Our community will grow and develop in a way that preserves and promotes Herculaneum's unique lifestyle and will be supported by modern, sustainable, well maintained and responsive services, utilities and infrastructure.

INFRASTRUCTURE

Background

Infrastructure plays an important, though sometimes unrecognized, role in supporting the high quality of life we enjoy in Herculaneum. Each morning, residents of the City turn on their taps and some may take for granted the clean and plentiful supply of water and the safe and efficient means for disposal of sanitary and storm wastewater available to them. The reliability with which the City provides infrastructure services is a testament to those who have planned and delivered those services over the years. The costs of those services, when compared to the benefits, provide a very high value to the residents and businesses in the City.

The reliability of the City's infrastructure services may also be an "Achilles' heel" to gaining the required public support for infrastructure planning for growth and the on-going requirements to maintain assets. Unfortunately, infrequent failures in our infrastructure systems provide us with reminders of the importance of infrastructure in our daily personal and business lives.

The City must pursue strategic directions which will ensure a continued high level of service and reliability, all in a cost effective and sustainable manner. With the City committed to good infrastructure planning, the residents of Herculaneum will continue to turn on their taps in the morning and perhaps consider, if only briefly, the excellent value of the services provided.

As a part of this planning process, the Herculaneum Community Master Plan Steering Committee surveyed the residents both at Town Hall Meetings and in the form of a city-wide mailed survey. As a result, the following ten aspects of infrastructure were ranked in order of importance:

1. Water
2. Streets
3. Sewers
4. Street Lights
5. Bridges
6. Storm Water
7. Sidewalks
8. Dam
9. Landscaping
10. Signage

These findings provide a voice from the community on the importance of infrastructure in their daily lives.

The first section on infrastructure deals with what is known as “streetscape”. The term streetscape refers to everything that is associated with a road including the view as one travels along the road. It includes the type of paving material, curbs, traffic medians, and bike lanes alongside the road. It includes the presence or absence of trees, tree species, and the maturity/height of the trees as well as other landscaping such as flowers in highway

medians. All of these components need to fit together to support a city's identity. It is recommended that a committee be put in place to oversee a streetscape project to allow for uniformity throughout the city. This committee will notify and include in the planning all citizens that will be affected by projects in the City. This committee will organize the priority of streetscape and keep it in line with the budget available. The remaining sections include utilities and services provided in the city.

City Streets
The City will implement these plans when funds become available.

Overview
The streets in Herculaneum total approximately 27 miles. Four of these roads are maintained by the Missouri Department of Transportation (approximately 4.5 miles). This total does not include the subdivisions of Providence and Stonewater that are currently in the first stages of construction. Streets today consist mostly of residential settings with very few that are used for industrial. Traffic congestion in the City is minimal mostly due to the lack of dead end streets and several ways to enter and exit the town. There are only a few traffic congestion issues that will be addressed later in the highway section.

Appearance
Most of the streets are without sidewalks or curbing and over the years have not had boundaries set. Since no boundaries are set, the street width varies and has taken on a meandering look. Streetscape guidelines need to be established for future street replacement projects so the appearance becomes consistent throughout the city. These guidelines must include road dimensions, curbing, sidewalks, storm water system, lighting, signage and landscaping. During the design of the streetscape, citizens, public works, and alderpersons should work together to obtain the desired appearance and choose materials that coincide with the City's identity. Once a streetscape design has been established, a street priority list should be created. For each street project, consideration of infrastructure upgrades such as water lines, fire hydrants and a storm water system will take precedence over aesthetic improvements such as lighting, sidewalks, landscaping and signage. As streets are replaced, residents along the street may be polled to determine the width of the street that is desired or possible. At that time, the residents may also be polled on the addition or location of sidewalks and landscaping. Funding for the road and curb replacements may be through the Jefferson County Road Tax. If needed, the water line replacements may be funded out of the City Water Improvement Certificate of Deposit. To complete additional improvements, alternate funding sources will need to be researched. Possible sources include improvement grants, bonds, community improvement districts, etc.

Construction and Standards
The streets in Herculaneum are constructed with asphalt with the exception of the subdivisions and industrial roads that are constructed of concrete. Currently the streets in

Herculaneum are in various stages of repair. A street maintenance/replacement program must be established and followed within the streetscape guidelines. The streets constructed of concrete are maintained by removing the broken slabs and replacing them with new concrete of the same thickness.

The streets constructed of asphalt material are maintained using an overlay of the same material in lifts of 2 to 4 inches to achieve maximum compaction. An asphalt street can be overlaid many times in this manner until it interferes with drainage and driveway slopes. The road level must also be reviewed in relation to the sidewalks. Once the height of the road approaches the top of the sidewalk, residents are more likely to park vehicles on the sidewalk which causes unnecessary wear and blocks pedestrian traffic. The process of "chip and seal" has also been used to maintain the surface of the asphalt roads. The City is currently researching the comparative costs and effectiveness of the "chip and seal" process. Although it is an effective form of maintenance, it is not preferred among citizens due to the property damage of vehicles, driveways and garages. Additionally, since curbs currently do not exist on most streets, the rock applied to the road surface falls into the surrounding ditches and yards. These rocks make it difficult to maintain these grassy areas with lawn mowers and weed trimmers.

The following standards from the City of Herculaneum Municipal Code Book list the required widths and depth of material for the construction of a street in the City. Once the street maintenance/replacement program is created, these standards should be followed for the streets that do not meet these standards if the proper rights-of-way can be obtained.

Section 445.370

E. Streets rights-of-way:

1. *Highways and major thoroughfares. Highways and major thoroughfares shall have widths as specified in the official Major Street Plan of the Comprehensive Plan. However, these shall not be less than the easement width specified for a secondary thoroughfare.*
2. *Collector Streets. Fifty (50) feet.*
3. *Minor streets, dead-end and cul-de-sac streets. All minor streets shall have a street easement width of forty (40) feet. All dead-end streets shall terminate in a circular turnaround having a minimum right-of-way diameter of eighty (80) feet, unless the Commission approves a "T" or "Y" shape paved space in place of the required turning circle. Turnarounds may not be required on dead-end streets which are less than two hundred fifty (250) feet in length and are planned to be extended in the future.*

F. Minimum pavement and sidewalk widths. Minimum pavement widths, back to back of curb, required to be installed at developer's expense, shall be as follows:

4. *Major thoroughfares. Thirty-six (36) feet. In the case of a major thoroughfare requiring pavement wider than thirty-six (36) feet, under the matter of financial and other arrangements for installing such wider pavements at the time the developer makes the improvements, shall be taken up by the developer with the officials having jurisdiction.*
5. *Collector streets. Twenty-six (26) feet*
6. *Minor streets, dead-end and cul-de-sac streets. Twenty-four (24) feet. The pavement of a turning circle at the end of a dead-end street shall have a minimum outside diameter of eighty (80) feet. A "T" or "Y" shape paved space, when approved by the Planning Commission, in the place of a turning circle, shall extend entirely across the width of the street right-of-way, except for the sidewalk space, and shall be at least ten (10) feet wide with a flaired portion rounded by minimum radii of twenty (20) feet.*

7. *Alleys and service drives. Minimum width of twenty (20) feet.*
8. *Sidewalks. Sidewalks may be installed on both sides of all major streets, on one side of collector streets, and may be required by the Planning Commission on any street, including minor residential streets. Sidewalks shall have a minimum width of four (4) feet in residential areas. In commercial and industrial areas, sidewalks may be required as deemed appropriate by the Planning Commission.*

H. Design characteristics of street pavements

Type of Material	Materials	Major and Secondary Streets (inches)	Minor Streets and Alleys (inches)
Concrete	Uniformed Design Thickness (Non-reinforced)	8	6
Concrete	Compacted Aggregate base	4	4
Asphaltic and Bituminous	Asphaltic surface	4	2
Asphaltic and Bituminous	Bituminous Coated Aggregate	4	3
Asphaltic and Bituminous	Sub-base, compacted screened Gravel	8	6

Table 1: Material Depth Standards

Parking on City streets in some locations is becoming more of an issue because the streets are not wide enough to accommodate parking on both sides and still allow traffic to flow. The parking ordinances should be reviewed to ensure that traffic flows properly and emergency vehicles can move through city streets without delays. Snow routes need to be designated.

Recommendations

- Develop a street maintenance/replacement program.
- Develop streetscape guidelines for standardization.
- Review parking ordinances so to not impede traffic flow.
- Create and implement a snow route.
- Develop a street maintenance program.

Sidewalks & Curbing

Overview

Today the City of Herculaneum has very few sidewalks. Most of the sidewalks that the City does own are either in the current Doe Run buy-out area or are in such need of repair they do not serve a purpose. Although many people walk in Herculaneum, they are forced to walk on the roads, which does not allow for a safe and enjoyable adventure. The presence of sidewalks in a town is beneficial in many ways, sidewalks encourage citizens and visitors to the community to walk, jog or run on a safe surface without the worry of traffic. They provide the community a means to exercise and will reduce pollution if people walk to restaurants, stores, a neighbor's house, etc. instead of driving vehicles. Fortunately, the new subdivisions of The Prairies, Providence and Stonewater include in their construction a sidewalk system that is beneficial to the residents.

A bike-trail/sidewalk 8' wide will be attached to the new South Bridge project as quickly as funds become available, hopefully before 2016. This trail/sidewalk will be extended to connect the old historic portion of Herculaneum to the new, rapidly growing western section.

Construction

Sidewalk construction greatly affects how much people will use them. Their width and location either encourage or discourage pedestrian movement. Wide sidewalks that are separated from the street by a tree-lined section or grass strip are more gracious and favorable to walking. Sidewalks constructed directly along the roadway offer the pedestrian a place to walk, but depending upon the amount and speed of the vehicular traffic, may not provide much physical or psychological protection. In cases where the easement needed can not be obtained or there is not physical room to place a sidewalk, at a minimum these areas should have a vertical curb and gutter in place along the road. These guidelines address multiple issues. First, a sidewalk or curb keeps storm water on the roadway from running into private property that may cause damage. Second, these structures establish a

definite road width that can be standardized for a more uniform look of the road throughout the City. The current sidewalk standard from the City of Herculaneum Municipal Code Book states:

Section 530.020: Specifications
All sidewalks hereafter constructed in the City shall be built of concrete and shall be not less than four (4) feet wide and four (4) inches thick. All sidewalks shall be built to grade in accordance with City profiles and plats.

It is recommended by the committee that specifications be added to this ordinance that a minimum of a four (4) inch aggregate base be listed as the initial step in the construction process. Additionally, specifications for a finished vertical curb and gutter need to be added as a feature to the sidewalk ordinance constructed of the same concrete material. At this time the City does not have an ordinance pertaining to a stand alone curb and gutter system. The City should adopt an ordinance stating that all stand alone curb and gutter systems be constructed of concrete.

The finance and responsibility of sidewalk maintenance has been a source of confusion for both the City and residents. At the present time, the City has no responsibility to maintain sidewalks. Citizens are able to split the cost for replacement of their sidewalk with the City. The material is provided by the City and the citizens supply the labor. Although this is the written procedure, the City has replaced sidewalks in various areas without any payment or labor from the citizens. Also, if all citizens constructed their own sidewalk, the standardization of the streetscape could not be upheld. It is recommended that the Board of Alderpersons, along with Planning and Zoning, review this topic and create a maintenance guideline for all sidewalks in the City and an installation guideline for preexisting streets that do not have sidewalks.

Recommendations

- Develop a maintenance/replacement program for sidewalks and curbing.
- Adopt an ordinance to create standards for a vertical curb and gutter system on streets that cannot accommodate a sidewalk.
- Modify the current sidewalk ordinance to include an aggregate base and require a vertical curb and gutter.
- Develop streetscape guidelines for standardization.

Storm Water

Overview

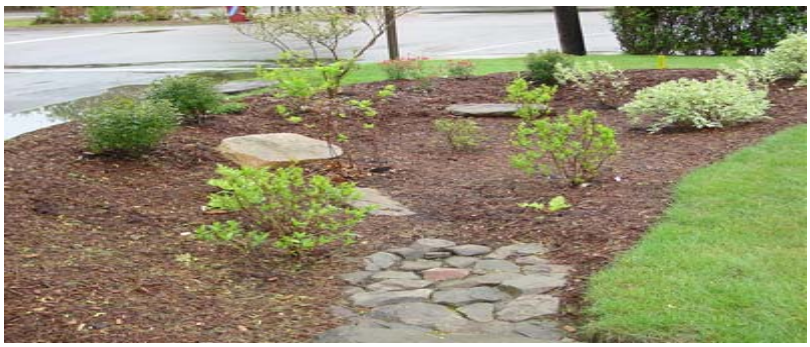
The storm water system requires attention and long-term planning in Herculaneum. Storm water run-off has been a topic of discussion at many City Council meetings due to inconvenience and damage to public and private property. Several engineering studies have been conducted over the years with the most recent conducted in 2004. These studies describe the areas most burdened by storm water run-off, but in most cases do not provide a permanent solution. Although many issues have been addressed in an ad-hoc manner by installing curbs and ditches, long-term solutions have been completed in Westchester and The Prairies subdivisions. To encourage continued permanent solutions, a storm water system should be designed for each street as a part of the street replacement program.

The storm water run-off in the City of Herculaneum is partially channeled through underground storm sewers and partially by open ditches. The run-off flows to the natural flood plain or undeveloped areas bounding Joachim Creek or directly into Joachim Creek itself. The water shed area for Herculaneum is, for the most part, within the city limits. The storm water sewers are totally separate from the wastewater sewers. At the current time the City does not have a storm water ordinance prohibiting disposal of harmful substances that may contaminate or damage local waterways or impede the flow of the drainage system. A committee was formed in 2004 to investigate the storm water issues being reported throughout the City. This committee is working to solve the storm water issues the City is facing.

Appearance

The most desirable image for the City is underground storm sewers in conjunction with rain gardens where needed. This concept follows the streetscape image that the City should try to obtain. Underground storm sewers also allow for citizens to easily maintain their property, optimize the ability for sidewalks to be installed, and reduce injuries from accidents that may occur in the open ditches. They also relieve the City of the cost of maintaining an open ditch by reducing man hours needed to remove debris and soil from all of the ditches and by reducing the cost of reshaping the ditch every few years.

Rain gardens can also be a very effective way of dealing with storm water. These gardens are constructed of natural material and plants that storm water from parking lots or roads drain into. This method addresses many water run-off issues. When drained



into a water garden, most of the pollutants from the road, roofs and parking lots that otherwise would end up in the streams and rivers are filtered by plant materials. These gardens can absorb hundreds of gallons of water run-off. This capability reduces flooding that may occur during heavy rains. Rain gardens should be used wherever it is feasible to eliminate standing water hazards and reduce the pollutants that are drained into our streams. Within these gardens, ponding of the rainwater should not last for more than six (6) hours. If this timeframe is exceeded due to the absorption rate of the soil, an alternate solution should be considered.

Construction

Since the storm water system will require the most attention and long-term planning, upgrades should be included in street replacement projects. Before any work can begin, research will have to be conducted on the type and size of drains that will need to be installed in an area to ensure adequate performance. Additionally, the construction or renovation of the storm water system will have to begin on streets that have access to the various creeks throughout the town and progress outward.

For the 2005 fiscal year, $35,000 was budgeted for the purpose of storm water improvements. These funds were utilized for the mitigation of storm water damage to personal property. The construction of a new system will be expensive and require additional funding over a period of many years.

Recommendations

- Develop a storm water system maintenance program.
- Develop streetscape guidelines for standardization.
- Design storm water system upgrades as a part of street replacement projects.
- Adopt a storm water system ordinance to ensure that the drains are not tampered with or blocked by debris.
- Distribute rain garden information to citizens as an alternate solution to control water runoff on private property.

Signs Overview

Citizens in Herculaneum have mentioned throughout the town hall meetings and the community survey that they would like Herculaneum to have a unique identity. The signs used by a city can portray this unique identity. Signs depicting a city entrance, building marker, park or general information are vital components in letting individuals know where services are located. The design, size and location of these signs affect how well this information is distributed and can improve the

aesthetics of the community. Balance in the number of signs is needed to ensure enough information is provided without creating a cluttered look. Currently signs in Herculaneum that the City maintains need to be upgraded and standardized. Specifically, an architectural standard should be established for all City signs including color, material, style and light level. In addition to the signs installed by the City, signs posted by businesses, citizens and other organizations need to be standardized and regulated.

Entrance signs

An entrance sign needs to provide a good first impression for tourists and people passing through the community. The City currently maintains one entrance sign located on the southeast corner of North Joachim Avenue and Commercial Boulevard. It has been determined that more of these signs are needed at the many entrances into the town. The location of these additional signs will be determined by the availability of property or easements that can be obtained. The existing and future entrance signs should also include illumination. The source of illumination should be from the top of the sign to reduce light pollution. These guidelines will be discussed in greater detail in the 'Lighting' section.

Street signs

Road identification and traffic signs also need to make a good impression and tie into the community's identity. Generally, street signs have a uniform size and color throughout the city. Road identification signs in Herculaneum are green signs attached to "u" channel poles. Traffic signs are either placed on "u" channel poles or wood posts. Several recommendations can be made to improve the appearance of these signs and standardize the streetscape. Any faded traffic signs should be replaced. Also, the road identifications signs should be upgraded and installed on round poles such as this example in Figure 1.3. Some of these designs have the option to include a city logo. Additionally, at street intersections a decorative sign pole as seen in Figure 1.4 is recommended to be installed to hold stop signs and street identifier signs. Finally, all other signs such as traffic signs, school signs, etc. should be placed on round poles with decorative caps as seen in Figure 1.5.

Figure 1.3
Round Pole

Figure 1.4
Decorative Pole

Figure 1.5
Simple pole

City facility signs
City facility signs are vital in marking specific locations for residents and visitors. Signs that identify government buildings, parks and historical sites along with sign boards need to fit the architecture of the surroundings and the identity chosen for Herculaneum.

Business signs
According to Section 410.220 in the City of Herculaneum Municipal Code Book, signs for businesses must comply with size, height and illumination standards.

Temporary signs
The signs discussed in this section include signs that are used by everyone in the community whether by businesses with temporary sale signs, members of the community for yard sales, politicians for elections, home sales, etc. If not monitored carefully these signs can get cumbersome and not allow the City to present its best appearance. In the current ordinances, no restrictions have been established regarding the number, placement or duration of temporary signs. Due to the lack of restrictions, some businesses including subdivision projects are using temporary signs in a manner detrimental to the appearance of the City. Additionally, residents place temporary signs on city-owned street poles and posts causing permanent damage. Therefore, a sign ordinance should be adopted regarding the number, placement, and duration of temporary signs used by city government, businesses, civic organizations, and residents.

A Missouri State Statute does exist relating to the placement of temporary signs along state highways. The following statute would apply to the right-of-way along Interstate 55, McNutt Street and Commercial Boulevard.

Section 227.220
2. Any person who erects or maintains advertising signs, marking or guide boards or signals on the right-of-way of any state highway without the written permission of the commission, or any person who willfully damages, removes or obstructs the view of sign boards or signals, erected or maintained on the highways without the written permission of the commission, shall be deemed guilty of a misdemeanor.

The City of Herculaneum should work with MoDOT to have non-approved advertising materials removed from the right-of way of all state roads in the City.

Sign Review Board

The city has many more businesses than in past years and more homes are being sold every day. To keep the size and number of signs under control, a sign application process needs to be created. This approval process will ensure that the addition of new signs, temporary or permanent, will be in compliance with the city's zoning regulations. This duty may be handled by the Planning and Zoning Commission, Building Inspector or Board of Aldermen.

Recommendations

- Establish architectural standards for signs including color, material, style and light levels.
- Install additional entrance signs that make a good first impression to members of the community and visitors.
- Upgrade the existing street signs and poles.
- Develop streetscape guidelines for standardization.
- Develop a maintenance plan for signs and poles.
- Adopt a temporary sign usage ordinance.
- Work with MoDOT to enforce state statute prohibiting non-approved advertising items or display materials on state right-of-way.
- Develop a sign application process.

Electric Overview

Currently all new installation of utilities whether it be commercial or residential are being constructed underground. All of the older developments of residential and commercial neighborhoods have the electric lines suspended above the roadways on utility poles.

Reasons to have underground utilities

Electric Lines Over the City

The subdivisions and new commercial development in Herculaneum are aesthetically pleasing because of the lack of utility poles. This improvement was accomplished due to the forethought of the City when regulations were adopted into the City of Herculaneum Municipal Code for the burial of utilities.

Section 445.370
K. Under Grounding of Utilities
All electrical, telephone and telegraph distribution lines installed in new residential subdivisions or developments platted hereafter, shall be installed underground except, however, that overhead distribution feeder lines into said subdivision or development, overhead through lines, cable switching enclosures, pad mounted transformers and service pedestals shall be allowed above ground.

Underground Lines

These new areas are also safer to citizens and visitors because of elimination of overhead lines. Burying these utilities reduces the chance of severe weather toppling the poles into structures or blocking roadways. Also, with these utilities underground, it will eliminate the hazard of citizens striking utility lines with an object such as a ladder or motor vehicle.

Recommendations
- Mandate that all utilities be placed underground on new development.
- Work with Ameren UE, SBC, Charter Communications and residents on the possibility of burying the existing utilities now located on poles.

Lighting Overview
In the past, most of the light in Herculaneum was produced by street lights, home illumination and the lighting at few businesses that were located in the town. In the last 5 years the commercial development has been rapid with no regulations placed on the type of lighting or how much lighting is really required. In some cases the race to have the biggest, brightest parking lot seems to overshadow the beauty of the night sky. This lighting excess in some areas does not only contribute to light pollution in the community but also wastes energy and natural resources. In a survey conducted with the citizens of the community,

Figure 1.6 *Comparison of dropped versus flat lenses*

lighting was 4th on the priority list of needed infrastructure improvements. The public safety section of the survey also reinforced the need for more consistent lighting when residents stated they would feel safer in the community with additional lighting in the residential areas.

Research

The master plan committee has researched how to reduce the light pollution in our community while maintaining the light needed to have a safe community. A good example and probably the most successful story has been Calgary Alberta. Calgary has gone above and beyond by replacing older drop lenses with flat lenses.

The advantage of using these flat lenses is lower wattage lights being used to direct light directly to the road surface instead of into the sky. For more in-depth information about this program please visit the following website:

http://content.calgary.ca/CCA/City+Hall/Business+Units/Roads/Street+Lights/Envirosmart+Street+Light+Retrofit+Program.htm

Materials for lamps and poles

Exterior lighting supports various functions depending on the installation, including the operation of vehicles, the activities of pedestrians and the illumination of various features. Each of these functions has different requirements for lighting relative to purpose, intensity of lighting, light color and maintenance. Many light characteristics, including brightness, color, energy efficiency, life span and, therefore, suitability for a specific application are determined by the type of lamp used in a light fixture (see Table 1.2). Two broad families of lamps are commonly used in exterior lighting. Incandescent lamps produce light from a filament being heated by an electric current. Electric-discharge lamps including mercury vapor, high-pressure sodium and metal halide produce light by passing an electric current through a gas or metallic vapor.

- Incandescent lamps provide a color rendition that is warmer and more pleasing than most electric-discharge lamps. However, they are also less energy efficient and shorter lived than electric-discharge lamps. For these reasons, the use of incandescent lamps should be limited to areas where their color characteristics are more essential, such as pedestrian pathways and courtyards. Low-voltage incandescent lamps (12 volts) provide a simple and safe alternative to high-voltage lamps (120 volts), but they are not appropriate where high illumination is required and should only be used for low-level lighting along such areas as walkways and stairs.
- Mercury vapor lamps produce a color in the green to blue-green spectrum that is not flattering to many natural colors. Color-corrected mercury vapor lamps improve the color rendition, but where purity of color is necessary, they are still lacking. Mercury vapor lamps have the longest life but the lowest energy

efficiency among electric-discharge lamps. They are recommended for use as street lighting in residential areas where somewhat lower levels of lighting may be desirable and color rendition is a secondary concern. Because mercury vapor lamps emphasize the green of foliage better than most other lamps, they are also a good choice for landscape accent lighting.

- Metal halide lamps provide better color rendition than mercury vapor lamps, have a higher energy efficiency rating and are relatively long-lived. This type of lamp is recommended for general area lighting in public areas such as commercial and community centers.
- High-pressure sodium lamps are very efficient and relatively long-lived. However, they provide poor color rendition, producing light with a golden cast that is not flattering to many natural colors. High-pressure sodium lamps are recommended for primary and secondary roadway lighting and parking lot lighting where efficiency, reliability and maintenance are critical and color rendition is a secondary concern.

Lamp Type	Color Rendition	Energy Efficiency (lumens/watt)	Life (hours)	Recommended Uses
Incandescent	Renders colors well with emphasis on warmer tones	10-20	750-2,000	Pedestrian areas, where natural color rendition is important
Mercury Vapor	green to blue-green; cannot render reds and yellows well	30-65	24,000	residential street lighting and accent lighting for planting material
Metal Halide	White light; renders colors well	75-125	15,000	general area lighting in public areas
High-Pressure Sodium	golden cast	75-130	20,000	Primary and secondary roadway and parking lot lighting

Table 1.2 Comparisons of Lamp Types

Light poles can be a significant visual element of the installation of a lighting system, especially in the daytime environment. They are available in a variety of shapes, materials and finishes and should be selected according to short- and long-term costs, functional considerations and aesthetic concerns. The variety of light poles used on an installation should be limited, and their selection should follow architectural standards.

- Concrete poles are available in a variety of finishes and are compatible in character with most settings, from roadways to pedestrian areas. Concrete poles are moderately expensive but require little long-term maintenance. They are appropriate for most applications but cannot exceed 50 feet in height. As they approach this height, their increased diameter may, depending on the setting, appear visually out of scale.
- Aluminum poles are also available in a variety of finishes and are appropriate in character for most uses and settings. They are relatively expensive but have low long-term maintenance requirements. The finish of an aluminum pole can be left natural but should be dulled to minimize reflection and glare.
- Decorative wood poles should be avoided because of high initial costs and high long-term maintenance requirements. Lights mounted on wooden utility poles should also be avoided because of aesthetic concerns.
- Painted steel poles, while relatively inexpensive, have high long-term maintenance requirements, and their use should generally be limited. Baked-on coatings help reduce this maintenance requirement but add considerably to cost.
- Weathered steel poles should be used for high mast applications exceeding 50 feet in height. They are inappropriate in pedestrian areas because of their scale and appearance and because the weathered finish can stain. Weathered steel poles are relatively expensive but are a practical, maintenance-free solution for high mast applications.
- Different types of poles can be used for different lighting applications, but they should be visually compatible. The same type of pole should generally be used for a similar application.

Construction

With the exception of areas with buried utilities, street lights in Herculaneum consist of older drop lenses located on utility poles. This type of light fixture is the cause of most of the light pollution in the city since not all of the light is directed towards the ground. Also, in many locations these light poles are too far apart and not evenly spaced making the lighting inconsistent and ineffective for the entire length of the street. The desired look is stand-alone light poles to coincide with the streetscape guidelines that will be established for the City. The current lighting standard in the City of Herculaneum Municipal Code Book states:

Section 445.370
Q. Street Lights

In a non-residential subdivision or a single-family dwelling residential subdivision a street light shall be provided at each intersection of a street within a subdivision, at each intersection of a street with a pedestrian way and at each circular turn around, but in no event shall there be fewer than one street light for each four hundred (400) linear feet, or portion therefore, of street frontage between intersections, or between a street intersection and that terminus of a dead-end street. Lighting intensity and height of street lights shall be as approved by the Planning Commission.

It is recommended that this standard distance between lights be decreased to a maximum jof 200 feet according to research the committee has obtained from other sources. Also, the height of the pole along with the lighting intensity should be standardized according to the type of street where it is installed and follow guidelines suggested by the International Dark-Sky Association (http://www.darksky.org). Currently, no guidelines exist for the height and lighting intensity according to the Municipal Code Book. The new light poles, once upgraded, will eliminate the older light fixtures and provide the citizens with the additional lighting locations that they have requested.

Recommendations

- Adopt an ordinance to reduce light pollution from businesses and homeowners with outdoor lighting.
- Work with Ameren UE, SBC, Charter Communications and residents on the possibility of burying the existing utilities and installing stand-alone light poles in their place.
- Develop a street lamp replacement program to replace older fixtures with flat lens fixtures in the areas where the utilities cannot be buried.
- Update Section 445.370 (Q) in the Municipal Code Book to decrease the maximum distance between poles and standardize the height and light intensity according to the type of street it serves.

Highway Overview

The City of Herculaneum is fortunate to have 2 highways in its boundaries: Interstate 55 and Commercial Boulevard also known as 61/67. McNutt Street, which is also maintained by MoDOT, connects these two highways.

Upgrades in the highway

Commercial Boulevard is in good condition because of the paving projects in 2001 and 2005. A few storm water drainage issues have been brought to the attention of the Storm Water Committee. This highway consists of four lanes with minimal traffic congestion. The streetscape of

Commercial Boulevard needs to be improved within the City to compliment the identity of Herculaneum. These improvements will include landscaping in the medians and within the city owned property that borders the highway and installing additional entrance signs. Drainage issues on Highways 61/67 need to be addressed by MoDOT.

Interstate 55 is a major interstate that carries an average daily traffic volume of 47,773 and average daily commercial truck volume of 4,855 through the City of Herculaneum according to the traffic volume study conducted by MoDOT in 2002. The highway consists of four lanes divided by a grass median. Over the past ten years MoDOT has been upgrading the highway to eight lanes, four northbound and four southbound, with a concrete median wall in the center. Currently the highway project has stopped at mile marker 186 at highway M. Construction on the expansion of the highway past Herculaneum is scheduled to begin in 2020. The City has also been in discussions with MoDOT to reconstruct the intersection at I-55 and McNutt Street, however an exact plan has not been decided upon. The congestion at this intersection has become a safety issue and is being watched closely. It is the recommendation of this planning committee to work with MoDOT and other city governments to move up the schedule for the eight lane expansion of the highway to the Festus exit along with the intersection upgrade at McNutt Street. As in any major project, the financing should be evaluated as to not place a financial burden on the City or its citizens. In the past, when an interchange has been completed on I-55, grasses were replanted but did not include a planned landscape. In the process of working with MoDOT on the improvements, an improvement group needs to be organized consisting of local businesses and the City to maintain the intersection to a higher standard with the addition of landscaping, that is in keeping with the personality of Herculaneum. The new appearance of the interchange will help the City attract new businesses, residents and tourism to the town. This appearance will also benefit the businesses in the area by attracting customers.

McNutt Street was just repaved in the summer of 2005 and new guard rails installed. This road is the only street in the town that contains major traffic concerns. The two main areas creating traffic congestion are the intersection at I-55 and McNutt Street and the intersection at McNutt Street and Scenic Plaza. Drainage along McNutt Street also needs to be addressed when the highway and intersection are updated. Standing water is becoming an issue at the exit and entrance ramps. Also, the creek that is along McNutt Street is overgrown and unsightly. This creek should be box drained to cover up this issue or should be formed into a creek bed with maintenance to eliminate the eye sore and to let storm water flow unrestricted.

Recommendations

- Continue to work with MoDOT to improve the drainage issues and appearance along Commercial Boulevard.
- Continue to work with MoDOT to improve the drainage issues and appearance along McNutt Street.
- Continue to work with MoDOT on the I-55 expansion project.

Bridges Overview

The City of Herculaneum contains two major bridges spanning the Joachim Creek. The bridge on Commercial Boulevard (US Highway 61/67) was built in 1933 and rehabilitated in 1985. It is maintained by the State of Missouri and is currently scheduled for major maintenance in 2006.

State Highway 61/67 Bridge at Herculaneum

Joachim Creek Bridge

The Joachim Avenue Bridge, Fed ID# 1925001, was constructed in 1924 of concrete and steel. Due to deteriorating support members, it was closed to all traffic on November 22, 2005. The bridge is scheduled for renovation in 2006. Funding has been received from the State of Missouri in the amount of 1.2 million dollars for fiscal year 2006-2007. The estimated project cost for the renovation of the bridge is 1.5 million dollars. If the City decides to alter the design in any way, for example raising the bridge out of the flood plain, the additional cost will be paid by the City of Herculaneum. The Master Plan Steering Committee has discussed the design of the new bridge with Herculaneum citizens and visitors. Several suggestions regarding the width and use of the bridge have been identified and should be taken into consideration when developing the new design. The lanes should be widened to accommodate large truck traffic in both directions since it is a haul route for the Doe Run Company. Additionally, a pedestrian walkway should be constructed on both sides of the bridge. For the safety of this pedestrian traffic, lighting should be included to illuminate the top and bottom surfaces of the bridge. Individuals voiced their concerns regarding the new height of the bridge and whether or not it will be constructed outside of current flood levels. According to officials, the State of Missouri has provided funding for the renovation of the current bridge meaning the same bridge will be constructed at the same height. The City should explore the possibility of raising the bridge out of the flood level. However, if no additional funding can be obtained the design will remain at the current height.

A bridge committee was formed for the sole purpose of choosing a consulting firm. EFK Moen, LLC was chosen to provide the engineering on the renovation of the Joachim Avenue Bridge. It is recommended that this bridge committee continue to meet regarding the design aspects of the renovation of the Joachim Avenue Bridge to ensure the ideas of the citizens are taken into consideration. A Town Hall Meeting should also be held to display the possible designs of this bridge prior to construction so that citizen input can be sought before major construction has begun.

Partial funding has been obtained for the construction of a bridge over the Joachim Creek located further south of the existing bridge on Joachim Avenue. This bridge will be accessed off of Riverview Drive and provide yet another means of access to the section of Herculaneum on the east side of the creek. Unlike the current bridges over the Joachim Creek, this bridge will be designed to be constructed above the creek's flood level. Therefore, the new bridge will provide access from the south to the east side of the creek even when water levels become high enough to flood both the bridge on Joachim Avenue and the bridge on Commercial Boulevard. This reliability will allow emergency vehicles to respond to all sections of Herculaneum more quickly in the event of a flood. Additionally, once this new bridge is constructed, the transportation of materials in and out of The Doe Run Company will utilize this new path removing all large truck traffic from traveling through residential areas. Also, any additional commercial traffic created by the development of the buyout zone will also utilize this new bridge.

Recommendations

- Continue the organization of the Bridge Committee to ensure the needs of the citizens are met in the design of the replacement bridge on Joachim Avenue and the new South Bridge over the Joachim Creek.
- Continue promoting the South Bridge to secure the remaining funds for construction.
- Verify that the maintenance for the Commercial Boulevard Bridge will be completed in 2006.

Water Overview

In the past, the city has relied on five (5) deep water wells to provide water to residents and businesses with the first one being constructed in 1909 and the newest one being dug in 1981. Information containing operation statistics about these deep water wells can be found in Table 1.3. These wells served the city well for over ninety years providing a reliable water source for its residents. As demands for water increased every year the City required a secure water source that would meet future needs. In 2003 the City of Herculaneum along with the City of Festus completed construction of the Cathy Jokerst Water Plant (Jefferson County Water Authority). Upon switching to the new water system, the old wells were no longer utilized on a daily basis to provide water to the City but are still maintained bi-weekly through an automatic run process. Maintaining these wells has placed the City in a good position to continue to supply water for its residents and businesses in the event that the City cannot receive water from the Jefferson County Water Authority. The water system

Herculaneum City Well # 2

Herculaneum Water Tower

today includes three water storage towers. Details on these towers can be found in Table 1.4. An adequate number of water storage towers exist in the City of Herculaneum. As more users are added, the installation of any additional towers will be determined by the amount of pressure loss in the system. In 2005, it was budgeted according to ordinance that 50% of the revenue received from the cell tower space rental (up to an amount of $2500.00 a month) will be saved for the future maintenance of the water towers.

Well #	Capacity GPM (Gallons Per Min)	Year Drilled	Depth to Water (Feet)	Depth (Feet)	Bottom of Casting (Feet)
1 (one)	20 GPM	1909	202	473	473
2 (two)	100 GPM	1909	131	800	400
3 (Three)	150 GPM	1930	0	910	380
4 (four)	180 GPM	1976	210	756	525
5 (five)	250 GPM	1981	242	750	250

Table 1.3

Tower Name	Address	Capacity (gallons)	Year In Service
Joachim Tower	135 Joachim Ave.	400,000	2003
Scenic Tower	1565 Scenic Dr.	280,000	1988
Western Tank	1040 McNutt School Rd.	400,000	2003

Table 1.4

The Jefferson County Water Authority is a non-profit organization that receives water through a horizontal collector located in the Mississippi River. The water plant has a production capacity of three million (3,000,000) gallons per day using a lime softening water treatment process. The storage facility located at the plant contains four hundred thousand (400,000) gallons. The cost for construction of the water plant was 6.5 million dollars. Improvements to the Herculaneum Distribution System were 3.75 million dollars, which included the construction of two towers and the replacement of the major service lines in the town. The water supply provided by the Jefferson County Water Authority is greatly

Herculaneum Water Treatment Plant

improved compared to the prior system. However, the water softening feature is not currently available to the Herculaneum public water system. In a region that can experience water wells that dry up or underground water in danger of encroachment from salt, the collector well utilizes a virtually unlimited source of water from the nation's premier river. Today the threat of a water shortage whether due to a fire or drought has been eliminated with this system. In the past, either one of these two events caused the citizens to conserve water.

The City is under contract to purchase 480,000 gallons of water per day. The monthly rate for both residential and commercial users begins with a base rate of $8.91 for the first 1000 gallons. Thereafter, the rate for water usage is $5.00 for each additional 1000 gallons of water up to 100,000 gallons of total water usage. Any user exceeding 100,000 gallons of water usage will pay $4.00 for each additional 1000 gallons above 100,000 gallons.

Upgrades

The City has taken great steps to improve the water system by utilizing the Jefferson County Water Authority. This conversion has provided the residents and businesses with cleaner, softer and better tasting water as well as eliminating the water shortage issue during drier months. Two additional improvements are needed to the water system to enhance the water quality and protect property. Water line and fire hydrant upgrades are the final items needed to make the water system in Herculaneum the best possible.

- Water line size – Found in the previous master plan in the Water Supply section on page 43, number 13: “The Water Department is replacing older water lines as a matter of maintenance as streets are repaired or a water main breaks. Six-inch pipes are replacing these older lines, many of which are two-inch pipes.” The City has made many improvements over the years to make certain that undersized lines have been replaced. Listed in Table 1.5 (behind this page) are the street locations for lines that do not meet this minimum requirement and should be replaced as a priority. Currently, an ongoing issue of “rusty” water is still present in the eastern side of the City. The cause of the discolored water is due to the older metal pipes in this area in combination with the softer water produced by the water authority. This combination causes the build-up of rust on the inside of the pipe to flake off and enter the water supply. The softer water affects the galvanized pipes within households in the same manner. The Jefferson County Water Authority along with the Cities of Herculaneum and Festus are working towards a solution to correct this issue.
- Fire hydrants – Fire hydrants are installed according to the Missouri Inspection Bureau which states fire hydrants should be 600 feet apart for residential, 400 feet apart for commercial and contain a steamer (3-way) connection. The new developments taking place currently and in the future are required to meet these standards. Some locations in the historic part of town are lacking these requirements and need to be brought up to code. Listed in Table 1.5 (behind this page) are the hydrants that should be upgraded as a priority from a 2-way connection to a 3-way connection. The City should work with the local fire departments

Older Fire Hydrant

New Fire Hydrant

determine new hydrant locations to become more compliant with the maximum distance requirement. With the availability of a reliable water supply and fire apparatus advancements over the years, the appearance and function of fire hydrants have changed. New hydrants being installed should contain a 5" Storz outlet as seen in Figure 1. This connection type allows for a quick and secure connection over the older threaded type of fire hydrant outlet and should be added to local building codes as a requirement. Hydrants that meet the flow standard but are constructed with the older style of threaded steamer cap should be retro-fitted with an adapter to accommodate the Storz connection. The priority areas where these hydrants should be replaced or retro-fitted are schools, nursing homes, large industrial and large commercial complexes due to the fire load of these buildings and greatest risk of catastrophic loss of life and property. Smaller commercial developments and residential areas will have a lower priority to receive the retro-fit of these hydrants unless the hydrant itself needs to be replaced.

Recommendations

- Replace metal water lines that are deteriorating or undersized for the area they serve to improve ISO rating and quality of water.
- Work with Jefferson County Water Authority to lessen the amount of “rust” in the water supply for the affected areas.
- Work with local fire departments to determine hydrant placement for areas that exceed maximum distances between hydrants.
- Replace or retro-fit current hydrants to accommodate a 5” Storz outlet.
- Update city ordinance to include that all fire hydrants installed in new developments must contain the 5” Storz connection.

Street Name	Main Size	Hydrant	Hydrant Location	Priority of Line Replacement	Priority of Hydrant Replacement
Francois Dr	2"	3-Way	98 Francois Dr	1	0
Broad St	4"	2-Way	867 Broad St	2	2
Circle St	4"	2-Way	Circle & Main	2	2
Circle St	4"	2-Way	774 Circle	2	2
Circle St	4"	2-Way	733 Circle	2	2
Circle St	4"	2-Way	710 Circle	2	2
Crane St	4"	2-Way	445 Crane St	1	1
Cross St	4"	2-Way	841 Cross St	2	2
Curved St	4"	2-Way	Curved & Main St	2	2
Curved St	4"	2-Way	328 Curved St	2	2
Dale St	4"	2-Way	948 Dale St	2	2
High St	4"	2-Way	863 High St	2	2
Lee St	4"	2-Way	580 Lee St	1	1
Liberty St	4"	2-Way	560 Liberty St	1	1
Liberty St	4"	2-Way	540 Liberty St	1	1
Licoln St	4"	2-Way	425 Lincoln St	1	1
Long St	4"	2-Way	423 Long St	1	1
Mott St	4"	2-Way	Mott & Curved St	2	2
Nassau St	4"	2-Way	45 Nassau	1	1
Sherman Dr	4"	2-Way	Sherman Dr	1	1
St Joseph St	4"	2-Way	453 St. Joseph St	1	1
Thurwell St	4"	2-Way	527 Thurwell St	1	1
Thurwell St	4"	2-Way	465 Thurwell St	1	1
Wall St	4"	2-Way	530 Wall St	1	1
Wall St	4"	2-Way	547 Wall St	1	1
Wall St	4"	2-Way	577 Wall St	1	1
Barclay St	4"	3-Way	298 Barclay St	1	0
Boadway St	4"	3-Way	287 Broadway St	2	0
Cross St	4"	3-Way	807 Cross St	2	0
Dale St	4"	3-Way	926 Dale St	2	0
Dale St	4"	3-Way	End of Dale St	2	0
Hill St	4"	3-Way	407 Hill St	1	0
Hill St	4"	3-Way	425 Hill St	1	0
Hill St	4"	3-Way	447 Hill St	1	0
Hill St	4"	3-Way	525 Hill St	1	0
Jefferson St	4"	3-Way	417 Jefferson St	1	0
Long St	4"	3-Way	405 Long St	1	0
Long St	4"	3-Way	459 Long St	1	0
Louis Dr	4"	3-Way	356 Louis St	1	0
Mississippi Dr	4"	3-Way	End of Mississippi	1	0
St Joseph St	4"	3-Way	547 St Joseph St	1	0
St Joseph St	4"	3-Way	415 St. Joseph St	1	0
Thurwell St	4"	3-Way	409 Thurwell St	1	0

Table 1.5

****Priority 0 areas do not need to be replaced***
*****Priority 1 areas should be replaced as soon as possible***
******Priority 2 areas are in the current buyout zone***

Sewer Overview

In the year 2000, in Jefferson County, Missouri there were four (4) public sewer districts, eight (8) municipalities that offered their own wastewater treatment service and six (6) private sewer companies. In 2000, the Herculaneum Sewer District and the Herculaneum Sewer Company were two of these entities. On January 26, 2004, the dissolution of the Herculaneum Sewer District was approved. The citizens voted that the Herculaneum Sewer Company, owned by the City of Herculaneum, would be the only entity to provide service in the City and would take over the assets and customers of the Sewer District. Herculaneum offers sewer services to residents of the City, however, it is estimated that in the year 2005 there were 177 locations using private on-site systems.

Herculaneum Sewer Treatment Facility

Public sewers are measured on a million gallons per day (MGD) basis. MGD represents the level of effluent that can be processed by the facility per day. A major sewage treatment plant must be rated not less than 0.4 MGD or 40,000 gallons of processed effluent per day. The Pollution Equivalent (PE) is the number of persons that can be reasonably served by the facility. A major sewage treatment plant must be capable of serving not less than 500 persons, or 500 PE.

The Herculaneum Sewer Treatment Facility size is 0.42 MGD with a 4900 PE. With the expansion of the City, this system had to be upgraded to handle the additional persons. The system is being upgraded to a 1.4 MGD plant. This project is being funded through a 6 million dollar loan from the State Revolving Fund with the debt service payable over 25 years. The new system will provide service for the new construction on the west side of the city as well as the existing residents utilizing private systems for their sewer service.

Currently, the monthly rate for residential users is $21.50. The monthly rate for commercial users is based on water usage: $20.10 for the first 6000 gallons plus $2.72 for each additional 1000 gallons used. The Board of Alderman recently approved an increase in the monthly rates in order to cover the cost of the sewer system improvements. Beginning January 1, 2007 the residential monthly rate will increase to $26.50. The commercial monthly rate will also be adjusted to a base fee of $50.00 plus $1.85 per 1000 gallons used. The Herculaneum Sewer Company maintains 8 lift stations as shown in Table 1.6.

Lift Station	Average Daily Flow GPD (GPM)	Users served
Meadow Lane	182,030 (126)	419 Residential 25 Commercial
Buchheit	6,325 (3)	9 Commercial
Road Side Plaza	NA	1 Commercial
Hwy 61/67	3,330 (2)	9 Residential
Jefferson Street	29,970 (21)	81 Residential

Senn Thomas School	980	1 School
Brown Street	348,055 (242)	307 Residential 3 Commercial 2 Schools 6 Lift Stations
Treatment Plant	147,730 (103)	129 Residential 1 Commercial

Table 1.6

It is proposed by the Howard R. Green Company to increase this number to 11 by adding lift stations at the end of Mississippi Drive, on Lake Drive and on the north end of Commercial Boulevard (61/67). These improvements along with upgrades to the current lift stations are proposed based on adding 169 residential users and a fully developed Providence Subdivision containing 699 houses and 360 apartments. The proposed lift station details once the upgrades are complete are shown in Table 1.7.

Lift Station	**Average Daily Flow GPD (GPM)**	**Users served**
Meadow Lane (new location)	555,690 (386)	1137 Residential 360 Apartments
Mississippi Drive	2,590 (1.8)	7 Residential
Lake Drive	2,590 (1.8)	7 Residential
61/67 North Commercial	1,720 (1.2)	4 Residential 3 Commercial
Buchheit	43,695 (30)	101 Residential 9 Commercial
61/67	3,700 (3)	10 Residential
Jefferson Street	31,450 (22)	85 Residential
Brown Street	171,170 (120)	347 Residential 3 Commercial 2 Schools 3 Lift Stations
Treatment Plant	148,000 (103)	130 Residential 1 Commercial
Senn Thomas School	980	1 School
Road Side Plaza	NA	1 Commercial

Table 1.7

Recommendations

- Create a maintenance program for sewer lines and lift stations.