



City of Memphis

ADDENDUM #3

Request for Proposal # 12507

**Parking Meter Replacement and Upgrade
for the City of Memphis**

Addendum Issue Date: August 15, 2012

All bidders are hereby informed of the following modification to the proposal package for this project:

Answers to questions submitted by Proposers, Walker Parking Study, and ConsulPark Study are all attached per Addendum #3.

The proposal opening date, location and time for opening have not changed.

END OF ADDENDUM #3

Parking Meter Request For Proposal

Q. What are the finance limitations?

A. The City's charter does not allow leases that exceed 5 years. We will consider other options and evaluate each on its merits.

Q. Revenue Projections and historical information.

A. Current revenues are \$400,000 to \$500,000. Compliance should double. We expect about a 15% increase in the number of metered spaces. No further reliable projections are available.

Q. Any other services outside of metering and payment?

A. We want CMS, technical support, marketing, and training as per RFP. No enforcement or collections need to be proposed.

Q. RFP talks about signs. Is the City providing poles/stanchions?

A. Proposer will provide complete sign installation.

Q. How many mounting pads will we need?

A. Proposer will need to inspect the site sidewalk conditions at each location to determine if existing sidewalk is in good enough condition.

Q. What does proposer do with meters that are converted from SS to MS? What happens to holes left from poles? (i.e. repairing sidewalk)

A. All removed parking meter heads shall be delivered to the Parking Meter Maintenance office in City Hall. For holes smaller than or equal to 6 inches in radius, the contractor shall backfill the void full depth with concrete when poles are removed. If a hole larger than 6 inches in radius occurs upon removal of the meter pole, then the entire block of sidewalk shall be replaced.

Q. Who provides MPD handhelds?

A. The handheld devices are free under contract with the current Verizon contract. MPD will be moving from a windows device to Androids in September. All Uniform Patrol Officers are issued their own PDA.

Q. Preference for pay by plate or pay and display?

A. Vendors are encouraged to present any options they deem appropriate, but pay and display is preferred.

Q. Does DBE participation above goal give extra credit?

A. No extra credit is allowed for exceeding this goal.

Q. What do we mean by "locations" of firms?

A. Firms with a local presence will be rated higher as explained in the evaluation criteria.

Q. What do we mean by integrating with oracle?

A. Financial information needs to be able to be imported from CMS directly into the Oracle financial system.

Q. Should interface be part of this bid?

A. Yes.

Q. Who performed the parking study? Can proposer get copy of most recent study?

A. Walker Parking Consultants and ConsulPark performed the parking studies. They are included in this addendum #3.

Q. Do we want all U.S. references or just a certain number?

A. We want at least three (3) U.S. references of similar size and scope.

Q. Will we accept non U.S. references?

A. No

Q. Will extra credit be given for TN references of similar cities?

A. No

Q. Do you want total fee in proposal?

A. The proposer should include all costs associated with installing and operating the system. Proposed fee breakdown should be included.

Q. Will the City of Memphis consider proposals for just the MSM portion of the RFP or does it require the proposer to provide a response for both sections?

A. A response is strongly encouraged for both sections of the RFP. Proposers will be allowed to bid on one or both sections to provide more options for the city.

Q. Will the City of Memphis consider a proposal for MSMs in single space areas as an alternative solution?

A. The proposal is encouraged to include an appropriate mix of MSMs and SMSs depending on the area served. The RFP is for a hybrid system of single-space and multi-space meters.

Q. Will cutting poles to be flush with the concrete and patching existing concrete be adequate for the SM pole removal?

A. The poles must be completely removed. For holes smaller than or equal to 6 inches in radius, the contractor shall backfill the void full depth with concrete when poles are removed. If a hole larger than 6 inches in radius occurs upon removal of the meter pole, then the entire block of sidewalk shall be replaced.

Q. Our company is located in Maryland. Is the EBO still a requirement in responding to the RFP?

A. Yes.

- Q. If the EBO is required, would a certain agency qualify for the EBO requirement?
- A. See addendum #1 for EBO master list. The EBO master list is established and maintained by the City Of Memphis Contract Compliance Office (901-576-6210).
- Q. Which agencies certify businesses located outside the State of Tennessee?
- A. See addendum #1 for EBO master list. The EBO master list is established and maintained by the City Of Memphis Contract Compliance Office (901-576-6210).
- Q. Since 30% of the public in the United States do not have a credit card or bank account, is the City considering requiring bill acceptance at a later date? If so, will the City require the MSM proposed to have the ability to be upgraded to bill acceptance without having to change out the existing equipment?
- A. No.
- Q. Does the City have sample parking guidance signs? Will the City install poles required for the parking guidance signs?
- A. The proposer is responsible for providing and installing all poles and signs associated with each parking area. The signs shall include the time limit for parking duration for each respective MSM. The City reserves the right to approve the final sign designs. Signage must meet the requirements of the Manual on Uniform Traffic Control Devices (MUTCD), 2009 Edition.
- Q. Work included section stated “remove existing SSMs and poles”. In the pre-bid meeting, it was discussed that the procedure to remove SSM poles included replacement of the entire concrete pad instead of just cutting the pole and grinding the surface flush to the ground. Can you please confirm the procedure required to remove the poles?
- A. The poles must be completely removed. For holes smaller than or equal to 6 inches in radius, the contractor shall backfill the void full depth with concrete when poles are removed. If a hole larger than 6 inches in radius occurs upon removal of the meter pole, then the entire block of sidewalk shall be replaced.
- Q. Work included section stated “prepare and install mounting pads”. Does the City have an accurate count of how many locations will need pads?
- A. Vendor will need to inspect sidewalk conditions at each location to determine how many pads are needed.

- Q. Work included section stated "Provide Press Releases". Would the City handle the marketing plan and want the proposer to do the press releases? How does the City envision the press release schedule?
- A. The proposer will develop the marketing plan and press release schedule should be arranged by the proposer to introduce and educate the public with regard to the new system.
- Q. Does the City have a selected or preferred hand-held and/or License Plate Recognition (LPR) provider?
- A. ESI Companies (www.esicompanies.com) is the preferred vendor for LPR systems. Verizon is the preferred for PDAs. MPD does not currently have PDA thermal printers and none have been budgeted.
- Q. Does the City have a selected or preferred Pay by Cell provider?
- A. No, but we reserve the right to review and approve the selection.
- Q. Fee calculation accuracy: 99%. Does the City mean "Rate calculation?" (p. 4, 2.2.3.4.1)
- A. Yes.
- Q. Will the City allow the proposer who has a prototype option or an option that requires additional development for remote rate programming to be considered compliant or do they require the proposer to currently have remote rate programming fully functioning with documented references prior to the submittal?
- A. Only fully functioning systems with documented references will be considered.
- Q. The statement (p. 5, 2.2.3.10.4) in #2 continues into #3, therefore the numbering is incorrect on the RFP: 2. Vault shall be keyed differently than other MSM locks such that access to 3. vault is not available when vaults are removed from the MSM.
- A. The numbering is incorrect, but inconsequential.
- Q. Who is the City's financial institution?
- A. The City uses multiple financial institutions.
- Q. The MSM must include a printer?
- A. Yes.
- Q. Collection reports shall be printed in full showing the amount collected in coins with non-resettable coin totals and the date and time of the previous collection. (p. 6, 2.2.3.10.7) why does the City want the report to be non-resettable? This means the amount on the report would just keep growing after each collection. Would the City want that amount to reset to zero instead?
- A. The printed collection report should provide the amount collected since the previous collection; therefore, they should reset after each collection. The CMS should include non-resettable counts as well as individual collection reports so that there is a running total available for auditing purposes.

- Q. User interface – this section (p6, 2.2.3.10.8) has incorrect numbering as #2 and #3 should be one statement.
- A. The numbering is incorrect, but inconsequential.
- Q. Collection reports shall provide the amount collected in coins with non-resettable coin totals and the date and time of the previous collection. (p. 8, n) why does the City want the report to be non-resettable? This means the amount on the report would just keep growing after each collection. Would the City want that amount to reset to zero instead?
- A. The printed collection report should provide the amount collected since the previous collection; therefore, they should reset after each collection. The CMS should include non-resettable counts as well as individual collection reports so that there is a running total available for auditing purposes.
- Q. What are the City's expectations and role with regards to the Marketing Plan? Does the City want to implement and execute the marketing plan themselves or would they prefer the Proposer to execute the plan? (p.2.2.7.1)
- A. The Proposer will handle all aspects of the marketing plan upon review and approval of the City.
- Q. Proposer shall provide technical support no later than 8:00 am the following Monday if requested between 12:00 noon and 5:00 pm on Saturday (p. 11, 2.2.10). Does the City require "on site technical support" or "phone technical support"?
- A. On site technical support.
- Q. All insurance companies must be acceptable to the City of Memphis and licensed in the state of Tennessee (p.20). Are insurance companies not licensed in the State of Tennessee acceptable?
- A. No.
- Q. Certificate of insurance (p. 21) – can insurance endorsement be produced upon award of contract?
- A. Yes.
- Q. We would like to know why property insurance (p. 22) is required. What property is the insurance covering?
- A. The insurance covers the proposer's equipment and shall require all sub-contractors to do likewise.
- Q. How will the City provide points in the evaluation model for proposers who will meet the 10% goal for M/WBE participation in the project, i.e., proposer has the potential to achieve 110 points / +10 points for proposers who meet the M/WBE goal?
- A. The determination of whether a Respondent has made a good faith effort to meet the M/WBE goal will be made by the City's Contract Compliance Officer, Director of Finance and the Purchasing Agent, prior to the award of the project. No extra credit is given for exceeding the goal.

- Q. Proposer shall use Microsoft 2003 file formats in preparing its Proposal to the maximum extent possible (p. 29). Would Microsoft 2010 be acceptable?
- A. The RFP states to use Microsoft 2003 file formats "to the maximum extent possible." Microsoft Office 2010 programs allow files to be saved in 2003 format.
- Q. How will the City score the Location section of the evaluation category? (p. 34, 5.2) Will the proposer receive full points if they have a Memphis office? Will the proposer be required to open a local office prior to award to receive credit for location?
- A. The intent is that the proposer will need to deliver on site service within the required minimum support times listed in the RFP.
- Q. How will the City score the pricing section of the evaluation category? (p. 34, 5.2) In many cases, Cities will score the lowest priced responsive bid with the full amount of possible points and then take the percentage of the difference to score the rest of the proposers.
- A. Pricing is 40% in the evaluation category and indicates whether proposer provides a cost effective pricing methodology including financing costs. Points shall be awarded on a basis relative to the understood total cost of the proposal.
- Q. Principle business address is located within the limits of the City of Memphis. Can a component of the proposer's subcontractor have a Memphis address or does the primary bidder have to have a local Memphis office? (p. 36)
- A. The proposer does not need to have a Memphis office. Subcontractor needs to have a local office capable of responding to needs within the RFP time limit for service.
- Q. What is the definition of a joint venture? (p.47, d)
- A. Bidding in combination with another company. It is not a requirement.
- Q. It appears the requirements have been written for a specific vendor and therefore exclude fair and open competition. The current procurement is restrictive and does not permit vendors to present the City with other solutions that are either more cost effective or beneficial for the City for the long term. Was this the City's intent?
- A. No.
- Q. The way the RFP is written today, it appears to be slanted towards a Parkeon and possibly an IPS solution. For example, paragraph 2.2.2.2.1 Pay and Display, specifically states "(the City's current choice for operation)" which is a Parkeon product. This is interesting considering the majority of the City's street meters are single space meters. Is it the City's intent to use Parkeon Hardware and minimize the number of solutions that can be presented even if some of the solutions will be less costly and of greater value to the City in the long term?
- A. Pay and display is a generic term. Research indicates that the first US generation of pay and display machines was introduced in 1950 by Park-Ur-Self based in San Francisco, California. Park-Ur-Self now goes by VenTek International. There are more than 10 manufacturers of pay and display technology.

Q. In section 3.6 REFERENCES, the RFP states “In section 6 of the Proposer’s Proposal, proposers shall provide a list of all municipal multi-space and /or single-space w/credit card installations completed in the U.S. with the proposed equipment manufacturer within the past five years. Do not include trials or pilots.” This statement precludes the City from being able to take advantage of any newer or more competitive meter products that can be more reliable and more cost effective for the City over the long term. Is this the City’s intent?

A. The City is looking for proven solutions and does not wish to be a trial or pilot installation.

Q. Is it the City’s intent to convert most, if not all street parking from single space to multi space parking? The 100 multi space meter requirement clearly indicates that. If so, is the City considering the cost of removing the current meter polls and repairing the sidewalks? Has the City also considered the operational and financial impact on revenue if a multi space meter is out of operation due to mechanical, electrical, or vandalism, since all of the spaces in that zone would become unenforceable? How will these added cost and risks be evaluated?

A. A hybrid meter system of approximately 100 to 150 MSMs and 300 to 500 single space smart meters is proposed for conceptual and pricing purposes. Pay and display operation by MSMs is preferred as parking display receipts may be purchased from a nearby MSM if one is out of operation. Any information that the vendor wishes to present may be submitted. Total understood cost of each proposal shall be considered.

Q. Was Parkeon documentation used to develop this RFP?

A. No.

Q. Were any outside resources, people, contractor or consultant (paid or not paid) used to help develop these requirements? If so, can you please identify who and what company they work for?

A. Assistance was provided by Walker Parking Consultants and ConsulPark. The RFP was written and issued by the City.

Q. Why doesn’t the City consider identifying the requirements and let the vendors develop the solution around those requirements? Doing so could present the City with a broader selection of solutions that could yield greater benefit through cost savings, reliability, and performance for the City’s citizens and visitors.

A. The City is open to all proposals that will deliver a proven solution.

Q. Please provide the following information regarding the existing parking equipment owned by the City: manufacturer, model and quantity of all SSM housings and mechanisms. Please verify whether or not this inventory would be accessible to the winning proposer.

A. All inventory will remain the property of the City of Memphis. The RFP states “It is the proposer’s responsibility to verify model numbers, quantity, location, ability to upgrade meters, and status/condition of meter poles”.

Q. Please provide a map or description of the street location of the existing meters. Please provide whether the parking spaces are parallel or diagonal.

A. See Walker Parking study.

Q. Please provide map or description to depict the location of the proposed newly established on-street paid parking spaces.

A. See Walker Parking study.

Q. Please provide the number of City staff by job designation to be trained. For example, number of meter maintenance personnel, collectors, enforcement staff, supervisors, etc.

A. Approximate numbers are; meter maintenance 5, collectors 5, enforcement staff 6, and supervisors 4.

Q. Please describe the meaning of each area outlined on the map.

A. See Walker Parking study.

Q. Please provide the total annual parking meter revenue for the past 5 years. If available please provide the figures by area.

A. See CounsulPark study.

Q. What is the annual number of parking citations issued for the past 5 years?

A. Parking citations issued by Parking Enforcement Technicians and Police:

FY2008 86,497

FY2009 97,554

FY2010 92,433

FY2011 89,374

FY2012 77,398

Ahead of the Curve
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PARKING CONSULTING SERVICES

PARKING METER STUDY

Prepared for:

CITY OF MEMPHIS, TENNESSEE

AUGUST 8, 2012



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August 8, 2012

Mr. James Toles
Toles & Associates, Inc.
2851 Lamb Place, Suite 2
Memphis, TN 38118

Re: *Parking Consulting Services: Parking Meter Study, City of Memphis, Tennessee
Walker Project No. 13-3041.00*

Dear Mr. Toles:

Walker Parking Consultants is pleased to submit this report of our study of the Memphis parking meter upgrade. This report presents a summary of certain information and facts that are intended to assist you and the City of Memphis in planning decisions relating to parking meter upgrade options, future strategic goals, and planning opportunities to be considered in conjunction with bid specifications and project administration.

We appreciate the opportunity to be of service to you and City of Memphis in this project. If you have any questions or comments, please do not hesitate to call.

Sincerely,

WALKER PARKING CONSULTANTS

A handwritten signature in black ink that reads "John W. Dorsett".

John W. Dorsett, AICP, CPP
Senior Vice President

A handwritten signature in black ink that reads "Jon Efroymsen".

Jon Efroymsen
Senior Parking Consultant

Enclosure

cc: George Little, Chief Administrative Officer, City of Memphis, TN
Richard M. Merrill, City Traffic Engineer, City of Memphis, TN
John Cameron, City Engineer, City of Memphis, TN
Ken Johnson, Parking Meters Engineer, City of Memphis, TN
Dan Kupferman, Director of Car Park Management Systems, WPC



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MEMPHIS PARKING METERS

PARKING CONSULTING SERVICES



WALKER
PARKING CONSULTANTS

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EXECUTIVE SUMMARY

The following report provides an overview of the current system, descriptions of various parking meter technology and systems available for consideration, and opinions of cost.

The objective of replacing or upgrading the existing meters is to increase efficiency, convenience, and revenue to the City by migrating from the current meter system to a fully integrated system of new single space and multi-space smart meters. The purpose of this report is to provide an objective, non-biased description of available meters and options to better prepare the City in defining the type of system best suited for Memphis.

Softness in the CBD office market and limited catalysts for change have obvious implications for the CBD parking system.

Parking capacity, on-street and off street, appears adequate to support the CBD in the near term planning horizon of this study.

Walker recommends that the City deploy a hybrid of multi-space meters and single-space smart meters.

Multi-space smart meters are recommended for those block faces that have an economically viable number of contiguous spaces, with the intent to maintain a system-wide density standard of approximately 6 to 11 on-street spaces per multi-space meter. The "pay and display" option is preferred due to objections to numbering spaces for pay by space operation, but pricing for pay by space could be requested of bidders as an alternate.

Single-space smart meters are recommended for those on-street metered spaces that do not meet the density standard, are geographically isolated, separated by physical streetscape elements (driveways, curb cuts, loading zones, etc.), or located on streets with grades that do not meet accessibility standards.

Walker recommends that all on-street meters accept coin and credit cards for payment. Accepting banknotes will add considerable expense and maintenance to the system, and with credit card acceptance, is not necessary. Multi-space meters issue receipts, single-space smart meters do not.

We recommend that a pay-by-phone option be considered. Pay-by-phone adds convenience and benefits for both the motorist and the City at minimal cost. Smart cards are not recommended as this technology has been superseded by the acceptance of credit cards. The City should survey the retail community to determine if tokens are desired and would be utilized.

This study identified 1,237 on-street, metered public parking spaces in the study area through physical inventory and occupancy data collection conducted by Walker from May 24 to May 27, 2012. This is an increase from the 1,210 reported by the City as of December 2011.



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Occupancies vary significantly by zone, time of day, day of the week, month season, and by special events. Occupancy of greater than 100% is judged to occur when cars are parked in loading zones and spaces that should or could be metered, but are not.

On-street metered spaces are heavily utilized, averaging 84% during the weekday and 58% in the evening during these observations. Zones 1, 2, 3, 4, 5 and 13 exceeded 95%, which is generally perceived as maximum occupancy as significant hunting is required to find the last remaining spaces. Some spaces are not well marked and some meters were missing, however, the peak counts provided are judged to be reasonably representative of a typical busy day.

During data collection, Walker identified opportunities to change the number of metered spaces. Opportunities are considered within the following parameters.

- Spaces on blocks that are already metered.
- New blocks that appear to be utilized and are in or adjacent to metered areas.
- Meters on blocks that are not occupied are not recommended for replacement.

Walker analyzed two scenarios for the distribution of multi-space and single-space meters.

“As Is” Scenario – based on the assumption that multi-space meters are installed on blocks in a manner that achieves an average of about 8 spaces per meter. The range is determined by the layout of the streetscape and walking distance to and from the meter. The remainder of spaces are allocated as single-space meters on existing poles.

“Proposed” Scenario – based on the addition of the recommended metered space opportunities.

The following table summarizes the distribution of meters in each scenario.

Scenario	Spaces	Single-Space Smart Meters	Multi-Space Meters
“As Is”	1,237	344	112
“Prospective”	1,522	462	132

The recommended new metered space opportunities add 285± metered spaces, or 23% to the on-street system, which increases capacity from the current 1,237 spaces to 1,522 spaces.

The recommended number of multi-space meters increases from 112 in the “as is” scenario to 132 meters in the “proposed” scenario. The additional 20 MSM meters is an 18% increase.

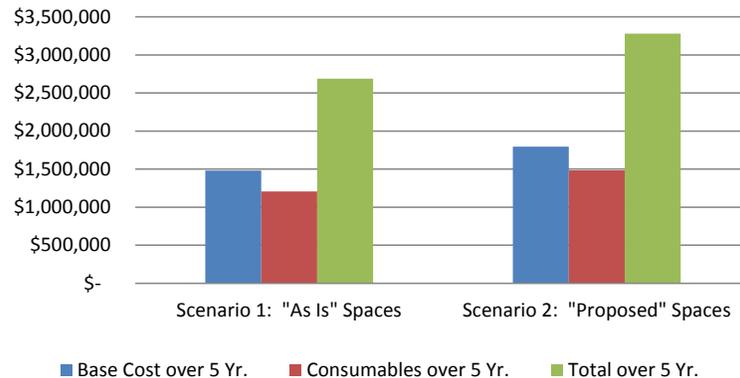
The recommended number of single-space meters increases from 344 in the “as is” scenario to 462 meters in the “proposed” scenario. The additional 118 SSM meters is a 34% increase.

An overall average ratio of approximately 8 spaces per multi-space meter is maintained. Blocks with isolated spaces and slopes that restrict accessibility are limited to only single-space meters.

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The following figure illustrates the cost of each option assuming a five year amortization for equipment at 6.0% interest plus five years of consumables, as the City's charter does not allow leases to exceed five years.



In each scenario, cost is impacted more by fees, credit card processing charges and consumables than by the cost of the installed equipment.

On-street parking meter rates were increased city-wide in 2011 from \$0.75 per hour to \$1.00 per hour. Walker surveyed 14 cities to assess market rates. The current rate is less than the mean of the comparables of \$1.39 per hour. The maximum rate among comparables is \$2.00 per hour. The minimum rate among the comparables is \$1.00 per hour. The Standard Deviation among these comparables is \$0.45. Thus, one standard deviation above the mean would be \$1.84 per hour.

From this analysis, it appears reasonable to consider increases in the hourly CBD parking rates to achieve at least \$1.50 in the near-term five-year projection period and increase to \$2.00 per hour in the CBD over the year five to year ten projection period for those sub-areas that exceed 85% occupancy. It is also judged to be reasonable to hold sub-areas with lower occupancies and transitional areas to \$1.00/hr. over the same projection period, which is more consistent with the mean of the comparable neighborhood rates, and re-analyze this rate in the future.

Walker recommends the City engage a professional public relations firm to assist in implementing a creative and successful launch of the new meter program. It would also be beneficial to the City to discuss strategies of successful implementation with vendors during the interview process.

Based on other cities' experience and successful installations of new meter systems, the following list provides examples of communications activities prior, during, and after installation:

- Three to six months prior to installing the new equipment, issue press release announcing plans for new system, with a focus on the positives of added customer convenience.
- Conduct community outreach meetings with the stakeholders in advance of the meter change.
- Deploy a website with project updates, meter directions, and an electronic survey form.

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- Display a “sample” meter in a public area for people to see, touch, and feel prior to beginning the installation.
- Develop and provide instruction cards throughout the CBD and on the website, illustrating how to use the new meters.
- Develop a directional video for municipal television and or YouTube.
- Train “ambassadors” to assist patrons with the proper use of the meters.
- Issue a progress press release a few weeks prior to the initial installation.
- Install meters and signage with covers with “Coming Soon” signage so that patrons can see where the new equipment is installed.
- Conduct a ribbon cutting and first use ceremony to officially welcome the new meters.
- Post parking ambassadors around the new meters to assist patrons with their use.
- Start the deployment of meters slowly so that any issues can be identified early and quickly as opposed to a mass-installation where the maximum number of meters are replaced at one time. Conduct a press release to showcase the new meters and utilize ambassadors to educate patrons. Installation can proceed on a quicker pace once any initial issues are corrected.
- Issue a press release of the deployment of the new meters and areas scheduled for deployment.
- Rotate ambassadors to new areas as meters are deployed.
- Provide citation warning for short period of time following meter deployment.

The full report describes the various meter options and other considerations in greater detail.

INTRODUCTION

Toles & Associates, a firm with an ongoing professional services contract with the City, engaged Walker Parking Consultants to assist The City of Memphis ("City") in crafting bid specifications and obtaining qualified submittals to replace and or upgrade their current single space parking meters with new smart meters capable of accepting a variety of payments including credit cards.

This report provides an overview of the current system, descriptions of various technology and systems available for consideration, and opinion of cost.

PROJECT OBJECTIVES

The objective of replacing or upgrading the existing meters is to increase efficiency, convenience, and revenue to the City by migrating from the current meter system to a fully integrated system of new single space and multi-space smart meters. The key objectives of the project are to:

- Provide a system capable of integrating parking meter hardware/software with a variety of payment and enforcement options.
- Offer credit card acceptance capability;
- Increase parking meter revenue and provide a return on the City's investment;
- Minimize the disruption of the current operation as little as possible;
- Secure a long-term commitment to provide meter reporting, functionality, and connectivity at a predetermined cost; and
- Represent no up-front, out-of-pocket expense to the City for meters selected under the resulting Contract;

PURPOSE OF THIS DOCUMENT

This report is intended to provide an objective, non-biased description of available meters and options to better prepare the City in defining the type of system best suited for Memphis. In addition, the report provides a conceptual cost of various options and support issues needed to implement the new system.

DESCRIPTION OF THE METER SYSTEM

Walker contacted the City's Engineering Division, which has responsibility for the on-street parking meters, interviewed with the City, reviewed the City's proposed scope of work for this project, and developed this understanding of the City's needs for this project.

Our understanding is that the City has 1,210 existing single space parking meters, a majority of which are located on-street. The meters are located in the downtown area in the following locations:

1. Civic Center – N/S of Poplar to S/S of Adams, Front of E/S of 3rd
2. CBD North – S/O Adams to N/O Madison, Front to E/S of 3rd
3. CBD Central – N/S of Madison to S/S of Monroe, Front to E/S of 3rd
4. CBD South – S/O Monroe to N/S of Peabody Pl., Front to E/S of 3rd
5. Wagner Lot – Wagner Union to Beale
6. Medical Center North – N/S of Jefferson to S/S of Court, Dunlap to Pauline
7. Medical Center West – S/S Washington to Madison, Dunlap to E/S of Manassas
8. Medical Center South – S/O Union to Eastmoreland, Dunlap to E/S Dudley
9. Medical Center East – W/S Bellevue to W/S Dunlap, Madison to Union
10. Juvenile Court – Inspection Station – Washington & Adams, W/O High Orleans
11. Downtown North – N/S Jefferson to Exchange, E/O Third to Thomas
12. Downtown Central – S/O Jefferson to S/S Madison, E/O Third to Thomas
13. Downtown South – S/O Madison to S/S Peabody Pl., E/O Third to Thomas
14. Downtown N/O Poplar to N/S Jackson, Main to St. Jude
15. Downtown W/S Front to Riverside, N/S Court to Gayoso
16. Downtown S/S Peabody Pl. to Calhoun, W/S Front to E/S 3rd

Parking meter rates are \$1.00 an hour. Meters are a mix of electronic and mechanical, however, none accept credit or debit cards. Parking meters require payment and have restrictions on durations of stay from 8:00 a.m. to 6:00 p.m. on weekdays. The City's Engineering Division employs three full-time parking-enforcement officers who work until 4:30 p.m. on weekdays. On-street meter signage indicates that parking is free after 6:00 p.m. on weekdays and weekends.

The City's off-street parking assets are controlled by the Downtown Memphis Commission. This includes off-street rate setting. This organizational practice is expected to continue into the future.

All parking tickets are manually written, however, the City has plans to move to handheld electronic ticket writers. The City Court Clerk supplies the paper tickets and collect the money associated with parking citations. The Memphis Police Department and Engineering Division issue parking citations. The Police Department is responsible for vehicle towing. Parking citations income flows to the City's general fund.

Recent studies have been provided to the City administration. Previous proposals have been addressed to the City, identifying significant upside with the parking meter operation and encouraging the City to lease or monetize its parking meter operation. One proposal offered a \$10 to \$15 million

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upfront payment to the City. The City is planning to keep the parking meter operation in house and modernize to reap potential benefits.

EXPANDABILITY

The City is aware that more opportunities exist for the installation of additional parking meters or the creation of new meter zones in the future. The meter system must have the capability for expansion in the future following the replacement/upgrade of the existing meters and initial recommendations for new meters. However, to solicit comparable bids from vendors, it is recommended that all vendors use the same assumptions, and provide a method to refine the final number of spaces based on the vendor's final assessment and recommendation.

Guinea pig

ON-STREET PARKING ADMINISTRATION

Figure 1: City Government Organization and Oversight



Engineering Division

The Engineering Division is responsible for design, and inspection during construction of streets, bridges, storm drains, sanitary sewers, traffic control devices and City facilities. This division also provides installation and maintenance of signs and markings along streets and maintenance of traffic lights for the City and County municipalities. In addition, the City Engineer's Office coordinates major construction projects with the Tennessee Department of Transportation and provides review and approval of developer designed public improvements. The City Engineer's Office employs approximately 125 engineers, technicians and clerical employees.

Traffic Engineering

Traffic engineering is accomplished through the design, operation, and maintenance supervision services for all permanent and temporary traffic control devices within the public rights-of-way and by insuring that these devices are utilized in accordance with the appropriate city, state, and federal laws and standards. The Traffic Engineering service center was established to improve the safety and quality of life within the City of Memphis. This service center is also responsible for the City's parking meters, which is considering the replacement of mechanical on-street parking meters with newer electric meters.



OFF-STREET PARKING ADMINISTRATION

The DMC manages and operates public parking garages in the downtown through the Downtown Parking Authority (DPA). The Downtown Parking Authority is a joint commission consisting of members from both the City of Memphis and Shelby County. This Authority establishes parking policies and coordinates parking management. To accomplish this, the board:

- Assists with strategic planning for existing and future parking facilities in downtown Memphis
- Contracts with private parking companies for day-to-day operations
- Issues bonds for construction or acquisition of additional parking facilities
- Tracks rates and occupancies of other downtown parking lots and structures

The Downtown Memphis Commission (DMC), formerly known as the Center City Commission, is the organization charged with advancing Memphis and Shelby County. The DMC is an independent development agency that is not funded by City or County taxes. Citizens and property owners outside of Downtown do not contribute to the DMC's operations or incentives. The DMC is primarily funded by a special assessment on commercial properties in the Central Business Improvement District (CBID), the area referred to as Downtown Memphis, and fees paid by private Downtown developers.

The DMC:

- Supervises the Downtown Parking Authority (DPA).
- Administers the City's Downtown Sign Code and Design Guidelines.
- Installs and maintains Downtown wayfinding signs.
- The DMC is one of five affiliate boards.

To advance its mission, the DMC Board works alongside its four other affiliate boards – (1) Center City Development Corporation, (2) Center City Revenue Finance Corporation, (3) Design Review Board, and (4) Downtown Parking Authority.

These five organizations play different roles in pursuing the overall goal of advancing Memphis and Shelby County; and although each is a separate board, they share the same offices and staff.

ON-STREET PARKING ENFORCEMENT

Memphis on-street meter payment is enforced by Parking Enforcement Officers and Memphis police. City of Memphis police officers issue 3 different types of tickets, citation tickets, summons tickets, and ordinance tickets. Typically, parking infractions are enforced by issuing citation tickets.

A citation ticket is a parking ticket that should be paid within 15 days after issuance or placed on the court docket for a hearing. After the 15 day grace period, any vehicle that has 3 or more unpaid citation tickets issued against it is subject to impoundment until all the tickets are paid. City Court Clerk Thomas Long implemented the booting and towing system targeting people with unpaid parking tickets beginning in January, 2012.

DESCRIPTION OF THE STUDY AREA

The Study Area is defined for the purpose of this analysis as the geographical area generally bounded by Jackson Avenue to the north, Front Street to the west, Butler Street to the south and Danny Thomas Blvd. to the east, and extends to include isolated metered areas to the east. This area includes most of the Central Business District (“CBD”) of Memphis, plus areas near Le Bonheur Hospital, The University of Tennessee Health Science Center and Baptist Memorial Hospital. The following figure illustrates the general study area.

Figure 2: Study Area



Source: Walker Parking Consultants

MEMPHIS PROFILE

Memphis is the largest city in Tennessee, 3rd-largest city in the Southeast, and 20th largest city in the U.S. (Source: 2010 Census). The Memphis central business district (“CBD”) is the primary employment and economic center of Shelby County and the greater region. Regional population is approximately 1.3 million. Memphis is home to St. Jude Children’s Research Hospital and the FedEx World Hub. The following summary demographic information is provided by the Greater Memphis Chamber from US Census source data.

Table 1: Population, Memphis, TN - DMA

	1990 Census	2000 Census	2011 Estimate	2016 Projection	Percent Change	
					1990 to 2000	2011 to 2016
Total Population	662,093	649,951	604,558	613,269	-1.8%	1.4%
Population Density (Pop/Sq Mi)	2,333.0	2,290.2	2,130.2	2,160.9	-1.8%	1.4%
Total Households	251,551	250,640	232,735	233,254	-0.4%	0.2%

Source: Greater Memphis Chamber, 2012

The downtown Memphis CBD neighborhoods are delineated on the following map.

Figure 3: Memphis Downtown CBD Neighborhood Map



Source: The Downtown Memphis Commission (DMC)

The following demographics are published by the DMC.

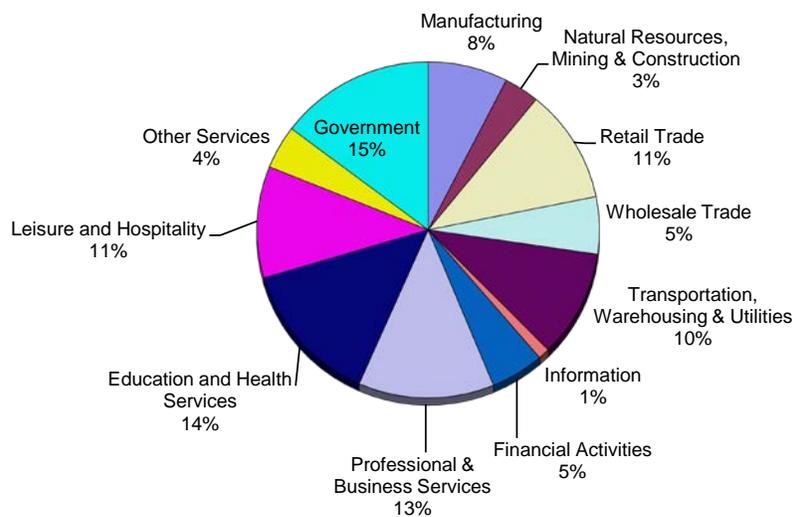
Table 2: Downtown Memphis Demographics

Downtown Residential Populations		Downtown Income Levels	
Residential Population	22,000	Avg. Household Income:	\$56,000
Households	10,700	Median Household Income:	\$27,300
Students	12,000	Per Capita Income:	\$32,500
Employees	73,300	Avg. Household Income:	\$56,000
Visitors	4,000,000	Median Household Income:	\$27,300
Downtown Educational Attainment		Downtown Apartment Occupancy	
Bachelor's degree:	19%		93%
Graduate degree:	18%	Downtown Office Vacancy Rate	22.6%
Retail Sales (Zip Code 38103)	\$238 million	Downtown Office Avg. Lease Rate	\$16.34/SF

Source: The Downtown Memphis Commission (DMC)

Sectors of particular interest to the Downtown include Leisure and Hospitality, Financial Activities, and Government.

Figure 4: Memphis Metro Area Employment by Industry, 2010



Source: The Downtown Memphis Commission (DMC)

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Table 3: Employment by Industry Sector

INDUSTRY SECTOR	2010	2009	% Change
Manufacturing	44,300	46,500	-4.7
Natural Resources, Mining & Construction	19,500	21,300	-8.5
Retail Trade	64,500	65,900	-2.1
Wholesale Trade	32,300	32,900	-1.8
Transportation, Warehousing & Utilities	60,700	61,900	-1.9
Information	6,400	6,800	-5.9
Financial Activities	29,600	30,800	-3.9
Professional & Business Services	75,500	76,100	-0.8
Education and Health Services	81,000	80,000	1.3
Leisure and Hospitality	63,100	66,300	-4.8
Other Services	24,500	24,900	-1.6
Government	86,500	87,700	-1.4
Total Non-Farm Employment:	587,700	601,100	-2.2

Source: Bureau of Labor Statistics, 2011, prepared By: Greater Memphis Chamber & Memphis Light, Gas & Water

A net loss of 13,400 jobs occurred during this period.



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The following excerpts from the Colliers International's 1st Quarter 2012 Memphis Office Market Report, which offers the following insights into the market.

While there are some signs that the Memphis Metro office market will finally stabilize, a number of short-term challenges continue to dampen the recovery.

Pinnacle Airlines' announcement of its Chapter 11 bankruptcy filing creates uncertainty for the CBD's One Commerce Square building.

The total Memphis office market ended Q4 2011 at approximately 33.5 million square feet, including 6.7 million in the CBD and almost 27 million square feet in suburban submarkets.

There were no deliveries and no buildings under construction in Q1 2012.

Total office vacancy rates increased from 14.6% at year-end 2011 to 15.5% as of the end of Q1 2012.

Absorption for Q1 was negative, at (53,738) square feet after ending 2011 with overall positive absorption of 152,955 square feet. Tenants moving in to large blocks of space in Q1 2012 included UBS Financial moving into 14,210 square feet at Triad Centre III, Sullivan Branding moving into 10,901 square feet at Toyota Center in the CBD.

The East submarket was the biggest contributor to the first quarter's negative absorption, with (43,013). This was the result primarily of Exel Logistics vacating 30,460 square feet. First Tennessee is looking to sublease 105,000 square feet at Lynnfield in the East submarket, which will further erode Class B rental rates. And companies continue to backfill existing space without adding new square footage.

There is, however, some good news. One of the more fundamental indications that we'll see stabilization soon is another drop in the unemployment rate, which is a full basis point lower than it was twelve months ago. Owners continue to exploit opportunities to maximize returns in a stagnant rate environment as evidenced by Highwoods' announcement of two new restaurants at the Crescent Center – Seasons 52 and Capital Grille. Also at the Crescent Center, FedEx has expanded by an additional 24,834 square feet, occupying the former Stanford Financial space. The FDIC's significant lease signing for 33,371 square feet at Lakecrest will create a loss at Clark Tower when they vacate that space in Q4 2012.

Softness in the CBD office market and limited catalysts for change have obvious implications for the CBD parking system.

Parking capacity, on-street and off street, appears adequate to support the CBD in the near term planning horizon of this study.

PARKING METER OPTIONS

The major requirement for the replacement or upgrade of meters is that the meters accept credit cards for the payment of parking fees. There are many manufacturers that provide multi-space meters and five that offer (or will offer) single space meters that accept credit cards. The following provides a brief description of the meter options.

SINGLE SPACE SMART METERS

Single-space meters are in use in Memphis today, with many meter housings reportedly in use for up to 35 years. On the plus side, these are simple to use and almost universally understood by the public. Innovations have brought electronic internal controls, credit card payment, smart card payment, and pay-by-phone payment options. On the negative side, the sheer volume of meters means more equipment to maintain and a labor intensive revenue collection process.

Single-space meters that accept credit cards are a relatively new product. IPS Group, Inc. ("IPS") is the only manufacturer with proven credit card accepting single space meter installations in the U.S. Three other manufacturers (Duncan, POM and MacKay) have recently developed and are testing meters with similar functionality, and multi-space meter manufacturer Cale recently unveiled a single-space credit card accepting meter.

The IPS solution is a meter upgrade instead of a meter replacement. IPS manufactures a direct replacement mechanism that fits on an existing single meter and into the existing housing (the installer removes the original top and mechanism and replaces it with the new mechanism). The meter features wireless cellular communication that links each meter to a centralized management system and provides real-time credit card authorization, meter occupancy status reporting, revenue tracking, and flexible remote rate change capabilities. The meters are solar powered and contain a rechargeable battery pack; no external power is required to operate the meter.

"Smart" Single-Space Meter



Figure 5: Single-Space Meters

Duncan Liberty



POM Parktel



IPS



MacKay Guardian Solo



Source: http://www.ehow.com/about_6655296_city-detroit-metered-parking-information.html
<http://www.dispatch.com/content/stories/local/2011/01/04/parking-you-can-charge-it.html>
<http://www.pom.com/ParktelCC.htm>
<http://www.mackaymeters.com/Products/SingleSpace/MacKayGuardianSOLO.aspx>

CONCEPTUAL COST OF SINGLE SPACE SMART METER

Costs for upgrading a single-space meter head with an IPS meter varies based on the quantity of units. The basic cost is approximately \$500 to \$550 per unit, assuming the existing equipment, including the pole and housing, can be re-used. On-going operating costs include a monthly fee of \$5.00 to \$6.00 per meter for IPS network connectivity and a \$0.13 per credit card transaction fee (not including the credit card vendor's interchange fees, which run about 6 to 15 percent of the transaction amount, depending on the amount charged and the volume). Consumable costs are limited to battery replacement, as the meter does not issue paper receipts.

ADVANTAGES OF SINGLE SPACE SMART METERS

- Built on the most familiar form of metered fee collection. The majority of patrons are familiar with the operations of single-space meters; little to no customer education is needed.
- Additional signage requirement is limited.
- Meters can be configured to accept coins or tokens, city smart cards, or credit cards for payment.
- Lower implementation cost than multi-space meters.
- Each machine covers one space, thus an out-of-service meter only impacts one space.
- Meters communicate with a central server. Communications can be configured to notify the parking operator when the coin vault is full and when a unit is out-of-service. This decreases the operational burden while increasing control.
- Rates can be changed from the central server, including adjusting rates for events or specific time periods.
- Retain existing operating procedures for bagging and reserving spaces.

DISADVANTAGES OF SINGLE SPACE SMART METERS

- Unused time remains on the meter when the vehicle leaves the space and is available at no cost to the next parker (a.k.a. "piggybacking").
- Limited maintenance cost savings due to the high number of units (one for each space).
- Besides meter head maintenance, the meter housing and poles require maintenance to straighten and secure.
- Some find the number of poles along the sidewalk less than aesthetically pleasing.
- No receipts are issued by the meter to the patron.
- No bill acceptance option.
- Ongoing monthly costs for on-line access and processing of credit card payments.

MULTI-SPACE METERS

The development of the multi-space meter (MSM) enhances metered parking as a viable option for controlling revenue from multiple spaces with fewer devices. For on-street applications, multi-space meters usually manage eight to twelve spaces. For surface lot or multi-level parking facility applications, a single multi-space meter can manage over one hundred parking spaces depending on the configuration and application.

Each meter is equipped with graphical and LED displays to instruct patrons; one or a combination of coin, token, banknote, credit card or smart card acceptors; a cashbox and/or bill vault to securely store money; and user interface buttons/keypad. The meters are computerized, which allows complex variable fee structures and promotes strong audit and enforcement trails.

A typical installation is networked, allowing transaction and revenue data to be consolidated to a central server and viewed remotely. This allows the owner to generate reports and other useful data necessary to manage the parking assets, including changing the rates and monitoring revenue.

Depending on the specific application and manufacturer, most multi-space meters can be configured for use in one of three modes of operation: *Pay and Display*, *Pay-by-Space*, or *Pay-by-License Plate*.

Aspen, Colorado was one of the first cities in North America to successfully implement pay-and-display parking in 1995.

This method has been successfully employed in areas that cannot normally be marked for parking, such as public beach parking areas on Sanibel Island, Florida.

Figure 6: Multi-Space Meter Face (Example)

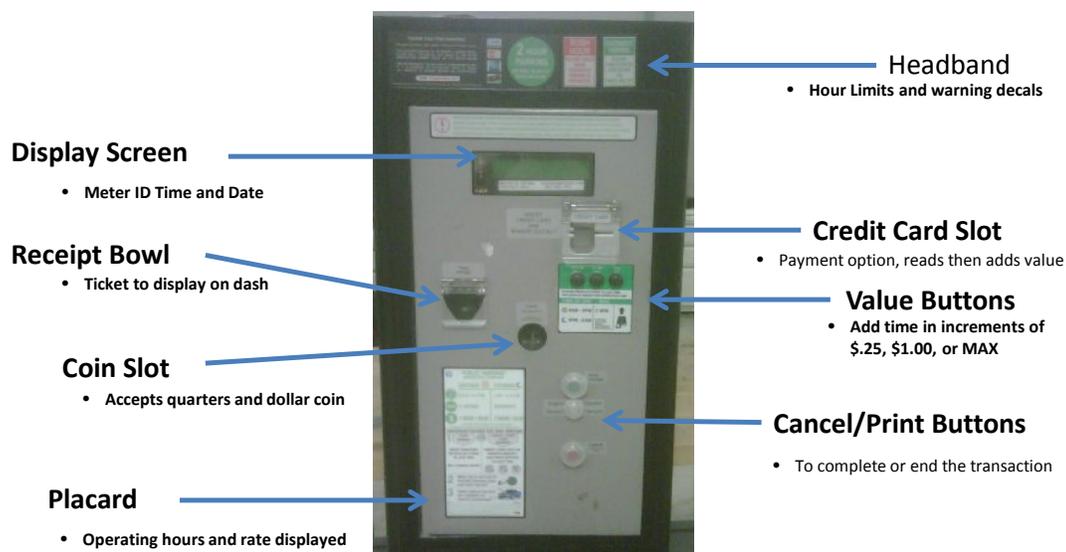


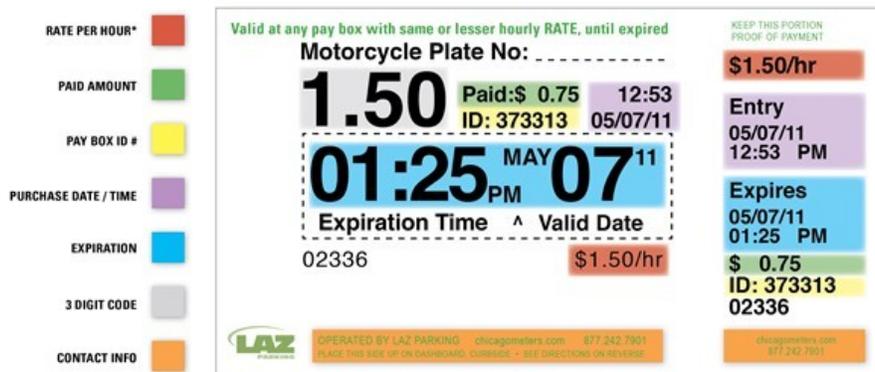


Figure 7: Multi-Space Meter Placard (Example)

Note: This is the general placard format. Other types of placards could display different rates, hours of operation, etc.



Figure 8: Multi-Space Meter Receipt (Example)



Source: CPM, City of Chicago

PAY AND DISPLAY

In pay and display mode, patrons park the vehicle, walk to the parking meter, pay a variable fee for a certain amount of time and receive a receipt. Somewhat less convenient for the patron than individual meters, in pay and display mode, the patron has to return to their vehicle to place the receipt on the dashboard. The receipt indicates the duration, location, machine number and end time for which the vehicle has paid for parking. The receipts are visually inspected during enforcement procedures, which has been found to take more effort and time as compared to the enforcement of other meter types.¹ Pay and display meters are typically used for on-street applications or areas that do not have defined parking spaces such as dirt, gravel, or sand-covered parking areas. *Pay and display* meters are not typically used in off-street parking applications with defined parking spaces.

Pay-and-Display Voucher



PAY-BY-SPACE

In *pay-by-space* mode, the patron is not required to return to the vehicle with a receipt. Instead each parking space is numbered. Patrons approach the parking meter, enter the parking space number in which their vehicle is parked, and select the amount of time desired. No receipt is needed for enforcement, but there can be a receipt for proof of transaction. Enforcement is done by viewing a web-based report of paid and/or unpaid spaces on a hand-held enforcement device or from any web-enabled computer. Some manufacturers have incorporated enforcement via a smart phone.

Pay-by-Space Signage in Tulsa, OK



Most pay-by-space applications offer the added convenience of allowing patrons to add parking time to the meter from another meter or through their phone for added convenience. *Pay-by-space* meters are typically used in off-street applications where spaces can be easily numbered using signs or surface paint; however, they are also gaining popularity for on-street applications due to the pay-by-phone option, no need for the customer to return to their car with the receipt, and their improved enforcement options.

¹ The Seattle Police Department reported the average enforcement time for a block face of single space meters went from an average of 2.6 minutes to 7.6 minutes when it changed to pay-and-display meters. Other cities have added bicycle enforcement squads to increase the efficiency of enforcement of pay-and-display units.



PAY BY LICENSE PLATE

In pay-by-license plate mode, the patron is not required to remember their parking space or return to their vehicle with a receipt. Instead, they enter their vehicle's license plate information, and select the amount of parking time. No receipt is required for enforcement, but there can be a receipt for proof of transaction. This system allows a patron to move their vehicle to another spot within the same meter zone without having to pay for parking again, provided there was time still remaining on the original purchase, and they were not in violation of the posted time restrictions. Enforcement is completed with a License Plate Recognition (LPR) system. Enforcement can be done with a vehicle mounted CCTV system that scans the license plates of all parked cars, or with a hand held unit, either scanning or manually entering the license plate. During the enforcement process, the officers can use an electronic ticket writer has the paid license plate data from the MSM. By entering the parked vehicle license plate information (or by using special cameras mounted on patrol vehicle to scan and read the data) into the enforcement handheld device, violators can be identified. Many applications also allow patrons to add parking time to the meter from another meter or by their phone for added convenience.

CONCEPTUAL COST OF MULTI-SPACE METER

Multi-space meter costs vary greatly depending on the options added to the unit. Some multi-space meters accept coins only while others take full advantage of credit card payment,, bill acceptance, and on-line credit card verification. Our opinion of cost varies from \$4,000 for a basic standalone unit that does not accept credit cards to \$14,000 for an on-line unit that accepts cash and credit cards. Prices vary based on volume, features, and manufacturer.

A typical unit can provide coverage for eight to twelve spaces per block face. A good rule of thumb is to plan on one unit per ten parking spaces; however this will be effected by fire hydrants, driveways and other interruptions in the parking layout. In addition to equipment costs, monthly connectivity fees from \$45.00 to \$60.00 per unit are required to maintain real-time wireless connectivity and to host the data. Maintenance costs include battery replacement and paper receipts. When credit cards are accepted, there are also credit card merchant fees. These fees typically include a flat charge per transaction of \$0.15 to \$0.20 plus 1.2 percent to 3.0 percent of the transaction amount. This makes credit cards acceptance virtually cost prohibitive for transactions under \$0.50.

ADVANTAGES OF MULTI-SPACE METERS

- Increased revenue (reported as between 10% to -40%) without increasing parking rates due to improved compliance, higher operability, alternative forms of payment, no piggy-backing, and parkers tend to purchase larger blocks of time when paying by credit card.
- Flexibility and user convenience. The machines can accept multiple forms of payment including credit/smart cards, coins and banknotes.

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- Fewer machines in the field, in addition to credit card transactions, will require fewer collections and less coin processing.
- Variable rate structures are available to encourage turnover of spaces and to discourage long-term parkers. Flat rates can also be set for event periods.
- Strong audit trail. Every transaction is tracked and reported. Multi-space systems provide a full range of revenue and statistical reports.
- Less maintenance needed. Fewer machines in the field require less maintenance and fewer spare parts.
- Meters communicate to a central server. Communications can be configured to maintenance when coin vaults are full or if units are out-of-service.
- In Pay & Display mode stall marking is not required. More cars may be able to fit on the street, depending on the size of the vehicles and how closely they park in relation to one another.

DISADVANTAGES OF MULTI-SPACE METERS

- Higher initial investment compared to single-space meters.
- Pay and Display units require the patron to return to their vehicle to place the receipt on the vehicle's dashboard. This issue is compounded for motorcycles, as the receipt is not secured; however 'sticky-back' and duplicate receipts are available.
- Pay-by-space or Pay-by-License Plate systems require patron to enter a space or plate number at the meter. Input errors or faulty memory can result in user frustration or fines.
- Requires additional customer education and supplemental signage. A marketing campaign is needed to promote, educate, and encourage acceptance of the new system.
- On-going monthly costs for on-line access, receipt paper, and processing of credit card payments.
- Operating procedures for reserving spaces is less convenient (there are no meters at every space for bagging).





PAYMENT OPTIONS

Several payment options are available for today's parking meters. As parking rates increase, payment with coins becomes impractical and/or inconvenient. Most meter manufacturers allow the City to pick which forms of payment are accepted. Typically, the more payment options selected, the higher the cost for the equipment. The following sections provide additional information on the payment options available.

COIN AND TOKEN PAYMENT

All the meters described accept standard coins for payment. As an option, a token program may be added to the meters. Tokens can be offered as a validation incentive from merchants to encourage repeat business. The city of Boulder, Colorado offers downtown merchants the opportunity to purchase parking tokens at a 20% discount. . Most merchants provide them to their customers free of charge as an incentive to return to their store.. As an added public relations benefit, the tokens can be embossed with a the City's logo.".

BANKNOTE PAYMENT

Adding banknote payments allows patrons to pay with paper currency in addition to coins. Most multi-space manufacturers offer this as an added option. Additional equipment (bank note acceptor, bank note vault, etc.) is required, as well as additional instructions for the patron. Even with this additional payment method, most manufacturers do not offer change. A parking patron inserting a \$5.00 bill for a \$3.00 parking charge will not receive any change.

In an outdoor environment bills will jam on a regular basis. The best manufacturers tout a 98% acceptance rate, meaning 2% of the time bills may jam. They're easily removed by maintenance staff, but it requires a trip to the machine. Adding to the operational costs are the fees to update the note acceptor whenever currency is updated.

Our opinion of cost for adding a typical banknote acceptor to a multi-space unit is \$1,500 to \$2,500 per unit.

CREDIT CARD PAYMENT

Paying for parking with a credit card has increased in popularity as more cities have increased parking rates and installed multi-space meters. Credit card acceptance is an essential component to meter installations where the rate exceeds \$1.00 per hour. As a result, most multi-space meter manufacturers provide credit card acceptance as a standard feature. Multi-space meters that do not accept credit cards usually can be upgraded in the future to allow for credit cards.

The processing fees for credit cards are a function of the volume, rate, and type of meter. A comparison of three major credit card processing centers found that the cost to process a \$1.50 transaction at a multi-space meter ranged from \$0.17 to \$0.23 per transaction. When the



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transaction is increased to \$3.00, the fee only increases an average of \$0.02, or to a range of \$0.19 to \$0.25 per transaction. The fees for processing credit cards at single space IPS meters are the same as for multi-space meters, plus an additional \$0.13 per transaction charged by IPS. These processing fees can be significant considering the number meters and potential credit card use.

In addition to customer convenience and increased revenue, credit card acceptance benefits the parking system by reducing the amount of coinage in the meters. This can reduce labor hours allocated for collecting, counting, and transferring the coins to the bank.

SMART CARD

Smart cards allow for the payment of parking through a pre-paid stored value memory card with an embedded micro-chip, similar to a credit card. The card is pre-loaded with a dollar value, and when inserted into the parking meter, the parking fee is deducted from the card. Most cards can be replenished either at the meter, at a re-loading station or via the internet. In many cities, the smart cards can be used for multiple purchases, most commonly for parking and transit.

According to the *Smart Card Alliance*, implementation of a smart card program can be challenging, as the acceptance of credit cards significantly diminish the need for a smart card. Many cities record percent usage rates in single-digits.

Advantages of smart cards include:

- Improved customer service (another way to pay for parking).
- Increased revenues due to more people paying, purchasing larger blocks of time, and losing the pre-paid card prior to using the full value.
- Increased operational efficiency.
- Avoidance of credit card fees.
- Stronger internal controls and security.
- Expanded strategic marketing opportunities such as discounted rates and loyalty programs
- Most single-space manufacturers can accept smart cards..

Disadvantages of smart cards include:

- City needs to administer the smart card program.
- Smart cards are proprietary single-application cards that do not have the more universal adoption and appeal of a credit card. Reloading value to the card can be inconvenient.
- Adoption rates are generally low.

LIST OF METER MANUFACTURERS

APARC Systems (Siemens)

Multi-Space Meters
San Francisco, CA (U.S. Office)

www.aparcsystems.com
info@aparcsystems.com



Cale Parking System USA, Inc.

Multi-Space Meters
Tampa, FL

www.caleparkingusa.com
rbonardi@caleparkingusa.com



Digital Payment Technologies

Multi-Space Meters
Burnaby, BC

www.digitalpaytech.com
info@digitalpaytech.com



Duncan Solutions, Inc.

Single space and multi-space meters.
Milwaukee, Wisconsin

www.duncansolutions.com
jkennedy@duncansolutions.com



Hectronic USA Corp.

Multi-space meters.
Chesapeake Diego, VA

www.hectronic.com
steve.snyder@hectronic.com



MEMPHIS PARKING METERS

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IPS Group, Inc.

Single space meters that accept credit cards.
San Diego, CA

www.ipsgroupinc.com
info@ipsgroupinc.com



Mackay Meters, Inc.

Single space and multi-space meters.
New Glasgow, NS

www.mackaymeters.com
sales@mackaymeters.com



Metric Parking

Multi-space Meters
Mount Laurel, NJ

www.metricparking.com



Parkeon

Multi-Space Meters
Dennis Charlton, 800.732.6868 x 327
Moorestown, NJ

www.parkeon.com
ussales@parkeon.com



POM

Single space meters; can accept credit cards as an option.
Russellville, AR

www.pom.com
aadkison@pom.com



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VenTek International

Single space meters; can accept credit cards as an option.
Petaluma, CA

www.ventek-intl.com
sales@ventek-intl.com



SYSTEM ENHANCEMENT TECHNOLOGY

Additional services and technology can be added to the system to enhance both productivity and the overall customer experience. Some examples of add-on technology include the following.

PAY-BY-PHONE

Technology improvements in the phone industry extend to the parking industry. By utilizing one of several vendors providing this service, a patron can use their phone as a payment method.

Here's how pay-by-phone works:

1. The pay-by-phone vendor sets up an account with the City, identifying all parking spaces and/or zones.
2. Motorists register their cellphones and provide credit card payment information for the pay-by-phone vendor via their phone.
3. Upon parking, the motorist calls the pay-by-phone vendor's automated payment line.
4. The motorist enters the appropriate location codes for the City, zone, meter number, space number, etc., or enters their license plate. The motorist enters the desired parking time.
5. The pay-by-phone vendor charges a convenience fee, typically .35 cents per transaction.
6. Enforcement is done by viewing a web-based report of paid transactions provided by the pay-by-phone vendor.
7. The pay-by-phone vendor deposits the parking fees into the City's established bank account, keeping the convenience fees.

Most vendors allow adding time before the parking session expires, and will send a text message to the phone with time expiration notification. When the parker returns to the vehicle, they may either allow the session to run until time expires, or call the same number to stop the parking session, and



pay for time parked only. The time limits are similar to the meter (parkers are unable to extend time beyond the legal time limits).

Benefits of the phone option to customers:

- No need to worry about coin availability.
- Receive a text message when parking time is about to expire.
- Extend parking remotely (within the allowable maximum time limit).
- Pay for time parked only (in selected locations) by stopping a parking session manually.
- Simple and user friendly.
- View/maintain parking transactions online.

Benefits of the phone option to the City:

- Pay-by-Phone parking can be implemented quickly, for minimal cost and with minimal infrastructure.
- Increased revenue due to more people paying and buying larger blocks of time.
- Lower operating costs due to reduced cash handling
- Real time statistics.
- Greater convenience, which leads to greater customer/voter satisfaction.
- Event parking, entertainment venues and sports facility parking can be handled by the system.
- Supports green initiatives and flexible rate models.
- Promotes image of modern innovative city or administration.

Many cities are extensively and successfully using payment by phone. This system is judged to work best with pay-by-space or pay by license plate systems, but will work with other systems.

Pay-by-phone adds another layer of enforcement when used in conjunction with parking meters, as the enforcement officer needs to view a web based report of paid vehicles in addition to checking the meter reports. Some vendors are now integrating their software systems to enable the customer to view combined payment data on one report. The following list is a sample of the pay-by-phone vendors. This list is not exhaustive.

- ParkMobile..... <http://us.parkmobile.com/>
- Verrus..... <http://www.verrus.com/verrus/index.aspx>
- ParkNow! <http://parknow.us/>
- PayByPhone..... <http://paybyphone.com/>
- QP <https://qpme.com/home>

The market leader is ParkMobile, followed by Verrus and ParkNow!.



REAL TIME ENFORCEMENT HANDHELDS

Enforcement handheld devices that have two-way communications, allow the officer to receive data directly from the multi-space meter ("MSM"), space sensors, and other software peripherals such as back-end citation management and motor vehicle checks. All citation information can be sent in real time from the handheld to the courts and is available immediately as opposed to a batch mode process². This is both a customer service and enforcement enhancement feature. Customers wishing to immediately dispute citations at the court will find their records already there. PEOs are able to work more efficiently because all violation data on handhelds is in real time.



Sample Enforcement Device

SENSORS

The option to add parking space sensors to each parking space is on the cutting edge of parking management. The use of parking space sensor technology allows the monitoring of each space 24 hours a day, 365 days a year, and provides the live information necessary to help policy makers make the best decisions on time restrictions and pricing. This technology also offers the added benefit of increasing the overall efficiency of the parking enforcement staff by directing them to a potential violator. Recent study of the sensors in Los Angeles indicated that this technology increased the average citation volume by nearly 2.6 times the previous average.³



Streetline Parking Sensor

Some vehicle sensor systems require the installation of routers and other wireless infrastructure on City street poles, traffic light poles and other utility poles. A single space meter manufacturer offers an integrated sensor installed in the street below each space. The following is the price range provided by the manufacturer.

Table 4: Sensors – Cost of Ownership

Costs	Integrated
Capital Cost per Sensor	\$250
Operating Costs, Wireless Fees, and Data Management System	\$3.75-\$6.25 per space per month
Additional wireless hardware to be installed on City street poles?	NO

Source: IPS Group, Inc.

² Enforcement handhelds that do not communicate in real time store all citation information in the device, and download it to the server at the end of the officers' shift.

³ A recent study in Los Angeles indicates the volume of citations in the study area increased 2.6 times the previous average with the use of sensors when compared to the same area without the use of sensors.

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IN-CAR METER OPTION

In car meters are similar to smart cards; however they act like pay & display receipts. Motorists purchase the device and load a dollar amount on it. Upon parking, the user activates the meter to pay for their parking and to show that parking is paid. Upon returning to the car the user shuts off the meter. In-car meters compliment pay and display systems well, as they provide an alternative to walking to and from the meter. This is also an excellent option for frequent on-street parkers such as delivery vehicles; However in-car meters have not really caught on. The public appears to prefer pay-by-phone as a meter alternative.



METER SIGNAGE

Signage is a key component of multi-space meter installations. Walker recommends following the Manual on Uniform Traffic Control Devices for Streets and Highways (“MUTCD”), 2009 Edition for any added signage.

Section 2B.46 Parking, Standing, and Stopping Signs of the MUTCD cover signs governing vehicle parking, stopping, and standing. MUTCD specifically states *“If a fee is charged for parking and a midblock pay station is used instead of individual parking meters for each parking space, pay parking signs should be used. Pay Parking signs should be used to define the area where the pay station parking applies. Pay Station signs should be used at the pay station or to direct road users to the pay station.”*

Examples of recommended signage are provided below and to the right with their MUTCD figure number. The examples to the right would be placed to direct patrons to the meter. Hours would be adjusted to the approved Memphis time limits.

The examples that follow would be placed at the actual meter facing both traffic directions.



R7-21



R7-21a



R7-20



R7-22

The City of Chicago initiated a slightly different signage standard in conjunction with their concession agreement with CPM/LAZ.

- o Every block should have at least 3 signs.
 - o Two end limits and a pay to park sign.
 - o Only exception would be “Signs Only” blocks (Two end limits).

- o 3 types of signs.
 - o End Limit – Defines the parking area (arrow)
 - o Pay To Park – Identifies the location of the box
 - o Mid-Block – Reminder sign that the block is a paid parking area

Examples of each type are shown below.

Figure 9: Typical Chicago Parking Meter Signs



Source: CPM, Chicago

CLOSURES AND SPECIAL SIGNAGE

Temporary closures of street parking are required by construction, street cleaning, dumpsters, and special events (parades, street fairs, etc.).

- The city can retain existing operating procedures for bagging and reserving single-space meters.
- Multi-space meters can be programmed to not accept payments: but will require signage at the meter and may also require additional temporary signs, cones or light barricades along block faces. Examples of signs at multi-space meters is shown.

Figure 10: Multi-space Meter Closure Signs



Source: City of Chicago

Loading zones, taxi stands, and designated accessible parking zones affect meter operations and require special signage.

Figure 11: Special Parking Zone Signs



Source: City of Chicago

SUMMARY OF METER OPTIONS

Walker recommends that the City deploy a hybrid of multi-space meters and single-space smart meters.

Multi-space smart meters are recommended for those block faces that have an economically viable number of contiguous spaces, with the intent to maintain a system-wide density standard of approximately 7 to 10 on-street spaces per multi-space meter. The “pay and display” option is preferred due to objections to numbering spaces for pay by space operation, but pricing for pay by space could be requested of bidders as an alternate.

Single-space smart meters are recommended for those on-street metered spaces that do not meet the density standard, are geographically isolated, separated by physical streetscape elements (driveways, curb cuts, loading zones, etc.), or located on streets with grades that do not meet accessibility standards.

Walker recommends that all on-street meters accept coin and credit cards for payment. Accepting banknotes will add considerable expense and maintenance to the system, and with credit card acceptance, is not necessary. Multi-space meters issue receipts, single-space smart meters do not.

We recommend that a pay-by-phone option be considered. Pay-by-phone adds convenience and benefits for both the motorist and the City at minimal cost. Smart cards are not recommended as this technology has been superseded by the acceptance of credit cards. The City should survey the retail community to determine if tokens are desired and would be utilized.

ON-STREET METER ANALYSIS

PARKING SUPPLY

This study identified 1,237 on-street, metered public parking spaces in the study area through physical inventory and occupancy data collection conducted by Walker from May 24 to May 27, 2012. These counts were supplemented by data provided by the City and other sources. Breakdowns of these spaces by zone and by neighborhood are summarized in the following tables.

Table 5: Current Inventory – Single Space Meters (SSMs)

Meter Zone	Current SSMs
Zone 1	70
Zone 2	106
Zone 3	51
Zone 4	94
Zone 5	48
Zone 6	22
Zone 7	98
Zone 8	98
Zone 9	49
Zone 10	75
Zone 11	120
Zone 12	69
Zone 13	96
Zone 14	108
Zone 15	41
Zone 16	92
Total	1,237

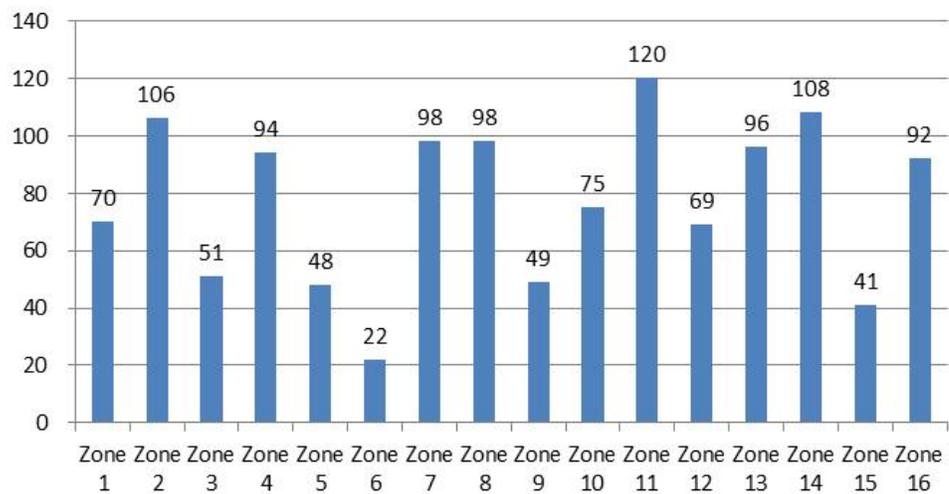
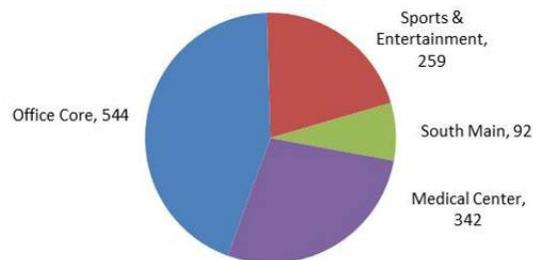


Table 6: Current Inventory by Neighborhood

Office Core	544
Sports & Entertainment	259
South Main	92
Medical Center	342
Total	1,237



Source: Walker Parking Consultants, 2012

A map delineating the parking meter zones is shown on the following page.

MEMPHIS PARKING METERS

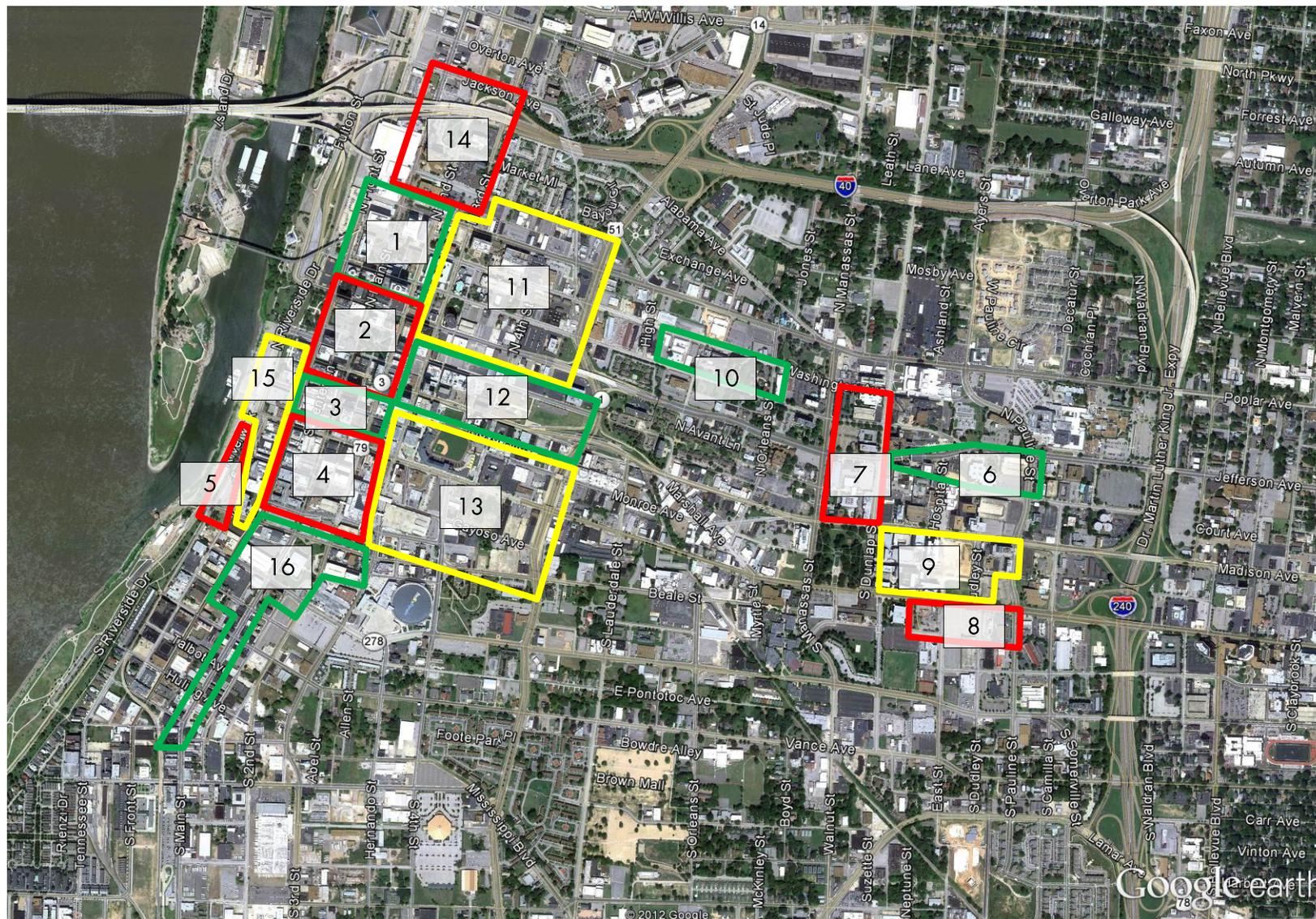
PARKING CONSULTING SERVICES



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Figure 12: Meter Zones



MISSING METERS

According to an independent study the City commissioned in 2011, about one in 12 meters were reported to be missing heads or heads and poles, with some blocks missing as many as 40 percent of their meters. The City provided an inventory of parking meters conducted in December 2011, which showed that 194 meters (15.4%) were missing.



Since that time, a number of meters have been replaced. Walker's data collected May 24 to 26, 2012 show that 106 meters (8.6%) were missing.

The numbers of missing meters documented by the City in December 2011 and by Walker in May 2012 are listed by zone in the following table.

Table 7: Missing Meters

Meter Zone	Current SSMs	Missing Dec-2011	%	Missing May-2012	%
Zone 1	70	7	10%	4	6%
Zone 2	106	19	18%	10	9%
Zone 3	51	6	12%	3	6%
Zone 4	94	12	13%	6	6%
Zone 5	48	4	8%	2	4%
Zone 6	22	2	9%	1	5%
Zone 7	98	2	2%	1	1%
Zone 8	98	32	33%	17	17%
Zone 9	49	4	8%	1	2%
Zone 10	75	23	31%	13	17%
Zone 11	120	14	12%	8	7%
Zone 12	69	12	17%	7	10%
Zone 13	96	21	22%	14	15%
Zone 14	108	11	10%	6	6%
Zone 15	41	7	17%	4	10%
Zone 16	92	18	20%	9	10%
Totals	1,237	194		106	
% of Current Spaces		15.7%		8.6%	

Source: Walker Parking Consultants, 2012

This situation is significantly improved since December 2011, and will be remedied by anticipated installation of the new meter system.

OCCUPANCY

Walker collected occupancy data for each meter zone. Walker may or may not have observed peak occupancy for many blocks. Beal Street, hotels, and downtown athletic facilities did not appear to be heavily patronized during the observation period. Some spaces are not well marked and some meters are missing, resulting in counts that may be subjective, and might be different if all meters were available. The peak counts provided are judged to be reasonably representative of a typical busy day. Peak weekday and evening counts are summarized by zone in the following table.

Table 8: Occupancy

Meter Zone	Current SSMs	Peak Occ. Weekday	Peak Occ. % Weekday	Peak Occ. Evening	Peak Occ. % Evening
Zone 1	70	68	97%	43	61%
Zone 2	106	103	97%	77	73%
Zone 3	51	49	96%	39	76%
Zone 4	94	90	96%	79	84%
Zone 5	48	45	94%	23	48%
Zone 6	22	21	95%	14	64%
Zone 7	98	90	92%	60	61%
Zone 8	98	71	72%	23	23%
Zone 9	49	25	51%	12	24%
Zone 10	75	22	29%	na	na
Zone 11	120	98	82%	65	54%
Zone 12	69	59	86%	30	43%
Zone 13	96	99	103%	74	77%
Zone 14	108	87	81%	71	66%
Zone 15	41	38	93%	31	76%
Zone 16	92	73	79%	38	41%
Totals	1,237	1,038		679	
% of Current Spaces			84%		58%

Source: Walker Parking Consultants, 2012

Occupancies vary significantly by zone, time of day, day of the week, month season, and by special events. Occupancy of greater than 100% is judged to occur when cars are parked in loading zones and spaces that should or could be metered, but are not.

On-street metered spaces are heavily utilized, averaging 84% during the weekday and 58% in the evening during these observations. Zones 1, 2, 3, 4, 5 and 13 exceeded 95%, which is generally perceived as maximum occupancy as significant hunting is required to find the last remaining spaces.

NEW METER OPPORTUNITIES

During data collection, Walker identified opportunities to change the number of metered spaces. Opportunities are considered within the following parameters.

- Spaces on blocks that are already metered.
- New blocks that appear to be utilized and are in or adjacent to metered areas.
- Meters on blocks that are not occupied are not recommended for replacement. Consideration should be given to removal.

The recommended changes, including replacement, additions and removals, are summarized in the following table.

Table 9: Recommended Metered Space Opportunities

Street	Location	Current SSMs	Proposed New Add	Proposed Metered Sp	Comments
Adams	Main to Second				
	North	0	3	3	
	South	4	5	9	
	Orleans to Manassas N				
	North	0	15	15	Housing Authority.
	South	0	12	12	Housing Authority.
Bishop G.E. Pat	East of Main S				
	West	0	10	10	Separated by Mulberry St.
	East	0		0	
	West of Main				
	North	0	10	10	Separated spaces.
Court	Fourth to Danny Thomas				
	North	6	25	31	Thomas Building.
	South	0	21	21	School Zone.
Dudley S	Madison to Monroe				
	West	0	19	19	Cars parked at construction project.
	East	6	2	8	
	Union to Eastmoreland				
	West	22	(22)	0	No demand pending redevelopment
	East	17	(17)	0	
Dunlap S	Poplar to				
		0	18	18	
		0	18	18	
Exchange	Lauderdale to Danny Thomas				
	North	0	8	8	Cars parked.
	South	0	12	12	
Fourth N	West	7	1	8	
	East	9	1	10	
Front S	Linden to Pontotoc				
	West	4		4	
	East	8	3	11	
Goyoso	Front to Main				
	North	0		0	
	South	0	8	8	(per Ken)
	Main to Second				
	North	0	7	7	
	South	2	4	6	
	To Wagner	0	10	10	On a hill (No MSM).
Jackson	Third to Lauderdale				
	West	6	(6)	0	No demand.
	East	5	(5)	0	No demand.
Jefferson	Main to Second				
	North	4		4	
	South	5	2	7	

Recommended Metered Space Opportunities (Continued)

Street	Location	Current SSMs	Proposed New Add	Proposed Metered Sp	Comments
Linden	Front to Main				
	North	11		11	
	South	9	1	10	Separated spaces.
	Wagner to Front				
Madison	North		6	6	
	South		5	5	
	Front to Main				
	North	5		5	
Main S	South	5	2	7	Add in front of hotel at S. Main
	Second to Third				
	North		5	5	At Regions Bank.
	South		2	2	At the Brass Door.
Manassas	Linden to Pontotoc				
	West	10		10	
	East	0	4	4	In blister.
	Pontotoc to Vance				
	West	7	2	9	
	East	5	7	12	
	Vance to Talbot				
	West	0	10	10	Cars parked in unrestricted spaces.
	East	7	5	12	
	Talbot to Huling				
Manassas	West	0	8	8	
	East	10	3	13	Separated spaces.
	Huling to Nettleton				
	West	6	2	8	
Manassas	East	0	7	7	
	at Forest Park				
	West	0	16	16	recount
Monroe	East	0	16	16	
	Fourth to Danny Thomas				
	North	12	6	18	Near AutoZone Park.
Monroe	South	10	6	16	Near AutoZone Park.
	At Goyoso	0	6	6	Across from lot.
Third S	Washington				
	Fourth to Danny Thomas				
	North	11		11	Separated
Washington	South	0	2	2	Other spaces for police only.

Source: Walker Parking Consultants, 2012

PROPOSED DISTRIBUTION OF MULTI-SPACE AND SINGLE-SPACE METERS

Walker analyzed two scenarios for the distribution of multi-space and single-space meters.

“As Is” scenario is based on the assumption that multi-space meters are installed on blocks in a manner that achieves an average coverage of about 8 spaces per meter, within a range of from 6 to 11 as appears reasonable. The range is determined by the layout of driveways, fire hydrants, loading zones, etc. that increase the length that the motorist needs to walk to and from the meter. Our goal was to maintain a maximum walking distance of 100 feet or five parking spaces. The remainder of spaces are allocated as single-space meters on existing poles.

“Proposed” scenario is based on the addition of the recommended metered space opportunities as detailed in the previous table.

The following table summarizes the distribution of multi-space and single-space meters in each scenario.

Table 10: Proposed Distribution of Multi-Space and Single-Space Meters

Meter Zone	Current SSMs	"As Is"		Proposed New Add'l.	Proposed Metered Sp	"Proposed"	
		MSMs	SSMs w/CC			MSMs	SSMs w/CC
Zone 1	70	7	15	8	78	8	14
Zone 2	106	8	61	2	108	3	85
Zone 3	51	1	44	9	60	1	53
Zone 4	94	10	28	19	113	6	61
Zone 5	48	4	3	21	69	4	21
Zone 6	22	3	0	0	22	3	0
Zone 7	98	12	16	59	157	20	16
Zone 8	98	7	11	(39)	59	4	27
Zone 9	49	3	28	57	106	12	8
Zone 10	75	9	0	0	75	9	0
Zone 11	120	9	50	22	142	12	52
Zone 12	69	9	6	48	117	14	12
Zone 13	96	7	36	21	117	7	54
Zone 14	108	8	26	(11)	97	8	26
Zone 15	41	5	3	0	41	5	3
Zone 16	92	10	17	69	161	16	30
Totals	1,237	112	344	285	1,522	132	462
Increase						20	118
% of Current Spaces				23.0%		17.9%	34.3%
Spaces per MSM		7.97				8.03	

Source: Walker Parking Consultants, 2012

The recommended new metered space opportunities add 285± metered spaces, or 23% to the on-street system, which increases capacity from the current 1,237 spaces to 1,522 spaces.

The recommended number of multi-space meters increases from 112 in the “as is” scenario to 132 meters in the “proposed” scenario. The additional 20 MSM meters is an 18% increase.

The recommended number of single-space meters increases from 344 in the “as is” scenario to 462 meters in the “proposed” scenario. The additional 118 SSM meters is a 34% increase.

An overall average ratio of approximately 8 spaces per multi-space meter is maintained. Blocks with isolated spaces and slopes that restrict accessibility are limited to only single-space meters.

**CONCEPTUAL COST ANALYSIS**

The first step in the cost analysis is to estimate the quantities and types of meters required, based on the desired system. The current meter system consists of 1,237 on-street parking spaces. In a typical on-street configuration, one multi-space meter will service 7 to 11 spaces. Single-space smart-meters are a one-for-one swap, so the number of meters remains the same for spaces that are determined to not be favorable for multi-space meters.

Per our discussions with the City, Walker understands that a hybrid system of multi-space meters and single-space meters with credit card acceptance will be implemented. While multi-space meters cost more to purchase and install than single-space meters with credit card acceptance, multi-space meters are more economical throughout the life of the system. Single-space meter manufacturers charge additional credit card transaction fees (in addition to the merchant fees charged by credit card providers). Over the useful life of the meters, these fees will exceed the initial purchase and implementation costs of multi-space meters. Multi-space meters are also less expensive to maintain, based on the reduced number of meters (fewer meters to collect and maintain).

Walker generally recommends multi-space meters in layouts that will enable the multi-space meter to service six or more spaces, and single-space meters for groups of five or less spaces.

Based on Walker's analysis, the "as is" on-street parking system (as currently demarked), would require 344 single space smart-meters and 112 multi-space meters.

The "prospective" on-street metered parking system space would add 285 new meter space opportunities recommended by Walker, increasing the total number to 1,522 metered spaces, requiring 462 single-space smart-meters and 132 multi-space meters.

The following table summarizes the estimated number of meters.

Table 11: Scenario Projections

Scenario	Spaces	Single-Space Smart Meters	Multi-Space Meters
"As Is"	1,237	344	112
"Prospective"	1,522	462	132

Source: Meter Inventory and Walker Parking Consultants

This projection is based on a cursory overview of specific blocks or groups of spaces. Further analysis of each zone and each block face may be required to determine the precise number of meters needed, as well as the opportunity for the installation of additional meters or the creation of new meter zones in the future.

METER COST

Costs of the new meters will vary based on the type of meters selected and payment options selected for the system.

Our review of multi-space meters finds a price range of \$7,000 to \$9,000 per solar powered, pay and display multi-space meter accepting coins and credit cards, for the quantities expected. For this analysis, we use \$8,000 per meter. Actual prices may be higher or lower, depending on the manufacturer and features selected.

Single space meters have been easier to price, as there has only been one vendor providing these meters, but several other manufacturers have recently announced the availability of single-space meters with credit card acceptance. For this analysis we will use IPS pricing, which is approximately \$550 per meter.

CONSUMABLES

On-going operating costs are a consideration. Depending on the system, there are monthly fees per meter for connectivity, credit card processing fees, paper receipts, and replacement batteries. This does not include on-going maintenance fees.

Our assumptions are based on 3.5 transactions per day per meter, six days per week, with two of the transactions paid by credit card.

Battery life is based on a three-year expected life. Signage is also included as a line item, assuming two signs for each multi-space meter and two signs per 50 single-space meters to promote the acceptance of credit cards.

Using these assumptions, we modeled the costs of two systems.

The following tables provide a breakdown of expenses for each scenario.



Table 12: Meter Scenario Cost Analysis

Scenario 1: "As Is" Spaces		Scenario 2: "Proposed" Spaces	
On-Street Spaces	1,237	On-Street Spaces	1,522
Off-Street Spaces	0	Off-Street Spaces	0
Total Spaces:	1,237	Total Spaces:	1,522
Number of MSM:	112	Number of MSM:	132
Number of SSM:	344	Number of SSM:	462
Total Meters:	456	Total Meters:	594
Spaces per On-Street MSM ¹	7.97	Spaces per On-Street MSM ¹	8.03
Spaces per On-Street SSM	1.0	Spaces per On-Street SSM	1.0
Total Signs:	238	Total Signs:	282
Cost per MSM	\$ 8,000	Cost per MSM	\$ 8,000
Cost per SSM	\$ 550	Cost per SSM	\$ 550
Base Cost for Meters	\$ 1,085,000	Base Cost for Meters	\$ 1,310,000
Spare Parts ²	\$ 54,000	Spare Parts ²	\$ 66,000
Site Prep and Installation ³	\$ 63,000	Site Prep and Installation ³	\$ 75,000
Cost for Signage ⁴	\$ 14,000	Cost for Signage ⁴	\$ 17,000
Total Installed Cost:⁵	\$ 1,216,000	Total Installed Cost:⁵	\$ 1,468,000
<i>Consumables</i>		<i>Consumables</i>	
Annual Service Fee ⁶	\$ 92,000	Annual Service Fee ⁶	\$ 112,000
Receipt Paper ⁷	\$ 9,000	Receipt Paper ⁷	\$ 11,000
Battery Replacement ⁸	\$ 9,000	Battery Replacement ⁸	\$ 11,000
CC Processing Fee ⁹	\$ 111,000	CC Processing Fee ⁹	\$ 136,000
SSM Vendor Addl. CC Fee ¹⁰	\$ 20,000	SSM Vendor Addl. CC Fee ¹⁰	\$ 27,000
Total Consumables	\$ 241,000	Total Consumables	\$ 297,000

Assumptions:

- ¹ Each MSM to cover 7 to 11 on-street spaces.
- ² Spare parts projected at 5% of base cost.
- ³ Site prep per MSM projected at \$500; per installation SSM projected at \$20.
- ⁴ Signage based on 2 signs per MSM; 2 sign per 50 SSMs; cost of \$60 each.
- ⁵ Figures rounded to the nearest \$1,000.
- ⁶ Monthly connection fee per MSM projected at \$50; per SSM projected at \$6.
- ⁷ Receipt paper based on 3.5 transactions/space per day ÷ 3,500 receipts per roll x \$35/roll; SSM do not issue receipts.
- ⁸ Battery based on 3-year life at \$120 per MSM; \$40 per SSM.
- ⁹ Credit card processing fee based on \$0.20 per cc transaction; assume 1.5 cc trans/day/meter.
- ¹⁰ Credit card vendor fee charged only for SSM transactions at \$0.13 per transaction, assuming 1.5 cc transactions/day/meter.

Source: Walker Parking Consultants



AMORTIZED COST OF METERS

Using the opinion of installed cost, potential annual payments are estimated using assumed terms and financing rate. The expected functional life of the equipment before replacement is roughly ten years. At this time the equipment should still function; however, technology will have evolved and maintenance costs will increase as components are more likely to fail. However, the City’s charter does not allow leases to exceed five years. To show various options, the following table shows terms from three to ten years for each option, assuming an interest rate of six percent (6.0%).

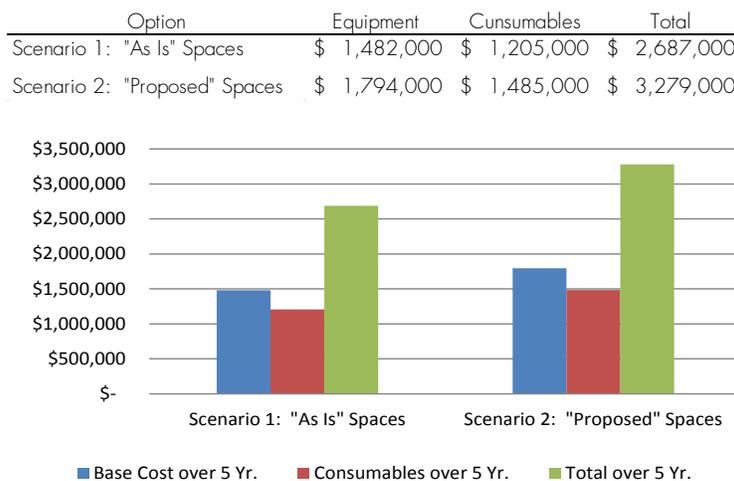
Table 13: Amortized Cost Table

Scenario 1: "As Is" Spaces				Scenario 2: "Proposed" Spaces			
Cost	Years	Rate	Payment	Cost	Years	Rate	Payment
\$ 1,216,000	3	6.00%	\$455,000	\$ 1,468,000	3	6.00%	\$549,000
\$ 1,216,000	4	6.00%	\$351,000	\$ 1,468,000	4	6.00%	\$424,000
\$ 1,216,000	5	6.00%	\$289,000	\$ 1,468,000	5	6.00%	\$348,000
\$ 1,216,000	6	6.00%	\$247,000	\$ 1,468,000	6	6.00%	\$299,000
\$ 1,216,000	7	6.00%	\$218,000	\$ 1,468,000	7	6.00%	\$263,000
\$ 1,216,000	8	6.00%	\$196,000	\$ 1,468,000	8	6.00%	\$236,000
\$ 1,216,000	9	6.00%	\$179,000	\$ 1,468,000	9	6.00%	\$216,000
\$ 1,216,000	10	6.00%	\$165,000	\$ 1,468,000	10	6.00%	\$199,000

Source: Walker Parking Consultants

The following figure illustrates the cost of each option assuming a five year amortization for equipment at 6.0% interest plus five years of consumables.

Figure 13: Comparison of Projected Costs over 5 Years



Source: Walker Parking Consultants

In each scenario, cost is impacted more by the cost of the installed equipment than by consumables.

PARKING METER MARKET RATES

On-street parking meter rates were adjusted city-wide in 2011 from \$0.75 per hour to \$1.00 per hour. The maximum parking time allowed varies by location, and includes 10-minute loading zones, 30-minute, 60-minute, two (2) hour and four (4) hour meters. Walker surveyed the following 14 cities to assess market rates. This list is not exhaustive, but is judged to provide a reasonable indication of market rate for Memphis.

Table 14: On-Street Meter Rates of Comparable Cities

City	Core CBD On-Street Meter Rate/Hour	Neighborhood/Transitional Meter Rate/Hour
Baltimore, MD	\$2.00	\$0.75
Cincinnati, OH	\$2.00	\$0.50
Pittsburgh, PA	\$2.00	\$0.50
Washington, DC	\$2.00	\$0.50
Indianapolis, IN	\$1.50	\$1.00
Nashville, NT	\$1.50	\$1.00
New Orleans, LA	\$1.50	\$1.00
Denver, CO	\$1.00	\$1.00
Cleveland, OH	\$1.00	\$1.00
Kansas City, MO	\$1.00	\$1.00
St. Louis, MO	\$1.00	\$1.00
Louisville, KY	\$1.00	\$0.75
Charlotte, NC	\$1.00	\$0.50
Columbus, OH	\$1.00	\$0.40
Mean	\$1.39	\$0.78

Source: Walker Parking Consultants, July 2012

Walker recommends that on-street parking meter rates be increased to reflect the relative value of the most valued parking opportunity desired by the customer. These rates should be consistent within zones, and not vary from block face to block face, or in proximity to one specific generator. In addition to rate, many municipalities also restrict parking durations by zone, with the shortest times imposed in the most congested areas, and longer durations allowed in more peripheral areas.

The current rate of \$1.00 per hour is less than the mean of the comparables (\$1.39 per hour). The maximum rate among comparables is \$2.00 per hour. The minimum rate among the comparables is \$1.00 per hour. The Standard Deviation among these comparables is \$0.45. Thus, one standard deviation above the mean would be \$1.84 per hour.

From our analysis, it appears reasonable to consider increases in the hourly CBD parking rates to achieve at least \$1.50 in the near-term five-year projection period and increase to \$2.00 per hour in the CBD over the year five to year ten projection period for those sub-areas that exceed 85% occupancy. It is also judged to be reasonable to hold sub-areas with lower occupancies and transitional areas to \$1.00/hr. over the initial projection period, which is more consistent with the mean of the comparable neighborhood rates, and re-analyze this rate in the future.

**MARKETING INITIATIVES**

A reasonable use of specific parking marketing initiatives may be productively applied toward supporting the meter district and the downtown as a whole. A representative list of such initiatives, including a short description of each, is presented as follows:

1. **Establishment of an enhanced parking website and parking information program.** An on-street parking website should be linked with City government and local websites, as well as other local and national city guides. The municipal parking website should provide accurate and timely data of parking availability, rates and maps. A website may also be used to conduct an online interactive survey of the perceptions and concerns of citizens and stakeholders. The cost of such a web site may be shared with off-street municipal and private parking operators, or provided as a service to the entire market. Set-up cost is estimated at \$10,000 to \$20,000, or more, depending on the complexity of the site and number of pages. Parking web pages are shown in the following list.

Table 15: Examples of Municipal Parking Web Pages

Lincoln, NE	www.downtownlincoln.org
Oklahoma City, OK	www.okc.gov
Univ. of Minnesota	www1.umn.edu/pts/
Pittsburgh, PA	www.city.pittsburgh.pa.us/pghparkingauthority/
Miami, FL	www.miamiparking.com
Springfield, MA	www.parkspa.com
Baltimore, MD	www.ci.baltimore.md.us/government/parking
Hartford, CT	www.hartfordparking.com
Norfolk, VA	www.norfolk.va.us/parking
Cedar Rapids, IA	www.crbus-parking.org/
Boise, ID	www.cityofboise.org/customer_and_support_services/parking_control/default.asp
Kalamazoo, MI	www.central-city.net/parking.php
Houston, TX	www.downtownstreets.com

2. **Parking Guide:** Design, publish, and distribute a downtown parking guide, including a downtown parking map and brochure describing the locations and availability of on-street an off-street parking, simplicity of access, rules and fees for parking for errand, short-term, and employee parking patrons. The cost to establish this program is estimated at \$20,000 to \$50,000.



PUBLIC RELATIONS PLAN

Upgrading or replacing the parking meters is a major investment that must be effectively communicated to the public to ensure its acceptance and success. A strong public relations plan is imperative to the successful implementation of the new meters.

Walker recommends the City engage a professional public relations firm to assist in implementing a creative and successful launch of the new meter program. It would also be beneficial to the City to discuss strategies of successful implementation with vendors during the interview process. Our comments are meant to supplement the professional public relations firm's efforts and do not present a final plan or actual material to be used in the communications efforts.

COMMUNICATIONS ACTIVITIES

Based on other cities' experience and successful installations of new meter systems, the following list provides examples of communications activities prior, during, and after installation:

- Six to three months prior to installing the new equipment, issue press release announcing plans for new system, with a focus on the positives of added customer convenience.
- Conduct community outreach meetings with the stakeholders in advance of the meter change.
- Deploy a website with project updates, meter directions, and an electronic survey form.
- Display "sample" meters in a public area for people to see, touch, and feel prior to beginning the installation.
- Develop and provide informational and instructional handouts (card and/or fliers) throughout the CBD and on the website, illustrating how to use the new meters.
- Develop a directional video for municipal television and or YouTube.
- Issue a progress press release a few weeks prior to the initial installation.
- Install meters and signage with covers with "Coming Soon" signage so that patrons can see where the new equipment is installed.
- Conduct a ribbon cutting and first use ceremony to officially welcome the new meters.
- Post trained parking ambassadors around the new meters to assist patrons with their use.
- Start the deployment of meters slowly so that any issues can be identified early and quickly as opposed to a mass-installation where the maximum number of meters are replaced at one time. Installation can proceed on a quicker pace once any initial issues are corrected.

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- Issue a press release of the deployment of the new meters and areas scheduled for deployment.
- Rotate ambassadors to new areas as meters are deployed.
- Provide citation warning, rather than fines, for a short period of time following meter deployment.

SUMMARY OF PUBLIC RELATIONS RECOMMENDATIONS

Press releases and public awareness campaigns are key factors to a successful implementation program. Website and printed material focusing on how the meters work has proven to be effective, as have survey's to collect feedback from patrons. The focus should be on the added convenience of the credit card payment feature, and enforcement officers should go through training to assist patrons as the new meters are deployed to avoid a negative public reaction to the new meters.

STATEMENT OF LIMITING CONDITIONS

This report and conclusions are subject to the following limiting conditions:

1. This report is based on some assumptions that are outside the control of Walker Parking Consultants/Engineers, Inc. ("Walker") and/or our client. Therefore, Walker does not guarantee the results.
2. The results and conclusions presented in this report may be dependent on future assumptions regarding the local, national, or international economy. These assumptions and resultant conclusions may be invalid in the event of war, terrorism, economic recession, rationing, or other events that may cause a significant change in economic conditions.
3. Walker assumes no responsibility for any events or circumstances that take place or change subsequent to the date of our field inspections.
4. All information, estimates, and opinions obtained from parties not employed by Walker, are assumed to be accurate. We assume no liability resulting from information presented by the client or client's representatives, or received from third-party sources.
5. This report is to be used in whole and not in part. None of the contents of this report may be reproduced or disseminated in any form for external use by anyone other than our client without our written permission.
6. The projections presented in the analysis assume responsible ownership and competent management. Any departure from this assumption may have a negative impact on the conclusions.
7. Computer models that use and generate precise numbers generate some of the figures and conclusions presented in this report. The use of seemingly exact numbers is not intended to suggest a level of accuracy that may not exist. A reasonable margin of error may be assumed regarding most numerical conclusions. Conversely, some numbers are rounded and as a result some conclusions may be subject to small rounding errors.
8. This report was prepared by Walker Parking Consultants/Engineers, Inc. All opinions, recommendations, and conclusions expressed during the course of this assignment are rendered by the staff of Walker Parking Consultants as employees, rather than as individuals.
9. This report presents some conceptual financial information that is intended to provide an order-of-magnitude assessment of parking expenses and relative costs. This report is not to be used for financing purposes.



APPENDIX A

RESIDENTIAL PERMIT PARKING PROGRAM

RESIDENTIAL PERMIT PARKING PROGRAM

The City does not presently have a residential permit parking program.

Neighborhood permit parking programs are primarily focused on the following issues.

1. On-street parking spaces in neighborhood commercial districts may be highly occupied and not available to residents at peak demand.
2. Residential parking is generally not controlled. Installing parking meters could tend to incentivize parkers to use uncontrolled on-street curbside spaces in adjoining residential neighborhoods to avoid payment.
3. Residential on-street parking permit systems are gaining traction as an acceptable solution.

On-street parking is often a critical parking resource despite the limited capacity it can provide. Some street lanes have intentionally been designed to provide on-street parking in addition to moving traffic. However, on-street parking is not solely adequate for even the smallest commercial areas. Generally, the goals of management of on-street parking relate to controlling who parks where, for how long, and preventing spillover parking into adjacent neighborhoods.

On-street parking management strategies include adding or removing spaces, changing the permitted time limit, restricting parking to certain times or users, and designating some on-street spaces for preferential handicapped parking, and carpool parking. On-street parking affects traffic movement on arterial streets critical for through-traffic, and conflicts over use of curb space for bus stops and deliveries can be a significant issue. Prohibiting parking in peak hours may provide a compromise between peak hour traffic needs and convenient parking for storefront businesses. It is important to review on-street parking restrictions for real need rather than habit.

For many residential neighborhoods, a residential permit parking (RPP) program is among the more common strategies for controlling the problem. Where the spillover is almost entirely employee or student parking, the on-street spaces may be restricted to one- or two-hour parking or a residential permit holder. The restrictions may only apply during certain hours of likely conflict, such as 8:00 a.m. to 6:00 p.m. Area residents pay a modest fee for a residential permit that allows a vehicle to be parked on the street. A time limit allows short visits by service vehicles and guests of the residents. Longer stays require the parker to obtain a RPP visitor pass card from the resident and return to place it in the vehicle. In other cases, the time limit does not work well.

To manage spillover by a particular class of parkers (such as students, tourists, employees, or visitors to a destination lacking adequate parking), all users may be required to display a permit. The environment of the residential neighborhood is not only enhanced by the reduction of nonresident parking, but also by the reduction of vehicular traffic resulting from hunting for a parking space.

A valid approach may be for the City to take the initiative with respect to residential parking management. The increasing spillover of public parking into residential areas may have already generated some resistance and ultimately will drive residents to demand solutions.

The following assumptions are made with regard to managing neighborhood parking issues:

1. Residential parking control may be inevitable.
2. Residential parking control may be desirable in order to support public parking goals.
3. Neighborhood permitting is becoming better known.
4. Many models of neighborhood parking permit systems are available to parking-issue activists.
5. The city has the choice or opportunity to be proactive or reactive.

To support existing and proposed new land uses and to mitigate the impact of spillover on adjacent neighborhoods from meter improvements, it will be necessary to more intensively manage on-street parking. Walker recommends that Memphis take the initiative through the following steps:

1. Memphis should offer and manage a neighborhood permit system to those neighborhoods or blocks where over 50% of residents are willing to vote to impose this solution on themselves.
2. Permit revenue should be returned to the neighborhood in tangible and highly visible ways.
3. Sales of permits should be limited by local demand, area, street, block, etc.
4. Some neighborhood permits should be available to be sold to institutional or commercial parkers.
5. On-street parking locations should be assigned by zone, and well designated by appropriate signage and highly visible curb indicators.

BEST PRACTICES – NEIGHBORHOOD PERMIT PROGRAMS

What are residential parking programs and why are they an issue?

Residential parking programs have been established in various cities across the U.S. The goal of these programs is to make more parking spaces available to residents and to discourage long-term parking by people who do not live in the respective neighborhoods. Residential parking programs are needed to restrict access by non-residents to street parking. The presence of non-resident vehicles parked in neighborhoods may increase noise and air pollution and create unsafe traffic conditions. Residential parking zones seem to be most commonly found in university communities, tourist and resort communities such as beach and ski towns, locations near major transit hubs such as ferries or other mass transit stops, and residential areas near major employers, including businesses, hospitals or major institutions.



Residential parking programs limit on-street parking by non-residents.

Residential parking programs limit on-street parking by non-residents.

NASHVILLE, TN

PROGRAM DESCRIPTION:

To apply for a residential parking permit, Metro Public Works requires an application process that includes a petition from all residents desiring a permit. The petition should include each resident's name, address and telephone number. The petition must be submitted to Metro Public Works.

ADMINISTRATIVE BODY:

Metro Public Works, Traffic and Parking Division, 750 S. 5th St., Nashville, TN

COST:

A permit is issued once the completed application and \$10 annual permit fee is received by Public Works.

LINKS:

<http://www.nashville.gov/pw/parking/permits.asp>

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BOSTON, MA**PROGRAM DESCRIPTION:**

Boston residents may participate in a Resident Permit Parking Program (RPP) and request the restrictions that they feel will accommodate the parking needs of their respective neighborhoods. Residents must submit a notification to City Hall requesting that the Commissioner of the Boston Transportation Department (BTD) participate in an informational community meeting consisting of residents of the surrounding streets in the RPP area. After evaluating advantages and disadvantages of the RPP program explained in the meeting, residents are then asked to make an informed decision regarding the applicability of the RPP program to their needs. If the community decides to move forward with the action, each street within the RPP area must submit at least 50% of residents' signatures to be considered for the RPP program. After the petitions are collected, a BTD representative may perform a license plate inventory to determine if vehicles parked in the proposed area are registered from outside of the neighborhood. If deemed appropriate, the BTD will implement the RPP program in the designated area and will inform residents of the appropriate time limitations for parking. (Note: Submission of petitions does not guarantee approval).



Parking permits in Boston are neighborhood specific.

ADMINISTRATIVE BODY:

A representative of the BTD manages and administers the process.

PROOF OF RESIDENCY REQUIREMENTS:

A resident must provide vehicle registration and a second proof of residency. Previous parking tickets must be paid in order to receive a residential parking permit.

COST:

The permit program is free of cost to residents. Permits can only be renewed 4 – 6 weeks prior to expiration.

ENFORCEMENT:

An unmarked vehicle parked in a residential permit vehicle is subject to a \$40 ticket. A \$13 fine is issued if the ticket is not paid within 21 days of the violation.

OTHER FEATURES:

Residential permit parkers cannot park on the street in the event of a snow emergency. Parking is banned on alternating sides of the street during street cleaning. All vehicles in violation of street cleaning regulations will be towed.

LINKS:

http://www.cityofboston.gov/transportation/res_perm_park.asp

<http://www.bumc.bu.edu/Dept/Content.aspx?DepartmentID=375&PageID=6901>

<http://boston.about.com/cs/livinginthecity/ht/ResidentParking.htm>



CHICAGO, IL

PROGRAM DESCRIPTION:

A community must be classified by specific conditions in order to receive a Residential Permit Parking (RPP) designation. The street(s) under consideration must be zoned within R1 and R5. A traffic survey must be conducted to confirm that 45% of existing vehicles on the proposed street are not owned by the residents. If an ordinance is passed, the Chicago Department of Transportation posts signs restricting use to residential vehicles during specific dates and times.



The RPP program in Chicago is designed to ensure that residents in densely populated areas have access to parking near their residences.

ADMINISTRATIVE BODY:

The Chicago City Council manages and administers the process.

PROOF OF RESIDENCY REQUIREMENTS:

A resident must provide vehicle registration and a second proof of residency, i.e. driver's license, utility bill, voter registration, etc. Previous parking tickets must be paid in order to receive a residential parking permit.

COST:

The current fee for the permit program is \$25 per resident. All residential permits expire on June 30. One-day visitor parking permits may be purchased from the Alderman's office and are available for \$5 for a pack of 15 passes. The passes are valid for 24 hours from the time of posting.

ENFORCEMENT:

An unmarked vehicle parked in a residential permit vehicle is subject to a \$50 ticket.

OTHER FEATURES:

Licensed, not-for-profit organizations qualify to acquire visitor parking permits to park in the adjacent Residential Permit Parking Zone if the organization is located within the Residential Permit Parking Zone or on either side of a business or commercial block immediately adjacent to the zone. This provision applies only in those wards where the Alderman has introduced and passed a not-for-profit Permit Parking Ordinance.

LINK:

http://www.chicityclerk.com/residential_parking/

<http://www.lincolnparkchamber.com/residents/parkingpermits.cfm>

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DENVER, CO

PROGRAM DESCRIPTION:

A residential parking permit exempts the resident's vehicle from posted on-street parking time limit restrictions at the street of residence. The limit on vehicles for any household is one vehicle for each licensed driver of the household, plus one vehicle for household use. Permits are valid for three years and do not allow you to park in violation of parking meters, loading zones, no parking anytime zones, 72-hour parking rules, street sweeping restrictions, or any other restrictive parking ordinances.

ADMINISTRATIVE BODY:

The Parking Cashier's Office for the City of Denver administers the process.

PROOF OF RESIDENCY REQUIREMENTS:

In order to be eligible for the permit, the applicant's name and address should match the information of the current vehicle registration and utility, phone or cable bill.

COST:

The permit program is free of cost to neighbors.

ENFORCEMENT:

An unmarked vehicle parked in a residential permit vehicle is subject to a \$20 ticket.

LINK:

http://www.denvergov.org/Parking_Management/374faq368.asp#link4



Residential permit parking is an integral part of the Denver Municipal Zoning Plan.

LOS ANGELES, CA

PROGRAM DESCRIPTION:

Los Angeles offers three types of residential parking permits: annual, visitor, and guest.

- Annual: An annual permit is the primary permit and attaches to the bumper of the vehicle. Each household is limited to three annual permits. An annual permit assigned to the vehicle allows parking anywhere within a specified district within Los Angeles.
- Visitor: Two visitor permits per year may be purchased by an annual permit holder. A visitor permit is valid for a period of four months. Visitor permits are only valid on the same block as the registered annual permit.



- Guest: An annual permit holder may purchase an unlimited number of one-day guest permits. Guest permits are purchased for a particular day and are valid until 6:00 am the following morning.

First time purchasers of a residential permit must obtain permit at a public service location in Los Angeles.

ADMINISTRATIVE BODY:

The Los Angeles Department of Transportation (LADOT) manages and administers the process.

PROOF OF RESIDENCY REQUIREMENTS:

A resident must provide vehicle registration and a second proof of residency, i.e. driver's license, utility bill, voter registration, etc. Previous parking tickets must be paid in order to receive a residential parking permit.

COST:

The current fee for an annual permit is \$15. Visitor permits are available for \$10 per permit. The current fee for a guest permit is \$1.00.

ENFORCEMENT:

An unmarked vehicle parked in a residential permit vehicle is subject to a \$50 ticket.

LINK:

<http://www.lacity-parking.org/laopm/permit.htm>

MIAMI BEACH, FL

PROGRAM DESCRIPTION:

The City of Miami Beach established six residential parking zones with varying rates associated with each neighborhood within each zone. The zone on a vehicle permit must match the zone on the residential parking sign. Decals are issued through an application process and must be permanently affixed to the front windshield, lower corner, or driver's side window. Visitor passes are for short term visitors and cannot be replaced.



ADMINISTRATIVE BODY:

The City of Miami Beach Parking Department manages and administers the process.

PROOF OF RESIDENCY REQUIREMENTS:

A resident must provide vehicle registration and a second proof of residency, i.e. driver's license, utility bill, voter registration, etc. Previous parking tickets must be paid in order to receive a residential parking permit.

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COST:

Varying rates, which reflect market conditions, are applied to each neighborhood within each zone.

ENFORCEMENT:

An unmarked vehicle parked in a residential permit vehicle is subject to towing or impoundment. Failure to display visitor passes may lead to enforcement action, up to and including impoundment.

LINK:

<http://www.miamibeachfl.gov/newcity/library/forms.asp#parking>

<http://www.miamibeachfl.gov/newcity/depts/parking/index.asp>

PHILADELPHIA, PA

PROGRAM DESCRIPTION:

A vehicle that displays a Pennsylvania license plate and that is registered to a home address within the areas permit parking district is eligible for a residential parking permit. Permits are restricted to on-street use only in the district number (27 districts) for which the permit is issued.

ADMINISTRATIVE BODY:

The Pittsburgh Parking Authority (PPA) manages and administers the process.

PROOF OF RESIDENCY REQUIREMENTS:

The PPA must be provided with the driver's license and a lease or a recent utility bill in the vehicle operator's name.

COST:

Permits cost \$35 per vehicle for the first year and \$20 for annual renewal. Visitor permits are available for \$15 for fifteen days.

LINK:

http://www.philapark.org/permits/residential_permit.aspx

PORTLAND, OR

PROGRAM DESCRIPTION:

The City of Portland divides the region into Parking Zones A – L, based on neighborhood location.

ADMINISTRATIVE BODY:

The Parking Control Department at the Bureau of Transportation System Management administers the applications.

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PROOF OF RESIDENCY REQUIREMENTS:

All applicants must provide one of the following proofs of residence: bank statement, credit card bill, or rental agreement.

COST:

A decal is issued at a rate of \$32 for the permit year. Single-day scratch off permits may be purchased in books at a cost of \$3/book. Each book contains ten permits and a maximum of 5 books per permit year may be issued.

LINK:

<http://www.portlandonline.com/transportation/index.cfm?c=39277>

SAN DIEGO, CA**PROGRAM DESCRIPTION:**

The City of San Diego is currently divided into areas A, B, D, E and F. The areas were formed after neighborhoods participated in a permit petition process. To establish a permit district, residents in a neighborhood must circulate a petition and receive signatures of at least 50% of residents in the affected area. Upon returning the petition to the Traffic Engineering Division, a parking survey will be conducted to evaluate the impact of commuter parking in the neighborhood. If the survey indicates that a residential permit parking district should be established, a noticed public hearing will be held. Final decisions are made by the City Council and the entire process to establish a residential permit parking district will take approximately one year.

Areas that are impacted by heavy demand for on-street parking by residents are not candidates for residential permit parking. The Residential permit program is intended to serve those areas that are affected by all-day commuter parking generated by a nearby facility or institution.

ADMINISTRATIVE BODY:

The Traffic Engineering Division manages the process.

PROOF OF RESIDENCY REQUIREMENTS:

A valid driver's license and California vehicle registration is required, even if it does not reflect a qualifying address. A proof of residency is required if the vehicle registration or driver's license does not reflect the qualifying address. Proof of residency documents include: current utility bill, property deed, tax bill, closing statement or rental/lease agreement.

COST:

A permit is issued in the form of a vehicle decal that must be affixed to the rear bumper or outside the rear windshield. The cost of each permit is \$14.00 and is reduced to \$7.00 for each permit during the last six months of the permit year. Temporary permits are valid for two weeks and can be purchased for \$3.50. There is a limit of one visitor placard, free of charge, per qualifying address.



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The permit is valid only when displayed within the same block as noted on the placard. Commercial properties are not eligible for a visitor placard.

ENFORCEMENT:

An unmarked vehicle in violation is subject to a \$40 ticket. Any vehicle parked in the same space for over 72 hours is subject to impoundment.

LINK:

<http://www.sandiego.gov/parkingmanagement/respermit/index.shtml>

SAN FRANCISCO, CA**PROGRAM DESCRIPTION:**

There are currently 27 separate residential permit areas in the City of San Francisco. Neighborhoods interested in receiving a residential permit designation must participate in a Residential Permit Process (RPP). In order to establish a permit area, the proposed blocks must contain at least one mile of street frontage and be contiguous to each other. A petition signed by at least 250 households in the proposed area is needed by the Traffic Engineering Division (TED). At least 50% of the vehicles parked in the proposed block must be non-resident vehicles and at least 80% of the legal on-street parking spaces in the proposed block must be occupied during the day. TED reviews the documentation submitted by the area and conducts a field study for the area. If approved, the legislation and sign installation process takes approximately six months.

The City issues four types of parking permits: annual residential, temporary, visitor/rental and business. An *annual residential* is for individuals with permanent residence addresses on blocks posted with RPP regulations. *Temporary permits* are for residents who have recently moved into an RPP area and have an updated vehicle registration. *Visitor/Rental* car permits may be purchased by an individual with a permanent residence. *Commercial business* owners within an RPP area may acquire a business permit.

ADMINISTRATIVE BODY:

TED conducts the field study and the Interdepartmental Staff Committee on Traffic and Transportation (ISCOTT) reviews the findings.

PROOF OF RESIDENCY REQUIREMENTS:

The following requirements are needed for each type of permit:

- Annual Residential – copy of California vehicle registration and an additional proof of residency (i.e. utility bill, current rental document, bank statement, etc.)
- Temporary – same as annual residential
- Visitor/Rental – same as annual residential
- Business – copy of current commercial lease, business tax registration certificate, copy of current vehicle registration



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COST:

The following costs are associated with each type of permit:

- Annual Residential – No more than four permits can be issued to the same address. Permits are \$60 each for a full year and \$30 if area expires in less than 6 months.
- Temporary – Permits are \$20 per week (up to 4 weeks) and \$40 for four weeks (maximum). For new or used vehicles without plates, \$60 is required for a 90 day temporary permit.
- Visitor/Rental – Permits may be purchased by annual residential holders at \$20 for 2 weeks, \$30 for 4 weeks, \$40 for six weeks, and \$50 for eight weeks.
- Business – Only one permit can be issued to each commercial business address at a rate of \$60 for a full year and \$30 if the area expires in less than six months.

OTHER FEATURES:

Caregivers, company vehicles, carpools and vanpools, contractors, fire stations, foreign consulates, military personnel, students, teachers and temporary visitors to the City may contact the DPT to inquire about parking permits. Permits for these uses require proof of additional certifications and/or documentations.

LINK:

http://www.sfgov.org/site/dpt_index.asp?id=13442

SAN JOSE, CA**PROGRAM DESCRIPTION:**

The City of San Jose has established the following guidelines for evaluation of a potential residential permit parking (RPP) program:

- The area is primarily residential
- Majority of residences are owner occupied
- Permit area is sufficient in size to eliminate rather than relocate the problem
- Peak on-street occupancy is at least 75%
- At least 50% of peak occupancy are non-resident parkers

There are five types of parking permits: resident, employee, guest, single-use, and special use. One residential permit is issued per currently registered vehicle. A maximum of two guest permits per address can be issued. A single-use permit may only be used for a maximum of 14 days and a special use permit is only valid for a maximum of 90 days.

Case Study: In Fall 2001, the College Park Neighborhood Association (CPNA) conducted a preliminary petition process out of growing concerns with parking congestion associated with Bellarmine Preparatory College (Bellarmine) in San Jose. Of the 239 surveyed households, 64% supported permit parking; well above the 50% +1 listed in the RPP program criteria. Based upon the results of the petition process, CPNA proposed two distinct permit zones. In March 2002, DOT staff facilitated a neighborhood meeting to explain the rules of the permit program. Coordination has continued between Bellarmine and the neighborhood.



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ADMINISTRATIVE BODY:

The San Jose Department of Transportation administers the applications.

PROOF OF RESIDENCY REQUIREMENTS:

Vehicle registration and either a telephone bill, property tax bill or rental contract are needed.

COST:

Permits in the RPP program are \$30 each. A \$25 fee per special-use permit may apply in certain cases.

ENFORCEMENT:

The minimum citation for a permit parking violation is \$51. Any vehicle in a spot for more than 72 hours may be subject to towing.

OTHER FEATURES:

Discounted parking spaces are available to downtown residents at specific parking garages. The Downtown Residential Parking Program provides a discounted monthly rate of \$50 for qualified downtown residents.

LINK:

http://www.sanjoseca.gov/transportation/permits_parking.htm

http://www.sanjoseca.gov/clerk/agenda/10_01_02docs/10_01_02_2.10.htm

http://www.sjdowntownparking.com/downtown_parking.php

SEATTLE, WA**PROGRAM DESCRIPTION:**

The Residential Parking Zone (RPZ) Program was created to ease parking congestion in residential neighborhoods. The purpose of the program is to discourage long-term use by non-residents. Eligibility for an RPZ permit is restricted to residents living on those blocks where a RPZ is established.

An RPZ program can be initiated if 75% of on-street spaces are in use for at least eight hours, with at least 25% of those spaces used by non-local vehicles, all in an area of at least five contiguous blocks. Existing demand generators must be identified, i.e. an event, institution, etc. If a residential area believes that they meet the qualifications, the following steps must be followed:

- Neighborhood will send a letter to Seattle Department of Transportation (SDOT) describing the parking problem
- SDOT will perform an assessment of RPZ feasibility upon receipt of letter
- SDOT will perform a parking study if a RPZ is deemed appropriate for the area



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- SDOT will take community action, i.e. distribute petition forms, if neighborhood wishes to proceed with project
- SDOT will install signs and begin issuing permits after the 3rd month of petitioning

ADMINISTRATIVE BODY:

SDOT facilitates the RPZ Program process.

PROOF OF RESIDENCY REQUIREMENTS:

A copy of current Washington State vehicle registration is necessary. Out-of-state registration is only accepted for military personnel or out-of-state students providing proof of non-resident status. A bill, bank statement, lease or rental agreement, rent receipt, or any properly dated business document is also needed for proof of residency.

COST:

As of June 2004, the cost of a permit is \$35 and is valid for the permit cycle, either one or two years. Guest passes obtained with a residential permit can be purchased for \$15. Guest passes sold separately cost \$35 each. Business owners and non-residents are not eligible for parking permits within an RPZ.

ENFORCEMENT:

Any vehicles parking over 72 hours are subject to a \$35 ticket. Unmarked vehicles in a residential area are subject to a \$44 ticket. Any vehicle is towed after four tickets.

LINK:

<http://www.ci.seattle.wa.us/transportation/parking/parkingrpz.htm>

WASHINGTON, D.C.

PROGRAM DESCRIPTION:

Permanent residents are eligible for a permit if their street is within specified Residential Parking Permit (RPP) zones. RPP zones are established when over 51% of households on a block request a parking limit in locations with RPP signs. Residents with permits are exempt from the parking restriction. The permit allows parking within any block in the same zone of the RPP included in the RPP program, an interested block must pick up petition forms at the Transportation (DCDOT).



RPP zones in Washington, D.C. are established only when over 51% of households on a block request an RPP program.

ADMINISTRATIVE BODY:

DCDOT administers the process.

PROOF OF RESIDENCY REQUIREMENTS:

Issuance of residential parking permits requires a valid DC vehicle registration card and a valid DC driver's license or valid DC Non-Driver's ID card. Proof of residency in the form of a utility bill,

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telephone bill, deed, homeowner's insurance policy, unexpired lease agreement or DC property tax bill is also required. Temporary permits for full-time students, members of Congress, and US military personnel on active duty are eligible for temporary resident permits. Additional documentation is needed for temporary resident permits.

COST:

Residential parking permits can be renewed for one or two years. A residential parking permit is \$15/year.

The following rates apply to other types of residential permits:

- Full-time students: \$338/yr.
- Temporary DC Resident: \$250/6 months
- Military/Members of Congress: \$10/yr.

ENFORCEMENT:

Unmarked vehicles that park more than two hours in a residential zone are subject to a \$30 fine.

LINK:

http://ddot.dc.gov/ddot/frames.asp?doc=/ddot/lib/ddot/services/rpp/rpp_brochure.pdf

<http://www.dccouncil.us/ambrose/PARKING%20INFORMATION.html>



PARKING BENEFIT DISTRICTS

The newest innovation in neighborhood parking programs is to typify them as "parking benefit districts." This is similar to a residential permit district, but the revenue from the parking fees flow directly back to the neighborhood in the form of streetscape enhancements, lighting enhancements, street and sidewalk repair, etc. This serves to reinforce the concept that permit revenue should be returned to the neighborhood in tangible and highly visible ways.

Permit revenue should be returned to the neighborhood in tangible and highly visible ways.

ASPEN, COLORADO

Aspen, Colorado, charges nonresidents \$5 a day to park in its residential permit districts. Aspen's population is only 5,000, so it should qualify as a small-city precedent. Redwood City, California, recently decided to charge market rates for curbside parking, and to spend the meter money for added public services on the metered streets.

Donald Shoup recently wrote about cities that are experimenting with parking benefit districts in his book, "The High Cost of Free Parking." Three of the cities are college towns.

BOULDER, COLORADO

Boulder sells permits to residents for \$12 a year in its Neighborhood Permit Parking zones, and also sells Commuter Permits to nonresidents for \$312 a year. Each permit is valid on a specific block face, and no more than four nonresident permits are sold on any block. The city periodically surveys the parking occupancy on all blocks in each permit zone, and sells nonresident permits only on blocks that have a vacancy rate greater than 25 percent between 9 a.m. and 5 p.m. This approach ensures that each block has vacant parking spaces for both residents and commuters. Because many residents drive to work during the day and park on their own streets only in the evening, the commuters and residents effectively time-share the same curb spaces. Boulder's Parking Services department maintains a map showing all the blocks on which permits have been sold, and where permits are still available; the permits are sold on a first-come, first-served basis. Businesses can also buy nonresident permits and provide them to their employees. All the revenue from the nonresident permits is used to reduce the price for the resident permits.

SANTA CRUZ, CALIFORNIA

The program in Santa Cruz is modeled on the one in Boulder. The city's goals were to make parking spaces available to commuters on under-occupied blocks, and to return some benefit to residents for sharing their on-street parking with out-of-area commuters. Downtown employees pay \$240 a year for Commuter Permits to park in nearby residential permit districts, while residents pay only \$20 a year.

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The permits are valid Monday through Friday between 6 a.m. and 8 p.m. Each permit is valid on a specific block face, and only the blocks with occupancies less than 75 percent at peak hours are eligible for the permits. A maximum of four Commuter Permits are assigned per block. The city intends to spend the revenue from the commuter permit program to benefit the permit districts, but has not created a special fund to achieve this purpose.

TUCSON, ARIZONA

In its ParkWise program, Tucson charges \$2.50 a year for residential parking permits, and from \$200 to \$400 a year for nonresidential permits, depending on location. The price of the nonresident permits is highest for the blocks nearest the University of Arizona, and declines with distance from the university. The nonresident permits are valid between 8 a.m. and 5 p.m., and each permit is valid on a specific block face. The permits are also vehicle-specific and must be attached to the car's rear window. Hanging tag permits are also available for an additional charge of \$100 a year and all vehicles using a hanging permit must be registered with the ParkWise program. The city may revoke a permit if the holder has three or more citations for parking in an unauthorized permit-program location during a year. The program began in 1997, and Tucson currently issues about 450 nonresident permits. All the revenue from the nonresident permits is used to reduce the price of resident permits.

SPECIAL PERMIT: GREEN PARKING PERMIT

NASHVILLE, TN

In December 2010, the Metro Council approved an ordinance allowing free parking at meters in the downtown Central Business District to drivers who own clean technology vehicles, including hybrid vehicles that use both electric and gasoline engines for power, or non-hybrid vehicles that get very high gas mileage and have very low exhaust emissions.

Beginning July 1 2011, the Davidson County Clerk's office began providing Green Parking permits to private passenger vehicles and may be obtained with an annual fee of \$10. The permits are valid for a period of one year and are issued at the time the motor vehicle is registered. Applications are available at the County Clerk's main office in the Howard Office Building at Fulton Complex, 700 2nd Avenue South, and at all five satellite locations.

Residents with Green Parking permits must adhere to all parking laws, including properly parking in metered spaces and parking no longer than meter limits. Green Parking permits are tied to vehicle VIN numbers and cannot be shared with another vehicle.

The Green Parking permit program was an initiative of Mayor Dean's Green Ribbon Committee on Environmental Sustainability.



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ORDINANCE CONSIDERATIONS

Walker reviewed a number of ordinances and assembled the following as an example. Walker is not a law firm and does not represent this exercise as an attempt to write an ordinance for Memphis. The following is only offered for discussion.

Privileges and restrictions on controlled parking residential zones:

- (A) Where parking prohibited. A residential parking zone shall not authorize the resident, tenant or guest to stop, stand or park a motor vehicle in such places where the stopping, standing or parking of a motor vehicle is prohibited or set aside for specific types of vehicles, nor exempt the resident, tenant or guest from the observance of any traffic regulation within the controlled residential area.
- (B) Use of on-street parking; nonresidents. No person other than residents, tenants or authorized guests of the controlled parking residential area shall park on streets properly marked as a residential parking zone.
- (C) The blocks or streets to be designated as Controlled Vehicle Parking must be listed in the ordinance.
(add list)
- (D) Any person violating this section shall be subject to a monetary fine not to exceed:
 - (1) \$50.00 for the first such violation;
 - (2) \$100.00 for the second such violation within 12 months of the first violation;
 - (3) \$150.00 for the third or any subsequent violation within 12 months of the first violation.
- (E) Administrative regulations. The police department shall have the authority to develop and implement administrative regulations for the enforcement of this chapter.

Privileges and restrictions on residential permitted parking only:

- (A) Permit bestows privileges and restrictions on residential parking permits. The holder of a residential parking permit shall be permitted to stand or park a motor vehicle displaying the permit and operated by him or her in a designated residential controlled parking area. While a vehicle for which a residential parking permit has been issued is parked, such a permit shall be prominently displayed as designated.
- (B) Where parking prohibited. A residential parking permit shall not authorize the holder thereof to stand or park a motor vehicle in such places where the stopping, standing or parking of a motor vehicle is prohibited or set aside for specific types of vehicles, nor exempt the holder from the observance of any traffic regulation within the controlled residential area.
- (C) Where parking permitted. A residential parking permit shall permit such residents/tenants to park in a designated street or zone for such permit.
- (D) Use by persons other than permitted regulated. No person other than the permittee named thereon shall use the residential parking permit or display it on a vehicle operated or parked, and any such use or display by a person other than the permittee shall constitute a violation of this chapter by the permittee and by the person who so used or displayed such parking permit. Bona fide visitors of permittee shall be issued a guest permit with permission of the permittee.
- (E) False representation. It shall constitute a violation of this chapter for any person to falsely represent himself as eligible for a residential parking permit and to furnish any false information in an application in order to obtain a residential parking permit.
- (F) Revocation of Permit. The City is authorized to revoke the residential parking permit for any permittee found to be in violation of this chapter and upon written notification thereof, the permittee shall



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surrender such to the City. Failure, when requested, to surrender a residential parking permit so revoked shall constitute a violation of this chapter.

- (G) Administrative regulations. The police department shall have the authority to develop and implement administrative regulations for the enforcement of this chapter.”

It is noted that the administration of the program usually is the responsibility of the Police Department, which has the authority to develop and implement administrative regulations for the enforcement of this program under the ordinance.

Creating and enforcing such a program can be problematic. Walker researched a selection of such programs, including a program in Laramie, Wyoming; Denver, Colorado; and the Athens-Clark County Southeast Five Points Residential Parking District in proximity to the University of Georgia. We recommend that the following issues be considered:

1. As written, the police would be the only entity authorized to provide routine patrol of the permit area for the express purpose of identifying parked vehicles in violation of the ordinance. In practice, the police would only respond to a specific complaint. Only the police may respond to a complaint. Vehicles found in violation will be ticketed. Towing is not specifically mentioned as a tool for enforcement. In some other programs, the police only respond to complaints registered with the Police Dept. if a non-permitted vehicle is parked without a permit.
2. It is the responsibility of each resident to acquire official resident and guest parking permits from the City and properly display the permit as required. Enforcement for guests is problematic as police may ticket guests before they post the permit. Some online programs allow that a temporary permit may be created by the permit holder for the use of an on-street parking space by a guest. A photocopy or a print of the valid guest parking permit may be placed on the dashboard of the guest's vehicle with the date and the signature of the permit holder. The temporary guest permit is usually valid for only one day.
3. Enforcement hours are not specified in the ordinances. It may be assumed that enforcement will be 24/7; however, any agreed period may be posted. Some programs limit on-street parking restriction to posted hours such as 8:00 a.m. to 5:00 p.m., Monday – Friday. If the residential district were overlaid on an on-street meter parking district, enforcement would begin after the meter operating hours, such as 6:00 p.m. to 6:00 a.m.
4. The controlled parking areas will probably be somewhat fragmented as enabling legislation usually requires that 50% of block residents must approve of the ordinance on their block. Enforcement areas need to be clearly marked from beginning to end within each curb segment.
5. Residents must be informed that no specific parking spaces or location may be assigned to an individual household and/or vehicle, and availability is not guaranteed by a permit. Any permitted vehicle may occupy any legal parking space within the defined area.



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6. The violation fine amounts appear to be adequate to constitute a penalty, and must not be low enough to be a substitute for paid parking. The ordinance could state that first, second, third and subsequent violations refer to annually or in perpetuity.
7. Annual parking permit fees are not mentioned. If imposed, the fee to residents should be nominal. Examples are indicated in the previous list of permit programs.
8. Money raised through the program should be returned directly to the neighborhood in highly visible and meaningful ways.

NEIGHBORHOOD PERMIT PARKING PROGRAM CONCLUSION

Walker recommends that Memphis establish a residential permit parking program. The increasing spillover of public parking into residential areas has already generated some resistance and ultimately will drive residents to demand solutions. Residential parking control may be inevitable, and may actually be desirable in order to support public parking goals. Many models of neighborhood parking permit systems are available.

To support existing and proposed new parking meters and to reduce the negative impact of parking spillover into adjacent neighborhoods, it will be necessary to more intensively manage on-street parking. Memphis has the choice to be proactive or reactive. Walker recommends that the City take the initiative.

MEMPHIS PARKING METERS

PARKING CONSULTING SERVICES



WALKER
PARKING CONSULTANTS

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APPENDIX B
ENTERTAINMENT AND SPORTS DISTRICTS



ENTERTAINMENT AND SPORTS DISTRICTS

Memphis downtown includes the Beale Street entertainment district, the AutoZone Park and FedExForum sports venues. Parking is provided by on-street parking and public and private downtown parking facilities in proximity to Beale Street. On-street parking on Beale Street within the entertainment district is available during the day and off-peak evenings, but access to the prime blocks of Beale Street are blocked during peak weekend evenings and special events.

Beale Street, which dates back to 1841, is anchored by the Orpheum Theatre at the south end and the Hard Rock Café on the northeast end with a variety of clubs, restaurants and retail shops in between. The district offers live music, outdoor concerts, clubs, and restaurants. Parking is available on-street and at numerous off-street parking facilities.

AutoZone Park is the home of the Memphis Redbirds, the AAA affiliate of the St. Louis Cardinals. AutoZone Park's main entry plaza is located at the corner of Third Street and Union Avenue in downtown Memphis (200 Union Avenue). AutoZone Park's main entry plaza is located at the corner of Third Street and Union Avenue in downtown Memphis (200 Union Avenue). The ballpark has a seating capacity of 14,384. Thus, peak parking demand would be expected to generate demand for about 5,000 vehicles. Because of its locations in downtown Memphis, near Beale Street, surface parking is limited. Most of the parking is provided by public and private downtown parking facilities.

The \$250 million dollar FedExForum is the largest public building construction project in Memphis history, and was constructed by the New Memphis Arena Public Building Authority. The facility is home to both the Memphis Grizzlies of the NBA and the University of Memphis Tigers basketball team. The facility has a 1,500 parking space, five-level attached parking garage.

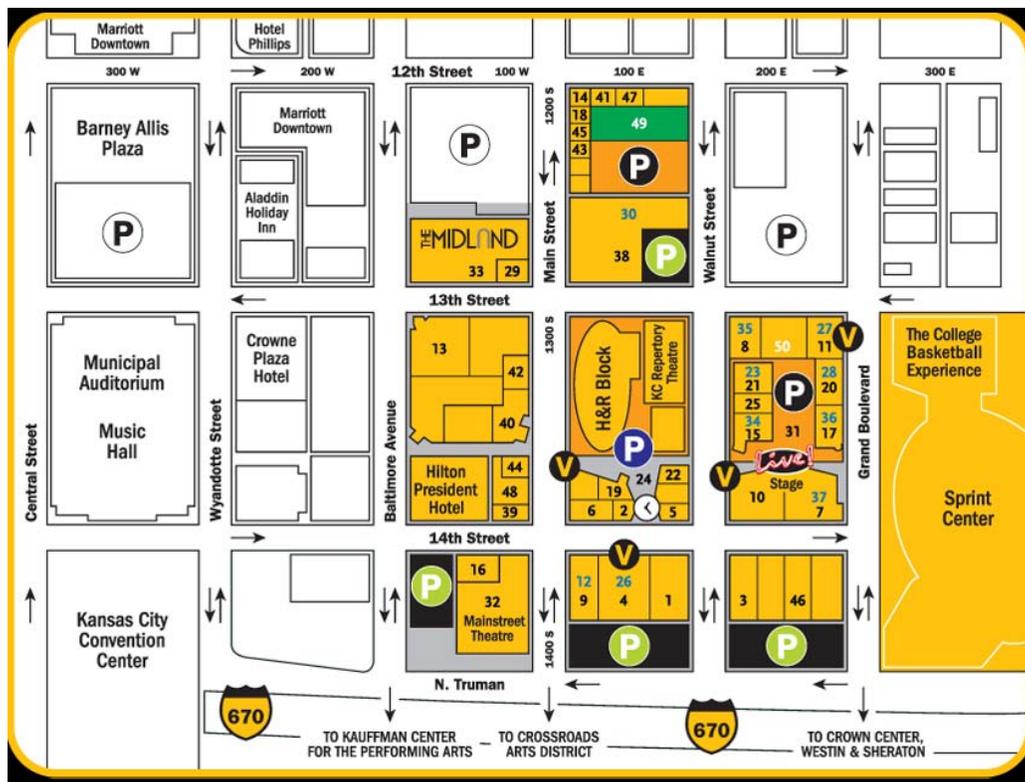
The FedExForum website identifies 6,700 spaces that are available in area parking lots within a quarter mile radius of the facility. On-street parking is a part of the parking supply. A parking study completed in 2011 found that there are more than 5,400 parking spaces within a quarter mile of FedExForum and nearly 13,000 parking spaces within a half-mile of the arena, which is more than the 8,300± spaces that the study estimated are required for a typical game night.

The following comparables are offered as examples demonstrate how other entertainment and sports districts address their specific parking issues.

POWER & LIGHT DISTRICT, KANSAS CITY, MO

The Kansas City Power & Light District is a dining, entertainment and shopping district in the heart of downtown Kansas City with over a half million square feet housing more than 50 restaurants, bars, shops and entertainment venues. The nine-block neighborhood links the Convention Center to the Sprint Arena. District attractions include the Midland Theater, the Mainstreet Movie Theater and the KC Live! Entertainment District.

Figure 14: Kansas City Power & Light District



KC Live! and Main Street Garages offer free parking during lunch and free three-hour parking with validation from any District tenant between 6:00 a.m. and 4:00 p.m. Monday through Friday. Parking fees vary according to the garage, surface lot or metered spaces. The two Power & Light District garages charge \$2:00 flat rate parking after 5:00 p.m., Monday through Friday and all day Saturday and Sunday. Non-validated parking is \$3.00 per hour with \$15 maximum. Private parking facilities in the Power & Light District charge market rates. Valet service is available for some destinations.

FOURTH STREET LIVE!, LOUISVILLE, KY

Fourth Street Live! is Louisville’s premier dining, entertainment and retail destination located on Fourth Street, between Liberty Street and Muhammad Ali Boulevard, in the heart of historic downtown Louisville, KY. In proximity to downtown hotels, waterfront park, Main Street, Slugger Field, and other major attractions, and is within walking distance of the KFC Yum! Center. Fourth Street Live! features retail stores, a major food court, restaurants, entertainment venues, bars and nightclubs. Concerts at Fourth Street Live! are open to all ages on most concert nights, but after 9:00 p.m., only 21 and over are admitted. Patrons under 21 are limited to the street level of Fourth Street Live! Customers park free weekdays after 6:00 p.m. and all weekend at the Fourth Street Live! garage (located on 5th Street).

Figure 15: KFC Yum! Center Parking Map



*Available parking spaces may change during certain events when a small number of meters may be "bagged" to aid traffic flow.

- 1-20
- 21-40
- 41+
- On-street spaces

Scale: 0 200' 400' 800'

Walking Time: 0 1 2 3 min

Source: Parking Authority of River City (PARC)

The 22,000-seat basketball and multipurpose KFC Yum! Center arena promotes that more than 21,000 parking spaces, including more than 2,200 free on-street parking spaces are available within 5 blocks of the Center. Operating hours for all meters are Monday - Saturday, 7:00 a.m. to 6:00 p.m., with free parking after 6:00 p.m. Monday through Saturday and free all day Sunday. Parking meter rates range from \$0.75/hr. to \$1.00/hr., and are limited from 1 hour to 4 hours of parking. During large events, some meter spaces are bagged to aid traffic flow.



FRENCH QUARTER, NEW ORLEANS, LA

The French Quarter, also known as Vieux Carré, is New Orleans cultural hub. Attractions include historical buildings, parks, restaurants, bars, nightclubs, retail stores, hotels, museums, a Harrah's Casino and is close to large sports venues just to the south. The French Quarter is 13 blocks long and 6 blocks deep, not just a "strip" lasting a couple of blocks. French Quarter streets tend to be narrow, single lane, one-way streets. Vehicles are allowed in, but be advised that street closings are common and so is gridlock. Bourbon Street is blocked to traffic every night, as is Royal Street every day to give pedestrian revelers and shoppers more room to wander.

The 76,468-seat Mercedes-Benz Superdome and adjacent New Orleans Arena. The Mercedes-Benz Superdome has seven (7) parking garages for public parking and two (2) surface lots, which can accommodate approximately 7,000 vehicles.

Parking in the French Quarter is often hard to find and expensive. Early Bird specials are available to motorists ranging from \$7.00 to \$10.00 all day. After 9:00 a.m., prices rise considerably: hourly rates can run as much as \$10.00 in some areas.

The city has modernized many of its parking meters, and most now accept dollar bills and credit cards, which give you a printed receipt to place on your car dashboard. Regular two-hour meters cost \$1.50/hour and long-term meters (up to 10 hours) cost \$1.00/hour. Both types of meters are enforced from 8 a.m. - 6 p.m. Monday - Saturday. Parking is prohibited at meters in designated rush hour zones from 7:00 a.m. - 9:00 a.m. and 4:00 p.m. to 6:00 p.m.

On-street parking spaces are difficult to find, and parking enforcement officers take their jobs very seriously. Broken meters are not free passes. They are technically off-limits and can result in a ticket. Violations range from \$20 at an expired meter and \$40 for parking too close to a corner, to \$75 for parking on the median (called a "neutral ground" in New Orleans) and \$200 for parking on the sidewalk in the French Quarter. On event days, most on-street metered spaces in proximity to the Superdome are bagged to ease traffic and pedestrian issues.

JACKSONVILLE LANDING, JACKSONVILLE, FL

Downtown Jacksonville is promoted as the business, cultural and entertainment center of Jacksonville, Florida. The 9-acre complex features 65 stores as well as dining, with full-service restaurants plus a food court, and entertainment. The Landing stages a variety of special events. There is weekly live music on the courtyard stage, and has a 19x15 foot JumboTron screen in the courtyard. The Landing hosts more than 300 events each year including Florida/Georgia Weekend Celebrations, the annual Christmas Tree Lighting, New Year's Eve and Gator Bowl Celebrations, St. Patrick's Day, the Jacksonville Jazz Festival and July 4th fireworks. Weekly events include year-round live entertainment, and has a partnership with Downtown Vision to host a Farmer's Market every Friday.

The Jacksonville Landing Lot located next to the Main Street Bridge has 250 parking spaces and is open 24 hours a day. On weekdays, this lot charges a flat \$3.00 rate for up to 3 hours, and a flat \$5.00 rate on weekends after 5:00 p.m. In 2010, the Jacksonville City Council passed a bill to contribute \$3.5 million toward the purchase of this existing parking lot across from the Landing. That money included the 20-year parking validation program at a cost of \$2.5 million to the city. Mayor John Peyton vetoed the bill, but the council voted unanimously to override the veto.

Jacksonville Landing offers valet parking for \$10 every Friday and Saturday evening. A number of public garages and surface lots offer daily, monthly and event parking in proximity to this destination. Metered parking spaces are free every weekday evening after 6:00 p.m. and on weekends and holidays. During weekdays until 6:00 p.m. metered parking costs \$0.25 cents for 30 minutes.

EAST FOURTH STREET ENTERTAINMENT DISTRICT, CLEVELAND, OH

East Fourth Street, in downtown Cleveland Ohio, lies between Prospect and Euclid Avenues, and is the city's up and coming entertainment district. East Fourth Street Entertainment District is within walking distance of Public Square and two area sports arenas. The block is home to restaurants, nightclubs, and scores of historic, renovated apartments.

East Fourth Street is within walking distance of Public Square, the Cleveland Arcade, the Warehouse District, Progressive Field, and Quicken Loans Arena as well as dozens of downtown restaurants and retail establishments.

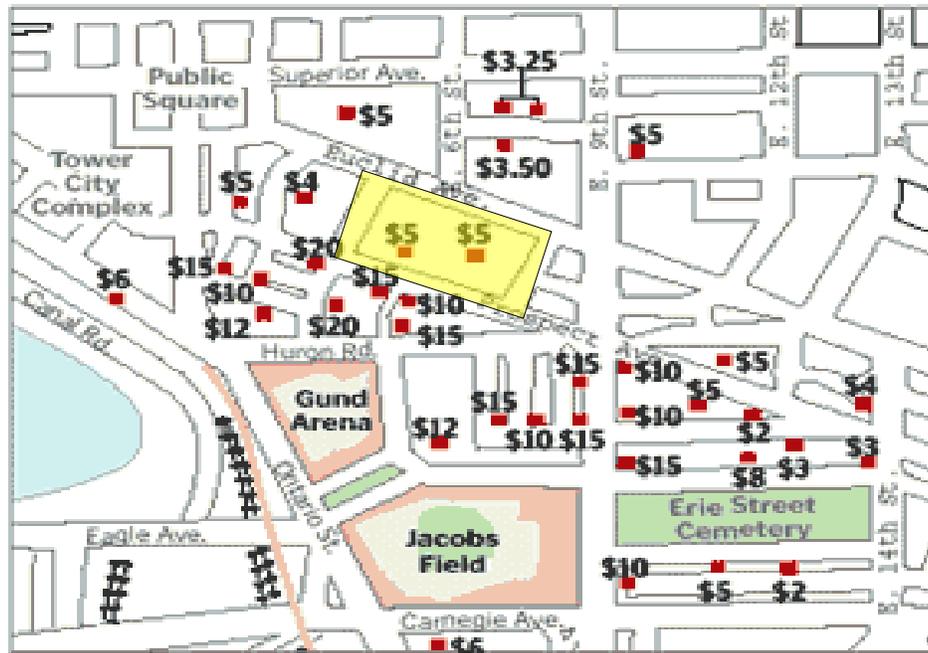
Cleveland's 20,562-seat Quicken Loans Arena, often referred to as simply the "Q", opened in 1994. The facility is home to the Cleveland Cavaliers basketball team as well as the site of numerous concerts and other special events. The "Q" is also home to the Lake Erie Monsters hockey team and the Cleveland Gladiators Arena football team.

Progressive Field (formerly Jacobs Field), opened in 1994 in downtown Cleveland, is the home of the Cleveland Indian's baseball team. The state-of-the-art stadium is adjacent to Quicken Loans Arena and is a short walk to Tower City, Public Square, and dozens of downtown restaurants and bars.

Figure 16: East Fourth Street Entertainment District (Yellow)

Special event parking

Parking rates are higher during special events, like the Oct. 14 Rolling Stones concert at Gund Arena. Here are the rates that night.



The city represents that ample parking is available in and around both sports facilities. The closest lots and the covered parking lots charge around \$10 to \$20. Two to three blocks away, rates are about half of that.

The Division of Parking Facilities operates on-street metered parking. Metered parking is available on the streets in proximity to the arenas. On-street meters in Cleveland are free from 6:00 p.m.-7:00 a.m. Monday-Friday, all day Saturday and Sunday, and major holidays. Those on-street meters closest to the sports venues are prohibited and bagged on game days.

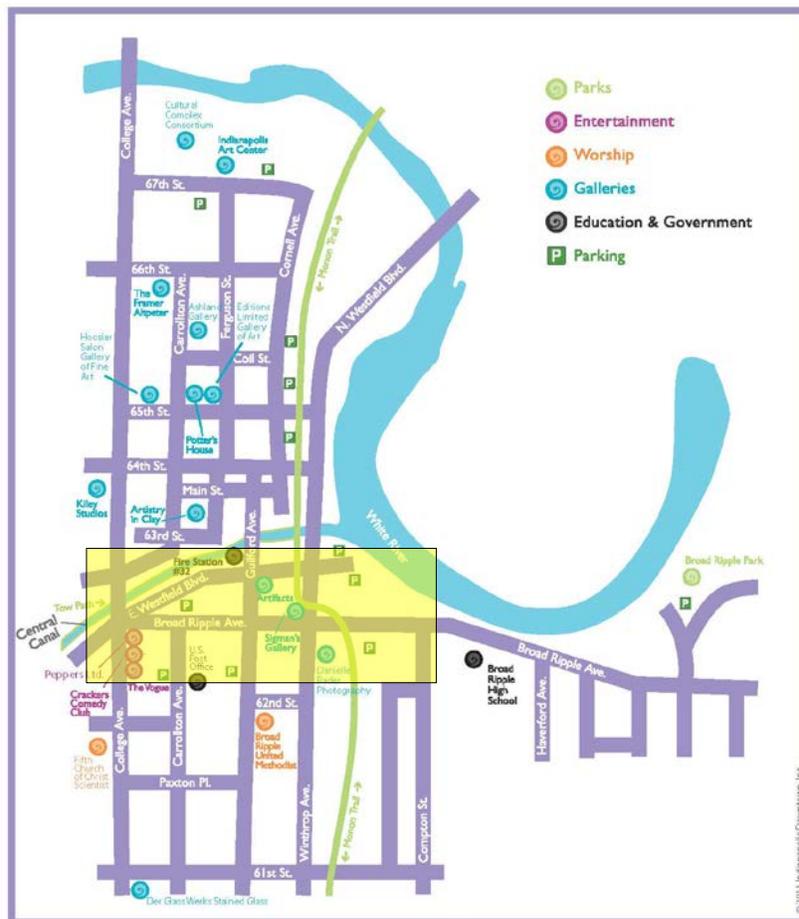
BROAD RIPPLE VILLAGE, INDIANAPOLIS, IN

Broad Ripple Village in Indianapolis is similar in some respects to Beale Street. Although not located downtown, Broad Ripple is a cornerstone of Indianapolis entertainment, youth culture and nightlife resulting from its thriving bar scene and the near presence of Butler University. The numerous Broad Ripple bars and restaurants remain open as late as 3:00 a.m., often on weekdays and weekends. The neighborhood is home to many of Indianapolis' locally-owned restaurants, four independent microbreweries, independent art galleries, private boutiques and specialty shops, a professional comedy club and multiple venues for live music, and the popular Monon Trail.

Parking for the most part is affordable in Broad Ripple and downtown when no major event is underway. Downtown parking is convenient and abundant with 70,000 parking spaces downtown. Special events in downtown Indianapolis impact on-street availability, which varies by venue (Circle Center Mall, Lucas Oil Stadium, Bankers Life Fieldhouse, Victory Field, etc.). Metered spaces downtown are free for Sunday Colts and Pacer games.

Parking meter rates are either \$1.00 per hour or \$1.50 per hour depending on location. As part of a recently completed public/private partnership, meters downtown and in Broad Ripple have been updated to smart meters and now accept credit cards. Meters accept payment for a maximum of two hours, but customers are allowed to feed more change after the designated period expires. There is no penalty for staying in a spot all day, so there is no need to move a car to the next block.

Figure 17: Broad Ripple Parking Meter District (Yellow)



Parking in Broad Ripple is judged to be a constraint to growth. Construction has begun on a new parking structure that will add parking. Funds from the previously referenced public/private partnership are funding the new structure, which will have space for more than 300 vehicles, along

with bicycle parking, a charging station for electric vehicles, 25,000 square feet of retail space and a substation for Indianapolis Metropolitan Police Department. The project at College and Broad Ripple Avenues and Westfield Boulevard is expected to be completed in March 2013.

Meters in Broad Ripple charge \$1.50 per hour and must be paid for weekday and Saturday games until 9:00 pm. Metered spaces are free after 9:00 p.m. Monday through Saturday and on Sundays and holidays.

On-Street Parking	Metered	Workday	Evening	Sat. & Sun.	Special Events
Power & Light District, Kansas City, MO	✓	Metered	Free	Free	Bagged
French Quarter, New Orleans, LA	✓	Metered	Metered	Metered	Bagged
Fourth Street Live!, Louisville, KY	✓	Metered	Free	Free after 6 pm Sat. and free all Sunday	Bagged
Jacksonville Landing, Jacksonville, FL	✓	Metered	Free	Free	Bagged
East 4th Street Ent. District, Cleveland, OH	✓	Metered	Free	Free	Bagged
Broad Ripple Village Indianapolis, IN	✓	Metered	Metered	Free after 9 pm Sat. and free all Sunday	Bagged

CONCLUSION FOR ENTERTAINMENT AND SPORTS DISTRICT PARKING

Off-street parking facilities exist to serve Beale Street, and AutoZone Park and FedExForum sports venues. On-street parking along streets in proximity to Beale Street and AutoZone Park are already metered and special parking management strategies are in use during peak periods. On-street parking on Beale Street within the entertainment district is available during the day and off-peak periods, but access to the prime blocks of Beale Street are blocked during peak demand evenings and special events. Walker recommends that meters should be upgraded along already metered streets in proximity to or within walking distance of these destinations.

Some of the on-street parking in proximity to FedExForum is already metered. However, there has been some discussion of expanding on-street parking meter zones to include what is currently unmetered on-street parking south and east of this venue. During Walker’s data collection, very limited or no demand for on-street parking was observed in these areas during the business day or in the evening. During sports and other special events, the police exercise significant on-street management and bag meters to assist traffic flow and reduce pedestrian/vehicle conflicts. Given the expense of installing new meters and the unlikelihood of returning a reasonable cash flow from their installation, Walker recommends that meters should be not be installed along what is currently unmetered on-street parking south and east of the FedExForum at this time.

This recommendation should be reviewed periodically. Acceptable walking distances are defined in the following section.



APPENDIX C

WALKING DISTANCE BY LEVEL OF SERVICE

WALKING DISTANCE

The concept of acceptable walking distance is introduced at this point, because walking distance is used to determine marketing areas for different facilities and parking adequacy for local developments.

Walking distance is a prime determinant of a parking facility's market area. As a whole, a parking supply may be sufficient, but if the available parking supply is located too far from a destination, users will not accept it, resulting in frustration and complaints.

The "acceptable" walking distance will vary based on the user, event, and time of year. For example, attendees of a black tie event will be much less likely to be willing to walk more than a block or two, but attendees to a sellout rock concert may be more willing to walk a few blocks to attend an event. In addition to the user group, several factors influence acceptable walking distance. These influences include the following:

- Climate
- Perceived security
- Signage
- Lighting
- Walking environment
- Terrain

To aid in estimating the appropriate walking distance, Walker utilizes a Level of Service ("LOS") rating system for evaluating appropriate walking distances based on specific criteria. LOS "A" is considered the best or ideal, LOS "B" is good, LOS "C" is average, and LOS "D" is below average but minimally acceptable.

The LOS conditions by walking distance is summarized in the following table.

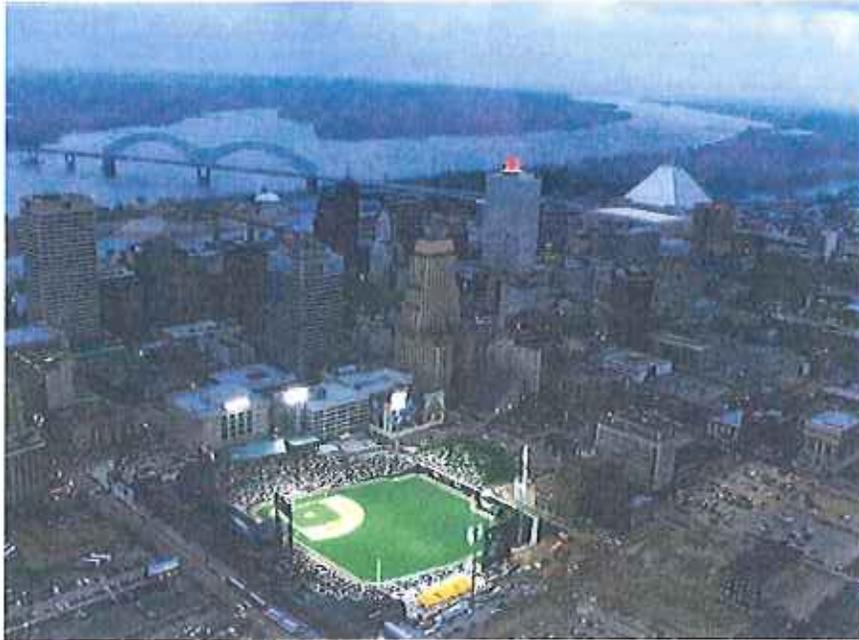
Table 16: Walking Distances by Level of Service

Level of Service (Distance in Feet)	A	B	C	D
Climate Controlled	1,000	2,400	3,800	5,200
Outdoor/Covered	500	1,000	1,500	2,000
Outdoor/Uncovered	400	800	1,200	1,600
Through Surface Lot	350	700	1,050	1,400
Inside a Parking Facility	300	600	900	1,200

Source: "How Far Should Parkers Have to Walk?" by Mary S. Smith and Thomas A. Butcher; *Parking*, September 1994

Based on the C to D level of service, it is assumed that parking market areas are alternatively defined in terms of a 5-minute walking area of two to three blocks surrounding a generator or destination. A greater walking time or distance from parking space to portal is typically perceived as a poor level of service by most patrons.

City of Memphis On-Street Parking Operational and Revenue Analysis



March 4, 2011

Prepared For:

City of Memphis

Prepared by:



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**City of Memphis
On-Street Parking Operational and Revenue Analysis**

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EXECUTIVE SUMMARY

ConsulPark, Inc. was engaged to conduct a comprehensive evaluation of the on-street parking assets within the City of Memphis. The purpose of the study is to determine and analyze the key factors affecting overall operational performance and system revenue. The findings from extensive field observations and data analysis are included herein. Explained in detail are several recommendations that will improve the public's parking experience and thereby improve the public's perception of Memphis in general. If implemented properly, these recommendations will also significantly enhance the City's financial position by creating additional NOI from parking operations of approximately \$4 to 6.8 million annually. **Most importantly, these recommendations provide the City of Memphis the necessary tools to develop an on-street parking system that supports and cultivates economic growth by providing convenient and available on-street parking.**

Declining Revenue Trend

Parking meter revenue in 2010 was 22% or \$126,737 less than parking meter revenue in 2007. This declining revenue trend, **-7.8%** compound annual growth rate (CAGR) from 2007-2010, can be reversed if parking is given the necessary attention and resources.

High Occupancy – Low Compliance Rates

The intended objectives of an on-street parking system are not being met due to high space occupancy and low turnover. While the on-street parking system absorbs the stress of near 100% occupancy, the compliance rate (rate of payment) is a low 42%. Included below are recommendations for improved enforcement and collection techniques that could bring these figures in line with industry averages and **generate the City of Memphis approximately \$444,000** in additional parking revenue annually.

Weak Fine Collection

Compounding the low compliance rate is a disappointing 30% citation collection rate according to the City Court Clerk's information. This is far below industry standards and an effort to bring fine collection rates to an acceptable benchmark could result in **approximately \$1,169,000** in revenue based on today's fine numbers.

Missing Meter Heads and Poles

Existing equipment is inadequate and often noticeably missing either from removal or vandalism. Block faces commonly have meter poles with no meter heads or unregulated parking areas where poles and meters once collected revenue. Certain blocks obviously designated and regulated as paid parking areas are missing as many as 40% of their meters. Of the 774 designated metered spaces in the study area, 60 or 7.75% were missing meter heads, meter poles or both. Simply reinstalling meters where they are missing would **recoup approximately \$35,000** in annual revenue.

Unregulated Areas throughout Downtown

In areas of downtown, there are many unregulated and free parking blocks in between regulated, paid parking blocks. Inconsistent regulation and enforcement confuse visitors seeking a legitimate parking space and add unnecessary stress to a trip downtown. A minimum of 150 additional metered parking spaces are obtainable in the downtown core where paid parking already exists. This represents a potential 20% increase in the number of spaces within the study area. These much needed spaces would serve to standardize the downtown core with the consistent application of regulated parking while **generating approximately \$92,000** in increased revenue.

Potential for New Meters in Sports and Entertainment Zone

On-street parking in the heavily trafficked sports and entertainment district is hindered by the lack of a definitive boundary. There are no "parameter" meters to corral parkers into the regulated parking areas and this encourages many visitors to drive an extra block to avoid paying for parking. Additional meters installed on Pontotoc Avenue, Mulberry and Beal Streets would retain parkers in regulated zones during non peak periods and generate revenue during peak periods on weekends and during Grizzlies games. Annual incremental revenue from these 148 potential metered spaces is **estimated to be approximately \$113,000**.

Other areas of Memphis lack adequate on-street regulation as well. The historic Pinch district could benefit from on-street meters and parking meters in the Main Street South area could be expanded as well. Incremental revenue estimates for these areas have not been included in this report. It is recommended, however, that the City continue to explore the benefits of regulating these areas.

Need for Updated Equipment

Today, Memphis is not benefitting from available technologies that make parking easier for the general public and enhance revenue. Electronic meters that accept credit cards allow users multiple payments methods and better secure parking revenue. These convenient forms of payment increase compliance, revenue and customer satisfaction. Other cities have seen revenue increases of 35-70% after such equipment upgrades. If Memphis realizes only a 40% increase in revenue from improved technology, this will **represent more than \$400,000 annually** when combined with other recommendations contained herein.

Low On-Street Parking Rates

On-Street parking rates in Memphis are \$0.75 per hour with hourly limits that vary by area. These rates are on the low end of the spectrum as compared to other comparably sized cities and as compared to cities similarly geographically situated. Memphis's on-street hourly parking rates lag the average of comparably sized cities by 46% or \$0.64 per hour. When compared to cities in the same region such as Nashville, Little Rock, Jackson, MS, etc., Memphis's rates trail the average hourly rates of these cities by 15% or \$0.13 per hour. These stats, combined with the high occupancy of the downtown system, indicate a need to upwardly adjust the on-street rates. Several rate scenarios are presented for the City's consideration and a specific rate escalation strategy is recommended. The impact of this pricing strategy is considerable and could **generate additional annual income of \$153,000 to \$300,000** within the first four years. Critically, however, the recommended rate structure will allow the system to function as an on-street system is designed to function by replacing the long-term, more than 4 hour parker with a limited duration parker of 1-3 hours.

Need for Extended Hours of Operation in Downtown Area

All of the parking meters in Memphis are enforced from 8:00 AM to 6:00 PM Monday through Friday. Busy, bustling cities that have the nightlife activities common to Memphis require a robust, extended-hours parking operation to support these activities. Heavy traffic persists through most of the downtown area after 6PM and especially on weekends. It is highly recommended that the hours of operation and enforcement be extended to midnight and include Saturdays and Sundays. This will result in significant revenue opportunities (**estimated to be more than \$855,000 annually**) but more importantly, will demonstrate a consistent application of regulation and better control of the City's on-street parking assets.

Other recommendations below include specific equipment suggestions, multiple use (flex) loading zones, advice on staffing and additional operational considerations.

INTRODUCTION AND BACKGROUND

ConsulPark, Inc. was engaged to conduct a comprehensive evaluation of the on-street parking assets within the City of Memphis. The purpose of the study is to determine and analyze the key factors affecting overall operational performance and system revenue. The findings from extensive field observations and data analysis are included herein.

Memphis has an estimated population of 676,640, making it the 19th largest city in the United States and the largest city in the state of Tennessee. The greater Memphis metropolitan area, including adjacent counties in Mississippi and Arkansas, has an estimated population of 1,280,533. Memphis is the hub of significant commercial activity and dense mixed-use development areas create high demand parking scenarios.

According to the engineering department, there are 1,250 meters throughout the entire City. The large majority of these meters are located in the Central Business District. The operating hours of all of the meters are 8:00 AM to 6:00 PM. The on-street rates are uniformly \$0.75 per hour though there a 30 minute, 1 Hour, 2 Hour and 4 Hour time limits.

The on-street parking system is managed by the traffic and engineering department. In addition to extensive field surveys, the engineering and finance departments provided information that has been incorporated into this report. According to the engineering department, the on-street parking operation is managed with 7 full-time employees: 1 manager, 3 parking enforcement officers, 1 meter maintenance technician and 2 meter collectors. All of these individuals currently work from 8:00 AM to 4:00 PM. The combined salaries of these individuals represent \$247,000 in salaries and benefits.

Parking is not assigned a distinct cost center for tracking revenue and expenses as an individual business unit. Therefore, operating results directly from parking were not available from the finance department. In addition to the above explained payroll information it was noted that \$5,000 per year is budgeted for meter repairs. The overhead costs of management from the engineering department, finance support from the finance department and vehicle and other equipment costs were not provided.

Parking revenue and the number of parking citations issued annually was provided. On-street revenue by month for 2010 is summarized in Table 1 and a four year trend of on-street revenue from parking meters is summarized in Table 2. While 2010 revenue is approximately \$30,000 higher than 2009, it is less than 2007 by \$126,000 or -22%. This represents a compound annual growth rate (CAGR) of -7.8% as noted in Table 2.

Approximately 29,000 parking citations or 2,430 per month were issued by the parking enforcement staff in 2010. The amount of parking fine revenue collected, however, is significantly diluted due to the very low collection rate of 30% as estimated by the City Clerk's office.

Table 1 2010 On-Street Revenue by Month

2010 On-Street Revenue by Month							
	Jan	Feb.	Mar	Apr	May	Jun	Total
On-Street Meter Revenue	-	60,000	52,000	40,000	43,000	47,000	
	Jul	Aug	Sep	Oct	Nov	Dec	
On-Street Meter Revenue	20,000	41,000	48,000	40,000	34,000	35,000	
Total							460,000

Table 2 Four Year Revenue Trend

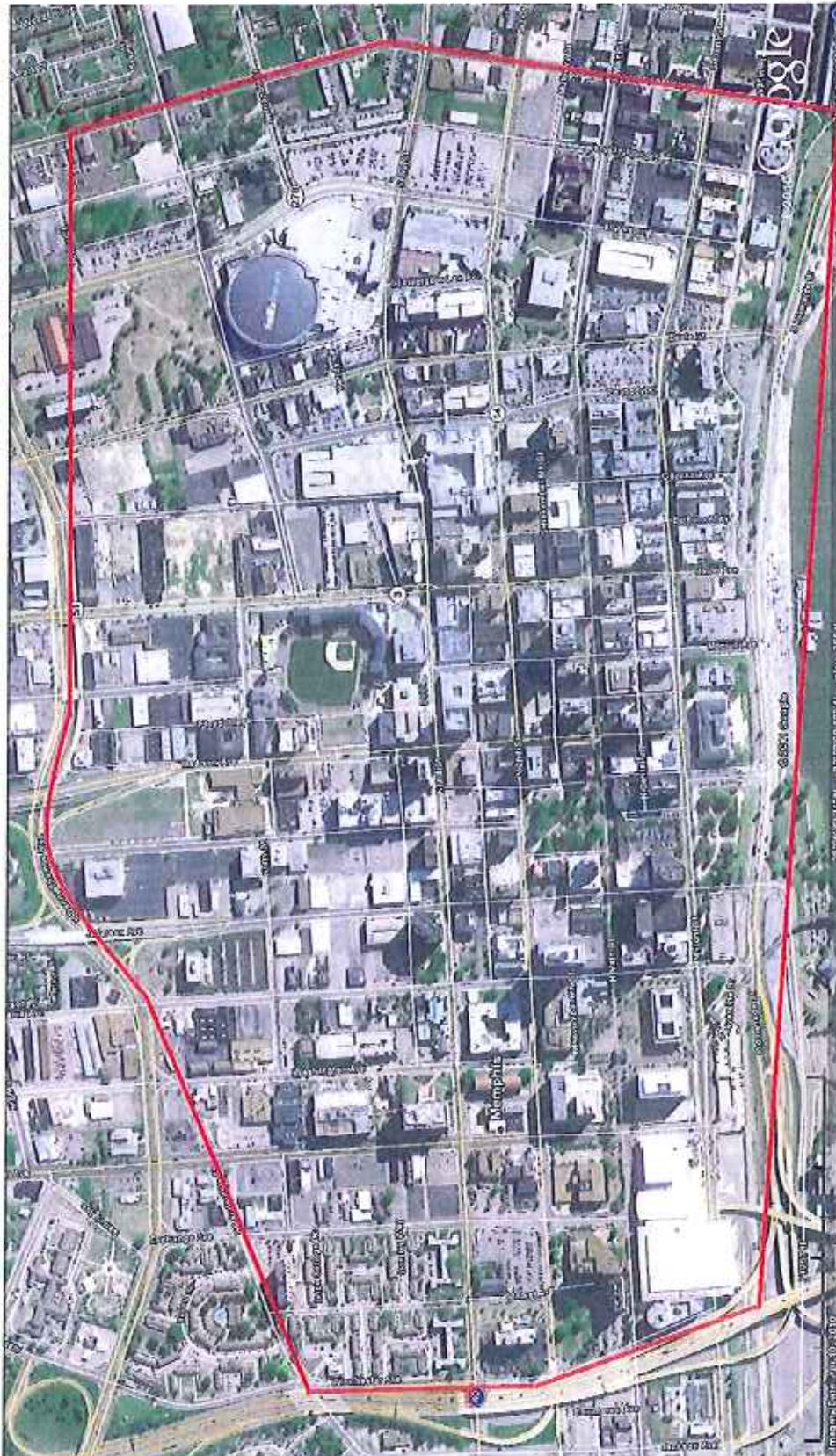
City of Memphis 2007 - 2010 On-Street Revenue Summary						
	2007	2008	2009	2010	2007-2010 Growth	2007-2010 CAGR
On-Street Meters	586,737	479,125	429,347	460,000	(126,737)	-7.8%

Survey Area & Inventory

DOWNTOWN ON-STREET PARKING INVENTORY

ConsulPark reviewed parking throughout all of Memphis and focused specifically on the downtown core for the detailed study area. The study area is contained within the boundaries of Highway 40 to the north, Vance Avenue to the south, Promenade St./Riverside Drive to the west and Danny Thomas Boulevard to the east. The study area is shown in the aerial photo on the following page. This area includes **774 metered parking spaces** which represent **62% of the purported 1,250 metered spaces** in the entire City. Although the City does not report revenue by area, it is clear that this area represents a larger portion of the City's parking revenue.

Figure 1 Survey Area



Missing Meters

The survey area was inspected block by block to confirm the number of metered parking spaces on each block front. The number of missing meters was noted as were the number of potential metered spaces within blocks that currently have metered parking.

Table 3 Meter Inventory

SURVEY AREA SUMMARY					
Street Name	West Side of Street	East Side of Street	Total Meter Spaces	Meters Missing	% Missing
WAGNER PL.	30	0	30	1	3.33%
FRONT	22	4	26	1	3.85%
MAIN	2	0	2	0	0.00%
2 ND	31	8	39	9	23.08%
3 RD	55	23	78	6	7.69%
HERNANDO	11	4	15	0	0.00%
4 TH	35	34	69	6	8.70%
N. LAUDERDALE	20	14	34	0	0.00%
Avenue Name	North Side of Avenue	South Side of Avenue	Total Meter Spaces	Meters Missing	% Missing
MARKET	8	7	15	2	13.33%
EXCHANGE	51	25	76	0	0.00%
WASHINGTON	11	7	18	2	11.11%
ADAMS	25	25	50	3	6.00%
JEFFERSON	27	21	48	13	27.08%
COURT	53	35	88	3	3.41%
MADISON	5	5	10	4	40.00%
MONROE	30	18	48	2	4.17%
UNION	6	25	31	4	12.90%
GAYOSO	6	5	11	0	0.00%
PEABODY PL.	26	16	42	0	0.00%
BEAL ST.	11	12	23	4	17.39%
LINDEN	12	9	21	0	0.00%
SURVEY AREA TOTAL	477	297	774	60	7.75%
2010 On-Street Revenue =		\$ 460,000 x 7.75%	=	\$ 35,650	

Detailed breakdown of each block can be found in Appendix A

As indicated in the block by block detail in Appendix A, existing equipment is inadequate and often noticeably missing either from removal or vandalism. Block faces commonly have meter poles with no meter heads or unregulated parking areas where poles and meters once collected revenue. Certain blocks previously designated and regulated as paid parking areas are missing as many as 40% of their meters. Of the 774 designated metered spaces in the study area, 60 or 7.75% were missing meter heads, meter poles or both. Simply reinstalling meters where they are missing would recoup more than \$35,000 in annual revenue.

Missing Meters and Poles



Potential Meter Locations

Unregulated Areas throughout Downtown

In areas of downtown, there are many unregulated and free parking blocks in between regulated, paid parking blocks. Inconsistent regulation and enforcement confuse visitors seeking a legitimate parking space and add unnecessary stress to a trip downtown.

Many of these unregulated spaces are block faces on streets that were probably regulated at some point in the past. Due to construction on adjacent properties, sidewalk improvements, roadwork or other reasons, the meters were removed and never re-installed. In some cases, it is possible that these areas never had meters but there is no obvious reason why they do not.



2nd St.



Third St. North of Union Ave.



3rd St.



2nd St. before Court

A minimum of 150 additional metered parking spaces are obtainable in the downtown core where paid parking already exists. This represents a potential 20% increase in the number of spaces within the study area. These much needed spaces would serve to standardize the downtown core with the consistent application of regulated parking while generating approximately \$92,000 in increased revenue.

Table 4 Potential Meters

2ND		
West Side of Street	East Side of Street	Potential Meter Spaces
Adams to 2	Jefferson	2
Jefferson to 8	Court	8
Madison to 1	Monroe 0	1
Union to 11	Gayoso 0	11
Gayoso to 10	Peabody Place 0	10
<i>Total</i>		32
3RD		
West Side of Street	East Side of Street	Potential Meter Spaces
Beal to 9	Linden 0	9
Gayoso to 5	Peabody Place 8	13
Union to 8	Gayoso 5	13
Monroe to 0	Union 10	10
Market to 5	Exchange 0	5
<i>Total</i>		50
<i>*Pick one side of the street and regulate with meters</i>		
N. LAUDERDALE		
West Side of Street	East Side of Street	Potential Meter Spaces
Exchange to 5	Poplar 7	12
Poplar to 7	Washington 4	11
<i>Total</i>		23
POPLAR		
North Side of Avenue	South Side of Avenue	Potential Meter Spaces
Main to 0	2nd St. 5	5
<i>Keep cab stand</i>		

ADAMS		
North Side of Avenue	South Side of Avenue	Potential Meter Spaces
2nd St. to 3	3rd St. 0	0
UNION		
North Side of Avenue	South Side of Avenue	Potential Meter Spaces
Main St. to 0	2nd St. 4	4
GAYOSO		
North Side of Avenue	South Side of Avenue	Potential Meter Spaces
Wagner to 0	Front St. 10	10
Front St. to 0	Main St. 15	15
Main St. to 0	2nd St. 13	13
<i>Total</i>		38

Total Potential Meters within currently regulated areas	152
Total Meters in study area (152 is 20% of 774)	774
2010 On-Street Revenue =	\$ 460,000
\$ 460,000 x 20% =	\$ 92,000

**Expanded Parameter Meter Locations
Potential for New Meters in Sports and Entertainment Zone**

On-street parking systems benefit from what are known as parameter parking zones that act as a buffer to busier nearby zones. Often, it is necessary to install meters one or two blocks further than the intended area to prevent spillover into nearby unregulated areas.

On-street parking in the heavily trafficked sports and entertainment district is hindered by the lack of a definitive boundary. There are no “parameter” meters to corral parkers into the regulated parking areas and this encourages many visitors to drive an extra block to avoid paying for parking. Additional meters installed on Pontotoc Avenue, Mulberry and Beal Streets would retain parkers in regulated zones during non peak periods and generate revenue during peak periods on weekends and during Grizzlies games. The same should be done for Gayoso Ave. and Beal St. from 4th St. east to Danny Thomas Boulevard.

Table 5 Recommended Parameter Meters

MULBERRY		
West Side of Street	East Side of Street	Potential Meter Spaces
Linden to 15	Pontotoc 0	15
Pontotoc to 0	Vance 14	14
<i>Total</i>		29
PONTOTOC		
North Side of Avenue	South Side of Avenue	Potential Meter Spaces
Main to 8	Mulberry 8	16
Mulberry to 7	2nd St. 6	13
2nd St. to 16	3rd St. 0	16
<i>Total</i>		45
BEAL		
North Side of Avenue	South Side of Avenue	Potential Meter Spaces
4 th to 20	Danny Thomas 30	50
GAYOSO		
North Side of Avenue	South Side of Avenue	Potential Meter Spaces
4 th to 12	Danny Thomas 12	24
Total Parameter Meters		148



Mulberry St.



Vance Ave.

The revenue from these spaces has been estimated based on a typical week of average traffic and the number of events at the Fedex Forum. It is important to note that these numbers are only obtainable if the recommendation for extended hours is implemented as detailed in a later section.

Table 6 Additional Meters

Additional Meters in Sports and Exhibition Area			
Typical Week		Event Days	
		60 Events	
Total # of proposed meters	148	Total # of proposed meters	148
Proposed Hourly Rate	\$ 1.00	Proposed Hourly Rate	\$1.00
Number of Hours Projected/Week	3,700	Number of Hours Projected/Week	592
Number of Hours Projected/Month	16,033	Number of Hours Projected/Month	2,960
Number of Hours Projected/Year	192,400	Number of Hours Projected/Year	35,520
Occupancy Rate	60%	Occupancy Rate	75%
Compliance	80%	Compliance	80%
Paid Hours of Parking Per Year	92,352	Paid Hours of Parking Per Year	21,312
Parking Meter Revenue in Year 1	92,352	Parking Meter Revenue in Year 1	21,312
Projected Meter Revenue		113,664	

Parking meter revenue from these 148 potential metered spaces is estimated to be approximately \$113,000.

The City will also realize increased fine revenue when these areas are added to the enforcement routes. This expanded area, citations from the added meters mentioned above and increased capture rates, will result in estimated additional fine revenue of \$310,000 or 40% of the current amount.

Other areas of Memphis lack adequate on-street regulation as well. The historic Pinch district could benefit from on-street meters and parking meters in the Main Street South area could be expanded as well. Incremental revenue estimates for these areas are not included below but the City should continue to explore the financial and practical benefits of expanding into these areas.

OCCUPANCY AND COMPLIANCE

ConsulPark reviewed parking throughout all of Memphis and focused specifically on the downtown core to perform the following space utilization surveys and determine the rate of payment compliance.

Randomly selected streets and block faces were studied for a 5-6 hour period to determine occupancy level, the paid rate for an occupied space (compliance rate) and the rate at which occupied but unpaid spaces are cited. This information was obtained on a Friday from the hours of 11:30 am – 4:00 pm.

Space Utilization Survey

As part of the study, a parking inventory and an on-street parking utilization analysis were conducted. This information is the basis for a typical parking study. The number of cars parked compared to the number of total available spaces determines space utilization. **This figure is commonly discussed as an occupancy rate which is the number of vehicles parked divided by the number of spaces inventoried.**

Occupancy rates on a block by block basis were determined. While these figures are particularly important based on an individual block or area, the combined stats for the entire study are equally relevant. On average, for each hour from 11:30 AM – 4 PM, the entire study area reported 88% occupancy (Table 7). As detailed below in Table 8, certain blocks reported 100% of the legitimate spaces occupied for hours on end. The occupancy rate in many sections exceeded 100% due to the large number of illegally parked vehicles both in No Parking Anytime spaces and loading zones. Vehicles parked illegally or in loading zones were not factored into the occupancy figures.

Table 7 Average Occupancy and Compliance

Average Occupancy and Compliance by Hour			
Time	Average Occupancy	Average Unpaid	Average Paid
11:30	96%	59%	41%
12:00	80%	59%	41%
12:30	90%	66%	34%
13:00	93%	56%	44%
13:30	93%	61%	39%
14:00	88%	53%	47%
14:30	82%	49%	51%
15:00	86%	58%	42%
15:30	86%	66%	34%
16:00	83%	53%	47%
AVG	88%	58%	42%

Generally speaking, occupancy rates in excess of 85% are considered "FULL" because at these rates, spaces are not immediately evident and drivers circle blocks looking for the few available spaces. This causes additional congestion, traffic, increased emissions, driver frustration and indicates that the on-street parking spaces are not meeting their intended use. This lack of available on-street parking during peak periods potentially discourages future visits and could stifle the economic vitality of the area.

Table 8 Occupancy by Street (11:30am – 4:00pm)

Jefferson			
	AVG Occupancy	Unpaid	Paid
Main to 2nd	93%	74%	26%
Front to Main	80%	55%	45%
Adams			
Main to Front (Side A)	96%	60%	40%
Main to Front (Side B)	98%	34%	66%
2nd to Main	96%	43%	57%
3RD TO 2ND	100%	57%	43%
Peabody Place			
Main to 2nd	81%	51%	49%
Second			
Monroe to Union	81%	51%	49%
Monroe			
Front to Main	94%	83%	17%
Main to Second	87%	66%	34%
Front to Main	78%	68%	32%
Main to Second	63%	73%	27%
Union			
Second to Main	80%	48%	52%
Main to Front	85%	81%	19%
3rd			
Adams to Jefferson (Side A)	93%	17%	83%
Adams to Jefferson (Side B)	89%	29%	71%
Union to Washington	96%	30%	70%
Monroe to Madison (Side A)	80%	84%	16%
Monroe to Madison (Side B)	100%	60%	40%
Court to Jefferson	75%	88%	13%
Adam to Washington (Side A)	100%	50%	50%
Adams to Washington (Side B)	87%	62%	38%
Jefferson To Court	92%	97%	3%
Court to Madison	82%	51%	49%
Monroe to Union	93%	95%	5%
Exchange			
Main to Second	95%	37%	63%

Compliance Rate

In addition to occupancy statistics, data collectors verified the number of paid vehicles compared to expired meters when the spaces were occupied. This provides a compliance rate that indicates the amount of time a space was occupied paid or occupied and not paid. A low compliance rate indicates that vehicles are occupying spaces and not paying the parking meters.

While the on-street parking system absorbs the stress of near 100% occupancy, the compliance rate (rate of payment) is a low 42%. This factor includes adjustments for disabled parking placards which park for free in any legitimate parking space. The number of these disabled placards was high too. In some blocks, 45% of the spaces were occupied by parkers with disabled placards and the other spaces were occupied and unpaid.

Compliance rates of 60-80% are expected when an on-street system is operating efficiently. There will always be parkers who choose not to pay but cajoling compliance through convenient payment methods and enforcement will increase the compliance rate to a more acceptable level.

Table 9 Increased Compliance Summary

Increased Compliance Summary	
Current Revenue with Compliance at 42%	\$ 460,000
Potential Revenue Based on 100% Compliance	1,095,238
Projected Revenue at only 70%	766,667 ←
Projected Increase from Improved Compliance	306,667

As indicated above, an increase in the compliance rate from today's 42% to a better though conservative rate of 60% will result in \$306,667 of increased revenue based on today's revenue of \$460,000. This number climbs to 444,000 per year when combined with the affect of the technology enhancements recommended and explained later in this report.

Violations

On-street parking must be enforced to garner compliance. The number one incentive for an individual to pay a parking meter is to avoid a citation. In the City of Memphis, this citation is a \$21 infraction for parking at an expired meter. Repeat visitors who do not anticipate a threat of receiving a violation, will park for increasing amounts of time without paying for parking. A large portion of the general public will only pay if there is a genuine threat of a parking citation.

Parking enforcement throughout the study area and in Memphis in general is inconsistent at best and largely absent on the day studied. Parking citations were very uncommon in the observations noted on the day surveyed. Many vehicles were observed parking for hours with expired meters and not receiving citations.

Loading zone violations were very common and regular vehicles are permitted to park in loading zones simply by turning on their hazards. There was no time limit control over the duration of any vehicle in a loading zone. This leaves the loading zones completely full for most of the day and requires delivery to park illegally as was documented in the following photos.



It was also noted that no efforts were made to monitor compliance with the stated time restrictions. This allows parkers to "feed meters" multiple times without moving their vehicles. Vehicles were allowed to park in the same spaces all day regardless of the stated time limit.

Recommendations for Increased Compliance and Turnover

It is recommended that on-street parking meters in Memphis be more adequately enforced to obtain the objectives of the on-street parking system. Without proper enforcement, there will continue to be little compliance and stagnant turnover. This low turnover will clog high demand spaces, increase congestion and stifle business in the subject areas. The following measures are recommended to improve enforcement efforts:

- Ⓟ During the peak periods, increase the visible presence of enforcement in the high trafficked areas.
- Ⓟ Change enforcements routes and stagger shifts to add randomness to the work.
- Ⓟ Add part time or full time employees during peak periods.
- Ⓟ Change the sunset law on one year old citations. This process creates low moral within the enforcement department and encourages non compliance.
- Ⓟ Increase the amount of the citation
- Ⓟ Use electronic chalking methods "license plate capture" to enforce time zones.

After 3-6 months of increased enforcement, the violation capture rate will increase, the compliance rate will increase and the occupancy rate will begin to decline. Eventually, a compliance rate of 60-80% and violation capture of 30-40% will create an occupancy rate of 80-90%. All of these things will benefit the general parking public and provide additional parking revenues for the City both from meters and fines.

Enhanced enforcement is the best tool to gain increased compliance. This too will generate additional revenue through increased citations. The recommendations above will increase the violation capture rate and also increase total fine revenue. As mentioned in a previous section of this report, it is anticipated that the replacement of missing meters, expansion into new areas and enforcement efficiencies will add a projected \$310,000 in additional fine revenue.

Fine Collection Rate

After fines are issued by the enforcement department or the police department, the collection of these citations becomes the responsibility of the City Clerk’s office.. According to the City Clerk’s office, the collection rate for citations is a dismal 30%. This statistic is seriously hampering the overall effectiveness of the on-street parking system and costing the City of Memphis millions of dollars annually. All measures to increase this rate to a minimum of 70% and possibly 80-90% should be considered and acted upon as soon as possible.

The financial impact of increasing the collection rate to 80% based on the citations issued in 2010 is estimated to be \$1,169,000.

Table 10 Citation Revenue

City of Memphis Citation Revenue			
	# of Citations	Avg. Fine Rate	Amount of Fines
Citations Issued in 2010	97,362	24.98	2,432,103
		Current Collection Rate	32%
		Amount of Fine Revenue in 2010	776,495
		Improved Collection Rate	80%
		Projected Fine Revenue at Improved Rate	1,945,682
		Increased Revenue from Improved Collections	1,169,187

Recommendations to Increase the Fine Collection Rate

- Ⓟ According to the engineering department, parking citations that are uncollected one year after they are issued are automatically voided by law. This is very costly to the City of Memphis and hampers the ability of the parking system to operate effectively. If this is a municipal ordinance, it is strongly recommended that it be changed.
- Ⓟ Many municipalities have successfully collaborated with the state vehicle title and registration authorities to place temporary holds on license plates with three or more outstanding parking citations. This practice works well and should be considered for Memphis.
- Ⓟ The Memphis Police Department is currently using advanced technology that deploys license plate recognition (LPR) cameras to locate vehicles with three or more outstanding violations. Expanding this use for parking enforcement personnel should be considered.
- Ⓟ Many specialty companies provide fine collection services and are expert at driving up collection rates. This option deserves serious consideration given the low rates experienced today.

Equipment

EQUIPMENT EVALUATION AND RECOMMENDATIONS

Memphis has a reported 1,250 single space parking meters deployed throughout the City. Both electronic meters (POM APM) and mechanical Duncan meters are in service. The mechanical meters are extremely old and in visibly poor condition. The electronic POM meters are more modern and it appeared that they were all in working order though they do not provide many of benefits of today's meters. As described in detail earlier in this report, 60 of the 774 meters in the study area were missing all together.



Single space parking meters that accept only coins are relatively unchanged from the 1930's. In some cases, electronic mechanisms count the coins and add time to the display but the customer interface is the same now as it was then. These meters are not user friendly and make parking compliance difficult.

New meters, single and multi space, offer additional payment options and other features that provide benefits for the municipality as well the user. The advantages and disadvantages of both are the following:

Advantages of Multi-Space Meters

- Ⓟ Accept multiple payment options: coins, bills, credit/debit cards and smart cards
- Ⓟ Eliminate piggy backing on unexpired time on meters
- Ⓟ Increase space count by eliminating space markings
- Ⓟ Function as pay and display or pay by space
- Ⓟ Remove meter clutter from the streetscape
- Ⓟ Communicate in real time to send alarms and notices
- Ⓟ Provide user programmability for multiple rates and easy rate changes
- Ⓟ Consolidate collection of many devices into one
- Ⓟ Create validation and advertising options on the receipts

Disadvantages of Multi-Space Meters

- Ⓟ New technology may be intimidating and confusing to certain users
- Ⓟ One down machine multiplies lost revenue
- Ⓟ Requires users to remember their space or walk back to their car to display receipt
- Ⓟ More sophisticated technology is more complicated and costly to maintain
- Ⓟ Reoccurring costs for communication and consumables
- Ⓟ Communicate in real time to send alarms

Advantages of Single Space Meters

- Ⓟ User acceptable based on years of use
- Ⓟ Few consumables with long lasting batteries
- Ⓟ Easy to maintain
- Ⓟ One down machine only affects one space
- Ⓟ New models accept credit cards
- Ⓟ New models have devices that "zero out" time on the meter when a car leaves
- Ⓟ Requires no additional signage

Disadvantages of Single Space Meters

- Ⓟ Require unsightly poles
- Ⓟ Require marked spaces and results in less spaces
- Ⓟ Credit card accepting devices are new and not well proven
- Ⓟ Still requires coin counting

New single space meters that accept credit cards are recommended in this instance. Given the public's familiarity with single space meters and the easy installation on existing poles, the switch to single space meters that accept credit cards would be the smoothest transition.

The financial model included below includes benefits of these meters. Many municipalities have realized increased revenues of 30-70% when switching to these devices. They increase revenue for the following reasons:

- Ⓟ Increased payment options result in increased revenues. Most customers intend to pay but they do not always have coins.
- Ⓟ The ability to set meters to zero time when a car leaves eliminates piggy backing by customers on others' payments.
- Ⓟ Typically, average credit card transactions are larger transactions than average coin payments. Customers tend to pay for longer times with credit cards.

Based on the number of existing meters and number of recommended meters plus a surplus, the cost of 1,770 single space meters that accept credit cards is detailed in the following table. A revenue increase of 45% was factored into the projections as a result of these technology enhancements. The expected revenue increase is more than \$400,000 when applied to all of the existing and proposed meters with the affects of the proposed rate increase.

Table 11 Single Space Meters with Credit Card and Sensors

Single Space Meters with Credit Card and Sensors		
Quantity	Description	Est. Price
1,770	Single Space Meter	708,000
1	Software	8,000
1	Central Server and Hardware	18,000
7	Handheld for Enforcement	14,000
50	Collection Canister (For entire system)	8,000
5	Coin Counter (For entire system)	10,000
ESTIMATED TOTAL		\$ 766,000
Reoccurring Costs		
1,000	Communication Costs \$20.10 /month	241,200
	2nd Year Warranty Costs	45,000

Space occupancy violations
maintenance

- carts

- credit card

1,770 meter

30 per meter maintenance

enable credit card

On-Street Meter Rates

ON-STREET METER RATES

Since the advent of on-street parking, the number one objective of a well run on-street system is to provide sufficient turnover and space availability. Based on the high occupancy numbers of Memphis's on-street spaces, this objective is not being met. The on-street meter rate throughout all of Memphis is \$0.75 per hour. This is low given these high occupancy levels. It is also low end of the spectrum as compared to other comparably sized cities and as compared to cities similarly geographically situated.

Rate Survey of Comparably Sized Cities

Table 12 Rate Comparisons by Population

Rate Comparisons by Population				
City	Population	One Hour Rate	\$ Diff. from AVG.	% Diff. from AVG.
Nashville, TN	605,473	1.50	0.11	8%
Baltimore, MD	637,418	2.00	0.61	44%
Boston, MA	645,169	1.25	(0.14)	-10%
Memphis, TN	676,640	0.75	(0.64)	-46%
Charlotte, NC	709,441	1.00	(0.39)	-28%
Fort Worth, TX	727,577	1.25	(0.14)	-10%
Columbus, OH	769,332	2.00	0.61	44%
	AVG	1.39		
	Mode	2.00		
	Median	1.25		

Memphis's on-street hourly parking rates lag the average of comparably sized cities by \$0.64 or 46% per hour.

Rate Survey of Regionally Situated Cities

Table 13 Rate Comparisons by Geographic Area

Rate Comparisons by Geographic Area				
City	Population	One Hour Rate	\$ Diff. from AVG.	% Diff. from AVG.
Jackson, MS	175,021	1.50	0.62	70%
Knoxville, TN	185,100	0.67	(0.21)	-24%
Little Rock, AR	191,933	0.50	(0.38)	-43%
Birmingham, AL	230,131	0.50	(0.38)	-43%
Chattanooga	170,880	0.75	(0.13)	-15%
Nashville, TN	605,473	1.50	0.62	70%
Memphis, TN	676,640	0.75	(0.13)	-15%
	AVG	0.88		
	Mode	1.50		
	Median	0.75		

When compared to smaller, regionally similar cities such as Nashville, Little Rock, Jackson, MS, etc., Memphis's rates trail the average hourly rates of these cities by 15% or \$0.13 per hour.

Combined Rate Survey

Table 14 Rate Comparisons by Geographic Area and Population

Rate Comps by Geographic Area and Population				
City	Population	One Hour Rate	\$ Diff. from AVG.	% Diff. from AVG.
Chattanooga, TN	170,880	0.75	(0.37)	-33%
Jackson, MS	175,021	1.50	0.38	34%
Knoxville, TN	185,100	0.67	(0.45)	-40%
Little Rock, AR	191,933	0.50	(0.62)	-55%
Birmingham, AL	230,131	0.50	(0.62)	-55%
Lexington, KY	296,545	1.00	(0.12)	-11%
Cincinnati, OH	333,012	1.00	(0.12)	-11%
Sacramento, CA	466,676	1.25	0.13	12%
Kansas City, MO	482,299	1.00	(0.12)	-11%
Portland, OR	566,143	1.60	0.48	43%
Louisville, KY	566,503	0.75	(0.37)	-33%
Nashville, TN	605,473	1.50	0.38	34%
Baltimore, MD	637,418	2.00	0.88	79%
Boston, MA	645,169	1.25	0.13	12%
Memphis, TN	676,640	0.75	(0.37)	-33%
Charlotte, NC	709,441	1.00	(0.12)	-11%
Fort Worth, TX	727,577	1.25	0.13	12%
Columbus, OH	769,332	2.00	0.88	79%
*Indianapolis, IN	807,584	1.00	(0.12)	-11%
	AVG	1.12		
	Mode	1.00		
	Median	1.00		

* Going to \$1/HR on March 1, 2011. First increase in 25 years

When Memphis's rates are compared to the average hourly rates of cities comparable in size and geographical location, Memphis is lower by \$0.37 per hour or 33%.

These stats, combined with the high occupancy of the downtown system, indicate a need to upwardly adjust the on-street rates. Several rate scenarios are presented on the following page for the City's consideration.

Table 15 Rate Adjustments

Current Revenue
Rate/HR @ Current Rates
0.75 460,000



\$0.50 Increase in 2011 and \$0.25 Each 3rd Year											
PROPOSED	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Post 2011 CAGR
Rate/HR	1.25	1.25	1.50	1.50	1.75	1.75	2.00	2.00	2.25	2.25	6.1%
\$ Increase	0.50	0.50	0.75	0.75	1.00	1.00	1.25	1.25	1.50	1.50	10 Year
% Increase	66.67%	66.67%	100.00%	100.00%	133.33%	133.33%	166.67%	166.67%	200.00%	200.00%	Rev. Impact
Annual Rev. Inc.	306,667	306,667	460,000	460,000	613,333	613,333	766,667	766,667	920,000	920,000	6,133,333

\$0.50 Increase in 2011 and \$0.25 Each 4th Year											
PROPOSED	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Post 2011 CAGR
Rate/HR	1.25	1.25	1.25	1.50	1.50	1.50	1.75	1.75	1.75	2.00	4.8%
\$ Increase	0.50	0.50	0.50	0.75	0.75	0.75	1.00	1.00	1.00	1.25	10 Year
% Increase	66.67%	66.67%	66.67%	100.00%	100.00%	100.00%	133.33%	133.33%	133.33%	166.67%	Rev. Impact
Annual Rev. Inc.	306,667	306,667	306,667	460,000	460,000	460,000	613,333	613,333	613,333	766,667	4,906,667

\$0.25 Increase in 2011 and Each 3rd Year											
PROPOSED	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Post 2011 CAGR
Rate/HR	1.00	1.00	1.25	1.25	1.50	1.50	1.75	1.75	2.00	2.00	7.2%
\$ Increase	0.25	0.25	0.50	0.50	0.75	0.75	1.00	1.00	1.25	1.25	10 Year
% Increase	33.33%	33.33%	66.67%	66.67%	100.00%	100.00%	133.33%	133.33%	166.67%	166.67%	Rev. Impact
Annual Rev. Inc.	153,333	153,333	306,667	306,667	460,000	460,000	613,333	613,333	766,667	766,667	4,600,000

\$0.25 Increase in 2011, Each Third Year until 2015 and \$0.10 Each 3rd Year After 2015											
PROPOSED	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Post 2011 CAGR
Rate/HR	1.00	1.00	1.25	1.25	1.50	1.50	1.60	1.70	1.80	1.90	6.6%
\$ Increase	0.25	0.25	0.50	0.50	0.75	0.75	0.85	0.95	1.05	1.15	10 Year
% Increase	33.33%	33.33%	66.67%	66.67%	100.00%	100.00%	113.33%	126.67%	140.00%	153.33%	Rev. Impact
Annual Rev. Inc.	153,333	153,333	306,667	306,667	460,000	460,000	521,333	582,667	644,000	705,333	4,293,333

Rate Recommendations

ConsulPark recommends an hourly rate of \$1.50 per hour for Memphis. If this is not immediately obtainable, an immediate, minimum \$0.25 per hour rate increase and consistent upward pressure to stabilize the parking system is recommend. This will bring the hourly rate to \$1.00 per hour in Year 1 and hopefully bring a commitment for future rate increases to reach the optimal level.

ConsulPark strongly recommends a mechanism that allows intrinsic growth in the parking rates. Too often, on-street parking rates are set and forgotten for years or even decades. For example, the city of Indianapolis recently raised its parking rates \$0.25 which was the first rate increase 25 years.

To be conservative, we projected revenues with a \$0.25 increase in Year 1 and \$0.25 increases each third year after. The impact of this pricing strategy is considerable and could generate additional annual income of \$153K in the first two years and more than \$300K annually in years 3 and 4.

More important than the revenue increases, the recommended rate structure will allow the system to function as an on-street system is designed to function by replacing the long-term, more than 4 hour parker with a limited duration parker of 1-2 or 3 hours where appropriate.

Need for Expanded Hours of Operation

All of the parking meters in Memphis are enforced from 8:00 AM to 6:00 PM Monday through Friday. The parking enforcement staff work from 8:00 AM to 4:00 PM. Busy, bustling cities that have the nightlife activities common to Memphis require a robust, extended-hours parking operation to support these activities. Extremely heavy traffic persists through most of the downtown area well after 6PM and especially on weekends. It is highly recommended that the hours of operation and enforcement be extended to midnight each day and include Saturdays and Sundays specifically in the downtown area.

Today, parking in the evening and on weekends is much of a free for all. The spaces are occupied by long term employees and not available to visitors. There are thousands of patrons attempting to access these spaces and regulation and enforcement will create space availability. Visitors to Downtown Memphis in the evenings and on weekends will more likely find a parking space if these spaces are regulated and controlled. Extended enforcement hours will demonstrate a consistent application of regulation and better control of the City's on-street parking assets.

Extending hours will require additional enforcement personnel as explained in a later section of this report. The financial benefits, estimated to be more than \$855,000 when compounded by the other recommendations, are explained in the following table.

Table 16

Projected Revenue from Extended Hours	
Current Hours of Enforcement Per Week	50
Current Hours of Enforcement Per Year	2,600
# of Existing Meters	1,250
Current Revenue	460,000
Current Revenue Per Hour Per Meter	0.14
Additional Hours of Enforcement Per Week	62
Additional Hours of Enforcement Per Year	3,224
Revenue based on Daytime Utilization	570,400
Estimated Utilization Compared to Day Time	50%
Revenue Potential Based on Existing System	285,200
Multiplier for Enhancements, New Meters, Expansion, Rate Increase, etc.	3
Projected Revenue from Extended Hours	855,600

STAFFING PLAN EVALUATION AND RECOMMENDATION

The on-street parking system is managed by the traffic and engineering department. According to the engineering department, the on-street parking operation is managed with 7 full-time employees: 1 manager, 3 parking enforcement officers, 1 meter maintenance technician and 2 meter collectors. All of these individuals currently work from 8:00 AM to 4:30 PM. The combined salaries of these individuals represent \$247,000 in salaries and benefits. One additional enforcement position is vacant at this time. Additionally, \$5,000 is budgeted each for year meter parts and repairs.

Table 17 Existing Operating Expenses

Existing Operating Expenses				
Meter Collector	2	\$	26,941	\$ 53,882
Meter Repair	1		22,967	22,967
Parking Enforcement	3		26,279	78,837
Manager	1		42,038	42,038
Sub-Total Payroll				197,724
Employee Taxes and Benefits 25%				49,431
Total Payroll and Benefits				247,155
Meter Maintenance				5,000
Existing Budgeted Operating Expenses				\$252,155

Parking is not assigned a distinct cost center for tracking revenue and expenses as an individual business unit. Therefore, the overhead costs of management from the engineering department, finance support from the finance department and vehicle and other equipment costs were not provided.

It is recommended that the vacant position is filled and three additional enforcement personnel be added. These four additional enforcement personnel will provide additional enforcement for the recommended extended hours. Based on the existing salary levels and a benefit rate of 25%, these four employees will cost the City approximately \$125,000 per year. This information appears Projected Operating Results in the Financial Projections section of this report.

It is estimated that these added FTE's will increase citation revenue by 80% or \$869,000 annually. This is conservative given that the number of enforcement hours will increase by 124% (increase of 62 hours from 50 to 112) and enforcement personnel will increase 133% (7 in total from today's 3).

FINANCIAL PROJECTIONS

Revenue Projections

The following revenue projections have been developed based on the recommendations contained in this report. Parking meter revenue and fine revenue projections have been layered with improvements as explained. The report shows all of the potential revenue sources and derives incremental revenue from subtracting the existing revenue streams for each category.

Today's current income stream from parking totals \$1,236,000 from both parking meter income and fine revenue. We project parking income can be raised to \$5,527,000 in the first full year after these recommendations have been implemented. This is a very achievable increase of \$4,490,000.

Financial Projections

FINANCIAL PROJECTIONS

Revenue Projections

The following revenue projections have been developed based on the recommendations contained in this report. Parking meter revenue and fine revenue projections have been layered with improvements as explained. The report shows all of the potential revenue sources and derives incremental revenue from subtracting the existing revenue streams for each category.

Today's current income stream from parking totals \$1,236,000 from both parking meter income and fine revenue. We project parking income can be raised to \$5,527,000 in the first full year after these recommendations have been implemented. This is a very achievable increase of \$4,490,000.

Table 18 Revenue Projections

Revenue Projections											
Table Ref.	2010	Year 1	Year 2	Year 3	Year 4	Year 5	Year 5	Year 7	Year 8	Year 9	Year 10
1	\$ 460,000	\$ 460,000	\$ 460,000	\$ 460,000	\$ 460,000	\$ 460,000	\$ 460,000	\$ 460,000	\$ 460,000	\$ 460,000	\$ 460,000
15		153,333	153,333	306,667	306,667	460,000	460,000	613,333	613,333	766,667	766,667
3		613,333	613,333	766,667	766,667	920,000	920,000	1,073,333	1,073,333	1,226,667	1,226,667
4		47,533	47,533	59,417	59,417	71,300	71,300	83,183	83,183	95,067	95,067
6		122,667	122,667	153,333	153,333	184,000	184,000	214,667	214,667	245,333	245,333
1	460,000	897,197	897,197	1,121,497	1,121,497	1,345,796	1,345,796	1,570,664	1,570,664	1,794,474	1,794,474
Potential Revenue Increases											
9		403,739	403,739	504,674	504,674	605,608	605,608	706,799	706,799	807,513	807,513
15		444,667	444,667	555,833	555,833	667,000	667,000	780,390	780,390	889,645	889,645
1	460,000	855,600	855,600	1,069,500	1,069,500	1,283,400	1,283,400	1,501,578	1,501,578	1,711,799	1,711,799
1	776,495	1,704,005	1,704,005	2,130,007	2,130,007	2,556,008	2,556,008	2,988,767	2,988,767	3,408,957	3,408,957
1		2,601,203	2,601,203	3,251,504	3,251,504	3,901,804	3,901,804	4,559,430	4,559,430	5,203,431	5,203,431
Fine Revenue Enhancements											
10		310,598	310,598	310,598	310,598	310,598	310,598	310,598	310,598	310,598	310,598
		869,674	869,674	869,674	869,674	869,674	869,674	869,674	869,674	869,674	869,674
		1,169,187	1,169,187	1,169,187	1,169,187	1,169,187	1,169,187	1,169,187	1,169,187	1,169,187	1,169,187
		312,595	312,595	312,595	312,595	312,595	312,595	312,595	312,595	312,595	312,595
		3,125,954	3,438,550	3,438,550	3,438,550	3,438,550	3,438,550	3,438,550	3,438,550	3,438,550	3,438,550
		5,727,157	6,039,753	6,690,053	6,690,053	7,340,354	7,340,354	7,997,980	7,997,980	8,641,981	8,641,981
	\$ 1,236,495	4,490,662	4,803,258	5,453,559	5,453,559	6,103,859	6,103,859	6,761,485	6,761,485	7,405,486	7,405,486

Projected Increase in Operating Income

The anticipated incremental operating expenses such as payroll, benefits, increased communication costs for the meters and maintenance costs are included in the following report. Using the projected increased revenue from Table 18, the projected change in Net Operating Income is summarized. The majority of the recommendations contained in this report can be implemented with very little capital and little on-going costs.

The result is a potential increase to Operating Income of \$4 Million in the first year these recommendations are fully implemented. The results are projected to continue in later years and income from operations is projected to reach \$6.8 million in Year 10. These figures are summarized in Table 19 on the following page.

Additional Revenue Opportunities

The intent of this report is identifying immediate and conservatively obtainable measures. All of the recommendations contained herein are relatively easy to implement and are being done in cities across the nation. If these recommendations are implemented, the on-street parking system will develop and its intrinsic value as a tool for economic growth will be demonstrated. This will allow for future management practices that will have many benefits for the developing areas of Memphis and the City of Memphis's budget. The following revenue opportunities are the likely result of a well managed on-street parking system. To be conservative, none of these have been included in the financial models herein.

System Stability

Currently many areas have been targeted for meter removal due to misunderstood parking policy. The Medical Center area showed signs that dozens of meters had recently been removed. The engineering department mentioned a request to remove more meters in this area was under consideration. When on-street parking demonstrates its full potential, these misguided requests can be better defended. Re-establishing meters in areas outside the survey area and maintaining meters currently in place could recoup income estimated to be **\$75,000 to \$100,000 annually**.

Expanded Meters

As mentioned earlier, there are many areas of Memphis that lack adequate on-street regulation. The historic Pinch district could benefit from on-street meters and parking meters in the Main Street South area could be expanded as well. Incremental revenue from these areas when managed as explained herein could **generate additional parking income of \$0.5 to \$1million annually**.

Increased Fine Rate

If the recommended on-street rate adjustments are applied, parking fines will require adjustment eventually. The current fine rate of \$21 should rise to \$25 within the next 2 or 3 years. At the projected fine collection rates, this \$4 increase per citation will **add approximately \$595,000 annually**.

Table 19 Projected Operating Results



Projected Operating Results											
Table Ref.		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
18	Projected Increased Parking Revenue	4,490,662	4,803,258	5,453,559	5,453,559	6,103,859	6,103,859	6,761,485	6,761,485	7,405,486	7,405,486
	Required Operating Expenses										
	\$ 25,000 Additional FTE's	100,000	100,000	103,000	106,090	109,273	112,551	115,927	119,405	122,987	126,677
	25% Employee Taxes and Benefits	25,000	25,000	25,750	26,523	27,318	28,138	28,982	29,851	30,747	31,669
	30 Meter Warranty Fees \$	45,000	45,000	45,000	46,350	46,350	47,741	49,173	49,173	-	50,648
12	Meter Comm. Fees (1000 Meters) \$ 20.10	241,200	241,200	241,200	241,200	241,200	241,200	241,200	241,200	241,200	241,200
	5% Credit Card Processing Fees	52,024	52,024	65,030	65,030	78,036	78,036	91,189	91,189	104,069	104,069
	Total Required Operating Expenses	418,224	463,224	479,980	485,193	502,177	507,665	528,471	530,818	499,003	554,263
	Projected Increased Net Income	4,072,438	4,340,034	4,973,578	4,968,366	5,601,682	5,596,194	6,235,015	6,230,667	6,906,483	6,851,223
	3.00% Op. Ex Inflation Factor										
	Escalates Expenses annually										

Appendix A – Missing Meters

SURVEY AREA SUMMARY					
Street Name	West Side of Street	East Side of Street	Total Meter Spaces	Meters Missing	% Missing
WAGNER PL.	30	0	30	1	3.33%
FRONT	22	4	26	1	3.85%
MAIN	2	0	2	0	0.00%
2 ND	31	8	39	9	23.08%
3 RD	55	23	78	6	7.69%
HERNANDO	11	4	15	0	0.00%
4 TH	35	34	69	6	8.70%
N. LAUDERDALE	20	14	34	0	0.00%
Avenue Name	North Side of Avenue	South Side of Avenue	Total Meter Spaces	Meters Missing	% Missing
MARKET	8	7	15	2	13.33%
EXCHANGE	51	25	76	0	0.00%
WASHINGTON	11	7	18	2	11.11%
ADAMS	25	25	50	3	6.00%
JEFFERSON	27	21	48	13	27.08%
COURT	53	35	88	3	3.41%
MADISON	5	5	10	4	40.00%
MONROE	30	18	48	2	4.17%
UNION	6	25	31	4	12.90%
GAYOSO	6	5	11	0	0.00%
PEABODY PL.	26	16	42	0	0.00%
BEAL ST.	11	12	23	4	17.39%
LINDEN	12	9	21	0	0.00%
SURVEY AREA TOTAL	477	297	774	60	7.75%
<p>2010 On-Street Revenue = \$ 460.000 x 7.75% = \$ 35.650</p>					

Appendix A – Missing Meters

WAGNER PL.				
West Side of Street	East Side of Street	Total Meter Spaces	Meters Missing	% Missing
Monroe to 20	Gayoso 0	20	1	5.00%
Beal at 10	Wagner Pl 0	10	0	0.00%
<i>Totals</i>				
30	0	30	1	3.33%
FRONT				
West Side of Street	East Side of Street	Total Meter Spaces	Meters Missing	% Missing
Union to 15	Gayoso 0	15	0	0.00%
Linden to 7	Pontotoc 4	11	1	9.09%
<i>Totals</i>				
22	4	26	1	3.85%
MAIN				
West Side of Street	East Side of Street	Total Meter Spaces	Meters Missing	% Missing
Winchester to 2	Exchange 0	2	0	0.00%
2ND				
West Side of Street	East Side of Street	Total Meter Spaces	Meters Missing	% Missing
Poplar to 0	Washington 8	8	4	50.00%
Jefferson to 5	Court 0	5	3	60.00%
Court to 5	Maddison 0	5	0	0.00%
Maddison to 6	Monroe 0	6	2	33.33%
Monroe to 5	Union 0	5	0	0.00%
Beal to 10	Linden 0	10	0	0.00%
<i>Totals</i>				
31	8	39	9	23.08%

Appendix A – Missing Meters

3RD				
West Side of Street	East Side of Street	Total Meter Spaces	Meters Missing	% Missing
Exchange to 8	Poplar 0	8	1	12.50%
Washington to 11	Adams 4	15	0	0.00%
Adams to 6	Jefferson 6	12	0	0.00%
Jefferson to 12	Court 6	18	2	11.11%
Court to 8	Madison 2	10	0	0.00%
Maddison to 2	Monroe 5	7	0	0.00%
Monroe to 8	Union 0	8	3	37.50%
<i>Totals</i>				
55	23	78	6	7.69%
HERNANDO				
West Side of Street	East Side of Street	Total Meter Spaces	Meters Missing	% Missing
Union to 11	Gayoso 4	15	0	0.00%

Appendix A – Missing Meters

4TH				
West Side of Street	East Side of Street	Total Meter Spaces	Meters Missing	% Missing
Exchange to 0	Poplar 10	10	0	0.00%
Washington to 10	Adams 0	10	0	0.00%
Adams to 0	Jefferson 4	4	0	0.00%
Jefferson to 7	Court 9	16	6	37.50%
Court to 8	Maddison 0	8	0	0.00%
Maddison to 6	Monroe 4	10	0	0.00%
Monroe to 4	Union 7	11	0	0.00%
<i>Totals</i>				
35	34	69	6	8.70%
N. LAUDERDALE				
West Side of Street	East Side of Street	Total Meter Spaces	Meters Missing	% Missing
Winchester to 20	Exchange 14	34	0	0.00%
<i>*Potential Residential</i>				
MARKET				
North Side of Avenue	South Side of Avenue	Total Meter Spaces	Meters Missing	% Missing
2nd St. to 8	3rd St. 7	15	2	13.33%
EXCHANGE				
North Side of Avenue	South Side of Avenue	Total Meter Spaces	Meters Missing	% Missing
Main to 20	2nd St. 0	20	0	0.00%
2nd St. to 5	3rd St. 5	10	0	0.00%
3rd St. to 26	N. Lauderdale 20	46	0	0.00%
<i>Totals</i>				
51	25	76	0	0.00%

Appendix A – Missing Meters

WASHINGTON				
North Side of Avenue	South Side of Avenue	Total Meter Spaces	Meters Missing	% Missing
2nd St. to 11	3rd St. 7	18	2	11.11%
ADAMS				
North Side of Avenue	South Side of Avenue	Total Meter Spaces	Meters Missing	% Missing
Front St. to 9	Maint St. 4	13	0	0.00%
Main St. to 3	2nd St. 4	7	3	42.86%
2nd St. to 0	3rd St. 3	3	0	0.00%
3rd St. to 13	4th St. 14	27	0	0.00%
<i>Totals</i>				
25	25	50	3	6.00%
JEFFERSON				
North Side of Avenue	South Side of Avenue	Total Meter Spaces	Meters Missing	% Missing
Front St. to 9	Maint St. 0	9	4	44.44%
Main St. to 9	2nd St. 4	13	8	61.54%
2nd St. to 9	3rd St. 5	14	0	0.00%
3rd St. to 0	4th St. 12	12	1	8.33%
<i>Totals</i>				
27	21	48	13	27.08%

Appendix A – Missing Meters

COURT				
North Side of Avenue	South Side of Avenue	Total Meter Spaces	Meters Missing	% Missing
Riverside to 21	Front St. 0	21	1	4.76%
Main St. to 0	2nd St. 9	9	0	0.00%
2nd St. to 6	3rd St. 7	13	2	15.38%
3rd St. to 26	4th St. 19	45	0	0.00%
<i>Totals</i>				
53	35	88	3	3.41%
MADISON				
North Side of Avenue	South Side of Avenue	Total Meter Spaces	Meters Missing	% Missing
Front St. to 5	Main St. 5	10	4	40.00%
MONROE				
North Side of Avenue	South Side of Avenue	Total Meter Spaces	Meters Missing	% Missing
Riverside to 9	Front St. 3	12	0	0.00%
Front St. to 10	Main St. 5	15	0	0.00%
Main St. to 5	2nd St. 7	12	2	16.67%
2nd St. to 6	3rd St. 3	9	0	0.00%
<i>Totals</i>				
30	18	48	2	4.17%

Appendix A – Missing Meters

UNION				
North Side of Avenue	South Side of Avenue	Total Meter Spaces	Meters Missing	% Missing
Riverside to 0	Front St. 8	8	0	0.00%
Front St. to 0	Main St. 7	7	4	57.14%
Main St. to 0	2nd St. 3	3	0	0.00%
2nd St. to 6	3rd St. 7	13	0	0.00%
<i>Totals</i>				
6	25	31	4	12.90%
GAYOSO				
North Side of Avenue	South Side of Avenue	Total Meter Spaces	Meters Missing	% Missing
3RD St. to 6	4TH St. 5	11	0	0.00%
PEABODY PL.				
North Side of Avenue	South Side of Avenue	Total Meter Spaces	Meters Missing	% Missing
Front St. to 17	Main St. 8	25	0	0.00%
Main St. to 9	2nd St. 8	17	0	0.00%
<i>Totals</i>				
26	16	42	0	0.00%
BEAL ST.				
North Side of Avenue	South Side of Avenue	Total Meter Spaces	Meters Missing	% Missing
Front St. to 6	Main St. 7	13	4	30.77%
Main St. to 5	2nd St. 5	10	0	0.00%
<i>Totals</i>				
11	12	23	4	17.39%

Appendix A – Missing Meters

LINDEN				
North Side of Avenue	South Side of Avenue	Total Meter Spaces	Meters Missing	% Missing
Front St. to 12	Main St. 9	21	0	0.00%

Total Potential Meters

2ND		
West Side of Street	East Side of Street	Potential Meter Spaces
Adams to 2	Jefferson	2
Jefferson to 8	Court	8
Maddison to 1	Monroe 0	1
Union to 11	Gayoso 0	11
Gayoso to 10	Peabody Place 0	10
<i>Total</i>		32
3RD		
West Side of Street	East Side of Street	Potential Meter Spaces
Beal to 9	Linden 0	9
Gayoso to 5	Peabody Place 8	13
Union to 8	Gayoso 5	13
Monroe to 0	Union 10	10
Market to 5	Exchange 0	5
<i>Total</i>		50

**Pick one side of the street and regulate with meters*

Appendix A – Missing Meters

N. LAUDERDALE		
West Side of Street	East Side of Street	Potential Meter Spaces
Exchange to 5	Poplar 7	12
Poplar to 7	Washington 4	11
<i>Total</i>		23
POPLAR		
North Side of Avenue	South Side of Avenue	Potential Meter Spaces
Main to 0	2nd St. 5	5
<i>Keep cab stand</i>		
ADAMS		
North Side of Avenue	South Side of Avenue	Potential Meter Spaces
2nd St. to 3	3rd St. 0	0
UNION		
North Side of Avenue	South Side of Avenue	Potential Meter Spaces
Main St. to 0	2nd St. 4	4
GAYOSO		
North Side of Avenue	South Side of Avenue	Potential Meter Spaces
Wagner to 0	Front St. 10	10
Front St. to 0	Main St. 15	15
Main St. to 0	2nd St. 13	13
<i>Total</i>		38

Appendix A – Missing Meters

Total Potential Meters within currently regulated areas	152
Total Meters In study area	774
152 is 20% of 774	
2010 On-Street Revenue =	\$ 460,000
\$ 460,000 x 20% =	\$ 92,000

Total Parameter Meters

MULBERRY		
West Side of Street	East Side of Street	Potential Meter Spaces
Linden to 15	Pontotoc 0	15
Pontotoc to 0	Vance 14	14
<i>Total</i>		29
PONTOTOC		
North Side of Avenue	South Side of Avenue	Potential Meter Spaces
Main to 8	Mullberry 8	16
Mullberry to 7	2nd St. 6	13
2nd St. to 16	3rd St. 0	16
<i>Total</i>		45

Total Parameter Meters	74
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Appendix B
Car Count

		Jefferson													
		11:30	11:30	12:30	12:30	1:30	1:30	2:00	2:00	3:00	3:00	3:30	3:30	4:00	4:00
Main to 2nd	1	X	U	X	U	X	P	X	U	X	P	X	P	X	U
	2	X	U	X	P	X	P	X	P	X	U	X	U	X	U
	3	X	U	X	U	X	U	X	P	X	U	X	U	X	U
	4	X	U	X	U	X	U	X	U	X	U	X	U	X	U
	X, U, D	4	4	4	3	4	2	4	2	3	2	4	3	3	3
% X, U	100%	100%	100%	75%	100%	50%	100%	60%	75%	67%	100%	75%	75%	100%	
		Adams													
		11:30	11:30	12:30	12:30	1:30	1:30	2:30	2:30	3:00	3:00	4:00	4:00	4:30	4:30
Front to Main	1	X	U	X	U	X	U	X	P						
	2	X	U	X	U	X	U	X	U						
	3	X	P	X	U	X	P	X	P						
	4	X		X	P	X	U	X	U						
	5	X		X	P	X	P	X	P						
X, U, D	3	2	5	3	5	3	3	1							
% X, U	60%	67%	100%	60%	100%	60%	60%	33%							
		Adams													
		11:30	11:30	12:00	12:00	1:00	1:00	2:30	2:30	3:00	3:00	4:00	4:00	4:30	4:30
Main to Front	1	X	U	X	U	X	U	X	U	X	U	X	U	X	U
	2	X	P	X	P	X	U	X	P	X	U	X	P	X	P
	3	X	P	X	U	X	P	X	P	X	U	X	U	X	U
	4	X	U	X	U	X	U	X	P	X	U	X	U	X	P
	X, U, D	4	2	4	3	4	3	4	1	4	3	3	2	4	2
% X, U	100%	50%	100%	75%	100%	75%	100%	25%	100%	75%	75%	67%	100%	50%	
		Adams													
		11:00	11:00	12:00	12:00	1:00	1:00	1:30	1:30	2:30	2:30	3:30	3:30		
Main to Front	1	X	D	X	U	X	D	X	D	X	D	X	U		
	2	X	U	X	U	X	P	X	P	X	P	X	U		
	3	X	U	X	P	X	P	X	P	X	P	X	D		
	4	X	P	X	U	X	P	X	P	X	P	X	P		
	5	X	P	X	P	X	P	X	P	X	P	X	P		
	6	X	U	X	U	X	U	X	U	X	U	X	U	P	
	7	X	U	X	U	X	D	X	D	X	D	X	D	X	D
	8	X	U	X	U	X	D	X	D	X	D	X	D	X	D
	9	X	U	X	U	X	P	X	P	X	P	X	P	X	P
X, U, D	8	5	9	7	9	1	9	1	8	1	6	3	3		
% X, U	100%	66%	100%	78%	100%	11%	100%	11%	100%	11%	69%	38%			
		Adams													
		11:30	11:30	12:30	12:30	1:00	1:00	3:00	3:00	4:00	4:00	4:30	4:30		
2nd to Main	1	X	U	X	P	X	U	X	U	X	U	X	U		
	2	X	U	X	P	X	P	X	P	X	U	X	U		
	3	X	P	X	U	X	P	X	P	X	U	X	D		
	4	X	P	X	U	X	P	X	P	X	P	X	P		
	X, U, D	4	2	4	2	4	1	4	1	4	3	3	1	1	

Appendix B
Car Count

	% X, U	100%	50%	100%	50%	100%	25%	100%	25%	100%	75%	75%	33%			
3RD TO 2ND																
		11:30	11:30	12:30	12:30	1:30	1:30	2:00	2:00	3:00	3:00	4:00	4:00	4:30	4:30	
1	X	U	X	U	X	U	X	D	X	D	X	D	X	D	X	
2	X	U	X	U	X	U	X	D	X	D	X	D	X	D	X	
3	X	U	X	U	X	D	X	U	X	U	X	U	X	U	X	
X, U		3	3	3	3	3	2	3	1	3	1	3	1	3	1	
D							1		2		2		2		2	
% X, U	100%	100%	100%	100%	100%	67%	100%	33%	100%	33%	100%	33%	100%	33%	100%	33%

Peabody Place

		11:30	11:30	12:00	12:00	3:30	3:30	4:00	4:00	4:30	4:30
Main to 2nd											
1	X	U	X	U	X	U	X	U	X	U	X
2	X	D	X	P	X	U	X	U	X	P	X
3	X	P	X	P	X	U	X	U	X	U	X
4	X	P	X	P	X	U	X	P	X	U	X
5	X	U			X	U	X	P	X	P	X
6	X	P			X	P	X	P	X	P	X
7	X	P			X	P	X	P	X	P	X
8	X	P	X	P	X	P	X	P	X	P	X
9	X	P	X	P	X	P	X	P	X	P	X
X, U		9	2	6	1	7	4	8	3	5	3
D			1								
% X, U	100%	22%	87%	17%	78%	67%	88%	98%	86%	80%	

Appendix B
Car Count

		Second																		
Monroe to Union		11:30	11:30	12:00	12:00	12:30	12:30	1:00	1:00	1:30	1:30	2:00	2:00	2:30	2:30	3:00	3:00	4:00	4:00	
	1	X	D	X	D	X	D	X	D	X	D	X	D	X	D	X	D	X	D	X
	2	X	P	X	P	X	U	X	U	X	U	X	P	X	P	X	D	X	X	U
	3	X	P					X	P	X	P									
	4	X	P	X	P	X	P	X	P	X	P					X	P	X	U	U
	5	X	U	X	U	X	U	X	U	X	U	X	U	X	U	X	U	X	X	U
	6	X	U	X	U	X	U	X	U	X	U	X	U	X	U	X	U	X	X	U
	X, U		6		2	5		6	3	6	3	4	2	4	2	4	2	4	4	3
	D				1				1		1						1			
% X, U		100%	33%	83%	40%	83%	80%	100%	50%	100%	50%	67%	50%	67%	50%	67%	50%	67%	75%	

Appendix B
Car Count

Monroe

Front to Main	11:30	11:30	12:00	12:00	12:30	12:30	1:00	1:00	2:00	2:00	3:30	3:30
1	X	U	X	U	X	D	X	U			X	U
2	X	U	X	U	X	P			X	U	X	U
3	X	D	X	D	X	U	X	U	X	U	X	U
4	X	U	X	U	X	P	X	P	X	U	X	U
5	X	U	X	U	X	U	X	U	X	U	X	U
6	X	U	X	U	X	U	X	U	X	U	X	U
X, U	6	5	6	6	6	3	5	4	5	6	6	6
D		1		1		1						
% X, U	100%	83%	100%	83%	100%	50%	83%	80%	83%	100%	100%	100%

Main to Second	11:30	11:30	12:30	12:30	1:00	1:00	2:00	2:00	3:30	3:30
1	X	U	X	U	X	U	X	U	X	U
2	X	D	X	U	X	U	X	U	X	U
3	X	D	X	D	X	P	X	D	X	D
4	X	P	X	U	U	X	X	U	X	U
5	X	U	X	U						
6	X	D	X	U	X	U	X	P	X	U
X, U	6	2	6	5	4	3	5	3	6	4
D		3		1				1		1
% X, U	100%	33%	100%	83%	87%	75%	83%	60%	83%	80%

Front to Main	12:00	12:00	12:30	12:30	1:30	1:30	2:30	2:30	3:00	3:00	3:30	3:30
1			X	D	X	U	X	P	X	P	X	P
2			X	D	X	U	U	U	X	U	X	U
3			X	U	X	U	X	U	X	U	X	U
4	X	U	X	U	X	U	X	P	X	P	X	P
5	X	U	X	U	X	U	X	U	X	U	X	U
6	X	U	X	U	X	U	X	U	X	U	X	U
7	X	D	X	P			X	P	X	U	X	U
8	X	U	X	P			X	X	X	U	X	U
9			X	U			X	X	X	P	X	P
10					X	U	X	P	X	U	X	P
11					X	U	X	U	X	P	X	P
12					X	U	X	U	X	P	X	P
X, U	6	4	9	5	9	9	11	6	11	7	11	6
D		1		2								
% X, U	42%	80%	75%	66%	75%	100%	92%	55%	92%	64%	92%	55%

Main to Second	12:00	12:00	1:00	1:00	1:30	1:30	2:30	2:30	3:00	3:00	3:30	3:30
1			X	P								
2	X	U	X	U	X	U	X	P	X	P	X	U
3	X	U			X	U	X	U	X	U	X	U
4	X	U	X	U	X	U	U	X	X	U	X	U
5	X	U	X	U	X	U	X	P	X	U	X	U
6	X	P	X	U	X	U	X	P	X	P		
7			X	U								
8			X	P								
X, U	5	4	7	6	5	5	4	1	5	3	4	4
D												
% X, U	63%	80%	88%	71%	83%	100%	60%	25%	83%	60%	50%	100%

Appendix B
Car Count

Union

Second to Main	12:30	12:30	1:00	1:00	1:30	1:30	2:00	2:30	3:00	3:00	3:30	3:30	4:00	4:00
1			X	P	X	U			X	P	X	U		
2	X	U	X	P	X	U	X	P	X	P	X	U		
3	X	U	X	U	X	U					X	P	X	P
4	X	U	X	U	X	U	X	U	X	U	X	P	X	P
X, U	3	3	4	2	4	4	2	1	3	1	4	2	2	-
D														
% X, U	75%	100%	100%	50%	100%	100%	50%	50%	75%	33%	100%	50%	50%	0%

Main to Front	12:30	12:30	1:00	1:00	2:30	2:30	3:00	3:00	3:30	3:30	4:00	4:00
1			X	P					X	U	X	U
2	X	U	X	U	X	U	X	U	X	P	X	P
3	X	U	X	U	X	U	X	U	X	U	X	U
4			X	U	X	D	X	U	X	U	X	U
X, U	2	2	4	3	3	2	3	3	4	3	4	3
D						1						
% X, U	50%	100%	100%	75%	75%	67%	75%	100%	100%	75%	100%	75%

3rd

Adams to Jefferson	12:00	12:00	12:30	12:30	1:00	1:00	1:30	1:30	2:00	2:00	2:30	2:30	3:00	3:00	3:30	3:30
1	X	D	X	U	X	D	X	D	X	D	X	D	X	P	X	D
2	X	D	X	D	X	U	X	U	X	D	X	D	X	D	X	D
3			X	D	X	P	X	P	X	P	X	P	X	D	X	D
4	X	P	X	D	X	P	X	P	X	P	X	P	X	P	X	P
5	X	D	X	U	X	D	X	D	X	D	X	D	X	P	X	P
6	X	U	X	U	X	U	X	U	X	P	X	P	X	U		
X, U	6	1	6	2	6	2	6	2	6	-	6	-	6	1	4	-
D		3		4		2		2		3		3		2		2
% X, U	83%	20%	100%	33%	100%	33%	100%	33%	100%	0%	83%	0%	100%	17%	67%	0%

Adams to Jefferson	11:30	11:30	1:00	1:00	1:30	1:30	2:30	2:30	3:00	3:00	3:30	3:30	4:00	4:00	4:30	4:30
1	X	U	X	D	X	U	X	U	X	P	X	U	X	U		
2	X	D	X	D	X	U	X	D	X	P	X	P	X	D	X	D
3	X	D	X	D	X	D	X	D	X	U	X	D	X	D	X	D
4	X	U	X	P	X	D	X	U	X	U	X	D	X	D	X	D
5	X	D	X	U	X	D	X	D	X	U	X	D	X	D	X	D
6	X	U	X	U	X	D	X	U			X	D	X	D	X	D
X, U	6	3	5	1	6	2	6	3	4	2	6	1	6	1	4	-
D		3		3		4		3		-	4	4	6	4	4	4
% X, U	100%	50%	83%	20%	100%	33%	100%	50%	67%	50%	100%	17%	83%	20%	67%	0%

Union to Washington	1:00	1:00	2:00	2:00	3:00	3:00	4:30	4:30
1	X	U	X	D	X	U	X	U
2	X	D	X	D	X	U	X	D
3	X	D	X	D	X	D	X	D
4	X	U	X	P	X	D	X	D
5	X	D	X	D	X	D	X	D
6	X	U	X	U	X	D	X	D
X, U	6	3	5	1	6	2	6	1
D		3		3		4		5
% X, U	100%	50%	83%	20%	100%	33%	100%	17%

Appendix D
Car Count

Monroe to Madison										
	1:00	1:00	2:00	2:00	3:00	3:00	4:30	4:30		
1					X	P	X	P		
2			X	U	X	U	X	U		
3	X	U	X	U	X	U	X	U		
4	X	U	X	U	X	P				
5	X	U	X	U	X	U	X	U		
X, U	5	3	4	4	5	3	4	3		
D										
% X, U	60%	100%	80%	100%	100%	60%	80%	75%		
Monroe to Madison										
	1:00	1:00	1:30	1:30	2:30	2:30	3:00	3:00	3:30	3:30
1	X	U	X	U	X	U	X	U	X	U
2	X	P	X	P	X		X	P	X	
X, U	2	1	2	1	2	1	2	1	2	2
D										
% X, U	100%	50%	100%	50%	100%	50%	100%	50%	100%	100%
Court to Jefferson										
	1:00	1:00	2:00	2:00	3:00	3:00	4:30	4:30		
1	X	P	X	U	X	U	X	U		
2	X	P								
3	X	U	X	U	X	U	X	U		
4	X	U	X	U	X	U	X	U		
5	X	U	X	U	X	U	X	U		
6	X	P								
X, U	6	3	4	4	4	4	4	4		
D										
% X, U	100%	50%	87%	100%	67%	100%	67%	100%		
Adams to Washington										
	1:00	1:00	2:00	2:00	3:00	3:00	4:30	4:30		
1	X	P	X	P	X	D	X	P		
2	X	U	X	U	X	U	X	U		
3	X	P	X	P	X	U	X	U		
4	X	U	X	P	X	P	X	U		
X, U	4	2	4	1	4	2	4	3		
D						1				
% X, U	100%	50%	100%	25%	100%	50%	100%	75%		
Adams to Washington										
	2:30	2:30	3:00	3:00	3:30	3:30				
1	X	U	X	P	X	U				
2	X	D	X	P	X	P				
3	X	D	X	U	X	U				
4	X	U	X	U	X	U				
5	X	U								
X, U	5	3	4	2	4	3				
D		2								
% X, U	100%	60%	80%	50%	80%	75%				

Appendix B
Car Count

Jefferson To Court	2:30	2:30	3:00	3:00	3:30	3:30
1	X	U	X	U	X	D
2	X	U	X	U		
3	X	U			X	U
4	X	U	X	U	X	U
5	X	U	X	U	X	U
6	X	U	X	U	X	U
7	X	U	X	U	X	U
8	X	U	X	U	X	U
9	X	U	X	U	X	U
10	X	U	X	U	X	U
11	X	U	X	U	X	U
12	X	U	X	U		
X, U	12	12	11	11	10	9
D						1
% X, U	100%	100%	92%	100%	83%	90%

Court to Madison	1:00	1:00	1:30	1:30	2:30	2:30	3:00	3:00	3:30	3:30
1	X	P					X	U	X	U
2	X	P			X	U			X	P
3	X	U	X	U	X	U	X	U	X	U
4	X	U	X	P	X	P	X	P	X	P
5	X	P				P	X	U	X	U
6	X	U	X	U	X	P	X	P	X	U
7	X	P	X	P	X	U			X	D
8	X	D	X	D	X	D	X	U	X	D
9	X	U	X	U			X	U	X	U
X, U	9	4	8	3	6	3	7	4	9	5
D		1		1		1		1		2
% X, U	100%	44%	87%	50%	67%	50%	78%	57%	100%	60%

Monroe to Union	1:00	1:00	1:30	1:30	2:30	2:30	3:00	3:00	3:30	3:30
1	X	U	X	U	X	U	X	U	X	U
2	X	U	X	U	X	U	X	U	X	U
3	X	U	X	U			X	U	X	U
4	X	U	X	U	X	U	X	U	X	U
5			X	P	X	U			X	U
6	X	U	X	U	X	U	X	U	X	P
7	X	U	X	U	X	U	X	U	X	U
8	X	U	X	U	X	U	X	U	X	U
X, U	7	7	8	7	7	7	7	7	8	7
D										
% X, U	88%	100%	100%	88%	88%	100%	88%	100%	100%	88%

Appendix B
Car Count

Main to Second	Exchange					
	12:37	12:37	2:00	2:00	2:30	2:30
1	X	D	X	U	X	U
2	X	P	X	U	X	U
3	X	D	X	P	X	U
4	X	U	X	P	X	U
5	X	P	X	P		
6	X	P	X	P	X	U
7	X	D	X	P	X	U
8	X	D	X	U	X	U
9	X	D	X	P	X	U
10	X	D	X	U	X	D
11	X	U	X	U		
12	X	U	X	D	X	U
13	X	D	X	U	X	D
14	X	D	X	U	X	P
15	X	D	X	U	X	D
16	X	U	X	D	X	D
17	X	U	X	P	X	D
18	X	D	X	P	X	D
19	X	U	X	U	X	U
20	X	D	X	D		
X, U	20	6	20	9	17	10
D		11		3		6
% X, U	100%	30%	100%	45%	85%	66%