SECTION 111200 - PARKING ACCESS AND REVENUE CONTROL SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specifications apply to this Section.

B. Abbreviations List:

1.	ACS	Access Control System
2.	API	Application Programming Interface
3.	APM	Automated Payment Machine
4.	ASV	Approved Scanning Vendor
5.	AVI	Automatic Vehicle Identification
6.	BTV	Burlington International Airport
7.	City	City of Burlington
8.	CMS	Central Management System
9.	CSR	Customer Service Representative
10.	CT	Cashier Terminal
11.	DPW	Department of Public Works
12.	EMV	Credit Card Payments via Chip
13.	ENS	Entrance Station
14.	EST	Eastern Standard Time
15.	EXS	Exit Station
16.	FPP	Frequent Parker Program
17.	GUI	Graphical User Interface
18.	HCPP	Handicapped Permit Parking
19.	IP	Internet Protocol
20.	LAT	Lane Acceptance Test
21.	LPN	License Plate Number
22.	LPR	License Plate Recognition
23.	NEMA	National Electrical Manufacturing Association
24.	OCT	Operational Completion Test
25.	PA-DSS	Payment Application Data Security Standard
26.	PAE	Pay-At- Exit
27.	PARCS	Parking Access and Revenue Control System
28.	PC	Personal Computer
29.	PCI-SSC	Payment Card Industry Security Standards Council
30.	PCI-DSS	Payment Card Industry Data Security Standard
31.	PM	Preventive Maintenance
32.	RCS	Revenue Control System
33.	RF	Radio Frequency
34.	UPS	Uninterruptible Power Supply
35.	VoIP	Voice over Internet Protocal
36.	XML	Extensible Markup Language
37.	JSON	JavaScript Object Notation

1.2 SUMMARY

A. The extent of work included in this Section is shown on the Drawings and is specified as follows:

1. Provision of all material, equipment, labor, services, testing, and training required to furnish and install a fully integrated on-line, real-time PARKING ACCESS AND REVENUE CONTROL SYSTEM (PARCS) that shall function in the manner described. Major system components of the PARCS includes, but is not limited to the following:

a. Access control units; includes automatic vehicle identification system, proximity card reader system and barcode scanners/reader systems.
b. Automatic payment machines.
1) Full Service – Accepting payments by credit card and bills only.
c. Cashier Terminals.
d. Central Management System: Including, but not limited to, the system servers, workstations and related Software.
e. Dynamic entry and exit lane signage.
f. Entrance stations.
g. Exit stations.
h. Handicapped permit parking system.
i. Integration with City provided dynamic wayfinding and facility status signage.
j. Mass validator for the creation of chaser tickets as specified.
k. Off-line or on-line validators as specified.
l. Parking barrier gates.
m. Intercom system.
n. Vehicle detection systems.

2. Provision of additional expendable items as specified.

3. PARCS System Design: This system shall be a gated PARCS with the following subsystems:

a. Central Management System (CMS) shall be a network consisting of server hardware, task or subsystem computers, workstations (physical and remote) and related required software providing on-line monitoring and control of all PARCS devices. Several options are being considered by the City as follows:

1) The network will be dedicated to the parking system, and will be separate from the City's operations. The solution will be locally hosted on physical servers provided by City. Primary server to be located at City's main data center and backup server (for redundancy) to be located at airport. All application, database, credit card and other required system software to be provided by vendor. This solution is specified with the Base System. Add alternate pricing is also requested for vendor furnished physical server hardware. The BTV and DPW parking facilities will connect via fiber optics communications to the Primary server.
2) As a hosted or SaaS solution. This solution is specified as an add alternate.

b. Revenue Control System (RCS): For transient parkers that pay for parking on each visit, an RCS in an automated payment machine (APM) and pay-at-exit (PAE) configuration is required. Ticket shall utilize machine-readable barcode ticket technology only.

c. Access Control System (ACS) for contract and/or monthly parkers who will either prepay or prearrange for payment of parking, an ACS using a proximity card reader system (Base System) or Automated Vehicle Identification (AVI) system (Add Alternate) is required as specified.
d. Handicapped Parking Permit System (HCPP) to enable permit holders validated or free parking per the rules and regulations of the City of Burlington as specified.
e. Roving Cashier System: For collecting and accounting for fees at exit lanes for exception transactions during peak egress periods.
f. Debit Card System: To enable use of a proximity card as a debit card with parking fees debited from card account deposits on each exit.
g. Validations Systems as specified.
h. Web Based Validation System (Add Alternate) to enable validation of parking tickets is required as specified.
i. System shall operate in on-line and off-line mode.
j. All time-dependent functions shall utilize real-time clock synchronization with a single central system clock.
k. Protect against interference or damage by lightning or other electrical influence; include fuse, over-voltage protection, flash-over protection, and line filter.
l. System shall include “credit card in/credit card out” (Add Alternate) feature and credit/debit card “pay as you exit” feature and with a direct on-line connection to the clearing house/bank processor. All systems to be PCI PA-DSS compliant.

4. Field coordination on site prior to installation through completion.

5. PARCS Operational and technical training of City’s personnel.

1.3 SYSTEM DESCRIPTION

A. General: The PARCS will be used for transient and contract parking. Transient parkers will be issued a parking ticket upon entry, pay parking fee via credit card in the exit lanes at an EXS or APM by credit card or cash and surrender the ticket upon exit. Contract parkers (authorized City employees and public monthly patrons) will utilize a proximity card reader system for entry to and exit from the parking decks.

B. Operation:

1. Entrance Lanes - Transient Parkers

a. Entering vehicle will be automatically detected as it passes over the inductive loop in the pavement and the ENS will be activated.
b. ENS will issue one (1) and only one ticket to each patron when the patron pushes the ticket issue button.
c. When the patron takes the ticket, the entry gate will be activated and the gate arm will rise to allow the vehicle passage into the parking area.
d. When the vehicle passes over the gate inductive loop, the gate will close, and the lane will reset to repeat the operation for the next vehicle.
e. If a vehicle does not enter the parking area after obtaining a ticket, the entrance gate will return to the down position when vehicle backs off of the arming loop or upon completion of a pre-programmed timeout. The entry lane equipment will reset to issue a valid ticket or accept a permit parker card/tag from the next patron.

2. Entrance Lanes - Contract Parkers

a. Entering vehicle will be automatically detected as it passes over the inductive loop in the pavement and the proximity reader will be activated.
b. Patron will present proximity card to reader.
c. When the proximity card is read the access control system software will check the card number for validity and the entry/exit sequence for an anti-passback violation.
d. If the proximity card is valid and the entry/exit sequence is correct, the gate will be activated and the gate arm will rise to allow passage of the vehicle into the parking deck.
e. When the gate arm has been raised by the entry proximity card reader, the ENS in the lane will not issue a ticket.
f. When the vehicle passes over the gate closing loop, the gate will close and the entry lane equipment will reset to repeat the operation for the next vehicle.
g. If the proximity card number fails validity or anti-passback checks, the card will be rejected, the CMS will log the occurrence with date, time, reader location, user identification number and type of invalid access. The gate will not be activated. The lane equipment will reset for processing the next vehicle. Communications between the patron and parking office can be initiated via the intercom system for resolution of any issues.

3. Exit Lanes - Transient Parkers

a. Exiting vehicle will be automatically detected as it passes over the inductive arming loop. The EXS device will audibly instruct the user to insert a ticket.
b. The ticket is then inserted into an EXS device and processed by the CMS computer after the presence of a vehicle in the lane is detected.
c. EXS's will not be operative if a vehicle is not present in the lane.
d. Should a pre-pay, validated, or free exit ticket be used, the EXS will automatically read the pre-pay, validation or free exit ticket and automatically open the exit gate.
e. Should an unpaid ticket be used, the patron will be informed of the amount of unpaid fee. The patron will insert a credit card into the exit device. Once verified and charged, the patron will be instructed to remove their credit card and the exit gate will be opened automatically.
f. Should an invalid ticket or credit card be used, the ticket/card will be rejected and the CMS computer will log the occurrence with date, time, card reader location, ticket number and type of invalid access. The gate will not be activated and the in-lane display shall provide an invalid message.
g. Upon the completion of a successful transaction, the barrier gate arm will open for vehicle exit. When the vehicle passes over the gate closing loop, the gate will close, and the lane will reset to repeat the operation for the next vehicle.

4. Exit Lanes – Contract Parkers

a. Same procedures apply as detailed for entry lane.

5. Automatic Payment Machines

a. Patron will insert ticket into the ticket slot on faceplate of APM.
b. Ticket is then processed by the CMS computer and the required parking fee is displayed.

c. Patron can remit payment via a credit card or cash. When payment is verified, instructions will be provided to remove the credit card or receive any change if paid by cash.
d. Patron may press button for receipt.
e. The validated ticket will be returned to the patron for exit.
f. Patron will insert validated ticket into slot provided on the EXS which will verify payment, elapsed time from payment and open gate arm for exit.

6. Monitoring: The entrance and exit lane parking equipment will be monitored via a remote workstation located in the manager's office which will identify the status of the equipment such as gates, ENS's, EXS's, APM's, access control readers and other PARCS equipment connected to system. Alternatively, equipment may be monitored by a CSR at a remote monitoring station.

C. System Configuration:

BURLINGTON INTERNATIONAL AIRPORT

Base System:

1. Five (5) entrance lanes equipped as follows:

a. Main entrance plaza
1) Entrance lanes #1, #2, #3:
a) ENS with intercom, bar-code scanner, proximity card reader.
b) Barrier gate.
c) Existing post mounted signs at main entrance plaza to be reused and incorporated in new PARCS. Existing signs display OPEN, CLOSED, FULL or blank out. Vendor to provide four (4) position control toggle switches at each ENS to toggle message status. Messages shall also be controlled via CMS.

b. Short Term entrance plaza
1) ENS with intercom, bar-code scanner, proximity card reader.
2) Barrier gate.
3) Dynamic LED entrance sign. Displays space availability, OPEN, CLSD, FULL messages. Posted mounted at location as shown on drawing and a visible angle to be approved by BTV. Vendor to provide four (4) position control toggle switch at ENS to toggle all messages except for space availability. Messages shall also be controlled via CMS.
a) Sign to be Signal-Tech© Model SA2430GR-01-410 or approved equivalent. Sign to post mounted at location and sign face angle to be determined by BTV.

c. Lot A entrance
1) ENS with intercom, bar-code scanner, proximity card reader.
2) Barrier gate.

d. All equipment to be installed on existing equipment islands or other locations as shown on drawings.

e. Four (4) exit lanes at main exit plaza equipped as follows:

f. Exit Lane #1:
   1) EXS with intercom, credit card reader, receipt printer, bar-code scanner, ROC reader, proximity card reader.
   2) Barrier gate.
   3) Dynamic LED exit sign (mounted on canopy).
   4) Exit cashier terminal and external fee indicator. Fee indicator to be mounted on outside of cashier booth wall in a location to be approved by BTV.

g. Exit Lanes #2, #3 & #4:
   1) EXS with intercom, credit card reader, receipt printer, bar-code scanner, ROC reader, proximity card reader.
   2) Barrier gate.
   3) Dynamic LED exit signs (mounted on canopy).
   4) Remove existing prefab cashier booth from lane #2.

h. All equipment to be installed on existing equipment islands at exit locations.

2. One (1) exit lane from Short Term parking area equipped as follows:
   a. Exit scanner, proximity card reader and intercom.
   b. Barrier Gate

   Note: Exit scanner does not have to be a complete EXS. No payment methods, or receipts at the device is required. Provide the ability to exit the short-term area and park in the main parking area when the short-term area is full. This feature to consist of a BTV programmable timer. Feature shall be enabled or disabled by BTV via the CMS.

3. One (1) exit lane from Lot A equipped as follows:
   a. EXS with intercom, credit card reader, receipt printer, bar-code scanner, ROC reader, proximity card reader.
   b. Barrier gate.

4. Handicapped Permit Parking System: Furnish and install cameras, software and other hardware items at each vehicle exit lane to enable an HCPP system to be managed remotely by CSR's as specified. HCPP system equipment is not required at the Short-Term parking area exit lane.

5. Furnish and install all lane equipment as detailed in RFP drawing set. Refer to drawings for gated control points and equipment list.

Automated Payment Machines

1. Furnish and install four (4) Full Service APM's at locations shown on drawings.

Remote Workstations:

Provide software to allow authorized users to use their existing desktop computers or laptops to access the system server via a web browser application or other means designated by the vendor.

1. Workstations connected via a web browser or network shall have all the functionality of a regular workstation connected to the PARCS network. Vendor must provide full specifications for workstations required.

2. Provide licenses/software for three (3) remote workstations at locations to be determined by BTV.

Validation System:

1. Bar-Code Validation System: Provide pricing to furnish and install a barcode validation system as specified.
2. Barcode Card Validation System: Provide pricing to furnish and install a validation system utilizing barcoded cards to provide validations.

Intercom System:

1. A VOIP intercom system is to be provided with the base system as specified.
2. Intercom calls from BTV lane equipment and APM's are to be routed to a dedicated CSR at the BTV monitoring station. Calls from DPW's lane equipment and APM's are to be routed to a dedicated CSR at the DPW monitoring station.

Remote Monitoring Station

BTV will have a dedicated remote monitoring station staffed with a CSR to respond to inquiries, trouble calls, provide general information, manage HCPP parking program and LPR system (Add Alternate). Vendor to provide software and any licenses required to enable a remote monitoring station. BTV will provide required PC's, monitors and peripherals.

Maintenance Agreements

1. Provide pricing for a series of one (1) year maintenance and service agreements for five (5) years to be supplied after warranty period ends. Preventative maintenance service to be included in pricing for each year. Maintenance servicesprovided to be same as services provided under Warranty in this section.

Other:

1. Furnish one (1) merchant validator as specified.
2. Furnish pricing for three (3) custom reports as specified.
3. Cut, wire and seal 22 new loops for (arming and safety/closing loops).

Add Alternates:

Add Altenate # 1: License Plate Recognition System

1. Provide pricing for an LPR system as specified.

Add Alternate # 2: Reuse Existing LPR Cameras

1. Provide deduct pricing if existing LPR cameras can be reused.

Add Alternate # 3: Wayfinding Count System

1. Provide pricing to count occupancy by level and display counts on ceiling mounted signs or post mounted sign at short term parking entrance as specified.

Add Alternate # 4: Wayfinding Signage Option

1. Provide deduct pricing to reuse existing ceiling mounted wayfinding signage.

Add Alternate # 5: Credit Card In/Credit Card Out Feature

1. Provide pricing to add credit card readers to ENS's for credit card in and credit card out functionality as specified.

Add Alternate # 6: AVI Readers

1. Provide pricing to provide AVI readers at entrance and exit lanes for main garage and Lot A. Short term parking area not included.
2. Vendor to provide all mounts (posts or ceiling) to support AVI reader mounting.
3. Provide deduct pricing for proximity readers included in base system with any associated panels, software etc.

DEPARTMENT OF PUBLIC WORKS

Base System:

Marketplace Garage

1. Two (2) entrance lanes (1 from Cherry St. & 1 from Bank St.) each equipped as follows:
    a. ENS with intercom, bar-code scanner, proximity card reader.
    b. Barrier gate.
2. One Monthly Entry/Exit Lane (2-way lane from and to Bank St.) equipped as follows:
        1) Remote radio receiver.
        2) Barrier gate.
        3) Note:
            a) Entry and exit is via a hand-held RFID transmitter.
            b) One safety loop is required under barrier gate arm.
            c) Vendor to furnish programmable timer to close gate after a vehicle clears the safety loop.
3. Two (2) exit lanes to South Winooski Ave. each equipped as follows:
    a. Exit Lanes #1 & #2:
        1) EXS with intercom, credit card reader, receipt printer, bar-code scanner, ROC reader, proximity card reader.
        2) Barrier gate.
        3) Remove existing prefab cashier booth from lane #2. ADA exit booth on exit lane #1 to remain.
    b. All equipment to be installed on existing equipment islands at exit locations.

College Street Garage

1. Two (2) entrance lanes (1 from College St. & 1 from Battery St.) each equipped as follows:
    a. ENS with intercom, bar-code scanner, proximity card reader.
    b. Barrier gate.
2. Three (3) exit lanes (2 to College St. and 1 to Battery St.) each equipped as follows:
    a. EXS with intercom, credit card reader, receipt printer, bar-code scanner, ROC reader, proximity card reader.
    b. Barrier gate.

c. Remove existing prefab cashier booth from lane #2. ADA exit booth on exit lane #1 to remain.
d. All equipment to be installed on existing equipment islands at exit locations.

Lake View Street Garage

1. Two (2) entrance lanes (1 from Cherry St. & 1 from West Lake) each equipped as follows:
   a. ENS with intercom, bar-code scanner, proximity card reader.
   b. Barrier gate.
2. Two (2) exit lanes to Cherry St. each equipped as follows:
   a. EXS with intercom, credit card reader, receipt printer, bar-code scanner, ROC reader, proximity card reader.
   b. Barrier gate.
   c. Remove existing prefab cashier booth from lane #2. ADA exit booth on exit lane #1 to remain.
   d. All equipment to be installed on existing equipment islands at exit locations.

General

1. Handicapped Permit Parking System: Furnish and install cameras, software and other hardware items at each vehicle exit lane to enable an HCPP system to be managed remotely by CSR's as specified.
2. Furnish and install all lane equipment as detailed in RFP drawing set. Refer to drawings for gated control points and equipment list.

Automated Payment Machines

1. Furnish and install six (6) Full Service APM's at locations shown on drawings.

Remote Workstations:

1. Provide licenses/software for ten (10) remote workstations at locations to be determined by DPW.

Cashier Terminal:

1. Furnish one (1) exit CT to be utilized by DPW to provide staffed exit cashier at any remaining prefab cashier booth.
2. Vendor to prep CT to be easily installed by DPW utilizing ready to use modular connections/plugs for communication and power.
3. Vendor to review and prep each remaining cashier booth to easily provide connections for CT installation.

Validation System:

1. Bar-Code Validation System: Provide pricing to furnish and install a barcode validation system as specified.
2. Barcode Card Validation System: Provide pricing to furnish and install a validation system utilizing barcoded cards to provide validations.

3. Hotel Validation System: Provide pricing to furnish and install merchant validators to provide validations for hotel guests as specified.

    a. Validators to be provided for:

        1) Hilton© Hotel
        2) Hotel Vermont©
        3) Courtyard© Hotel

Dynamic Wayfinding and Facility Status Signs:

Vendor to provide control interfaces to five (5) dynamic wayfinding and facility status signs furnished and installed by City as specified.

Intercom System:

1. A VOIP intercom system is to be provided with the base system as specified except that all calls to be routed to dedicated CSR for DPW.

Remote Monitoring Station

DPW will have a dedicated remote monitoring station staffed with a CSR to respond to inquiries, trouble calls, provide general information, manage HCPP parking program. Vendor to provide software and any licenses required to enable a remote monitoring station. DPW will provide required PC's, monitors and peripherals.

Maintenance Agreements

1. Provide pricing for a series of one (1) year maintenance and service agreements for five (5) years to be supplied after warranty period ends. Preventative maintenance service to be included in pricing for each year. Maintenance services provided to be same as services provided under Warranty in this section.

Other:

1. Furnish three (3) merchant validators for hotels as specified.
2. Furnish pricing for three (3) custom reports as specified.
3. Cut, wire and seal 27 new loops for (arming and safety/closing loops).

Add Alternates:

Add Alternate # 1: High Volume Scanner Add to CMS Alternate #1

1. Provide pricing to add a bar-code scanner for high volume validations.

Add Alternate # 2: Count System between College Street and Lakeview Garages

1. Provide count system to count vehicles transitioning from College Street to the Lakeview garage or vice versa to enable an accurate facility count within each garage as specified.

Add Alternate # 3: E-Commerce System for Monthly Parking

1. Provide pricing to implement an e-commerce system to allow patrons to originate leases and renew contract parking as specified.

Add Alternate # 4: Major Employee Cards for Parking

1. Provide pricing to enable employees of major employers to use their employer issued access control/identification cards for parking.

Add Alternate # 5: Central Validations Kiosk

1. Provide pricing to enable a central validations kiosk as specified.

CENTRAL MANAGEMENT SYSTEM

Base System:

Central Management System Server Software:

1. The solution will be operated on an independent network, dedicated to the parking system. City will provide their own physical servers to run the PARCS CMS software on virtual servers. The current physical server/s will be located in a server room at City's main data center. All necessary PARCS CMS software shall be provided by Vendor including but not limited to Revenue Control, Access Control, Credit Card Software, Database, Application, PCI and any and all software necessary to provide a fully operational PARCS with full PCI compliance. Vendor shall provide all the required necessary software, licenses etc. to enable City to create a redundant secondary server for fail-over capability in the event of failure or loss of communications to the primary server. The server and/or workstation computers will be used for system administration, programming and consolidation of data.
    a. Implementation of Virtual Server Software to be performed as follows:
        1) Installed by Vendor at agreed upon time by City.
        2) City to participate with Vendor in observation/installation of software.

Note: Include pricing for all software as requested on Bid Forms.

Add Alternates:

Add Alternate # 1: Web Based On-Line Validation System

1. Provide pricing for a web based on-line validation system as specified.

Add Alternate # 2: Frequent Parker/Loyalty Program

1. Provide pricing to implement a frequent parker/loyalty program as specified.

Add Alternate # 3: Reservation System

1. Provide pricing to implement a reservation system as specified.
2. Vendor to provide a detailed overview of how the parking reservation system will operate, employee interface , patron interface , sign-up procedures , and management of program , on-going fees and other features provided.

Add Alternate # 4: Hosted Solution and Saas instead of Local Servers & Software

1. Provide pricing for a hosted solution and/or Saas solution instead of local servers and software.
2. Vendor to provide annual fees yearly for the first five years. The full cost of a operating and maintaining the hosted of SaaS solution as specified should be provided, inclluding licensing fees, per-user fees, transaction fees, etc.

Add Alternate # 5: Pay By Phone Payment System

1. Provide pricing to implement a pay by phone system.

2. Vendor to provide cost for annual license fees and transaction fees.

Add Alternate # 6: System Server Hardware

1. Provide pricing to provide physical primary and redundant servers for PARCS in lieu of City provided server hardware.

Add Alternate # 7: PCI External Vulnerability Scan

1. Provide pricing for an external vulnerability scan as specified.

General:

1. Remote gate up control for all lanes shall be via CMS computer.
2. All lane equipment, APM's and CT's shall be on-line to the CMS.
3. Provide barrier gates with straight or articulating gate arms, as required in sufficient length to prevent a vehicle from driving through when in the closed position.
4. Each area controlled by entrance and exit gates (or count system) shall be a separate parking zone for occupancy and count purposes. Count system between College Street and Lakeview garages shall be utilized to create separate facility counts between the two facilities.
5. All EXS and APM housings shall be provided with easily removable plates on faceplates that can easily accommodate PIN keypads (if required) for EMV chip and PIN cards without having to replace the entire housing.
6. All ENS's, EXS's APM's to be equipped with intercom units. Intercom system shall ring at locations as programmed by City.
7. Vendor to provide number on faceplate of each ENS, EXS and APM adjacent to intercom push button to identify lane location to patrons. Number format to be determined by BTV and DPW.
8. Vendor to reuse existing bollards or provide new protective bollards where new equipment is installed or existing equipment is relocated and not protected.
9. Provide complete operational parking system with all necessary components. It is PARCS Vendor's SOLE RESPONSIBILITY to provide every component necessary for a complete functioning system.
10. Vendor must review lane equipment locations on drawings carefully and compare to locations of existing lane equipment. Vendor is responsible for the relocation of equipment from existing locations to provide for proper operation of all furnished and installed equipment. This is especially critical to the installation of AVI system equipment (Add Alternate) to provide for proper AVI transponder reads within vehicles and elimination of any cross reads from AVI readers in adjacent lanes.
11. Facility counts from each garage or count area to be provided as an XML and JSON feed to City or BTV website

D. System Expansion:

1. Vendor to furnish a PARCS that is capable of future expansions/enhancement as listed below:

    a. Additional control points with applicable lane equipment within garage.
    b. Nested or reserved parking areas with gated entrances and exits within garage.

c. Additional garages to be added to parking system.

E. Work Included (To be provided by Vendor):

1. Design, fabricate, deliver, and install all new PARCS equipment as described in specifications.
2. Provide an install a PARCS that complies with all applicable codes and standards including State and Americans with Disabilities Act.
3. Obtain any and all permits that are required to complete work.
4. Vendor is responsible for reviewing plans, specifications, existing and proposed infrastructure and existing conditions. to be certain that all functional requirements, as described, will be achieved with equipment to be supplied.
5. Submit Shop Drawings and product literature as specified.
6. Vendor to furnish and install all new communications wiring at and between equipment islands at each entrance and exit plaza.
7. Vendor to utilize any existing conduits buried in equipment islands (if reusable). Any additional conduits required for installation of proposed PARCS equipment shall be furnished and installed by Vendor. All conduits must be buried in concrete equipment islands.
8. Vendor to replace all device control and communications wiring (utilizing existing conduit) at equipment island locations and local junction boxes and provide all additional communications wiring required for manufacturers system architecture and design. Vendor shall include all additional communications conduit and wiring and any additional power wiring and conduit required by Vendor's system in bid amount and not specified as by City below.
9. Vendor to provide all required power conditioners in bid amount if PARCS system or any component thereof requires power differing from that specified.
10. DPW: Vendor to remove all unused signs and related mounting posts, brackets etc. at each lane. Remove all related unused conduits at island level and cap as appropriate. Vendor to work with City to determine which unused items are to remain.
11. Vendor to provide scope of work services as detailed/clarified under Wayfinding Count System scope of work to be provided by City.
12. Attend construction meetings, provide schedules for base and add alternates as requested, and schedule fieldwork that shall be coordinated with other trades.
13. Test equipment in accordance with these specifications.
14. Install and test all software provided.
15. Provide record drawings, operating manuals, maintenance manuals, spare parts, and training sessions as specified.
16. Provide information to City about type, and location of high speed data communications line needs for credit card processing system within two weeks after notice to proceed.
17. Remove and dispose of all existing parking equipment, signs, prefab cashier booths etc. removed. Coordinate disposal and storage equipment items with City.
18. Terminate and connect all communications cabling. Install all Vendor supplied equipment and the interconnection with City's supplied equipment. Furnish and install all network

and internet connection devices, electronics and equipment for communications network.

F. Work to be provided by City:

General:

1. Provide high speed communications for credit card processing at system server location.
2. Provide physical PARCS CMS servers with required redundancy and backup, based upon specifications provided by vendor.
3. Provide conduit with power and communications to new APM's.
4. Provide all required fiber optic cabling from one location at each parking garage to City system server location. PARCS vendor to provide all required media converters, cabinets, housings and or switches to connect fiber to lane equipment. Vendor to furnish a lockable rack cabinet at each garage for network switch, media converters etc. at City fiber drop point.
5. Provide conduit with communications from fiber drop in each garage to existing equipment network location as required, if deemed necessary.
6. Provide telephone lines from City server room to enable routing of intercom calls via telephone lines (if required).
7. Remove all unused conduit left after booth removals and patch areas of concrete equipment island as required.
8. All surface mounted conduit on equipment islands to be removed by the City.
9. City to furnish and install all required conduit with power and communications wiring for HCPP rear license plate cameras.

BTV:

Main Garage Exit:

1. Provide concrete island extensions with communications conduit and power at main exit lanes #2, #3 and #4 to accommodate post mounted LPR and HCPP cameras as required.
2. Remove existing protective bollards and prep base for EXS. Replace bollard to protect EXS. Provide power and communications conduit to EXS.

Lot A Exit Lane:

1. Extend concrete equipment island to accommodate rear license plate ADA camera.
2. Provide power and communications conduit to camera.

Existing Facade Mounted LPR Cameras: (This is required for add alternates #1 and #2)

1. Remove the existing cameras and cap and/or remove existing conduit.

Remote Monitoring Station:

1. Provide PC, monitors and other peripherals to be used.

Wayfinding Count System (add alternate #3):

1. Power to all new signs locations.

2. Communications conduit from new sign locations to count system server. Vendor to reuse existing communications cabling or replace as required.
3. Vendor to reuse existing power and communications at existing sign locations.

Short Term Parking Area:

1. Provide concrete equipment islands, protective bollards and restrictive curbing.
2. Provide required construction items to create and segregate short-term parking area from main parking area.
3. Provide power and communications conduit to new parking equipment from fiber drop.
4. Provide power and communications conduit to new Short-Term entrance sign. Prep base/footing for sign as required.

DPW

Count System between College Street and Lakeview Garage:

1. Provide conduit with power to count point.
2. Provide communications conduit from count point to garage network drop.

RF Transmitter System at Marketplace Garage:

1. Provide communications conduit from standalone receiver to garage network drop.

Remote Monitoring Station:

1. Provide PC, monitors and other peripherals to be used.

Dynamic Wayfinding and Facility Status Signs:

1. Installation of all City owned dynamic signs.
2. Provision of power and connection to all signs provided.
3. Testing of all signs provided.

1.4 SUBMITTALS

A. General: Submit the following in accordance with the Conditions of Contract, specifications and Division 01 Sections.

B. Schedule: Vendor shall submit a detailed schedule of project requirements including milestones for shop drawings, fabrication, delivery, installation, training, transition plan and testing within 30 days after award of contract. Schedule to be updated at 30-day intervals. At a minimum, the following shall be included:

1. Schedule in Gantt or similar format identifying milestone dates, project start and completion dates, lane-by-lane installation dates, testing and training dates.
2. Phasing Plan: Provide schedule for decommissioning existing equipment, installation of new equipment and activation for public use per phasing requirements in section 1.9.

C. Product Data:

1. Submit manufacturer's product data, specifications, installation, and maintenance instructions for each type of parking equipment furnished.

a. Product data/literature to include equipment dimensions, finishes, power and electrical requirements, communications requirements, temperature ranges and NEMA or intrusion protection (IP) ratings.

b. For CMS, ACS, RCS, HCPP system and Remote Monitoring software and associated hardware provide the following at a minimum:

1) Software user interface including GUI and screenshots.
2) Diagram in schematic format showing communication between CMS and all major devices.

2. Provide templates (if applicable) for anchor bolts and other items encased in concrete or below finished surfaces as requested by City and other trades in adequate timeframe so as not to delay the Work.

D. Shop Drawings: Provide plans, elevations, sections, details, and attachments to other work. Detail equipment assemblies and indicate dimensions, required clearances, method of field assembly, components and location and size of each field connection.

1. Wiring Diagrams: The Vendor shall supply three sets of wiring diagrams and maintenance manuals for each of the major components of the system, as well as the entire as-built system wiring diagrams.

E. As-Built Documentation:

1. Submit drawings showing the actual location of each piece of equipment utilizing drawing provided with bid documents prior to acceptance of system.

2. Submit one hard copy set and one set in AutoCAD file format (2012 or newer format) as-built documentation of all systems and components installed. Vendor shall update the most recent as-built documentation submitted as further changes occur in the field as a result of upgrades throughout the warranty period. Include identification of all TCP/IP devices with each device's IP address.

F. Proof of PA-DSS validation suitable for new installations including implementation guide from all systems subject to PA-DSS validation.

G. EMV Status: Provide a statement of EMV status for either of the following:

1. EMV Complete: This certifies that the credit card devices are EMV ready, certified and tested to provide credit card transactions as a Chip based transaction as well as a mag-stripe.
2. EMV Upgradeable: Credit card devices are not EMV ready but can be upgraded to EMV ready devices without having to replace any PARCS cabinetry.
3. EMV Not Complete: Either the credit card payment devices are not Chip enabled, not upgradeable or incompatible with EMV. This provision must be listed as an exception on forms provided in front end documents.
4. Statement of EMV status for credit card devices to be provided on forms in front end documents.

H. Samples: Provide samples of paint colors and finishes for ENS's, EXS's and APM's; ACS proximity cards (if applicable); standard reports including screenshots and layouts and other elements requiring selection by City with 30 days of contract approval. Approved selections will be returned to Vendor within 30 days of submittal.

I. Qualification Data: Submit qualifications per Section 1.6.

J. Operation and Maintenance Data: Provide City with manuals for equipment/systems being provided. Manuals should clearly delineate day-to-day operation and maintenance of the equipment. As a minimum, the following shall be provided:

1. Operations Manuals:

a. System Administrator Manual: Manual shall contain all procedures necessary for administration and monitoring of PARCS. At a minimum, manual shall contain separate sections that cover the following topics: day-to-day operations, modification of field programmable settings, back-up and recovery, audit and control procedures, report production, contingency plans, configuration control, and system diagnostics (System Administrator is meant to be a non-technical Super-User. These individuals will be responsible for day-to-day operation of system, creation and maintenance of user accounts, inputting of all City policies and customized fields, and reporting.

b. Supervisor Manual: Operations manual describing data collection processing and transmission systems and equipment for supervisory personnel. Manual shall explain all features and functions (e.g. sort, prepare and print standard and ad hoc reports) required for day-to-day management. A section shall be included for problems and/or exception conditions so Supervisor can resolve common operating problems and on how to perform normal maintenance (e.g., changing paper for printer). Manual shall not contain any installation or power explanations.

c. Cashier Manual: Manual designed for Cashiers explaining all features and functions related to cashiering. A section shall be provided that contains instructions for Cashiers to resolve common operation problems (e.g. how to change receipt paper).

d. Maintenance Manuals: Manual shall contain detailed instructions on how to perform regular and preventive maintenance on all components of PARCS and communications network that can be performed by City's maintenance staff. Include first line and preventative procedures.

e. Software programming manuals describing each item of software and all report programs.

f. IT Network Administration Manual: outlining procedures necessary for the maintenance, operation, and security of the system and network, including configurations, back-up and recovery, redundancy and fail-over, audit and control, and diagnostics.

g. Three hard copies and one electronic copy (Pdf format) of each manual shall be provided.

K. Warranty Documents: Provide manufacturer’s warranty documents in formats, and quantities specified in Warranty section.

L. Software Documents: Provide original copies of all licenses, registrations, documentation, disks and other media as may have been included with those commercially available software packages provided with system.

M. Training Plan: Provide training plans for each category of personnel being trained 30 days prior to scheduling any training classes.

N. Transition Plan: Provide a plan describing how the new PARCS system will be implemented while concurrently operating the existing system. A narrative describing the strategy to maintain all critical systems and functionalities of the existing PARCS during the transition period. shall be provided.

O. Testing Plan and Documentation:

1. Submit a PARCS testing plan for review and approval by City 30 days prior to commencement of first test.
2. Plan must include testing scripts for testing all system functionalities described in this specification document and all other standard functionalities (included with the proposed PARCS) that are not described herein.
3. City to provide comments/edits to the testing plans provided. Vendor to incorporate changes and edits (if any) and resubmit revised plan for approval.
4. Test procedures and scripts are to be provided for the following tests:
    a. Lane Acceptance Test (LAT)
    b. Operational Completion Test (OCT)

P. Provide a minimum of two commercial sources for purchasing parking tickets.

Q. Provide the following sets keys for each piece of equipment with locks in quantities specified for BTV and DPW. Keys shall not fit any other equipment in same city or metropolitan area.

1. ENS – 4 keys for each lock.
2. EXS – 4 keys for each lock.
3. APM – 4 keys for outer door locks. 4 keys for each vault lock or vault door.
4. Cashier Terminals – 4 keys for cash drawers. Cash drawers shall have a set of keys unique to each drawer.
5. If a special tool is required instead of/or in addition to keys, the same quantities of tools shall be furnished.

1.5 QUALITY ASSURANCE

A. Equipment provided shall be designed, constructed and installed to operate as specified under day to day climate and exposure conditions of the City of Burlington Vermont.

1. All new equipment shall be provided.
2. Used, rebuilt or reconditioned equipment or parts are not acceptable.

B. All electrical equipment shall be approved by Underwriters Laboratories, Inc. (UL) where such approval is standard in the industry. Where required by Code, provide electrical enclosures complying with applicable NEMA standards.

1. Equipment and materials not covered by UL Standards may be considered if equipment and material is listed, labeled, certified or otherwise determined to meet safety requirements of a nationally recognized testing laboratory.

C. Equipment housings, conduits, and junction boxes exposed to weather shall meet or exceed NEMA 4 or IP54 standards.

D. Provide a PARCS with all associated equipment and components that have a useful service life of ten years with periodic service. Specify periodic maintenance requirements in maintenance manuals to meet life expectancy.

E. Vendor to be responsible for all provided software and insure that all PARCS device communicate properly.

F. Vendor to provide a trained/experienced field representative to meet with City and its subcontractors, before any work begins. Prior to installation of any PARCS equipment vendor shall conduct a pre-installation meeting at each garage in conjunction with City representatives to:

1. Review any applicable construction plans as they relate to the PARCS, to explain details or precautions necessary to assure that all provided equipment will work properly and to determine that all required conduits and wiring are properly laid out.

1.6 QUALIFICATIONS

A. Vendor shall have at least 5 years of experience in the sales, installation and service of PARCS and maintain a stock of replacement parts for the equipment specified. Vendor must have a service center within 300 miles (5 hours) driving distance of City of Burlington **OR** must commit to placing a permanent service technician or office within this range if awarded the contract.

B. Vendor shall have previously worked successfully with the PARCS manufacturer and shall submit names, locations, contacts and telephone numbers for the five most recently installed, completed projects.

C. Vendor to use only fiber-certified technicians for fiber installation, related equipment and connections.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Equipment delivered to site shall be packaged to prevent damage and marked for easy identification of each component.

B. City to provide Vendor with a designated secure storage/staging area for PARCS equipment pending installation. Damaged equipment shall be replaced at no cost to City.

1.8 PROJECT CONDITIONS

A. Vendor shall familiarize itself with project conditions within the local environmental area of the project. Weather conditions typical to the project area shall in no way interfere with the operation of the equipment proposed.

1.9 PROJECT INSTALLATION PHASING

A. Phasing for installation of the PARCS shall be as follows:

1. Installation will commence with the installation of all PARCS equipment required for complete operation of the BTV parking garage.

2. Upon satisfactory completion of the BTV garage City will provide notice to proceed with installation of the PARCS at the DPW garages.

1.10 OPERATING CONDITIONS

A. Equipment shall be designed, fabricated, and installed to operate effectively under the climate and exposure conditions to which the equipment will be exposed. All equipment located within the parking areas is for exterior, exposed-to-weather use.

B. Provide a system such that environmental conditions in a cabinet do not cause failure of the installed electronics (i.e. moisture, condensation etc.).

C. It is recognized that certain solid state and computer-type parking and revenue control equipment may require special electrical power and grounding considerations. If required by the parking and revenue control equipment, the Vendor of the PARCS to:

1. Include in the bid amount, the cost to provide and install voltage stabilization modules or devices to protect each component from normal voltage variations.
2. Furnish and install on-line, regulating computer grade uninterruptible power supply (UPS) for:

    a. Work stations, CT's, APM's, ENS's, EXS's and local controllers with thirty minutes of backup battery power for data protection only.

3. Advise the City in writing at the time of the award of contract of any special electrical power and grounding requirements.

1.11 TIME OF COMPLETION

A. Vendor shall coordinate installation and testing of equipment and software so that City may transition operation of the new PARCS with minimal interruption to operations.

1.12 WARRANTY

A. Vendor to provide an equipment warranty covered by a manufacturer's/Vendor's warranty covering all equipment and installation (100% parts and labor) for a one-year period, excluding misuse or vandalism. The following provisions to be provided by vendor:

1. Maintain and service PARCS against any and all malfunctions due to manufacturing or installation defects at no cost to City during warranty period.
2. Vendor shall provide Manufacturer's recommended schedule and preventative maintenance list. Preventative maintenance shall be performed by experienced technicians based on a preplanned schedule.
3. All warranties commence upon final system acceptance when the respective equipment is totally operational and is accepted in writing as such by City.
4. Warranty shall not cover acts of vandalism, third party damage, damage from natural phenomena or damage caused by maintenance actions of untrained/unapproved City personnel.
5. Starting at the time of acceptance of the PARCS by City, provide complete systematic inspection and maintenance of parking equipment for the duration of the warranty period.
6. Furnish equipment and trained experts to check, adjust, lubricate and otherwise maintain the parking equipment in operation without defects or deterioration.
7. Warranty Response:

    a. Local maintenance service shall be provided to maintain all equipment and systems during the warranty period and any extended maintenance periods with regularly scheduled maintenance.
    b. Emergency call-back service for minor repairs and adjustments to return the PARCS to service shall be available on demand, 24 hours per day, seven days per week. In the case of any malfunction.

c. Warranty and any subsequent extended maintenance contract response shall be Monday - Friday: 8:00am – 6:00pm (EST). Response time for on-site repairs shall be limited to five (5) hours. No equipment, system or component shall be left non-operable after the next business day following notification by City.

B. Software:

1. Vendor to repair or correct software functions required by specifications and proper system operation, even if undiscovered during testing or commissioning, including report formatting and data recovery resulting from software deficiencies at no additional cost to City.

2. Vendor to notify and provide City with all commercially released software updates and patches applicable to PARCS that are released during warranty period and any extended maintenance contract periods at no additional cost to City.

1.13 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels with the part name, the serial number and safe storage conditions:

1. Spare Parts: Furnish the following spare parts. Spare parts to be maintained in quantities shown through warranty period. Vendor to replace parts utilized from this inventory during warranty period and any extended warranty periods.

<u>BTV:</u>

a. APM:

1) One bill acceptor.
2) One bill dispenser.

b. Barrier Gates:

1) Two loop detectors (if not solid state onboard).

c. HCPP System:

1) One spare rear license plate camera.

<u>DPW:</u> Same types and quantities as specified for BTV.

2. Stock Items: Furnish the following stock items. Samples or mockup for approval on any custom printed item to be provided by Vendor.

<u>BTV:</u>

a. 400,000 self-park tickets printed to BTV's specifications. Man-readable number on front and disclaimer printed on back. All other print via ENS thermal printer.
b. 700 proximity cards – Thin ISO prox cards.
c. 40 Bar-coded Validation Cards
d. 10 Roving cashier cards (if not same as proximity card)
e. 20 rolls of receipt paper for each CT.
f. 40 rolls of paper or ticket stock (40,000) for APM receipt printers.
g. 40 rolls of paper or ticket stock (40,000) for EXS receipt printers.
h. 2 replacement straight gate arms.

i. 2 extra cash drawer trays.
j. APM:

1) Two banknote dispenser lockable cassettes per each denomination. Dispenser vaults shall have lockable lids.
2) Two banknote acceptor lockable vaults. Acceptor vaults shall have lockable lids.

DPW:

a. 500,000 self-park tickets printed to DPW's specifications. Man-readable number on front and disclaimer printed on back. All other print via ENS thermal printer.

b. 1,500 proximity cards – Thin ISO prox cards.
c. 40 Bar-coded Validation Cards
d. 10 Roving cashier cards (if not same as proximity card)
e. 20 rolls of receipt paper for each CT.
f. 40 rolls of paper or ticket stock (50,000) for APM receipt printers.
g. 40 rolls of paper or ticket stock (50,000) for EXS receipt printers.
h. 2 replacement straight gate arms.
i. 2 replacement articulating gate arms.
j. 2 extra cash drawer trays.
k. 100 RFID transmitters for Marketplace Garage reserved area.
l. APM:

1) Two banknote dispenser lockable cassettes per each denomination. Dispenser vaults shall have lockable lids.
2) Two banknote acceptor lockable vaults. Acceptor vaults shall have lockable lids.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS OF PRIMARY COMPONENTS

A. PARCS manufacturer shall be able to demonstrate successful performance of proposed system and equipment. Proof of successful performance shall be submitted as specified. Acceptable manufacturers for all primary components shall meet the following requirements

1. Been continuously in operation for past five years.
2. Manufacturer shall have current version of each primary component currently operating successfully in three or more comparable parking facilities.

B. Substitutions:

1. Where functional performance, features or quality of vendor's proposed equipment or system varies from specifications, submit request identifying substitution being proposed. Submit documentation for substitution via the concurrent submittal of supporting data sheets, brochures, and technical specifications with proposal

2.2 GENERAL CONDITIONS:

A. All lane devices shall be ergonomically designed for ease of use by patrons.

1. Internal components shall be modular and plugged for easy maintenance and replacement.
2. Connection boxes for all wiring connections shall be corrosion resistant.
3. Barrier Gates, APM's, ENS's and EXS's shall have:
    a. Access doors shall open away from traffic lane (lane equipment only).
    b. Grounded 115VAC convenience outlet.
    c. Thermostatically controlled heaters.

2.3 MATERIALS:

A. Cabinets shall be fabricated of a material that is strong and durable including but not limited to:

1. Stainless steel, aluminum alloy, 12-guage steel.
2. Mounting bolts shall be accessible from inside of cabinet only.
3. All surfaces to be corrosion resistant.

B. Access Tickets:

1. Access Tickets: Ticket stock shall be perforated roll or fan-folded high quality paper tickets. Tickets shall have an external number for easy identification and be custom printed with text and graphics as determined by City. Ticket size, perforation and paper type as required by manufacturers/reader requirements.

2.4 CREDIT AND DEBIT CARD PROCESSING

A. The following types of credit card payments shall be accepted:

1. VISA
2. Master Card (Including Type 2-series BIN cards)
3. American Express
4. Discover
5. Bank Debit Cards with Credit Card logo

B. Utilize credit and debit card acceptance hardware, software, and other system components that are PCI DSS compliant:

1. PCI-DSS Compliant Systems: For all devices and systems that are in scope of PCI-DSS compliance as defined within the latest version of PCI-DSS, provide verifiable proof that all such devices are:
    a. A currently validated PA-DSS Application, suitable for new installations, as listed at the PCI-SSC web site.
2. All devices that accept a payment card must accommodate point to point encryption (P2PE) EMV payments with one of the following level of readiness:
    a. Device is fully ready to accept P2PE EMV payments as provided.
    b. Device is not fully ready to accept P2PE EMV payments but can be upgraded to accept without replacement of equipment.
    c. Devices that are not EMV upgradeable or ready will not be accepted.
    d. Provide a list of all available options for Payment Processors and Gateways that may be selected to support EMV processing.

e. All attended devices (where an employee facilitates the transaction) must have a P2PE EMV PIN-pad included. All unattended (automated) devices (APM, EXS) may have a PIN pad, but it is not required.

C. Credit Card Approval System: The credit card reader with each CT, APM and EXS shall be connected directly or indirectly (via intermediary server) to a payment processing gateway via a high-speed connection for real time authorizations. Authorization for credit card transactions from swipe to authorization shall not be greater than five seconds. Vendor shall be responsible for confirming record formats required by Owner's financial institution. Credit card processing shall integrate with the City's credit card processing clearinghouse. Vendor to include cost of integration in Base Bid.

D. Credit Card on File: Provide ability to have a credit card "on file" to enable recurring charges to credit card. This feature must be fully PCI-DSS compliant. Provide details on how credit cards "on file" are encrypted and protected.

E. All devices and software that accept a payment card must encrypt all payment card related data that is stored on the device, software, or database. Vendor must provide full details on encryption methodology, and any methods employed to secure data at rest.

2.5 EQUIPMENT LIST

A. The following equipment list consists of base system components. Auxiliary items required for the proper functioning of the system, whether mentioned or not, shall include but not be limited to: heaters, coolers, wiring, transformers, relays, pedestals, etc. It is the vendors' and manufacturer's responsibility to provide every component necessary for a complete functional system.

1. Refer to System Configuration in Part 1 of this section and drawings for equipment quantities and locations at each facility.

B. Equipment should be located as shown on the drawings. Adjustments may be necessary due to field conditions and may be permitted following consultation with the City.

2.6 AUTOMATIC BARRIER GATES

A. General: Each automatic barrier gate unit shall consist of an operator and controller housed in a cabinet enclosure with gate arm. Include the following features:

1. Operation Modes: On-line communication to CMS computer with automatic switch to standalone mode if communications are interrupted.
2. Field programmable with built-in service diagnostics.
3. Gate system shall include safe guards to ensure that gate arms do not continue to lower onto any vehicle or person regardless of size. Gate shall provide method of rising immediately upon contact with anything under gate arm, without causing damage or injury.

B. System Performance: Automatic barrier gate unit shall be provided with or capable of the following:

1. Provide unit with all necessary control logic for activation by a signal from the ACS system reader, ENS, EXS or remote command from workstation.
2. Report generation for exception events.

C. Operation:

1. Controller:
    a. Controller shall contain logic for one-way lanes, two-way lanes, operations with automatic and push button ENS's, card/tag readers, detector loops and be easily field programmable through the use of easily accessible DIP type switches or by keypad buttons.
    b. All gate logic controllers shall be removable and interchangeable with the logic controllers of all other gates on this project.
    c. Provide output signals for the following counts: Total contract parker, total transient, total vehicle and total illegal vehicle passage. These counts shall be taken directly from the control logic and not from detector loops. Provide a momentary contact any time a car illegally passes through the lane by tailgating the previous automobile.
    d. Provide two vehicle detectors inside the control logic (see Vehicle Detection System this Section). The logic controller shall send and receive information from the CMS computer.
    e. Controller shall include a timer to automatically close barrier gate arm in the event of a patron taking a ticket and not proceeding through entry lane. Timer closing time shall be programmable via CMS. This feature shall be activated or deactivated by City.
    f. Storage of at least three vend inputs and sequentially processing each vend. Gate arm shall remain up until stored vend input vehicles have cleared lane. This feature shall be selectable on/off from CMS
2. Automatic Barrier Gate Reporting: Provide full reporting functionality including, but not limited to, the following:
    a. Gate off line/powered off, online.
    b. Gate manually raised or manually lowered.
    c. Gate manually raised and a car crossed over the loop detector.
    d. Gate opened remotely via a command from the controller.
    e. Communication failure.
    f. Device Malfunction.

D. Gate Arm:

1. Gate shall have appropriate length barrier arm constructed of aluminum with breakaway gate arm design that allows for easy and inexpensive replacement when broken. Provide folding gate arm if required by low height clearance. Height of arm approximately 36 inches from drive in the down position.
2. Provide signage on both sides of gate arm in graphics and text to warn pedestrian not to pass through a gated lane.
3. Provide a protective sleeve or foam strip along the bottom edge of gate arm.
4. Gate shall not be able to be raised or lowered by any manual force applied to the gate arm.

2.7 VEHICLE DETECTION SYSTEMS

A. General: For use in temperature range of -40 to 160 °F, each vehicle detection system shall consist of detector module and one or more inductance loops (sensing loops) working in conjunction to detect the presence of a vehicle as it passes over the loop(s) and generate an electric signal to operate other control equipment.

B. Detector Modules:

1. Vehicle detectors shall be RENO AE Model DL-ATG anti-tailgating intelligent detectors with directional logic or approved equivalent where required herein.
2. Unless indicated otherwise, vehicle detector modules shall be installed within parking equipment cabinetry serving the same lane (no separate enclosure required). Installation shall be shielded to prevent Radio Frequency Interference (RFI), allowing for vehicle detector operation within an electrically noisy environment typically found in parking systems.
3. Required Features/Functions:

    a. Single or dual channel detectors; modular or on-board solid state.
    b. Incorporate a tailgate recognition system capable of detecting two automobiles within one foot of each other over a standard 2.5 ft. x 6 ft. loop.
    c. Compact Plug-In Design if not on-board.
    d. Loop Frequency Selection.
    e. Self-Tuning and self-compensating, and tune to its loop environment.
    f. Selectable permanent presence
    g. LED Indicators for all functions
    h. Modular plug-in construction or built in, and easily serviced.

C. Inductance Loop Requirements:

1. Loops may be either embedded (for new construction) or saw cut into paving surface. Coordinate saw cut loops with Engineer to avoid damage or work of other trades.
2. Loop Wire: #14 or #16 AWG, stranded wire with XLPE coating/insulation; loop size as required to meet functional requirements listed above.
3. Loop wire shall not be spliced.
4. Loop Groove Fill: Loop sealant and backer rod, as recommended by the manufacturer, shall be compatible with loop wire, substrate, and all substrate sealants/coatings. Contractor to coordinate.
5. Contain loop wire in a separate conduit to prevent interference.
6. Loops shall be placed in saw cuts 3/16” or 1/4” wide and 1 to 1 1/2 inches deep in paving surface, installed per manufacturer’s recommendations.
4. Each vendor will provide its own independent determination of loop location. New loops shall be cut in same locations if position and location of loop is appropriate for functioning of new equipment to be installed. Loops on supported slabs may be in areas containing post tension cabling. Vendor is responsible for providing x-rays to determine post tension cabling location prior to saw-cutting.

2.8 ENTRANCE STATION (ENS)

A. General: ENS shall consist of a customer display, controller(s), ticket printing and issuing mechanisms, ticket magazines and printer housed in a durable metal cabinet. Include the following features:

1. On-line communication to CMS Computer with automatic switch to standalone mode if communications are interrupted. Provide off-line transaction buffer for 1000 transactions minimum.
2. Customizable display with minimum 5” display.

3. 2D Barcode reader integrated into the faceplate of the ENS to read 1D and 2D barcodes on pre-printed coupons/validations or displayed on mobile devices.
4. Proximity card reader.
5. ENS shall include provisions for City programmable audible instructions through the ticket issuing process.
6. Built-in push-button intercom with call button. Intercom speaker and call button shall be fully integrated on faceplate of ENS. Surface mounted speakers or call buttons are not acceptable.
7. Real-time clock synchronization with CMS computer with programmable daylight savings time adjustment.
8. Ticket tray that provides easy loading of tickets with a minimum capacity of 5,000 tickets.
9. Ticket dispense button.
10. Dispense a ticket within three seconds from depression of ticket issue button.
11. Ticket dispensing mechanism shall be an easily removable unit.
12. Incorporate a self-sharpening ticket cutter or burster.
13. Encode lane time and date of entry on ticket.
14. Imprint ticket with man-readable date, hour, minute, lane number when issued.
15. Issue ticket to patron at a height and location permitting easy removal from ENS by patron in vehicle.
16. Cause an audible tone to sound when ticket is issued.
17. Retraction bin for retaining retracted tickets.
18. Provide an operational minimum processing rate of 400 transactions per hour.
19. Low ticket alarm at CMS when ticket stock at ENS is low.
20. Incorporate easily replaceable and self-contained components.
21. Provide a 115 V.A.C. grounded convenience outlet, heater with on/off switch, heater thermostat and on/off power switch in cabinet.
22. Alarm for ENS offline condition to be displayed on the PARCS GUI.

B. Operation:

1. Functionality: ENS shall provide functionality including, but not limited to, the following:
    a. Print a unique multi-digit identification number on the ticket to be used in the event the ticket encoding cannot be read.
    b. Be user-definable to distinguish between current rates and rate structures for specific areas or purposes.
    c. Detect when a ticket is issued but not taken, and void the ticket as such so that it will be retracted and retained at internal bin.
    d. Detect when a ticket is taken but the car does not cross over the closing loop (a back-out ticket) and void the ticket as such so that it will be rejected at a cashiering device.
    e. Assign, in real-time, a non-resettable sequence number for each successful ticket issuance for audit purposes.
    f. Capable of incrementing or decrementing occupancy counters.
    g. Capable of disabling the ticket issue function when occupancy counter limits are reached (and enable the ticket issue function when the occupancy drops below the limit).
    h. Capable of activating a “lot full” sign when occupancy counter limits are reached (and deactivating the lot full sign when the occupancy drops below the limit).

i. Not permit any duplicated ticket usage.
j. If integrated with a card reader, the unit shall be capable of disabling the ticket dispensing mechanism upon a successful card read.

2. Reporting: ENS shall provide full reporting functionality via the CMS including, but not limited to, the following:

a. Ticket Jam.
b. Ticket in Throat.
c. Low Tickets.
d. No Tickets.
e. Encoding Not Read.
f. Manual Ticket Issued.
g. Tickets Issued.
h. Arming Loop Activated.
i. Tickets Vaulted.
j. Device Malfunction.

2.9 EXIT STATION (EXS)

A. General: EXS shall consist of a customer display, controller(s), credit card reader and ticket reader. Include the following features:

1. Operation Modes: On-line communication to Central Computer with automatic switch to standalone mode if communications are interrupted. Provide off-line transaction buffer for 1000 transactions minimum.
2. Customizable display with minimum 5” display.
3. Time and date display.
4. Built-in push-button intercom with call button. Intercom speaker and call button shall be fully integrated on faceplate of EXS. Surface mounted speakers or call buttons are not acceptable.
5. Real-time clock synchronization with central computer with programmable daylight savings time adjustment.
6. Program timer for closing barrier gate.
7. Credit card reader for payment of fees due accepting and reading both mag-stripe and EMV credit cards. Receipt printer.
8. 2D Barcode reader integrated into the faceplate of the EXS to read 1D and 2D barcodes on pre-printed coupons/validations or displayed on mobile devices.
9. Roving cashier reader.
10. Proximity card reader.
11. EXS shall include provisions for City programmable audible instructions through the ticket payment/exit process.
12. Processed ticket vault with minimum capacity of 500 collected tickets.
13. Incorporate easily replaceable and self-contained components.
14. EXS reader mechanism shall be removable as a unit, and all electrical connections shall be a modular plug.
15. Provide a 115 V.A.C. grounded convenience outlet, heater with on/off switch, heater thermostat and on/off power switch in cabinet.
16. Alarm for EXS offline condition to be displayed on the PARCS GUI.

B. System Performance: EXS shall be capable of the following:

1. Fee Calculation:
    a. Calculate and display amount owed on unpaid or insufficiently paid ticket based on current exit time and system rate schedules.
    b. Accept exit grace period programmed at CMS.
2. Elapsed time from insertion of a valid paid ticket into reader until gate is fully open shall not exceed three seconds (except as delayed by EMV chip card processing).
3. EXS shall be able to accept chaser/coupon tickets as payment. The unit shall be able to accept up to five (5) chaser tickets in series. After the patron inserts a parking ticket, up to five (5) chaser tickets can be inserted into the EXS. The parking fee shall reduce by the amount or combined amount of chaser ticket/s.
4. Report generation for events and exception events.

C. Operation:
1. Functionality:
    a. Inserting exit ticket into the EXS ticket reader results in the following actions:
        1) Valid Exit Ticket: ENS ingests ticket and automatically sends signal to raise barrier gate.
        2) Invalid Exit Ticket: Reader rejects ticket.
    b. Inserting Credit Card into the reader results in the following actions:
        1) Valid Credit Card: Reader captures and sends card information to the Credit Card Server for on-line real time processing or point to point direct to credit card processor for EMV enabled cards, displays programmed message and automatically sends signal to raise barrier gate.
        2) Invalid Credit Card: Reader displays programmed message, plays audible "Invalid Card" message, rejects card, displays programmed message and sends alarm signal to the system server. Once credit card is removed, the system resets.
2. Reporting: EXS shall provide full reporting functionality via the CMS including, but not limited to, the following:
    a. Ticket Jam.
    b. Encoding Not Read.
    c. Back-Out Ticket.
    d. Tickets Read.
    e. Arming Loop Activated.
    f. Gate Opened.
    g. Tickets Vaulted.
    h. Device Malfunction.

2.10 CASHIER TERMINALS

A. General: Cashier terminal shall be a machine-readable electronic terminal that computes parking fees, automatically or from manual input, based on duration of stay and pre-programmed rate structure and parameters. Include the following features:
1. Cashier terminal shall be provided with a computer unit, ticket reader/encoder mechanism, credit card reader, printer and cash drawer. It shall control exit barrier gate

(when used as an exit cashier terminal); patron fee displays and activate cash drawer. Cash drawers to be provided with removable trays and locking covers and shall be automatically actuated by system. Automatic function shall be capable of being activated or deactivated from CMS.

2. Cashier terminal shall provide a minimum accuracy as follows:
    a. Ticket read accuracy of 99.9%
    b. Fee calculation accuracy: 99.9%
3. Cashier terminal shall completely process each transaction in not more than three seconds.
4. Cashier terminal shall be provided with a 2D barcode reader to read 1D and 2D barcodes on preprinted coupons/validations or displayed on mobile devices.
5. Cashier terminal shall be able to accept chaser tickets as payment. The unit shall be able to accept up to five (5) chaser tickets in series. After the cashier inserts a parking ticket into the ticket reader/encoder, up to five (5) chaser tickets can then be inserted. The parking fee shall reduce by the amount or combined amount of chaser ticket/s.
6. Cashier terminal shall include a credit card reader capable of reading both mag-stripe and chip based credit cards in two directions.
7. Validation Keys: A minimum of 36 preset keys to differentiate between transaction types (i.e. accounts, validations, exception transactions, tow trucks, etc.) Keys shall be programmable only by the CMS. Application of keys by cashier shall generate separate counts on revenue control reports.
8. Validations: Provide a minimum of 100 validation account numbers that may be used by the system. Cashier terminal shall apply machine readable validations automatically to tickets to permit free or discounted parking.
9. Receipt: Cashier Terminal shall issue a receipt automatically or on demand for every transaction. This receipt functionality shall be programmable. Receipt shall include the date, time, fee collected, transaction number, lane number (exit cashiering) and facility name printed on one line each as approved by City. Receipts may be printed for current transactions any time prior to the start of the next transaction.

B. Programming:

1. The Cashier Terminal shall be user programmable.
    a. Rates shall be programmable from the CMS only, and accommodate the following:
        1) Application of rates programmed via CMS for device.
        2) 24-hour maximums.
        3) Automatic daylight savings time and leap year in fee calculations.
        4) Exit grace time for central cashier terminals.
2. Provide a means to program and authorize a minimum of 20 individual cashiers to be recognized by system.
3. Cashier terminal shall be operational only when a cashier is individually logged onto system. Cashiers will log-on to operate the cashier terminal by entering a pre-programmed user identification and password on cashier terminal.

C. Reports - Provide the following reports:

1. Revenue Report: This report will list all revenue received by the cashier. Include the following on the report:

a. Type of report.
b. Date and time of report.
c. Lane number or central cashier terminal number.
d. Lane name (not applicable for central cashier terminals).
e. Cashier name/ID.
f. Time and date report was last cleared.
g. Quantity and amount of parking fees charged by fee structure.
h. Quantity and amount of parking fees paid by cash and credit card.
i. Quantity and amount of preset fees charged.
j. Quantity and amount of miscellaneous charges.
k. Quantity and amount of lost tickets.
l. Quantity and amount of surcharges.
m. Total amount of charges.
n. Quantity and amount of merchant validations by type.
o. Quantity and amount of debits (unpaid charges).
p. Total amount of credits.
q. Average parking fee computed.
r. Number of times the no sale key was used.
s. Total number of transactions.
t. Time card. Supply a time card print-out for the cashier. Include the following: time and date cashier logged on, time and date cashier logged off, total time cashier was on shift in hours and minutes, starting transaction number and ending transaction number.

2.11 PATRON FEE INDICATOR

A. Patron fee indicator shall be a housed in a separate cabinet or integrally mounted device connected to the cashier terminal. Exit lane fee indicators should be mounted on side of cashier booth. Interior fee indicators typically used with central cashier stations may be integrally mounted on cashier terminal. Fee indicators shall indicate the following utilizing a digital display:

1. Amount due
2. Change
3. Time

B. Fee indicator shall operate in a temperature range at locations installed.
Exit lane (outdoor) fee indicator cabinets shall be weatherproof with a clear impact proof window.

C. Fee characters displayed shall be legible and easily read by a patron at the service position under lighting conditions to be found at installed location.

2.12 AUTOMATIC PAYMENT MACHINE (APM)

A. General: Each APM unit shall consist of the following components housed in a metal cabinet: Color graphic display, controller(s), credit card reader, ticket reader/encoder, bill acceptor, bill dispensers, banknote tester with escrow and banknote vault, printer and additional equipment as necessary to provide the required features

B. Features: APM features shall calculate fees and enable transient parkers to pay for parking fees using bank notes, credit cards, discount vouchers/validations, print receipts, and provide a validated ticket for exit within a predefined grace period (exit grace). APM shall include, front panel with integrated controls, ticket reader/encoder, cancel button, intercom call button,

function buttons, break-proof monitor window, illuminated ticket slot, note vault, receipt printer, color monitor, UPS module, journal printer, heater, cooling fan, door lock, alarm siren and waterproof vandal proof housing and door. In addition, the APM unit shall include, but not be limited to, the following features:

1. Operation Modes: On-line communication to CMS with automatic switch to standalone mode if communications are interrupted. Provide off-line transaction buffer for 1000 transactions minimum.
2. Front access door with appropriate tamper-resistant locking system. Rear access is not acceptable.
3. Cabinet shall consist of a “safe within a safe design” with a locking outer door and internal locking doors for access to all units containing cash.
4. Customer interface monitor/screen for message display.
5. Programmable audible instructions (by City) in addition to audible prompts for patron to remove ticket, credit card and cash.
6. APM shall accept U.S. banknotes in $1.00, $2.00 $5.00, $10.00, $20.00, $50.00 and $100.00 denominations in any combination. Banknote vaults shall require two keys; one required to remove vault; another separate key to unlock the vault.
7. APM shall dispense change as follows:
    a. Banknotes: Banknote dispensers shall be included with each APM to dispense change in $1.00 and $5.00 banknote denominations. All banknote dispensers shall be lockable.
8. Bank note vault shall store all notes collected by the bank note acceptor.
9. Credit card reader capable of reading both mag-stripe and chip based credit cards.
10. 2D Barcode reader integrated into the face of the APM capable of reading 1D and 2D barcodes including reading pre-printed coupons/validations and electronic barcodes displayed on mobile devices.
11. Proximity card reader to enable contract parkers to pay for monthly parking fees. Vendor to include description of this feature to include patron interface etc.
12. Accept up to five (5) chaser tickets in series. After the patron inserts a parking ticket, up to five (5) chaser tickets can be inserted into the APM to reduce the parking fee by the appropriate amount.
13. APM machine shall have concise customer instructions with pictograms where appropriate for user-friendly operation. City to approve all static labels prior to approval/acceptance of hardware
14. Time and date display.
15. Built-in push-button intercom integrated into the faceplate of APM. Intercom speaker and call button shall be fully integrated on faceplate of APM. Surface mounted speakers or call buttons are not acceptable.
16. Real-time clock synchronization with central computer with programmable daylight savings time adjustment.
17. Cancel button to allow a patron to cancel a transaction once a parking ticket has been inserted.
18. Rate structures shall be customizable to include variable rates and free parking hours.
19. Receipts shall be issued with the following information: Facility name, date, time in, time out, amount, transaction number, unit I.D. number, and rate selected.
20. Minimum storage capacity of 500 retracted tickets.

C. Access Configuration: APM units shall be ADA-compliant configured for the following type of patron access:

1. APM shall comply with all applicable State of Vermont and ADA requirements including but not limited to reach of all slots and verbal cues.

D. Operation:

1. Patron shall insert the entry ticket into the APM, guided by instructions displayed on the color monitor, guidance lights or graphical signage on the front panel of the APM. The APM shall automatically calculate the patron's parking fee based on date and time encoded on the ticket, accept payment, tender any change due and then perform the following operations:

   a. Issue encoded ticket to allow patron to exit the facility by inserting ticket into an EXS reader; print a receipt either automatically or on demand as configured.

2. Exit Grace Time Control:

   a. Exit grace time shall be the amount of time allocated to the patron to exit the facility via an EXS after paying for their parking fee at an APM. Exit grace time shall be programmable by City through the CMS. Patrons who exceed the exit grace time will be required to submit additional fees at an EXS.

3. Off-line Credit Card Control:

   a. If credit card acceptance/processing is off-line, the APM shall continue to accept payment in notes.

4. Patron guidance lights shall light when appropriate and indicate to the patron where to insert tickets, credit card and notes.

   a. Invalid Operation Indication: If an unreadable, invalid, or expired ticket or credit card is inserted, it shall be returned to the patron accompanied by a display message. If applicable, ticket or credit/debit card shall be returned to the patron.

5. Cancellation of a Transaction:

   a. A transaction may be cancelled at any time prior to completed payment of the parking fee.
   b. Once full parking fee payment is completed or credit card approval process has started, transaction cancellation cannot be performed and refunds shall not be available.

6. Out of Change:

   a. The unit shall be programmable to stop operation.
   b. Display a closed message to the patron.
   c. Issue a claim check for the amount of change due the patron.

7. Bank Note Full Operation:

   a. When the note vault is full, credit cards shall still be accepted and the APM shall display a visual indicator. In either case, an alarm shall signal on a manager's workstation.

8. Security:

a. APM should contain at a minimum:
   1) Concealed hinges.
   2) Multiple locks to access the front cabinet door.
   3) Lock to access the drawer of the bank note vault.
   4) Lock to access the bank note vault.
   5) Password protection.

9. Events and alarms shall include but not be limited to the following:

   a. Receipt paper out or low.
   b. Door alarm.
   c. Bank note vault full.
   d. Door open.
   e. Out of change; operation stopped.
   f. Note reader error.
   g. Bank note vault error.
   h. Shutter error.
   i. Reader error.
   j. Note dispenser low.
   k. Credit card server error.
   l. Credit card processing error.

10. Management cards shall be user-programmable and each programmable with varying levels of security management. Varying security level functions include at a minimum money management, inventory, subtotal, and fill.

11. APM Reporting: The APM unit shall provide full reporting functionality including, but not limited to, the following:

    a. Ticket Jam.
    b. Ticket in Throat.
    c. Encoding Not Read.
    d. Back-Out Ticket.
    e. Tickets Read.
    f. Tickets Vaulted.
    g. Device Malfunction.
    h. Standard Reports shall include: totals, inventory status, inventory maintenance activities, transaction journal report, event journal report and validation/discount report.

2.13 VALIDATIONS - The following validation devices or systems shall be included with the system:

A. MASS VALIDATION ENCODING UNIT

1. Provide a separate on-line PARCS workstation or device to encode tickets to be utilized for validations. These encoded tickets (sometimes referred to as “chaser tickets”) will be utilized by City parkers to apply a validation to a ticket as follows:

   a. Manually at Cashier: Handed to cashier to electronically apply validation discount to patron ticket.
   b. Automatically at EXS or APM: Inserted after parking ticket to electronically apply validation discount to ticket.

2. Provide PC (if required for unit), software, ticket feed mechanisms, printers and other peripherals to allow authorized to encode tickets for validations/chaser tickets. Printer and related hardware shall be installed in a location to be determined by DPW. Provide capability to encode tickets for time off (i.e. one hour free), discounted percentage, money off or no-charge. Validator shall be capable of encoding tickets automatically, in high volume, quickly and easily from this device with an appropriate user ID and password.
3. CMS shall record validations produced and track, type, quantity, validation amounts for audit and reporting purposes on demand by City.

B. MERCHANT VALIDATOR:

1. Shall be a portable desktop device capable of re-encoding tickets with a unique code identifying that a validation shall apply to ticket. “Clam Shell” design validators are not acceptable. Device may be off-line or on-line.
2. Validator shall apply a single validation to each ticket only. Only one validation per ticket shall be allowed. Validator shall recognize that a ticket had already been validated and not apply a second validation to same ticket.
3. Refer to System Configuration in Part 1 of this section for quantities of merchant validators to be furnished for DPW and BTV.
4. DPW will use a combination of merchant validators and web based on-line validation system (Add Alternate) to provide validations as needed.

C. BAR-CODE VALIDATION SYSTEM:

1. Barcode Validation: System shall provide the ability for authorized City staff to create and print barcode validation coupon on any printer via CMS software. These barcoded validations may be utilized by patrons to apply a validation to a ticket as follows:
    a. Manually at Cashier: Handed to cashier to electronically apply validation discount to patron ticket.
    b. Automatically at EXS or APM: Scanned on external barcode scanner after parking ticket is inserted to apply validation discount to ticket.
2. Bar-code validation coupons shall be creatable and printable individually and in quantities.
3. System shall provide the ability to create bar-code validations that provide 100% free, time-off, dollar amount off or percentage off discounts.
4. All locally printed validations must be track-able on the CMS. For example, if a validation was printed for $1.00 off it should be assigned a transaction number to track this specific validation and match it when used to validate a ticket.

D. VALIDATION CARD SYSTEM:

1. System shall provide the ability for authorized City staff to issue bar-coded cards to enable certain groups of parkers to validate their parking. These validation cards may be utilized by patrons to apply a validation to a ticket as follows:
    a. Manually at Cashier: Handed to cashier to electronically apply validation discount to patron ticket.
    b. Automatically at EXS or APM: Scanned on external barcode scanner after parking ticket is inserted to apply validation discount to ticket.

2. Validation cards to be enabled, disables or suspended via software at CMS workstation.
3. System shall provide the ability to create/enable validation cards that provide 100% free, time-off, dollar amount off or percentage off discounts.
4. All validations applied must be track-able on the CMS for audit and reporting purposes.

2.14 HANDICAPPED PERMIT PARKING SYSTEM

A. The City provides up to one day of free parking to any parking patron with handicapped license or placard. This system is currently managed by cashiers in exit lanes. Under the new automated system, CSR's will manage the HCPP system remotely.

B. Equipment: Provide the following equipment at a minimum to implement a HCPP system that can be managed via a remote management station via CSR's as follows:

1. Provide cameras in all EXS's to provide the ability for a CSR to easily see a handicapped placard displayed to camera by parker.
2. Provide rear license plate cameras to enable a CSR to easily see a handicapped license plate in the exit lane. Vendors to provide power and communications conduit and cabling to rear license plate cameras.
3. Furnish all required software and interfaces to enable system operation.
4. Provide ability to enter a handicapped placard number or license plate in a field and record and save this information along with an image associated with a HCPP system transaction by a CSR.

C. Operational Description:

1. Handicapped parker in exit lane will call CSR via the intercom on the EXS and identify themselves as a handicapped parker.
2. CSR will ask handicapped parker to insert their parking ticket and present their handicapped placard to the EXS for verification. Or if no placard is available CSR will verify handicapped license plate via a rear license plate camera.
3. Upon verification CSR will depress a validation button on remote management screen that will apply validation to patron's ticket.
4. HCPP system shall save a record of the transaction which will include ticket number, handicapped license plate or placard number and associated image.

Note: It is recognized that some vendor may have alternate methods of accomplishing the implementation of this system. The City prefers that system proposed is substantially similar to system specified. Provide full description of any methodology that may differ from specification concurrently with bid.

2.15 DYNAMIC WAYFINDING AND FACILITY STATUS SIGNS – DPW ONLY

A. The City is implementing a City-wide wayfinding signage system to assist and guide residents and visitors to attractions, amenities and parking. Included in the wayfinding signage system are five (5) dynamic signs with LED messages or arrows that are to be controlled by the PARCS software.

B. Sign Types and Locations:

1. PF.1 Marketplace Garage – Bank Street side.
2. PF.2 Marketplace Garage – Cherry Street side.
3. PF.3 College Street Garage – On College Street.

4. PF.4 Lakeview Garage – Cherry Street (north side of street across from entrance).
5. H.11 NE corner of the intersection of Main and South Winooski

Refer to drawing set for signage images.

C. Communications:

1. Communications interface for all signs are via a cellular modem.

D. Provide the following control functionality for LED messages on signs:

1. Automatic message display based on occupancy thresholds within each garage.
2. Manual control of message display by City via PARCS software through a system workstation or remote management software.
3. Furnish all required software and interfaces to enable control and display of LED messages.

E. Installation:

1. City will provide mounting of all City owned signs.
2. City will provide power and communications modules at each sign.

2.16 ROVING CASHIER SYSTEM

A. ROC system shall consist of an ACS proximity or insertion reader integrated on faceplate of EXS's and software.

B. Operational Description:
Roving Cashier at Exit Lanes

1. A ROC card will be set up in the system and assigned to an employee. The ROC card number will be unique and grouped by series differently from other ACS or debit cards.
2. ROC card will be credited with a balance or number of uses as determined by the parking manager per shift requirements.
3. A patron who inadvertently ends up at an exit lane with an unpaid ticket and is unable to pay via credit card would summon parking management via the EXS intercom.
4. An ROC will be dispatched to the lane where they will insert the unpaid ticket into the slot provided on the EXS. The amount due will be displayed and collected in cash from the patron by the ROC.
5. The ROC will "present" or "insert" the ROC card at the EXS to satisfy payment and raise the gate for patron exit.
6. At the end of the shift an ROC will "cash out" with their parking manager who will produce a report on the CMS. ROC report will provide the outstanding balance on the ROC card which, along with a detailed report showing all transactions made with the ROC will be used to close out the ROC shift.

ROC cards may also be used by employees to collect additional fees from patrons with expired exit grace times at an exit verifier.

2.17 RF TRANSMITTER SYSTEM – DPW ONLY - FOR MARKETPLACE GARAGE RESERVED AREA

A. The Marketplace garage reserved area which utilizes a single shared lane for entry and exit from Bank Street is equipped with an RF transmitter system manufactured by Door King Systems© (DKS). Reserved parkers utilize a single button handheld remote transmitter to vend gate open for entry and close gate after exit. The current system is standalone and requires that

transmitters are programmed at a local keypad. No reports are available for usage of remotes to enter or exit parking area.

B. Vendor to provide a replacement RF access control system with the following features and functionality:

1. Provide and on-line receiver and panel to connect system to PARCS.
2. Receiver shall be DKS Model 8040 or equivalent.
3. Provide ability to activate or deactivate remote transmitters through PARCS software.
4. Provide ACS reporting as specified in this section.

Note: The City may reuse existing handheld remotes with new on-line system. Vendor to verify and acknowledge with bid that handhelds may be reused.

2.18 DYNAMIC EXIT LANE MESSAGE SIGNS – BTV ONLY

A. Furnish and install dynamic LED exit lane signs at BTV main exit lanes as specified. Signs to be mounted at locations to replace existing dynamic exit signs.

1. Signs shall be Signal-Tech© Model TCL1440AA-K760 and TCL2040GAA-K761 or approved equivalent.
2. Display technology shall be super bright direct view LEDs.
3. Functional Requirements:

a. All messages shall be clearly legible, attracting attention under any lighting condition.
b. Sign shall completely blank out when not energized. No phantom message shall be visible under any ambient light condition.
c. Technology shall be solid state, redundant circuitry so that removal or failure of one component has minimal or no effect on overall sign performance.
d. Signs shall be capable of continuous operation from -30º F to 165º F.

4. Operation:

a. Sign messages to be controlled via toggle switches located in parking office adjacent to lane #1. Existing toggle switches to be reused. Vendor to conduct evaluation of existing switches, functionality and ability to be reused and provide replacement switches as appropriate.

2.19 ACCESS CONTROL SYSTEM (ACS)

A. ACS shall be an on-line system for parkers authorized by City to have access to parking facilities or controlled parking areas. Distributive, networked or centralized processing may be employed, so long as required multi-lane control features such as anti-passback, occupancy and activity tracking are maintained. System shall employ proximity card reader technology as specified.

B. Performance Requirements:

1. Individually recognize and process a minimum of 5000 ACS users at 50 reader locations.
2. Minimum of 16 preprogrammed access levels. Provide ability to change access level of ACS devices without reprogramming of ACS.
3. Minimum of 16 preprogrammed time zones.
4. Minimum of 40 reader groups.
5. Provide anti-passback control. With this feature, users shall enter and exit in proper sequence (i.e., entry, exit, entry, exit). System shall be selectable to allow either "hard"

(out of sequence user is rejected and an alarm is generated) or "soft" mode (out-of-sequence user is allowed access.) Access to be programmable as soft or hard per user. In both hard and soft modes, each out-of-sequence event is reported as an exception transaction in daily ACS access log. Timed anti-passback (in which device cannot be used out-of-sequence until programmable time period has elapsed from last ACS use) is not acceptable. A password-protected "resynchronization" of all users to one access before return to anti-passback control shall be provided.

6. Link users to each other to allow one entity to be identified with and/or pay for a group of users. Up to 100 such ACS groups shall be provided.
7. Debit Card Feature: Provide ability to program a proximity card user account to be used as a debit card. Provide following features:
    a. Ability to add funds or place a credit card on file for an authorized account.
    b. Decrement fees based on duration of stay and associated rate schedule when an authorized debit card is used.
    c. Prevent entry or exit via a debit card if account funds are depleted. Under this exception an alarm shall sound at the CMS to alert management.
8. Re-sync Software: Provide software to automatically resync the anti-passback status of a proximity card to the start position at pre-programmed time by City each morning. Cards in the start position can be used to either enter or exit on next use. Feature shall be enabled or disabled by City.
9. Time Zone Violator Software: Provide time zone violator software to manage ACS parkers as follows:
    a. Provide ability to deny entry or exit from facility to an ACS parker that has violated their allowable time zone. This includes but is not limited to the following time zone violation scenarios:
        1) Entering or exiting outside of authorized time zone.
        2) Exiting within an authorized time zone but ACS parker is in violation because their duration of stay within the facility included periods of time outside of their allowable time zone.
    b. All time zone violations shall be tracked and recorded on the CMS for audit and reporting purposes.
    c. Provide the capability to charge a credit card “on file” for fees applicable to time zone violation in lieu of denying entry or exit. Penalty fees shall be selectable and programmable by City and be current rates or other penalty fees.
    d. Provide the capability to allow a time zone violator to enter or exit and log violation as an exception for future operational remedies in lieu of denying entry or exit.

C. Proximity Card System

1. Proximity card readers and cards shall be provided to read, identify and process a proximity card within one second when presented to reader.
2. Proximity cards shall be of a passive design and capable of being read when presented within six (6) inches of reader.
3. ACS shall be capable in conjunction with barrier gate of processing a minimum of 500 transactions hourly.

4. Proximity Reader/Controller: Each Proximity Reader/Controller unit shall consist of a self-contained, compact reader and controller that is equipped to send activation signals to the PARCS and related equipment when an authorized proximity card is presented. Include the following features:
    a. On-line communication to Central Computer with automatic switch to standalone mode if communications are interrupted. Provide off-line transaction buffer for 1000 transactions minimum.
    b. System shall be controlled by the CMS server with following features:
        1) The system shall be programmable to allow or disallow access to any one user or group of users at any facility or reader for any time period.
        2) ACS software system to provide for validation, logging of valid and invalid actions and the signaling of invalid entry/exits or malfunction conditions.
    c. Provide all necessary software and hardware to communicate with the CMS server.
    d. Protection from common and/or local sources of interference.
5. Operation:
    a. When the vehicle detection system senses the presence of a vehicle adjacent to a proximity reader and the user presents a card to the reader the ACS controller will check the validity of the proximity card. If proximity card is valid and authorized a signal shall be sent by the ACS controller to open the barrier gate. Invalid or unauthorized cards will be rejected and the barrier gate will remain closed. An invalid use shall be recorded on the CMS and logged as an exception.
    b. System shall operate optimally under all environmental conditions common to installation site such as precipitation, vibration, snow, ice, dirt and/or extreme heat or cold.

2.20 INTERCOM SYSTEM

A. Intercom system to be a VoIP system utilizing a software or hardware based intercom server system with following features:
1. Intercom system shall provide for two-way communications between intercom call stations at ENS's, EXS's, APM's to intercom PC based substation at remote monitoring stations (BTV and DPW) managed by CSR's.
2. Programming for all intercom features shall be performed through system workstation.
3. Include all required operating software and programming software.
4. Provide two (2) client module licenses (software based solution) or two (2) intercom masters to enable communications (via PC or master) at remote monitoring stations.
5. Include the following features:
    a. Ability to forward VoIP calls initiated at an intercom station to a land-line or mobile phone number.
    b. Ability to dial and forward calls to a backup number if initial phone number is busy or unanswered within a number of rings. Number of rings to be programmable by City. Include ability to dial two external phone numbers at a minimum.
    c. Provide programmable volume control for each intercom station.
    d. Include ability to provide up to 20 pre-recorded messages at intercom stations.
    e. Messages to be programmed based on select criteria such as input from ENS's, EXS's or APM's.

f. Include ability to queue calls received based on first come, first serve basis.

6. Intercom stations to be installed by manufacturer at height to enable a patron to easily access it from a standing position (APM's) or from a passenger vehicle in a seated position at lane equipment.
7. System to comply with current Americans with Disabilities Act requirements.

2.21 SECURITY

A. Provide CMS and all subsystem controllers with security protocols, password protection and reports of exception and transaction logs that prevent unauthorized access to and manipulation of data and reports.

B. All databases of transactions, ACS users, reports, etc. shall be secured by means of user ID's and passwords. Include minimum of 20 user groups with pre-defined and configurable access authorization to operational, administrative and reporting functions. The following security features to be included at a minimum:

1. Define individual user and group based security. Must provide permission-granting capabilities that allow users to be assigned rights of least privilege.
2. Ability to assign a unique user ID for each person authorized to use the system
   Ability to assign a unique, strong password and force periodic change to that password for each authorized user ID
3. Ability to establish an expiration period for passwords
   Ability to disable a user ID following successive long-on failures exceeding a specific limit
4. Ability to configure, view, and report user and group level security rights.
5. Ability for users to reset forgotten passwords without administrator involvement
6. Ability to de-activate user accounts for former users and internal and external customers, without losing record of prior user activity
7. Available user-defined fields.
8. Encrypt all passwords maintained in the software.
9. Vendor must ensure any default passwords are changed prior to acceptance by the City.
10. Must allow to provided limited-privilege access to external parties (e.g. retailers to validate parking for customers, report viewing by BBA).

C. Payment Card Data Security Standards

1. PARCS software applications must be PA-DSS validated for use in new deployments and upgradable to maintain current standards throughout the life of the system.
2. The PARCS Vendor shall submit proof of PA-DSS compliance.
3. Provide City with guidance to ensure compliant and best-practice with regard to network configuration, Firewall, Router, Intrusion Detection, etc. This guidance shall conform to PCI-DSS Implementation Guide.
4. Provide City with instruction on any and all steps required of City to maintain PCI-DSS compliance.

D. Virus Protection

1. Vendor must provide standard threat protection (e.g. anti-virus), satisfactory and approved by City, on any PARCS server, hardware or PC furnished and running on the network. This includes any system or subsystem (automated payment machines, cashier

terminal etc.) where the device is attaching to the IP network and running an operating system.

2.22 CENTRAL MANAGEMENT SYSTEM (CMS)

A. General: The PARCS CMS system shall consist of and utilize a network of computers and/or servers, peripherals and software. System software shall provide automatic on-line monitoring, alerting and control of all PARCS equipment, supervision, and remote control of peripheral equipment from one or more selected locations. System shall automatically collect data for revenue and activity reporting, access and space control, ticket tracking, and equipment programming.

B. Central Management System Server:

1. City will provide server/s hardware for operation of PARCS CMS Software. Vendor to specify required operating system(s), configuration, and virtualization.
2. All software and installations recommended and implemented must be in compliance with all PCI standards for the vendor and the City. The selected vendor must provide the City with full assurances of the solution's and the vendor's compliance with all appropriate PCI standards.

C. Workstations:

1. City will provide computer/servers with monitors and associated peripherals to be utilized as system workstations. Equipment provided shall meet or exceed the recommendations of software vendor. Vendor must provide specifications for all required workstations
2. Workstations to provide the following functionality:
    a. Viewing (in real-time and historically) records of transaction data, generate reports and perform system administrative tasks with appropriate password authorization.
    b. Provide system alarms at all or selected workstations as programmed and authorized.
    c. Print reports at local or network printers as specified.
    d. Allow other applications to run concurrently on the workstation.

D. Central Management System Software: The CMS software shall have the following features:

1. System shall utilize an open architecture structure to support, accommodate and provide features and functionalities including but not limited to the following:
    a. Operating System: Windows Server
        1) Windows Server 2012 preferred (2008 minimum).
    b. Database: Use of Industry standard SQL databases
        1) Microsoft SQL Server 2012 (2008 minimum) is preferred
    c. Interoperability.
    d. Integration via open communications protocols.
    e. Support standard hardware.
    f. Support separated environments for production and test.
    g. Use of standard setting on servers.
    h. Client Application:
        1) Shall support, but not require, the use of Active Directory for authentication and authorization.

2) Browser based client application preferred.

2. Communication capabilities with all PARCS equipment for the purposes of monitoring and control.
3. Strict security protocols with multiple passwords providing limitations of access.
4. Remote (internet) access capabilities.
5. System shall accommodate a minimum of sixteen simultaneous users of the CMS without degrading system performance or interference with each other's work.
6. Visual and audible alarms at system workstations to report pre-programmed exceptions.
7. Hand-off of all transaction data for general analysis using standard Windows-based applications such as MS Excel, Access and Word.
8. User interface by means of a series of graphical menus that shall meet or exceed the following functional requirements:

a. Main Menu: A Main Menu shall allow access to sub-menus. Software functionality shall be distributed amongst the sub-menus.

1) Sub-Menus: Sub-menus shall include the following:

a) System Configuration Menu
b) System Monitor Menu
c) System Control Menu
d) System Programming Menu

E. Graphical Menu Configuration:

1. System must have a Window-based graphical user interface (GUI).

a. Physical and remote workstations shall have identical GUI's.
b. GUI to provide a user interface with the following capabilities:

1) Access to and ability to view, print or export system reports.
2) Real-time monitoring of all PARCS field devices.

2. System Configuration Menu: The System Configuration Menu shall be as follows:

a. Log On: Provide a minimum of one hundred (100) user programmable passwords to gain access into the Main Menu and Sub-Menus.
b. Set Passwords: Each password can be programmed into any level of the Main Menu or Sub-Menus. Provide name insertion with the password of each person to be programmed.
c. Set Count System: Provide the following sub-menus for count configuration to all lanes, areas and facilities:

1) Set Lanes: End user will be able to define which gates are assigned to a facility. Provide a lane assignment menu for the end user to number each gate by lane.
2) Set Areas: End user will be able to define which areas are assigned to a facility. Provide an area assignment menu for the end user to identify the areas by number that are assigned to each facility.
3) Set Facility's: End user will be able to define the name of each facility, the lane number, if the lane is one-way or reversing and if the counting by that lane is forward exit, forward entrance or reversing. This menu shall also be user programmable and display the total capacity of the facility, total

monthly reserved spaces, total available spaces, total monthlies currently in the facility, total transients currently in the facility, total illegal entries into the facility and total illegal exits out of the facility.

d. Set Reader Count System: Provide the end user the means of programming the following:

1) Differential counters per facility to display the total monthly vehicles that can be in the facility by parker group or card access level at one time. The end user shall be able to program the maximum number of vehicles for each facility and parker group.

e. Set Time and Date: Provide user setting of current time and date.

f. Set Ticket Auditing System: Provide the user a means to program the following ticket information:

1) Facility name and number.
2) Lane number.
3) Starting ticket number and number of tickets in the stack.
4) Low ticket warning count - User will enter a low-ticket number and the system will notify the users when the amount of unused tickets reaches the pre-programmed number.

g. Set Mass Validation System: System shall be capable of creating multiple validations by dollar, time, percentage and alternate rate.

3. Equipment Monitoring Software: Shall allow the end user to monitor the following:

a. Monitor operational status of all PARCS devices/equipment provided under this contract.

b. Monitor All Lanes: Provide a matrix that will display ALL lanes and will identify the following activity:

1) Lane number.
2) Lane status; open or closed.
3) Vehicle in lane.
4) Ticket in chute.
5) Gate arm up.
6) Gate in over-ride (gate arm locked in up position).
7) Gate failure.
8) Monthly patrons disabled.
9) Transient patrons disabled.
10) Lane on-line or off-line.
11) Operating mode of lane.
12) Low ticket supply
13) Illegal entrance or exit reverse direction through lane.
14) Back-out

c. Monitor APM's: For each APM monitor and display:

1) APM status; open or closed.
2) Door status; open or closed.
3) Receipt paper supply.

4) Note vault status.

d. Monitor Monthly Facility Counts: Provide counters to display the total card users that are in the facility.

e. Monitor Monthly Peak Counts: Provide counts to display the total card user's peak counts by facility. Record these counts by hour and store them in a daily/monthly peak counts file.

f. Monitor Transient Peak Counts: Provide counts to display the total transient park counts. Record these counts by hour and store them in a daily transient peak counts file.

g. Abnormal status conditions shall be flashed on monitor(s) and accompanied by an audible alarm. Display shall continue to flash until abnormal condition is corrected. Audible alarm shall continue until it is turned off by a command issued through monitoring computer(s). Alarms may be acknowledged and turned off through any workstation connected to CMS. A record shall be saved of

4. System Control Menu: The System Control Menu (SCM) shall have the following Sub-Menus and shall allow the user to send these commands to one lane or all lanes:

a. SCM/Function Control Menu: The Function Control Menu will have the following features:

1) Set Anti-Passback off.
2) Set Anti-Passback on.
3) Set Passive Anti-Passback on.
4) Set Auto Re-Sync Time: The end user shall program a time when the anti-passback will resync automatically every day.

b. SCM/Gate Control Menu: The Gate Control Menu will have the following features:

1) Disable Monthly Card Readers.
2) Enable Monthly Card Readers.
3) Disable Transient Ticket Dispensers.
4) Enable Transient Ticket Dispensers.
5) Tune Loop Detectors.
6) Remote Raise Auto Gate: This command will raise the auto gate and the gate will close after the vehicle enters the facility.

c. SCM/Reader Control Menu: The Reader Control Menu shall have the following features:

1) Validate a Single Card I.D.
2) Validate a Group of Card I.D.'s.
3) Void a Single Card I.D.
4) Void a Group of Card I.D.'s.
5) Remote Raise an Auto Gate.
6) Check Status of a Single I.D.
7) Set Reader Time.
8) Set Reader Date.

5. System Programming Menu: The System Programming Menu (SPM) shall allow the user to program any card reader auto gate or cashier terminal directly from the CMS computer.

Provide a means for the end user to create a program, save the program and/or send the program to a group of external devices or an individual device.

F. Occupancy Monitoring Software: Provide the following counting functions:

1. Each vehicular entry or exit lane from each facility shall serve as a counting point.
   a. Counting point to be equipped with two vehicle detection loops to provide directional logic at each point.
   b. Transmit counts to CMS.
2. Entering vehicles to subtract a count of one from number of available spaces. Exiting vehicles shall add a count of one to number of available spaces.
3. Provide directional logic software to determine direction of travel in each lane. Vehicles entering through an entrance lane or through an exit lane shall be counted as an entering vehicle. Vehicles exiting through an exit lane or through an entrance lane shall be counted as an exiting vehicle.
4. Total number of parking spaces within facilities/areas controlled by gates or designated as a count point shall be programmable through CMS. Track the number of available parking spaces within each facility/area for automatic or on demand display on workstation monitors.
5. Provide two programmable occupancy thresholds for each facility/area:
   a. First occupancy threshold to be used to trigger "full status". When full status is reached, the count system shall either provide an alarm signal for parking staff to elect to activate dynamic message signs or automatically activate dynamic message signs as pre-programmed.
   b. Second occupancy threshold to be used to trigger "open status". When open status is reached, the count system shall either provide an alarm signal for parking staff to elect to activate dynamic message signs or automatically activate dynamic message signs as pre-programmed.
   c. Provide ability to manually override occupancy status of each facility/area.
6. Maintain and display separate counts for each parking facility or area within a facility. Counts shall be maintained and displayable for total occupancy or spaces available, total RCS and ACS occupancy and total RCS and ACS spaces available. Counts to be viewable in real time from a workstation monitor.
7. Provide ability to activate messages on dynamic signs.
8. Provide ability to automatically disable ENS when facility/area is full with override from CMS.
9. Maintain the following counts for each lane:
   a. Monthly/contract, transient and total parking patron counts.
   b. Illegal entry/exit counts.
   c. Vends, loops, and gate counts.
10. Store lane, facility and area counts at hourly intervals in CMS database files. Count data to be available for customized reports to analyze facility occupancy.
11. Retaining detailed and consolidated data to allow for report generation. The following are minimum required reports:
    a. Demographics Reports: Shall provide reports of vehicles entering and

exiting. Report shall be sortable by user selectable date and time range periods and intervals within the range (i.e. April 15th, between the hours of 12:00am to 11:59pm, on an hourly basis, sorted by entries and exits hourly).

b. Occupancy Reports: Shall provide occupancy reports by facility. Report shall be sortable by user selectable date and time range periods and intervals within the range (i.e. April 15th, between the hours of 12:00am to 11:59pm, on an hourly basis, occupancy sorted by parker category). Report shall also be sortable by parker category (i.e. transient, access card group, monthly parker group, etc.)

12. Transaction Counts: Provide, display and compare separate counts corresponding to each transaction as follows:
    a. ENS and ACS reader counts shall be compared against directional loop counts and gate counts. EXS's, CT's, and ACS readers shall also be compared to directional loop counts and gate counts.
        1) Loop counts records number of vehicles passing through lane.
        2) Gate counts records number of gate openings.

G. REVENUE AND RATES SOFTWARE:

1. Rates shall be programmable from any CMS workstation by system user with appropriate authorization level.
2. Rates including rate structures shall be programmable from the CMS on-line and in real-time remotely. **Systems that require rates programming at field devices are not acceptable.**
3. The following shall be accommodated by the PARCS rates software:
    a. A minimum of four completely different fee structures. Fee structures shall be provided with the ability to program a minimum of forty rate increments.
    b. Provide for automatic adjustment for daylight saving time and leap year in fee calculations.
    c. Ability to define maximums per fiscal or other periods (i.e. 12-hour, 24-hour, etc.)
    d. Include, at a minimum, provisions for the following rate types:
        1) Day, evening and night rates.
        2) Early Bird rates.
        3) Weekend rates.
        4) Flat rates.
        5) Event rates.
        6) Holiday rates.
    e. Definable grace times by end user to include the following:
        1) Turnaround grace time
        2) Elapsed grace time to allow for elapsed time from payment at a central location (APM or CT), retrieve vehicle and drive to exit lane.
    f. Accommodate all fee structures currently in use at City plus growth for additional fee structures.

4. Provide analysis or rates projection software to test proposed fee structure against existing facility usage statistics. This software feature shall enable City to utilize historical facility usage statistics and data and apply it to a new proposed rate structure to project the financial impact of changes to rate interval fee amounts or structures.

5. Validations Programming:

   a. Provide the ability to program the following types of validations:

      1) 100% Free
      2) Time or Money Off
      3) Flat rate.
      4) Surcharges: One Time or Daily
      5) Apply an alternate rate schedule

   b. Provide the ability to input, define and program the following:

      1) Validation type.
      2) Validation name.
      3) Bill- back accounts for validations with ability to define agreed upon amounts to be charged back if different from validation amount.
      4) Quantities of validations that may be applied to a single ticket.
      5) Whether validations of different types can be mixed and applied to a single ticket.
      6) Restrictions on use of validations by date, day, time period or other event.

H. REPORTING: CMS reporting subsystem shall upload and consolidate reports from ENS's, EXS's, APM's, CT's. In addition to reports described in other parts of this Section the following reports and reporting functionality shall be provided (at a minimum):

1. Ability to retrieve and review individual transactions. Parameters shall be defined by authorized user accessing reports.
2. All reports produced shall be capable of being displayed on a monitor or printed from any workstation with the appropriate authorization level.
3. Exporting of reports to Excel, MS Access, converted to a pdf or ASCII file.
4. CMS shall consolidate and retain data for report generation.
5. Reports Menu shall include selections and/or sub-menus as required to provide the following minimum reporting functionality for standard reports generated from each facility's central computer database. The configuration of standard reports may vary from the structure indicated below provided the required minimum reporting functionality is maintained. All report configurations shall be customizable by user-selected options.
6. General Account Information Reporting:

   a. User Account Report: This report shall list all general account information, including, but not limited to: User Name, Full Name, and I.D. Number.
   b. User Account Edit Log Report: This report shall list all revisions to a particular user account, what fields were revised, the time/date when each revision took place and who was logged in when the changes were made.
   c. User Account Edit Summary Report: This report shall list all user accounts that have been edited within a selected time period, what fields were revised, the time/date when each revision took place and who was logged in when the changes were made.

d. Patron Account Report: This report shall list all general account information, including, but not limited to: Name, I.D. Number, Address, Phone, E-mail, date account created, account history, and vehicles associated with the account.
e. Patron Account Edit Log Report: This report shall list all revisions to a particular user account, what fields were revised, the time/date when each revision took place and who was logged in when the changes were made.
f. Patron Account Edit Summary Report: This report shall list all user accounts that have been edited within a selected time period, what fields were revised, the time/date when each revision took place and who was logged in when the changes were made.
g. Patron Vehicle Report: This report shall provide information on all vehicles associated with each patron.
h. Account-Access-by-User Summary Report: This report shall list all accounts accessed and/or revised by a single user within a specific time period.

7. System Status Reporting:

a. System Status Summary Report: This report shall list the various system status data with any system alerts or errors flagged for action.
b. Holiday Report: This report shall list the holidays that are entered into the system.

8. System Activity Reporting: This report shall list facility-specific data pertaining to system activity within a specified date, time period, device and/or message type.
9. Patron Activity Reporting:

a. System-wide Patron Activity Report (all patron classes)
b. Patron Class Activity Report (multiple owner-editable patron classes)

10. Mass Validation System Reporting: Validation reports shall configurable to list any combination of the following details for each user:

a. Validation Provider
b. Validation Type
c. Applicable Parking Duration
d. Applicable Time Windows

11. User Access Log Report: This report shall provide login data within a specified date and time range. Reports shall include, but not be limited to the following: Log IN or OUT Time, User Name, User Number, Action (include Transaction Number if applicable), Date and Time of Day.

12. System Financial Reporting:

a. Transaction Summary Report: This report shall provide detailed information on all transactions. Reports shall include, but not be limited to the following: Date and Time Range, User Name, User Number, Lane/Device ID(s), Transaction Number, Transaction Type, Transaction Number Range, Ticket Number Range, Ticket Status, Clock IN, Clock OUT, Account ID, Fee(s), Fee Type(s), Tax(es) Paid, Total Charges and Payment Type.
b. Deposit/Withdrawal Report: This Report shall enable the User to select a particular User or CT. Reports shall include, but not be limited to the following: Date and Time Range, User Name, User Number, Transaction Number, Transaction Type, Transaction Time, Deposit Amount, Withdrawal Amount and Totals.

c. Tax Summary Report: This report shall provide a summary of pulled and cleared Tax Reports within a specified date and time range.
d. Billing/Invoicing/Payment Summary Report: This Report shall enable the User to select a Patron or range of Patrons. Reports shall include, but not be limited to the following: Date and Time Range, Patron ID, Payment History, Paid-Through Date, Date Last Invoice Sent, and Next Invoice Date.

13. Vehicle Count Reporting:

a. Count Configuration Summary Report: This report shall list all saved Count Differentials Report settings by saved report name (determined by user), last User to revise each report type and date last revised.
b. Count Differentials Report: This report shall provide single facility or multiple facility activity data (by Zone) for a specified time/date period. The report shall provide capacity, start, minimum, maximum and average counts for monthly, transient and total amounts.

14. Statistic Reporting:

a. Statistical Report Configuration Summary Report: This report shall list all current Statistical Report settings by saved report name (determined by user), last User to revise each report type and date last revised.
b. Statistical Reports: These reports shall include, but not be limited to the following:

1) Revenue Statistics
2) Entry, Exit and Entry/Exit Statistics
3) Length of Stay Statistics

15. Automatic Pay Machine Exchange Summary Report: This report shall provide a summary of activities between the vault and the hopper in the APM. The report shall include, but not be limited to the following: Date and Time Range, Vault index, User ID, Start Transaction, End Transaction, Number of Notes Removed/Added and the balances in the vault or hopper at a given time. See APM requirements for additional report requirements.
16. Event Log – Report shall include at a minimum all modifications/changes to PARCS identifying the authorized user initiating changes. Report shall include date and time of user log on and log off and all actions initiated during logged on period.

17. Shift Reports – To include the following:

a. Cashier Shift Report: Report of one cashier's transactions by shift that includes:

1) Transactions processed by rate amount and type.
2) Total revenue accountable for during shift showing cash and credit card subtotals by bankcard type.
3) Counts during shift period from gate, transaction or closing loop counters.
4) Transactions processed at exit lane without vehicle present.
5) Number of No Sale Key activations.
6) Validations.
7) Report from cashier terminal for each cashier shift must match report from CMS of cashier shift.

b. Daily and Monthly Shift Reports - Report summarizing each fee collection devices on a daily, monthly or shift basis.

18. Individual Transactions Report - Provide listing of every transaction processed by a cashier by shift or lane.
19. Credit Card Reports – Provide totals and listing of credit card transactions by bankcard, payment location or cashier.
20. Lane Activity Report – Provide a summary report by exit lane of revenue, rate type and transactions type. Time period for report shall be defined by user.
21. No-Revenue and Void Transaction Report – Provide a report of no-revenue and void transactions. Time period for report shall be defined by user.
22. APM Report – Report of APM daily activity for each APM and totals of all APM's.
23. Lane Volume Report – Provide a report of entry and exit for a selectable date and time period.
24. Duration of Stay Report - Provide duration of stay report based on entry time and length of stay. Time period for report shall be defined by user.
25. Debit Card Payment Report – Report of debit card payments applied.
26. Cashier Sign On/Sign Off Report - Report of all cashiers signed on/off, time period of shift, and all transactions that occurred during shift.
27. Validation Reports:
    a. Provide a report of all validation transactions by validation type.
    b. Charge-back Validation Report – Report to include only charge-back validations (identified by validation number).
28. Ticket Disposition Report – Provide a complete sequence of transactions for all tickets issued showing disposition for every ticket. Report to show whether ticket has been paid (include exit time and fee collected) or still outstanding and in facility.
29. Ticket Value Report - Provide ticket stratification report sorted by value of all transactions processed to include breakdown by individual rate structure.
30. Outstanding Ticket Report – Provide a listing of tickets issued but not yet processed at an exit sorted by entry time. Report shall provide outstanding revenue amounts owed per ticket and summarized in report.
31. Back-out Ticket Report – Provide a list of back-out tickets issued by ENS. These are tickets that are issued at an ENS where the patron did not proceed completely through the entrance lane.
32. Daily Revenue Report – Report shows each lane, type of activity, type of revenue (i.e. transient parking, monthly etc.) and type of payment (i.e. cash, credit card by bankcard type).
33. Access Control System Reporting:
    a. Monthly/contract parker Card Report: Report lists all monthly/contract parkers and includes the card #, account #, name of client and amount.
    b. Usage Reports: Report of monthly/contract parker usage by date, time, card or account number and entrance/exit lanes. Report shall be sortable by date, time card number or account number and entrance/exit lanes.
    c. Active Accounts Report: Report shall provide a list of all active ACS device ID's. Report shall be provided in numerical account or card number order with totals for all active accounts.

d. Violation Reports: Report listing violations to include anti-passback, time limits, etc. Report shall provide a listing of all violations by type and period or by patron.
e. Duration of Stay Reporting: Report listing monthly/contract parkers within each facility by length of stay. Length of stay parameter to be selectable by City staff requesting report.

34. Occupancy Reports – Provide occupancy reports by month, day, hour, minute, weekday versus weekend.
35. Hotel Transactions Report – Report of hotel self-park usage showing entry, exits, transaction date, validation applied by hotel.
36. Chaser Production Report – Report of chaser tickets produced.
37. Bar-code Validations Report – Report of bar-code validations produced.
38. First/Last Ticket Report – Report of starting and ending ticket numbers and tickets issued by lane.
39. Validation Report: List all validations by user groups as follows:
    a. User key.
    b. Name of user group.
    c. Type of validation. Partial-dollar amount, flat-fixed dollar amount, Time-partial time amount and full-total validation of ticket.
40. Validation Summary Report – Summary report of daily discount validations redeemed or sold for a specific period of time.
41. Roving Cashier Report: Shall provide report for ROC by shift duration showing starting balance, ending balance and detailed transaction information for shift period.
42. Entry/Exit Report: This report will list ticket IN times in one hour increments or as programmed by the user. User may program up to 24 time segments to track in and out time statistic in the facility.
43. Length of stay Report: This report will track the length of time a vehicle stays in the facility. The user may program up to 24 time segments to track average time of tickets.
44. Dollar Statistics Report: This report is the same as the Length of Stay Report except the report will list the time a vehicle stays in the facility by dollar amount.
45. Demographics Reports: Provide reports of vehicles entering and exiting. Report shall be sortable by user selectable date and time range periods and intervals within the range.
46. Occupancy Reports: Provide occupancy reports by facility. Report shall be sortable by user selectable date and time range periods and intervals within the range. Report shall be sortable by parker category (i.e. transient, access card group, monthly parker group, etc.)
47. Custom Reports: Provide pricing on Bid Forms for quantities of custom reports as specified. City to provide requirements, coordinate data, format and layout of custom reports with Vendor for mockup and approval.

2.23 AD-HOC REPORTS (Configured by User): The software shall include a report generation tool for developing additional standard reports, as well as for developing ad-hoc reports. This should allow users to include any and all data that is captured.

A. Include ability to automatically print reports based on defined event or database trigger.
B. Capability to be exported to Excel, MS Access or converted to a pdf or ASCII file.
C. IT and System Administrators must be able to access and extract all data that is captured and maintained.

ADD ALTERNATES:

2.24 License Plate Recognition System – BTV Alternate #1

A. Furnish and install an LPR system comprised of LPR cameras, software, mounting posts at public entry and exit lanes as specified.

1. Main Entrance Lanes:
   a. Furnish and install LPR cameras on each entry lane.
   b. Vendor to conduct a review of the existing LPR camera mounting posts to determine if they may be reused. If they cannot be reused vendor shall furnish pricing for new mounting posts.
2. Main Exit Lanes:
   a. Furnish and install LPR cameras on each exit lane.
   b. Vendor to furnish and install mounting posts for LPR cameras.
   c. BTV to furnish extension to concrete equipment islands as required to mount cameras. Vendor to provide BTV with dimensions and requirements for extensions.
3. Short Term Entrance Lane:
   a. Furnish and install LPR cameras on entrance lane.
   b. Vendor to furnish and install mounting post for LPR camera.

Vendor to install LPR cameras along with any required lighting for illuminating LPN's, trigger loops and canopies to shade cameras from direct sunlight if required.

B. LPR system shall be fully integrated with PARCS and designed to capture the license plate number of vehicles and ticket number taken or proximity card number used by patron to obtain entry to facility. LPR system shall tie ticket or card number to license plate and store in database. Upon exit the LPR system will capture LPN and ticket or card information and compare against entry information for a match. If a match does not occur the ticket or card and LPN information will be directed to a CSR to review and take appropriate actions as required. This LPN matching requirement may be turned on or off as selected by BTV.

C. Vendor to provide all required hardware and software necessary to provide a complete and functional LPR subsystem that provides BTV's required functionality and accuracy.

D. LPR subsystem will be utilized by BTV for:

1. Inventory purposes.
2. Preventing ticket swapping.
3. Assistance in calculating lost ticket fees.

E. Maintain LPR images and corresponding LPN in the database for length of time as required by BTV (or as required by law) at which point the LPR image and LPN is purged from the database. Storage duration time between purges shall be programmable by BTV.

F. Operation:

Normal Entry and Exit

1. Entry: Vehicle LPN to be imaged by LPR system after entry ticket is taken or proximity card is used at ENS or accepted by system. LPN is placed in the LPR system database inventory.
2. Exit: Vehicle crosses over the LPR system trigger loop in the exit lane and the LPN is captured. When the ticket is inserted or proximity card is presented at the EXS the LPR system will verify the ticket number and associated LPN for a match. Upon a successful system verification of a match the LPN will be moved or marked as inactive.

Exceptions:

1. The following LPR system exceptions shall be sent to a CSR for review and associated actions:
    a. Upon exit a stored LPN does not match entry ticket or card.
    b. Upon entry or exit LPN cannot be accurately read by LPR system.
    c. Lost tickets.

G. LPR Review Workstations

1. LPR review workstation hardware to be provided by the BTV, with all necessary LPR software furnished and installed by Vendor.
2. BTV to review LPR exceptions via a CSR at a remote monitoring station.
   Provide the ability to review and correct entry images after the vehicle has entered the parking facility. No time limit shall be required for after entry lane LPN corrections.

H. Performance Requirements

1. LPR system to meet or exceed the following requirements:
    a. Capture an image of a vehicle's entire license plate at a 99 percent (99%) capture rate. This capture rate to provide a visual image record of 99% of all vehicle license plates entering the facility.
    b. The LPR system shall be an on-line system with LPR check on every RCS or ACS transaction. Devices at the entrance lanes and exit lanes shall automatically gather the LPR data. The image of the license plate and/or rear end of the vehicle shall be linked to the RCS or ACS transaction and stored in the computer database. When the ticket is presented at exit, the system shall retrieve the LPR record from entry and compare it to the LPR image at exit. If valid the license plate number shall be removed from the inventory and all data shall be sent to the CMS.
    c. Provide the following read accuracies:
        1) The LPR system shall read all but two LPN characters of all LPN characters (sometimes referred to as an N-2 Factor) on license plates with a 98% accuracy. For example, if a LPN contains the characters "123BTV" (N=6) then in order to achieve an N-2 read the system must recognize "123" or "BTV". When there is not a match, the picture of the plate and back of vehicle shall be displayed either on the fee computer (cashier intervention) or to a workstation (CSR or supervisor intervention) so a manual match can be chosen.
        2) The LPR system shall read all LPN characters (sometimes referred to as an N Factor) on license plates with an 85% accuracy. For example, if a LPN contains the characters "123BTV" (N=6) then in order to achieve an N read the system must recognize "123BTV" exactly. When there is not a match, the picture of the plate and back of vehicle shall be displayed either on the fee computer (cashier intervention) or to a workstation (CSR or supervisor intervention) so a manual match can be chosen.
        3) The following vehicles shall be classified as exceptions and not counted against accuracy of LPR system performance:

a) Vehicle with an obstructed license plate where LPN's are obscured by a physical object such as a trailer hitch, bicycle rack, license plate covering etc.
b) Oversized vehicles defined as vehicles that measure more than 15 feet from the centerline of the driver's window to the rear bumper.
c) Vehicles without license plates.
d) Motorcycles.

d. Local ambient lighting shall not have any effect on the LPR accuracy regardless of time of day or night. Vendor to provide any necessary shading or lighting elements required to mitigate the effect

of the ambient lighting conditions on the LPR system performance.

e. Vendor to provide a means to score LPR system accuracy. Images stored on LPR database shall be transferred from sample lanes along with LPR system LPN recognition to a standalone PC for reviewing and determining accuracy percentages. Owner shall be able to select any images stored on the LPR database for scoring purposes. Vendor to furnish all software required to test the LPR system's performance.

I. Vendor to provide complete system description supported by datasheets, screen shots, reports and other supporting documentation.

2.25 Wayfinding Level Count System – BTV Alternate #3

A. Provide a parking level count system that monitors each level of the facility and displays real-time parking space availability on dynamic signage located at strategic decision points to facilitate patron wayfinding as follows:

1. System shall obtain counts from all entrance and exit lanes in main parking garage. All requirements of the occupancy monitoring system as specified in this section shall apply.
2. Provide pricing to furnish and install dynamic signage as specified herein and shown on drawings at locations within facility.

a. Level One (Ground Floor): Signal-Tech© Model SA1264GR-02-K759 or approved equivalent.
b. Level Two – Five: Signal-Tech© Models SA1668GR-02-K955, SA1668GR-02-K956, SA1668GR-02-K957 and SA1668GR-02-K958 or approved equivalents.

1) Display technology shall be super bright direct view LEDs.
2) Functional Requirements:
a) All messages shall be clearly legible, attracting attention under any lighting condition.
b) Sign shall completely blank out when not energized. No phantom message shall be visible under any ambient light condition.
c) Technology shall be solid state, redundant circuitry so that removal or failure of one component has minimal or no effect on overall sign performance.
d) Signs shall be capable of continuous operation from -30º F to 165º F.

3) Some signs are to replace existing wayfinding dynamic signs in same location. Other signs are to be installed at new locations to expand current wayfinding functionality. Vendor to review sign locations accordingly.

3. Provide ability to display level by level space availability on a system workstation monitor.
4. Provide and install all software and signage interfaces as required for functionality as specified.
5. Vendor to provide overall design of level count system.
6. Either of the following methods may be deployed for counting:

    a. Overhead ultrasonic sensors with directional logic. At a minimum provide the following:

        1) Furnish and install overhead sensor(s) to determine direction of travel. In order to compensate for the ungated geometry, the software shall be programmed to accurately determine crossing direction and increment or debit counts from garages appropriately.
        2) Vendor to furnish and install any delineator posts required to channel traffic in their count solution.

    b. Vehicle based counting cameras. At a minimum provide the following:

        1) Vehicle based counting cameras specifically designed to determine direction of travel and count vehicles over the count point.
        2) Count camera accuracy shall not be degraded due to weather conditions (moisture in air etc.) at installation locations.

7. Provide all required panels, interfaces and software to connect to the PARCS system.
8. Provide all mounting brackets/structures to mount signs provided. Vendor to maintain minimum overhead clearances for overhead mounted signs.
9. Level count system shall provide a minimum count accuracy of 98%.
10. System shall maintain a minimum accuracy of 98% over any 24-hour period at each level counted.
11. Testing: At a minimum, the following tests shall be performed by Vendor:

    a. Physically count vehicles at each level and compare to system count.
    b. Verify that system at each level increments/decrements counts correctly.
    c. Confirm that counts vary < 2%

12. Ability to control the signs and update count information via the PARCS GUI
13. Signs shall communicate via hardwire connection. Power to signs shall be hardwired.

2.26 Frequent Parker/Loyalty Program – CMS Alternate #2

Provide a FPP system which will enable BTV/DPW to provide rewards to repeat parking patrons based on accumulation of points as follows:

1. Software shall be provided to enable the following:

    a. Provide BTV/DPW website interface/link to allow new or existing FPP members to enroll in program, view, manage or redeem points for rewards etc.
    b. FPP software shall enable BTV/DPW to view and print reports by patron or for all patrons enrolled in program.
    c. Enable an expiration date for FPP cards.
    d. Enable BTV/DPW to award points to FPP patrons as a user programmable setting.
    e. Enable FPP patrons to redeem reward points for free parking certificates (or other rewards prearranged and selected by BTV/DPW).

2. Provide FPP patron with ability to print out bar-coded reward certificates to redeem at exit lanes.
3. FPP shall utilize any of the following methods as the FPP media to manage and track FPP usage and entry and exit to the facilities:

    a. Linked to credit cards:

        1) Barcoded cards at entrance and exit barcode readers.
        2) Note that any storage of credit cardholder data must employ secure and PA-DSS validated techniques.

    b. Not linked to credit cards:

        1) Patron takes ticket to enter and:

            a) Inserts ticket into EXS then inserts or scans FPP card followed by credit card for payment.
            b) This method can also be utilized by handing the FPP card to a cashier at exit followed by payment.

2. Vendor to provide a detailed overview of how the FPP would operate, BTV/DPW employee interface, patron interface, sign-up procedures, management of points and rewards and other features provided

2.27 Reservation System – CMS Alternate #3

A. Provide pricing for an automated, web-based Parking Reservation System to enable patrons to reserve space in advance at a facility for selected days and times. The system shall provide the following features and functionalities:

1. The Parking Reservation System shall provide a link in the DPW or BTV website allowing self-park patrons to pay and reserve parking through the DPW or BTV website by use of a computer with standard web browser.
2. Provide multiple platforms for making and/or managing a reservation.

    a. Desktop or laptop via a web browser utilizing the latest versions of Internet Explorer and other browsers at a minimum.
    b. Support for mobile devices utilizing Android or IOS via the use of free downloadable apps or standard mobile web browser.
    c. Interface shall be provided for existing registered user to log-on or new patron to register. Enable registered users to enter payment card for single use or to be stored as payment card on file.

3. Patron shall use any available printer (capable of printing bar-codes) to print their reservation pass. Each reservation shall utilize a unique bar-code generated, tracked and managed by CMS. Barcoded permits shall be printed with “fold lines,” if required, to enable patrons to fold paper to easily align permit with barcode scanner for reading.
4. Patrons shall scan their bar-coded reservations pass at bar-code scanners on ENS’s and EXS’s to enter and exit the facility.
5. Provide ability for patron to manage reservation including the ability to modify or cancel a reservation.
6. Full anti-passback controls shall be applied to reservation passes by CMS.
7. If there is an overstay the PARCS CMS shall compute and calculate additional charges to be paid by patron through PARCS.

8. Full reporting and audit trails of all reservation activity shall be tracked or enabled by the CMS.
9. System shall provide the ability for BTV or DPW to determine and program the number of reservations allocated by facility, date and time period.
10. Credit card interface and input shall be fully PCI compliant and securely store all personal identification. Provide current PA-DSS validation for system.
11. BTV and DPW shall provide website, reservation page or buttons to host and display reservation system. Vendor to provide assistance with providing reservation link from CMS to website and methods to visually and functionally blend system into existing facility website page as required.

2.28 Credit Card In/Credit Card Out – BTV Alternate #5

A. Provide pricing to furnish and install credit card readers at ENS's. Readers to be fully integrated on faceplates of ENS's. Credit Card In/Credit Card out functionality to be provided as follows:

1. ENS shall prompt the parker to insert credit card to enter. Upon successful read of the credit card, the data shall be sent to the CMS, which shall raise the gate.
2. EXS shall prompt the parker to insert their credit card. The data shall be sent to the CMS for correlation with the original entry data, fee calculation and authorization using the credit card approval system. Upon authorization, exit machine shall perform the following tasks:

    a. Generate a receipt with date, time, and location of entry; date, time, and location of exit; last four digits of the credit card used; and fee charged.
    b. Raise the gate.

2.29 AVI Reader System – BTV Alternate #6

A. Provide pricing to furnish and install AVI readers instead of proximity readers at the following locations:

1. Main entrance lanes.
2. Main exit lanes
3. Lot A entrance and exit lane.
   Note: Short Term entrance lane will not require an AVI reader.
4. Vendor to furnish and install required post mounts or other mounting hardware as required. BTV to provide any required extension to equipment islands to accommodate distance requirements for AVI readers to front windshield of vehicle.
5. Provide windshield sticker type transponder tags as specified on bid forms.

B. General: The AVI System shall be long-range and high performance and use radio-frequency identification (RFID) technology. BTV-authorized vehicles within the facility will display a windshield-mounted AVI ID Device (tag) which can automatically be read by the AVI System. The AVI system shall consist of antennas, readers and local controllers (as required by PARCS manufacturer's architecture) which read the AVI ID Device number and transmit it to the controller for verification of authorization for access to the system and/or recording of the appropriate data regarding the transaction. Distributive, networked or centralized processing may be employed, so long as required multi-lane control features such as anti-passback, occupancy and activity tracking are maintained. In addition, the AVI System shall include, but not be limited to, the following components:

1. AVI Reader/Controller: Each AVI Reader/Controller unit shall consist of a self-contained, compact reader/controller combination device that is equipped to send activation signals to the PARCS and related equipment when an authorized AVI ID Device is presented. Include the following features:
    a. Operation Modes: On-line communication to CMS computer with automatic switch to standalone mode if communications are interrupted. Provide off-line transaction buffer for 1000 transactions minimum.
    b. The entire system shall be controlled by the CMS Computer:
        1) The system shall be programmable to allow or disallow access to any one user or group of users at any station for any time period.
        2) The software system shall be designed for validation, event conditions, logging of valid and invalid actions and the signaling of invalid entry/exits or malfunction conditions.
        3) The database shall be able to store more than 15,000 identities.
    c. Provide all necessary software and hardware to communicate with the central computer
    d. Real-time clock synchronization with central computer with programmable daylight savings time adjustment.
    e. Field programmable with built-in service diagnostics.
    f. The transmitted power and reception sensitivity shall be adjustable. The reader must have the capability of hopping between 902 and 928 frequencies.

2. Operation: The AVI System shall operate using a radio frequency (RF) signal to identify authorized patrons. An identification device (ID) will normally be mounted on the inside windshield of the vehicle that will then be identified as it passes through as RF field at each monitoring location (lane). The AVI System will consist of all equipment necessary, at the lane, to broadcast the RF signal and receive the return signal from the identification device. The system will decode the signal, validate the identification code, validate the ID, append additional information to the code, and transmit the transaction to the Controller for further processing.
    a. Readers may be "smart" (i.e. access decisions made at the reader or a local controller) or "passive" (i.e., access decision made at the central controller) so long as multi-lane functions such as anti-passback are maintained. Timed anti-passback is not acceptable.
    b. The AVI system must be able to be tuned to any frequency within the band by changing the settings of the reader without changing, modifying or replacing the tag.
    c. The equipment shall be installed and adjusted to allow reading of AVI ID Devices attached to the windshield of vehicles. The read zones must be adjusted to prevent readings and crosstalk from any devices in adjacent lanes or from vehicles queued in line behind the vehicle being serviced in the lane.
    d. The AVI ID Devices must be readable at a typical read range of 10-15 ft. at 10 MPH with a 99.9% accuracy rate, independent of rate of transmission. System shall read and process AVI ID Device within 1.0 seconds of presentation to reader.
    e. The system shall operate optimally under all environmental conditions such as precipitation, vibration, snow, ice, dirt and/or extreme heat or cold.
    f. The system shall have interference protection from common sources of RF radiation. The system shall neither affect nor be affected by neighboring electronic systems or

electronically controlled devices. The system shall not require any additional facility modifications such as fences, blocks or mounted absorption material.

g. The system shall operate within established standards, safety and governmental regulations for RF non-ionizing radiation emissions.

1) Error checking communications protocol shall not allow partial tag numbers to be transmitted to the host computer.

3. Enclosure: AVI Reader/Controller unit enclosure shall be durable, non-corrosive and environmentally sealed with tamper-proof hardware and tight-fitting gaskets. Suitable for outdoor mount.

2.30 Pay By Phone Payment System – CMS Alternate #5

A. Provide pricing to enable patrons to pay for parking at BTV or DPW parking facilities via a pay by phone app/system.

B. It is expected that payment via the pay by phone app will be managed by the patron in one of the following methods:

1. Method One:
   a. Patron pays for parking on app and a bar-code is generated.
   b. Patron scans bar-code at ENS to enter the facility.
   c. Patron scans bar-code at EXS to exit the facility.
2. Method Two:
   a. Patron takes ticket to enter at ENS.
   b. Patron scans bar-code on ticket via app. Ticket is now “paired” with patrons account. Pay by phone system app sends payment information to PARCS.
   c. Patron inserts ticket at EXS to leave.

C. Pricing to include any initial setup fee and expected transactions fees.

D. Vendor to provide complete system description of how the pay by phone app and system can be utilized by patrons to pay for parking. Provide datasheets, screen shots, reports and other supporting documentation.

2.31 Hosted Solution and/or SaaS Solution instead of Local Servers & Software – CMS Alternate #4

A. Provide complete pricing to provide a hosted or SaaS solution instead of local servers.

B. Vendor to include pricing for software as a service (SaaS) or hosted solution.

C. Vendor to provide full information and description of their hosted solution provider. Include full details on system, infrastructure requirements, security, service level agreements (SLA’s)etc.

2.32 System Server Hardware – CMS Alternate #6

A. Provide pricing to furnish and install physical primary and redundant servers.

1. Provide hardware and software redundancy to enable continued PARCS operation in the event of failure of one part of system without loss of system data.
2. Performance Requirements:
   a. Computer hardware provided shall meet the current requirements of software and accommodate for future growth and system expansion as specified.
   b. Functional performance of tasks shall not be slowed by other concurrent tasks being performed.

c. Ability to backup system in less than three hours.

3. Data Storage:

a. PARCS data shall be stored in actual data format, not in report format.
b. Provide hard drive in sufficient size to store transactional data for each parking facility for a minimum period of one-year.
c. Provide hard drive to archive data from PARCS with a minimum storage capacity of five years.
d. Annual transactions volumes are projected as follows:

BTV

1) ACS transactions 100,000
2) RCS transactions 300,000

DPW

1) ACS transactions 500,000
2) RCS transactions 750,000

B. Vendor to provide required number of servers along with complete specifications on hardware provided supported by datasheets and other supporting documentation. Include full details on system, infrastructure requirements, security, service level agreements (SLA's) etc.

2.33 PCI External Vulnerability Scan – CMS Alternate # 6

A. Provide pricing a PCI external vulnerability scan as follows:

1. External vulnerability scan shall be performed initially upon completion of PARCS installation, prior to acceptance.

a. Scan shall be conducted through an Approved Scanning Vendor (ASV) approved to conduct external vulnerability scanning services and listed on the PCI Security Standards Council website.
b. ASV to conduct external vulnerability scanning services to validate adherence with the external scanning requirements of PCI DSS Requirement 11.2.2
c. Pricing shall include quarterly scans for the first year after the initial scan. Yearly scan program shall transfer to the City upon successful completion of initial vulnerability scan and resolution of all "high risk" vulnerabilities as defined in PCI DSS Requirements 6.1.
d. Provide evidence that the external scanning process meets the ASV program requirements for passing, including no vulnerabilities with a CVSS score higher than 4.0
e. Vendor in conjunction with ASV shall review the scan reports and verify that the scan process includes rescans until all "high-risk" vulnerabilities as defined in PCI DSS Requirement 6.1 are resolved.

2.34 Web Based On-line Validation System – CMS Alternate #1

A. Validation system shall be a web-based application hosted by the City that provides secure paperless parking validations using standard web browser or web-enabled wireless handheld device to apply/issue validations. Primary features and functionalities of the validation system shall include the following:

1. Web-Browser User Page: Allows user or account holder to simply type in ticket number and validation amount which is sent to the system online and in real-time.
2. Validation and Revenue Accountability: System shall provide accurate accountability of all validation activities.
3. Online Validation Fund Recharging: Merchant/account holder shall have ability to set threshold on the number of validations and/or amount of fund for a programmed period. Application shall include the ability to automatically recharge the account.
4. Real-time Validation Activity: Authorized City staff shall have ability to view validation activities in real-time from their workstations with secure logins.
5. Management reporting: Validation program shall provide on-line monitoring of all validation activities including validation reconciliation with revenue generated, and various validation activity reports by individual or groups.

B. Workstation Web Browser and Web-Enabled Handheld Device Validation Account Requirements:

1. Validation Account Configuration: Validation account shall be configured with the following features and functionalities:
   a. Web browser URL for use by merchant or account holders.
   b. Web browser account holder secure login.
   c. Validation user page shall include the following:
      1) Merchant or Account holder information
      2) Validation amount associated with the account
      3) User logged in providing the validation
      4) Window to type in parking ticket number
      5) Verification that parking ticket number is validated including date, time, amount of validation, etc.
   d. The Validation user page shall include other information such as remaining balance, threshold, status of account, etc.

C. Vendor to provide complete description of the proposed web-based validation system including datasheets and screen shots.
D. Vendor to provide an 800 number for any assistance required by entities providing validations.
E. Provide pricing to accommodate a minimum of 100 different users.

2.35 Count System between College Street and Lakeview Garages – DPW Alternate #2

A. Furnish and install a count system at crossover points between the College Street and Lakeview Garages provide an accurate facility count at each garage. Refer to drawing set for count point areas. Provide the following features, functionality and equipment:

1. Vendor to provide design of count point system.
2. Count point equipment to be installed at locations as shown on drawings.
3. Either of the following methods may be deployed for counting:
   a. Vehicle presence loops with directional logic. At a minimum provide the following:
      1) Furnish and install “A” and “B” loops at count location. In order to compensate for the ungated geometry, the software shall be programmed to accurately determine crossing direction and increment or debit counts from garages appropriately.

2) Vendor to furnish and install any delineator posts required to channel traffic in their count solution.

b. Overhead ultrasonic sensors with directional logic. At a minimum provide the following:

1) Furnish and install overhead sensor(s) to determine direction of travel. In order to compensate for the ungated geometry, the software shall be programmed to accurately determine crossing direction and increment or debit counts from garages appropriately.

2) Vendor to furnish and install any delineator posts required to channel traffic in their count solution.

c. Vehicle based counting cameras. At a minimum provide the following:

1) Vehicle based counting cameras specifically designed to determine direction of travel and count vehicles over the count point.

2) Count cameras accuracy shall not be degraded due to weather conditions (moisture in air etc.) at installation locations.

4. Provide all required panels, interfaces and software to connect to the PARCS system.
5. Count point system shall provide a minimum count accuracy of 98%.
6. Testing: At a minimum, the following tests shall be performed by Vendor:

a. Manually count vehicles crossing over count point.
b. Verify that system at each garage increments/decrements counts correctly.
c. Confirm that counts vary < 2%

2.36 E Commerce System for Contract Parking – DPW Alternate #3 (see pricing note on bid forms)

A. Provide pricing to enable DPW to establish an E Commerce system where patrons may originate and make payments for their monthly contract parking.

B. DPW shall provide website, E Commerce page or buttons to host and display E Commerce system. Vendor to provide assistance with providing link from CMS to website and methods to visually and functionally blend system into website page as required.

C. Credit card payment interface and input shall be fully PCI compliant. Provide current PA-DSS validation for system.

D. Reporting: Provide tracking and audit trails for full reporting of all monthly contracts initiated or paid via the system. An automatic notification shall be provided to alert DPW management staff of new registrations or payments for existing contracts.

E. Vendor to provide complete description of proposed E-Commerce system solution including datasheets and screen shots.

2.37 Major Employee Cards for Parking – DPW Alternate #4 (See pricing note on bid forms)

A. DPW is interested in allowing employees of major employers to utilize their existing employee cards for entry and exit from parking facilities.

B. Vendor to provide pricing (if any) to accommodate a one card solution utilizing a participating employees card as follows:

1. As a monthly access card with unrestricted or restricted access.
2. As a debit card with fees debited per use.
3. Monthly, daily or hourly fees applied may differ (be discounted) from current rates in effect as pre-programmed by DPW.

C. Vendor to provide complete description of proposed solution including datasheets and screen shots.

2.38 Central Validations Kiosk – DPW Alternate #5

A. DPW may establish a central validations kiosk where patrons may have their parking tickets validated. Vendor to provide pricing for the following:

1. It is anticipated that the web based on-line validation add alternate will be utilized to provide validations to tickets by a CSR. Patrons with a receipt from a participating merchant will show their receipt to the CSR who would look up the appropriate merchant and enter the ticket number to provide a validation.
2. All required software.
3. The ability to provide a minimum of validations entities is required.
4. Reporting: System shall provide a report of all validations applied by merchant.
5. DPW will provide kiosk and PC with all required peripherals.

B. Vendor to provide complete description of the proposed central web-based validation system including datasheets and screen shots.

C. Vendor to provide an 800 number for any assistance required by CRS's providing validations.

PART 3 - EXECUTION

3.1 PROJECT COORDINATION

A. Meet with City, Engineer, Consultant and General Contractor within 30 days of contract award.

3.2 EXAMINATION:

A. Verification of existing conditions before starting work:

1. Prior to beginning installation, examine areas to receive PARCS equipment. Verify that critical dimensions are correct and that conditions are acceptable.

3.3 PREPARATION

A. Provide templates for anchor bolts (if required) and other items encased in concrete or below finished surfaces in sufficient time so as not to delay work.

3.4 INSTALLATION

A. General: Sequence, coordinate and integrate the various elements of PARCS System materials and equipment. Coordinate PARCS System with other building components. Install PARCS System as specified.

B. Rough-In: Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected. Refer to equipment specifications and to product data for rough-in requirements.

1. Anchor Bolts: Furnish anchor bolts and other connectors required for securing equipment to in-place work.

C. Install systems, materials, wiring and equipment to conform with manufacturer's instructions and approved submittal data including coordination drawings. Conform to arrangements

indicated by the Contract Documents. Where coordination requirements conflict with individual system requirements, refer conflict to the City.

1. Detector Loops: Install loops in accordance with manufacturer's instructions. After testing loop wires, seal slots with manufacturer's recommended sealant.

D. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components.

E. Install PARCS System equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. Connect equipment for ease of disconnecting, with minimum of interference with other installations.

F. Protection: Provide protection necessary to ensure that the equipment will be without damage or deterioration at the time of acceptance.

3.5 TESTING/ACCEPTANCE

A. Equipment is to be tested for compliance to requirements of this specification and manufacturer's performance standards.

B. General Requirements:

1. Submit schedule and format for all system acceptance testing to City for approval prior to start of any tests.
2. Provide a checklist to test equipment for all functions. Checklist documents shall include provisions to indicate the pass/fail status of lane/device tested. A lane/device shall receive a passing grade only if all criteria for passing the test is satisfied.
3. Provide all items necessary to complete testing including stock of tickets, proximity cards, AVI transponders, currency in different denominations, credit cards and other stock materials and consumables as required.
4. City shall be notified in writing at least seven days prior to each test session. In event that the first test is not successful, correct noted deficiencies and notify the City, at least two days in advance that test session is ready to resume. Vendor shall promptly correct all problems encountered at Vendor's expense.
5. Tests observed by City shall not relieve Vendor of responsibility for providing hardware, software and documentation in accordance with this Specification.

C. Lane Acceptance Test (LAT)

1. Vendor shall conduct LATs after each lane of equipment is installed to demonstrate to City that the installed equipment complies is operating correctly as installed.
2. Vendor to provide testing scripts for all equipment provided and all functionalities specified. At a minimum, test scripts shall include the following:

   a. Testing procedures to be followed;
   b. Expected results;
   c. Checklist for the components of each lane or device;
   d. Signature page for all LAT participants' signatures;
   e. Tests for verifying reports;
   f. "Pass" or "Fail" check-off boxes; and
   g. Notes section for describing issues found.

3. When a PARCS equipment location installation has been completed, the Vendor shall conduct its own testing of the installed equipment. This testing shall follow the identical LAT test procedures that shall be used during by City.

4. Signed passing LAT's shall be provided to City at least one day prior to testing by City.
5. Vendor shall make provide sufficient personnel to perform the LAT.
6. All systems and components of the PARCS must successfully pass the LAT prior to use of equipment. Minor deviations from testing script results may not be considered grounds for failure of test. Major deviations found shall require a retest upon correction by Vendor.

    a. Minor deviations are any failure that does not affect system functionality, fee calculation accuracy, transaction count accuracy, exception count accuracy, active ticket inventory accuracy (system vs. actual), transaction processing, credit card processing, calculations, or report accuracy.
    b. Major deviations are any failures that affect system functionality, fee calculation accuracy, transaction count accuracy, exception count accuracy, active ticket inventory accuracy (system vs. actual), transaction processing, credit card processing, calculations, or report accuracy.

D. Operational Completion Test (OCT)

1. Upon completion of all LAT the system shall be required to pass an OCT for a period of thirty consecutive days. The OCT shall monitor the performance of the PARCS as an installed system. If external vulnerability scan add alternate is purchased by City then the successful completion of an external vulnerability scan and associated ASV passing scan report shall be provided prior to commencement of the OCT.
2. The Vendor shall submit an OCT test plan which shall outline the procedures for testing entire PARCS system.
3. The OCT test plan documents shall include:

    a. General procedures to be followed.
    b. Methodology for calculation of downtime and accuracy for the various PARCS components.
    c. Electronic reporting to be used during the OCT period for documenting failures and downtime.

4. If during the 30-day OCT the system fails to meet any one of the following specified performance criteria, the test shall be extended or begin anew on a day agreed upon by the City and Vendor. Whether the test is extended or restarted depends on the impact/severity of the failure as specified below.
5. The performance criteria for successful completion of the OCT shall include:

    a. No individual subsystem shall be operationally unavailable for four or more hours cumulative during the 30-day test period.
    b. No individual subsystem shall be operationally unavailable for more than two consecutive hours.
    c. If any single component fails, more than once during the 30-day period for the same reason, it shall be replaced upon the second failure with a newly manufactured component of the same type and the test shall continue.
    d. No component of a given type shall fail more than three times during the 30-day test period for the same reason. Upon the fourth failure, all components of that type shall be replaced or modified to correct the common deficiency, and the test shall be restarted from the beginning.

6. In addition to the PARCS reports generated during the OCT, the Vendor shall provide City with a report that clearly provides the overall percentage of system downtime and causes of that down time.
7. Vendor to provide City with a corrective action report that provides a detailed description of each failure that occurs during the OCT. The corrective action report shall include the type of failure, reason for failure, what was done to remedy the failure, and whether the failure resulted in a restart of the OCT.
8. A subsystem shall be considered unavailable if any major component of the subsystem is not functioning. The following items which cause a subsystem to become inoperative shall not be deemed as a subsystem or system failure:

    a. Power outages.
    b. Damage or vandalism caused by an outside party.
    c. Network connectivity issues outside of the PARCS.
    d. Failures caused by a 3rd party.

E. Punch List

1. Starting with the beginning of installation through Final System Acceptance, the Vendor shall submit a document on a weekly basis showing the status of all outstanding system issues, regardless of severity, including the plan for resolution and estimated completion date.
2. All deviations noted during acceptance testing shall be recorded on the Punch List.

F. Final System Acceptance

1. Final System Acceptance will be submitted by the City, in writing to the Vendor, upon completion of the following:

    a. All PARCS equipment has passed LATs and OCT
    b. Verification by City of complete resolution of all outstanding items on the Punch List
    c. All spare parts, stock, and manuals are on site and have been approved
    d. All software components are installed and tested
    e. An initial PCI vulnerability scan is completed and does not identify and vulnerabilities
    f. All training is complete to City's satisfaction
    g. All completed test documentation has been provided City

2. Warranty period for the PARCS will commence upon Final System Acceptance.

3.6 ADJUSTING AND CLEANING

A. Adjust all equipment provided this section so that it operates smoothly, easily and properly. Confirm that locks engage accurately and securely without forcing or binding.
B. Lubricate hardware and other moving parts.

C. After completing installation of exposed, factory-finished parking equipment, inspect exposed finishes and repair damaged finished to the satisfaction of the Architect.
D. Remove barrier-gate arms during the construction period to prevent damage, and install them immediately before Substantial Completion.

3.7 MAINTENANCE RECORDS

A. Vendor shall maintain accurate and up-to-date records of service calls, preventive maintenance operations and equipment failures for each component and sub-system. Records in the form of a log shall become the property of CITY at the end of the one-year warranty and any extended maintenance periods.

3.8 TRAINING

A. Vendor shall provide operational training classes for all levels of CITY personnel including cashiers, managers and service personnel.

B. A comprehensive training program shall be developed and utilized for training City's personnel. Training shall be implemented through use of classroom training, hands-on field training and/or other forms of training that Vendor shall propose. Training plan documents shall be provided per the submittal requirements.

C. Vendor shall conduct required training at times and locations as coordinated with City.

1. Training shall include, but not be limited to, the following employee categories and numbers of staff and recommended number of hours of training:

	# to be trained	hours to be trained
Attendants/Ambassadors	50	6
Supervisors	6	8
Maintenance Personnel	6	40
PARCS System Administrators	4	16
IT Network Administrators	3	12

D. Training curriculum shall consist of the following:

1. Cashiers/Operators: Shall be trained to operate cashier terminal and shall include at a minimum the ability to process normal and exception transactions, and to understand all system messages provided by cashier terminal. Vendor to setup cashier terminals to provide cashiers with training in a classroom or on-site environment prior to actual operational use.

2. Supervisors: Shall be trained to:

a. Perform primary maintenance on PARCS components (troubleshoot / replenish supplies).
b. Understand all system messages provided by CMS, including but not limited to alarm messages, indications of attempts to compromise system and explanations of atypical lane activity displayed by access, revenue and count control system.
c. Correlate tickets issued with vehicles present, time parked with revenue generated.
d. Understand purpose and data contained within all reports produced by CMS.
e. Operate CMS.
f. Process exception transactions occurring at all payment locations.
g. Load and remove bills, clear note jams, and trouble shoot APMs.

3. Maintenance personnel: Shall be trained to perform primary maintenance on all major components of system. Additionally, maintenance personnel shall be trained to:

a. Replenish all system supplies.
b. Clear ticket and other paper jams.
c. Reset system after a power failure.
d. Replace internal elements such as circuit boards.
e. Lubricate and clean internal components.
f. Remove and replace gate arms and adjust gate arm travel.
g. Be certified by manufacturer to trouble shoot all systems and perform primary maintenance.

4. System Administrators: System Administrators shall have same basic training as Supervisors. In addition to such training, System Administrators shall be trained to operate CMS and to retrieve, view and create and understand statistical reports which reveal trends in revenue generation, facility utilization, and based on information available from CMS, to perform checks and balances over actions of Supervisors and their subordinates. Three and six months after Final Acceptance, System Administrators shall have one day's additional training.

5. IT Network Administration Staff: IT staff shall receive training on all aspects of system administration, system backups, preventive maintenance of database and operating system at scheduled intervals, configurations, version and revision updating, archiving of historical data as required, troubleshooting, desktop maintenance, and operation and maintenance of all software provided by vendor, as well as any other topics deemed necessary by the vendor.

PART 4 - LIST OF UNIT PRICES

4.1 Vendors shall provide unit pricing for PARCS bid forms provided with RFP.

END OF SECTION 11 12 00