



Change Order

Contract Number TA 6485	Contract Title Russell Avenue Improvements	Federal Aid Number STPR-B309
Change Order Number 02	Change Description Provide Cement Treatment to Ballast	Date 5/22/2020
Prime Contractor / Design-Builder Northwest Construction General Contracting, Inc.		

Ordered by Engineer under the terms of Section 1-04.4 of the Standard Specifications

Change proposed by Contractor / Design-Builder

Change Description

This change order includes work to repair the road base from approximately Station 0+65 to 2+68, including removal of the crushed surfacing material previously placed, cement treatment of the ballast material per the attached specification, and replacement/compaction of the removed crushed surfacing. This change order also includes adding Section 4-05, In-Place Cement Treated Base, and acceptance of the crushed surfacing material that was placed within the limits of work as stated above.

(Description of work cont'd on next page)

Verbal Approval Given By Karl Russell, PWD; Tim Shell, Construction Mgr.	Verbal Approval Date 5/19/20	Working Days +/- 0
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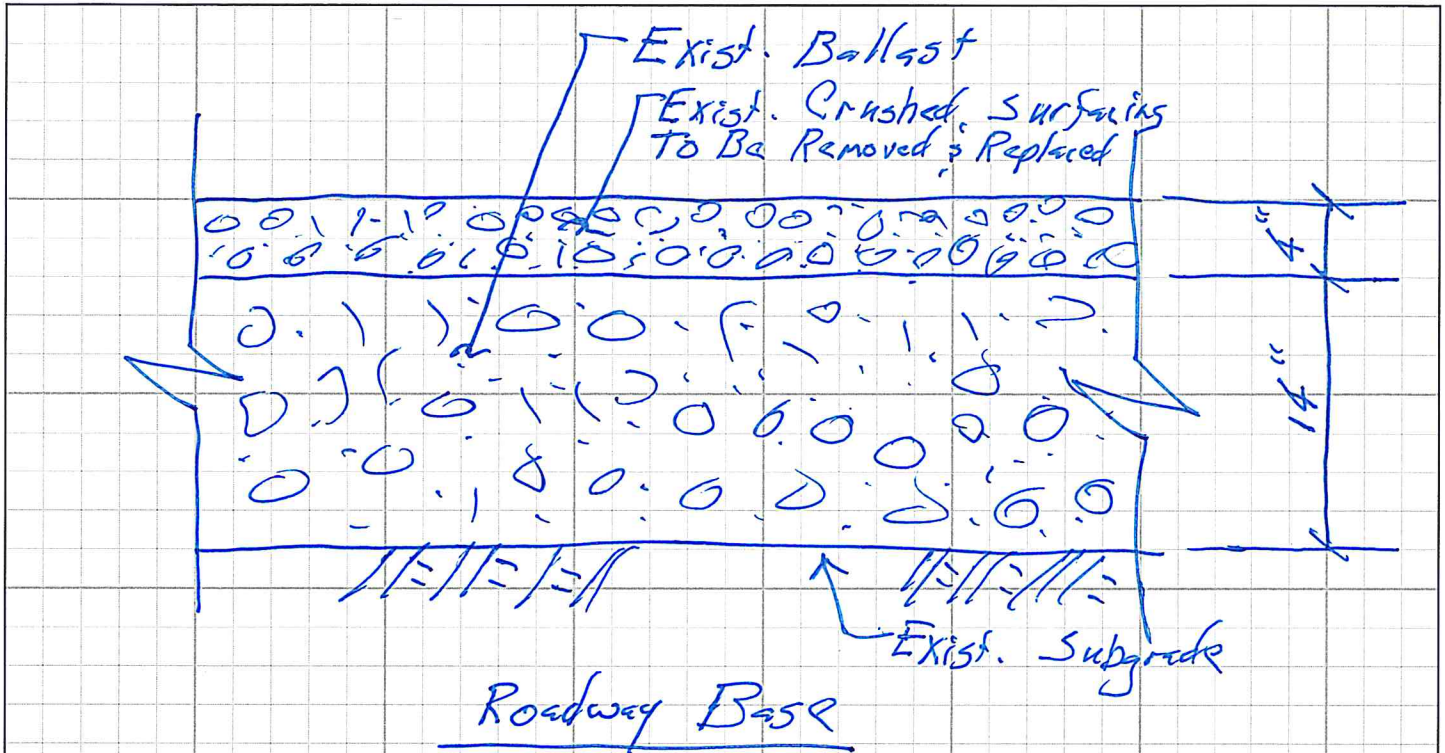
Original Contract Amount \$712,957.65	Current Contract Amount \$714,426.45	Est. Net Change This C.O. \$7,000.00	Est. Contract Amount \$721,426.45
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Approval Recommended <input checked="" type="checkbox"/> Approved	Approved <input checked="" type="checkbox"/>
 Project Engineer	 Approving Authority per C.A. Agreement
5/22/20 Date	05/26/2020 Date
Approval Recommended	Other Approval As Required
 By Prime Contractor	Signature _____ Date _____
5/27/2020 Date	Representing _____

Contract Number TA 6485	Contract Title Russell Avenue Improvements	Change Order Number 02
<p>Change Description Cont.</p> <p>The road base was constructed on Tuesday, April 28, 2020. The Plans call for 14" of ballast and 4" of CSBC. The geotech report recommended proof rolling the subgrade but no construction traffic on or compaction of subgrade. During proof rolling (prior to placement of ballast) the subgrade was visibly seen to yield. After a discussion with the geotech engineer, the decision was to repair the proof roll-damaged subgrade by 6" over-excavation and replacement with ballast, place the 14" ballast, compact the ballast, then proof roll the ballast. The explanation from the geotech engineer was that the subgrade material was found to be of poor condition when the exploratory borings were taken and the roadway section was designed with the found subgrade material taken into consideration. Extra depth excavation would not be needed for the road base. Repair of the damaged subgrade and placement of the ballast was then completed, and the ballast material was placed, compacted and proof rolled with no visible deflection. The CSBC was then placed and compacted. Paving was scheduled to occur the next Tuesday, May 6, 2020.</p> <p>The weekend of May 2-3, 2020, it rained in excess of 1" at the project site.</p> <p>On Tuesday, May 6, 2020, the Contractor brought up in the weekly construction meeting that the road base was soft and stated they believed soft/wet subgrade was causing the pumping. After confirming the pumping condition in the field, a meeting was set up for Wednesday, May 7, 2020 for the geotech engineer to look at it and provide an opinion. During the geotech engineer inspection on 5/7/20 the contractor exposed the ballast for the geotech to look at the material and take a sample. The geotech engineer found the ballast material to be "wet and coated with what appeared to be an excessive amount of fine-grained material that had the consistency of sandy clay-clayey sand", and that the ballast material "did not appear to meet the gradation specification for ballast per Section 9-03.9(1)". Samples were taken of the ballast and CSBC material for laboratory analysis. Alternatives were also discussed with the geotech engineer and the Contractor, and consensus was the least expensive alternative for correcting the pumping would be to remove the CSBC, treat the ballast with 2% cement, let it cure for 4 days, then replace and compact the CSBC.</p> <p>Lab results for the ballast sample collected on 5/7/20 were 17% passing the #40 sieve (1% over specification) and 11% passing the #200 sieve (2% over specification). This contradicted the preliminary sample, which showed the ballast contained 6% passing the #4 sieve (within specification) and 3% passing the #200 sieve (6% under specification). Lab results for the CSBC showed 96% passing the 5/8" screen (16% over specification). When presented with the lab results the Contractor disagreed and stated that the material was within specification at the point of acceptance. A verification sample was not collected during placement at the source of the material to confirm. The geotech engineer's opinion was that the excessive fines in the ballast material was causing the pumping, however the Contractor stated that the wet subgrade was causing the pumping. The Contractor later revealed that CSTC material was placed instead of CSBC.</p> <p>Section 1-07.13(1) states that the Contractor shall rebuild, repair, restore or make good any work that is damaged before the physical completion date, and bear all costs for doing so. However, the Contractor was directed to proceed with excavating the roadway and constructing the road base as quickly as possible so that the roadway could be reopened to traffic as soon as possible. By providing said direction to the Contractor, he could argue that they are alleviated from the subsequent damage that the inclement weather caused to the road base and/or subgrade. Since it is not fully clear on the cause of the pumping and the cost to correct the situation is acceptable, this change order is written to compensate the Contractor for the added work rather than arguing responsibility for the damage.</p> <p>An independent cost estimate of this work was developed, dated 5/21/20, for \$9,078.</p> <p>This change adds no time to the contract.</p>		

By: T. Shell

Meeting Attendee(s)/Person(s) Called: _____

Date: 5/13/20 Time: _____ Location/Phone #: _____ Job #: 1465AJob Name: Russell Ave. Imp'ts. Subject: Stabilization of Road Base

Construction Notes:

1. Remove 2- $\frac{1}{2}$ " to 3- $\frac{1}{2}$ " of existing crushed surfacing. Stockpile for replacement. Do not allow ballast material to intermingle and contaminate crushed surfacing material.
2. Provide In-Place Cement Treated Base to a depth of 12". Allow material to cure for a minimum of 4 days.
3. Replace crushed surfacing material. Grade per the Plans and compact to 95% maximum dry density per ASTM T 180 Method D.
4. Crushed surfacing shall be protected while it is stockpiled.

4-05 IN-PLACE CEMENT TREATED BASE

4-05.1 Description

The In-Place Cement Treated Base (ICTB) work consists of constructing a reclaimed cement treated base by mixing the existing ballast with cementitious materials and water, and compacting and grading the treated base to the lines, grades, thicknesses and cross sections in accordance with these Specifications in conformity with the Plans or as established by the Engineer.

4-05.2 Materials

Materials shall meet the following requirements:

Portland Cement. Portland cement shall be type I or II and shall be provided in accordance with Section 9-01.

Water. Water shall be provided by the Contractor and shall be free from substances deleterious to the hardening of the soil-cement. The Contractor may obtain water from a hydrant as designated by the City Water Department. The Contractor will be responsible for obtaining a hydrant use permit.

Base Material. Base material shall consist of reclaimed ballast. The reclaimed material shall conform to the gradation in the table below. All material larger than 3" shall be removed.

Sieve Size	% Passing
3 inch	100

Cationic Emulsified Asphalt Cement for Curing Compound. Curing compounds shall be CSS-1 in accordance with Section 9-02.

Sand Blotter. Sand used for the prevention of pickup of curing materials shall be clean, dry, and non-plastic.

4-05.2(1) Mix Design

The mix design establishes the depth of the completed ICTB, the amount of added materials, the amount of portland cement stabilizing agent (cement) to be incorporated into the pulverized, mixed material, and the maximum dry density and optimum moisture content. The mix design is based on the materials that are found on the project site.

The Engineer may adjust the cement application rate based on observations and daily field samples.

The estimated mix design is as follows:

- ICTB mixture dry unit weight: 136 pcf
- Initial pulverization and mixing depth: 12 inches
- Cement Content: 2.0% +/- 0.50% (each)
- Finished ICTB compacted depth: 12 inches

- Predominate soil type: Ballast, no crushed surfacing or subgrade soil

The percentage of dry cement shall be based on the dry weight of compacted, reclaimed material.

The contractor shall determine the amount of additional water required to achieve specified compaction.

4-05.3 Construction Requirements

4-05.3(1) Equipment.

1. Pulverizing and Mixing Equipment - Furnish a self-propelled, single-shaft or multiple- shaft pulverizer mixer machine specifically made for reclamation and capable of reclaiming the existing material to a minimum depth of 16 inches. The machine shall be equipped with automatic depth control and maintain a constant cutting depth and width. It shall be capable of pulverizing and mixing existing asphalt concrete, base rock and soil, injecting water at controlled rates and mixing cement into the reclaimed material to produce a homogeneous mixture. All pulverizing and mixing shall be performed with this machine. Agricultural disks or motor graders are not acceptable mixing equipment.

Pulverizing and mixing equipment shall be approved by the Engineer prior to use.

2. Dry Cement Spreading and Cement Transfer Equipment - Furnish cement spreading equipment providing a positive means for accurately controlling the rate of delivery and total delivery of the cement onto the surface of the pulverized material in relation to the speed of the cement spreader and in relation to the quantity of reclaimed material. The cement spreading equipment shall be capable of being adjusted for the width of the reclaimed material surface such that the overlapped mixture maintains the designed residual cement content. Cement drop height from the spreader shall be less than 12 inches above the ground to minimize airborne cement dust. The cement spreading equipment shall be equipped with protective skirts which shall prevent excessive airborne cement dust during the spreading operation and shall extend down to within two inches or less of the ground. If the cement spreading equipment does not adequately prevent airborne cement dust, the Contractor shall immediately discontinue use of the equipment until adjustments to the equipment have been made to correct the excessive dust. If adjustments do not adequately correct the excessive dust, the Contractor shall immediately remove the non-compliant cement spreader and supply another which complies with these specifications.

Take measures to prevent airborne cement dust during the transfer of cement to the spreading equipment including but not limited to an expandable boot to provide a dust-tight seal between the cement transfer equipment and the receiver to the tank of the cement distributor. If the Contractor's measures do not effectively limit the airborne cement dust, immediately stop cement transfer until corrections have been made to prevent airborne cement dust. If the Contractor does not prevent airborne dust from the cement transfer operation, the Engineer will stop Work until adequate corrections have been made to prevent airborne cement dust.

3. Grading Equipment – Provide grading equipment capable of spreading the reclaimed material and striking it off to designated lines, grades, and transverse slopes without segregation, dragging or fracturing of aggregate.

4. Compaction Equipment – Provide self-propelled vibratory tamping foot and steel-wheel rollers capable of reversing without backlash.
5. Water Trucks – Provide a water truck with a maximum gross vehicle weight of 26,000 pounds to provide water used to keep the surface of the mixed material damp until the seal coat is applied.
6. 4-05.3(2) Seasonal and Temperature Limitations - The Contractor shall not perform reclaiming operations when the weather conditions are such that proper mixing, shaping, and compacting of the reclaimed material cannot be accomplished. In addition, no cement placement and mixing shall be performed when it is raining, or when wind causes the cement dust to become airborne.

4-05.3(3) Pre-Reclamation Conference

Supervisory personnel of the Contractor, including any subcontractors who are to be involved in the reclamation Work, shall meet with the Engineer at a mutually agreed time to discuss methods of accomplishing the Work. A representative of the Contractor responsible for the quality control on the project shall also attend.

At least two working days prior to the pre-reclamation conference the Contractor shall present the following:

- A list of proposed equipment
- A schedule showing phasing for each ICTB section
- A proposal for construction methodology
- Plan for review and potholing of subsurface utilities and any areas requiring special attention.
- A quality control plan
- A review of potential utility conflicts including location, depth to utilities, and a plan to protect existing utilities during construction.

4-05.3(4) Pulverizing and Mixing

Pulverize, mix, and compact the reclaimed base material in a single lift.

1. Initial pulverization, mixing, compacting, and grading:
Pulverize and mix the existing materials in-place to the mix design depth. After initial pulverizing and mixing, grade and compact the material per Section 4-05.3(5). Excavate as necessary so that the finish grade after final mixing, shaping and compaction complies with the plans and specifications. Complete compaction after grading with a smooth wheel roller. Remove excess material in accordance with Section 2-03.
2. Final mixing, compacting and grading:
 - a). Immediately prior to final mixing operations, apply the dry cement to the reclaimed material at the specified rate that meets the mix design. The Engineer may vary the application rate of the dry cement based on the aggregate and subgrade materials and mixture moisture content. The dry cement shall be controlled within +/-0.50 percent of the target established by the mix design or as directed. The specified quantity of cement shall be applied uniformly in a manner that minimizes fugitive dust and is satisfactory to the Engineer. Do not allow vehicles to drive through the cement.

- b). Dry cement shall not be placed on the grade more than 200 feet in front of the mixing equipment. Do not allow vehicles to drive through the cement.
- c). Begin final mixing as soon as possible after the cement has been spread, and continue until a homogeneous mixture of aggregate, soil, cement and water is achieved which meets the gradation, cement content and moisture content requirements throughout the full design depth and width, and is free of soil clumps. The Engineer may require multiple mixing passes in order to achieve a uniform and homogeneously mixed material. If multiple passes of the equipment are required, overlap each pass a minimum 6 inches.
- d). Any cement treated material that has not been compacted and graded shall not be left undisturbed for longer than 30 minutes. If this time limit is exceeded, the Engineer may require the material to be remixed with fresh cement to allow for compaction and/or grading and to correct for partial cement hydration.
- e). Cement application, mixing, spreading, compacting, shaping, and finishing shall be continuous and completed within 3 hours from the start of mixing. The timing of the dry cement application and mixing shall be coordinated to allow compaction, shaping, and finishing of the treated material to occur prior to the end of the allowable 3 hour period. Sections of the ICTB Work that have not been completely shaped, compacted and finished within 3 hours of mixing the reclaimed material with cement, shall be re-treated with cement at a rate directed by the Engineer, and re-mixed, re-shaped and re-compacted to the requirements of this Section.
- f). The Contractor shall determine the amount of additional water needed to facilitate uniform mixing with the cement and to achieve a stable ICTB at or above the minimum specified density. Water shall be applied directly through the pulverizer mixer. The water shall be injected into the mixture in the mixing chamber of the pulverizer mixer so that it is added concurrently to the reclaimed materials as they are mixed with the cement. Water quantities shall be controlled to allow proper hydration of the cement. However, excessive water shall not be applied so as to result in a visually unstable mixture.
- g). Following mixing in the cement, the surface of the treated material shall be kept continuously moist using a fine water spray until completion of the curing seal application.

Failure to comply with any of the above specifications is cause for the Engineer to order any or all portions of the Work to stop until the Work is brought into compliance or to repeat the treatment of the material at no additional cost to the Agency.

4-05.3(5) Shaping and Compaction

Immediately following initial and final mixing/shaping, the ICTB layer shall be compacted to at least 95 percent of maximum density. The determination of field in-place density shall be made by proof rolling the entire surface after the 4-day cure period in accordance with Section 4-05.3(8).

At the start of compaction the moisture content shall be within 2% of the optimum moisture. No section shall be left undisturbed for longer than 30 minutes during compaction operations. All compaction operations shall be completed within 2 hours from the start of mixing. Discontinue

any type of rolling resulting in cracking, movement, or other types of distress until such time that the problem can be resolved. If there is a significant change in mix proportions, weather conditions, or other controlling factors, the Engineer will require construction of test strips to check target density.

The completed layer shall have a smooth, tight, uniform surface true to the line, grade, and cross-section shown in the Plans, or as staked.

4-05.3(7) Curing:

1. After completion of final grading and compaction of the ICTB, finished portions shall be protected in such a manner as to prevent equipment from marring, permanently deforming, or damaging completed work.
2. The surface shall be cured by being kept continuously moist for a period of 4 days. This shall be accomplished by covering the surface with fabric and applying water, or sealing the surface for curing with CSS-1 emulsified asphalt cement at a uniform application rate of 0.20 to 0.25 gallons per square yard (diluted 1:1 with water) to create a sealing membrane.
3. Allow ICTB to cure in place for 4 days following final grading. Re-route all vehicles during curing time as part of the quality control plan.

4-05.3(8) Preparation for Paving

1. Proof roll the ICTB base under the observation of the Engineer. Areas exhibiting deflection, reaction, or pumping shall be repaired according to Section 4-04.
2. Sawcut and remove damaged or uplifted pavement adjacent to the ICTB base. Sawcut and replace curbs and gutters damaged by the pulverizing operation. Repair to pavement and structures damaged by ICTB process shall be at no additional cost to Agency.
3. Remove loose sand, dust, and debris prior to paving.

4-05.3(9) Maintenance

Care and Maintenance of Work - Maintain the ICTB base in good condition until all Work is completed and accepted at the Contractor's expense. Maintenance shall include immediate repairs of any defects that may occur. If it is necessary to replace any ICTB base, the replacement depth shall be the design depth of the ICTB or match the depth of the adjacent ICTB, whichever is greater. Replace the ICTB base with crushed surfacing material complying with Section 4-04 at equal depth. No skin patches will be permitted.