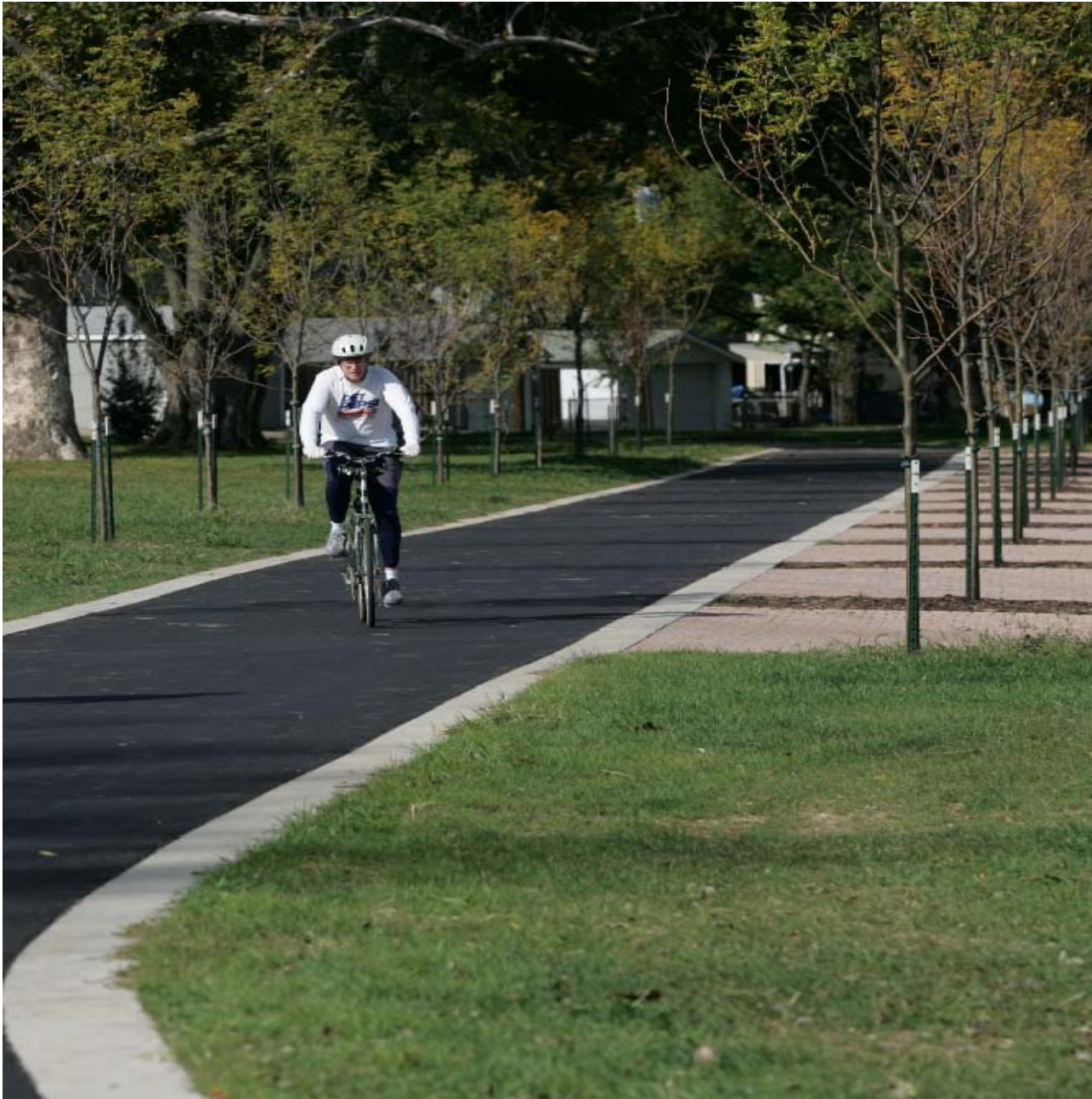


Greenway Level of Care Guidelines

July 2017



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LOC Implementation

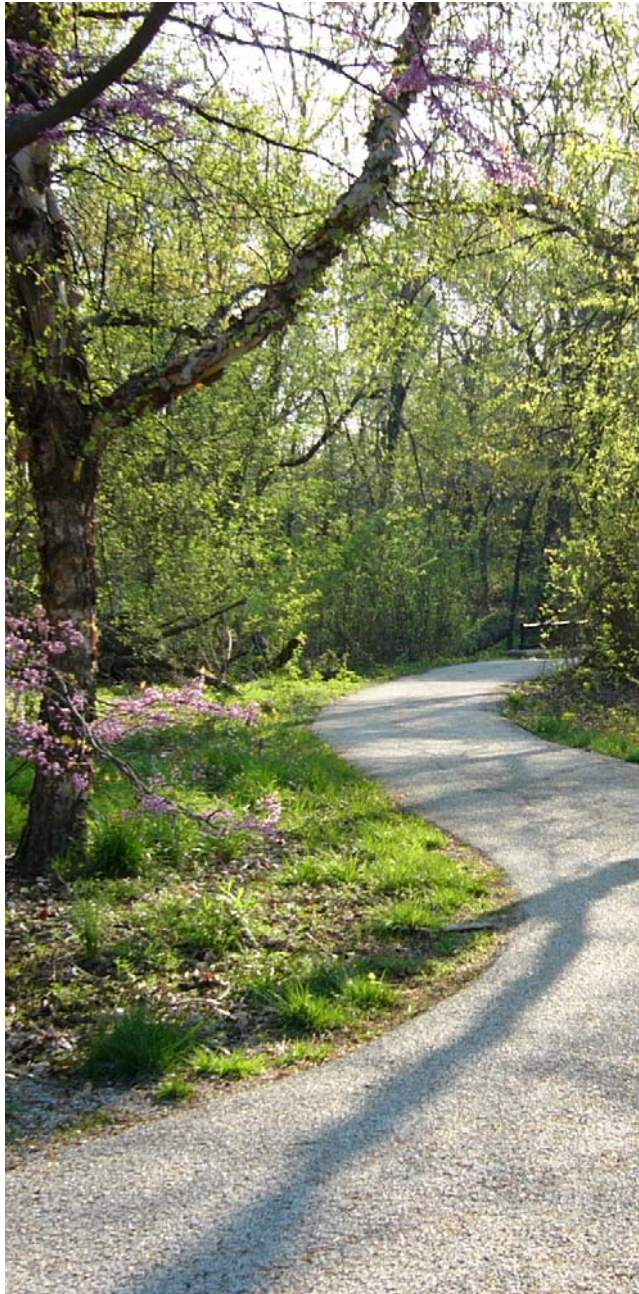
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Introduction



Implementing the Mission:

Great Rivers Greenway makes the St. Louis region a more vibrant place to live, work and play by developing a network of greenways to connect people to their rivers, parks and communities.

Residents of the St. Louis region voted for and invested in a clear, bold vision – a dynamic network of parks and open spaces linked together by greenways, connecting our communities so people can live life outside. The network of greenways strengthens the region’s social, economic and environmental well-being. Community members proudly invest in, care for and champion greenways for years to come. Great Rivers Greenway (GRG) builds greenways so everyone can explore the St. Louis region in different ways. People use the greenways to discover what our vibrant communities have to offer.

Citizen voices from the City of St. Louis, St. Louis County and St. Charles County continue to be a guiding force to the organization’s mission. The mission and implementation methodologies are reviewed, refined and updated approximately every five years in the greenway’s Regional Plan Update. Stakeholder input in the 2016 update emphasized further collaboration to ensure the ongoing promotion and sustainability of the greenway system known as the River Ring.

Great Rivers Greenway’s implementation strategy is organized around Building, Promoting and Sustaining the regional network of existing and proposed greenways. This overall implementation strategy is presented in the recent 2016 Regional Plan Update - Action Plans to Create an Exceptional River Ring Experience. Early efforts of the organization focused on “building” greenways, which continues to be a key initiative. However, with 113-miles of trail completed, the organization has broadened it’s efforts and placed much more emphasis on Promoting and Sustaining green-

ways. The Level of Care (LOC) Guidelines will define expectations of how we manage and maintain the greenway system as a regional asset.

Greenway Level of Care (LOC):

Greenways are outdoor spaces that connect people and places. They are more than a functional trail because their presence impacts our communities and provides personal experiences with the outdoors for both recreation and commuting. Each greenway is unique, with neighborhoods, businesses, parks and rivers to explore. You can take a walk, go for a run, ride a bike, or get some fresh air. As a part of the implementation strategy, greenways must be managed to sustain positive, safe and secure user experiences on the greenways.

The Greenway Level of Care Guidelines will direct resources to protect investments in facilities and ensure greenways are operated and managed in a sustainable manner to provide a positive user experience. The goal of the LOC Guidelines is to promote a consistent, well-maintained and safe greenway system that extends across the many jurisdictional boundaries of our



Greenway Implementation Strategy:
Build - Promote - Sustain.
These LOC Guidelines addresses
SUSTAINING the Greenways.

greenway partners. The goals of this document are to:

- 1) Promote a consistent maintenance level of care on the greenways.
- 2) Provide LOC type guidance during the planning and design of new facilities.
- 3) Identify a process to program for ongoing capital repairs on greenway facilities.
- 4) Assist in disseminating information and providing LOC training related to greenway operation and maintenance.

LOC Guidelines Development

The development of the LOC Guidelines generally followed the multi-step process illustrated on the Project Approach Diagram that included data collection, development of initial thoughts and organization, and then soliciting input from different partner stakeholder groups. This review/coordination process was then repeated several times to create a LOC Guideline document with the partners who will be utilizing this document as part of their day to day operations.

Stakeholder advisory committees were established to assist in the development and evaluation of LOC Guidelines early in the process to assist in building consensus and acceptance of the guidelines. Information was presented to these committees, but most time was spent soliciting input via discussion and at some points via key pad polling. Each of these advisory committees were comprised of 8 to 10 key and representative greenway “partners”.

- Operations & Maintenance Technical Advisory Committee – The focus of this committee was to address and provide input on the routine and seasonal maintenance tasks ranging from mowing and trash removal to tree trimming and snow

removal. Members of the committee were generally comprised of partner park and recreation management staff who focus on maintenance activities.

- Capital Repairs Technical Advisory Committee – The focus of this committee was to address longer term capital repairs, remediation and restora-

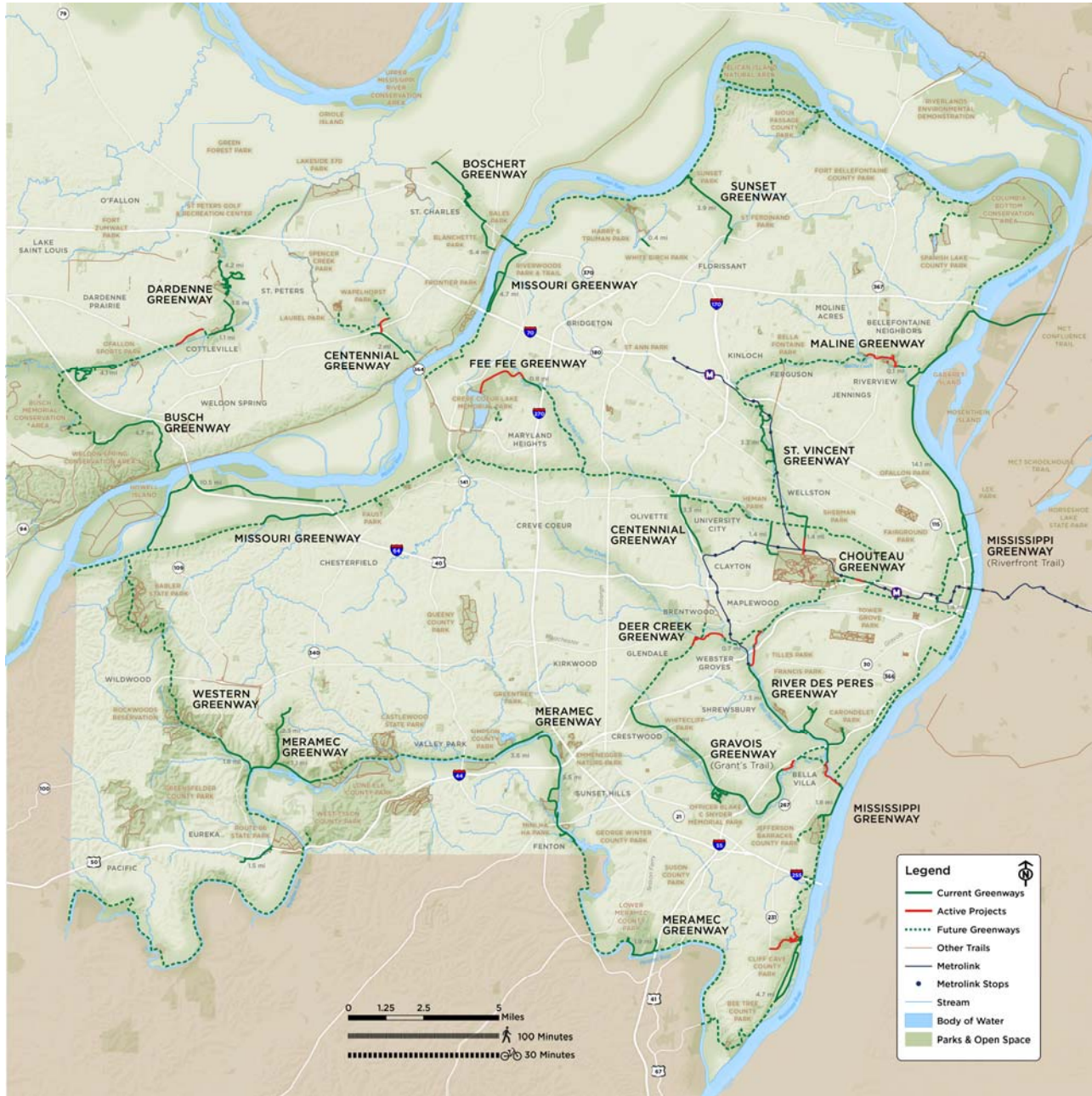
tion of greenway facilities. It was comprised of staff representing both parks and public works to address long term infrastructure capital repairs.

- Policy Advisory Committee (PAC) - This committee provided input related to greenway principles, policies and responsibilities included in the greenway level of care guidelines. It was comprised of management and administrative level staff from key and representative partner/stakeholders, such as park and recreation directors or city/county/agency administration staff and GRG Staff and Board members.
- Design & Construction Peer Review Committee (PRC) – This committee focused on lessons learned from past projects along with Design and Construction Best Management Practices to provide recommendations for the LOC guidelines. The committee was comprised of planners, landscape architects, engineers and construction managers that have worked on prior projects.

The contributions of the individuals and partners representing these committees is greatly appreciated. A listing of these committee members is included in the Appendices.



Greenway Context



Greenway Development

Development of the Great Rivers Greenway system began shortly after voters approved Proposition C in 2000. Since then over 113-miles of trails have been developed on 16 greenways across the City of St. Louis, St. Louis County and St. Charles County. The organization's long term plan identifies development of 45 greenways that will include roughly 600-miles of trails. These greenways traverse existing parks, open space, institutions and rights-of-way with settings ranging from urban hardscapes to more rural natural open space areas. Partnerships have been developed with over 100 organizations that will operate and maintain these facilities.

It is within the context of this broad and diverse range of greenway types and partners that the LOC is established to provide shared, consistent, clear and defined level of care expectation for the entire greenway system. This unified approach will demonstrate to the community how we will care for the greenways as a valuable regional resource.

Completed:
113 Miles on 16 Greenways

Long Term Plan:
600 Miles on 45 Greenways

Life Cycle Perspective

To maintain and sustain greenway function, safety and appearance in a cost effective manner, a holistic approach has been taken to provide consistent high quality facilities that provide a positive user experience. The guidelines have been developed to address the full range of life cycle cost of the various components that comprise the greenway. This approach addresses anticipated level of care requirements for both the ongoing Operations & Maintenance (O&M), as well as the long term Capital Repairs required to maintain facilities providing a positive and safe user experience. Each component guideline includes specific LOC activities separated into O&M requirements and Capital Repairs.

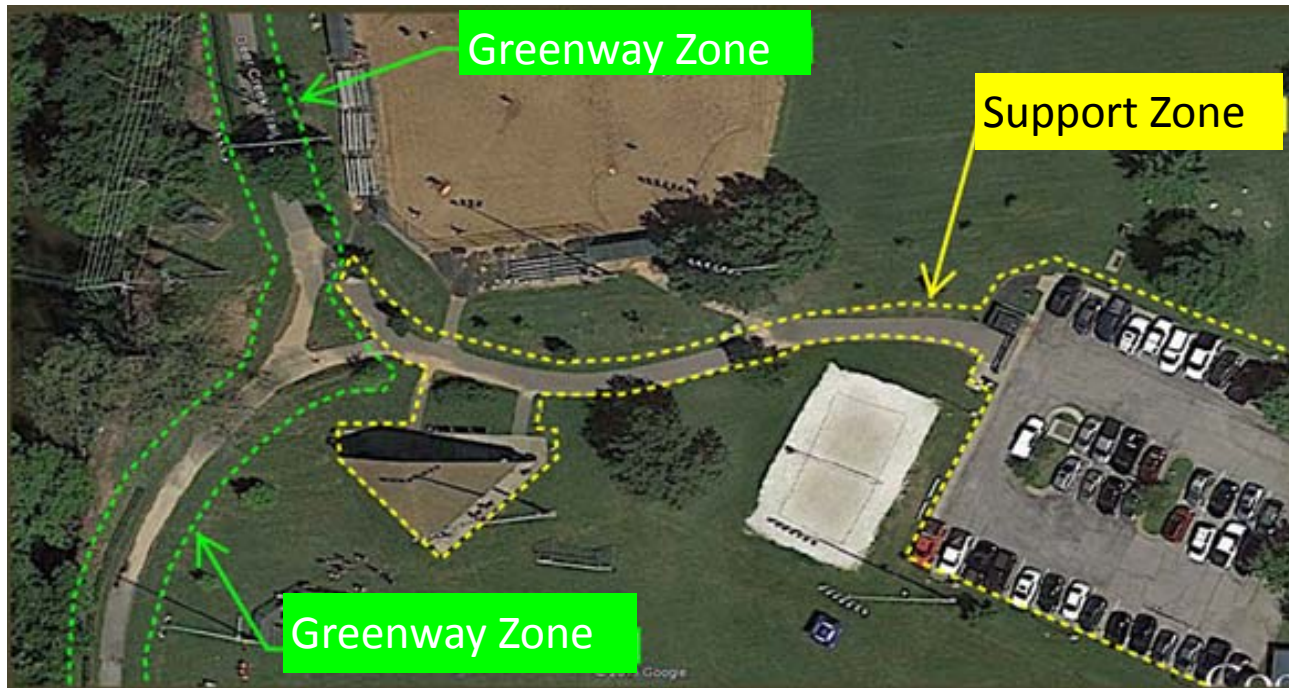
LOC Zones

Identifying the area associated with the greenway impacts the extent covered by these LOC guidelines. Past O&M Cooperation Agreements between Great Rivers Greenway and partners typically provide only a general definition of the greenway. Future agreements will describe in more detail the areas and expectations. The purpose of these guidelines is to insure that each greenway provides consistent high quality facilities that provide a positive user experience, particularly related to function, safety and aesthetics. Within these guideline, the areas impacting greenways have been separated into two zones: Greenway Zone and Support Zone.



The Greenway Zone includes areas, facilities, landscapes and site features developed or included specifically for the greenway or whose primary purpose is serving greenway related activities. The LOC Guidelines are applicable to this zone. Within previously maintained park/open space areas it will be defined as a corridor (ranging from about 50' to 100' wide - more specifically described in the O&M Cooperation Agreements).

The greenway Support Zone includes those areas, facilities, landscapes and site features that are adjacent and/or near the greenway, but not formally covered in the O&M Cooperation Agreement. These are identified here because they can impact greenway user experience and compliance with the LOC guidelines within these areas is encouraged. Examples of this could include: 1) A parking lot whose primary purpose is serving other uses or activities, but also to a limited extent serves as trailhead parking; 2) A park comfort station serving picnic or sports fields and is also serving trail users.



Greenway Assets

Concurrent with the development of these LOC Guidelines, a Greenway Asset Inventory has been undertaken to inventory the facility assets of each greenway. This inventory is GIS based, with input gathered via field GPS units with a sub-meter level of accuracy. Data has been assembled into multiple collection layers including greenways, municipalities, property parcels, flood plains and facilities (i.e. trails by pavement type, bridges, landscape, site furnishings, walls, fencing, lighting, buildings and related elements). Coordination between the LOC Guidelines and Asset Inventory will be required as they are implemented.

O&M Cooperation Agreements

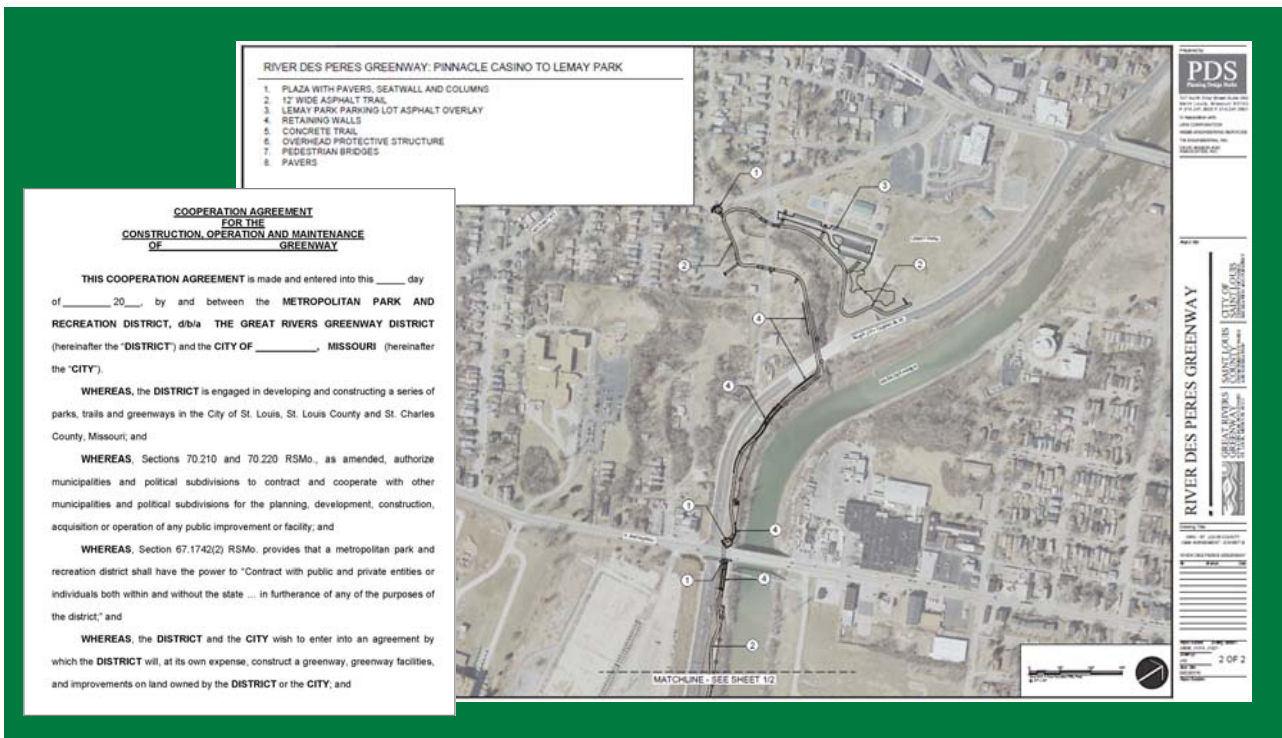
Great Rivers Greenway and their partners enter into agreements outlining the transfer of the developed greenway facilities to the partner and their responsibilities to operate and maintain. In the past these agreements have described in writing the general location and greenway facilities being transferred along with the requirement that the partner will operate and maintain these facilities.

Recently these agreements have more specifically identified the facilities being constructed and transferred (including a graphic attachment illustrating the location of these facilities) and a more detailed listing of routine maintenance to be completed by the part-



ner (i.e. trail surface, lawn grass, landscape plantings, amenities, slope stabilization and stormwater “Best Management Practices” (BMP)). Responsibilities for non-routine maintenance (i.e. capital repair, replacement and catastrophic event damage) is often listed as “to be determined”. Typically responsibility for repair and replacement of the greenway wayfinding signs is borne by Great Rivers Greenway.

It is the intent that future agreements consider referencing the LOC Guideline pages associated with facilities included in the project to define the level of care expectation.



RIVER DES PERES GREENWAY: PINNACLE CASINO TO LEMAY PARK

1. PLAZA WITH PAVERS, SEATWALL AND COLUMN
2. 12' WIDE ASPHALT TRAIL
3. LEMAY PARK PARKING LOT ASPHALT OVERLAY
4. RETAINING WALLS
5. CONCRETE TRAIL
6. OVERHEAD PROTECTIVE STRUCTURE
7. PEDESTRIAN BRIDGES
8. PAVERS

COOPERATION AGREEMENT FOR THE CONSTRUCTION, OPERATION AND MAINTENANCE OF GREENWAY

THIS COOPERATION AGREEMENT is made and entered into this ____ day of _____, 20____, by and between the METROPOLITAN PARK AND RECREATION DISTRICT, d/b/a THE GREAT RIVERS GREENWAY DISTRICT (hereinafter the "DISTRICT") and the CITY OF _____, MISSOURI (hereinafter the "CITY").

WHEREAS, the DISTRICT is engaged in developing and constructing a series of parks, trails and greenways in the City of St. Louis, St. Louis County and St. Charles County, Missouri; and

WHEREAS, Sections 70.210 and 70.220 RSMo., as amended, authorize municipalities and political subdivisions to contract and cooperate with other municipalities and political subdivisions for the planning, development, construction, acquisition or operation of any public improvement or facility; and

WHEREAS, Section 67.174(2) RSMo. provides that a metropolitan park and recreation district shall have the power to "Contract with public and private entities or individuals both within and without the state ... in furtherance of any of the purposes of the district;" and

WHEREAS, the DISTRICT and the CITY wish to enter into an agreement by which the DISTRICT will, at its own expense, construct a greenway, greenway facilities, and improvements on land owned by the DISTRICT or the CITY; and

PDS
PROJECT DESIGN SERVICES
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St. Louis, MO 63104
Phone: (314) 437-2800
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RIVER DES PERES GREENWAY
2 OF 2

LOC Guidelines



Using the LOC Guidelines:

These Greenway LOC Guidelines are unique due to the special partnership that's been established between Great Rivers Greenway and its partners. A simplified summary is that GRG plans, designs and builds the greenways and the partners operate and maintain the greenways. However, the residents of the St. Louis region expect much more coordination, cooperation and consistency than that simple statement provides. The implementation of the LOC must address the interest of partners and their staff while providing a consistent user experience. Both community and regional goals need to be addressed while working within the available resource levels of different communities.

A primary focus of this document is to provide the specific guidelines that outline the level of care requirements for greenway facilities to provide a consistent user experience. In addition, this LOC document also addresses how the LOC will be utilized in both Pre-Construction Activities and On-Going Coordination and programming for long term needs. The application and utilization of the LOC occurring in each of these three cycles is illustrated on the graphic below and described in the following paragraphs.

- 1) LOC Pre-Construction Activities. Soliciting partner input and establishing expectations early is the process, particularly related to LOC requirements are emphasized in the LOC Guidelines.
 - a) Planning & Design New Facilities

- b) Operation & Maintenance Cooperation Agreement

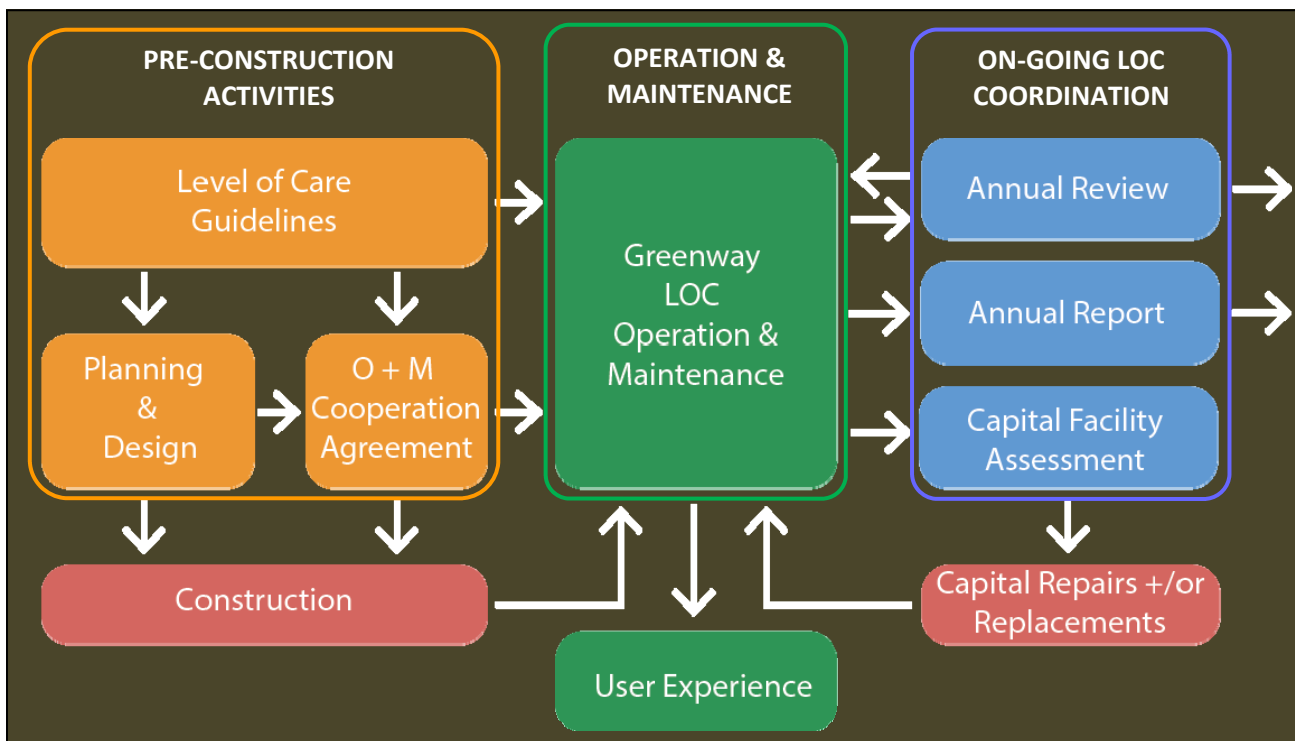
- 2) Operation & Maintenance. These guidelines summarize the specific requirements and expectations for the greenways. They are organized into twelve general facility groups, each of which have LOC descriptions for specific facility types. These guidelines address Operation and Maintenance requirements, Capital Repairs and required ongoing LOC Evaluations.

- 3) On-Going LOC Coordination. Viewed as an evaluation and communication tool, this coordination will assist in assessing LOC maintenance levels, resource allocations, identifying opportunities and needed improvements and communicating lessons learned between partners. The three components of this coordination are:

- a) Annual Reviews
- b) Annual Reports
- c) Capital Facility Assessments

Each LOC Guideline is formatted onto a separate page in a consistent format. The format includes five sections, including:

- 1) *GUIDELINE NAME & #* - The specific name and identifying reference number are provided in the upper left corner of the formatted page.
- 2) Description and Context - The description of the item addressing relative size, location, material, context and relationship to site conditions and other guideline items.
- 3) *OPERATIONS & MAINTENANCE* - The O&M requirements are separated into three sub-categories:



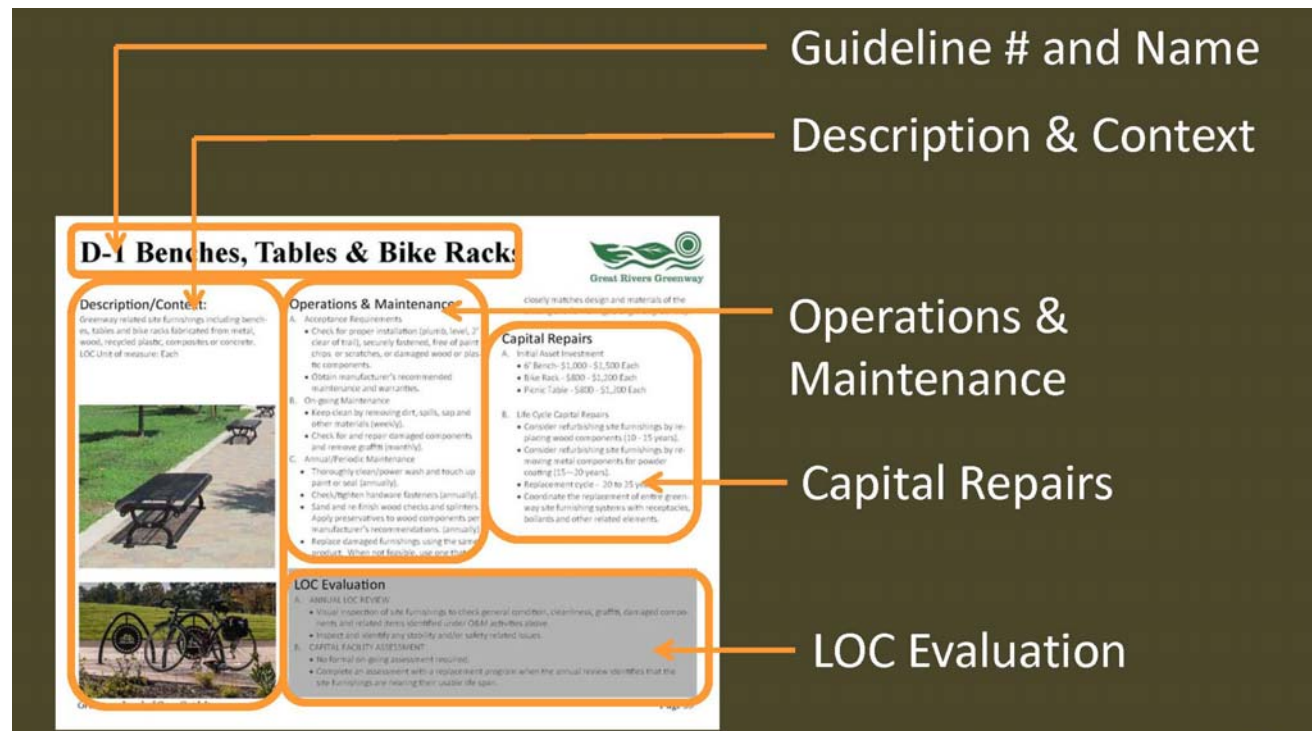
- a. Acceptance Requirements - A listing of items that are typically addressed when the completed construction project is accepted from the Contractor and transferred to the partner. This includes items ranging from warranties and As-Built Drawings to acceptable condition of completed construction. Typically the O&M Cooperation Agreement identifies the timing of this transfer to occur at substantial completion of construction.
- b. On-Going Maintenance - A listing of the typical maintenance activities and/or site/facility conditions that are required on a regular ongoing basis to meet LOC expectations. Examples range from litter patrol or sweeping gravel to mowing grass.
- c. Annual/Periodic Maintenance - A listing of standard maintenance practices required on more of an annual or long range basis. Examples of such might range from dethatching or fertilizing lawns to touch up painting, calking joints to lamp replacing.

4) **CAPITAL REPAIRS** - This section addressed the need to plan and program for anticipated capital repairs required to maintain facilities in highly functional and safe conditions. This task will have a broad range of requirements based on the type of facility. Some greenway elements may require little to no capital repair consideration, while other may have significant needs.

- a. Asset Investment - This provides a description of the construction and/or installation required to develop the asset. Additional guidance is provided in Appendix I of the general cost in current dollars to develop, construct or install this asset today. Because site conditions can vary significantly, this should not be taken as an estimated replacement cost. However

- having a general value like this can assist in evaluating facilities to justifying (or not) required maintenance, capital repair, renovation or replacement. Cost provided are based on contracting the required work and not completed by in-house staff.
- b. Life Cycle Capital Repairs. The longer term repairs to keep the facilities in a condition that promote a consistent, well maintained and safe greenway system to provide a positive user experience. These can range from pavement overlays or deck replacements to bridge painting. Additional guidance is provided in Appendix II of the general cost in current dollars to complete capital repairs on this asset.

- 5) LOC Evaluations -
 - a. Annual LOC Reviews. An on-site walk thru review by Great Rivers Greenway and the partner conducted annually to assess general existing conditions of all aspects and facilities on the greenway. These guidelines include an Annual LOC Review Form.
 - b. Capital Facility Assessments. These are more formal assessments completed on facilities that typically require capital repairs over the years to maintain functionality and safety. Examples include formal pavement reviews, bridge inspections or wall conditions.



The diagram illustrates a document titled "D-1 Benches, Tables & Bike Racks" with the Great Rivers Greenway logo. The document is divided into several sections, each highlighted with an orange box and a callout line pointing to a label on the right:

- Guideline # and Name:** Points to the title "D-1 Benches, Tables & Bike Racks".
- Description & Context:** Points to the "Description/Context:" section, which includes text about greenway-related site furnishings and a photo of a bench.
- Operations & Maintenance:** Points to the "Operations & Maintenance" section, which includes sub-sections for Acceptance Requirements, Ongoing Maintenance, and Annual/Periodic Maintenance.
- Capital Repairs:** Points to the "Capital Repairs" section, which includes sub-sections for Initial Asset Investment and Life Cycle Capital Repairs.
- LOC Evaluation:** Points to the "LOC Evaluation" section, which includes sub-sections for Annual LOC Review and Capital Facility Assessment.

LOC Guidelines



A - Pavements

A-1 Asphalt Trail



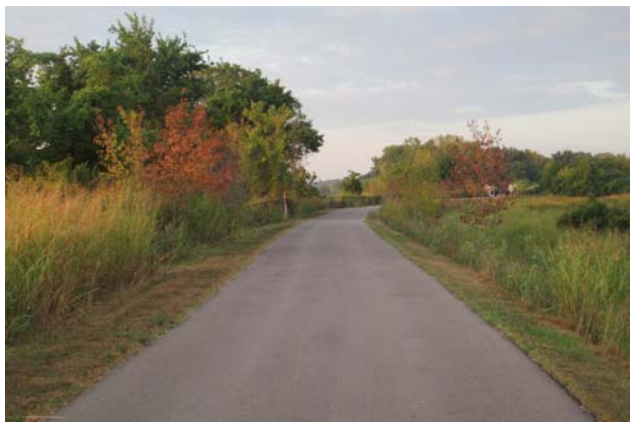
Description/Context:

Typically a 12' wide asphalt paved trail designed to meet AASHTO and ADA requirements (i.e. <5% profile slope and <2% cross slope). Soil conditions and anticipated vehicle loading requirements dictate pavement design and thickness. (Asphalt is a mixture of liquid asphalt and graded aggregates.)

LOC Unit of Measure: Per Square Yard (SY)

*AASHTO - American Association of State Highway Transportation Officials

*ADA - American with Disabilities Act



Operations & Maintenance

- A. Acceptance Requirements
 - Verify proper installation per contract documents, punch list items completed/accepted.
 - Verify ADA compliance including profile and cross slope grades.
 - Verify positive drainage off trail—no puddles after rain.
 - Review maximum vehicle loading type the pavement was designed to accommodate.
- B. On-going Maintenance
 - Remove trash/debris and sweep regularly to maintain clean/safe surface (weekly).
 - Trim pavement edges (monthly).
- C. Annual/Periodic Maintenance
 - Repair/fill cracks (annually).
 - Repair damaged pavements when identified (i.e. potholes, root bumps, edge sluffing).
 - Remove debris, eroded soils or flood silt deposition after storm events.

Capital Repairs

- A. Asset Investment - Development cost typically include site grading, aggregate base and asphalt pavement.
- B. Life Cycle Capital Repairs
 - Seal Coat Maintenance (5 - 7 years).
 - Rehabilitation - Mill and Overlays (10 - 15 Years).
 - Reconstruction including removal of existing asphalt, supplement base material and new asphalt (25 - 30 Years).

LOC Evaluation

- A. ANNUAL LOC REVIEW: Visual inspection of pavement system:
 - Is trail clean, clear of debris and no ponding water?
 - Are there cracks or damaged pavement? Are edge conditions strong and firm with no raveling?
 - Are there vandalism or safety concerns?
- B. CAPITAL FACILITY ASSESSMENT
 - Complete formal inspection and report of structural integrity of pavement system by a qualified professional or technician experienced in pavement evaluation. Follow recognized standard inspection procedures (i.e. PASER *Manual - Asphalt Roads* or ASTM D6433 *Std. Practice for Road and Parking Lot Pavement Conditions Index Surveys*) Frequency - Every 1 to 3 years.

A-2 Concrete Trails, Walks & Plazas



Description/Context:

Typically a 12' wide concrete paved trail designed to meet AASHTO and ADA requirements (i.e. <5% profile slope and <2% cross slope). Soil conditions and anticipated vehicle loading requirements dictate pavement design and thickness. (Concrete is a mixture of cement, fine and coarse aggregates used as a paving material)

LOC Unit of Measure: Per Square Yard (SY)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify proper installation per contract documents, punch list items completed/accepted.
 - Verify ADA compliance including profile and cross slope grades.
 - Verify positive drainage off trail—no puddles after rain.
 - Review maximum vehicle loading type the pavement was designed to accommodate.
- B. On-going Maintenance
 - Remove trash/debris and sweep regularly to maintain clean/safe surface (weekly).
 - Trim pavement edges (monthly).
- C. Annual/Periodic Maintenance
 - Repair and caulk expansion joints (bi-annual).
 - Repair damaged pavements when identified. (i.e. large cracks, uneven joints, potholes, root damage)
 - Remove debris, eroded soils or flood silt deposition after storm events.

Capital Repairs

- A. Asset Investment - Development cost typically include site grading, aggregate base and concrete pavement.
- B. Life Cycle Capital Repairs
 - Reconstruction including removal of existing concrete, supplement base material and new concrete pavement (25 - 50 Years).

LOC Evaluation

- A. ANNUAL LOC REVIEW: Visual inspection of pavement system:
 - Is trail clean, clear of debris and no ponding water?
 - Are there cracks or damaged pavement? Are edge conditions strong and firm with no raveling?
 - Are there vandalism or safety concerns?
- B. CAPITAL FACILITY ASSESSMENT
 - Complete formal inspection and report of structural integrity of pavement system by a qualified professional or technician experienced in pavement evaluation. Follow recognized standard inspection procedures (i.e. PASER Manual - Concrete Roads or ASTM D6433 *Std. Practice for Road and Parking Lot Pavement Conditions Index Surveys*) Frequency - Every 1 to 3 years.

A-3 Gravel Trail



Description/Context:

Typically a 12' wide gravel trail comprised of two different courses of graded aggregate over compacted subgrade. The surface course should have fines to bind aggregates. Soil conditions and anticipated vehicle loading requirements dictate design and thickness. Gravel trails will require continual surface dressing to maintain ADA accessibility and bike safety.

LOC Unit of Measure: Per Square Yard (SY)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify proper installation per contract documents, punch list items completed/accepted.
 - Verify whether the gravel trail was developed as ADA compliant, which impacts on-going maintenance requirements.
 - Verify positive drainage off trail—no puddles after rain.
 - Review maximum vehicle loading type the pavement was designed to accommodate.
- B. On-going Maintenance
 - Remove trash/debris (weekly).
 - Finish grade gravel to maintain smooth surface free of ruts, rills and holes (bi-monthly).
- C. Annual/Periodic Maintenance
 - Maintaining ADA accessibility and bike safety will require regular maintenance of the gravel surface.
 - Repair and/or rehab gravel surface by adding surface fine aggregate fill to re-establish crown and address wash boarding, potholes

- and rutting . The grader moldboard should be angled to pull aggregate to center of trail and maintain surface drainage (annually).
- Remove debris, eroded soils or flood silt deposition after storm events.
- Repair areas damaged by roots.

Capital Repairs

- A. Asset Investment - Development cost typically include site grading, aggregate base and surface courses.
- B. Life Cycle Capital Repairs
 - Long term life cycle capital repairs are not needed if gravel trail is maintained in good condition.
 - Storm events of other events may require more significant repair and or replacement of the gravel trail.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of gravel pavement checking if trail is clean; clear of debris; no ponding water; firm edge conditions; no damage, wash boarding or rutting; and no vandalism or safety concerns.
- B. CAPITAL FACILITY ASSESSMENT
 - Complete formal inspection and report of structural integrity of pavement system by a qualified professional or technician experienced in pavement evaluation. Follow recognized standard inspection procedures (i.e. *PASER Manual - Gravel Roads*) Frequency - Every 1 to 3 years.

A-4 Unit Pavers



Description/Context:

Standardized manufactured paver units designed specifically as pavement systems. Paver materials include concrete, clay (bricks) and sometimes asphalt units in various sizes and shapes. Pavers are most often laid over a prepared base consisting of graded aggregates, but sometimes over concrete or asphalt. Depth of aggregate base and units varies based on loading requirements.

LOC Unit of Measure: Per Square Yard (SY)



Operations & Maintenance

- A. Acceptance Requirements
 - Verify proper installation per contract documents, punch list items completed/accepted.
 - Verify surface and joint uniformity and ADA compliance (profile and cross slope grades).
 - Verify positive drainage off trail—no puddles.
 - Review maximum vehicle loading type the pavement was designed to accommodate.
- B. On-going Maintenance
 - Remove trash/debris and sweep regularly to maintain clean/safe surface (weekly).
 - Manual removal or spot spray vegetative growth with a broad spectrum herbicide such as glyphosate (bi-monthly).
 - Trim pavement edges (monthly).
- C. Annual/Periodic Maintenance
 - Repair damaged pavement. (i.e. depressions, uneven joints, root damage)
 - Consider applying pre-emergent herbicide to areas with persistent vegetative growth

(annually - early spring).

- Remove debris, eroded soils or flood silt deposition after storm events.
- When joint sand is lost or becomes infiltrated with silts, the top of joints should be sweep or blown and new polymeric binder sand installed. (as needed)
- If efflorescence occurs use cleaners specifically made for paver type.

Capital Repairs

- A. Asset Investment - Development cost typically include site grading, aggregate base and pavers.
- B. Life Cycle Capital Repairs
 - Paver unit life exceeds 50 years.
 - The paver system life cycle is dependent on the stability of base and subgrade. When these are compromised, reconstruction requires removal and treatment of subgrade, new base installation and reinstalling pavers (As needed).

LOC Evaluation

- A. ANNUAL LOC REVIEW: Visual inspection of pavement system:
 - Is trail clean, clear of debris and no ponding water?
 - Is there any paver settlement or damaged pavers. Are edge conditions strong and firm?
 - Are there vandalism or safety concerns?
- B. CAPITAL FACILITY ASSESSMENT
 - Complete formal inspection and report of structural integrity of pavement system by a qualified professional or technician experienced in pavement evaluation. Follow recognized standard inspection procedures (i.e. PASER Manual - *Brick/Block Roads* or *ASTM E2840 Std. Practice for Pavement Condition Index Surveys for Interlocking Conc. Roads and Parking Lots*) Frequency - Every 1 to 3 years.

A-5 Permeable Pavers



Description/Context:

Standardized manufactured paver units designed specifically as pavement systems with sufficient surface voids to allow water infiltration. Paver materials include concrete, clay (bricks) and sometimes asphalt units in various sizes and shapes. Pavers must be laid over a prepared aggregate base and subbase that allows the movement of stormwater through the system as infiltration into the ground. In addition to reducing runoff, this effectively traps suspended solids and filters pollutants from the water. Depth of aggregate base system and units varies based on both stormwater and loading requirements.

LOC Unit of Measure: Per Square Yard (SY)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify proper installation per contract documents, punch list items completed/accepted.
 - Verify surface and joint uniformity and ADA compliance (profile and cross slope grades).
 - Verify permeability and positive drainage off trail—no puddles.
 - Review maximum vehicle loading type the pavement was designed to accommodate.
- B. On-going Maintenance
 - Remove trash/debris and sweep regularly to maintain clean/safe surface (weekly).
 - Manual removal or spot spray vegetative growth with a broad spectrum herbicide such as glyphosate (bi-monthly).
 - Trim pavement edges (monthly).
- C. Annual/Periodic Maintenance
 - Suction vacuum joints and replace lost joint materials (annually)

- Repair damaged pavement. (i.e. depressions, uneven joints, root damage)
- Apply pre-emergent herbicide to areas with persistent vegetative growth (early spring).
- Remove debris, eroded soils or flood silt deposition after storm events.
- If efflorescence occurs use cleaners specifically made for paver type.

Capital Repairs

- A. Asset Investment - Development cost typically include site grading, open graded aggregate bases and pavers.
- B. Life Cycle Capital Repairs
 - Paver unit life exceeds 50 years.
 - The paver system life cycle is dependent on the stability of base and subgrade. When these are compromised, reconstruction requires removal and treatment of subgrade, new base installation and reinstalling pavers (As needed).

LOC Evaluation

- A. ANNUAL LOC REVIEW: Visual inspection of pavement system:
 - Is trail clean, clear of debris and no ponding water? Are there vandalism or safety concerns?
 - Is there any paver settlement or damaged pavers. Are edge conditions strong and firm?
 - Verify permeability, no ponding water and sub-drainage system conveyance of stormwater.
 - For MSD permeable pavement BMP's, complete MSD annual inspection and maintenance report.
- B. CAPITAL FACILITY ASSESSMENT
 - Complete formal inspection and report of structural integrity of pavement system by a qualified professional or technician experienced in pavement evaluation. Follow recognized standard inspection procedures (i.e. *PASER Manual - Brick/Block Roads* or *ASTM E2840 Std. Practice for Pavement Condition Index Surveys for Interlocking Conc. Roads and Parking Lots*). Frequency - Every 1 to 3 years.

A-6 Permeable Concrete



Description/Context:

Permeable concrete utilizes a special concrete mixture, base and subbase that allows the movement of stormwater through the surface. Permeable concrete must be poured over a prepared aggregate base and subbase that allows the storage and movement of stormwater through the system as infiltration into the ground. In addition to reducing runoff, this effectively traps suspended solids and filters pollutants from the water. Depth of aggregate base and pavement system varies based on both stormwater and loading requirements.

LOC Unit of Measure: Per Square Yard (SY)

Operations & Maintenance

- A. Acceptance Requirements
 - Verify proper installation per contract documents, punch list items completed/accepted.
 - Verify surface uniformity and ADA compliance (profile and cross slope grades).
 - Verify permeability and positive drainage off trail—no puddles.
 - Review maximum vehicle loading type the pavement was designed to accommodate.
- B. On-going Maintenance
 - Remove trash/debris and sweep regularly to maintain clean/safe surface (weekly).
 - Trim pavement edges (monthly).
- C. Annual/Periodic Maintenance
 - Suction vacuum (annually)
 - Repair damaged pavement. (i.e. depressions, cracks, root damage)
 - Remove debris, eroded soils or flood silt deposition after storm events.

Capital Repairs

- A. Asset Investment - Development cost typically include site grading, open graded aggregate bases and permeable mix concrete pavement.
- B. Life Cycle Capital Repairs
 - Permeability dependent on keeping infiltration clean and not clogged. Suction vacuum can only address upper 1"-2". Clogging below that requires removal and reconstruction. Suction vacuuming on regular schedule and after inundations is critical.
 - Reconstruction including removal of existing concrete and base, install of new base material and concrete (20 - 30 Years).



Greenway Level of Care Guidelines

LOC Evaluation

- A. ANNUAL LOC REVIEW: Visual inspection of pavement system:
 - Is trail clean, clear of debris and no ponding water? Are there vandalism or safety concerns?
 - Is there any pavement settlement or damage. Are edge conditions strong and firm?
 - Verify permeability, no ponding water and sub-drainage system conveyance of stormwater.
 - For MSD permeable pavement BMP's, complete MSD annual inspection and maintenance report.
- B. CAPITAL FACILITY ASSESSMENT
 - Complete formal inspection and report of structural integrity of pavement system by a qualified professional or technician experienced in pavement evaluation. Follow recognized standard inspection procedures (i.e. *PASER Manual - Concrete Roads* or *ASTM D6433 Std. Practice for Road and Parking*)

A-7 Permeable Asphalt



Description/Context:

Permeable asphalt utilizes specialized asphalt mixture and installation methods that allow the movement of stormwater through the asphalt into the aggregate base/subbase, which have significant voids for the flow and storage of stormwater. In addition to reducing runoff, this effectively traps suspended solids and filters pollutants from the water. Depth of aggregate base and pavement system vary based on both stormwater and loading requirements.

LOC Unit of Measure: Per Square Yard (SY)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify proper installation per contract documents, punch list items completed/accepted.
 - Verify surface uniformity and ADA compliance (profile and cross slope grades).
 - Verify permeability and positive drainage off trail—no puddles.
 - Review maximum vehicle loading type the pavement was designed to accommodate.
- B. On-going Maintenance
 - Remove trash/debris and sweep regularly to maintain clean/safe surface (weekly).
 - Trim pavement edges (monthly).
- C. Annual/Periodic Maintenance
 - Suction vacuum (annually)
 - Repair damaged pavement. (i.e. depressions, cracks, root damage)
 - Remove debris, eroded soils or flood silt deposition after storm events.

Capital Repairs

- A. Asset Investment - Development cost typically include site grading, open graded aggregate bases and permeable mix asphalt pavement.
- B. Life Cycle Capital Repairs
 - Permeability dependent on keeping infiltration clean and not clogged. Suction vacuum can only address upper 1"-2". Clogging below that requires removal and reconstruction. Suction vacuuming on regular schedule and after inundations is critical.
 - Reconstruction including removal of existing asphalt and base, install of new base material and concrete (15 - 20 Years).

LOC Evaluation

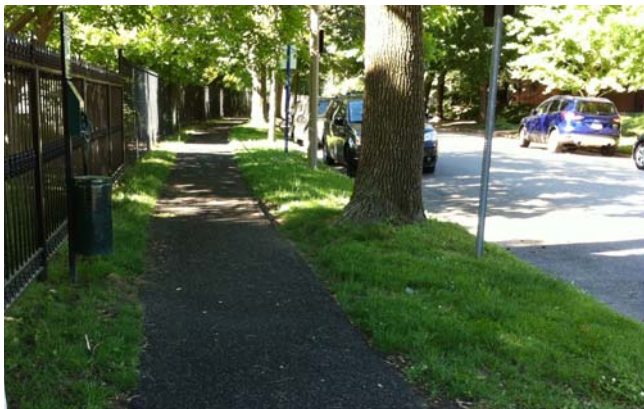
- A. ANNUAL LOC REVIEW: Visual inspection of pavement system:
 - Is trail clean, clear of debris and no ponding water? Are there vandalism or safety concerns?
 - Is there any pavement settlement or damage. Are edge conditions strong and firm?
 - Verify permeability, no ponding water and sub-drainage system conveyance of stormwater.
 - For MSD permeable pavement BMP's, complete MSD annual inspection and maintenance report.
- B. CAPITAL FACILITY ASSESSMENT
 - Complete formal inspection and report of structural integrity of pavement system by a qualified professional or technician experienced in pavement evaluation. Follow recognized standard inspection procedures (i.e. *PASER Manual - Asphalt Roads* or *ASTM D6433 Std. Practice for Road and Parking Lot Pavement Conditions Index Surveys*). Frequency - Every 1 to 3 years.

A-8 Permeable Rubber

Description/Context:

Permeable rubber is a special rubber pavement system that allow the movement of air and storm-water through the surface. The flexible rubber pavement (2" - 3" thick) can be installed directly over subgrade. Therefore it's often used as a pavement within the root zone of large trees to minimize impacts. The surfacing is also appreciated by runners due to it's resilience. If installed with the proper base, it can be used as a stormwater BMP, however it's not on the MSD approved list.

LOC Unit of Measure: Per Square Yard (SY)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify proper installation per contract documents, punch list items completed/accepted.
 - Verify surface uniformity and ADA compliance (profile and cross slope grades).
 - Verify permeability and positive drainage off trail—no puddles.
 - Review maximum vehicle loading type the pavement was designed to accommodate.
- B. On-going Maintenance
 - Remove trash/debris and sweep regularly to maintain clean/safe surface (weekly).
 - Trim pavement edges (monthly).
- C. Annual/Periodic Maintenance
 - Suction vacuum (annually)
 - Repair damaged pavement. (i.e. depressions, cracks, root damage)
 - Remove debris, eroded soils or flood silt deposition after storm events.

Capital Repairs

- A. Asset Investment - Development cost typically include site grading, open graded aggregate bases and permeable shredded rubber surfacing.
- B. Life Cycle Capital Repairs
 - Anticipated life cycle is 10 - 20 years (similar to playground surfacing) and is very dependent on maintenance. When silts, sands, debris and composting materials clog the voids, water is trapped and freeze-thaw cycles can cause damage. Suction vacuuming on regular schedule and after inundations is critical.
 - Reconstruction including removal of existing pavement and base, install of new base material and concrete (15 - 20 Years).

LOC Evaluation

- A. ANNUAL LOC REVIEW: Visual inspection of pavement system:
 - Is trail clean, clear of debris and no ponding water? Are there vandalism or safety concerns?
 - Is there any pavement settlement or damage. Are edge conditions strong and firm?
 - Verify permeability, no ponding water and sub-drainage system conveyance of stormwater.
 - For MSD permeable pavement BMP's, complete MSD annual inspection and maintenance report.
- B. CAPITAL FACILITY ASSESSMENT
 - Complete formal inspection and report of structural integrity of pavement system by a qualified professional or technician experienced in permeable rubber pavement evaluation. Follow in recognized standard inspection procedures. Frequency - Every 1 to 3 years.

LOC Guidelines



B - Bridges & Boardwalks

B-1 Pre-Fabricated Steel Bridges



Description/Context:

Modular prefabricated steel structures designed to accommodate primarily pedestrians and cyclists. In most cases these will also serve small maintenance and emergency vehicular loads. Structure includes both sub-structure components and super-structure components.

LOC Unit of Measure: Per Linear Feet (LF)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify installation per contract documents and punch list items completed/accepted.
 - Obtain file copy of design & shop drawings and calculations (hard copy/digital).
 - Verify installation of bollards and load bearing capacity signs at both ends of bridge.
 - Obtain Warranty w/dates (as applicable).
- B. On-going Maintenance
 - Remove trash/debris and sweep as needed to maintain clean surface (weekly).
 - Check for damage, graffiti and trip hazards (monthly).
- C. Annual/Periodic Maintenance
 - Clean all surfaces - pressure wash and/or brush as needed (annually).
 - Paint or repair steel coatings per manufacturer's recommendations (bi-annual).
 - Caulk un-welded seams needing repair with

high quality clear exterior silicone caulk (annually).

- D. Event Based Maintenance
 - After major storm events, conduct a visual check of structural components, abutments, piers, rip rap and for any tree, limb or debris hung up under bridge. If damage is observed complete a formal structural inspection by a Professional Engineer (PE).

Capital Repairs

- A. Asset Investment (varies - Programmatic Level).
 - Development cost typically include sub-structure (piles or footings, abutments and piers/bents) and superstructure (fabricated steel bridge, decking and railings).
- B. Life Cycle Capital Repairs
 - *Rehabilitation - Coating system*
 - *Rehabilitation - Decking system*
 - *Rehabilitation - Structural Components*
 - 30-40 years

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of bridge superstructure components including decking condition, fasteners, expansion joints, walls, drainage systems and coatings as well as checking for trip hazards, damage and/or graffiti. Confirm fence/railing systems are intact. Check for rust and/or chipped coating system.
 - Visual inspection of abutments, walls and piers looking for erosion, cracks, damage and trees, limbs or debris hung onto these structures.
- B. CAPITAL FACILITY ASSESSMENT (Every 2 – 3 years)
 - Formal structural inspection and reporting of structural components of bridge by a MO. licensed structural engineer (PE) following standardized inspection procedures (i.e. Federal Highway's National Bridge Inspection Standards, MoDOT, AASHTO or other similar inspection policy guides).

B-2 Concrete Bridges

Description/Context:

Cast-in-place or pre-cast concrete bridges designed to accommodate primarily pedestrians and cyclists. In most cases these will also serve small maintenance and emergency vehicular loads. For this document we are addressing both the sub-structure components and super-structure components of the bridge.

LOC Unit of Measure: Per Linear Feet (LF)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify installation per contract documents and punch list items completed/accepted.
 - Obtain design drawings, shop drawings & design calculations (hard copy and digital).
 - Verify installation of bollards and load bearing capacity signs at both ends of bridge.
 - Obtain Warranty w/dates (as applicable)
- B. On-going Maintenance
 - Remove trash/debris and sweep as needed to maintain clean surface (weekly).
 - Check for damage, graffiti and trip hazards (monthly).
- C. Annual/Periodic Maintenance
 - Clean all surfaces - pressure wash and/or brush as needed. (annually).
 - Paint or repair fence/railing system coatings per manufacturer's recommendations (bi-

annually).

- Caulk joints needing repair with high quality clear exterior silicone caulk (annually).
- D. Event Based Maintenance
 - After major storm events, conduct a visual check of structural components, abutments, piers, rip rap and for any tree, limb or debris hung up under bridge . If damage is observed complete a formal structural inspection by a Professional Engineer (PE).

Capital Repairs

- A. Asset Investment - Development cost typically include sub-structure (piles or footings, abutments and piers/bents) and superstructure (concrete bridge, decking and railings).
- B. Life Cycle Capital Repairs
 - *Rehabilitation - Micro-Surfacing*
 - *Rehabilitation - Structural Components*
 - 40-50 years

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of bridge components including decking condition, fasteners, expansion joints, walls, drainage systems and coatings as well as checking for trip hazards, damage and/or graffiti. Confirm fence/railing systems are intact. Check for rust and/or chipped coating system.
 - Visual inspection of abutments, walls and piers looking for erosion, cracks, damage and trees, limbs or debris hung onto these structures.
- B. CAPITAL FACILITY ASSESSMENT (Every 2 – 3 years)
 - Formal structural inspection and reporting of structural components of bridge by a MO. licensed structural engineer (PE) following standardized inspection procedures (i.e. Federal Highway's National Bridge Inspection Standards, MoDOT, AASHTO or other similar inspection policy guides).

B-3 Boardwalks & Decks



Description/Context:

A walk or trail constructed of planking designed to accommodate pedestrians and cyclist loading (typically not vehicles) . Structure includes both sub-structure components and super-structure components.

LOC Unit of Measure: Per Square Feet (SF)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify installation per contract documents and punch list items completed/accepted.
 - Obtain design drawings, shop drawings & design calculations (hard copy and digital).
 - Verify installation of bollards and load bearing capacity signs at both ends of bridge.
 - Obtain Warranty w/dates (as applicable).
- B. On-going Maintenance
 - Remove trash/debris and sweep as needed to maintain clean surface (weekly).
 - Check for damage, graffiti and trip hazards (monthly).
- C. Annual/Periodic Maintenance
 - Clean all surfaces - pressure wash and/or brush as needed. (annually).
 - Paint or repair component decking and fence/railing system coatings per manufacturer's recommendations (annually).

- Caulk joints needing repair with high quality clear exterior silicone caulk (annually).
- D. Event Based Maintenance
 - After major storm events, conduct a visual check of structural components, abutments, piers, rip rap and for any tree, limb or debris hung up under bridge . If damage is observed complete a formal structural inspection by a Professional Engineer (PE).

Capital Repairs

- A. Asset Investment - Development cost typically include footings, abutments/post/piers, decking and railings.
- B. Life Cycle Capital Repairs
 - Wood Decking Replacement - 10-20 years
 - Wood Structural Component Replacement - 20 - 40 years

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of boardwalk and decks should include decking condition, fasteners, walls, drainage systems and coatings as well as checking for trip hazards, damage and/or graffiti. Confirm fence/railing systems are intact.
 - Visual inspection of piers, abutments and adjacent retaining walls to identify deterioration, erosion, damage and trees, limbs or debris hung onto these structures.
- B. CAPITAL FACILITY ASSESSMENT (Every 2 – 3 years)
 - Formal structural inspection and report of structure by a MO. licensed structural engineer (PE) following standardized inspection procedures.

LOC Guidelines



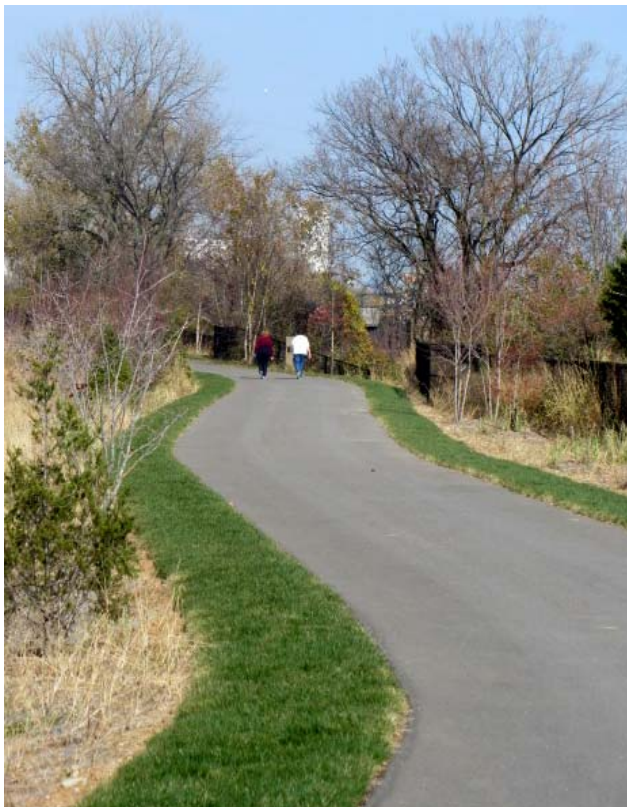
C - Lawn & Landscape

C-1 Lawn Shoulder

Description/Context:

Lawn shoulders are mowed grass strips along both sides of a greenway trail in open space areas. Generally these should be maintained at a width of 3' to 5' (2' minimum) as a safety or buffer area along the trails.

LOC Unit of Measure: Per 100 Linear Feet (CLF) of Trail.



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify shoulder width, slope (<1:6), smooth grades, grass established per contract documents, punch list items completed/accepted.
- B. On-going Maintenance
 - Pickup trash/debris (weekly)
 - Mow at a 3" height (weekly) - remove grass clumps from lawn and sweep/blow clippings off trails.
- C. Annual/Periodic Maintenance
 - Trim grass from along pavements, fences, walls, signs and other features (quarterly).
 - Fertilize as needed (fall)
 - Apply herbicide and insecticide as needed.
 - Preventive herbicide in early spring.
 - Contact herbicides and insecticides thru year per manufacturer's recommendations.
 - Maintain a list of damaged or dead grass areas and reseed or sod in early fall or spring (bi-annually).

Capital Repairs

- A. Asset Investment - Development cost typically include finish grading, soil amendments, seed bed preparation, seeding (or sodding) and establishment period maintenance.
- B. Life Cycle Capital Repairs
 - Long term capital repair or replacement cost are normally not required with good maintenance practice to keep grass in healthy growing condition.
 - Issues may arise (ie. disease, drought, wear from events) when grass lawn areas will need repair and require the following:
 - Lawn Overseeding - short mow/rake and drill seed.
 - Lawn Restoration - herbicide treatment, mow/rake, core aeration, fertilize, drill/disk seed, drag & mulch.
 - Lawn Replacement (after regrading or erosion repair).

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection to review lawn condition and identify bare spots, over compacted soil, weed overgrowth, infestations or signs of erosion.
 - Identify any safety related issues.
- B. CAPITAL FACILITY ASSESSMENT
 - When poor grass cover persist, identify contributing factors and address. Complete soil test. Carry out recommendations of test including soil amendments, aeration, overseeding, restoration or replacement of lawn.

C-2 Grass Lawns



Description/Context:

Grass Lawns are areas within the Greenway Zone that are mowed and maintained at a turf grass maintenance level. Grass species will vary, but generally include improved varieties of turf type tall fescue and bluegrass.

LOC Unit of Measure: Per Acre (Ac)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify slope maintainability, smooth grades and grass is established per contract documents and punch list items completed/accepted.
- B. On-going Maintenance
 - Pickup trash/debris (weekly)
 - Mow at a 3" height (weekly) - remove clumps from lawn and sweep/blow lawn clippings off trails.
- C. Annual/Periodic Maintenance
 - Edge along pavements (2/year)
 - Fertilize (as needed) fall
 - Herbicide and insecticide control (as needed) early spring and contact spray in late spring.
 - Overseed bare and weak lawn areas (as needed) in early spring or early fall.
 - Maintain a list of damaged or dead turf areas and reseed or sod in early fall or spring (bi-annually).

Capital Repairs

- A. Asset Investment - Development cost typically include finish grading, soil amendments, seed bed preparation, seeding (or sodding) and establishment period maintenance.
- B. Life Cycle Capital Repairs
 - Long term capital repair or replacement cost are normally not required with good maintenance practice to keep grass in healthy growing condition.
 - Issues may arise (ie. disease, drought, wear from events) when grass lawn areas will need repair and require the following:
 - Lawn Overseeding - short mow/rake and drill seed.
 - Lawn Restoration - herbicide treatment, mow/rake, core aerate, fertilize, drill/disk seed, drag & mulch.
 - Lawn Replacement (after regrading or erosion repair).

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of lawn condition to identify bare spots, weed overgrowth or signs of erosion.
 - Identify safety related issues
- B. CAPITAL FACILITY ASSESSMENT
 - When poor grass cover persist, identify contributing factors and address. Complete soil test. Carry out recommendations of test including soil amendments, aeration, overseeding, restoration or replacement of lawn.

C-3 High Mow Lawn



Description/Context:

Lawn areas within the Greenway Zone that are only periodically mowed and maintained at a height of approximately 8". Grass species will vary, but generally will include improved varieties of tall fescue or bluegrass.

LOC Unit of Measure: Per Acre (Ac)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify slope maintainability, smooth grades and grass is established per contract documents and punch list items completed/accepted.
- B. On-going Maintenance
 - Pickup trash/debris. (monthly)
 - Mow to 8". Frequency varies - mow before grass reaches 12" height (remove < 1/3 the grass height) generally every 4 to 6 weeks (about 6 times per year).
 - Remove all grass clippings off all trail and activity areas.
- C. Annual/Periodic Maintenance
 - Fertilize only to address poor growth issues (spring).
 - Herbicide and insecticide control only as needed to control infestations that would impact grass cover.
 - Maintain a list of damaged or dead turf areas and reseed or sod in early fall or spring (bi-annually).

Capital Repairs

- A. Asset Investment - Development cost typically include finish grading, soil amendments, seed bed preparation, seeding and establishment period maintenance.
- B. Life Cycle Capital Repairs
 - Long term capital repair or replacement cost are normally not required with good maintenance practice to keep grass in healthy growing condition.
 - Issues may arise (ie. disease, drought, wear from events) when the grass areas will need repair and require the following:
 - Lawn Overseeding - short mow/rake and drill seed.
 - Lawn Restoration - herbicide treatment, mow/rake, fertilize, drill/disk seed, drag & mulch.
 - Lawn Replacement (typ. after regrading or erosion repair).

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of lawn condition to identify bare spots, weed overgrowth or signs of erosion.
 - Identify any safety related issues.
- B. CAPITAL FACILITY ASSESSMENT
 - When poor grass cover persist, identify contributing factors and address. Complete soil test. Carry out recommendations of test including soil amendments, aeration, overseeding, restoration or replacement of lawn.

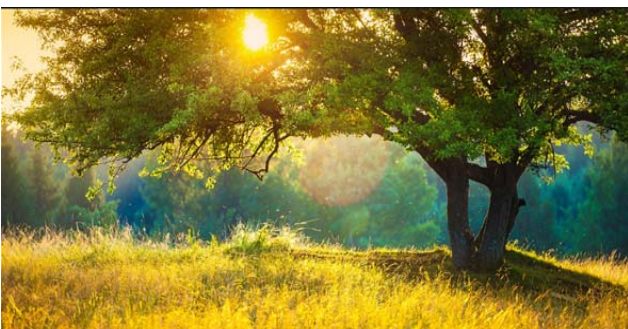
C-4 Annual Mow Grass



Description/Context:

Taller no-mow grass areas that are not used or accessed by the public on a regular basis, but enjoyed more as a visual amenity, like a pasture area or wildlife habitat. Annual mowing is completed to deter woody plant growth. This differs from Native Grasslands in that it's typically comprised of more cultivated varieties of grasses such as fescue, Kentucky bluegrass, bromegrass, ryegrass or timothy. Often these areas were previously maintained as lawn areas but left to grow out.

LOC Unit of Measure: Per Acre (Ac)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify slope maintainability, smooth grades and grass is established to contract requirements and punch list items are completed/accepted.
 - Locate, identify and communicate limits of no-mow areas.
- B. On-going Maintenance
 - Pickup trash and debris (monthly).
 - Check for erosion or damage (monthly).
 - While not mowed on a regular schedule, these areas are susceptible to noxious weed encroachment and need to be observed and treated for invasive species.
- C. Annual/Periodic Maintenance
 - Mow at 8"-12" ht. In early spring (annually)
 - Inspect areas for noxious weeds (such as Johnson Grass, Sericea lespedeza, etc.), spot treat with herbicide and manually remove seed heads.

Capital Repairs

- A. Asset Investment - Development cost typically include finish grading, soil amendments, seed bed preparation, seeding and establishment period maintenance.
- B. Life Cycle Capital Repairs
 - Long term capital repair or replacement cost are normally not required with good maintenance practice to keep grass in healthy growing condition.
 - Issues may arise (ie. disease, drought, wear from events) when the grass areas will need repair. In those cases the following may be required:
 - Overseeding - short mow/rake and drill seed.
 - Restoration - herbicide treatment, mow/rake, fertilize, drill/disk seed, drag & mulch.
 - Replacement (typ. after regrading or erosion repair).

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection to review conditions and identify bare spots, weed overgrowth or signs of erosion.
 - Identify safety related issues
- B. CAPITAL FACILITY ASSESSMENT
 - When poor grass cover persist, identify contributing factors and address. Complete soil test. Carry out recommendations of test including soil amendments, overseeding, restoration or replacement.

C-5 Native Grasslands



Description/Context:

A native grassland is an area that has been seeded with native grasses (and perennials) to mimic prairie and savanna ecosystems. Grass types vary but generally include Switch Grass, Indian Grass, Little Bluestem, Side Oats Grama, Prairie Dropseed and Prairie Cordgrass.

LOC Unit of Measure: Per Acre (Ac)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify slopes with no erosion, grass established to contract requirements; punch list items are completed/accepted.
 - Locate, identify and communicate limits of native grass areas.
- B. On-going Maintenance
 - Year 1 – High mow to a height of 6" - 12" throughout growing season to control weeds; spot spray herbicide to treat invasive/noxious weed as needed. (3X/year)
 - Years 2 & 3 – Late winter mow* (annually); During growing season spot mow and herbicide treatments. (monthly)
 - Year 4 – Late winter mow* (annually); During growing season spot mow and spot treat with herbicide (2X/year). Complete prescribed burn (annually).
 - Year 5 & Beyond – Late winter mow* (annually) and periodic inspections for invasive/noxious weeds.
 - *Late winter mowing should not disturb wildlife. February is typically a good time.

- Complete soil test in areas exhibiting poor vegetative growth. Amend soil with organics (i.e. compost) per the soil test results.

C. Annual/Periodic Maintenance

- Mow in late winter and where possible, burn following a prescribed schedule.

Capital Repairs

- A. Asset Investment - Development cost typically include finish grading, seed bed preparation, seeding and 4-year establishment period maintenance.
- B. Life Cycle Capital Repairs
 - Long term capital repair or replacement cost are normally not required with good maintenance practice to keep grass in healthy growing condition.
 - Issues may arise (ie. disease, drought) when the grassland areas will need repair. In those cases prepare soil by removing unwanted vegetation with 2-3 herbicide applications or clearing and grubbing if needed, winter/dormant seeding, 18-20 PLS lbs/acre, cover crop, Curlex 2 erosion control blanket for sloped areas.

LOC Evaluation

A. ANNUAL LOC REVIEW

- Visual inspection to review conditions and identify bare spots, weed overgrowth or signs of erosion.
- Identify safety related issues

B. CAPITAL FACILITY ASSESSMENT

- When poor grass cover persist, identify contributing factors and address. Complete soil test. Carry out recommendations of test including soil amendments, overseeding, restoration or replacement.

C-6 Wildflower/Native Beds



Description/Context:

Perennial wildflowers and other native plant material planted (pots, plugs or seed) within defined landscape beds for display, borders, rain gardens, bio-swales or related purposes.

LOC Unit of Measure: Per Square Feet (SF)



Operations & Maintenance

- A. Acceptance Requirements
 - Verify soil mix, slope maintainability, healthy plants and mulch installed per contract documents; punch list items completed/accepted.
 - Confirm maintenance and watering requirements during warranty period.
- B. On-going Maintenance
 - Water during first 2-years to establish plants (weekly thru periods without rain).
 - Pick up trash and debris (weekly).
 - Weed beds (2/Month - April thru Sept.)
- C. Annual/Periodic Maintenance
 - Late winter cut-down and remove plant material. Replace dead plants and refresh mulch (annually).
 - Optional: Apply pre-emergent herbicide treatment (early spring). Use sparingly to encourage native plants to self-seed.
 - Complete soil test (every 3 years) and amend soil per recommendations.

Capital Repairs

- A. Initial Asset Investment - Development cost typically include finish grading, soil amendments, seed bed preparation, seeding (or plug planting) and 4-year establishment period maintenance.
- B. Life Cycle Capital Repairs
 - Long term life cycle cost are minimal if good maintenance practices are followed.
 - Issues may arise (ie. disease, drought, wear from vehicle or foot traffic) when areas will need replanting. In those cases smaller bed areas may be replanted with deep cell plugs, larger areas can be seeded. Follow establishment period guidance.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection to identify unhealthy plant material, unwanted vegetation/weeds, invasive/noxious weeds and any safety issues.
 - If the annual greenway LOC review is conducted during months of plant dormancy, a separate review of plant material should be conducted during the growing season and documented for inclusion in the next annual LOC review.
- B. CAPITAL FACILITY ASSESSMENT
 - When poor vegetative growth persist, soil testing should be completed, soil amended per recommendations and plant replacement initiated.

C-7 Shrub & Perennial Beds



Description/Context:

Shrub and perennial (i.e. grasses and groundcover) plantings located within defined mulch beds used as borders, buffers, screens and in rain gardens.

LOC Unit of Measure: Per Square Feet (SF)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify soil mix, slope maintainability, healthy plants and mulch installed per contract documents; punch list items completed/accepted.
 - Confirm maintenance and watering requirements during warranty period.
- B. On-going Maintenance
 - Water during first 2-years to establish plants (weekly thru periods without rain).
 - Weed beds (2/month - April - Sept.)
 - Pick up trash and debris (weekly).
 - Prune plants 3' off trails (Perennials bi-monthly. Woody plant stems annually during dormant season).
 - Prune dead/diseased branches (monthly).
- C. Annual/Periodic Maintenance
 - Rake and replenish mulch beds in spring (annually).
 - Replace dead plants in spring or fall (annually).

- Optional: Apply pre-emergent herbicide treatment to beds (early spring)
- Complete soil test (every 3 years) and amend soil per recommendations.
- Optional: Unique or special plants may require annual fertilizing.
- Spade and divide perennials requiring such per species requirements (\pm 5 - 8 years)

Capital Repairs

- A. Asset Investment - Development cost typically include bed preparation, soil amendments, plants, mulch and 1-year warranty.
- B. Life Cycle Capital Repairs
 - Long term life cycle cost are minimal if good maintenance practices are followed.
 - Issues may arise (ie. disease, drought, physical damage) that will require replanting and maintenance to establish new planting.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection to identify unhealthy plant material, unwanted vegetation/weeds, invasive/noxious weeds and any safety issues.
 - If the annual greenway LOC review is conducted during months of plant dormancy, a separate review of plant material should be conducted during the growing season and documented for inclusion in the next annual LOC review.
- B. CAPITAL FACILITY ASSESSMENT
 - When poor vegetative growth persist, soil testing should be completed, soil amended per recommendations and plant replacement initiated.

C-8 Annual Beds & Planters



Description/Context:

Annual plantings (typically flowering and foliage ornamentals) located within defined mulch beds and/or planters.

LOC Unit of Measure: Per Square Feet (SF)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify soil mix, slope maintainability, healthy plants and mulch installed per contract documents; punch list items completed/accepted.
 - Confirm maintenance requirements during warranty period and source of water.
- B. On-going Maintenance
 - Pick up trash and debris (weekly).
 - Water as needed (up to 2 times weekly).
 - Weed beds and trim plants off all trail areas (2/month - April -Sept).
 - Dead-head flowers for best production.
- C. Annual/Periodic Maintenance
 - Replant annuals in spring.
 - Optional: Bulb planting in fall.
 - Apply leaf compost mulch in spring.
 - Apply slow release fertilizer when planting.
 - Optional: Apply liquid fertilizer (monthly).
 - Optional: Apply pre-emergent herbicide treatment to beds (early spring).

- Insecticide and/or fungicide might be required but selection of annual plants should strive for hardy varieties.
- Complete soil test (every 3 years) and amend soil per recommendations.

Capital Repairs

- A. Asset Investment - Development cost typically include bed preparation, soil amendments, plants, and mulch (planters where applicable).
- B. Life Cycle Capital Repairs
 - Annual replanting is a perpetual requirement included in the annual LOC cost.
 - Soil issues (ie. infertility, disease, fungus damage) may arise requiring major treatment or replacements of soil media.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection to identify unhealthy plant material, unwanted vegetation/weeds, invasive/noxious weeds and any safety issues.
 - If the annual greenway LOC review is conducted during months of plant dormancy, a separate review of plant material should be conducted during the growing season and documented for inclusion in the next annual LOC review.
- B. CAPITAL FACILITY ASSESSMENT
 - When poor vegetative growth persist, soil testing should be completed, soil amended per recommendations and/or replaced as needed.

C-9 Shrub Massings

Description/Context:

Mass plantings of deciduous and evergreen shrubs initially in beds but maturing into just a shrub massing (without mulch beds).

LOC Unit of Measure: Per Square Feet (SF)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify soil mix, slope maintainability, healthy plants and mulch installed per contract documents; punch list items completed/accepted.
 - Confirm maintenance and watering requirements during warranty period.
- B. On-going Maintenance
 - Water during first 2-years to establish plants (weekly thru periods without rain).
 - Weed beds (2/month - April -Sept.).
 - Pick up trash and debris (weekly).
 - Prune dead/, broken or diseased branches. (monthly).
- C. Annual/Periodic Maintenance
 - Rake and replenish mulch beds in spring (annually). After well established shrub beds should not require annual mulching.
 - Optional/As-needed: Apply pre-emergent herbicide treatment to beds (early spring)
 - Prune shrubs 3' off trails during dormant sea-

son (annually).

- Weed if needed and remove any vine encroachment onto shrubs.
- Replace dead plants in spring or fall (annually).
- Complete soil test (every 3 years) and amend soil per recommendations.

Capital Repairs

- A. Initial Asset Investment - Development cost typically include bed preparation, soil amendments, planting, mulch and 1-year warranty.
- B. Life Cycle Capital Repairs
 - Long term life cycle cost are minimal if good maintenance practices are followed.
 - Issues may arise (ie. disease, drought, physical damage) that will require replanting and maintenance to establish new planting .

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection to identify unhealthy plant material, unwanted vegetation, invasive/noxious weeds and any safety issues.
 - If the annual greenway LOC review is conducted during months of plant dormancy, a separate review of plant material should be conducted during the growing season and documented for inclusion in the next annual LOC review.
- B. CAPITAL FACILITY ASSESSMENT
 - When poor vegetative growth persist, soil testing should be completed, soil amended per recommendations and plant replacement initiated.

C-10 Trees

Description/Context:

Trees of both deciduous and evergreen varieties including overstory, understory, flowering and ornamental plantings.

LOC Unit of Measure: Per Each



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - For new plantings, verify healthy plants installed per contract documents; punch list items completed/accepted.
 - Confirm maintenance requirements during warranty/establishment period.
 - For existing trees saved during construction, verify condition and identify trimming requirements and remedial care.
- B. On-going Maintenance
 - During 2-year establishment period:
 - Water as needed to provide 15 gallons/1" caliper/week using slow release water bags.
 - Maintain & weed mulched saucer/donut ring - no mounding on trunk (monthly).
 - Prune dead, broken or diseased branches. (monthly).
 - Treat for insect and disease issues as needed.
- C. Annual/Periodic Maintenance
 - Trim and prune trees during dormant season

- at least every 3 years following ANSI 300 Pruning Standards - completed by ISA Certified Arborist. Maintain 3' horizontal clearance from edge of trail and a 10' vertical clearance.
- When pruning is required near utility lines, coordinate with utility company's arborist.
- Replace dead trees - replanting preferably in fall - 2nd choice in early Spring. (annually).

Capital Repairs

- A. Initial Asset Investment - Development cost typically include soil amendments, planting, mulch and 1-year warranty.
- B. Life Cycle Capital Repairs
 - Long term life cycle cost are minimal if good maintenance practices are followed.
 - Issues may arise (ie. disease, drought, physical damage) when tree will require replanting.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of trees looking for damage, disease, un-healthy condition and any safety issues.
 - If safety issues are identified in the arborist "off" year (see below) - have the arborist conduct a separate assessment using the ISA Tree Risk Assessment requirements.
- B. CAPITAL FACILITY ASSESSMENT
 - A tree assessment should be completed trees along the greenway corridor every three years by an ISA Certified Arborist (International Society of Arboriculture) following the *ISA Tree Risk Assessment* requirements. Assessment should address tree condition, identifying a specific list of safety issues, recommendations and anticipated long term life expectancy of trees.

C-11 Woodlands/Forest



Description/Context:

These areas are forested and semi-forested areas along the greenway. Most often these were existing woodlands through which the greenway trail was built. These woodland/forest areas extend through lowlands with sycamores, cottonwoods and willows, as well as uplands with oak/hickory forest. Successful implementation of the LOC requires the identification and understanding of the specific greenway ecosystem characteristics and requirements.

LOC Unit of Measure: Per Acre (Ac) (within the defined $\pm 100'$ wide greenway corridor)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - For existing trees saved during construction, verify condition and identify required trimming and any anticipated remedial care.
 - Have a GPS tree inventory conducted by an ISA Certified Arborist that identifies the species, size, health, key features and hazard/risk assessment of trees $> 6''$ caliper along a $100'$ wide greenway corridor.
- B. On-going Maintenance
 - Pickup trash/debris (weekly).
 - Cleanup storm damaged downed trees/limbs when located within $10'$ of trail (as required).
- C. Annual/Periodic Maintenance
 - Prepare and implement an Invasive Species Removal Plan where required. Typically requires annual removal programs completed over many years.
 - Trim and prune trees during dormant season at least every 3 years following ANSI 300 Pruning Standards - completed by ISA Certi-

fied Arborist. Maintain $3'$ horizontal clearance from edge of trail and a $10'$ vertical clearance.

- When pruning is required near utility lines, coordinate with utility company's arborist.

Capital Repairs

- A. Initial Asset Investment - Development cost are typically limited to tree inventory/risk assessment and remedial tree pruning but sometimes includes new tree or shrub plantings.
- B. Life Cycle Capital Repairs
 - Long term life cycle cost are minimal if annual/periodic maintenance is followed.
 - Removal of dead or dangerous trees as identified in assessments.
 - Issues may arise (ie. disease, major storm damage) that may require clearing. In those cases consider replanting with seedlings, container or balled-and-burlapped trees.

LOC Evaluation

- Visual inspection of trees looking for damage, disease, un-healthy condition and any safety issues.
- If safety issues are identified in the arborist "off" year (see below) - have the arborist conduct a separate assessment using the ISA Tree Assessment requirements.
- B. CAPITAL FACILITY ASSESSMENT
 - A tree assessment should be completed trees along the greenway corridor every two years by an ISA Certified Arborist (International Society of Arboriculture) following the *ISA Tree Risk Assessment* requirements. Assessment should address tree condition, identifying a specific list of safety issues, recommendations and anticipated long term life expectancy of trees.

C-12 Wetlands



Description/Context:

In-undated or frequently in-undated wet areas resulting in oxygen-poor soils with plant and animals that have adapted to these conditions. Plants range from marsh/aquatic type to lowland swamp trees. Wetlands categories are based on specific conditions and include seasonal, emergent marsh, shrub-scrub, fens and forest swamp. Know the type and characteristics of a wetland is important to maintaining and protecting it. Within the context of this document this designation does not imply governmental jurisdictional designation as a wetland. (Coordinate with LOC guideline “G-6 Ponds and Wetlands” for stormwater related maintenance.)

LOC Unit of Measure: Per Acre (Ac) (within the defined $\pm 100'$ wide greenway corridor)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - For existing vegetation adjacent to construction that was saved, verify condition and identify any required remedial care such as trimming, soil reshaping, removal, replacement or contaminant removal.
 - Have a GPS tree inventory conducted by an ISA Certified Arborist that identifies the species, size, health, key features and hazard/risk assessment of trees > 6” caliper along a 50’ wide greenway corridor.
 - Obtain any Wetland Delineation studies (prepared for construction activities) that should locate and identify allowable activities.
- B. On-going Maintenance
 - Pickup trash/debris (weekly).
 - Cleanup storm damaged downed trees/limbs when located within 10’ of trail (as required).
 - Herbicides and algaecides should be avoided, but when necessary applied by a state licensed applicator.

- C. Annual/Periodic Maintenance
 - Prepare and implement an Invasive Species Removal Plan where needed, which typically requires a multi-year removal program.
 - Trim and prune trees during dormant season at least every 3 years following ANSI 300 Pruning Standards - completed by ISA Certified Arborist. Maintain 3’ clearance from trail and 10’ vertical clearance (annually).
 - When pruning required near utility lines, coordinate with utility company arborist.

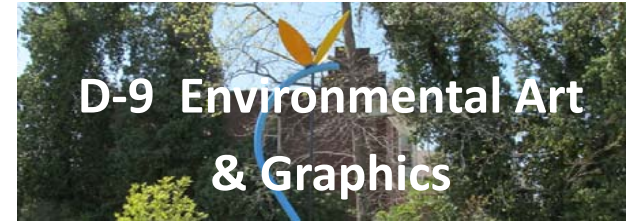
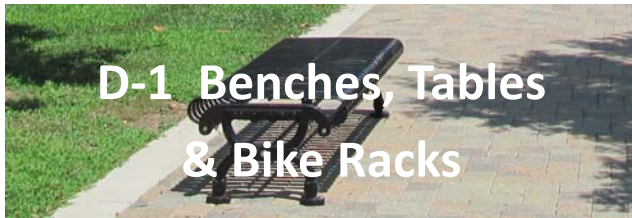
Capital Repairs

- A. Initial Asset Investment - Development cost are typically limited to wetland delineation study and tree inventory/risk assessment but sometimes includes new tree or shrub plantings.
- B. Life Cycle Capital Repairs
 - Long term life cycle cost are minimal.
 - Remove dead or dangerous trees as identified in assessments.
 - Issues may arise (ie. disease, major storm damage) that may require clearing.
 - Replant with seedlings.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of marshland to identify invasive species, safety issues and general conditions.
 - Visual inspection of trees looking for damage, disease, un-healthy condition and any safety issues.
 - If safety issues are identified in the arborist “off” year (see below) - have the arborist conduct a separate assessment using the ISA Tree Assessment requirements.
- B. CAPITAL FACILITY ASSESSMENT
 - Every two (2) years conduct an ISA Tree Assessment (per Woodlands requirements) of lowland wooded areas.

LOC Guidelines



D - Site Furnishings

D-1 Benches, Tables & Bike Racks

Description/Context:

Greenway related site furnishings including benches, tables and bike racks fabricated from metal, wood, recycled plastic, composites or concrete.

LOC Unit of Measure: Per Each



Operations & Maintenance

- A. Acceptance Requirements
 - Check for proper installation (plumb, level, 2' clear of trail), securely fastened, free of paint chips or scratches, or damaged wood or plastic components.
 - Obtain manufacturer's recommended maintenance and warranties.
- B. On-going Maintenance
 - Keep clean by removing dirt, spills, sap and other materials (weekly).
 - Check for and repair damaged components and remove graffiti (monthly).
- C. Annual/Periodic Maintenance
 - Thoroughly clean/power wash and touch up paint or seal (annually).
 - Check/tighten hardware fasteners (annually).
 - Sand and re-finish wood checks and splinters. Apply preservatives to wood components per manufacturer's recommendations. (annually)
 - Replace damaged furnishings using the same product. When not feasible, use one that

closely matches design and materials of the existing site furnishings along that greenway.

Capital Repairs

- A. Asset Investment - Cost includes equipment purchase and installation.
- B. Life Cycle Capital Repairs
 - Replacement cycle - \pm 20 years.
 - Consider refurbishing site furnishings by replacing wood components (10 - 15 years).
 - For special, distinctive or memorialized site furnishings, consider refurbishing metal components by removing and re-powder coating (\pm 15 years).
 - Coordinate the replacement of entire greenway site furnishing systems with receptacles, bollards and other related elements.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of site furnishings to check general condition, cleanliness, graffiti, damaged components and related items identified under O&M activities above.
 - Inspect and identify any stability and/or safety related issues.
- B. CAPITAL FACILITY ASSESSMENT
 - No formal on-going assessment required.
 - Complete an assessment with a replacement program when the annual review identifies that the site furnishings are nearing their usable life span.

D-2 Bollards

Description/Context:

Vertical post used as barriers within or adjacent to the trail to control access of vehicles. Bollards located within the greenway trail are most often removable bollards so an authorized service vehicle can access the trail. Bollards off the trail are typically not removable. Most bollards are metal but wood is sometimes utilized.

LOC Unit of Measure: Per Each



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Check for proper installation (plumb, level, break-away direction), securely fastened, free of paint chips or scratches, or damaged components.
 - Obtain manufacturer's recommended maintenance and warranties.
 - Confirm responsibilities for locking bollards.
 - Removable bollards—confirm locking mechanism, responsibilities and authorized parties.
- B. On-going Maintenance
 - Keep clean by removing dirt, spills, sap and other materials (weekly).
 - Check for and repair damaged components and remove graffiti (monthly).
- C. Annual/Periodic Maintenance
 - Thoroughly clean/power wash and touch up paint or seal (annually).
 - Check/tighten hardware fasteners (annually).
 - Clean and loosen any locking mechanisms.
 - Sand and re-finish wood checks and splinters.

Apply preservatives to wood components per manufacturer's recommendations. (annually)

- Replace damaged bollards using the same product. When not feasible, use one that closely matches design and materials of the existing bollards along that greenway.

Capital Repairs

- A. Asset Investment - Cost includes equipment purchase, installation and typically a footing.
- B. Life Cycle Capital Repairs
 - For distinctive bollards, consider refurbishing metal components by removing and re-powder coating (\pm 15 years).
 - Replacement cycle - 20 to 25 years.
 - Coordinate the replacement of entire greenway bollard systems with benches, tables, bike racks, receptacles and other related elements.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of bollards to check general condition, cleanliness, graffiti, damaged components and related items identified under O&M activities above.
 - Inspect and identify any stability and/or safety related issues.
- B. CAPITAL FACILITY ASSESSMENT
 - No formal on-going assessment required.
 - Complete an assessment with a replacement program when the annual review identifies that the bollards are nearing their usable life span.

D-3 Trash/Recycle Receptacles

Description/Context:

Receptacles used for site collection of trash, refuse and recycled materials typically fabricated from metal, concrete, wood or recycled plastic material.

LOC Unit of Measure: Per Each



Operations & Maintenance

- A. Acceptance Requirements
 - Check for proper installation (plumb, level, 2' clear of trail), securely fastened, lid tether in place, free of paint chips or scratches, or damaged components.
 - Obtain manufacturer's recommended maintenance and warranties.
 - Confirm responsibilities and frequency for emptying receptacles.
- B. On-going Maintenance
 - Empty receptacles at a frequency to avoid over-spilling or bad odors (weekly).
 - Keep clean by removing dirt, spills, sap and other materials (weekly).
 - Check for and repair damaged components and remove graffiti (monthly).
- C. Annual/Periodic Maintenance
 - Thoroughly clean/power wash and touch up paint or seal (annually).
 - Check/tighten hardware fasteners (annually).
 - Sand and re-finish wood checks and splinters.

Apply preservatives to wood components per manufacturer's recommendations (annually).

- Replace damaged receptacles using the same product. When not feasible, use one that closely matches design and materials of the existing receptacles along that greenway.

Capital Repairs

- A. Asset Investment - Cost includes equipment purchase and installation.
- B. Life Cycle Capital Repairs
 - Consider refurbishing site furnishings by replacing wood components (10 - 15 years).
 - For special, distinctive or memorialized site furnishings, consider refurbishing metal components by removing and re-powder coating (\pm 15 years).
 - Replacement cycle - 20 to 25 years.
 - Coordinate the replacement of entire greenway receptacle systems with benches, tables, bike racks, bollard and other related elements.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of receptacles to check general condition, cleanliness, graffiti, damaged components and related items identified under O&M activities above.
 - Inspect and identify any stability and/or safety related issues.
- B. CAPITAL FACILITY ASSESSMENT
 - No formal on-going assessment required.
 - Complete an assessment with a replacement program when the annual review identifies that the receptacles are nearing their usable life span.

D-4 Greenway Wayfinding

Description/Context:

Greenway Wayfinding requirements are defined in the Great Rivers Greenway's Exterior Sign Design Standards. The signs address greenway identification, directional, informational and regulatory/safety signs along the greenway. Refer to the GRG Sign standards for more information on the different types of GRG branded signs.

LOC Unit of Measure: Per Each



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Check for proper installation (location, plumb, level, 2' clear of trail); securely fastened, free of paint chips or scratches, or damaged components.
 - Confirm installed sign is compliant with recommendations of Exterior Sign Design Standards and AASHTO.
 - Obtain manufacturer's recommended maintenance and warranties.
- B. On-going Maintenance
 - Keep clean by removing dirt, spills, sap and other materials (monthly).
 - Check for and repair damaged components and remove graffiti (monthly).
 - Coordinate greenway sign system repairs with current GRG Exterior Sign Design Standards.
- C. Annual/Periodic Maintenance
 - Thoroughly clean/power wash and touch up paint or seal (annually).

- Check/tighten hardware fasteners (annually).
- GRG to replace damaged signs matching the signs along that greenway.

Capital Repairs

- A. Asset Investment - Cost include purchase of sign/post, installation and typically a footing.
- B. Life Cycle Capital Repairs
 - Replace every 10-15 Years.
 - Coordinate greenway sign system replacement with current GRG Exterior Sign Design Standards.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of signs to check general condition, cleanliness, graffiti, damaged components and related items identified under O&M activities above.
 - Inspect and identify any stability and/or safety related issues.
- B. CAPITAL FACILITY ASSESSMENT
 - No formal on-going assessment required.
 - Complete an assessment with a replacement program when the annual review identifies that the signs are nearing their usable life span.

D-5 Roadway Signs/Pavement Markings



Description/Context:

Greenway trails require non-Great Rivers Greenway branded signs and pavement markings that are most often regulatory signs and pavement markings along streets and other vehicular routes (or parking lots) at trail crossings. These are signs and pavement markings (i.e. Cross walks, stop bars, bike lane designations) typically required and maintained by the local highway, streets and/or public works department following MUTCD (Manual on Uniform Traffic Control Devices) and AASHTO recommendations

LOC Unit of Measure: Per Each



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Check for proper installation (location, plumb, level, 2' clear of trail); securely fastened, free of paint chips or scratches, or damaged components.
 - Confirm installed sign is compliant with recommendations of MUTCD, AASHTO and the Exterior Sign Design Standards.
 - Obtain manufacturer's recommended maintenance and warranties.
- B. On-going Maintenance
 - Keep clean by removing dirt, spills, sap and other materials (monthly).
 - Check for and repair damaged components and remove graffiti (monthly).
- C. Annual/Periodic Maintenance
 - Signs: Thoroughly clean/power wash, check/tighten hardware & touch up paint (annually).
 - Signs: Replace damaged, worn or faded signs following AASHTO recommendations (annually).

- Re-apply pavement markings to maintain high and consistent visibility. Follow AASHTO and MUCTD recommendations. Frequency will vary based on pavement marking material (paint markings more frequent and thermoplastic markings less frequent).

Capital Repairs

- A. Asset Investment - Sign cost include sign/post purchase, installation and footing. Pavement markings cost include material purchase and installation
- B. Life Cycle Capital Repairs
 - Signs: Replacement timing can vary depending on material type and setting, but typically every 10-15 years following current AASHTO recommendations.
 - Pavement Markings - Varies based on marking material used with ranges from basic pavement paint (2 years) to thermoplastic (± 10 years)
 - Generally these signs and pavement markings are the responsibility of the Partner or the local street department.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of signs to check general condition, cleanliness, graffiti, damaged components and related items identified under O&M activities above.
 - Inspect and identify any stability and/or safety related issues.
 - Notify agency responsible for signs and pavement markings of conditions and any issues.
- B. CAPITAL FACILITY ASSESSMENT
 - Complete an assessment with a replacement program when the annual review identifies that the signs are nearing their usable life span.

D-6 Pet Waste Bag Dispenser

Description/Context:

Receptacles used to dispense and collect plastic pet waste bags typically fabricated from metal, wood or recycled plastic material. Includes small instructional signs.

LOC Unit of Measure: Per Each



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Check for proper installation (plumb, level, 2' clear of trail), securely fastened, paint chips or scratches, or damaged components.
 - Obtain manufacturer's recommended maintenance and warranties.
 - Confirm responsibilities and frequency for emptying receptacles.
- B. On-going Maintenance
 - Empty receptacles/replenish bag supply as needed - frequency based on use avoiding over-spilling or bad odors (weekly).
 - Keep clean by removing dirt, spills, sap and other materials (monthly).
 - Check for and repair damaged components and remove graffiti (monthly).
- C. Annual/Periodic Maintenance
 - Thoroughly clean/power wash and touch up paint or seal (annually).
 - Check/tighten hardware fasteners (annually).
 - Sand and re-finish wood checks and splinters.

Apply preservatives to wood components per manufacturer's recommendations (annually).

- Replace damaged dispensers using the same product. When not feasible, use one that closely matches design and materials of the existing dispensers along that greenway.

Capital Repairs

- A. Asset Investment - Cost includes equipment purchase and installation.
- B. Life Cycle Capital Repairs
 - Replacement cycle - 10 to 15 years.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of dispensers to check general condition, cleanliness, graffiti, damaged components and related items identified under O&M activities above.
 - Inspect and identify any stability and/or safety related issues.
- B. CAPITAL FACILITY ASSESSMENT
 - No formal on-going assessment required.
 - Complete an assessment with a replacement program when the annual review identifies that the dispensers are nearing their usable life span.

D-7 Trail Counters

Description/Context:

The digital electronic trail counters installed by Great Rivers Greenway are an all-inclusive proprietary equipment and technology used to count pedestrians and bicyclist on shared use greenway trails. The equipment includes sensor loops installed into the trail pavement and a vertical post containing battery operated equipment that counts and transmits (cell phone type technology) the information via the internet. These are a key component of a system-wide program to monitor and track the metrics of trail use.

LOC Unit of Measure: Per Each



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements (GRG)
 - Check for proper installation (plumb, level, 2' clear of trail and other Mfg. requirements), location clear of electronic interference; securely fastened; free of paint chips or scratches, or damage.
 - Obtain manufacturer's recommended maintenance and warranties.
- B. On-going Maintenance
 - Mow and/or trim tall vegetation around counter that may interfere with sensor eye (monthly).
 - Keep clean by removing dirt, spills, sap, other materials and graffiti (monthly).
 - Notify GRG staff when damaged trail counter components are identified.
 - GRG Staff will confirm transmission of counts, address count issues and repair damaged components (monthly).
- C. Annual/Periodic Maintenance
 - Thoroughly clean/power wash and touch up

paint or seal (annually).

- Check/tighten hardware fasteners (annually).
- Repair post and loop wire damage from crashes, rodents or vandalism.
- Replace battery (2 years).
- Update software subscription (annually).

Capital Repairs

- A. Asset Investment - Cost includes equipment purchase and installation (footing, saw cutting pavement for sensor wiring.)
- B. Life Cycle Capital Repairs
 - Trail counter life cycle will be dependent on both information needs and available technology. Great Rivers Greenway will be responsible for this ongoing system-wide program that includes both equipment and technology.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of trail counters to check general condition, cleanliness, graffiti, damaged components and related items identified under O&M activities above.
 - Inspect and identify any stability and/or safety related issues.
 - Confirm transmission of pedestrian and bicycle counts.
- B. CAPITAL FACILITY ASSESSMENT
 - Formal capital facility assessments of trail counters on individual trails will be a part of Great Rivers Greenway's review of the overall system-wide program.

D-8 Drinking Fountain

Description/Context:

Accessible drinking fountain with or without a hose bib and/or dog water bowl. Typical construction is metal or architecture precast. Most drinking fountains are seasonal and then winterized, but fixtures in some locations may be freeze proof with underground valves.

LOC Unit of Measure: Per Each



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Check for proper installation (plumb, level, 2' clear of trail), securely fastened, free of paint chips or scratches and damaged components.
 - Confirm compliance with plumbing codes, water quality and drainage.
 - Obtain manufacturer's recommended maintenance and warranties.
- B. On-going Maintenance
 - Keep clean by removing dirt, spills, sap, other materials and graffiti (weekly).
 - Check for proper operation (on-off, no leaks) and repair damaged components (weekly).
- C. Annual/Periodic Maintenance
 - Thoroughly clean/power wash and touch up paint or seal (annually).
 - Check/tighten hardware fasteners (annually).
 - Non-freeze proof fixtures should be winterized in late fall and operation re-started in spring (annually).

- Replace damaged fountains using the same product. When not feasible, use one that closely matches design and materials of the existing fountains along that greenway.

Capital Repairs

- A. Asset Investment - Cost includes equipment purchase and installation (water supply, waste drain, footing and pad).
- B. Life Cycle Capital Repairs
 - 15 - 20 Years

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of drinking fountain to check general condition, cleanliness, graffiti, damaged components and related items identified under O&M activities above.
 - Inspect and identify any stability and/or safety related issues.
- B. CAPITAL FACILITY ASSESSMENT
 - No formal on-going assessment required.
 - Complete an assessment with a replacement program when the annual review identifies that the water fountains are nearing their usable life span.

D-9 Environmental Art & Graphics

Description/Context:

Installation of sculptural art work, mural or environmental graphic art adjacent within the greenway corridor.

LOC Unit of Measure: Per Each



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Check and confirm with artist proper installation (plumb, level, 2' clear of trail), securely fastened, free of paint chips or scratches and damaged components.
 - Obtain artist and/or manufacturer's recommended maintenance and repair methods.
- B. On-going Maintenance
 - Keep clean by removing dirt, spills, sap and other materials (monthly).
 - Check for and repair damaged components and remove graffiti (monthly).
- C. Annual/Periodic Maintenance
 - Thoroughly clean in method and frequency recommended by artist or manufacturer.
 - Check/tighten hardware fasteners (annually).

Capital Repairs

- A. Asset Investment - Cost vary but typically includes artist design, artwork purchase and installation (often including site work and footings).
- B. Life Cycle Capital Repairs
 - Varies

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of environmental art to check general condition, cleanliness, graffiti, damaged components and related items identified under O&M activities above.
 - Inspect and identify any stability and/or safety related issues.
- B. CAPITAL FACILITY ASSESSMENT
 - Requirements will vary based on installation. It is recommended that the artist conduct a review of art work every 2 to 3 years.

LOC Guidelines



E - Walls

E-1 Concrete Retaining Walls

Description/Context:

Cast-in-place concrete retaining wall and footing over a prepared sub-base. Coping or caps can be set on top of wall. Typical surface finish treatments include unfinished, hand rubbed, sandblasted, and/or use of formliners to create interest or replicate other materials.

LOC Unit of Measure: Per Square Feet Wall Face (SFW)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Visual review of installed wall checking for proper wall height, expansion joints, sub-drainage provided, backfill placed/compacted, surface finished as specified and free of chips or damage.
 - Obtain copy of wall detail and calculations for use by engineer in future assessments.
- B. On-going Maintenance
 - Trim grass/vegetation along wall (monthly).
 - Keep area free of debris and trash (monthly).
 - Repair damaged components and remove or paint over graffiti (monthly).
- C. Annual/Periodic Maintenance
 - Check wall and repair after flooding, particularly for erosion around base or ends of wall (event based).
 - Check walls for cracking and water seepage—repair as required (annually).
 - Inspect expansion joints and re-caulk as re-

quired (annually).

- Check and repair caps (if present) for cracks and adherence to wall units (annually).

Capital Repairs

- A. Asset Investment - Cost includes excavation, aggregate base, subdrainage, concrete footing and wall, formliner (optional), backfill and finish grading.
- B. Life Cycle Capital Repairs
 - Long term life cycle cost are minimal with good installation and maintenance. Issues focus on physical crash damage, vandalism and erosion around footings.
 - Replacement cycle: 50 plus years
 - If joints/cracks are not addressed with an on-going program, a more major joint/crack rehabilitation effort will be required at \pm 20 years.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of concrete retaining wall checking for general condition, cleanliness, graffiti, defects, cracks, damaged components, stability and related items identified under O&M activities above.
- B. CAPITAL FACILITY ASSESSMENT
 - Formal structural inspection and reporting of structural components of segmental unit wall by a MO. licensed structural engineer (PE) following a standardized inspection procedure to be determined by engineer (Every 3 - 5 years).

E-2 Concrete Retaining Wall w/Veneer

Description/Context:

Cast-in-place concrete retaining walls and footing over a prepared sub-base with a veneer installed over the face of wall. Top of wall typically has a cap or coping. Typical veneer treatments includes brick, stone, tile and/or decorative concrete block units. LOC Unit of Measure: Per Square Feet Wall Face (SFW)



Operations & Maintenance

- A. Acceptance Requirements
 - Visual review of installed wall checking for proper height, expansion joints (reflected thru veneer), subdrainage provided, backfill placed/compacted, surface veneer finish as specified and free of chips or damage.
 - Obtain copy of wall detail and calculations for use by engineer in future assessments.
- B. On-going Maintenance
 - Trim grass/vegetation along wall (monthly).
 - Keep area free of debris and trash (monthly).
 - Repair damaged components and remove or paint over graffiti (monthly).
- C. Annual/Periodic Maintenance
 - Check wall and repair after flooding, particularly for erosion around base or ends of wall (event based).
 - Check walls for efflorescence, cracking and water seepage—repair as required (annually).
 - Inspect expansion joints and re-caulk as re-

quired (annually).

- Inspect wall face and mortar joints and repair as required (annually).
- Check and repair caps (if present) for cracks and adherence to wall units (annually).

Capital Repairs

- A. Asset Investment - Cost includes excavation, aggregate base, subdrainage, concrete footing and wall, veneer, backfill and finish grading.
- B. Life Cycle Capital Repairs
 - Long term life cycle cost are minimal with good installation and maintenance. Issues focus on physical crash damage, vandalism and erosion around footings.
 - Replacement cycle: 50 plus years
 - A tuckpointing and caulk rehabilitation effort should be programmed at 15 - 20 years.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of concrete retaining wall checking for general condition, cleanliness, graffiti, defects, cracks, damaged components, stability and related items identified under O&M activities above.
- B. CAPITAL FACILITY ASSESSMENT
 - Formal structural inspection and reporting of structural components of segmental unit wall by a MO. licensed structural engineer (PE) following a standardized inspection procedure to be determined by engineer (Every 3 - 5 years).

E-3 Segmental Unit Walls

Description/Context:

Precast modular block units made from concrete used for vertical grade change. System consists of dry or wet cast concrete units that are placed without mortar and rely on their unit to unit interface and combined mass to resist overturning and sliding. Units range from small units (8"x16"x16") to large units (3'x8'x 44") and can be cast to resemble a stone, brick, tile or precast appearance. Set on a prepared aggregate base.

LOC Unit of Measure: Per Square Feet Wall Face (SFW)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Visual review of installed wall checking for proper wall height, units set level with proper batter, subdrainage provided, backfill placed/compacted, caps secured, wall units as specified and free of chips or damage.
 - Obtain copy of design detail and calculations for use by engineer in future assessments.
 - Obtain wall unit manufacturer's recommended maintenance and warranties.
- B. On-going Maintenance
 - Trim grass/vegetation along wall (monthly).
 - Keep area free of debris and trash (monthly).
 - Repair damaged components and remove or paint over graffiti (monthly).
- C. Annual/Periodic Maintenance
 - Check and repair after flooding, particularly for erosion around base or ends of wall (event based).
 - Check and repair segmental units for cracks (annually).

- Check and repair caps (if present) for cracks and adherence to wall units (annually).

Capital Repairs

- A. Asset Investment - Cost includes excavation, aggregate base, subdrainage, segmental unit wall installation, backfill and finish grading.
- B. Life Cycle Capital Repairs
 - Long term life cycle cost are minimal with good installation and maintenance. Issues are limited to physical crash damage and vandalism.
 - Rehabilitation - Replacement of damaged units or wall segments
 - Replacement cycle: 40 - 50 Years

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of segmental unit wall checking for general condition, cleanliness, graffiti, defects, cracks, damaged components, stability and related items identified under O&M activities above.
- B. CAPITAL FACILITY ASSESSMENT
 - Formal structural inspection and reporting of structural components of segmental unit wall by a MO. licensed structural engineer (PE) following a standardized inspection procedure to be determined by engineer (Every 3 - 5 years).

E-4 Living Walls

Description/Context:

Living walls are segmental unit retaining walls where the wall unit includes a pre-formed pocket designed to accommodate soil growing media in which plants are grown. Most units are precast concrete, installed on a prepared aggregate base without mortar. They retain the vertical grades by relying on their unit to unit interface and combined mass to resist overturning and sliding. Units sizes vary. Living walls often include drip irrigation for easier plant establishment and maintenance. Plantings selected for the wall units should be drought tolerant, appropriate for site conditions, sun exposure and expected level of maintenance. LOC Unit of Measure: Per Square Feet Wall Face (SFW)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Visual review of installed living wall checking that units and system are as specified, wall is proper height, units set level with proper batter and free of chips or damage, subdrainage provided, irrigation installed (if included) and specified plantings and soil/compost growing media installed.
 - Obtain copy of design detail and calculations for use by engineer in future assessments.
 - Obtain wall unit manufacturer's recommended maintenance and warranties.
- B. On-going Maintenance
 - Note: Safety consideration will be required to maintain plantings for walls over 6' high (i.e. ladders or safety body harness).
 - If irrigation is not included, hand water as needed (at least 1/week) during 2-years establishment period. Water as required to maintain healthy plant growth thereafter.
 - Weed walls (2/Month - April -Sept.)

- Prune planting and trim grass/vegetation along wall (monthly).
- C. Annual/Periodic Maintenance
 - Check plant viability and replace as needed during season for specific plants (annually).
 - Check and repair after flooding, particularly for erosion around base or ends of wall (event based).
 - Check and repair segmental units for cracks (annually).

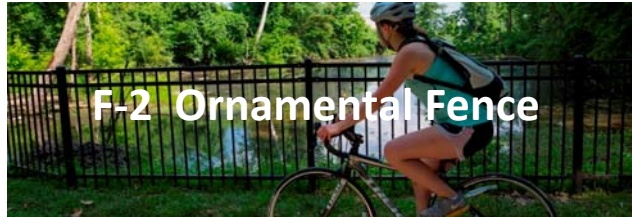
Capital Repairs

- A. Asset Investment - Cost includes excavation, aggregate base, subdrainage, wall unit installation, backfill and finish grading.
- B. Life Cycle Capital Repairs
 - Long term life cycle cost are minimal with good installation and maintenance. Issues are limited to physical crash damage and vandalism.
 - Rehabilitation - Replacement of damaged units or wall segments.
 - Replacement cycle: 40 - 50 Years

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of segmental unit wall checking for general condition, cleanliness, graffiti, defects, cracks, damaged components, stability and related items identified under O&M activities above.
- B. CAPITAL FACILITY ASSESSMENT
 - Formal structural inspection and reporting of structural components of segmental unit wall by a MO. licensed structural engineer (PE) following a standardized inspection procedure to be determined by engineer (Every 3 - 5 years).

LOC Guidelines



F - Fencing

F-1 Chain Link Fence

Description/Context:

Fencing of various heights comprised of galvanized steel post (typ. 10' OC), rails and steel wire woven into diamond mesh fabric. Finish is galvanized or vinyl coated. Fencing often includes single leaf pedestrian gates and double leaf gates for wider vehicular access. Most often posts are buried in a concrete footing. Plate mounted installation is used on walls and sometimes in paved areas.

LOC Unit of Measure: Per Linear Feet (LF)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Check for proper installation: post plumb, rails level, fabric securely fastened, components damage free and materials as specified.
 - Gates swing freely, hardware installed including locking hardware and keeper bar.
 - Obtain manufacturer's recommended maintenance and warranties.
 - Confirm responsibilities for gate locking.
- B. On-going Maintenance
 - Trim vegetation under fence & around post and keep fence free of debris and trash (monthly).
 - Repair damaged components and remove graffiti (monthly).
- C. Annual/Periodic Maintenance
 - Check condition and stability of fence framework (post, top/bottom rails), fabric and gates. Repair damaged components (annually).
 - Check fence finish condition - galvanized and

- vinyl coating. Check for rust (annually).
- Check and repair damage after major storms and flooding (event based).

Capital Repairs

- A. Asset Investment - Cost include fencing materials (post, rails and fabric) and installation (typically with footings).
- B. Life Cycle Capital Repairs
 - Replacement cycle: 20 - 30 Years
 - Consider refurbishing by painting fence to extend useful life.

LOC Evaluation

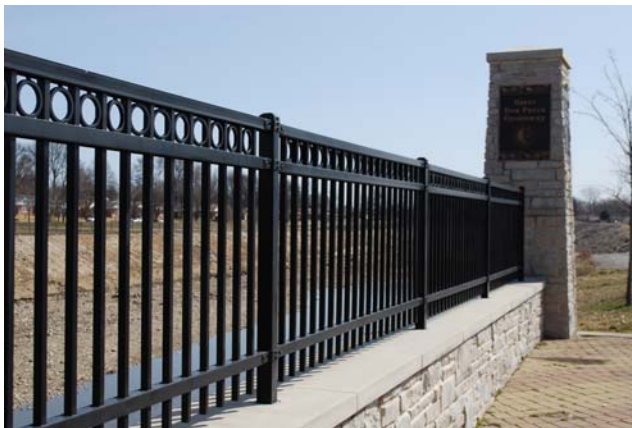
- A. ANNUAL LOC REVIEW
 - Visual inspection of fencing checking for general condition, cleanliness, graffiti, damaged components and stability and related items identified under O&M activities above.
- B. CAPITAL FACILITY ASSESSMENT
 - No formal on-going assessment required.
 - Complete an assessment with a replacement program when the annual review identifies that the fence is nearing the end its usable life span.

F-2 Ornamental Fence

Description/Context:

Steel or aluminum ornamental fence sometimes used in high visibility areas. Post (typ. set 8' OC) with 2 to 3 rails. Post embedded in concrete footing or sometimes plate mounted when set in pavement or on walls. Fencing often includes single leaf pedestrian gates and double leaf gates for wider vehicular access. Typically all members are powder coated finish.

LOC Unit of Measure: Per Linear Feet (LF)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Check for proper installation: post plumb, rails level, fasteners tightened, components damage free and free of chips or scratches, materials as specified.
 - Gates swing freely, hardware installed including locking hardware and keeper bar.
 - Obtain manufacturer's recommended maintenance and warranties.
 - Confirm responsibilities for gate locking.
- B. On-going Maintenance
 - Trim vegetation under fence & around post and keep fence free of debris and trash (monthly).
 - Repair damaged components and remove graffiti (monthly).
- C. Annual/Periodic Maintenance
 - Check condition and stability of fence framework (post, top/bottom rails), pickets and gates. Repair damaged components (annually).

- Check powder coated finish condition and for rust (annually).
- Check and repair damage after major storms and flooding (event based).

Capital Repairs

- A. Asset Investment - Cost include fencing materials (post, rails and panel sections) and installation (typically with footings).
- B. Life Cycle Capital Repairs
 - Replacement cycle: 20 - 30 Years
 - Consider refurbishing by painting fence to extend useful life.

LOC Evaluation

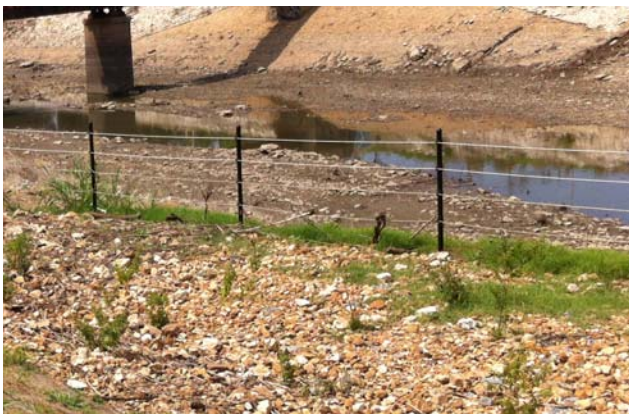
- A. ANNUAL LOC REVIEW
 - Visual inspection of fencing checking for general condition, cleanliness, graffiti, damaged components and stability and related items identified under O&M activities above.
- B. CAPITAL FACILITY ASSESSMENT
 - No formal on-going assessment required.
 - Complete an assessment with a replacement program when the annual review identifies that the fence is nearing the end its usable life span.

F-3 Cable Fence

Description/Context:

Galvanized steel braided cable between black vinyl coated steel posts. This type of fence is typically used as a pedestrian barrier in locations where flooding is frequent. The cable fence does not typically collect flood debris as readily as a chain link fence.

LOC Unit of Measure: Per Linear Feet (LF)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Check for proper installation: post plumb, cables securely fastened, components damage free, materials as specified.
 - Obtain manufacturer's recommended maintenance and warranties.
- B. On-going Maintenance
 - Keep fence free of debris and trash (monthly and after storm and flood events).
 - Trim vegetation under fence & around post (monthly).
 - Repair damaged components and remove graffiti (monthly).
- C. Annual/Periodic Maintenance
 - Check condition and stability of post and cables. Repair damaged components (annually).
 - Check fence finish condition - galvanized and vinyl coating. Check for rust (annually).
 - Check and repair damage after major storms and flooding (event based).

Capital Repairs

- A. Asset Investment - Cost include fencing materials (post and cables) and installation (typically with footings).
- B. Life Cycle Capital Repairs
 - Replacement cycle: 20 - 30 Years
 - Consider refurbishing by painting post to extend useful life.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of cable fencing checking for general condition, cleanliness, graffiti, damaged components and stability and related items identified under O&M activities above.
- B. CAPITAL FACILITY ASSESSMENT
 - No formal on-going assessment required.
 - Complete an assessment with a replacement program when the annual review identifies that the fence is nearing the end its usable life span.

F-4 Welded Wire Fence

Description/Context:

Powder coated steel or stainless steel fence system comprised of panels between posts - generally available in heights up to 8'. Fencing often includes single leaf pedestrian gates and double leaf gates for wider vehicular access. Due to minimal visual impact, dark colored fences are sometimes called "invisible fences".

LOC Unit of Measure: Per Linear Feet (LF)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Check for proper installation: post plumb, panels securely fastened, no scratches or damage, materials as specified.
 - Gates swing freely, hardware installed including locking hardware and keeper bar.
 - Obtain manufacturer's recommended maintenance and warranties.
 - Confirm responsibilities for gate locking.
- B. On-going Maintenance
 - Trim vegetation under fence & around post and keep fence free of debris and trash (monthly).
 - Repair damaged components and remove graffiti (monthly).
- C. Annual/Periodic Maintenance
 - Check condition and stability of fence components including post, panels and gates. Repair damaged components (annually).
 - Check powder coated finish condition for

- damage and/or rust and repair (annually).
- Check and repair damage after major storms and flooding (event based).

Capital Repairs

- A. Asset Investment - Cost include fencing materials (post and welded wire panels) and installation (typically with footings).
- B. Life Cycle Capital Repairs
 - Replacement cycle: 20 - 30 Years
 - Consider refurbishing by painting fence to extend useful life.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of fencing checking for general condition, cleanliness, graffiti, damaged components and stability and related items identified under O&M activities above.
- B. CAPITAL FACILITY ASSESSMENT
 - No formal on-going assessment required.
 - Complete an assessment with a replacement program when the annual review identifies that the fence is nearing the end its usable life span.

F-5 Precast Rail Fence

Description/Context:

Precast concrete fence (Typically 3' to 5' ht) comprised of post and 2 to 4 rails. The concrete rails typically slide into the post. Available in different finishes and integral colors.

LOC Unit of Measure: Per Linear Feet (LF)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Check for proper installation: post plumb, rails square, components damage free and materials as specified.
 - Obtain manufacturer's recommended maintenance and warranties.
- B. On-going Maintenance
 - Trim vegetation along fence and post and keep fence free of debris and trash (monthly).
 - Repair damaged components and remove or paint over graffiti (monthly).
- C. Annual/Periodic Maintenance
 - Check condition and stability of fence components (post and rails) and gates. Repair damaged components (annually).
 - Check and repair damage after major storms and flooding (event based).

Capital Repairs

- A. Asset Investment - Cost include fencing materials (post and rails) and installation (typically with footings).
- B. Life Cycle Capital Repairs
 - Long term life cycle cost are minimal with good installation and maintenance. Issues are limited to physical crash damage and vandalism.
 - Replacement cycle: 30 - 40 Years

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of precast rail fence checking for general condition, cleanliness, graffiti, damaged components and stability and related items identified under O&M activities above.
- B. CAPITAL FACILITY ASSESSMENT
 - No formal on-going assessment required.
 - Complete an assessment with a replacement program when the annual review identifies that the fence is nearing the end its usable life span.

F-6 Precast Screen Wall

Description/Context:

Precast concrete site wall comprised of post and panels (often stacked to desired height), ranging in height from 6' - 20'. The concrete panels slide between posts to form a strong barrier that is effective not only to screen views but also to function as a sound buffer. Available in different rusticated finishes and integral color.

LOC Unit of Measure: Per Liner Feet (LF)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Check for proper installation: post plumb, panels square, components damage free, materials as specified.
 - Obtain manufacturer's recommended maintenance and warranties.
- B. On-going Maintenance
 - Trim vegetation along wall (monthly).
 - Keep wall free of debris and trash (monthly).
 - Repair damaged components and remove or paint over graffiti (monthly).
- C. Annual/Periodic Maintenance
 - Check condition and stability of screen wall components including post, panels and gates. Repair damaged components (annually).
 - Thoroughly clean/power wash (2 - 3 years).
 - Check wall finish condition for damage and/or discoloration. Repaint, re-stain or reseal (± 5 years).
 - Check and repair damage after major storms and flooding (event based).

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of precast wall checking for general condition, cleanliness, graffiti, damaged components and stability and related items identified under O&M activities above.
- B. CAPITAL FACILITY ASSESSMENT
 - Formal structural inspection and reporting of structural components of precast wall by a MO. licensed structural engineer (PE) following a standardized inspection procedure to be determined by engineer. (Every 3 - 5 years)
 - Complete an assessment with a replacement program when the annual review identifies that the screen wall is nearing the end its usable life span.

Capital Repairs

- A. Asset Investment - Cost include screen wall materials (post and panel insets) and installation (typically with footings).
- B. Life Cycle Capital Repairs
 - Long term life cycle cost are minimal with good installation and maintenance. Issues are limited to physical crash damage and vandalism.
 - Replacement cycle: 30 - 40 Years

F-7 Wood Privacy Fence

Description/Context:

Wood fences (generally 6' - 12') intended to provide a physical and visual barrier of unsightly feature.

LOC Unit of Measure: Per Linear Feet (LF)



Operations & Maintenance

- A. Acceptance Requirements
 - Check for proper installation: post plumb, panels square, fasteners tightened, components damage free and free of chips or scratches and materials as specified.
 - Gates swing freely, hardware installed including locking hardware and keeper bar.
 - Obtain recommended maintenance and warranties.
- B. On-going Maintenance
 - Trim vegetation under fence & around post and keep fence free of debris and trash (monthly).
 - Repair damaged components and remove graffiti (monthly).
- C. Annual/Periodic Maintenance
 - Check condition and stability of framework components (post, top/bottom rails), panels, boards and gates. Inspect for warped or damaged members. Repair damaged components using appropriate wood type (cedar or

treated wood for structural components and wood in soil contact) (annually).

- Check wall finish condition for damage and/or discoloration. Remove mildew/algae buildup by thoroughly cleaning/power washing (annually).
- Check and repair damage after major storms and flooding (event based).
- Power wash and apply oil based clear finish or stain (5 years).

Capital Repairs

- A. Asset Investment - Cost include fencing materials (post, rails, panels or boards) and installation (typically with footings).
- B. Life Cycle Capital Repairs
 - Replacement cycle: 15 - 20 Years

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of fencing checking for general condition, cleanliness, graffiti, damaged components and stability and related items identified under O&M activities above.
- B. CAPITAL FACILITY ASSESSMENT
 - No formal on-going assessment required.
 - Complete an assessment with a replacement program when the annual review identifies that the fence is nearing the end its usable life span.

F-8 Composite Fence

Description/Context:

Rail, picket and panel fencing (3' to 8') made from composites, recycled and/or PVC/Vinyl materials. Fencing used as a physical barrier and/or visual screen.

LOC Unit of Measure: Per Linear Feet (LF)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Check for proper installation: post plumb, rails/panels level, fasteners tightened, components damage free and free of chips or scratches and materials as specified.
 - Gates swing freely, hardware installed including locking hardware and keeper bar.
 - Obtain manufacturer's recommended maintenance and warranties.
 - Confirm responsibilities for gate locking.
- B. On-going Maintenance
 - Trim vegetation under fence & around post and keep fence free of debris and trash (monthly).
 - Repair damaged components and remove graffiti (monthly).
- C. Annual/Periodic Maintenance
 - Thoroughly clean and/or power wash to remove mildew/algae buildup (annually).
 - Check condition and stability of fence components (post and rails) and gates. Inspect

for warped or damaged members. Repair damaged components (annually).

- Check and repair damage after major storms and flooding (event based).

Capital Repairs

- A. Asset Investment - Cost include fencing materials (post, railings or panel insets) and installation (typically with footings).
- B. Life Cycle Capital Repairs
 - Replacement cycle: 15 - 20 Years

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of fencing checking for general condition, cleanliness, graffiti, damaged components and stability and related items identified under O&M activities above.
- B. CAPITAL FACILITY ASSESSMENT
 - No formal on-going assessment required.
 - Complete an assessment with a replacement program when the annual review identifies that the fence is nearing the end its usable life span.

LOC Guidelines



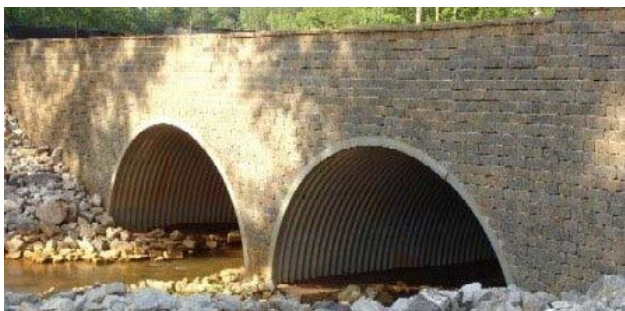
G - Stormwater

G-1 Culverts

Description/Context:

A structure that allows water to flow under a road, railroad, trail, or similar routing from one side to the other side. Culverts types include corrugated metal pipe, concrete pipe (RCP), concrete box culvert and high-density polyethylene (HDPE) pipe. The ends of smaller culverts often have flared end sections; larger culverts typically have a headwall (poured PCC or segmental wall); many culvert ends are rip-rapped.

LOC Unit of Measure: Per Each



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify proper installation per contract documents and punch list items completed/accepted.
 - Confirm acceptance by applicable stormwater review agency for the project location.
 - Verify profile slope grades and drainage thru pipe.
 - Confirm and note maximum vehicle loading per the design accommodates.
- B. On-going Maintenance
 - Trim vegetation and remove trash/debris to maintain stormwater flow without blockage. (monthly).
 - Confirm culvert is clear to allow drainage through pipe (monthly).
- C. Annual/Periodic Maintenance
 - Check and repair eroded and unstable slope and rip rap at culvert ends. (annually).
 - Check drainage structure joints and seams for failure (annually).

- Remove fallen trees and limbs that restrict stormwater flow as required after major storms and flooding (event based).

Capital Repairs

- A. Asset Investment - Cost include piping or culvert materials, grading/excavation, installation (typically with flared end or headwall) and finish grading/shaping.
 - Culvert sizes and lengths vary significantly
- B. Life Cycle Capital Repairs
 - Long term life cycle cost are minimal with good installation and maintenance.
 - Replacement Cycle: 50 years

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual Inspection of the culvert check general condition, structure condition, water flow obstructions, stability of end conditions, graffiti and vegetative cover along drainage path and items identified under O&M activities above.
- B. CAPITAL FACILITY ASSESSMENT
 - No formally scheduled assessments. If annual review identifies specific issues, a Missouri licensed engineer should conduct an inspection and prepare recommendations to address issues.

G-2 Rock Blanket

Description/Context:

A rock blanket (often referred to as rip-rap) used to stabilize and provide erosion protection by armor-ing stream banks and lake/pond shores. It's typi-cally comprised of a layer of rock (most often crushed limestone in categorical sizes ranging from 3" to 28") set over aggregate base. Rock blankets can be planted with native vegetation as a bio-stabilization composite revetment.

LOC Unit of Measure: Per Square Yard (SY)



Operations & Maintenance

- A. Acceptance Requirements
 - Verify proper installation per contract documents and that punch list items completed/accepted.
 - Confirm proper coverage, slopes and rock blanket thickness.
 - Confirm allowable forms and amount of vegetation growth.
- B. On-going Maintenance
 - Check and remove trash/debris and any fallen limbs/trees impacting water flow (monthly).
- C. Annual/Periodic Maintenance
 - Confirm Check for slope stability and repair any erosion (annually).
 - Confirm vegetative growth is compatible. Remove undesirable and invasive species (annually).
 - Remove fallen trees/limbs and points of flow restrictions (semiannually).

Capital Repairs

- A. Asset Investment - Cost include grading, aggregate base and rock blanket installation.
- B. Life Cycle Capital Repairs
 - There are no long term life cycle cost other than repair from erosion or settlement damage.
 - Replacement Cycle: None - only repair
 - Reconstruction - If settlement or storm related erosion occurs, complete an engineering review (including geotechnical evaluation) to define cause/issues and redesign and reconstruct accordingly.

LOC Evaluation

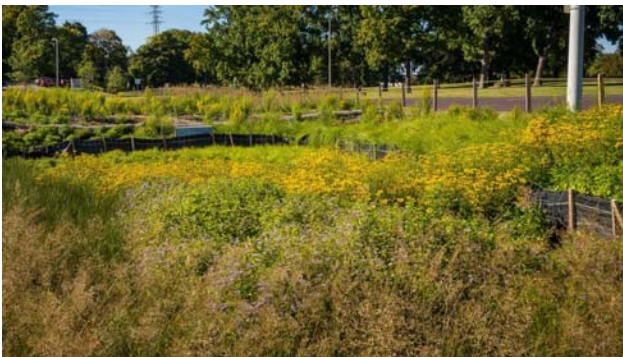
- A. ANNUAL LOC REVIEW
 - Visual inspection of the rock blanket to check general condition, settlement or erosion, water flow obstructions, graffiti, types of vegetative growth and items identified under O&M activities above.
- B. CAPITAL FACILITY ASSESSMENT
 - No formally scheduled assessments. If annual review identifies specific issues, a Missouri licensed engineer should conduct an inspection and prepare recommendations to address issues.

G-3 Bio-Retention Cells

Description/Context:

A bio-retention cell, also called a rain garden, is designed to collect, hold and treat storm-water runoff from adjacent impervious surfaces. Bio-retention is the process in which sedimentation and contaminants are removed from the storm-water runoff using a modified soil profile consisting of a mixture of soil, organics and sand.

LOC Unit of Measure: Per Square Yard (SY)



Operations & Maintenance

- A. Acceptance Requirements
 - Verify proper installation per contract documents; viable plant material; punch list items completed; and no construction sediment in the cell; and the overflow drainage structure is working.
 - After storm event confirm water percolation thru soil and cell drain down time <24-hours.
 - Confirm contractor requirements for plant material maintenance and warranty.
 - Confirm acceptance by applicable stormwater review agency for the project location.
- B. On-going Maintenance
 - Maintain per applicable landscape LOC guidance including trash/debris removal (weekly).
 - Check and clean overflow drainage pipe or structures in spring and fall (semiannually).
- C. Annual/Periodic Maintenance
 - Remove organic material (leaves, limbs,

grasses) from cells in late winter after trimming (annually).

- Check cell percolation for full drain down within 24-hours after a storm (annually).
- Check and repair any erosion on side slopes or bottom of cell (annually).
- Complete annual LOC landscape requirements including mulching (annually).

Capital Repairs

- A. Asset Investment - Cost include site grading and shaping, subgrade preparation, specified backfill and piping. Plantings are addressed in the landscape guidelines.
- B. Life Cycle Capital Repairs
 - Replacement Cycle: 10 to 25 years
 - Capital repairs will vary greatly based on site conditions, particularly the runoff sediment and contaminant load level and type.
 - Reconstruction - Anticipate soil media removal/replanting required at 10-25 years.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of bio-retention cell components including drainage system, plants, and mulch for conformance to LOC and the MSD/Sponsor Maintenance Agreement (confirm that required MSD inspection and report (see below) have been completed).
- B. CAPITAL FACILITY ASSESSMENT
 - MSD requires within the Maintenance Agreement a formal annual inspection and report of Bio-Retention Cell BMP's (Best Management Practice) by an engineer or qualified technician (annually).
 - If annual MSD inspection/report identifies specific issues, a qualified licensed professional should complete further investigation and prepare recommendations to address issues.
 - Monitor reports to identify when replacement will be required to begin budget programming.

G-4 Amended Soils

Description/Context:

Amended soils in the context of this stormwater guideline refers to specific designated areas where the soil has been modified by incorporating compost or related material to be more absorptive. The amended soils provide a “sponge” effect for absorbing water that is then infiltrated, evaporated, and transpired in landscape areas. The purpose is to manage runoff close to the source, reducing impervious surfaces runoff to the sewer system. Amended soil areas are a component of a project’s stormwater management approvals and require annual monitoring with reports.
LOC Unit of Measure: Per Square Yard (SY)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify proper installation per contract documents, viable plant material; no ponding; and punch list items completed.
 - Confirm construction did not leave sediment on the amended soil.
 - Confirm acceptance by applicable stormwater review agency for the project location.
 - Confirm contractor requirements for plant material maintenance and warranty.
- B. On-going Maintenance
 - Maintain per applicable landscape LOC guidance including trash/debris removal (weekly).
 - Check and remove any sediment and repair any erosion (monthly).
- C. Annual/Periodic Maintenance
 - Complete annual landscape LOC requirements including mulching.(annually).

- Check for adequate vegetative cover - reseed/replant as required (semiannually).
- Remove organic material, leaves, limbs and excess plant material (semiannually).

Capital Repairs

- A. Asset Investment - Cost include soil compost type amendments tilled into soil, site grading/shaping. Lawn or plantings are addressed in the landscape guidelines.
- B. Life Cycle Capital Repairs
 - Replacement Cycle: 10 to 25 years
 - Capital repairs will vary greatly based on site conditions, particularly the runoff sediment and contaminant load level and type.
 - Reconstruction - Anticipate soil media will require amending or replacement and replanting at 10 - 25 years.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of amended soil area including surface drainage, grass/plant material condition and mulch for conformance to LOC and the MSD/Sponsor Maintenance Agreement (confirm that required MSD inspection and report (see below) have been completed.)
- B. CAPITAL FACILITY ASSESSMENT
 - MSD requires within the Maintenance Agreement a formal annual inspection and report of Amend-ed Soil BMP’s by an engineer or qualified technician. (annually)
 - If annual MSD inspection/report identifies specific issues, a qualified licensed professional should complete further investigation and prepare recommendations to address issues.
 - Monitor reports to identify when replacement will be required to begin budget programming.

G-5 Sheet Flow to Buffer

Description/Context:

Sheet flow to buffer in the context of this storm-water guideline refers to directing water from impervious surfaces over a vegetative buffer at a uniform depth and flow. Buffers are intended to slow the flow of water and treat pollutants prior to the water entering into a water body or storm sewer system. Buffers can be developed as part of project construction or they can be existing areas with an appropriate vegetative cover used as a buffer.

LOC Unit of Measure: Per Square Yard (SY)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify location and size of buffer area.
 - Confirm any construction work within buffer was installed per contract documents, viable plant material; no ponding, punch list items completed, and when applicable Metropolitan Sewer District (MSD) acceptance.
 - Confirm construction did not leave sediment in the buffer area.
 - Confirm Contractor's required plant material maintenance and warranty.
- B. On-going Maintenance
 - Maintain per applicable landscape LOC guidance including trash/debris removal (weekly)
 - Check and remove any sediment and repair any erosion (monthly).
- C. Annual/Periodic Maintenance
 - Complete annual landscape LOC require-

ments including mulching (annually).

- Check for adequate vegetative cover - re-seed/replant as required (semiannually).
- Remove organic material, leaves, limbs and excess plant material (semiannually).

Capital Repairs

- A. Asset Investment - If existing area meets slope criteria there is almost no cost. Developed area cost include site grading and shaping. Lawn or plantings are addressed in the landscape guidelines.
- B. Life Cycle Capital Repairs
 - Capital repairs based on Landscape LOC and generally be required to repair buffers damaged from storms, erosion, disturbance, disease or infestations.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of buffer area including surface drainage, grass/plant material condition and mulch for conformance to LOC and the MSD/Sponsor Maintenance Agreement (confirm that required MSD inspection and report (see below) have been completed.)
- B. CAPITAL FACILITY ASSESSMENT
 - MSD requires within the Maintenance Agreement a formal annual inspection and report of buffer areas by an engineer or qualified technician. (annually)
 - If annual MSD inspection/report identifies specific issues, a qualified licensed professional should complete further investigation and prepare recommendations to address issues.
 - Monitor reports to identify when replacement will be required to begin budget programming.

G-6 Ponds and Wetlands



Description/Context:

Ponds and wetlands are areas saturated with water, either permanently or seasonally, such that it takes on the characteristics of a distinct ecosystem. The primary factor that distinguishes wetlands from other land forms or water bodies is the soil characteristics and vegetation cover of aquatic type plants that have adapted to the unique soils. Wetland designation is a formal process completed by a qualified professional soil scientist. (Coordinate with LOC guideline “C-12 Wetlands - Marshes” for wetland landscape maintenance.)
LOC Unit of Measure: Per Acre (Ac)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify designated location, limits and size of wetland area.
 - Confirm construction work was kept out of wetland area or any within the wetland was completed per contract documents and accepted.
 - Confirm construction did not leave sediment in the wetland area.
- B. On-going Maintenance
 - Check plant growth (monthly).
 - Check and remove trash/debris (monthly).
 - For wet ponds, check for algae growth during summer and address source conditions (bi-weekly).
- C. Annual/Periodic Maintenance
 - Check that overflow and drainage structures are clear and draining properly when present (monthly).

- Remove invasive non-native plants (annually).
- Correct erosion along side slopes (annually).
- Remove fallen trees and limbs that restrict stormwater flow as required after major storms and flooding (event based).

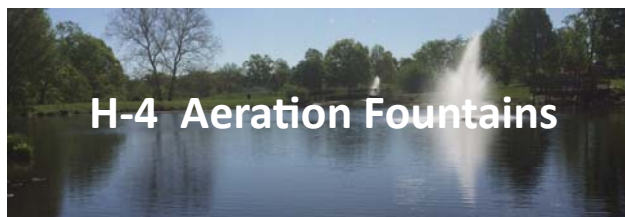
Capital Repairs

- A. Asset Investment - Existing area cost vary to include addressing hydrologic or environmental issues. New area cost include grading and piping. Plantings are addressed in the landscape guidelines.
- B. Life Cycle Capital Repairs
 - Capital repairs will vary greatly based on site conditions, particularly the runoff sediment and contaminant load level and type.
 - Reconstruction - Generally not required if good maintenance practices are followed. Issues can arise from excessive sediment infiltration or invasive plant material infestations.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of ponds and wetlands including drainage and grass/plant material conditions for conformance to LOC . If pond or wetland is an MSD BMP comply with the MSD/Sponsor Maintenance Agreement (confirm that required MSD inspection and report (see below) have been completed.)
- B. CAPITAL FACILITY ASSESSMENT
 - If this is an MSD BMP, complete requirements of the Maintenance Agreement including a formal annual inspection and report of buffer areas by an engineer or qualified technician. (annually)
 - If annual MSD inspection/report identifies specific issues, a qualified licensed professional should complete further investigation and prepare recommendations to address issues.
 - Monitor reports to identify when replacement will be required to begin budget programming.

LOC Guidelines



H - Lakes & Streams

H-1 Lake/Pond Overflow Structures

Description/Context:

Structure used to regulate the outgoing flow of stormwater from a lake or pond. Typically of concrete, corrugate metal or HDPE construction and often referred to as a weir, overflow or diversion structure. Types include concrete weir, concrete manhole with grate, and/or pipe with grate. Lake structures can also be at incoming piped stormwater that enters the lake, typically with a head-wall, flared end or rip-rap.

LOC Unit of Measure: Per Each



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify proper installation per contract documents, punch list items completed and acceptance by applicable stormwater review agency for the project location (obtain copy of required As-Built Survey).
 - Verify clear flow without sediment in structure.
 - During storm event confirm the drainage is working and confirm overflow bypass is functioning.
- B. On-going Maintenance.
 - Trim vegetation and remove trash/debris to maintain stormwater flow without blockage. (monthly).
 - Check for erosion on side slopes and at outfall structure (monthly).
- C. Annual/Periodic Maintenance
 - Check and repair eroded and unstable slopes and rip rap around lake structure and outfall (annually).

- Check and repair drainage structure joints and seams for failure (annually).
- Remove fallen trees and flow restrictions as required after major storms and flooding (event based).

Capital Repairs

- A. Asset Investment - Cost include excavation, aggregate base, overflow structure, installation, sometimes piping and finish grading/shaping.
- B. Life Cycle Capital Repairs
 - Long term life cycle cost are minimal with good installation and maintenance.
 - Metal grating replacement 20 - 25 years
 - Replacement Cycle:
 - Concrete Structures 50 years
 - Corrugated Metal Structures: ±25 years

LOC Evaluation

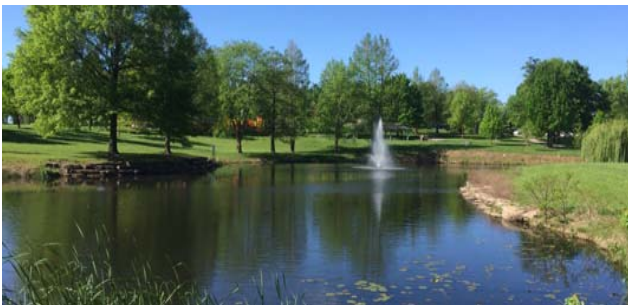
- A. ANNUAL LOC REVIEW
 - Visual inspection of the lake structure to check general condition, structure condition, water flow, obstructions, stability, graffiti, vegetation and items identified under O&M activities above.
- B. CAPITAL FACILITY ASSESSMENT
 - Formal structural inspection and reporting of structural components of segmental unit wall by a MO. licensed structural engineer (PE) following a standardized inspection procedure to be determined by engineer (Every 3 years)

H-2 Pond & Lake Shores

Description/Context:

The pond and lake shore area refers to the edge condition directly adjacent to a lake or pond which slopes toward the water body. It covers the entire bank from the waterline to the crest of the slope or the first definable break in slope, either natural or constructed feature. Types of edges varies from natural soil with vegetative cover (native and ornamental grasses/plantings and turf grass) to hardscape treatment (stone, rock, cobbles, rip rap or wall).

LOC Unit of Measure: Per Linear Feet (LF)



Operations & Maintenance

- A. Acceptance Requirements
 - Verify proper installation per contract documents, punch list items completed and where applicable acceptance by applicable storm-water review agency for the project location
 - Obtain copy of As-Built Survey and confirm low and high water levels.
 - Confirm no erosion and slope is solid and stable.
- B. On-going Maintenance
 - Trim vegetation and remove trash/debris from shore and waters edge (monthly).
 - Complete landscape LOC requirements (weekly).
 - Check and repair any erosion on side slopes and at structures (monthly).
- C. Annual/Periodic Maintenance
 - Remove organic material (leaves, limbs, grasses) from shoreline in late winter after trimming (annually).

- Remove fallen trees and flow restrictions as required after major storms and flooding (event based).

Capital Repairs

- A. Asset Investment - Cost include grading, surface treatment ranging from hardscape (i.e. rock or walls with aggregate base) to vegetative cover or a combination. Plantings are addressed in the landscape guidelines.
- B. Life Cycle Capital Repairs
 - Capital repairs will vary based on site conditions, but generally are limited if installed correctly and well maintained.
 - Once establish both planted and hardscape shorelines require limited long term capital repairs. Issues can arise from erosion, physical damage, over growth or rodent infestation.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection lake or pond shore including surface drainage, plants, and mulch for conformance to LOC requirements above and within the landscape LOC section.
- B. CAPITAL FACILITY ASSESSMENT
 - No regularly scheduled formal assessment. When erosion, lack of plant growth or other damage is noted in Annual LOC Review, have a qualified professional inspect and prepare a recommended remedial action plan to address issue.

H-3 Stream and Creek Banks

Description/Context:

Stream and creek banks refer to the side slopes directly along a watercourse, which defines and channels water flow. These banks need protection from erosion and to maintain the integrity of a watercourse. The bank extends to the crest of the slope or the first definable break in slope, either natural or constructed feature. Bank protection can vary from a natural or introduced vegetative cover (i.e. grasses, perennials, shrubs and trees) to hardscape treatment (i.e. stone, rock, cobbles and riprap).

LOC Unit of Measure: Per Linear Feet (LF)



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify proper installation per contract documents, punch list items completed and where applicable MSD acceptance.
 - Confirm no eroded areas and where present hardscape is solid and stable.
 - Check LOC Landscape requirements.
- B. On-going Maintenance
 - Trim vegetation and remove trash/debris from stream/creek bank edge (monthly).
 - Check and repair any erosion on side slopes and at structures (monthly).
 - Check and repair erosion on side slopes (monthly).
- C. Annual/Periodic Maintenance
 - Complete annual landscape LOC requirements including mulching (annually).
 - Remove organic material (leaves, limbs, grasses) from stream and creek banks in late winter after trimming (annually).
 - Repair side slope erosion and riprap

(annually).

- Check locations of drainage pipes along stream banks for potential erosion (annually).
- Remove fallen trees and flow restrictions as required after major storms and flooding (event based).

Capital Repairs

- A. Asset Investment - Cost include grading, surface treatment ranging from hardscape (i.e. rock or walls with aggregate base) to vegetative cover or a combination. Plantings are addressed in the landscape guidelines
- B. Life Cycle Capital Repairs
 - Capital repairs will vary based on site conditions, but are generally limited if installed correctly and well maintained.
 - Once establish both planted and hardscape stream and creek banks require limited long term capital repairs. Issues can arise from erosion, physically damage, over growth or rodent infestation.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection stream and creek banks including surface drainage, plants, and mulch for conformance to LOC requirements above and within the landscape LOC section.
- B. CAPITAL FACILITY ASSESSMENT
 - No regularly scheduled formal assessment. When erosion, lack of plant growth or other damage is noted in Annual LOC Review, have a qualified professional inspect and prepare a recommended remedial action plan to address issue.

H-4 Aeration Fountains

Description/Context:

Mechanical device that provides aeration for a body of water for the purpose to improve water quality. Types include surface floating aeration fountain, paddlewheel aerators and sub-surface aeration by use of bubble and/or jet aerators. Electric service is required to operate.

LOC Unit of Measure: Per Each



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Check fountain for proper installation in accordance with electrical codes, secured anchors in place and fully operational.
 - Obtain manufacturer's recommended maintenance and warranties.
 - Confirm programmed operational schedule (seasons of use and daily operation schedule).
- B. On-going Maintenance
 - Confirm fountain performance, functions and correct timer settings (monthly).
 - Remove litter and debris from lake and check filters for clogging (monthly).
 - Check algae growth during summer (weekly).
- C. Annual/Periodic Maintenance
 - Check pumps and associated mechanical equipment for proper working condition (semiannually).
 - Pull floating fountains for annual inspection and maintenance of pump, plumbing and electric (annually).

- Check power supply for damage and repair as required (annually).
- Check anchoring system to insure proper support for floating fountains (annually).

Capital Repairs

- A. Asset Investment - Cost includes equipment purchase, electric service and installation.
- B. Life Cycle Capital Repairs
 - Good maintenance will extend pump life.
 - Replacement Cycle: Somewhat dependent on level of use - generally 7-8 years.
 - Replacing just the pump to extend life is optional, but with labor cost generally more cost effective to replace entire fountain.

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of floating fountains should check for function, general condition, height of spray, damaged components, anchor stability and related items identified under O&M activities above.
- B. CAPITAL FACILITY ASSESSMENT
 - No formal on-going assessment required.
 - Complete an assessment with a replacement program when the annual review identifies that the fountain is nearing its usable life span.

LOC Guidelines



I - Electric & Lighting

I-1 Exterior Lighting

Description/Context:

Exterior lighting is used to illuminate the trail, parking, and/or other assets of the greenway system. For LOC purposes all lighting is within this category, whether pedestrian, street, parking and/or other (i.e. bollard) lighting.

LOC Unit of Measure: Per Each



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Check for proper installation (plumb, level, 2' clear of trail), fasteners secured,, free of paint chips or scratches, no damaged components, conduit backfilled & electric panels secured.
 - Verify lighting is functioning, distribution as intended and timer or photo cell working.
 - Obtain manufacturer's recommended maintenance and warranties.
- B. On-going Maintenance
 - Check for proper working lamps and timer/ photo cell operation (monthly).
 - Re-lamp light fixtures as necessary.
 - Adjust control timers 2 - 4 times per year.
- C. Annual/Periodic Maintenance
 - Clean lamp/lens components of debris and dead insects (annually).
 - Check and repair covers, handholds, access points are tightened and secured (annually).
 - Check and repair banner arms and attachments for stability (annually).

- Touchup paint as necessary (annually).

Capital Repairs

- Asset Investment - Cost includes lighting equipment (pole and luminaire fixture), installation, concrete footing, controller and electric service.
- B. Life Cycle Capital Repairs
 - Capital Repairs vary based on pole and fixture type and materials. Proper maintenance will maximize useful life of pole and fixtures.
 - Consider refurbishing exterior lighting by replacing just the fixture (utilizing existing pole and electric distribution) to extend useful life and often reduce electric consumption - 10 to 15 years
 - Total Replacement Cycle: ±25 Years

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of the light pole, lamp, banners, and other attachments for damage and deficiency. Confirm lights and timing working properly.
- B. CAPITAL FACILITY ASSESSMENT
 - No formal on-going assessment required. Address issues as identified.
 - Complete an assessment with a replacement program when the annual review identifies that the fountain is nearing it's usable life span.

LOC Guidelines



J - Buildings

J-1 Shelters

Description/Context:

Metal or wood pavilions adjacent to the trail. Roof material is typically asphalt singles or metal. Used as picnic facility, shaded rest area (with benches), entryways and protection from overhead elements. Most shelters are pre-fabricated, hauled and assembled on site, but some are “stick-built” on site. Many shelters include lighting and electric outlets. LOC Unit of Measure: Per Each



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify proper construction and installation per contract documents including ADA compliance, punch list items completed/accepted and regulatory agency acceptance.
 - Confirm lighting, electric outlets and any equipment is working.
 - Obtain copy of: design calculations (for use in future assessments), shop drawings, manufacturer’s recommended maintenance and warranties.
- B. On-going Maintenance
 - Sweep floor (hose when needed), pickup trash/debris, empty receptacles and clean tables (2X/week).
 - Check/repair lighting, electric outs, structure damage or graffiti (weekly).
- C. Annual/Periodic Maintenance
 - Thoroughly clean floor, post, roof underside by power washing and clear roof/gutters of

leaves and debris (annually).

- Inspect for pest (insects, termites and rodents) and check base of wood posts for rot. (annually)
- Inspect and repair any damage to roof, post, masonry, siding, paint, caulking, grout, structural elements, flashing, lighting, electric outlets, or hardware (annually).
- Check expansion joints in concrete pad and re-caulk as needed. (annually)

Capital Repairs

- A. Asset Investment - Cost include site preparation and grading, concrete pad with aggregate base (or structural decking), access walks, shelter structure, footings, lighting, electric and finish grading.
- B. Life Cycle Capital Repairs
 - Capital repairs vary based on construction type and materials.
 - Roof replacement - 15 to 20 years
 - Total replacement Cycle: ±40 Years

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of shelter checking roof, footings, electric panel, conduit and outlets, drinking fountain and light fixtures for general condition, cleanliness, graffiti, defects, cracks, damaged components, stability and related items identified under O&M activities above.
- B. CAPITAL FACILITY ASSESSMENT
 - Complete a detailed assessment of all shelter components every five years by a qualified professional (inspector, architect or engineer). For issues identified have qualified professional follow-up with recommendations on corrective actions.
 - Complete an assessment that include a renovation or replacement program at 20 years.

J-2 Restrooms

Description/Context:

Permanent structures located adjacent to the greenway with lavatory facilities (toilet and wash-basin). Exterior building materials can be concrete block, brick, stone, wood or composite material. Roof material is typically comprised of metal roofing or asphalt shingles. Many restrooms are built on-site, but some are pre-fabricated and hauled to site. Most have electric/lighting and some are heated. Waste systems include sanitary sewer, septic and composting.

LOC Unit of Measure: Per Each



Greenway Level of Care Guidelines

Operations & Maintenance

- A. Acceptance Requirements
 - Verify construction is per contract documents ADA compliant, punch list items completed/ accepted and regulatory agency acceptance.
 - Confirm plumbing, electric/lighting, and HVAC systems are working. If present, confirm septic field location with development restricted.
 - Obtain copy of: design calculations (for use in future assessments), shop drawings, manufacturer's recommended maintenance (including winterization) and warranties.
- B. On-going Maintenance
 - Sweep floors, pickup trash/debris, empty receptacles, clean restroom fixtures and check/replace supplies (i.e. hand soap, toilet paper, paper towels) (daily or every 2 days)
 - Wash floors (2/month).
 - Check/repair lighting, electric outs, structure damage or graffiti (weekly).
- C. Annual/Periodic Maintenance
 - Thoroughly clean floor, post, roof underside

by power washing. Clear roof/gutters of leaves and debris (semiannually).

- Inspect for pest (insects, termites and rodents) and check base plates and wood posts for rot (annually).
- Thoroughly inspect and repair damage to roof, post, masonry, siding, paint, caulk, grout, structural elements, flashing, lighting, electric outlets, doors, fixtures, partitions, hardware and locks (annually).
- Septic systems: Inspect annually and pump out tank every 3-5 years.

Capital Repairs

- A. Asset Investment - Cost include site grading, concrete pad (or structural deck), structure, footings, lighting, electric and finish grading..
- B. Life Cycle Capital Repairs
 - Roof replacement - 15 to 20 years
 - Interior renovation (including fixture & stall partition replacement) 15—20 years
 - Septic system replacement: 20 years
 - Total replacement cycle: ±40 Years

LOC Evaluation

- A. ANNUAL LOC REVIEW
 - Visual inspection of restrooms checking roof, footings, plumbing fixtures, electric panel, conduit outlets, lighting and drinking fountain for general condition, cleanliness, graffiti, defects, cracks, damaged components, stability and related items identified under O&M activities above.
- B. CAPITAL FACILITY ASSESSMENT
 - Complete a detailed assessment of all restroom components every five years by a qualified professional (inspector, architect or engineer). For issues identified have qualified professional follow-up with recommendations on corrective actions.
 - Complete an assessment that includes a renovation or replacement program at 20 years.

LOC Implementation



Overview

Tools have been developed to assist in implementing the Greenway LOC Guidelines over the broad geographic extent, different site conditions and various partners comprising the greenway system. These tools should assist in not only in implementing the guidelines, but also in understanding the overall level of commitment required to sustain the greenways as a regional resource and consistently provide a positive user experience. Generally these tools have been developed for use at different stages of greenway development and operations, including:

- Pre-Construction LOC Programming
- Turnover & Acceptance
- Annual Review & Programming
- Capital Repair Evaluations

Additionally, the application of the Level of Care Guidelines will be organized by the greenway, but each greenway is typically developed over multiple phases and crosses jurisdictional lines. Therefore greenways will be separated into Greenway Segments that have common characteristics. Factors to be considered when dividing greenways into segments include the following criteria.

- Development phasing
- Boundaries of partner agencies
- Changes in Cooperative Maintenance Agreements
- Key changes in type of greenway development

Pre-Construction Programming

The Pre-Construction Greenway LOC Programmatic Cost form is intended to be utilized as a tool to provide a general programmatic estimate of anticipated LOC requirements based on typical conditions and cost. It's anticipated this form will be completed at least 3



times during pre-construction activities: 1) Upon completion of planning and as a specific project phase is defined in preparation for design; 2) As part of the Preliminary Design submittal (50%-60% design level – while changes can still be easily incorporated); 3) Final Design/Construction Documents (this will be a useful tool as part of establishing the final O&M Cooperation Agreement.) The two-page Excel form requires the following types of input:

- General greenway/segment and partner information at the top of the form.
- Culling the list to include only the types of elements included in this segment of the greenway. There are over 60 potential guideline elements, but most greenway segments will only include a fraction of those. Therefore this task eliminates those items not included in the project. It's suggested to "Hide" rather than delete these unneeded items such that they can be re-added if needed in the future without starting a new file.
- The last task in preparing this programming form is to add the quantities for each of the items. It's understood that early in the planning process some items will have very rough estimates, but it's important to start including rough estimates that will be refined as more detail is worked out. For some items in the list, this task will require identifying the limits of the Greenway Zone to

Pre-Construction LOC Programming



Program Stage: **PLANNING - DESIGN - CONSTRUCTED (As-Built)**

Greenway: **Add Greenway Name**

Segment: **Add Greenway Segment** Miles: _____

Partner Agency: **Add Partner**

Primary Contact: _____ Title: _____
 Email: _____ Phone: _____

Prepared by: _____ Date: _____

Reviewed By: _____
Partner Staff GRG Staff

The following are "Programmatic level" estimates of annualized LOC O&M Cost and Capital Repair Cost to be estimated at the Planning, Design and Constructed stages of greenway development.

Guideline #	Guideline Name	Quantity	Unit	Annualized LOC O&M Cost		Projected Opening Year	Annualized Capital Repair Cost	± Year of 1st Capital Repair	Programmatic Estimate of First Capital Repair
				Hours	\$'s				
A-1	Asphalt Trail		SY	Hrs	\$ -		\$ -		\$ -
A-2	Concrete Trail, Walk or Plaza		SY	Hrs	\$ -		\$ -		\$ -
A-3	Gravel Trail		SY	Hrs	\$ -		\$ -		\$ -
A-4	Unit Pavers		SY	Hrs	\$ -		\$ -		\$ -
A-5	Permeable Pavers		SY	Hrs	\$ -		\$ -		\$ -
A-6	Permeable Concrete		SY	Hrs	\$ -		\$ -		\$ -
A-7	Permeable Asphalt		SY	Hrs	\$ -		\$ -		\$ -
A-8	Permeable Rubber		SY	Hrs	\$ -		\$ -		\$ -
A-9	Asphalt Parking & Drives		SY	Hrs	\$ -		\$ -		\$ -
A-10	Concrete Parking & Drives		SY	Hrs	\$ -		\$ -		\$ -
B-1	Pre-Fabricated Steel Bridge		LF	Hrs	\$ -		\$ -		\$ -
B-2	Concrete Bridge		LF	Hrs	\$ -		\$ -		\$ -
B-3	Boardwalks & Decks		SF	Hrs	\$ -		\$ -		\$ -
C-1	Grass Shoulder		100LF	Hrs	\$ -		\$ -		\$ -
C-2	Grass Lawn		Acre	Hrs	\$ -		\$ -		\$ -
C-3	High Mow Lawn		Acre	Hrs	\$ -		\$ -		\$ -
C-4	Annual Mow Grass		Acre	Hrs	\$ -		\$ -		\$ -
C-5	Native Grassland		Acre	Hrs	\$ -		\$ -		\$ -
C-6	Wildflower/Native Beds		SY	Hrs	\$ -		\$ -		\$ -
C-7	Shrub & Perennial Beds		SY	Hrs	\$ -		\$ -		\$ -
C-8	Annual Beds & Planters		SY	Hrs	\$ -		\$ -		\$ -
C-9	Shrub Massings		EA	Hrs	\$ -		\$ -		\$ -
C-10	Trees		EA	Hrs	\$ -		\$ -		\$ -
C-11	Woodland Forest		Acre	Hrs	\$ -		\$ -		\$ -
C-12	Marshland		Acre	Hrs	\$ -		\$ -		\$ -
D-1	Benches, Tables & Bike Racks		EA	Hrs	\$ -		\$ -		\$ -
D-2	Bollards		EA	Hrs	\$ -		\$ -		\$ -
D-3	Trash Receptacles		EA	Hrs	\$ -		\$ -		\$ -
D-4	Greenway Wayfinding		EA	Hrs	\$ -		\$ -		\$ -
D-5	Roadway Signs/Pvmnt Markings		EA	Hrs	\$ -		\$ -		\$ -



determine the area impacted.

The output from completing this form will be a very preliminary estimate of the Level of Care resource requirements provided in both hours and dollars.

Turnover & Acceptance

The individual guideline sheets include a listing of items that should be reviewed at completion of construction and turnover of the facility to the partner. This includes a listing of site conditions and general expectations for the completed items. Additionally on some items, documents are listed that the contractor should provide to the partner. It's not intended for this to be a "nit-picking" list, but more of a general and reasonable guidance of expectations. It is suggested that a representative from the partner have the opportunity to be a part of the "punch list" review of the project at acceptance of construction.



Annual LOC Reviews

Annual reviews are also identified in the standard O&M Cooperation Agreements and each guideline lists the types of items to be reviewed as part of the Annual Review of each greenway. It's recommended that the Annual Review be a cooperative effort completed together by partner and Great Rivers Greenway staff. The GRG staff member will typically complete many such reviews with different partners, which will add some consistency in the reviews. The Annual Review Form has the following three sections:

- LOC Activity Summary: The first two pages are questions to be completed by the partner before

the site review of the greenway. These have been utilized previously to provide general information as to the level of effort required, issues encountered, events held and any changes to the trail facilities.

- Facility Inspection: This is the annual walk thru facility inspection completed cooperatively which rates the facility condition related to level of care and provides space to provide comments or describe issues. This form can be completed in hard copy or on a digital tablet in the field. (Note: The first year completing this will require form preparation by culling the list to eliminate those facilities that are not in this greenway segment - similar to what was done in the programming phase.)

Annual LOC Review

The Annual LOC Review is a visual condition assessment addressing compliance with Level of Care items. The on-site walk through review is completed jointly by the responsible Partner Agency and GRG for all constructed greenways.

Greenway: **Add Greenway Name**

Segment: **Add Greenway Segment** Miles: **1.30**

Partner Agency: **Add Partner**

Primary Contact: _____ Title: _____
 Email: _____ Phone: _____

Site Review Date: _____

Reviewed By: _____ (Partner Staff) _____ (GRG Staff)

In general, please describe your annual/seasonal maintenance activities on the greenway:

Routine Maintenance Activities
 On average, how many hours per season do you spend on the following greenway maintenance activities. Enter 0 for those activities not applicable to your greenway or that you were not engaged in. Example: If you mow along the greenway weekly for four hours each week during spring, summer and fall, enter 0 in Winter and 48 each in Spring, Summer and Fall (4 hrs x 4 weeks x 3 months).

Activity	Winter	Spring	Summer	Fall	Total
Mowing:					0
Tree trimming/brush clearing:					0
Trash/litter removal:					0
Maint. to site furnishings: (hardscape, lights, trash cans, tables, benches, bike racks, signs, etc.)					0
Landscape maintenance:					0
Facilities: (shelters, restrooms, parking lots, etc.)					0
Trail surface cleaning:					0
Erosion control: (regrading, installing erosion blankets, sediment logs, etc.)					0

ANNUAL LOC REVIEW - FACILITY INSPECTION

LOC FACILITY RATING GUIDE	
E	Excellent Condition - Facilities in Excellent Condition and Exceed LOC Maintenance Guidelines
G	Good Condition - Facilities have NO functional, aesthetic or safety issues. Maintenance meets LOC Guidelines
P	Poor Condition - Facilities have function, structural, aging or aesthetics issues - or Maintenance does NOT meet LOC Guidelines
F	Failed Condition - Facility and/or landscape needs immediate attention due to safety, basic structural integrity and/or significant repair if not addressed.

LOC ISSUE RESPONSE GUIDE	
N-O	NOT-OBSERVED - This issue was "Not Observed" during the walk through annual visual inspection.
YES	YES - An "Issue" was observed - see summary description under comments

ZONE GUIDE	
Greenway Zone:	Facilities and/or landscape developed as part of greenway; primary purpose is serving greenway related activities; within ±100' corridor of previously maintained park/open space areas. (Identified in O&M Coop. Agreement)
Support Zone:	Facilities and/or near the greenway zone with a secondary purpose to serve greenway related facilities. LOC compliance encouraged.

Zone	Greenway	Quantity	SY	Description	Rating	Comments +/- for Issue Location
A-1	ASPHALT TRAIL	5555	SY	4167 LF - 12' wide		
Annual Review Items						
1.	Trail clean and clear of debris	E G P F				
2.	No ponding water.	E G P F				
3.	Condition - Potholes, cracks, raveling other?	E G P F				
4.	Edge condition - good and solid	E G P F				
5.	Pavement Markings	E G P F				
6.	ADA Issues (ie. slopes, ramps, detectable panels)	N-O YES				
7.	Vandalism or graffiti issues	N-O YES				
8.	Safety or other issues	N-O YES				

Zone	Greenway	Quantity	SY	Description	Rating	Comments +/- for Issue Location
A-2	CONCRETE TRAILS, WALKS & PLAZAS	5555	SY	4167 LF - 12' wide		
Annual Review Items						
1.	Trail clean and clear of debris	E G P F				
2.	No ponding water.	E G P F				
3.	Condition - Cracks, spalling or damage	E G P F				
4.	Edge condition - good and solid	E G P F				
5.	Expansion joints caulked	E G P F				
6.	Pavement Markings	E G P F				
7.	ADA Issues (ie. slopes, ramps, detectable panels)	N-O YES				
8.	Vandalism or graffiti issues	N-O YES				
9.	Safety or other issues	N-O YES				

Zone	Greenway	Quantity	SY	Description	Rating	Comments +/- for Issue Location
A-3	GRAVEL TRAIL	5555	SY	4167 LF - 12' wide		
Annual Review Items						
1.	Trail clean and clear of debris	E G P F				

Program Stage: **PLANNING - DESIGN - CONSTRUCTED (As-Built)**

Greenway: **Add Greenway Name**

Segment: **Add Greenway Segment** Miles: **99.90**

Partner Agency: **Add Partner**

Primary Contact: _____ Title: _____
 Email: _____ Phone: _____

Prepared by: _____ Date: _____

Reviewed By: _____ (Partner Staff) _____ (GRG Staff)

The following are "Programmatic Level" estimates of annualized LOC O&M Cost and Capital Repair Cost to be estimated at the Planning, Design and Constructed stages of greenway development.

Guideline	#	Subline Name	Quantity	Unit	Annualized LOC O&M Cost	Year Built	Annualized Capital Repair Cost	Estimate of Next Capital Repair	Estimate of Next Capital Repair
A-1	Asphalt Trail	SY	4167 LF - 12' wide	SY	\$ -	-	\$ -	\$ -	
A-2	Concrete Trail, Walk or Plaza	SY	4167 LF - 12' wide	SY	\$ -	-	\$ -	\$ -	
A-3	Gravel Trail	SY	4167 LF - 12' wide	SY	\$ -	-	\$ -	\$ -	
A-4	Unit Pavers	SY	4167 LF - 12' wide	SY	\$ -	-	\$ -	\$ -	
A-5	Permeable Pavers	SY	4167 LF - 12' wide	SY	\$ -	-	\$ -	\$ -	
A-6	Permeable Concrete	SY	4167 LF - 12' wide	SY	\$ -	-	\$ -	\$ -	
A-7	Permeable Asphalt	SY	4167 LF - 12' wide	SY	\$ -	-	\$ -	\$ -	
A-8	Permeable Rubber	SY	4167 LF - 12' wide	SY	\$ -	-	\$ -	\$ -	
A-9	Asphalt Parking & Drives	SY	4167 LF - 12' wide	SY	\$ -	-	\$ -	\$ -	
A-10	Concrete Parking & Drives	SY	4167 LF - 12' wide	SY	\$ -	-	\$ -	\$ -	
B-1	Pre-fabricated Steel Bridge	LF	4167 LF - 12' wide	LF	\$ -	-	\$ -	\$ -	
B-2	Concrete Bridge	LF	4167 LF - 12' wide	LF	\$ -	-	\$ -	\$ -	
B-3	Boardwalks & Decks	SF	4167 LF - 12' wide	SF	\$ -	-	\$ -	\$ -	
C-1	Grass Shoulder	1000LF	4167 LF - 12' wide	1000LF	\$ -	-	\$ -	\$ -	
C-2	Grass Lawn	Acres	4167 LF - 12' wide	Acres	\$ -	-	\$ -	\$ -	
C-3	High Mow Lawn	Acres	4167 LF - 12' wide	Acres	\$ -	-	\$ -	\$ -	
C-4	Annual Mow Grass	Acres	4167 LF - 12' wide	Acres	\$ -	-	\$ -	\$ -	
C-5	Native Grassland	Acres	4167 LF - 12' wide	Acres	\$ -	-	\$ -	\$ -	
C-6	Wildflower/Native Beds	SY	4167 LF - 12' wide	SY	\$ -	-	\$ -	\$ -	
C-7	Shrub & Perennial Beds	SY	4167 LF - 12' wide	SY	\$ -	-	\$ -	\$ -	
C-8	Annual Beds & Planters	SY	4167 LF - 12' wide	SY	\$ -	-	\$ -	\$ -	
C-9	Shrub Massings	EA	4167 LF - 12' wide	EA	\$ -	-	\$ -	\$ -	
C-10	Trees	EA	4167 LF - 12' wide	EA	\$ -	-	\$ -	\$ -	
C-11	Woodland Forest	Acres	4167 LF - 12' wide	Acres	\$ -	-	\$ -	\$ -	
C-12	Marshland	Acres	4167 LF - 12' wide	Acres	\$ -	-	\$ -	\$ -	
D-1	Benches, Tables & Bike Racks	EA	4167 LF - 12' wide	EA	\$ -	-	\$ -	\$ -	
D-2	Bollards	EA	4167 LF - 12' wide	EA	\$ -	-	\$ -	\$ -	
D-3	Trash Receptacles	EA	4167 LF - 12' wide	EA	\$ -	-	\$ -	\$ -	
D-4	Greenway Wayfinding	EA	4167 LF - 12' wide	EA	\$ -	-	\$ -	\$ -	
D-5	Roadway Signs/Pvment Markings	EA	4167 LF - 12' wide	EA	\$ -	-	\$ -	\$ -	
D-6	Pet Waste Bag Dispenser	EA	4167 LF - 12' wide	EA	\$ -	-	\$ -	\$ -	

- Annual Report Post Construction Greenway LOC Programmatic Cost: This task is the same as in pre-construction, but includes the final quantities built and looks closer at the long term capital repair projections. Reviewing this will assist in programming for those longer term cost.

Capital Repair Assessments

Capital repair assessments are more technical in nature and requirements vary greatly by the type of facility. For instance lawns or native grasses won't have a formal evaluation unless a specific issue is identified that requires soil testing. However pedestrian bridges included within the greenways should have technical inspection completed every 2 to 3 years. Each of the guidelines list general recommendations related to the need and requirements for Capital Repair Assessments. This includes references to several regional



and national standard review forms often used by local agencies in completing technical reviews for similar facilities. Several of these have been provided in the Appendices.

Other Considerations

Through the process of interviews, partner surveys and stakeholder engagement sessions that were a part of developing these guidelines, many ideas and recommendations were provided. Several of these are provided below for consideration as the guidelines are implemented.

- Training Opportunities: Partners strongly supported the idea of Great Rivers Greenway organizing and sponsoring technical training related to greenway level of care task and expectations. Having these sessions in multiple locations closer to municipalities might allow attendance of more staff. Sessions should be developed with an understanding of the audience with some more oriented to managers and others to those in the field. The types of opportunities might include:
 1. Office presentations ranging from discussion of LOC expectations, industry trend and lessons learned to how-to sessions related to working with volunteer groups or organizing greenway events.
 2. Field demonstrations and detail technical training of level of care task that could include maintenance of such items as stormwater BMP's, living walls and native plantings. (It's noted there was very strong support for this type of hands-on training of staff that typically have limited opportunity to receive training.)
 3. Annual symposium type meetings that would include update reviews of the LOC Guidelines, lessons-learned group sessions, technical

training sessions and even a Partner Recognition Awards program.

- Catastrophic Event Policy: Partners would like to see Great Rivers Greenway develop a general policy related to addressing damage from catastrophic events, such as tornado/wind damage, flooding or even earthquakes. Items that could be addressed range from cost sharing of clean up and repairs to assistance in coordinating the required permitting required to address these issues.
- Purchase/Work Order Program: Many partners believed they would be more compliance with the LOC Guidelines if Great Rivers Greenway could developed a Purchase/Work (P/W) Order program for certain standard greenway items, through which the partner could purchase these items. Most believed if the P/W Order bidding followed standard public agency requirements, their municipality would be able to utilize and order directly. Partners pointed out the amount of time and effort required to identify product types, locate vendors, prepare the purchase orders or bid often times for one specific item or work task that can be very small. That was anticipated to be a hindrance to complying with LOC guidelines presented. Typical items discussed that could be included:
 1. Site Furnishing: Replacing damaged/stolen items, such as benches, receptacles, bollards.
 2. Vacuuming permeable pavements
 3. Restriping crosswalks and related pavement markings
 4. Asphalt seal coating
 5. Milling and asphalt overlay program
 6. Completion of MSD annual reviews
 7. Completion of pedestrian bridge and other structural evaluations



Great Rivers Greenway