#### Contractor Name XXXX South XX Street CITY, State, Zip Code

**CONTRACTOR QUALITY CONTROL PLAN**

**Project Name: XXXX**

**City Project Number: XXXX**

**Date of Submittal XX/XX/20XX**

**Contractor: XXXXX**

**Contractor Address: XXX South XX Street**

**City, State**

## Introduction

The Contractor Quality Control Program (CQCP) describes the actions XXXXX, Inc. will take to ensure that quality workmanship, equipment, inspection and documentation on this project. The primary objective of the CQCP is to meet the requirements of the City of Lincoln.

Copies of the Plan will be provided for evaluation prior to the start construction. Copies will be distributed to the City of Lincoln, all subcontractors, and each material supplier involved in the project as well as to the following XXXX, Inc. personnel:

|  |  |
| --- | --- |
| Name | Position |
|  | Project Manger |
|  | Project Superintendent |
|  | Paving Superintendent |
|  | Grading Superintendent |
|  | QC/QA Manager |
|  | QC Technician |

Additional copies will be made available upon request.

A Quality Control (QC)/Quality Assurance (QA) meeting with the Engineer, Project Manager (PM), Contractor, subcontractors, testing laboratories, and Owner’s representative must be held ***at least 15 business days prior*** to start of construction. ***The QC/QA meeting will be facilitated by the Contractor at the City of Lincoln’s Office.*** The Contractor shall coordinate with the with the Engineer and Project Manager on time of the QC/QA meeting.

# Project/Program Description

This project involves construction of ????????????. The construction of the ??????? will consist of ????????????????????????. Also improvements will be made to ????????????????????????.

The CQCP shall ensure conformance to applicable specifications and plans with respect to materials, off-site fabrication, workmanship, construction, finish, and functional performance. The CQCP shall be effective for control of all construction work performed under this Contract and shall specifically include surveillance and tests required by the technical specifications for the following items:

LIST ITEMS THAT REQUIRE TESTING (Soil Compaction, pipe bedding, types of paving, etc)

# CQCP Organization

The CQCP is being implemented by NAME OF TESTING FIRM IF USED. The following organizational chart is included (NOTE The organizational chart shall identify all QC staff by name and function, and shall indicate the total staff required to implement all elements of the CQCP, including inspection and testing for each item of work. If necessary, different technicians can be used for specific inspection and testing functions for different items of work. If an outside organization or independent testing laboratory is used for implementation of all or part of the CQCP, the personnel assigned shall be subject to the qualification requirements of paragraphs CQCP 100-03a and 100-03b. The organizational chart shall indicate which personnel are Contractor employees and which are provided by an outside organization. At a minimum, the following should be included Program Administrator, QC techs,)

# Project Progress Schedule

The project progress schedule has been included. The schedule includes critical QC activities.

# Submittals Schedule

The submittals schedule has been included. The schedule includes a detailed listing of all submittals and shop drawings requires by the technical specifications. NOTE: include as a minimum: Specification item number, Item description, Description of submittal, Specification paragraph requiring submittal, Scheduled date of submittal

# Inspections/Testing Plan

NOTE: Provide a summary of all definable features of work. Refer to CQCP 100-6 through 100-8

# Documentation

?????? shall maintain current QC records of all inspections and tests performed. These records shall include factual evidence that the required QC inspections or tests have been performed, including type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejection, etc.; proposed remedial action; and corrective actions taken.

These records shall cover both conforming and defective or deficient features, and must include a statement that all supplies and materials incorporated in the work are in full compliance with the terms of the contract. Legible copies of these records shall be furnished to the RPR ***daily***. The records shall cover all work placed subsequent to the previously furnished records and shall be verified and signed by the CQCPA.

**a. Daily inspection reports.** Each QC technician shall maintain a daily log of all inspections performed for both Contractor and subcontractor operations. The technician’s daily reports shall provide factual evidence that continuous QC inspections have been performed and shall, as a minimum, include the following:

**(1)** Technical specification item number and description

**(2)** Compliance with approved submittals

**(3)** Proper storage of materials and equipment

**(4)** Proper operation of all equipment

**(5)** Adherence to plans and technical specifications

**(6)** Summary of any necessary corrective actions

**(7)** Safety inspection.

**(8)** Photographs

The daily inspection reports shall identify all QC inspections and QC tests conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective actions taken or proposed.

The daily inspection reports shall be signed by the responsible QC technician and the CQCPA. The RPR shall be provided at least ***one copy of each daily*** inspection report on the ***work day following the day of record***. When QC inspection and test results are recorded and transmitted electronically, the results must be archived.

**b. Daily test reports.** ???????? shall be responsible for establishing a system that will record all QC test results. Daily test reports shall document the following information:

1. Technical specification item number and description
2. Test designation
3. Location
4. Date of test
5. Control requirements
6. Test results
7. Causes for rejection
8. Recommended remedial actions
9. Retests

Test results from each day’s work period shall be submitted to the CPM prior to the start of the next day’s work period. When required by the technical specifications, the Contractor shall maintain statistical QC charts. When QC daily test results are recorded and transmitted electronically, the results must be archived.

## Project Field Office and QC/QA Laboratory Site

The Project field office and the QC laboratory will be housed in separate trailers. The QC laboratory will be located near the project office trailers.

# Pre-Construction Requirements

## QC/QA Technician Duties and Responsibilities

The primary duties of the QC/QA technician will be to perform and utilize quality control tests and other quality control practices to ensure that all material and proportioning meet the requirements of the mix design, including strength. The technician will also verify the thickness of the pavement and conduct and evaluate profilograph measurements of the final pavement surface.

The QC/QA technician will also document and maintain a daily report log during the PCCP operations. At a minimum, the daily report will include description of the work activity being performed and observations that have been made, a log of all sampling and testing performed, and any corrective actions taken.

In addition to the above sampling and testing requirements, the QC/QA technician will periodically inspect all equipment utilized in transportation, proportioning, mixing, placing, consolidating, finishing, and curing to assure proper operation and that placement, consolidation, finishing, and curing conform to the mix design and other contract requirements. Additionally, the QC/QA technician will consult with the sawing personnel on approximate sawing times and weather changes that affect the set times of the PCCP.

## Quality Control Organization

????CONTRACTOR, Inc. intends to have on site at least one full time certified QC technician whenever (INSERT MATERIAL INSPECTIONS THAT REQUIRE FULL-TIME TESTING FOR EXAMPLE PCC, ACC, ETC.) is being placed on the project site. Testing, as needed, for the aggregate base courses will be performed by the QC personnel. Additional QC personnel and testing will be provided accordingly.

|  |  |  |  |
| --- | --- | --- | --- |
| ??CONTRACTOR , Inc. Personnel | Duty | Location | Contact Phone |
| ???? | Project Superintendent | Project Office | ??????? |
| ????? | Paving Superintendent | Project Site | ??????? |
| ????? | Final Grade & Base  Superintendent | Project Site | ??????? |
| ?????? | QC Manager | QC Lab | ????? |
| ?????? | QC Technician | QC Lab | ????? |

## Material and Suppliers

????CONTRACTOR, Inc. will be provided with the PCCP concrete by ??????Ready Mix on this project. ????? Ready Mix will be utilizing their batch plant located a short distance from the project, and revolving drum mix trucks for delivery to the jobsite. ??????? Ready Mix also will be acquiring the fine and coarse aggregates, cementitious materials and admixtures necessary for use in the approved PCCP mix. ?????? will be supplying the reinforcing steel, and curing compound.

All materials will be scheduled for timely delivery by ???? or subcontractor(s) and will be available for inspection prior to their use. All materials will be accompanied with all required certifications as stated by the project specifications.

**Production and Paving**

**Concrete Production**

Consistent concrete is essential to the production of a high quality pavement. Concrete production at the ready mix plant must be closely monitored and adjusted to provide the needed consistency of the paving operation.

?????CONTRACTOR personnel will relay information to the ready mix plant when adjustments are needed. Information on the aggregate moistures will be relayed to the plant manager as soon as they are tested so that adjustments can be made accordingly. Any additional test(s) will be performed when deemed necessary and/or required by the engineer.

Due to changes in the stockpiles and in the ambient weather conditions, it is necessary to constantly adjust the production batch weights during paving operations. Information for these changes may come from sources including but not limited to the following: aggregate tests, plastic concrete tests, observations of paving superintendent/foreman, plant slump meters, visual inspection of stock piles, and weather reports. Any changes in the batch plant weights to keep the target slump and air content will be made by the plant foremen or plant operator. The plant operator, paving superintendent/foreman, and quality control personnel will be in constant contact to ensure appropriate changes are made.

## Concrete Delivery

?????? Ready Mix will employ as many revolving drum mixer trucks as needed to maintain continuous production. All trucks will be thoroughly cleaned and inspected by their drivers at the end of each production day. Any maintenance problems will be immediately reported to the truck foreman and/or mechanic to make needed repairs. Drum mixers will be washed out after each load, during the production day to ensure a clean hauling unit. Quality control personnel will check drum mixers as needed during operation to ensure cleanliness. All truck washings will be contained in an earthen sediment basin constructed at the plant site and/or other approved wash basin. No discharge will be permitted beyond the basin.

The completed concrete pavement may be used as a haul road when it meets the minimum cure requirements for opening to construction traffic (either compressive strength ????? psi or ??? days of age).

## Concrete Placement

The most critical factor in the production of a high quality pavement is the continuous progression of the paving train. The uniformity of the mix at the site is of the utmost importance to ensure a constant pressure and vibration in the slip-form paver. Communication of the paving foreman, plant operator, and quality control personnel is top priority to ensure the placement of quality pavement.

The placed concrete will be finished by a NAME OF EQUIPMENT FOR EXAMPLE Gomaco Commander 3 four track paver. The paver uses an extrusion process that confines the concrete using pressure and vibration under the pan. Pressure is applied by weight and forward motion of the paver. Vibration is supplied by a series of hydraulic vibrators. Vibration will be adjusted to consolidate the concrete while minimizing the loss of entrained air. String less operation of the paving equipment will be achieved utilizing a Leica 3D Pave Smart system.

Concrete may be placed utilizing a Gomaco RTP 500 material placer to facilitate faster delivery of concrete or placed directly onto the subgrade via the revolving drum mixer trucks. Irregular shaped areas will be set to the proper line grades with forms. The form crew will also have the responsibility of placing any reinforcing steel required in the proper locations.

OR Concrete will be placed in the forms utilizing either a Gomaco RTP 500 material placer or the revolving drum mixer trucks and consolidated using hand vibrators, with care being taken to avoid disturbing the forms or steel reinforcing.

## Finishing, Texturing, and Curing

The paving machine will be followed by a finisher utilizing a 20 foot straight edge for checking smoothness. Additional finishers will perform any corrective work as needed. The paving foreman will monitor finishing operations, and any adjustments that are necessary will be made to the paving operation.

The burlap drag finish will be applied to the surface of the plastic pavement in the longitudinal direction either by mechanical means such as a Gomaco TC-600 texture/cure machine, or by hand. Irregular shaped areas will have the burlap drag finish applied by hand.

Immediately after the finishing operations have been completed and as soon as marring of the concrete will not occur, the entire surface and exposed edges of the newly placed concrete shall be covered and secured. White pigmented curing compound will be the primary curing method utilized and applied at the specified rate per specification. Either the Gomaco TC-600 or hand spraying will be utilized to apply the curing compound for an even application at the rate specified. Irregular shaped areas will be cured using a hand sprayer for even distribution of the curing compound.

## Weather Considerations

?????CONTRACTOR field personnel will have access to a weather monitoring system during the course of the project. In the event of an unexpected storm or project scheduling requiring work during sub- optimal conditions, the following procedures may be employed:

Weather Management Actions

|  |  |
| --- | --- |
| **Condition** | **Possible Action(s)** |
| Severe storms (lightning, hail, high  winds, tornadoes) | Cease operations, get crew to safety, cover slab with  protective medium if time permits. |
| Significant precipitation | Cover slab with protective medium, suspend of cease operations |
| Light precipitation | Cover slab with protective medium. |
| High Temperatures | Increase water content, water grade ahead of paver, cool mix water, do low volume work (hand pours), switch to night operations. Add/adjust water reducer  dosage. |
| Freezing Temperatures | Layer with protective medium to maintain surface temperature. |
| Freezing Temperatures in the first 4  days of cure | Have sufficient protective medium on hand to cover  three days of production. |

Periods of weather where plastic shrinkage cracking could be of concern will be evaluated according to specifications. Adjustments in paving operations including adjusting start times along with other measures depending on the weather circumstances may be employed to mitigate plastic shrinkage cracking.

## Opening the Slab to Traffic

The slab will be opened to traffic based on the results of compressive strength testing. The concrete pavement shall not be opened to traffic until the concrete has attained minimum compressive strength of ???? psi, or 14 days old. Cylinders will be utilized for determining the minimum strength requirements prior to the early opening of a pavement segment to traffic. Maturity meters may be used to establish a maturity curve to determine the strength of the concrete for opening to traffic.

# Quality Control Operations

## Testing Equipment

All testing equipment in the quality control lab will be supplied by a reputable manufacturer and will be professionally calibrated. Field calibrations will be done quarterly during production, with additional calibrations to field equipment completed when needed/requested. Calibration records will be kept on file in the field lab.

## Pre-Production Testing

All materials will be tested by their producers before they are shipped. It is expected that all materials arriving on the job and to suppliers will meet all applicable specifications of the City of Lincoln.

????CONTRACTOR may at their discretion take samples from any of the supplied materials and test or have them independently tested for compliance with specifications prior to production. These samples will become the property of ????CONTRACOTR and will be used to determine acceptance of materials.

## Aggregate Testing

Aggregate samples will be taken in accordance with specifications required for the project to determine compliance with the specified gradation requirements. Samples will be taken from aggregate feed belts at the plant or from stock piled material and transported to the lab in closed containers for testing. The sample gradations will be tested according to ASTM specifications to ensure compliance.

After performing the tests, the equipment will be cleaned and stored carefully to avoid damage and distortion of calibration. All test results will be logged and charted on the appropriate control charts per P501-6.3.

## Placement Testing

Concrete samples will be taken at the start of production each day (within the first 5 batches) and at random to verify that the required air content and slump is met. More tests will be taken at the request of the engineer, project manager, paving superintendent/foreman, or plant manager. Concrete samples shall be accepted for strength and thickness on a lot basis. A lot shall consist of one day’s production not to exceed See materials manual ????? square yards. Smaller production days may stand alone or be combined with a previous production day.

Test Description

|  |  |
| --- | --- |
| Air Content of Freshly Mixed Concrete | ASTM 231, ASTM C 172 |
| Unit Weight of Freshly Mixed Concrete | ASTM C 138 |
| Slump of Freshly Mixed | ASTM C 143 |
| Temperature of Freshly Mixed Concrete | ASTM C 1064 |

After performing the tests, the equipment will be cleaned and stored carefully to avoid damage and distortion of calibration. Test results will be logged and charted on the appropriate control charts.

## Thickness Testing

Thickness determination will be made from drilled cores taken from the slab. Each day’s production will be subdivided into 4 equal sub lots per specification. Cores will be drilled for each sub lot. Sampling locations will be determined at random by the engineer in accordance with ASTM D3665. Thickness of the cores shall be determined by the engineer in accordance with ASTM C174.

## Pavement Trueness

Refer to materials manual for method of trueness method

## Documentation

????CONTRACTOR QC personnel will document all testing at the time of testing on worksheets specific to the test they are performing. The data will be collected and logged into field books and computer located in the testing laboratory within 48 hours. Test data will also be submitted to the engineer both informally and written as required in the specifications.

## Checklist for Portland Cement Concrete Pavement Preconstruction

* Thoroughly review plans and specifications
* Has plant been checked, calibrated, and approved?
* Is the proposed cement appropriate?
* Have cement, pozzolans, and admixtures been tested and approved?
* Are aggregates from an approved source or have they been tested?
* Is water from an approved source?
* Has the proposed mix proportions been approved? Does it meet the specifications?

**Preconstruction and Periodically**

* Are cements and pozzolans stored properly and protected from dampness?
* Are admixtures protected against freezing?
* Visually check aggregates for:
  + Contamination (soils, mud from equipment, wind-blown dust, clay balls, ect.)
  + Segregation (watch storage and handling procedures)
  + Flat and elongated particles
  + Moisture (is sand allowed to drain before us or is it fluctuating in moisture content)
* Is the base properly placed, graded and at proper elevation?
* Are all forms, reinforcing steel, tie bards and/or dowel bars of the proper size, properly placed and adequately secured?
* Are all floats, screeds, etc., straight?
* Are paving vibrators operating at specified frequency, properly spaced, and capable of being inserted to adequate depth in concrete?
* Is the electronic vibrator monitoring system working properly?
* Are there adequate backup equipment and materials to handle problems? (Forms and dowels for transverse construction joints, backup saw for sawing construction joints, method of applying curing compound, etc.)

**Mixing and Placing**

* Are proportions same as approved mix design?
* Are adjustments being made for moisture content of the aggregates (particularly the sand)? Is anyone watching moisture content of the aggregate?
* Any sign of segregation, hardened balls of cement, or contaminants in the concrete?
* Is supply of concrete continuous and uniform? Is paver able to keep in forward motion at a rate that meets or exceeds the specified minimum paving speed?
* Is there an automatic shutoff for the vibrators if the paver stops?
* Are vibrators operating at a frequency of not less than 8000 impulses/minute at proper amplitude?
* Are QC tests being run properly, and at correct frequency?
* Are fresh concrete tests within specifications? (temperature, air content, slump)
* Are strength specimens prepared, cured and handled properly?

**Behind the Paver**

* Is hand finishing and spot repair minimal?
* Is smoothness being checked?
* Is edge slump within specifications?
* Is finish water sprayed in a fine mist and only minimally when needed to properly finish the pavement? Are adjustments being made to alleviate the need for finish water?
* Is the burlap drag operating as specified?
* Is curing as specified, continuous and uniform? Is curing protection maintained?
* Is sawing started as soon as possible and continued until finished?
* Is unnecessary traffic kept off of pavement?
* Is someone charting QC/QA results? Do those results meet specifications?

**Schedule – See attached.**