SPECIAL PROVISIONS

City of Flagstaff, Arizona

2022 Street Maintenance Program

City of Flagstaff Project Number:

01-22001

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Final 1 Submittal

Appendices:

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION 2022 REVISION TO THE 2020 EDITION, CITY OF FLAGSTAFF GENERAL PROVISIONS, AND CITY OF FLAGSTAFF ENGINEERING STANDARDS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

PART 100 – GENERAL CONDITIONS

SECTION 104 SCOPE OF WORK

104.1.1 GENERAL:

(Revise to include the following)

The Project includes milling and overlay (M&O) or chip seal of various City of Flagstaff streets in the West (M&O) and Northeast (chip seal) areas of the City. In addition, curb, gutter and sidewalk may be repaired or replaced where hazards or drainage conditions exist for streets requiring a mill and overlay.

Refer to the construction plans for locations and extents of M&O and chip seal work. In general, improvements are located in dispersed locations in west Flagstaff and miscellaneous infill sidewalk in east and west Flagstaff.

The scope of work presented in these Special Provisions and the accompanying construction plans more specifically include the following.

Mill & Overlay

- Paving improvements
    - Edge milling in locations specified
    - Full width milling
    - Isolated full depth pavement replacements at failure areas
    - Cleaning and sealing of noted cracks
    - Modified Asphaltic Concrete (MAC) Overlay
    - Pulverization and reconstruction of isolated roadway segments
- Isolated curb and gutter replacement in areas of drainage impediments
- Isolated sidewalk replacement where concrete panels create a trip hazard or exceed ADA tolerance
- Isolated reconstruction or replacement of sidewalk ramps and landings for inclusion of truncated domes or for meeting geometric requirements of ramp landings
- Street striping
- Adjustment and replacement of concrete collars around utility appurtenances and survey monuments
- Isolated replacement of water valve cans

Chip Seal

- Cleaning and sealing of noted cracks
- Protection of utility appurtenances and survey monuments
- Placement of bituminous material and cover material (chips)
- Street striping

104.1.2 MAINTENANCE OF TRAFFIC:

(Revise to include the following)

Any full street closures will require the approval of the City and involve adequate re-routing (as approved by the City Traffic Engineer), notification of media, notification of residents and businesses in the project area and along the proposed route, and adequate temporary signage/signals. All street restrictions or closures must be coordinated with emergency responders.

See 107.6 for advance notification of work that may impact traffic.

Traffic Safety:

At the time of the pre-construction conference, the Contractor shall designate an employee who is qualified and experienced in construction traffic control and safety, to be available on the project site during all periods of construction to coordinate and maintain safe barricading whenever construction restricts traffic. This person shall be available during non-construction hours in case of any traffic control and/or safety items that need to be handled in an urgent manner. Traffic control shall include pedestrian, bicycle and vehicular traffic.

Sanitation Pickup:

Regular residential sanitation pickup and Dumpster pick up varies from location to location; coordinate with the City's Environmental Division and the property owner for pick-up days. When construction activity interferes with sanitation pickup, the Contractor shall provide for sanitation vehicle access to the affected properties or relocate the trash containers where access is acceptable. The Solid Waste Division of the Public Works Department contact is (928) 213-2110. The contact number for Waste Management is (928) 779-6050. If trash or recycle pickup is obstructed by the construction activity, the Contractor will be responsible for proper disposal.

Bulk trash pickup occurs approximately every 5 weeks with the specific schedule found on the City of Flagstaff website at: https://www.flagstaff.az.gov/DocumentCenter/View/70990/2022-Bulky-Trash-Postcardpdf.

Emergency Access:

All roadway closures shall be coordinated by the Contractor with Traffic Engineering and the City's Project Manager at least 1 week in advance of the closures. The Contractor shall submit the closure for approval to the Traffic Engineer, copy the information to the City's Project Manager, and forward the street closure information to the Fire Department, Police Department, and Emergency Medical Services after approval.

US Postal Service Access:

The Contractor shall be responsible for maintaining access for postal service within the project area at all times. The Contractor shall coordinate this work to avoid interruption of mail service. Should an existing mailbox be damaged by construction activity, the Contractor shall promptly remove and replace the damaged mailbox in kind, including post and foundation, at no cost to the resident or the City.

The Contractor shall maintain mailboxes, and/or provide temporary mailboxes, so that no disruption of mail service shall occur. If mail disruption is anticipated, the Contractor shall notify the City's Project Manager, Inspector, affected property owner and/or resident(s), and the Post Office at least 48 hours in advance.

Bus Route:

The Contractor is responsible for coordinating with Mountain Line for road closures, restrictions and possible delays as a result of construction. Contact Anne Dunno, (928) 779-6624.

The Contractor is responsible for coordinating with Flagstaff Unified School District's Transportation Department for road closures, restrictions and possible delays as a result of construction that could impact school bus routes in the work areas. Contact Bob Kuhn, Assistant Superintendent for Operations, (928) 220-2035.

104.1.3 WATER SUPPLY:

(revise to include)

The Contractor is advised that except for public water main flushing and testing, the City will not authorize the use of potable water for construction purposes. The Contractor shall determine the availability of reclaimed water for construction purposes by contacting the City of Flagstaff Utilities Department.

Prior to loading, hauling, and applying reclaimed water, the Contractor shall be required to obtain the necessary permit (no fee) at the Wildcat Hill Wastewater Treatment Plant and will be responsible for complying with all permit requirements.

SECTION 105 CONTROL OF WORK

105.2 PLANS AND SHOP DRAWINGS:

(Revise as follows)

The Contractor shall submit electronic copies product data and mix design(s) to the City for review. Only materials to be used on this specific construction project shall be submitted.

The General Contractor shall review and stamp all product data for conformance with the construction documents prior to submission.

Any engineering design performed by others and submitted for review shall bear a seal of an engineer registered in the appropriate jurisdiction and discipline. The adequacy of designs and layouts performed by others rests with the designing or submitting party.

(Revise to include the following)

105.2.1 RECORD DRAWING PREPARATION AND COORDINATION:

See the City of Flagstaff Engineering Standards Division 13-03-006 and Appendix C for the City of Flagstaff Record Drawings Checklist.

105.5 COOPERATION OF CONTRACTOR:

(revise to include)

The Contractor's Project Manager and Project Superintendent shall attend weekly construction progress meetings. The Contractor shall be prepared to discuss construction schedule, construction activities

planned for the upcoming two (2) weeks (submit proposed two (2) week schedule), problems, issues, any information required by the City's Project Representative, construction staking, business/residence/citizen complaints, safety, traffic control and pedestrian access requirements, weather delays experienced during the previous week, disposal of materials, access/construction coordination with businesses/residences, inspection/testing, overtime worked during the previous week, payments, water/sewer service disruption, submittals, field orders/field changes and any other business as necessary. The Contractor shall prepare meeting agendas and meeting minutes. Minutes shall be distributed within four (4) working days after the meeting.

Public Involvement: At the time of the Pre-construction Conference, the Contractor shall designate an employee that is fully responsible for coordination with the public, including but not limited to; the property owners, renters, leasers, Public media, the City of Flagstaff Public Information Officer and Mayor/Council. This person shall be qualified and experienced in public coordination and shall be available during all periods of construction to coordinate any issues.

Protection of Work: The Contractor is required to protect work during inclement weather. The Contractor shall grade areas to drain and utilize pumps to remove ponding water immediately during all stages of construction during both working and non-working hours.

105.7 COOPERATION BETWEEN CONTRACTORS:

(revise to include)

A current capital improvements project is under construction in the Coconino Estates neighborhood (vicinity of Stevanna Way). Contractors will coordinate traffic control and trucking routes accordingly.

105.8 CONSTRUCTION STAKES, LINES AND GRADES:

(revise to include the following)

Unless noted otherwise in the contract documents, the Contractor shall lay out the work from the lines, grades and dimensions shown on the drawings. The Contractor shall be responsible for all such work for the duration of the project. Any dimension or grade errors shall be immediately transmitted in writing to the City's Project Manager for clarification, before proceeding with the work.

SECTION 106 CONTROL OF MATERIALS

106.2 SAMPLES AND TESTS OF MATERIALS:

(revise second sentence of the third paragraph to read as follows)

Unless otherwise specified, samples and tests will be made in accordance with either: the Materials Testing Manual of the Contracting Agency; the standard methods of AASHTO, ASTM, or ADOT, which were in effect and published at the time of advertising for bids.

SECTION 107 LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC

107.2 PERMITS:

(revise to include the following)

Erosion Protection and Site Restoration

Erosion control shall be in accordance with Section 431 of the City of Flagstaff Amendments to MAG Standard Specifications for Public Works Construction. BMP's are shown on the construction documents for the Contractor's use, however the Contractor shall modify BMP's as needed to control erosion. The SWPPP shall be kept and maintained on site during construction.

Measurement and Payment

Measurement shall include all items required to comply with the requirements of the AZPDES permit program and City of Flagstaff requirements. The cost for obtaining and complying with the AZPDES permit, inspection documentation, erosion control devices and all work associated with stormwater protection shall be included in the pay item for SWPPP. If no pay item is included, work shall be paid out of project contingency.

107.6 PUBLIC CONVENIENCE AND SAFETY:

(revise to include the following)

REMOVAL OF PARKED VEHICLES

Whereas on-street parking currently exists within the project limits, the Contractor shall give written notice, describing the proposed work and parking restrictions, to each adjacent business or residence. Written notice (with specific dates of anticipated construction work) shall be given at least **24-hours** in advance of the work.

A special, separate notice is required for the crack seal portion of the work warning the adjacent residents of the dust and other problems associated with that work. In the event that the work requires removal of parked vehicles, the Contractor shall coordinate removal to the nearest convenient side street at the Contractor's expense.

107.7 BARRICADES AND WARNING SIGNS:

The Traffic Barricade Manual referred to under this section and thereafter in the Standard Specifications shall be part VI of the Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD).

107.9 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE:

See the City of Flagstaff Amendments to MAG Standard Specifications for Public Works Construction.

(revise to include the following)

The Contractor shall take special care to control construction-related dust and noise and to keep the project site cleaned up to the greatest extent possible.

Prior to construction commencing, the Contractor shall prepare a video recording of the project area that adequately shows each private property within the project corridor to document existing conditions. A copy of this video shall be provided to the City in a viewable format.

As part of the work, the Contractor is responsible for replacing and/or restoring landscaping (including but not limited to fences, gates, brick pavers, retaining walls, landscape rock walls or rock barriers, parking bumpers, driveway materials, private signage, etc.), and any other owner improvements impacted by construction of the project (e.g. water meter and PRV installation, removal of the existing water meter and box, sewer service/clean outs, storm drain/catch basins, fire hydrants, driveway match backs, slope match backs, and gate adjustments) not otherwise called out on the construction plans.

SECTION 108 COMMENCEMENT, PROSECUTION AND PROGRESS

108.4 CONTRACTOR'S CONSTRUCTION SCHEDULE:

(Revise to include)

It is the intention of the City of Flagstaff that the streets be re-striped prior to opening to traffic.

If the scheduling of the work does not permit re-striping of these streets prior to opening to traffic, lighted vertical panels shall be installed and maintained on 40' spacing, separating the opposing lanes of traffic and delineating designated turn lanes., until the required re-striping is completed.

In all cases, restriping shall be completed within 48 hours of completion of the surface treatment and opening to traffic. All preformed plastic markings shall be placed within one week of completion of surface treatment and opening to traffic.

SECTION 109 MEASUREMENTS AND PAYMENTS

109.4 COMPENSATION FOR ALTERATION OF WORK:

(Revise to include)

Allowance and Contingency items will only be paid if explicitly authorized in a City of Flagstaff Construction Field Order from the City's Project Manager.

PART 200 – EARTHWORK

SECTION 211 FILL CONSTRUCTION

211.2 PLACING:

(Fourth paragraph, revise last sentence to read as follows)

However, such material shall not be placed within 3 feet of the finished subgrade of the fill.

211.3 – COMPACTING:

(Fifth paragraph; revise last sentence to read as follows)

Each layer shall be compacted to a uniform density of not less than 95 percent, or as directed by the Engineer.

(Sixth paragraph; revise first sentence to read as follows)

When fill material contains by volume over 25 percent of rock larger than 6 inches in the greatest dimension, the fill (up to 4 feet below finished subgrade) may be constructed in layers of a loose thickness not exceeding the maximum size of rock in the material. In no case shall such layers exceed 3 feet in thickness.

PART 300 – STREETS AND RELATED WORK

SECTION 301 SUBGRADE PREPARATION

(revise to include)

301.2.2 UNSTABLE SUBGRADE:

If it is determined by the owner's representative that the subgrade is unstable for compaction and placement of aggregate base, the contractor shall use one of the following methods to make subgrade stable. This work shall be authorized from the contractor's contengincy.

Remove subgrade and replace with additional subbase (minimum of 2 feet of stockpiled asphalt millings), cement treating per MAG Section 311, or the use of geogrid such as Tensar BX1200 with an additional 12 inches of aggregate base per MAG Section 306.

Contractor should consult with Engineer prior to performing work.

Once the suspect areas are stabilized to the satisfaction of the engineer, the normal ABC sub-base should then be installed. The contractor shall take all reasonable efforts to eliminate or reduce construction traffic on the repaired areas.

301.3 RELATIVE COMPACTION:

The work under this section shall be in accordance with the COF Revisions to MAG Uniform Standard Specifications Section 13-21-001-0301.3 as follows:

Revise section to read:

The subgrade shall be scarified and loosened to a depth of 9 inches. When fill material is required, a layer of approximately 3 inches may be spread and compacted with the subgrade material to provide a better bond. The subgrade cut and fill areas shall be constructed to achieve a uniform soil structure having the following density when tested in accordance with AASHTO T-99, Method A; T-191 or ASTM D-2922; and D-3017 with the percent of density adjusted in accordance with the rock correction procedures for maximum density determinationto compensate for the rock content larger than that which will pass a No. 4 sieve:

a. Major streets - 95 percent

b. Other streets and traffic ways - 95 percent

c. Curbs, gutter and sidewalks - 95 percent

Modify to add:

Moisture content shall be within two percent of optimum.

301.4 SUBGRADE TOLERANCES:

(revise to read as follows)

Subgrade upon which pavement, sidewalk, curb and gutter, driveways, or other structures are to be directly placed shall not vary more than ¼ inch from the specified grade and cross-section. Subgrade upon which sub-base or base material is to be placed shall not vary more than ½ inch from the specified grade and cross-section. Variations within the above specified tolerances shall be compensating so that the average grade and cross-section specified are met.

301.8 PAYMENT:

(revise as follows)

No separate payment will be made for Subgrade Preparation, it is incidental to roadway construction.

SECTION 305 STREET REBUILDING (NEW SECTION)

305.1 DESCRIPTION:

Certain small areas of the streets to be overlaid are to be rebuilt before overlay. These areas will be marked in the field by the Engineer. This work shall consist of removal and disposal of existing materials, subgrade preparation, and furnishing and placing asphaltic concrete.

305.2 CONSTRUCTION:

The areas may vary in size. The existing pavement, base, and subgrade will be removed to an elevation that will facilitate minimum City of Flagstaff asphalt structural sections in detail 10-09-010. The subgrade will be compacted to 95%. The existing pavements shall be wheel or saw cut back to a neat straight line. The asphaltic concrete (3/4”) will be placed and compacted so that it meets the following requirements:

1. The density of the asphaltic concrete is as specified under Section 321.
2. The finished grade of new asphalt can be up to 1/4" above but no lower than the adjacent existing pavement or as directed by owner’s representative.
3. The maximum thickness of the new asphaltic concrete is 6" placed in 2 lifts or as necessary to match existing pavement grade.

305.3 MEASUREMENT AND PAYMENT:

Measurement and payment will be made at the contract unit price for each square yard of pavement removed and replaced as directed by the Engineer. Payment will be accepted as full compensation for all equipment, labor and materials used under this item.

SECTION 310 PLACEMENT AND CONSTRUCTION OF AGGREGATE BASE COURSE

310.2 PLACEMENT AND CONSTRUCTION:

The work under this section shall be in accordance with COF Revisions to MAG Uniform Standard Specifications and MAG Uniform Standard Details, Section 13-21-001-0310.2.

(revise 3rd paragraph to read)

After placement, the aggregate base course surface shall be true, even and uniform conforming to the grade and cross-section specified. In no case shall the aggregate base course vary by more than 1/4 inch above or below required grade.

310.3 COMPACTION:

(revise 6th paragraph to read)

Unless otherwise noted in the project plans or project specifications, the moisture content of the aggregate base course at the time of compaction shall be the optimum moisture contact +/- 2%.

(revise 7th paragraph to read)

The following percent compaction is required:

(A) Below asphalt concrete pavement 100%

(B) Below Portland cement concrete pavement, driveways, curb & gutter, sidewalks, alley entrances, handicap ramps, and catch basins. 95%

(modify to add)

Should suspension of operations take place between time of initial base placement and commencement of paving operations, contractor shall place additional aggregate base as required, and reestablish the specified grade, cross sections and compaction prior to paving.

Finish grading of aggregate base may be checked and verified by the Engineer. In areas of new paving, paving cannot commence until the grades have been checked and verified by the Engineer. The Engineer shall be notified once finish grading is ready for verification. The Engineer shall complete his or her checking and verification within 24 hours of notification. If the grades in these areas are found to be unacceptable by the Engineer, the Contractor shall regrade the areas to the satisfaction of the Engineer, at no additional expense to the Owner.

If, during the paving operations “soft spots” in the ABC are noted, they shall be excavated to a sufficient depth and backfilled with compacted ABC material (8” lifts) so that they are eliminated. No additional payments will be made for soft spot repairs, the cost is to be included in the bid price.

310.5 PAYMENT:

(revise as follows)

Payment for aggregate base course shall be included in the contract unit prices for items of work that include aggregate base course.

SECTION 311 PLACEMENT AND CONSTRUCTION OF CEMENT TREATED SUBGRADE

311.2 MATERIALS:

(Second sentence, revise to read)

The soil for the mixture shall consist of the material in the area to be paved or approved selected material.

(Last sentence, revise to read)

The cement content shall be determined by the procedures set forth in AASHTO T136-50 or ASTM D560-67. The selection of a cement content based on compressive strength requirements without regard to freeze-thaw durability will not be allowed.

311.4 CONSTRUCTION METHODS:

(Second paragraph, revise to include the following)

Soil cement base course shall not be mixed with or placed on any frozen material; at the time of mixing and placing, the air temperature shall be 40ºF (5ºC) and rising, and the surface temperature shall be 45ºF (10ºC). The soil cement base course shall be protected from freezing for a minimum period of seven (7) days.

SECTION 317 ASPHALT MILLING

317.2 CONSTRUCTION REQUIREMENTS:

(revise to include the following after the second paragraph)

The Contractor is responsible for the removal of pavement as per the typical sections and plans. It is anticipated that the work would be performed with a CMI Roto-mill or similar machine.

The pavement shall be removed with minimum disturbance to the remaining pavement, curb and other improvements. All paving material removed by milling shall remain the property of the City. Portions of the millings shall be used for shoulder build up as directed and determined by owners' representative. All remaining millings shall be delivered to City property, location to be determined at the pre-construction meeting. All loose material shall be removed from the pavement surface immediately following the milling operation. A pickup broom or other suitable means shall be provided by the Contractor to perform this work. Any cleanup work, by hand brooming or shoveling, needed to pick up loose material shall also be provided by the Contractor.

Where the pavement is milled across a street, causing a significant bump for the traffic, the Engineer may order the milled area patched with temporary pavement. The Contractor shall immediately place milled asphaltic concrete in the rough area and remove this material no more than two hours before that street is overlaid.

The Contractor shall locate and lower, as necessary, any water valve boxes, manhole covers, survey monument boxes or other objects that may interfere with the pavement milling operation. The plans indicate "potential conflicts" which the contractor is responsible for generating quantities and estimating accordingly. Payment will be made for lowering these facilities on a per-unit basis.

The Contractor shall schedule the pavement milling so that no street shall be milled more than ten calendar days prior to its scheduled date for overlay.

SECTION 321 PLACEMENT AND CONSTRUCTION OF ASPHALT CONCRETE PAVEMENT

321.2 MATERIALS AND MANUFACTURE:

(Modify to add)

For patching and remove and replacements, asphalt concrete shall be a Type 3/4" dense surface course PG 58-28 for all asphalt paving, unless modified by the Engineer. For this project, a MAG Type C-3/4 surface course shall be taken as equivalent to Type 3/4" surface course.

In addition to the requirements of MAG Specification Section 710, the aggregates and mix to be incorporated into the work must also meet the following requirements:

Test	Test Results
Index of Retained Strength	60 Min.

Compaction of asphalt concrete shall be a minimum of 95% of ASTM D1559-75 Blow Method.

Minimum temperature as measured at lay down machine to be 275 degrees F.

321.4 APPLICATION OF TACK COAT:

(Modify to add)

Tack coat applied to vertical surfaces shall be sprayed (pressurized sprayer) or brushed on to ensure total (100%) coverage of the surface. Dribbling, spray bottle or pouring on will not be approved.

321.8 PLACEMENT:

(modify to add)

Asphalt concrete shall only be placed upon a surface of at least 70ºF. The temperature of the asphalt concrete of any course, just prior to the dumping of the material from the hauling vehicle, shall be at least 275ºF; a lower temperature is allowed if written approval is given by the Engineer. Compaction and finishing shall be completed before the mix has cooled to 180ºF. The Engineer may authorize placement of asphalt concrete upon surfaces having a temperature of 70°F or above, providing those mentioned above and the following conditions are met.

a. The underlying surface is dry.

b. The weather is dry and without threat of precipitation.

c. The temperature of the asphalt concrete mixture is such that the sum of the air temperature plus the temperature of the mixture when placed is between 320ºF – 345ºF pending on above surface temperatures.

Self-propelled lay down machines shall be used for all paving. This shall include patches larger than ±40 S.Y. (depending on patch shape) and as directed by the Engineer. Smaller patches may be placed by hand methods if the Contractor can demonstrate adequate placement and finishing control to the

satisfaction of the Engineer. The size of the paver shall be approved by the Engineer prior to beginning paving.

321.8.2 JOINTS:

(modify to add)

Cold transverse and longitudinal joints shall be either trimmed back and tacked, or heated with a joint heater. A cold joint shall be defined as any joint which has been placed for 6 hours or longer before adjoining asphalt is placed, unless approved by the Engineer.

The Contractor shall provide sufficient rollers (size and number) to compact the asphalt to the specified density. If the rollers being used do not appear capable of reaching the minimum density (as shown by field test results) paving operations shall be suspended until proper equipment is available.

Coarse aggregate from any and all raking operations shall be removed from the fresh asphalt surface prior to rolling.

321.8.3 ASPHALT LEVELING COURSE:

(modify to add)

An acceptable surface shall not vary more than 1/4 inch from the lower edge of a 10 foot straightedge when placed parallel to the centerline of the roadway.

Asphalt shall not be placed on grade that is frozen.

321.8.4 BASE PREPARATION:

(Modify to add)

If, during the paving operations “soft spots” in the ABC are noted, they shall be excavated to a sufficient depth and backfilled with compacted ABC material (8” lifts) so that they are eliminated. No additional payments will be made for soft spot repairs, the cost is to be included in the lump sum bid price.

321.8.5 SMOOTHNESS:

(modify to add)

The contractor is to supply the 12 foot straight edge and meet the approval of the owner / engineer prior to testing.

321.10.2 GRADATION, BINDER CONTENT AND AIR VOIDS:

(modify first two sentences of the fourth paragraph)

The asphalt cement content shall be considered acceptable if it is within -0.30% to +0.40% of the mix design target value. If the asphalt binder content deviates more than the above amounts from the mix design target value…

(modify next-to-last sentence of the fourth paragraph)

If the resulting average of the asphalt binder content deviates by more than -0.30% to +0.40% from the mix design target value…

321.10.4 ASPHALT PAVEMENT THICKNESS:

(Modify to add #3)

(3) When the deficiency of the pavement thickness exceeds 1/4 inch, the pavement shall be overlaid on the area affected. In no case shall this overlay be less than one City block or 660 feet in length, whichever is less. This overlay shall be placed over the full width of pavement with a new mat of material specified by the Engineer; equal in thickness to the deficiency, but not less than 1 inch in any instance.

321.13 PAYMENT:

Modify to add:

The cost for asphalt concrete pavement and tack coat shall be paid for as part of the appropriate unit bid price for the thickness and type of asphalt concrete specified.

SECTION 326 PLACEMENT AND CONSTRUCTION OF POLYMER MODIFIED ASPHALTIC CONCRETE (MAC)

326.1 DESCRIPTION:

(revise the first sentence to read as follows)

Asphalt concrete overlay consists of milling existing pavements in accordance with the approved plans and placing and compaction of modified asphaltic concrete (MAC) and ADOT 409 Terminal Blend mix over existing asphaltic concrete paving.

Modified Asphalt Concrete (MAC) overlay shall conform to the requirements of SECTION 325 – PLACEMENT AND CONSTRUCTION OF ASPHALT-RUBBER ASPHALT CONCRETE, except as modified herein.

All references to ARAC in Section 325 shall be construed as applying to MAC overlay in section 326.

MAC concrete overlay consists of milling and overlay over existing asphaltic concrete pavement using MAC materials.

326.2 MATERIALS AND MANUFACTURE:

(revise the section to read as follows)

The tack coat, asphaltic concrete mix, modified asphaltic concrete and transportation of the mix shall be as specified in Sections 321, 710, 719 and ADOT Section 409 as amended by the General Provisions and these Special Provisions.

Asphalt cement shall be PG64-28TR+ (MAC) or ADOT 409 Overlay PMRCA PG 64-28TR (ADOT 409 mix – 2” lift or less gradation). The mix designs shall include an antistripping agent when tests on aggregate indicate that the proposed aggregate is subject to stripping. The Contractor shall submit a mix design certified by a registered Professional Engineer for approval not less than fourteen (14) days prior to scheduled paving date. Engineer shall review the mix design in accordance with submittal procedures.

The aggregate gradation and percentage of binder for modified asphaltic concrete shall be in accordance with section 710, 719, M.A.G. 701 or ADOT Section 409 as amended by the General Provisions and Special Provisions.

326.8.6 POLYMER MODIFIED ASPHALT CONCRETE OVERLAY:

(revise to include)

Before placing asphalt concrete overlay, severely raveled areas or cracked areas that are depressed more than ¾ inch from the adjoining pavements shall be cut out and patched at least 48 hours prior to the resurfacing operation. Over-asphalted areas or rough high spots shall be removed by burning or blading. Small shrinkage cracks (between ¼ inch to 1 ¾ inch) shall be filled in with asphalt sealing compound per Section 337. Large shrinkage cracks (in excess of 1 ¾ inch) shall be filled with 3/8" hot mix asphalt per Section 337 and acceptable to the City / engineer.

(new section)

326.8.6.1 PLACING AND CONSTRUCTION METHODS:

Although the great majority of the work is straight-run overlay, the Contractor is cautioned that certain areas require careful treatment. So that the Contractor may review these areas and may account for them fully in his proposal, the City of Flagstaff points out that:

1. In some cases, cross-streets shall be overlaid on the approach. The location and extent of work on cross-streets shall be as outlined by the Engineer prior to beginning the work. However, for estimating purposes, no more than ten (10) cross-street approaches are to be overlaid and included under items of work shown in the Bid Proposal.

2. In areas of odd configuration, care will be taken to tack and overlay, to smooth lines that match adjacent existing pavement, curb, gutter and other controls. Handwork may be necessary.

3. Special care and additional grade control may be required at intersections, at cross-gutters, around returns, along curbs without concrete gutters, at conforms to railroad tracks and cross street and drives, etc. The object is to provide a smooth, attractive surface and to maintain positive surface drainage.

4. Two (2) "screed" men may be required while the lay-down machine conforms at gutter, dips or other places of difficult conform.

5. It shall be the contractors' responsibility to immediately clean up any spillage. Failure to limit spillage and keep the job site cleaned up from such spillage shall be justification to shut the work down until adequate procedures and resources are provided to resolve the problem. Modified Asphalt Concrete shall be delivered and placed at a temperature no higher than necessary for placing, finishing, spreading and compacting, but shall be high enough to accomplish this work. The minimum temperature of the PMA, RAC, HMA, or MAC shall be 275°F. These temperatures will be taken at a point 1 inch below the surface at the point of delivery and may need to be higher if material is found unworkable by the Engineer. Asphalt concrete found deficient in temperature shall be rejected and removed from the job site at no cost to the contracting agency. No free treating fluid shall be present in the truck bodies at the time of asphalt concrete loading. Diesel fuel shall not be used as a treating fluid.

Section 321.6, Corrective Requirements for Deficiencies, shall apply to asphaltic concrete overlay in this contract.

(new section)

326.8.6.2 ADJUSTMENTS:

After installation of an overlay course all necessary frame and cover adjustments for manholes, valve boxes, survey monuments, sewer clean-outs, etc. shall be completed by the contractor within the given segments being surfaced and shall be per City of Flagstaff typical details 9-03-060 and 9-03-62.

326.13 PAYMENT

(revise the section to read as follows)

Payment for tack coat, asphaltic concrete and modified asphaltic concrete shall be in accordance with Section 321.

Payment for crack sealing shall be made in accordance with Section 337.

Payment for pavement milling shall be on a square yard basis in accordance with Section 317 and is to include trucking, disposal, pick up broom, and all work associated with pavement milling. Measurement for pavement milling will be made based on the length of pavement surface actually milled and the width specified or milled, whichever is less.

SECTION 330 ASPHALT CHIP SEAL

330.2.1 ASPHALT:

(Revise to include)

Emulsified asphalt Type CRS-2P shall be used for the chip seal coat. See section 713 for additional specs.

330.3 TIME OF APPLICATION AND WEATHER CONDITIONS:

(Second paragraph; revise second sentence to read as follows)

The ambient air temperature shall be at least 70ºF and rising.

(Third paragraph, revise to read as follows)

Asphalt chip seal shall not be performed between October 1 and May 1 unless specifically permitted by the City Engineer.

(new section)

330.4.8 PROTECTION OF UTILITY APPURTENANCES AND ADJACENT PROPERTY:

The Contractor shall protect all manhole covers, water valve boxes, survey monuments, and/or other man-made features so that no bituminous material or cover material remains and so that covers can be easily accessed after sweeping. All adjacent sidewalks and driveways shall be swept and maintained clear of loose cover material.

SECTION 336 PAVEMENT MATCHING AND SURFACING REPLACEMENT

336.2.2 PAVEMENT TO BE REMOVED:

(Modify to add)

The owner or his representative will field mark (in white or pink paint) approximate areas for removal and replacement. The contractor is to call Arizona 811 (Dial 811 or Arizona811.com) at least two full working days PRIOR to digging or removing pavement.

336.2.3 TEMPORARY PAVEMENT REPLACEMENT:

(Modify to add)

Temporary pavement replacement, as required in Section 601, shall be with UPMTM or an approved equal with a minimum thickness of 2 inches and shall conform to the following requirements:

DESCRIPTION:

1. The paving material shall be composed of an aggregate, as specified herewith, and plant mixed with Unique Paving Material (U.P.M.tm) liquid asphalt blend from the Sylvax Corporation or approved equal. The bituminous material shall be capable of coating wet aggregates without stripping, shall be available in various grades, and permit any one grade to be stockpiled and remain pliable and workable at a temperature of -15ºF for a minimum period of 12 months.

2. The paving material shall be capable of maintaining adhesive qualities in an uncovered stockpile or in paved areas which were damp or wet at the time of application for a minimum period of 12 months.

MATERIALS:

1. The aggregate gradation shall meet the following requirements:

Sieve Size	% Passing
3/8 inch	100
No. 4	85-100
No. 8	10-40
No. 16	10
No. 50	0-5
No. 200	2 maximum

2. The aggregate shall also meet the following criteria:

Sand equivalent	45 min.

Crushed faces	70% min.
Flakiness index	25 max.
Absorption	1.0 – 2.5%
Specific gravity	2.55 – 2.75%

3. Bituminous material:

The bituminous material shall be UPMTM liquid asphalt blend from the Sylvax Corporation or approved equal. When prepared from a base asphalt stock of either AC-10 or AC-20 and blended, it shall meet the following requirements:

Flash point (TOC)	200ºF (94ºC) min.
Kinematic Viscosity @140ºF (60ºC)	1000 – 4000 cSt
Water	0.2% max.

Distillate Test

(volume of original sample)

To 437ºF	0%
To 500ºF	0 – 55%
To 600ºF	0 – 20%
Residue from Distillate @ 680ºF	78 – 95%

Residue Test:

Absolute Viscosity @ 140ºF	125 poises
Penetration	200 min.
Ductility @ 39ºF	100 min.
Solubility in Trichloroethylene	99% min.

4. Composition of Mixture:

The mixture shall consist of an aggregate as specified and a bituminous material as specified mixed in such a manner as to contain approximately 6% of bituminous material per finished ton.

5. Preparation of Mixture:

The asphalt shall be heated to a temperature between 150ºF and 300ºF and mixed with the heated aggregate until all aggregates are uniformly coated. The mixed temperature shall not exceed 170ºF.

6. Plant and Equipment:

A batch-type mixer of approved design and capacity shall be used in mixing the ingredient materials.

(new section)

336.2.5.1 EXCESSIVE CRACKS / VOID FILLER:

Prior to any overlay construction the contractor is to fill in all pavements cracks per section 337.

(new section)

336.2.5.2 EXCESSIVE RUTTING AND SHOVING FILLER:

Prior to any overlay construction the contractor is to fill (microsurface) in all pavements rutting / shoving in excess of ½" (depth) with the appropriate size (gradation) Hot Mix Asphalt.

336.5 PAYMENT:

(Modify to add)

Payment for pavement matching (patch) will be made on the basis of square yards under the Remove and Replace Pavement (4"AC/6" ABC [C-3/4"]) Patch line item. Payment for crack / void excessive rutting and shoving filling will be made on the basis of tons.

SECTION 337 ASPHALT PAVEMENT CRACK SEALING AND CRACK FILLING

(revise as follows)

337.1 DESCRIPTION:

Crack sealing shall consist of blowing out loose material and sealing all cracks wider than 1/4 inch and narrower than 1 3/4" with an approved crack sealant.

For edge mill streets: crack sealing shall take place prior to milling.

For full-width mill areas: crack sealing shall take place after any specified milling and prior to placement of overlay.

The locations identified in Appendix B will receive only crack sealing.

337.2 MATERIALS:

The crack sealant shall be composed of asphalt, reclaimed and or virgin synthetic rubber, and polymer modifiers. The material shall be approved by the Engineer prior to notice to proceed and shall meet the following requirements:

TEST	METHOD	REQUIREMENT
Softening point	ASTM D-36	200º F. Min.
Cone penetration @77ºF	ASTM D-3407	30 Min.
Resilience @77º F	ASTM D-3407	40% Min.
Flow	ASTM D-3407	3 mm Max.
Safe heating Temperature		410º F. Min.

Crack sealant shall be applied in accordance with manufacturer's recommendation.

337.4 APPLICATION OF CRACK SEALANTS AND CRACK FILLERS:

(Modify to add)

Cracks in existing pavements 1/4 inch wide or wider shall be sealed. Cracks that are wider than 1 3/4" shall not be filled with crack sealant, but shall be filled with 3/8" hot mix asphalt. Crack sealing shall not be done after the street edges have been milled if applicable. **Those cracks that are filled with dirt shall be blown out to a depth of no more than 1 1/2".**

Crack sealant shall be placed to an elevation approximately 1/4" below the pavement surface. Sealant on the pavement surface shall be minimized. Should traffic pick up the crack seal material, the contractor shall provide and apply sand or a **very light** application of fine graded sand to protect the sealant. If the contractor opens the roadway to traffic before the sealant is set, sand application will be done at the contractor's expense.

337.6 MEASUREMENT:

Crack sealant shall be measured by the ton complete in place. The method of accounting for the material shall be discussed at the preconstruction conference and shall be acceptable to the Engineer. No separate measurement will be made for any sand necessary to prevent pickup by traffic.

337.7 PAYMENT:

Payment will be full compensation for furnishing and placing all materials specified and used and shall include all labor, traffic control, equipment, tools and incidentals necessary to complete the work as prescribed and directed by the Engineer. All costs for sand or Portland cement will be included in the unit price for crack sealant.

SECTION 340 CONCRETE CURB, GUTTER, SIDEWALK, SIDEWALK RAMPS, DRIVEWAY AND ALLEY ENTRANCE

340.1 DESCRIPTION:

(revise to include the following)

Appendix A is included to describe the location and approximate quantities of removals and replacements. Actual limits of removal and replacement will be as directed by the Engineer. Concrete valley gutter shall be constructed in accordance with City of Flagstaff Detail 8-06-010.

340.2 MATERIALS:

(revise to read)

Concrete shall be Class A, containing 5 to 7% air entrainment, and conforming to applicable requirements of Section 725.

Curb & gutters, sidewalks, driveway aprons and handicapped sidewalk ramps shall be constructed on three (3) inches of aggregate base course. Valley gutters shall be constructed on eight (8) inches of aggregate base course. No direct payment will be made for aggregate base course. All costs associated with this work are to be included in the amount bid for the items of work to which it is incidental or appurtenant. The contractor is to field verify number of dome panels needed for each ramp and bid accordingly. No additional payment will be made for “wider” ramps.

340.2.1 DETECTABLE WARNINGS:

(revise to include the following)

Detectable warnings shall consist of raised truncated domes aligned in a square grid pattern in conformity to the Americans with Disabilities Accessibility Guidelines. Truncated domes shall have the following nominal dimensions: base diameter of 0.9 inches, top diameter to 0.4 inches, height of 0.2 inches, and dome spacing center-to-center spacing of 2.35 inches, measured between the most adjacent domes on the square grid. Detectable warnings shall contrast visually with adjoining surfaces. The material is to be durable with non-slip surface not subject to spalling, chipping, or separation. Uncoated Cast iron per East Jordan Iron Works or approved equal is to be used. The owner is to specify the color of the panels.

The following is a table of the approved suppliers. Contractor is to use one of the following suppliers or an approved equal.

DURALAST® Cast Iron: Coated or Uncoated	East Jordan Iron Works	(800-874-4100) http://www.ejiw.com
Cast Iron: Coated or Uncoated	Neenah Foundry Co	(800-252-5801) http://www.nfco.com

IRON PED Cast Iron: Coated or Uncoated	Manufactured by Neenah Foundry Co	(763-478-8128) http://www.ironped.com
CAST-DWD™ or CAST CORP Cast Iron: Coated or Uncoated	Cast Corporation	(218-263-8510) http://www.castcorporation.com
CAST-DWD™: Coated or Uncoated	Pioneer Detectable, LLC	(262-370-5355) (877-270-3663) http://www.metadome.com

340.3 CONSTRUCTION METHODS:

(revise to include the following)

The longitudinal extent of any curb and gutter removal, replacement necessary because of nonconformity with the plans or specification, and replacement due to damage prior to acceptance shall not be less than the appropriate contraction joint spacing.

340.3.1 SUBGRADE PREPARATION:

The subgrade shall be compacted to a relative density of 95% max density.

340.3.7 FORM REMOVAL AND FINISHING:

The Contractor shall take extra precaution to protect all freshly poured concrete from vandalism. The Contractor shall coordinate placement of all new concrete with businesses and residences a minimum of forty-eight (48) hours in advance of the work. Night work, admixtures to accelerate hydration and setting of concrete and protective coverings should be considered by the Contractor to ensure that the finished concrete is free from any defects. Refer to MAG Specifications 107.10.

Concrete finishes shall be as called-out on the plans, details and in these Special Provisions. Any concrete finish that does not meet these requirements shall be removed and replaced at the Contractor's expense.

340.5 MEASUREMENT:

(revise to include the following)

No separate measurement or payment will be made for saw cutting necessary for removal of pavement, curb, valley gutter or aprons. No separate measurement or payment will be made for 3" ABC under sidewalk or sidewalk ramps. The cost of saw cutting and ABC is to be measured and paid in the associated work items.

Measurement or payment for Remove Sidewalk & Install Sidewalk Ramp shall include all costs associated with special forming and handwork to construct the MAG 236-5 or 238-2 curb ramps including the curb at the back of the ramps. Measurement and payment will also be made of the necessary curb and gutter removal and replacement for the curb ramp. Measurement and payment will also be made of the necessary sidewalk removal and replacement through the curb ramp.

Measurement or payment for ramp retrofit shall include all costs associated with special forming and handwork to construct the curb ramps (as detailed on the plan sheets) including the curb at the back of the ramps if applicable. Measurement and payment is per each and includes truncated domes and formwork. The curb and gutter and concrete is measured separately in their respective pay items.

SECTION 345 ADJUSTING FRAMES, COVERS AND VALVE BOXES

345.1 DESCRIPTION:

(revise to include the following)

The adjustment of manhole frames and covers and water valve boxes shall be done in accordance with City Standard Drawing 9-03-060 and 9-03-062. The contractor is cautioned that only straight, centered (relative to adjustment pavement or concrete) valve boxes that conform to City Detail 9-03-060 will be acceptable. The Engineer will provide the contractor necessary direction for the appropriate adjustment or replacement of each valve box and cover.

In mill and overlay areas, all existing valve boxes, meter boxes, manhole covers, survey monument boxes, or similar items designated to remain in service shall be temporarily lowered prior to milling, so as to not impede milling operations.

The contractor is to supply a new valve box and cover, as directed by the Engineer, to replace existing tops that are broken, non-standard or defective. Payment for furnishing of new valve boxes and covers supplied shall be at the bid unit price for Remove water valve box and cover, Supply and adjust new valve box & cover to finished grade bid item.

In all mill & overlay areas, the entire valve box and cover shall be excavated, removed and replaced under the Remove water valve box and cover, Supply and adjust new valve box & cover to finished grade bid item. This item includes excavation to the valve nut, removal of the old box and cover, a new complete valve box and cover as well as the adjustment to grade.

Any usable valve box and covers removed under this contract shall remain the property of the City. The water valve box and covers that require removal and replacement shall be excavated and installed prior to the overlay. Final adjustments shall be made after repair and resurface of existing pavement.

On the proposed streets where the existing manhole collars are bigger than current City of Flagstaff standards additional labor and materials will be needed. When the contactor lowers the existing manholes, they are to remove the existing collars and fill the void with HMA per section 321 and place a new collar around the manhole frame per the City of Flagstaff Standard Detail 9-03-062. Payment for the HMA for collar patching only will be per unit cost for manhole lowering on each street.

The Contractor will be required to keep a record of locations of each frame or box as per the following:

1. For those boxes and frames readily visible, the Contractor will make reference points which will allow him to accurately locate frames and boxes after they are covered. It will be the Contractor's responsibility to preserve these reference points.

2. For those boxes and frames not visible before surface treatment, utilities representatives will locate frames and boxes, making a mark at each location. It will be the Contractor's

responsibility to preserve these marks and all reference marks as required and identified in item 1 above.

PART 400 – RIGHT-OF-WAY AND TRAFFIC CONTROL

SECTION 401 TRAFFIC CONTROL

401.1 DESCRIPTION:

(revise to include the following)

The work under this section shall be in accordance with Section 401 of the MAG Standard Specifications and the City of Flagstaff Amendments to MAG Standard Specifications for Public Works Construction.

401.4 TRAFFIC CONTROL MEASURES:

(revise to include the following)

The streets shall remain open to through traffic at all times. One lane of traffic shall be open at all times on Walgreens St., Riordan Rd., High Country Tr., Blackbird Roost, and Gemini Rd. Other streets not listed but included in the program may be managed with local closures at the discretion of the City's Project Manager.

Prior to any construction, the contractor is to submit a traffic and pedestrian (if applicable) control plan for revisions and approval.

The Contractor is to supply and install, at 40-foot spacing, temporary raised pavement markers along the existing pavement stripes on the streets identified on the plans. Temporary raised pavement markers shall be as supplied by Davison Plastics Company or approved equal. The furnishing and installation of temporary raised pavement markers shall be considered incidental and included in the price bid for Traffic Control.

401.5 GENERAL TRAFFIC REGULATIONS:

(Revise to be added)

The contractor will reinstall all permanent traffic control devices as required by the approved construction plans and specifications.

Existing traffic signs, including stop, yield and street name signs shall be maintained by the contractor until such time as construction renders them obsolete. The contractor shall be responsible for furnishing and installing all permanent traffic signs as required by the construction plans and specifications.

401.6 MEASUREMENT:

(revise to read)

Traffic control shall be measured as a single lump sum over the duration of the project.

401.7 PAYMENT:

(modify to add)

Payment for traffic controls shall be a single lump sum.

SECTION 405 SURVEY MONUMENTS

405.1 DESCRIPTION:

(revise to include the following)

All right-of-way centerline monuments shall be set as part of this project. Existing right-of-way monuments shall be reset in accordance with Section 13-03-005-0004 of the City Engineering Standards. In locations where right-of-way centerline monuments are missing, monument locations shall be calculated by a registered land surveyor in the State of Arizona and new monuments shall be set by the same.

405.2 MATERIALS:

(revise second paragraph to read)

All concrete shall be Class A with 5 to 7% air entrainment

405.3 CONSTRUCTION:

(revise to read)

Survey monuments shall be set by a licensed land surveyor registered in the State of Arizona. Survey monuments shall be installed accurately per City of Flagstaff Engineering Detail 3-02-070

Monument information shall be documented in accordance with section 13-03-002-0007 of the City Engineering Standards. Information on the as-built plans shall be furnished by a registered land surveyor and include all the information listed in the City engineering standards, Section 13-03-002-0007(I). including, but not limited to: City assigned point number, street location, monument type, and NAVD88 elevation. The surveyor shall prepare and record a Record of Survey map showing the monuments found and set. This map shall include the City's unique identifying number for each point. The Result of Survey shall be reviewed and accepted by the City prior to recordation.

Any survey monuments with boxes and covers shall be adjusted to grade by the Contractor without disturbing the survey monument.

405.4 MEASUREMENT:

(revise as follows)

Survey monuments shall be measured by lump sum for all monuments constructed and accepted.

PART 700 – MATERIALS

SECTION 702 BASE MATERIALS

702.1 GENERAL:

(Revise to include the following)

The aggregate base course will be clean, free of organic matter, and be of such a nature to be compacted to a dense, firm layer capable of supporting loaded trucks and self-propelled pavers without rutting. Volcanic cinders shall not be used for base materials.

702.2 PHYSICAL PROPERTIES:

(Table 702, revised to read as follows)

For aggregate base, the percentage by weight passing the No. 200 sieve shall be limited to no more than 10 percent.

SECTION 710 ASPHALTIC CONCRETE

710.2.1 ASPHALT BINDER:

(revise the section to read)

The asphalt to be mixed with the mineral aggregate shall be paving grade asphalt conforming to AASHTO Designation MP1, *Standard Specification for Performance Grade Asphalt Binder* and shall be 58-28 for the patching, 68-28TB+ for the MAC unless otherwise specified in the special provisions or approved by owner.

710.3.2.1 MARSHALL MIX DESIGN:

(revise to include the following)

Marshall mix design criteria will be used for both 3/4" and MAC. The aggregates and mix to be incorporated into the work shall also meet the following additional requirements:

Test	Acceptable	Test Results
AC TYPE Test	3/4"	½" MAC
Absorbed Asphalt Range (ASTM 1559)	0 - 1%	0 - 1%
Combined Water Absorption (AASHTO T-84)	0 - 2.25%	0 - 2.25%
Marshall Stability (ASTM D1559)	1800 min	1,000 min
Flow (ASTM D1559) Units of .01 inches	8 to 18	15 min
Air Voids Content (mix)	3% to 5%	3% to 5%

Tensile Strength Ratio (TSR) (AASHTO T 283, with optional freeze cycle)	0.75 min	0.75 min
Sodium Sulfate Soundness (AASHTO T-104)	12 % max	12 % max
Percent Carbonates (Arizona test Method 238)	30 % max	30 % max
Binder Content	5.3% to 6.0%	5.5% to 7%

All asphaltic concrete and modified asphaltic concrete shall contain a minimum of 1% Portland cement or dry hydrated lime by weight of total aggregate added to the aggregate in a pug mill prior to addition of the binder. The moisture content of the aggregate immediately prior to the addition of the admixture shall be a minimum of 3.0 %.

The contractor shall furnish the engineer with a job-mix formula for asphalt concrete not less than ten (10) days in advance of actual placement of the material. The job-mix formula, upon approval of the Engineer, shall be used to establish the standards to which field test results will be compared and to determine compliance of the materials furnished with all physical properties of the composite mix and its individual components as shown on the approved job-mix formula. The job-mix formula, with the allowable tolerances for a single test shall be used for monitoring compliance with the specifications.

The maximum permissible variation in the daily Marshall Plug unit weight from the unit weight shown in the approved job-mix shall be +/- 3%. If the unit weight of the Marshall Plug deviates from the permissible variation by more than 1%, production shall be halted until such time as the excess variation is corrected; payment will be reduced in accordance with Table 321-2.

The aggregate and mix to be incorporated into the work shall also meet the following requirements:

TEST	ACCEPTABLE TEST RESULTS
Loss on Abrasion (ASTM C0131 and/or ASSHTO 96) after 500 revolutions	40 Max.
Absorbed Asphalt Range (ASSHTO T-245	0 – 1%
Combine Water Absorption (ASSHTO T-84)	0 – 2.25%

All asphaltic concrete shall contain a minimum of 1% Portland Cement or dry hydrated lime by weight of total mixture.

Revise the percent of asphalt range for B-1 and 3/4 inch asphaltic concrete from 5.0 to 6.0% to 5.3 to 6.0%.

The asphalt cement content shall be considered acceptable if it is within -0.30% or +0.40% of the mix design target value.

See Section 719 for additional modified asphaltic concrete specifications.

SECTION 713 EMULSIFIED ASPHALTS MATERIALS

713.1 GENERAL:

(Revise to include the following)

REQUIREMENTS FOR ANIONIC/CATIONIC EMULSIFIED ASPHALT

CATIONIC RAPID-SETTING POLYMER-MODIFIED ASPHALTIC EMULSION, CRS-2P

Test Description	Test Method	Min	Max
TEST OF EMULSION			
Viscosity, SFS @ 122 F	D244	125	400
Settlement, 5 days, %	D244		5
Storage Stability 1 Day, %	A244		1
Class, Un-coated Par	A502	60	
Particle Charge Test	D244		+
Sieve Test, %	D244		0.30
Oil Distillate, % V of Emulsion	D244		3
Residue by Distillation, %	D244	66	
Tests on Residue by VACUUM RECOVERY A512			
Viscosity, ABS, Poise @ 140 F	D2171	1800	2800
Pen @ 77F, 100g/5 sec, Dmm	D5	40	90
Ductility, 77F, 5 cm/min, Cm	D113	40	
Solubility in TCE, %	D2042	97.5	
Toughness, inch-pounds	(1)	150	
Elastic Recovery by means of Ductilometer, %	T301	58	
Tenacity, inch-pounds	(1)	110	
Polymer Content (by wt. Of solids) %	CAL-401	2.5	

TEST ON RTFO RESIDUE			
Aging Ratio, ABS viscosities	D2171		2.5
POLYMER REQUIREMENTS			
Melt flow rate, dg/min 190 C	D1238		45

1) Benson method of toughness and tenacity: Scott tester, inch-pounds @ 77ºF, 20 inches per minute pull. Tension head 7/8" diameter.

2) Upon standing undisturbed for a period of 24 hours, the emulsion shall show no white milky film upon the surface.

3) The base asphalt shall be modified prior to emulsification.

4) The emulsion shall be precertified prior to use. A one-quart sample each of the base asphalt and polymer shall be supplied to the agency 10 days in advance to the project start.

SECTION 716 COVER MATERIAL

716.1 GENERAL:

(First paragraph, revise to include the following)

No volcanic cinders will be acceptable for cover material.

716.2.3 GRADATION:

(Tables 716-1 and 716-2, revise to read as follows)

GRADATION CM-11

Sieve Size	% Passing
3/8 inch	100
No. 4	0-40
No. 8	0-5
No. 200	0-2.0

SECTION 719 POLYMER MODIFIED ASPHALT CONCRETE

719.1 DESCRIPTION:

(revise to include a new section as follows)

Modified Asphalt Concrete (MAC) shall consist of a mixture of paving asphalt, modifiers and mineral aggregate which, with the addition of mineral filler and blending sand as may be required, shall be mixed at a central mixing plant in the proportions hereinafter specified to provide a homogeneous and workable mixture.

Modified Asphaltic Concrete (MAC) shall consist of furnishing asphaltic concrete with binder meeting the requirements of either:

- Rubberized Asphaltic Concrete (RAC)
- Polymer Modified Asphalt Concrete (PMA)
- Polymer Modified Rubberized Asphalt Concrete – Dry Process (PMRAC)
- SHRP graded PG64-28TR = (TR+)

Paving asphalt at the locations shown on the plans in accordance with the following specifications.

Within 10 calendar days of notice of award, the contractor shall submit in letterform, the name of the supplier and a type of MAC to be supplied.

Two weeks prior to construction the Contractor shall submit three (3) gallons of the modified asphalt binder for testing. Application and testing will be in accordance with MAG 321 as amended by the General Provisions and Special Provisions.

719.2 MATERIALS:

719.2.1 BINDER:

The asphalt rubber binder in the mix shall comply with MAG Section 717 and 335 except the rubber shall be type II and the minimum rubber content for RAC shall be 17% as a percentage of total binder. Asphalt cement for all MAC shall meet the requirements of PG 64-28TR+ as per AASHTO MP-1 Table I. Polymer shall be Type SBS and shall be 5.5% to 7% of the total binder for PMA. Twenty percent of the modifier for PMA shall be ground tire rubber. The PMA shall be such that the materials conform to the specification requirements. Ground rubber shall be Type II with the following gradation:

Gradation - Ground Rubber (Type II)

Sieve Size	% Passing
No. 10	100
No. 16	70-100
No. 30	25-60
No. 50	0-20

No. 200	0-5

Binder for Rubberized Asphaltic Concrete (RAC) shall conform to the following specifications:

Parameter	Requirement
Apparent viscosity, centipoise, 350ºF, Spindle 3, 20 RPM (ASTM D2196)	1500-6000 Centipoise
Penetration, 77ºF, dmm, 100g, 5 sec (ASTM D-5)	25 minimum 90 maximum
Penetration, 39.2ºF, dmm, 200 g, 60 sec (ASTM D-5)	15 minimum
Cone Penetration, 77ºF, dmm,150g, 5 sec (ASTM D-5)	25 minimum
Resilience, 77ºF, % (ASTM D-3407)	20 minimum
Softening Point, ºF (ASTM D-36)	135 minimum
TFOT Residue (ASTM D1754) Penetration Retention, 39.2ºF, %"	75 minimum

Haake type viscosity may be substituted for field control

Binder for Polymer Modified Asphaltic Concrete shall conform to the following specifications:

Specification:	ASTM	SPEC. LIMITS	
ORIGINAL ASPHALT	METHOD	MIN.	MAX.
Penetration, 39.2 F (200g/60 sec), dmm	D5	25	
Penetration, 77 F (100g/5 sec), dmm	D5	40	90
Softening point, F	D36	180	
Flash point, F	D92	450	
Ductility, 39.2, F (5 cm/min), cm	D113	30	
Ductility, 77 F (5 cm/min), cm	D113	100	
Viscosity, 275 F, cst	D2170	1000	

Recovery, 39.2 F, %	D113 MOD	60	
Solubility in Tricholrethylyene %	D2042	99	

AGED ASPHALT (RTFO)	METHOD	MIN.	MAX.
Retained Penetration, 77 F, %	D5	60	
Viscosity Ratio, 275 F, %	D2170		1.5
Softening Point, F	D36	175	
Ductility, 39.2 F (5 cm/min), cm	D113	20	

The asphalt binder modifier for the PMA shall contain a minimum of 20% recycled material.

The Polymer Modified Rubberized Asphalt Concrete – Dry Process (PMRAC-DP) and SHRP graded PG64-28TR+ shall conform to requirements of Superpave Grade PG64-28 (AASHTO MP-1 and MAG Section 335) except as follows:

		PMRAC-DP	PG64-28TR+
Test Properties	Test Method	Specification	Specification
Scrap whole tire rubber (Type II) content, %, Minimum		17.0	8.0
Trans-polyoctenamer rubber polymer (TOR), %, Based on the weight of the tire rubber		4.5	
SBS Polymer content %, Minimum			2.0
Original Testing COC Flash Point, °C, Minimum	ASTM D92	232	232
Softening Point, °C, Minimum	ASTM D36	50	50
Elastic Recovery, 10°C, 10cm, % recovery/1hr, Minimum	ASTM D6084	55	55

Solubility in Trichloroethylene, Minimum, %	ASTM D2042	97.5	97.5
Dynamic Shear, 64°C, 10 rad/sec,	AASHTO TP5	1.00	1.00
Dynamic Shear, 25°C, 10 rad/sec, G∗/sin delta, kPa, Maximum		75	75
RTFO Residue Testing	AASHTO TP5		
Dynamic Shear, 64°C, 10 rad/sec, G∗/sin delta, kPa, Minimum		2.20	2.20
PAV Aging Residue Testing	AASHTO TP5		
Dynamic Shear, 25°C, 10 rad/sec, G∗/sin delta, kPa, Maximum		5000	5000
Bending Beam Rheometer	AASHTO TP5		
Creep stiffness, -18°C, MPa/60 sec, Maximum		300	300
M-Value, -18°C, 60 sec, Minimum		0.300	0.300

719.2.2 AGGREGATE

Aggregate shall conform to Section 710.2.2 as amended by the Special Provisions.

The aggregate gradation will be as follows:

Sieve Size	% Passing
5/8 inch	100
½ inch	96-100
3/8 inch	78-92
No. 4	28-42
No. 8	12-25
No. 30	10 +/- 5

No. 200	5 +/- 2

(new section)

719.2.2.1 AGGREGATES CHARACTERISTICS

Combined aggregates shall conform to 710.2.2 except the minimum sand equivalent shall be 65 and at least 85% by weight of the aggregate retained on the #8 sieve shall consist of particles with at least one rough, angular surface produced by crushing.

719.2.3 MINERAL ADMIXTURE:

(revise to include)

Mineral filler and anti-stripping agent shall be as per Section 710.2.3.

719.3 MIX DESIGN REQUIREMENT:

The provisions of 710.3 MIX DESIGN REQUIREMENTS shall apply to MAC except that:

References to asphalt, liquid asphalt, bituminous cement shall be changed to "binder conforming to 714.2.1."

For estimating purposes, the percentage of binder in the MAC shall be 7% for PMA and RAC. For estimating purposes, the percentage of binder in the MAC shall be 7% for TR+ and for PMRAC-DP. The exact amount of binder in the MAC shall be subject to the Engineer's approval after review of the contractor's job mix formula and materials submittals. Marshal mix design criteria will be used for MAC.

(new section)

719.4 TRANSPORTATION AND DELIVERY REQUIREMENTS:

The provisions of 710.6 shall apply for MAC.

SECTION 725 PORTLAND CEMENT CONCRETE

725.1 GENERAL:

(Revise to read as follows)

As tested in accordance with ASTM C-39, the maximum slump shall be 4 inches, or as specified in the special provisions, when tested in accordance with ASTM C-143.

Class AA concrete, with 5 to 7% entrained air, shall be used for all valley gutters and as specified.

Class A concrete shall be used for concrete structures, either reinforced or non-reinforced. Additionally, Class A concrete with 5 to 7% entrained air shall be used for all curbs, gutters, sidewalks, and exposed structures except as may be specified otherwise.

Class B concrete shall be used as specified, except 5 to 7% entrained air shall be included for all exposed structures.

Class C concrete may be used for thrust blocks, encasements, fill or over excavation, and/or other purposes as approved by engineer.

725.3 AGGREGATES:

(First paragraph, after the second sentence, revise to include the following)

Aggregates must be subjected to five cycles of the sodium sulfate soundness test in accordance with the requirements of AASHTO T-104. The total loss shall not exceed ten percent by weight of the aggregate as a result of the test.

725.4 WATER:

(Last paragraph, revise to include the following)

Water shall be sampled and tested in accordance with AASHTO T-26.

SECTION 797 PAVEMENT MARKINGS (NEW SECTION)

797.1 GENERAL:

This work shall consist of cleaning and preparing the pavement surface, and applying longitudinal and transverse pavement markings as indicated on the plans or as specified herein.

Reference and incorporate appropriate portions of the Arizona Department of Transportation *Standard Specifications for Road and Bridge Construction – 2008* (herinafter ADOT SS) as indicated below.

797.2 MATERIALS AND INSTALLATION:

797.2.1 LONGITUDINAL PAVEMENT MARKINGS

This item of work shall apply to all longitudinal pavement markings, as well as any other markings not specified to be pre-formed plastic.

Permanent Markings: All permanent pavement markings shall be furnished and installed in accordance with ADOT SS 708.

Temporary Markings: Temporary longitudinal pavement markings, when approved, shall be furnished and installed in accordance with ADOT SS 701-3-05.

797.2.2 TRANSVERSE MARKINGS, SYMBOLS AND LEGENDS:

This item of work shall apply to all lane use arrows, all transverse pavement markings such as crosswalks and stop bar markings, and all pavment legend markings, except for bicycle lanes Permanent transverse pavement markings shall be either:

Applied thermoplastic, vurnished and installed in accordance with ADOT SS 704, with a minimum 70 mil applied thickness, or

Preformed markings, furnished and installed in accordance with ADOT SS 705.

Temporary Markings: Temporary transverse pavement markings, when approved, shall be furnished and installed in accordance with ADOT SS 701-3-05

797.3 CONSTRUCTION PROVISIONS:

The Contractor shall as-built and reference the existing lane striping and markings prior to construction. Unless noted otherwise on the plans or in these Special Provisions, the configuration of new lane striping and marking shall match that of the existing.

The contractor is responsible for layout of the revised striping. The striping quantities do not include the revised striping for these revisions. The contractor shall estimate the cost of the pavement markings necessary to make the revisions indicated and include those costs in the amount bid.

All new painted pavement markings placed under this contract shall receive a double application of traffic paint. The second application shall be applied no sooner than 3 hours after the first application.

All existing bike lane stripes are to be replaced as 6” wide solid white stripes. (Existing bike lane stripes may now be 4” wide) The existing bike lane symbols and cross walks are to be replaced in accordance with bike lane assembly details and piano key cross walk details shown on the plans.

Bike lane diamonds are no longer required.

Double yellow centerline is to be replaced with a 6” space between the two 4” stripes.

All crosswalks and stop bars shall be replaced with thermoplastic paint. Crosswalks shall be striped in a “piano key” configuration. All lengths of crosswalks are given in the lengths of the crossing at the intersection, not the length of thermoplastic needed for the crosswalk. It is the contractor’s responsibility to determine how much thermal plastic paint is needed to install the piano key crosswalk at the given lengths of the crosswalks.

All turn lane symbols, and bike assembly markers must be replaced with thermoplastic or preformed tape. If the striping is not a typical longitudinal lane marker stripe, it must be thermoplastic or preformed.

797.4 MEASUREMENT AND PAYMENT:

Pavement markings shall be measured and paid for as a single lump sum, to include the cost of all preparation, materials, layout and application, including the cost of those changes shown on the plans or included in the Special Provisions.

END OF SPECIAL PROVISIONS

APPENDIX A

	Street	Improvement Location	R&R SIDEWALK SF	Infill Sidewalk w/ clear & grub	R&R DRIVEWAY RAMP/WING SF	RETROFIT ADA Add domes EA	RAMP radial parallel EA	RAMP MISC OTHER EA	R&R VALLEY GUTTER APRON SF	INTEGRAL CURB FOR VG APRON LF	R&R VERTICAL CURB & GUTTER LF	ROLL CURB & GUTTER LF	R&R SCUPPER & SPILLWAY EA	R&R CATCHBASIN LID SF	Full depth ACP rebuild (PATCH) SF
1	HIGH COUNTRY TR.														
From	PULLIAM DR	QUARTZ INTERSECTION				8									
to	QUARTZ	1020' WEST OF QUARTZ PC	25.0												
		1170' WEST OF QUARTZ PC	35.0												
		1256' WEST OF QUARTZ PC	25.0												
		VASEYS PARADISE INT.				5									
		16' EAST OF TOPAZ PC	25.0												
		TOPAZ INT.				5									
		10' WEST OF TOPAZ PC	32.5												
		30' WEST OF TOPAZ PC													480.0
		62' WEST OF TOPAZ PC	25.0												
		92' WEST OF TOPAZ PC	25.0												
		142' WEST OF TOPAZ PC	45.0												
		35' EAST OF SERPENTINE PC	50.0												
		INTERSECTION OF SERPENTINE	145.0			5									
		38' WEST OF SERPENTINE PC	25.0												
		206' WEST OF SERPENTINE PC	25.0												
		228' WEST OF SERPENTINE PC	55.0												
		319' WEST OF SERPENTINE PC	25.0												
		355' WEST OF SERPENTINE PC													1,125.0
		437' WEST OF SERPENTINE PC	25.0												
		EAST OF PULLIAM PC	17.5												
		90' WEST OF SERPENTINE PC													272.0
		PULLIAM PC TO SERPENTINE PC													5,280.0
		Total	605.00	0.00	0.00	23.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7,157.00
2	BLACKBIRD ROOST														
From	RT. 66	143' SOUTH OF PC			103										
to	CLAY AVE.	165' SOUTH OF CLAY PC			20										
		NORTH OF McCRACKEN PC	20												
		McCracken PC									26.0				
		165' FROM MCCRACKEN PC	14												
		250' FROM MCCRACKEN PC			120										
		290' FROM MCCRACKEN PC	16												
		START: ROUTE 66 HEADING NORTH													
		67' FROM ROUTE 66 PC			150										
		284' FROM ROUTE 66									53.0				
		308' FROM ROUTE 66									26.0				
		360' FROM ROUTE 66									28.0				
		385' FROM ROUTE 66 PC									128.0				
		516' FROM ROUTE 66 PC									28.0				
		544' FROM ROUTE 66 PC									115.0				
		659' FROM ROUTE 66 PC									45.0				
		INT. CHATEAU SOUTH CURB									35.0				
		INT. CHATEAU NORTH CURB													
		555 BLACKBIRD ROOST									18.0				
		903 CLAY AVE			200										
		Total	50.00	0.00	593.00	0.00	0.00	0.00	0.00	0.00	502.00	0.00	0.00	0.00	0.00
3	RIORDAN RD.	MILTON NORTH EAST CORNER				2.0									
From	MILTON RD.	590 W RIORDAN	24.0												
to	RIORDAN RANCH ST.	590 W RIORDAN	72.0												
		INT. RIORDAN RANCH NORTH SIDE			56.0										
		REBUILD CATCH BASIN?													
		INT. RIORDAN RANCH SOUTH EAST CORNER	65			1									
		INT. RIORDAN RANCH SOUTH WEST CORNER					1								
		605 RIORDAN			160.0										
		1050 S MILTON													
		MILTON SOUTH EAST CORNER	120			1									
		Total	281.00	0.00	216.00	4.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	RIORDAN RD.	START: METZ WALK				1.0									
From	MILTON RD.	MILTON NORTH WEST CORNER				2									
to	METZ WALK	MILTON SOUTH WEST CORNER	100			1									
		717 W RIORDAN	4.0												
		717 W RIORDAN	27.5												
		717 W RIORDAN	40.0												
		SOUTH EAST CORNER AT METZ WALK													
		Total	172.00	0.00	0.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	GRANDVIEW DR.	3608 GRANDVIEW										23.0			
From	LINDA VISTA DR.	3618 GRANDVIEW										16.0			
to	PARADISE RD.	3712 GRANDVIEW													
		3726 GRANDVIEW										80.0			
		3735 GRANDVIEW										58.0			

	Street	Improvement Location	R&R SIDEWALK SF	Infill Sidewalk w/ clear & grub SF	R&R DRIVEWAY RAMP/WING SF	RETROFIT ADA Add domes EA	RAMP radial parallel EA	RAMP MISC OTHER EA	R&R VALLEY GUTTER APRON SF	INTEGRAL CURB FOR VG APRON LF	R&R VERTICAL CURB & GUTTER LF	ROLL CURB & GUTTER LF	R&R SCUPPER & SPILLWAY EA	R&R CATCHBASIN LID SF	Full depth ACP rebuild (PATCH) SF
		3725 GRANDVIEW										26.0			
		3723 GRANDVIEW													
		3707 GRANDVIEW										10.0			
		3703 GRANDVIEW										13.5			
		3619 GRANDVIEW										17.0			
		3619 GRANDVIEW													
		3609 GRANDVIEW										23.0			
		1124 LINDA VISTA													
		INTERSECTION OF GRANDVIEW AND LINDA VISTA				2				136.0	34.0				
		Total	0.00	0.00	0.00	2.00	0.00	0.00	0.00	136.00	34.00	267.00	0.00	0.00	0.00
6	WALGREENS ST.	**SOUTH SIDE**													
From	TRUCK ENTRANCE	WALGREENS BUILDING SOUTH DRIVEWAY				2									5,137.5
to	INDUSTRIAL DR.	WALGREENS BUILDING FRONTAGE		3,655.0			4								
		WALGREENS/INDUSTRIAL INTERSECTION					1								
		WEST/NORTH SIDE													
		2469 WALGREENS		435.0											
		2463A WALGREENS		475.0											
		2437 WALGREENS		1,300.0	270.0										
		2385 WALGREENS		355	330										
		Total	0.00	6,220.00	600.00	2.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5,138.00
7	WALGREENS ST.	**SOUTH SIDE**													
From	VICKEY ST.	2100 WALGREENS WEST DRIVEWAY WING (COMMERCIAL)			20.0										
to	TRUCK ENTRANCE	2126 WALGREENS									13.0				
		2248 WALGREENS			93.0						6.0				
		2268 WALGREENS	25.0		92.0						10.0				
		2274/2320 WALGREENS		780.0							152.0				
		2332 WALGREENS	25.0		159.0						13.0				159.0
		NORTH SIDE													
		2357 WALGREENS			147.0										
		2323 WALGREENS		2,000.0	201.0						10.0				
		OLSEN'S GRAIN	75.0		222.0										
		WALGREENS/STEVES INTERSECTION	30.0			2									
		2225 STEVES			117.0						11.0				
		2133 WALGREENS	25.0								18.0				
		Scupper needed between COF water services and Olsen's Grain											1.0		
		Total	180.00	2,780.00	1,051.00	2.00	0.00	0.00	0.00	0.00	233.00	0.00	1.00	0.00	159.00
8	STEVANNA	**NORTH SIDE**													
From	HIGHWAY 180	1720 STEVANNA										34.0			
to	END	VALLEY GUTTER								234.0					
		1680 STEVANNA	14.0									76.0			
		1660 STEVANNA	16.0									12.0			
		1640 STEVANNA										20.0			
		1620 STEVANNA	291.0		80.0										
		SOUTH SIDE													
		1639 STEVANNA										44.0			
		1679 STEVANNA	40.5												
		1679 STEVANNA	34.0												
		1701 STEVANNA	36.0												
		1701 STEVANNA	18.0												
		1719 STEVANNA	20												
		1739 STEVANNA	38.0												
		1759 STEVANNA	32.0												

	Street	Improvement Location	R&R SIDEWALK SF	Infill Sidewalk w/ clear & grub	R&R DRIVEWAY RAMP/WING SF	RETROFIT ADA Add domes EA	RAMP radial parallel EA	RAMP MISC OTHER EA	R&R VALLEY GUTTER APRON SF	INTEGRAL CURB FOR VG APRON LF	R&R VERTICAL CURB & GUTTER LF	ROLL CURB & GUTTER LF	R&R SCUPPER & SPILLWAY EA	R&R CATCHBASIN LID SF	Full depth ACP rebuild (PATCH) SF
		Total	540.00	0.00	80.00	0.00	0.00	0.00	0.00	234.00	0.00	186.00	0.00	0.00	0.00
9	MCCRACKEN CR	START BLACKBIRD ROOST													
From	BLACKBIRD ROOST	SOUTH CURB RAMP	22.5			1					24.0				
to	END	10' EAST OF CURB PC	26.0												
		65' EAST OF PC	96.0												
		SOUTH DRIVEWAY 1			140.0						4.0				
		EAST DRIVEWAY 2			156.0										
		291' FROM SOUTH PC	20.0								50.0				
		NORTH DRIVEWAY 3			130.0										
		348' FROM SOUTH PC	20.0												
		359' FROM SOUTH PC	16.0												
		60' EAST FROM NORTH PC									45.0				
		NORTH CURB RAMP				1									
		Total	201.00	0.00	426.00	2.00	0.00	0.00	0.00	0.00	123.00	0.00	0.00	0.00	0.00
10	FANNING DR.	INT. INDUSTRIAL AND FANNING	60.0								16.0				1,189.0
From	INDUSTRIAL DR	INT. INDUSTRIAL AND FANNING	25.0												
to	HUNTINGTON DR	3585 NORTH OF SOUTH DW	35.0												
		INT. FANNING AND HUNTINGTON													2,524.0
		Segment 3													666.0
		Segment 2													1,064.0
		Segment 1													950.0
		ABC Roofing													342.0
		Total	120.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.00	0.00	0.00	0.00	6,735.00
11	GEMINI RD	START: BUFFALO PARK NORTH WEST SIDE				1.0									
From	FOREST AVE	36' FROM NASA BLVD DW (NORTH SIDE)	30.3												
to	END	36' FROM NASA BLVD DW (SOUTH SIDE)	93.5												
		41' FROM NASA DW - (SOUTH SIDE)	33.0												
		RACHEL CARSON RD				2.0									522.0
		RACHEL CARSON RD													481.0
		COOLEY DR				2.0									180.0
		2225 GEMINI (80' SOUTH FROM COOLEY DR)	25.0												
		2201 GEMINI - NORTH OF HYDRANT	25.0												
		2201 GEMINI - 34' WEST OF FOREST PC	25.0												
		306' FROM FOREST PC (EAST SIDE OF ROAD)	100.0												
		NORTH EAST END	85.0												3,100.0
		Total	417.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4,283.00
12	LATROBE CIR	1886 EDGEWOOD										25.0			
From	EDGEWOOD ST	5521 LATROBE										28.0			
to	END	5531 LATROBE							100						
		CENTER OF CULDESAC													920.0
		Total	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	53.00	0.00	0.00	920.00
13	LA COSTA LN	1300 LA COSTA								37.0					
From	EAST END	1330 LA COSTA													168.0
to	NORTH END	1340 LA COSTA										20.0			
		1341 LA COSTA										23.0			
		1321 LA COSTA										15.0			
		4701 LA QUINTA													104.0
		1301 LA COSTA													240.0
		Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37.00	0.00	58.00	0.00	0.00	512.00
14	LA QUINTA WAY	4701 LA QUINTA													182.0
From	LACOSTA WAY	4711 LA QUINTA													0.0
to	CUL-DE-SAC	4721 LA QUINTA										11.0			
		4720 LA QUINTA										12.0			0.0
		4710 LA QUINTA										24.0			0.0
		1321 LA COSTA													90.0

Street		Improvement Location	R&R SIDEWALK SF	Infill Sidewalk w/ clear & grub	R&R DRIVEWAY RAMP/WING SF	RETROFIT ADA Add domes EA	RAMP radial parallel EA	RAMP MISC OTHER EA	R&R VALLEY GUTTER APRON SF	INTEGRAL CURB FOR VG APRON LF	R&R VERTICAL CURB & GUTTER LF	ROLL CURB & GUTTER LF	R&R SCUPPER & SPILLWAY EA	R&R CATCHBASIN LID SF	Full depth ACP rebuild (PATCH) SF
		Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	47.00	0.00	0.00	272.00
15	HARRIS WAY	3325 Harris Way			32.0										
From	LINDA VISTA DR.	3345 HARRIS	12.0												
to	EVEREST	3365 HARRIS	14.0												
		3385 HARRIS - SOUTH OF DW	16.0												
		3385 HARRIS - SOUTH OF DW	80.0												
		3405 HARRIS	40.0												
		INT. HARRIS & EVEREST					2		318	40.0					
		1585 EVEREST WAY	48.0												
		3420 HARRIS			88.0										
		3380 HARRIS			92.0										
		3360 HARRIS	16.0												
		3360 HARRIS	48												
		Total	274.00	0.00	212.00	0.00	2.00	0.00	318.00	40.00	0.00	0.00	0.00	0.00	0.00

APPENDIX B

APPENDIX C

AS-BUILT PLANS/RECORD DRAWINGS CHECKLIST

for

City of Flagstaff Public Improvements

December 12, 2019

General (applies to entire plan set)

_____ As-Builts/Record Drawings plan set shall contain all sheets from the approved design/construction plan set (cover sheet to last sheet including details). This includes Landscape Plan, Retaining Wall sheets and Resource Protection Plan (if applicable)

_____ As-Built survey data shall tie into the same horizontal and vertical control as that used for the approved construction plans

_____ All plan sheets shall have an Engineer seal per B.T.R. rules.

_____ Certification. All as-built plans shall contain a statement by a licensed professional engineer who is currently registered in the State of Arizona certifying the drawings to be as-built. All plans must also contain the seal and signature of said registered professional.

_____ All survey data given by the as-built plans shall be performed by a registered land surveyor who is currently registered in the State. Plans must show seal and signature of registrant

_____ Any easements or ROW recorded must include the instrument number

_____ If the As-Built Engineer is different from the Design Engineer, provide the As-Built Engineer contact info on cover sheet.

_____ Place "As-Built" or "Record Drawing" lettering and date in lower right hand corner of all sheets.

_____ Improvements deleted in the field shall be crossed out with an "x" and labeled "not built".

_____ Improvements changed from the approved design plans shall be reflected and clearly called out by "clouding".

_____ Plan sheets that represent improvements that were not changed from the approved design plans shall have "Per Plan" placed in the lower right hand corner.

Sanitary Sewer Plans

_____ Improvements built exactly per design plan shall have the elevations/stations noted within parenthesis and marked "AB".

_____ Stations for all manholes, cleanouts, services and lateral stub-outs.

____ Manhole pipe invert elevations (in and out) and manhole rim elevations shall be determined by field surveying.

_____ Pipe lengths indicated on both plan and profile.

_____ Recalculate longitudinal pipe slopes for all pipe segments. (All measurements to MH Centers)

_____ Stations and length of pipe encasements/extra protection.

_____ Anode locations, valves and tracer wire connection stations and cross ties to two permanent structures at least 30" high

Water Plans

_____ Stations of all water services including landscape and fire lines. At least two (2) horizontal cross-ties

_____ Stations of all fire hydrants.

_____ Stations of all valve boxes, blow-offs, and air release valves.

_____ Stations of all bends, tees, and bell restraints.

_____ Profile view of all pipeline vertical alignments, including stations of all fittings, depth to finish grade, and pipe separation dimensions.

_____ Stations and length of pipe encasements/extra protection.

_____ Horizontal cross ties to two permanent structures (fire hydrants, light poles & ID #, power poles & ID #, etc.) for all valve boxes.

_____ Anode locations, valves and tracer wire connection stations and cross ties to two permanent structures at least 30" high

Drainage Plans

_____ Inverts for storm sewer pipes at inlets and manholes shall be determined by field surveying.

_____ Recalculate longitudinal pipe slopes for all pipe segments.

Street/Trail Plans

_____ Stations of all survey monuments – existing and new

_____ Sleeve/conduit/casing types, sizes, locations and stations.

_____ Provide spot elevations at intersections as well as pavement and curb every 500 ft.

Street Lights and Traffic Signal Plans

_____ Stations for all street illumination lights.

_____ Locations of all traffic signal poles, cabinets, J-boxes and related conduits.

_____ Abandonment of existing conduits and facilities.

_____ Location of signage related to traffic signal.

Miscellaneous

_____ Major unexpected dry utility crossings of water and sewer mains

_____ Unforeseen underground structures exposed during water and sewer main construction such as vaults

_____ Major constructed dry utilities

____ ADA compliance within the ROW, spot elevations, cross and longitudinal slopes