THE PORT AUTHORITY OF NY & NJ
2 Montgomery Street, 3rd Floor, Jersey City, NJ 07302

Date 11/27/2013

REQUEST FOR QUOTATION

Collective# 0000035725
Bid Due Date 12/18/2013
Bids must be received no later than 11:00 AM on the above Bid Due Date.

Contact person/Telephone
Larry Waxman/201-395-3451

Deliver Goods/Services To:
Newark Liberty International Airport
Building 11 - Stockroom
Newark NJ 07114

Quantity	Description	Unit Price	Total
	DOWEL BASKETS AND BARS FOR NEWARK LIBERTY INTERNATIONAL AIRPORT. FURNISH AND DELIVER. SEE ATTACHED SPECIFICATIONS: DIVISION 2 SECTION 02510,PRICING SHEET AND OTHER REQUIREMENTS. INCLUDE WITH YOUR BID RESPONSE TWO COPIES OF CATALOG CUTS/SPECIFICATIONS/DRAWINGS FOR PORT AUTHORITY REVIEW AND APPROVAL. QUOTE FOB DELIVERED PRICES. IN THE INVENT OF AN ORDER ADVISE DELIVERY IN DAYS_____A.R.O. IN THE EVENT OF AN ORDER DELIVER TO: Newark Liberty International Airport Brewster Road - Bldg. 80 Newark, NJ 07114 ATTENTION: Catherine Nigro TEL#973-961-6109 PLEASE FOLLOW RETURN TO BID INSTRUCTIONS. REPLY IF POSSIBLE ONLY ON PATH/PA REQUEST FOR QUOTATION FORM AS ATTACHING YOUR COMPANY'S TERMS&CONDITIONS MAY CAUSE YOUR BID TO BE		
	PLEASE QUOTE FULLY DELIVERED PRICES	**PAYMENT TERMS**	**Total Delivered Price**

This Quotation is subject to the terms and conditions set forth on the back page hereof. Bidder is advised to read these before signing.

We have read the instructions and, if favored with an order, we agree to furnish the items enumerated herein at the prices and under the conditions indicated.

Signed _____
Firm Name _____
Telephone number_____Date_____
Fax Number_____
Federal Taxpayer ID _____

Bidder Must Sign In Two Places

NOTICE TO BIDDERS: Unless the following term of assurance that the above offer is irrevocable is signed, the offer submitted herein shall not be deemed to be complete.

The foregoing offer shall be irrevocable for 90 days after the date on which the Port Authority of New York and New Jersey opens this proposal.

Signed_____Date_____
Firm Name_____

THE PORT AUTHORITY OF NY & NJ
2 Montgomery Street, 3rd Floor, Jersey City, NJ 07302

Date 11/27/2013

REQUEST FOR QUOTATION

Bid Due Date
12/18/2013

Quantity	Description	Unit Price	Total
	DEEMED NON RESPONSIVE AND OR DELAY AN AWARD ISSUED. QUESTIONS ONLY CONTACT: LARRY WAXMAN TEL: 201 395 3451 OR EMAIL: Lwaxman@panynj.gov		
	PLEASE QUOTE FULLY DELIVERED PRICES **PAYMENT TERMS**	**Total Delivered Price**	

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We have read the instructions and, if favored with an order, we agree to furnish the items enumerated herein at the prices and under the conditions indicated.

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Signed_____Date_____
Firm Name_____

THE PORT AUTHORITY OF NY & NJ
2 Montgomery Street, 3rd Floor, Jersey City, NJ 07302

Date 11/27/2013

REQUEST FOR QUOTATION

Bid Due Date
12/18/2013

Quantity	Description	Unit Price	Total
	This is a Formal Bid Invitation Mail Sealed Bids to: The Port Authority of NY & NJ Attn: Bid Custodian Procurement Department 2 Montgomery Street, 3rd Floor Jersey City, NJ 07302 by the date and time listed above, where it will be publicly opened and read. Bids are only accepted Monday through Friday, excluding Port Authority holidays,between the hours of 8 A.M. & 5 P.M., via regular mail,express delivery service or hand delivery. If you do not use or have an envelope provided, you must clearly mark the outside envelope/package with 'BID ENCLOSED' and show the company name, address, as well as Bid number and Due date as stated on this bid document. A valid photo id is required to gain access into the building, to attend the bid opening or hand deliver a bid.		
	Dowel Bar Baskets, Slab Dowel, etc.		
	PLEASE QUOTE FULLY DELIVERED PRICES **PAYMENT TERMS**	**Total Delivered Price**	

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We have read the instructions and, if favored with an order, we agree to furnish the items enumerated herein at the prices and under the conditions indicated.

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Firm Name _____
Telephone number_____Date_____
Fax Number_____
Federal Taxpayer ID _____

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The foregoing offer shall be irrevocable for 90 days after the date on which the Port Authority of New York and New Jersey opens this proposal.

Signed_____Date_____
Firm Name_____

THE PORT AUTHORITY OF NY & NJ
2 Montgomery Street, 3rd Floor, Jersey City, NJ 07302

Date 11/27/2013

REQUEST FOR QUOTATION

Bid Due Date
12/18/2013

Quantity	Description	Unit Price	Total
1	**The item covers the following services:** Dowel Bar Basket A price preference of 10 % is available for NY/NJ Minority and Women Business Enterprises (M/WBE) or 5% for NY/NJ Small Business Enterprises (SBE) certified by the Port Authority (PA) by the day before bid opening for awards not exceeding $1,000,000. My firm was certified as a _____on_____.		
	PLEASE QUOTE FULLY DELIVERED PRICES	**Total Delivered Price**	

PAYMENT TERMS

This Quotation is subject to the terms and conditions set forth on the back page hereof. Bidder is advised to read these before signing.

We have read the instructions and, if favored with an order, we agree to furnish the items enumerated herein at the prices and under the conditions indicated.

Signed _____
Firm Name _____
Telephone number_____Date_____
Fax Number_____
Federal Taxpayer ID _____

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Signed_____Date_____
Firm Name_____

PA280/9-03

TERMS AND CONDITIONS

1. The Port Authority (PA) reserves the right to request information relating to seller's responsiblity, experience and capability to perform the work.
2. Unless otherwise provided, complete shipment of all items must be in one delivery FOB delivery point. Payment will not be made on partial deliveries unless authorized in advance by the party to be charged and the discount, if any, will be taken on the total order.
3. PA payment terms are net 30 days. Cash discounts for prompt payment of invoices may be taken but will not be considered in determining award, except in the case of tie bids.
4. Separate unit and total FOB delivered prices must be shown.
5. Sales to the PA and to PATH are currently exempt from New York and New Jersey State and local taxes and generally from federal taxation. The seller certifies that there are no federal, state, municipal or any other taxes included in the prices shown hereon.
6. The PA shall have the absolute right to reject any or all proposals or to accept any proposal in whole or part and to waive defects in proposals.
7. Unless the phrase "no substitute" is indicated, bidder may offer alternate manufacturer / brands, which shall be subject to Port Authority approval. Please indicate details of product being offered with bid.
8. Acceptance of seller's offer will be only by Purchase Order Form signed by the PA. No change shall be made in the agreement except in writing.
9. If the seller fails to perform in accordance with the terms of this purchase order, the PA may obtain the goods or services from another contractor and charge the seller the difference in price, if any, a reletting cost of $100, plus any other damages to the PA.
10. Upon request, sellers are encouraged to extend the terms and conditions of any terms agreement with the PA to other government and quasi-government entities by separate agreement.
11. By signing this quotation or bid, the seller certifies to all statements on Form PA 3764A regarding non-collusive bidding; compliance with the PA Code of Ethics; and the existence of investigations, indictments, convictions, suspensions, terminations, debarments and other stated occurrences to assist the PA in determining whether there are integrity issues which would prevent award of the contract to the seller. The PA has adopted a policy set forth in full on PA 3764A, that it will honor a determination by an agency of the State of New York or New Jersey that a bidder is not eligible to bid on or be awarded public contracts because the bidder has been determined to have engaged in illegal or dishonest conduct or to have violated prevailing wage legislation. The Terms and Conditions of PA 3764A apply to this order. A copy can be obtained by calling (201) 395-3405 or at http://www.panynj.gov/business-opportunities/become-vendor.html
12. The vendor may subcontract the services or use a supplier for the furnishing of materials required hereunder to such persons or entities as the Manager, Purchasing Services may from time to time expressly approve in writing. All further subcontracting shall also be subject to such approval.
13. The successful bidder (vendor) shall not issue nor permit to be issued any press release, advertisement, or literature of any kind, which refers to the Port Authority or that goods will be, are being or have been provided to it and/or that services will be, are being or have been performed for it in connection with this Agreement, unless the vendor first obtains the written approval of the Port Authority. Such approval may be withheld if for any reason the Port Authority believes that the publication of such information would be harmful to the public interest or is in any way undesirable.
14.Neither the Commissioners of the Port Authority, nor Directors of PATH, nor any of them, nor any officer, agent or employee thereof, shall be charged personally by the Contractor with any liability, or held personally liable to the Contractor under any term or provision of this Agreement, or because of its execution or attempted execution, or because of any breach, or attempted or alleged breach, thereof.

Newark Liberty International Airport
Package 13 - Civil Items

Pricing SHEET BID# 35725

ITEM NO.	BID ITEM	DESCRIPTION	PA SPEC No.	QUANTITY	Manufact. Offered	Manufact. Part No.	UNIT COST	SUB-TOTAL
1	Dowel Bar	24" long X 2" dia. dowel bar	02510	18,400				
2	RW Dowel Baskets	Dowel bar basket with 4-24" Long X 2" dia Dowel Bar set 10" from bottom of basket to center of dowel bar. Dowel bars shall be set 15" on center. 4 dowel bars per basket.	02510	700				
3	TW Dowel Baskets	Dowel bar basket with 4-24" Long X 2" dia Dowel Bar set 9" from bottom of basket to center of dowel bar. Dowel bars shall be set 15" on center. 4 dowel bars per basket.	02510	1,680				
4	Transition Slab Dowel Basket	Dowel bar basket with 4-20" Long X 2" dia Dowel Bar set 5" from bottom of basket to center of dowel bar. Dowel Bars shall be set 18" on center. 4 dowel bars per basket.	02510	120			_____	

TOTAL AMOUNT OF BID ITEMS 1 - 4	

_____

BID#36725

Vendor Requirements

- The vendor shall submit all required shop drawings and/or catalog cuts within 3 business days after receipt of award.

Delivery Requirements

- Delivery schedule to state 100% of the purchase items and quantities to be received by 9 weeks after
- Shop drawing/catalog cut approval.

Deliver to Address:
Newark Liberty International Airport
Building 80, Brewster Road
Newark, NJ 07114
Delivery Contact: Catherine Nigro (973) 961-6109

Terms and Conditions: See attached

Supplement to Terms and Conditions

A) If the vendor fails to perform in accordance with the terms (including timeliness of delivery) of this purchase order, the Authority may obtain the goods or services from another source and change the vendor the difference in price, if any, plus a reletting cost of $100, plus any other damages to the Authority.

B.) The Vendor's obligations for the delivery of the material within the time (or times) as quoted & provided for in this Purchase Order are of the essence of this Purchase Order. The Vendor guarantees that he can and will complete the delivery of the material within the time hereinbefore stipulated. Inasmuch as the damage and loss to the Authority which will result from delay in delivery of the material within the time herein stipulated will include items of loss whose amount will be incapable or very difficult or accurate estimation, the damages to the Authority for each calendar day or other time interval by which the Vendor does not complete the delivery of the material within the time or times above stipulated, shall be liquidated in the sum of the following amounts: Two percent (2%) of the Vendor's itemized bid price for each calendar week (or prorated portion thereof) by which the Vendor fails to deliver the material as scheduled.

Newark Liberty International Airport
Package 13 - Civil Items

PRICING SHEET BID# 35725

ITEM NO.	BID ITEM	DESCRIPTION	PA SPEC No.	QUANTITY	Manufact. Offered	Manufact. Part No.	UNIT COST	SUB-TOTAL
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TOTAL AMOUNT OF BID ITEMS 1 - 4	

_____

BID#36725

Vendor Requirements

- The vendor shall submit all required shop drawings and/or catalog cuts within 3 business days after receipt of award.

Delivery Requirements

- Delivery schedule to state 100% of the purchase items and quantities to be received by 9 weeks after
- Shop drawing/catalog cut approval.

Deliver to Address:
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Building 80, Brewster Road
Newark, NJ 07114
Delivery Contact: Catherine Nigro (973) 961-6109

Terms and Conditions: See attached

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BID# 35725

A 10/11/11

DIVISION 2

SECTION 02510

PLACEMENT OF PORTLAND CEMENT CONCRETE PAVING

PART 1. GENERAL

1.01 SUMMARY

This Section specifies requirements for placement of Portland cement concrete pavement and bonded or unbonded Portland cement concrete overlays of existing pavement. For requirements for furnishing Portland cement concrete see Section 03301 entitled "Portland Cement Concrete, Long Form".

1.02 REFERENCES

The following is a listing of the publications referenced in this Section:

American Association of State Highway Transportation Officials (AASHTO)

AASHTO M 254	Corrosion Resistant Coated Dowel Bars.

American Society for Testing and Materials International (ASTM)

ASTM A 615	Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
ASTM D 1751	Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
ASTM D 4397	Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.
ASTM E 950	Measuring the longitudinal Profile of Traveled Surfaces with an Accelerometer Established Inertial Profiling Reference.
ASTM E 1274	Standard Test Method for Measuring Pavement Roughness Using a Profilograph.

American Concrete Institute (ACI)

ACI 309	Guide for Consolidation of Concrete.

1.03 ENVIRONMENTAL REQUIREMENTS

A. Placement and Protection During Inclement Weather

Do not commence placing operations when heavy rain or other damaging conditions appear imminent. Have on hand at the construction site at all times when placing concrete sufficient waterproof cover and means to rapidly place it over all unhardened concrete or concrete that might be damaged by rain. Suspend placement of concrete whenever rain or other damaging weather commences to damage the surface or texture of the placed unhardened concrete, washes cement out of the concrete or changes the water content of the surface concrete. All unhardened concrete shall be immediately covered and protected from the rain or other damaging weather. Completely remove and replace at no cost to the Authority any pavement damaged by rain or other weather conditions.

B. Cold Weather Conditions

1. Cold weather concreting shall conform to the requirements of Section 03301 entitled "Portland Cement Concrete, Long Form".

2. Ensure that reinforcement, forms and ground with which concrete will be in contact are completely frost free. The use of chemicals to eliminate frost will not be permitted.

3. Comply with all provisions herein for placing and curing.

C. Hot Weather Conditions

Hot weather concreting shall conform to the requirements of Section 03301 entitled "Portland Cement Concrete, Long Form".

1.04 IN-PLACE PAVEMENT AND OVERLAY REQUIREMENTS

A. Concrete shall conform to the thicknesses shown on the Contract Drawings. Acceptance will be on a lot basis as set forth in Section 03301 entitled "Portland Cement Concrete, Long Form". Test for thickness only after all corrections for smoothness and grade have been completed.

B. Pavement Alignment

Lateral deviation from the alignment of the pavement edge shown on the Contract Drawings shall not exceed plus or minus 0.10 foot.

C. Final Surface Grade

The final surface shall conform to the finished grades shown on the Contract Drawings within a target tolerance for vertical deviation of plus or minus 0.04 foot, except where closer tolerance is required for proper functioning of appurtenant structures and drainage. The final surface abutting existing pavements shall smoothly transition to the existing surface grades. The Engineer will test the final surface, which will be accepted or rejected on a lot basis as set forth in 3.03 B. For areas within the runway, taxiway or apron edge markings, and for roadways, the Engineer will adjust Contract compensation based on the percentage of grade measurements exceeding the target tolerance as set forth in 4.02 A. Make corrections for deficiencies as set forth in 3.05 B and D.

D. Surface Smoothness

1. Airfield Pavements

a. Longitudinal Direction

The final surface shall have a Profile Index of 15.0 inches or less per mile and no deviation shall be greater than 0.4 inch in 25 feet. Testing and acceptance will be on a lot basis as set forth in 3.03 A.1. Adjustment to Contract compensation will be made based on the Profile Index of the lot as set forth in 4.02 B. Make corrections for deficiencies in surface smoothness as set forth in 3.05 A and D.

b. Transverse Direction for areas within runway or taxiway edge markings and longitudinal and transverse direction for aprons and paved areas outside runway or taxiway edge markings

The final surface shall be smooth and free from irregularities greater than 1/4 inch when tested with a 16-foot straight edge. Testing and acceptance will be on a lot basis as set forth in 3.03 A.2. Make corrections for deficiencies in surface smoothness as set forth in 3.05 A and D.

2. Roadway Pavements

a. The final surface shall have a Profile Index of 15.0 inches or less per mile and no deviations shall be greater than 0.4 inch in 25 feet. Testing and acceptance will be on a lot basis as set forth in 3.03 A.1. Adjustment to Contract compensation will be made based on the Profile Index of the lot as set forth in 4.02 B. Make corrections for deficiencies in surface smoothness as set forth in 3.05 A and D.

b. Longitudinal direction for roadways where paving lane is less than 500 linear feet

Final surface shall be smooth and free of irregularities greater than 1/8 inch when tested with a 10-foot straight edge. Testing and acceptance will be as set forth in 3.03 A.1. Make corrections for deficiencies in surface smoothness as set forth in 3.05 A and D.

E. Check dowel bars and assemblies for position and alignment. The maximum permissible tolerance for dowel bar alignment in each plane, horizontal and vertical, shall be 2 percent or 1/4 inch per foot of dowel bar. Dowel position shall meet the following:

1. Horizontally, within plus or minus 1/2 inch of specified spacing.

2. Vertically, within plus or minus 1/2 inch at mid-depth of slab.

3. Midpoint of the dowel relative to the center of the joint, within one inch.

F. Airfield concrete pavements shall not exhibit any cracks prior to opening the pavement to aircraft operations. For all other pavement the concrete shall not exhibit any cracks prior to opening to normal operations.

G. For slipformed concrete not more than 15 percent of the total free edge of each five hundred feet of pavement, or fraction thereof, shall have an edge slump exceeding 1/4 inch, and none of the free edges of the pavement shall have an edge slump exceeding 3/8 inch. The area affected by the downward movement of the concrete along the pavement edge shall be limited to not more than 18 inches from the edge. Make corrections for deficiencies made as set forth in 3.05 C.1.f.

1.05 QUALITY ASSURANCE

A. Develop a Quality Control Program in accordance with Section 03301 entitled "Portland Cement Concrete, Long Form". In addition to the requirements therein, the program shall address all elements which affect the quality of the pavement including but not limited to:

1. Placing and consolidation.
2. Joints.
3. Dowel placement and alignment.
4. Finishing and curing.
5. Surface smoothness.
6. Alignment and grade.
7. Thickness.
8. Surface preparation for unbonded overlays.
9. Surface preparation for bonded overlays.

B. Surface Smoothness

Perform quality control smoothness testing of the final surface using methods which produce results with measuring units and accuracy similar to the Engineer's acceptance testing specified in 3.03 A. As a minimum test the final surface of each day's paving after initial curing is completed. Submit written results to the Engineer after each test. Test results shall clearly identify the test location. Upon completion of all quality control testing and any required corrective work, the Engineer will perform acceptance testing in accordance with 3.03 A.

C. Final Surface Grade Side-Form Construction

Perform quality control surveys of forms to check grades. Measure elevations at the finished grade locations shown on the Contract Drawings. Submit to the Engineer written survey results prior to scheduling concrete placement. The survey results shall identify the location of each measurement by station and offset, measured elevations to the nearest 0.01 foot, required finished grades from the Contract Drawings and the difference between measured elevations and required elevations to the nearest 0.01 foot. This survey is for Contractor's quality control. Acceptance of the finished surface will be as specified in 3.03 B.

D. Final Surface Grade Slipform Construction

Perform quality control surveys to check grades immediately after initial curing is completed. Measure elevations at the finished grade locations shown on the Contract Drawings. Submit the written survey results to the Engineer. The survey results shall identify the location of each measurement by station and offset, measured elevations to the nearest 0.01 foot, required finished grades from the Contract Drawings and the difference between measured elevations and required elevations to the nearest 0.01 foot. This survey is for Contractor's quality control. Acceptance of the finished surface will be as specified in 3.03 B.

1.06 SUBMITTALS

See Appendix "A" for submittal requirements.

PART 2. PRODUCTS

2.01 MATERIALS

A. Portland Cement Concrete

Conform to the requirements of Section 03301 entitled "Portland Cement Concrete, Long Form".

B. Forms

1. Straight side forms shall be made of steel having a thickness of not less than 7/32 inch and shall be furnished in sections not less than 10 feet in length. Forms shall have a depth equal to the prescribed edge thickness of the concrete without horizontal joint, and a base width equal to the depth of the forms.
2. Flexible or curved forms of proper radius shall be used for curves of 100-foot radius or less. Flexible or curved forms shall be of a design acceptable to the Engineer.
3. Forms shall be provided with adequate devices for secure settings so that when in place they will withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment.
4. Forms with battered top surfaces and bent, twisted or broken forms shall be removed from the construction site. Repaired forms shall not be used until inspected and approved by the Engineer.
5. Built-up forms shall not be used, except as approved by the Engineer. The top face of the form shall vary from a true plane by not more than 1/8 inch in 10 feet, and the upstanding leg shall vary by not more than 1/4 inch. The forms shall have provisions for locking the ends of abutting sections together tightly for secure setting.
6. Forms shall have a top flange approximately two inches wide.
7. Forms may be punched to admit dowels.

C. Joints

1. Preformed bituminous joint filler shall conform to ASTM D 1751 and shall be punched to admit dowels. Filler for each joint shall be furnished in a single piece for the full depth and width required for the joint.
2. Dowels shall be straight, smooth, solid round bars, free from burring or other deformation that would interfere with free movement in the concrete. They shall be resistant to abrasion resulting from pavement expansion and contraction and shall be one of the following:
   a. Carbon steel (ASTM A 615, Grade 60) tightly encased in stainless steel tubing or infused with chromium over the entire exposed surface.
   b. Organic coated steel dowel bars (ASTM A 615, Grade 60) conforming to AASHTO M 254.

3. Joint support assemblies shall be capable of maintaining dowels and joint filler where required, in proper position and alignment both before and during concrete placement.

4. For expansion joints, furnish and install metal or plastic sleeve-type end caps for dowel bars. End caps shall cover four inches of the dowel, with a closed end containing a compressible plug to hold the end of the sleeve at least one inch from the end of the dowel bar.

5. Shop applied bond breaker, if used, shall meet the pullout requirements for AASHTO M 254.

6. Tie bars (ASTM A 615, Grade 40) shall conform to Section 03200 entitled "Concrete Reinforcement".

D. Cement Paste

A uniform mixture of cement, fine aggregate and water with the consistency of a paste, broomed out of the concrete as it is placed. A separately mixed paste will not be permitted.

E. Grout

1. Epcon A7, manufactured by ITW Ramset/Red Head, Wood Dale, IL.

2. Epcon Ceramic 6, manufactured by ITW Ramset/Red Head, Wood Dale, IL.

3. HIT HY-150, manufactured by Hilti Fastening Systems, Tulsa, OK.

4. Keligrout, manufactured by Kelken Construction Systems, Parlin, NJ.

5. Power-Fast Cartridge, manufactured by Power Fastening, Inc., New Rochelle, NY.

6. Sure Anchor I (J-51), manufactured by Dayton Superior, Oregon, IL.

7. An approved equal, as accepted by the State of New Jersey Department of Transportation and New York State Department of Transportation, which is chemically cured.

F. Welded Wire Fabric shall conform to Section 03200 entitled "Concrete Reinforcement".

G. Polyethylene Film: ASTM D 4397, two-ply.

PART 3. EXECUTION

3.01 PREPARATION

A. Surface Preparation

1. Full-Depth Pavement

a. Side-Form Construction

(1) After completion of the fine grading of the base course, lay and anchor forms to lines and grades shown on the Contract Drawings. The base course shall be prepared at least one foot beyond the edge of all forms and shall be in firm contact with the forms for their entire length. After the forms have been set to the correct grade, thoroughly tamp the base course, either mechanically or by hand, at both the inside and outside edges of the base of the forms when the forms are not placed on a previously paved surface.

(2) Ruts or depressions in the subgrade or subbase caused by hauling or usage of other equipment shall be filled with suitable material (not with concrete or concrete aggregates) as they develop and shall be thoroughly compacted by rolling. If damage occurs to a stabilized subbase, it shall be corrected full depth by the Contractor at no additional cost to the Authority.

(3) If base course is dry, moisten it by sprinkling with as much water as it will readily absorb and so that moisture penetrates to a depth of at least 1/2 inch. Where necessary, in the opinion of the Engineer, commence such sprinkling or thorough wetting from 12 to 36 hours prior to placing concrete. Remove any standing pools of water before placing concrete.

(4) If the base is asphalt concrete or asphalt stabilized and either the ambient temperature is greater than 75 degrees F or the asphalt surface temperature is above 90 degrees F, whitewash the base surface with white pigmented curing compound meeting the requirements of Section 03301 entitled "Portland Cement Concrete, Long Form". Apply at a minimum rate of one gallon per 200 square feet. After application of the whitewash, allow pavement to cool prior to depositing concrete.

b. Slipform Construction

(1) The base course and subbase course on which the concrete will be placed shall be widened to extend beyond the paving machine track to support the paver without displacement.

(2) After the base course is placed and compacted, test the surface for smoothness in the presence of the Engineer. Test smoothness using a 10-foot straight edge laid in successive positions 5 feet on-center parallel to the centerline of the pavement. Advance the straight edge along the pavement in movements not exceeding 5 feet. Correct base course surface smoothness deviations exceeding 1/4 inch by removing and replacing the base full-depth in the deficient area.

(3) Test the base course for vertical deviations from required grades. Run levels at intervals of 50 feet longitudinally and transversely to determine the elevation of the finished base course. Correct vertical deviations exceeding 0.04 foot by removing and replacing the base full-depth in the deficient area. Submit test results to the Engineer in writing for approval before placement of concrete.

(4) Moisten base course and whitewash as set forth in 3.01 A.1.a (3) and (4).

2. Unbonded Concrete Overlays

a. Side-Form Construction

(1) Remove asphalt pavement in areas shown on the Contract Drawings by milling, scraping or scarifying and chipping.

(2) Repair underlying pavement as directed by the Engineer.

(3) On milled asphalt surfaces, whitewash the surface with white-pigmented curing compound meeting the requirements of Section 03301, entitled "Portland Cement Concrete, Long Form". Apply at a minimum rate of one gallon per 200-square feet. After application of the whitewash, allow pavement to cool prior to depositing concrete.

(4) Where shown on the Contract Drawings, place an asphalt concrete leveling course as shown on the Contract Drawings. Asphalt concrete shall conform to Section 02561 entitled "Asphalt Concrete Paving (FAA)", or Section 02553 entitled "Asphalt Concrete Paving".

(5) Where an asphalt concrete leveling course is required and the ambient temperature is 75 degrees F or greater, whitewash the surface with a white-pigmented curing compound meeting the requirements of Section 03301 entitled "Portland Cement Concrete, Long Form". Apply at a minimum rate of one gallon per 200 square feet. After application of the whitewash, allow pavement to cool prior to the depositing of concrete.

b. Slipform Construction

(1) Remove asphalt pavement in areas shown on the Contract Drawings by milling, scraping or scarifying and chipping.

(2) Repair underlying pavement as directed by the Engineer.

(3) On milled surfaces or on an asphalt leveling course, whitewash the surface with white-pigmented curing compound meeting the requirements of Section 03301 entitled "Portland Cement Concrete, Long Form". Apply at a minimum rate of one gallon per 200 square feet. After application of the whitewash, allow pavement to cool prior to depositing concrete.

(4) Where shown on the Contract Drawings, place an asphalt concrete leveling course as shown on the Contract Drawings. Asphalt concrete shall conform to Section 02561 entitled "Asphalt Concrete Paving (FAA)", or Section 02553 entitled "Asphalt Concrete Paving".

(5) Where an asphalt concrete leveling course is required and the ambient temperature is 75 degrees F or greater, whitewash the surface with a white-pigmented curing compound meeting the requirements of Section 03301 entitled "Portland Cement Concrete, Long Form". Apply at a minimum rate of one gallon per 200 square feet. After application of the whitewash, allow pavement to cool prior to the depositing of concrete.

3. Bonded Concrete Overlays

a. Remove asphalt pavement in areas shown on the Contract Drawings by milling, scraping or scarifying and chipping.

b. All surfaces that will be in contact with concrete shall be abrasive blasted or shot blasted within 8 hours of the start of concrete placement or if the area was open to vehicular traffic after final closure of the traffic prior to concrete placement, but not more than 8 hours before placement of overlay.

c. After removal and abrasive blasting, thoroughly clean concrete surfaces of dust, concrete particles, slurry produced by wet sawing or wet scarifying and other debris by oil-free air blast followed by water blast to the satisfaction of the Engineer. Remove all standing water. Complete surface cleaning just prior to placing concrete.

d. Abrasive blasting shall conform to the applicable requirements of Section 02574 entitled "Abrasive Blasting of Pavements".

e. The prepared surface will be tested for bond strength in accordance with Section 03301 entitled "Portland Cement Concrete, Long Form".

f. In the event that full-depth slab repair is required by the Engineer in areas found to be deteriorated, preparation for concrete shall not commence on newly placed slabs earlier than 14 days after placement of base slab concrete or until the concrete has attained a compressive strength of 4,000 psi.

g. Moisten prepared surface immediately prior to placing concrete. Remove any standing water or pools.

B. Placing Forms

1. Prior to setting of forms, the Engineer will approve the preparation of the base or existing pavement upon which the concrete is to be placed.

2. Form sections shall be tightly locked and shall be free from play or movement in any direction. Stake forms into place with not less than 3 pins for each 10-foot section. Place a pin at each side of every joint. Set forms so that they will withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment. Clean and oil forms prior to the placing of concrete.

3. Check alignment and grade of forms and make corrections prior to placing concrete. Form alignment and grade shall meet the requirements set forth in 1.04 B and C.

4. Straighten bent dowels, whether placed under this Contract or by others, using tools approved by the Engineer. Do not apply heat to dowels.

5. Clean forms, dowels and all steel which will be embedded in concrete, of all loose rust, scale, paint and other objectionable materials. Coat forms with non-staining mineral oil or other approved material before each use.

6. Check all form locking devices to ensure that they are in place and properly secured.

7. Do not place concrete until the Engineer has approved the form work and the base course or existing pavement upon which the concrete is to be placed.

3.02 APPLICATION

A. Pavement Joints

1. Furnish and install materials for joints as specified herein and in Section 02578 entitled "Pavement Joint Sealing".

2. The type, size, shape and location of joints shall be as shown on the Contract Drawings.

3. Construct all joints true to line with their faces perpendicular to the surface of the pavement. Joints shall vary by not more than 1/2 inch from line and shall be true to line with not more than 1/4-inch variation in 10 feet from their designated position. The vertical surface of the pavement adjacent to all formed joints shall be finished to a true plane and edged to a radius of 1/8 inch or as otherwise shown on the Contract Drawings.

4. Joint filler shall be supported in the support assembly perpendicular to the slab surface, shall be set below the surface of the slab to accommodate the sealant, and the top edge of the joint filler shall be protected during concrete placement by a metal channel cap.

5. Contraction joints shall be saw cut. To saw cut contraction joints use a two stage sawing operation. A chalk line or other suitable guide shall be used to mark the alignment of the joint. The first stage saw cut shall be one saw blade in width and to the depth shown on the Contract Drawings. Sawing shall commence as soon as the concrete has reached its final set and cutting does not chip, spall or tear the concrete regardless of weather conditions. Have on hand a sufficient number of saws and cut all joints in one continuous operation. The saw shall produce a cut that does not ravel or damage the concrete 1/8 inch beyond the edge of the sawcut. Immediately after saw cutting, thoroughly flush the joint with water to remove all waste from sawing. Have on hand one standby saw in good working order and an ample supply of saw blades at the construction site at all times during sawing operations. Perform second stage saw cuts not sooner than 72 hours after concrete is placed or curing is completed, whichever is less. Second stage sawing shall cut the slot required for the joint sealer to the dimensions shown on the Contract Drawings.

6. Plan each day's operations to end against a temporary bulkhead, at a contraction joint or at a thickened edge joint.

7. Where required on the Contract Drawings, form keyways in the plastic concrete by means of side forms. The keyway shall be formed to a tolerance of 1/4 inch in any direction. The dimension of the keyway forms shall vary by not more than plus or minus 1/4 inch from the mid-depth of the pavement.

B. Dowels and Tie Bars

1. Place dowels of required size and type at locations shown on the Contract Drawings.

2. Set all dowels and tie bars accurately, parallel to the pavement surface and, except for skewed or irregular joints, perpendicular to the pavement joint. The maximum permissible tolerance on dowel bar alignment and position shall meet the requirements of 1.04 E.

3. At all contraction joints and construction joints, apply a thin even film of lubricating oil to one-half of each dowel, unless the dowels are coated with a shop applied bond breaker.

4. Support dowels and tie bars rigidly using approved assemblies capable of holding dowels or tie bars and joint filler in position during the entire construction operation.

5. Install dowels and tie bars in existing or previously placed concrete as follows:

   a. Core drill holes in existing concrete. Do not use impact or percussion drills if spalling of the concrete occurs.

   b. Clean out hole and grout dowels and tie bars in place in accordance with the grout manufacturer's printed instructions.

   c. Coat exposed portions of dowels with lubricating oil, unless the dowels are coated with shop applied bond breaker.

6. Tie bars shall consist of deformed bars installed in joints as shown on the Contract Drawings. Place tie bars at right angles to the centerline of the concrete slab and space them at intervals shown on the Contract Drawings. They shall be held in position parallel to the pavement surface and in the middle of the slab depth. When tie bars extend into an unpaved lane, they may be bent against the form at construction joints, unless threaded bolt or other assembled tie bars are specified. Tie bars shall not be painted, lubricated or enclosed in sleeves.

C. Placing Concrete

1. General

   a. Unless otherwise specified on the Contract Drawings, the Contractor has the option of side-form or slipform paving.

   b. At any point in the concrete conveyance, the free vertical drop from one point to another or to the underlying surface shall not exceed 3 feet.

   c. Place concrete only in the presence of the Engineer and by methods approved by the Engineer.

   d. Place concrete for full-depth pavement on a moistened surface, but take precautions to prevent water from entering and ponding where concrete is being placed or setting.

2. Side-Form Method

a. For the side-form method, deposit concrete in such a manner as to require as little rehandling as possible. Unless truck mixers, truck agitators, or non-agitating hauling equipment are equipped with means for discharge of concrete without segregation of the materials, place and spread concrete using an approved mechanical spreading device that prevents segregation of the materials. Placing shall be continuous between transverse joints without the use of intermediate bulkheads. Necessary hand spreading shall be done with shovels – not rakes. Do not allow workers to walk in the freshly mixed concrete with boots or shoes coated with earth or foreign substance.

b. Deposit concrete as near to expansion and contraction joints as possible without disturbing them but do not dump concrete from the discharge bucket or hopper onto a joint assembly unless the hopper is centered above the joint assembly.

c. Thoroughly consolidate concrete against and along the faces of all forms and previously placed concrete and along the full length and on both sides of all joint assemblies by means of vibrators inserted in the concrete. Do not permit vibrators to come in contact with a joint assembly.

3. Slipform Method

a. Place concrete with an approved crawler-mounted, slip-form paver designed to spread, consolidate and shape the freshly placed concrete in one complete pass of the machine so that a minimum of hand finishing will be necessary to achieve a dense and homogeneous pavement in conformance with requirements of the Contract Drawings and Specifications. Place concrete directly on top of joint assemblies to prevent them from moving when the paver moves over them. Side forms and finishing screeds shall be adjustable to the extent required to achieve the specified pavement edge and surface tolerance. The side forms shall be of dimensions, shape and strength to support the concrete laterally for a sufficient length of time so that no edge slumping exceeds the requirements set forth in 1.04 G. Complete final finishing while the concrete is still in the plastic state.

b. In the event that slumping or sloughing occurs behind the paver or if there are any other structural or surface defects which, in the opinion of the Engineer, cannot be corrected within specified tolerances, immediately cease paving operations until proper adjustment of the equipment or satisfactory procedures and pavement are achieved. Complete the balance of the work with the use of standard metal forms and the formed method of placing and curing. Any concrete not corrected to permissible tolerances shall be removed and replaced at no cost to the Authority.

c. Operate the slipform paver on staked string lines on each side of the paver to control vertical and horizontal placement. The string line shall consist of piano wire and shall be supported as required to prevent sag.

D. Concrete Placing and Finishing Equipment

1. Side-Formed Pavements 8-Inches Thick or Greater

a. Concrete shall be spread, screeded, shaped and consolidated by one or more self-propelled machines. These machines shall uniformly distribute and consolidate concrete without segregation so that the completed pavement will conform to the required cross section with a minimum of handwork.

The number and capacity of machines furnished shall be adequate to perform the work required at a rate equal to that of concrete delivery. Use internal vibrators to effectively consolidate concrete for the full paving width without causing segregation. The rate of vibration of internal type vibrators shall be not less than 7,000 cycles per minute. Amplitude of vibration shall be sufficient to be perceptible on the surface of the concrete more than one foot from the vibrating element. Furnish a tachometer or other suitable device for measuring and indicating frequency of vibration.

The previous criteria relating to the frequency and amplitude of internal vibration shall be considered the minimum requirements and are intended to ensure adequate density in the hardened concrete.

b. Use manual, hand-held vibrators adjacent to joint assemblies and similar locations where gang-mounted vibrators are not practical.

c. Check all vibrators prior to the start of Work and a minimum of twice daily to verify that they are working properly.

d. Provide manual tools, such as bull floats, trowels, straight edges, brooms and other similar hand tools.

2. Side-Formed Pavements Less than 8-Inches Thick

a. For pavements less than 8 inches thick vibrating surface pans or screeds will be allowed. Operating frequencies for surface vibrators shall be as required to achieve uniform consolidation without excess latents being developed at the surface of the finished concrete.

b. Provide manual tools, such as bull floats, trowels, brooms and other similar hand tools.

c. Use manual, hand-held vibrators adjacent to joint assemblies and similar locations where gang-mounted vibrators are not practical.

d. Check all vibrators prior to the start of work and periodically during construction progress to verify that they are working properly.

3. Slipform Paver

The slipform paver shall be equipped with traveling side forms of sufficient dimensions, shapes and strength to support the concrete laterally for a sufficient length of time during placement to produce pavement of the required cross section.

a. The slipform paver shall be operated and manned by personnel experienced and trained on the operation of the equipment.

b. The slipform paver shall, when arriving at the construction site and at each time the paver is transported from one location to another, be thoroughly inspected and checked, by an experienced person, preferably the manufacturer's representative, for misalignment, warping, breakage or inadvertent changes in the settings of various control elements. This shall include inspecting the configuration of the main screeds when in paving position. Perform inspections in accordance with the recommendations of the manufacturer of the slipform paver used for the Work.

c. The slipform paver shall be of a type that permits vertical adjustment of side tracks so that where there is existing pavement, the machine can operate with one track placed on the existing pavement and the other placed on the subgrade.

d. The slipform paver will be subject to approval by the Engineer prior to starting paving operations. The paver shall be self-propelled and designed for the specific purpose of placing, screeding, consolidating and finishing concrete pavement slabs true to grade and cross-section in one complete pass without the use of fixed forms. The slipform paving machine shall be equipped with electronically controlled devices to control the grade and alignment of the finished surface from wire lines on both sides of the paver regardless of the condition of the surface the paver is traveling upon. The paver shall be equipped with means for spreading the concrete to a uniform depth before it enters the throat of the paver. The paver shall vibrate the concrete internally with sufficient intensity to consolidate the concrete throughout its entire depth and width. The paver shall be a heavy-duty, self-propelled machine designed specifically for paving and finishing high quality concrete pavements. It shall weigh at least 2200 pounds per foot of paving lane width and be powered by an engine having at least 6.0 horsepower per foot of lane width. Vibrators shall be the internal type. Operating frequency for internal vibrators shall be between 8,000 and 12,000 vibrations per minute. Average amplitude for the internal vibrators shall be 0.025-0.05 inches. The number, spacing, and frequency shall be sufficient to achieve a dense and homogeneous pavement and to meet the recommendations of ACI 309 "Guide for Consolidation of Concrete". Adequate power to operate all vibrators shall be available on the paver. The vibrators shall be automatically controlled so that they shall be stopped as forward motion ceases. Provide an electronic or mechanical means to monitor vibrator status. Check vibrator status a minimum of two times per day or when requested by the Engineer.

E. Placing Reinforcing Steel

The type and amount of steel reinforcement shall be as shown on the Contract Drawings. For pavement thickness of 12 inches or more, install reinforcement steel by the strike-off method wherein a layer of concrete is deposited on the underlying material, consolidated and struck to the indicated elevation of the steel reinforcement. The reinforcement shall be laid upon the prestruck surface, and the remaining concrete shall then be placed and finished in the required manner. When placement of the second lift causes the steel to be displaced horizontally from its original position, provisions shall be made for increasing the thickness of the first lift and depressing the reinforcement into the hardened concrete to the required elevation. The increase in thickness shall be only as necessary to permit corrected horizontal alignment to be maintained. Any portions of the bottom layer of concrete that have reached initial set shall be removed and replaced with newly mixed concrete. Initial set is defined as concrete, which cannot be worked with a vibrator. For pavement less than 12 inches thick, position reinforcement on suitable chairs securely fastened to the base prior to concrete placement. Vibrate concrete after the steel has been placed. Regardless of placement procedure, the reinforcing steel shall be free from coating which could impair the bond between the steel and concrete. Regardless of the equipment or procedures used for installing reinforcement, ensure that the entire depth of concrete is adequately consolidated.

F. Consolidation and Finishing

1. The concrete adjacent to joints shall be compacted or firmly placed without voids or segregation against the joint material; it shall be firmly placed without voids or segregation under and around all load-transfer devices, joint assembly units, and other features designed to extend into the pavement. Concrete adjacent to joints shall be mechanically vibrated as set forth in 3.02 C.2.c. After the concrete has been placed and vibrated adjacent to the joints, operate the paver or finisher in a manner to avoid damage to or misalignment of joints. If uninterrupted operations of the paver or finisher, to, over and beyond the joints, cause segregation of concrete or damage to or misalignment of joints, the paver or finisher shall be stopped when the screed is approximately 10 inches from the joint. Segregated concrete shall be removed from the front of and off the joint; and the forward motion of the paver or finisher shall be resumed. Thereafter, the paver or finisher may be run over the joint without lifting the screed, provided there is no segregated concrete immediately between the joint and the screed or on top of the joint.

2. The concrete shall be spread as soon as it is placed, and it shall be struck off and screeded by a paver or finisher. The machine shall go over each area once. When side forms are used, the tops of the forms shall be kept clean by an effective device attached to the machine, and the travel of the machine on the forms shall be maintained true without lift, wobbling or other variation tending to affect the precision finish. During operation of the paver-finisher, maintain a uniform ridge of concrete ahead of the front screed for its entire length. When in operation, the paver-finisher shall be moved forward, always moving in the direction in which the work is progressing, and so manipulated that neither end is raised from the side forms during the striking-off process. The finished surface shall be uniform in texture, true to grade and cross section and free from porous areas. Wetting the surface to facilitate finishing will not be permitted.

3. Hand finishing methods will not be permitted, except under the following conditions: in the event of breakdown of the mechanical equipment, hand methods may be used to finish the concrete already deposited on grade; in areas of narrow widths or of irregular dimensions where operation of the mechanical equipment is impractical. Concrete, as soon as placed, shall be struck off and screeded. Use an approved portable screed. Provide a second screed for striking off the bottom layer of concrete when reinforcement is used.

4. Apply water-fog or evaporation retardant immediately after the concrete has been worked with the paver or finisher, as set forth in Section 03301 entitled "Portland Cement Concrete, Long Form".

5. Use bull floats sparingly.

6. While the concrete is still plastic, test for trueness with a 16 foot straightedge swung from handles 3 feet longer than one-half the width of the slab. Hold the straightedge in contact with the surface in successive positions parallel to the centerline and go over the whole area from one side of the slab to the other, as necessary. Advance in successive stages of not more than one-half the length of the straightedge. Any excess water and laitance in excess of 1/8 inch thick shall be removed from the surface of the pavement and wasted. Any depressions shall be immediately filled with freshly mixed concrete, struck off, consolidated and refinished. Cut down and refinish high areas. Give special attention to ensure that the surface across joints meets the smoothness requirements set forth in 1.04 D. Straightedge testing and surface corrections shall continue until the entire surface is free from observable departures from the straightedge and until the slab conforms to the required grade and cross section.

7. Any paver or finisher operation which requires appreciable hand finishing shall be immediately stopped and proper adjustments made or the equipment replaced.

G. Surface Texturing

Apply broom finish to all horizontal surfaces, unless otherwise shown on the Contract Drawings, subject to the following:

1. Apply finish when the water sheen has practically disappeared and before applying the curing compound.

2. Use push broom or floor brush type, not less than 18 inches wide and made of good quality bass or bassine fibers not more than 4-1/2 inches long and with handles longer than half the width of the slab.

3. Provide adequate number of brooms to keep up with other operations. When high early strength concrete is used, give extra care and attention to ensure proper finish is applied prior to initial set of the concrete.

4. Wash and thoroughly dry brooms at frequent intervals and remove worn or damaged brooms from the construction site.

5. Draw broom across previously finished surface from the centerline to each edge of the paving strip with a slight overlap of strokes.

6. Corrugations thus made in surface shall be uniform in appearance, approximately 1/16 inch in depth and not more than 1/8 inch in depth.

7. Complete brooming before initial set of concrete and before concrete is in a condition in which the surface will be torn or unduly roughened.

H. Edging

Immediately following surface texturing, carefully finish the edges of slab along sides and at joints with an approved edging tool to form a smooth rounded surface of 1/8-inch radius and subject to the following:

1. Where corners or edges of slabs have crumbled and at any locations which have leaked sufficient mortar to make proper finishing difficult, remove loose fragments and soupy mortar, and fill solidly with a mixture of correct proportions and consistency and finish.
2. Edges shall be smooth, to line and free of unnecessary tool marks.

I. Removal of Forms

Removal of forms shall be subject to the following:

1. Exercise care not to damage concrete.
2. Do not remove until approved by Engineer.
3. Do not remove sooner than 12 hours after placing concrete except for concrete with an initial cure time of 6 hours.
4. After removal of forms, patch areas of concrete which, in the opinion of the Engineer, show excessive honeycomb by cutting out defective areas and by keying and refilling them with a mortar of cement, water and sand in the same proportions as those in the concrete.
5. After forms are removed, cure sides of slabs in accordance with Section 03301 entitled "Portland Cement Concrete, Long Form".

3.03 FIELD TESTS

A. Smoothness Testing

1. Longitudinal Direction

a. The Engineer will use a lightweight profilometer meeting the requirements of ASTM E 950 Class 1 to measure the pavement surface profile.

b. The profile will be measured prior to opening the pavement to normal operations. Sweep the pavement prior to profilometer testing.

c. The profilometer test results will be used to simulate California profilograph testing of the pavement. The simulation will be used to compute the Profile Index in inches per mile using a 0.2 inch blanking band, in accordance with ASTM E 1274. A straight line moving average smoothing filter with a filter length of 3.00 feet will be used.

d. Testing will be performed on a lot basis. A lot is defined as an area consisting of 500 linear feet of consecutive concrete slabs in the longitudinal direction. When less than 250 feet remains after dividing the pavement into 500 linear foot lots, the remaining length will be added to the adjacent lot. When more than 250 feet remains a short lot will be tested.

e. For paving lanes 20 feet or less in width measurements will be made along the centerline of the concrete pavement slabs. Two lines of measurement will be made for paving lanes greater than 20 feet in width. Each line of measurement will be six feet from and parallel to the centerline of the concrete pavement slabs. The average of the two measurements will be considered as the result for the lot.

f. The Profile Index for the length of paving lane in each lot is converted to the Profile Index of the lot in inches per mile using the following formula:

$$PI = PT \times \frac{5280}{L}$$

Where:

PI	=	Profile Index, inches per mile
PT	=	Profile Index, inches per length in feet of paving lane in a lot
L	=	Length of the paving lane in the lot in feet

2. Transverse Direction

a. A lot is defined as 50,000 square feet of final paved surface. Where paving areas are not equally divisible into 50,000 square foot lots, odd sized lots between 25,000 and 75,000 square feet will be used. The odd sized lots will be used for the area remaining after the paved area is divided into 50,000 square foot lots.

b. Each lot will be evaluated by the Engineer with a 16-foot rolling straightedge provided by the Contractor and subject to approval by the Engineer. The Engineer at his sole discretion may elect to use a lightweight profilometer and straightedge simulation in lieu of rolling straightedge testing. Measurements will be made perpendicular to the centerline of the paving lanes at the center of each slab. Designed breaks in grade shown on the Contract Drawings will not be included in the measurements. When measurements within a lot exceed the tolerance specified in 1.04 D, correct the deficiency in accordance with 3.05 A.

3. Longitudinal direction for roadways where paving lane lengths are less than 500 linear feet.

a. The Engineer will evaluate each paving lane with a 10-foot long rolling straightedge, which marks the length of surface variations that exceed the required tolerance.

b. Sweep the pavement prior to measurement.

c. Measurement will be taken along the centerline of each paving lane.

d. The Engineer will calculate the percentage of final surface which exceeds the required tolerance by dividing the measured length of the marked surface deficiencies by the total length of the paving lane.

B. Final Surface Grade Testing

1. Runways, Taxiways and Aircraft Aprons

The grades of the final surface of each lot will be measured at the finished grade locations shown on the Contract Drawings. A lot is defined as 50,000 square feet of final pavement surface. Where paving areas are not equally divisible into 50,000 square foot lots, odd sized lots between 25,000 and 75,000 square feet will be used. The odd sized lots will be used for the area remaining after the paved area is divided into 50,000 square foot lots. Perform the survey jointly with the Engineer.

2. Roadways

The grades of the final surface of each lot will be measured at the finished grade locations shown on the Contract Drawings. A lot is defined as 15,000 square feet of final pavement surface. Where paving areas are not equally divisible into 15,000 square foot lots, odd sized lots between 7,500 and 22,500 square feet will be used. The odd sized lots will be used for the area remaining after the paved area is divided into 15,000 square foot lots. Perform the survey jointly with the Engineer.

3.04 PROTECTION AND CURING

A. Protect concrete against defacement, loss of moisture and rapid temperature changes for at least seven days (except for concrete that has initial cure time of less than seven days) from the beginning of curing operations. Protect unhardened concrete from rain and flowing water. Protection shall include, but not be limited to:

1. Have all equipment and materials required for adequate protection and curing on hand ready for installation, prior to commencing concrete placement. Failure to make such provisions or failure to properly protect and cure concrete will be the cause for immediate suspension of concreting operations.

2. Immediately after form removal, protect and cure sides of slabs exposed by such removal, in the same way as provided for slab surfaces.

3. Do not use any covering material that has become contaminated with sugar, tannic acid or any other substance detrimental to Portland cement concrete.

4. Keep concrete surfaces wet at all times when covering materials are not in place.

B. Curing

Cure concrete in accordance with Section 03301 entitled "Portland Cement Concrete, Long Form".

C. Use of Pavement

1. Do not use new pavement for construction equipment and provide such barricades as may be required to prevent the entrance of traffic on concrete slabs until fully cured.

2. The Engineer may allow traffic on concrete slabs earlier if tests of the samples of concrete taken during the placing of the slab show that the concrete has attained a minimum flexural strength of 550 psi.

3. If only the paver or finisher is to be carried on a previously placed slab in order to place concrete in adjacent lanes, a minimum flexural strength of 400 psi will be sufficient. Take precautions to prevent damage to the previously placed concrete.

3.05 CORRECTION OF DEFICIENCIES

A. Deficiencies in Surface Smoothness

1. Make corrections as specified in 3.05 D at no cost to the Authority in the event of the following:

   a. Longitudinal direction within Runway or Taxiway edge markings, and for roadways where paving lane length equals or exceeds 500 feet- The Profile Index exceeds 22.0 inches per mile, or the surface profile deviations exceed 0.4 inch in 25 feet, when tested in accordance with 3.03 A.1 unless the Engineer elects to accept the deficient surface subject to an adjustment to Contract compensation. Adjustments to Contract compensation will be made as set forth in 4.01 D.

   b. Transverse direction within runway or taxiway edge markings, longitudinal and transverse for aprons and paved areas outside runway or taxiway.

      (1) 15 percent of all measurements in a lot exceed the requirements of 1.04 D.2 when tested in accordance with 3.03 A.2.

      (2) Any deviations exceed 1/2 inch when tested with a 16-foot straightedge.

   c. Longitudinal direction for roadways where paving lane is less than 500 feet.

      (1) 15 percent of all measurements in a lot exceed the requirements of 1.04 D.2.b when tested in accordance with 3.03 A.3.

      (2) Any deviations exceed 1/4 inch when tested with a 10-foot straightedge.

B. Deficiency in Final Surface Grade

Make corrections as specified in 3.05 D at no cost to the Authority in the event of the following:

1. 15 percent of all measurements in a lot exceed the requirements of 1.04 C, when tested in accordance with 3.03 B.

2. Any individual measurement exceeds a grade tolerance of 0.06 foot when tested in accordance with 3.03 B.

3. Following the correction of deficiencies, the Engineer will retest the final surface of the concrete. In the event grade tolerance is exceeded, make additional corrections at no cost to the Authority.

C. Other Deficiencies

1. Remove and replace full concrete slabs in full depth pavement or bonded and unbonded overlays as specified in 3.05 D.3 and at no additional cost to the Authority if any of the following deficiencies exist in the finished pavement:

   a. Percent Within Tolerance Limits (PWL) for flexural strength is below 55 when calculated as specified in Section 03301 entitled "Portland Cement Concrete, Long Form".

   b. Percent Within Tolerance Limits (PWL) for thickness is below 55 percent when calculated in accordance with Section 03301 entitled "Portland Cement Concrete, Long Form" using thicknesses measured after any required diamond grinding.

   c. Slabs exhibiting any cracks prior to opening the pavement to aircraft or normal operations, except as provided in Section 03301 entitled "Portland Cement Concrete, Long Form".

   d. Percent Within Tolerance Limits (PWL) for bond strength is below 55 when calculated in accordance with Section 03301 entitled "Portland Cement Concrete, Long Form".

   e. For quick curing concrete if the initial flexural strength does not meet the requirements of Section 03301 entitled "Portland Cement Concrete, Long Form".

   f. For slipform concrete if the edge slump requirements of 1.04 G are not met.

   However, the Engineer may elect to accept the deficient concrete. In that case, if the Engineer and Contractor agree in writing that the concrete shall not be removed, it will be paid for at 50 percent of the Contract unit price as specified in Section 03301 entitled "Portland Cement Concrete, Long Form".

2. Remove and replace bonded overlays if more than 5% of a lot is found to be delaminated, when tested in accordance with Section 03301 entitled "Portland Cement Concrete, Long Form". Remove and replace delaminated concrete as approved by the Engineer.

D. Corrections

1. Remove and replace, or diamond grind, pavement deficient in surface smoothness, or final surface grade tolerance in accordance with all applicable requirements of the Contract Drawings and this Section, at times approved by the Engineer, so as not to interfere with operations of the Authority or others using the area.

2. Diamond Grinding

   a. Diamond grinding may be used to correct deficiencies in surface smoothness and surface grade tolerance subject to approval by the Engineer. However, if removal of more than 3/4 inch of pavement is required to correct any deficiency, the deficient area shall be removed and replaced.

   b. The diamond grinding equipment shall be as approved by the Engineer and shall have a minimum grinding head of 36 inches and 54 to 59 diamond blades per foot of shaft.

c. Where grinding is required, grind the entire width of the pavement by the length of defective area. If, in the sole opinion of the Engineer, the deficiencies are closely spaced and grinding individual areas will adversely affect ride, grind the entire pavement surface.

d. Perform grinding prior to joint sealing and grooving.

e. Dispose of slurry produced from grinding operations off Authority property.

f. Perform diamond grinding, if required, at no additional cost to the Authority.

3. Remove and Replace Slabs

a. Remove and replace shall mean the removal of an entire slab or slabs even if the deficient area is only a portion of a slab.

b. Where removal is required, all edges of the slab or slabs shall be saw-cut full depth with a concrete saw. All saw cuts shall be perpendicular to the slab surface. Following edge sawcutting the slab shall be further divided by sawcutting full depth, at appropriate locations, and each piece lifted and removed. Suitable equipment shall be used to provide a vertical lift, and approved safe lifting devices shall be used for attachment to slab sections. No mechanical in-place breakers shall be used for slab removal.

c. Install dowels of the same size and spacing as shown on the Contract Drawings, using drilling and grouting procedures specified in 3.02 B.5.

d. Repair any damaged base as directed by the Engineer.

e. Clean the surfaces of all joint faces of loose materials and contaminates. Coat all joint faces with a double application of curing compound. Do not allow curing compound to touch dowel bars.

f. Place concrete as specified for original construction.

PART 4. ADJUSTMENTS TO CONTRACT COMPENSATION

4.01 GENERAL

A. Notwithstanding other adjustments to Contract compensation or corrections specified herein for various deficiencies, no payment will be made for material that must be removed to correct deficiencies, or for that material placed in excess of the plus tolerance for the total thickness of concrete course as specified in 1.04 A.

B. The assigned unit price for concrete shall be one hundred thirty dollars ($130.00) per cubic yard or, in the case of Classified Work, the actual Contract unit price bid for the appropriate concrete item in the Schedule of Unit Prices For Classified Work.

C. Adjustments for surface smoothness and final surface grade will be based on the final test results, which are measured after the correction of deficiencies. Reductions in payment will be determined by the following:

$R = A \times T \times D \times F \times 0.037$

Where:

R = Reduction in payment per lot for surface smoothness or final surface grade, dollars

A = Area of lot, square feet

T = Design Thickness of Pavement in feet

D = Price per CY of concrete, assigned unit price or Contract unit price as set forth in 4.01 B.

F = Contract Unit Price Adjustment Factor specified in 4.02 A and 4.02 B.

Reductions in payment for failure to meet surface smoothness and final surface grades are calculated separately for the entire pavement or overlay surface. Deductions from Contract compensation are made for the requirement (surface smoothness or final surface grade), which results in the greatest payment reduction. Reductions for surface smoothness or final surface grade are in addition to all other adjustments to Contract compensation.

D. When the Engineer elects to adjust Contract compensation in lieu of correcting areas with deficiencies in surface smoothness, the Contract Unit Price Adjustment Factor specified in 4.01 C will set at 0.10.

4.02 ADJUSTMENT TO CONTRACT COMPENSATION FOR PAVEMENT DEFICIENCIES

A. Deficiency in Final Surface Grade Tolerance

Adjustment to Contract compensation for each lot will be made using the table entitled "Adjustment to Contract Compensation for Exceeding Final Surface Grade Tolerance" by entering the appropriate row with the percentage of all measurements within a lot which exceed the grade tolerance, measured in accordance with 3.03 B, and by reading the number under the column headed "Contract Unit Price Adjustment Factor".

ADJUSTMENT TO CONTRACT COMPENSATION FOR EXCEEDING FINAL SURFACE GRADE TOLERANCE	
Measurements Exceeding Grade Tolerance (Percent)	Contract Unit Price Adjustment Factor
0.0 – 5.0	0
5.1 – 10.0	0.05
10.1 – 15.0	0.25
15.1 and up	Corrective Work required as specified in 3.05.B.

The Contract Unit Price Adjustment Factor is used to calculate adjustments to Contract compensation as specified in 4.01 C.

B. Deficiency in Surface Smoothness

Adjustment to Contract compensation for each lot will be made using the table entitled "Adjustment to Contract Compensation for Surface Smoothness" by entering the appropriate row with the Profile Index, measured and calculated in accordance with 3.03 A.1, and by reading the number under the column headed "Contract Unit Price Adjustment Factor".

ADJUSTMENT TO CONTRACT COMPENSATION FOR SURFACE SMOOTHNESS	
Average Profile Index (inches per mile)	Contract Unit Price Adjustment Factor
0.0 - 15.0	0.00
15.1 - 16.0	0.02
16.1 - 17.0	0.04
17.1 - 18.0	0.06
18.1 - 20.0	0.08
20.1 - 22.0	0.10
22.1 and up	Corrective Work required as specified in 3.05 A

The Contract Unit Price Adjustment Factor is used to calculate adjustments to Contract compensation as specified in 4.01 C.

END OF SECTION

SECTION 02510

PLACEMENT OF PORTLAND CEMENT CONCRETE PAVING

APPENDIX "A"

SUBMITTALS

Submit the following in accordance with the requirements of "Shop Drawings, Catalog Cuts and Samples" of Division 1 - GENERAL PROVISIONS:

A. Shop Drawings

Submit detailed working drawings of formwork.

B. Samples

1. Sample of the joint dowel assembly.
2. Sample of the preformed bituminous joint filler.

C. Name of manufacturer and model number of the paver-finisher.

END OF APPENDIX "A"

SECTION 02510

PLACEMENT OF PORTLAND CEMENT CONCRETE PAVING

INSTRUCTIONS TO SPECIFIER

A. Contract Drawings

Ensure that the Contract Drawings show the following items specified in the text:

(1.03 C)	The Engineer shall ensure for Airfield Pavements that there are no conflicts with hours of work under "Airport Operations and Conditions," Division 1.
(1.04 A, B, C, D.2, D.3; 1.05 C; 3.03 B)	Concrete thickness, alignment and grades.
(3.01 A.1)	Lines and grades.
(3.01 A.2)	Bond breakers.
(3.01 A.2, A.3)	Asphalt pavement removal areas.
(3.02 A.2; 3.05 D.3.c)	Type, size, shape and location of pavement joints.
(3.02 A.3)	Radius of Vertical pavement adjacent to formed joints.
(3.02 A.5)	Depth of sawcut detail to be shown.
(3.02 A.7)	Show keyway details when required.
(3.02 B.1, B.5, B.6)	Location and size of dowels and tie bars.
(3.02 D)	Type and amount of reinforcing steel.
(3.02 G)	Locations of pavement to receive other than a broom finish. For runway pavements, sawcut grooves meeting FAA requirements should be provided.

B. Other Items

Ensure that the Specifications include the following Sections referenced in this Section:

(1.01)	"Portland Cement Concrete, Long Form"
(2.01 C.2)	"Concrete Reinforcement"
(2.01 F)	"Concrete Reinforcement"
(3.01 A.3d)	"Abrasive Blasting of Pavements," "Pavement Milling"
(3.02 A)	"Pavement Joint Sealing"

C. Designer Notes

1. Ensure construction estimate includes the one foot of base course required beyond the forms. Also, ensure that the net cost budget includes funds to pay performance incentives.

2. Use flexural strength of 750 psi for thickness design. For 7 day, 36 hour and 6 hour class concrete check that concrete will not be overstressed at initial cure strength.

3. When a flexural strength other than that shown in Specification Section 03301 is required, show the requirements on the Contract Drawings.

END OF INSTRUCTIONS