Carriage Hills Renewal

Fifty-Year Master Plan
Five-Year Master Plan
and
Design Details

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Project Introduction

MSU’s graduating class of landscape architects was given the opportunity to revitalize the Carriage Hills shopping center, the majority of which is owned by DTN Management Co. This project included development of both a fifty-year master plan and a five-year master plan, as well as presentations to expert professionals and community members.

The class first collected inventory and analysis data for the Carriage Hills site and the surrounding region. This information was presented to neighborhood residents and a DTN representative at the initial neighborhood meeting. The class then used this data, as well as input from meeting attendees, to formulate an initial master plan. The original plans underwent a series of critiques and subsequent changes through the different design phases. The plans include a variety of development types, including single-family residential, multi-family residential, retail, and office.

Existing Site Conditions

The project entails the redevelopment of a portion of Meridian Charter Township, located in Ingham County, MI. It includes Carriage Hills shopping center, Castle Pointe apartments, and several blocks of single family homes.

Site Boundaries

The south boundary of the site falls along Lake Lansing Rd, starting at Gibson Ave (1) and moving toward Hagadorn Rd. The eastern boundary follows Hagadorn from its intersection with Lake Lansing (2) to its intersection with Birch Row Dr (3). It then follows Birch Row eastward around to its second intersection with Hagadorn Rd (4). From this intersection, the border extends north to include the properties on the north side of Biber St (5).

The north boundary stretches west from this point to Hardy Ave (6). The western boundary follows Hardy Ave south to its intersection with Birch Row Dr (7), following Birch Row to its intersection with Gibson Ave (8), then Gibson south to its intersection with Lake Lansing Rd (1). All proposed fifty-year development boundaries include a 20’ setback along affected roads to allow for streetscape modification on both side of the road.
Site Context

The Carriage Hills shopping center is conveniently located at the intersection of Lake Lansing Rd and Hagadorn Rd, both well-traveled routes. Saginaw Highway, I-127, Eastwood Towne Center, Meridian Mall, and the campus of Michigan State University are all less than five miles from the project site. East Lansing, Lansing, Haslett, Okemos, Dewitt, Holt, and Bath are all located within ten miles. While this location creates potential for a successful development, the proximity of nearby shopping centers has created competition for the Carriage Hills shopping center, causing economic hardship for many tenants and limited success for long-term leases.

Surrounding Land Uses

There are a number of different land use types surrounding the proposed site. The core retail site (shown here outlined in red) is categorized as mixed-use development, while the surrounding areas includes a variety of uses, including residential, recreational, and educational.

Existing Land Use:
- Mixed-Use Development
- Carriage Hills Apartments/Condos
- Castle Pointe Apartments
- Edgewood Apartments
- Multi-family Residential
- Public Elementary School
- Undeveloped Forest
- Walnut Hills Country Club

The core site is surrounded by residential developments, both single-family and multi-family. Carriage Hills, Castle Pointe, and Edgewood Apartments (shown in varying shades of purple on the above map) provide a variety of housing options, with rent ranging from $350 to $800 per person. Carriage Hills also includes a number of available condos. There are approximately 1300 current residents in these three complexes.

Single-family homes (dark purple) cover a vast majority of the region; they vary in cost and size from small starter homes to larger, more expensive homes.
Two public elementary schools are located near the site: Donley Elementary and Whitehills Elementary. Donley, located on the southeast corner of the intersection of Lake Lansing and Hagadorn, includes kindergarten through fourth grade. Whitehills Elementary, located on Lake Lansing to the west of the site, supports fifth and sixth grades. The proximity of these schools to the site, as well as the variety of existing housing options in the adjacent neighborhoods, suggests a high probability of large child populations in the area.

Open recreation space exists near the schools, and undeveloped hardwood forests form the north border of the proposed site. These recreational opportunities are expanded by Walnut Hills Country Club, the East Lansing Family Aquatic Center, and the Northern Tier Trail system.

**Core Retail Site Building Use**

The core retail site contains a number of buildings, the majority of which are owned and leased by DTN. These buildings contain a variety of retail establishments, as well as a number of vacant spaces.

White Birch condominiums (1) and Sunshine Auto Wash (2) border Birch Row Dr on the north side of the site. These buildings are separated from the rest of the shopping center by a vegetative buffer and are not owned by DTN. The condominiums are in good condition and successful, while the auto wash is decreasing working hours.

The largest building on the core retail site (3) contains a combination of current tenants and vacant spaces. Current tenants include a dry cleaner, Frames Unlimited, a Goodwill drop-off center, a DTN training center, an apartment-finding store associated with DTN, Spartan Net, and Hong’s Café. The building previously contained a grocery store as well, first L&L, then C&H. Meetings with community members highlighted the great importance of a grocery store onsite; reestablishment of a grocery store was one of the initial motivations behind the creation of this project.
Buddies Pub and Grill (5) is located on the west border of the core site, surrounded by parking lot. Buddies is popular in the community and is consistently successful. Two small buildings on the southwest corner of the site (5) are a functional fitness center and a vacant Pennzoil oil change station. None of these three buildings are owned by DTN.

Option 1 Credit Union (6) borders Hagadorn on the east side of the site, just north of a combined Marathon station and Tim Hortons’ (8) that are located on the corner of Hagadorn and Lake Lansing. These two establishments are relatively new and successful. This collection of lots are also not owned by DTN. The vacant lot to the south of Buddies is not owned by DTN but is available for purchase and development.

The two buildings located near the south site entrance (7) have few current tenants. The northernmost of the two buildings is currently in the process of becoming a convenience store. The other contains an eyewear shop, Wok ‘N’ Roll, and a vacant space that previously contained a beauty salon.

The buildings’ appearance quality varies from building to building. The condominiums, credit union, and gas station are most recently constructed and have a more polished appearance than do the rest of the onsite. All buildings appear to be maintained and of preservable quality.

While Buddies (4) and the largest building (3) share one expansive parking lot, each other section has its own parking area. Approximately 75% of the site is hardscape; much of this hardscape is open asphalt.

In addition to parking lot space, the Carriage Hills shopping center can be accessed via public transportation. CATA Bus Route 24 travels past the site, stopping adjacent to the core retail site before continuing onward to the bus station. This access to public transportation is critical for these neighborhoods, as a number of residents are visually-impaired. There are also a large number of college students living in the apartment complexes nearby, making a bus route to campus a popular amenity.

**Precedent Images**

Rindlehaven is located in Portland, MI, bordering the Looking Glass River. It is a 250-acre mixed-use development that focuses on the incorporation of all aspects of daily life and provides a pleasant, walkable community. This involves multi-family residential, single-family residential, and commercial facilities, as well as a number of community parks, walking trails, and access to a nearby trail system.
The Manistee Peninsula Neighborhood Revitalization Action Plan elaborates on a proposed new mixed-use development anticipated for the region. The plan development includes a hotel, retail space, office space, apartments, duplexes, and senior housing. The new development was projected in the Revitalization Action Plan to eventually include 95 units of market rate housing and 25 units of senior housing. The design was intended to enhance the existing neighborhood quality of Manistee.

Phillips Place is a very successful mixed-use development in Charlotte, North Carolina, covering approximately 35 acres. The design includes a main “high street” for retail, with residential units above the retail. Unity of materials and style create a unique atmosphere and sense of place identity. The site includes 130,000 sf of retail, restaurants, a theater, and a hotel, with 102 new multi-family housing units incorporated on upper floors.

Wayne State University, in Detroit, MI, plans to implement a new mixed-use development on a 1.5-acre site which was previously a parking lot. It is projected to open in 2016. The new development will consist of a nine-story mixed-use building. The building design will incorporate nearly 250 market-rate apartments, a conference center capable of holding 300 people, and a hotel with up to 120 rooms. The building will also include 19,000 sf of ground floor retail space for a variety of tenants.

The Hamptons is a DTN development located in Okemos, Michigan, built in 2008. Nearby retail establishments, aesthetic appeal of the exterior and interior of the apartments, and close proximity to Michigan State University make the Hamptons an appealing and successful development.
Problem Statement

The Carriage Hills shopping center is a once-thriving shopping mall, gradually failing due to increased competition and insufficient economic support from surrounding neighborhoods. Additionally, the surrounding multi-family residential complexes are approaching the end of their economic life spans. The overarching goal of this project is to design a neighborhood development that combines retail establishments and residences into a cohesive, economically-stable community.

A mixed-use development is suggested to achieve this goal. The proposed fifty-year plan boundaries encompass nearly 106 acres, including the existing Carriage Hills shopping center, Castle Pointe apartments, and a block of single-family homes. The partnership between landscape architects, neighborhood representatives, local government, and DTN developers provides a balanced view of the needs and desires of the affected parties in order to create an appropriate design for the site.

The proposed mixed-use development creates a versatile new community for residents who desire innovative solutions and new environments. A mixture of retail uses and public facilities are proposed to create a diverse, stable economic foundation, as well as varied residential products to provide a variety of affordable housing opportunities. This solution is especially appropriate in light of the current trend toward urban lifestyles. A wide range of people desire convenient access to amenities in a diverse, livable neighborhood. This design proposal accommodates a broad spectrum of future residents, including college students, seniors, empty-nesters, and young families.

To increase the visual appeal, the center retail core is proposed to have a unique atmosphere which will attract shoppers to the attractive, functional environment. The combination of aesthetic appeal, access to amenities, and practicality will enhance the overall appeal of the site and attract site users. Interconnected green spaces, bike lanes, pedestrian corridors, and public transportation promote environmental and community health through increased infiltration of runoff, minimized heat island impact, and reduced cost of personal vehicle transportation. Development intensity is greatest at the retail core but decreases toward the site boundaries. This transition minimizes disturbance to surrounding neighborhoods by avoiding drastic changes adjacent to the majority of existing residences.

The proposed mixed-use development design concept has the potential to renew the Carriage Hills Shopping Center and its surroundings, providing an innovative approach to modern community development and creating an attractive neighborhood for new residents.

Goals and Objectives

* Create an economically-stable new retail center.
  - Create a compact, connected area for retail development
  - Include both private and public institutions to reduce risk.
* Create diverse living opportunities for a variety of residents.
  - Offer a variety of housing options.
* Minimize environmental impact.
  - Increase green space and greenway connections to promote environmental health.
  - Provide bike lanes, pedestrian paths, and bus route access to reduce cost and pollution related to personal transportation.
  - Reduce surface parking to reduce runoff and heat islands.
**Fifty-Year Master Plan**

*Overview*

This proposed community development will consist of mixed-use development, multi-family residential neighborhoods, and enhanced green space. The vision is to enhance place identity, promote sustainable lifestyle opportunities, and provide diverse opportunities for residents and visitors.

A group of residents currently require available public transportation to travel off-site, as well as a safe walking and biking environment. These include blind, disabled, elderly, and college-age residents, as well as those who prefer more sustainable methods of transportation to use of personal vehicles. These characteristics should be retained and enhanced to better provide for the needs and desires of site users. CATA bus route 24 currently stops on the border of the proposed development site, and major streets feature walkable pedestrian sidewalks. These features should be retained and enhanced to promote safety and encourage increased use.

*Design Concept*

The concept of this fifty-year plan is a ripple. When the first raindrop lands on the surface of a still body of water, there is an immediate effect. The energy moves outward, creating an undulating series of concentric circles commonly known as ripples. This site design was inspired by the image and action of a ripple, with two distinct yet related concepts stemming from the simple yet elegant consequences of a single drop.

As a ripple decreases in intensity from the epicenter to the outermost rings, the proposed development plan gradually transitions from the most intense development area, found along the retail corridor, into the somewhat less intense zones of multi-family residential. This then transitions into the lower density single-family residential neighborhoods. This transition allows the new development to assimilate into the community with minimal disturbance. Areas of development bordering off-site properties are designed to have comparable levels of development intensity to the adjacent lots. This proposed design feature is intended to facilitate adaptation to and acceptance of proposed changes by community members.

Additionally, the effect of this proposed development is intended to function similarly to the raindrop creating the initial ripples. As the raindrop causes ripples that emanate outward from the epicenter, this proposed development is intended to create ripples of influence on nearby communities, positively impacting the surrounding areas. This may be through economic stability, community health, or inspiration of similar development.
Design Process

The design process is not linear. After each design attempt, reconsiderations and revisions are necessary to modify and improve the design. These modifications may range from small site detail alterations to large-scale land use changes.

Functional use diagrams (FUDs) are one of the first steps in the design process. These simple process graphics stimulate creative thought and denote relationships between different areas of the site.

The first FUD outlined the initial thought process about the relationships between land use areas, as well as general traffic flow patterns. The second FUD was created in response to design critique comments and shows alterations to the flow through the site.

FUD #1
01.28.14
Initial Thoughts

FUD #2
01.30.14
Modified
Following the creation of FUDs, preliminary master plan designs are created. These lack the detail of a completed plan but provide enough graphic clarity to display the essence of the design.

Mass-void study sketches are one key component in the process, as design critiques continue to fuel plan changes. These simple drawings create a quick, clear picture of the proposed site layout, depicting how building masses create spaces and showing design patterns. This visual element is a foundational part of creating new design options.

The following images show the progression of master plan concepts from the original (#1) through the last conceptual plan, including the mass-void study drawing for the second concept.
The proposed community center (A) provides an anchor, visually and economically, at the end of the central “high street” axis. The community center could contain a variety of amenities, examples of which include an adult education center, a small gallery featuring local artists, a post office, a café, and a credit union. A variety of public and private uses diversifies the site and creates a more stable economic basis for the proposed development. The building should be distinguished from surrounding buildings architecturally, creating an appealing visual element at the end of the view line from the “high street” and adjacent retail spaces. A buffer and open green space separate the community center from the proposed multi-family residential development to the west.

The highest density of proposed development is found along the “high street” in the southern portion of the site. This street provides a dense cluster of retail opportunities, topped by two floors of apartments. The sidewalks are wide, allowing for large amounts of foot traffic. Small spaces along the walk can be used as outdoor café seating and private social areas.

The proximity of Lake Lansing Rd to the site provides the high levels of traffic needed to bring customers into the proposed development. Retail frontage along Lake Lansing Rd, visible through and above the streetscape, creates immediate awareness of retail location, while entry signage directs potential customers toward the retail center. Both convenience parking and parking deck spaces are available to accommodate the varying quantities, needs, and desires of site visitors.
At each end of the “high street,” roundabouts are incorporated to decrease vehicle speed and facilitate efficient traffic flow, as well as create view line accepts. These should feature colorful planting beds, as they provide an early impressions of the site. The east roundabout is particularly visible, as it is located on the primary route leading into the core of the proposed development site.

Centered in each roundabout is a large fountain (C) featuring an artistic sculptural element. These proposed sculptures serve to add interest to the fountains, both in water flow effects and winter character, and could be commissioned from a local artist to highlight the local relevance of the proposed development. As a way to emphasize an environmental stewardship ethic, the proposed fountain should use water that has been collected, cleaned, and recycled instead of potable water. This collected water should also be used for irrigation purposes through a system of water collection, purification, and reuse incorporated into the site infrastructure.

The plaza and event space (D) in the northern portion of the mixed use sector allows for a wide range of uses. The area could be used for a variety of activities, potentially including art exhibits, outdoor concerts, summer festivals, outdoor lounge space, street vendors, and organized group gatherings. A key view for the surrounding buildings, the area should be a combination of decorative planting beds, turf, and porous pavement to provide an aesthetically-appealing open space with reduced environmental impact. Areas of porous pavement provide opportunities to capture, clean, and reuse water for purposes such as irrigation and fountains.
The central park space in the community (E) provides a restful site for residents and visitors alike to engage in passive recreation. Located in the heart of the site, the park provides a community green space. Direct views from a number of residential buildings, as well as the mixed-use buildings to the south, increase both the aesthetic appeal of the site and the economic value of the adjacent lots.

Paved paths around the outer portion of the park provide opportunities for exercise, while the open space in the middle allows for group activities such as informal sports games, bazaars, gatherings, outdoor music, or a farmers’ market. The groves of trees provide protection from the sun and screen the park from the traffic circle surrounding it. Environmental benefits include increased infiltration and reduced heat island effect.

The northern park (F) serves as the community green space for the single-family residences and northern multi-family residential areas, encouraging interaction between the potentially separated groups. This green space provides benefits similar to those provided by the central park space, with environmental health effects and varied recreational opportunities. Naturalistic prairie plantings and pond ecosystems increase habitat diversity onsite.
Street Trees and Mass Plantings

This diagram shows the proposed woody vegetation onsite. All greenways and streetscapes are clearly displayed, as are buffer plantings and the natural forest to the north of the proposed development site.

Building Mass-Void and Use Study

This diagram shows the proposed mass-void relationships of buildings onsite. The smaller townhouses are closely clustered, while the larger multi-family and mixed-use buildings generally have more space between them, as the building size requires extra open areas to provide a human-scaled atmosphere. Building use areas are clearly visible.

Green Space

This diagram displays the relationship between hardscape and green space onsite. Vehicular traffic routes can be differentiated from pedestrian traffic corridors through variation in depicted pavement colors.
Site Sections

Site sections are used to clarify the location, scale, and relationships of design elements by providing a vertical profile of a select portion of the site. For this proposed design, sections are used to depict four of the most unique aspects of the site.

The map below shows the location of each section as found on the master plan, while the sections shown depict design details.

Section A-A' - Community Park

Section B-B' - Hagadorn Road

Section C-C' - High Street

Section D-D' - Central Park Circle
“High Street” Study

“High Street” Details Concept
03.12.14

The more detailed high street plan was created after the completion of the fifty-year master plan. Design critiques fueled small plan changes as the plan was examined in greater depth.

The detailed plan involved additional exploration of specific aspects of the site, such as shop sizes, possible tenants, paving patterns, and building footprints. Details are added to the plan to clarify spatial relationships and circulation patterns more clearly than can be shown in a general master plan. Inclusion of these details also makes the sense of place more evident.

The concept of the high street was inspired by the existing high street in Phillips Place, in Charlotte, NC. This high street also provides an example of on-street convenience parking, retail frontage, upper level residential units, long views, and roundabouts.
This expanded plan of the “high street” portion of the site shows a more detail than the full master plan did, as well as minor alterations after a series of design critiques. This more detailed plan shows variation in building footprints more clearly, as well as various changes in paving patterns. These paving pattern changes help to create distinct spaces in the streetscape and lead pedestrians through the space; they are envisioned to be brick pavers set into concrete, complementary to the building facades. Building uses vary. Retail square footage, residential units, and possible uses are provided above. Residential units are calculated to have 900 sf minimum; the number per building varies based on square footage and height of retail ceilings.

There should be one parking space for every 250 sf of retail space; each residential unit is calculated to require 1.5 spaces, allowing for mixed-use development variance for parking use overlap. This portion of the site contains 231,635 sf of retail space and 367 total residential units, requiring 927 spaces for retail and 245 spaces for residential. There are 270 proposed spaces onsite, with additional parking in a parking deck to the north of the site.
Five-Year Master Plan

Design Concept

The concept of the five-year master plan revolves around the idea of a carriage wheel. This was inspired by the decision to keep the previous Carriage Hills’ name, attempting to revitalize the site instead of create an entirely new development. The existing Carriage Hills shopping center has value to members of the community, leading to the decision to retain a portion of the previous site identity in recognition of the site that was so valued and vibrant.

The carriage wheel concept creates an overall theme for the site. Radial design elements are included in the pavement pattern, several mimicking the shape of a spoked carriage wheel. It also inspired a set of materials for the site: wood, iron, and brick.

Brick types are specified below; pavers used should be Belden Brick Aqua-Bric porous paving. Site furnishings should be wood and iron, formed in a classic, simple style.
Design Process

The design process for the five-year master plan was shorter than that of the fifty-year master plan, as the site had already been explored and plan ideas had already been developed. Initial concept plans were again developed and edited based on design critiques.

Character sketches were also done to explore the appearance of the proposed site elements, particularly of unique components.
Master Plan

The five-year master plan is intended to be a more practical plan in regard to construction time and cost. Buildings on-site should be maintained if possible and incorporated into the design concept. Any properties not owned by DTN should be altered only if acquisition is feasible. Existing buildings are indicated on the plan. In this design, eight structures were retained, five buildings and three adjunct structures. Twelve buildings were added.

This new development implements elements from the previous plan through inclusion of a roundabout, mixed-use buildings, and a retail plaza.
The two main entries to the site both come from Lake Lansing Rd. Each of these entrances has an entry sign and ornamental plantings to advertise the Carriage Hills site to passersby.

Signage should be large enough to be visible from the road. It should also conform to the site character. The sign displayed below is one suggested form.

Also seen here are crosswalks, brick to attract drivers’ attention and increase awareness of crosswalk location. This would be paired with audible crossing markers and detectable warning strips to aid visually-impaired residents with safe street crossing.

Along the entry drive, there is a retail area with on-street convenience parking. This area has widened sidewalks to facilitate pedestrian flow. The median is planted with ornamental trees for visual interest and a vegetative buffer between lanes.

The southern two buildings are single-story retail buildings; the northern two buildings are mixed-use, with ground floor retail and first floor multi-family residential units. Each building contains four units, eight in total.
The roundabout in the center of the site is paved with brick, as brick paving typically reduces traffic speeds. The single lane of traffic is unusually wide to allow parked cars to back out of on-street parking safely.

The green space in the center of the roundabout features a round water feature which is proposed to include a sculptural element to provide year-round visual interest.

The roundabout is encircled by a wide band of pavement, allowing for easy travel around the circle. Pedestrians have views to Buddies, the decorative center green space, and multiple retail locations. The residents of the mixed-use buildings onsite can look down into the roundabout as well.

The outdoor patio proposed at Buddies is intended to increase the versatility of the already-popular establishment. The existing building remains, with minor alterations suggested for the building facade. The north side patio incorporates a brick and concrete pattern to create a carriage wheel radial pattern. A 3’ retaining wall borders the north and west sides of the patio to create a more intimate space while still allowing views.

The brick on the patio is laid out in a basketweave pattern, while the path leading to the patio is proposed to be herringbone. The small water feature serves as additional visual interest; the jointing around it also incorporates the carriage wheel pattern.
The main retail center onsite is the retail plaza on the east edge of the site. This plaza is proposed to incorporate the elements of a grocery store in smaller stores instead of one large store. Some examples could be a meat shop, a bakery, and a fresh produce stand. The plan also includes outdoor dining space for a cafe or events. Open spaces create opportunities for social gatherings, farmers’ markets, outdoor music, or other community events.

There is convenience parking available both on the roundabout to the west and the small parking lot to the east. There is no vehicular access within the plaza; all paths are reserved for pedestrian traffic.

The plaza also contains a circular water feature, similar to that in the center of the nearby roundabout. This water feature forms the visual and physical end point for the pedestrian thoroughfare that bisects the plaza.

This pedestrian thoroughfare leads across the road to the north of the plaza. That section of road is paved in brick and is set aside to allow free crossing by pedestrians.

The flush curb and line of protective bollards combine to create a streetscape that allows free passage by pedestrians but restricts accidental entry by cars or pedestrians walking into the street. Brick pattern differs from the pedestrian-only sidewalk to the road-crossing zone to further differentiate the transition.

The pedestrian thoroughfare is a wide pedestrian walk from the north edge of the side to the retail plaza, running down between the condominiums and the parking lot. This walk is intended to draw site users through the site on a pleasant, efficient route.

Constructed of brick and concrete, the path is bordered by ornamental trees and has specialty light poles set at 20’ intervals in the center stripe.
The majority of the parking onsite is found in the upper northeast corner of the site. This removes much of the vehicular traffic from the site while still providing the required amount parking for site visitors. While core site parking will be most used, these spaces will serve for employee or overflow parking. Pedestrian traffic is encouraged onsite to reduce vehicle use.

The parking lot has entrances onto both Hagadorn Rd and Birch Row Ave. The lot is formed into sections, with green space and pedestrian connections between rows. This reduces heat island effect, minimizes the visual impact of the asphalt, and creates safer flow through the lot.

The green space surrounding the lot can be used as an attractive vegetative buffer, as well as a natural water purification system. Implementation of a system of rain gardens provides an opportunity for water purification onsite through natural methods. This water could be used for summer irrigation or to fill water features onsite. Vegetative buffers should be as self-sufficient as possible, requiring very little supplementary water.

There are five mixed-use buildings onsite. Two of them are found in the entry drive retail sector, while the other three border the central roundabout.

The two southern buildings contain eight multi-family units between them, one floor of four units in each building. The other three contains six units, three units per floor and two floors per building. This adds 26 units of multifamily housing into the site. The incorporation of retail into the site also brings additional revenue into the site, a benefit for any development.

**Conclusions**

The Carriage Hills site has the potential to become a thriving center again. Incorporation of mixed-use buildings, walkable shopping areas, green spaces, and varied retail opportunities creates a versatile, appealing, and predictably successful development. Investment in a mixed-use development on this site could completely revitalize the site, as well as bringing new life to the surrounding neighborhoods.