



# The City of **WORCESTER**

DEPARTMENT OF PUBLIC WORKS & PARKS

Parks, Recreation & Cemetery Division - Capital Projects

## **REQUEST FOR BIDS**

**Sport Court Renovations**

**May 2023**

### **PROJECT SPECIAL CONDITIONS & SPECIFICATIONS**

Jay J. Fink, P.E., Commissioner

Robert C. Antonelli, Jr., Assistant Commissioner



## TABLE OF CONTENTS

ARTICLE 1	PROJECT SITE.....	4
ARTICLE 2	SUMMARY OF WORK .....	4
ARTICLE 3	WORK WITHIN A PUBLIC PROPERTY.....	5
ARTICLE 4	SITE INSPECTION .....	5
ARTICLE 5	PRE-CONSTRUCTION MEETINGS .....	5
ARTICLE 6	SITE ACCESS .....	5
ARTICLE 7	OWNER'S TAX EXEMPTION .....	5
ARTICLE 8	TIME FOR COMPLETION & SEQUENCE OF WORK .....	5
ARTICLE 9	LIQUIDATED DAMAGES.....	6
ARTICLE 10	CONSTRUCTION SCHEDULES & PAYMENT ESTIMATES.....	6
ARTICLE 11	CONSTRUCTION REPORTS & WEEKLY PROGRESS MEETINGS .....	7
ARTICLE 12	HOURS OF OPERATION.....	7
ARTICLE 13	CONTRACT DOCUMENTS.....	7
ARTICLE 14	STORAGE, USE OF MATERIALS & EQUIPMENT/MACHINERY .....	7
ARTICLE 15	DELIVERY, INSPECTION & ACCEPTANCE OF NEW AMENITIES.....	7
ARTICLE 16	CARE AND RESPONSIBILITIES OF CONTRACTOR.....	8
ARTICLE 17	EMERGENCY CONTACT INFORMATION .....	9
ARTICLE 18	ON SITE SUPERINTENDENT & PROJECT MANAGER .....	9
ARTICLE 19	PROVISIONS FOR TRAFFIC/POLICE DETAIL (As Applicable) .....	9
ARTICLE 20	COMMUNICATIONS.....	10
ARTICLE 21	PARTIAL USE OF SITE IMPROVEMENTS.....	10
ARTICLE 22	SAMPLING, TESTING, INSPECTION OF WORK & MATERIALS.....	10
ARTICLE 23	TEMPORARY FACILITIES.....	10
ARTICLE 24	SANITARY FACILITIES.....	11
ARTICLE 25	TEMPORARY LIGHT AND POWER .....	11
ARTICLE 26	TEMPORARY WATER .....	11
ARTICLE 27	UTILITIES.....	11
ARTICLE 28	PHOTOGRAPHS & TIME-LAPSE CAMERAS - Not in Contract (NIC) .....	11
ARTICLE 29	CONTRACTOR'S SHOP & WORKING DRAWINGS.....	11
ARTICLE 30	HISTORICAL, ARCHAEOLOGICAL OR ANTIQUE ITEMS .....	13
ARTICLE 31	PROVISIONS FOR PUBLIC SAFETY & CONVENIENCE.....	13
ARTICLE 32	PROTECTION OF EXISTING FACILITIES.....	14
ARTICLE 33	AS BUILT SURVEY / PROJECT CLOSEOUT DELIVERABLES (NIC) .....	14
ARTICLE 34	RUBBISH REMOVAL .....	14
ARTICLE 35	PROJECT CONSTRUCTION SIGN (NIC) .....	14
ARTICLE 36	DEMOLITION, SITE EXCAVATION & PREPARATION.....	14
ARTICLE 37	CAST IN PLACE CEMENT CONCRETE (NIC) .....	16
ARTICLE 38	GRAVEL BORROW (NIC) .....	16
ARTICLE 39	BITUMINOUS CONCRETE PAVING (NIC) .....	16
ARTICLE 40	GENERAL LAWN AREAS, LOAM & SEEDING .....	16
ARTICLE 41	SECURITY CAMERA APPURTENANCES (NIC).....	22
ARTICLE 42	PLAYGROUND EQUIPMENT (NIC).....	22
ARTICLE 43	POURED-IN-PLACE PLAYGROUND SAFETY SURFACING (NIC).....	23
ARTICLE 44	SPORTS COURTS BIT. CONCRETE RENOVATION & PAINTING .....	23
ARTICLE 45	WPRC DIVISION CHAIN LINK FENCE FRAMEWORK & FABRIC (NIC).....	23
ARTICLE 46	ATTACHMENTS .....	23

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## PROJECT SPECIAL CONDITIONS

### ARTICLE 1 PROJECT SITE

- a. All work of this contract is located within the confines and adjacent Right-of-Way of:
- a. **BASE BID:** Burncoat Playground Basketball, Tennis and 4-Square Courts, 524 Burncoat Street
  - b. **ADD ALTERNATE #1:** University Park Basketball Courts, 965 Main Street
  - c. **ADD ALTERNATE #2:** University Park Volleyball Court, 965 Main Street
  - d. **ADD ALTERNATE #3:** Piedmont St. Basketball Court, 124 Piedmont Street
  - e. **ADD ALTERNATE #4:** Vernon Hill Basketball Court, 144 Vernon Street
  - f. **ADD ALTERNATE #5:** Beaver Brook Basketball Court, 300 Chandler Street

....properties owned and maintained by the City of Worcester DPW and Parks.

### ARTICLE 2 SUMMARY OF WORK

- a. The work to be completed under this contract involves the furnishing of all labor, materials and equipment for the following items of work and all incidentals thereto. All work shall be performed in full accordance with the specifications, other contract documents, obviously implied and necessary or under the direction of the Owner.
- b. The plans and specifications are intended to be cooperative, and any item called for in one and not the other shall be as binding as if called for in both. During the bidding period discrepancies should be immediately brought to the attention of the Owner for clarification. If a discrepancy is discovered within the plans and the specifications after the Bid period, **the Owner will determine which shall apply.**
- c. When Applicable, The City of Worcester DPW and Parks, will specify Project Standard appurtenances/amenities such as, but not limited to, park benches, trash receptacles, irrigation controllers, pedestrian, parking and sports field lighting, etc. in the facilities within their jurisdiction that are **currently installed at this or other facilities.** By standardizing, it provides the Division with a consistent product which through familiarity reduces operator training and maintenance time. Standardization also provides opportunities for maintenance cost saving through interchangeable parts such as but not inclusive to luminaries, ballast, poles, compatibility with current Division maintenance equipment etc.
- d. Quality Control: In order to ensure the highest level of quality with respect to the playing surface of this greatly utilized public athletic facility, the General Contractor / Awardee shall have a minimum of five (5) years of successful experience.
- 1. as the Prime Contractor constructing (provide verifiable references upon request)
  - 2. ability to demonstrate constructing (provide verifiable references upon request)
  - 3. coordinating and supervising (provide verifiable references upon request)

**Park and Playground Improvements** of similar scope, quality and size of this Project as per the standards of the Project specifications and construction drawings.

- e. **Project Scope of Work:** Provide a lump sum price to prep, clean, furnish and install, renovations, repairs, utilizing the RiteWay® Tru-Bounce Crack Repair System (or approved equal), and re-painting using a textured acrylic color surfacing system for bituminous concrete sports courts and play areas.

**ARTICLE 3      WORK WITHIN A PUBLIC PROPERTY**

- a. As a point of information, all the work to be undertaken is located within the confines of an unsecured public property, and as such is subject to acts of vandalism. The City of Worcester is not liable for any damage to the Contractor's equipment or materials. The Contractor shall take all means and measures necessary to protect the public, work in progress, work completed, and all furnishings, materials and equipment stored at the site through the completion of the Project. The repair or replacement of work in place or in progress shall be the sole responsibility of the Contractor and shall be accomplished at no cost to the Owner.
- b. **Furnish, install, and maintain six-foot height panelized/mobile temporary constructions metal fence and hardware as required to protect and secure the limits of work. Restore any areas disturbed or damaged by the work.**

**ARTICLE 4      SITE INSPECTION**

- a. **It shall be contingent upon the Contractor to inspect the site as an aid to determining the extent and quantity of the work under the various contract items before submission of the Bid.**

**ARTICLE 5      PRE-CONSTRUCTION MEETINGS**

- a. A mandatory pre-construction meeting will be arranged by the Owner's representative after the award of the Contract. Sub-consultants may be asked to attend the pre-construction meeting if determined by the Owner's Representative to be warranted.

**ARTICLE 6      SITE ACCESS**

- b. Prospective bidders are advised that access to the Project sites shall be in accordance with the governing traffic patterns with specific locations into the site, to be verified in the field after award of the contract.
- c. Regardless of the eventual location of the construction access and limits of work, the Contractor shall make every provision to ensure the access and safety of the public using the balance of any of the existing amenities on the property.

**ARTICLE 7      OWNER'S TAX EXEMPTION**

- a. The Awarding Authority, as a department of a corporate municipality in the Commonwealth is exempt from the taxes listed below. Contractor shall notify all suppliers of the following current certificates.
  - 1. Federal Excise Taxes as applied to articles taxable under Chapter 32 of the Internal Revenue Code of 1954, as amended, City Excise Tax Exemption Certificate is not required.
  - 2. From Sales and Use Tax imposed by the Commonwealth of Massachusetts under Chapter 14, Acts of 1966, the City has been assigned and exemption certificate with respect to leases, rentals, or purchases of "Tangible Personal Property". The Owner at the Contractor's request will furnish the tax-exempt certification number.

**ARTICLE 8      TIME FOR COMPLETION & SEQUENCE OF WORK**

- a. Except as the work may be interrupted by weather conditions as hereinafter specified, the Contractor shall prosecute the Work with the diligence necessary to ensure its completion within the required time. The Contractor shall provide sufficient labor, materials, and equipment, and shall promptly take such appropriate action to keep the Work on schedule or as directed by the Owner. No additional time shall be provided for Change Orders.



- b. The Parks, Recreation and Cemetery Division shall be solely responsible for determining when the work shall be interrupted due to unsatisfactory weather conditions. Determination of the period to be included in the Time for Completion shall cease when the City directs that the work stops due to weather and shall commence again on the first working day thereafter that the City may designate for the work to be resumed.
- c. The Contractor must completely understand that once the Contractor mobilizes and begins work, the Contractor shall be on-site, every day during the normal work week, and must work continuously until substantial completion of the Project. The Parks, Recreation, and Cemetery Division will not allow any time gaps of any length of time during the construction due to the Contractor's scheduling of other work not related to this specific Contract.
- d. It should be further understood that this Project will not be a "fill-in" for the Contractor and that the Contractor does not have the ability to start and stop construction at the Contractor's option. Any unauthorized time gaps will be subject to a flat fee of \$500.00 per day. The Owner reserves the right to deduct said fee from the Contractor's periodic application for payment and the Contract Sum.
- e. The Contractor shall carry on the Work and adhere to the schedule during all disputes and disagreements with the Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements. The Contractor shall exercise reasonable precautions, efforts and measures to avoid or mitigate situations that would cause delays.
- f. Punch list shall be completed within 28 days from date of issue.
- g. The Contractor is advised that the **required calendar days** regarding Time for Completion and Punchlist, shall be consecutive.

#### **ARTICLE 9 LIQUIDATED DAMAGES**

- a. Prospective Bidders are advised that liquidated damages shall be in effect for this Project. The Contractor shall be liable for and compensate the Owner.
  - 1. the sum of Five Hundred and Dollars (\$500.00) as fixed and agreed, as liquidated damages for each calendar day of delay from the date stipulated for completion, or as modified in accordance with the provisions of the Contract
  - 2. If Applicable, State and Federal Grant Funding losses.
  - 3. and/or actual costs incurred by the Owner for additional Construction Administration/Management (City Staff, Consultants, etc.) salaries/compensation from the date stipulated for completion, or as modified in accordance with the provisions of the Contract and notification to The Sureties.

#### **ARTICLE 10 CONSTRUCTION SCHEDULES & PAYMENT ESTIMATES**

- a. The Contractor must submit a construction schedule to the Owner indicating the general sequence of all work under this Contract. This schedule must be submitted within 7 calendar days of the date of the Notice-to-Proceed and shall be revised if required to the satisfaction of the Owner.
- b. The Contractor shall submit a breakdown and monthly cost estimate (schedule of values) for all items of work, including separate categories, phases, grant funded or reasonable requests by the Owner.
- c. The established breakdown of items, categories and values shall be utilized to prepare the monthly pay requisition forms. It is recommended that the Contractor submit a draft Payment Applications to the Owner for approval, no later than the **second** week of every month. The Owner shall review and edit this copy to indicate the amount of payment to be approved and return this to the Contractor after field review.
- d. Revised/updated; monthly payment estimates, construction schedule, As Builts and proof of up-to-date daily

construction reports shall be submitted with monthly Payment Applications. The Contractor shall then formally submit three (3) originals of the Payment Applications, conforming to the Owner's approval, for payment.

**ARTICLE 11 CONSTRUCTION REPORTS & WEEKLY PROGRESS MEETINGS**

- a. The Contractor and Sub-Contractors shall attend a regular weekly meeting with the Owner at the Parks, Recreation and Cemetery Division Headquarters, 50 Officer Manny Familia Way, Worcester, MA, at a pre-determined time set by the Owner. The Contractor must be present for these meetings during the Contract and reserves no right to cancel the meeting.
- b. The Contractor will be required to take minutes for the weekly scheduled meetings. The Contractor will have three (3) business days from the date of the meeting to submit to the Owner the minutes of the meeting on the Parks, Recreation and Cemetery Division form. The form will be supplied to the respective Contractor when the Notice to Proceed has been issued.
- c. The Contractor will be required to maintain daily construction reports (DCRs) (format and information required to be provided and/or approved by Owner). PDF of the DCRs shall be submitted weekly for Owner review and files.
- d. The Owner may desire other meetings from time to time, and the Contractor shall attend these, and such Sub-Contractors as are directed to attend. All the above-mentioned conditions should apply.

**ARTICLE 12 HOURS OF OPERATION**

- a. Unless otherwise approved by the Owner, hours of operation shall be 7:00 a.m. to 3:30 p.m., Monday through Friday, excluding City observed holiday(s).

**ARTICLE 13 CONTRACT DOCUMENTS**

- a. The Owner will furnish the Contractor, without charge, four (4) complete copies of the Contract Documents. Additional copies requested by the Contractor will be furnished at cost.

**ARTICLE 14 STORAGE, USE OF MATERIALS & EQUIPMENT/MACHINERY**

- a. Bidders are advised that the storage of equipment within the confines of the Project limit shall be at the Contractors own risk. No material or equipment shall be stored outside the limits of work as defined in the contract documents, designated and agreed to by the Owner.
- b. The Contractor shall not use as any part of his operation any skid steered, track driven, or heavy machinery/equipment on adjacent roadways.

**ARTICLE 15 DELIVERY, INSPECTION & ACCEPTANCE OF NEW AMENITIES**

- a. General Contractor shall provide product manufacturer and Owner, 72 hours advance notice of any onsite scheduled deliveries of Amenities for Inspection and Acceptance.
- b. Any damages noted by any of the parties present at time of inspection shall be corrected in one of the three options below, as determined by the Owner, with no delays or extensions to the Project Schedule.
  - 1. Repair to the **FIT & FINISH** of the manufacturer's/factory Specification prior to installation.
  - 2. Replace with new product from manufacturer/factory.
  - 3. Install damaged product and field repair to the Owner's satisfaction and provide new identical replacement part as spare.
  - 4. This Article shall also apply to amenities stored offsite and damages discovered while under the Responsibilities of the General Contractor, until the Acceptance of Work.



**ARTICLE 16 CARE AND RESPONSIBILITIES OF CONTRACTOR**

- a. Except as otherwise specifically stated in the Contract Documents and Technical Specifications, the Contractor shall provide and pay for all materials, tools, labor, equipment, water, light, heat, power, transportation, superintendence, protection, temporary construction of every nature, charges, levies, fees or other expenses, permits and back charges and all other services and facilities of every nature whatsoever necessary for the performance of the Contract and to deliver all improvements embraced in this Contract completed in every respect within the specified time.
- b. Unless otherwise specified herein all materials, workmanship, methods, and practices shall conform to the current Standards and Ordinances of the appropriate Departments and/or Commissions of the City. The following documents are available online at [www.worcesterma.gov/engineering](http://www.worcesterma.gov/engineering).
  - i. The City of Worcester DPW and Parks, Engineering Division, Construction Management Section, Standard Specifications and Details - March 2007 or current edition.
  - ii. Permit Manual – Revised 2004 or current edition.
- c. The Contractor shall be responsible for detailed layout. All stakeout and grade control shall be performed by a third-party MA registered Land Surveyor, approved by the Owner, for this purpose. The Owner has the option to verify and approve the layout and locations of improvements prior to excavation or installation.
- d. Grade control shall be verified by the Contractor for compliance with federal, state and or local accessibility requirements. During the construction sequence (such as: installation of subbase, bituminous binder and/or top, concrete flatwork etc.), the Contractor shall be required to verify grades, by approved methods, with the Owner present and prior to placement of finished grade for sidewalks, pathways, plazas, ramps, parking spaces, associated appurtenances, etc., that are required to meet accessibility and the Project Documents.
- e. The Contractor shall verify dimensions and utility locations shown on the plans and if any inconsistencies or discrepancies should be noted on the Drawings, or between the Drawings and actual field conditions, or between the Drawings and the specifications he/she shall immediately notify the Owner. The Contractor will be held responsible for any errors resulting from his/her failure to exercise the precaution. Such information shall be marked on copies of the "As Built" drawings and the original "As Built" drawings are to be reviewed at weekly job meetings.
- f. The Contractor shall provide final As Built Survey Drawings to the Owner. See "Record Drawings – As Built" of this Section. Punch list items shall be completed within twenty-eight (28) consecutive calendar days from date of issue, unless agreed upon otherwise by both parties. Owner has the right to complete punch list items not completed in within this timeline and deduct cost from the Contract.
- g. The Contractor shall maintain a full-time onsite superintendent, whether the construction forces are employed by his construction company or employed by a Sub-Contractor.
- h. As soon as the Contract is executed, the Contractor shall order materials, submit construction schedules as herein after specified and otherwise anticipate the Notice to Proceed. When the Owner gives the Notice to Proceed, the work of construction shall begin at the time stipulated therein and shall be completed within the Time for Completion specified.
- i. It is the Contractor's responsibility to make his own investigation and related assumptions, to satisfy her/him as to subsurface conditions and to ensure that these are reflected in the bid.
- j. In order to verify locations of utilities and varying field conditions, exploratory excavations may be necessary, the cost of which is to be included in the contract bid price.



- k. The Contractor's attention is called to the necessity of obtaining permits and coordination with, especially those required by various departments of the City and all external utility companies. These permit fees will **not be waived** by the City and must be paid in full by the Contractor.
- l. The Contractor shall furnish and maintain all temporary fences, barriers, enclosures, lights and warning devices necessary to protect his/her work area and to protect the public and his work forces throughout the life of this Contract.

#### **ARTICLE 17 EMERGENCY CONTACT INFORMATION**

- a. The Contractor will be required to submit within seven (7) business days after the Notice to Proceed a list of all people that will be involved with the completion of this Project including all principal(s), president(s), superintendent, and Project manager of the company. The list shall contain the following information, including but not limited to name, title, address, voice mail number, cell/contact phone number, fax number and email address.

#### **ARTICLE 18 ON SITE SUPERINTENDENT & PROJECT MANAGER**

- a. The Contractor must, always, maintain an on-site Superintendent during the construction and administration of this Contract. The superintendent must be completely familiar with all aspects of the Project and capable of following the construction through from start to finish. The Contractor does not have the right to switch, replace, change or otherwise remove the superintendent assigned to this Project unless specifically authorized in writing by the Owner. The on-site superintendent must be present a minimum of seven (7) hours per day during construction. If the on-site superintendent fails to meet the above-mentioned requirements, the Contractor will be subject to a flat fee of \$500.00 per day. The Owner reserves the right to deduct said fee from the Contractor's periodic application for payment and the Contract Sum.

The Contractor must assign a Project Manager to this Contract that is completely familiar with all aspects of the work, available and capable of completing the Project. The Contractor does not have the right to switch, replace, change or otherwise remove the on-site Superintendent and/or Project Manager assigned to this Project unless specifically authorized in writing by the Owner. It should be further understood that the Owner would discuss all matters regarding the administration of this Contract with only one (1) Project Manager, regardless of how many the Contractor assigns to the Project.

All correspondence, emails, voice mail, faxes, etc. will be handled through the designated Project Manager only. The Parks, Recreation and Cemetery Division reserves the right, in conjunction with the Contractor, to remove the Contractor's assigned on-site Superintendent and/or Project Manager if the City feels it is the best interest to do. Upon written notification, the Contractor must assign a new Project Manager within three (3) business days.

#### **ARTICLE 19 PROVISIONS FOR TRAFFIC/POLICE DETAIL (As Applicable)**

- a. The Contractor shall not close or obstruct any portion of the **RIGHT-OF-WAY** without obtaining the necessary permission from the proper municipal authorities. If any street or private way shall be rendered unsafe by the Contractor's work, he shall make such repairs or provide such temporary ways or guards as shall be acceptable to the Owner including the provision of police details required to complete the work.
- b. The Contractor at his/her expense shall maintain public roads and sidewalks passable and accessible, and the Contractor shall assume full responsibility for the adequacy and safety of provisions made. He shall conduct his construction operations such that interference with the activities of park users will be held to a minimum.
- c. The Contractor shall cooperate in every way possible with the municipal authorities in accommodating park activities and events.



## **ARTICLE 20 COMMUNICATIONS**

- a. All notices, demands, requests, instructions, approvals, proposals and claims must be in writing and must be presented in person or by mail to the Owner, or alternate methods (s) agreed upon by both parties.
- b. Any notice to or demand upon the Contractor shall be considered sufficiently given if delivered at the office or field office of the Contractor stated on the signature page of the Agreement (or at such other office as the Contractor may from time to time designate in writing to the Owner), or if deposited in the United States mail in a sealed, postage prepaid envelope, or delivered with charges prepaid to any telegraph company for transmission, in each case addressed to such office.
- c. All papers required to be delivered to the **Owner** shall, unless otherwise specified in writing to the Contractor, be delivered to:

Robert C. Antonelli, Jr., Assistant Commissioner  
Department of Public Works and Parks  
50 Officer Manny Familia Way, Worcester, MA 01605

and any notice to or demand upon the Owner shall be sufficiently given is so delivered, or if deposited in the United States mail in a sealed, postage prepaid envelope, or delivered with charges prepaid to any telegraph company for transmission to said Owner at such address, or to such other representatives of the Owner or to such other address as the Owner may subsequently specify in writing to the Contractor for such purpose.

- d. Any such notice shall be deemed to have been given as of the time of actual delivery or (in the case of mailing) when the same should have been received in due course of post, or in the case of telegrams, at the time of actual receipt.

## **ARTICLE 21 PARTIAL USE OF SITE IMPROVEMENTS**

- a. The Owner, at its election, may give notice to the Contractor and place in use those sections of the improvements which have been completed, inspected and can be accepted as complying with the Technical Specifications and if, in its opinion, each such section is reasonably safe, fit and convenient for the use and accommodation for which it was intended, provided:
  1. The use of such sections of the improvements shall in no way impede the completion of the remainder of the work by the Contractor.
  2. The Contractor shall not be responsible for any damages or maintenance costs due directly to the use of such sections.
  3. The use of such sections shall in no way relieve the Contractor of his liability due to having used defective materials or due to poor workmanship.
  4. The period of guarantee stipulated in the specifications shall not begin to run until the date of the final acceptance of all work which the Contractor is required to construct under this Contract.

## **ARTICLE 22 SAMPLING, TESTING, INSPECTION OF WORK & MATERIALS**

- a. Sampling, testing and inspections ordered or required by the Owner to ensure that work and materials are as specified, and that compaction of all materials conforms to the necessary requirements shall be taken and completed by the Owner or representatives of a Massachusetts certified testing laboratory satisfactory to the Owner and shall be paid for by the Owner unless described/required in the Technical Specifications. Contractor shall provide the Owner at least 72 hours advance notice of work to coordinate the intent of this Article and shall apply automatically with all work below finished grade unless directed otherwise by the Owner.

## **ARTICLE 23 TEMPORARY FACILITIES**

- a. Furnish all labor, materials, and services to fulfill the requirements for temporary facilities, at no additional cost to the Owner, and comply with all requirements set forth herein, except where noted requirements conflict with

Federal, State, or Local laws, rules, and regulations, in which case(s) the applicable Federal, State, or Local requirements shall govern.

**ARTICLE 24     SANITARY FACILITIES**

- a. Provide, place, and maintain in good order from the commencement to final completion of the work, suitable temporary toilet facilities for use by all persons employed under this contract. Toilets shall be rented from and serviced by an approved company and shall be kept sanitary and always secured. The type of toilets proposed for use shall have the approval of the appropriate City Agency, and the number of units shall be as recommended by the Department of Labor. Toilets shall be locked during nonworking hours and placed in a secured (fenced) location, where possible.

**ARTICLE 25     TEMPORARY LIGHT AND POWER**

- a. Make all necessary arrangements with the local utility company and pay all costs including labor, in operating and maintaining all temporary services for electricity used during the construction, unless specifically noted otherwise.
- b. Ensure that temporary wiring, outlets, and lighting are provided in accordance with the current requirements of Bulletin No. 12, Division of Industrial Safety, Department of Public Safety, Commonwealth of Massachusetts.

**ARTICLE 26     TEMPORARY WATER**

- a. Contractor shall be responsible to furnish, install and coordinate temporary water needs and temporary connections. **Contractor is eligible to apply for a hydrant use permit through the City of Worcester DPW and Water Department.**

**ARTICLE 27     UTILITIES**

- a. The Contractor shall obtain and pay for all licenses and/or permits, which are required by the City or any other agencies that may be involved; he/she shall comply with all codes, regulations and standards of the City.
- b. Contractor shall be responsible for all on-site coordination with utility companies and public agencies and for obtaining all required permits and paying all required fees. In accordance with M.G.L., Chapter 82, Section 40, including amendments; Contractor shall notify all utility companies and government agencies in writing prior to such excavation, Contractor shall also call "Dig Safe" at 1-(888) 344-7233 no less than 72 hours (exclusive of Saturdays, Sundays and Holidays.) prior to such excavation. Documentation of requests and numbers provided to Contractor shall be provided to Owner prior to excavation work.

**ARTICLE 28     PHOTOGRAPHS & TIME-LAPSE CAMERAS - Not in Contract (NIC)**

**ARTICLE 29     CONTRACTOR'S SHOP & WORKING DRAWINGS**

- a. Contractor to coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
- b. All Contractors are directed to the timeliness and critical importance of expediting the submittal process. Any lead times that may impact sequencing should be prioritized to meet the Project schedule. The Owner must be notified if any delays arise that impact lead times.
- c. The Contractor shall coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that requires sequential activity.



- d. The Owner reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
- e. To avoid the need to delay installation as a result of the time required to process submittals and to allow sufficient time for submittal review, all initial product submittals, shop drawings shall be submitted for processing and within **twenty-eight calendar days** (28) days from the date of Notice to Proceed.
- f. The Contractor must allow the Owner **10 calendar days** (10) per initial and subsequent shop drawing review to achieve efficient construction sequencing. Allow additional time if the Owner must delay processing to permit coordination with subsequent submittals. If an intermediate submittal is necessary, process the same as the initial submittal. Allow ample time for reprocessing each submittal to achieve efficient construction sequencing.
- g. No extension of Contract Time will be authorized because of the Contractor's failure to transmit submittals to the Owner for processing sufficiently in advance of the scheduled Work.
- h. Shop drawings, product data and samples submitted for each item will be reviewed no more than two (2) times at the Owner's expense. Submittals failing to comply with the Contract requirements will be reviewed at times convenient to the Owner and the Owner's consultants and at the Contractor's expense, based upon the hourly rate of the Engineer/Consultant for each subsequent re-submittal. The Owner reserves the right to deduct said reimbursement from the Contractor's periodic application for payment and the Contract Sum.
- i. The Owner's review and approval of submittals shall be held to limitations stated in the conditions of the Contract. In no case shall approval or acceptance by the Owner be interpreted as release of Contractor of responsibility to fulfill requirements of Contract Documents. No acceptance or approval of submittals, nor any indication or note marked by the Owner on submittals, shall constitute authorization for increase in Contract Sum. The Owner will stamp each submittal with an action stamp.
- j. As the timely submittal of samples, shop drawings, catalogue cuts and other related submittals is of paramount importance to the completion of the Project within the stipulated time period, a contract value of 1% will be assigned to this effort. Upon receipt of the complete submittal package the General Contractor will be permitted to submit payment of this item with a value equal to 1% of the base bid contract amount.
- k. Show in large-scale any unique fabrication and setting requirements or any other specified areas seen as necessary or as directed by the Owner's Representative.
- l. Prior to review by Owner's representative, shop drawings shall indicate specification section or drawing reference and proof of review and approval by Contractor for Project compliance, otherwise the submittal will be rejected immediately and count as one (1) official review as per item "h" above.
- m. The Contractor shall provide two sets of bindered hard copies of all final approved shop documents and or drawings and warranties as part of the closeout of the Project.
- n. Contractor shall submit to the Owner's Representative a notarized certificate of compliance from the galvanizer with all galvanizing requirements including ASTM number and weight of coatings in ounces per square foot. Certificate of compliance shall also contain the following:
  - 1. Sole Source Responsibility: include statement that galvanizer accepts sole responsibility for coatings under this Article. Galvanizer who does not accept this responsibility is not acceptable and will be rejected.
  - 2. Quality Assurance: include evidence that Galvanizer meets requirements of ANSI Q90.
  - 3. Certificate of Compliance with Current Environmental Regulations: Galvanizer shall certify that coatings proposed for use comply with applicable environmental regulations. Contractor and Galvanizer shall be

responsible for penalties assessed by governmental or environmental authorities for coatings that do not comply with current environmental regulations. All coatings shall be Lead-free.

**ARTICLE 30 HISTORICAL, ARCHAEOLOGICAL OR ANTIQUE ITEMS**

- a. The Contractor during his excavation, site clearance and other operations may come upon, uncover or otherwise discover items of historical, archaeological or antique nature. The Contractor shall immediately stop operations at the site of the discovery and notify the Owner so that a proper evaluation may be made of its importance. The Owner shall arrange for the evaluation in a manner that shall not unduly interfere with the Contractor's operation.
- b. All such items, if designated by competent authority to be of historical, archaeological or antique nature shall not become the property of the Contractor but shall be placed in the custody of the Owner for disposition.
- c. The Contractor shall be required to remove with care or to assist in the removal of any such item or items and to transport the same to a place of safe keeping within the City. The costs for so assisting shall be reimbursed to the Contractor if approved by the Owner.

**ARTICLE 31 PROVISIONS FOR PUBLIC SAFETY & CONVENIENCE**

- a. Care shall be taken to establish and maintain such methods and procedures as will not create hazards. Access to all park facilities and shall be maintained in a reasonable and safe manner for the duration of the construction period.
- b. Every reasonable effort shall be made to reduce to a minimum any interference with or inconveniences to park operations and park patrons due to the construction work. Excavated material shall be trucked away and returned if the Owner deems it necessary and practical as a means for avoiding serious interference with and inconvenience to business concerns and abutters.
- c. The Contractor's attention is directed to the fact that the work on this Project is to be performed within a recreation area and adjacent to park drives and walkways which are utilized by pedestrians, bikers, joggers and vehicles. The Contractor shall be responsible for the installation of adequate precautions and other safety measures and controls deemed necessary by the Owner in order to protect all park users.
- d. Any automotive equipment not protected by traffic cones that is operating on a public way under this Project shall have one amber flashing warning light mounted on the cab roof or on the highest practical point of the machinery. This light shall be in operation while the equipment is so working.
- e. Trenches shall not be opened in park areas until all material and equipment required for the work are on the site and available for immediate use. The work at each trench shall be practically continuous, with the placing of utilities, backfill and patching (where applicable) of the surface closely following each preceding operation. When work is not in progress, trenches in areas subject to use by park patrons shall be covered with steel plates capable of safely sustaining all anticipated loads.
- f. The Contractor shall provide traffic signs, warning markers and other construction safety measures as necessary to maintain public safety and optimum traffic flow. Parking of personal vehicles will be prohibited in construction areas as directed.
- g. With suspension of construction activities during holidays, weekends and nights, the Contractor shall remove temporary traffic and/or safety control devices, as requested, and return them to their positions when work begins again. Payment for the installation and maintenance of appropriate safety provisions shall be included under the base bid price and no separate payment shall be considered.
- h. The Contractor shall without additional compensation be required to always maintain access to the Project area and property for fire apparatus and other emergency vehicles.



#### **ARTICLE 32 PROTECTION OF EXISTING FACILITIES**

- a. All existing walks, pipes, conduits, poles, fences, stairways, curbing, walls, buildings, trees and other structures which are to remain in place shall be carefully supported and protected from injury by the Contractor without additional compensation and in case of injury they shall be restored by him without compensation therefore to as good condition as that in which they were found. The value of any trees damaged shall be determined in accordance with established practices of the American Association of Nurserymen or a Registered or Certified Arborist selected by the Project Manager. Limits of liability shall not be limited to the replacement with new and immature trees.
- b. The Contractor shall, at his own expense, provide suitable and safe bridges and other crossings, where required, for accommodation of travel and to provide access to the building/property during construction, and shall remove said structures thereafter.
- c. The location of all/ prior existing utility systems is not known and therefore may not be shown on the drawings prepared for this Project. The existence of utilities shall not be considered as an unusual obstacle, and the Contractor shall not be entitled to extra compensation for maintaining, protecting, or repairing these utilities. The Contractor shall use the exploratory excavation included in his contract price, whenever he/she or the Owner's representatives deem it necessary to verify, or prevent interruption of, existing services.

#### **ARTICLE 33 AS BUILT SURVEY / PROJECT CLOSEOUT DELIVERABLES (NIC)**

#### **ARTICLE 34 RUBBISH REMOVAL**

- a. The Contractor shall remove all rubbish, waste, tools, equipment, and appurtenances caused by and used in the execution of the work; but this shall in no way be construed to relieve the Contractor of his primary responsibility for maintaining the site clean and free of debris, leaving all work in a clean condition. The Contractor shall always keep the site free of rubbish and construction debris.
- b. The Contractor shall provide sufficient metal barrels or dumpsters into which all refuse and garbage shall be deposited. All containers shall have tight fitting covers. These shall be secured overnight or removed daily.
- c. At the end of each work week, the Contractor shall thoroughly clean premises of rubbish and debris of any nature and remove such from the premises.

#### **ARTICLE 35 PROJECT CONSTRUCTION SIGN (NIC)**

#### **ARTICLE 36 DEMOLITION, SITE EXCAVATION & PREPARATION**

- a. The work shall consist of excavating, removing and legal disposal of surplus if any, vegetation, earth, boulders, masonry, existing pavements, building materials, footings, appurtenances and other materials encountered of whatever nature that is unsuitable for the construction and improvements of finished conditions. Excavated to the depth necessary to install according to the specifications, plans and details plans provided in the construction bidding documents.
- b. Location of existing utilities shall be verified before excavation commences. The Drawings are based on available utility record drawings and site observation.
- c. The excavation shall be carried out to such depths that sufficient materials will be left above the designated grade to allow for compaction to this grade. Should the Contractor, through negligence or other fault, excavate below the designated lines, he shall replace such excavation at his own expense. The Owner shall have complete control over excavation, moving, placing, and disposition of all material. Existing materials/objects determined to be unsuitable or not required or used, as determined by the Owner, for finished conditions shall be disposed offsite at no additional cost.

- d. The Contractor shall inform and satisfy himself as to the character, quantity, and distribution of all material to be excavated. No payment shall be made for any excavated material, which is used for purposes other than those designated or implied.
- e. If it is necessary in the process of the work to interrupt existing surface drainage, sewers, or to pass under drainage, conduits, utilities, or similar underground structures, or parts thereof, the Contractor shall protect it or provide temporary services. The Contractor shall, at his own expense, satisfactorily repair all damage to such facilities or structures that may result from any of his operations or from negligence during the period of the Contract.
- f. No excavation shall be started until the Owner has approved the proposed area of construction.
- g. Excavation shall be performed at such places as are indicated on the Drawings, to the lines, grades and elevations shown or as directed by the Project Manager and shall be made in such manner that requirements for the formation of the sub-grade can be followed. Unless directed otherwise any disturbed existing rimmed structures shall be adjusted flush to final adjacent grade.
- h. Existing pavements and base courses shall be carefully saw cut or core drilled and removed to the lines indicated and, in a manner, to obtain sound edges or connections, and so as not to disturb or damage existing buildings, utilities, pavements, and base coats which are to remain.
- i. Unit pavers, such as granite brick and concrete, shall be carefully removed and stockpiled for reuse, if required.
- j. All excavations shall be opened using minimum, straight, parallel cuts through pavement and base materials, and other excavations opened using square or rectangular cuts or as directed to minimize removal while permitting regular, straight-line repair and patching.
- k. No excavation shall commence in any until the pavement covering the proposed excavation has been marked for cutting.
- l. Excavated areas shall be made safe for the residents at the end of each workday.
- m. Transport excavated materials, waste materials, trash, and debris and legally dispose of it off City property.
- n. Prevent, minimize and control groundwater and/or surface water to accumulate in excavations. Remove water to prevent the undercutting of footings and soil changes detrimental to the stability of sub-grades, foundations and granite, brick or concrete paving.
- o. Payment for site excavation and preparation work shall be considered incidental to the individual items installed. No separate payment shall be made for site excavation and preparation work. No separate payment shall be made for all labor, equipment, tools and incidentals necessary to complete the work to the satisfaction of the City, including transportation and disposal of excavated materials.
- p. It is the responsibility of the Contractor to verify the accuracy of all survey information provided by the Owner prior to commencing excavations or filling operations. Commencement of these operations constitutes acceptance of the survey information as appropriate to meet the intent of the Contract.
- q. Soil testing, if required, for all materials to be reused on-site or removed and disposed of offsite, shall be the responsibility of the Contractor. The City reserves the right to obtain its own test results from the same sample as the Contractor without penalties to the Owner. The Contractor is required to obtain a large enough sample to divide with the Owner for this proposes.
- r. Transport excavated materials, waste materials, trash, and debris and legally dispose of it off City property.
- s. Surplus excavated material not needed as specified above shall be hauled away and disposed of by the Contractor at no additional cost to the Owner, at appropriate locations, and in accordance with arrangements made by him. Disposal of all rubble shall be in accordance with all applicable local, state and federal regulations.
- t. The Contractor shall comply with Massachusetts regulations (310 CMR 40.0032) that govern the removal and disposal of surplus excavated materials. Materials, including contaminated soils, having concentrations of oil or hazardous materials less than an otherwise Reportable Concentration and that are not a hazardous waste, may not be disposed of at locations where concentrations of oil and/or hazardous material at the receiving site



are significantly lower than the levels of those oil and /or hazardous materials present in the soil being disposed or reused.

- u. If required: In response to the State/ Federal imposed quarantine regarding the Asian long-horned beetle infestation, the protocol for handling and disposal of wood-based materials within the Project area by the Contractor shall be to:
  - i. at a minimum, process all onsite vegetative, wood and cellulose based materials (trees, shrubs, root, stumps, branches, leaves, etc. **twelve inches and under in diameter** and designated for disposal) to a size of less than one inch as measured in two directions by approved mechanical means (woodchipper) prior to disposal/removal offsite. All other existing vegetative, wood and cellulose based products; tree trunks, stumps, branches etc., **greater than twelve inches, in diameter** and designated for removal/disposal shall be delivered to the current transfer station.
  - ii. Contractor shall be responsible to comply with changes or current quarantine protocols for the duration of the Project.

**ARTICLE 37 CAST IN PLACE CEMENT CONCRETE (NIC)**

**ARTICLE 38 GRAVEL BORROW (NIC)**

**ARTICLE 39 BITUMINOUS CONCRETE PAVING (NIC)**

**ARTICLE 40 GENERAL LAWN AREAS, LOAM & SEEDING**

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. The work under this section shall require the Contractor to provide all labor, materials, equipment and transportation involved in the installation and establishment of playfield turf or lawn. The work shall include, but not limited to the re-use, screening, re-spreading of existing topsoil and the furnishing of additional loam borrow-if required, incorporating soil additives, fine grading, seeding and the protection and maintenance of the established lawn until final acceptance of the Project, or a minimum of sixty (60) days, whichever is longer.

1.02 Not Used.

1.03 QUALITY ASSURANCE

- A. Qualifications of Work

Provide at least one person who shall be always present during execution of this portion of the Work, be thoroughly familiar with the type of materials being installed and the best methods for their installation, and direct all work performed under this Section.

- B. Standards

- 1. All planting material shall meet or exceed the specifications of Federal and State laws requiring inspection for plant disease and insect control.
- 1. Quality shall conform to the current edition of "Horticultural Standards" for number one grade nursery stock, as adopted by the American Association of Nurserymen. ANSI 2260.1 - Nursery Stock.



- C. It is the responsibility of the Contractor to verify the accuracy of all survey information provided by the Owner prior to commencing excavations or filling operations. Commencement of these operations constitutes acceptance of the survey information as appropriate to meet the intent of the Contract.

#### 1.04 SUBMITTALS

##### A. Materials List

Within 30 days after award of Contract and before any seeding materials are delivered to the job site, submit to the Owner a complete list of all seeding and other items proposed to be installed. At least 10 days prior to shipment/delivery of materials, the Contractor shall submit to the Owner a one (1) cubic foot representative sample, certifications, certified test results for materials as specified below. The Contractor shall provide a listing of the addresses (locations) identifying the origin of the soil to be delivered. If the origin is from multiple locations, all locations shall be provided at the time of submission of required information specified above. No material shall be ordered or delivered until the required submittals have been submitted and approved by the Owner. Delivered materials shall closely match the approved samples. Approval shall not constitute final acceptance. The Owner reserves the right to reject, on or after delivery, any material that does not meet these specifications.

1. Include complete data on source, size, and quality.
2. Demonstrate complete conformance with the requirements of this Section.
3. This shall in no way be construed as permitting substitution for specific items described in the Drawings or these Specifications unless the substitution has been approved in advance by the Owner.

##### B. Certificates

1. All certificates required by law shall accompany shipments.
2. Prior to installation, deliver all certificates to the Owner.

#### 1.05 PRODUCT HANDLING

##### A. Delivery and Storage

1. Deliver all items to the site in their original containers with all labels intact and legible at time of Owner's inspection.
2. Immediately remove from the site all seeding materials, which are not true to name, and all materials, which do not comply with the provisions of this Section of these Specifications.
3. Use all means necessary to protect seeding materials before, during, and after installation and to protect the installed work and materials of all other trades.

##### B. Replacements

In the event of damage or rejection, immediately make all repairs and replacements necessary to the approval of the Owner, at no additional cost to the Owner.

#### 1.06 PLANTING SEASON

##### A. Seeding



Seeding shall be done between August 15th to September 30 and/or April 1st to June 15th.

B. Variance

If special conditions exist which may warrant a variance in the above planting dates, a written request shall be submitted to the Owner stating the special conditions for the proposed variance. Permission for the variance will be given if warranted in the opinion of the Owner. Regardless of the time of seeding, the Contractor shall be responsible for a full growth of grass.

PART 2.00 - PRODUCTS

2.01 TOPSOIL

A. General

Screened loam shall be "fine sandy loam" or "sandy loam" determined by mechanical analysis (ASTM d-422) and based on the USDA Classification System. Screened loam shall have the following mechanical analysis:

Textural Class	Percentage of Total Weight	Average Percentage
Sand (0.05-2.0mm dia.)	45-75	60
Silt (0.002-0.05mm dia.)	15-35	25
Clay (<0.002mm dia.)	5-20	15

Screened loam shall not contain less than 5 percent nor more than 10 percent organic matter as determined by the loss on ignition of oven-dried samples, at 100 degrees C, +/- 5 degrees C.

Screened loam shall consist of fertile, friable natural loam capable of sustaining vigorous plant growth. Loam shall be without admixture of subsoil and refuse, resulting in a homogenous material free of stones greater than 1/2" in the greatest dimension, be free of lumps, plants, glass, roots, sticks, excessive stone content, debris and extraneous matter as determined by the Owner. Screened loam shall fall within the pH range of 6.0-6.5 except as noted on plans and details. It shall be uncontaminated by salt water, foreign matter and substances harmful to plant growth. The maximum soluble salt index shall be 100. Screened loam shall not have levels of aluminum greater than 200 parts per million.

If limestone is required to amend the screened loam to bring it within the pH range of 6.0-6.5, no more than 200 pounds of limestone per 1000 square feet of loam, incorporated into the soil, or 50 pounds of limestone per 1000 square feet of loam, surface application, per season.

The Owner will reject any material delivered to the site which, after post-delivery testing does not meet these specifications. If the delivered screened loam does not meet the specifications in this document, the delivered screened loam will be removed by the Contractor at the Contractor's expense and at the time of rejection.

B. Testing

The Contractor shall take representative samples of topsoil from the site and from topsoil to be hauled in and shall submit samples to a Soil Testing Laboratory for chemical analysis, and physical analysis. The Contractor shall indicate to the

testing agencies that turf is to be planted and who the Owner is. The Contractor shall forward to the Owner two copies of analysis and recommendations of the testing agencies.

**2.02 FERTILIZER**

**A. General**

All fertilizer shall be a commercial balanced, 10-6-4 fertilizer delivered to the site in bags labeled with the manufacturer's guaranteed analysis.

**B. Commercial Fertilizer**

Commercial fertilizer shall be a complete fertilizer in which 50-70 percent of the nitrogenous elements shall be derived from organic sources; phosphate shall be derived from superphosphate containing 16-20 percent phosphoric acid or bonemeal containing 25-30 percent phosphoric acid and 2-3 percent nitrogen; and potash shall be derived from muriate of potash containing 55-60 percent potash. It shall contain the following percentages by weight.

18% Nitrogen - 26% Phosphoric Acid - 12% Potash

Fertilizer shall be mixed, as specified, and delivered to the site in standard, unopened containers showing weight, guaranteed analysis, and name of manufacturer.

**C. Special Protection**

If stored at the site, always protect fertilizer from the elements.

**2.03 SOIL AMENDMENTS**

**A. Peat**

Peat shall be moist. It shall be finely shredded, consist of 90 percent organic moss peat, be brown in color, and suitable for horticultural purposes. Shredded particles shall not exceed one (1) inch in diameter. Peat shall be measured in air-dry condition, containing not more than 35 percent moisture by weight. Ash content shall not exceed 10 percent.

**B. Limestone**

Ground dolomitic limestone shall be an approved agricultural limestone and shall contain not less than 85 percent of total carbonates. Limestone shall be ground to such fineness that 50 percent will pass a 100-mesh sieve, and 90 percent will pass a 20-mesh sieve.

**2.04 GRASS SEED**

**A. General**

All grass seed shall be:

1. Free from noxious weed seeds and cleaned.
2. Grade A current crop seed.
3. Treated with appropriate fungicide at time of mixing.

2. Delivered to the site in sealed containers with dealer's guaranteed analysis.

**B. Seed Mix Proportions by Weight**



<u>Percent by Weight</u>	<u>Seed</u>	<u>Min. % of Purity</u>	<u>Min. % of Germination</u>
10%	Shamrock Kentucky Bluegrass	98%	90%
10%	Perennial Creeping Red Fescue	98%	90%
20%	Annual Ryegrass	98%	90%
30%	Intermediate Ryegrass	98%	90%
30%	Perennial Ryegrass	98%	90%

### SECTION 3 - EXECUTION

#### 3.01 SURFACE CONDITIONS

##### A. Inspection

1. Prior to all work of this Section, carefully inspect the installed work of all other trades, and verify that all such work is complete to the point where this installation may properly commence.
2. Verify that seeding may be completed in accordance with the original design and the referenced standards.

##### B. Discrepancies

1. In the event of discrepancy, immediately notify the Owner.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

#### 3.02 SUBGRADE PREPARATION

- A. The Contractor shall do whatever grading is necessary to bring the subgrade to a true, smooth slope, parallel and 6" below finished grade, for all seed bed areas. Remove all existing lawns and grasses, including roots.
- B. There must be sufficient grade staked, as determined by the Owner, to insure correct line and grade of subgrade and of finished grade.
- C. Immediately prior to being covered with topsoil, the top 3" of the subgrades shall be raked or otherwise loosened and shall be free of stones, rock, and other foreign material 3" or greater in dimensions.

#### 3.03 FINISH GRADE PREPARATION

- A. Topsoil shall not be delivered or worked in a wet, frozen or muddy condition.
- B. Topsoil shall be placed and spread over approved areas to a depth sufficiently no less than 4" in "loam and seed" lawn areas and 15" in plant bed areas so that after natural settlement and light rolling, the completed work will conform to the lines, grades, and elevations indicated. If excess topsoil exists, topsoil shall be spread a maximum of 8" deep on lawn areas.

- C. After topsoil has been spread in approved areas, it shall be carefully prepared by scarifying or harrowing, and stones over one inch in diameter shall be removed from the topsoil. It shall be free of smaller stones in excessive quantities, as determined by the Owner.
- D. The whole surface shall then be rolled with a roller, which weighs not more than 100 pounds per foot of width. During the rolling, all depressions caused by settlement of rolling shall be filled with additional topsoil, and the surface shall be regraded and rolled until presenting a smooth and even finish to the required grade.

#### 3.04 SEED BED PREPARATION

- A. After the areas to be seeded have been brought to the grades specified, spread limestone at a rate of 100 pounds per 1,000 square feet.
- B. Apply the 18-26-12 fertilizers at a rate of 5 pounds per 1,000 square feet within 10 days prior to seeding. Thoroughly and evenly incorporate fertilizer and lime with the soil to a depth of 3" by discing or other approved method. In areas inaccessible to power equipment, use hand tools. Adjacent to trees and shrubs, use hand tools to avoid disturbances of the roots.
- C. The Seeding Contractor shall reconstitute the soil, as may be recommended by a soil testing agency, prior to use as planting soil. Any deficiencies in the topsoil shall be corrected by the Contractor, as recommended, at no expense to the Owner.
- D. After incorporation of fertilizer and lime into the soil, the seedbed shall be fine graded to remove all ridges and depressions and the surface cleared of all debris and of all stones one inch or more in diameter.

#### 3.05 SEEDING

- A. Immediately before seeding, the ground shall be restored, as necessary, to a loose friable condition by dicing or other approved method to a depth of not less than 2". The surface shall be cleared of all debris and of all stones 1" or more in diameter.
- B. Seed all areas to be seeded with specified grass seed, sowing evenly with an approved mechanical seeder at the rate of 6 pounds per 1,000 square feet. Sow 3 pounds per 1,000 square feet in one direction and 3 pounds per 1,000 square feet at right angles to the first seeding. Spread seed when soil is moist. Cultipacker, or approved similar equipment, may be used to cover the seed and to firm the seedbed in one operation. In areas inaccessible to cultipacker, the seeded ground shall be lightly raked and rolled in two directions with a water ballast roller. Extreme care shall be taken during seeding and raking to ensure that no change shall occur in the finished grades and that the seed is not raked from one spot to another. Hydro-seeding is an acceptable manner of seeding, providing the Contractor certifies in writing that the hydro-seed fertilizer mix is as herein specified and applied at the equivalent rate of 6 pounds per 1,000 square feet.
- C. Promptly after seeding, wet the seedbed thoroughly, keeping all areas moist throughout the germination period.
- D. Mulch shall be placed immediately after seeding. Straw or salt marsh hay that has been thoroughly fluffed shall be spread evenly and uniformly at the rate of two to three tons per acre. Lumps and thick mulch materials shall be thinned. All mulch anchor stakes, strings and matting shall be removed before final acceptance of lawns. In addition, following mulching, all slopes of 5:1 or greater shall be covered with jute, biodegradable tobacco netting or approved equal for additional stabilization. Securely stapled in place. Overlap all joints in netting a minimum of 6".
- E. Take whatever measures are necessary to protect the seeded area while it is germinating. These measures shall include furnishing warnings signs, barriers, and other needed measures of protection.

#### 3.06 MAINTENANCE



- A. Maintenance shall begin immediately after seeding operations and shall continue until Acceptance or for a minimum of 60 days or after two pre-approved cuttings, whichever is longer.
- B. Maintenance of seed areas shall consist of watering, weeding, curing, repair of all erosion, and reseeding as necessary to establish a uniform stand of grass. Lawns shall be watered in a satisfactory manner during and immediately after planting, and not less than twice per week until final acceptance. All areas, which fail to show a uniform stand of grass for any reason, shall be reseeded repeatedly until a uniform stand is attained. Scattered bare spots and not exceeding 6" square of any lawn area, will be allowed at the discretion of the Owner.
- C. At the time of the first cutting, there shall be a uniform stand between 3 and 3-1/2" high, and mechanical mower blades shall be set between 2-1/2" and 3" high.
- D. Catch shall be representative of seed specified.

### 3.07 SPRING RE-SEEDING

If the original seeding of the areas affected by work takes place in the fall, the Contractor shall be responsible for additional spring maintenance, including reseeding by slice seeding, application of fertilizer and removal of weeds.

### 3.08 ACCEPTANCE

The Owner shall inspect all work for Acceptance upon written request of the Contractor. The request shall be received at least 10 calendar days before the anticipated date of inspection. **Upon completion and re-inspection of all repairs or renewals necessary in the judgment of the Owner,** he shall certify in writing to the Contractor as to the Acceptance of the work.

### 3.09 ACCEPTANCE IN PART

The work may be accepted in parts when it is deemed to be in the Owner's best interest to do so and when approval is given to the Contractor in writing to complete the work in parts. Acceptance and use of such areas by the Owner shall not waive any other provisions of this Contract.

### 3.10 CLEANUP

- A. When any of this work is done while buildings are occupied, pavements shall be always kept clear, broom cleaned to prevent tracking dirt into buildings.
- B. After completion of all planting operations, dispose of all debris and excess material to the satisfaction of the Owner. All pavements shall be swept and hosed clean.

### 3.11 FINAL INSPECTION AND ACCEPTANCE

At the end of the guarantee period, the Owner will inspect all guaranteed work for the Final Acceptance upon written request of the Contractor. The request shall be received at least 10 calendar days before the anticipated date for final inspection.

Upon completion and re-inspection of all repairs or renewals necessary in the judgment of the Owner at that time, he shall certify in writing to the Contractor as to the Final Acceptance of the Project.

## **ARTICLE 41 SECURITY CAMERA APPURTENANCES (NIC)**

## **ARTICLE 42 PLAYGROUND EQUIPMENT (NIC)**

**ARTICLE 43     POURED-IN-PLACE PLAYGROUND SAFETY SURFACING (NIC)**

**ARTICLE 44     SPORTS COURTS BIT. CONCRETE RENOVATION & PAINTING**

1. **Furnish, install, and maintain six-foot height panelized/mobile temporary constructions fence and hardware as required to protect and secure the limits of work. Restore any areas disturbed or damaged by the work.**
2. The renovation surface shall be thoroughly cleaned and shall be free of dirt, debris and any blistering or delamination of the existing coatings. Surface should be cleaned and pressure-washed to remove any loose coatings, contaminants or materials insufficient for finish work. Any depressions or low spots should be repaired to bring the court to proper uniformity. Surface should be free from cracks. The court surface shall be checked with a ten-foot straight edge or shall be flooded with water and allowed to dry in full sun, minimum 70° F for one hour to locate low areas which are more than 1/16" deep (the thickness of a nickel). Any minor depressions that are detected shall be leveled by troweling or screeding a layer of patch mix over the low area. Suitable leveling materials and leveling compound, resurfacer and filler coat (which has not been diluted with water). Deeper depressions may require multiple applications. Excessively deep (1/2" wide or deeper) structural cracks or depressions should be patched with the asphaltic concrete repair system. All protrusions, rough paving or paint joints and roller marks shall be leveled prior to application of the specified asphaltic concrete repair system and color system.
3. **Asphaltic Concrete Structural Repair System (RiteWay© Tru-Bounce Crack Repair System or approved equal)**
  - a. Crack must be free of dirt & debris.
  - b. Crack must be filled from bottom to top with court patch binder or cement and let dry.
  - c. Filled Crack must be scraped or buffed flush with court and cleaned, broomed and blown.
  - d. Area to be repaired must be DRY and at 60°F or higher.
  - e. First layer is to be centered over Crack by removing a few inches of the release liner exposing the soft sealant apply to Crack when centered, pull release liner to move along Crack. If Crack turns cut tape and butt up another piece and continue. Make sure there are no bubbles. If a bubble is found cut with razor knife and press out bubble. Roll with tape machine pressing firmly.
  - f. Apply Liquid Acrylic(NO Sand) and Latex binding formula(NO Sand) (50/50) over tape with paint roller approximately 24" wide. Apply 20" stress mat centered over first layer making sure there are no wrinkles, etc. Using roller saturate stress mat with liquid acrylic, making sure there are no bubbles and roll smooth.
  - g. Apply bonding edge ½ on fabric ½ on court and roll on Liquid Acrylic making sure there are no wrinkles or bubbles and let dry.
  - h. When dry use 9" roller to apply binding formula over the RiteWay Tape area of the repair, approximately 12" wide, let dry and repeat once more
  - i. When totally dry squeegee resurfacer with sand lengthwise over crack this will fill voids where layers overlap and hide the repair. Minimum of two coats is required.
  - j. Prior to applying the acrylic color system, apply an asbestos free, bituminous emulsion, aggregate filled asphalt resurfacer of sufficient quantity to produce a tight surface without voids and pits that will show through the pigmented surface layers.
4. **Textured Acrylic Color Surfacing/Painting shall be for outdoor bituminous concrete sports courts and play areas, as manufactured by **California Sports Surfaces, a division of the ICP Group, Andover MA, 01810/ Plexipave System or approved equal**. Court colors shall be a maximum of three manufacturer's premium colors pattern plus the white, black and yellow lines.**

**ARTICLE 45     WPRC DIVISION CHAIN LINK FENCE FRAMEWORK & FABRIC (NIC)**

**ARTICLE 46     ATTACHMENTS**

Sports Court Dimension and Renovation Schedule (1 page)

Asphaltic Concrete Repair System -RiteWay© Tru-Bounce Crack Repair System Detail and Installation Instructions (2 pages)

Textured Acrylic Color Surfacing For Tennis Courts and Play Area Specifications and Installation Guide (7 pages)

**End of DPW & Parks Special Conditions and Specifications.**

## DIMENSIONS AND RENOVATION SCHEDULE

Court	Approx. Size/Limit of Work, Sq. Feet of Renovation	Color and Striping Scheme	Court Layout / Size	Address	Note
Burncoat Basketball, Tennis Court & 4 Square	14,500 SF	Match Existing & See Note 1	50'X94' BB 78'X36' Tennis	524 Burncoat St. Worcester, MA	BASE BID
University Park Double Basketball	15,750 SF	Match Existing	(50'x94')X2	965 Main St. Worcester, MA	ADD Alt. #1
University Park Tennis Volleyball Combo	7,800 SF	Match Existing & See Note 2	Match Existing Volleyball Only	965 Main St. Worcester, MA	ADD Alt. #2
Piedmont St. Basketball	5,000 SF	2 Premium Color with White Lines	50'X84'	124 Piedmont St. Worcester, MA	ADD Alt. #3
Vernon Hill Basketball	6,900 SF	2 Premium Color with White Lines	50'X94'	144 Vernon St. Worcester, MA	ADD Alt. #4
Beaver Brook Basketball	5,700 SF	2 Premium Color with White Lines	50'X84'	300 Chandler St. Worcester, MA	ADD Alt. #5

**Notes:**

1. Burncoat Tennis/Volleyball Court Combo - Tennis striping color is White, Volleyball striping color is Black.  
Add single Pickleball court line striping, color is Yellow, center layout on existing tennis net.
2. University Park Tennis Volleyball Court - Delete Tennis court striping.



Dept. Of Public Works & Parks  
Capital Projects Division  
JAY J. FINK P.E.  
Commissioner  
ROBERT C. ANTONELLI, JR.  
Assistant Commissioner

## SPORTS COURT RENOVATIONS - Multiple Locations Dimension and Renovation Schedule

February 2023

D-1





## **RiteWay Crack Repair**

### **Installation Guidelines**

1. Crack must be free of dirt & debris.
2. Crack must be filled from bottom to top with court patch binder or cement and let dry.
3. Filled Crack must be scraped or buffed flush with court and cleaned, broomed and blown.
4. Area to be repaired must be DRY and at 60°F or higher.
5. First layer is to be centered over Crack by removing a few inches of the release liner exposing the soft sealant apply to Crack when centered, pull release liner to move along Crack. If Crack turns cut tape and butt up another piece and continue. Make sure there are no bubbles. If a bubble is found cut with razor knife and press out bubble. Roll with tape machine pressing firmly.
6. Apply Liquid Acrylic(NO Sand) and Latex binding formula(NO Sand) (50/50) over tape with paint roller approximately 24" wide. Apply 20" stress mat centered over first layer making sure there are no wrinkles, etc. Using roller saturate stress mat with liquid acrylic, making sure there are no bubbles and roll smooth.
7. Apply bonding edge ½ on fabric ½ on court and roll on Liquid Acrylic making sure there are no wrinkles or bubbles and let dry.
8. When dry use 9" roller to apply binding formula over the RiteWay Tape area of the repair, approximately 12" wide, let dry and repeat once more
9. When totally dry squeegee resurfacer with sand lengthwise over crack this will fill voids where layers overlap and hide the repair. Minimum of two coats are recommended.

Repair is complete.

**TOLL FREE**

**877-5-RITEWAY**  
**(877-574-8392)**

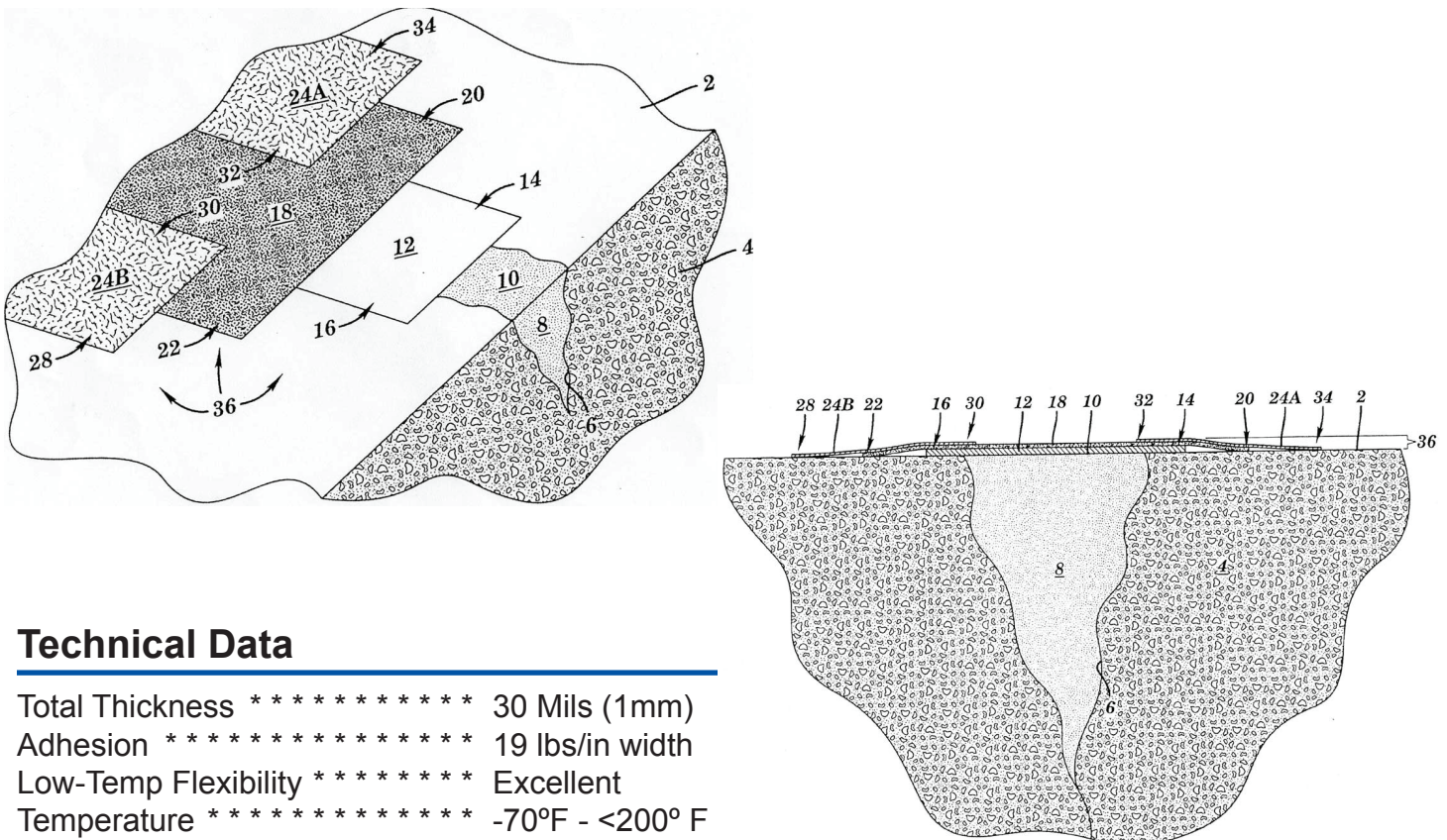
Box Contents: (6) 50' rolls of RiteWay Tape ( Grey )  
(1) 309' roll of RW Stress Mat ( White )  
(4) 175' rolls of RW Bonding Edge ( Yellow )

## Cut Sheet

1. #4 = Base
2. #8 & 10 = Filled Crack
3. #12 & 14 = RiteWay Seam Tape 6"
4. #18, 20 & 22 = RiteWay Stress Matt 20"
5. #24A & B = RiteWay Bonding Edge 9"

RiteWay Seam Tape utilizes advanced Exclusive Technology, a 100% solids formulation of synthetic resins, thermoplastics and non-curing rubber (non-butyl) with a built-in primer, bonded to a woven polyester backing for maximum comfortability.

Designed NOT to harden under even the most rigorous conditions. Sag temperature >200° F. Adhesive is protected (while in a roll) by a tough, easily removed siliconized release liner, which prevents contaminations prior to its use. All materials are prefabricated to provide uniform thickness.



## Technical Data

Total Thickness	*****	30 Mils (1mm)
Adhesion	*****	19 lbs/in width
Low-Temp Flexibility	*****	Excellent
Temperature	*****	-70°F - <200° F
Pliability	*****	No membrane cracking
Water Vapor Test (ASTME 96B)		.005 grms/100" sq./24hours/100°
Permanence	*****	.001 perms maximum
Elongation	*****	>500%
Application Temperature	*****	>150°F to 20°F

## **TEXTURED ACRYLIC COLOR SURFACING FOR TENNIS COURTS AND PLAY AREAS**

### **PART 1 GENERAL**

#### **1.1 GENERAL DESCRIPTION**

- A. Textured acrylic surfacing for asphalt tennis courts and similar play areas.

#### **1.2 RELATED SECTIONS**

##### **A. References**

1. National Asphalt Paving Association (NAPA)
2. United States Tennis Association (USTA)
3. International Tennis Federation (ITF)
4. American Sport Builders Association (ASBA)

#### **1.3 QUALITY ASSURANCE**

- A. Surfacing shall conform to the guidelines of the ASBA for planarity.
- B. All surface coatings products shall be supplied by a single manufacturer.
- B. The contractor shall record the batch number of each product used on the site and maintain it through the warranty period.
- C. The contractor shall provide the inspector, upon request, an estimate of the volume of each product to be used on the site.
  - E. The installer shall be an authorized applicator of the specified system.
  - F. The manufacturer's representative shall be available to help resolve material questions.

#### **1.4 SUBMITTALS**

- A. Manufacturer specifications for components, color chart and installation instructions.
- B. Authorized Applicator certificate from the surface system manufacturer.
- D. ITF classification certificate for the system to be installed.
- E. Reference list from the installer of at least 5 projects of similar scope done in each of the past 3 years.
- F. Current Material Safety Data Sheets (MSDS).
- G. Product substitution: If other than the product specified, the contractor shall submit at least 7 days prior to the bid date a complete type written list of proposed substitutions with sufficient data, drawings, samples and literature to demonstrate to the owners satisfaction that the proposed substitution is of equal quality and utility to that originally specified. Information must include a QUV test of at least 1000 hours illustrating the UV

stability of the system. The color system shall have an ITF pace rating in Category 3. Under no circumstances will systems from multiple manufacturers be considered.

#### 1.4 MATERIAL HANDLING AND STORAGE

- A. Store materials in accordance with manufacturer specifications and SDS.
- B. Deliver product to the site in original unopened containers with proper labels attached.
- C. All surfacing materials shall be non-flammable.

#### 1.5 GUARANTEE

- A. Provide a guarantee against defects in the materials and workmanship for a period of one year from the date of substantial completion.

#### 1.6 INSTALLER QUALIFICATIONS

- A. Installer shall be regularly engaged in construction and surfacing of acrylic tennis courts, play courts or similar surfaces.
- B. Installer shall be an Authorized Applicator of the specified surface system.
- C. Installer shall be a builder member of the ASBA.

#### 1.7 MANUFACTURER QUALIFICATIONS

- A. System manufacturer shall provide documentation that the surface to be installed has been classified by the ITF as a medium pace surface.
- B. System manufacturer shall be a US owned company.
- C. System manufacturer shall be a member of the ASBA.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. California Sports Surfaces, a division of the ICP Group, Andover, MA. 01810 / Plexipave System  
[www.plexipave.com](http://www.plexipave.com)

B. Substitutions: Submit requests at least 7 days prior to the bid date with a complete type written list of proposed substitutions with sufficient data, drawings, samples and literature to demonstrate to the owners satisfaction that the proposed substitution is of equal quality and utility to the specified product. Information must include a QUV test of at least 1000 hours illustrating the UV stability of



the system. The system shall have an ITF pace rating.

## 2.2 MATERIALS

- A. Patching Mix (California Court Patch Binder) - for use in patching cracks, holes, depressions and other surface imperfections.
- B. Crack Filler (California Crack Filler) - for use in filling fine cracks.
- C. Acrylic Filler Course (California Acrylic Resurfacer) – for use as a filler for new or existing asphalt surfaces. The acrylic filler shall be blended with approved silica sand at the job site.
- D. Acrylic Color Playing Surface (Plexichrome Ultra Performance/Plexipave Color Base) – for use as the finish color and texture. Plexichrome and Plexipave Color Base are blended at the job site to achieve the correct surface texture. \*Factory Fortified Plexipave may be used as an alternative material.
- E. Line Paint (California Line Paint) – for use as the line marking on the court/play surface.
- F. Water – for use in dilution/mixing shall be clean and potable.

## 2.3 MATERIAL SPECIFICATIONS

- A. Court Patch Binder – acrylic resin blended with Portland Cement and silica sand.
- B. Plexipave Crack Filler – acrylic resin heavily filled with sand.
- C. California Acrylic Resurfacer – acrylic resin (no vinyl copolymerization constituent). The product shall contain not less than 3.5% attapulgite.
- D. Plexichrome Ultra Performance –acrylic resin (no vinyl copolymerization constituent) with selected light fast pigments.
- E. Plexipave Color Base – acrylic resin containing no vinyl copolymerization constituent. Contains not more than 63% rounded silica sand.
- F. California Line Paint – 100% acrylic resin containing no alkyds or vinyl constituents. Texturing shall be rounded silica sand.

All surfacing materials shall be non-flammable and have a VOC content of not less than 100g/L. Measured by EPA method 24.

Local sands are not acceptable in the color playing surface. Sands must be incorporated at the manufacturing location to ensure quality and stability.

## PART 3 EXECUTION

### 3.1 WEATHER LIMITATIONS

- A. Do not install when rainfall is imminent or extremely high humidity prevents drying.
- B. Do not apply unless surface and air temperature are 50°F and rising.
- C. Do not apply if surface temperature is in excess of 140°F.

### 3.2 PREPARATION FOR ACRYLIC COLOR PLAYING SYSTEM

A. Clean surfaces of loose dirt, oil, grease, leaves, and other debris in strict accordance with manufacturer's directions. Pressure washing will be necessary to adequately clean areas to be coated. Any areas previously showing algae growth shall be treated with Clorox or approved product to kill the organisms and then be properly rinsed.

B. Holes and cracks: Cracks and holes shall be cleaned and a suitable soil sterilant, as approved by the owner, shall be applied to kill all vegetation 14 days prior to use of **Court Patch Binder** according to manufacturer's specifications.

C. Depression: Depressions holding enough water to cover a US five-cent piece shall be filled with Court Patch Binder Patching Mix. 3 gallons of Court Patch Binder, 100 lbs. 60-80 silica sand, 1-gallon Dry Portland Cement (Type I). **This step shall be accomplished prior to the squeegee application of Acrylic Resurfacer.** The contractor shall flood all the courts and then allow draining. Define and mark all areas holding enough water to cover a nickel. After defined areas are dry, prime with tack coat mixture of 2 parts water/1 part Court Patch Binder. Allow tack coat to dry completely. Spread Court Patch Binder mix true to grade using a straight edge (never a squeegee) for strike off. Steel trowel or wood float the patch so that the texture matches the surrounding area. Never add water to mix. Light misting on surface and edges to feather in is allowed as needed to maintain work ability. Allow to dry thoroughly and cure.

NO WORK FROM THIS STAGE ON SHALL COMMENCE UNTIL AN INSPECTOR HAS ACCEPTED THE SURFACE.

D. Filler Course. (Acrylic Resurfacer): Filler course shall be applied to the clean underlying surface in one application to obtain a total quantity of not less than .06 gallon per square yard based on the material prior to any dilution. Acrylic Resurfacer may be used to pre-coat depression and crack/hole repairs to achieve better planarity prior to filler course application.

1. Over a properly repaired surface of asphalt on existing courts, apply one coat of Acrylic Resurfacer according to the following mix:

	Acrylic Resurfacer	55 gallons
	Water	20 - 40 gallons
Sand	600-800 pounds / 60-80 mesh	
	Liquid Yield	112-138 gallons

On new asphalt, two coats of Acrylic Resurfacer shall be used to properly fill all voids in the asphalt surface. Use clean, dry 50-60 mesh sand and clean, potable water to make mixes. The quantity of sand and water in the above mix may be adjusted within above limits to complement the roughness and temperature of the surface.

2. Mix the ingredients thoroughly using accepted mixing devices and use a 70 Durometer rubber bladed squeegee to apply each coat of Acrylic Resurfacer as required.

3. Allow the application of Acrylic Resurfacer to dry thoroughly. Scrape off all ridges and rough spots prior to any subsequent application of Acrylic Resurfacer or subsequent cushion or color surface system.

### 3.3 APPLICATION OF ACRYLIC COLOR PLAYING SURFACE

A. All areas to be color coated shall be clean, free from sand, clay, grease, dust, salt or other foreign matters. The Contractor shall obtain the Engineer's approval, prior to applying any surface treatment.

B. Blend color base and Plexichrome Ultra Performance with a mechanical mixer to achieve a uniform Fortified Plexipave mixture. The mix shall be:

Color Base	30 gallons
Plexichrome	20 gallons
Water	20 gallons

C. Application shall be made by 50 durometer rubber faced squeegees. The Fortified Plexipave mixture should be poured on to the court surface and spread to a uniform thickness in a regular pattern.

D. A total of 3 applications of Fortified Plexipave shall be made to achieve a total application rate of not less than .15 gal./sy. No application should be made until the previous application is thoroughly dry.

### 3.4 LINE PAINTING

A. Line shall be 2" wide unless otherwise noted on the drawings. Lines shall be carefully laid out in accordance with ASBA and USTA guidelines. The area to be marked shall be taped to insure a crisp line. The California Line Paint shall have a texture similar to the surrounding play surface. Application shall be made by brush or roller at the rate of 150-200 sq./gal. (3/4 gal. per tennis court).

### 3.5 PROTECTION

A. Erect temporary barriers to protect coatings during drying and curing.

B. Lock gates to prevent use until acceptance by the owner's representative.

### 3.6 CLEAN UP

A. Remove all containers, surplus materials and debris. Dispose of materials in accordance with local, state and Federal regulations.

B. Leave site in a clean and orderly condition.

## PLEXIPAVE INSTALLATION GUIDE

### DESCRIPTION

This specification covers the application of a new Plexipave athletic surface on new or existing asphalt tennis courts that have a sound, well-drained base of adequate thickness and stability.

### ACCEPTABLE BASE SPECIFICATION

The success of the all-weather characteristics of resurfacing is dependent on a sound base (with good drainage) and asphalt meeting the requirements of American Sports Builders Association.

**New Asphalt-** Asphalt base should be installed to the specifications as laid out in the American Sports Builders Association Asphalt Guidelines. CSS requires a minimum cure time of 14 days on new asphalt. Surface variation should not exceed 1/8 inch in ten feet when measured in any direction with a straightedge and a slope of 1 inch in 10 feet, all in one plane.

**Existing Courts-** Should be free of dirt, debris and any blistering or delamination of the existing coatings. Surface should be cleaned and pressure-washed to remove any loose coatings or contaminants. Any depressions or low spots should be repaired to bring the court to proper uniformity. Surface should be free from cracks.

### WEATHER LIMITATIONS

No part of the installation shall be conducted during rainfall, or when rainfall is imminent. The air and surface temperature must be a minimum of 50°F (10°C) and rising. Do not apply when surface temperature is above 140°F (60°C).

**COURT PATCHING -** The surface to be coated must be sound, smooth, and free from dust, dirt or oily materials. Prior to the application of surfacing materials, the entire surface should be flooded and left in direct sunlight for one hour under ideal conditions and checked for minor depressions or irregularities. Any puddled area that exceeds 1/8 inch in depth shall be marked and repaired with Court Patch Binder using the following mix:

100 lbs. (45kg) of 60-80 mesh silica sand (dry)
3 gallons (10L) Court Patch Binder
12-24 lbs. (5.5-11 kg) dry Portland Cement (depending on humidity and temperature)
Tack coat consisting of 1-part Court Patch Binder and 2 parts water shall be applied to the patch areas and allowed to dry thoroughly prior to patching. After patching, the surface shall not vary more than 1/8 inch in ten feet measured in any direction. Edges of the patch should be sanded down, as necessary, to avoid ridges.

### CRACK FILLING

California Crack Filler may be applied by hand trowel or small broad knife to force crack filler into cracks. Do not dilute. Cracks need to be cleaned and free of moisture. Will not prevent the reappearance of cracks in the substrate.

### ACRYLIC RESURFACER

In order to provide a uniform, textured surface for the Plexipave system, Acrylic Resurfacer shall be applied to obtain a coverage rate of .05-.07 gallons per square yard (.16-.22 liters per square meter) per coat, prior to any dilution. On new or rough asphalt, a second coat may be necessary. No application shall be covered by a succeeding application until thoroughly cured. Dilution with water and sand is required utilizing the following mix ratio:

Acrylic Resurfacer	Sand 40-60 mesh	Mix	Clean, potable Water	Mix
18 gallons	225-250	5 minutes or until uniform	8-12 gals	5 mins or until uniform



Mix should not sit more than 20 minutes prior to application.
Cure time is approximately 2-4 hours under ideal conditions.
Liquid Yield 37-46 gallons (141-177L)

Application methods:

- Use a 50-70 durometer rubber squeegee to level material across the court.
- After initial pour, acrylics should not be poured onto dry surface. Pour additional materials into existing wet windrow.
- Care should be taken not to leave ridges where adjoining applications overlap.
- Under hot conditions, application is improved by keeping surface damp with a fine mist water spray. Do not allow water to puddle.

**FORTIFIED PLEXIPAVE (FIELD-MIXED USING LOOSE SAND)**

Fortified Plexipave shall be applied to a clean, dry surface in a minimum of 2 applications to obtain a total quantity of not less than .10 gallons per square yard (.32 liters per square meter), prior to any dilution. No application shall be covered by a succeeding application until thoroughly cured.

Plexichrome Ultra Performance	80-100 mesh silica sand	Mix	Clean, potable Water	Mix
30 gallons	240 pounds	5 minutes or until uniform	15 gallons	5 mins or until uniform
Mix should not sit more than 20 minutes prior to application.				
Cure time is approximately 4 hours under ideal conditions.				
Liquid Yield 35 gallons (133L)				

The diluted material shall be homogenous. The finished surface shall have a uniform appearance and be free from ridges and tool marks.

**PLAYING LINES** – Four hours minimum after completion of the color resurfacing, the appropriate line markings for the desired sport shall be accurately located, marked, and painted with California Line Paint as specified. For cleaner, sharper line markings, it is recommended that the masking tape be sealed with either Line Rite or undiluted Plexichrome Ultra Performance, prior to the application of the Line Paint.

Allow finished surface to cure a minimum of 24 hours before opening surface to use.

**LIMITATIONS**

Will not prevent surface or structural cracks from occurring or reoccurring

Will not prevent metal or organic staining if there are contaminants in the subsurface.

Do not allow product to freeze.

Do not store in direct sunlight.

Indoor applications will require a minimum constant temperature of 70°F (21°C) and proper air ventilation.