

SECTION A

1.0 Introduction

The purpose of the Operations and Procedures Manual is to provide the Concessionaire a methodology to establish the minimum requirements necessary for the basic development of an annual Operations Plan for the City of Pittsburgh Public Parking System off-street parking (the “Off-Street System”). The Off-Street System, as defined by the Concession and Lease Agreement, include the attended parking facilities (the “Facilities”) and selected off-street parking lots (the “Surface Lots”).

The Operations and Procedures Manual is divided into specific areas that are critical to the overall operation of the Facilities. Each of these sections provides a general overview for the Concessionaire regarding their responsibilities for each of these sections. These responsibilities must be addressed in the Concessionaire’s annual Operations Plan for the Facilities. Each of the sections introduces the overall policies, procedures and practices that will be implemented in respect to the specific section. These sections include:

- Staffing Identification (*Section 2.0*)
- Interagency Coordination (*Section 3.0*)
- Parking System Operations Plan (*Section 4.0*)

2.0 Staffing Identification

The Concessionaire has the sole responsibility to determine its staffing needs to adequately fulfill the maintenance, contractual and operation obligations as described in the Concession Agreement. The Concessionaire is additionally solely responsible for any and all acts, errors and omissions of its personnel, staff, employees, agents and consultants. The Concessionaire must schedule employees to ensure that there are always adequate personnel, as determined in the sole discretion of the Concessionaire, in all of the Facilities’ during all hours of operation. The Staffing requirement is based on the current and future needs of each of the Facilities and Surface Lots.

During the lease, the City will retain responsibility over [] and the Authority will retain responsibility over the enforcement efforts and contract oversight. Collectively, the City and Authority constitute the “City Parties.”

2.1 Staff Personnel

In the annual Operations Plan, the Concessionaire must identify key staff as they relate to the Off-Street System. The Concessionaire will provide to the City Parties an organizational chart of the key personnel and update it when appropriate. The organizational chart includes: the name and title of each employee and the employee’s primary and secondary contact information.

3.0 Interagency Coordination

The Facilities and Surface Lots are located within the City limits of Pittsburgh, the County limits of Allegheny County and the State Limits of Pennsylvania and are thus subject to the ordinances, codes and laws set by the city, county, state and federal governments. The Concessionaire must cooperate with the Pennsylvania Department of Transportation (“PennDOT”), the Office of Homeland Security, and the Pittsburgh Police Department and the City of Pittsburgh Department of Public Works. These agencies may require coordinated efforts with the Concessionaire, access to the Facilities, surveillance camera footage or any other evidence that they deem necessary in the process of maximizing public safety during non-emergency and emergency situations.

The Concessionaire must maintain only the property which is included in the Concession Agreement. Any area that the Concessionaire is not responsible for the maintenance is listed as “excluded areas” in the Concession Agreement. If the facility is located or attached to property which is not included in the Concession Agreement, the Concessionaire will not be held responsible for the maintenance of the attached property, unless otherwise stated in the Concession Agreement.

4.0 Parking Systems Operations Plan

A general outline for the Parking Operations Plan is provided in this section. This outline is a basic template for the Concessionaire to use when developing their Parking Operations Plan. It is understood that over time, new needs or concerns arise and that the Parking Operations Plan will need to be revised and modified to address these new needs or concerns of the Facilities and Surface Lots. All sections of the Operations Plan are subject to local, state and federal laws, as well as codes and requirements pertaining to each Facility and Surface Lot. The Parking Operations Plan and all its subsections will need to be updated annually and approved by the City Parties. The Concessionaire will develop an Operations Plan which must include, as a minimum, the following sections:

- Parking Operations Requirements
- Systems Maintenance Plan
- Metered Customer Payments
- Customer Service
- Custodial and Snow/Ice Control Plan
- Meter Collection
- Security Plan
- Emergency Plan
- Safety Plan
- Equipment Plan
- Capital Asset Management Plan

The initial Operations Plan will be submitted to the City Parties for approval within three months (90 days) of the Concession Agreement closing date. After the Operations Plan is submitted to

the City, the Concessionaire is permitted to resubmit an updated Operations Plan to the City Parties for approval before the first anniversary of the Concession Agreement. This allows the Concessionaire to include any new needs or concerns that need to be addressed that were not included in the initial Operations Plan. An updated Operations Plan must be submitted to the City Parties at the anniversary of the Concession Agreement closing date. The annual updated Operations Plan must have each of its sections updated annually.

4.1 *Parking Operations Requirements*

In the Parking Operations Requirement section, the Concessionaire will include a brief discussion regarding the essential staff and their titles, functions, duties and responsibilities as it pertains to the operation of the Facilities and Surface Lots. This section also discusses all major equipment that will be used in each facility and Surface Lot and its role in the operations.

This section includes the procedures when an event, incident or unusual occurrence occurs at the Parking Facility. These events include, but are not limited to:

- Emergency
- Insurance claims
- Accident claims
- Criminal acts
- Abandoned vehicles

4.2 *Off-Street System Maintenance Plan*

The Off-Street System Maintenance Plan section of the Operations Plan outlines processes and procedures that will be implemented to ensure the sustainability and continuous operation of the Facilities. The guidelines for each of the subsections in the Off-Street System Maintenance Plan are detailed in a separate document, *Maintenance Recommendations Manual*. The written plan ensures that both long-term and short-term maintenance and improvements are completed in a way that ensures the Facilities and Surface Lots remain fully operational, safe, user friendly and productive at all times.

4.2.1 *Facility and Surface Lot Maintenance*

The Off-Street System Maintenance Plan addresses, at a minimum, the following systems to ensure the continual operation of the Facility:

- Operations Systems
- Structural Systems
- Waterproofing, sealer & Sealant Systems
- Architectural systems, escalators and elevators
- Signage and graphics
- Pavement markings and traffic striping
- Fire Protection System

- Heating, Ventilating and air conditioning (HVAC) mechanical systems
- Utility Systems
- Plumbing Systems
- Electrical and Lighting Systems
- Communication and Security Systems
- Emergency Systems
- All Affected Property such as, parks, roadways and other elements which are required to preserve the Facility
- Revenue Control Equipment
- Elevators

4.2.2 *Metering Device Maintenance Schedule*

The Concessionaire will establish a maintenance schedule for any metering devices in the Surface Lots (the “Metering Devices”). These procedures will be implemented to ensure the sustainability and continuous operation of the Surface Lot metered system (the “Metered System”). These guidelines ensure that both long-term and short-term maintenance and improvements are completed in a way that ensures that the Metered System remains operational, safe, user friendly and productive at all times.

- The Concessionaire must establish protocol for the routine and operational maintenance of the surface lot Metered System, which includes, but is not limited to: daily meter inspection schedules and protocols, preventative maintenance schedules and an established protocol for the frequency of maintenance.
- Events such as extreme weather conditions, utility service outages/overload, vandalism and vehicular accidents can cause unanticipated emergency repairs. The Concessionaire shall provide an emergency repair protocol which details the specific practices that will be performed in the case of emergency repairs.

4.2.3 *Life Systems*

The Facility Systems Maintenance Plan must also address any and all Life Safety Systems within the Facility. The Life Safety Systems are essential to provide safety, communication and systems necessary for the operation of the Life Safety Systems. The Concessionaire must provide in the Facility Systems Maintenance Plan, at a minimum, the following Life Safety Systems operational procedures and policies.

- Intercoms
- Telephones
- Mobile communications
- Video surveillance system
- Alarms
- Fire precaution systems
- Fire Alarms
- Sprinkler systems

- Heat sensors
- Smoke detectors
- Carbon monoxide detectors
- Emergency call stations
- The computer hardware and software required to operate or monitor the Life Safety Systems

4.2.4 Energy Systems

The constant energy flow to and from the Facilities is critical in keeping the Facilities in a fully operational mode at all times. In the Energy Systems section of the Maintenance Plan, the Concessionaire outlines the policy and procedures that will be executed to ensure that there is a constant stream of energy to all of the systems in the Facility. The Energy System plan will also outline the actions taken in the event of a power failure. The Energy system plan will discuss, at a minimum, the following systems and the Concessionaire's policy and procedures for each section.

- Life Safety Systems
- Mechanical Systems
- Electrical Supply
- The coordination efforts with the electrical, phone, natural gas, water and sewer companies/agencies

4.3 Metered Customer Payments

The Concessionaire will be required to establish the following criteria as it relates to customer payments in any metered Surface Lots

- As described in the Concession Agreement, the Concessionaire will implement and maintain cashless alternatives for payment of parking.
- The Concessionaire will implement time differential metering systems, including demand-based pricing models and progressive rates in accordance with the Metered Parking Fees established in the Concession Agreement upon the City Parties' request.
- The Concessionaire is obligated to charge and collect the full amount of the Parking Fees.
- Any time the customer must display a parking receipt in their vehicle, the metering device receipts must have an adhesive backing or an approved methodology to secure receipts to motorcycles and/or scooters. The receipts and any graphics on the receipts must be approved in advance and in writing by the City Parties prior to its implementation and use.

4.4 Customer Service Plan

The Customer Service Plan outlines the minimum policies and procedures necessary to ensure that the Concessionaire's staff utilizes an efficient system of handling customer service concerns, protocol for customer inquiries, protocol for responding to and recording customer

inquiries/concerns. The Customer Service Plan is intended to increase the Concessionaire's staffs' handling of customer service related issues and to ensure the satisfaction of the customers.

4.4.1 Customer Service

The Customer Service Complaints and Inquiries section includes the Concessionaire's policies and procedures in handling complaints and inquiries. The Concessionaire establishes a customer service log to be used when receiving a customer's complaints, comments and concerns regarding the Facility or Surface Lot in question. This section includes, at a minimum, the following procedures to ensure proper handling of customer complaints and inquiries.

- The Concessionaire shall establish and maintain a customer service system for customer complaints and inquiries during the hours of operation of the meters and Facilities. The system can be maintained with live persons or another system which must be approved by the City Parties in advance of its implementation. The Concessionaire will establish a minimum set of requirements to ensure that all reasonable complaints and inquiries that are received are resolved in a reasonable length of time. All complaints and inquiries will be documented in the customer service log. The length of time that a response will be expected for various levels of customer related inquiries and comments will be outlined in the section.
- The procedures that will be developed in responding to customer concerns will be differentiated by degree and priority.
- The Concessionaire must maintain each metering device in the surface lots and will provide the name of the Operator and a toll free phone number on each of the meter units.
- The Concessionaire will provide the City Parties with access to information concerning the specific capability of the Metering Devices to measure compliance with the Pittsburgh Municipal Code.

4.5 Custodial and Snow/Ice Control Plan

The Custodial Plan documents the policies and procedures that the Concessionaire will undertake to ensure that the Facilities are clean for the general public. The Custodial and Snow/Ice Control Plan outlines the janitorial and general maintenance guidelines within the Facilities. These maintenance guidelines include, at a minimum, the following:

- Sweeping of parking and public areas
- Cleaning of all surfaces of the parking Facilities and Surface Lots
- Trash removal
- Pressure washing of parking decks and walls
- Chemical storage protocol
- Equipment
- Snow and ice control
- Snow plowing and removal
- Application of salt and chemical deicer

4.6 Meter Collection

It is the Concessionaire's responsibility to establish efficient meter collection routes.

- The Concessionaire shall establish meter collection routes and schedules that ensure the continuous operation of the Metered System.

4.7 Security Plan

The Security Plan documents the policies and procedures that the Concessionaire will develop with respect to the security and safety of the general public. The Plan includes staff training and supervisory policies and procedures, as well as the Concessionaire's general approach to the safety of the public. This section includes, at a minimum, the following criteria:

- A description of all security related systems and their location with respect to the parking facility
- The safety patrol routes
- CCTV monitoring
- Supervision of the security personnel and coverage
- Incident and Accident reporting protocols
- The emergency notification system
- Recordkeeping protocols
- Security of customer credit card and personal information
- All City codes and ordinances must be adhered to

4.7 Emergency Plan

The Emergency Plan documents the policies and procedures that the Concessionaire will develop in response to an emergency situation either at or around the parking facility. This section outlines the general protocols that will be enacted in the case of a natural or man-made disaster. The Concessionaire will also provide a staff training program in the case of an emergency. This section will include, at a minimum, the following criteria:

- The command structure which details the organization of staff and their responsibilities during an emergency
- The communication flow between emergency responders
- The protocols for providing accurate and timely information to the general public
- The protocols for the evacuation of the public from the at risk area
- Staff training program

4.8 Safety Plan

The Safety Plan documents the policies and procedures that the Concessionaire will develop to ensure the safety of its staff and the public. The Safety Plan ensures that all employees are fully trained in the Occupational Safety and Health Administration ("OSHA") standards. This section includes, at a minimum, the following criteria:

- An employee safety training program which trains each employee on specific hazards related to their specific job role
- Policies and procedures required during facility work zone maintenance

4.9 Equipment Plan

The Concessionaire has the sole responsibility for the operation, management and maintenance of the required equipment within the parking facility. The Equipment Plan documents the policies and procedures that will be undertaken in order to ensure that all the equipment is maintained according to the manufacturers' requirements. The Equipment Plan includes, at a minimum the following criteria:

- Staff equipment training program
- Licensing of equipment
- Insurance
- Subcontractor equipment conformance
- Equipment operators are currently State registered and licensed
- Vehicle safety equipment, such as, amber warning lights and back-up alarms
- Staff Equipment training program
- Equipment maintenance schedule

4.10 Capital Asset Management Plan

The Capital Asset Management Plan ("CAMP") is required to preserve the facilities and ensure the continual operation. The general goals of the CAMP are to provide a pleasant and safe experience for the parking patrons as well as to preserve the facilities over time. The CAMP section includes, but is not limited to, the following sections:

- Planning of routine and preventative maintenance requirements
- Capital repair requirements
- An independent inspection and reporting by a Professional Consulting Firm, not affiliated in any way to the Concessionaire, for each facility

The CAMP must provide a general summary of the condition of the facilities as well as the implementation of strategies to preserve the Facility. Each CAMP and every strategy and any recommendation provided therein must comply with industry standards and practices generally applicable to similar parking facilities.

The independent consulting firm's qualified engineer (the "Project Manager") will direct the CAMP. The Consulting Firm must develop an annual inspection schedule for the facilities' infrastructure, electrical, architectural and mechanical elements. The Project Manager will insure that its crew complies with all safety protocols outlined in the Safety Plan while performing inspections of the facilities. The Concessionaire will provide the Project Manager with each facility's general plan and drawings prior to the onsite inspections. The Project Manager must review the site plans prior to the onsite inspections. The Concessionaire and/or the Professional Consulting Firm must have all required permits, insurance and access requirements to perform site inspections. The Firm will supply the following:

- An Annual CAMP which outlines a general summary of the annual recommendations and capital improvements required for the next ten years
- Long-Term CAMP which provides a general summary of the recommendations and capital improvements necessary at ten year increments for the remaining Concession Agreement term
- Condition Assessment Report which provides any changes in conditions of the Facilities that were noted during that particular year
- The Concessionaire must supply an electronic copy of the annual CAMP and Condition Assessment Reports to the City.

5.0 Metering Device Installation, Removal and Repair

The Concessionaire must abide by the following requirements during the installation, removal and repair of the Metering Devices in the Surface Lots.

- All Metering Devices, support poles and bases installed following the Closing Date are to be the color and size previously approved by the City Parties
- All sign poles and bases must meet the requirements of the Manual of Uniform Traffic Control Devices (“MUTCD”)
- Metering Devices located within the Concession Parking Lots shall be installed in the best possible area to maximize revenue and customer service
- Commencing one year following the date of the Concession Agreement, multi-space meters shall not operate more than fifty (50) parking spaces in each Surface Lot and must have an adequate frequency of collection. Any Concession Surface Lot that contains more than fifty (50) spaces must have at least two (2) multi-space Metering Devices
- To facilitate meter parking enforcement, the Concessionaire’s newly implemented meter technology must allow for visual enforcement or provide notification of violation status in another manner which has been approved by the Authority
- Unless pre-approved by the City Parties, any improvements made to the Metered System cannot include ground loops or other street construction
- If the Concessionaire chooses to implement pay-by-phone options, it must allow for peak period pricing, in accordance with the Metered Parking Fees established in the Concession Agreement
- Unless consented to in writing by the City Parties, each new stall of a single-bay Metering Device shall be no less than eighteen (18) feet, but no more than twenty two (22) feet in length.

- The Concessionaire must give written notice to the City Parties at least three (3) business days prior to the installation of new Metering Devices. New Metering Devices will be posted with an initial enforcement date of the next operation day
- Following the installation of a new metering device, the Concession must install a placard with the City seal on the Metering Device which indicates that the device was recently installed and also provides the day that enforcement will begin
- It is the Concessionaire's responsibility to repair or replace any Metering Device that is not fully functioning within two (2) business days of notification. It is the City's sole discretion to extend the time period for the repair
- Following the removal of the metering devices, the Concessionaire is responsible for repairing any damage that was caused to the public way

6.0 Motorcycle Parking

It is the Concessionaire's responsibility to comply with all current and future City and State standards and Applicable Laws regarding motorcycle parking regulations.

7.0 Recycling

To help protect the environment and remain in compliance with all applicable laws, including environmental laws, the Concessionaire must manage and maintain a battery recycling program, with respect to the Facilities and off-street surface lots. The Concessionaire must handle all the logistics, shipping, receiving, recycling and proper documentation related to the Concessionaire's recycling program. The following must be included in the recycling program, but are not limited to:

- Regular household batteries that are used in meters or both rechargeable and non-rechargeable batters, D-Cell, C-Cell, AA, AAA, 9-Volt and button cells
- Rechargeable and non-rechargeable battery packs used in the meter equipment, cell phones, cameras, laptop computers, power tools, etc.
- Handheld electronics such as cell phones, iPods, PDAs, pagers, etc.
- Any other dry-cell battery that was not previously listed

8.0 Service Vehicle Use

The Concessionaire will be permitted to utilize its Service Vehicles to facilitate the operations of the System. The following guidelines must be followed as it pertains to the use of Service Vehicles.

- All Concessionaire service vehicles must display the following identification decals and contact information on both sides of the vehicle. These include, but are not limited to:
 - Company Name
 - Vehicle (Fleet) number
 - Company area code and phone number
 - Company web address
 - “How Am I Driving” or equivalent customer complaint/compliment decal and access number
 - Vehicle (Fleet) number located on the rear of each vehicle
- All service vehicles utilized by the Concessionaire must be clean and regularly maintained to ensure safe operation
- All service vehicles must be equipped, at the Concessionaire’s expense, with electronic location safety devices or equipment approved by the City Parties and deemed reasonably necessary
- All service vehicles’ operators must possess and retain a valid Pennsylvania driver’s license in the personal possession at all times of vehicle operation
- The Concessionaire must comply with all local, state and federal vehicle licensing regulations. This includes displaying current license plates and any plate and City stickers. Additionally, the vehicle must carry insurance certification required by Law
- The Concessionaire is responsible for ensuring the safe operation of all service vehicles
- It is the Concessionaire’s responsibility to ensure timely payment to the City of all service vehicle violations
- All service vehicles must display any and all safety awareness stickers
- Vehicle operators and passengers of service vehicles can not smoke in or around the service vehicles. Additionally, the operator cannot permit unauthorized passengers to utilize the service vehicles at any time
- Service vehicle use for illegal activity including, but not limited to: the transportation or storage of weapons, hazardous chemicals or illegal substances is prohibited

- The service vehicle operator is required to adhere to all established vehicle “moving” regulations
- The service vehicle operator is permitted to park service vehicles at metering devices and areas without payment only while performing professional duties with respect to the operation of the System
- The service vehicle operators are required to use hands-free devices when using cellular phones or two-way communication devices in any of the service vehicles
- All drivers and passengers utilizing the service vehicle must wear seat belts at all times
- The Concessionaire is required to report all service vehicle accidents to the City within 48 hours following any accident
- Concessionaire is solely responsible for costs incurred from the necessary transport of equipment and personnel
- All service vehicles will bear similar markings and are the same color
- All service vehicles must be equipped with fully operational Mars lights with flashing yellow caution lights. All service vehicles that do not have a rear window must utilize video when backing up

9.0 Signage

The Concessionaire must follow the following criteria as it pertains to the Off-Street System’s signage

- The Concessionaire will be responsible for all installation, removal and repair of signage related to the Off-Street System. The Concessionaire will not be responsible for the installation, removal and repair of signage not related to the Off-Street System
- Signs must comply with the standards contained in the MUTCD with respect to size and consist of a reflective white background and green overlay for symbols and text
- The City of Pittsburgh Department of Public Works must review and pre-approve all signage design, installation, removal and repair and verify compliance with the standards contained in the MUTCD

1.0 SECTION B - FACILITY INTRODUCTION

1.1 Objective

Due to direct exposure to traffic and weather, all parking structures and surface lots (the “Facilities”) need an appropriate maintenance and repair program to provide a safe and satisfactory level of service and maximize their service life. Without such a program, the Facilities may sustain premature deterioration, undue repair expense, interrupted service, inconvenience or an unpleasant experience for the patrons resulting in a loss of cash flow.

This manual is intended to provide guidelines to help ensure a satisfactory and safe level of service for the Public Parking Authority of Pittsburgh parking facilities. Criteria for an effective maintenance program will be presented and specific practices and procedures considered applicable and essential to the program will be described in detail in the subsequent chapters. Separate sections describe the maintenance requirements for the Public Parking Authority structures (Section 3) and surface lots (Section 5).

1.2 Maintenance Program Overview

Even with the highest quality of construction practices, it is imperative to implement a maintenance program to maximize service life and provide a safe and pleasant parking experience for facility users. A comprehensive maintenance program typically includes the following:

- Establishing a record database of facility systems, components, and repairs and keeping the database up-to-date.
- Periodic inspections of the facility systems and components, including consultation with qualified, professional engineers.
- Establishing and implementing a capital expenditure, or repair program.
- Routine operational and preventative maintenance
- Emergency repairs as necessary

Record Database

A record database of each of the facility’s systems and components should be created and maintained for each facility. The database should include: a comprehensive list of facility components, warranty and maintenance information, and records of previous repairs/replacements/upgrades. The purpose of the database is to:

- Track inventory with a record of the facility systems and components
- Detail preventative maintenance, particularly for equipment, necessary to minimize breakdowns and maximize service life
- Provide copies of warranties to ensure work to components under warranty is not performed at the Owner’s cost
- Track work and maintenance performed in the facility during the life of the Concession Agreement.

- The Concessionaire must keep the record database in a format that will be easily transferred from the Concessionaire to the Authority at the end of the Concession Term.

Periodic Inspections

Periodic inspection of the various systems and components in each of the facilities should be performed by maintenance personnel who are familiar with the operation of the facility. A recommended inspection schedule detailing the specific items to review and their frequency is provided in Chapter 5. Deficiencies should be noted in a concise report with recommendations for additional investigation or remedial action. As necessary, qualified engineers should be consulted to review the deficiencies and recommend remedial action.

A detailed visual inspection of the general conditions should be performed on a periodic basis by a structural or civil engineer. Deficiencies and problems should be recorded and noted in a report recommending further investigation or remedial action. As necessary, condition appraisals should be performed to investigate substantial deterioration or unexplained issues to determine the extent, cause, and corrective options available.

Capital Expenditure Program

A capital expenditure, or repair, program should be established based on the results of the periodic inspections. The capital expenditure program should prioritize repairs based on the current condition and the expected life cycles of the various facility components to aid the Owner in budgeting for current and future repairs. It is imperative that the repairs be performed in a timely manner to ensure a safe and satisfactory level of service and to maximize the useful service life of the facility.

Routine and Operational Maintenance

Routine and operational maintenance should be performed in each of the facilities. Routine and operation maintenance includes items such as janitorial services, lubrication/adjustment of equipment, filter and light bulb replacement, drain and pipe cleaning, etc. Further discussion regarding routine and operational maintenance issues is provided in Chapter 3 for the structures and Chapter 5 for the surface lots.

Emergency Repairs

Even with the most diligent maintenance program in place, emergency repairs to various facility components will be required from time to time. Events such as extreme weather conditions, utility service outages/overloads, vandalism and vehicular accidents can cause unanticipated damage to facility equipment or components. As necessary, emergency repairs should be performed promptly to ensure the facility is properly operating and providing a safe and pleasant experience for facility users.

2.0 Recommended Structure Maintenance Program

2.1 Overview

The recommended maintenance program includes period inspections, capital improvements, and routine/operation maintenance to each of following systems:

- General Cleaning
- Structural Systems
- Waterproofing Systems
- Architectural Components
- Elevators and Escalators
- Fire Protection System
- Plumbing System
- Mechanical System
- Electrical System
- Parking Control Equipment
- Security System
- Landscaping

The following sections further detail the recommended actions to maximize each system's performance and service life.

2.2 General Cleaning

Please see Table 2 for more a more detailed description of general cleaning. While most cleaning relates to the appearance of the parking garage and the resulting image that is portrayed to the public, some items can cause problems if neglected. For example, trash can clog drains and result in flooding, and trash left on stairs or landings may result in liability for any resulting personal injury. A cleaning program should be established for each facility that directs personnel to perform the required cleaning tasks on a regular basis.

In part, the suggested frequencies of cleaning are based upon the concept that users have a lower tendency to litter a clean, neat environment than an environment which is already messy. A clean, well kept parking garage promotes a good reputation and invites users to return to the facility. Often, the increased revenue more than offsets the cost of keeping the facility clean.

One of the most frequently overlooked aspects of parking garage maintenance is proper floor cleaning. It is recommended that all parking deck levels be swept on a quarterly basis, while floors public areas such as entrances, exits and lobby areas should be swept weekly. Sweeping can be done either with hand brooms or mechanized sweepers designed for use in parking garages. Between sweepings it is recommended that litter be picked up from general parking areas and trash cans are emptied daily.

Some floor areas should have daily cleaning by sweeping, mopping, or vacuuming, including lobbies, restrooms, offices, cashiers booths, and entrance/exit lanes. Stairs should be cleaned on

the same frequency as the parking areas, unless they are heavily used and more frequent cleaning is warranted. Stair handrails and walls should be cleaned each time the stairs are swept.

In addition to sweeping, a semi-annual wash down, or power-washing, of the parking floors with a high volume, low pressure water hose is recommended. In high traffic areas, such as entrance lanes and main driving aisles, more frequent power-washing may be desirable. During power-washing operations, grease and oil drippings from vehicles that build up in parking stalls and entrance and exit lanes should be removed with degreasers, such as an industrial detergent. Before and after washing the floors, floor drains should be checked to see that they are functioning properly. Temporary burlap or straw filters may be used to prevent dirt/debris from getting into drains, but those temporary filters must be removed immediately after washing.

Windows in cashier booths should be washed daily. Other windows, such as those in stairways or offices, should be washed monthly or quarterly, depending upon their condition. Walls in restrooms, elevator cabs, lobbies, and other public use areas should be cleaned on a weekly basis.

2.3 Structural System

The structural system represents the largest portion of the initial construction investment. Protection of that investment requires an on-going program of regular inspection, repairs, and preventative maintenance. Deferred repairs and maintenance can lead to more costly repairs and greater disruption to the operations of the garage.

The structural system should be regularly inspected for deterioration due to weather, wear, vehicular damage, and any other deterioration mechanisms. Chapter 5 provides recommendations for the inspection frequency of the different structural components. During the inspections, the location and extent of conditions which could cause, or have already caused, concrete or steel deterioration should be noted. Items to be looked for include surface deterioration on the top and bottom of the floor slabs, evidence of water leakage, cracks, and corrosion of exposed steel. This survey can be performed by maintenance personnel familiar with the facility, supplemented by a more detailed walk-through inspection by a qualified engineer on a yearly or as-needed basis. Based on these inspections, an itemized list of capital expenditures (or repairs) for the current and subsequent years can be developed and budgeted for.

The structural system shall be considered to be performing adequately when the following criteria are met or exceeded:

- The structure can adequately support the imposed loading conditions
- Driving and walking surfaces are maintained for vehicular and pedestrian traffic
- Deteriorated areas designated for repair have been repaired or are scheduled to be repaired
- Repair areas encompass all deteriorated concrete and are structurally sound
- Repair areas maintain the structural integrity of the facility as a whole
- Repair materials are well bonded and compatible with the substrate
- Repair areas closely match existing color, finish, and profile

Floor Slabs

In most garages, the floor slab is subjected to the most severe load, wear, and weather conditions, requiring the largest portion of repairs and maintenance over the life of the facility. In particular, floor slabs at entrance and exit lanes, drive lanes, and turn aisles are subject to the most extreme conditions. To minimize deterioration and repair costs, all slab areas should be regularly inspected and timely repairs should be performed.

To address potential liability issues, any potential tripping hazards noted in the floor slab should be filled immediately, even if only on a temporary basis until proper repairs can be performed. Additionally, any loose overhead or vertical concrete on the underside of the slabs should be removed as soon as possible to avoid potential safety hazards to vehicles or facility users.

Types of potential slab deterioration include spalling, delamination, and cracking. Any deterioration observed should be repaired in a timely manner using proper repair techniques and materials. Improper repair techniques and materials hide, but do not cure, the problem. An example is an area of slab spalling patched with an asphalt material. While the asphalt material will infill the spall and provides a level driving surface, asphalt tends to trap and retain moisture. The entrapped moisture can accelerate deterioration and potentially create a more severe spalled area.

Proper repair of concrete spalling or delamination includes the removal of all unsound and delaminated concrete, cleaning of exposed reinforcing steel, and touching-up any reinforcing steel that was originally epoxy-coated. The repair areas should then be completely cleaned of loose dust or debris and patched back with a high-quality, Portland cement repair material that is compatible with the substrate concrete. During annual inspections, previous repair locations should be sounded to ensure they are performing adequately.

The proper repair of slab cracking consists of routing the crack to an approximate ½" by ½" V-groove, priming the substrate concrete, and caulking with a flexible urethane or silicone sealant. This repair will minimize the ingress of moisture into the floor slabs and reduce subsequent corrosion-related deterioration. Typically, crack sealant has a useful service life of 8 to 12 years before it needs to be replaced.

In addition to the repairs described, it may be prudent to install a waterproofing membrane system over critical areas of the floor slabs to minimize water penetration into the slab and future deterioration. See Section 3.5 for a further discussion of waterproofing membrane systems.

Beams, Columns, and Walls

Deterioration of the concrete beams, columns, and walls can adversely affect the structural integrity of structure as a whole. Beam, column, and wall deterioration is typically due to the ingress of moisture into the structural elements and corrosion of the embedded steel reinforcing.

Any loose overhead or vertical concrete noted should be removed as soon as possible to avoid potential safety hazards to vehicles or facility users. Repairs to corrosion-related beam, column, and wall spalling and delamination are nearly identical to those detailed for floor slab repairs in the previous section.

Beam, column, and wall deterioration can also be caused by restraint and/or excessive load. Conditions of this nature are beyond the scope of this manual and should be evaluated by a structural engineer experienced in the repair and maintenance of parking facilities. An example of this type of deterioration is extensive cracking at beam-column joints, which may be caused by restraint and require a combination of epoxy injection of the cracks and carbon fiber reinforcement of the joint.

Structural Steel

Structural steel is generally limited to lintels, connection hardware, stairs, guardrails, and bollards in most garages, but serves as the primary structural framing in the Smithfield Liberty, Wood Allies, Forbes Semple, and Shadyside parking garages and as supplemental framing in the Third Avenue parking garage. The structural steel framing consists of structural steel beams and columns. All structural steel components should be regularly inspected for the onset of corrosion. When corrosion is observed, the steel component should be cleaned and the painting or protective coating should be touched-up. If heavy corrosion or significant deterioration of the structural steel elements is observed, a qualified structural engineer should be consulted.

As preventative maintenance, complete re-painting or re-coating of exposed structural steel elements should be performed at regular intervals. See Section 3.5 for a further discussion on re-painting and re-coating intervals.

Metal handrails and guardrails are also subject to damage from impact. It is recommended that these handrails and guardrails be checked regularly to verify that they are rigid, not damaged, and can serve their intended purpose as crash wall and/or fall protection.

2.4 Waterproofing System

The waterproofing system consists of waterproofing membranes, joint sealants (i.e. caulking), and expansion joint seals. This purpose of this system is to prevent water movement into or through the structure in an effort to minimize future deterioration.

It is recommended that the waterproofing system be regularly inspected for water leakage and locations of damage, wear, or missing components. Chapter 5 provides recommendations for the inspection frequency of the waterproofing system components. This survey can be performed by maintenance personnel familiar with the facility, supplemented by walk-through inspections by a qualified engineer on a yearly or as-needed basis. Based on these inspections, an itemized list of capital expenditures for the current and subsequent years can be developed and budgeted for.

The waterproofing system shall be considered to be performing adequately when the following criteria are met or exceeded:

- The waterproofing components are free of leaks, defects, damage, and deterioration
- The waterproofing components are properly installed and adhered to substrates
- The waterproofing components allow for proper movement associated with temperature changes, long-term creep, and shrinkage
- The waterproofing components provide a smooth and safe transition for users

Waterproofing Membranes

Two types of waterproofing membranes are utilized throughout the various parking structures of the Public Parking Authority of Pittsburgh. The types include thin, cold-applied membranes and protected, hot-applied membranes. Thin elastomeric waterproofing membranes are cold, liquid-applied urethane systems on the order of 20 to 30 mils thick (1 mil = 0.001 inch) with sand added to a 20 to 30 mil top coat for skid resistance. They are designed for use under direct exposure to vehicular traffic and come in a variety of colors. Once installed, elastomeric waterproofing membranes provide a waterproof surface over the protected area. Typically, they are installed in high traffic areas or in critical slab locations for protection from concrete deterioration.

Typical elastomeric waterproofing membranes have a useful service life of 6 to 8 years in high traffic areas (entrance and exit lanes, drive aisle, and turning lanes) before re-coating is necessary. Moderate traffic areas (parking stalls and pedestrian traffic areas) have a useful service life of 8 to 12 years before re-coating is necessary. The condition of the membrane should be noted and monitored during the on-going inspections to determine the optimal time for re-coating as the membranes near the end of their useful service life. A complete removal and replacement of waterproofing membrane systems can be expected approximately every 15 to 20 years.

Protected waterproofing membranes consist of a hot-applied rubber membrane with an asphalt protection course laid over it. They are designed for use under direct exposure to vehicular traffic. A protected waterproofing membrane typically has a minimum 5 year warranty, but has a useful life of approximately 20 years or more. The waterproofing membrane will provide a waterproofed surface. The advantage of a protected membrane over an elastomeric membrane is that the waterproofing material is not directly exposed to traffic. Identified cracking and construction joints only need to be reinforced with a fabric reinforcement sheet embedded directly in the hot-applied rubber membrane. Protected membranes are typically installed over occupied space.

During inspections, signs of leakage beneath the waterproofing membrane, damage or de-bonding of the membrane and general wear and tear should be noted. Locations of damaged or de-bonded membrane should be repaired in a timely manner by removing the membrane in question, cleaning the slab, and re-applying the membrane with a proper overlap of the existing, well-bonded membrane. If active water leakage is observed, the source or location of the leak should be determined, which may involve a visual inspection or a flood test. Once the source of the leak is identified, the proper repair to the membrane should be performed in a timely manner.

It may be necessary to consult an engineer experienced in the design and maintenance of parking facilities and/or the membrane manufacturer proper materials and methods of repair.

Particular care should be given to areas covered with waterproofing membranes during power-washing and de-greasing so the membrane is not damaged. The waterproofing membrane manufacturer should be contacted for recommendations regarding power-washing guidelines and cleaning materials utilized. It may be prudent to sample the cleaning materials and procedures on a small sample area prior to full-scale cleaning.

Sealants and Caulking

Sealants and caulking are used to seal joints and slab cracks by adhering to the surrounding concrete to protect against moisture infiltration into the slab. The materials may be self-leveling or non-sag, depending on whether they are intended for use on horizontal or vertical surfaces. Sealants and caulking should conform to the requirements of Federal Specification TT S-00227OE, Class A, Type 1 or 2 and remain bonded to the substrate concrete and flexible during their service life.

All sealants and caulking must be inspected periodically for wear, damage, and failure. Deterioration can be caused by cohesion failure within the material itself, adhesion failure between the material and concrete, incorrect joint design, abrasion or damage by traffic, rapid temperature changes, freeze-thaw damage, and ultra-violet light induced embrittlement. When deterioration is observed, repairs should be performed in a timely manner. If left un-repaired, sealant deterioration can impair the serviceability of the structure and accelerate deterioration of the structural system due to moisture intrusion into the slab.

Typically, repairs include the removal of deteriorated sealant and caulking material, examination of the underlying concrete substrate for deterioration, repairs to the concrete substrate as necessary, and installation of new sealant or caulking materials. As a rule of thumb, when 30% of the sealant or caulking is deteriorated, planned replacement of all sealants should be budgeted for. A qualified engineering consultant and the manufacturer of the material should be consulted for proper materials and methods of repair.

Sealants and caulking usually have a useful service life of 8 to 12 years when they are not directly exposed to ultra-violet light. Sealants and caulking directly exposed to ultra-violet light, such as on the roof level of a parking structure, usually have a service life of between 5 and 8 years. The general wear and tear of all sealant and caulking materials should be noted and monitored during the on-going inspections to determine the optimal time for replacement.

Expansion Joint Seals

Expansion joint openings are used to provide separation between sections of a garage and accommodate movements associated with temperature changes, creep, and long-term shrinkage. These openings are filled with a flexible material, or an expansion joint seal. Because expansion joint seals are direct exposure to wheel traffic, they are very vulnerable to wear and damage.

Therefore, they must be regularly inspected for damage, deterioration, and signs of leakage beneath the joints.

Various repairs and specialized expansion joint seal systems may be utilized to correct deterioration observed. Consultation with a qualified engineer and the expansion joint seal manufacturer is recommended prior to specifying any expansion joint repair or replacement. It is also recommended that expansion joint seals be installed or repaired by experienced and manufacturer-licensed contractors to ensure optimum performance.

Expansion joint seals typically have a useful service life of 5 to 10 years before some repairs are necessary to ensure their performance and long-term durability. Complete replacement of expansion joint seals can be expected approximately every 10 to 15 years. The general condition of the seals should be noted and monitored during the on-going inspections to determine the optimal time for repair and/or replacement.

Foundation Walls

In below-grade parking structures, such as the Mellon Square and Oliver parking garages, small cracks in the foundation can develop and water from the saturated soils retained by the foundation walls may begin to leak through the cracks. During the periodic inspections, foundation walls should be reviewed to determine locations of leaking foundation wall cracks.

Leaking foundation wall cracks should be addressed in a timely manner to minimize water infiltration into the walls and reduce subsequent corrosion-related damage. Often times, leaking foundation wall cracks may be sealed from the inside using a quick-setting or pressure injected grouts. If injecting the crack from the interior does not properly address the water infiltration, additional repair options include the injection of bentonite, finely divided clay which swells considerably when wetted, into the soil adjacent to the leak or excavating the retained soil and repairing the leaks from the exterior face of the wall. Consultation with a qualified engineer is recommended to determine the proper repairs.

2.5 Architectural Components

Architectural components include non-structural walls, surface finishes, windows, doors, painting, striping, and signage. All architectural components should be regularly inspected for deterioration due to weather, wear, damage, age, etc. Chapter 5 provides recommendations for the inspection frequency of the different architectural components. This survey can be performed by maintenance personnel familiar with the facility, supplemented by walk-through inspections by a qualified engineer or architect on a yearly or as-needed basis. Based on these inspections, an itemized list of capital expenditures for the current and subsequent years can be developed and budgeted for.

The architectural components shall be considered to be performing adequately when the following criteria are met or exceeded:

- Components remain in a safe and operable condition
- Components contribute to a smooth operation of the parking facility

- Components contribute to a safe and positive parking experience

Walls and Surface Finishes

Walls and surface finishes include exposed, non-structural walls (i.e. non-load bearing masonry walls), wall finishes (i.e. drywall, tile), ceiling finishes (i.e. suspended acoustical ceiling, drywall), and floor surface finishes (i.e. tiles, carpet). These elements are typically used in garages for privacy, aesthetics, safety, security, and to enclose temperature controlled spaces.

During inspections, the walls and surface finishes should be inspected for deterioration due to water damage, chips, cracks, general wear and tear, etc. Locations of deterioration should be recorded, and repairs should be performed in a timely manner.

The various walls and surface finishes have different useful service lives based on their composition, location of use, and exposure. In general, walls and surface finishes directly exposed to the weather or the exterior will have shorter life spans than walls and surface finishes on the interior or protected from the weather.

Doors

Most of the garages have both pedestrian access doors and overhead vehicular doors. Pedestrian access doors are typically utilized at entrance to stairs, lobbies, and occupied spaces for temperature control, security, and safety. Overhead vehicular doors are typically utilized for restricting after hour vehicular access into the garage or to provide fire separation.

Both pedestrian and vehicular doors should be checked regularly to ensure they operate properly. The door hardware, including latches, panic hardware, closers, locks, and manual operation devices, should be inspected at the same time. When a malfunction is noted, it should be corrected immediately to maintain the safety and security of the parking garage. Lubrication of all moving parts should be performed in accordance with manufacturer's recommendations.

All doors, frames, and hardware should also be inspected for corrosion. When corrosion is observed, the component should be properly cleaned and re-painted/re-coated. See the following section for a further discussion on re-painting and re-coating.

Typical pedestrian access doors and overhead vehicular doors have a useful service life of approximately 20 years. However, the service life of specific doors will depend on the door material, painting or protective coating, maintenance, and exposure conditions. Individual doors should be monitored on a regular basis to determine the optimum time frames for repairs and/or replacement.

Painting

Painting enhances the overall appearance of a component, while also providing protection from water infiltration and/or corrosion. Painted surfaces should be inspected as detailed in Chapter 5

to determine their condition. Small rust spots or areas of paint deterioration should be cleaned and touched up each year. Complete repainting should be performed as required by the element, type of paint, and the exposure conditions. Most painted surfaces in the parking garage will need repainting at intervals in the 3 to 7 year range.

Regular painting of doors, door frames, pipes, and pipe guards not only helps prevent corrosion deterioration but provides a pleasant and well kept appearance. The re-painting of interior or exterior concrete and masonry is usually done for appearance, while some masonry paints also serve as waterproofing. Some of the new anti-graffiti paints are effective for that purpose and should be considered when graffiti is or may be a problem. The face of concrete curbs should be re-painted semi-annually to minimize potential tripping hazards.

Structural steel (including metal pan stairs) should be regularly inspected for signs of corrosion and/or paint deterioration. Minor corrosion or peeling paint can be touched up by maintenance personnel as needed. However, if heavy corrosion or deterioration of the structural steel elements is observed, a qualified structural engineer should be consulted. Handrails and guardrails serve safety related functions in the facilities and should be inspected and re-painted in a similar fashion to structural steel.

All paint should be carefully selected to ensure it is appropriate for the particular application. As a protective coating, painting depends principally upon its adherence to the underlying surface. Therefore, before painting any surface, it is extremely important to properly clean and prepare the substrate surface.

Striping

Striping is essential to maintain the safe and orderly movement of vehicles and pedestrians, while ensuring smooth operation of the facility. Therefore, directional and informational floor striping should be inspected regularly and kept in good condition, and pedestrian walkways and lobby areas should be properly striped, signed, and well lit.

Re-striping should be performed whenever striping begins to fade or is deteriorated. Localized areas of re-striping, particularly at entrance, exits, and heavy traffic areas, can be expected on a regular basis. Re-striping of a garage as a whole can be anticipated every 2 to 5 years, depending on the amount of use and weather exposure.

Occasionally, striping layouts are changed within a garage to accommodate changes in traffic flow, smaller vehicles, etc. When changes in the striping layout are performed, it is recommended that the old striping be completely removed before the new striping is applied. Painting over old stripes will often times confuse users due to two layers of striping being visible. The Owner should also check with local and state traffic departments for the preferred or required striping color and dimensions.

Signage

Properly installed and maintained signage ensures that regulatory, warning, guide, informational, and advisory information is relayed to the garage users. The signage inside and outside a facility plays an important role in directing and informing the users of the traffic flow into and within the garage, while ensuring the safe and orderly movement of vehicles and pedestrians.

All signage should be regularly inspected and kept clean, legible, and well lit. Any deterioration to signage painting, coating, and facing materials should be promptly repaired and any illuminated signs or lighting damaged near signage should be replaced in a timely manner. Level indicator signage, stair or elevator location signage, and general information signage should be kept at eye level and be visible from entrances and exits.

2.6 Elevators and Escalators

The purpose of escalators and elevators is to allow for safe, quick, and efficient pedestrian entrance into and exit from the facility. All elevators and escalators, along with their associated components, require periodic safety checks and maintenance services. In addition to on-going operation inspections by in-house maintenance personnel described in Chapter 5, a service contract with the equipment manufacturer or a reputable service company should be in place. The service contract should include regular and code required inspections, maintenance recommended by the manufacturer, and emergency service as necessary.

The elevators and escalators shall be considered to be performing adequately when the following criteria are met or exceeded:

- The elevators and escalators are maintained in operable condition
- The elevators and escalators allow for quick and efficient entrance and exit from the facility
- The elevators and escalators contribute to the overall positive performance of the facility

In addition to the inspections and on-going maintenance and repairs, particular care should be given to frequent and regular cleaning of the elevator/escalator components. For instance, excessive dirt or grime the tracks or grooves in elevator floor sills and/or landing floor sill can cause the elevator doors to malfunction.

2.7 Fire Protection System

The fire protection system consists of fire alarms (i.e. smoke detectors, visual notification devices, etc.) and fire suppression (i.e. sprinklers, fire extinguishers). The purpose of this system is to detect, notify, and protect the garage users and fire department in the event of a fire.

It is recommended that fire protection system be regularly inspected for proper operation, damage, and code compliance. In addition to on-going general operation inspections by in-house maintenance personnel described in Chapter 5, the fire protection components should be

routinely inspected by qualified personnel as required by the local, state, and federal regulations. Based on these inspections, an itemized list of capital expenditures for the current and subsequent years can be developed and budgeted for.

The fire protection system shall be considered to be performing adequately when the following criteria are met or exceeded:

- The fire protection system detects a fire in the facility
- The fire protection system notifies both the users of the facility and the fire department in the event a fire is detected
- The fire protection system minimizes damage to the facility in the event of a fire

Fire Alarms

Fire alarms consist of smoke and heat detectors and audio and visual notification devices (i.e. strobes and horns). The detectors and notification devices should be connected to a fire alarm panel with the ability to notify both the garage users and fire department if a fire is detected. It is imperative that all components of the fire alarm be in an operable condition at all times.

The fire alarm system components should be regularly inspected and tested per all applicable local, state, and building codes and as detailed in Chapter 5. Proper and on-going maintenance of the components should be performed according to the manufacturer's recommendations. All defective or damaged components should be repaired or replaced in a timely manner in accordance with building code requirements and manufacturer's recommendations. It is recommended that a stock of replacement detectors, strobes, horns, wires, etc. is maintained to allow for efficient repairs to defective or damaged components. Qualified personnel should perform all repairs and may include licensed electricians and certified technicians.

Fire Suppression

Fire suppression components typically consist of a fire pump, standpipes, fire sprinklers, and fire extinguishers. The objective of a fire suppression system is to provide a safe environment for garage users and to minimize facility damage in the event of a fire. Therefore, it is imperative that the fire suppression components be properly maintained, repaired, and replaced prior to failure.

Similar to the fire alarm, the fire suppression components should be regularly inspected and tested per all applicable local, state, and building codes and as detailed in Chapter 5. Proper and on-going maintenance of the components should be performed according to the manufacturer's recommendations, and defective or damaged components should be repaired or replaced in a timely manner in accordance with building code requirements and manufacturer's recommendations. It is recommended that a stock of replacement sprinkler heads, fire extinguisher, etc. is maintained to allow for efficient repairs to defective or damaged components. Qualified personnel should perform all repairs and may include licensed electricians and certified technicians.

In addition to the inspections, periodic reviews should be performed to ensure the proper fire suppression components are present in the garage. Examples include checking that the proper number and location of fire extinguishers are available for use and that the extinguishers are adequately charged.

2.8 Plumbing System

The plumbing system consists of storm water drainage (i.e. drains and associated piping), sump pumps, and plumbing fixtures. All plumbing components should be regularly inspected for deterioration due to damage, leakage, wear, and obsolescence. Chapter 5 provides recommendations for the inspection frequency of the different plumbing components. This survey can be performed by maintenance personnel familiar with the facility, supplemented by walk-through inspections by a qualified engineer on a yearly or as-needed basis. Based on these inspections, an itemized list of capital expenditures for the current and subsequent years can be developed and budgeted for.

The plumbing system shall be considered to be performing adequately when the following criteria are met or exceeded:

- Proper drainage is provided from all areas of the facility
- Plumbing components are free of leaks
- Plumbing components are and operating properly and safely

Storm Water Drainage

Storm water drainage mainly consists of floor drains, trench drains, and drainage piping. Neglecting frequent inspections of the storm water drainage may have adverse effects of the garage. The most common issue with the storm water drainage in the garage is infrequent cleaning out of floor and trench drains. Floor and trench drains should be cleaned at least once a month to ensure they are free flowing to prevent ponding around the drains. Sediment baskets should be utilized to prevent pipes from clogging, and drains at the lowest floor may have backwater valves which should be checked for operation.

Drainage piping, sleeves, and hangers should be regularly inspected for corrosion, damage, or signs of leakage. Minor areas of corrosion should be properly cleaned and protected. If the corrosion has significantly deteriorated the piping, sections of pipe may need to be removed and replaced. Damaged piping should also be removed and replaced in a timely manner.

Sump Pumps

Sump pumps are typically utilized in garages to remove water from below grade areas containing electrical or mechanical equipment. As an example, most elevator and escalator pits contain sump pumps to ensure water is quickly removed from areas surrounding the operating equipment. It is imperative that all scheduled maintenance be performed per the manufacturer's recommendations to ensure the continual operation of the sumps. In addition, all deterioration or damage observed during inspections should be repaired in a timely manner. Improper

maintenance practices or untimely repairs can lead to breakdowns of the pumps and potential costly damage to electrical or mechanical equipment.

Plumbing Fixtures

Some of garages have plumbing fixtures, such as toilets and sinks, which must also be inspected regularly. Signs of water leakage should be addressed immediately, and any damage to the fixtures should be repaired in a timely manner. Fixtures should also be cleaned on a daily basis.

2.9 Heating, Ventilation, and Cooling (HVAC) Systems

The HVAC consists of heating, cooling, and ventilation equipment and the associated ductwork, control, dampers, pumps, and piping. All mechanical components should be regularly inspected for deterioration due to damage, wear, and obsolescence and should be properly maintained and serviced. Chapter 5 provides recommendations for the inspection frequency of the different mechanical components. Inspections, maintenance, and service should be performed by qualified personnel, such as mechanical engineers or certified technicians. Based on these inspections, an itemized list of capital expenditures for the current and subsequent years can be developed.

The mechanical system shall be considered to be performing adequately when the following criteria are met or exceeded:

- The mechanical system is providing a safe environment for garage users.
- The mechanical system is adequately heating and cooling the areas intended to be heated or cooled.
- The mechanical system is adequately ventilating all areas of the garage, including the proper removal of carbon monoxide from enclosed garages.

Service or maintenance manuals for all equipment should be followed for the proper on-going maintenance action. All required servicing should be performed as scheduled and per the manufacturer's requirements. This includes general lubrication of moving parts, replacement of worn belts or pulleys, filter replacement, etc. A stock of common replacement parts is recommended to expedite maintenance procedures.

Heating and cooling systems should be tested before seasonal temperature changes to ensure they are operating properly before they are required. In addition, HVAC ductwork should be regularly inspected for damage, wear, and air leakage and be repaired in a timely manner.

If in use, carbon monoxide detectors should be regularly inspected and tested. In addition, the area covered by each detector should be in compliance with the applicable building codes and manufacturer's recommendations. Repairs and/or modifications to the sensors should be performed as necessary based on the results of the inspections and testing.

As the HVAC systems age, their performance and efficiency will begin to fade and breakdowns may occur more often. As the HVAC equipment nears the end of its service life, consideration should be given to the replacement or upgrade of the systems to more efficient and current

technology. Depending on the size, use, and exposure conditions, HVAC equipment has a typical useful service life of between 20 and 30 years.

2.10 Electrical System

The electrical system consists of the electrical distribution and lighting fixtures. All electrical components should be regularly inspected for deterioration due to damage, wear, and obsolescence. Chapter 5 provides recommendations for the inspection frequency of the different electrical components. In addition to on-going general operation inspections by in-house maintenance personnel described in Chapter 5, an annual maintenance contract with an electrical firm is strongly recommended. Based on these inspections, an itemized list of capital expenditures for the current and subsequent years can be developed and budgeted for.

The electrical shall be considered to be performing adequately when the following criteria are met or exceeded:

- The electrical system provides a safe environment for garage users.
- The electrical system provides an adequate power source to all areas of the facility.
- Proper lighting levels are provided in all areas of the facility.

Electrical Distribution

A detailed annual inspection of the electrical distribution is recommended and on-going maintenance and minor repairs should be included in a maintenance contract with a reputable electrical firm. Any damage, corrosion, or wear of the distribution panels or components should be repaired or replaced.

Outlets should be periodically tested to ensure they are properly working and with cover plates attached. If a back-up power supply or emergency generator is present in the facility, periodic testing and maintenance of the equipment should be performed per the manufacturer's recommendations to ensure the reliability of the power source.

Electrical conduit should be regularly inspected, cleaned, and protected as required. Damaged conduit, conduit that is not well supported, or shows exposed wiring should be replaced and properly supported. It is recommended that replacement conduit and wiring be kept in stock to expedite replacement.

Lighting Fixtures

Adequate lighting is required in all areas of the garage to allow for proper operation of the facility and safe and secure movement of vehicles and pedestrians. The most common problem lighting fixtures is burnt out lamps and ballasts. Lamps should be replaced regularly, either when identified during inspections or during scheduled replacement based on anticipated lamp life. It is important to note that lamp life can vary substantially based on the type of fixture, amount of usage, and exposure conditions. It is recommended that replacement lamps and ballasts be kept in stock to expedite replacement.

Efficiency lighting controls, such as timers and photocells, should be checked routinely and maintained as required. In addition, timers may have to be reset occasionally to account for seasonal changes in dark hours. If lighting controls are not used in the facility, consideration should be given to their installation in an effort to conserve on electricity use.

Pedestrian exit lighting fixtures and emergency lighting fixtures should be visually inspected on a regular basis to ensure proper operation. Emergency lighting battery packs should be tested periodically and will need to be replaced per the manufacturer's recommendations or after extended use during a power loss.

Damage noted to any lighting fixtures should be repaired in a timely manner. All work should be performed per the manufacturer's recommendations and by qualified personnel, such as electrical engineers and certified technicians.

2.11 Parking Control Equipment

Parking control equipment consists of gates, entry stations, fee computers, controllers, detector loops, exit verifiers, pay on foot machines and card readers. All parking control equipment should be regularly inspected for proper operation and deterioration due to damage, wear, and obsolescence. Chapter 5 provides recommendations for the inspection frequency of the parking control equipment components. In addition to general operation inspections by in-house personnel, a service contract with an authorized parking equipment supplier is strongly recommended. The service contract should include regular inspections, preventative maintenance, and emergency repairs as necessary. Consideration should also be given to providing training to in-house staff to deal with limited maintenance issues and emergency situations.

The parking control equipment shall be considered to be performing adequately when the following criteria are met or exceeded:

- Parking control equipment is operating within the manufacturer's guidelines and specifications.
- Garage users can enter and exit the parking facility without difficulty.
- Breakdowns in the parking control equipment are minimal and addressed in a timely manner when they do occur.

It is strongly encouraged that copies of the operation and service manuals for the equipment be kept on hand for easy access. Key garage personnel should be familiar with the location of the manuals and be properly trained to address breakdowns as they occur. In addition, it is desirable to establish a log of maintenance and service work performed for each piece of equipment.

Prior to the start of the Concession Term, the Concessionaire must have a preventative maintenance schedule and practices for a minimum of the first three (3) years of the Concession Agreement. Having a preventative maintenance schedule in place prior to the beginning of the lease, will ensure a smooth transition and will further decrease the likelihood of equipment malfunction during the start of the Concession. Preventative maintenance should be performed by a qualified technician. This includes detailed inspections of the components, lubrication, adjustments as necessary, and cleaning. Reports of each inspection should be provided and deficiencies should be noted.

Any deterioration to the parking control equipment should be addressed in a way that ensures the continuous operation of the Facility during normal operating hours. Minor repairs or complete replacement of the equipment may be necessary, depending on the type and extent of deterioration observed. If new equipment is installed, compatibility with the existing equipment must be verified prior to installation.

2.12 Security Systems

The security system consists of the audio monitoring, call for assistance buttons, and closed circuit television/cameras. Chapter 5 provides recommendations for the inspection frequency of the security system components. Based on these inspections, an itemized list of capital expenditures for the current and subsequent years can be developed and budgeted for.

The security system shall be considered to be performing adequately when the following criteria are met or exceeded:

- All security components are operational and maintained.
- The security system covers all critical areas of the garage.

Similar to the parking control equipment, a service contract with the manufacturer or their registered service representative is strongly recommended in addition to the general inspections performed by in-house personnel. To ensure the continuous operation of the security system, the Concessionaire must provide a preventative maintenance schedule and protocols for a minimum of the first three (3) years of the Concession Agreement. Additionally, it is recommended that consideration be given to providing training to in-house staff to deal with limited maintenance issues and emergency situations. Any deficiency should be corrected immediately.

Copies of the operation and service manuals for all equipment in the facility should be kept on hand for easy access. It is desirable that a log of maintenance and service work done on each piece of equipment is established and maintained.

2.13 Landscaping

Landscaping features of a parking garage can either enhance its appearance when well maintained or be an eyesore if maintenance is neglected. Daily removal of trash from landscaped areas is necessary to maintain a pleasing appearance.

On-going landscaping should be performed either by in-house maintenance personnel or under an annual contract with a landscaping contractor. Typical landscaping includes mowing, fertilizing, weed removal, trimming, etc., with the extent dependent on the type of planting at the facility and the time of year. Judicious landscaping will reduce hiding spaces and increase the overall security of the facility.

3.0 Surface lots General Information

3.1 Facility Information

In January of 2010, DESMAN performed a physical due diligence review and evaluation of the City of Pittsburgh Parking Lots. A brief description of each of the lots is listed in **Table 1**. **Table 1** lists the address, equipment type, hours of enforcement, time limits and inventory for each surface lot.

Table 1 – Surface Lot Information

Lot Name	Address	Equipment Type	Hours of Enforcement	Time Restriction	Inventory
Ivy & Bellefonte	726 Ivy Street	Multi-space Meters	7AM - 11PM	4 hours	74
Forbes & Murray	5801 Forbes Avenue	Multi-space Meters	7AM - 11PM	4 hours	72
Forbes & Shady	1648 Shady Avenue	Multi-space Meters	7AM - 11PM	4 hours	59
JCC & Forbes	5738 Forbes Avenue	Single Space Meters	M-F: 5:45AM-11PM, Sat: 10AM-11PM, Sun. 7AM - 11PM	4 hours	72
Tamello & Beatty	135 Tamello Street	Single Space Meters	7AM - 11PM	4 hours	76
Eva & Beatty	120 S. Beatty Street	Multi-space Meters	7AM - 11PM	4 hours	130
Ansley & Beatty	121 Beatty Street	Single Space Meters	7AM - 11PM	4 hours	23
Beacon & Bartlett	5737 Beacon Street	Multi-space Meters	7AM - 11PM	4 hours	69
Observatory Hill	3901 Perrysville Ave	Single Space Meters	7AM - 11PM	4 hours	23
20th & Sidney	20th & Sidney	Multi-space Meters	7AM - 11PM	4 hours	80
Penn Circle N.W.	5900 Penn Circle North	Single Space Meters	7AM - 11PM	4 hours / Monthly Permit	125
Sidney Lot	18th & Sidney	Multi-space Meters	7AM - 11PM	4 hours	45
Harvard & Beatty	5910 Harvard Street	Single Space Meters	7AM - 11PM	4 hours	61
42nd & Butler	4200 Butler Street	Single Space Meters	7AM - 11PM	4 hours	22
Sheridan & Kirkwood	6117 Kirkwood Street	Multi-space Meters	7AM - 11PM	4 hours	114
Sheridan & Harvard	6226 Harvard Street	Single Space Meters	7AM - 11PM	4 hours	41
Brookline Avenue	916 Brookline Blvd	Single Space Meters	7AM - 11PM	4 hours	28
East Ohio Street	529 Foreland Ave	Single Space Meters	7AM - 11PM	4 hours	88
Beechview Avenue	1541 Beechview Ave	Single Space Meters	7AM - 11PM	4 hours	17
Homewood & Zenith	Kelly & Zenith Rd	Single Space Meters	7AM - 11PM	4 hours	24
Friendship & Cedarville	203-233 Cedarville	Multi-space Meters	7AM - 11PM	4 hours	90
19th & Carson Street	1916 Carson Street	Multi-space Meters	7AM - 11PM	4 hours	27
Douglas & Phillips	5819 Phillips Avenue	Single Space Meters	7AM - 11PM	4 hours	45
Main & Alexander	431 Main Street	Single Space Meters	7AM - 11PM	4 hours	29
Brownsville & Sankey	2702 Brownsville Rd	Single Space Meters	7AM - 11PM	10 hours	80
Asteroid & Warrington	65 Asteroid Way	Single Space Meters	7AM - 11PM	4 hours / 15 min (2)	13
Taylor Street	Taylor St & Corday Way	Multi-space Meters	7AM - 11PM	4 hours	26
Walter & Warrington	Walter & Warrington Ave	Single Space Meters	7AM - 11PM	4 hours	15
12th & East Carson	1217 Carson Street	Multi-space Meters	7AM - 11PM	4 hours	35
Shiloh Parking Plaza	118 Virginia Ave	Single Space Meters	7AM - 11PM	4 hours	73
18th & Carson Street	1800 East Carson Street	Multi-space Meters	7AM - 11PM	4 hours	41
Butler Street Plaza	5224 Butler Street	Multi-space Meters	7AM - 11PM	4 hours	12

DESMAN Associates

4.0 Recommended Surface Lot Maintenance Program

4.1 Overview

The recommended maintenance program includes period inspections, capital improvements, and routine/operation maintenance to each of following systems:

- General Cleaning
- Pavement/Structural/Waterproofing Systems
- Architectural Components
- Storm Drainage System
- Electrical System
- Parking Control Equipment
- Security Systems
- Landscaping

The following sections further detail the recommended actions to maximize each system's performance and service life.

4.2 General Cleaning

While most cleaning relates to the appearance of the lots and the resulting image that is portrayed to the public, some items can cause problems if neglected. For example, trash or silt, sand or other erosion susceptible material can clog storm drains and result in flooding. A cleaning program should be established for each facility that directs personnel to perform the required cleaning tasks on a regular basis.

In part, the suggested frequencies of cleaning are based upon the concept that users have a lower tendency to litter a clean, neat environment than an environment which is already messy. A clean, well kept lot promotes a good reputation and invites users to return to the facility. Often, the increased revenue more than offsets the cost of keeping the facility clean.

One of the most frequently overlooked aspects of lot maintenance is proper pavement cleaning. It is recommended that all pavements be swept on a monthly basis. Sweeping can be done either locally with hand brooms or mechanized sweepers designed for street or parking garage use. Between sweepings it is recommended that litter be picked up from general parking areas and trash cans are emptied daily.

In addition to sweeping, a semi-annual wash down, or power-washing, of the pavements with a high volume, low pressure water hose is recommended. In high traffic areas, such as entrance lanes and main driving aisles, more frequent power-washing may be desirable. During power-washing operations, grease and oil drippings from vehicles that build up in parking stalls and entrance and exit lanes should be removed with degreasers, such as an industrial detergent. Before and after washing the lots, storm drains should be checked to see that they are functioning properly.

4.3 Pavements/Structural/Waterproofing Systems

Asphalt pavement

The lot pavement system typically represents the largest component of the site improvement and initial construction investment. Protection of that investment requires an on-going program of regular inspection, repairs, and preventative maintenance. Deferred repairs and maintenance can lead to accelerated deterioration, resulting in more costly repairs and greater disruption to the operations of the lot.

The asphalt pavement system should be regularly inspected for deterioration due to cracking, water ponding, poor sub-grade drainage, weather, wear, vehicular damage, and any other deterioration mechanisms. Chapter 5 provides recommendations for the inspection frequency of the pavement. During the inspections, the location and extent of conditions which could cause, or have already caused deterioration should be noted. Items to be looked for include:

- General condition of the asphalt surface, including locations of surface scaling (loss of aggregate at surface) rutting or shoving. Areas of asphalt deterioration should be identified for short term or long term repair or replacement. Replacement of the surface and, if necessary, the base course will depend on its condition.
- Extent and pattern of cracking in the asphalt pavement. Cracks should be addressed by routing and sealing the cracks and filling with a hot, rubberized joint sealer.
- Areas exhibiting water ponding or evidence of ‘pumping’ of moisture from the sub grade. Replacement of the surface and base courses and, if necessary, the granular sub base or drainage layer will depend on its condition.

As a general rule, we do not advocate the application of asphalt sealers to existing pavement surfaces to extend the service life. Although they provide a ‘like new’ appearance, this look rapidly fades back to the preceding condition. Typically, new striping is also required. Owners are better off spending the same funds to rout and fill cracks and proactively replace pavement areas exhibiting pavement failure or extensive deterioration such as ‘alligator’ cracking.

To address potential liability issues, any potential tripping hazards noted in the pavements should be filled immediately, even if only on a temporary basis until proper repairs can be performed.

The proper repair of pavement cracking consists of routing the crack prior to filling with sealant. Simply ‘pouring’ a sealant material or squeegee or brooming an extra coat of asphalt sealer over cracks is not a proper approach.

Concrete

In most lots, the extent of concrete is limited to curbed islands, light pole bases and curb cut driveway approaches in the public way. Concrete surfaces should be reviewed for extent of cracking, spalling, curling or settlement and water ponding in vicinity of curbing. Though occurring on rare occasions, there are instances where the sidewalk area could be a vaulted

sidewalk if a building formerly occupied the lot area or it is possible that an underground storm detention tank or vaulted area could exist within a portion of the lot area. It is always advisable to verify if any of these conditions exist.

Structural Steel

Structural steel in lots is generally limited to stairs to access roads above or below the lots, guardrails, and bollards. All structural steel components should be regularly inspected for the onset of corrosion. New lots should feature galvanized steel since they are usually exposed to the elements. When corrosion is observed, the steel component should be cleaned and the painting or protective coating should be touched-up. If heavy corrosion or significant deterioration of the structural steel elements is observed, a qualified structural engineer should be consulted.

Metal guardrails are also subject to damage from impact. It is recommended that guardrails be checked regularly to verify that they are rigid, not damaged, and can serve their intended purpose as a crash barrier.

As preventative maintenance, complete re-painting or re-coating of exposed structural steel elements should be performed at regular intervals. See Section 3.5 for a further discussion on re-painting and re-coating intervals.

Foundation Walls

In isolated locations, some lots may contain below-grade walls due to significant elevation differences. Small cracks in the foundation walls can develop due to shrinkage cracks at 5 to 10 foot intervals and water from the saturated soils retained by the foundation walls may begin to leak through the cracks. During the periodic inspections, foundation walls should be reviewed to determine locations of leaking foundation wall cracks.

Leaking foundation wall cracks should be addressed in a timely manner to minimize water infiltration into the walls and reduce subsequent corrosion-related damage. Often times, leaking foundation wall cracks may be sealed from the inside using a quick-setting or pressure injected grouts. If injecting the crack from the interior does not properly address the water infiltration, additional repair options include the injection of bentonite, finely divided clay which swells considerably when wetted, into the soil adjacent to the leak or excavating the retained soil and repairing the leaks from the exterior face of the wall. Consultation with a qualified engineer is recommended to determine the proper repairs.

Waterproofing Systems

In the event a storm detention vault or tank exists on the lot, its top surface may or may not be protected with either an exposed or buried waterproofing membrane system. This system is designed to protect the top surface of the tank or vault slab from corrosion related deterioration. The existence of any such areas should be verified and a professional engineer consulted on how to best protect and monitor the service condition of the membrane. The establishment of

deterioration mechanisms in vault or tank slabs can have significant cost implications should they need to be repaired in future years. Often, that portion of a lot containing a storm detention vault or tank may be separated by height restriction devices in order to keep very heavy vehicles from driving over these areas and overloading the structure below.

4.4 Architectural Components

Architectural components include cashier booths or trailers, fencing, striping, and signage. All architectural components should be regularly inspected for deterioration due to weather, wear, damage, age, etc. Chapter 5 provides recommendations for the inspection frequency of the different architectural components. This survey can be performed by maintenance personnel familiar with the facility, supplemented by walk-through inspections by a qualified engineer or architect on a yearly or as-needed basis. Based on these inspections, an itemized list of capital expenditures for the current and subsequent years can be developed and budgeted for.

The architectural components shall be considered to be performing adequately when the following criteria are met or exceeded:

- Components remain in a safe and operable condition
- Components contribute to a smooth operation of the lot
- Components contribute to a safe and positive parking experience

Metal handrails are also subject to damage from impact. It is recommended that handrails be checked regularly to verify that they are rigid, not damaged, and can serve their intended purpose as pedestrian traffic guidance or fall protection.

Painting

Painting enhances the overall appearance of a component, while also providing protection from water infiltration and/or corrosion. Painted surfaces should be inspected as detailed Chapter 5 to determine their condition. Small rust spots or areas of paint deterioration should be cleaned and touched up each year. Complete repainting should be performed as required by the element, type of paint, and the exposure conditions. Most painted surfaces in lots will need repainting at intervals in the 3 to 7 year range.

The face of concrete curbs, if painted, should be done semi-annually to minimize potential tripping hazards.

Striping

Striping is essential to maintain the safe and orderly movement of vehicles and pedestrians, while ensuring smooth operation of the facility. Therefore, directional and informational lot striping should be inspected regularly and kept in good condition, and pedestrian walkways should be properly striped, signed, and well lit.

Re-striping should be performed whenever striping begins to fade or is deteriorated. Localized areas of re-striping, particularly at entrance, exits, and heavy traffic areas, can be expected on a regular basis. Re-striping of a lot as a whole can be anticipated every 2 to 3 years, depending on the amount of use and weather exposure.

Signage

Properly installed and maintained signage ensures that regulatory, warning, guide, informational, and advisory information is relayed to the lot users. The signage at a facility plays an important role in directing and informing the users of the traffic flow, while ensuring the safe and orderly movement of vehicles and pedestrians.

All signage should be regularly inspected and kept clean, legible, and well lit. Any deterioration to signage painting, coating, and facing materials should be promptly repaired and any illuminated signs or lighting damaged near signage should be replaced in a timely manner.

4.5 Storm Drainage System

Storm water drainage mainly consists of area drains, trench drains, and drainage piping. Neglecting frequent inspections of the storm water drainage may have adverse effects on the lot. The most common issue with the storm water drainage in the garage is infrequent cleaning and rodding.

Chapter 5 provides recommendations for the inspection frequency of the different drainage components. This survey can be performed by maintenance personnel familiar with the facility, supplemented by walk-through inspections by a qualified engineer on a yearly or as-needed basis. Based on these inspections, an itemized list of capital expenditures for the current and subsequent years can be developed and budgeted for.

The drainage system shall be considered to be performing adequately when the following criteria are met or exceeded:

- Proper drainage is provided from all areas of the facility

4.6 Electrical System

The electrical system typically consists of pole mounted lighting fixtures. All electrical components should be regularly inspected for deterioration due to damage, wear, and obsolescence. Chapter 5 provides recommendations for the inspection frequency of the electrical components. In addition to on-going general operation inspections by in-house maintenance personnel described in Chapter 5, an annual maintenance contract with an electrical firm is strongly recommended. Based on these inspections, an itemized list of capital expenditures for the current and subsequent years can be developed and budgeted for.

The electrical shall be considered to be performing adequately when the following criteria are met or exceeded:

- The electrical system provides a safe environment for facility users.

- Proper lighting levels are provided in all areas of the facility.

Electrical conduit should be regularly inspected, cleaned, and protected as required. Damaged conduit, conduit that is not well supported, or shows exposed wiring should be replaced and properly supported. It is recommended that replacement conduit and wiring be kept in stock to expedite replacement.

Lighting Fixtures

Adequate lighting is required in all areas of the lot to allow for proper operation of the facility and safe and secure movement of vehicles and pedestrians. The most common problem with lighting fixtures is burnt out lamps and ballasts. Lamps should be replaced regularly, either when identified during inspections or during scheduled replacement based on anticipated lamp life. It is important to note that lamp life can vary substantially based on the type of fixture, amount of usage, and exposure conditions. It is recommended that replacement lamps and ballasts be kept in stock to expedite replacement.

Efficiency lighting controls, such as timers and photocells, should be checked routinely and maintained as required. In addition, timers may have to be reset occasionally to account for seasonal changes in dark hours. If lighting controls are not used in the facility, consideration should be given to their installation in an effort to conserve on electricity use.

Damage noted to any lighting fixtures should be repaired in a timely manner. All work should be performed per the manufacturer's recommendations and by qualified personnel, such as electrical engineers and certified technicians.

4.7 Parking Control Equipment

Parking control equipment consists of gates, entry stations, fee computers, controllers, detector loops, exit verifiers, pay on foot machines and card readers. All parking control equipment should be regularly inspected for proper operation and deterioration due to damage, wear, and obsolescence. Chapter 5 provides recommendations for the inspection frequency of the parking control equipment components. In addition to general operation inspections by in-house personnel, a service contract with an authorized parking equipment supplier is strongly recommended. The service contract should include regular inspections, preventative maintenance, and emergency repairs as necessary. Consideration should also be given to providing training to in-house staff to deal with limited maintenance issues and emergency situations.

The parking control equipment shall be considered to be performing adequately when the following criteria are met or exceeded:

- Parking control equipment is operating within the manufacturer's guidelines and specifications.
- Lot users can enter and exit the parking facility without difficulty.
- Breakdowns in the parking control equipment are minimal and addressed in a timely

manner when they do occur.

It is strongly encouraged that copies of the operation and service manuals for the equipment be kept on hand for easy access. Key personnel should be familiar with the location of the manuals and be properly trained to address breakdowns as they occur. In addition, it is desirable to establish a log of maintenance and service work performed for each piece of equipment.

Prior to the start of the lease agreement, the Concessionaire must have a revenue equipment preventative maintenance schedule and practices for a minimum of the first three (3) years of the Concession Agreement. Having a preventative maintenance schedule in place prior to the beginning of the lease, will ensure a smooth transition and will further decrease the likelihood of equipment malfunction during the start of the Concession. Preventative maintenance should be performed by a qualified technician. This includes detailed inspections of the components, lubrication, adjustments as necessary, and cleaning. Reports of each inspection should be provided and deficiencies should be noted.

Any deterioration to the parking control equipment should be addressed in a way that ensures the continuous operation of the surface lots during normal operating hours. Minor repairs or complete replacement of the equipment may be necessary, depending on the type and extent of deterioration observed. If new equipment is installed, compatibility with the existing equipment must be verified prior to installation.

4.8 Security Systems

The security system consists of the audio monitoring, call for assistance buttons, and closed circuit television/cameras. Chapter 5 provides recommendations for the inspection frequency of the security system components. Based on these inspections, an itemized list of capital expenditures for the current and subsequent years can be developed and budgeted for.

The security system shall be considered to be performing adequately when the following criteria are met or exceeded:

- All security components are operational and maintained.
- The security system covers all critical areas of the lot.

Similar to the parking control equipment, a service contract with the manufacturer or their registered service representative is strongly recommended in addition to the general inspections performed by in-house personnel. To ensure the continuous operation of the security system, the Concessionaire must provide a preventative maintenance schedule and protocols for a minimum of the first three (3) years of the Concession Agreement. Additionally, it is recommended that consideration be given to providing training to in-house staff to deal with limited maintenance issues and emergency situations. Any deficiency should be corrected immediately.

Copies of the operation and service manuals for all equipment in the facility should be kept on hand for easy access. It is desirable that a log of maintenance and service work done on each piece of equipment is established and maintained.

4.9 Landscaping

Landscaping features of a parking lot can either enhance its appearance when well maintained or be an eyesore if maintenance is neglected. Daily removal of trash from landscaped areas is necessary to maintain a pleasing appearance.

On-going landscaping should be performed either by in-house maintenance personnel or under an annual contract with a landscaping contractor. Typical landscaping includes mowing, fertilizing, weed removal, trimming, etc., with the extent dependent on the type of planting at the facility and the time of year. Judicious landscaping will reduce hiding spaces and increase the overall security of the facility.

DRAFT

5.0 Periodic Structure and Surface Lot Inspection Schedule

5.1 Structure and Surface Lot Inspection

Regular inspection of the various systems and components within each of the facilities is essential to determining the necessary repairs in the current and coming years. However, different systems and components should be inspected at different intervals. The recommended inspection intervals for the various systems and component are provided in **Table 2** for the structures and **Table 3** for the surface parking lots. The following notes apply to **Table 2** and **Table 3**:

- **Table 2** lists the recommendation inspection intervals for an all-inclusive structures and **Table 3** lists the recommendation inspection intervals for the surface lots. **It is likely that not all systems or components will be present or applicable for each garage and lot, so the inspection schedule should be customized for each garage and lot for it to be meaningful. A separate schedule should be developed for each of the included structures and lots on a monthly basis, and prominently displayed in the particular maintenance or parking management office where it can be viewed by all appropriate personnel. These maintenance schedules must be approved by the City Parties.**
- A management control system should be used to verify that the inspections and maintenance are being performed as scheduled and are effective.
- Records of all inspections, preventative maintenance, and repairs performed should be kept and maintained.
- If significant deficiencies are noted, a qualified engineer should be consulted to review the deficiencies and recommend remedial action.
- The preventative maintenance and detailed inspections of specialty equipment such as parking control equipment, elevators and escalators should be included in a service contract. This will ensure all work on the equipment is performed by qualified and/or trained personnel with proper parts and will maintain warranties and maximize the service life.

Table 2. Periodic Facility Inspection Schedule

General Cleaning		
Component	Task to be Performed	Minimum Frequency
General	Pick-Up Litter and Empty Garbage Cans	Daily
Floors - High Traffic Pedestrian Areas	Sweep/Vacuum/Mop (Lobbies, Restrooms, Offices, etc.)	Daily
Floors - General Parking Areas	Sweep	Weekly
Floors - General Parking Areas	De-Grease and Power Wash Clean	Semi-Annually
Restrooms	General Cleaning of Fixtures, Mirrors, etc.	Daily
Stairs	Sweep, Remove Litter, Clean Handrails & Walls	Weekly or As Necessary
Windows - General	General Cleaning	Monthly to Quarterly
Windows - Cashier Booths	General Cleaning	Daily
Walls - Restrooms, Lobbies, etc	General Cleaning	Weekly
Structural System		
Component	Task to be Performed	Minimum Frequency
All Structural System Components	In-House Maintenance Personnel Walk-Through Observation	Monthly
Floor Slabs	Visual Inspection and Sounding/Testing As Necessary by Engineer	Yearly or As Necessary
Beams	Visual Inspection and Sounding/Testing As Necessary by Engineer	Yearly or As Necessary
Columns	Visual Inspection and Sounding/Testing As Necessary by Engineer	Yearly or As Necessary
Walls	Visual Inspection and Sounding/Testing As Necessary by Engineer	Yearly or As Necessary
Structural Steel	Visual Inspection and Sounding/Testing As Necessary by Engineer	Yearly or As Necessary
Waterproofing System		
Component	Task to be Performed	Minimum Frequency
All Waterproofing System Components	In-House Maintenance Personnel Walk-Through Observation	Monthly
Waterproofing Membrane	Visual Inspection and Sounding As Necessary by Engineer	Yearly or As Necessary
Sealants and Caulking	Visual Inspection by Engineer	Yearly or As Necessary
Expansion Joints	Visual Inspection by Engineer	Yearly or As Necessary
Foundation Walls	Visual Inspection for Water Leakage by Engineer	Yearly or As Necessary
Architectural Components		
Component	Task to be Performed	Minimum Frequency
All Architectural Components	Complete/Update Inventory	Yearly
	In-House Maintenance Personnel Walk-Through Observation	Monthly
Walls and Wall Finishes	Detailed Visual Inspection	Yearly
Ceilings Finishes	Detailed Visual Inspection	Yearly
Floors Finishes	Detailed Visual Inspection	Yearly
Windows	General Operation Check	Weekly
	Detailed Visual and Operational Inspection	Monthly
Doors and Hardware	General Operation Check	Daily
	Adjust and Lubricate	Monthly or As Required
	Detailed Visual and Operational Inspection	Monthly
Stairs	General Condition and Safety Check	Daily
	Visual Inspection and Sounding/Testing As Necessary	Yearly
Painting	General Visual Observation	Monthly
	Detailed Visual Inspection	Yearly
Striping	General Visual Observation	Monthly
	Detailed Visual Inspection	Yearly
Signage	General Visual Observation	Monthly
	Detailed Visual Inspection	Yearly
Elevators and Escalators		
Component	Task to be Performed	Minimum Frequency
Elevators and Escalators	Complete/Update Inventory	Yearly
Elevators	General Operation, Condition, and Safety Check	Daily
	General Cleaning of Cabs, Sills, etc	Daily
	Detailed Operation, Condition, and Safety Inspection and Testing	Per Manufacturer's Guidelines
	Preventative Maintenance - Clean, Lube, Adjust, etc.	Per Manufacturer's Guidelines
Escalators	General Operation, Condition, and Safety Check	Daily
	General Cleaning of Handrails, Walls, etc	Daily
	Detailed Operation, Condition, and Safety Inspection and Testing	Per Manufacturer's Guidelines
	Preventative Maintenance - Clean, Lube, Adjust, etc.	Per Manufacturer's Guidelines

Table 2. Periodic Facility Inspection Schedule

Fire Protection System		
Component	Task to be Performed	Minimum Frequency
Fire Protection Components	Complete/Update Inventory	Yearly
Fire Alarm (Heat & Smoke Detectors, Audio & Visual Notification Devices)	General Condition Inspection	Weekly
	General Operation Inspection	Weekly
	System Test and Certification	Per Code
Sprinkler System	General Condition/Operation Inspection for Leaks, Corrosion, etc.	Monthly
	Drain Sprinkler Lines and Standpipes	Per Code
	Detailed Condition/Operation Inspection and Testing	Per Code
Fire Extinguishers	Verify Extinguishers are Present and Charged at Marked Locations	Monthly
	Detailed Inspection and Certification	Per Code
Fire Doors	General Condition Inspection	Monthly
	General Operation Inspection	Weekly
	Detailed Condition/Operation Inspection and Testing	Per Code
Pumps	General Condition/Operation Inspection for Leaks, Oil Levels, Noise, etc.	Daily
	Detailed Condition/Operation Inspection and Testing	Per Manufacturer's Guidelines
	Preventative Maintenance - Clean, Lube, Adjust, etc.	Per Manufacturer's Guidelines
Air Compressor	General Condition/Operation Inspection for Leaks, Oil Levels, Noise, etc.	Daily
	Detailed Condition/Operation Inspection and Testing	Per Manufacturer's Guidelines
	Preventative Maintenance - Clean, Lube, Adjust, etc.	Per Manufacturer's Guidelines
Plumbing System		
Component	Task to be Performed	Minimum Frequency
Plumbing Components	Complete/Update Inventory	Yearly
Service Water	General Condition Observation	Weekly
	Cross Flow Prevention Device Test and Certificate	Per Code
Fixtures	General Condition/Operation Observation	Daily
	General Cleaning of Restroom Fixtures	Daily
Drains and Piping	General Condition Observation for Leaks, Corrosion, Cracking, etc.	Monthly
	Inspect for Damaged or Missing Insulation or Pipe/Valve Labels	Monthly
	Clean/Rod Out Drains	Monthly
	Evacuate Triple Basins and Ejector Pump Pit	Monthly
Pumps	General Condition/Operation Inspection for Leaks, Oil Levels, Noise, etc.	Daily
	Detailed Condition/Operation Inspection and Testing	Per Manufacturer's Guidelines
	Preventative Maintenance - Clean, Lube, Adjust, etc.	Per Manufacturer's Guidelines
Heating, Ventilation, and Air-Conditioning (HVAC) System		
Component	Task to be Performed	Minimum Frequency
HVAC Components	Complete/Update Inventory	Yearly
Ventilation Fans	General Condition/Operation Inspection	Daily
	Detailed Condition/Operation Inspection and Testing	Per Manufacturer's Guidelines
	Preventative Maintenance - Clean, Lube, Adjust, Drive Belts, etc.	Per Manufacturer's Guidelines
Carbon Monoxide Detectors	General Condition/Operation Inspection	Daily
	Detailed Condition/Operation Inspection and Testing	Per Manufacturer's Guidelines
Heating and Cooling Equipment	General Condition/Operation Inspection	Daily
	Check/Adjust Thermostat for Season Changes	Seasonal
	Replace Disposable Media Filter	Every 3 Months or As Required
	Detailed Condition/Operation Inspection and Testing	Per Manufacturer's Guidelines
	Preventative Maintenance - Clean, Lube, Adjust, Drive Belts, etc.	Per Manufacturer's Guidelines
Dampers	General Condition/Operation Inspection	Daily
	Detailed Condition/Operation Inspection and Testing	Monthly
	Preventative Maintenance - Clean, Lube, Adjust, etc.	Per Manufacturer's Guidelines
Ductwork	General Condition Observation for Leaks, Corrosion, Cracking, etc.	Monthly
	General Cleaning	Monthly
	Inspect for Damaged or Missing Insulation or Pipe/Valve Labels	Monthly
Pumps	General Inspection for Leaks, Oil Levels, Noise, Vibration, etc.	Daily
	Detailed Operation Inspection and Testing	Per Manufacturer's Guidelines
	Preventative Maintenance - Clean, Lube, Adjust, etc.	Per Manufacturer's Guidelines
Piping	General Condition Observation for Leaks, Corrosion, Cracking, etc.	Monthly
	Inspect for Damaged or Missing Insulation or Pipe/Valve Labels	Monthly

Table 3. Periodic Lot Inspection Schedule

Electrical System		
Component	Task to be Performed	Minimum Frequency
Lighting Fixtures	General Lot Lighting and Conduit Inspection - Daytime Hours	Weekly
	Replace Burnt Out Lamps and Ballasts	As Required
	General Lot Lighting and Sign Illumination Inspection - Evening Hours	Weekly
	Pedestrian Walkways and Stairwell Illumination Inspection - Evening Hours	Weekly
	Clean Fixture Lamps	Monthly
Lighting Controls	General Condition/Operation Inspection	Weekly
	Re-Set for Seasonal Changes	As Required
Parking Control Equipment		
Component	Task to be Performed	Minimum Frequency
Parking Control Components	Complete/Update Inventory	Yearly
Collection Booths	General Condition/Operation Inspection	Daily
	General Cleaning	Weekly
Parking Control Equipment (Meters, Gates, Ticket Dispensers, Fee Computers, Loops, etc.)	General Condition/Operation Inspection	Daily
	Detailed Condition/Operation Inspection and Testing	Per Manufacturer's Guidelines
	Preventative Maintenance - Clean, Lube, Adjust, etc.	Per Manufacturer's Guidelines
Security System		
Component	Task to be Performed	Minimum Frequency
Security Components	Complete/Update Inventory	Yearly
Emergency Intercom/Call for Distress	General Condition/Operation Inspection	Daily
	Detailed Condition/Operation Inspection and Testing	Per Manufacturer's Guidelines
	Preventative Maintenance - Clean, Lube, Adjust, etc.	Per Manufacturer's Guidelines
CCTV Cameras/System	General Condition/Operation Inspection	Daily
	Detailed Condition/Operation Inspection and Testing	Per Manufacturer's Guidelines
	Preventative Maintenance - Clean, Lube, Adjust, etc.	Per Manufacturer's Guidelines
Landscaping		
Component	Task to be Performed	Minimum Frequency
General	Remove Trash	Daily
	Mowing, Weed Removal, Trimming, Fertilizing, etc.	Weekly or As Necessary