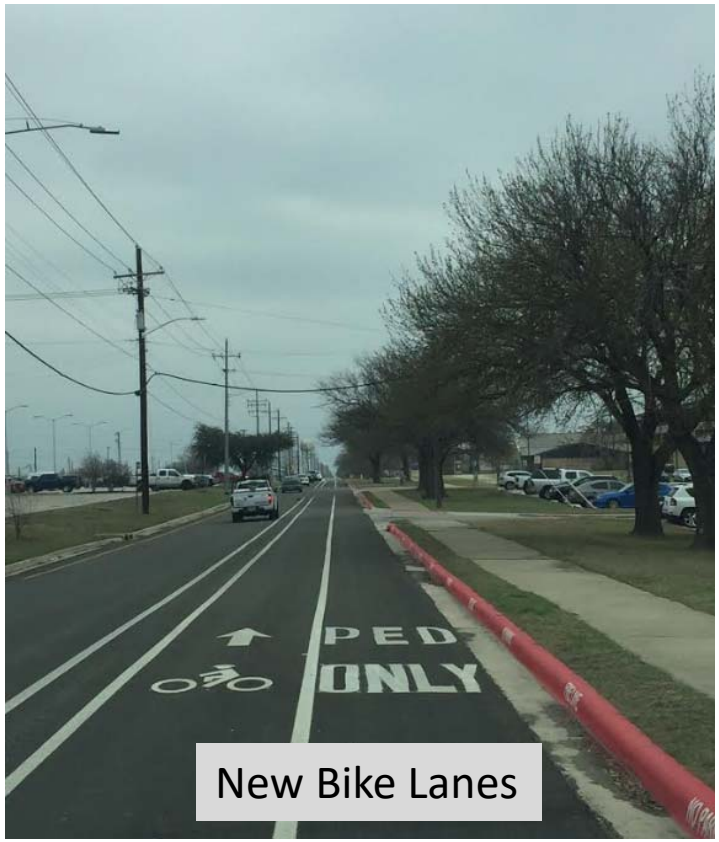
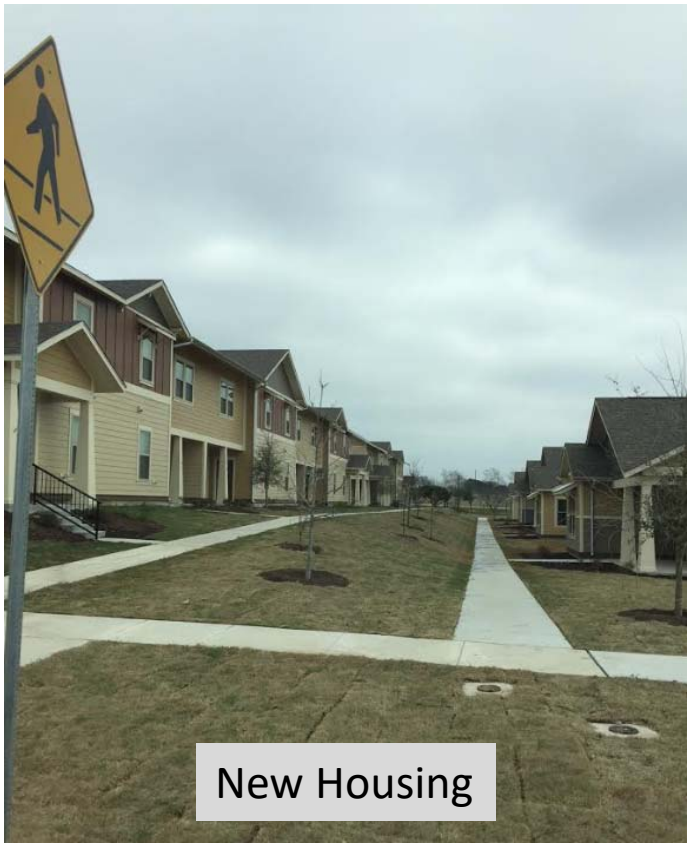


New Bike Lanes



New Housing

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Sustainability Component Plan

FORT HOOD
INSTALLATION SUSTAINABILITY COMPONENT PLAN




Introduction

The Installation Sustainability Component Plan (ISCP) is the culmination of planning efforts with a Visioning Workshop, which included participation from installation stakeholders and leadership, including the Commanding General.

During the Visioning Workshop, participants developed a framework plan that divided the installation into 11 districts. Over the next two and a half years, the installation created an Area Development Plan for each district.

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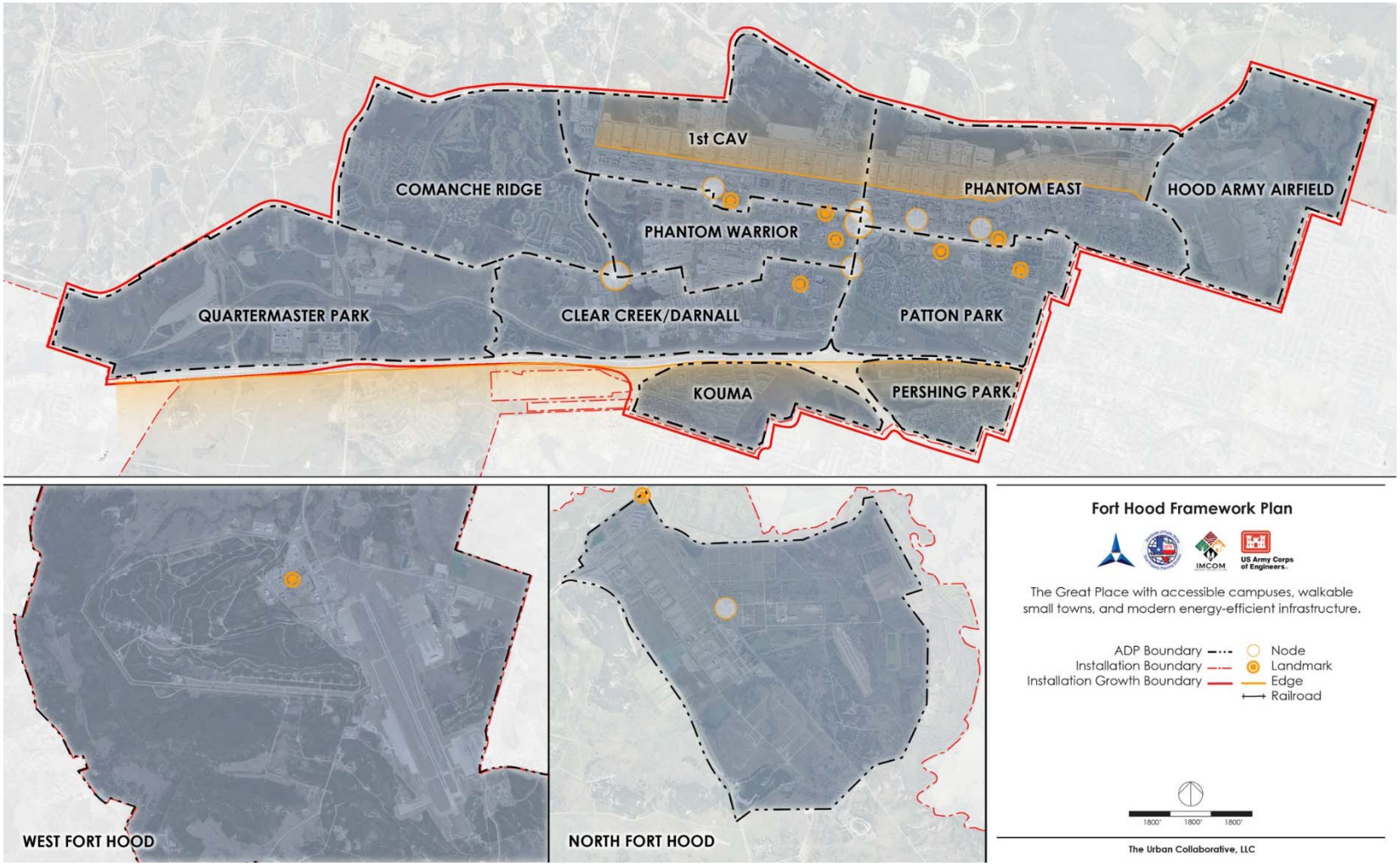
Framework Plan



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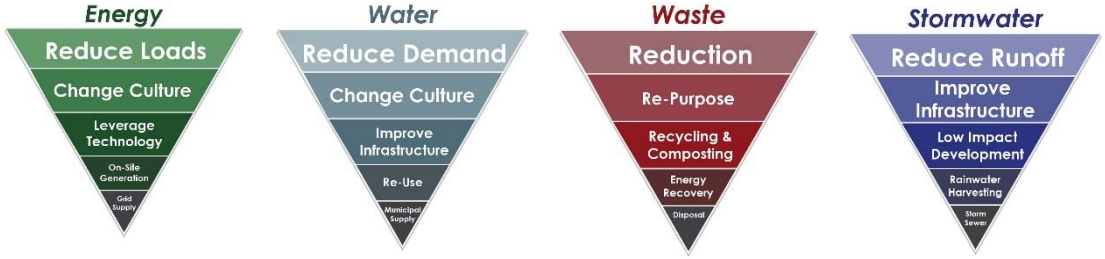
Sustainability Component Plan Summary

Fort Hood Master Plan Vision:
The Great Place with accessible campuses, walkable small-towns, and modern, energy-efficient infrastructure.

The purpose of the ISCP is to serve as a technical manual illustrating the sustainability actions that will support development at Fort Hood, and help meet the Fort Hood Master Plan Vision, in addition to the Fort Hood sustainability vision and goals.

Fort Hood's Commitment to Sustainability



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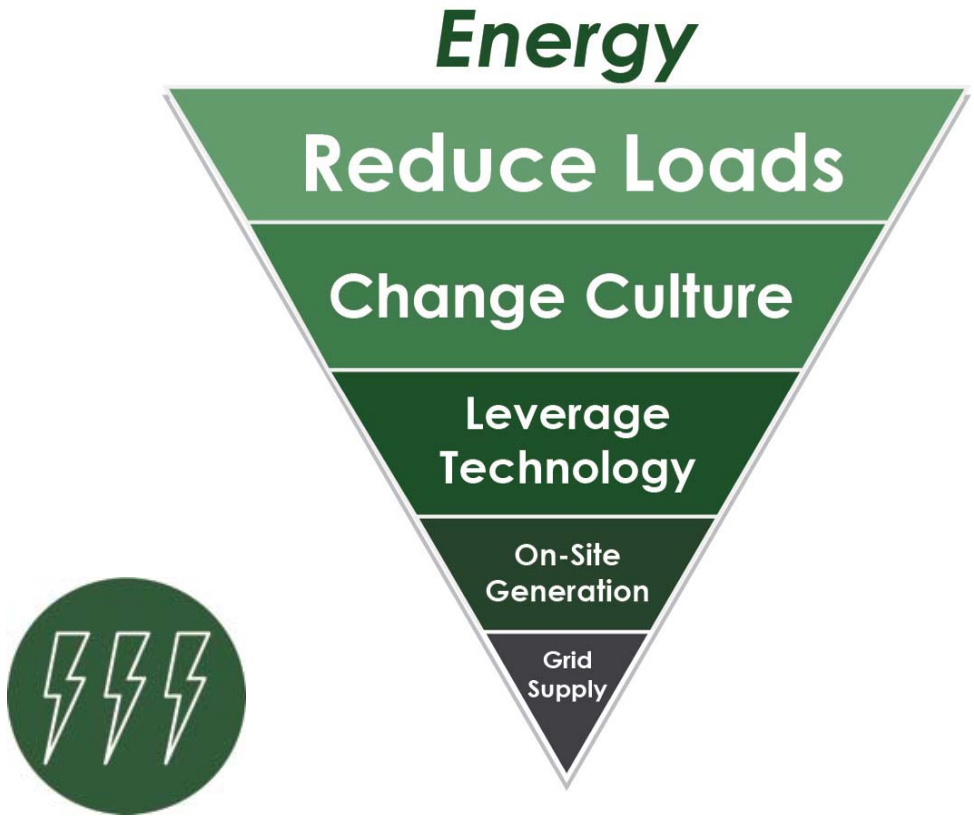
Sustainability Hierarchies

Energy

- Net zero energy projects must first reduce loads for buildings.
- Passive strategies, daylighting, and thermal mass reduce the need for energy.
- Next, optimize mechanical systems, find synergies and stack functions to ensure best use of energy.
- Heat recovery and co-generation make use of waste heat.
- Once loads are small enough and waste energy is minimized, supplying needs with on-site renewable generation becomes feasible.
- Grid supply is the final strategy for energy-independence.



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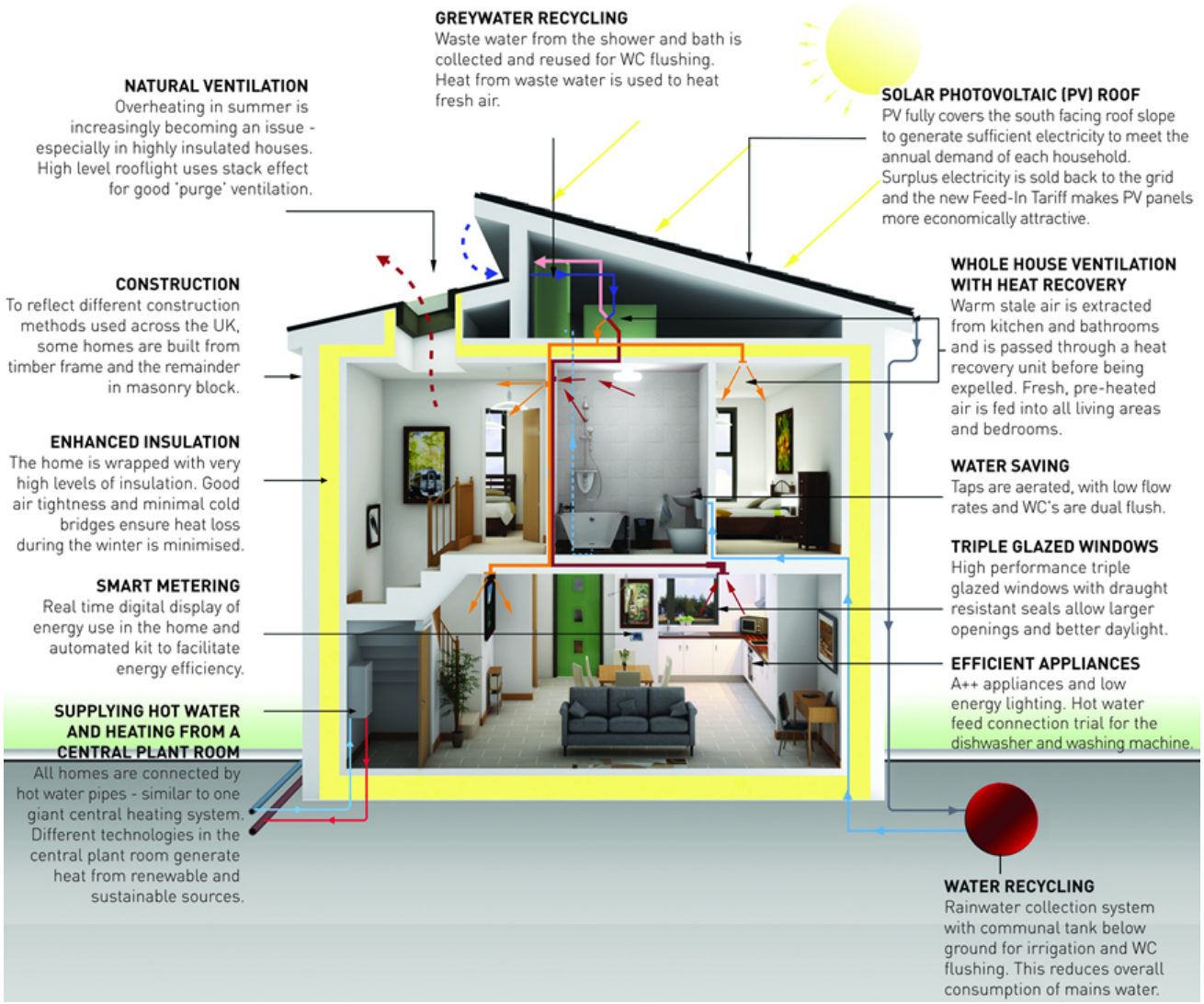
Sustainable Design Elements



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Fort Hood Energy Initiatives and Future Opportunities

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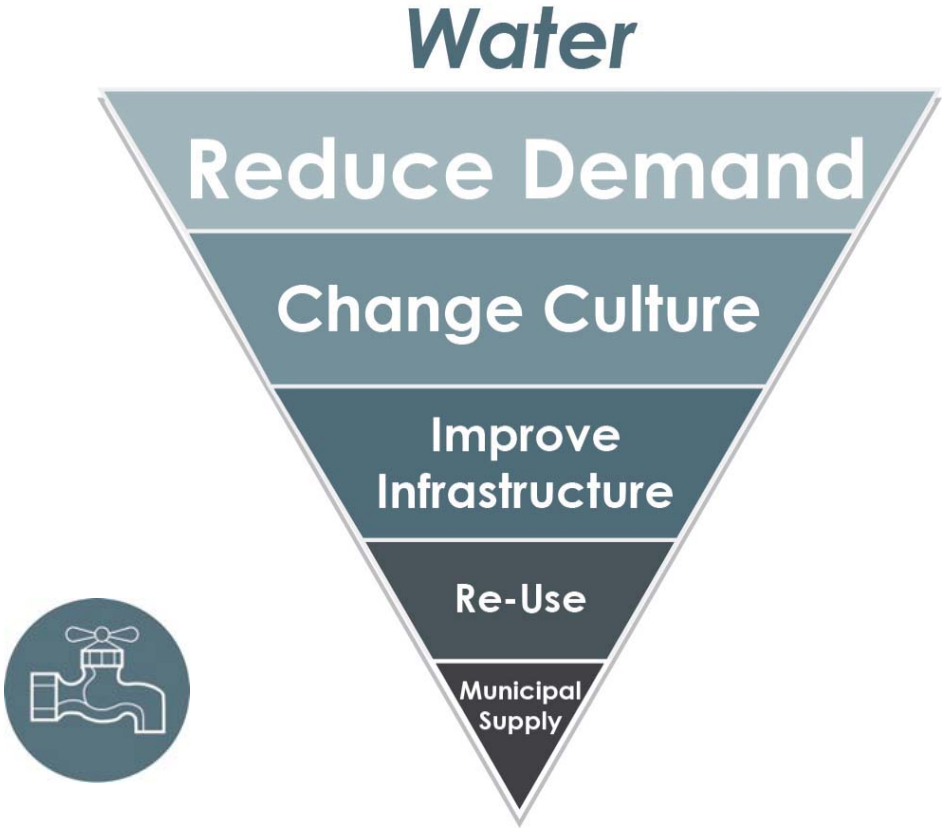
Sustainability Hierarchies
Water

Water

- Net zero water projects must reduce demand for water first.
- Low and no-flow fixtures, xeriscaping, and closed-loop process water reduce the need for supply.
- Next, matching use to source reduces the need for potable water.
- Greywater can be used for irrigation and most wet-cleaning purposes.
- Reduced demand can be met with captured rainwater.
- Wastewater is not all blackwater: streams with no human or food waste should be captured for reuse. Even blackwater can be treated in living machines and used for non-potable purposes.



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Initiatives and Future Opportunities

Water

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Sustainability Hierarchies
Waste

Waste

- Net zero waste projects must first seek to reduce solid waste before it enters the installation.
- This can be achieved with a green purchasing plan: low- or no-packaging goods and durable goods produce less waste, materials that can be re-purposed are preferable to disposables.
- At end-of-life, materials should be recycled (e.g., metals and glass), or composted (organic waste).
- Materials which cannot be reused, recycled, or composted should be harvested for energy.
- Only materials that cannot be processed by any other means should be sent to landfill.

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Initiatives and Future Opportunities

Waste

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Initiatives and Future Opportunities

Waste

Current and ongoing waste initiatives

- Education and outreach
- Singe-stream recycling
- Composting Food Waste
- Improving use of digital signatures and paper processing
- Building audits
- Accountability inspections

Future waste opportunities

- Increase composting across installation, including schools and CDCs
- Increase recycling containers across installation
- Install water-bottle filling stations in large buildings
- Increase high-speed hand-dryers in restrooms to reduce paper towel use

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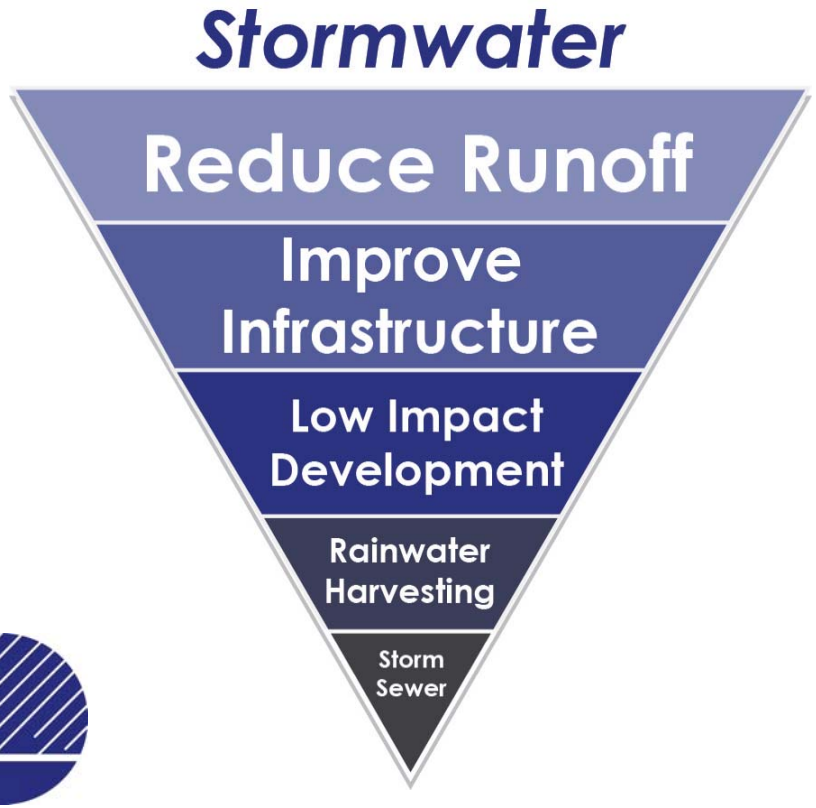
Sustainability Hierarchies

Stormwater

Stormwater

- Net zero stormwater projects must first reduce the amount of runoff that is generated.
- Strategies to reduce the impervious area on the installation offset the need for stormwater infrastructure that is costly to install and maintain.
- Reduced runoff can then be absorbed by street trees, planted strips, and more aggressive strategies like constructed wetlands or engineered bioswales.
- Rainwater harvesting reduces runoff while providing a renewable source of usable water.
- Ideally, all stormwater can be captured or infiltrated where it falls, and reduced-size storm sewer systems would be used only during extreme storm events.



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Initiatives and Future Opportunities

Stormwater

Current and ongoing stormwater initiatives

- Watershed modeling
- Installation of pervious pavement in many locations
- Green roof at Carl R. Darnall Army Medical Center
- Constructed wetlands, including 69th ADA campus
- Rainwater harvesting
- Median bioswales
- Passive irrigation systems

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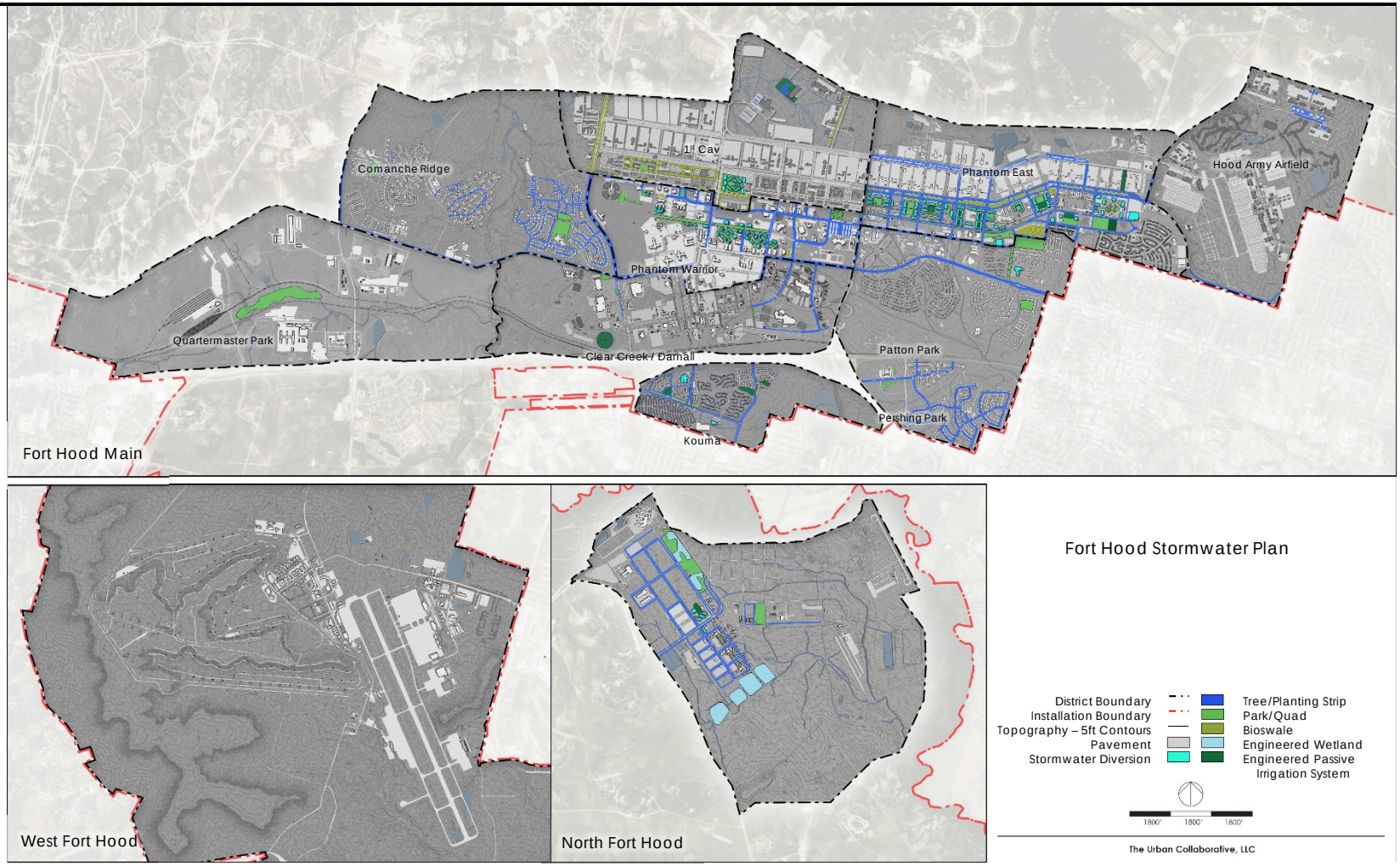
Stormwater Mitigation Network Plan

Short-Term



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Stormwater Mitigation Network Plan

Long-Term

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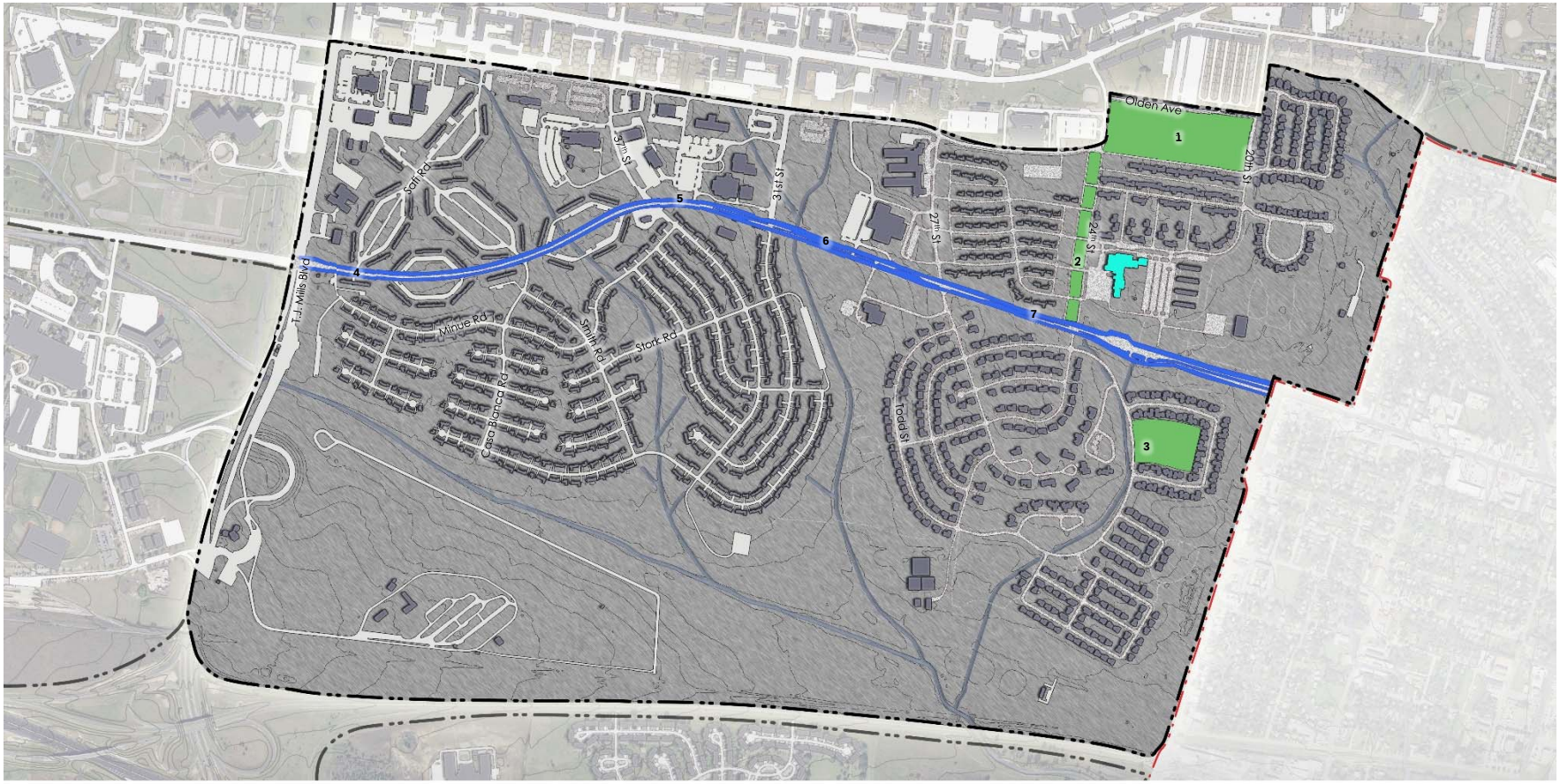
Stormwater Mitigation Plan

Short-Term Patton Park



Patton Park

Short-Term Stormwater Mitigation Plan

Buildings near parks, bioswales or passive irrigations systems will receive stormwater diversion upgrades as those LID features are developed. In the long term, extensive parks and quads and selective engineered passive irrigation systems enable 3% mitigation of stormwater from new development.

Project Summary

1-3 Parks / Quads
4-7 Planting Strips with Trees

District Boundary
Installation Boundary
Topography – 5ft Contours
Pavement
Stormwater Diversion
Tree/Planting Strip
Park/Quad
Bioswale
Engineered Wetland
Engineered Passive Irrigation System

400' 400' 400'

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Stormwater Mitigation Plan

Long-Term Patton Park

Patton Park

Long-Term Stormwater Mitigation Plan

Buildings near parks, bioswales or passive irrigations systems will receive stormwater diversion upgrades as those LID features are developed. In the long term, extensive parks and quads and selective engineered passive irrigation systems enable 100% mitigation of stormwater from new development.

Project Summary

1-6	Parks / Quads
7	Running Track
8-9	Engineered Passive Irrigation System
10-23	Planting Strip with Trees

District Boundary
Installation Boundary
Topography – 5ft Contours
Pavement
Stormwater Diversion

Tree/Planting Strip
Park/Quad
Bioswale
Engineered Wetland
Engineered Passive Irrigation System

400' 400' 400'

The Urban Collaborative, LLC

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Stormwater Mitigation Plan

Short-Term Phantom East

Phantom East

Short-Term Stormwater Mitigation Plan

Buildings near parks, bioswales or passive irrigations systems will receive stormwater diversion upgrades as those LID features are developed. In the long term, extensive parks and quads and selective engineered passive irrigation systems enable 76% mitigation of stormwater from new development.

Project Summary

1-9	Engineered Passive Irrigation Systems
10-21	Bioswales
22-32	Parks / Quads & Stormwater Diversion
33-45	Planting Strip with Trees

District Boundary
Installation Boundary
Topography – 5ft Contours
Pavement
Stormwater Diversion

Tree/Planting Strip
Park/Quad
Bioswale
Engineered Wetland
Engineered Passive Irrigation System

450' 450' 450'

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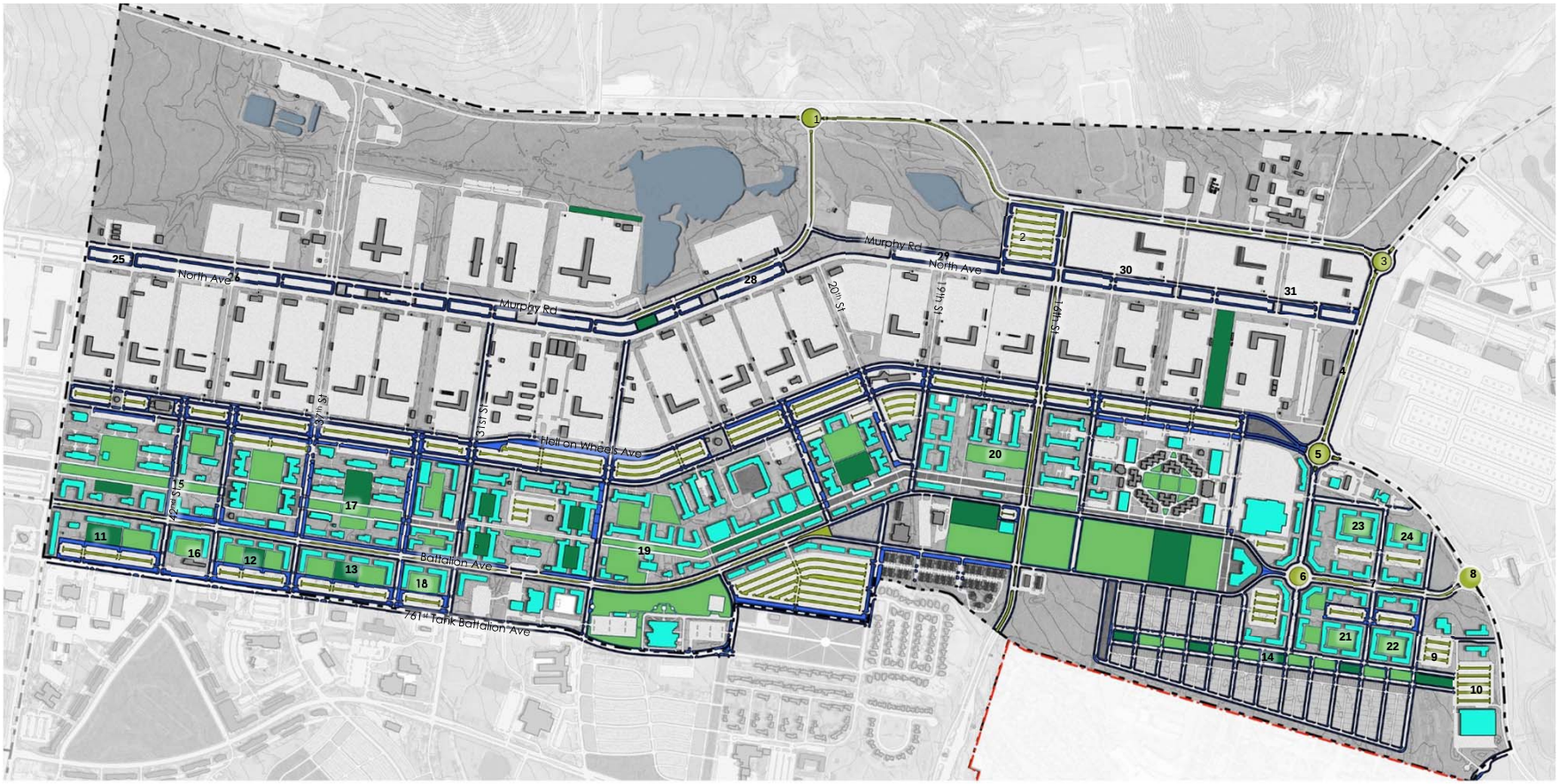
Stormwater Mitigation Plan

Long-Term Phantom East



Phantom East

Long-Term Stormwater Mitigation Plan

Buildings near parks, bioswales or passive irrigations systems will receive stormwater diversion upgrades as those LID features are developed. In the long term, extensive parks and quads and selective engineered passive irrigation systems enable 100% mitigation of stormwater from new development.

Project Summary

1-10	Bioswales
11-14	Engineered Passive Irrigation Systems
15-24	Parks / Quads & Stormwater Diversion
25-31	Planting Strip with Trees

District Boundary
Installation Boundary
Topography – 5ft Contours
Pavement
Stormwater Diversion

Tree/Planting Strip
Park/Quad
Bioswale
Engineered Wetland
Engineered Passive Irrigation System

450' 450' 450'

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LID Management Practices

Maintaining and Improving

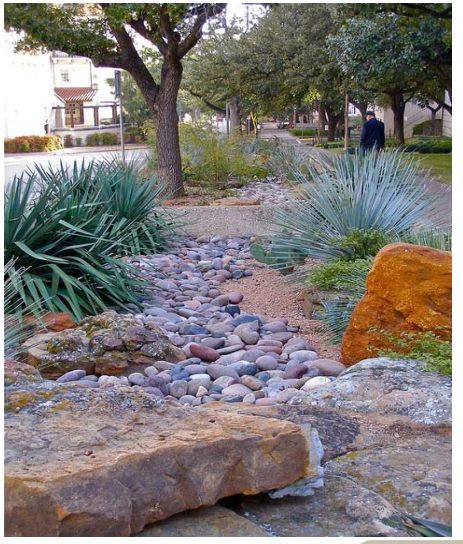
Pervious Parking and Sidewalks

Permeable surfaces allow precipitation to percolate through soil and plant roots into the earth's groundwater reservoirs and aquifers, which supply much of our drinking water. Impermeable surfaces in densely populated areas generate vast magnitudes of runoff which ultimately overwhelm natural drainages and reroute water away from natural reservoirs.

Xeriscaping with native plants

Enforce "Car Park" Standards

Basic car park standards, providing a 20' median between parking and driving lanes, provide maximum space for storm water mitigation, replacing the need for storm-water retention facilities usually present in parking lots, and do not change the overall area required. On-site runoff can be treated more effectively in the islands within the car park.



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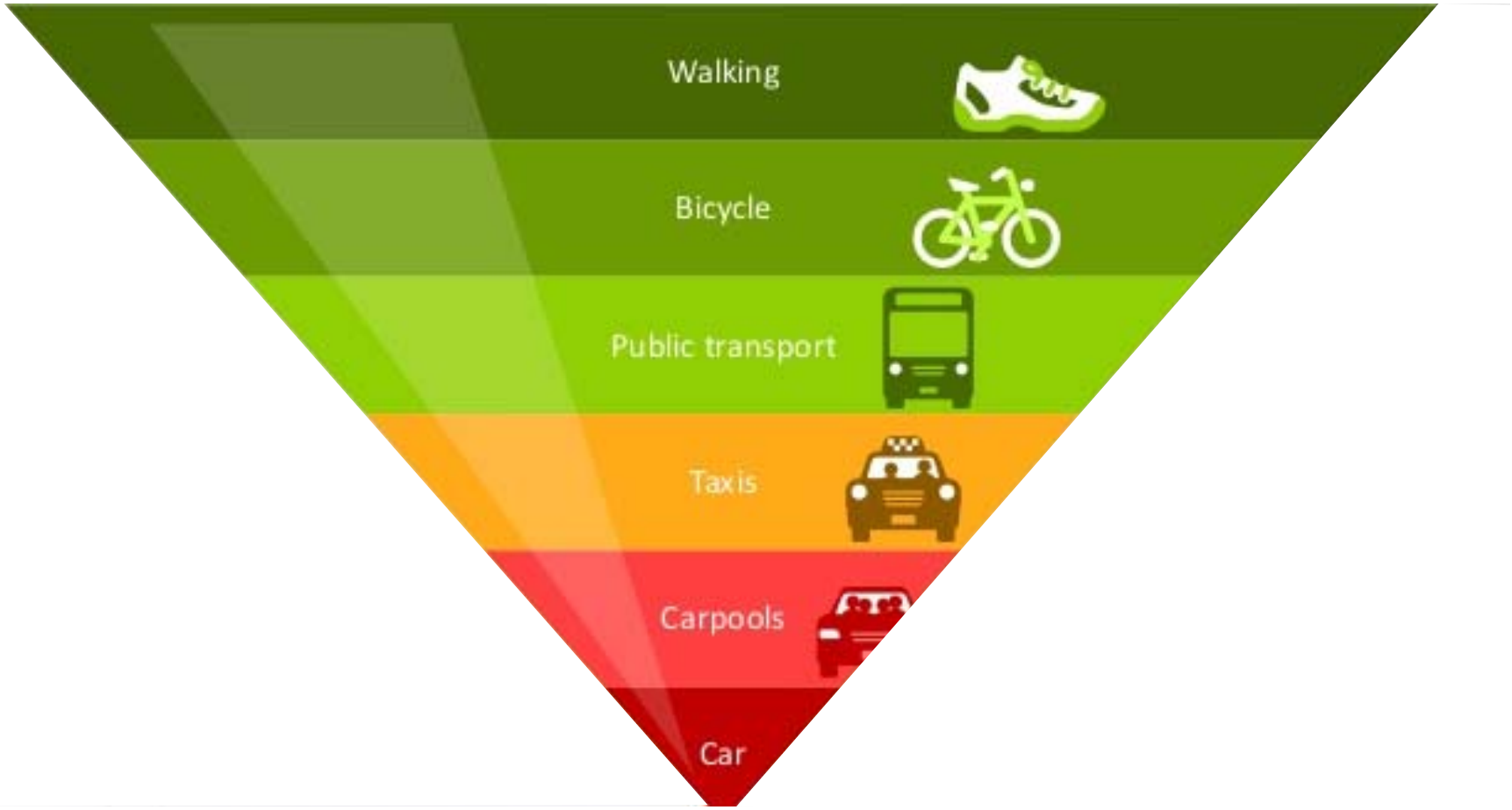
Sustainable Transportation Pyramid

Bringing it all Together



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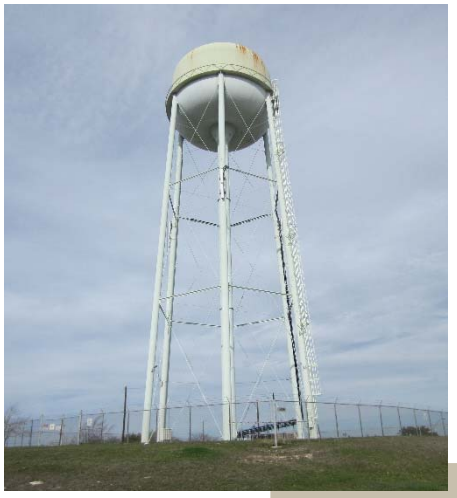
Key Findings

Energy

- Conservation first and then renewable energy
- Existing district heating and cooling systems are very successful, and can be expanded in future development to ensure optimal efficiency

Water

- Recent droughts have raised awareness about the importance of water
- Long hot and dry periods in the summer can make establishment of trees and landscape difficult; temporary irrigation systems should always be planned and used for new plantings
- Fort Hood has achieved the largest reduction of water through renovations in water infrastructure; further infrastructure improvements are the most likely sources of significant reductions in water use in the future



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Key Findings

Waste

- Fort Hood has committed to becoming a Net Zero Waste installation
- Begin with procurement and complete materials ecology
- Properly managed recycling and composting can reduce waste generation considerably

Stormwater

- Heavy runoff from severe storms in the area causes flooding; storm infrastructure should be designed to accommodate these peak flows
- Integrating open spaces and planting into the developed area will increase stormwater infiltration
- Diverting stormwater to greenbelts, parks, and engineered infiltration systems is an efficient strategy for stormwater infiltration
- Maintaining and planting trees and adding infiltration basins can help to reduce the load to stormwater infrastructure
- Properly designed and installed constructed wetlands and engineered bioswales can mitigate a much larger area of hardscape than traditional berms or swales

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Conclusion

LIVABILITY 2040
connecting people & places

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Questions/Discussion

NET ZERO WASTE 2020 Fort Hood

2020 "Perfect Vision, Perfect Mission"

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End of Brief

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