

CITY OF MEMPHIS

DIVISION OF ENGINEERING



CONSULTANT HANDBOOK

BUILDING DESIGN AND CONSTRUCTION

125 N. MAIN ST. ROOM 554

MEMPHIS TN 38103



TABLE OF CONTENTS

DIVISION	DESCRIPTION	REV. DATE
TABLE OF CONTENTS		Feb 22, 2011
INTRODUCTION		Feb 22, 2011
DIVISION 00	PROCUREMENT AND CONTRACTING	Feb 22, 2011
DIVISION 01	GENERAL REQUIREMENTS	May 17, 2006
DIVISION 02	SITE CONSTRUCTION	May 17, 2006
DIVISION 03	CONCRETE	May 17, 2006
DIVISION 04	MASONRY	May 17, 2006
DIVISION 05	METALS	May 17, 2006
DIVISION 06	WOOD AND PLASTICS	May 17, 2006
DIVISION 07	THERMAL AND MOISTURE PROTECTION	May 17, 2006
DIVISION 08	DOORS AND WINDOWS	May 17, 2006
DIVISION 09	FINISHES	May 17, 2006
DIVISION 10	SPECIALTIES	May 17, 2006
DIVISION 11	EQUIPMENT	May 17, 2006
DIVISION 12	FURNISHINGS	May 17, 2006
DIVISION 13	SPECIAL CONSTRUCTION	May 17, 2006
DIVISION 14	CONVEYING SYSTEMS	May 17, 2006
DIVISION 15	MECHANICAL	May 17, 2006
DIVISION 16	ELECTRICAL	May 17, 2006
DIVISION 17	CODES	Jan. 18, 2011
DIVISION 18	CODE MEETINGS	Feb. 28, 2011
DIVISION 19	FUTURE	May 17, 2006
DIVISION 20	PROJECT DIRECTORY	Mar. 7, 2006
DIVISION 21	CONSTRUCTION DRAWINGS	Apr. 6, 2006
DIVISION 22	PROJECT MANUAL	May 17, 2006
DIVISION 23	DESIGN SUBMITTALS	May 17, 2006
DIVISION 24	FUTURE	May 17, 2006
DIVISION 25	FUTURE	May 17, 2006
DIVISION 26	FUTURE	May 17, 2006
DIVISION 27	FUTURE	May 17, 2006
DIVISION 28	FUTURE	May 17, 2006
DIVISION 29	FUTURE	May 17, 2006
DIVISION 30	FUTURE	May 17, 2006
DIVISION 31	BD&C MISSION	Feb 22, 2011

INTRODUCTION

A. THE ORGANIZATION

The staff of the City of Memphis Building Design and Construction department would like to welcome you to the City of Memphis facility project team. This Consultant's Handbook will increase the rewards of working with the City.

The Building Design and Construction department provides complete construction project coordination for the City of Memphis Capital Improvement Projects such as office buildings, transportation facilities, firehouses, police stations, community centers, health centers, senior centers, special needs centers, parks, warehouses, and sewage treatment facilities. These facilities are used and operated by the executive branch of the City government including the operating divisions of Chief Administrative Office, Engineering, Finance and Administration, Fire Services, General Services, Human Resources, Law, Planning and Development, Park Services, Police Services, Public Services and Neighborhoods, Public Works,. (This department does not construct facilities for Memphis Light Gas and Water, Memphis Area Transit Authority, City of Memphis schools, nor any Shelby County, State of Tennessee, or Federal government facilities.)

The operating divisions each work with BD&C establishing teams to define projects of renovation and new construction. The teams begin with project definition and work through budgeting, programming, design, construction, and commissioning.

BD&C team members are professionals from the fields of architecture, engineering, interior design, and landscape architecture.

B. THE PURPOSE OF THIS GUIDE

It is the desire of the City to provide contemporary, attractive, functional, and cost effective facilities for its citizens and their civil servants. It is the intent of the City to provide the citizens with the longest facility life reasonable through the selection of long life materials. The content of this Guide will provide some guidelines and details to help achieve these goals. These come from the collective input of the administration and operations of the various arms of the City. Some of the specified materials and equipment provide the City with standardized parts storage thus reducing storage and handling requirements. Experience has identified equipment that is convenient for the public and requires minimum maintenance to remain serviceable. This Guide focuses maintenance scheduling and training to a limited list of variations. Specific methods and materials presented herein are to be implemented in each respective project when the scope of the project includes such materials and methods.

This Guide is of part of, and subordinate to the contract between the City and each design consultant. The current version of this Consultant's Handbook is provided to the Consultant with each contract awarded by the City. This Handbook is updated as needed to reflect the current needs and methods of the City and at the same time take advantage of current trends and technology. Because of updates and revisions to this Guide, one version of the Guide is not to be used with other contracts. The version distributed with the contract is to be applied throughout the duration of the Contract and the respective Project.

It is the desire of the City that each consultant utilize his/her creative, imaginative, and innovative abilities to design quality facilities that are showplaces of Design Excellence. The Consultant is expected to notify the BD&C project manager in the event of any conflict between this Handbook and any other team member's project related request or direction, any available technology, or any significant change in the marketplace.

C. DESIGN EXCELLENCE

Every citizen in the community receives rewards from the community and has the responsibility to give back to the community. You, the Consultant, have this opportunity go beyond day-to-day work and into the realm of contributing to the community through the implementation of design excellence. Design excellence will

capitalize on your expertise through:

1. Purpose

Civic projects have a unique purpose – serve resident and visitor. The purpose of excellence is to deliver form and function for multiple views, philosophies, values, and generations. Successful purpose produces pride in our personal, business, and political communities.

2. Creativity

It is challenging to find equilibrium between innovation and operation / maintenance. Some materials favored by the City for ease of maintenance are mentioned herein.

3. Value

Public projects require cost efficient design integrated with life-cycle value in the selected methods, materials, and equipment.

4. Safety

Life safety is at the core of design criteria for all public projects. Arrangement and application of materials shall be carefully thought through to provide facilities that go beyond minimum standards and requirements.

5. Universal Design

The City is committed to supporting universal design, going beyond the minimum standards of the ADA requirements to make each facility truly accessible.

6. Constructability

Complete, accurate, understandable, and practical contract documents are required to provide the contractors with the appropriate tools to produce a successful facility.

7. Advancement

While municipalities can be recognized by their historic facilities, progress and growth demand that today's facilities be designed for current technology with as much foresight as possible to meet tomorrow's needs.

8. Durability

Wise use of taxpayer's dollars delivers structures that serve successive generations. A durable facility will be accommodating the public with adaptive use into the future.

9. Green

Responsible design integrates manmade facilities with natural creation achieving collaboration between people and nature. City projects should make use of known technology to achieve this desired collaboration protecting our natural resources such as the aquifer, local vegetation, recreational waters, and clean air.

D. PROFESSIONALISM

The City is pleased to utilize consultants who are the leaders in their field because the entire community benefits. The highest levels of professionalism are expected. By you accepting this contract with the City the City in return accepts your commitment to live up to the highest standards of the industry. The City expects the professional consultant to produce designs for the Work and the construction documents describing such designs, such that the local contractor and subcontractors have all the necessary instructions and details to produce a 100% complete Project. Error-free design, complete and clear construction documents and project manuals, do remain the responsibility of the Consultant. The City expects the Consultant to provide to inspect

thoroughly the progress of the Work, and to identify promptly every failure of the Contractor to comply with the construction documents.

E. HANDBOOK FORMAT

This Handbook presents these guidelines in an order that follows the division numbers and titles of the Construction Specifications Institute MasterFormat, 1995 Edition.

1. These guidelines refer to issues, actions, materials, and methods that the City prefers. The Consultant shall address many additional issues, actions, materials, and methods. The Consultant shall integrate City guidelines and Consultant designs and specifications ultimately to provide a complete set of Plans and Specifications such that the Contractor may construct a complete Project.
2. City of Memphis instructions to the Consultant will generally refer to some action the Consultant shall take during the course of his contract with the City. Not all of the guidelines will be applicable to each project. Each project will require many instructions and specifications beyond the contents of this handbook. Note: Changes in project scope may require an action that was not required under the original project scope.
3. Appendix A of this Handbook contains methods, materials, drawings, and details required as City standards. The Consultant will have to select, from all of the City's standards, those standards that are applicable to the respective project and include the applicable standards in the project manual.
4. All references herein to actions of the Contractor are to be conveyed by the Consultant to the Contractor appropriately in the Construction Documents.

The Consultant shall contact the Project Manager to receive direction or interpretation regarding the inclusion or exclusion of the Handbook data with respect to each specific project.

Use of the term Consultant refers to prime Consultant on the contract and all his staff and his subconsultants for this project.

F. BASIC REQUIREMENTS

Project design solutions shall be based upon the following key issues:

1. Construction Cost – The estimated cost of the project has been budgeted in the development of the City's Capital Improvement Program (CIP). The Consultant is expected to design the facility such that construction bids come in within that budgeted amount called the Fixed Construction Cost Limit (FCCL). The Consultant is to provide an estimate of the probable cost at each major phase of the project design to ensure the probable cost is within the FCCL. Failure of the bids to be within the FCCL will be cause for the Consultant to redesign the project, at no additional cost to the City, and for the City to re-bid the project. The Consultant shall notify the BD&C Project Manager of any reason the project cost estimate appears to surpass the FCCL, whether from escalations of market prices for materials or from another City representative issuing design review comments, or requesting additions.
2. Life Cycle Costs: Durability of Materials - Materials should be appropriate for the intended use and potential abuse. Emphasis should be low maintenance, avoiding finishes that require repainting, frequent waxing, etc., and choosing finishes that need only to be kept clean to look good. Reliability should be a prime consideration in specifying equipment and simplicity foremost in designing systems and controls.
 - A. Maintenance - equipment requiring maintenance shall be designed and positioned so it is easily accessible and has adequate workspace available. Indoor mechanical rooms and outdoor enclosures shall have adequate size doors and sufficient circulation space to remove, repair, and replace equipment. Roofs should have interior access to lower roofs and permanently installed ladders from lower to upper roofs.
 - B. Standard Equipment - This Handbook contains requirements that have been developed based on

- the reliability of the products and the cost and availability of repair parts. Where a single manufacturer and model is shown, that is the only acceptable product. When the Consultant desires to vary from these requirements, for reasons of cost or the belief that another product would better serve the purpose, he is to make the request in writing and receive written approval. Absent that, these requirements shall be followed as shown.
- C. Energy Conservation - Low energy consumption system should be selected. Passive energy conservation measures, such as insulation, shading, geographical orientation, and choice of materials, should be considered. The Consultant is expected to give serious consideration to those sections of the specifications that recommended energy saving design methods for architectural, mechanical, and lighting. The Consultant shall review with the Project Manager all energy conservation used and not used in the respective project.
 - D. Exterior Architecture - Architectural style and appearance should complement adjacent facilities and should be appropriate for the neighborhood.
3. Schedule - A schedule for the term of design phases is included in the Consultant's agreement. Ability to maintain the required schedules will be a consideration in the award of future City of Memphis design services contracts.
 4. Seismic Design - Seismic design criteria shall be in accordance with current building code.
 5. Access for the Disabled – The City is 100% committed to providing facilities that are accessible to the disabled. The Consultant is expected to provide designs that fully accommodate the disabled and exceed all codes, regulations, and laws such that the completed work of the project is satisfies all such requirements. (The Consultant may bare the responsibility of remediation of the work where the design contributes to unacceptable work.)

G. DEFINITIONS

BD&C – Building Design and Construction department of the City of Memphis Engineering Division.

Bidder – Construction companies who are preparing or have prepared bid proposals to the Owner for a contract to construct the subject Project.

CIP – Capital Improvement Projects of the City of Memphis.

City Project Team – All persons employed by the City of Memphis who are regularly involved each respective major step of the design and construction of the Project.

Construction Management Team – A person or persons under contract to the City, to work as a representative of the City with the Project Manager, Consultant, and Contractor.

Owner – The City of Memphis.

Owner's Representative – City of Memphis, Engineering Division, BD&C Project Manager.

Project – The completed work of physical improvements to City of Memphis property or properties that are the subject of the Consultant's respective Architectural and Engineering Services Agreement.

Project Manager - The City of Memphis Engineering Division, BD&C department designee. He or she is the focal point for all communications and decisions between the City, the Consultant, and Contractor. He or she is the only person through whom any adjustments to the Agreement or the Construction of the Project.

Project Team – All persons regularly involved each respective major step of the design and construction of the Project.

DIVISION 00

PROCUREMENT AND CONTRACTING

The Consultant shall include the following City standard forms in each project manual. Here is the current version of the forms. These standard forms are updated frequently. Prior to printing the project manual the Consultant shall obtain from the Project Manager any revised or updated version of the forms for including in the printed bid sets.

CURRENT VERSION as of the date of the distribution of this handbook.

SECTION 00015	Index of Drawings
SECTION 00010	Legal Notice to Bidders
SECTION 00100	Instructions to Bidders
SECTION 00310	Bid Form
SECTION 00410	Bid Bond
SECTION 00420	Certificate of Non-Discrimination
SECTION 00430	Minority / Women Business Enterprise Program Goals
SECTION 00433	M/WBE Good Faith Effort Documentation Form
SECTION 00510	Construction Contract
SECTION 00525	Escrow Agreement
SECTION 00549	Agreement Between City, Contractor, and Bank
SECTION 00610	Performance Bond
SECTION 00640	Partial Release of Liens for Subcontractors
SECTION 00641	Final Release of Liens for Subcontractors
SECTION 00642	Final Release of Liens for General Contractors
SECTION 00710	General Conditions of the Contract

DIVISION 01

GENERAL REQUIREMENTS

Division 01 of this Consultant's Handbook includes information with respect to the following Sections:

SECTION 01200	ALLOWANCES	2
SECTION 01230	ALTERNATES	2
SECTION 01240	VALUE ANALYSIS	2
SECTION 01250	CONTRACT MODIFICATION PROCEDURES	2
SECTION 01251	CONTRACT MODIFICATION - WEATHER DELAYS	2
SECTION 01270	UNIT PRICES	2
SECTION 01290	PROGRESS PAYMENT PROCEDURES	3
SECTION 01297	SCHEDULE OF VALUES	3
SECTION 01310	PROJECT MEETINGS	3
SECTION 01320	CONSTRUCTION PROGRESS SCHEDULE	3
SECTION 01330	SUBMITTALS SCHEDULE	4
SECTION 01333	SUBMITTALS	4
SECTION 01410	REGULATORY REQUIREMENTS	4
SECTION 01450	QUALITY CONTROL	5
SECTION 01510	TEMPORARY UTILITIES	5
SECTION 01520	CONSTRUCTION FACILITIES	6
SECTION 01560	TEMPORARY BARRIERS AND ENCLOSURES	6
SECTION 01580	PROJECT IDENTIFICATION	6
SECTION 01630	PRODUCT SUBSTITUTION PROCEDURES	6
SECTION 01640	OWNER FURNISHED PRODUCTS	7
SECTION 01750	STARTING AND ADJUSTING	7
SECTION 01760	PROTECTING INSTALLED CONSTRUCTION	7
SECTION 01770	CLOSEOUT PROCEDURES	7
SECTION 01780	CLOSEOUT MATERIALS	8
SECTION 01781	FINAL SITE SURVEY	9
SECTION 01783	OPERATION AND MAINTENANCE	10
SECTION 01788	PROJECT RECORD DOCUMENTS	10
SECTION 01789	SPARE PARTS AND MAINTENANCE MATERIALS	10
SECTION 01820	DEMONSTRATION AND TRAINING	10
SECTION 01850	WARRANTY FOLLOW-UP	10

SECTION 01200 ALLOWANCES

From the list below, and as directed by the Project Manager, prepare the project specifications including allowances

- A. Provide the following allowances:
 - 1. Construction Fencing
 - 2. Construction Sign
 - 3. Park Sign
 - 4. Soil Testing and/or Replacement
 - 5. Brick
 - 6. Sod / Seeding
 - 7. Carpet
 - 8. Appliances
 - 9. Tile
 - 10. Door Hardware
 - 11. Building Signage / Interior, Exterior
 - 12. Bridges
 - 13. Tree Pruning / Grubbing

- B. Provide allowances for the following, as applicable. The actual invoiced amounts will be reimbursed to the Contractor with no mark-up.
 - 1. MLG&W
 - 2. Bell South
 - 3. Time Warner

SECTION 01230 ALTERNATES

No standard Alternates. Consultant shall include alternates only upon the Project Manager's direction. Base Bid shall include entire Work of the Project.

SECTION 01240 VALUE ANALYSIS

Consultant shall coordinate Value Engineering when so directed by the Project Manager.

SECTION 01250 CONTRACT MODIFICATION PROCEDURES

Refer to "General Conditions of the Contract for Construction - Changes"

SECTION 01251 CONTRACT MODIFICATION - WEATHER DELAYS

Consultant shall use the language found under this section number in the Appendix under this section number and title, for Weather Delays.

SECTION 01270 UNIT PRICES

When the following elements are a part of the project, Consultant shall instruct the bidders to provide a lump sum bid plus unit prices for incremental reduction or addition to the following.

1. Sod
2. Erosion Fabric
3. Hydroseed
4. Trash Receptacles
5. Tree Grates
6. Safety Surface Base and Material
7. Top Soil
8. Trees
9. Benches
10. Ornamental Landscape Materials
11. Concrete
12. Fencing
13. Unsuitable soil

SECTION 01290 PROGRESS PAYMENT PROCEDURES

Consultant shall instruct the Contractor regarding the following:

- A. Construction applications for payment shall be submitted on the Standard AIA G702 - Application and Certification for Payment, including continuation sheets when required. Submit two (2) "typed" copies to Consultant for review and approval.
- B. Pay requests should not exceed one (1) application per calendar month. Check with Project Manager for preferred application date.
- C. Submit updated construction schedule with each application.
- D. Consultant shall review Contractor's application for accuracy, sign it and forward it to the Project Manager.

SECTION 01297 SCHEDULE OF VALUES

Consultant shall instruct the Contractor to provide a schedule of values.

SECTION 01310 PROJECT MEETINGS

Consultant shall coordinate weekly progress meetings. He shall

- A. Notify each scheduled participant, several days in advance of each meeting;
- B. Prepare with a pre-set agenda;
- C. Chair the meetings;
- D. Document the meeting including time and place of meeting, attendees, items of discussion;
- E. Review progress of the Work with respect to the Schedule;
- F. Review the all other aspects of the Work with respect to compliance to the contract documents;
- G. Distribute minutes of each meeting within 3 business days.

SECTION 01320 CONSTRUCTION PROGRESS SCHEDULE

Consultant shall instruct the Contractor to provide a Construction Project Schedule. Consultant shall monitor the Contractor's Project Schedule and notify the Owner in writing, of any concerns about Contractor's maintaining the Work on schedule. Consultant shall make recommendations, to the Owner in writing for

corrective measures to maintain the schedule. Consultant shall provide a narrative report to define problems, anticipated delays, and the impact on the schedule. Instruct the Contractor on the following:

- A. Contractor shall submit revised schedule with each application for payment, in duplicate, subject to the review and approval of Owner. Contractor shall distribute copies of the approved revised schedule to the job site, each major subcontractor, Project Manager, Consultant, and other concerned parties as directed.
- B. The Contractor shall comply with the Schedule format and content found in the General Conditions of the Contract Article 3, Section 2.

SECTION 01330 SUBMITTALS SCHEDULE

Consultant shall prepare a list of all the required submittals. Consultant shall check weekly to see that the Contractor is in compliance with the time for each required submittal. The schedule shall indicate the date that each complete submittal arrived, and the date that any requested or required response was returned. The schedule shall be turned in to the Owner with the final Closeout Submittal.

SECTION 01333 SUBMITTALS

The Consultant shall:

- A. Receive and distribute the submittals unless otherwise agreed upon.
- B. Confirm with the Project Manager the distribution of submittals, and then appropriately specify the quantity of submittals and distribution thereof. Recipients to be considered for each of the submittal distribution list:
 1. Owner's Project Manager
 2. Owner's User
 3. Owner's Property Maintenance Department
 4. Owner's Construction Management Team
- C. In a timely manner, consolidate the comments from all submittals and respond to the Contractor.

The Consultant shall instruct the Contractor:

- A. To provide suitable time for the Consultant's and the Owner's review and approval of submittals.
- B. To indicate in writing with each submittal, what response he requires back from the Consultant and the Owner such as return date.
- C. To submit within fifteen (15) days after date of Notice to Proceed, a complete list of major products proposed for use indicating for each item important information such as: manufacturer, trade name, model number, color, and other pertinent data as required to fully identify such products, etc.
- D. To provide six (6) copies of product data and manufacturer's certificates bound in 3-ring binders. Binders are to be labeled on the spine and the cover. Dividers should be provided and properly labeled.

SECTION 01410 REGULATORY REQUIREMENTS

Consultant shall instruct the Contractor to abide by all applicable code, laws, and rules and is responsible for

all costs of fees and permits.

See Section 02370 for additional information on Erosion and Sedimentation Controls compliance with Tennessee Department of Environmental and Conservation.

See Division 17 for additional information on Accessible design as defined by the United States Department of Justice Americans with Disability Act (ADA) compliance.

SECTION 01450 QUALITY CONTROL

Consultant shall be responsible to enforce quality control requirements as indicated throughout the contract documents. The Term "Quality Control" includes but is not limited to, Inspection, Testing, Certification, and other associated requirements. Consultant shall enforce "Professional Workmanship and Execution", "Industry Standards, Specifications", "Manufacturer's Directions", and required follow up for field samples, details, submittals, and references.

Consultant shall prepare a schedule of testing needs and obtain approval of the Project Manager before proceeding.

The Consultant shall coordinate and contract for the following testing services. The City shall reimburse the Consultant for these testing services.

A. Soil

1. Soil classification including plasticity index and liquid limit.
2. Sieve analysis.
3. Laboratory compaction test, standard and modified proctor of relative density test.
4. Field compaction test.
5. Borings.
6. Technician inspecting time.

B. Concrete

1. Compressive strength.
2. Technician time such as casting, delivery of test cylinders, slump test, air content test.
3. Post tensioning or pre-stressing of tendons.

C. Structural Steel

1. Bolt torque inspection.
2. Weld inspection.

Consultant shall prepare a schedule of tests to be performed by the Contractor and obtain approval of the Project Manager before proceeding.

SECTION 01510 TEMPORARY UTILITIES

Consultant shall instruct the Contractor to acquire temporary utilities with MLG&W. Contractor shall be fully responsible for utilities until the acceptance of Substantial Completion.

SECTION 01520 CONSTRUCTION FACILITIES

FIELD OFFICES: Use and placement of field offices shall be with permission of the Project Manager. Field offices are not permitted on any sites where existing City operations or public use continues during the term of the construction, without express written permission of the Project Manager.

FIRST AID: Contractor is to provide First Aid materials on site for all persons working on the site under the respective construction contract.

SANITARY FACILITIES: Contractor is to provide sanitary facilities for all persons working on the site under the respective construction contract whether there are existing functioning facilities on site or not.

SECTION 01560 TEMPORARY BARRIERS AND ENCLOSURES

In order to maintain a safe environment for the surrounding community, job sites shall be temporarily fenced and “danger” signs placed accordingly.

When a facility is in use during construction specify appropriate barriers to protect occupants from noise, dirty air, and danger.

SECTION 01580 PROJECT IDENTIFICATION

The standard detail for City approved Construction Signage is found in the Appendix under this section number and title. Project Identification sign design shall be submitted to Project Manager for approval.

SECTION 01630 PRODUCT SUBSTITUTION PROCEDURES

Consultant shall instruct the Contractor regarding the following:

- A. A substitution includes any change from
 1. the Project Program,
 2. this Handbook,
 3. any phase of any approved specification or drawing,
 4. any subsequent approved substitution.
- B. After a product or process is approved by the City at any time during the design process, the Consultant shall not make any substitutions or changes in such product or process, without approval of the Project Manager, Property Maintenance, and the user. The Consultant may need to solicit the comments from all the required parties to be able to arrive at an approved change.
- C. Substitutions for a specified product or process shall be approved by the Owner in writing prior to submitting a bid. No substitution of equipment will be allowed after bids have been accepted.
- D. Requests for substitution of an “or equal” piece of equipment shall be submitted, reviewed, and approved by the Project Team through the Consultant and the Project Manager 7 calendar days before the bid date. Requests after that date will not be considered.
- E. Requests for substitution shall be submitted by the bidder in the number of copies to be determined in conjunction with the Project Manager.
- F. Requests for substitution shall include a complete set of manufacturer’s information fully describing the operational, maintenance and spec data including but not limited to drawings and/or text descriptions of material, construction process, color, size, finish, installation instructions, warranty, and any other pertinent information necessary for complete evaluation and consideration of the Owner.

SECTION 01640 OWNER FURNISHED PRODUCTS

Construction Documents that reflect "By Owner" will not be accepted without Project Manager's prior approval.

Check with the Project Manager for details on design for installation of padlocks. Owner will provide some padlocks, and some will locks will have 3/8" diameter shanks.

SECTION 01750 STARTING AND ADJUSTING

Consultant shall coordinate this procedure with all necessary Owner representatives. Owner requires that Property Maintenance personnel be present as systems are made operational, tested, and balanced. Consultant shall classify this as Project Meeting and attend and document activities as Consultant would for other Project Meetings.

SECTION 01760 PROTECTING INSTALLED CONSTRUCTION

Protection and security of installed construction including construction equipment and construction materials onsite is the sole responsibility of the Contractor. The Owner shall not be responsible for theft or vandalism.

SECTION 01770 CLOSEOUT PROCEDURES

The Consultant shall coordinate Project Close-out.

SUBSTANTIAL COMPLETION

- A. Contractor may request Substantial Completion inspection after receipt of approvals by ADA Consultants and respective governing authorities including but not limited to:
 1. Fire Marshal,
 2. Health department,
 3. Code Enforcement, etc.
- B. Contractor shall have received the Certificate of Occupancy.
- C. Consultant shall review the Work and notify Contractor in writing
 1. of items not substantially complete, or
 2. request approved for Owner's Substantial Completion inspection.
- D. Consultant shall schedule, set-up, and coordinate Substantial Completion inspection including but not limited to:
 1. Contractor and subcontractors
 2. Consultant and sub consultants,
 3. Owner;
 - a. Project Manager,
 - b. Property Maintenance,
 - c. User.
 4. ADA Consultant as needed.
- E. If Substantial Completion is rejected by the Owner, the Consultant shall notify the Contractor in writing:
 1. Items not approved as Substantially Complete, and

2. Items approved as Substantially Complete but do not meet specification requirements.
3. Follow-up date for second Substantial Completion inspection in not less than seven (7) days.
- F. Consultant shall collect punchlist from Project Manager, integrate it into his own punchlist, and forward combined punchlist to Contractor, with copies to Project Team.
- G. Consultant shall prepare Certificate of Substantial Completion for owner's signature, get signature and forward to Contractor with the punchlist. See appendix for form.
- H. Consultant shall notify Contractor that he has 30 days to achieve Final Completion.
- I. Consultant shall notify the Contractor that the City will assume the cost of the MLG&W utilities upon receipt of all the following:
 1. Substantial Completion,
 2. Letter requesting transfer of utilities account
 3. Copy of the MLG&W utility bill for the project related account.

FINAL COMPLETION

- A. Contractor shall make request to the Consultant, for Final Completion inspection.
- B. Consultant shall review the Work and notify Contractor in writing
 1. of items not finally complete, or
 2. request for Final Completion Inspection is approved and shall be scheduled with Project Manager.
- C. Consultant shall schedule, set-up, and coordinate Final Completion inspection including but not limited to:
 1. Contractor (and subcontractors as needed)
 2. Consultant (and subconsultants as needed)
 3. Owner
 - a. Project Manager
 - b. Property Maintenance
 - c. User
 4. ADA Consultant as needed.
- D. If Final Completion is rejected by the Owner, the Consultant shall notify the Contractor in writing regarding:
 1. Items not approved as Finally Complete, and
 2. Follow-up date for repeat Final Completion inspection. A repeat Final shall be scheduled for seven (7) days or more after first Final.
- E. Consultant prepares Certificate of Final Completion for owner's signature, gets signature and forwards to Contractor.
- F. Within 14 days of Final Completion the Consultant shall collect from the Contractor all project closeout materials, inventory and organize such materials, and deliver them to the Project Manager.

SECTION 01780 CLOSEOUT MATERIALS

Contractor shall provide to Consultant for review and approval, Original materials as required. When original documents have already been transmitted to the Owner, Contractor shall provide photo copies of original documents and the respective transmittal letters recording such transmittals. Closeout materials shall include

but not be limited to:

- A. Project Directory (see Section 20000).
- B. Permits issued by a governing authority,
- C. Approvals issued by a governing authority,
- D. Certificate of Substantial Completion,
- E. Warranty documents,
- F. Operation and Maintenance manuals (see Section 01782)
- G. Manufacturer's data and certificates,
- G. All previous submittals,
- I. Project Record documents (see Section 01788).
- J. Spare parts (see Section 01789).
- K. Contractor's Consent of Surety
- L. Contractor's Waivers of Lien,

As a part of project close-out the Consultant shall deliver to the Project Manager two complete sets of submittals, manuals, and operations books. Each set is to be boxed and with a label on each end of the box indicating the BD&C Project Name, BD&C Project Number, and Substantial completion date. Each box shall be labeled Set 1, box one (1) of one (1), two (2) of two (2), Set 2, box one (1) of one (1), two (2) of two (2), etc. Samples of building materials are not to be included.

Samples of building materials shall be delivered to project manager during the course of the project to ensure timely review and/or approval. The Consultant shall indicate in the project specifications the total number of copies of submittals the Contractor shall submit for review. The City will require two copies as shown above. The remaining sets shall be required for Consultant review and/or approval. If the City has retained a "Construction Management Team" for a particular project, three sets shall be required for their review and files. The General Contractor shall submit all copies to the Consultant. If the City has retained a "Construction Management Team" then all submittals shall go to the Management Team.

The Consultant shall indicate in the specifications submittals that shall be required by the General Contractor.

All submittals shall be boxed and indexed in the following storage system:

AKRO-MILLS 12 gallon tote
Model NO. 0301-6104
Clear/Blue / 66-486 File B
Loc. OfficeMax

Deliver submittals to the attention of:

Project Manager
BD&C, room 554
125 N. Main St.
Memphis, TN. 38103

Consultant shall be responsible to initiate Contractor's submittal of certification that all Contract Documents have been reviewed and adhered to, all work has been inspected, all work is completed and in Total compliance with all contract documents, building codes, fire prevention, and any other state and local requirements. Contractor is responsible to submit any other documents required by any other state or local authority. Contractor shall be responsible to submit final application for payment identifying total adjusted contract sum, and previous payments, using Standard AIA Documents G706, G706A and G707.

NOTE: CHECK WITH THE PROJECT MANAGER FOR POSSIBLE CHANGES WITH THIS SECTION.

SECTION 01781 FINAL SITE SURVEY

In projects where site work has been designed for ADA accessibility, the Consultant shall provide a final survey to confirm as-built work complies with design and specification criteria on ADA accessible improvements. Fee will be reimbursed in keeping with contract language, additional services.

SECTION 01783 OPERATION AND MAINTENANCE

Consultant shall be responsible for collecting Operation and Maintenance data from the Contractor.

UNLESS OTHERWISE NOTED, Contractor shall provide:

1. Three (3) sets of Operation & Maintenance manuals.
2. Spare parts and other maintenance materials.
3. Written list of maintenance items and instructions for Owner to perform during the warranty period. These items should be regular routine and not interfere with individual item warranty.
4. Instructions for maintaining finishes, including recommended cleaning methods and materials and special precautions identifying detrimental cleaning agents.

SECTION 01788 PROJECT RECORD DOCUMENTS

Consultant shall instruct the Contractor to provide Project Record Documents that reflect as-built conditions.

SECTION 01789 SPARE PARTS AND MAINTENANCE MATERIALS

Consultant shall prepare a schedule of spare parts and maintenance materials to be provided by the Contractor, provide the schedule to the Owner, receive the spare parts and maintenance materials from the Contractor and certify to the Owner the presents of spare parts and maintenance materials upon substantial completion. Spare parts and maintenance materials as identified by the City shall be called for in the Project manual. Spare parts and maintenance materials shall be delivered to the Owner in the original manufacturer's packaging. Spare Parts and maintenance materials may be stored in a secure storage room within the project and turned over to the Owner upon substantial completion and upon securing the storage room with locks changed to permanent locks from construction locks.

SECTION 01820 DEMONSTRATION AND TRAINING

UNLESS OTHERWISE NOTED, Contractor shall provide Owner a VIDEO of all systems demonstrations and operational recommendations. Video shall clearly explain all systems in their entirety. Video shall include "actual dates for warranty termination" and who to contact for warranty repairs. Video shall include a detailed description of warranty covered items. Video shall include the manufacturer's recommended preventive maintenance during and after the warranty period.

SECTION 01850 WARRANTY FOLLOW-UP

Contractor is to fully warranty 100% of the Work under his contract for 365 days from the date of substantial Completion, Certificate of occupancy or punch list completion, whichever is latest. Owner shall submit and/or copy Consultant on all warranty claims during the one year warranty period. Prior to the expiration of the warranty period Consultant shall coordinate (11mo.) walk-thru to inspect the Work. Consultant shall instruct the Contractor of all warranty claims follow-up on such claims though satisfactory resolution such as repair or replacement. Contractor shall provide full repair or replacement to the Owner's satisfaction at no expense to the Owner.

DIVISION 02

SITE CONSTRUCTION

Division 02 of this Consultant's Handbook includes information with respect to the following Sections:

SECTION 02201	SITE SURVEYS.....	2
SECTION 02203	ACCESSIBILITY ASSESSMENT	2
SECTION 02210	SUBSURFACE INVESTIGATION	2
SECTION 02221	GRANITE CURB REMOVAL	2
SECTION 02230	SITE CLEARING	3
SECTION 02231	TREE PROTECTION.....	3
SECTION 02300	EARTHWORK	3
SECTION 02370	EROSION AND SEDIMENTATION CONTROLS.....	4
SECTION 02700	BASES, BALLASTS, AND PAVING	7
SECTION 02750	RIGID PAVEMENT	7
SECTION 02810	IRRIGATION SYSTEM.....	7
SECTION 02870	SITE FURNISHINGS	7
SECTION 02871	TRASH AND LITTER RECEPTORS	8
SECTION 02880	PLAYGROUND EQUIPMENT	8
SECTION 02881	PLAYGROUND PROTECTIVE SURFACING	9
SECTION 02882	TENNIS COURT SURFACING.....	9
SECTION 02920	LAWNS AND GRASSES	10
SECTION 02930	EXTERIOR PLANTS	10
SECTION 02945	TREE GRATES	10

SECTION 02080 BASIC SITE MATERIALS AND METHODS- UTILITIES

The Consultant shall investigate and verify the site for location of fire hydrants. Comply with all applicable codes including Memphis Code of Ordinances Title 9, Chapter 9 – 48 FIRE HYDRANTS. (This may be found at <http://municipalcodes.lexisnexis.com/codes/memphis/>)

Please note that fire hydrants in the City of Memphis that are painted red by the City are not in service. Fire hydrants that are painted silver by the city are in service.

SECTION 02201 SITE SURVEYS

All topographical survey work shall be tied into the City of Memphis Benchmark system. For blue book data go to, http://www.ngs.noaa.gov/cgi-bin/ds_proj.prl . For additional information contact:

City of Memphis
Survey Service Center
389 Washington Ave
Memphis TN 38105
528-2594
528-2595

SECTION 02203 ACCESSIBILITY ASSESSMENT

Accessibility is as critical to City facilities. All project work at existing facilities shall include remediation of every impediment to the disabled. The City wants to go beyond the minimum regulatory requirements, and wishes to always comply with the most stringent interpretation of accessibility for everyone. If the theory as well as regulation advances during the course of design or construction, every effort shall be made to adapt the Work to the new information.

The Consultant shall thoroughly investigate every aspect of the existing location from the public street into every last space inside the building. While previous contractors or consultants or City staff may have met requirements at the time of previous work, the City expects the Consultant to review every aspect of the existing facility and then shall design for 100% compliance to current regulations. In the event that the estimated cost of making repairs exceeds the cost of new construction the City needs to be notified immediately in writing, and the City may select other alternatives for the facility.

It is the opinion of the United States Justice Department that Owner, Consultant, Contractor, lessee, or lessor shall be fully responsible for complete compliance to the ADA. See Division 17 for additional information on accessible design.

SECTION 02210 SUBSURFACE INVESTIGATION

Consultant shall hire an independent firm for subsurface investigations when it is required by the nature of the project. Geotechnical investigation report shall detail the existing conditions and recommend a course of action that will provide site conditions suitable for the respective project. Geotechnical investigation fee will be reimbursed in keeping with contract language, additional services.

SECTION 02221 GRANITE CURB REMOVAL

HISTORY: Many of the downtown area streets and alleys have cut Limestone or Granite curbing. These curbs were hand laid between 1900 and 1910. At the time, surface street paving was of various materials including cobblestone and compacted gravel or limestone. The granite curbs were hand placed in a trench with compacted fill. Cobblestone were then laid and cut to fit against the curb.

The remaining granite curb sections function as the early Architects designed, allowing us to enjoy the history and craftsmanship of that particular period in Memphis history. The City of Memphis wishes to protect and use the cut stone curbs for another century. When a project calls for the moving or removing the cut stone curbs or calls for work that abuts or encompasses these curbs the Consultant shall specify suitable methods for the protection of the curbs.

When removal of cut stone curb is required the Consultant shall include the following guidelines in the project specifications.

1. Cut stone curb shall not be removed without prior approval from the BD&C Project Manager.
2. All relocated cut stone shall be stacked on pallets and separated to prevent breakage during transportation and handling. Loaded pallets of cut stone shall wrapped in plastic to prevent water intrusion during transportation and extended storage. Pallets are to be handled by the Contractor with fork-lift equipment.
3. Contractor shall maintain a record of all sections removed and relocated to storage. Records shall be made for each pallet of stone. Records shall include location removed from, date of removal, type of stone, piece sizes and the quantity of each size. Record information by pallet shall be permanently engraved, stamped or embossed on a metal tag/plate sized approximately 6" x 12". Documentation of each pallet record shall become a part of the project documents and shall be turned over to the City at project close out in the formats other records are handed over, such as paper copies, digital copies, etc.
4. Contractor shall take the pallets of cut stone to Collins Yard, 304 Collins St., or some other location as directed by the Project Manager, for storage. Contractor shall load and off-load and place the pallets.

SECTION 02230 SITE CLEARING

Check with your Project Manager for imitations and/or selective clearing

DAMAGE TO TREES WILL NOT BE TOLERATED

SECTION 02231 TREE PROTECTION

Consultant shall specify Tree Protection on any project that could possible cause tree damage. All Project manuals shall include sections on Tree Protection and Tree Repair.

The Contractor shall be instructed to engage a qualified arborist to perform the tree protection and repair.

Consultant shall be aware that most trees, stumps and branches at the Memphis Zoo, are to be stockpiled on site. Consultant shall coordinate with Zoo personnel on each occurrence.

DAMAGE TO TREES WILL NOT BE TOLERATED

SECTION 02300 EARTHWORK

For all projects that include sitework, the Consultant shall include in the specifications, instructions to the Contractor concerning the following:

- A. The Contractor shall bear the responsibility of dealing with sub-grade conditions that impact achieving required compaction. The earthwork portion of specifications shall address the following points :
 1. Soil that is only too wet (or too dry) will not be considered unsuitable material.
 2. Define unsuitable soil.

3. The City will pay for the removal and replacement of unsuitable soil over and above whatever allowance is included in the contract.
4. The Contractor is totally responsible for achieving required sub-grade compaction at his expense. He should be given the option of undercutting and backfilling or processing and drying inside material entirely at his discretion. However, any costs associated with this activity are at his expense.

B. DAMAGE TO TREES WILL NOT BE TOLERATED

- C. Protect existing trees and other vegetation against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation that remains. Guards to remain in-place at all times.
- D. Provide temporary guards to protect trees and vegetation that scheduled to remain in place. Keep guards in place at all times.
- E. Water trees and other vegetation scheduled to remain in place within the limits of the contract work, as required to maintain their health during the course of the Work.
- F. Contractor shall replace all vegetation damaged during the course of the Work. Some trees and shrubs that receive minor damage can be repaired by a qualified arborist. Such repairs shall be completed to the satisfaction of the City.

SECTION 02370 EROSION AND SEDIMENTATION CONTROLS

1.01 On July 1st, 2001, the Tennessee Department of Environment and Conservation (TDEC) began a vigorous enforcement effort toward compliance with the Clean Water Act, (Federal Water Pollution Control Act and subsequent Amendments of 1972, 1977, (became commonly known as the Clean Water Act.), 1981, 1987, Title I of the Great Lakes Critical Programs Act of 1990, and Great Lakes Legacy Act of 2002 [Public Law 107-303, November 27, 2002]). The regulations are to reduce pollution of surface waters resulting from Construction activities.

- A. The Consultant shall comply with all Federal, State, County, and City regulations for construction storm water run-off, erosion, and sedimentation control.
- B. Documentation may include but is not limited to:
 1. **Erosion Control Plan (ECP)** – Required by the Office of Land Development, submitted through the Office of Code Enforcement.
 2. **Notice of Intent** – Required by the Environmental Protection Agency (EPA), submitted through TDEC.
 3. **Storm Water Pollution Prevention Plan (SWPPP)** – Required by the EPA, submitted through TDEC.
 4. **Notice of Coverage (NOC)** – Provided by TDEC to contractor. Required by EPA prior to any work on the site.
 5. **Notice of Termination (NOT)** – Required by EPA. Submitted by the Contractor to TDEC.
 6. **404 Permit** – Required by, and issued to the U.S. ARMY Corps of Engineers.
 7. **401 Water Quality Certification** – Issued by TDEC.
 8. **Aquatic Resource Alteration Permit** – Issued by TDEC.
- C. City of Memphis, as the Owner of the Project, requires:
 1. Consultant be responsible for preparation of Storm Water Pollution Prevention Plan (SWPPP),
 2. Consultant obtains approval of the SWPPP by City of Memphis, Public Works Environmental

Engineer, Mr. Don Hudgins and by TDEC Manager of Water Pollution Control, Mr. Terry Templeton, with a copy to the Project Manager, at both

- (a.) the Design Development submittal phase and,
 - (b.) the Construction Document submittal phase,
3. Consultant submit a NOI, SWPPP, and any required attachments far enough in advance to secure TDEC's NOC before the project bids (NO EXCEPTIONS); provide a copy to the Project Manager and to Public Works Environmental Engineer,
 4. Consultant receive the NOC and immediately notify and then provide a copy to the Project Manager and to Public Works Environmental Engineer,
 5. Consultant shall pay for Permit with reimbursement at \$0- markup,
 6. Consultant to include all SWPPP requirements in the bid documents and highlight SWPPP actions in the pre-bid conference,
 7. Consultant provide all inspections and documentation of the pollution prevention measures as required by all regulations,
 8. Consultant shall notify the Contractor in writing, with a copy to the Project Manager, of any deficiencies found during the inspections and instruct the Contractor to make necessary changes/repairs,
 9. Consultant submit the Notice of Termination (NOT), with a copy to the Project Manager, at the completion of the Project,
 10. Consultant provide a Post Run-Off Control Plan to the Public Works Environmental Engineer, not later than the completion of the Project.
 11. That between the Consultant and the Contractor ALL regulations, including fees, are met within basic contract scope and payment.

1.02 Every project requiring alterations to public infrastructure-

Comply with local codes and requirements for permits. An Erosion Control Plan is required within these submittals.

1.03 Construction disturbance of one acre or greater-

If the total disturbed acreage of the proposed development is equal to or greater than one acre, a NOI for coverage under the Tennessee Construction General Permit shall be submitted to TDEC. The NOI and required attachments, including a SWPPP, shall be submitted to TDEC with advance timing as required for TDEC to issue a NOC prior to commencement of construction. At the completion of each project a NOT shall be submitted by the Contractor to TDEC. The Contractor shall provide a copy to the Project Manager of the NOI, SWPPP, NOC, and NOT at the time of each respective submission or receipt each.

1.04 Alteration of regulated streams or wetlands-

If regulated streams or wetlands will be altered by the project other State or Federal permits may be required. The US Army Corps of Engineers issues §404 permits for discharge of dredge or fill material into water of the US and TDEC shall issue either 401 Water Quality Certifications (for Corps §404 permits) or ARAP for physical alterations of waters of the State.

1.05 Contacts

A. CITY OF MEMPHIS

Local regulations: A Guidance Document is provided by the City of Memphis, Division of Public Works, Environmental Engineer:

http://www.cityofmemphis.org/pdf_forms/Gen-011.pdf

Local regulations for the original City of Memphis Ordinance #4538:

http://www.cityofmemphis.org/pdf_forms/stormwater.pdf

(NOTE: amendments 5116 and 5135 are not on the web site as of this writing. Photo copies may be found in the appendix of this Consultant's Handbook.)

City of Memphis,
Public Works Environmental Engineer,
Don Hudgins
2303 North Second St.
Memphis, TN 38127
Phone 901-576-7122

B. TENNESSEE

Tennessee regulation information, including the Erosion Control Handbook, may be found at:

<http://www.state.tn.us/environment/permits/#wpc>

TDEC
Manager of Water Pollution Control,
Mr. Terry Templeton
2510 Mt. Moriah Rd., Ste E-645
Memphis, TN 38115-1520
phone 901 368-7959.
www.tdec.net

Division of Water Pollution Control
401 Church Street, 6th floor
Nashville, TN. 37243-0625
Phone: (615) 532-0625

Division of Construction Grants and Loans
401 Church Street, 8th floor
Nashville, TN. 37243-1533
Phone: (615) 532-0445

Division of Water Supply
401 Church Street, 6th floor
Nashville, TN. 37243-1549
Phone (615) 532-0191

C. UNITED STATES

The EPA Federal Water Pollution Control Act can be found at:

<http://www.epa.gov/region5/water/pdf/ecwa.pdf>

The EPA Developing Pollution Prevention Plans and Best Management Practices can be found at:

<http://cfpub.epa.gov/npdes/stormwater/swppp.cfm>

The EPA Construction General Permit can be found at:

<http://cfpub.epa.gov/npdes/stormwater/cgp.cfm>

SECTION 02700 BASES, BALLASTS, AND PAVING

Parking lots and on site driveways shall have a minimum design of the following:

- A. 10" soil cement base
- B. 2" asphalt base course
- C. 1" asphalt top course

Paving design shall follow recommendations of the soil investigation report. If a stronger design is recommended, concrete paving may be used. Check with Project Manager for direction.

Isles and parking areas known to be used for large trucks shall be designed for their estimated weight.

SECTION 02750 RIGID PAVEMENT

Consultant shall specify that the Contractor shall comply with the following:

- A. All sidewalk and curb cuts shall comply with the City of Memphis Ordinances.
- B. All cast in place concrete shall be a minimum of 4000 psi and 5" thick.
- C. All sidewalks shall be of Portland cement and have fiber mesh reinforcement.
- D. Dumpster pads shall be a minimum 8" thick with Portland cement and fiber mesh reinforcement. Dumpster pads shall extend a minimum of 30' in front of the dumpster location.

SECTION 02790 POURED-IN-PLACE RUBBER SAFETY SURFACE SYSTEM

Park Services Division of the City of Memphis provides playground equipment in accordance with their current requirements. Codes, ADA regulations, environment friendly materials and safety considerations change frequently and the Work must be current.

- A. The following manufacturers are approved to provide Poured-in-place rubber safety surface system.
 - 1. VITRICON, INC.
Product: VITIRTURF 'HD' System
Manufacturer's representative in Memphis:
Mid-South Recreation
Telephone: (901) 754-0905

SECTION 02810 IRRIGATION SYSTEM

When underground irrigation systems are a part of new installation the City specifies Toro controllers, heads, and valves. When the project is located at a site where an existing system is to remain in operation, new equipment shall be of the same manufacturer and model.

SECTION 02870 SITE FURNISHINGS

- A. Park Benches: Contractor shall furnish and install permanent mounted recycled plastic benches as manufactured by:
 - 1. DUMOR, Inc.
Manufacturer's representative in Memphis:
Mid-South Recreation

(901) 754- 0905

- a. Bench model : Model # 105 PL (backless bench) S-1 embedment mount.
- B. Pedestal Tables: Contractor shall furnish and install permanent-mounted recycled plastic tables as manufactured by:
 1. DUMOR, Inc.
Manufacturer's representative in Memphis:
Mid-South Recreation
(901) 754- 0905
 - a. Table model: Model # 76-34; S-1 embedment mount; Recycled plastic top and benches, 3"x4" members.
- C. Drinking Fountain: Contractor shall furnish and install one handicapped accessible drinking fountain as manufactured by:
 1. MOST DEPENDABLE FOUNTAINS (MDF)
4697 Winchester Rd.
Memphis, Tennessee 38118
 - a. Model # 440 DB-MPC with hose bib and lockable hose bib cover, 1/8" thick stainless steel bottom plate below cantilevered fountain arm, and attached valve box options with padlock hasp. Lock by Owner.
- D. Bicycle Rack:
 1. DERO BIKE RACK CO.
1429 Washington Ave. South
Minneapolis, MN 55454-1000
Toll free: 888-337-6729
(612) 359-0689 Fax: (612) 341-3356
www.dero.com
 - a. Model: Campus Rack S-6; Foot mount 34"x3"; anchor with stainless steel expansion bolts.

SECTION 02871 TRASH AND LITTER RECEPTORS

Where the existing facility has exterior trash receptacles, Consultant shall specify that additional receptacles shall match existing.

On projects where the facility has all new exterior receptacles, they shall all be from the same manufacturer and shall be from the following source.

- A. Urban Accessories
P.O. Box 310
20004 144th N.E.
Woodinville, WA 98072
Phone 206-487-0488
Fax 901-568-3033
 1. Model- T-20-T,
 2. Size- 14" diameter

SECTION 02880 PLAYGROUND EQUIPMENT

Park Services Division of the City of Memphis provides playground equipment in accordance with their current requirements. Codes, ADA regulations, environment friendly materials and safety considerations change frequently and the Work must be current.

A. The following manufacturers are approved to provide play equipment.

1. LITTLE TIKES, INC.
Manufacturer's representative in Memphis:
Mid-South Recreation
David Jones, Sales Representative
Telephone: (901) 754 - 0905
2. LANDSCAPE STRUCTURES, INC.
601 7th Street South. P.O. Box 198
Delano, MN 55328-0198
Telephone: (763) 972-3391
1-888-574-7377
Matt Breyer ext. 5436
3. PLAYWORLD SYSTEMS, INC.
1000 Buffalo Road
Lewisburg, PA 17837-9795
Telephone: (570) 522-9800
1-800-233-8404
4. MIRACLE RECREATION
959 Rocky Hill Estate Road
Clarkson, KY 42726
Telephone: 1-800-251-5578
Tami Patton, Sales Representative

SECTION 02881 PLAYGROUND PROTECTIVE SURFACING

See Section 02790 above.

SECTION 02882 TENNIS COURT SURFACING

Consultant shall provide a specification based upon the following:

- A. New construction of Tennis Court to be POST-TENSIONED CONCRETE SLABS.
 1. Concrete shall be 4,000 psi, 5% air entrained with ASTM C 33 compliant aggregate. Fine shall be Natural Sand ASTM C 144 and Coarse shall be Limestone (3/4" to 1")
- B. Fencing for court(s) shall be 11 gauge Class 2a PVC coating extruded and adhered to zinc coated fabric. Height shall be 10'. All areas with access gate(s) as located by owner. Line Posts @ 10' o.c. maximum and Rail Couplings @ 21' o.c. maximum
- C. Tennis Court Posts shall be Douglass Brand System #TN-36.
- D. Tennis Court Nets shall be Douglass Brand System #DTP-37 green.
- E. Playing Lines shall be 2" wide, textured, marked and painted with Plexicolor Line Paint, in conformance with the U. S. Tennis Association.
- F. Finish shall be light broom with -0- depressions.
- G. Court surfacing shall be Plexiplay System as manufactured by California Products Corporation of Cambridge, Massachusetts. Installation per manufacturer's instructions.
- H. Screen , when specified, shall be as manufactured by MacGregor Canvas Products of Fond Du Lac, Wisconsin. Material shall be pure polypropylene dark green 6" open mesh, grommetted on all (4) sides @ 18" o.c. with reinforced 4-ply hems. Box vents #BSN-MTAIRVNT, spaced at 10' intervals.

Follow manufacturers installation instructions.

- I. SUBMITTALS: Refer to Section 01 33 00.
 1. Manufacturer's data for tennis court surfacing including surface preparation and application requirements.
 2. Manufacturer's data on Wind Screen. Submit sample of material to Owner and Consultant.
 3. Submit copies of shop drawings and technical data on fencing.

SECTION 02920 LAWNS AND GRASSES

Park Services Division has specific requirements for lawns and grasses. Contact the Project Manager to obtain the current information.

For all projects, disturbed lawn areas shall be repaired with sod that matches the disturbed lawn.

SECTION 02930 EXTERIOR PLANTS

Consultant shall specify Tree Protection on any project that could possibly cause tree damage and refer the Contractor to the language found in the Section 02231 Tree protection. The size and type of project and the nature of the site will dictate the degree of application and the editing of this specification.

(For Memphis Zoo related projects coordinate with Zoo personnel and instruct the contractor as to which tree trunks, stumps, and branches are to be stockpiled on site and are to be used for furnishing the natural animal habitats.)

SECTION 02945 TREE GRATES

Consultant shall specify, where applicable, that tree grates that are ADA compliant, unpainted, and from one of the following:

A. Urban Accessories

P.O. Box 310
20004 144th N.E.
Woodinville, WA 98072
Phone 206-487-0488 Fax 901-568-3033

Model- Cast Iron 4' x 4' Standard Flat, Custom Mold with inner ring.

B. Neenah Foundry Company

KTM Associates
P.O. Box 364
Cordova, TN 38018
Phone 901-853-8400 Fax 901-853-1792

Model- number 8768, 4' x 4', Cast Iron

DIVISION 03

CONCRETE

Division 03 of this Consultant's Handbook includes information with respect to the following Sections:

SECTION 03050	BASIC CONCRETE MATERIALS AND METHODS	2
SECTION 03100	CONCRETE FORMS AND ACCESSORIES.....	2
SECTION 03200	CONCRETE REINFORCEMENT	2
SECTION 03210	REINFORCING STEEL	2
SECTION 03220	WELDED WIRE FABRIC.....	2
SECTION 03300	CAST-IN-PLACE CONCRETE	2
SECTION 03360	CONCRETE FINISHES (High-Tolerance Floor).....	3
SECTION 03350	CONCRETE FINISHING	3
SECTION 03370	SPECIALLY PLACED CONCRETE	3
SECTION 03390	CONCRETE CURING	3

SECTION 03050 BASIC CONCRETE MATERIALS AND METHODS

- A. All Slabs-on-grade shall have moisture / vapor retarder that is resistant to deterioration according to ASTM E 154, such as polyethylene sheets minimum thickness (8) mils (0.2 mm) thick. Vapor barrier shall be free of any punctures, tears, open seams, or other disruptions to the function of the barrier, when concrete is placed.
- B. Consultant shall establish and enforce inclement weather restrictions.
- C. Cold weather placement shall comply with ACI 306.
- D. Hot weather placement shall comply with ACI 305.
- E. Concrete mix shall conform to ASTM C150, TYPE 1 or 1A throughout project.

SECTION 03100 CONCRETE FORMS AND ACCESSORIES

- A. Consultant shall detail all anchors, inserts, expansion and control joints, and water stops in a manner that clearly describes depth, length, width, and other dimensions required to accomplish a professional installation.
- B. Consultant shall review and approve all material substitutions.
- C. Consultant shall review and approve all form work and reinforcing prior to concrete placement.

SECTION 03200 CONCRETE REINFORCEMENT

- A. All concrete reinforcing materials shall comply with ASTM A615 Grade 60 and/or ASTM A615M Grade 400, deformed.
- B. Epoxy-Coated reinforcing shall comply with ASTM A 82, plain, cold drawn steel.
- C. Supports, chairs, bolsters, spacers and other devices shall comply with CRSI Specifications. For exposed-to-view concrete where supports are in contact with forms, plastic coated supports shall be provided, CRSI class I or CRSI class II (stainless steel)
- D. Fibrous reinforced concrete is encouraged on all "flat work".

SECTION 03210 REINFORCING STEEL

- A. Galvanized reinforcing steel bars shall comply with ASTM A 767, ASTM A 767M, class II (2oz zinc psf (610g/sq.m) hot dipped galvanized after fabrication / deforming. Placement of reinforcing
- B. Standard steel reinforcing bars shall comply with ASTM A615, grade 60 (#3 bars grade 40).

SECTION 03220 WELDED WIRE FABRIC

Building Design and Construction encourages the use of Fibrous concrete that eliminates the need for Welded Wire Fabric.

SECTION 03300 CAST-IN-PLACE CONCRETE

Any admixtures require the Projects Manager's "EXCLUSIVE" written approval.

SECTION 03360 CONCRETE FINISHES (High-Tolerance Floor)

Special Finishes require the written approval of the Project Manager.

SECTION 03350 CONCRETE FINISHING

- A. Consultant shall specify a test slab to be placed for Owner's approval prior to permanent concrete placement. Test slab should be located to become a part of the project if approved. Slab shall be a minimum 5' x 10' x 4". Approval of test slab reflects Owner's expectations to quality of finish for all remaining concrete placement.
- B. Consultant shall be responsible to approve locations of all block-outs, anchor bolts, and embedded angles / plates / lugs, etc. Contractor shall not proceed without Consultant's inspection and approval.

SECTION 03370 SPECIALLY PLACED CONCRETE

Pumped or otherwise specially placed concrete shall comply with ACI 304, (Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete) ASTM C33, (Concrete Aggregates) ASTM C150, (Portland cement) ASTM C260, (Air-Entrained Admixtures for Concrete) ASTM C494, and (Chemical Admixtures for Concrete).

SECTION 03390 CONCRETE CURING

Unless otherwise noted, Curing Process shall comply with FS TT - C 800, (Curing compound, Concrete, for New and Existing Surfaces).

DIVISION 04

MASONRY

Division 04 of this Consultant's Handbook includes information with respect to the following Sections:

SECTION 04050 BASIC MASONRY MATERIALS AND METHODS

- A. Consultant shall be responsible for Quality Assurance and ASTM C compliance for proper grout, mortar mix, masonry units, and installation procedures.
- B. Consultant shall coordinate with Contractor for testing submittal prior to commencement of work.
- C. Contractor shall provide materials that comply with all required tests.
- D. Consultant shall require Contractor to comply with the current standards for masonry materials and methods. Standards requires for compliance include but are not limited to:
 - 1. ASTM C 150 Portland Cement
 - 2. ASTM C 595 Specifications for Blended Hydraulic Cements
 - 3. ASTM C 260 Specifications for Air Entraining Admixtures for Concrete
 - 4. ASTM C 91 Masonry Cement
 - 5. ASTM C 5 Quicklime for Structural Purposes
 - 6. ASTM C 207 Hydrated Lime for Masonry Purposes
 - 7. ASTM C 144 Aggregate for Masonry Mortar
 - 8. ASTM C 387 Packaged, Dry, Combined Materials for Mortar and Concrete.
 - 9. ASTM C 476 Grout for Masonry
 - 10. ASTM C 270 Mortar for Unit Masonry
 - 11. ASTM C 404 Aggregates for Masonry Grout
 - 12. ASTM E 447 Methods for Compression Strength of Masonry Prisms

SECTION 04060 MASONRY MORTAR

Consultant shall design mortar according to application. Property Requirements for Load Bearing Walls, Non-Load Bearing Walls, Parapet Walls, Retaining Walls, Foundation Walls, Manholes, Sewers, Pavements, Walks, and Patios, shall comply with ASTM C 270 and ASTM C 150. Admixture must be used with "Extreme" caution so the performance of the Masonry is not compromised. Admixtures containing "Chlorides" shall not be used.

SECTION 04070 MASONRY GROUT

Grout compressive strength shall match that of the brick masonry or be 2000 psi, whichever is greater.

SECTION 04080 MASONRY ANCHORAGE AND REINFORCEMENT

Anchors and Reinforcements shall comply with but not be limited to the following:

- A. ASTM A 641 - Mill Galvanizing joint reinforcement, interior.
- B. ASTM A 153 - Hot-Dipped Galvanized: joint reinforcement, wire ties, and wire anchors, interior / exterior.
- C. ASTM A 525 - Sheet metal ties, interior.

- D. ASTM A 123 - Steel plates and bars.
- E. ASTM A 167 - Stainless steel anchors and ties. (Type 304)

SECTION 04200 MASONRY UNITS

Masonry unit shall comply with ASTM standards such as

- A. ASTM C 62 (Building Brick)
- B. ASTM C 216 (Facing Brick)
- C. ASTM C 652 (Hollow Brick)
- D. ASTM C 902 (Paving Brick)
- E. ASTM C 126 (Ceramic Glazed Brick)
- F. ASTM C 1088 (Thin Brick veneer Brick)
- G. ASTM C 32 (Sewer and Manhole Brick)
- H. ASTM C 279 (Chemical Resistant Brick)
- J. ASTM C 410 (Industrial Floor Brick)
- K. ASTM C 979 (Admixture for Colors)

SECTION 04210 CLAY MASONRY UNITS

Clay units shall comply with but not be limited to the following:

- A. ASTM C 134 (Structural Clay Load Bearing)
- B. ASTM C 56 (Structural Clay Non-Load Bearing)
- C. ASTM C 212 (Structural Clay Facing tile)
- D. ASTM C 530 (Structural Clay Non-Load Bearing Screen Tile)
- E. ASTM C 126 (Ceramic Glazed Tile)

SECTION 04220 CONCRETE MASONRY UNITS

Concrete units shall comply with but not be limited to the following:

- A. ASTM C 55 (Concrete Brick)
- B. ASTM C 73 (Calcium Silicate Face Brick)
- C. ASTM C 129 (Non-Load Bearing Concrete Masonry Units)
- D. ASTM C 139 (Concrete Units for Construction of Catch Basins and Manholes)
- E. ASTM C 744 (Prefaced Concrete and Calcium Silicate Masonry Units)
- F. ASTM C 936 (Solid Concrete Interlocking Paving Units)

SECTION 04270 GLASS MASONRY UNITS

Glass Masonry units can be used in design on a limited basis. Check with your Project Manager for direction.

SECTION 04400 STONE

STONE SHALL NOT BE INCLUDED IN DESIGN WITHOUT PROJECT MANAGER'S "EXCLUSIVE" WRITTEN APPROVAL. **NO EXCEPTIONS**

SECTION 04710 SIMULATED BRICK

Simulated brick, brick paving, stone, stone paving, and tile, shall not be used in design without Project Manager's "Exclusive" written approval.

SECTION 04900 MASONRY RESTORATION

1. Replacement: Damaged masonry shall be carefully removed and replaced with matching, undamaged units using mortar. Mortar color shall match original work. Remove masonry units back to full block / brick as required to match and blend in with original placement.
2. Pointing: Mortar with visible holes or mortar that cannot be compacted properly because of hidden voids, shall be removed and replaced with fresh mortar, filling each joint completely and tooling to match adjacent work.

SECTION 04930 UNIT MASONRY CLEANING

Consultant shall be responsible to enforce manufacturer's directions and NCMA TEK Bulletin No. 45 for cleaning CMU. Drips, Splatters, and Stains shall be removed by hand.

DIVISION 05

METALS

Division 05 of this Consultant's Handbook includes information with respect to the following Sections:

SECTION 05560	METAL CASTINGS	2
SECTION 05510	METAL STAIRS AND LADDERS	2
SECTION 05550	TAIR TREADS AND NOSINGS.....	2

SECTION 05510 METAL STAIRS AND LADDERS

Ladders shall be vandal resistant and located in secure and controlled areas.

SECTION 05550 TAIR TREADS AND NOSINGS

Nosings and treads shall be non-skid slip resistant.

SECTION 05560 METAL CASTINGS

Consultant shall specify corner wheel guards such as, McKinley Iron Works, Inc. model WG-7 heavy duty, at vehicular overhead doorjamb. Specify finish to coordinate with building design and color elements.

DIVISION 06

WOOD AND PLASTICS

Division 06: No City guidelines at this time.

DIVISION 07

THERMAL AND MOISTURE PROTECTION

Division 07 of this Consultant's Handbook includes information with respect to the following Sections:

SECTION 07050	BASIC THERMAL AND MOISTURE PROTECTION	2
SECTION 07100	DAMPROOFING AND WATERPROOFING.....	2
SECTION 07210	BUILDING INSULATION	2
SECTION 07240	EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS)	2
SECTION 07300	ROOF SYSTEMS AND COVERINGS	2
SECTION 07310	SHINGLES.....	3
SECTION 07400	ROOFING AND SIDING PANELS.....	3
SECTION 07500	MEMBRANE ROOFING	4
SECTION 07550	MODIFIED BITUMINOUS MEMBRANE ROOFING.....	4

SECTION 07050 BASIC THERMAL AND MOISTURE PROTECTION

The Consultant shall “CLEARLY” specify and detail “PROVEN” waterproofing. Manufacturers and material systems shall be listed by brand name and specification.

SECTION 07100 DAMPROOFING AND WATERPROOFING

The Consultant shall be present, oversee and/or approve all waterproofing installations. The Consultant shall verify that each application was accomplished by a manufacturer-certified representative.

SECTION 07210 BUILDING INSULATION

The minimum thermal insulation requirements for all construction, new and renovation/restoration, is the current code requirement for new construction, or the following, whichever is greater:

- A. All walls shall have a minimum combined thermal R value of 19.
- B. All roofs shall have a minimum combined thermal R value of 40.

SECTION 07240 EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS)

EIFS shall not be used without the written approval of the Administrator of BD&C.

SECTION 07300 ROOF SYSTEMS AND COVERINGS

All roofing must be designed to meet the City of Memphis' insurance carriers approved roofing assemblies. Reference : FMGlobal.com, ROOFNAV – Roofing Navigation Tool for Approved Roofing Assemblies. The roofing design must be approved by FMGlobal prior to bidding.

- A. No flat roofs will be allowed.
 - 1. (If the design team feels that the only way to design their project is to use a low slope roof, they shall have written approval from the administrator of BD&C. If a low slope roof is approved, the minimum slope shall be ½" per foot. Slope shall be achieved by structural system and decking, not by insulation board.)
- B. The Consultant shall strive to attain the maximum roof slope possible on existing construction for re-roofing projects.
- C. Use metal standing seam roofing where possible. The slope for a standing seam roof shall be a minimum of 4 / 12.
- D. No gutters shall be used on new roof construction.
- E. Submittals and shop drawings which include complete technical data and physical samples of the material proposed for use shall be forwarded to the Consultant for written approval prior to delivery of any material to the job site.
- F. Testing: all roofs shall be tested prior to acceptance by the City of Memphis.
- G. R values: all roofs shall comply with current code or have a minimum combined thermal R value of 40, whichever is greater.

- H. Buildings under major renovation shall meet thermal insulation standards for new construction.

SECTION 07310 SHINGLES

- A. TESTING: Shingle roofs shall be tested by placing oscillating sprinklers along the roof ridge in sufficient numbers to cover all areas of the roof with water for a period of no less than three (3) hours.
- B. INSTALLER QUALIFICATIONS: The roofing contractor and all applications technicians shall have at least five (5) years experience installing the shingled roofing products listed in paragraph 5 of this section.
- C. FIELD MEASUREMENTS: The roofing contractor shall be responsible for taking all necessary measurements to verify the dimensions indicated on the project drawings.
- D. WARRANTY: Warranties shall start at the time of final acceptance. The manufacturer shall provide a thirty-year replacement warranty. The roofing contractor shall provide a written five (5) year workmanship No Dollar Limit (NDL) warranty.
- E. SPECIFICATIONS: Composition shingles shall be fiberglass based asphalt shingles conforming to:
 - 1. Federal Specifications SS-S 001534, Class A, Type 1, and ASTM D-4362-87 and,
 - 2. Labeled by Underwriter's Laboratory as Class A-Fire Resistant and Wind Resistant,
 - 3. Algae resistant.
- F. APPROVED SHINGLE MANUFACTURES:
 - Tamko - Heritage
 - Owens Corning - Oak Ridge
 - CertainTeed - Landmark
 - GAF - Timberline

"NO MANUFACTURER SUBSTITUTIONS WILL BE ALLOWED"
- G. Asphalt coated underlayment shall be one layer of 30 pound organic felt, 36" wide and conforming to the requirements of ASTM D-226-81.
- H. Shingled roofs on new construction shall have a minimum 6/12 slope.
- I. Surface roll roofing shall be 36" wide, 90 pounds or heavier, and supplied by the shingle manufacturer. Roll roofing shall be used as closed valley flashing.
- J. Fasteners shall be nails and shall conform to the roofing manufacturer's requirements for material, shape and installation placement.
- K. Roof brackets shall be used; nailing walk boards onto shingles will not be allowed.

SECTION 07400 ROOFING AND SIDING PANELS

- A. SUBMITTALS: Submit shop drawings for approval in advance of fabrication. The shop drawings shall include large scale details of the system components in assembled position in relation to materials and/or components, not necessarily a part of the metal roofing system, with which it shall member and adjoin. Samples of exact material and color shall accompany shop drawings.
- B. CERTIFICATION: Installers shall be certified by an acceptable roofing manufacturer listed in paragraph 4 and have at least five (5) years experience in installing materials made by that manufacturer.

- C. **WARRANTY:** The metal roofing manufacturer shall provide a written warranty agreeing to repair and/or replace any defective roofing materials for a period of not less than twenty-five (25) years from the date of final completion. In addition, the roofing contractor shall provide a written warranty agreeing to repair all leaks, plus repair and/or replace any faults or defects due to workmanship for a period of not less than five (5) years from the date of final completion. The effective warranty period will not commence until a complete water tight installation has been demonstrated.
 - D. **ACCEPTABLE MANUFACTURERS OF MANUFACTURED ROOFING SYSTEMS:**
 - Berridge Cee-Lock
 - Peterson Snap-Clad
- "NO MANUFACTURER SUBSTITUTIONS WILL BE ALLOWED"**
- E. The roofing system shall be comparable to Berridge Standing Seam Cee-Lock Panels with seams at a minimum of 1-1/2" high, spaced a maximum of 16-1/2" on center. Panels shall be continuous length from ridge to eave. Each seam shall have an extruded vinyl insert for water tight seal. Underlayment shall be "Moisture Guard" or roofing felt as recommended by the manufacturer.
 - F. **TESTING:** Standing seam metal roofs shall be tested by placing oscillating sprinklers along the ridge in sufficient numbers to cover all areas of the roof with water for a period of no less than three (3) hours. The Contractor shall notify the Consultant and the Property Maintenance Bureau prior to commencing the testing procedure. The Contractor shall repair all leaks and eliminate pooling discovered by these procedures prior to substantial completion.

SECTION 07500 MEMBRANE ROOFING

Membrane roofing shall not be used without written approval from the Building Design and Construction administrator.

SECTION 07550 MODIFIED BITUMINOUS MEMBRANE ROOFING

- A. Prior to ordering materials and commencing work, the Consultant shall conduct a Pre-Bid Roofing Conference which shall include the following persons:
 - 1. General Contractor and his licensed Roofing Subcontractor
 - 2. Roofing Membrane Manufacturer's Representative
 - 3. BD&C Project Manager
 - 4. Property Maintenance Representatives
- The purpose of this meeting shall be to answer any questions, discuss issues, and resolve potential problems associated with the project. At the conclusion of this meeting and prior to submitting a bid, the Contractor shall inspect all existing roof surfaces and notify the Owner in writing (through the Consultant) of any conditions or defects that will prevent the installation of his proposed roofing system.
- B. Submittals shall include complete technical data, shop drawings, samples and manufacturer's certification of installer experience with the specified materials.
 - C. The roofing material manufacturer shall furnish a written warranty for twenty (20) years from date of Substantial Completion. This warranty shall cover all labor and material necessary to keep the roofing membrane watertight for the period of the warranty and is to have an unlimited penal sum.
 - D. The Contractor shall furnish a written warranty for five (5) years from date of substantial completion. This warranty is to cover all labor and material and is to have an unlimited penal sum. Warranty shall

include a maximum (48 hr) response time.

E APPROVED MANUFACTURES OF ROOFING MEMBRANE SYSTEMS:

1. Tamko Asphalt Products
2. CertainTeed
3. Soprema Roofing System

“NO MANUFACTURER SUBSTITUTIONS WILL BE ALLOWED”

F. All roofs shall be tested prior to acceptance by the City of Memphis.

G. Modified /bitumen roofs shall be tested as follows:

1. Roof drains shall be plugged,
2. Roof shall be flooded to a minimum depth of 2 inches above the drain clamp ring. (At no time shall the water level rise as high as 2 inches below the top of any flashings, pitch pockets, curbs, equipment, top of any vent or stack, or any other facility element that may be damaged from this test).
3. Water shall remain for a period of two (2) hours. Each roof drain shall then be allowed to drain its area one area at a time until the entire roof is drained.

DIVISION 08

DOORS AND WINDOWS

Division 08 of this Consultant's Handbook includes information with respect to the following Sections:

SECTION 08100	HOLLOW METAL DOOR AND FRAMES.....	2
SECTION 08210	WOOD DOORS	2
SECTION 08310	ACCESS DOORS AND PANELS	2
SECTION 08330	COILING COUNTER DOORS	2
SECTION 08360	SECTIONAL OVERHEAD DOORS	2
SECTION 08410	ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS.....	2
SECTION 08460	AUTOMATIC ENTRANCES	2
SECTION 08500	WINDOWS.....	2
SECTION 08600	ROOF WINDOWS AND SKYLIGHTS	3
SECTION 08710	DOOR HARDWARE	3
SECTION 08810	GLAZING	4
SECTION 08830	MIRRORS.....	4
SECTION 08840	PLASTIC GLAZING	5
SECTION 08900	OUTSIDE GLAZED WALL SYSTEM.....	5

SECTION 08100 HOLLOW METAL DOOR AND FRAMES

“CLEARLY” specify and detail hollow metal doors and frames so that all metal frames are fabricated in a single manufacturer’s shop. Eliminate or minimize the amount of field fabrication on all doors, windows and store front framing.

Doors and frames shall be primed by the manufacturer. Where possible, doors and frames shall be painted by the manufacturer.

All exterior doors shall be metal with minimum view light.

Interior doors shall be solid core wood.

SECTION 08210 WOOD DOORS

This section of specifications is contained in the Appendix as a guideline for the Consultant to adapt, when applicable, to each respective project. Notify the Project Manager of proposed modifications.

SECTION 08310 ACCESS DOORS AND PANELS

FIRE STATIONS: specify this floor access door in the hose tower platform: Bilco, type Q, 2’-6” x 2’-6”. This should be installed by the steel erector.

SECTION 08330 COILING COUNTER DOORS

This section of specifications is contained in the Appendix as a guideline for the Consultant to adapt, when applicable, to each respective project. Notify the Project Manager of proposed modifications.

SECTION 08360 SECTIONAL OVERHEAD DOORS

This section of specifications is contained in the Appendix as a guideline for the Consultant to adapt, when applicable, to each respective project. Notify the Project Manager of proposed modifications.

FIRE STATIONS: Overhead Door Corporation; door series 521, operator model L, track 3”.

SECTION 08410 ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

This section of specifications is contained in the Appendix as a guide line for the Consultant to adapt, when applicable, to each respective project. Notify the Project Manager of proposed modifications.

SECTION 08460 AUTOMATIC ENTRANCES

Automatic doors shall be multipurpose, Push Button, electrically operated with manual push / pull over-ride.

SECTION 08500 WINDOWS

FIRE STATIONS: For security style windows that separate interior spaces the Fire Division uses double layered windows with internal mini blinds. Consultant shall design around Pella Designer Series® products and SmartSash® System, and fixed Slimshades® Blinds.

SECTION 08600 ROOF WINDOWS AND SKYLIGHTS

Roof Windows and Skylights shall NOT be used without the written approval of the BD&C administrator.

SECTION 08710 DOOR HARDWARE

Where existing hardware is different from that listed herein, Consultant shall check with Project Manager for specific hardware to be used. Notify the Project Manager of proposed modifications

MATERIALS - Acceptable manufacturers for various types of products are listed herein.

- A. If finish and base material and quality of finish are not otherwise indicated, provide at least the commercially recognized quality specified in ANSI A156 series standards applicable to each particular type of hardware.
- B. Butts: Hager, McKinney, Stanley.
 - 1). Provide full-mortise type hinges on each door, except as otherwise indicated, and except as otherwise needed for proper support and operation of doors. Provide stainless steel pins, except steel pins with steel hinges; non-removable for exterior, non-rising for interior doors, flat button with matching plugs.
- C. Lock/Latch Sets:
 - a. Cylindrical Lever Sets - Corbin/Ruswin, 3300/NZD series (extra heavy duty.)
 - b. Mortise Lock Sets – Corbin/Ruswin, ML2000 series (used in remodel situations where door is existing mortise prep)
- D. Cylinders: Corbin/Ruswin — L-4 Keyway, with six (6) pins, and interchangeable core. No substitutions.
- E. Locks: Equip lock sets with specified lock cylinders, in a master key system, to be designated by Owner. (L-4 Keyway Only)
 - 1) Construction Locks: Either temporary cylinders for construction period, or temporary construction keying which is automatically voided through use of Owner's keys.
 - 2) Stamp keys "DO NOT DUPLICATE". (Omit notation from one key per group).
- F. Exit Devices: Corbin/Ruswin
 - 1) Exit devices ED5000/ED4000,
 - 2) Equip exit devices with keyed devices,
 - 3) Equip fire-rated doors with Corbin/Ruswin ED5600A1 with keyed trim pack.
 - a. Trim Pack – Corbin/Ruswin N955
 - b. Equip trim pack with interchangeable core rim housing.
- G. Overhead Closers: Corbin/Ruswin, DC6000 adjustable spring pressure, mounted with sex bolts.
 - 1) Size and mount units indicated or, if not indicated, to comply with manufacturer's recommendations for the exposure condition. Reinforce the substrate as recommended.
- H. Stops, Kick Plates, Push Plates, Pull Plates, Flush Bolts: Ives, Hager, Rockwood, Quality.
 - 1) Provide grey rubber to exposed resilient parts.
 - 2) Hardware finish to match dull chrome (US26D).
 - 3) Finish exposed metal to match hardware, except finish floor plates to match thresholds or floor finish.

- I. Continuous Hinge: Roton, Markar, Pemko
- J. Silencers: Provide silencers in metal door frames, unless not permitted for fire-rating, or unless bumper-type weatherstripping is provided; 3 per single-door frame, 2 per double-door frame.
- K. Manufacturer's of Push & Pull Latches: Glynn-Johnson or approved equal.
- L. Manufacturer's of Overhead Holders: Glynn-Johnson, Rixson, Sargent
- M. Manufacturer's of Seals and Thresholds: National Guard, Pemko, Hager.
- N. Weatherstripping: Provide manufacturer's standard weatherstripping of type, size and profile indicated continuous at head and jamb edges of each exterior door opening. Provide non-corrosive fasteners.
- O. Electronic Keypad and Proximity Card Reader Locks: Marks I-Que series locks. No substitutions.
- P. Key Control System: Corbin/Ruswin standard key control system including metal cabinet with 150% capacity, envelopes, labels, clips, forms, card index, and markers.

INSTALLATION

- A. Hardware Mounting Heights: Door and Hardware Institute "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames 1990", except as otherwise indicated.
- B. Install lock sets with construction cores. Provide City with two (2) Construction Control Keys upon substantial completion.
- C. Develop master key schedule with Property Maintenance and Corbin/Ruswin Representative and in coordination with existing City master key system. Obtain written approval by Property Maintenance of schedule before producing cores and keys. Provide keys in the quantity specified Property Maintenance; total quantity of keys shall be approximately two (2) keys per door.
- D. Deliver to City, upon Substantial Completion permanent cores fully tagged with identification information including but not limited to: core number and door number. Keys shall accompany each respective core. Keys shall only be given to Property Maintenance; no key shall be delivered/provided any other person.
- E. Property Maintenance shall receive cores and keys from Contractor and install permanent cores.
- F. Property Maintenance shall return construction cores to contractor upon request.

SECTION 08810 GLAZING

- A. Detail all glazing and accessories as location specific. Thermal value shall be a factor in assigning glazing. Glazing shall be detailed to allow for thermal movement. Glazing shall be installed to withstand normal conditions without failure, loss of weather tightness, or deterioration.
- B. Reference manufacturer's installation recommendations / methods.
- C. Coordinate with Contractor in securing an installer with not less than (5yrs) experience in the glazing trade. Proof of experience required.
- D. Consultant shall be responsible for submittal approval.
- E. Provide OWNER with the latest revisions / samples available from the glazing manufacturer.
- F. Materials shall be laminated shatter proof safety glass.

SECTION 08830 MIRRORS

Some projects may require a highly polished aluminum in place of mirrors. Check with your Project Manager

before glass mirrors are specified.

SECTION 08840 PLASTIC GLAZING

Lexan and other plastic materials may only be used where breakage from either security or operational activities or sports activities are a primary concern. Plastic glazing shall be approved by the Project Manager in advance.

SECTION 08900 OUTSIDE GLAZED WALL SYSTEM

This section of specifications is contained in the Appendix as a guideline for the Consultant to adapt, when applicable, to each respective project. Notify the Project Manager of proposed modifications.

DIVISION 09

FINISHES

Division 09 of this Consultant's Handbook includes information with respect to the following Sections:

SECTION 09260	PLASTER AND GYPSUM BOARD ASSEMBLIES	2
SECTION 09110	NON-LOAD-BEARING WALL FRAMING	2
SECTION 09250	GYPSUM BOARD	2
SECTION 09510	CEILINGS	2
SECTION 09640	WOOD ATHLETIC FLOORING	2
SECTION 09650	RESILIENT FLOORING	2
SECTION 09620	RESILIENT ATHLETIC FLOORING	3
SECTION 09750	STONE FACING	3
SECTION 09910	PAINTING	3
SECTION 09960	EPOXY FLOORING.....	4

SECTION 09110 NON-LOAD-BEARING WALL FRAMING

- A. Where applicable, given program requirements and code requirements, use metal studs for walls:
1. nominal 6" metal studs for exterior wall studs. (to accommodate 6" batt insulation.)
 2. nominal 4" metal studs for interior walls. (to accommodate 3.5" batt insulation.)

SECTION 09250 GYPSUM BOARD

- A. Use 5/8" fire shield type X fire rated gypsum board, as a minimum, throughout all projects. Provide other/additional materials as required by applicable stringent code.
- B. Use fire shield moisture resistant board in wet locations.
- C. Use Durock cement board or Dens-Shield at all ceramic tile and wet locations.

SECTION 09260 PLASTER AND GYPSUM BOARD ASSEMBLIES

Pre-manufactured gypsum board wall systems shall not be used except with written approval from the BD&C administrator.

SECTION 09510 CEILINGS

Suspended acoustical ceilings shall be 24" x 24" tiles with exposed grid. In kitchens, restrooms, and locker rooms use fiberglass vinyl film faced tiles.

SECTION 09640 WOOD ATHLETIC FLOORING

When the City of Memphis wishes to specify a maple hardwood floor, the Consultant shall specify 25/32" maple hardwood flooring, or the updated spec from the Maple Flooring Manufacturers Association, Inc. (MFMA). The subfloor spec shall also comply with the current guidelines from MFMA.

They may be contacted at:

Maple Flooring Manufacturers Association, Inc.
60 Revere Drive, Suite 500
Northbrook, IL 60062
Phone: 847-480-9138
Fax: 847-480-9282
E-mail: mfma@maplefloor.com

Aerobic Flooring shall either be Bio-Cushion III by Robbins or Neo-Shock by Conner.

Consultant shall also specify the appropriate HVAC system for spaces that utilize hardwood flooring to maintain temperature and humidity as recommended by hardwood floor manufacturer.

SECTION 09650 RESILIENT FLOORING

Resilient flooring systems, rubber, vinyl, cork, linoleum etc; requires Project Manager's approval.

FIRE STATIONS: Floor areas of the entry, front office, dining area, kitchen, and other areas as directed by the Project Manager shall have Fritztile, Classic CL200 flexible resilient flooring.

SECTION 09620 RESILIENT ATHLETIC FLOORING

Indoor Running Track flooring shall be one of the following:

- A. Durathon by Robbins
- B. ElastiTrac by Connor
- C. Ramflex by Mondo

Fitness Room flooring shall be one of the following:

- A. Everlast by Regupol
- B. Dinoflex by Dinoflex
- C. ElastiMat by Connor
- D. Ramflex by Mondo
- E. Malibu by AFCO USA

FIRE STATIONS: Consultant shall specify American Floor Products Company, Inc. (AFCO-USA) model MALIBU Reversible Tiles (FE-1013) for the floor finish in the Fire Station Fitness room and other areas as instructed by the Project Manager.

SECTION 09750 STONE FACING

Stone facing requires prior approval from the Project Manager.

SECTION 09910 PAINTING

GENERAL PAINT SPECIFICATIONS

- A. Consultant shall instruct the Contractor to notify Property Maintenance in advance of application dates. Property Maintenance shall inspect each coat of primer and finish.
- B. Doors shall be finished on both faces and all four (4) edges.
- C. Surface shall be lightly sanded before each successive coat.
- D. Concrete and masonry shall have block filler applied to ensure complete coverage with all pores filled.
- E. Exterior ferrous metal shall have one (1) coat rust inhibitive primer and two (2) finish coats.
- F. Exterior galvanized metal shall have one (1) coat galvanized primer and two (2) finish coats.
- G. Exterior aluminum surfaces shall have one (1) coat acrylic or alkyd-base primer, and two (2) finish coats.
- H. Interior ferrous metal shall have one (1) coat of rust inhibitive primer, one (1) coat enamel undercoat and one (1) finish coat.
- I. Interior aluminum shall have (1) coat galvanized metal primer and two (2) finish coats.
- J. Interior stained woodwork shall have filler coat, stain coat, sealer coat and two (2) finish coats
- K. Exposed steel in swimming pool areas shall have primer with Tnemec series 135, and two (2) finish coats.
- L. Paint shall be from one of the following manufacturers:
 - 1. Devoe & Reynolds Co.
 - 2. Ferrell-Calhoun Paint inc.

3. Fuller-O'Brien Paints
4. Glidden Co.
5. Benjamin Moore & Co.
6. PPG Industries, Inc.
7. Pratt & Lambert, Inc.
8. Sherwin-Williams Co.

SECTION 09960 EPOXY FLOORING

FIRE STATIONS: Consultant shall specify epoxy coating for the concrete floor in the Fire Station apparatus bay and other areas as instructed by the Project Manager. The product shall be Tnemec Terra-Tread FC, series 205, color 32GR- light gray.

For general use concrete floors such as warehouse and parking garage, Consultant shall specify floor coating Sherwin-Williams, first coat Kem Cati-Coat HS Epoxy Filler/Sealer, second coat Cor-Cote EN 7000, third coat Armorseal Floor-Thane CRU polyester Urethane.

DIVISION 10

SPECIALTIES

Division 10 of this Consultant's Handbook includes information with respect to the following Sections:

SECTION 10050	COMMON WORK RESULTS FOR SPECIALTIES	2
SECTION 10170	TOILET COMPARTMENTS.....	2
SECTION 10260	WALL AND CORNER GUARDS	2
SECTION 10350	FLAG POLES	2
SECTION 10400	EXTERIOR SIGNAGE	2
SECTION 10420	PLAQUES	2
SECTION 10440	INTERIOR SIGNAGE	3
SECTION 10500	LOCKERS.....	3
SECTION 10520	FIRE EXTINGUISHER CABINETS	3
SECTION 10800	TOILET ACCESSORIES	3

SECTION 10050 COMMON WORK RESULTS FOR SPECIALTIES

All specialties shall meet all ADA accessibility requirements. See Division 17 for additional information on City of Memphis requirements on accessible design.

SECTION 10170 TOILET COMPARTMENTS

Toilet compartments / partitions shall be solid polymer or equal. Door hardware including hinge, brackets and fasteners shall be stainless steel.

- A. All Dividers shall be mounted securely using "full length" wall mounted two ear brackets (front and back) and "grip resistant" caps.
- B. Attach pilasters to floor with concrete anchors using manufacturer's mounting package for proper shoe.
- C. Secure pilasters at the top with a common grip resistant head rail attached to both end wall supports.

Do not specify Metal Toilet Compartments without written approval of the Project Manager.

Do not specify Plastic Laminate Toilet Compartments without written approval of the Project Manager.

PARTICLE BOARD MATERIAL WILL NOT BE ACCEPTED.

Do not specify Stone Toilet Compartments without written approval of the Project Manager.

SECTION 10260 WALL AND CORNER GUARDS

Specify Wall and Corner protection in the Kitchen and Preparatory areas. Dishwashing areas shall be protected with aluminum sheeting beginning at the top of the mop strip and continuing up 75% (+/-) of the surrounding walls. All Mop Sink areas shall be protected in a similar manner .

SECTION 10350 FLAG POLES

One (1) 30' pole per new or renovated facility. Pole shall be rated to withstand 110 mph wind when flagged with 6'x10' flag. Halyard shall be external and cleat shall be covered and locked with a padlock. Padlock shall be provided by the City and installed by the Contractor. Finish shall match exterior door and window frames. Lighting, controlled by photocell, shall be provided to illuminate the Flag.

SECTION 10400 EXTERIOR SIGNAGE

City of Memphis facilities shall be identified by exterior yard signs. Design signs for a long life with low maintenance and no operational cost. Exterior yard signs should not be illuminated internally or externally.

The Division of Park Services has their unique yard sign standard. Park Services will provide sign information as needed.

SECTION 10420 PLAQUES

City of Memphis standard exterior bronze plaque design is shown in the exhibit portion of this Handbook. Check with your Project Manager for current City Council member names.

SECTION 10440 INTERIOR SIGNAGE

The Consultant shall specify interior signs in accordance with ADA requirements and the City's standards as described in the exhibit included herein. The City has a contract with McNeal Graphics for standard interior signs. The Consultant shall advise the Contractor of the availability of McNeal Graphics to handle interior sign manufacture and installation, but Contractor has no obligation to use this vendor.

SECTION 10500 LOCKERS

Unless otherwise instructed in writing, all lockers shall be heavy-duty metal lockers.

- A. Exposed surfaces shall be minimum 16 gauge steel, 14 gauge preferred; doors shall be 14 gauge.
- B. Specify ADA compliant units, quantity as required, minimum one (1) per installation and thereafter minimum one (1) per hundred.
- C. Doors over 42" height shall have minimum three (3) hinges.
- D. Lockers shall accept padlock. No built-in keyed locks.
- E. Lockers shall be equipped with locking device where the locker may be locked while the door is open and then closed without unlocking and without damaging locking mechanism.
- F. Locker over 42" height shall have minimum three (3) latching points; units under 42" shall have minimum two (2) latching points.
- G. Provide sloped tops.
- H. Design for minimum 1-1/2" deep x 3" high recessed toe space.
- I. Lockers shall have louvers that are not big enough for visual inspection of locker contents or jeopardize security.

FIRE DIVISION- in Fire Stations design around GearGrid Storage Systems as manufactured by Mid-Minnesota Wire and Manufacturing, Inc. for turnout gear.

SECTION 10520 FIRE EXTINGUISHER CABINETS

FIRE STATIONS: Specify fire extinguisher cabinets equal to Larson model AL2409-5R, aluminum, full glass, fully recessed with flat trim (where possible), without lock.

SECTION 10800 TOILET ACCESSORIES

The Consultant shall specify for toilet accessories:

EXISTING FACILITIES- match existing.

NEW FACILITIES-

- A. No soap dispensers.
- B. No feminine product dispensers.
- C. No trash receptacles.
- D. No paper towel dispensers.
- E. Electric hand dryers.
- F. Baby changing units in both men and women restrooms.
- G. Break / crack resistant (polished aluminum) mirrors.

All accessories shall be very securely mounted to withstand vandalism. In solid walls used heavy duty wedge or sleeve type anchors. In new hollow wall construction specify 3/4" exterior plywood behind gypsum board to a minimum height of 7 feet, continuous in areas where accessories shall be indicated and where later accessories may be relocated. In remodeling projects where hollow gypsum board walls have no blocking or wood backing use toggle wings. No plastic fasteners or fastener components permitted.

For Fire Division facilities specify the following toilet accessories:

- A. Toilet Tissue Dispenser- Bradley, model MPO-PS900848.
- B. Mirror- Bradley, model 708
- C. Accessories- as directed- Bradex Bright Polished Stainless Accessories.
- D. Grab Bars- Bradex 812. Mount grab bars on structural walls, not toilet partitions.
- E. Mop and Broom holder- Bradex 9953
- F. Towel Dispenser- Bradex 252.

DIVISION 11

EQUIPMENT

Division 11 of this Consultant's Handbook includes information with respect to the following Sections:

SECTION 11130	TV BRACKET	2
SECTION 11400	FOODSERVICE EQUIPMENT	2
SECTION 11480	ATHLETIC AND RECREATIONAL EQUIPMENT	2
SECTION 11500	INDUSTRIAL AND PROCESS EQUIPMENT	3

SECTION 11130 TV BRACKET

FIRE STATIONS: Specify TV wall mount bracket equal to Peerless, model JMW2650.

SECTION 11400 FOODSERVICE EQUIPMENT

FIRE DIVISION- projects shall be designed around one of the manufacturers in the respective section:

- A. Refrigerator / Freezer- Frigidaire PLHT217TA.
- B. Range / Oven- SunFire, model SX-10-2626, 6 burners, 1 griddle.
- C. Ice Maker- Manitowoc, model QR-0280A, 115/60/1, 10a, with Storage Bin S-570
- D. Exterior Gas Grill- Phoenix, model SWRG1998 (patio mounted), natural gas
- E. Microwave Oven- Panasonic model NE-2180, stainless steel.
- F. Coffee Maker- Bunn model CWTF15-3, three (4) glass decanters

SECTION 11480 ATHLETIC AND RECREATIONAL EQUIPMENT

PARK SERVICES- projects shall be designed around one of the manufacturers in the respective section.

- A. Other manufacturers interested in bidding on a project shall submit two copies of:
 - 1. 1/8" scale shop drawings showing
 - a. plan view of the proposed equipment with the manufacturer's recommended fall-zone
 - b. designated boundary line
 - 2. certification by
 - a. the most current CPSC Handbook for public safety and
 - b. ASTM F1487-96- Play Equipment for Public Use.
- B. Submittals shall be in accordance with [Section 01 25 13](#) – Product Substitution Procedures

BASKETBALL EQUIPMENT

- A. Glass Backboards:
 - 1. Ultra Play model 948, rectangular glass.
 - 2. Progressive Athletics, Inc., model A0022.
- B. Fiberglass Backboards:
 - 1. Ultra Play, model 926.
 - 2. Progressive Athletics, Inc., model A0023.
- C. Steel Goals with nets:
 - 1. Ultra Play, model 1230.
 - 2. Progressive Athletics, Inc., model A0576.
- D. Basketball Backboard protective pads:
 - 1. Ultra Play, model 102.
 - 2. Progressive Athletics, Inc., model A0253.
 - 3. AALCO, model RBP-DS.
 - 4. Duraskin, model BA68U.
- E. Ceiling Mounted Backstop Suspension System – Fixed:
 - 1. Ultra Play, model 3110-CS.
 - 2. Progressive Athletics, Inc., model TS-21.
 - 3. Porter Athletic Equipment Co., model 626.
- F. Ceiling Mounted Backstop Suspension System – Rear Folding:

1. Ultra Play, model 3110-CS.
2. Progressive Athletics, Inc., model A0489.
- G. Manual winch for Backstops:
(Provide one wench for each backstop. Wench brand shall be the same brand as the backstop suspension system.)
 1. Ultra Play, model 1153.
 2. Progressive Athletics, Inc., model A0489.
- H. Basketball scoreboard:
 1. Nevco, model 2200.
 2. Dactronics, Inc., model BB-1713-B

GYMNASIUM BLEACHERS

- A. Aluminum frame moveable bleachers: (size as required by project.)
 1. Dant Corp., model TR-330 or TR-440.
 2. Outdoor Aluminum, model (DLSTR) 3-15 or 4-15.
 3. Sturdisteel Tilt and Roll bleachers.

VOLLEYBALL EQUIPMENT

- A. Volleyball Uprights:
 1. Sench, model DE11.
- B. Volleyball Floor-plates and sleeves:
 1. Sench, model KA 25 S.
- C. Volleyball Uprights Pads:
 1. Sench, model SP 2. ("Medalist Safety Pad")
- D. Volleyball Nets: (Provide two nets for each set of uprights.)
 1. Sench, model VP 20325.
- E. Volleyball Uprights wall storage racks.
 1. Sench, model WR 10.

FIRE STATIONS: BASKETBALL GOAL: equivalent to Bison PR55 Premium Fan-Shaped, 39" x 54", white powder coated, 48" clearance between backboard and ground set pole.

SECTION 11500 INDUSTRIAL AND PROCESS EQUIPMENT

A. Kilns

1. Paragon Industries, Mesquite, TX
 - a. model number TnF-24-3
 - b. electrical
208 volt, single phase, 50.2 amp., (needs hard wire to 60 amp disconnect on adjacent wall)
or
240 volt single phase, 45 amp, with 6-50P (needs 6-50R receptacle)

DIVISION 12

FURNISHINGS

Division 12 of this Consultant's Handbook includes information with respect to the following Sections:

SECTION 12300	CASEWORK.....	2
SECTION 12580	WALLBEDS	2

SECTION 12300 CASEWORK

FIRE STATIONS: develop specifications around product by Jamestown Metal Products Inc., 178 Blackstone Ave., Jamestown, New York, 14701.

SECTION 12580 WALLBEDS

FIRE STATIONS: specify a wall bed such as SICO North America Inc.

DIVISION 13

SPECIAL CONSTRUCTION

Division 13 of this Consultant's Handbook includes information with respect to the following Sections:

SECTION 13150	SWIMMING POOLS	2
SECTION 13700	ELECTRONIC SAFETY AND SECURITY.....	2
SECTION 13900	FIRE SUPPRESSION.....	2

SECTION 13150 SWIMMING POOLS

Requirements:

- A. Contractor shall have a minimum 3 years experience and furnish references. Experience shall be equal in size and/or value to job bidding.
- B. All piping to be schedule 80 PVC. Pressured tested at 125 PSI for 3 hours.
- C. Pipes shall not be stacked on other piping installed in the same ditch.
- D. Pools to utilize the open through drain, no plastic inserts.
- E. Run pool piping in the most direct route as possible, with as few fittings as possible.
- F. All ditches shall be compacted to meet 95% compaction rating.
- I. Manufacturers recommendation shall be adhered to on all installations.

SECTION 13700 ELECTRONIC SAFETY AND SECURITY

Consultant shall coordinate the selection of all device locations for electronic safety and security equipment. Coordination shall include, but not be limited to the following persons, the user department, Consultants, Contractor, Project Manager, and others as designated by the Project Manager.

Consultant shall review the site conditions within the two weeks before installation and verify "exact" locations before rough-in begins.

NOTE: CHANGES AFTER LOCATION VERIFICATION WILL NOT BE CONSIDERED.

Rough-in shall be provided by the General contractor. Rough-in may or may not include pulling cable in the conduit.

SECTION 13900 FIRE SUPPRESSION

- A. All new City buildings shall have automatic sprinkler protection.
- B. All renovation projects shall include automatic sprinkler protection if the total renovation is more than 50 % of the total building cost. Consultants shall review this with the project Manager.
- C. Fire Protection - It is the policy of the City of Memphis that the Contractor, through his fire protection sub- contractor who designs and installs the fire protection system (sprinklers, smoke detectors, heat detectors, alarms, etc.), assume full responsibility for providing a system that fully meets all code requirements. Accordingly, the following language is to be included in the specifications (and on the drawings if the Consultant deem appropriate) .
- D. "The Contractor is responsible for a complete and satisfactory installation including all labor and necessary parts, devices, accessories, etc. Required to meet code. Any changes to the approved system required to meet code shall be accomplished at the Contractor's expense. The only exceptions will be if the applicable code changes after the system is approved or the scope of the building is increased."

DIVISION 14

CONVEYING SYSTEMS

Division 14: No City guidelines at this time.

DIVISION 15

MECHANICAL

SECTION 15000	HVAC GENERAL REQUIREMENTS	2
SECTION 15050	HVAC BASIC MECHANICAL MATERIALS AND METHODS	6
SECTION 15080	MECHANICAL INSULATION.....	7
SECTION 15400	PLUMBING	8
SECTION 15410	PLUMBING FIXTURES	13
SECTION 15700	HVAC EQUIPMENT	16
SECTION 15800	HVAC AIR DISTRIBUTION	18
SECTION 15900	INSTRUMENTATION AND CONTROL FOR HVAC	21
SECTION 15950	TESTING, ADJUSTING AND BALANCING FOR HVAC	21

SECTION 15000 HVAC GENERAL REQUIREMENTS

The Consultant shall prepare detailed specifications that will properly instruct the Contractor to construct this portion of the Work to the highest standards of the profession, and he shall include the following information in the specifications.

A. DEFINITIONS

1. Mechanical work shall comply with all applicable Federal, State and local codes. Additionally, the standards and codes (latest edition or revision of each) shall apply to all mechanical work. Manufacturer's specifications shall also apply.
 - a. Air Diffusion Council (ADC)
 - b. Air Moving and Conditioning Assoc., Inc. (AMCA)
 - c. American Boiler Manufacturer's Association (ABMA)
 - d. American Gas Association (AGA)
 - e. American National Standard Institute (ANSI)
 - f. American Refrigeration Institute (ARI)
 - g. American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)
 - i. American Society of Mechanical Engineers (ASME)
 - j. American Society for Testing Materials (ASTM)
 - k. American Water Works Association (AWWA)
 - l. ANSI Code of Pressure Piping and Unified Pressure Vessels
 - m. Cast Iron Soil Pipe Institute
 - n. Institute of Boiler and Radiator Manufacturers (IBR)
 - o. National Electrical Manufacturer's Assoc. (NEMA)
 - p. National Fire Protection Association (NFPA)
 - q. Occupational Safety & Health Act (OSHA)
 - r. Sheet Metal & Air Conditioning Contractors National Association (SMACNA)
 - s. Standards of the Hydraulic Institute
 - t. Underwriters' Laboratories (UL)

B. SUBMITTALS

1. Complete Shop Drawings for all mechanical work shall be submitted for review before fabrication of work and within thirty days after signing contract. Shop Drawings shall be submitted on all items of equipment, fixtures, tanks, specialties controls, etc. complete with a clear indication of the unit, type, arrangement, accessories, color samples, etc.
2. The Shop Drawings shall be reviewed by the Contractor and the Consultant before submitting to the City.
3. Submittals / Shop Drawings shall indicate the name of the project and the name of the Architect, Engineers and Contractor. The Contractor shall check all Submittals / Shop Drawings prior to transmitting as to conformance to the plans and specifications. Drawings found to be inaccurate or otherwise in error shall be corrected before submitting to the City.
4. Drawings not accepted shall be corrected and returned for final review. The Contractor shall furnish to the field copies or prints of approved Shop Drawings as soon as possible. No Shop Drawings shall be used on the work unless reviewed and approved by the Consultant.
5. Where equipment schedules require a factory representative to supervise installation, start-up, adjustments and/or proper operation of equipment of systems, the Contractor shall furnish a signed statement from said representative that all services specified have been satisfactorily completed before final payment will be made for that portion of the project.

C. AS-BUILT / RECORD DRAWINGS

1. The Contractor shall maintain and keep an up-to-date set of drawings reflecting "As-Built" conditions of their work. Upon completion of the project, this set of drawings shall be certified by the Contractor. The Contractor shall deliver to the City Consultant all reproducible drawings and three (3) sets of prints of same.
2. The As-Built/Record Drawings shall indicate exact dimensional locations for all underground work with elevations below grade noted. All tie-in points shall be established with respect to elevation and location. Underground mains and services within the buildings shall be accurately located from column lines and footings.

D. OPERATION AND MAINTENANCE MANUALS

1. Furnish to the Owner three (3) copies of approved bound (3 ring binders) books with tabs for sections covering each item of equipment. Where more than one volume is required, each volume will be labeled and table of content for all volumes will be identical. Notebooks shall include approved copy of Shop Drawings, Maintenance Manuals, Operating Manuals, and parts lists as necessary to instruct the operating and maintenance staff on proper operation and use, lubrication and periodic maintenance, together with source of replacement parts and service for each item of equipment. Copies of the final test and balance report and temperature control as-built shall be included in the manuals.
2. The manuals shall include, but not be limited to, all details of care, maintenance, operation, parts, manufacturer's names, model number, near-by-manufacturer's representative name, address, and telephone number for all major components of various systems. Also include sequence of operation, control equipment literature, wiring and pneumatic control drawings, certificates of guarantee, certificates of inspection, training sessions attendees list, test reports, mechanical system balancing report complete with all water and air system distribution as explained various sections of the specifications.
3. All instruction manuals shall be reviewed and approved by the City Consultant.
4. Upon completion of the installation, the Contractor shall be responsible for instructing the Owner's operating staff, for a specified period, in the starting, care and proper operation of all mechanical systems and equipment, including the temperature control system. This shall be done before receipt of final payment and occupancy by the Owner. For each training session, the Contractor shall prepare a sign-up sheet(s) and include the attendees list in the O&M Manuals.

E. ACCESSIBILITY

1. Equipment and materials will be installed to provide required access for servicing and maintenance. Coordinate the final location of concealed equipment and devices requiring access with final location of required access panels and doors. Allow ample space for removal of all parts that require replacement or servicing. Extend all grease fittings to an accessible location.

F. GUARANTEES

1. The Contractor performing the work shall give to the City a written guarantee that he will make good at his own expense any imperfections in material and workmanship which may develop under ordinary use from substantial completion date of the work as follows:
 - a. Heating Work (including all piping, equipment, controls, and ductwork): One complete heating season extending from October 16 through April 15, or for one year, whichever is the greater. If substantial completion of the installation is made at any time during the heating season, then the warranty shall extend through the entire following heating season.
 - b. Cooling Work (including all piping, equipment, controls, and ductwork): One complete cooling season extending from April 16 through October 15, or for one year, whichever is the greater. If

substantial completion of the installation is made at any time during the cooling season, then the warranty shall extend through the entire following cooling season.

2. Loss of refrigerant or lubricant shall be considered as a defect in workmanship and shall be included in the guarantee.
3. All compressorized equipment shall be guaranteed (material and labor) against failure for an additional period of four (4) years, including loss of refrigerant and oil.

G. RECEIPT OF PORTABLE AND DETACHABLE PARTS

1. The Mechanical Contractor performing the work shall retain all portable portions of the installation such as keys, spare accessories, operating manuals, including approved Shop Drawings, as-built drawings, etc., in his possession until the completion of the work and is then to turn them over to the Owner and obtain signed itemized receipts. These receipts shall be attached to the Contractor's request for final payment.

H. EQUIPMENT, VALVES AND PIPE IDENTIFICATION

1. All mechanical equipment given an identification number or letter on drawings shall be so identified on the project by the Contractor. The identification number shall be in a visible location on the piece of equipment. Exterior equipment shall have the identification permanently engraved, embossed, or such on permanent plates permanently fixed (no screws or such) to the equipment. Interior equipment may have identification permanently painted on the face of the equipment. (i.e. Air Handling Unit #AHU-1 shall have "AHU-1" stenciled on it.)
 - a. The letters and numbers shall be a minimum of 2" high on larger pieces of equipment such as air handlers, make-up air units, etc. The stenciling letters and numbers on smaller pieces of equipment such as heat pumps, VAV boxes, exhaust fans, pumps, unit heaters, etc., may be reduced in size.
 - b. Mechanical equipment located above suspended ceiling shall also have the identification number placed on the ceiling grid in vinyl non peel off labels or characters smaller than the face of the grid.
2. All major control and sectionalized valves shall be identified as to its function and system number. The designation on the valve tag shall correspond to the designation shown on the valve chart which is to be prepared and submitted to the Owner at the end of the project.
 - a. Valve tags shall be a minimum of 2" in diameter, nonferrous minimum 16 gauge metal, with stamped letter indicating the service. Secure the tags to the valve with key chain or approved equal.
 - b. Identify automatic control system components as for valves. Identification shall be coordinated with control diagrams and panels.
3. All piping shall be identified with color pipe bands, identification labels and flow arrows.
 - a. Pipes shall be banded and labeled on 10'-0" centers on continuous lines, at equipment connections at each valve, at both sides of a wall through which pipe passes, at every branch connection, at each riser and on piping within sight of an access door on panel. Show flow direction arrows at each identification point.
 - b. Pipe identification shall be by the scheme as called for by ANSI A13.1.
 - c. Pipe identification may use pressure sensitive labels as manufactured by Allstate, W. H. Brady, Emed Co. or Seton.
 - d. Labels and flow arrows shall be 1" high on pipe sizes up to 2 ½", and 2" high on pipe sizes of 3" and larger.
 - e. Bands shall be 1-1/2" wide.

- f. Bands and labels shall have flow arrows at the same location.
 - g. Stenciling or labeling shall be color coded according to ANSI A131.
 - h. Pipe lines in areas where letters and arrows cannot be installed shall have stencil identification installed on metal panels, in the proper color to agree with the color of identification. Panels shall be of 16 gauge steel hung to the pipe with key chains.
 - i. Provide 4" wide plastic tape marker over center line of all underground piping in all earth trenches 12" below grade.
4. Label all thermostats, indicating which piece of equipment they operate.

I. TESTING

1. Testing shall be completed according to any applicable codes or governing authorities, and in the presence of the Project Manager or his/her designee. The tests shall be made in the presence of the City representative. The Contractor shall notify the City in writing, at least 72 hours prior to testing of any mechanical system, and shall submit within 24 hours copies of any test result to the City Consultant.
2. Testing shall be completed according to manufacturer's requirements as applicable or in the absence of such requirements, as described herein.
3. Upon completion of any portions of the work, the piping and ductwork systems shall be cleaned and tested as described here and any defects discovered shall be corrected before applying any covering to piping or ductwork and prior to final inspection.
4. Water circuits shall be thoroughly cleaned, pressure tested and proven tight with minimum 100 lbs. hydrostatic pressure for eight hours without drop in pressure.
5. Steam and condensate return piping shall be thoroughly cleaned, pressure tested, and proved tight with hydrostatic pressure of 100 psi or 150 percent of system operating pressure, whichever is highest.
6. Refrigerant piping shall be tested and proven tight with 250 lb. test anhydrous carbon dioxide, then all lines shall be evacuated with a vacuum of 28 inches of mercury and held without loss for a period of 24 hours.
7. Gas piping shall be tested and proven tight with 100 lbs. air pressure or as recommended by gas utility supplier. Compressed air piping shall be tested and proven tight with 125 lbs. air pressure.
8. Soil, waste and vent piping shall be tested by plugging all openings and testing in 10 psi sections with water. Test shall be maintained for not less than 15 minutes.
9. Roof drain piping shall be tested same as specified for soil, waste and vent piping.
10. Domestic water circuits shall be thoroughly cleaned, pressure tested and proven tight with minimum 100 lbs. hydrostatic pressure. Test of interior piping shall be made prior to setting of fixtures. Complete system sterilization shall be provided as required by code.
11. The domestic water system shall be disinfected as follows: The system shall be filled with a solution containing 100 parts per million of available chlorine and allowed to stand 2 hours before flushing and returning to service.
12. Disinfecting of cast iron water main shall be in accordance with AWWA C 601-68 latest revision.
13. Upon completion of the Fire Protection System and prior to the acceptance of the installation, subject the system to the tests required by the local code and NFPA Pamphlet No. 13. Furnish the Architect with a certificate as required by NFPA.
14. All medium pressure and high pressure ductwork shall be tested at 1.5 times the operating pressure of the system to which it is connected, or at the total fan static pressure, whichever is greater.

15. All audible air leaks shall be repaired. Ductwork shall be tested for leaks before applying external insulation and before concealing in inaccessible locations.

J. ADJUSTMENTS

1. Upon completion of the installation of all work and equipment, the Contractor shall start all equipment and make all necessary adjustments to place entire heating, ventilating, and air conditioning systems in a satisfactory condition for continuous safe operation.
2. All throw-away filters shall be replaced with the specified type after the period of adjustment.
3. Air circulation systems shall be cleaned free of all dirt and debris and adjusted to provide uniform heating and/or cooling of all spaces served by each system. Test adjustments shall be continued until uniform temperature within conditioned areas has been attained within two (2) DegF for one (1) DegF above and below thermostatic setting.
4. Lubricate all bearings of equipment furnished using only lubricant recommended by manufacturer of such equipment. Tag each piece of equipment with date of lubrication, with subcontractor's name imprinted thereon. Bearings shall be left in cool, trouble free, operating condition.
5. Temperature and safety controls shall be adjusted as necessary to insure continuous, trouble free, safe, and automatic operation of systems including boiler, gas burner, refrigerating equipment, etc.

SECTION 15050 HVAC BASIC MECHANICAL MATERIALS AND METHODS

The Consultant shall prepare detailed specifications that will properly instruct the Contractor to construct this portion of the Work to the highest standards of the profession, and he shall include the following information in the specifications.

A. GENERAL

1. Products furnished for City projects shall be manufactured by manufacturers regularly engaged in manufacture of similar items and with a minimum of five (5) years of production of the specified product.
2. All equipment and devices shall bear the manufacturer's nameplate, giving name of manufacturer, description, size, type, model number, serial number, electrical characteristics, etc. in order to facilitate future maintenance or replacement.
3. In an existing facility with renovation or expansion projects, all new major equipment shall match the existing and manufacturer with the following exceptions:
 - a. It is specifically requested otherwise by the City prior to commencement of the design work.
 - b. Similar required equipment is not present at the facility.
 - c. All of the equipment in the facility is to be replaced, or existing equipment is antiquated and no longer is manufactured.
4. The Owner reserves the right to reject any materials and workmanship not meeting the City approval either before or after installation.

B. PIPING AND SPECIALTIES

1. Piping materials shall be American made and the manufacturer shall be approved by the Owner. Certification to be provided when requested.
2. All piping shall have provisions for expansion and contraction with anchorage at each point where required and shall be shown on the drawings.
3. Welding shall conform to ANSI Code for Pressure Piping, Section B31.1. All Welds shall be of the

single "V" butt joint type with optimum fusion and 100% weld penetration of wall-thickness of piping. A certificate shall be provided by the contractor indicating certification of all pipe welders on the project, in accordance with Section IX if the ASME Code.

4. Refrigerant piping shall be sized and arranged in accordance with the compressor manufacturer's recommendations for proper pressure drops and oil return. Suction line pressure drops shall not exceed 3 PSI from a point located at the end of evaporator and the beginning of the suction line to a point to entering the compressor.
5. All gas piping shall be installed according to code. Flex connector shall not be used to connect heating appliances to the gas supply lines. All appliances shall be connected with rigid piping. Do not obstruct access doors of equipment with gas pipe.
6. All openings around piping shall be sealed; meet all applicable codes. Provide chrome plated metal escutcheons -of the proper size- with fastening devices, on all pipes passing through finished wall surfaces and finished ceiling surfaces.
7. Where piping connects to equipment and at valves, traps, and accessories, and locations where disconnection of piping may be required or desired without disassembly of additional piping:
 - a. Screwed piping – use unions;
 - b. Welded piping – use flanged joints or flanged unions;
 - c. Dissimilar metals junctions; use dielectric unions.
8. A shutoff valve shall be installed in each connection to each piece of equipment and valves shall be located such that the equipment may be serviced or removed and replaced without shutdown of the general piping system. Shutoff valves shall also be installed in branch lines to risers dropping in walls, partitions, or chases.
9. Ahead of each expansion valve and/or solenoid valve provide a filter-dryer and a moisture indicator.
10. A/C Condensate Drain piping shall have DWV fittings with 1-1/4 inch minimum size. Use combination wye and 1/8 bend with clean out plug at each change in direction.

SECTION 15080 MECHANICAL INSULATION

The Consultant shall prepare detailed specifications that will properly instruct the Contractor to construct this portion of the Work to the highest standards of the profession, and he shall include the following information in the specifications.

A. GENERAL

1. All piping and ductwork shall be insulated in accordance with the Tennessee Code for Energy Conservation.

B. PIPING TO BE INSULATED

1. Domestic cold, hot, and hot water return piping.
2. All horizontal roof drain piping.
3. Refrigerant suction and hot gas lines.
4. Space heating and chilled water piping.
5. Steam and condensate return piping.
6. Condensate water piping when water side economizer is designed.
7. Makeup water and condensate drain lines.

8. All valves, strainers, fittings, etc., shall be insulated. This requirement may be deleted from hot water piping, steam piping, steam traps and steam condensate return piping subject to prior written approval from the City.
9. Premolded fittings matching basic pipe insulation shall be provided at all pipe fittings and finished with glass fabric and vapor barrier mastic where required. glass fiber blanket inserts with plastic covers are not acceptable for pipe fitting insulation.

C. PIPING TO BE HEAT TRACED

1. Piping installed in areas subject to freezing shall be heat traced and insulated. Heat tracing shall be self-regulated and shall be sized to maintain piping surface temperature of 40°F at 0°F ambient temperature. Water piping exposed to weather conditions shall be provided with weatherproof insulation and jacket.

D. DUCTWORK TO BE INSULATED

1. All supply and return conditioned air ductwork in unconditioned spaces will be insulated. Also, surfaces of equipment and/or devices in the air conditioning system subject to condensations shall be insulated.
2. Ductwork and plenums within the equipment room and where subject to damage shall be insulated with duct board insulation.

E. EQUIPMENT TO BE INSULATED

1. Converts.
2. Air separators (hot and chilled water).
3. Domestic water heaters/storage tanks (when not factory insulated).
4. Condensate receiver tanks and boiler feed water receiver tanks (when not factory insulated).
5. Compression tank (chilled water).
6. Pumps (chilled and free cooling condenser water).
7. Chiller evaporators.

SECTION 15400 PLUMBING

A. General

1. Products and systems shall be as described herein. Where a manufacturer's model number is listed exclusively, no exceptions are allowed.

B. Piping

1. Soil and waste piping and fittings under the building or any permanent structure below grade shall be sized according to the drawings but not less than 3" and be standard weight cast iron with bell and spigot ends, coated inside and out, and shall conform to latest issue of ASTM A-74. Joints to be made with lead and oakum under any building, moat, driveway or other permanent structure. All other below grade locations may be hub & spigot rubber gasket joints made with positive double seal elastomeric compression-type gaskets conforming to ASTM C564, latest issue.
2. Soil, waste and vent piping and fittings inside the building and above grade shall be cast iron hubless soil pipe, meeting the Cast Iron Pipe Institute Standard 301 & ASTM A888 or latest revision thereof, with clamp assembly for hubless pipe shall meet the Cast Iron Pipe Institute standard 310 & ASTM C-1277 or latest revision thereof and shall bear the registered insignia C.1 or bell and spigot with lead

and oakum joints as listed above.

3. Building sewer piping and fittings 5'-0" from building shall be PVC plastic pipe D-3033 or D-3034 SDR 26 shall be joined using rubber seals complying with ASTM D-1869 or schedule 40 PVC with solvent joints.
4. Rain leader piping below grade inside of building shall be same as for below grade soil pipe. Rain leader piping above grade inside of building shall be same as above ground soil pipe.
5. Storm drainage piping and fittings outside building may be PVC sewer pipe conforming to ASTM D-3033 or D 3034. SDR 26 shall be joined using rubber seals complying with ASTM D – 1869 in sizes up to 12". 12" thru 24" shall be truss pipe.
6. Trenches and ditches in which any type of plumbing piping is placed, shall be compacted during backfilling. Contractor shall provide the services of site engineer of record or an independent testing agency to monitor the backfill and compact and certify that it has been completed to specification.
7. Domestic Water Piping:
 - a. Hot and cold water piping shall be Type "L" hard drawn copper with wrought copper fittings above ground.
 - b. Water lines installed underground shall be Type "K" copper with wrought copper fittings and Silfos joints.
 - c. Water lines 3" and larger outside of building or permanent structures shall be AWWA Bell & Spigot cement lined ductile iron (250 lb. Class) with a coat of black asphaltum or shall be class 150 PVC pressure pipe manufactured with integral bell section and using a solid cross section rubber ring. It shall meet ASTM D-2241, except that the OD's shall be cast iron size, and also meet AWWA C-900-75. Each length, including the bell section, shall be tested to four times the class of the pipe. The SDR shall be 18. The pipe shall be Underwriters Laboratory accepted. Fittings shall be ductile iron with mechanical joints.
 - d. Water lines less than 3" outside of the building or permanent structure shall be PVC pipe Schedule 40 complying with ASTM D 2241 with solvent welding joints with ASTM D 2564 cement. All materials shall bear NSF seal on pipe and cement container.
 - e. All water piping from 5'-0" outside of the building to service rise shall be ductile iron, copper or brass.
8. Natural gas piping shall be schedule 40 black steel pipe. Underground gas piping shall be provided with mill wrapped protective coating or job wrapped with "Scotchrap" No. 40 pipe wrap. Piping below grade shall be welded. Piping above grade shall be joined with black malleable iron fittings with pipe dope or Teflon tape.
9. Condensate drain pipe shall be type "M" copper with DWV fittings or PVC DWV pipe with PVC DWV fittings.
10. Air piping shall be Schedule 40 black steel, with screwed black malleable fittings.
11. Piping Application Requirements:
 - a. All PVC piping and fittings shall be installed with metallic trace tape installed in trench at maximum depth recommended or with 3'-0" long sections of #4 rebar installed in trench at 10'-0" o.c. approximately 6" deep to allow tracing of all non-metal pipes.
 - b. Domestic Water Piping:
 - (1) Type "L" copper shall be installed with "Lead Free" 95.5% tin, 4.5% copper and .5% silver solder and non-corrosive flux.
 - (2) Type "K" copper shall be installed with "Sil-Foss" brazing alloy with melting temperature in excess of 1100⁰ F. Contractor shall minimize the number of fittings below grade. Buried

pipe shall be coated with two coats of asphaltum with glass cloth embedded after first coat.

- (3) In seasonal buildings all water piping shall be installed to allow complete drainage and freeze protection of system. Provide low point drains as required.
 - (4) All water lines shall be installed in interior walls where possible but in no case shall a water line be installed in an exterior wall with a northern exposure.
 - (5) Each branch line shall have an accessible cut off valve as close to main as possible.
 - (6) Water lines 2" and larger shall have thrust blocks installed at all branches 45° elbows, and 90° elbows.
 - (7) All water lines shall be flushed and disinfected as requires.
- c. All shock arrestors shall be installed in a vertical position. Pipe size shall not be less than opening in shock arrestors.

C. Valves

1. All interior valves shall be ball valves with 125 lb. water rating, ring ball design, conventional port, three piece construction, anti blowout stem, with screwed connections for steel pipe and solder connections for copper pipe.
2. Hydrants for installation on exterior walls shall be non-freezing type Woodford model #25 series with 3/4 inch hose connection, integral vacuum breaker, key operated units. Cover to be nickel brass with bronze casing. Provide hose bibs close to all HVAC equipment for cleaning.

D. Drains

1. Floor drains shall be Wade No. 1370 with integral trap and clean out. Match to 3" or 4" waste line size as indicated on the drawings. All floors shall be sloped to drain.

E. Cleanouts

1. Cleanouts shall be installed at the base of all stacks, at any change of direction of 45 DegF or more, and at the end of all lines. Clean outs shall be installed on each fixture rough-in. Each urinal, lavatory, sink, drinking fountain, etc. to have own riser and clean out, installed above outlet where possible.
2. Cleanouts shall be installed at intervals of fifty (50') feet or less inside building and seventy five (75') ft. outside of buildings.
3. No plumbing fixtures shall be designated as cleanouts.
4. There shall be a double two-way clean out installed within 5' of any building, outside of exterior wall.
5. Cleanouts shall also be installed at the base of all roof drains.
6. Any clean out located in a dirt area shall have a 12" x 12" x 6" thick concrete pad surrounding it.
7. Wall clean out plug shall be installed within 6" of access wall.
8. All cleanout plugs should be lubricated for easy removal.

F. Reduced Pressure Back Flow Preventer

1. Provide reduced pressure back flow preventers where indicated on drawings and/or where required by code. Units shall equal or exceed AWWA Standards C-50-6 and U.S.C. foundation for cross connection control standard. Units shall be Watts Series 909 without substitution. Units 2-1/2" and under shall be installed with strainer, ball valves and unions on each side of device for easy removal. Units 3" and larger shall be flanged. All piping including risers on both side of units shall be copper, brass, galvanized or ductile iron.

2. General Services shall be provided with a copy of plumbing permit and also a copy of test report within 10 days.

G. Air Compressors

1. All air compressors shall be "Quincy" with oil pump.
2. Two stage duplex air compressor operates up to 200 psi oil pump with low pressure switch, with horizontal tank whenever possible. Automatic water drain-down with water eliminator installed on rubber-vibro-insolator pads or approved equal.
3. Supplier shall be a local stocking distributor with a working service department.
4. Air compressor shall be installed outdoors when possible.
5. Special service compressor to be submitted to Property Maintenance for approval.

H. Pumps

1. All centrifugal pumps shall be provided with low flow switches and pump control relays to shut down pumps on low flow conditions. Flow switch shall be "Flowline" Model No. FT10-1302 relay shall be "Flowline" Model LC30-1001 or equal.
2. Standard swimming pool pumps shall be Purex 7.5 H.P.
3. Oil transfer pumps are Lincoln air operated.
4. Circulating pumps are Grundfos with aquastat.
5. Sump pumps and sewage pumps are Zoellar or Gould with a union for easy removal.
6. Pumps to be provided by local distributors for parts, service and warranty.

I. Valve Boxes

1. All valve boxes in the ground for valves 2-1/2" and under shall be Goddard 37T-12 and shall have a 12" x 12" concrete pad surrounding it. Provide extensions as required for depth of bury.
2. Valve boxes for valves 3" and larger shall be heavy duty cast iron roadway boxes suitable for valve installed on.

J. Water Filter

1. Provide US Filter #158005 with filter model 155405-43 or equal in supply line to each appliance, including but not limited to dishwashers, ice makers, and units providing water for consumption.

K. Heat Trace Cable

1. All heat trace cable shall be self regulating type. (Thermostat bulb type will not be permitted.)

L. Cleaning, Inspection and Testing

1. Storm Drainage System:
 - a. The interior of the pipe shall as work progresses, be cleared of all CRT, cement or other joints materials, debris, and extraneous materials of every description. For small diameter pipe where cleaning after laying may be difficult, a squeegee shall be kept in the pipe line and pulled forward past each joint immediately after its completion. The contractor shall flush all lines with clean water, prior to final inspection to assure complete removal of all debris and foreign material.
 - b. A water test shall be applied to the drainage system either in its entirety or in sections. If applied to the entire system all openings in the piping shall be tightly closed, except the highest opening and the system filled with water to the point of overflow. If the system is tested in sections, each

opening shall be tightly plugged except the highest openings of the section under test, and each section shall be filled with water, but no section shall be tested with less than a 10 foot head of water. In testing successive sections,

- 1) a minimum of at least the upper 10 feet of the next or preceding section shall be tested, so that
- 2) no joint or pipe in the building (except the uppermost 10 feet of the system) shall have been submitted to a test of less than a 10 ft. or more than 20 ft., and so that
- 3) a head of water shall be kept in the system, or in the portion under test, for at least one hour before inspection starts, and
- 4) the system or portion under tests shall then be tight at all joints.

The exfiltration tests shall be maintained on each system or section of system being tested as necessary to locate all leaks for a minimum of two consecutive hours.

- c. The drainage system or any part thereof shall not be covered until it has been water-tested, inspected, and approved. To do otherwise will be grounds for rejection of the pipe by the City representative. (Note: Test water shall remain in pipe for a minimum of two consecutive hours after backfill to inspect for leaks caused by backfilling.)
 - d. The remaining tests of the completed drainage and vent system shall be visual and in sufficient detail to assure the provisions of plans, specifications, contract documents, and code have been met or exceeded, as they pertain, but are not limited to, debris and obstructions, structural cracks and defects, joint tolerances, joint workmanship, and satisfactory connection to drainage structures. Pipe sized greater than 36 inches in diameter shall be entered and examined while smaller diameter pipe shall be visually inspected from end of the pipe section. This visual inspection shall include lamping the system so that, upon completion, each section of line shall show a full circle of light when lamped between manholes. Additionally, all sections with a diameter smaller than 36" shall be tested by rolling a ball with a circumference the same as the diameter of the pipe being inspected from one manhole to the next without obstruction to its travel.
2. Sanitary Sewer System:
- a. Gravity sewer tests shall consist of plugging the end of the sewer at the point where it enters the right-of-way, easement, or public sewer, filling the building sewer with water and testing with not less than a 10 foot head of water, and maintaining such pressure until backfill is completed.
 - b. Any private sewer mains shall also be subjected to the lamp and ball tests.
 - c. The contractor shall make the applicable tests described in this section, giving reasonable advance notice to the appropriate representative of the City when the systems are ready for tests, and furnish the equipment, power, material, and labor necessary for the inspection and tests. Repair shall be the responsibility of the contractor should his work not withstand the pressure prescribed by the tests.
3. Domestic Water:
- a. Domestic water circuits shall be thoroughly cleaned, pressure tested and proven tight with minimum 150 lbs. hydrostatic pressure. Test of interior piping shall be made prior to setting of fixtures. Complete system sterilization shall be provided as required by code.

- Insulation Kit - Truebro #102 (H.C.)
- P-5 Lavatory (Wall Hung, Vitreous China, With Single Lever Faucet and Chair Carrier)
Bowl - Kohler - K-2005
Faucet - Delta Single Lever
Grid Strainer - Kohler - K-7715
1-1/4" P-Trap - McGuire 8872
3/8" Supplies - McGuire 158LK
Insulation Kit - Truebro #102 (H.C.)
Carrier - Wade W-520
- P-6 Lavatory (Wall Hung, Vitreous China with Sensor Type Faucet and Chair Carrier)
Bowl - Kohler - K-2005
Faucet - Sloan ETF-600
Strainer - Kohler - K-7715
1-1/4" P-Trap - McGuire 8872
3/8" Supplies - McGuire 158LK
Carrier - Wade W-520
Insulation Kit - Truebro #102 (H.C.)
- P-7 Urinal (Wall Hung, Flush Valve, Wash Out Vitreous China, Chair Carrier -Flush Valve, Integral Trap and Strainer)
Siphon Jet Bowl - Crane 7-121 Bedford
Flush Valve - Sloan 186 (186 ES-S)
Carrier - Wade W-461
- P-8 Handicapped Urinal (Wall Hung 17" From Lip to Floor, Siphon Jet, Vitreous China Chair Carrier Flush Valve, Integral Trap)
Siphon Jet Bowl - Crane 7-209 Manhattan
Flush Valve - Sloan 186 (186 ES-S)
Carrier - Wade W-461
- Note: This type urinal shall be used to allow wheel chair leg room beside extended bowl.
- P-9 Drinking Fountain (Wall Hung, 8.0 gph, Standard Finish, selection by architect, mount bubbler 34" AFF)
Fountain -Sunroc HCWC-8
1-1/4" P-Trap - McGuire 8872
3/8" Supply - McGuire 158LK
Carrier - Wade 400-AM11
- Note: Single drinking fountain locations shall be mounted at ADA / H.C. height - multiple fountain locations shall be mounted high / low.
- P-10 Outdoor Drinking Fountain
Fountain - Most Dependable Fountain Model No. 493 with vandal proof valve box and sleeve. Furnish unit with sleeve from valve box to fountain to allow replacement of supply hose. Provide cut off valve at main where unit is 25' or more from main.
- P-11 Service Sink (Floor Mounted, 24" x 24" x 12", Back Splash, Stops In Shank, Vacuum Breaker, Mop Hanger)
Bowl - Stern Williams SBC-1700BP
Faucet - T-15-VB w/T-35 Hose w/Wall Hook
3" 'P' Trap - Cast Iron
Mop Hanger - T-40
- P-12 Shower (Concealed Stops, 3GPM)
Mixing Valve - Delta

	Head	- Delta
P-13	<u>Shower</u>	(Concealed Stops, 3GPM, Handicapped)
	Mixing Valve	- Delta
	Head	- Delta

C. Application Requirements

1. No waste arms to be allowed.
2. As built drawings to be provided to General Services Property Maintenance at time of completion by the contractor.
3. Copy of permit shall be provided to Project Manager, Code Enforcement, Health Dept., E.P.A., Fire Marshal and other governing agencies as required. All work to conform to latest codes.
4. All installations should be according to manufacturers specs.
5. Operational drawings of pumps and filter systems shall be framed and mounted in equipment rooms where installed.
6. Project Manager/Property Maintenance shall be notified of any installation and any testing of systems, 24 hours in advance of covering pipes.
7. All water piping shall be installed so that it may be winterized and drained down. Low point drains shall be installed.
8. No garbage disposals to be installed unless approved by Property Maintenance.
9. Fixtures shall be installed per code and manufacturer recommendations.
10. Provide each fixture with an approved compression service stop. Exposed stops shall be either loose key or screwdriver type.
11. Caulk joint between wall and fixture at wall mounted lavatories, water closets, urinals, drinking fountains and service sinks with silicone sealant, white.
12. In general, unless of otherwise noted on the drawings, the sizes of all the branch connections to fixtures shall be no smaller than those listed in the following schedule:

Fixture	Waste	Vent	C.W.	H.W.
Lavatory	1-1/4"	1-1/2"	1/2"	1/2"
Sinks (General)	1-1/2"	1-1/2"	1/2"	1/2"
Service Sinks	3"	2"	1/2"	1/2"
Water Closet-Flush Valve	4"	2"	1-1/4"	—
Urinal-Flush Valve	2"	2"	1"	—
Wall Hydrants (Hose Bibbs)	—	—	3/4"	—
Drinking Fountain	1-1/2"	1-1/2"	1/2"	—
Showers	2"	2"	3/4"	3/4"

13. All valves, waste and water supply piping servicing fixtures exposed beyond face of finished walls shall be chromium plated brass, where fixtures are mounted in countertops and cabinet work concealing valves and piping, chrome plated brass finishes are not required.
14. All fixtures shall be independently valved with either integral stops or brass stops.
15. Where flush valves are specified with fixtures, supply to valve in each room shall be at same height for that type of fixture, and valve shall be set in place so that center line of valve discharge is directly above center line of fixture spud. Bending of nipple between valve and spud to achieve connection will not be permitted.

16. All brackets, cleats, plates, anchors, etc., required to support fixtures or piping rigidly in place shall be provided as work of this section and shall be installed behind finished walls.
17. Provide and install basic fixtures from one major fixture manufacturer. Also, accessories such as faucets, strainers, stops, traps, etc. shall be manufactured by one major company where possible.

SECTION 15700 HVAC EQUIPMENT

The Consultant shall prepare detailed specifications that will properly instruct the Contractor to construct this portion of the Work to the highest standards of the profession, and he shall include the following information in the specifications.

A. General

1. All equipment shall be equipped with a secondary drain pan piped to an interior sanitary sewer drain line.
2. In areas such as museum, storage areas, and gyms where undetected water leaks are critical - all secondary pans shall be equipped with electronic water sensing devices with an alarm signal wired into the office of the facility.
3. All HVAC and refrigeration equipment shall be equipped with refrigerant isolation service valves in accordance with all the EPA regulations, and ASHRAE Standard 15 - 1994 "Safety Code for Mechanical Refrigeration".
4. All roof mounted equipment shall be provided with roof walk pads acceptable to manufacturer or roof material from point of entrance of roof to all equipment and shall form a circumferential path around each piece of equipment.
5. All roof mounted package heating equipment shall be equipped with electronic spark ignition systems with 100% gas safety shut-off or hot surface igniters.
6. All equipment mounted on roof shall be set on steel frame construction in such a way as not to void any roof warranties.
7. All roof mounted heating equipment burners and heat exchangers shall be constructed of stainless steel materials or an approved equal.

B. Air Handling Units

1. Central air handling units shall be double wall factory assembled, draw-thru or blow thru type as applicable with double wall stainless steel inner liner drain pan.
2. The entire unit shall be provided with a full-length, continuous, base rail channel of minimum height of 5 inches. Units without a complete and continuous base rail will not be acceptable.
3. The units interior lining shall be a solid lining of a minimum of 20 gage galvanized steel. use of perforated lining where sound control is critical is only acceptable upon prior written approval by the City.
4. Cooling coils in excess of 48" in height shall not be acceptable unless provided with an intermediate stainless steel drain pan. The intermediate pans shall have drop tubes to guide condensate to the main drain pan.
5. Double wall access doors same thickness and construction as the unit wall panels shall be provided for all sections, except coil sections. All access doors shall be shown on the drawings. Access doors perimeter shall be gasketed and shall have industrial style hinges to permit a complete 180 door swing.
6. Coils shall be plate fin and tube, continuous circuit type constructed of copper tubing 1/2" or 5/8" o.d.

with minimum wall thickness of 0.010" mechanically bonded. Fin spacing shall be no closer than 12 fins per inch. All water coil capacities, pressure drops and selection procedures shall be in accordance with ARI standard 410 and shall be ARI certified.

7. The filter frames shall be constructed of galvanized steel and be built and insulated same as unit casing. All filter segments shall be side service with access doors on both sides. The filter section shall house two filter media. The first media shall be 2"-30% pleated throwaway filter. The second media shall be rigid filter minimum 12 inches deep and efficiency of 80%-85% as determined by ASHRAE Standard 52-76. Maximum allowable face velocity through the filter media is 500 FPM. Filter media and modules regardless of type shall be nominal 12 x 24 or 24 x 24 for all units. Where filter section does not fit to the unit opening using the approved filter sizes, it shall be shown on drawings to be installed in the ductwork with transition to the unit opening.
8. The Access Segment(s) shall be provided for placement anywhere in the unit to gain access to a particular area. The access segment shall be minimum depth of 18" and shall be shown on the drawings. As a minimum, access segment shall be provided upstream of each coil section. Use of heating and cooling coil in a single housing without a access segment between them is not acceptable.
9. One (1) extra set of fan bearings for each size of unit shall be provided and turned over to Owner.
10. Provide dial-type pressure gauge at each filter bank. Gauges shall be selected for proper range of filter pressure drop and loading.
11. Floor mounted units shall be set on minimum 4 inch concrete pads, or high enough for trap depth required for proper drainage of condensate.
12. Install on vibration isolators and all required seismic snubbers and provide flexible connections at ducts. Where vibration isolators are external to the units, they shall be bolted to both units and its supports.
13. Units shall be located such that fans, fan shafts, bearings, coils, and filters can be removed without moving or disassembling the unit. Adequate access space shall be provided for easy maintenance.
14. Schedule expected fans sound level (discharge and radiated) for each octave-band, and where required provide sound attenuators at unit suction and discharge to limit sound level in the occupied space to those outlined in ASHRAE Applications Handbook.
15. All equipment shall be equipped with a secondary drain pan piped to an interior sanitary sewer drain line. Install lines such that they do not obstruct access to equipment or circulation around equipment. (Floor drain locations shall be designed to allow secondary drain pipe access without obstructing circulation routes.)
16. All refrigerant circuits shall have the following:
 - a. Low pressure circuits: cut-out w/5 minute anti-cycle timer.
 - b. High pressure circuits: cut-out with manual reset.
 - c. Wrap around crankcase heater.
 - d. Fan ambient control: "For cool weather operation."

C. Air Cooled Condensing Units

1. Condensing units of the capacities 10 tons and larger shall have dual compressors with two independently refrigerant circuits.
2. Unit shall be arranged for supply from a single electrical feeder with fusible disconnect switch and all additional disconnect means or overload protection for unit and its components shall be an integral part of the unit.
3. Compressor shall be internally isolated with springs or neoprene pad.

4. Minimum efficiency for condensing units will be 12 SEER when tested in accordance with ARI 210/240.
5. Units set outdoors on grade shall be set on 6 inch concrete pads. Minimum clearances for service shall be as recommended and published by manufacturer.
6. All condensing units shall be equipped with a side arm weather tight disconnect located within arm's reach and in sight of the equipment it services. Install weather tight 110 volt receptacle on each unit.
7. All low voltage wiring shall be stranded wiring of proper size for the load it serves and shall be encased in conduit for protection. Low voltage wiring shall be color coded.
8. All connections shall be made using appropriate size wire nuts and encased in junction boxes complete with covers.
9. All low voltage controls shall be fused to proper size.
10. All three phase equipment shall be equipped with single phase protection device.

D. Gas Fired Furnaces

1. Furnaces with fifty percent outside air capacity or greater shall have stainless steel heater exchanger. All other furnaces shall have heavy gage aluminized steel heat exchanger. All models shall be approved by the American Gas Association with minimum thermal efficiency of eighty (80) percent.
2. Heat exchanger constructed of heavy gauge aluminized steel will have ten (10) year, non-prorated warranty.
3. Where applicable, filters shall be 2" pleated throwaway. Filter size shall be 24" x 12" or 24" x 24" for all units. Where filter section does not fit to the unit opening using the approved filter sizes, it shall be shown on the drawings to be installed in the ductwork with transition to the unit opening. Maximum allowable face velocity through filter is 500 FPM.
4. Twined furnaces shall be wired as shown in Attachment "A" to operate from a single electronic multi-stage thermostat.
5. Install with proper clearance from combustibles.
6. Provide required combustion air and ventilation air per NFPA requirements. Do not install in area where space is under negative pressure.
7. Floor mounted units equipped with cooling coils shall be set high enough above floor to provide condensate drain trap seal equal to the negative or positive pressure in the drain pan plus 1-1/2". Unit shall rest on vibration isolators.
8. All damaged finishes shall be touched-up with matching enamel.
9. All equipment with cooling coil shall be equipped with a secondary drain pan piped to an interior sanitary sewer drain line. Install lines such that they do not obstruct access to equipment or circulation around equipment. (Floor drain locations shall be designed to allow secondary drain pipe access without obstructing circulation routes.)

SECTION 15800 HVAC AIR DISTRIBUTION

The Consultant shall prepare detailed specifications that will properly instruct the Contractor to construct this portion of the Work to the highest standards of the profession, and he shall include the following information in the specifications.

A. Variable Air Volume Terminal Units

1. All VAV boxes and Fan Terminal Units (FTUs) shall be Envirotech, Tempmaster, Titus or Trane.

2. FTUs and VAV boxes shall be physically located in a readily accessible area within the confines of the area controlled by its respective temperature controller (thermostat).
3. All ceilings and wall structures shall be designed to provide adequate space for service and repair of boxes.
4. Contractor shall place, permanently mounted, a copy of as-built drawings on the wall in the mechanical room(s) of the facility. As-built drawings shall include schematics clearly identifying the system design, operating sequence, component location, shaded and numbered area affected by each VAV and/or FTU, contractor, and date. As-built drawings shall be covered with clear and washable surface.
5. Exact location of VAV boxes, FTUs, and all controls including static pressure controls shall be marked on ceiling of facility by tack or other means that shall not overly detract from overall appearance of facility. Additionally, all controls shall be positioned so as to be readily accessible to maintenance personnel upon completion of the project. All static pressure controls shall receive particular attention in this regard.
6. VAV boxes and FTUs shall have a number clearly printed or painted on the cover which number relates to as-builts permanently affixed in mechanical room(s).
7. All controls mounted on boxes or units above ceiling of a building shall be permanently tagged with an identification, a definition of which, may be found on the as-builts or schematics. Said definition shall include manufacturer and part number.
8. Resistive (electrical) strip heat shall not be an integral component of the VAV boxes or fan terminal units unless approved in advance by the Project Manager.
9. Following are basic variable air volume boxes and fan terminal units approved by owner:

VAV Box:

1. Cooling only
2. Fixed minimum CFM - hot water heating coil.

Fan Terminal Unit (FTU)*

1. Fixed minimum CFM - hot water heating coil

* Series arrangement FTUs shall be used to serve break rooms, conference rooms, toilets, locker rooms and other areas with constant exhaust or with sidewall air distribution.

B. Ductwork

1. Ductwork shall be constructed from one of the following:
 - a. Galvanized steel ASTM A525-75 Grade G90, hot dip galvanized to 0.90 oz. of zinc per square foot of metal.
 - b. "Utility grade" aluminum sheets ASTM B-209-76.
2. All construction and construction methods shall be in accordance with SMACNA recommendations for pressure class required.
3. Radius elbows shall have minimum centerline radius of 1.5 X duct width. Squared and rectangular elbows shall have factory airfoil turning vanes per S.M.C.N.A. details and shall be shown on the drawings.
4. Final connections from ducts to ceiling diffusers may be made with flexible insulated duct not to exceed 3'-0" in length.
5. Access doors shall be shown on the drawings to be installed in ductwork at the following locations for ready access to controls and operating parts of any kind:

- a. Fire Dampers
 - b. Smoke Dampers
 - c. Control Dampers
 - d. Duct Mounted Heating Coils
6. Volume dampers shall be installed where branches take-off from main trunk ductwork or where ducts divide. Volume damper at runout to a single air device may be deleted, when the air device has built-in damper and ceiling height is greater than 10'-0".
 7. Provide flexible connections at all connections between ducts and fans or casings.

C. Flexible Insulated Duct

1. Shall be constructed as follows:
 - a. Core liner: Flexible acoustically transparent plastic sheet liner bonded to galvanized spring steel wire helix.
 - b. Insulation: 1" thick glass fiber 1 lb. Density.
 - c. Vapor Jacket: Flexible copolymer seamless sheet having perm rating 0.05.
 - d. Rating: U/L-181 Class 1 Air Duct, rated and labeled 2.0" or 12.0" static pressure, 4,000 or 5,500 FPM velocity as applicable for low and high pressure class respectively.
2. Provide non-ferrous metal draw bands at ends of duct.
3. Where ends of duct abut other insulation or lined metal ducts, seal the vapor jacket to the adjacent surface with permanent adhesive. Do not use "duct-tape."

D. Acoustical Duct Lining

1. Do not use duct liner in supply air ductwork and avoid using in other areas except for acoustical treatment. Where duct liner is used provide stick clips and continuous coat of adhesive to avoid having rough edges of liner exposed to the air stream.
2. All duct liner, cements and mastics shall have composite fire and smoke hazard rating as tested by procedures ASTM E-84, NFPA 255, and WL 723 not exceeding flame spread 25 and smoke developed 50.
3. When acoustic liner must be left out (such as at electric duct heaters) or other locations (such as ceiling outlets) where condensation could occur on the outside of duct joints or outlets, externally insulate duct and outlet areas.

E. Diffusers, Grilles And Registers

1. Ceiling supply and return diffusers shall be sized for a maximum static pressure drop of 0.05 inches W.G., and maximum noise level of NC=30 for all spaces except conference rooms, meeting rooms, lecture hall, etc., where noise level shall not exceed NC=25. Selection for throw to nearest wall shall provide a downward air movement at wall of 50 FPM.
2. All ceiling diffusers shall have volume control damper operable from the face of the diffuser unless where ceiling height is less than ten (10) feet and manual control damper is installed at each branch take-offs to diffusers.
3. Unless otherwise requested by the City air distribution construction and finishes shall be as follows:
 - a. Ceiling Diffusers - Steel Construction, baked white enamel finish.
 - b. Ceiling Grilles and Registers - Steel or Aluminum Construction, baked white enamel finish.
 - c. Ceiling diffusers, grilles, sidewall register and grilles in wet areas (toilets, showers, lockers,

- kitchen, etc.) shall be aluminum construction with baked white enamel finish.
4. Paint interior surfaces of all air devices with flat black paint to avoid visible rough finishes.

SECTION 15900 INSTRUMENTATION AND CONTROL FOR HVAC

This section of specifications is contained in the Appendix as a guideline for the Consultant to adapt, when applicable, to each respective project. Notify the Project Manager of proposed modifications.

SECTION 15950 TESTING, ADJUSTING AND BALANCING FOR HVAC

- A. The testing and balancing contractor shall be an independent agency who shall be a member of the Associated Air Balances council (AABC) or National Environmental Balance Bureau (NEBB).
- B. Final inspection of work shall be made when records and reports have been certified and submitted which show that all mechanical equipment and systems have been balanced and performance tested under the direction of a qualified engineer to meet all design
- C. All systems shall be adjusted and balanced as required to deliver the specified quantities within plus or minus five (5) percent.
- E. Final copies of the test and balance data shall be included in the O&M Manuals.

DIVISION 16

ELECTRICAL

SECTION 16010	ELECTRICAL GENERAL PROVISIONS.....	2
SECTION 16050	BASIC MATERIALS AND METHODS.....	2
SECTION 16060	ELECTRICAL INSPECTIONS.....	2
SECTION 16070	SEISMIC RESTRAINT SYSTEMS.....	2
SECTION 16230	EMERGENCY GENERATOR SYSTEM.....	2
SECTION 16440	SWITCHBOARDS AND PANELBOARDS.....	2
SECTION 16420	ENCLOSED CONTROLLERS.....	2
SECTION 16500	LIGHTING.....	2
SECTION 16520	FIELD LIGHTING SYSTEM.....	2
SECTION 16700	COMMUNICATIONS.....	3
SECTION 16820	PUBLIC ADDRESS SYSTEMS.....	3

SECTION 16010 ELECTRICAL GENERAL PROVISIONS

This section of specifications is contained in the Appendix as a guideline for the Consultant to adapt, when applicable, to each respective project. Notify the Project Manager of proposed modifications.

SECTION 16050 BASIC MATERIALS AND METHODS

This section of specifications is contained in the Appendix as a guideline for the Consultant to adapt, when applicable, to each respective project. Notify the Project Manager of proposed modifications.

SECTION 16060 ELECTRICAL INSPECTIONS

This section of specifications is contained in the Appendix as a guideline for the Consultant to adapt, when applicable, to each respective project. Notify the Project Manager of proposed modifications.

SECTION 16070 SEISMIC RESTRAINT SYSTEMS

This section of specifications is contained in the Appendix as a guideline for the Consultant to adapt, when applicable, to each respective project. Notify the Project Manager of proposed modifications.

SECTION 16230 EMERGENCY GENERATOR SYSTEM

This section of specifications is contained in the Appendix as a guideline for the Consultant to adapt, when applicable, to each respective project. Notify the Project Manager of proposed modifications.

SECTION 16440 SWITCHBOARDS AND PANELBOARDS

This section of specifications is contained in the Appendix as a guideline for the Consultant to adapt, when applicable, to each respective project. Notify the Project Manager of proposed modifications.

SECTION 16420 ENCLOSED CONTROLLERS

This section of specifications is contained in the Appendix as a guideline for the Consultant to adapt, when applicable, to each respective project. Notify the Project Manager of proposed modifications.

SECTION 16500 LIGHTING

This section of specifications is contained in the Appendix as a guideline for the Consultant to adapt, when applicable, to each respective project. Notify the Project Manager of proposed modifications.

SECTION 16520 FIELD LIGHTING SYSTEM

This section of specifications is contained in the Appendix as a guideline for the Consultant to adapt, when applicable, to each respective project. Notify the Project Manager of proposed modifications.

SECTION 16700 COMMUNICATIONS

Consultant shall coordinate all device locations for voice communication including public pay phone, data equipment, and audio-video equipment. Coordination shall include, but not be limited to the following persons, the user department, Information Systems department, Consultants, General Contractor and others as may be designated by the Project Manager.

Consultant shall review and verify "exact" locations before rough-in begins.

NOTE: CHANGES AFTER LOCATION VERIFICATION WILL NOT BE CONSIDERED.

Rough-in shall be provided by the General contractor. Rough-in may or may not include pulling cable in the conduit.

SECTION 16820 PUBLIC ADDRESS SYSTEMS

FIRE STATIONS: Specify Bogen, Classic Series public address amplifier C100, with wall mount cabinet model WMK1, and desktop paging microphone model MBS1000A. Size speakers to match.

DIVISION 17

CODES

- A. The Consultant shall comply with all applicable laws and codes, including but not limited to:
1. **Federal Water Pollution Control Act** and subsequent Amended:
Amendment 1972; Amendment 1977 (became commonly known as the Clean Water Act.); Amendment 1981; 1987; Amended by attachment Title I of the Great Lakes Critical Programs Act of 1990, Amended by attachment Great Lakes Legacy Act of 2002 [Public Law 107-303, November 27, 2002]; and Amendment 2002.
 2. **International Building Code (IBC)** with Local Amendments 2003 Edition
 3. **International Existing Building Code** or Chapter 34 IBC 2003 Edition
 4. **ICC/ANSI Handicap Accessibility Code** in Conjunction with Chapter 11 of 2003 IBC 1998 Edition
 5. **National Electrical Code** 2002 Edition
 6. **Joint Electrical Code** 2003 Edition
 7. **International Mechanical Code** 2003 Edition
 8. **International Gas Code with Local Amendments** 2003 Edition
 9. **International Plumbing Code with Local Amendments** 2003 Edition
 10. **ANSI/ASME Elevator Code – A17.1** 2004 Edition
 11. **Council of American Building Officials (CABO) Model Energy Code** 1992 Edition
 12. **Americans with Disabilities Act**, Code of Federal Regulations, 28 CFR Part 36 July 1, 1994 Edition
 13. **Memphis and Shelby County Unified Development Code** 8-10-2010
- B. In the event of differences between codes, for example IBC, ICC/ANSI, and ADA, the Consultant shall satisfy all the codes and design to the most stringent code.
- C. The City of Memphis and Shelby County Office of Construction Code Enforcement (hereinafter referred to as Code Enforcement) does not review for ADA compliance. Code Enforcement phone 901-379-4200.
- D. Special guidelines for ADA design.
1. The City of Memphis requires 100% compliance with ADA. The Consultant shall employ additional consultants as necessary to assure the completed project meets the strictest current interpretation of the applicable edition. To help insure the completed project meets all minimum requirements, Consultant shall not design to the allowable limits but shall design leaving a margin to make-up for possible variations in field conditions and installation variations.
 2. The Consultant shall design with the goal of creating facilities that go beyond accommodating disabled (per minimum standards) persons to facilities that invite or encourage all disabled persons to utilize the facilities. Examples of areas of extra design consideration include floor covering materials as they effect mobility impaired, finishes in various colors as they effect visually impaired.
 3. Design all accessible parking spaces
 - a. as Universal parking space as shown on page 569 and 570 of the ADA. San accessible signs are not required

- b. with signs as noted in 502.6 identification page 188 of the ADA,
 - c. with signs mounted 84", to the bottom of the sign, above the respective parking pavement surface,
 - d. without handicapped symbol painted on the parking pavement surface,
4. City may have an ADA consultant to review and comment on the Consultant's plans and specifications. Such comments and instructions shall be incorporated into the plans and specifications.
 5. To assist consultants in keeping up to date on adapting to ADA design integration attached is an article in the Appendix, Clarifying Barrier-Free Washroom Accessibility.
 6. Clearly identify, on the plans, accessible route from each property point of entry to the accessible entry of each building. Property points of entry include but are not limited to curb ramps, accessible parking spaces and other buildings.

END OF SECTION



Clarifying Barrier-free Washroom Accessibility

All images courtesy Bobrick Washroom Equipment Inc.

by Alan Gettelman

The Americans with Disabilities Act (ADA) prohibits discrimination against persons with disabilities by ensuring equal access to all goods and services. Inaccessible facilities are considered discriminatory as well, and many lawsuits have been filed on this basis. Since the ADA is a civil rights law, not a building code, compliance with its guidelines does not ensure a building is completely accessible to the disabled—specifiers should consult local building codes to determine requirements. Many communities and municipalities have compliance officers within their building departments, while non-governmental agencies, such as Easter Seal societies, can also be of help. Such agencies are experienced in providing accessibility advice for restrooms and the building as a whole.

To achieve ADA-compliance on a project, specifiers must provide detailed design specifications following ADA guidelines, originally called *ADA Accessibility Guidelines for Buildings and Facilities (ADAAG)*. These guidelines were developed by the U.S. Architectural and Transportation Barriers Compliance Board (commonly called the 'Access Board'), based on American National Standards Institute (ANSI) A 117.1, *Accessible and Usable Buildings and Facilities*, and the *Uniform Federal Accessibility Standards (UFAS)*.¹

While the present ADAAG stand as the most authoritative design compliance documentation for the Americans with Disabilities Act, the Access Board's revised

guidelines, published in the Federal Register on July 23, 2004, will eventually be adopted by federal agencies and state building code authorities. This 'new' ADAAG, called the *ADA-ABA Accessibility Guidelines*, incorporates requirements from the *Architectural Barriers Act (ABA)*. (Information on the new guidelines can be found in the *Barrier-Free Washroom Planning Guide Addendum* [provided with the original guide], on a complimentary basis to the specifier community.)

Public restrooms and accessibility

New restroom construction, as well as additions and substantial alterations to existing facilities, must comply with ADAAG requirements. This includes entrances, toilet facilities, and accessible routes servicing the additions or altered spaces. Building owners are also required to remove barriers that are 'readily achievable' based on the organization's size, resources, and the type/complexity of the barriers in question (e.g. adding a separate, compliant entrance rather than re-constructing a single entrance). Barrier-removal requirements are decided entirely on a case-by-case basis, with no standard formula for compliance.

Universal design

Since ADA mandates nationwide accessibility, it must support the concept of universal design. Universal design suggests designers and manufacturers include the necessary characteristics and/or options in all products, building elements, and spaces to ensure usability by the greatest number of persons with all types and levels of physical ability. Sometimes, universal design is met simply by using the same item for everyone, with slight modifications. This eliminates radically different-looking items and special labels, and the stigma associated with them.

Left- and right-hand accessibility

Some disabled persons can only approach a restroom product from one side. As a result, some toilet and shower compartments, and non-symmetrical accessories such as corner-mounted towel dispensers, can prove inaccessible. While only one accessory of each type in each restroom must be accessible, universal design demands both left- and right-handed versions be provided whenever possible. Where space constraints make this unreasonable, units should be mounted to provide equal access from both sides.

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Table 1 Children's Reach Ranges

Forward or side reach	Ages 3 and 4	Ages 5 through 8	Ages 9 through 12
High (maximum)	915 mm (36 in.)	1015 mm (40 in.)	1120 mm (44 in.)
Low (minimum)	510 mm (20 in.)	455 mm (18 in.)	405 mm (16 in.)

Products specially designed to accommodate access from either side are not available.

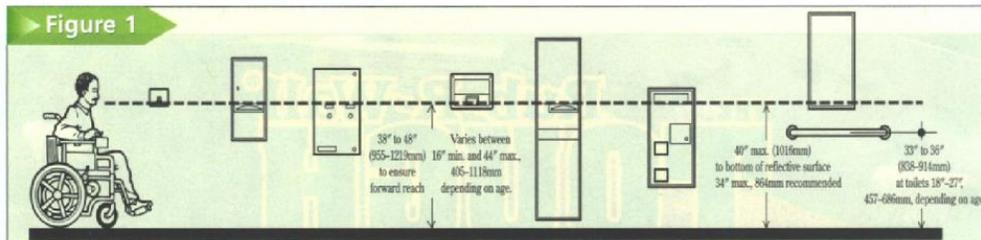
Space for wheelchairs

The needs of wheelchair-bound persons are commonly used as the standard of accessibility for entrances, exits, and appropriate proximities of restroom equipment. This perspective also accommodates persons using a walker, cane, or crutches. Mounting heights for mirrors, paper towel dispensers, waste receptacles, soap dispensers, napkin/tampon vendors, toilet partition-mounted grab bars, toilet-tissue and seat-cover dispensers, and sanitary- napkin disposals are equally important (see Figures 1 and 2). Some common examples of restroom design that challenge disabled persons include:

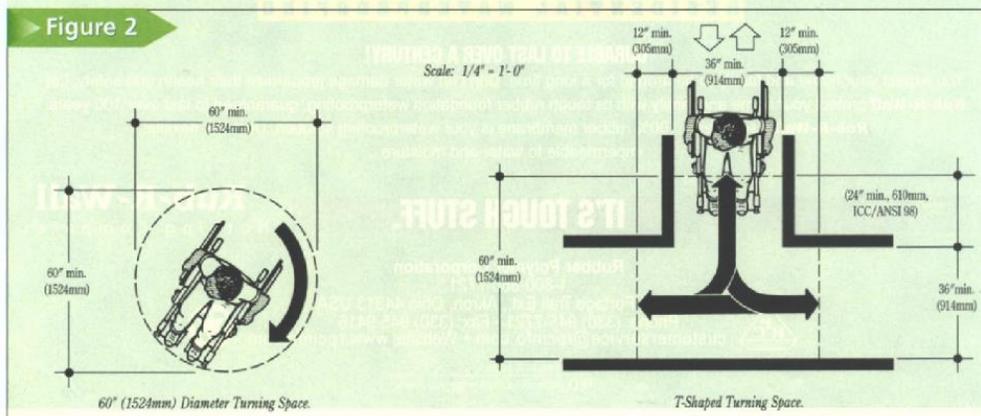
- toilet-tissue dispensers mounted above grab bars in toilet compartments;
- mirrors mounted too high for visibility from a wheelchair; and
- clothes-hooks mounted too high to be reached from a seated or crouched position.

Children's reach issues

When designing with children's use in mind, one should consider their age and stage of physical development, focusing on height and reach capabilities. These factors will vary by academic level (*i.e.* elementary, middle, or high school). As with disabled users, the mounting heights of toilet seats, grab bars, toilet tissue, towel, and soap dispensers, lavatories, and plumbing fixtures are all



The needs of wheelchair-bound patrons are often the standard by which restroom-accessibility is judged. Figure 1 shows acceptable heights for a variety of restroom elements, including grab bars. Figure 2 depicts the kinds of floor space required for a wheelchair-user to move effectively in restroom areas



relevant. Tables 1 and 2 (pages 48 and 53) depict guidelines for making facilities accessible to children, as published by the Access Board.

Barrier-free restroom openings

Single doors

Single-door entries are the most common restroom layout and must have a level and clear corridor or passageway leading to the door of at least 1219.2 mm (48 in.).

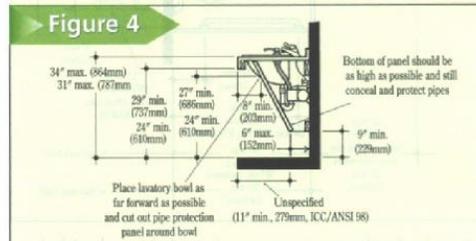
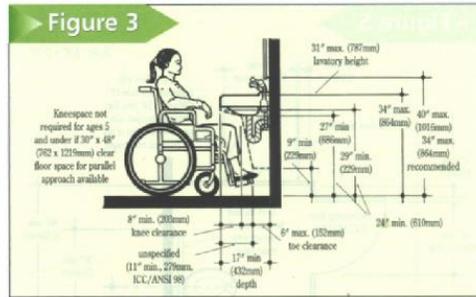
When the door is open 90 degrees, it must provide a minimum clear opening of 812.8 mm (32 in.) and should swing into a minimum 1524 x 1524-mm (60 x 60-in.) level clear space.

Opposing doors

Opposing doors (*i.e.* one for the entrance and another for the exit), require that no hazard (*i.e.* potential for the door to strike someone in the common space) be created in the alcove by the simultaneous entry/exit of two wheelchairs. Alcove-width must be a minimum of 1219.2 mm (48 in.) plus the width of the door. Opposing doors should swing in the users' intended directions of travel, since it is difficult to back up in a wheelchair, or on crutches.

Raised thresholds

Raised thresholds (placed on the floor at entrance-ways such as doorways and roll-in entries) should be avoided whenever possible, since it is difficult to maneuver wheelchairs and walkers over them. They also present a trip-hazard for persons on crutches. When necessary for a design, raised thresholds should be no more than 12.7 mm (0.5 in.) with a beveled slope no greater than 1: 2.



Lavatories, as depicted in the above diagrams, must account for the clearance-requirements of a wheelchair. Lavatory bowls extending far from the wall can be easier to access, and the means of pipe-protection should not obstruct the user.

Interior doors

Interior doors must push or pull open with a minimum of 2.3 kg (5 lb) of force. Handles, pulls, latches, and locks should be mounted no higher than 1219.2 mm (48 in.), and be easy to operate with one hand, requiring no tight grasping, pinching, or twisting of the wrist. Self-closing faucet valves are acceptable if they remain open at least 10 seconds.

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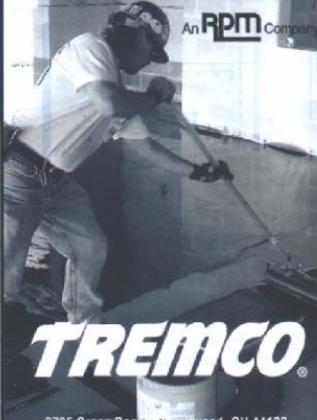
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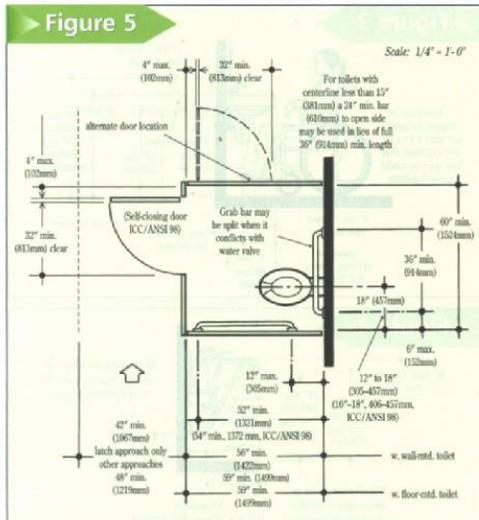
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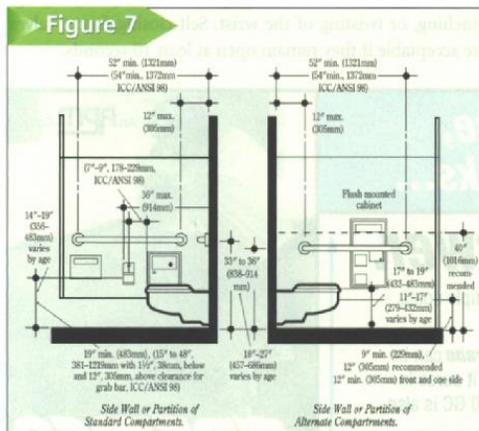
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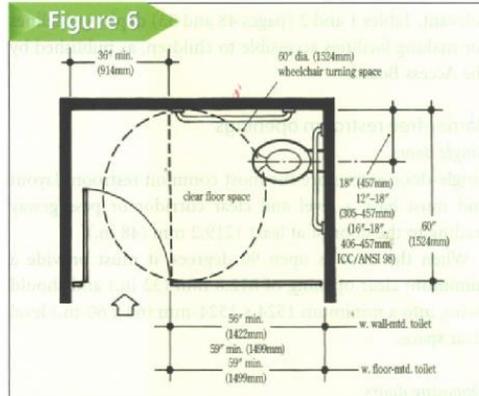
Standard toilet compartments, intended for wheelchair users, have a minimum width of 1524 mm (60 in.).

Open vestibules

Open vestibules (i.e. door-less entranceways) are the most universally usable means of entry to a restroom, and least likely to cause problems for disabled persons. The recommended minimum width for a passageway is 1219.2 mm (48 in.).



Wall-mounted toilets, with either hand-operated levers or automatic flush controls, are preferred for use by the disabled. This diagram depicts two side views of a Standard toilet compartment.



Standard toilet compartments can also include alcoves, as depicted above. Grab bars remain an important feature here.

Special considerations for lavatories

Lavatories can provide convenient hygienic facilities for all public-restroom users when at least one area in each restroom meets or exceeds ADAAG standards. Figures 3 and 4 (page 49) provide an overview of clearances and under-lavatory, exposed-plumbing protective paneling required by ADAAG.

Accessories and accessibility

Recessed accessories

A preferred choice for universal design, recessed accessories must not project more than 127 mm (4 in.) into clear access aisles ('clear access' denoting a 1067-mm [48-in.] wide, clear main passageway). Should floor-standing or surface-mounted units be used, and project more than 127 mm, they must be located in corners, alcoves, or between other structural elements so as not to impede the visually impaired, or interfere with access aisles or wheelchair-turning areas. For example, recessed tampon vendors mounted in the wall across from the lavatory will not impede travel from entrance to lavatory to toilet compartment.

Mirrors

Mirrors should be installed with the bottom edge no higher than 1016 mm (40 in.), so as not to reduce visibility for the wheelchair-bound. A single, full-length mirror can be used by everyone, and is therefore recommended.

Other accessories

Soap dispensers installed over lavatories must be mounted so push buttons are no higher than 1117.6 mm (44 in.). Paper-towel dispensers/receptacles and warm-air hand

dryers must be accessible to persons in wheelchairs, with the towels and the dryer start-button(s) located 965.2 to 1016 mm (38 to 40 in.) above the finished floor. Sanitary napkin/tampon vendors for women's restrooms should also be installed at accessible mounting heights, and provide operating mechanisms meeting ADAAG requirements. Examples include push-buttons, valves, knobs, and levers operable with one hand, and without tight grasping, pinching, or twisting of the wrist. Required force should be no greater than 22.2 N (5 lbf).

Toilet partitions

There are five accessible toilet compartments specified in the ADAAG. Four are intended for use by the wheelchair-bound, while the fifth serves walking mobility-impaired people who need the support of parallel grab bars when sitting and rising. Two of the compartments have a minimum width of 1524 mm (60 in.) and are termed Standard, including one with an alcove configuration. The next two types, called Alternative, feature narrower compartment-widths of 914.4 mm (36 in.) and 1219.2 mm (48 in.), respectively. The fifth type is a 914.4-mm walk-in compartment. Figures 5 and 6 illustrate the Standard and Standard (alcove) compartment toilet and grab-bar locations and significant dimensions. Figure 7 depicts the side view of a Standard compartment, and illustrates required toe clearance (the vertical height between the bottom of the toilet partition panel/door and floor), as well as toilet specifications. Wall-mounted toilets are preferred with

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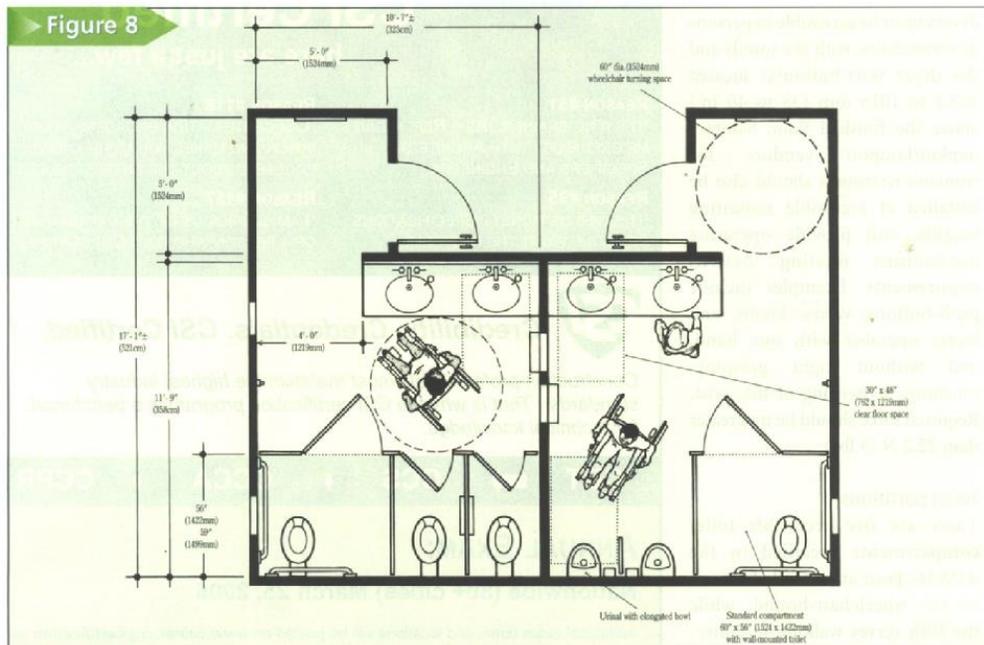
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This diagram depicts a side-by-side layout for men's and women's restrooms. The space features Standard toilet compartments, acceptable wheelchair-turning space, and a variety of other features

hand-operated lever or automatic flush controls. The height of the toilet seat must be 431.8 to 482.6 mm (17 to 19 in.) above the finished floor, to allow for level wheelchair-to-toilet seat transfer.

Grab bars

Grab bars must have a diameter of 31.8 to 38.1 mm (1.25 to 1.5 in.) and a clearance between the grab bar and wall (and/or accessory surfaces) of 38.1 mm. Mounting height must be

Additional Information

Author

Alan Gettelman is director of marketing, and chair of the marketing committee, for Bobrick Washroom

Equipment, Inc., having served with the company for over 40 years. He can be reached at (818) 503-1629, or via e-mail at agettelman@bobrick.com.

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- D2010—Plumbing Fixtures
- D2020—Domestic Water Distribution

Key words

- Americans with Disabilities Act
- ADA Accessibility Guidelines for Buildings and Facilities
- Universal design

Abstract

Restrooms that fail to comply with the *Americans with Disabilities Act (ADA)* can be considered discriminatory.

Using standards based on wheelchair-accessibility, specifiers can choose structural designs and accessories that meet the needs of people at all levels of physical ability.

Table 2 Specifications for Water Closets Serving Children

	Ages 3 and 4	Ages 5 through 8	Ages 9 through 12
Water closet centerline	305 mm (12 in.)	305 to 380 mm (12 to 15 in.)	330 to 455 mm (15 to 18 in.)
Toilet seat height	280 to 305 mm (11 to 12 in.)	305 to 380 mm (12 to 15 in.)	380 to 430 mm (15 to 17 in.)
Grab bar height	455 to 510 mm (18 to 20 in.)	510 to 635 mm (20 to 25 in.)	635 to 685 mm (25 to 27 in.)
Toilet tissue dispenser height	355 mm (14 in.)	355 to 430 mm (14 to 17 in.)	430 to 485 mm (17 to 19 in.)

838.2 to 914.4 mm (33 to 36 in.), while structural strength of grab bars and their mounting devices must withstand at least 1112.1 N (250 lbf). Straight horizontal grab bars are the minimum specified by ADAAG, though some jurisdictions require a combination of horizontal and vertical grab bars, providing a variety of hand supports for sitting and rising.

wheelchair-turning space, clear-floor space, a standard compartment with wall-mounted toilet and grab bars, and urinals with elongated bowls (another excellent application of universal design). These restrooms demonstrate a thoughtful application of the concepts discussed above. ♥

Sample layouts of two small public restrooms

Figure 8 illustrates a basic, barrier-free layout for side-by-side women's and men's restrooms, complete with

Notes

¹ Building plans should always be confirmed with local jurisdictions—in some cases, they require more stringent guidelines than ADAAG.

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DIVISION 18

CODE MEETINGS

MEETINGS / REVIEW WITH OFFICE OF CONSTRUCTION CODE ENFORCEMENT

- A. General - In conjunction with preparing and filing the required documents for approval of governmental authorities having jurisdiction over the project, Consultants are required to meet with the Memphis and Shelby County Office of Code Enforcement (Code Enforcement) and Fire Marshall officials at the critical phases of the project to eliminate later design changes.

This is in accordance with the consultant's responsibility per the Architectural and Engineering Services Agreement paragraph 2.5.D. "Prepare and file the required documents for approval of governmental authorities having jurisdiction over the project, including application for Shelby County Construction Code Enforcement building plans review. All deficiencies noted in code review comments and comments from other involved governmental authorities shall be addressed by the Consultant, revising the documents at no cost to the Owner. The Consultant shall submit the plans review document to the Owner for review and signing. **Any construction cost increases after bid opening due to a failure to obtain and incorporate code review comments shall be the responsibility of the Consultant."**

A.1 The Consultant shall Meet with the Division of Engineering for the City of Memphis , Land Development Department at each phase of the Project to insure that all City of Memphis needs are met in the bid package documents. . Any construction cost increases after bid opening due to a failure to obtain and incorporate City of Memphis review comments shall be the responsibility of the Consultant."

- B. Schematic Development Submittal - Consultant shall arrange and attend a meeting with Code Enforcement and Project Manager to review the schematic development stage of the plans. The Consultant will prepare minutes of this meeting and submit them to BD&C.
- C. Design Development Submittal - Consultant shall arrange and attend a meeting with Code Enforcement and Project Manager to review the design development stage of the plans. The Consultant will prepare minutes of this meeting and submit them to BD&C.
- D. Construction Documents Submittal - Immediately upon completion of the final construction documents, the Consultants shall submit plans and specifications to the proper authorities, in the form and quantities as required by each respective authority, for review and approval. The Building Code Zoning Analysis checklist, as outlined by Code Enforcement, shall be completed and attached with final drawings and specifications, sealed and signed. Consultant shall make changes to the plans and specifications as recommended or required by such authorities and as approved by the Project Manager. It is the Consultant's responsibility to make all corrections to the plans and specifications without delaying the bid date. Adequate time should be allowed in the project schedule for plan review by the enforcement authorities and obtain input. The Consultant must obtain the Health Department and Fire Marshall reviews and approval separately and before distribution of documents for bidding. The review comments from enforcement authorities shall be forwarded to the Project Manager as part of the Construction Document review process.
- E. The Administrator of the City's Building Design and Construction department shall sign for the City where such signature is needed for plans and specification submittals by respective authorities.
- F. The Consultant shall be aware that certification is required by the Consultant that the Construction Documents comply with all governing authorities requirement. That Certification is a part of the

Architectural and Engineering Services Agreement Exhibit F, sample of which is attached hereto.

END OF SECTION

(Attachment to Consultant's Handbook, from Architectural and Engineering Services agreement)
EXHIBIT F

CONSULTANT'S CERTIFICATE

TO: BDC Project Manager
125 North Main Street, Room 554
Memphis, TN 38103
("Owner")

and

RE: _____
("The Project")

The undersigned, _____ (the "Consultant") does hereby state as follows:

1. Consultant has heretofore prepared the Plans and Specifications (herein generally called the "Plans") for the above Project pursuant which the Owner and Consultant contemplate construction of certain improvements and related amenities described herein (herein generally called the "Improvements") upon the property described above (herein called the "Property").

2. In the professional opinion of the Consultant:

(a) The Plans have been approved by all requisite governmental entities having jurisdiction;

(b) All governmental permits and authorizations necessary for the lawful construction of the Improvements in accordance with the Plans have been obtained, including all necessary building permits, the American with Disabilities Act, environmental protection permits and zoning variances, if any;

(c) If the Improvements are completed in accordance with the Plans:

(i) the Improvements will comply with all zoning, building, environmental protection, and other laws, ordinances, statutes and regulations applicable to the Plans and Improvements; and

(ii) the Improvements, including site improvements, will not violate any applicable governmental permit or approval issued in connection with the construction and erection thereof; and

(iii) subject to the obtaining of applicable use and like permits (as to which we express no opinion) and required occupancy certificates (which we have no reason to believe

will not be issued), occupancy of the Improvements for their intended use and purpose will be permissible under the zoning, building, environmental protection and other laws, ordinances, statutes and regulations applicable to the Plans and Improvements and Property.

(d) The Property and the building areas described in the Plans are adequate in size and location to comply with all requirements of all building, zoning and use laws, ordinances and regulations of any governmental or public authority having jurisdiction over the same;

(e) All necessary utilities, including water service, electric service, sanitary and storm sewer service, gas service (if required in accordance with the Plans) and telephone service are available to the property line of the Property, and all legally required permits and authorizations relating thereto, have been issued.

3. To the Consultant's best knowledge there are no petitions, actions or proceedings pending or threatened to revoke, rescind, alter or declare invalid any laws, ordinances, regulations, conditions, covenants, permits, certificates or agreements for or relating to the Improvements or the Plans.

4. The Consultant represents that its engagement in connection with the Project is under that certain Agreement dated _____ between the Owner and the Consultant and that the statements made herein are made in accordance with the standards of its best professional care and skill of the Consultant's profession.

DATED: _____

By: _____

Title: _____

DIVISION 19

FUTURE

This Division number is reserved for future use.

DIVISION 20

PROJECT DIRECTORY

PROJECT:

Project Manager _____
Project Name _____
Project Address _____

Project Number _____
CIP Number _____
City Design Contract Number _____
City Construction Contract Number _____

CITY CONTACTS FOR THIS PROJECT:

USING DIVISION: _____
Contact name _____
Address _____

Telephone _____ Fax _____ E-mail _____

PROJECT ARCHITECT:

Name _____
Company name _____
Address _____

Telephone _____ Fax _____ E-mail _____

GENERAL CONTRACTOR:

Name _____
Company name _____
Address _____

Telephone _____ Fax _____ E-mail _____

OTHER CONTACTS:

LAND SELLER:

Name _____
Company name _____
Address _____

Telephone _____ Fax _____ E-mail _____

SELLER'S CONTACT:

Name _____
Company name _____
Address _____

Telephone _____ Fax _____ E-mail _____

SURVEYOR:

Name _____
Company name _____
Address _____

Telephone _____ Fax _____ E-mail _____

SOILS LAB/ENGINEER:

Name _____
Company name _____
Address _____

Telephone _____ Fax _____ E-mail _____

CIVIL ENGINEER:

Name _____
Company name _____
Address _____

Telephone _____ Fax _____ E-mail _____

STRUCTURAL ENGINEER:

Name _____
Company name _____
Address _____

Telephone _____ Fax _____ E-mail _____

MECHANICAL ENGINEER:

Name _____
Company name _____
Address _____

Telephone _____ Fax _____ E-mail _____

PLUMBING ENGINEER:

Name _____
Company name _____
Address _____

Telephone _____ Fax _____ E-mail _____

ELECTRICAL ENGINEER:

Name _____
Company name _____
Address _____

Telephone _____ Fax _____ E-mail _____

LANDSCAPE DESIGN:

Name _____
Company name _____
Address _____

Telephone _____ Fax _____ E-mail _____

ROOFING CONSULTANT:

Name _____
Company name _____
Address _____

Telephone _____ Fax _____ E-mail _____

SECURITY SYSTEM CONSULTANT:

Name _____
Company name _____
Address _____

Telephone _____ Fax _____ E-mail _____

CITY/AREA CONTACTS: (subject to change)

MEMPHIS AND SHELBY COUNTY BUILDING OFFICIAL:

Contact: Ted Illsley Address: 6465 Mullins Station Road, Memphis, TN 38134
Telephone 379-4200 Fax 379-4204 E-mail _____

CITY OF MEMPHIS FIRE MARSHALL:

Contact: Robert Decker Address: 2668 Avery Avenue, Memphis, TN 38112
Telephone 320-5402 Fax 320-5425 E-mail robert.decker@memphistn.gov

CITY OF MEMPHIS PLANNING OR ZONING OFFICIAL:

Contact: John Zeanah Address: 125 N. Main, Room 468, Memphis, TN 38103
Telephone 576-7197 Fax 576-7188 E-mail _____

CENTER CITY COMMISSION:

Contact: Andy Kitsinger (Director) Address: 114, N. Main Street, Memphis, TN 38103
Telephone 575-0540 Fax 575-0541 E-mail _____

MEMPHIS LIGHT GAS & WATER:

Contact: _____ Address: 220 S. Main, Memphis, TN 38103
Telephone 544-6549 Fax _____ E-mail _____

TELEPHONE COMPANY: BELLSOUTH

Contact: Business Customer Service Address: Memphis, TN
Telephone 557-6000 Fax _____ E-mail _____

MEMPHIS AND SHELBY COUNTY HEALTH DEPARTMENT:

Contact: Norman C. LaChapelle Address: 814 Jefferson, Memphis, TN 38105
Telephone 544-7582 Fax 544-6814 E-mail nlachapelle@co.shelby.tn.us

TIME WARNER COMMUNICATIONS:

Contact: Gary Dickerson (Mgr. Comm. Dev.) Address: 6555 Quince Road, Suite 500, Memphis, TN 38119
Telephone 365-1770 ext 4004 Fax 369-4543 E-mail _____

CITY OF MEMPHIS - INFORMATION SYSTEMS:

Contact: Mike Rodriguez (CIO) Address: 125 N. Main, Room 528, Memphis, TN 38103
Telephone 636-7087 Fax 576-6213 E-mail rodney.crenshaw@memphistn.gov

CITY OF MEMPHIS - TRAFFIC ENGINEER:

Contact: Randall Tatum Address: 125 N. Main, Room 668, Memphis, TN 38103
Telephone 576-6710 Fax 576-6960 E-mail _____

STATE HIGHWAY DEPARTMENT:

Contact: N/A Address: 6430 Summer Avenue, Memphis, TN 38134
Telephone 543-6256 Fax _____ E-mail _____

CITY OF MEMPHIS SANITARY SEWER DESIGN:

Contact: Faraedoon Qaladize Address: 125 N. Main, Room 639, Memphis, TN 38127
Telephone 576-6725 Fax 576-6960 E-mail gary.vaden@memphistn.gov

CITY OF MEMPHIS STORM DRAINAGE AUTHORITY:

Contact: George Cox Address: 125 N. Main, Room 677, Memphis, TN 38103
Telephone 576-6690 Fax 576-6960 E-mail george.cox@memphistn.gov

STORM WATER POLLUTION CONTROL (CITY):

Contact: Don Hudgens Address: 2303 North Second St., Memphis, TN 38127
Telephone 576-7122 Fax _____ E-mail _____

STORM WATER POLLUTION CONTROL (STATE):

Contact: Terry Templeton Address: 2510 Mt. Moriah Rd., Ste E-645, Memphis, TN 38115
Telephone 901-368-7959 Fax _____ E-mail _____

DIVISION 21

CONSTRUCTION DRAWINGS

The City's standard requirements for construction Project Drawings are included herein. The Project Manager shall approve, in writing, additional requirements for specific projects and exceptions to the standards as listed herein or as may arise during the course of the project.

1. DRAWING SIZE:
 - a. All drawings in a set for a project shall be one size.
 - b. Preferred size of all sheets of drawings shall be 24" x 36".
 - c. Maximum size of sheets of drawings may be as large as 30" x 42". (BD&C storage capacity is limited to this size.)
2. DRAWING SCALE:
 - a. Site and civil drawings shall be scaled at 1" = 20' or 1" = 30'.
 - b. Other plan drawings shall be scaled at 1/8" = 1' or 1/4" = 1'; no exceptions.
 - c. Details shall be minimum 3/4" = 1'.
 - d. Scale of graphics and text on sheets 30" x 42" shall readable at half size.
 - e. Provide a graphic scale and text scale for each drawing and detail.
 - f. Provide a north arrow on all plans. Indicate direction of view of all elevations.
3. Use standard City of Memphis drawing cover sheet for each project. See Figure 21-A. The AutoCAD (.dwg) file included in the CD that comes with this Consultant's Handbook, may be used, or the consultant may create his own drawing that looks like the standard.
4. Use standard City of Memphis information sheet for each project. See Figure 21-B. The AutoCAD (.dwg) file included in the CD that comes with this Consultant's Handbook, may be used.
5. Use standard City of Memphis title Block for sheet in each project. See Figure 21-B. The AutoCAD (.dwg) file included in the CD that comes with this Consultant's Handbook, may be used.
6. The vicinity map on the information sheet shall include at least two major streets and highlight the project site. The vicinity map shall be a minimum size of 5" x 5" and easily readable. Map scale of 1" = 1250' or so is desirable. Consultant shall secure written permission from the copyright holder for any duplication of any copyrighted publication.
7. All drawings shall have the same orientation on each sheet throughout all architectural and subconsultant sheets in the entire set, and on all revisions and additions throughout the duration of the Project. Plans should be oriented on the sheets where North is toward the top of the page. Exceptions must be approved by the Project Manager, in advance, in writing.
8. When match lines are required, use the same match line for all drawings.
9. Provide legend and graphic scales on all plan sheets. Use keyplans when applicable.
10. Use keynotes whenever possible. List keynotes on the same sheet as the key reference.
11. Highlight all features, designed to meet ADA requirements, with graphics or text to alert tradesmen. Highlighted features shall be indicated on respective drawings for mechanical, electrical, plumbing, etc. as needed to alert tradesmen.

CITY OF MEMPHIS, TENNESSEE

THE HONORABLE WILLIE W. HERENTON, MAYOR

PROJECT TITLE
FOR: PARK SERVICES DIVISION
CITY OF MEMPHIS CIP NUMBER: PK234
BUILDING DESIGN AND CONSTRUCTION PROJECT NUMBER: 15C200D12

ARCHITECT
street
city

ENGINEER 1

CONSULTANTS:
ENGINEER 2

ENGINEER 3

ETC.

DRAWING SET ISSUE DATE: JANUARY 1, 1900

BID SET NUMBER _____

Fig. 21 - A

DIVISION 22

CONSTRUCTION PROJECT MANUAL

The City's standard requirements for the construction Project Manual are included herein. The Project Manager shall approve in writing additional requirements for specific projects and exceptions to the standards as listed herein or as may arise during the course of the project.

1. **Project Manual shall be printed on 8-1/2" x 11" white bond paper, printed both sides, 3-hole punched and bound in a 3 ring rigid-backed binder. Binder shall display the cover sheet.**
2. Use standard City of Memphis Project Manual Cover format. See Figure 22-A.
3. Project Manual shall be in the CSI 16 Division Format.
4. Provide permanent tabs for all 16 Divisions. Where there is no division content, provide a sheet that indicates that there is no content for this respective section. Indicate the same on the table of contents.
5. The footer of each sheet in the Project Manual shall display the BD&C Project Number, Project Manual CSI Section Number, and Section page of page(s) numbers.
6. Print the Bid Form, Bid Bond, and Certificate of Non-Discrimination on one side only, and on light pastel colored paper.
7. Consultant shall instruct bidders to register with the Consultant so that they are assured of notification of addenda and notices.
8. Consultant shall register all bidders as they pick up Bid Documents.
9. Bidders shall be instructed to use City of Memphis Bid Form, Bid Bond, and Certificate of Non-Discrimination in original form as distributed by the Consultant.
10. All Project Manuals sent to Plans Rooms and such for bidder's review, shall have the Bid Form, Bid Bond, and Certificate of Non-Discrimination, either, removed from the manual or stamped "Sample". This is to insure that Bidders pick up these forms in original version from the Consultant.
11. Consultant shall distribute City of Memphis BD&C Bid Envelopes and instruct Bidders to use the envelopes.
12. Owner's copy of bid documents shall be exactly like distributed documents.
13. Project Manual review submittals to the Owner during the progress of the documents shall be

Programming:	None.
Schematic Design:	List of planned manual sections.
Design Development:	95% manual submittal.
Construction Documents:	100% manual submittal.
14. Upon the City's selection of a bidder to be Contractor, the consultant shall prepare one additional copy of the Project Manual which shall include:
 - a. The selected bidder's signed originals of the Bid Form, Bid Bond, Certificate of Non-Discrimination, and Insurance Certificate.
 - b. The entire Project Manual in PDF format, on CD(s).
 - c. The entire set of Drawings in PDF format on CD(s).

CITY OF MEMPHIS
DR. WILLIE W. HERENTON, MAYOR



CONSTRUCTION PROJECT MANUAL FOR
**DOWNTOWN PARK RENOVATIONS &
ROOF REPAIR**
For: Park Services Division

City of Memphis CIP Number: **PK234**
Building Design and Construction Project Number: **15C200D12**

Design Architects, Inc.
123 Main Street
Memphis, TN 38103

Consultant Project Number: 061234

BID DATE
July 4, 2006

BID SET NO.

Fig. 22-A

DIVISION 23

DESIGN SUBMITTALS

Design Submittals shall include the following:

A. PROGRAMMING SUBMITTAL

1. PROGRAM STATEMENT - Original Program plus all modifications.
2. DRAWINGS - Sketch of the site plan and floor plan (may be hand-drawn).
3. COST ESTIMATE by square foot.

B. SCHEMATIC DESIGN SUBMITTAL

1. PROGRAM UPDATE – Incorporate changes/comments from previous Design Submittal reviews or explain in writing why those comments have not been included.
2. DRAWINGS – All drawings shall meet the requirements of this Consultant's Handbook, Division 21, *Drawings*.
 - A. Floor plans:
 - a. Room or space name (or use-designation) and room number.
 - b. Toilet fixtures.
 - c. Door and window locations.
 - d. Pertinent notations and dimensions
 - e. Area Tabulations (square footage).
 - B. Elevations:
 - a. Doors and windows (indicate type and material).
 - b. Ground floor elevation with respect to finish grade.
 - c. Finish materials.
 - C. Sections showing wall materials, dimensions, wall height, ceiling and roof heights.
3. COST ESTIMATE - in CSI 16 Division format.

C. DESIGN DEVELOPMENT SUBMITTAL

1. PROGRAM UPDATE – Incorporate changes/comments from previous Design Submittal review or explain in writing why those comments have not been included.
2. DRAWINGS - All drawings shall meet the requirements of this Consultant's Handbook, Division 21, *Drawings*. All changes/comments from previous Design Submittal reviews or explain in writing why those comments have not been included.
 - a. Civil Drawings -
 - (1) Survey
 - (2) Site Demolition Plan: Show all existing site improvements such as buildings, pavements, utilities, storm drainage, location, and description of benchmarks, property lines, easements, wooded areas, specimen trees, etc. Show all demolition. Outline new

- buildings.
- (3) Site Plan: Show, as a minimum, property lines, easements and setbacks, traffic flow patterns, all existing structures that remain after demolition, new above ground site features including all buildings and pavements, complete dimensions, parking layout and striping, fences and all other structures and facilities.
 - (4) Grading and Storm Drainage Plan: Include existing and finish contours at 1-foot intervals, existing and finish spot elevations, ditches, existing and new storm drainage pipes, manholes, catch basins, curb inlets, headwalls, and other necessary structures.
 - (5) Water and Sewer System Plan: Show existing and new water and sewer lines with sizes indicated. Show the location of water valves and hydrants. Identify the location of manholes and pump stations and their invert elevations.
 - (6) Landscaping Plan: Locate all trees, shrubs, and lawns. Include a complete planting list.
 - (7) SWPPP: This Storm Water Pollution Prevention Plan shall show all requirements from the State of Tennessee and the City of Memphis Public Works Department.
- b. Architectural Drawings -
- (1) Architectural floor plans: Show the different types of wall / partition structural materials, rating of fire walls, door swings, toilet partitions and fixtures, drinking fountains, ramps and other provisions for disabled, all pertinent dimensions, and the north arrow. Provide a chart that indicates the building gross area and individual space areas according to BOMA measurement standards.
 - (2) Building elevations: All sides shall show pertinent features including all finish materials, all openings, finish grade at building and all exterior mechanical equipment, ventilators, and other roof mounted structures constituting visual elements.
 - (3) Exterior wall sections: Show wall from foundations to parapets for each different type of exterior wall system.
 - (4) Roof Plan: Show all slopes, internal or external drains, and mechanical equipment.
- c. Structural Drawings -
- (1) Foundation Plan: This plan shall show the general sizes and arrangements of all major support systems for the structure. Indicate special construction features required, such as excavation, bracing, underpinning, and de-watering.
 - (2) Section and Details: Identify general types, methods, and quantities of the major construction features. Show any special construction.
- d. Mechanical Drawings -
- (1) Show all ducts, and piping systems for heating, air conditioning and ventilating the building.
 - (2) Show equipment schedules. Include air conditioning and ventilating units, refrigeration elements, cooling towers, engineering control center, fans, pumps, etc. Submit equipment selection based on manufacturer's catalog data.
 - (3) Show and clearly identify all plumbing fixtures and riser diagrams.
 - (4) Major details, elevations, sections, and legends on the drawings shall be complete. Show typical sections for entire floor, where applicable.
 - (5) Show system flow diagrams, chilled water and condenser water system, hot water and steam piping systems.
 - (6) Mechanical equipment room plan shall detail layout of all equipment.
- e. Electrical Drawings -
- (1) Existing Site and Demolition Plan (When applicable) -
 - a. Include all existing site information such as building, pavement, and utilities. Indicate all utilities that supply or traverse this property. Indicate demolition limits and

termination points. Interior demolition shall be on separate plan.

(2) Site Plan

- a. Show existing and new above ground and underground electrical equipment, electrical lines, telephone and fire alarm, and TV cable lines that supply or traverse this property. Information on existing conditions shall be complete and field checked.

(3) Lighting Plan(s)

- a. Show all areas of all floors.
- b. Indicate the number and type of fixtures and design foot-candle levels.

(4) Power Plan(s)

- a. Show all areas of all floors. Power plans shall show the location of panel boards, switchboards, motor control centers, transformers and any other major electrical equipment throughout the inside and outside of the building or project.

(5) Single Line or Riser Diagram

- a. Show primary feeder to the project
- b. Show transformer or pad mounted substation with primary and secondary switchgear
- c. Show secondary feeders
- d. Show all panels, switchboards, motor control centers, transformers, and other major electrical equipment such as M.G. sets and A/C chillers.

- f. Fire Protection. Provide Fire Protection Criteria /Data on the appropriate drawings of the other disciplines or provide new Fire Protection Design drawings as appropriate:

(1) Water System Plan. Show all existing and new water lines. This shall include location of point(s) of connections, valves, fire hydrants, and sprinkler system lines.

(2) Mechanical Floor Plan. Include location of sprinkler risers. Areas to be protected by sprinklers and other automatic fire detection systems shall be clearly designated. Do not show layout of overhead sprinkler piping.

(3) Fire Alarm Riser Diagram. This diagram shall show all fire alarm equipment and interconnections. Point of power supply and connection to base alarm system be indicated.

3. COST ESTIMATE.

D. CONSTRUCTION DOCUMENTS SUBMITTAL

1. PROGRAM UPDATE – Incorporate changes/comments from previous Design Submittal reviews or explain in writing why those comments have not been included.

2. DRAWINGS -

- a. All changes/comments from previous Design Submittal reviews or explain in writing why those comments have not been included.
- b. All drawings required for the Design Development submittal. Drawings shall be complete in every respect, ready for advertising and bidding, and for construction of the project
- c. Any additional drawings necessary to complete the project.
- d. All details necessary to complete the project.
- e. Specific care shall be taken to ensure interdisciplinary coordination of the final drawings.

3. COST ESTIMATE - develop from complete drawings and specifications.

DIVISION 24

FUTURE

DIVISION 25

FUTURE

This Division number is reserved for future use.

DIVISION 26

FUTURE

This Division is reserved for future use.

DIVISION 26

FUTURE

This Division is reserved for future use.

DIVISION 27

FUTURE

This Division is reserved for future use.

DIVISION 28

FUTURE

This Division is reserved for future use.

DIVISION 29

FUTURE

This Division is reserved for future use.

DIVISION 30

FUTURE

This Division is reserved for future use.

DIVISION 31

MISSION AND PHILOSOPHY

SECTION 31100 MISSION

To obtain properly designed, engineered, and constructed facilities for the City of Memphis.

SECTION 31200 PHILOSOPHY

We will utilize the best available architectural and engineering consultants, and will deal with them in a fair and ethical manner, obtaining a quality design for the City, while recognizing the necessity for the consultant to realize a reasonable return for his efforts.

We will evaluate contractors' bids fairly and equitably, recommending the bid that will result in the best contract for the City. We will administer construction contracts in such a manner that the City realizes all it has contracted for, while recognizing our obligation to be fair and reasonable with the contractor.

SECTION 31300 CONSULTANT SELECTION

We will utilize consultants for design, with in-house design being reserved for unique circumstances.

We will utilize local firms as consultants whenever sufficient expertise is available.

We will attempt to spread our consultant contracts among all competent, local firms, matching scope and complexity of project with size and expertise of firms.

We will broaden our consultant base by utilizing firms who have not previously done City work.

We will seek user agreement on consultant selection.

For projects above \$5M in size, we will ask for an expression of interest and interview the best-qualified firms.

SECTION 31400 DESIGN MANAGEMENT

We will follow a "design to budget" philosophy once we have satisfactorily determined the scope and FCCL.

Emphasis will be to design a functional facility with concern for life cycle costs in such areas as materials, maintenance access and energy conservation.

Exterior appearance should complement the adjacent facilities, if any. Materials and style should be in keeping with the neighborhood where the facility is sited.

We will establish a reasonable schedule at the onset of design and will work toward that schedule. We will push both the consultant and the customer to accomplish their responsibilities on time.

SECTION 31500 CUSTOMER RELATIONS

We are a support organization that exists to help other City Divisions (our customers) accomplish their mission.

We will provide professional, technical advice to our customers, making recommendations where appropriate. The choice between scope or quality and cost rests with the customer.

In the event the customer makes a decision we believe jeopardizes the safety or usefulness of a facility or results in a significant unnecessary cost, we will take the question to a higher authority for resolutions.

SECTION 31600 CONSTRUCTION MANAGEMENT

We assure that the Work complies plans and specifications and receives the full benefit of the contract value.

We will give prompt attention to payment applications.

We will maintain adequate presence at the job site to assure quality work, with a goal of at least one visit per week to each job.

We will work to minimize changes, but when changes occur, we will reach decisions quickly and take action immediately.

We will maintain documentation adequate to verify the various decisions and clarifications that are made by the consultant or us during the construction phase.

We will ensure the quality of construction and degree of completion is sufficient before accepting a facility as substantially complete.

We will place emphasis on closing out contracts, completion of punch list items and submission of required documentation in a timely manner.