

**CONSTRUCTION
OBSERVATION
MANUAL**

City of St. Joseph, Missouri
Public Works Department

Rev-May, 2009

INTRODUCTION

This manual shall be used as a general guideline for duties and responsibilities of construction observers performing services for the City of St. Joseph. Duties and responsibilities of construction observers will vary depending on the type of construction project and funding source.

It is the construction observer's main responsibility to observe whether work is being provided according to the plans and specifications and take appropriate action if deviations are identified. Adhering to the guidelines in this manual will help the construction observer meet that goal.

Each construction observer is expected to become proficient in the duties required and procedures in this manual to function in a self-reliant manner. That is, each construction observer will be expected to be familiar with the requirements of the specifications, perform necessary checks and tests, communicate directly with the contractor, report activities to the project manager, practice good public relations, and maintain a good working relationship with the City and contractor of the project.

Each construction observer is responsible for asking for assistance from the project manager, and/or project engineer when necessary. Each construction observer must realize that they function as a representative of the City and should represent themselves in a professional manner and appearance at all times.

TABLE OF CONTENTS

INTRODUCTION..... 1

SECTION ONE – GENERAL..... 4

A. DUTIES/RESPONSIBILITIES..... 4

 1. General Preparation 4

 2. Administrative 4

 3. Observation of Construction Work..... 5

B. COMMUNICATION/CONTACT PROCEDURES..... 5

 1. Project Manager and/or City Staff 5

 2. Design Professionals (Other than City Staff)..... 6

 3. Contractor Liaison 6

 4. Public Relations 7

C. JOB SITE AND WORK SAFETY..... 7

 1. Role of the Construction Observer..... 7

 2. Trench Safety..... 8

 3. Confined Space Entry 8

 4. Climbing or Bridge Work Fall Protection 8

 5. Personal Protective Equipment..... 8

 6. Crisis Management..... 8

D. PROJECT DOCUMENTATION/RECORDS 8

 1. Forms..... 9

 2. Project Photos 9

 3. Quantities..... 9

 4. Record Drawings 10

 5. Daily Reports and Diaries/Field Log Book..... 10

 6. Weekly Construction Reports 10

 7. Construction Reporting Guidelines..... 11

E. PROCESS FLOW CHART (Including Noncompliance Consequences)..... 11

 1. Scheduling/Coordination of Tests 11

 2. Work Acceptance 11

 3. Notice of Unacceptable or Defective Work 12

 4. Correction or Removal of Defective Works..... 12

 5. Non-compliance Actions 12

F. LIST OF ADOPTED STANDARDS AND PREFERRED PRACTICES 12

SECTION TWO – PUBLICLY FUNDED INFRASTRUCTURE PROJECTS..... 13

A. EARTHWORK..... 13

 1. Preliminary 13

 2. Temporary Erosion Control and Land Disturbance 13

 3. Excavation, Clearing, and Demolition..... 14

 4. Placement/Backfill..... 14

 5. Proctor Sample for Compaction Tests (Requirements & Procedure) 14

 6. Field Compaction Testing..... 15

 7. Soil Moisture Content..... 15

 8. Liquid Limit/Plasticity Index 15

 9. Method and Frequency of Testing 15

 10. Aggregate Testing (Gradation Testing)..... 16

 11. Alignments, Grade, and Cross-section 16

12.	Sub-grade Works	16
13.	Proof-roll Testing.....	16
B.	UTILITIES, WATER LINES.....	17
C.	UTILITIES-- SANITARY SEWER / DRAINAGE.....	17
1.	Material Check, Delivery, and Storage.....	17
2.	Trench Excavation	17
3.	Observation During Installation	17
4.	Grade/Profile and Alignment and Backfill	18
5.	Pressure Testing.....	18
6.	Video Verification	18
7.	Alignment and Grade Testing (Deflection and Mandrel Test)	18
8.	Manholes/Fitting/Connections.....	19
9.	Manholes – Vacuum Testing.....	19
D.	CONCRETE PAVEMENT AND SURFACING	19
1.	Reinforcing Steel and Form Work.....	19
2.	String Line Observation for Curbs.....	19
3.	Batch Tickets/Mix Design	20
4.	Concrete Slump Tests	20
5.	Compressive Strength Testing (Concrete Test Cylinders)	20
6.	Air Entrainment Test.....	21
7.	Concrete Placement	21
8.	Concrete Finishing	21
9.	Concrete Cure	21
10.	Concrete Joint Work (Pavement and Curbing)	22
E.	ASPHALT PAVEMENT AND SURFACING	22
1.	Batch Tickets/Job Mix Formula (JMF) and Tolerances.....	22
2.	Placement, Controlling Uniform Spreading and Lift Thicknesses.....	22
3.	Rolling and Compaction	22
4.	Asphalt Compaction Density Test	23
5.	Finishing and Smoothing.....	23
6.	Weather Limitations and Density	23
7.	Scales & Weighing Trucks	24
F.	INCIDENTALS	24
1.	Signage, Traffic Control, and Fencing.....	24
2.	Temporary Facilities and Access	24
3.	Site Clean-up and Equipment Storage	24
4.	Soil Contamination, Spills, and Disposal of Chemicals.....	25
5.	Environmental Considerations	25
SECTION THREE - PRIVATELY FUNDED INFRASTRUCTURE PROJECTS		
(Residential, Commercial & Site Development)		26
1.	Waterline Installation.....	26
2.	Bond Requirements for Private Developers.....	26
3.	Schedule and Work Hours.....	26
4.	Documentation Required for Privately Funded Infrastructure Projects Which Will Be Accepted by City for Maintenance.....	26

APPENDIX

Project Templates for Reporting Forms

SECTION ONE – GENERAL

A. DUTIES/RESPONSIBILITIES

1. General Preparation

- a. Be familiar with all aspects of the project plans and specifications. If not certain of plans and specification details, research the appropriate sections, ask questions and/or obtain clarifications from the project manager and/or project engineer.
- b. Be familiar with all change orders and field orders, including knowing the manufacturers' recommendations and specifications conformance. Assist the project manager with reviewing and approval of field orders and change orders.
- c. Keep up-to-date with all changes including change orders, field orders, and clarifications.
- d. Be aware of all tests required by the specifications, including proper test methods and procedures (obtain written test procedures if necessary).
- e. Have knowledge of test equipment to be used in field and conduct necessary calibration of such testing equipment to be used on the project.
- f. Inform the project manager of any additional testing equipment that will be needed for the project.
- g. Be familiar with all provisions of permits and easements issued to the City.
- h. Be familiar with the contractor's schedule and coordinate with the contractor on a daily basis.
- i. Be prepared to provide daily construction reports to the project manager.
- j. Have a copy of the APWA – Kansas City Chapter, design standards for reference at all times.

2. Administrative

- a. As required, maintain an up-to-date, organized, chronological file system of the project, to include all related project documents. At the end of the project, make sure project files are organized with no duplicate information and turn over project files to the project manager.
- b. Review correspondence relating to the contract and consult with the project manager when necessary.
- c. Maintain up-to-date contract documents and construction drawings which will include all addenda, field change directives, field orders, change orders, and clarifications.
- d. Maintain an accurate check of quantities installed by the contractor on a daily basis and discuss with the contractor and project manager and design engineer as needed. This is especially important so that projects balance at close out matching pay estimates and contract amounts.
- e. Review contractor progress and as required provide the project manager with written reports regarding weekly or monthly construction progress.
- f. Maintain and complete an up-to-date daily construction report for each project.
- g. Maintain a log of photographs taken on the project. A sufficient number of photographs should be taken to present a representative view of construction conditions, techniques, and progress. Photographs should be taken (if possible) of items which may result in a dispute. Photos should be cataloged by descriptive label of what the picture is; the location of the picture; the direction of the picture; and any other pertinent information. As necessary, include a tape measure in the photo to show scale.
- h. Assist the project manager in preparation of field orders, change orders and contract related correspondence.
- i. Inform the project manager of clarifications requested by contractor, and transmit resulting clarifications to the contractor.

- j. Assist with pre-final observation/close out as requested by the project manager. This could include preparing a punch list and/or narrative of final observation.

3. Observation of Construction Work

- a. Conduct on-site observation of work and upon each visit to the project site report the progress of the work.
- b. Perform spot checks and tests as necessary/required to confirm that work is in conformance with plans and specifications and record the results in the daily construction report and construction drawings.
- c. Perform tests as required by plans and specifications or as requested by the project manager and prepare reports of test results.
- d. Check materials for conformance to submittals and change orders and inform the contractor and the project manager of any materials found not meeting the contract specifications.
- e. Check storage of materials for conformance to the requirements of the plans and specifications and manufacturer's recommendations. Inform the contractor and the project manager of any materials found not being stored as such. If payment for stored materials is a part of the contract, keep track of stored materials for monthly pay estimates.
- f. Review project's work for compliance with provisions of permits and easements issued to City. Inform the contractor and the project manager of any provisions that are not being followed as required.
- g. Inform the project manager in advance of scheduled major tests, inspections, or start of any important phase or work.
- h. Prepare reports for results of tests run, equipment start-ups, and system start-ups.
- i. Inform contractor of any unacceptable work and cite appropriate specification or plan detail. Document in writing a notice of unacceptable work with the contractor and include a description and location of the work in the daily construction report.
- j. Inform the project manager if defective work is not corrected. The observer is authorized to stop defective work or the placement of defective materials without prior authorization by the City. However, the observer is expected to quickly inform the City in any such instance for concurrence.
- k. Do not accept or approve work on behalf of the City, inform the project manager and design engineer if project milestones needing approval are completed.
- l. Do not approve or authorize changes or deviations from the contract documents, instead notify the project manager, design engineer, and City Staff of required changes for authorization.
- m. Do not agree to extra payment and/or modifications to the unit price. Instead, notify the project manager, design engineer, and City Staff for authorization.

B. COMMUNICATION/CONTACT PROCEDURES

1. Project Manager and /or City Staff

Completion of successful construction projects is a team effort. City construction observers shall work as a team with any other construction observers assigned to the project and the project manager. It is important to communicate on a regular basis with the project manager to keep them apprised of the project status and ask for their assistance when necessary. Some examples of items requiring communication could include, but are not limited to:

- a. Asking for clarifications and interpretations on plans or specifications when necessary.

- b. Accompanying the project manager, City staff and/or project engineer during any on-site observation.
- c. Informing the project manager, or their designee in advance of major tests, observation effort or the start of any important phase of work.
- d. Notifying the project manager or their designee if instructions are issued that may have adverse consequences.
- e. Discussing required testing procedures and frequencies.
- f. Attend project meetings to discuss progress, issues related to the project, and construction schedules, as required.
- g. Requesting review and authorization for changes to the plans and specifications and extra pay items.

2. Design Professionals (Other than City Staff)

Professionals such as the consulting design engineer, geotechnical engineer, and architects working on construction observer's project are vital resources in ensuring the success of the observation team and the quality of the completed project. Timely and regular communication will help prevent costly mistakes and project delays. Examples of communication points are as follows:

- a. Asking for clarifications and interpretations on the geotechnical report, plans and specifications, lab reports, and permits.
- b. Discussing submittals such as mix designs for concrete or asphalt and material certificates for aggregates.
- c. Questions regarding the phasing or sequencing of the work by the contractor.
- d. Informing them in advance of the start up of critical phases and major tests.
- e. Asking for input before key approval of milestones in the schedule.
- f. Discuss required testing procedures and frequency.
- g. Requests from the contractor or others for a modification to the plans or specifications.
- h. Review of pay requests and payment quantities.

3. Contractor Liaison

- a. Work and quality of work is the CONTRACTOR'S RESPONSIBILITY.
 - Contractor selects methods to be used.
 - Contractor determines schedule to be followed.
 - Contractor supervises and directs the construction force.
 - Contractor controls workmanship to be utilized unless specific language is included in the contract documents that states otherwise. (The construction observer may accept or not accept the end product.)
 - Contractor is responsible for safety of the site, procedures, and programs.
 - Contractor is responsible for proper quality control and for quality control programs instituted unless specific language is included in the contract documents that states otherwise.
- b. All communications shall be directed through the contractor's designee or appropriate personnel (foreman and/or superintendent). Lines of communication must be maintained at all times.
 - Establish proper communication channels with contractor.
 - All correspondence should follow proper lines of authority.
 - No internal project related written communications shall be given to the contractor's representative or to the contractor's labor force without proper prior authorization.

- c. Construction observers shall be familiar with all clarifications and interpretations of the contract documents made by the project manager and transmit to the contractor if requested. The construction observer also shall request any necessary clarifications and interpretations.
- d. Construction observers shall inform contractor of work that is not in conformance with project plans and specifications, and, as appropriate, that such work must be corrected.
- e. Weather shut down is a job specific or case by case situation as outlined in the contract documents or APWA specifications. The contractor should be the one who shuts down because of weather conditions, but if that decision is not made by the contractor and the quality of work or end product is not meeting the contract specifications, then the construction observer should bring this to the attention of the contractor and the project manager and/or project engineer.

4. Public Relations

- a. Construction observers are to conduct themselves in a professional and courteous manner. Everyone the construction observer comes in contact with should be treated in this manner.
- b. Depending on the project, a “public relations” policy may need to be developed with the contractor. Affected landowners should be notified of pending construction activities on their property prior to construction beginning. A sample notification is included in the appendix.
- c. Public relations activities could include
 - Coordinating daily public relations by the contractor with affected property owners
 - Aiding the contractor in understanding restrictions or requirements of easements and permits.
 - Asking the name of visitors to the site and who they represent and recording in the daily diary report.

C. JOB SITE AND WORK SAFETY

1. Role of the Construction Observer

- a. Each construction observer should be responsible for their own safety, aware of operating equipment, site conditions, hazardous materials, traffic, etc.
- b. Do not assume the role of the contractor’s safety officer.
- c. If you observe an unsafe condition, operation, or situation, immediately report it to the contractor, contractor’s superintendent or safety officer.
- d. Document your observations, your actions, and the contractor’s actions, if any, to correct the unsafe condition, operation or situation.
- e. If the unsafe condition, operation or situation is not addressed and/or corrected immediately by the contractor, immediately notify your project manager and/or project engineer, or if necessary, a member of the City Staff.
- f. Fully document any discussion regarding job site safety.
- g. A construction observer’s authority is limited. Do not instruct or suggest that the contractor stop or suspend work. Do not instruct the contractor or suggest means for resolving a safety concern.
- h. As invited, do attend and document safety meetings conducted by the contractor.

2. Trench Safety

- a. Enter only if absolutely necessary.
- b. Enter only if entering and exiting can be accomplished safely.
- c. Do not enter if the height of the trench wall is greater than the trench width unless the contractor is incorporating a trench box.
- d. Do not enter if the height of the trench wall is more than five feet unless the contractor is incorporating a trench box.
- e. Enter only if trench walls are stable.

3. Confined Space Entry

NEVER enter a confined space without:

- a. Approval from the project manager and/or a City manager.
- b. An entry team trained in confined space entry.
- c. An atmospheric quality meter.
- d. Fresh air blower/circulator.
- e. Fall protection/personnel retrieval equipment (harness, winch, tripod).

4. Climbing or Bridge Work Fall Protection

- a. Never climb alone, always have a partner on the ground.
- b. Gain approval from the City, project manager, or above.
- c. From 0 to 12 feet above ground or water, fall protection equipment may not be necessary depending upon personal comfort and safety.
- d. From 12 feet or more above ground or water, fall arrest/protection equipment including full body harness, lanyards, etc. must be used (waist belts are not to be used for fall arrest).

5. Personal Protective Equipment

- a. Protective equipment includes hardhats, steel toe safety boots, eye protection, hearing protection, reflective work wear, gloves, respiratory protection, etc.
- b. Job specific protective equipment may be required by the City, contractor, public entity, private entity, and project manager.

6. Crisis Management

Only City of St. Joseph representatives have the authority to issue public communications in the event of a crisis. Examples of a potential crisis situation are an employee injury at a worksite, any damage, collapse or injury on a project, or any issue or event that could harm the City's reputation. In the event of a crisis or potential crisis, you should notify City staff immediately.

Do not divulge any information about a situation. If you are questioned about a situation, inform the individual you do not have all the details and refer them to the City's spokesperson for further information.

D. PROJECT DOCUMENTATION/RECORDS

The availability of detailed and clear project records can help successfully explain the quality of work and if necessary defend the City against a claim. Also credibility is established by preparing records upon each visit to the project site. Documents should be prepared using the following guidelines:

- Be proactive – establish documentation efforts that match the project and client
- Be systematic – establish and enforce predetermined procedures
- Be timely – document circumstances and events as they occur
- Be objective – state facts, avoid opinions or conclusions on the cause of a problem or incident, do not speculate

Project records should be maintained in an organized manner, either electronically or in hardcopy form. Construction files should include but are not limited to the following documentation: pay quantity computations, correspondence, pay estimates, change orders/field directives, project meeting minutes, test reports, submittal control forms and log, and weekly reports. E-mails should be properly saved in project folders, and conversations, whether face-to-face or by phone, should be documented as needed. In addition, documentation should include photographs as appropriate to the project.

Any deviation from these guidelines needs to be approved by the project manager or the City manager. As needed, project documents also should be archived (Adobe or pdf format) and stored electronically.

1. Forms

Recognize that there may be templates and forms available for use in developing project documentation. Sample templates and forms are included in the appendix.

2. Project Photos

Digital photographs are a very important part of the documentation of construction projects. Photos should be taken on a daily basis. However, it is important to remember that pictures are only as good as the effort taken to catalog them. The following guidelines are suggested:

- a. Pictures should be cataloged by descriptive label describing what the picture is of, which direction the picture was taken, the location of the picture, and any other pertinent information.
- b. Pictures should be downloaded weekly at a minimum.
- c. Pictures not properly cataloged are of little value. The volume of pictures taken on projects is a judgment call, but keep in mind that more is not necessarily better.

3. Quantities

- a. Books or spreadsheets should be created prior to the beginning of each project with each bid item listed.
- b. Accurate records of quantities installed by the contractor are to be kept daily in the book or spreadsheet. Quantities should be measured and discussed with the contractor on a regular basis.
- c. For any calculations performed outside of the spreadsheet, construction observers are required to show (write out) their calculations and any applicable drawings.

4. Record Drawings

Maintain and update a current set of record drawings as the project progresses. All construction observers are required to record any changes or deviations on contract drawings when approved changes have occurred to the plan documents. All changes are to be approved by the project manager and/or City Staff. This information will be used to create record drawings and shall be completed as soon as possible at the end of construction. The appropriate project manager should be informed if additional survey work is required. Turn record drawing mark-ups over to project manager at the completion of the project.

5. Daily Reports and Diaries/Field Log Book

Guidelines for report needs are dictated in part by the location and type of project. However, it is very important that, all construction observers gather basic information in the daily diaries/field log book. The following guideline shall be followed accordingly for all projects and locations.

- a. Contractor hours on job site, work force, and equipment.
- b. Personnel on site, their names and companies they are associated with.
- c. Visitors and who they represent.
- d. Weather conditions, including precipitation.
- e. General observations relating to work progress.
- f. Verify that all construction materials delivered meet contract specifications and were previously approved through the submittal process. Include material types and identifying codes or markings.
- g. Tests performed, results, and whether they were acceptable or not. Note test number and location as shown on appropriate test form and any calibration checks run on test equipment.
- h. Conversations, including telephone, regarding the project with the project manager and/or project engineer. Most importantly, document any agreements or disagreements with the contractor's superintendent or its representative.
- i. Decisions made by the construction observer relating to the project plans and specifications.
- j. Changes that require a field order or work change directive be issued.
- k. All checks made (grade, location, depth, etc.).
- l. Written reports received by the construction observer regarding the project.
- m. Detailed sketches of all work not shown on record drawings.
- n. Photos taken of the project and their location.
- o. Calendar day or working day charged.
- p. Traffic control in place. (Larger projects may require record keeping in a separate field book.)
- q. Call attention to items of utmost importance with an asterisk or star or by highlighting them.

6. Weekly Construction Reports

- a. To maintain conformity, the initial weekly construction reports should be typed up with the static information, such as project name, location, project number, distribution list, etc.
- b. Construction observers are to type the forms and e-mail or turn them in to the project manager no later than 8:00 a.m. the Monday following the week's work.
- c. The project manager will review and distribute the report.

7. Construction Reporting Guidelines

Following is a list of specific guidelines for use in project reporting. This list is a guideline; some items listed may not be relevant to some projects while other projects may require additional items. In those instances, the project manager and/or project engineer will specify additional requirements.

- a. Reports should be written in the past tense.
- b. Important terminology usage:
 - Asphalt is laid or laid down
 - Concrete is placed
 - Use backfilled, not filled
 - Thrust blocks are placed
 - Pipe is installed
- c. When referring to pipe quantity installed, report it in LF (linear feet).
- d. Be specific with pipe type and size, for example 8" C 900 CL 150 PVC.
- e. Indicate a.m. or p.m. when referencing time of day
- f. Visitors to the site should be mentioned by name, employer, and position.
- g. If no work is performed, indicate why.
- h. Indicate when project has reached substantial completion
- i. Indicate final report

E. PROCESS FLOW CHART (Including Noncompliance Consequences)

1. Scheduling/Coordination of Tests

- a. Anticipate and proactively communicate with the contractor beforehand about the type and level of testing and the documentation required.
- b. Notify the project manager and design engineer of upcoming tests.
- c. Discuss and review who will perform the field and lab tests, the equipment for use, and required forms and documentation that need to be completed and signed.
- d. Require only the amount and level of testing that is indicated in the specifications. If additional testing is thought necessary discuss this with the project manager and the design engineer before asking the contractor to perform the extra testing.

2. Work Acceptance

- a. Always document the results of the tests as they are completed and have the contractor's representative sign and attest to the documentation.
- b. Provide copies of the test documentation to the contractor.
- c. If there are questions of interpretation of the test results or the plans and specifications from the contractor immediately discuss these with the project manager and/or design engineer.
- d. It is not the role of the construction observer to approve the contractor's work. Rather the construction observer is to note if work does or doesn't meet the requirements of the plans and specifications.
- e. If the contractor needs approvals to proceed at set points or milestones within the project, notify the project manager or City Staff.
- f. Do not accept the contractor's work methods without notifying the project manager or design engineer. Accepting the method of work may be viewed as accepting the end results.

3. Notice of Unacceptable or Defective Work

- a. Notify the contractor and project manager immediately when there is work or test results that do not comply with the requirements of the plans and specifications.
- b. Provide notice of unacceptable work in writing and attach related documentation including test results and pictures documenting defective work.
- c. When giving notice of unacceptable work always notify the contractor's designated representative and document that they received the notice.
- d. Provide copies to the project manager and design engineer of documentation given to the contractor.

4. Correction or Removal of Defective Works

- a. Verify and document with pictures that the contractor has corrected and removed the defective work.
- b. Retest as necessary the corrected work and observe compliance with the plans and specifications.
- c. When the contractor requests an alternate design, substitute material, or a revision to the plans and specifications do not approve any modifications but notify immediately the project manager and design engineer. Understand and file any resulting change orders.
- d. Understand the conditions related to the poor workmanship but DO NOT take charge, take over, or direct the contractor's work, methods, or staff in correcting the defective work or in subsequent work.

5. Non-compliance Actions

- a. If the contractor refuses to comply with a corrective work order and to correct defective work notify the project manager and design engineer, and City Staff.
- b. If after documenting non-complying work with the contractor, they continue with work that does not meet the requirements of the plans and specification proceed to stop the work. Immediately notify the project manager and City Staff of any stop work action taken.

F. LIST OF ADOPTED STANDARDS AND PREFERRED PRACTICES

1. Erosion Control-Land Disturbance Policy, City of St. Joseph, Mo
2. Storm water Management, City of St. Joseph, Mo
3. Kansas City Chapter of the American Public Works Association's "Standard Specifications and Design Criteria".

SECTION TWO – PUBLICLY FUNDED INFRASTRUCTURE PROJECTS

This section relates to work that is completed with public funds (City, State, and/or Federal financing) to complete construction works within the City. During the course of the project, the construction observer is expected to visit the site daily to observe the quality of work and project conditions. The construction observer is not required to be on site full time, except during sanitary sewer installation, or during certain key construction phases identified by City staff. The construction observer's schedule related to site visits will initially be assumed to be ½ time, but will vary depending upon instructions from project manager or City staff.

A. EARTHWORK

1. Preliminary

- a. Before beginning, obtain from the contractor their construction sequence schedule for the project and coordinate with the project manager.
- b. Read and be familiar with any soils report or borings that were prepared as part of the project and note requirements for coordination with a qualified geotechnical firm. They are typically NOT part of the Contract Documents for the project.
- c. Read and be familiar with the environmental reports that have been prepared as part of the project making particular note of any protected wetlands, wildlife, or plant species.
- d. Check that the contractor has completed a one-call to locate all existing utilities.
- e. Review earthwork construction stakes before the work begins.
- f. Accompany and verify the contractor's photo documentation when they are required to video or photograph the proposed construction area and limits including temporary easements to document possible damages by their activity.
- g. If photo documentation is not required of the contractor then the observer is to video and photograph the proposed construction area.
- h. Be aware of the location and requirements for all temporary construction and permanent easements. Verify contractor is aware of these areas as well.

2. Temporary Erosion Control and Land Disturbance

- a. Read and be familiar with the National Pollutant Discharge Elimination System (NPDES) permit prepared for the site and the related Storm Water Pollution Prevention Plan developed for that particular NPDES permit. These are required for construction sites disturbing one acre of land or more.
- b. Verify the contractor has secured a City of St. Joseph Land Disturbance Permit and is complying with its provisions.
- c. Verify that the contractor understands the NPDES terms and conditions for the site.
- d. Check permitting requirements for handling any wetlands, streams or similar drainage channels on site.
- e. Verify the construction setback requirements for natural channels and check that these are maintained during construction and that final grade and elevations in the area are according to plans and specifications.
- f. Understand the temporary grading, basins, vegetation, and ground surface roughening required for reducing site runoff and controlling drainage.
- g. Verify the requirements of erosion and sediment control fencing, straw bales, blankets, and fiber matting and that they are secured and staked as required by specifications or manufacturer instructions.
- h. Verify the contractor is following the specification and manufacturer's methods and instructions and related weather conditions for applying mulches, fertilizing, seeding and soil binding chemicals.

- i. Observe the seedbed preparation, seed mix and rates, and fertilizers (sometimes seasonal) meet specification.
- j. Check the resulting grass stands at emergence and weekly thereafter for compliance with requirements and notify the contractor of inadequate coverage for reseeding.
- k. Check seeded areas after rain events for washes and notify the contractor to grade, reseed and mulch as needed.
- l. Always observe the performance of erosion products after installation to verify 100% coverage and continued integrity and notify the contractor of sediment buildup or faulty issues needing repair.
- m. After high winds or rainfall events of 0.5-inch or greater check all erosion and sediment control devices and measures undertaken by the contractor for stability and notify the contractor of breaks needing repair.

3. Excavation, Clearing, and Demolition

- a. Verify with the City and/or plans the proper and clear marking of trees or other landmarks for clearing and demolition and those for protection.
- b. Document the condition of all items to be salvaged and replaced or relocated.
- c. Specifications sometimes clearly indicate the method or means of excavation and compaction etc. Note these requirements and observe they are being followed by the contractor.
- d. Notify the contractor and project manager of rock excavation or other materials not anticipated on the plans or in the quantity take-off.
- e. If during excavation any abandon utilities, artifacts or objects of otherwise historical significance are uncovered notify the contractor and project manager immediately.
- f. When the contractor is stockpiling materials note that the side slopes, and the perimeters are protected as specified.
- g. Check separation and cover as needed for stock piled materials, including top soil.
- h. Observe that after demolition, waste materials are properly transported and disposed of off site.

4. Placement/Backfill

- a. Particularly when on site soils are used, check to see that they are free of debris or organic content such as weeds and grass, frozen material, and large rocks.
- b. Observe the type and grade of materials for placement to verify that the content and gradation is as specified.
- c. Check all material certificates provided by the contractor to verify they are according to specifications and/or submittals and provide originals to the project manager.
- d. Collect and systematically file copies of all material certificates received on site.
- e. Spot check the depth of the lifts during placement/backfill of materials.

5. Proctor Sample for Compaction Tests (Requirements & Procedure)

- a. Compaction tests for soils are usually specified as a percentage of the maximum density as determined by or in accordance with a standard ASTM proctor test (sometimes referred to as a moisture-density test).
- b. The proctor sample to be taken for testing in a lab shall be representative of the material to be compacted. Usually about a 5 gallon pail of loose material is needed to determine proctor.
- c. Indicate location of test sample if more than one sample is required on project. Sample locations will be determined by City Staff.

- d. Tests on the proctor sample in the lab shall indicate the maximum achievable dry density and optimum moisture content of the soil/material along with the related moisture density curve.
- e. Test results shall indicate the soils plastic and liquid limit along with the related plasticity index.

6. Field Compaction Testing

Field compaction testing is completed to verify the soil/material strength has been obtained by the contractor. The compaction testing of base material is a critical step in verifying the quality of work in construction as weak or poorly compacted materials can ultimately result in the failure of the super structure or road.

- a. Field compaction test are to be completed by qualified professionals using a calibrated nuclear test gage and probe.
- b. Compaction tests taken in the field are then compared with the proctor test and must be equal to or exceed the specified compaction for each type and grade of material.
- c. The construction observer is to document field test results and track the date, location, and depth of all tests completed.
- d. The observer is to notify the contractor and project manager of failed compaction tests and observe the redoing and retesting of the failed work.

7. Soil Moisture Content

- a. The moisture content of the material in the field is to be within a specified percentage of the optimum moisture content for compaction.
- b. The contractor is responsible for directing the wetting or drying of the material to meet the specified range prior to compaction. Never direct the work of the contractor to meet the specification.
- c. When the moisture content is not as required notify the contractor and project manager of the situation.

8. Liquid Limit/Plasticity Index

The plastic limit indicates the moisture content at which a soils behavior turns plastic and the liquid limit indicates the point at which a soils behavior turns plastic to liquid. The difference of the two limits is the plasticity index ($LL-PL=PI$). The plasticity index is an indicator of the clayey characteristics of a soil, the higher the plasticity index, the more clayey and typically more unsuitable a soil is for most construction purposes.

- a. Verify soil samples taken for proctor testing meet the LL/PI requirements as indicated in contract documents.

9. Method and Frequency of Testing

- a. The number of tests required at each location is usually specified, if not, notify the project manager.
- b. Testing requirements for compaction may indicate the number of tests per square foot for each layer of material. If not indicated in contract documents, perform compaction testing once every 3,000 square feet for each lift of material placed.
- c. Proctor samples must be taken for each type and grade of material proposed for use on the project.

10. Aggregate Testing (Gradation Testing)

Depending on the materials use and desired characteristics the percentage of different aggregate sizes are included in the specification. Tests to determine the size distribution of particles are run by separating them through a series of sieves. The weight of each sample retained at each sieve size is then measured.

- a. Aggregate testing will be completed at the discretion of the City.
- b. When requested by City staff take samples of aggregate for testing in a lab in accordance with lab standards and verify the results with the contractor and the project manager and/or project engineer.

11. Alignments, Grade, and Cross-section

- a. Check graded areas to observe proper slope and runoff.
- b. Observe that materials are placed and compacted to the lines and grade as shown on the plans.
- c. Tolerances for sub-grade and finished elevations as noted in the plans or specifications shall be understood by the construction observer.
- d. Do not direct the contractor while they are setting working elevations.
- e. Document the contractor's working elevations and use of instruments, and notify the contractor and project manager of discrepancies with the plans.

12. Sub-grade Works

- a. Carefully read the geotechnical and lab reports before works begins, and note the location of bores, type of soils, and recommendations for compaction.
- b. Watch for any changes or discrepancies in the soils (color, texture to feel, etc.) placed and notify the contractor and project manager.
- c. Verify the material is spread uniformly in successive layers and when compacted meets the specified depth. Check that each lift does not exceed the specified depth.
- d. Watch the wetting of the material surface before compaction and note the moisture content of the soil during field density tests. Be aware of the sensitivity of the optimum moisture content and meeting compaction requirements.
- e. Observe the sub-grade while undergoing compaction by heavy equipment and note any movement (pumping or rolling) or deflection of the soil and notify the contractor and project manager.
- f. When used, observe the placement and overlapping of geogrid or geofabric as specified.

13. Proof-roll Testing

- a. A roll test is typically performed just prior to approval of the sub-grade.
- b. It consists of driving a fully loaded dual axle truck within each traffic lane and observing any rutting, pumping, or deformation of the sub-grade.
- c. Observe while walking along the truck any signs of deformation or rutting and notify the contractor and project manager.
- d. Areas failing the roll test need to be documented by the construction observer and reworked and retested by the contractor.

B. UTILITIES, WATER LINES

1. Coordinate with Missouri American Water, other utilities and their staff during the installation of water utilities including water mains, services, valves, and hydrants.
2. Contractor questions related to water utilities should be directed to Missouri American Water staff on site.
3. Document the presence of Missouri American Water staff on site during construction of water utilities.
4. Monitor any excavations and trenching across the compacted subgrade, prior to pavement placement on the same, to ensure backfill compaction appropriately meets standard. Any substandard compaction shall be removed at the utility's cost, at the direction of the observer.
5. Encourage utility trenching to occur before the pavement subgrade and compaction moves forward.

C. UTILITIES-- SANITARY SEWER / DRAINAGE

1. Material Check, Delivery, and Storage

- a. Check pipe pressure class, type, and size including length and manufacturer are correct as per the submittals, plans, and specifications.
- b. Observe the unloading methods are as per specifications or manufacturer instructions.
- c. Observe that the pipe is stored in a secure area and protected from flooding and high winds.
- d. After notifying the contractor and the project manager, the construction observer is to mark and separate unacceptable pipe that is chipped, cracked and does not conform to the plans and specifications.

2. Trench Excavation

- a. Review construction staking for the proposed pipe line.
- b. Verify the trench width is as specified.
- c. Check that topsoil and other materials during excavation are separated and stockpiled.
- d. See Section Two-.A.Earthwork.3.Excavation, Clearing, and Demolition, for related requirements for excavation works.

3. Observation During Installation

- a. Observe pipe joining for conformation with specifications and pipe manufacturer's instructions for each pipe material type, size, and class.
- b. Items for special attention for the construction observer during installation includes the following:
 - Observe cleaning of bell and spigots prior to joining.
 - Method of joining does not necessitate excessive force or mechanical equipment if not allowed.
 - Check for "rolling" of gasket during joining.
 - Use of only joint lubricant that has been approved by pipe manufacturer.
 - Protecting the pipe end from storm water and debris during pipe laying and plugging the pipe end at the close of work.
 - No dropping or handling of pipe with hooks or backhoe buckets.
 - Typically pipe installation is to begin at the lowest point.
- c. Verify special installation requirements such as poly lining and/or encasement are being implemented.

- d. When existing utilities are encountered verify that minimum vertical and/or horizontal separation and encasement requirements in the specifications are met by the contractor.

4. Grade/Profile and Alignment and Backfill

- a. The construction observer is to understand the different pipe embedment designations and descriptions required.
- b. Verify embedment materials are properly placed and distributed to support the line and grade of pipe after installation.
- c. Observe the contractors set up and use of a pipe laser level for laying pipe to line and grade and measurements taken for centering the pipe with the laser beam.
- d. Verify the depth and type of granular embedment materials used.
- e. Document as required elevation and grade checks to hubs completed by the contractor.
- f. Verify backfill material and methods are in accordance with plans and specifications.

5. Pressure Testing

The construction observer is to observe and document that the contractor has successfully completed the field pipe testing requirements of the specifications. Tests are to be conducted by the contractor.

- a. Pressure testing is usually accomplished by capping and bringing the pipe pressure within a segment of mainline to a pressure exceeding the maximum operating pressure for the tested pipe material and class. The leakage is determined by the amount of water needed to pressurize again the pipe segment after a period of time has elapsed.
- b. The construction observer is to observe the reading of the pressure gauge, verify the length of time for the pressure test and check the quantity of water needed to again pressure the system.
- c. Using the specified formula and the pressure, pipe diameter, and number of pipe joints the construction observer is to check the allowable leakage calculation of the contractor.
- d. When specified limits are not met during tests, the construction observer is to notify the contractor and monitor and document the repairing and retesting of the failed pipe segment.

6. Video Verification

- a. When a sanitary sewer main can not be tested by pressure testing, video verification will be required. Video verification is to be performed by the City.
- b. Video verification will look for displaced joints, deformed pipe, and improper and illegal connections, etc.
- c. Observer will verify the test is performed and review video results and provide comments.

7. Alignment and Grade Testing (Deflection and Mandrel Test)

- a. Gravity sewer pipes need to be installed at accurate slopes to verify their performance. A segment with dips and too little slope can result in blockages and pipe segments with too much slope can result in higher than anticipated velocities.
- b. The test for deflection is to verify uniform pipe slope and alignment by the contractor and consists of pulling by hand through the pipeline a mandrel.
- c. The construction observer is to verify the mandrel meets specified dimensions for the pipe size and class to be tested.
- d. Passing of the mandrel by hand successfully through pipe segments by hand is to be documented by the construction observer.

- e. The mandrel test is to be completed after the final backfill and compaction of the pipe trench.

8. Manholes/Fitting/Connections

- a. Check precast concrete for cracks or defective work and specified wall thickness. Note any concrete strength or waiting period requirements specified for precast before installation.
- b. Observe the installation of the base, careful to note the sub-base preparation. If a cast-in-place base is specified note the form work, reinforcing rebar, and concrete work.
- c. Check that joints between precast manhole sections are sealed and lift holes grouted as specified.
- d. Verify the type and use of gaskets and seals for pipe openings and that inverts transition and slope to drain as shown on the plans.
- e. Verify the coating material for waterproofing and that the application and thickness is as specified.
- f. Confirm and document that the contractor has set pipe invert elevations and the elevation on the top of manhole castings as specified on the plans.
- g. Check that specified joint restraint and thrust blocking are incorporated on all fittings and connections.

9. Manholes—Vacuum Testing

- a. Vacuum testing of manholes by the contractor shall as determined by City staff and specifications and in accordance with ASTM C1244.
- b. Verify that testing is done before backfill is completed around the manhole and specified adjustments to vacuum pressure were made for the presence of ground water.
- c. Coordinate with the project manager and project engineer in the selection of manholes for testing.
- d. Observe the vacuum pressure for the duration of the test period as meeting specified levels.
- e. Notify the contractor and project manager and/or project engine of manholes failing the test and observer the repair and sealing of defective work and retesting.

D. CONCRETE PAVEMENT AND SURFACING

1. Reinforcing Steel and Form Work

- a. Verify that the diameter, spacing, overlap, and layout of reinforcing steel conform to project plans.
- b. Note the spacing of ties and that they are bent over below the finished surface.
- c. Check the specified concrete cover depth and the placement/use of spacers or bar chairs between the sub-base/form work and reinforcing steel.
- d. Check that all forms are clean and lubricated so as not to damage the concrete on removal and set to line and grade within tolerances as shown on the plans.

2. String Line Observation for Curbs

- a. Observe curb string for uniform slope and grade of the curb work and note abrupt changes in string line.
- b. Observe the transition curbing is uniform between grade changes.
- c. Notify the contractor and project manager of any abrupt changes for correction.

3. Batch Tickets/Mix Design

- a. Verify that the contractor has submitted and has an approved concrete mix design with the project manager and/or project engineer before any concrete pours begin.
- b. Confirm material compliance certificates for the aggregate, Portland cement, and air entrainment agent from the contractor were submitted and reviewed by the project engineer.
- c. Review initial batch tickets immediately with the project manager and/or project engineer for conformity with submittals and the concrete mix design.
- d. Collect and review batch tickets from all ready mix trucks arriving on site and notify the contractor and project manager of any parameter not complying with the design mix.
- e. Review the time table noted on the batch ticket for; batching time, time of departure from plant and arrival on site, and time of concrete placement for compliance with specifications.
- f. Do not approve any changes to the concrete mix design.
- g. Do not approve adding water to concrete on site. It is the contractor's responsibility to control the amount of water added on site to any trucks.
- h. Note on the batch ticket water added on site by the contractor and verify with the project manager and/or project engineer the amount of water added is within the tolerances of the mix design.
- i. Do not accept concrete trucks arriving without a properly completed batch ticket.
- j. Do not accept concrete not meeting specifications.

4. Concrete Slump Tests

- a. The slump test indicates the water content of the concrete mix and is an important indicator because the higher the water to cement ratio the weaker the concrete.
- b. Slump tests shall be taken in accordance with ASTM C143 standards.
- c. The construction observer is to observe and measure the vertical depth of slump. It is usually expressed in inches.
- d. If the slump is more than the allowable limit including specified tolerances (and sometimes averages) then notify the contractor and project manager and do not accept the concrete load.
- e. Slump tests shall be performed again after the addition of water.
- f. Unless otherwise specified, one slump test shall be taken for each 50 cubic yards place in any one day.

5. Compressive Strength Testing (Concrete Test Cylinders)

- a. Concrete cylinders shall be taken by the construction observer in accordance with the requirements of ASTM C31, C143, and C172.
- b. Confirm that cylinders are tagged and numbered, indicating the date, location of work represented, batch number, air content, and slump.
- c. Cylinders are to be stored, cured, and transported to the lab in the manner specified.
- d. Note that the test cylinders are filled with concrete representative of the concrete work. If the contractor adds water to the mix after taking test cylinders new test cylinders are to be filled and the old ones rejected.
- e. Note the number of test cylinders taken per day, and/or per trucks, and/or per cubic yard of concrete meet the requirements of the specifications.
- f. Unless otherwise specified, one set of four cylinders shall be taken for compressive strength tests for each 50 cubic yards place in any one day.

6. Air Entrainment Test

- a. Air entrainment or small bubbles are usually added to concrete by means of a chemical additive at the batching plant. In exterior concrete such as pavement it improves the workability and reduces damage from the freeze thaw cycle and surface scaling.
- b. Tests for air entrainment shall be performed in accordance with ASTM C231.
- c. Document test results and the frequency and method employed for testing.
- d. Confirm test results with the approved mix design and notify the contractor and project manager of failed tests.
- e. Unless otherwise specified, one air entrainment test shall be taken for each 50 cubic yards place in any one day.

7. Concrete Placement

- a. Review with the project manager and/or project engineer the contractor's concrete delivery plan including; the number of dedicated ready mix trucks, route and distance from the batching plant, and rate of concrete use/placement.
- b. Review with the project manager and/or project engineer the contractor's equipment and method for placing, distributing, and finishing the concrete.
- c. Verify that the vibrating and the free drop height of concrete during handling do not cause separation and meet specifications.
- d. Check the contractor's mechanical finishing or slip-form equipment that it is cleaned and the vibrating and finishing mechanism is in working order.
- e. Track the number of delivery trucks/the rate of delivery and rate of concrete use. Notify the contractor and project manager if delivery trucks or the finishing machine have longer than specified wait periods.

8. Concrete Finishing

- a. The contractor may be required to test for the trueness of the slab's finished surface using a highway straightedge (usually 10' in length).
- b. Note that the test is performed as specified, while the concrete is still plastic and both longitudinally and transversely.
- c. Observe that any depressions are filled with fresh concrete, struck smooth again, consolidated, and refinished as specified.
- d. Check that during final finishing water (if allowed) is added only by means and traces specified.
- e. Verify that surface texturing or grooving is completed as required.

9. Concrete Cure

- a. If a liquid curing membrane is required check that the contractor has on site working equipment for applying.
- b. Observe that the compound used for curing is as specified and that the application rate and method conforms to specification and manufacture instructions.
- c. Verify where and when required that the contractor maintains a wet cure for the duration specified with required matting and protection.
- d. Record temperature and wind speed at several points during the day.

10. Concrete Joint Work (Pavement and Curbing)

- a. Verify that joints are completed as shown on the plans and as specified.
- b. Document the time period after the concrete is placed to time of sawing noting weather conditions and when specified the time for both the first phase and second phase cuts.
- c. Verify that excessive raveling does not occur along the saw cut.
- d. Verify that the sealant/joint filler material and application equipment are as specified.
- e. Prior to joint sealing, observe the cleaning, final depth, and preparation of the joint are as specified.

E. ASPHALT PAVEMENT AND SURFACING

1. Batch Tickets/Job Mix Formula (JMF) and Tolerances

- a. No asphalt is to be mixed and delivered to the project site until the contractor has received an approved Job Mix Formula (JMF) from the design engineer.
- b. Check compliance with specification, type and grade, for asphalt cement.
- c. Verify that submittals for aggregate gradation and asphalt content have been reviewed by the project engineer.
- d. Check and record weather conditions prior to and during placement of asphalt mix for compliance with weather limitations in the specifications.
- e. If weather limitations are exceeded due to hot windy conditions notify the contractor and project manager and design engineer and they may direct operations to cease.
- f. Collect and review batch tickets from trucks arriving on site from the batch plant and notify the contractor and project manager of any perimeter not complying with the Job Mix Formula.
- g. Do not approve changes to the Job Mix Formula.
- h. Do not approve changes to the batch temperature and mixing time, the contractor controls the mixing temperature and mixing time.
- i. Check the asphalt mix temperature records at the batch plant.

2. Placement, Controlling Uniform Spreading and Lift Thicknesses

- a. During placement note that there are a constant number of trucks delivering hot mix at regular intervals to the paver.
- b. Observe that the hopper is not allowed to empty completely, allowing leftover cold aggregate being used.
- c. Check that haul trucks are covered when they arrive from the hot mix plant and remain covered if there are delays in unloading.
- d. Observe the paver screed is working properly including heater, vibrator, and automatic level controls. Streaks and tears usually occur with poor performance of the screed.
- e. Notify the contractor of bumps and waves or tears in the finished asphalt mat or of persistent centerline streaks, oil streaks, and waviness.
- f. Before compaction, take spot measurements and record the thickness of the mat.

3. Rolling and Compaction

- a. Discuss the compaction equipment, speed, and the roller pattern/the number of passes required for compaction of the asphalt mat with the contractor.
- b. Discuss the sequence of rollers proposed for the job; typically a vibratory steel roller is used in the beginning followed by a pneumatic tire roller for a different type of kneading compaction.

- c. Verify that compaction occurs before the hot mix cools and reaches cessation temperature (the point when it will no longer compact). If the time to cool is not specified for various mat thicknesses notify the project manager or design engineer.
- d. As required, work with the contractor to set up a test strip for testing before continuous pavement, noting the roller pattern and number of passes before taking compaction tests.
- e. If compaction tests fail set up a new test strip and vary roller pattern as needed to reach specified levels.
- f. Typically a new test strip will be required when there are any changes to the tested and agreed upon roller pattern or the asphalt job formula, and typically at the beginning of a new course of overlay.

4. Asphalt Compaction Density Test

- a. The compaction of asphalt by the contractor is critical to the life and long term wear and performance of the pavement. While the contractor is responsible for the quality of work, observing and tracking the specified tests and quality control measures are the responsibilities of the construction observer.
- b. Asphalt compaction is the process of removing the air voids or volume of air from within the pavement.
- c. Testing of asphalt is done by comparing the field test results with the maximum density, a test sample in which theoretically all the air voids were removed.
- d. Field density results are determined by taking core samples or by using a nuclear gage with a probe. Calibration and cross checking of the nuclear gage by core samples tested in the lab is to be done as specified in the contract documents. In the absence of testing requirements, nuclear density gage testing shall be performed once every 3,000 square feet on each lift of material placed.
- e. There are a number of considerations including temperature of the hot mix, air, and base, properties of the job mix formula, mat thickness, and compaction equipment that potentially affect the final asphalt density. The construction observer is to monitor and document these changes during each lane pavement section and compare with density test results and verify adjustments made accordingly by the contractor.

5. Finishing and Smoothing

- a. Verify the method specified for the process of smoothing and finishing the asphalt mat.
- b. Smoothing or finishing of the mat follows the compaction rolling effort after the mat has cooled, sometimes below the cessation temperature.
- c. Finishing is typically done with a non-vibrating roller to provide the smoothest final surface.

6. Weather Limitations and Density

- a. Review with the contractor the weather limitations for air and base temperatures and moisture conditions for asphalt pavement work.
- b. Monitor and document that weather conditions are within the limitations indicated in the specifications.
- c. Verify the range of weather limitations, because the allowable rolling times may vary with temperatures and the course/lift thickness.

7. Scales & Weighing Trucks

- a. Check the tare (empty) weight of vehicles as specified.
- b. Observe the weighing was completed as required by specification (vehicle was clean, full of fuel, etc.).
- c. Agree with the contractor on the scale location and verify the scale is certified.

F. INCIDENTALS

1. Signage, Traffic Control, and Fencing

- a. Before construction works begin, check that temporary speed control, rerouting signs, barricades and cones, flashers, and other warning devices/signage have been set up as specified.
- b. Check patterns, reflectivity, and location of temporary signing and pavement marking.
- c. Observe regularly that temporary signage, cones and barricades, flashers, and markings are in working order and being maintained with work progress.
- d. Note and ask the contractor to replace devices in poor condition.
- e. When flag persons are employed in traffic control verify that procedures and equipment conform to specifications.
- f. Document public complaints and coordinate solutions with the contractor and the project manager and design engineer.
- g. Verify that orange plastic protective fencing as specified is placed around construction work areas, protected areas, and excavations.
- h. Check weekly the condition of protective or temporary fencing and note any damage to trees or other structures near the site and notify the contractor and project manager.

2. Temporary Facilities and Access

- a. Be aware of temporary and permanent construction easement and R.O.W. boundaries and allowed roads for access to the project site.
- b. Check that the contractor is limiting activities and site access to the designated construction area allowed by specification.
- c. Verify that the contractor is using and maintaining temporary construction entrances to drop mud before entering public roads.
- d. Observe the contractor's connections and use of temporary utilities for the project and notify the contractor and project manager of any abuse of services provided.

3. Site Clean-up and Equipment Storage

It is in the interest of the City to keep the site clean and free of trash and debris and to see that project material and equipment are stored properly and in order.

- a. Verify at the end of the work day that trash and other garbage are cleaned up and disposed of as required.
- b. See that the contractor has parked and secured trucks and heavy machinery in an orderly fashion.
- c. Verify that materials stored on site are secured and protected.
- d. Notify the contractor and project manager when the site clean-up fails to meet specifications.

4. Soil Contamination, Spills, and Disposal of Chemicals

- a. Verify that the contractor has Erosion and Sediment Control Officer to coordinate the prevention and cleanup of spills and that the contractor has a plan for managing spills and hazardous materials.
- b. Observe the storage of fuel, oils, paints, and other hazardous materials for clear labeling and the locations for vehicle fueling and servicing does not potentially harm the environment and complies with specifications.
- c. Verify with the contractor that flushing and cleaning of chlorinated pipelines is either permitted or water de-chlorinated and the contractor understands responsibilities not to damage the natural environment or wildlife.
- d. Notify the contractor and project manager whenever abandon fuel tanks or other suspected contaminants are uncovered during excavation and check that the contractor has notified the relevant agency within the Missouri Department of Natural Resources.
- e. After discussing with the project manager, ask the contractor to stop work in the affected area.

5. Environmental Considerations

- a. In Missouri the contractor is required by State law to control fugitive dust blown from the site.
- b. Verify per APWA Section 2154 that dust control by the contractor is managed according to specifications and Missouri Department of Natural Resources (MDNR) Air Pollution Control Program.
- c. Observe that cleaning and washing down of concrete trucks is completed in an approved area only and there is no disturbing the natural environment and/or not discharging into streams and storm drains.
- d. Notify the contractor and project manager whenever bones or artifacts or other evidence of past human occupation is uncovered and check that the specified agency or historical society has been contacted by the contractor.
- e. After discussing with the project manager, ask the contractor to stop work in the affected area.

SECTION THREE – PRIVATELY FUNDED INFRASTRUCTURE PROJECTS (Residential, Commercial & Site Development)

Private Developers shall be required to provide construction observation and testing of their work to the same requirements as listed in Section Two. City observers will randomly visit the site to verify the procedures are in place and are being utilized. City observers will document each of their site visits in a report and provide documentation to the project manager and City staff.

Private Developers may elect to utilize the City’s construction observation staff to provide compliance for Section Two for a negotiated fee. Failure to comply with the requirements of Section Two may result in the public infrastructure improvements not being accepted by the City or no issuance of a Certificate of Occupancy.

Exceptions/Additions to Section Two for Private Developers is as follows:

1. Waterline Installation

- a. Backfill and Compaction
 - Construction observer shall take note of any compaction/backfill changes due to waterline or other utilities being installed under streets, curbs, sidewalks, or drives.
 - Construction observer shall inform contractor, private developer, project manager, and City Staff when backfill and compaction requirements are not in accordance with plans and specifications.

2. Bond Requirements for Private Developers

- a. Private Developers are required to provide maintenance bonds on public infrastructure improvements for a period of two years after final acceptance of the improvement.
- b. The value of the bond shall be 50% of the infrastructure replacement costs which would be **incurred by the City** if the improvement is defective or fails within the two year period. The City shall review the proposed amount with the Private Developer before the bond is accepted.
- c. The bond language must be approved by the City before the bond is accepted.
- d. Construction observers shall notify City Staff when infrastructure improvements have been completed. This notification will only serve for the informational purposes of the City, and does not indicate formal acceptance of the improvement by the City.

3. Schedule and Work Hours

- a. Private Developers are required to provide the City with a complete schedule for approval including the number of work hours per day and weekends.
- b. When work occurs outside of the approved schedule that exposes the City to additional costs from the City’s contractor for observation, these costs are the responsibility of the Private Developer.

4. Documentation Required for Privately Funded Infrastructure Projects Which Will Be Accepted by City for Maintenance

- a. Deed of Gift/Bonding - Private developer shall be required to provide the City of St. Joseph with a Deed of Gift for the portion of infrastructure which will be given to the City for ownership and maintenance. In addition, said infrastructure must be covered by a maintenance bond as described in Section 3.2 above.

- b. Cost Estimates/Schedules of Work - Private developer shall provide a construction cost estimate for the portion of infrastructure which will be given to the City for ownership and maintenance. Costing of the work shall be based on the costs which would be incurred by the City if the work was to be completed through a typical public contracting process. In addition, the private developer shall provide the City with a proposed schedule of work at least **two weeks prior** to the commencement of work.
- c. Daily Progress Reports - If a private developer elects to provide their own construction observation services, the developer will be required to submit their construction observer's daily progress report to the City. The content of the daily progress report shall be consistent with previous sections of this manual.
- d. Documentation of Test Results - The private developer must provide all testing documentation of the proposed infrastructure which will be given to the City for ownership and maintenance. Required tests are indicated in previous sections of this manual.
- e. Project As-Builts - The private developer is required to provide as-built record drawings of the completed infrastructure which is to be given to the City for ownership and maintenance. As-built record drawings shall show the horizontal plan location and vertical elevation verification information in addition to the other requirements listed for as-built record drawings found in Chapter 26 - Subdivisions of the City Code of Ordinances.

APPENDIX

Project Templates for Reporting Forms

DAILY CONSTRUCTION REPORT

Date: _____ Actual Complete: % Scheduled Complete: %

Project No.: _____

Project: _____ Location: _____

Client: _____ Weather: _____

Project Mgr.: _____ Temp: _____ Wind: _____ Humidity: _____

Contractor: _____ Visitors: _____

Construction Mgr.: _____

Contractor Personnel			
Name of Contractor/Subs on site	Non. Manual	Manual	Remarks
Equipment at the Site			
Construction Activities			

Reported By: _____
Construction Observer

Signed: _____
Project Manager

cc:

File:

DAILY CONSTRUCTION REPORT - (Cont. Pg 2)

Date:

Project No.:

Project:

Reported By: _____
Construction Observer

Signed: _____
Project Manager

cc:

File:

WEEKLY CONSTRUCTION REPORT

Date: _____ Actual Complete: % Scheduled Complete: %

Project No.:

Project: _____ Location: _____

Client:

Date	Brief Description of Work Performed
Saturday: Weather:	
Sunday: Weather:	
Monday: Weather:	
Tuesday: Weather:	
Wednesday: Weather:	
Thursday: Weather:	
Friday: Weather:	

Reported By: _____
Construction Observer

Signed: _____
Project Manager

cc:

File:

Soil Density Report

Soil Density Report												
STANDARD COUNTS	DENSITY	MOISTURE	Testing Firm: Name & Address			WO NO.	SHEET 1 OF 1					
<i>Previous Two</i>						PROJECT NAME & LOCATION						
<i>Today</i>												
TOTAL												
AVERAGES												
MOISTURE & DENSITY DATA												
DATE												
TEST NO.												
FILL ELEV.												
TEST LOCATION												
PROBE DEPTH												
WET DENSITY P.C.F.												
WATER P.C.F.												
% MOISTURE												
DRY DENSITY P.C.F.												
% RELATIVE COMPACTION												
PREFERENCE CURVE												
TESTING LAB PROCTOR RESULTS												
MAX. DENSITY (lb./c.f.)		OPTIMUM MOISTURE (%)		<u>INSPECTOR</u>			<u>CHECKED BY</u>		_____			
Instrument - Dry Density (P.C.F.) divided by Lab Test Max. Dry Density (P.C.F.) = % Relative Compaction								DATE	_____			

SANITARY SEWER MAIN AND MANHOLE TESTS												
Sewer Main	Manhole	Top Elev.	Flow out Elev.	Manhole Depth	Station	Lots Served	Tap	Length	Date Installed	Vacuum Test	Invert Complete	Comments
	Length	Grade	Size/Type							Air Test	Mandrel	
					+							
					+							
					+							
					+							
					+							
					+							
					+							
					+							
					+							
					+							
					+							
					+							
					+							
					+							
					+							

Pressurize to 4 psi
Cool 2 to 3 min.
Bleed to 3.5 psi
Record time to 2.5 psi

8" 70 s/100 227 max
10" 110 s/100 283 max
12" 158 s/100 340 max
15" 248 s/100 425 max
18" 356 s/100 510 max

SWPPP/SWMP Compliance Evaluation Form

Site Name: _____ Date of Evaluation: _____ Page ____ of ____

Completed by: _____ Existing Weather Conditions: _____

Rainfall Event	Date Began	Duration (Hours)	Amount (Inches)	Rainfall Event	Date Began	Duration (Hours)	Amount (Inches)	Rainfall Event	Date Began	Duration (Hours)	Amount (Inches)
1.				2				3			

	YES	NO	N/A	Comments
SWPPP/SWMP Information				
1. For a nonlinear project, is a sign or other notice: a) Posted conspicuously near the main entrance of the construction site or if not feasible, b) Posted in a local public building such as the town hall or public library For linear projects, is a sign or other notice posted at a publicly accessible location near the active part of the construction project? <input checked="" type="checkbox"/> Is a copy of the permit attached? <input checked="" type="checkbox"/> Is the current location of the SWPPP/SWMP and names and telephone numbers of a contact person for scheduling viewing times shown?				
2. Does a copy of the SWPPP/SWMP and accompanying sediment and erosion control drawings exist on the construction site? <input checked="" type="checkbox"/> Is the discharge permit on the construction site? <input checked="" type="checkbox"/> Is the discharge permit acknowledgement letter on the construction site? <input checked="" type="checkbox"/> Are the SWPPP/SWMP and/or accompanying sediment and erosion control drawings updated and documented?				
3. Do inspection records exist on the construction sites? <input checked="" type="checkbox"/> Has the frequency of inspections occurred as specified in the SWPPP/SWMP? <input checked="" type="checkbox"/> Have all previous inspection items been addressed and documented within seven (7) calendar days after an inspection?				
4. Do climatic records exist since the last inspection?				
BMP/Housekeeping Information				
5. Are offsite flows entering the construction site?				
6. Is there evidence of, or the potential for, increased pollutant (e.g., sediment, fuel, concrete waste, portable toilet waste, etc.) loading to enter the storm water conveyance system due to lack of maintenance or improper BMP installation?				If yes, see attached detail report
7. Do installation, repair and/or maintenance of <u>sediment</u> control BMPs need to occur?				If yes, see attached detail report
8. Do installation, repair and/or maintenance of <u>erosion</u> control BMPs need to occur?				If yes, see attached detail report
9. Is there evidence of sediment discharging <u>off</u> the construction site and onto downstream locations?				If yes, see attached detail report
10. Are vehicles tracking <u>sediment off</u> the construction site?				If yes, see attached detail report
11. If applicable, is soil, construction material, landscaping items, or other debris evident on the streets?				If yes, see attached detail report
12. Do locations exist where consideration of installing additional BMPs not found in the SWPPP/SWMP should occur?				If yes, see attached detail report
13. Do locations exist where consideration of removing existing BMPs identified and shown in the SWPPP/SWMP can occur?				If yes, see attached detail report
14. Does your site evaluation indicate a need to possibly update and document the SWPPP/SWMP report and accompanying sediment and erosion control drawings within the next seven (7) days?				If yes, see attached detail report

SWPPP/SWMP Compliance Evaluation Form

Site Name: _____ Date of Evaluation: _____ Page ____ of ____

Completed by: _____

Detail Report: Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Date: _____

 (Print Inspector Name) (Signature)

Title/Qualification of the Inspector: _____

One or both of the following statements must be signed by a corporate officer (for corporations), general partner or proprietor (for partnership or sole proprietorship), principal executive officer or ranking elected official (for municipality, state, federal or other public agency), or their duly authorized representative.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Date: _____

 (Print Name) (Signature)

Title or Position: _____

To be signed only when no incidents of non-compliance conditions are identified by this report: I certify the construction site is in compliance with the SWPPP/SWMP and any accompanying discharge permit.

Date: _____

 (Print Name) (Signature)

Title or Position: _____