Ruffino Hills Landfill: Resilient Redevelopment and Detention Strategy

Houston One Voice
University of Houston

December 2020

EXECUTIVE SUMMARY

The Ruffino Hills landfill site represents a generational opportunity to create an ICONIC Town Center and Flood Control facility that is a catalyst for new investment. This site is ideally located to support needed stormwater detention to protect the residents and businesses in this area. However, traditional cost-benefit analysis, to clean-up the landfill and convert it to a flood control detention pond, has ruled this site out as being too costly. The master plan aims to meet flood control detention goals through a public-private approach of blending ***development income*** with ***detention funding*** as a pathway to a more feasible project. Southwest Houston Redevelopment Authority/ Tax Increment Reinvestment Zone #20 (TIRZ 20), with Houston One Voice and University of Houston, have initiated an engaging process to discover a balanced approach to ***Detention***, ***Economic Development***, and ***Recreation***. This report is the beginning of a comprehensive effort to plan, engineer, finance, and develop a project that demonstrates the possibilities of harnessing Houston's scarce open space to create more resilient infrastructure and development.

The Town Center at Five Ponds

This concept delivers a balanced approach to Detention, Economic Development, and Recreation.

The TOWN CENTER at FIVE PONDS is envisioned as a midrise livable, walkable, and resilient project. The site features a moon lake detention basin, the built-out vision will provide over 1,800 jobs and housing for 6,700 residents. The concept plan accommodates net zero energy and greenhouse gas (GHG) strategies that demonstrate how new investment can meet the goals of the City of Houston climate action planning and resilience planning.

The plan concept is guided by five principles:

i. *Create an Iconic Regional Address*
ii. *Balance Detention, Economic Development, and Recreation*
iii. *Plan a Walkable, Bike-able, and Transit Accessible Neighborhood*
iv. *Provide Natural and Educational Parks*

v. *Make the Town Center at Five Ponds Sustainable and Resilient*

TIRZ 20 LEADERSHIP

Envisioned outcomes from the ***Ruffino Hills Resilient Redevelopment and Detention Strategy*** will be dependent on the continued leadership of TIRZ 20. TIRZ 20 has a unique opportunity to extend the traditional leadership in infrastructure development into a dynamic action role to create a project that demonstrates the benefits of an ***integrated economic and environmental resilience project***.

This report summarizes key findings from Houston One Voice. It includes (1) Site Assessment, (2) Development Programming, (3) Redevelopment scenarios, (4) a Preferred Concept plan, and (5) an Action plan. It was prepared as a foundational roadmap for implementation reflecting community priorities.

There are three key drivers for leadership that can support an impactful project outcome.

Driver 1: Policymaker and Agency Outreach

The Ruffino Hills site can result in a **strong economic repositioning of the Beltway 8 and I-69 regional intersection**. This site provides an example of a livable net-zero climate and stormwater project and expand the open space and trail systems in SW Houston. Houston One Voice will support TIRZ 20 to continue to provide leadership to implement a community-based vision of a project that implements the City of Houston's resilience planning goals. This includes ***gaining support of policymakers and staff*** from the Mayor's office, city council, Harris County judge and commissioners, and state and nationally elected representatives.

Driver 2: Champion for a Public-Private Approach to Creating an Economic Development Catalyst

Implementation of **blended economic and environmental objectives** can result in a project with an enhanced economic spill-over for the I-69 and West Bellfort corridors. This project will be the first in the region to attain a ***balanced detention, economic, and recreation project*** with multiple partners. Houston One Voice will support TIRZ 20 to continue to champion the Ruffino Hills redevelopment as an economic development catalyst project due to its added detention capacity, recreation and quality of life features, and private sector investment. This includes **preparing a Financial Feasibility Study** to better understand the factors for success, including market conditions and timing, of a successful public-private partnership. This will help TIRZ 20 leverage its investment with funding from other sources.

Driver 3: Coordination of Infrastructure Planning and Finance

The initial process has successfully engaged key agency partners, Harris County Flood Control District and the City of Houston, necessary to coordinate the planning, design, and funding of remediation and detention for Ruffino Hills. The redevelopment process for the Ruffino Hills landfill would benefit from continued leadership and coordination by Houston One Voice to meet detention, economic, and open space objectives. Houston One Voice will support TIRZ 20 to continue to play the role of the ***Project Coordinator*** bringing partners together to facilitate outcomes beyond the missions of single, special-purpose agencies. This includes **developing an 'Integrated Development and Detention Infrastructure Financing Plan'** and related ***Public-Private Implementation Responsibilities and Resource Coordination'***.

SUCCESSFUL PROJECT IMPLEMENTATION

Action 1: Policymaker and Agency Outreach

The Ruffino Hills site can result in a **strong economic repositioning of the Beltway 8 and I-69 regional intersection**. This site provides an example of a livable net-zero climate and stormwater project and expansion of open space and trail systems in SW Houston. TIRZ 20 will continue to provide leadership to implement a community-based vision of a project that implements the City of Houston's resilience planning goals. This will include ***support of policymakers*** and the Mayor's office, city council, Harris County judge and commissioners, and state elected representatives.

By financing pre-development planning and environmental efforts early in the process, TIRZ 20 will assist investors and the public agencies involved to better understand how their resources can be invested in the creation of the ***Ruffino Hills Resilient Redevelopment and Detention Strategy***. TIRZ 20 will also be actively reducing the development risk, both from the Flood Control District and from potential investors to the mixed-use site. The recommended next steps in the process are as follows:

1. Collaborate with the Harris County Flood Control District (HCFCD) to finalize the ***Ruffino Hills Resilient Redevelopment and Detention Strategy*** based on detention needs and improvement plans to Keegans Bayou channel and the Keegans Bayou watershed.
2. Collaborate with City of Houston on Phase I and II environmental study findings and updates to the ***Ruffino Hills Resilient Redevelopment and Detention Strategy*** based on condition of project site soil conditions and in-situ vs offsite remediation options.
3. Collaborate with the Cities of Bellaire and West University on property agreements.
4. Collaborate with the Houston Parks Board (HPB) on trail and amenities alignments.
5. Collaborate with the Texas Commission on Environmental Policy (TCEQ) on permitting and environmental impact analysis for project site.
6. Collaborate with the Army Corps of Engineers on modelling the ***Ruffino Hills Resilient Redevelopment and Detention Strategy*** as an alternative to the existing Cost-Benefit model, which has no ability to integrate revenue generating flood-control projects.

Action 2: Champion for a Public-Private Approach to Creating an Economic Development Catalyst

Implementation of **blended economic and environmental objectives** can result in a project with an ***enhanced economic spill-over for the I-69 and West Bellfort corridors***. This project will be the first in the region to attain a ***balanced detention, economic, and recreation project*** with multiple partners. TIRZ 20 will continue to champion the Ruffino Hills redevelopment as an economic development catalyst project due to its added detention capacity, recreation and quality of life features, and private sector investment. This includes:

1. P**reparing an Economic Feasibility Assessment** to better understand the factors for success, including market conditions and timing, of a successful public-private partnership.
2. Prepare a ***Public-Private Implementation Responsibilities and Resource Coordination' Plan***. Compiling local government incentives for private sector partners that implement important catalyst projects on the Ruffino site. This may include reduced development fees; prioritization on Capital Improvements Program (CIP) funding to support infrastructure needs, Local governments may also collaborate to apply for various types of regional, state and federal funding to support infrastructure and other area needs.
3. Conduct and participate in meetings and presentations with various real estate trade and business organizations such Urban Land Institute, Greater Houston Partnership, General Contractors of Houston, Houston Area Realtors, etc.

Action 3: Coordination of Infrastructure Planning and Finance

The Redevelopment process for the Ruffino Hills landfill would benefit from continued leadership and coordination by TIRZ 20 to continue to play the role of the ***Project Coordinator*** bringing partners together to facilitate outcomes beyond the missions of single, special-purpose agencies. This includes:

1. D**eveloping an 'Integrated Development and Detention Infrastructure Financing Plan'.** By combining the aspects of real estate delivery, financing, and long-term operation and maintenance, TIRZ 20 can encourage more collaboration and high-quality delivery for project infrastructure.
2. Ultimately, using the financing capacity of all local government stakeholders, TIRZ 20 can coordinate making the Ruffino site available for redevelopment; make the site physically

suitable for development and coordinate public financing assistance for the ***Ruffino Hills Resilient Redevelopment and Detention Strategy.***

Action 4: Ruffino Hills Resilient Redevelopment and Detention Development Process

The Redevelopment process for the Ruffino Hills landfill into the **Ruffino Hills Resilient Redevelopment and Detention** project will be conducted in two (2) segments.

1. **Detention/ Retention pond and trails network** developed by the Harris County Flood Control District.
   a) TIRZ 20 should facilitate a ***Landfill Remediation scenarios and cost assessment***. This will be conducted in collaboration with the Harris County Flood Control District and following the site plan for the ***Ruffino Hills Resilient Redevelopment and Detention Strategy*** as a guide for site planning. The process will involve iteratively modelling (1) costs for best practices in landfill remediation with (2) stormwater capacity on site, with (3) Mixed-Use development capacity on-site.
   b) The portion of the property to be developed as Detention/ Retention pond and trails network should be identified in collaboration with the Harris County Flood Control District during the Spring of 2021.
   c) TIRZ 20 should collaborate with Bellaire and West University to secure ownership to Harris County Flood Control District for the portion of the site to be developed as Flood Control and Trails Network.

2. **Mixed-Use Commercial Development** by master developer using PPP model.
   a) A request for qualifications (RFQ) should be outlined by TIRZ 20 to identify a master developer to manage redevelopment of the site and to refine the concept plan developed: '**Ruffino Hills Resilient Redevelopment and Detention Strategy'.**
   b) TIRZ 20 should collaborate with the master developer to complete the redevelopment of the Ruffino site with PPP partnership model using the following best practices to guide the strategy:
      i. Ensure shared vision and public purpose
      ii. Precision with assembling the team
      iii. Proactive predevelopment strategies
      iv. Enhancing relationships between developers and public offices
      v. Ensuring 'Fair Deals'
      vi. Assessing fiscal impacts and community benefits
      vii. Structuring development partnership deals
      viii. Evaluating and structuring infrastructure and facility PPP
      ix. Managing risk and shared success
      x. Documenting and carefully monitoring deals

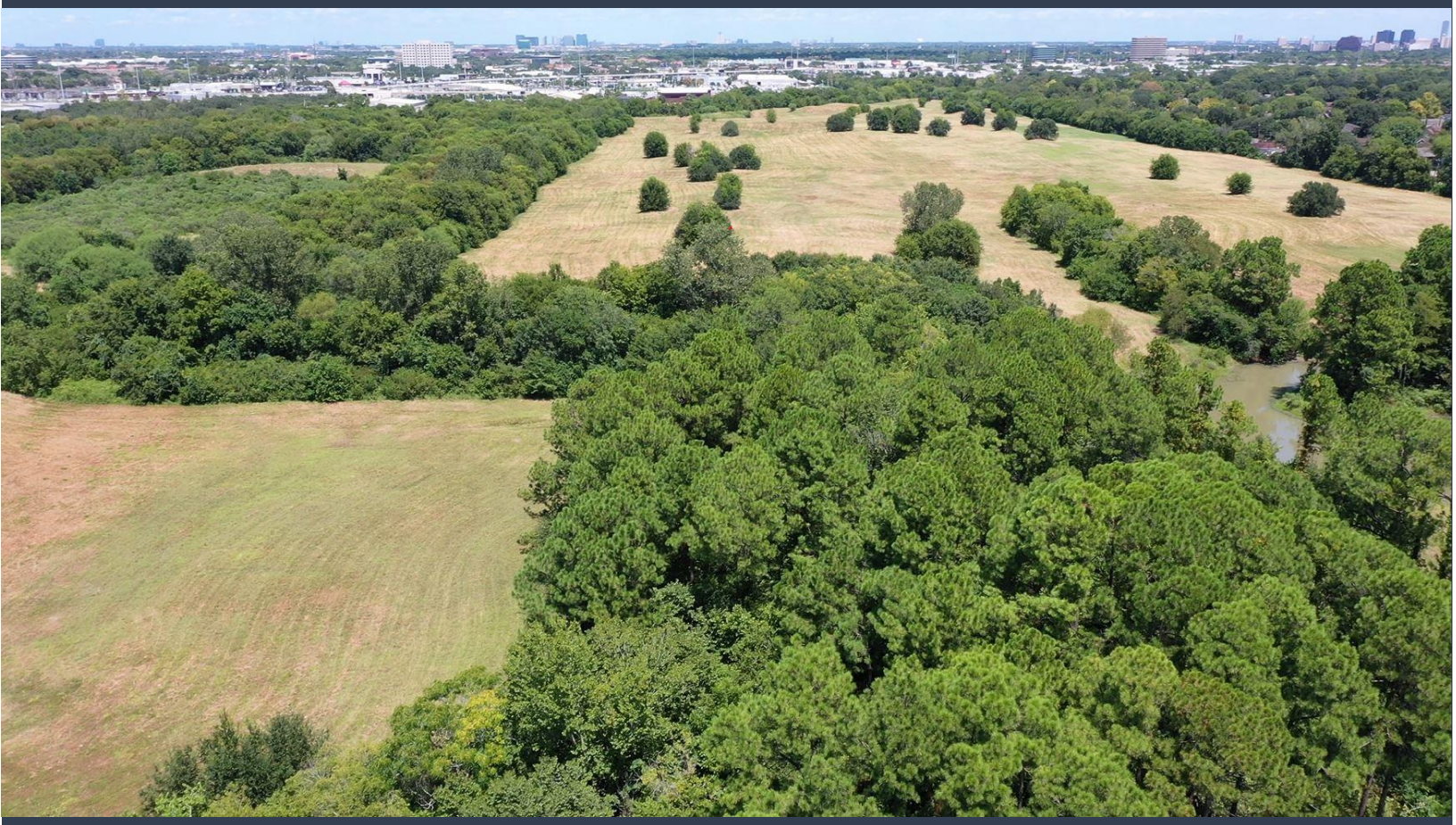
Project Timeline

Stage	Activity	Subactivity	2020				2021				2022				2023				2024				2025			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Predevelopment	Site Planning Scenarios				■	■																				
		Stakeholder Engagement			■	■																				
		Alternative Development Scenarios			■																					
		Preferred Scenario				■																				
		Agency Coordination (COH/ HCFCD)			■	■																				
		Action Plan				■																				
	Preferred Concept Remediation Engineering / Detention Engineering Assessment						■																			
		Environmental Assessment Review					■																			
		Preliminary Alternative Scenarios					■																			
		Scenario Analysis					■																			
		Preferred Plan Refinement					■																			
	Preferred Concept Remediation/ Detention Engineering Integration							■																		
		Detention Engineering synchronization						■																		
		Remediation Engineering synchronization						■																		
		PPP Resources and Finance Assessment						■																		
	Action Plan and Development Partner Identification								■																	
		Development Partner Outreach							■																	
		Draft 3P Request for Qualifications (RFQ)							■																	
		Action Plan							■																	
	Master Development Process PPP Model								■	■																
		RFP Selection							■	■																
		Consultant Identification								■																
		Due diligence and final negotiation								■																
Site Redevelopment*	Detention and trails network										■	■	■	■												
		HCFCD Property Transfer									■															
		Site Remediation										■	■													
		Detention Pond construction and trails												■												
	Mixed-Use Commercial Development										■	■	■	■												
		PPP Engagement									■	■	■	■												
		Property Transfer									■															
		Site Remediation										■	■													
		Infrastructure - Utilities, roads, etc.												■	■											
		New development construction (start)													■	■	■	■								

* Site Redevelopment Schedule and Approach Determined by Pre-development Stage

TABLE OF CONTENTS

INTRODUCTION



The Ruffino Hills landfill site represents a generational opportunity to create an iconic town center that is catalyst for new investment. This site is ideally located for needed stormwater detention. However, traditional cost-benefit analysis for a landfill remediation project and flood control facility has not justified its development. The master plan aims to meet detention goals through a public-private approach of blending development income and detention funding as a pathway to a more feasible project. TIRZ 20, with Houston One Voice and University of Houston, have initiated an engaging process to discover a balanced approach to detention, community development, and open space and recreation. This process is envisioned as the beginning of a longer, comprehensive effort to plan, engineer, finance, and develop an iconic project that demonstrates the possibilities of harnessing Houston's growing economy to create a more resilient infrastructure.

Purpose

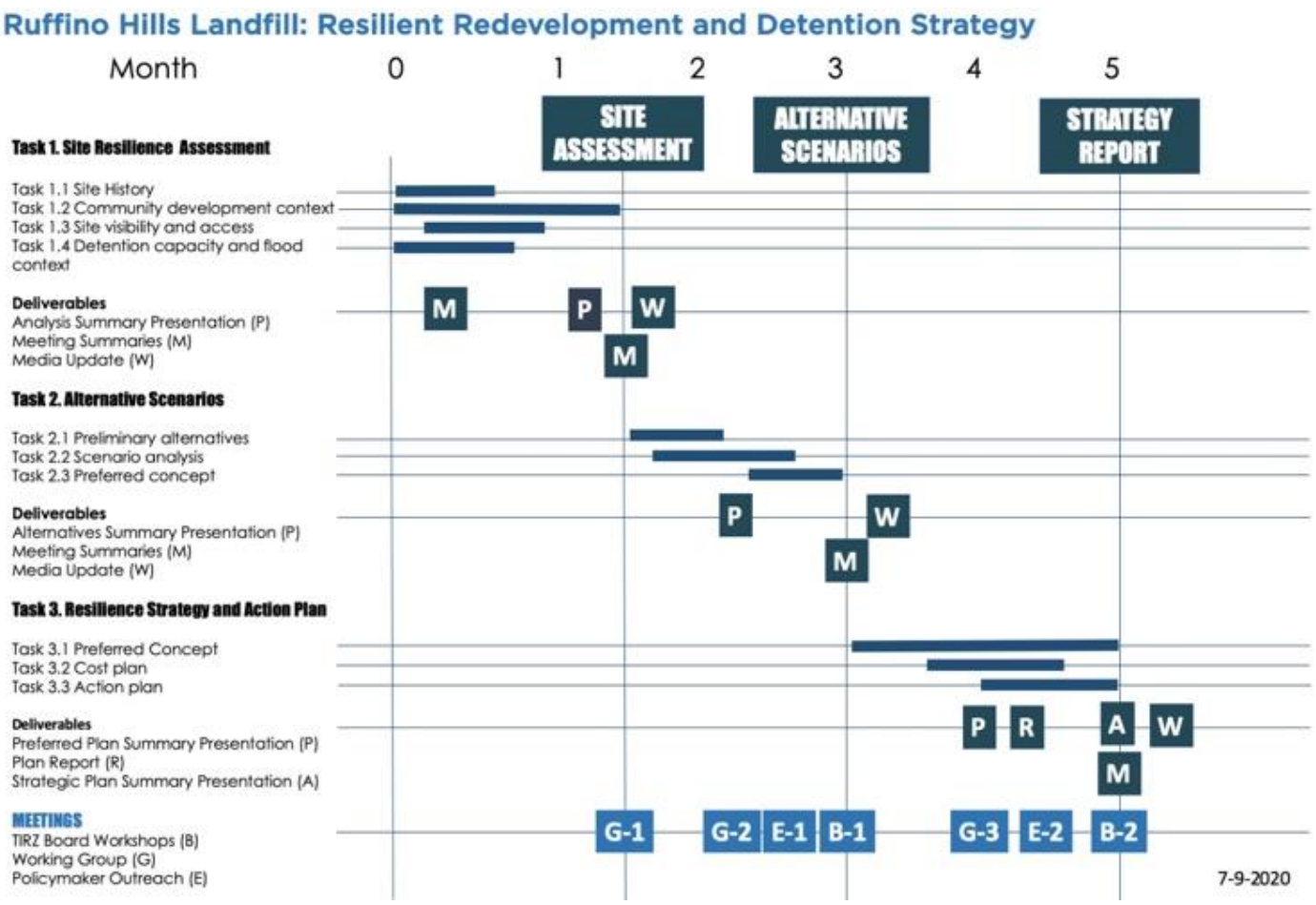
The overall aim of the Resilience and Redevelopment Strategy for Ruffino Hills is to develop a roadmap for redevelopment of the City of Belaire and West University Ruffino Hills landfill. The 143.4-acre site is located at an important confluence of the Keegans Bayou stormwater that has historically flooded and the regional intersection of I-69 and Beltway 8. In addition, Southwest Houston communities have been striving to plan and implement open space and trails, improve local schools, and attract private investment and commercial services. Redevelopment of Ruffino Hills has the potential to become an economic development catalyst inspiring new investment in the West Belfort corridor and low-density commercial, industrial, and warehouse properties at the intersection of I-69 and Beltway 8.

Process

The planning and research process were organized as three steps (Figure I.1). Over a five-month period, Houston One Voice and their community partners assessed and discussed the possibilities Ruffino Hills presented, explored alternative redevelopment scenarios, and prepared a resilience strategy and action plan for the preferred concept.

The process was guided by a working group of residents and staff from TIRZ 20 and the Southwest Management District, Brays Oaks Management District, International Management District. The team reviewed initial assessment findings and community objectives, alternative scenarios, the preferred concept, and the action plan to the TIRZ 20 Board. The Board reviewed the final draft plan in January 2021. The planning and research team The Houston One Voice team assisted TIRZ 20 staff to prepare a communications plan and a website.

Figure I.1: Planning Process



People

The TIRZ 20 Board of Directors budgeted for the study in the 2020 Capital Improvement Plan. Houston One Voice, and their research partners from University of Houston, were selected as the consultants in the summer of 2020 and started the project in July of 2020. Community input was crucial to the success of the strategic planning effort. Houston One Voice assisted in organizing a working group of local residents and staff from TIRZ 20 and the Southwest Management District, Brays Oaks Management District, International Management District. The Working Group meet six times during the process to set overall objectives, review alternatives, and refine the preferred concept.

Parallel with the community process, Houston One Voice met with the City "Flood Czar" and senior staff from the Harris County Flood Control District. These meeting were critically important to coordinate technical studies and establish overall objectives for detention and environmental remediation of the landfill. In addition, Houston One Voice met with Brays Oaks Management District staff to discuss current studies for wayfinding and streetscape programs and parks and recreation planning.

TIRZ 20 BOARD OF DIRECTORS
Position 1: Dennis "Corky" Fowler
Position 2: Welcome Wilson, Jr. – Chairman
Position 3: Kenneth Li
Position 4: Stephen Le, Jr. – Secretary
Position 5: Saul Valentin
Position 6: Dale Davidson – Vice-Chair
Position 7: Fred Bhandara

TIRZ 20 STAFF
David Hawes, Executive Director
Annie Trinh, Deputy Executive Director
Don Huml, Project Manager
Linda Clayton, Director of Records and Compliance
Alan Bernstein, Director of Public Affairs and Communications

RUFFINO HILLS WORKING GROUP
Charmaine LeBlanc
Pat Dorsey
Alice Lee
Sheri Cortez
Marcy Williams
Dale Davisdson
Alan Bernstein
Ben Brewer
Sharon Young
Annie Trinh
Natalie Hurtado

CITY OF HOUSTON
Stephen Costello, PE
Chief Recovery Officer, Mayor's Office

HARRIS COUNTY FLOOD CONTROL
Ataul Hannan, Planning Leader
Nasiha Alibegovic, Project Manager
Gary Bezemek, Project Feasibility Manager
Dena Green, Environmental Feasibility Manager

SOUTHWEST MANAGEMENT DISTRICT
Alice Lee
Executive Director

BRAYS OAK MANAGEMENT DISTRICT
Ben Brewer
Executive Director

HOUSTON ONE VOICE
Michael Bercu
Sylvester L. Skip Reeder III
Dr. David Abraham, AICP

UNIVERSITY OF HOUSTON
Dr. Bruce Race, FAIA, FAICP
Rahma Hassan, Student
Patrick Jones, Student
Hugo Margain, Student

SECTION 1: Community Context

Ruffino Hills is a linchpin site for southwest Houston. It represents a generational opportunity to reposition the I-69 and Sam Houston Parkway intersection as an important address and be a catalyst for future investment. The area has a 150-year history as a rural African American Riceville community that has evolved into a culturally rich part of Houston. Since the 1960s, the area has developed as a suburban community of subdivisions with supporting institutional and commercial services. The community has tremendous pride in their schools and aspirations for a high-quality parks and trails system. The site interfaces with residential, commercial, industrial and quasi-institutional uses offering an opportunity to pursue a mixed-purposed site. Ruffino Hills is a regionally accessible and visible location.

1.1 Community Development Context

The Ruffino Hills site is located at an important regional highway intersection (Figure 1.1). Once the detention and flooding solutions are implemented, the area can open up for redevelopment. The Ruffino Hill site could become a new generation of business and community center reflecting an emerging economy that has more flexible choices about the physical proximity between work and home and at the same time, have easy transit access to Houston's medical center and downtown.

Ruffino Hills is in the southwestern edge of the Brays Oaks Management District and the southern end of TIRZ 20. Its market area borders the Westchase Management District, Southwest Management District, the International Management District, and Sugarland/ Fort Bend to the south (Figure 1.2).

1.2 Site History

The site history can be characterized as having three distinct periods including a natural predevelopment and agricultural phase, landfill, and suburbanization (Figure 1.3). These phases reflect the region's dynamic growth and have established the physical framework and demographics that will adapt to continued economic and population growth in southwest Houston and Harris and Fort bend Counties.

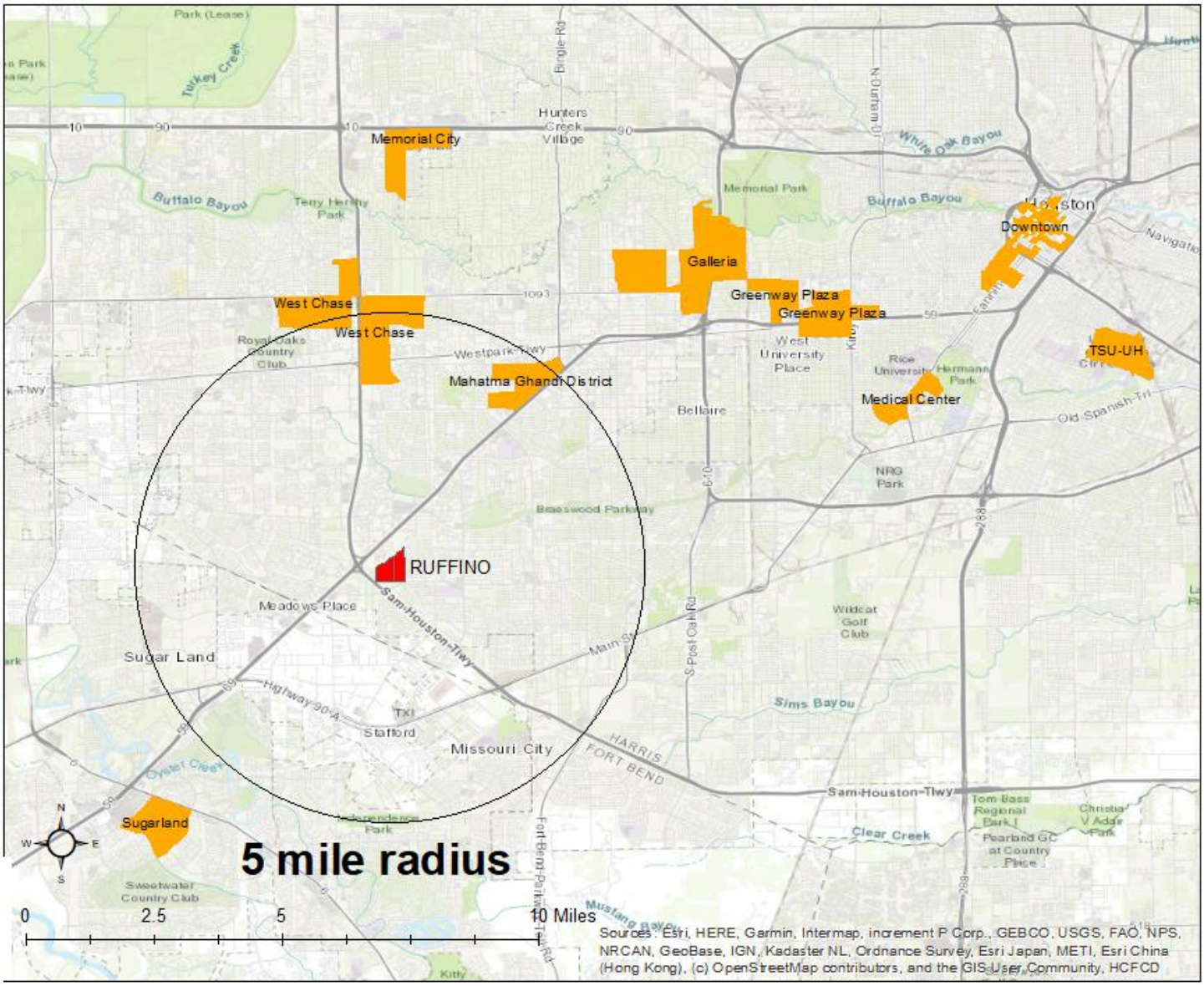
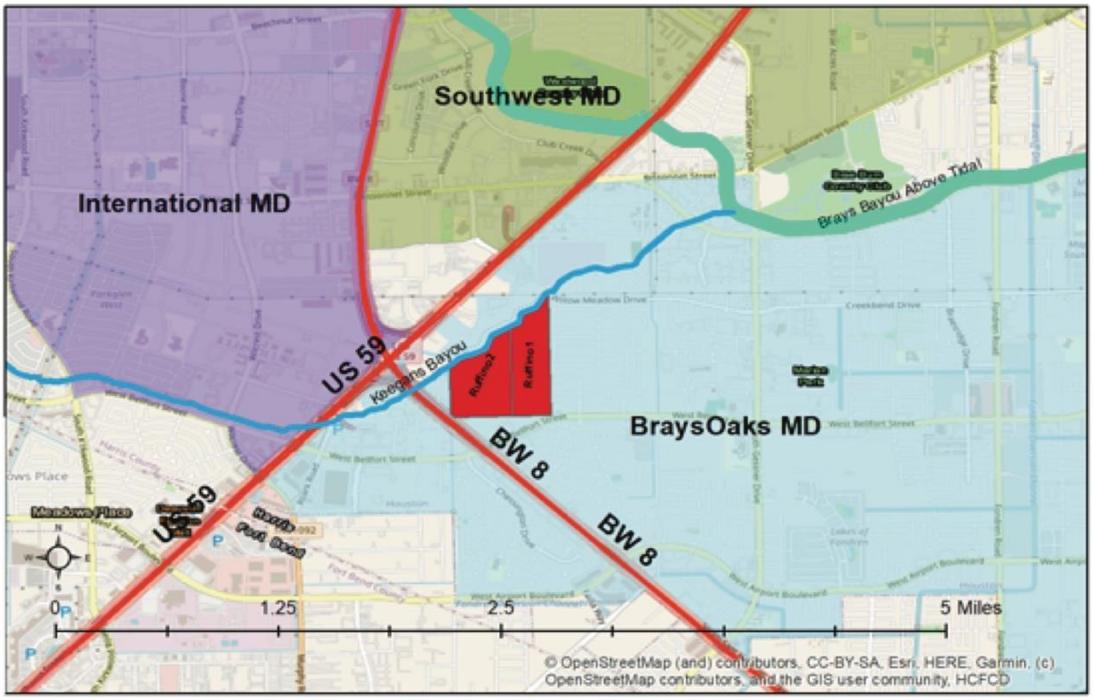


Figure 1.2: Ruffino Hills Southwest Communities Context

SOUTHWEST NEIGHBORHOODS



BRAYS OAKS DISTRICT AREA

The imposing multi-story Cao Dai temple, along with an adjacent pond and community hall, is the largest of its kind outside of Vietnam.

The Raindrop Turkish House is a community space found on the south-side of ruffino hills. This space represents the diversity of the area

SOUTHWEST DISTRICT AREA

Memorial Hermann Southwest employs state-of-the-art technology and a team of highly trained affiliated physicians to offer world-class care close to home.

PlazAmericas offers over 150 stores with a diverse variety of retailers, restaurants, entertainment, carts and kiosks. Occupying 83,000 square feet, the Mercado at PlazAmericas is filled with numerous stores and small businesses providing unique items and services.

INTERNATIONAL DISTRICT AREA

Arthur Storey Park seamlessly blends functionality with aesthetics. This 210-acre detention basin into a charming neighborhood park, featuring amenities such as picnic pavilions, gazebos, walking trails, playgrounds, and more!

Hong Kong City Mall is the main attraction for the Asian American community. It is the perfect place to celebrate cultural festivities and activities with your friends and family.

Natural Setting and Agricultural Period

Keegans Bayou is a branch of Brays Bayou. The site was a riparian corridor and coastal prairie prior to a brief period of farming and ranching. Keegans Bayou is named for James Keegan, Jr., an early settler. The natural rolling landscape around the bayou has sandy and clay loam soils and one time had included a mix of hardwoods and pines (Handbook of Texas Online, 2020).

The Landfill Era

The Ruffino Hills site was a rural part of the growing Houston region in the 1950's when the cities of Belaire and West University purchased the land for their municipal landfills. Within 20 years, the Brays Oaks community expanded and the landfills were surrounded by subdivisions. Municipal solid waste disposal site by the city of Bellaire (1954-1988) and city of West University Place (1959-1992). Bellaire owns 72.56 acres on the western side and West University owns 70.87 acres on the eastern side. From 1994-2002, the site was a private golf course.

Boom and Bust Suburbanization

The aerial photos indicate how the areas around the Ruffino Hills site has developed. Population growth, new thoroughfares and highways opened up land and developers met the demand for subdivisions, warehouses, auto dealers, and commercial services. The community added schools and parks to provide institutional services for growing Houston.

Brays Oaks Super Neighborhood population grew from a few hundred in 1950 to about 37,000 by 1980. Southwest Houston was a booming suburb in 1980 and high oil prices lead to steady growth. However, that all ended in the 1982 recession when oil prices dropped from $35 per barrel to $10. The Houston economy lost 211,000 jobs between 1982 and 1987 and did not recover until. Since, Brays Oaks has grown another 20,000 people.

Figure 1.3: Historic Aerial Photography Ruffino Hills Context (Texas land Office/Google Earth)

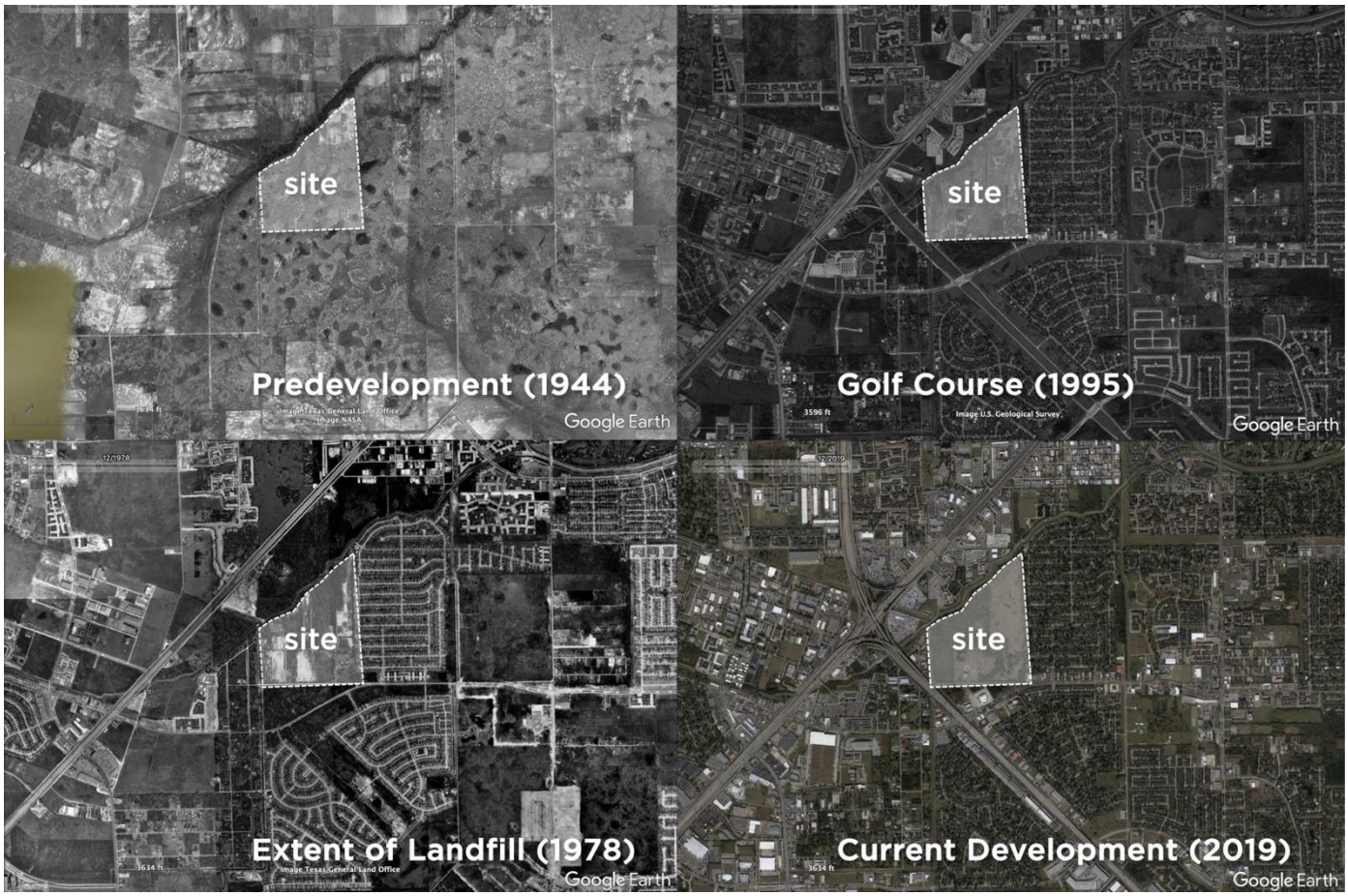
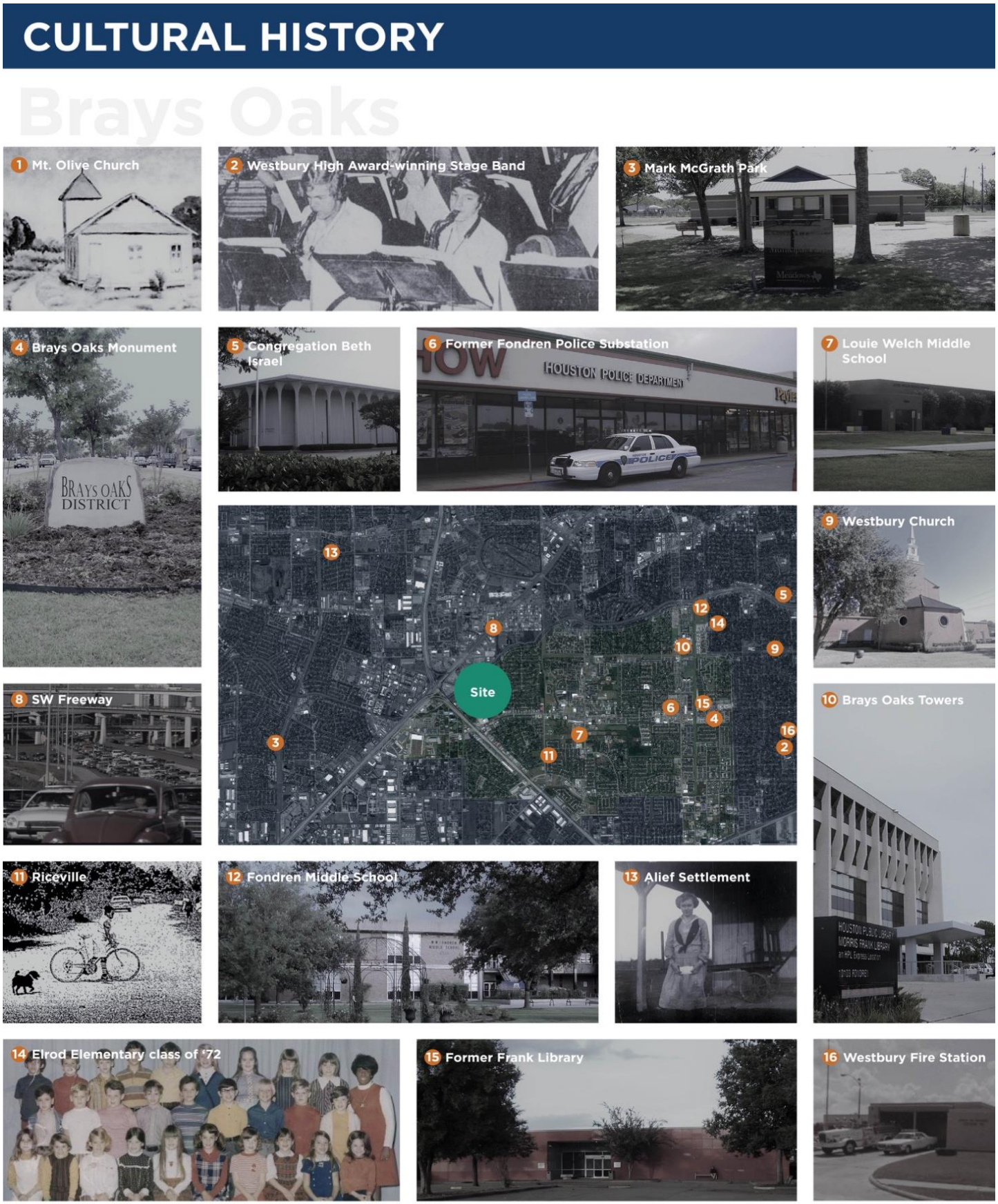


Figure 1.4: Cultural History



Sources: Figure 1 from ricevillecurch.org ; Figures 3-8, 10, and 12-16 from Public Domain; Picture 8 is from Google Streetview; Figure 11 is from the Houston Chronicle (1978)/ Figure 14 is from HISD.

Cultural Memory and Diversity

Brays Oaks has a long history and its development has reflected Houston's economic, cultural heritage, and social values (Figure 1.4).

Just north the Ruffino Hills site is the historic black community church and cemetery of Riceville. Founded in 1850 by Leonard Rice, he and other inhabitants were farmers. Riceville's Mt. Olive Church was built in 1889, burned in 1968 and was rebuilt in 1978 (Riceville Church, 2020). Riceville was annexed in 1960 but was not provided basic urban services including water and sanitary sewers. In 1990, there were 300 people living in Riceville's mostly poorly constructed homes from the 1940s and 1950s. Some of these houses can be seen in the 1944 aerial photograph (Figure 4) located along Riceville School Road. The Riceville Cemetery remain as a physical memory of the Riceville community on the north side of Keegans Bayou (Kleiner, 2020). The existing church, opened in 2002, is located at 11439 S. Gessner Road.

Much of Brays Oaks was the ranch owned by Walter Fondren, a co-founder of Humble Oil Company. The original district was approximately nine square miles bounded by Brays Bayou and I-69 on the north, Hillcroft Avenue on the east, and South Main/US90 on the east. Later in the 1980s, the community expanded and multifamily housing was developed in the Fondren Southwest. With the economic downturn, a significant number of the middle class and upper-middle class left the area. Property values declined and the apartment complexes were rented to low income Hispanic and African American families.

Brays Oaks and adjacent communities' cultural traditions are reflected in houses of worship, nonprofit community centers, and commercial services. The community was first settled by Christian and Jewish families in the 1970s and 1980s. Local cultural

Figure 1.5: Community Context

(CeSAR/HGAC)

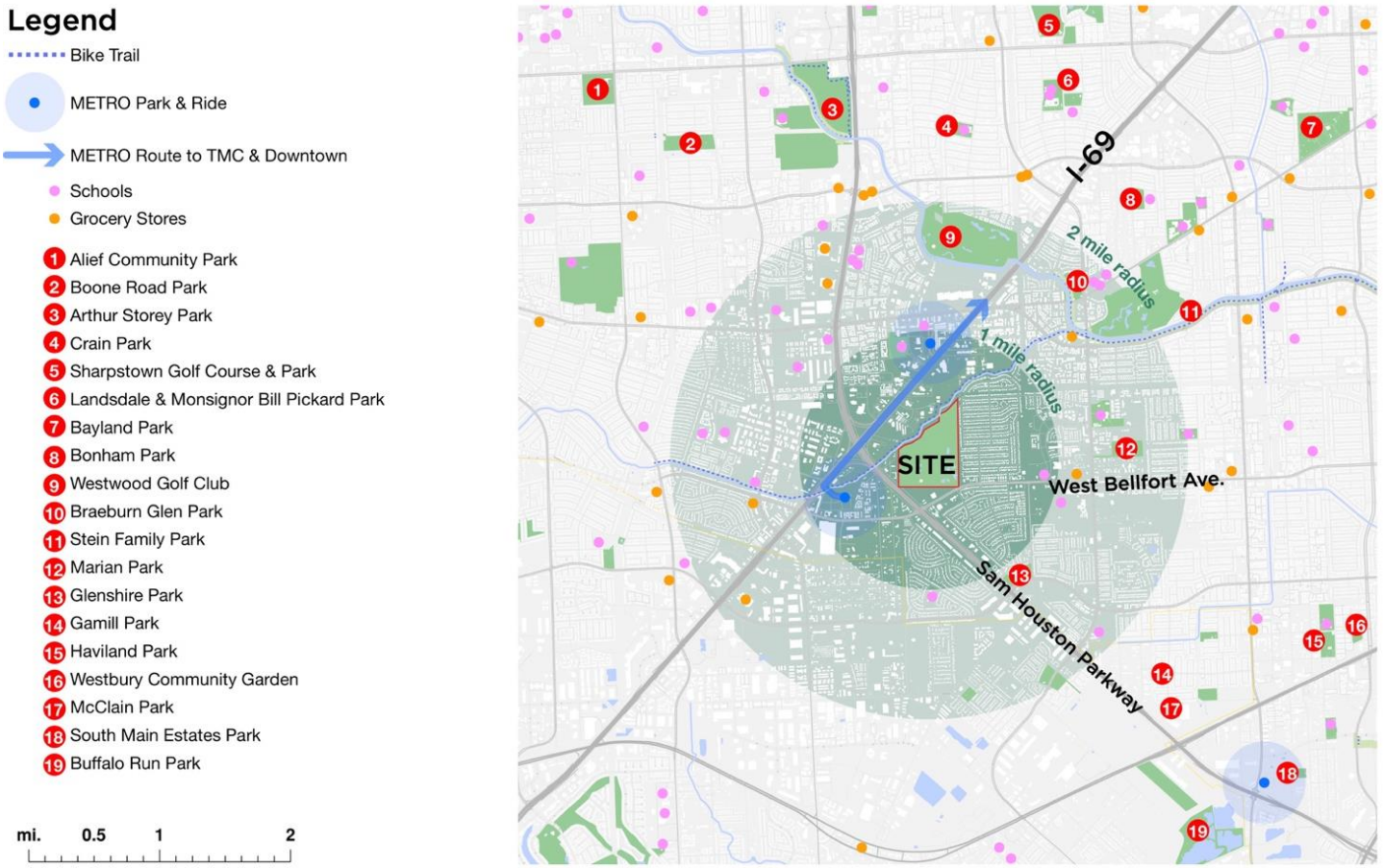


Figure 1.6: Site Access

and religious organizations today include Christian, Jewish, Muslim, Zoroastrian, Ethiopian and Budhists. Religious institutions include Congregation Beth Israel and three Orthodox synagogues, India House, Raindrop Turkish House, and several mosques including the Islamic Institute and Houston Blue Mosque. Commercial businesses and services also reflect the area's diversity including Westwood Mall, the China Town commercial district and former Sharpstown Center and Mall, now PlazAmercias, that caters to the region's Hispanic population.

1.3 Current Community Context

The Ruffino Hills site is located at an important regional intersection in Southwest Houston (Figure 1.5). It has excellent freeway access and visibility and at the center of a cluster of communities. Residents nearby enjoy a comprehensive access to schools, parks, transit facilities, commercial services, and healthcare. The site is located by West Bellfort Avenue, the principal civic corridor for Southwest Houston's neighborhoods.

Land Use

The Ruffino Hills site is surrounded by a variety of land uses (Figure 1.7). To the north is the I-69 commercial and industrial warehouse corridor. Directly to the north along I-69 is "auto row." This area has a variety of auto dealers located on both sides of the highway. There is approximately 110 acres of auto sales, repair, and RV sales and storage on the north side of Keegans Bayou. On the west side of the I-69 and Sam Houston Parkway intersection is a low-density warehouse, general commercial, and light industrial area. The West Bellfort Park and Ride transit station is located along Keegans Bayou to the west. The area has apartments and warehousing. Directly to the east and south are 1970s and 1980s vintage suburban subdivisions. West Bellfort Avenue's frontage is primarily institutional, commercial, and multifamily uses.

Site Accessibility and Visibility

Ruffino Hills is located at a highly visible and regionally accessible intersection (Figure 1.6). West Bellfort Avenue Highway has highway access from both I-69 and the Sam Houston Parkway. Bissonnet Street, to the north, has off ramp access to I-69. The METRO West Bellfort Park and Ride provides express service to the Medical Center and Downtown and is the hub for local bus routes. To the east, Creek Bend and Bob White Streets are planned for future road improvements. No immediate thoroughfare improvements are

Figure 1.7: Land Use

(HGAC)

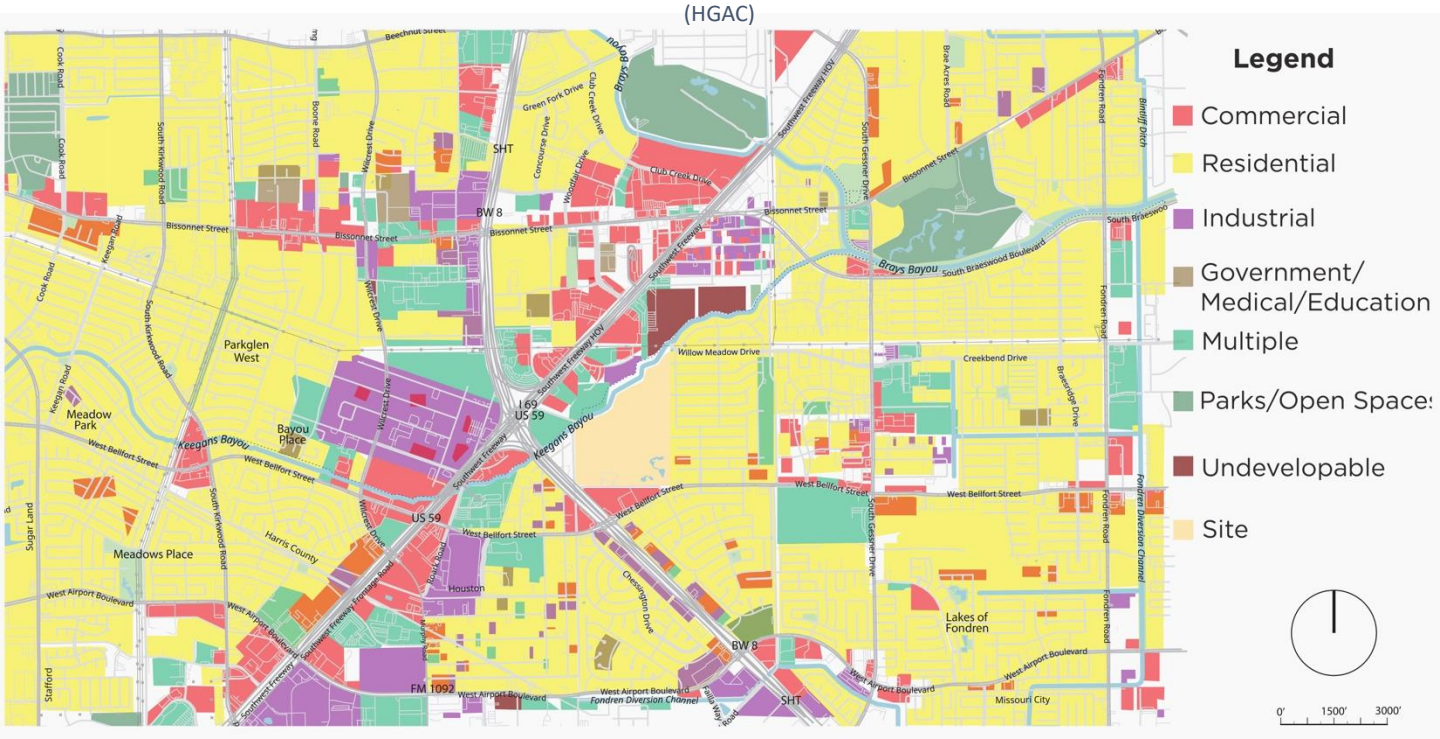
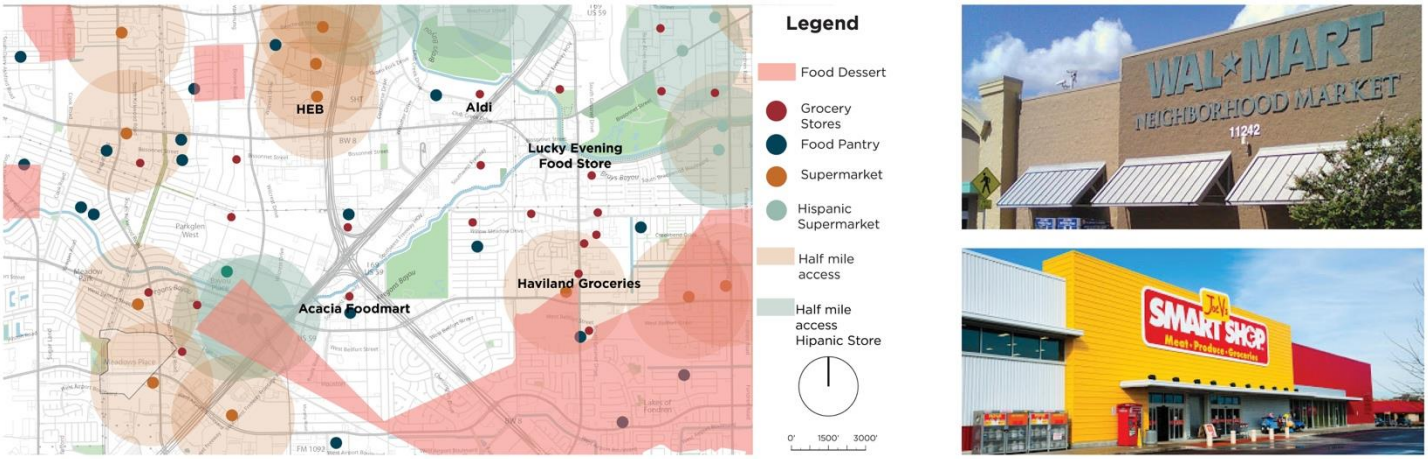


Figure 1.8: Food Access



planned adjacent to the Ruffino Hills site. Bike facilities are planned for West Bellfort Avenue and the Keegans Bayou trail. It should be noted that the communities around the Ruffino Hills site have a relatively high housing and transportation cost to income ratio. This community can benefit from affordable transportation options.

Grocery Stores and Food Access

Houston's post-war boom generated the demand for commercial and institutional services. One of the priorities for current residents in Brays Oaks is having better access to a quality full service grocery store. Figure 1.8 indicates the pattern of grocery stores near the Ruffino Hills site. There are two full service stores near the site east of the highways. WalMart has a Neighborhood Market format store and there is a Smart Shop store. In addition, there are a variety of other local smaller-format stores catering to the community's ethnic diversity. These stores reflect the mixed market demand in the area. The area is a "Food Desert" where socially disadvantaged families do not have access to healthy food options.

Health Care Facilities

Southwest Houston has a variety of access points for health care (Figure 1.9). The West Bellfort Park and Ride bus station provides express service to the Texas Medical Center (TMC). Memorial Hermann Southwest Hospital is to the north. There are also local clinics and medical buildings located in surrounding areas.

Parks and Schools

Great schools and parks are a top priority for Brays Oaks residents (Figure 11). The Southwest Management District, Brays Oaks Management District, International Management District has been developing a parks and trails master plan that assesses existing facilities

Figure 1.9: Health Care Access

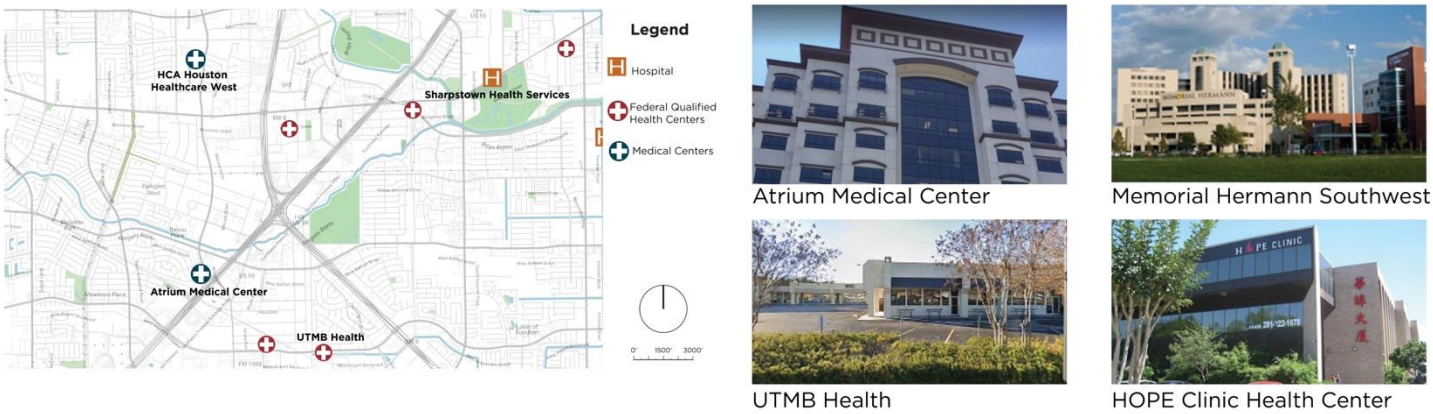
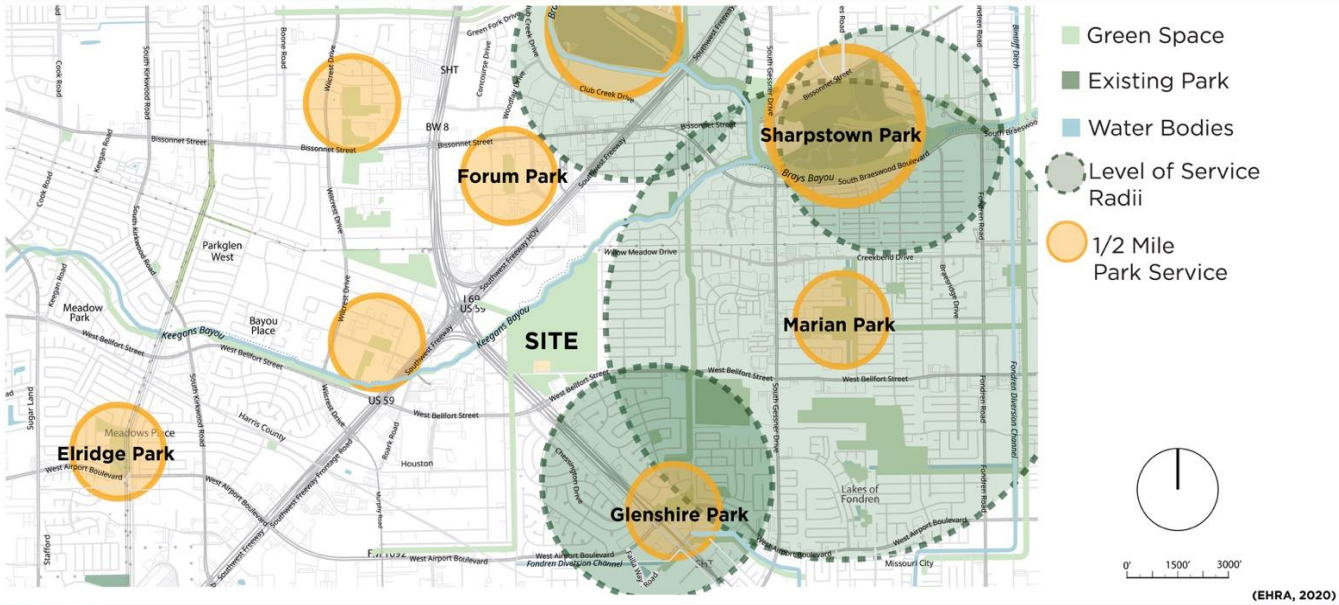


Figure 1.10: Parks and Schools

PARKS AND SCHOOLS



(EHRA, 2020)

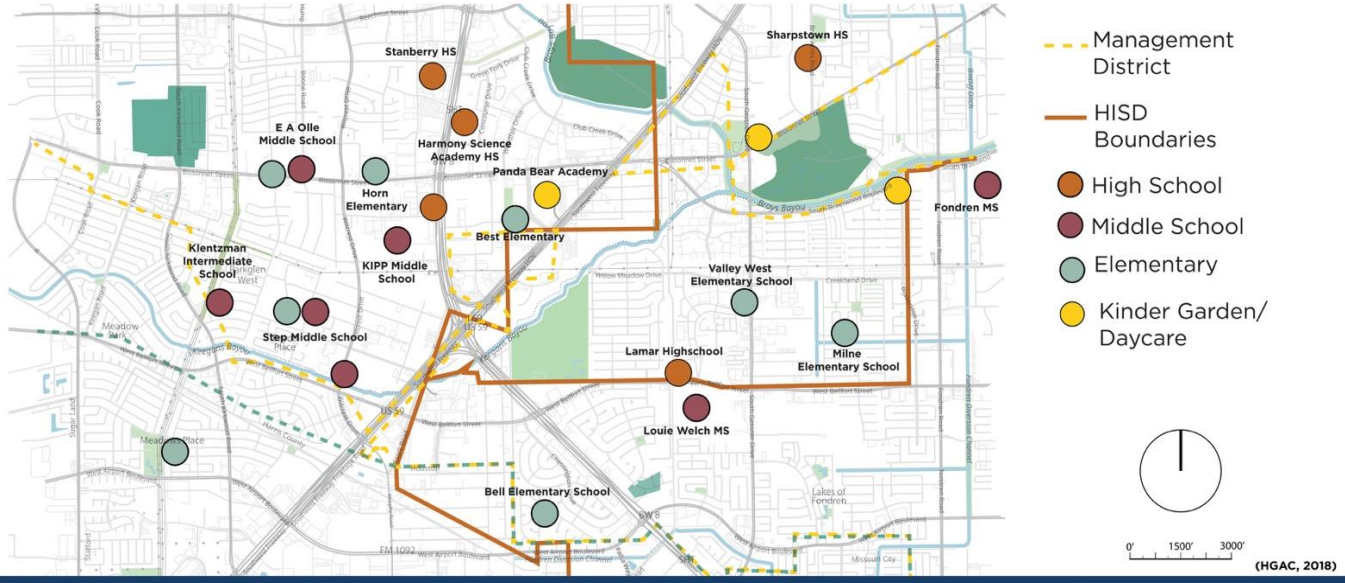
PARKS

Bayland Park

Arthur Storey Park

Glenshire Park

Crain Park



(HGAC, 2018)

SCHOOLS

Sharpstown High School

Nutcrakers Day Care

KIPP Academy

Klentzman Intermediate School

and projects future demand and improvements (EHRA, 2020). The community has a mature Adopt-A-School program that provides community volunteers for improving school grounds.

There are three significant parks near the site (Figure 1.10). These include Marian Park, Sharpstown Park, and Glenshire Park. The Ruffino Hills site has the potential to provide opportunities in the recreational service gap at the I-69 and Sam Houston Parkway intersection and the adjacent communities. In addition, the site can connect existing and future bayou trail systems.

Ruffino Hills is located in the Houston Independent School District (HISD). In the HISD area near Ruffino Hills are three elementary schools, two middle schools, several charter and private schools and Sharpstown High School. To the west are schools in the Alief ISD including a mix of public and private preschools, five elementary schools, five middle schools and three high schools.

1.4 Development Susceptibility

Redevelopment of the Ruffino Hills site will be a catalyst for new investment in the I-69, Sam Houston Tollroad (Beltway 8), and West Bellfort Avenue corridors. Over the next 30 years, low density nonresidential uses are likely candidates for redevelopment. This includes older existing light manufacturing and assembly uses, warehousing, automotive sales and service, and strip commercial land uses. The Ruffino Hills redevelopment can set the tone for the quality and intensity of new investment with an opportunity to reposition the I-69 and Sam Houston Tollroad (Beltway 8) intersection.

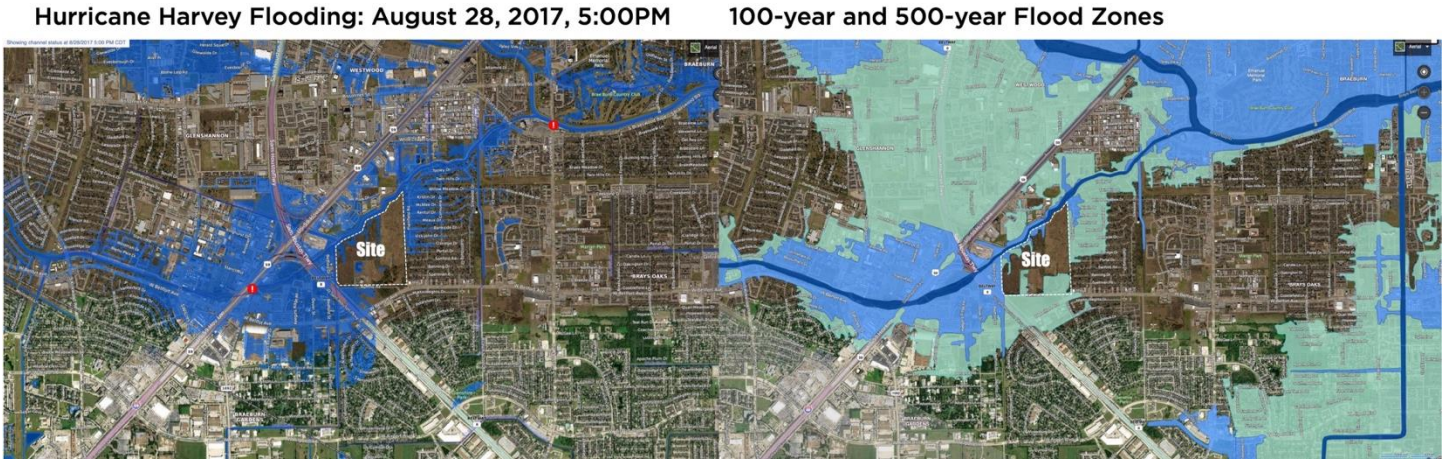
The West Bellfort Avenue corridor will be particularly well positioned to benefit from the Ruffino Hills site redevelopment. New development can increase traffic providing added market support for existing businesses and increase property values. Increased job densities, and added knowledge worker employment, can improve housing markets and provided added support for quality commercial services desired by existing residents.

West Bellfort Avenue has four commercial nodes that could be transformed. Existing strip commercial at Fondren Road has a cluster of mid- and near-term opportunity sites. Considered collectively, there is an opportunity to reimagine the future for this traditionally important Brays Oaks shopping destination. Gessner Road has larger tracts of open land contiguous to frontage parcels that could be redeveloped as ownership housing thereby increasing the purchasing power available for

Figure 1.11: Development Susceptibility

Figure 1.12: Flooding

(HCFCD)



businesses. Undeveloped frontage parcels are adjacent to the Ruffino Hills site and Sam Houston Parkway. In addition to these gateway sites, there are near term and mid-term opportunities adjacent to the METRO station that could materialize as a transit-oriented development (TOD). West of I-69 is an area of very low-density warehouses, auto repair, and auto sales. Collectively, these sites could be transformed into a new, upscale business address with excellent highway visibility and access. Low density commercial at Kirkwood Road could be redeveloped or repositioned for a future growing market.

1.5 Detention Capacity and Flooding Context

The principal motivation for studying detention alternatives for the Ruffino Hills site is to examine ways in which new development can help financially carry the cost. Economic development and open space opportunities can be co-benefits of this approach. First, as detention can reduce flooding and increase investment in the Keegans Bayou watershed. Secondly, a more economically intensive use of the site can be a catalyst for other investment in the community.

Any new investment has to address the role the site can play in reducing flooding in the Keegans Bayou watershed, the existing flood risks, and the extent of flooding in the watershed during historic events such as Hurricane Harvey.

Keegans Bayou

Keegans Bayou is a branch of Brays Bayou. Keegans watershed includes about 12.7 square miles of primarily developed urban lands (HCFCD, 2020). The Ruffino Hills site is located at a restricted point just before Keegans merges with Brays Bayou and is considered a strategic opportunity to introduce detention that will reduce flooding throughout the sub-watershed.

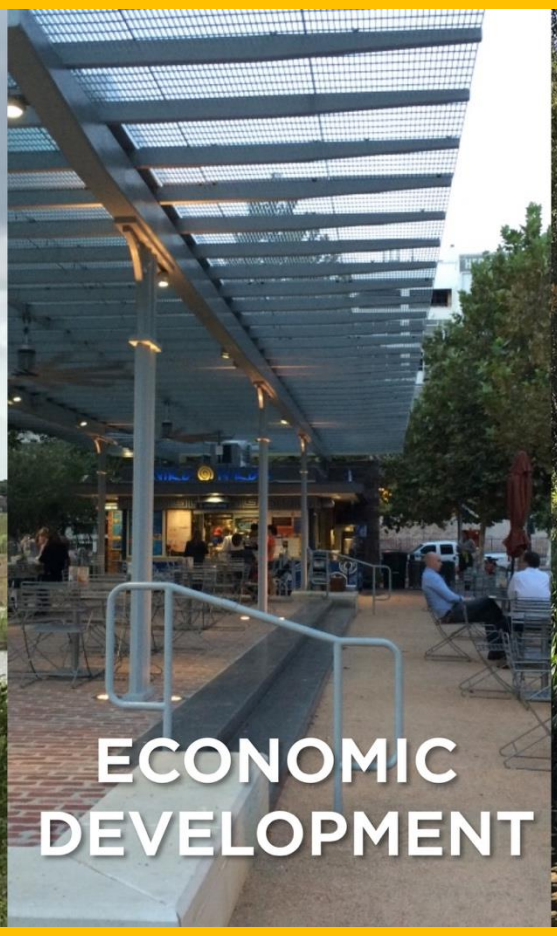
Flood Zones

Much of the site is not in flood zones (Figure 1.12). Approximately 90% of the Ruffino Hills site is above the 100-year (1% risk) flood zone. There is a portion of the southeast section of the site that is in the 500-year (0.2% risk) zone.

Hurricane Harvey

In 2017, Keegans Bayou had a historic level of flooding. The bottleneck portion of the bayou pushed back water into much of the watershed to the 500-year flood level and higher. Brays Bayou flooding backed up into the neighborhoods to the east of Ruffino Hills and Keegans Bayou flooding was widespread, primarily in nonresidential areas adjacent to the I-69 and Sam Houston Parkway intersection and some residential areas to the west. These areas suffered flooding three years in a row from the 2015 May Day Flood, 2016 Tax Day Flood, and Hurricane Harvey in August 2017.

SECTION 2: Development Objectives



There will be an additional 2 million people living in Harris County by 2045 and a growing demand for livable, walkable, and transit accessible neighborhoods. Ruffino Hills is located at the visible and accessible intersection of the Sam Houston Tollway (Highway 8) and I-69. In Greater Houston, these highway intersections form the backbone of the regions' polycentric growth patterns for high-density employment and communities. Ruffino Hills' location and development capacity can be leveraged to meet detention, economic revitalization, and recreational goals for Southwest Houston's communities.

2.1 Long Term Community Context

Current projection by the Houston-Galveston Area Council (H-GAC) envisions the I-69 and Loop-8/Sam Houston Parkway to continue to be a low-density job and residential part of the region (H-GAC, 2017). In Houston, freeway intersections and contiguous neighborhoods have become defining features in the city's polycentric development pattern of high-profile business centers. The Ruffino Hills site represents a generational opportunity to reposition southwest Houston as an employment address.

GOAL: To develop Ruffino Hills as a catalyst flagship address for southwest Houston.

PROGRAM OBJECTIVES:

JOB CREATION

- Pursue creation of a business address that raises the profile and prosperity for southwest Houston
- Seek employers that increase access to higher paying jobs
- Expect new investment to provide a variety of employment opportunities

CATALYST FOR COMMUNITY REVITALIZATION

- Position the Ruffino Hills site as a catalyst for economic expansion for surrounding areas
- Leverage increased property values to improve community park, sidewalk, and trail infrastructure
- Plan for features and places that are part o southwest Houston's shared experience

DEMONSTRATION FOR COLLABORATION

- Build on the partnerships, collaboration, and commitment to the project by community and agency partners
- View Ruffino Hills as an opportunity to demonstrate the benefits of a collaborative approach to addressing complex economic and environmental challenges
- Reflect Houston's commitment to an equitable, resilient, and sustainable future

2.2 Detention Program

TIRZ 20 is collaborating with The Harris County Flood Control District (HCFCD) and City of Houston to prepare a course of action for the Ruffino Hills site. The site is located at a bottleneck in Keegans Bayou. West of Ruffino Hills are areas that have suffered from repeated flooding. The principal challenge for using the site for detention has been uncertainty of its feasibility. The City has prepared a level one and two environmental study, HCFCD is studying opportunities to improve detention in the bayou, and TIRZ 20 is studying how value created by developing a portion of the site can improve the economics of detention and recreation.

GOAL: To develop a regional detention facility that reduces flood risk in the Keegans Bayou watershed.

PROGRAM OBJECTIVES:

SIZE AND CAPACITY

- Plan for at least 3,000 acre-feet of storage in Keegans Bayou, reflecting updated weather projection in Atlas 14
- Assume a multiple facility approach to meet overall detention goal for the bayou
- Optimize detention capacity and revenue producing uses

REMEDIATION AND DETENTION

- Consider recreational and economic development opportunities beyond the 144-acre site when designing detention facilities
- Pursue remediation methods that consider costs and schedule supportive of private development timing and technical requirements
- Utilize best practice methods for detention and remediation planning, integration, and funding

CONNECTION SCOPE TO FUNDING SOURCES

- Approach the detention planning for Keegans Bayou and Ruffino Hills as parts of an integrated stormwater solution for the watershed
- Identify public funding sources that match the scope of the bayou and site projects
- Consider the legal and policy conditions and terms of public funding as they relate to private investment on the Ruffino Hills site

2.3 Open Space Program

TIRZ 20 has made a concerted effort to assess and plan for a robust parks and trails system. Regardless of the types of development and detention is developed on the site, the community sees this as an opportunity to connect the bayou trail system and to create a natural park.

GOAL: To create a natural green space available for City of Houston programs already developed with significant partnerships.

PROGRAM OBJECTIVES:

SIZE AND CHARACTER

- 25-35 acres of park space with most being natural
- Emphasize development of park space that provides access to restored natural wetlands, prairie, and pine woodlands

CONNECTIONS

- Provide access to Keegan Bayou walking and biking trails
- Provide trailhead amenities in new development including parking
- Include detention lake overlooks and loop trail connections

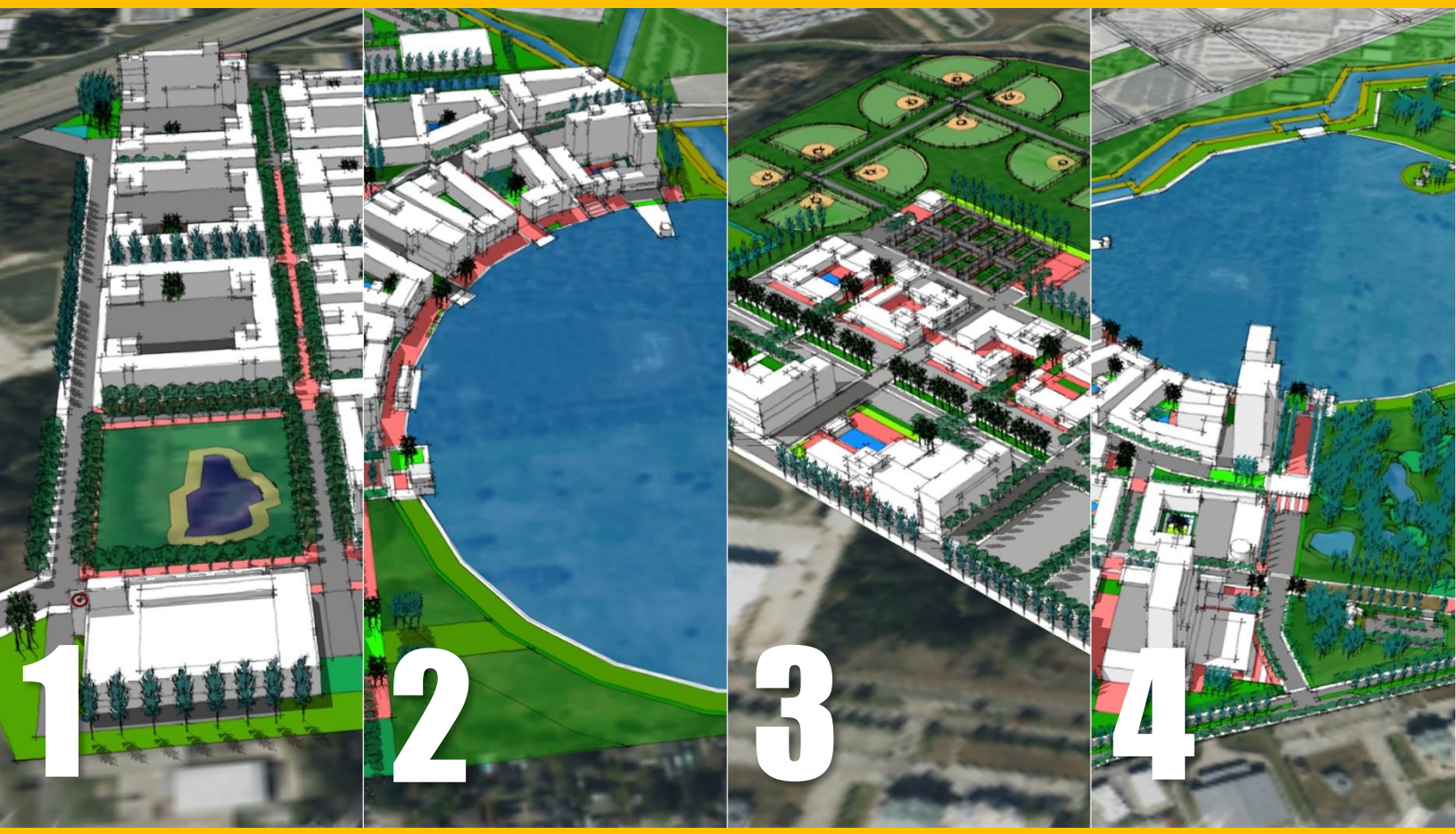
ACTIVITIES

- Plan for the park and trails to be used by people of all ages and abilities
- Create educational and instructional opportunities
- Include public art

IMPLEMENTATION

- Support development of integrated detention and new development as a method for project financing
- Build on existing City and other programs
- Create partnerships for landscape restoration and maintenance
- Identify partners that can benefit and contribute to programming and ongoing operational funding

SECTION 3: Alternatives



Houston One Voice developed three alternative scenarios for the 144-acre Ruffino Hills site. The purpose of the scenarios was to explore various approaches to detention, responses to long term economic and population growth in southwest Houston, off-site economic catalytic effects, and design and planning features that could be included in a hybrid preferred concept. The scenarios were reviewed with the Working Group, TIRZ 20 staff and Board, City of Houston, Harris County Flood Control District staff, and the Southwest Management District, Brays Oaks Management District, International Management District staff. The Working Group and other stakeholders identified their preferred features that became the basis for the fourth and preferred scenario.

3.1 Purpose of Alternatives

Houston One Voice developed four alternative scenarios for the 144-acre Ruffino Hills site. The purpose of the scenarios was to explore various approaches to detention, responses to long term economic and population growth in southwest Houston, off-site economic catalytic effects, and design and planning features that could be included in a hybrid preferred concept.

Scenarios Process

Through the scenarios process, Houston One Voice endeavored to determine an overall site concept that met expectations for stakeholder consensus. The scenarios were reviewed with the Working Group, TIRZ 20 staff and Board, City of Houston, Harris County Flood Control District staff, and the Brays Oaks Management District staff.

Through four rounds of discussions, the Working Group and other stakeholders, identified preferred features in the alternative scenarios that became the basis for the fourth and preferred scenario. Scenario 4 has become the conceptual framework for coordination and refinement.

3.2 Alternative Scenario Descriptions

The alternative scenarios reflected three approaches to the future of the I-69 and Sam Houston Parkway intersection and detention context. They included a land use program, circulation diagram, detention capacity estimate, and example placemaking opportunities.

Scenario 1: Lake Ruffino

The first scenario assumes the southern 44 acres of the site is developed as a residential mixed-use district with 2,460 dwelling units (DUs) and 295,000 SF of commercial uses (Figure 3.1). Based on aerial photos, much of this area was not previously land fill. The scenario includes community commercial uses at the southeast corner oriented towards West Bellfort Avenue. This is the most assertive scenario regarding detention providing an estimated 2,148 acre-feet of detention. The eastern edge and northeastern portions of the site are reserved for natural park.

Scenario 2: Bellfort Town Center

The second scenario is the most assertive regarding employment and residential development (Figure 3.2). It assumes expansion of the TIRZ 20 boundary to capture tax increment on adjacent areas to assist in offsetting infrastructure costs. It aims to be a catalyst and set the tone for redevelopment of areas to the north and along West Bellfort Avenue. The scenario includes 1.7 MSF of office, 86,000 SF of storefront commercial, 2,680 DUs, and 400 hotel rooms. The balance of the site includes a 60-acre detention basin and natural park.

Scenario 3: Houston Sports Complex

The third scenario assume the site does not include development of a regional detention facility (Figure 3.3). Scenario 3 uses areas of the site along the southeast edge assumed not to have been part of the landfill for commercial recreation as part of a sports complex. The program includes amateur champion sports fields, 350,000 SF of commercial, and 500 hotel rooms. The eastern edge and northeast portion of the site are to become natural park space.

Scenario 4: Town Center at Five Ponds Park (Preliminary Preferred Scenario)

The fourth scenario combined features favored by stakeholders that balanced development, detention, and park uses (Figure 3.4). This scenario borrows from Scenario 2 and moves the natural park space to the southeast corner and incorporates former golf course ponds into a natural park space. The development is primarily a residential mixed-use project within in the 144-acre Ruffino Hills site. The development program includes 2,680 DUs, 400,000 SF of office, 86,000 SF of commercial, and 400 hotel rooms. The park would include an education center and nature center. The approximately 30-acre areas to the west and south of the site would become part of the new address and TIRZ 20 project area and be developed with commercial uses.

Figure 3.1: Scenario 1-Lake Ruffino

- Community commercial and residential emphasis
- Focus development on southern areas that were not landfill
- Most assertive for detention
- Natural park

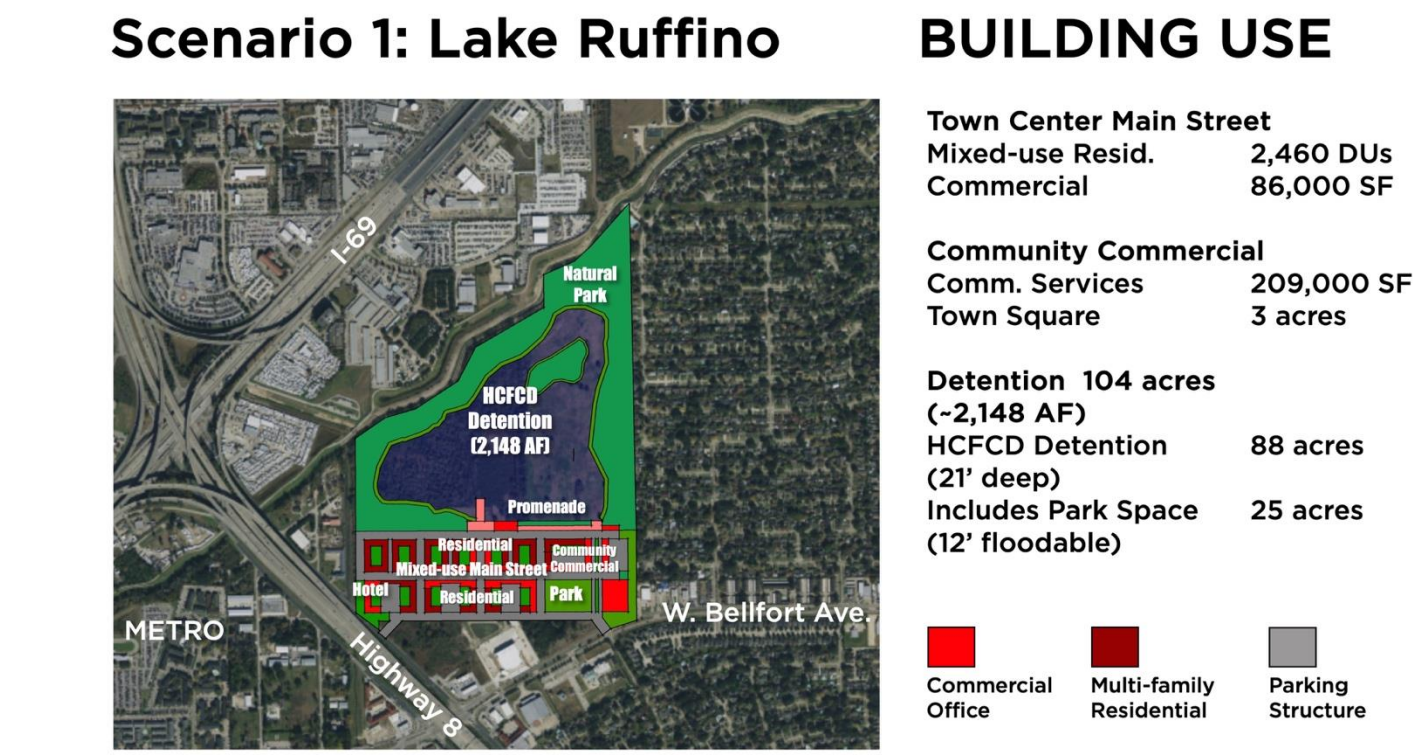


Figure 3.2: Scenario 2-Bellfort Town Center

- Office and mixed-use residential emphasis
- Focus development on southern and western areas visible from highways and away from neighborhood
- Balanced development, detention, and park

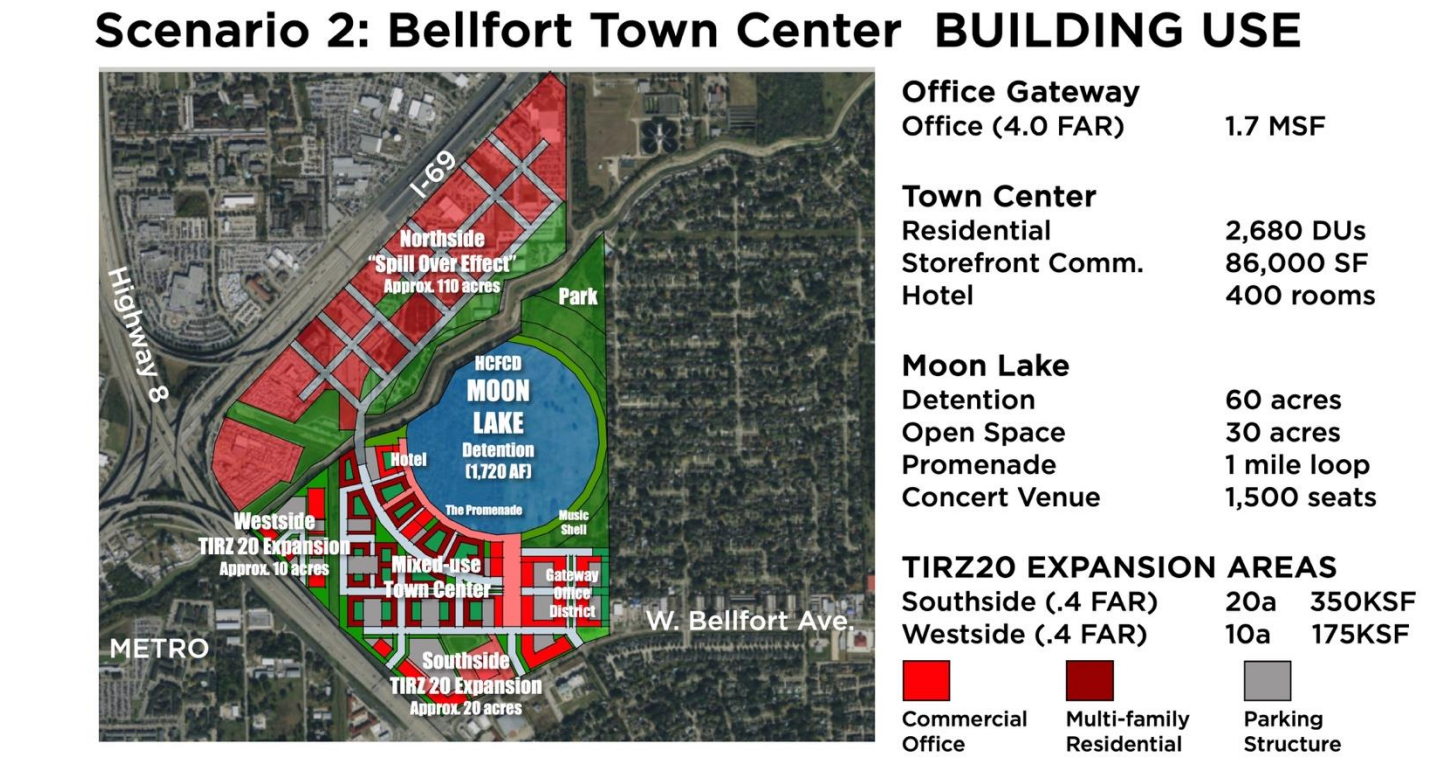


Figure 3.3: Scenario 3-Houston Sports Complex

- Assumes detention is not financially or politically feasible
- Amateur championship sports complex - - commercial, hotels, sports
- Focus development on southern areas that were not landfill
- Assumes no detention
- Natural park

Scenario 3: Houston Sports Complex BUILDING USE

Commercial Recreation

Site Area	38 acres
Commercial	350,000 SF
Hotels	500 rooms

Sports Complex

Site Area	132 acres
Sports Fields	92 acres
• Soccer	
• Softball	
• Tennis	
Parks	40 acres

POPULATION
2,100 jobs

Figure 3.4: Scenario 4-Town Center at Five Ponds Park (Preliminary Preferred Scenario)

- Office and mixed-use residential emphasis
- Expands TIRZ 20 30 acres to the west and south of the 144-acre land fill site
- Focus development on southern and western areas visible from highways and away from neighborhood
- Balanced development, detention, and park
- Protects the "Five Ponds" natural landscape in the SE corner of the site and expands it as a natural and education resource for the community

Scenario 4: Town Center at Five Ponds Park

Town Center

Residential	2,680 DUs
Office (4.0 FAR)	400KSF
Storefront Comm.	86,000 SF
Hotel	400 rooms

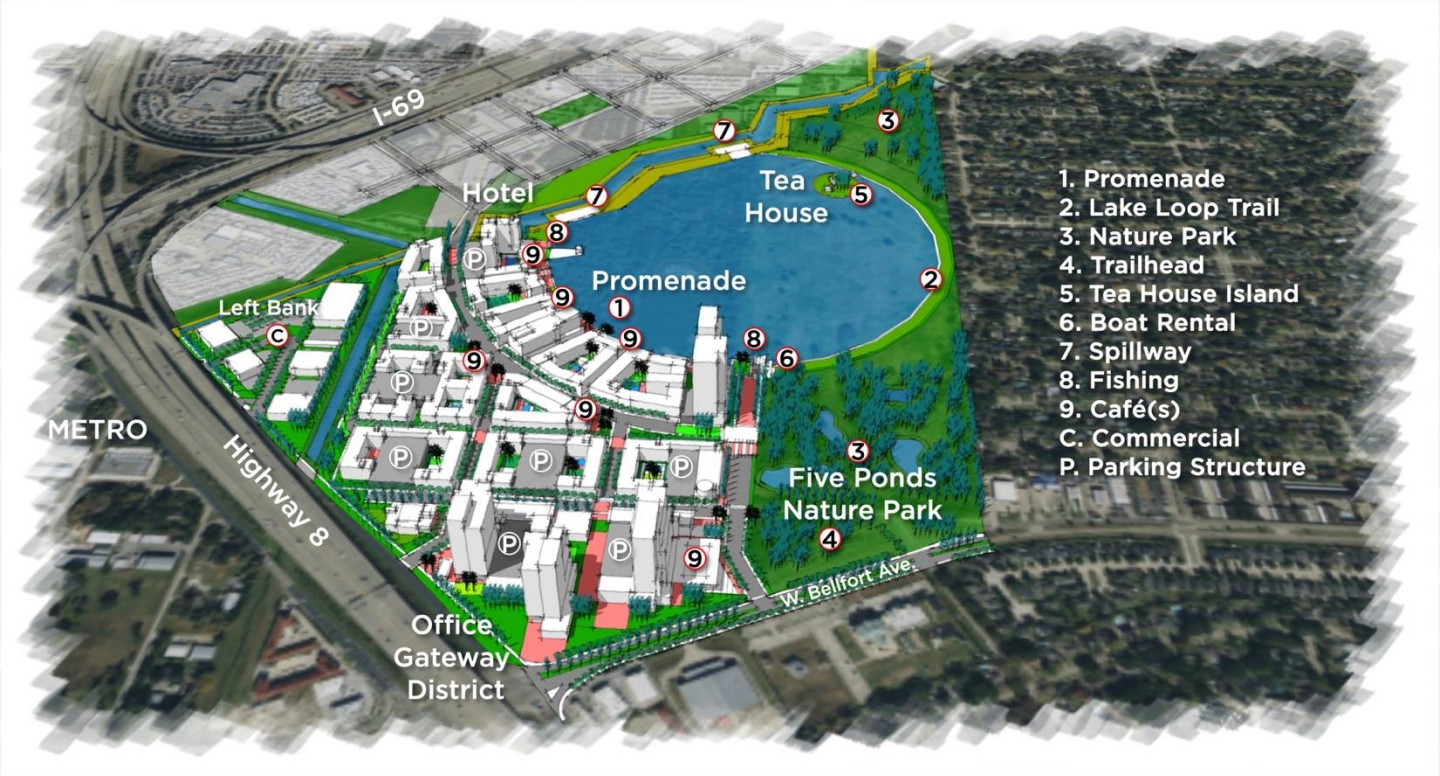
Moon Lake

Detention	58 acres
Open Space	44 acres
Promenade	1 mile loop

TIRZ20 EXPANSION AREAS

Office Gateway		
Southside (1.5 FAR)	20a	1.3MSF
Park Expansion		
Left Bank		
Westside (.4 FAR)	10a	175KSF

Commercial Office | Multi-family Residential | Parking Structure



3.3 Alternatives Comparisons

The scenarios reflect various approaches to land use planning, detention, and recreation. The mixed of land utilization effects the project's ability to provide commercial support development of detention and recreational uses (Figure 3.5). The mode land dedicated to development, the most potential income can flow to the public benefits facilities. The figure below compares the scenarios economically, how much of the 144-acres is dedicated to urban development, estimated amount of detention, acres of park and recreation, and number of access traffic lanes to the site.

Economic Performance Comparisons

The HCFCD and the Corps of Engineers use a cost-benefit analysis to determine a detention project's value in reducing flood risk. The HCFCD invests, on average, about $12,000 per acre-foot of detention. The 2018 City estimate for remediation of the landfill and building a detention facility for 2,400 acre-feet of stormwater storage was $198M. This works out to about $82,500 per acre-foot of detention. This is almost seven times the average amount HCFCD typically funds, and a key reason the project has not moved forward.

The economic performance of the developed portion of the site can contribute to the financing of the regional detention facility. The amount it can contribute is a function of the amount of revenue generated by development and value of eco-services; and the costs of detention and remediation of the landfill.

Figure 3.6 is a screen shot of a cost-revenue calculator prepared for comparing the economic performance of site development scenarios. By changing the cost and revenue assumptions in the scenarios, the spreadsheet can provide a comparison residual land value. In this case, the lower the residual land value, the more likely the project can contribute to the economics of building detention.

Figure 3.6 includes the program assumptions for Scenario 4. There would be 48-acres of development; 58-acres of land area and 1,665 acre-feet of detention storage; the cost of remediation and detention would be $54/cubic yard (based on the City's estimate); and the HCFCD would contribute its average $12,000 per acre-foot for detention. Based on these assumptions, Scenario 4 would need to have a residual land value, the

Figure 3.5: Scenario Comparison Summary

Comparison Summary

Scenarios	Economics: Comparative Residual Land Value	Developable Acres	Detention: Acre Feet of Detention	Parks: Acres of Park and Rec.	Access: Lanes Required vs. Provided
Scenario 1: Lake Ruffino	$40/SF	44 A	1,900 AF	46 A (12' floodable)	10 lanes (8 shown)
Scenario 2: Bellfort Town Center	$15/SF	61 A	1,665 AF	30 A (12' floodable)	12 lanes (12 shown)
Scenario 3: Houston Sports Center	$54/SF	34 A	0 AF	106 A	8 lanes (8 shown)
Scenario 4: Town Center at Five Ponds Park	$20/SF	48 A	1,665 AF	44 A (30 A floodable to 12')	12 lanes (8 shown)

(traffic count assumes 1/DU + 2/1000 comm. and 1 lane/300)

Figure 3.6: Revenue Cost Calculator

Ruffino Hills Cost-Revenue Calculator

Assumptions	Site Area-Acres	Detention Site Area-Acres	Development Site Area-Acres	Average Feet of Excavation Depth (includes floodable park space)	Acre Feet of Detention
	144	58	48	28.7	1,665
	Site Area-Acres	Depth of Excavation-Feet	Cubic Yards	Cost per Yard*	Total Excavation Cost
Excavation and Disposal	58	28.7	1,122,880	$ 54.00	$ 60,635,520.00
	Acre Feet of Detention	Revenue/Cost per Acre Foot **	Potential Revenue	Cubic Yard Multiplier	Potential Detention Revenue
Detention Revenue	1,665	$ 11,980.22	$ 19,942,274.21	$ 7.43	$ 19,942,274.21
	Square Feet of Land	Value Assumption per SF***	Potential Revenue	Cubic Yard Multiplier	Potential Development Revenue
Development Revenue	2,090,880	$ 19.50	$ 40,772,160.00	$ 0.68	$ 40,772,160.00
					Total Revenue
					$ 60,714,434.21
					NET COST/REVENUE
					$ 78,914.21

* Variables include extent of contamination and regulatory costs and potential revenue from materials (metal/aluminum) mining and sale of soil
** Estimated based on HCFCD average cost - - HCFCD needs to determine the acre-foot value is for detention in this location
*** Look at land sale comps or residual land values from similar mixed-use developments

amount of value created after a development project meets its financial feasibility, that can be assigned to the land. Because the landfill site has zero land value, this residual value can be used to support redevelopment of the 144-acre Ruffino Hills site.

Based on the inputs in the calculator, Scenario 4 would need create about $20/Sf of land value to support the costs of detention. By comparison, Scenario 1 about $40/Sf, Scenario 2 about $15/Sf, and because there would not be a HCFCD contribution for a detention facility, Scenario 3 about $54/Sf.

A detailed development pro forma is required to identify actual contributions. It would take in to account more detail regarding remediation costs and schedule, market support (rents and sales) and timing for development, and the value determined by the public sector assigned to detention. City, state, county and federal governments may consider the detention project worthy of a greater investment beyond the HCFCD typical $12,000 per acre-foot for detention. As a result, the project may attract grant funding for remediation and development of detention facilities. In addition, current environmental studies being done by the City of the landfills may indicate a lower or higher the overall cost for remediation than the 2018 estimate.

Jobs and Housing Comparisons

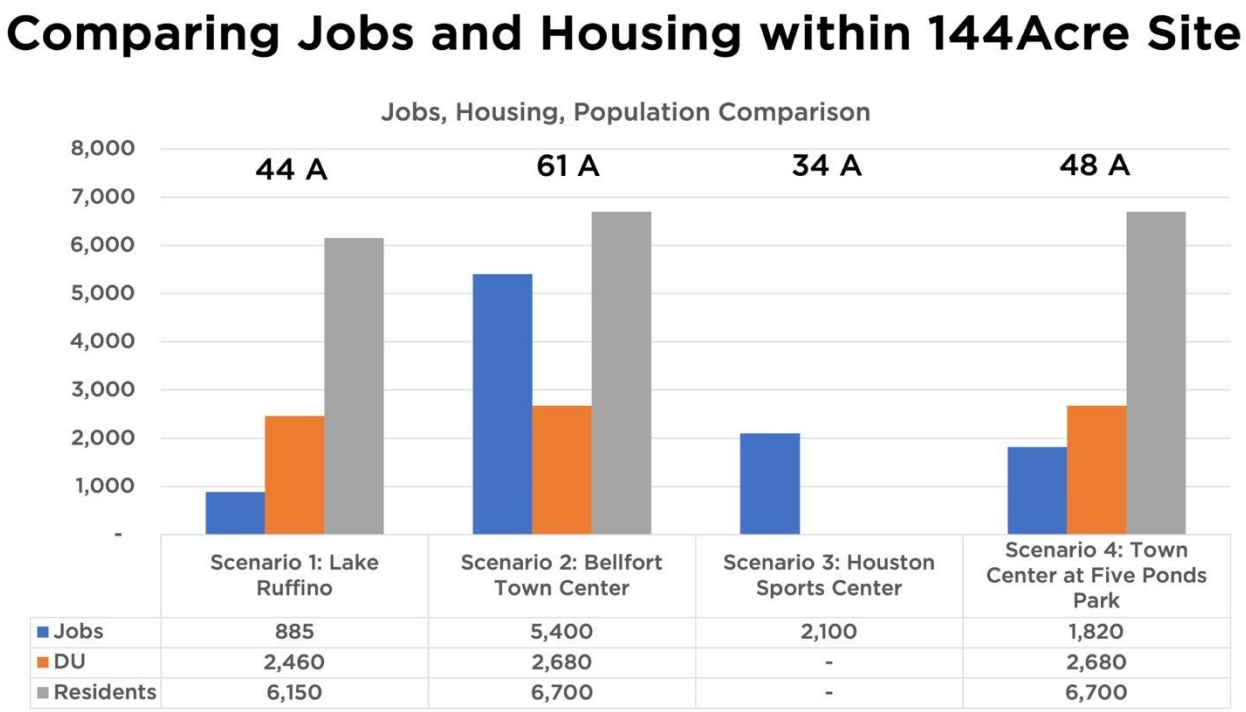
The economic performance of the scenarios will cascade beyond the boundaries of the 144-acre Ruffino Hills site. The project can be a catalyst for investment for the community, with the potential to set the tone for Southwest Houston's quality of life coming decades. The scenarios demonstrate the range of new residents and jobs the site could accommodate (Figure 3.7).

The scenarios illustrate the potential to introduce a new type of address reflecting the city's demand for walkable and accessible lifestyles. Scenarios 1 and 4 emphasize residential mixed-use, Scenario 2 provides a boost in employment. Scenario 3 focusses on commercial recreation, amateur sports, and visitor facilities. They could provide space for an addition 6,000-7,000 new residents and 5,000-7,000 new jobs, depending on the market and financial feasibility.

Implications for Detention

A 2017 study projected the need for an additional 2,100 acre-feet of detention in Keegans Bayou. That projection was prior to new Atlas 14 weather data now used for watershed and stormwater planning. The 2018 Ruffino Hills City capacity estimate was 2,400 acre-feet of detention. Atlas 14 weather data may require additional storage capacity, potentially

Figure 3.7: Comparing Scenario Jobs and Housing within 144-Acre Ruffino Hills



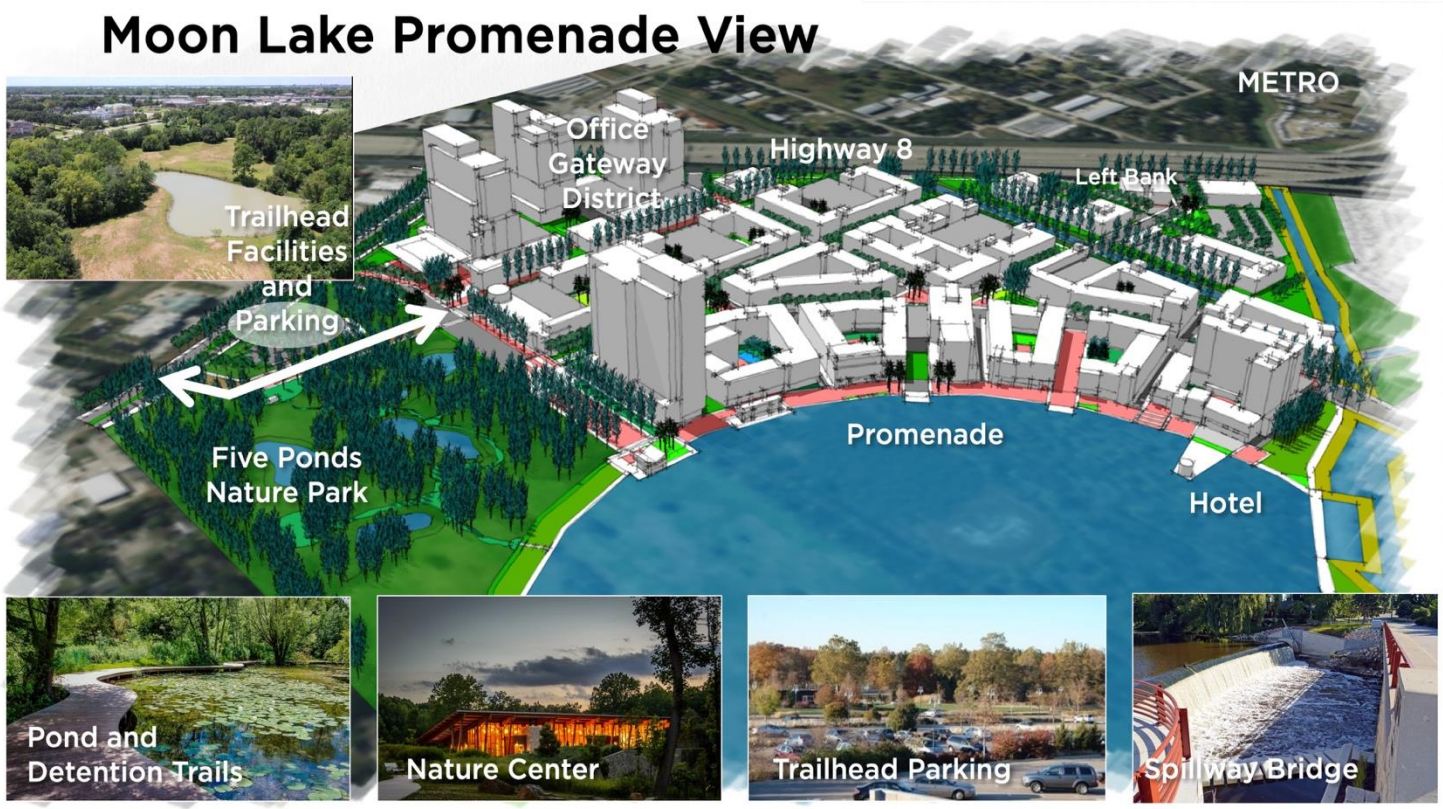
3,000 or more acre-feet. This means that the Ruffino Hills will likely be part of a multi-facility solution for Keegans Bayou. Other locations, besides Ruffino Hills, will need to be identified as part of a solution that protects properties in the Keegan Bayou watershed.

HCFCD is currently developing a detention strategy for Keegans Bayou. The study is to determine the detention needs for the bayou watershed and potential solutions. The Houston One Voice team has meet with the HCFCD planners and are coordinating the efforts.

SECTION 4: Concept Plan

The Town Center at Five Ponds concept delivers a balanced approach to detention, economic development, and recreation. Its implementation can reposition the I-69 and Sam Houston Parkway intersection as a flagship address that inspires quality investment in Southwest Houston. It is envisioned as a midrise livable, walkable, and resilient project. The site features a moon lake detention basin, the built-out vision will provide over 1,800 jobs and housing for 6,700 residents. The concept plan accommodates net zero energy and greenhouse gas (GHG) strategies that demonstrate how new investment can meet the goals of the City of Houston climate action planning and resilience planning.

Figure 4.1: Town Center at Five Ponds



4.1 Vision and Guiding Principles

This planning and research effort took place during the COVID-19 pandemic. The process was primarily virtual. In many respects, the pandemic has accelerated many of the business and workplace trends already underway. Planning a new community requires some imagination on how future small businesses and corporations will make choices about locations for work and collaboration, and how we create "the office." Employees are also redefining what a home and neighborhood look like. This could include housing with extra office and media rooms, and "education" features; neighborhoods with accessible third places that create higher valued addresses; and easy access to community schools, parks, and trails. The concept for Ruffino Hills leans into these challenges by imagining a place that provides a flexible framework for living and working; a live-work-recreate place for residents and Brays Oaks neighbors (Figure 4.1).

<u>Overall Guiding Principles</u>

The plan concept is guided by five principles:

Create an Iconic Regional Address

The plan should result is a memorable and iconic address that contributes to Southwest Houston's aspirations as a business address for the future.

Balance Detention, Economic Development, and Recreation

The site plan should help meet Keegans Bayou detention needs while providing economic and recreational opportunities.

Plan a Walkable, Bike-able, and Transit Accessible Neighborhood

Infrastructure design should support development of social, walking, transportation options, and healthy environments.

Provide Natural and Educational Parks

The plan should connect to the existing system of community parks and trails and complement active parks with natural parks and educational facilities.

Figure 4.2: Town Center from West

Make the Town Center at Five Ponds Sustainable and Resilient
The planning should demonstrate how to design for achieving the City of Houston's climate and resilience goals.

4.2 Urban Design Framework Plan

The Town Center at Five Ponds is organized around a 58-acre moon pond detention basin (Figures 4.2 and 4.3). The detention basin geometry and provides a central featured amenity for the Ruffino Hills site and for contiguous areas. The 48-acre developed portion of the site has a street grid that is similar to Houston's Midtown District. The grid provides a rational street system for auto and service access, pedestrian-oriented residential, commercial, and mixed-use buildings.

Public Realm Experience Principles

The overall urban design framework can be described in terms the of the types of public realm experiences created.

Create a Sense of Community
The Town Center should purse a synergistic combination of uses that result in a sense of place.

Plan Safe, Active, and Social Places
Planning should deploy design features that result in social and safe streets and places.

Scale Streets and Spaces for Pedestrians
Street and open space design should be at a scale that results in social and environmentally comfortable places.

Landscape for Environmental and Esthetic Effect
Use landscaping to reduce heat islands, slow stormwater, and introduce a distinctive esthetic identity.

Transitional Neighborhood Interface
Plan uses to improve visibility from freeways for commercial uses and provide a transitional scale with adjacent neighborhoods.

Figure 4.3: Town Center from North

Places

Great communities have places which provide a social and economic focus. They have cultural gravity that draw people together. The concept for the Town Center at Five Ponds includes several places that could provide common experiences for residents, patrons, and the community.

Five Ponds Nature Center

The legacy landscapes of the former golf course include ponds and trees. The five ponds in the southeast portion of the site are imagined as a nature park with educational and recreational activities for the larger community.

Moon Lake and The Promenade

The Moon Lake detention basin is a central feature of the project. Its edges connect the regional trail system, parks, and urban plazas. Within the Town Center, the basin edge includes a pedestrian-oriented promenade where residential and commercial uses overlook Moon Lake. The Promenade is punctuated with social-economic-recreational uses including food and cafes, kayak and rowboat rentals, fishing docks, bird watching stations, and other activities that take advantage of overlooking Moon Lake.

Crescent Street

Crescent Street is the curving street that provides access to the blocks facing Moon Lake. It is the principal address for most of the Town Center's residential blocks. Crescent Street is anchored by the gateway buildings and Five Pond Park on the east and a promenade hotel on the west. Crescent Street is also an important conduit for the site green infrastructure stormwater system and has plazas, raingardens, and Best Management Practices (BMPs) that are the setting for neighborhood third places (cafes, pubs, and restaurants).

Residential Streets

Most of the other streets are residential addresses. The plan proposes ground floor residential units with stoops and porches to help socialize these streets. This "eyes-on-the-street" approach makes them safer, social, and esthetically interesting.

Regional Trails

Moon Lake and Five Ponds Park are connected to the regional trail and bike facility system. As a regional "hub" for the trails, the Town Center at Five Ponds can provide memorable experiences as trails intersect with recreational and social uses. The trails can become walking pace, linear place.

4.3 Development Program

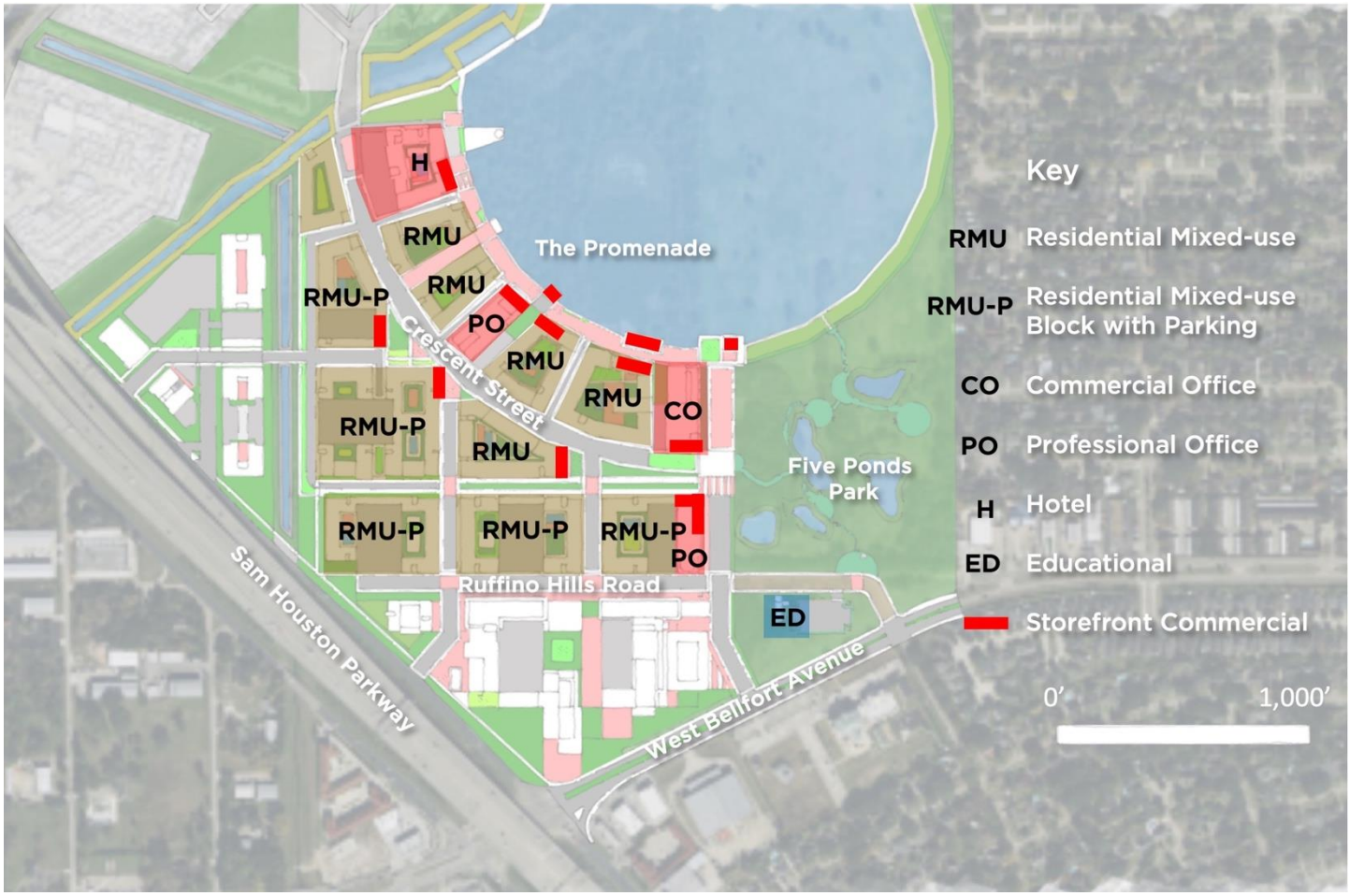
The Town Center will take many years to complete. Larger mixed-use projects confront economic cycles that introduce new opportunities and challenges. The vision for the Town Center at Five Ponds assumes the overall development program will strive to meet the Overall and Public Realm Experiences Guiding Principles. There should be a particular focus on integrating detention, economic development, and recreational objectives. Also, a project like this needs a holistic approach to its management and maintenance.

Taking the Long View

The current economic outlooks are discouraging from a real estate perspective. Unemployment rates, particularly in the service and hospitality industries, are at an all-time post WW2 high. Currently, housing markets are mixed with continued demand for single family housing and rental housing, although with lower rents. And, office and hospitality markets are waiting for a new normal context to shake out. Regardless, the planning for a town center project will require taking the long view and maintaining a strategic focus on three programmatic objectives:

1. *Creating the Next-Gen Sustainable Neighborhood* - - The development program that provides the ingredients of the next generation neighborhood. One that can sustain itself socially, economically, and environmentally for decades to come.
2. *Provide Amenities for the Larger Southwest Houston Community* - - Maintaining a civically minded approach to the project's contributions, and dependency on the regional growth in southwest Houston.
3. *Integrate Detention, Economic Development, and Recreation* - - Strive to balance economic and environmental objectives for the site and surrounding community.

Figure 4.4: Land Use



Four Key Program Components

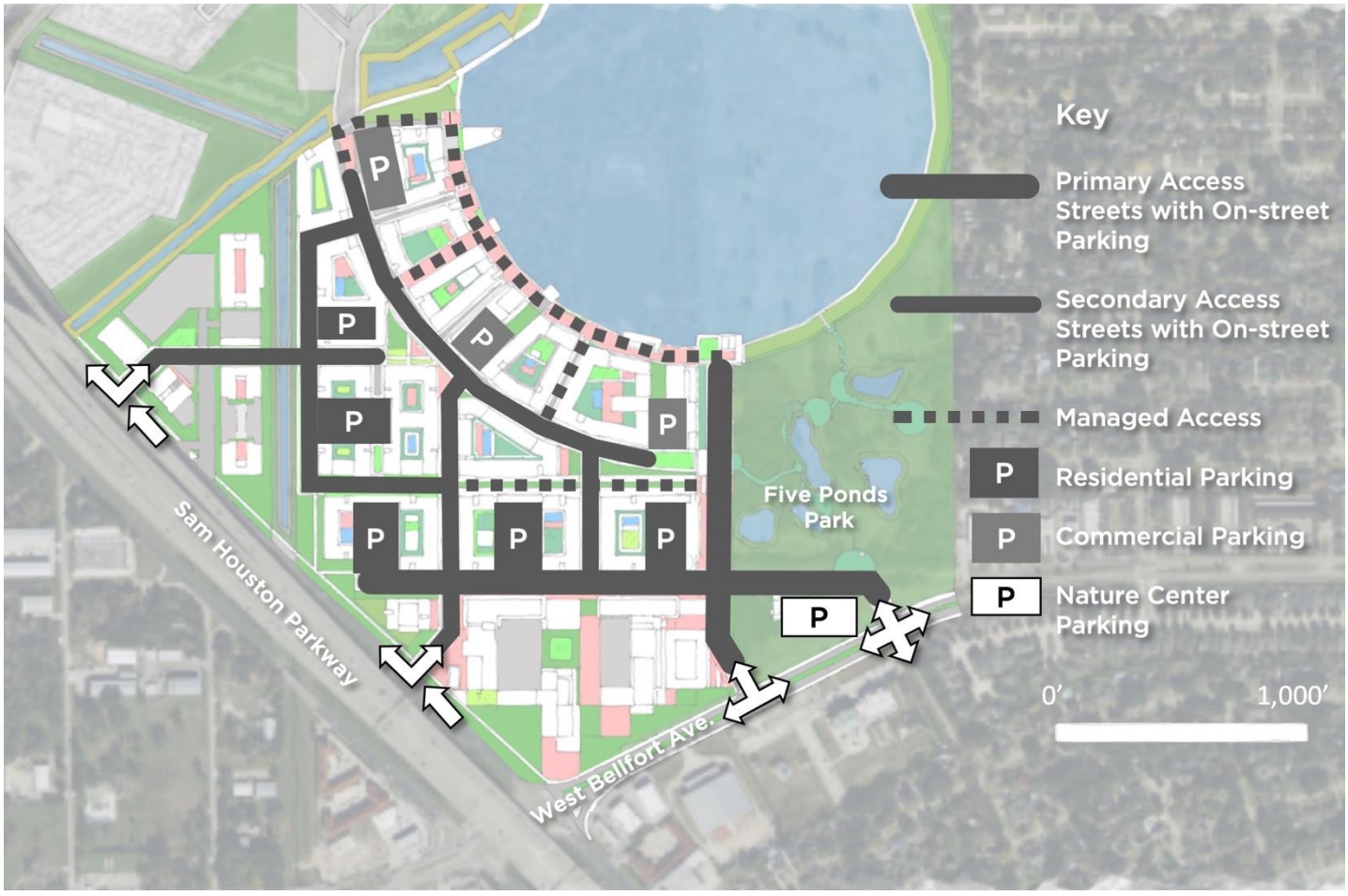
The development program for the developed portion of the has four key components. These include development of a midrise mixed-use residential neighborhood, development of commercial recreation uses associated with the Promenade including a hotel and pedestrian-oriented commercial, office development, and the Five Ponds Nature Center and Park.

1. *Mid-rise and Mixed-use Neighborhood* - - The core of the development program includes quality midrise ownership and rental housing. The residential blocks assume neighborhood parking structures, ground floor and courtyard common amenities, and nonresidential uses.
2. *Commercial Recreation and Hospitality* - - The common draw for residents, employees, and the community can be the street-oriented commercial and recreation uses woven into the program that takes advantage of the Moon Lake and Promenade environments. The development program assumes development of at least one hotel of about 400 rooms that is visible from I-69 and San Houston Parkway.
3. *Office Employment* - - Although currently an uncertain market, the development program adds the potential to increase the density of employment at the I-69 and Sam Houston Parkway intersection. This could be accommodated in midrise multi-tenant towers and streetwall professional buildings.
4. *Park and Nature Center* - - The Five Ponds Park is an amenity for the Town Center and southwest Houston. It provides a thematic link to area schools, botanical gardens, arboretums, zoos, and universities.

Managed as a District

The development program assumes the Town Center is managed as a district, and not just a collection of developer projects. This includes the

Figure 4.5: Parking and Vehicular Access



programming of the public realm, maintenance, parking, and landscaping.

4.4 Land Use Concepts

The overall land use concept assumes creation of a new neighborhood. The core of the Town Center includes midrise and mixed-use residential blocks at about 90 dwelling units per acre (DU/A) and ancillary ground floor amenity uses (Figure 4.4). The land use diagram includes an office tower block and a streetwall commercial professional building facing the Promenade. The plan assumes the Town Center will use a parking district approach with shared garages.

Residential Blocks

The residential block occupies about 30 net acres. The average assumed density is 90 DU/A for a total of about 2,680 DUs. This would house about 6,700 people at 2.5 persons per household.

Commercial Office Blocks

Commercial uses are located on 3.0 net acres of land and have an average floor area ratio (FAR) of 3.0. This would result in approximately 400,000 SF of office space and house about 1,200 jobs at 3/1,000 SF.

Hotel Block

The hotel block is about 3.0 net acres. It is assumed to be a full-service 400 room facility with freeway visibility. The hotel would face onto the Promenade and provide outdoor food services for guests and visitors. The hotel would provide about 360 jobs at 0.9 jobs per room.

Ground Floor Commercial

The planning concept for the Town Center assumes there would be 84,000 SF of ground floor commercial uses distributed throughout. This includes cafes and services on Crescent Street and the Promenade. These would provide about 250 jobs at 3/1,000 SF.

4.5 Circulation Plan

The circulation and access concepts for the Town Center support a walking environment. The planning leans towards transportation infrastructure that will support a net zero community by 2050. There are three guiding circulation principles.

Parking Access

Parking access should be kept to the perimeter of the site.

Design for Pedestrians

ROWs design should place a priority on pedestrian comfort and interest.

Complete and Connect

The project should connect to, and complete local sidewalk, trail, and transit systems.

Vehicular Access

One of the challenges for the Ruffino Hills site is access. The site has limited frontage and could require up to 12 access lanes. The urban design framework for the Town Center indicates four access points. There are located at West Bellfort Avenue and Stanwood Drive, another intersection 600’ south on West Bellfort Avenue, and two access points on the Sam Houston Parkway frontage road (Figure 4.5).

The plan diagram identifies six streets that provide access to residential and commercial blocks. These include Ruffino Hills Road, Crescent Street, and three north-south streets that connect them. Other ROWs provide managed access for service, emergency, and maintenance vehicles.

Parking

The program assumes parking will be managed as a district. The site has neighborhood garages for residential uses and dedicated parking for commercial and hotel blocks. Vehicular streets have on-street parking for visitors and storefront patrons.

The number of spaces assumes reductions associated with mixed-use projects. By calculating peak parking for each land use, the City of Houston mixed-use parking spreadsheet reduces the amount of required parking. This could result in a third less parking spaces than separate freestanding projects.

Table 4.1: Net Zero Energy Scenarios

Net Zero Energy Scenarios

	ENERGY DEMAND					RENEWABLE SUPPLY		
	Buildings Plug Loads and FFE gWh Annual Demand	Buildings Hot and Cold Water gWh Annual Demand	Buildings Total Energy gWh Annual Demand	Tansportation* gWh Annual Demand	Total Building and Transportation Energy	PV** gWh	GT*** gWh	Grid gWh
Sceanrio 1: Building Energy with PV	8.88	7.43	16.31	8.49	24.80	17.99	-	6.81
						50% coverage		
Scenario 2: Building Energy with PV and GT	8.88	7.43	16.31	8.49	24.80	13.85	3.72	7.24
						35% coverage		
Scenario 3: Building and Transportation Energy with PV	8.88	7.43	16.31	8.49	24.80	28.78	-	(3.98)
						80% coverage		
Scenario 4: Building and Transportation Energy with PV and GT	8.88	7.43	16.31	8.49	24.80	23.39	3.72	(2.31)
						65% coverage		

* Assumes 40% VMT reduction and EV fleet (H-CAP)
** Assumes various percentage of roof area for PV
*** Assumes 50% of hot and cold water energy for buildings

Transit Service

There is existing bus service along West Bellfort Avenue. However, transit services in 2050 will look very different. The planning assumes there will be regular circulator service between the Town Center and a transit station at the West Bellfort METRO Park and Ride. The private fleet of passenger cars will be fewer, smaller, and electric. We will need fewer parking spaces, and perhaps cars can self-park. Ridesharing could be automated as well.

Trails

The Ruffino Hills site is a gap in the regional park and trail system. The planning concept for the Town Center at Five at Five Ponds is a trailhead and hub for the bayou trails and city street bike facilities. Five Ponds Park and the Promenade connect to the Moon Lake loop trail and bayou trails.

4.6 Resilience Strategies

The City of Houston Resilience Plan and Climate Action Plan provide a vision of a safe, equitable, and climate responsive and climate mitigating city. The

Figure 4.6: Roof Top PV Opportunities

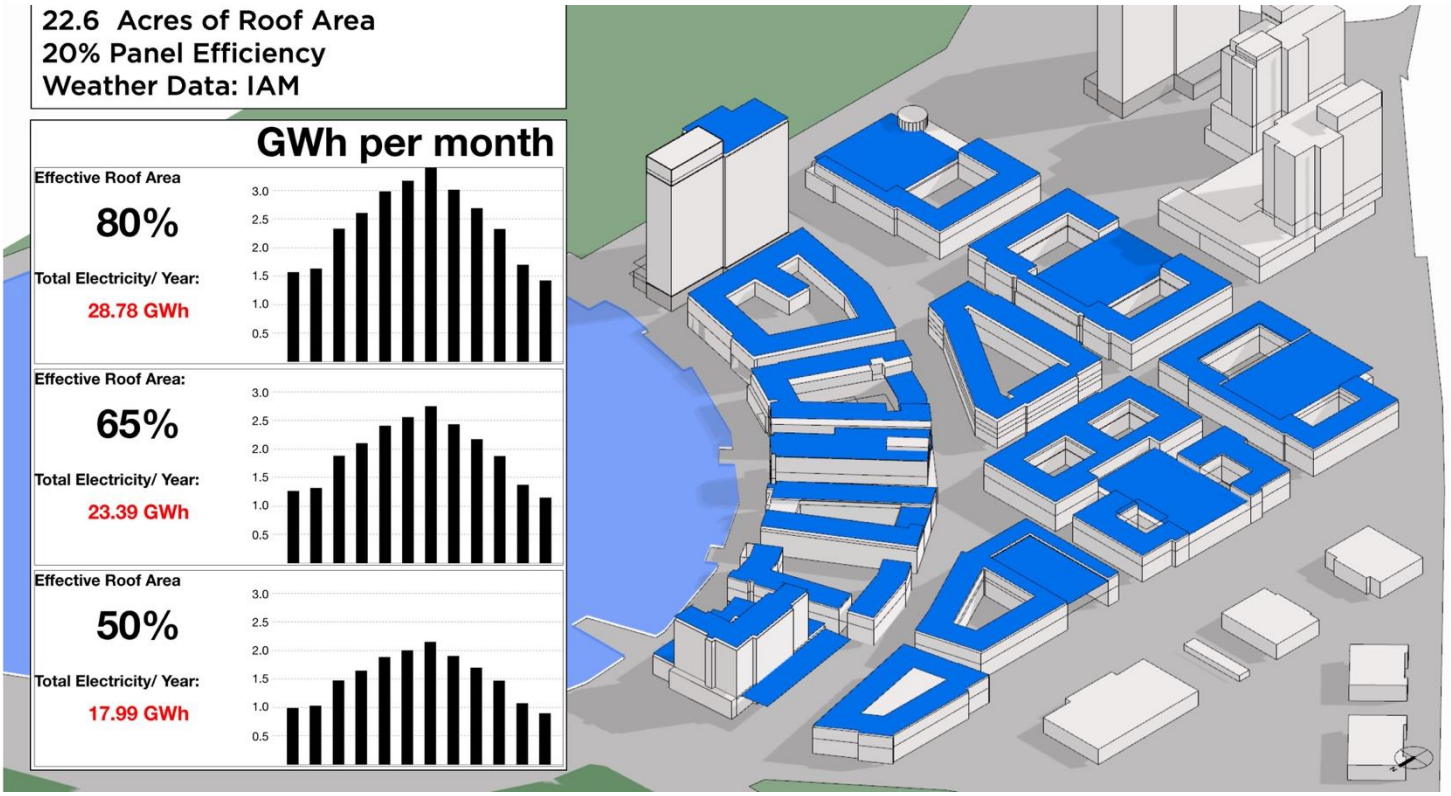
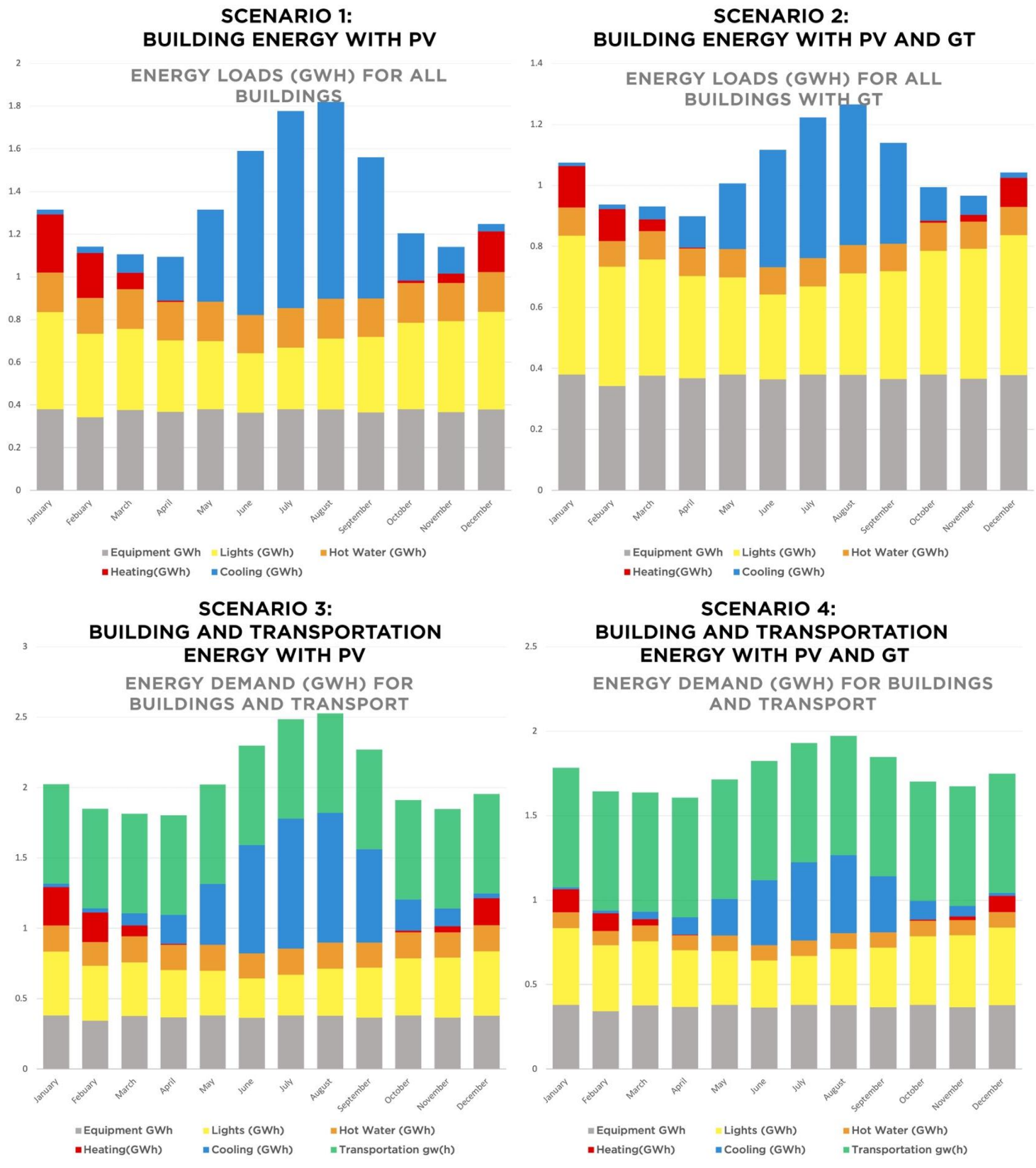


Figure 4.7: Net Zero Scenario Energy Demand



concepts for the Ruffino Hills site strive to demonstrate how strategic infill projects can provide eco-services for Houston's communities.

Resilience and climate strategies for the Town Center project illustrate how the project can:

- Be developed as a net zero energy and GHG community;
- Meet the goals for a net zero transportation system by 2050;
- Reduce heat island impacts caused by urban development; and
- Reduce and slow down stormwater runoff, while improving water quality.

Net Zero Energy: A District Approach

The largest source of GHG emissions in the City of Houston is from purchased energy. Nationally, buildings are responsible for about 40% of all GHG emissions (Architecture 2030, 2020). The planning for the Town Center assumes new development will be design to meet the International Energy Conservation Code (IECC) and Architecture 2030 targets for net zero buildings by 2030 (Architecture 2030, 2019). Net zero strategies assume a steep 80% target reduction in energy use and a renewable energy supply. In addition, a true net zero solution will also provide energy for transportation. The Houston CAP assumes a 20% reduction in VMT to reach a GHG reduction target of 70% below the 2014 baseline. Reaching net requires efficient electrification of the fleet.

A net-zero development requires a commitment to a district-scale approach to generating energy. This may include roof top solar, ground-source geothermal (dumping heat into cooler ground temperatures in deep boreholes), and green energy purchases. Figure 4.6 illustrates the energy producing capacity of a district-scale roof top PV system that could support energy demands from both buildings and transportation.

Net Zero Transportation Emissions

At build-out, there will be an estimated 2,680 units of housing and 6,700 people living in the Town Center. The 2014 Houston baseline GHG inventory for transportation emissions indicates that each person in Houston generates 7.11 MTCO2e a year (Race, 2019). The City of Houston's 2020 Climate Action Plan will employ three strategies for reducing that amount 70% by 2050. The Preferred Concept Plan employs strategies for VMT reduction, EV technologies, and renewable energy. The VMT assumption for the Town Center is 40% reduction below the 2014 VMT baseline in the Houston CAP.

1. Reducing per capita vehicle miles traveled (VMT) by 40%:

The Town Center reduce per capita VMT by providing commercial and institutional services within walking distance for residents; providing access to public transportation (METRO); and connecting the community to the growing regional bike trail system.

2. Switch technologies and fuels for higher efficiency vehicles:

New housing and commercial development in the Town Center will be electric vehicle (EV) ready with 240V service and fast charging service in garages.

3. Fuel the performance gap with renewables:

There is an estimated 8.49gWh for energy required to meet the needs of an electric fleet in the Town Center. This would require about 6.9 acres of photo voltaic (PV) to make the Town Center's residents net zero transportation families.

Integrated Net Zero Strategies for the Town Center

Two methods were used to predict the Town Center's energy demand.

Method 1: Spreadsheets

A spreadsheet model was developed using national building type data from Energy Star and Architecture 2030. The spread sheet targeted an 80% reduction and the number of solar panels was estimated to zero-out remaining 20% (Race, Ruffino Hills Energy Targets, 2020).

Method 2: Computer Models

The second method employed the use of a computer model. Software was calibrated by energy demand reduction strategies, such as amount and location of windows, thermal insulation, and energy conserving building management and operations. The computer model produced an energy profile for each building type. That became the basis for an overall renewable energy strategy.

Figure 4.8: LST Comparison

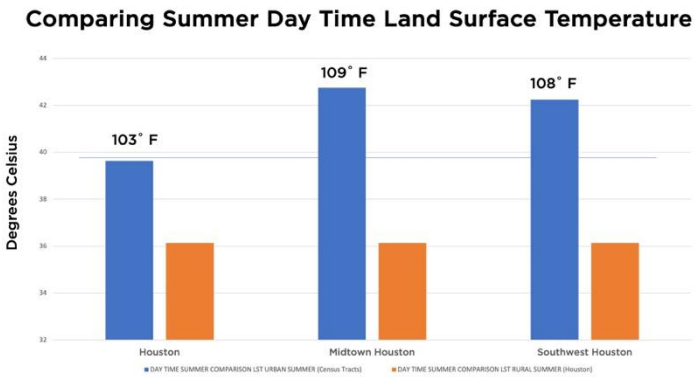


Figure 4.9: NDVI Comparison

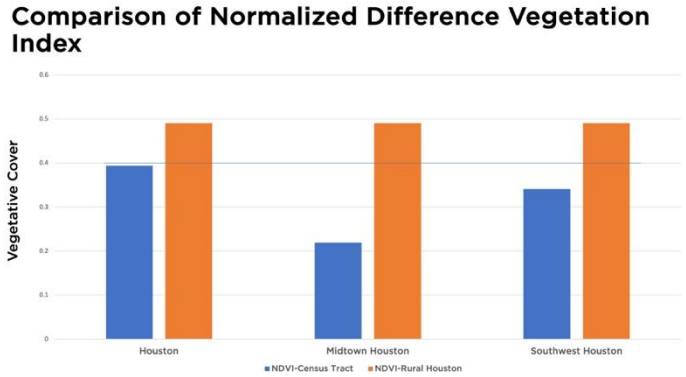
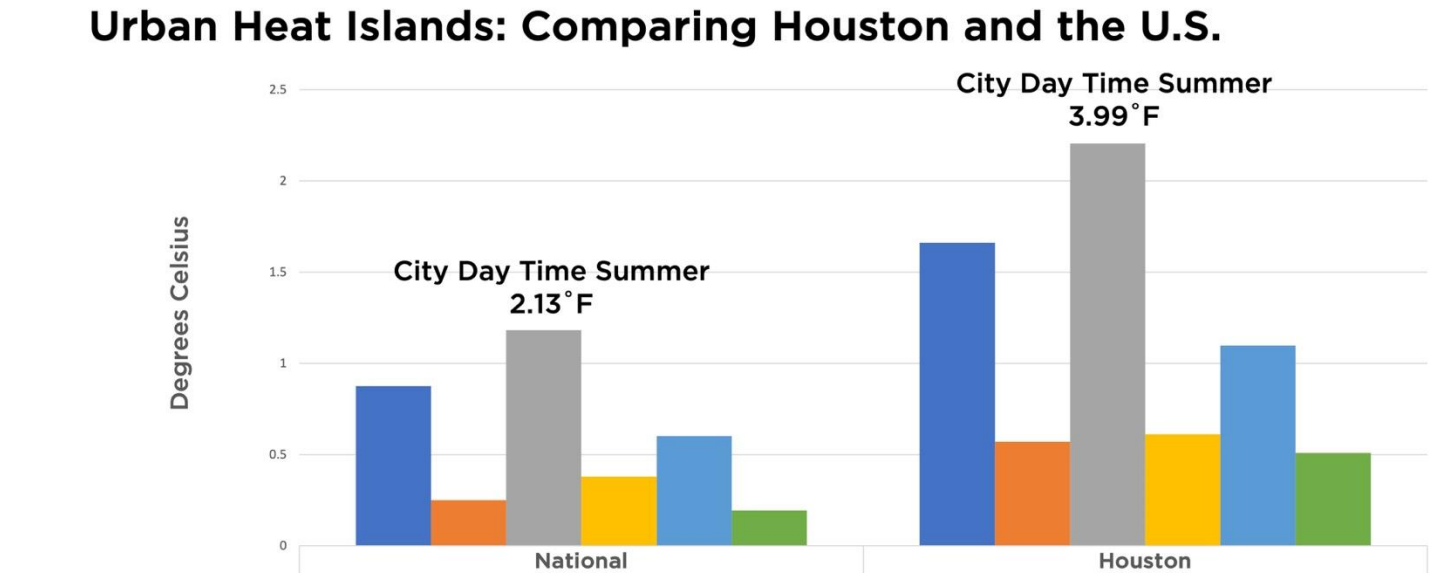


Figure 4.10: UHI National Urban Average and Houston



	National	Houston
UHI_annual_day_city	0.875346141	1.662410868
UHI_annual_night_city	0.251233375	0.571461085
UHI_summer_day_city	1.183138022	2.205126201
UHI_summer_night_city	0.381184082	0.612399555
UHI_winter_day_city	0.602524018	1.099062803
UHI_winter_night_city	0.195495382	0.509877806

The computer model identified a need for 12.6 gWH of annual energy for the Town Center buildings. A separate spreadsheet modeled estimated the need for an additional annual demand of 8.49 gWh for transportation. The total estimated annual energy demands for the Town Center would be 24.8 gWh.

The data generated from the computer model became the basis for testing the feasibility for a next zero energy district (Table 4.1 and Figures 4.7).

These include:

Scenario 1: Building Energy with Photovoltaics (PV)
This scenario assumes the project will use roof top PV to generate energy for the buildings. The transportation energy demand would be met by a green purchase via the grid. With 50% roof PV coverage, the project would require about 6.81 gWh per year from the grid.

Scenario 2: Building Energy with PV and GT

The second scenario assume hot and cold water would be developed by a district-wide ground source geothermal system. The balance of the energy would be collected by 35% roof top PV. This would require 7.14 gWh per year of purchased green grid energy to cover the balance of building and transportation energy.

Scenario 3: Building and Transportation Energy with PV

The third scenario assumed 80% roof top PV coverage. This aggressive PV approach could make the Town Center an energy-positive district. Roof coverage of 80% could sell back to the grid nearly 4gWh a year.

Scenario 4: Building and Transportation Energy with PV and GT

The fourth scenario assumes the district-scale hot and cool water system from geothermal and 65% rooftop PV coverage. This approach also could be an energy positive solution returning about 2.3gWh of renewable energy back to the grid per year.

<u>Mitigating Urban Heat Islands</u>

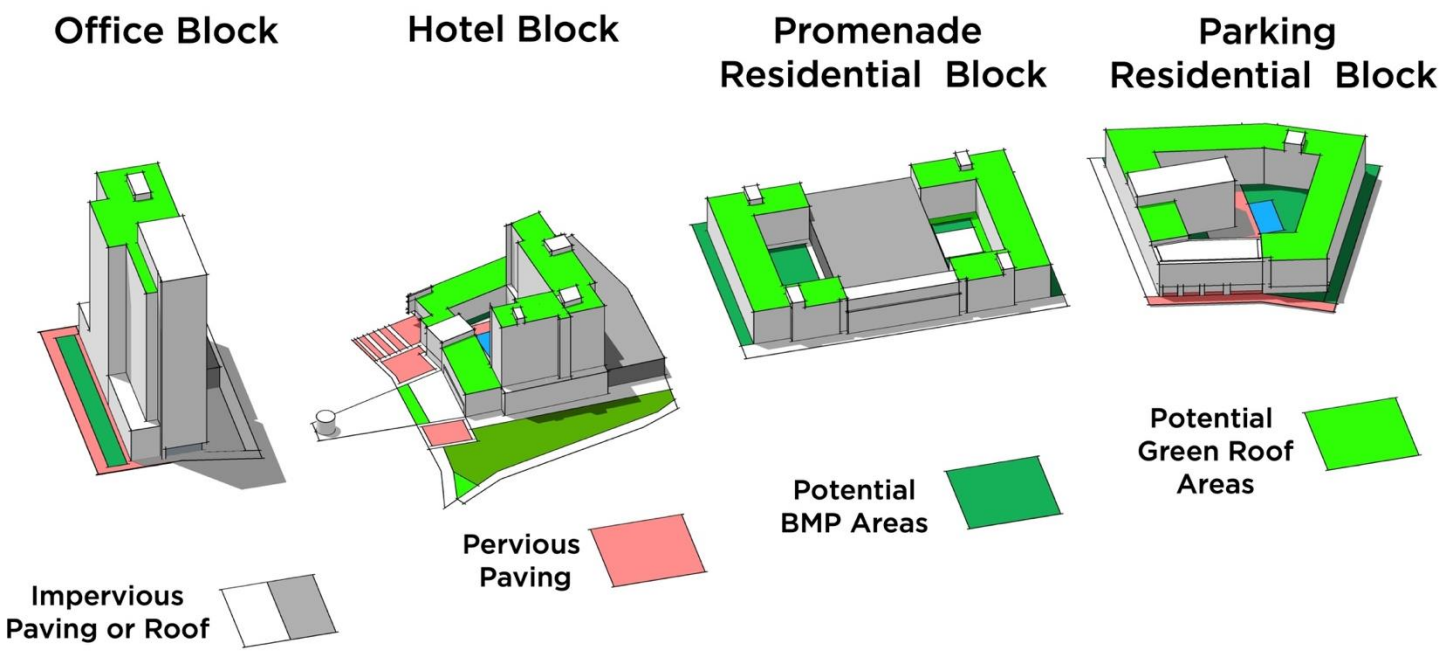
A national data set was used to calculate the Urban Heat Island (UHI) for Houston (Chakraborty, Hsu, Sheriff, & Manya, 2020). Houston's UHI is 3.99°F compared to 2.13°F for the average U.S. city (Figure 4.10). The summer daytime Land Surface Temperature (LST) for southwest Houston is 108°F. Houston's Midtown is 109°F. These are higher than the Houston average LTS of 103°F (Figure 4.8). Midtown and southwest Houston are 5°F warmer than the rest of Houston because they have a lot of paving and buildings, but also less landscaping.

Landscape cover is characterized by the Normalized Difference Vegetation Index (NDVI) (Figure 4.9). This compares the average landscape cover in rural areas to urban areas. In Houston, rural area NDVI is approximately 0.49. Urban Houston is .39, Midtown is about 0.22 and southwest Houston is .34. These NDVIs reflect the LST variations.

UHI mitigation largely relies on two types of strategies. These include light colored building materials, often referred to as "Cool Roof" strategies, and increased vegetation cover.

The Town Center 3D model was used to prepare a baseline UHI approach and a mitigated UHI. The baseline did not include cool materials for buildings or paving and the mitigated model used light

Figure 4.11: On-Site Detention and Water Quality



colored, reflective materials and robust landscaping concepts.

Reducing Stormwater Impacts

The 144-acre Ruffino Hills project provides about 1,665 acre-feet of storage for the Keegans Bayou watershed. In addition, 48-acre Town Center has its own stormwater detention requirements. Based on land use runoff coefficients used by the City (City of Houston, 2019), the developed portions of the site would need about 54.4 acre-feet of detention.

An Integrated Stormwater System

The Low Impact Design (LID) strategies for the Town Center consider three scales of integrated stormwater facilities to meet the demand.

On-site: The total stormwater runoff was estimated for a 1hr annual event of 0.16' or about 2" of rain (NOAA, 2017). Different types of blocks and various mitigation measures were applied. Based on these assumptions, blocks could detain about .18 acre-feet per developed acre and 16% of the Town Center's detention requirements

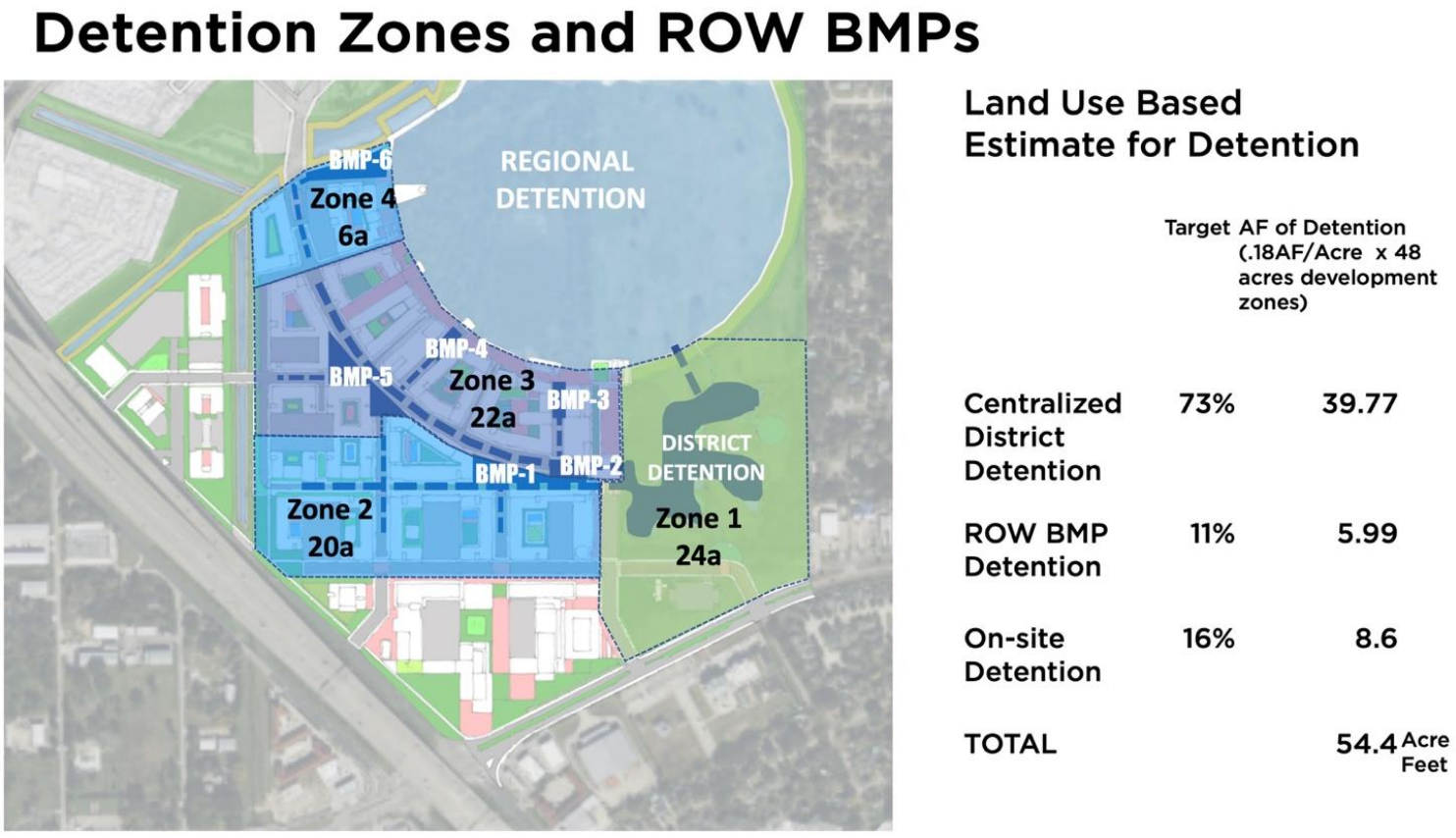
ROWs: Streets and ROWs comprise about 25% of the site. They would need about 12.6 acre-feet of detention but could reduce this by 6 acre-feet of BMP facilities. This would detain about 11% of the total detention needs for the site.

Centralized District Detention: The Five Ponds Park can be used as a centralized detention facility for the Town Center providing eco-services justifying funding for park development and maintenance. The remaining 73% (40 acre-feet) of required detention could be satisfied here.

Drainage Zones

The stormwater strategy for the Town Center includes four drainage zones with six BPM facilities. Primary conveyance would be along Crescent Street and the Residential Mew blocks. Zone 1 is the Five Ponds Park. Zone 2 are the residential blocks on the south side of the Town Center. Zone 3 includes the

Figure 4.12: Town Center Stormwater Concept



Promenade and adjacent residential blocks. Zone 4 is the hotel and a contiguous residential block.

BMP Design

The stormwater strategy assumes 6 acre-feet of BMP storage in the Town Center ROWs. These facilities are an integral part of the landscape esthetic and UHI mitigation.

Table 4.2: Detention Capacity of BMPs in ROWs

	Detention Zone	SF of BMP	Acres	Percent of Facility	Average Depth/ Capacity	BMP AF
ROW Site Area			14.40			
BMP 1	Zone 2	28,000	0.64	60%	3	1.2
BMP2	Zone 3	10,000	0.23	80%	3	0.6
BMP 3	Zone 3	10,000	0.23	60%	3	0.4
BMP 4	Zone 3	10,000	0.23	60%	3	0.4
BMP 5	Zone 3	40,000	0.92	40%	3	1.1
BMP 6	Zone 4	32,000	0.73	80%	4	2.4
TOTAL BMP						**6.0**

SECTION 5: Action Plan

The Ruffino Hills landfill site represents a generational opportunity to create an iconic town center that is catalyst for new investment. This site is ideally located adjacent to Keegans Bayou and can be excavated for needed stormwater detention. However, traditional cost-benefit analysis to convert a landfill remediation project into a flood control facility has not justified its development. Our recommendations aim to meet detention goals through a public-private approach of blending ***development income*** and ***detention funding*** as a pathway to a more feasible project. TIRZ 20, with Houston One Voice and University of Houston, have initiated an engaging process to discover a balanced approach to ***detention***, ***economic development***, and ***open space/ recreation***. This process is envisioned as the beginning of a comprehensive effort to plan, engineer, finance, and develop an iconic project that demonstrates the possibilities of harnessing Houston's scarce open space to create more resilient infrastructure and development.

TIRZ 20 LEADERSHIP

Envisioned outcomes from the ***Ruffino Hills Resilient Redevelopment and Detention Strategy*** will be dependent on the continued leadership of TIRZ 20. TIRZ 20 has a unique opportunity to extend the traditional leadership in infrastructure development into a dynamic action role to create a project that demonstrates the benefits of an ***integrated economic and environmental resilience project***. There are three key areas of leadership that can support a successful and impactful outcome.

Action 1: Policymaker, Agency and Stakeholder Outreach

The Ruffino Hills site can result in a **strong economic repositioning of the Beltway 8 and I-69 regional intersection**. This site provides an example of a livable net-zero climate and stormwater project and expansion of open space and trail systems in SW Houston. TIRZ 20 will continue to provide leadership to implement a community-based vision of a project that implements the City of Houston's resilience planning goals. This may include ***gaining support of policymakers*** and the Mayor's office, city council, Harris County judge and commissioners, and state elected representatives.

By completing initial planning and environmental efforts early in the process, TIRZ 20 will assist investors and the public agencies involved to better understand how their resources can be invested in the creation of the ***Ruffino Hills Resilient Redevelopment and Detention Strategy***. TIRZ 20 will also be actively reducing the development risk, both from the Flood Control District and from potential investors to the mixed-use site. The recommended next steps in the process are as follows:

1. Collaborate with the Harris County Flood Control District to finalize the ***Ruffino Hills Resilient Redevelopment and Detention Strategy*** based on detention needs and improvement plans to Keegans Bayou channel and the Keegans Bayou watershed.
2. Collaborate with City of Houston on Phase I and II environmental study findings and updates to the ***Ruffino Hills Resilient Redevelopment and Detention Strategy*** based on condition of project site soil conditions and in-situ vs offsite remediation options.
3. Collaborate with the Cities of Bellaire and West University on property agreements.
4. Collaborate with the Houston Parks Board on trail and amenities alignments.
5. Collaborate with the Texas Commission on Environmental Policy (TCEQ) on permitting and environmental impact analysis for project site.
6. Collaborate with the Army Corps of Engineers on modelling the ***Ruffino Hills Resilient Redevelopment and Detention Strategy*** as an alternative to the existing Cost-Benefit model, which has no ability to integrate revenue generating flood-control projects.

Action 2: Champion for a Public-Private Approach to Creating an Economic Development Catalyst

Implementation of **blended economic and environmental objectives** can result in a project with an ***enhanced economic spill-over for the I-69 and West Bellfort corridors***. This project will be the first in the region to attain a ***balanced detention, economic, and recreation project*** with multiple partners. TIRZ 20 will continue to champion the Ruffino Hills redevelopment as an economic development catalyst project due to its added detention capacity, recreation and quality of life features, and private sector investment. This includes:

1. P**reparing an Economic Feasibility Assessment** to better understand the factors for success, including market conditions and timing, of a successful public-private partnership.
2. Prepare a ***Public-Private Implementation Responsibilities and Resource Coordination' Plan***. Compiling local government incentives for private sector partners that implement important catalyst projects on the Ruffino site. This may include reduced development fees; prioritization on Capital Improvements Program (CIP) funding to support infrastructure needs, Local governments may also collaborate to apply for various types of regional, state and federal funding to support infrastructure and other area needs.

3. Conduct and participate in meetings and presentations with various real estate trade and business organizations such Urban Land Institute, Greater Houston Partnership, General Contractors of Houston, Houston Area Realtors, etc.

Action 3: Coordination of Infrastructure Planning and Finance

The Redevelopment process for the Ruffino Hills landfill would benefit from continued leadership and coordination by TIRZ 20 to continue to play the role of the ***Project Coordinator*** bringing partners together to facilitate outcomes beyond the missions of single, special-purpose agencies. This includes:

1. D**eveloping an 'Integrated Development and Detention Infrastructure Financing Plan'.** By combining the aspects of real estate delivery, financing, and long-term operation and maintenance, TIRZ 20 can encourage more collaboration and high-quality delivery for project infrastructure.
2. Ultimately, using the financing capacity of all local government stakeholders, TIRZ 20 can coordinate making the Ruffino site available for redevelopment; make the site physically suitable for development and coordinate public financing assistance for the ***Ruffino Hills Resilient Redevelopment and Detention Strategy.***

Action 4: Ruffino Hills Resilient Redevelopment and Detention Development Process

The Redevelopment process for the Ruffino Hills landfill into the **Ruffino Hills Resilient Redevelopment and Detention** project will be conducted in two (2) segments.

1. **Detention/ Retention pond and trails network** developed by the Harris County Flood Control District.
   a) TIRZ 20 should facilitate a ***Landfill Remediation scenarios and cost assessment***. This will be conducted in collaboration with the Harris County Flood Control District and following the site plan for the ***Ruffino Hills Resilient Redevelopment and Detention Strategy*** as a guide for site planning. The process will involve iteratively modelling (1) costs for best practices in landfill remediation with (2) stormwater capacity on site, with (3) Mixed-Use development capacity on-site.
   b) The portion of the property to be developed as Detention/ Retention pond and trails network should be identified in collaboration with the Harris County Flood Control District during the Spring of 2021.
   c) TIRZ 20 should collaborate with Bellaire and West University to secure ownership to Harris County Flood Control District for the portion of the site to be developed as Flood Control and Trails Network.

3. **Mixed-Use Commercial Development** by master developer using PPP model.
   a) A request for qualifications (RFQ) should be outlined by TIRZ 20 to identify a master developer to manage redevelopment of the site and to refine the concept plan developed: '**Ruffino Hills Resilient Redevelopment and Detention Strategy'.**
   b) TIRZ 20 should collaborate with the master developer to complete the redevelopment of the Ruffino site with PPP partnership model using the following best practices to guide the strategy:
      i. Ensure shared vision and public purpose
      ii. Precision with assembling the team
      iii. Proactive predevelopment strategies
      iv. Enhancing relationships between developers and public offices
      v. Ensuring 'Fair Deals'
      vi. Assessing fiscal impacts and community benefits
      vii. Structuring development partnership deals
      viii. Evaluating and structuring infrastructure and facility PPP
      ix. Managing risk and shared success
      xi. Documenting and carefully monitoring deals

Project Timeline

Stage	Activity	Subactivity	2020				2021				2022				2023				2024				2025			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Predevelopment	Site Planning Scenarios																									
		Stakeholder Engagement																								
		Alternative Development Scenarios																								
		Preferred Scenario																								
		Agency Coordination (COH/ HCFCD)																								
		Action Plan																								
	Preferred Concept Remediation Engineering / Detention Engineering Assessment																									
		Environmental Assessment Review																								
		Preliminary Alternative Scenarios																								
		Scenario Analysis																								
		Preferred Plan Refinement																								
	Preferred Concept Remediation/ Detention Engineering Integration																									
		Detention Engineering synchronization																								
		Remediation Engineering synchronization																								
		PPP Resources and Finance Assessment																								
	Action Plan and Development Partner Identification																									
		Development Partner Outreach																								
		Draft 3P Request for Qualifications (RFQ)																								
		Action Plan																								
	Master Development Process PPP Model																									
		RFP Selection																								
		Consultant Identification																								
		Due diligence and final negotiation																								
Site Redevelopment *	Detention and trails network																									
		HCFCD Property Transfer																								
		Site Remediation																								
		Detention Pond construction and trails																								
	Mixed-Use Commercial Development																									
		PPP Engagement																								
		Property Transfer																								
		Site Remediation																								
		Infrastructure - Utilities, roads, etc.																								
		New development construction (start)																								

* Site Redevelopment Schedule and Approach Determined by Pre-development Stage

Works Cited

Architecture 2030. (2019, June). *ZERO Code Passes Through Critical IECC Committee*. Retrieved from Architecture 2030: https://architecture2030.org/zero-code-passes-through-critical-iecc-committee/

Architecture 2030. (2020). *Achieving Zero*. Retrieved from Architecture 2030: https://achieving-zero.org/

Chakraborty, T., Hsu, A., Sheriff, G., & Manya, D. (2020, February 7). United States Surface Urban Heat Island Database.

City of Houston. (2019). *City of Houston Design Manual Chapter 9 STORMWATER.*

EHRA. (2020). *Parks Master Plan.* Brays Oaks Management District.

Handbook of Texas Online. (2020, November 28). *Keegans Bayou*. Retrieved from Texas State Historical Association: https://www.tshaonline.org/handbook/entries/keegans-bayou

HCFCD. (2020, September). *Keegans Bayou Conveyance Improvements*. Retrieved from Harris County Flood Control Disitrict: https://www.hcfcd.org/Find-Your-Watershed/Brays-Bayou/F-07-Keegans-Bayou-Conveyance-Improvements

H-GAC. (2017). *Regional Population Growth Trends (1980-2040)*. Retrieved from H-GAC: https://public.tableau.com/views/RegionalPopulationGrowthTrends1980-2040/Trend?:embed=y&:display_count=yes&:showTabs=y&%3AshowVizHome=no

Kleiner, D. (2020, November 29). *Riceville, Harris County*. Retrieved from Handbook of Texas Online: https://www.tshaonline.org/handbook/entries/riceville-tx-harris-county

NOAA. (2017). *NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: TX*. Retrieved from NOAA: https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=tx

Race, B. (2019). *Houston-CAP Transportation Targets, Goals, and Policies.*

Race, B. (2020). *Ruffino Hills Energy Targets.*

Riceville Church. (2020, November 29). *Church History*. Retrieved from Riceville Mount Olive Baptist Church: https://ricevillechurch.org/church-history/

Wray, D. (2020, June 9). *Houstonia*. Retrieved from The 1980s Oil Bust Almost Broke Houston. Almost: https://www.houstoniamag.com/news-and-city