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Case # 08-10

DATE: January 7, 2009

TO: MAG Specifications and Details Committee Members

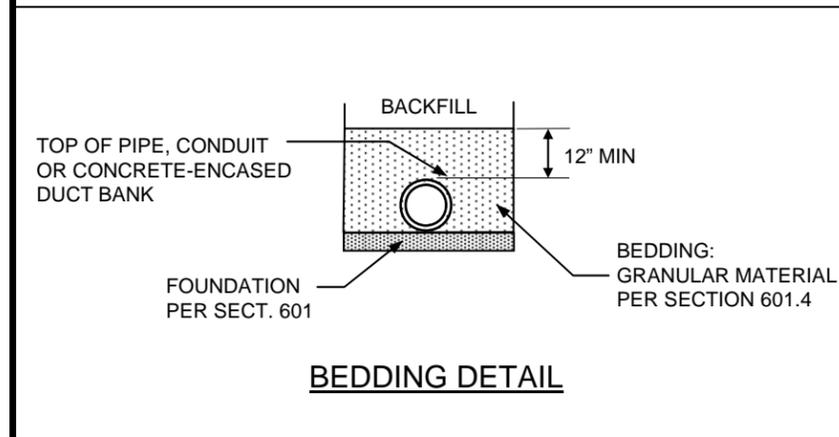
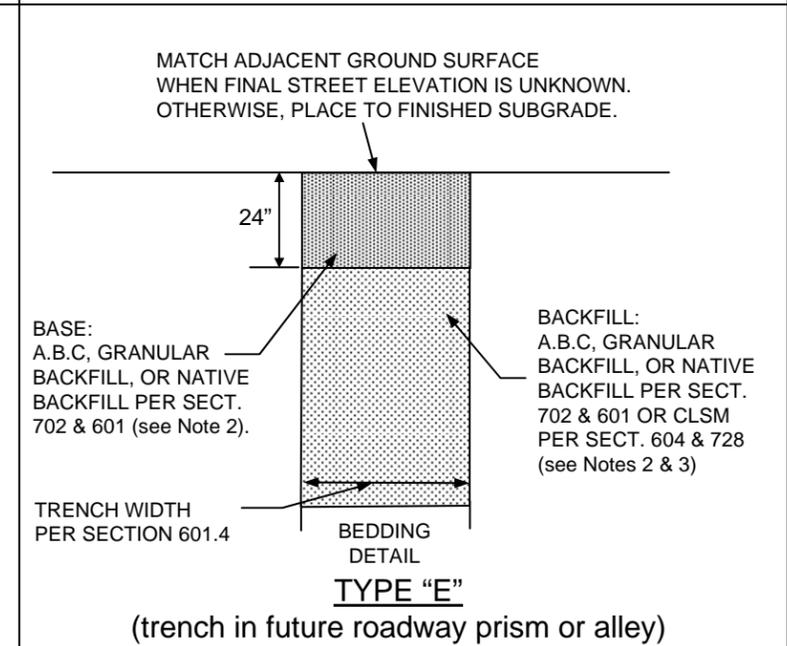
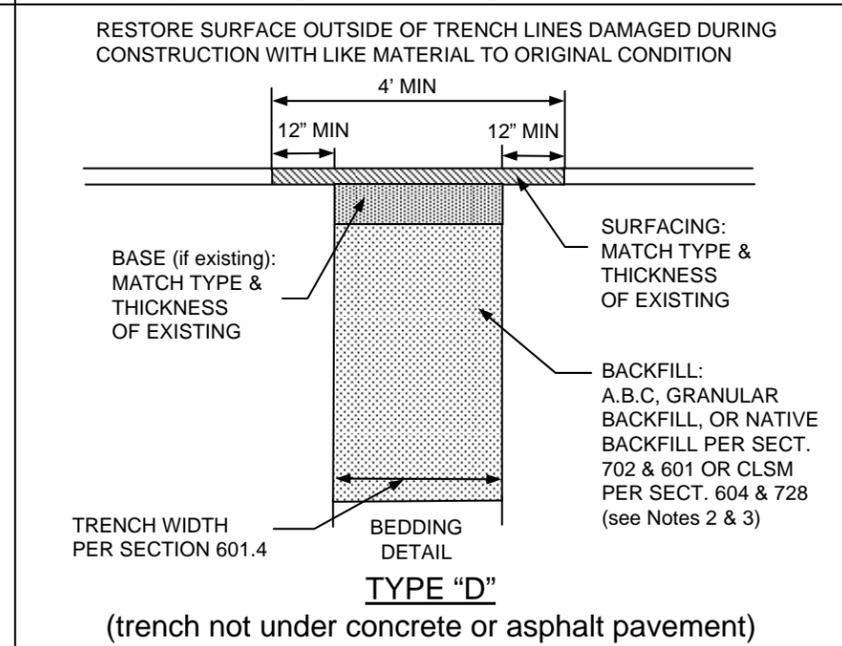
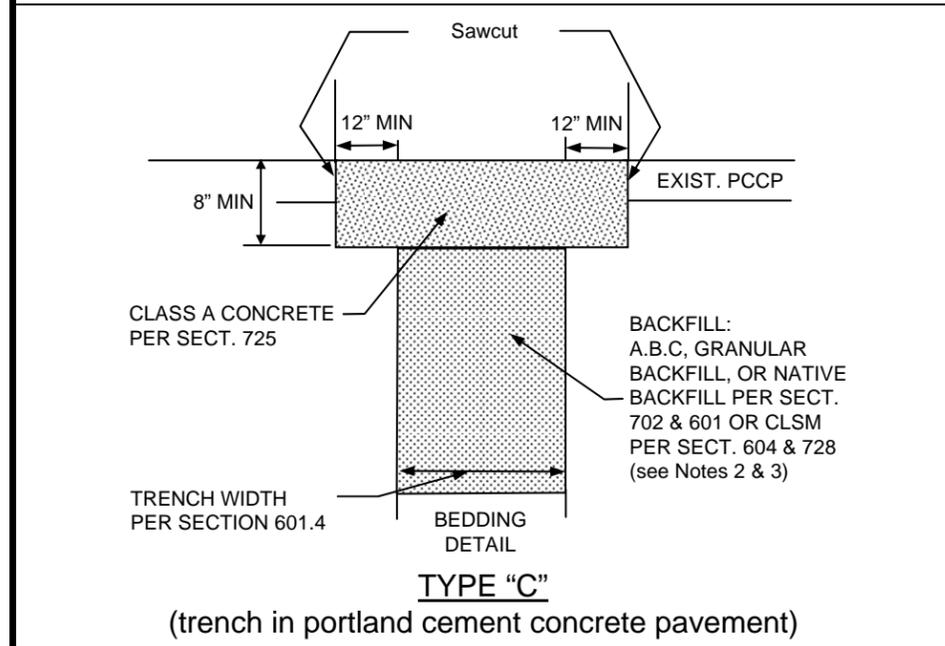
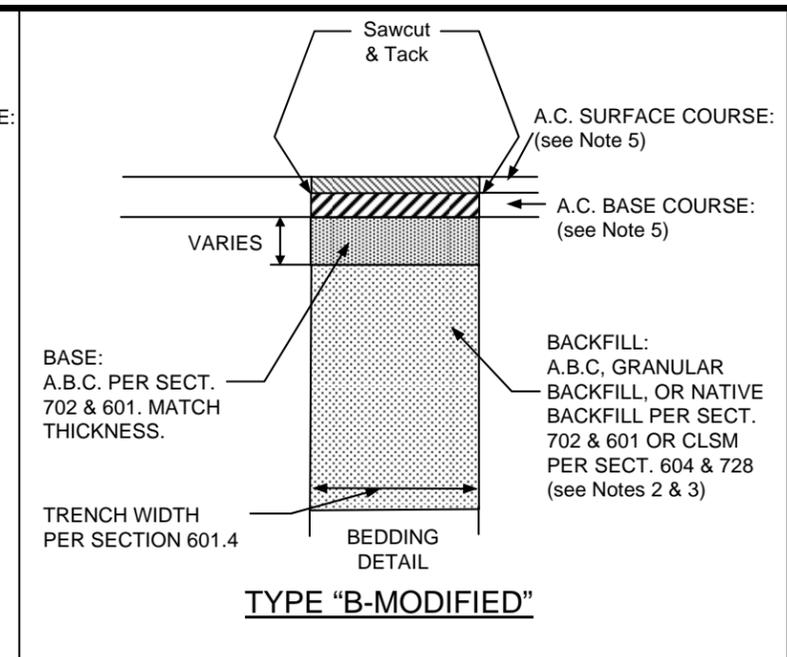
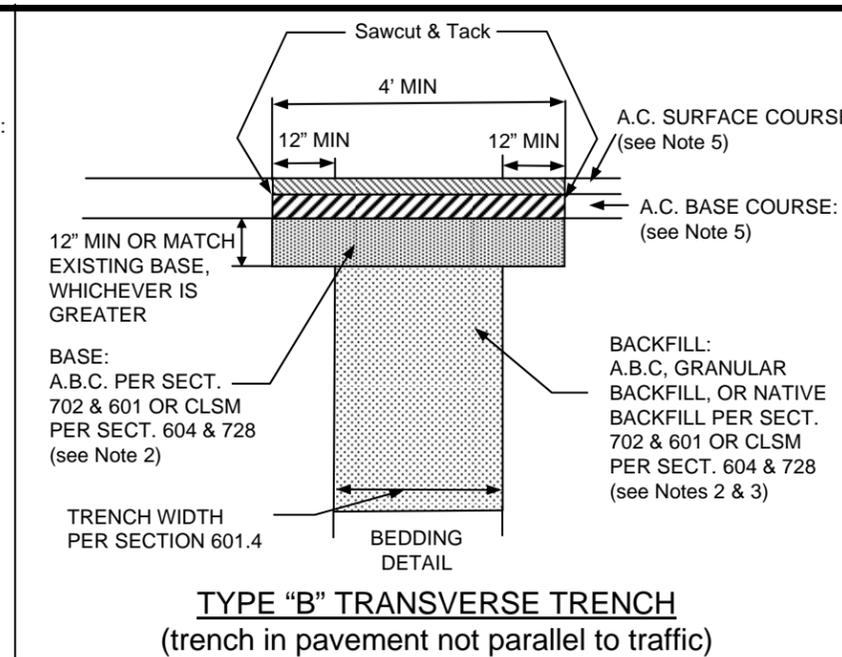
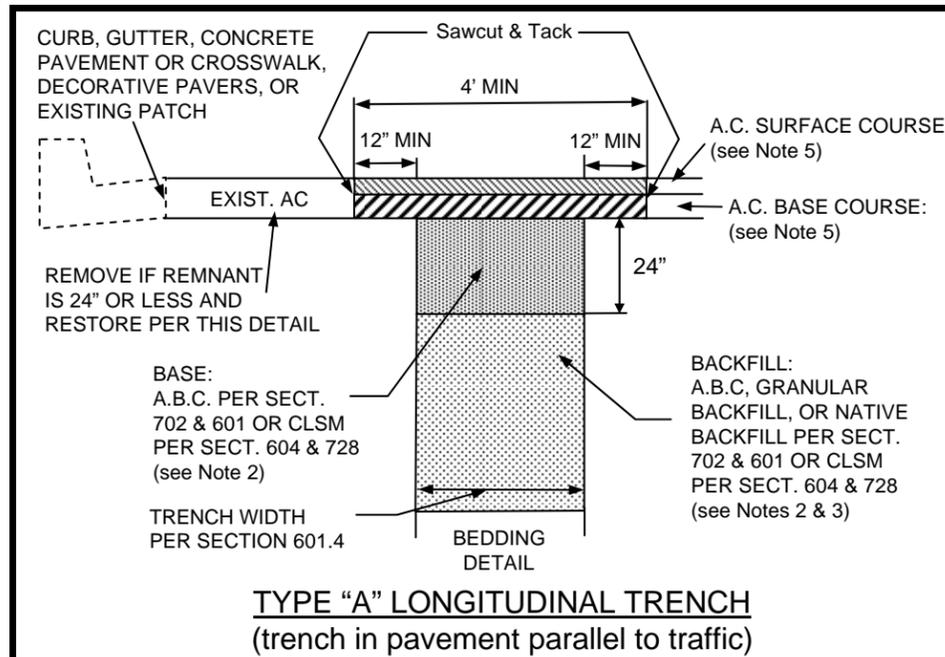
FROM: Peter Kandaris, SRP Representative

RE: **Modifications Detail 200, Section 336 & Section 601: Trench Backfill and Pavement Replacement**

The attached details and specification section revisions have been modified per comments received from Maricopa County and City of Tempe.

Maricopa County also recommends reducing the depth of base ABC under pavement in Type "A" longitudinal trench repair from 24 inches to 12 inches (or match existing, whichever is greater) to make this detail more compatible with Type "B" requirements. Please provide feedback on this concept in your subsequent comments.

Please review and provide any additional comments so that we may finalize the case in the near future. The focus of this case is on standardizing trench geometry and backfill. Many agencies will still need to retain supplemental details because of the widely varying methods, approaches and materials used for asphalt concrete pavement repair. The goal of this revision is to reduce the scope of trench repair variations, making more standard the trench cross section below the pavement section. Agencies should be able to scale back (but probably not eliminate) supplemental recommendations. It is still recommended that a separate subcommittee meeting be held to discuss a more uniform approach to asphalt pavement section repair.



- NOTES:
1. PAVEMENT MATCHING AND SURFACE REPLACEMENT SHALL BE IN ACCORDANCE WITH SECTION 336.
  2. TYPE OF BACKFILL AND BASE (IF APPLICABLE) SHALL BE AT CONTRACTOR'S OPTION UNLESS OTHERWISE SPECIFIED IN CONTRACT DOCUMENTS.
  3. TRENCHES LESS THAN 24" WIDE SHALL BE BACKFILLED FROM TOP OF BEDDING TO BOTTOM SURFACING MATERIALS WITH 1-SACK CLSM PER SECTIONS 604 AND 728.
  4. BASE, BACKFILL, BEDDING AND FOUNDATION COMPACTION REQUIREMENTS SHALL BE IN ACCORDANCE WITH SECTION 601.
  5. ASPHALT CONCRETE BASE AND SURFACE COURSE SHALL COMPLY WITH SECTION 336.2.4.1.
  6. PROVIDE 12" MINIMUM BASE WIDENED AS SHOWN IN TRANSVERSE TRENCH (TYPE B) AT ENDS OF LONGITUDINAL TRENCH (TYPE A), EXCEPT WHERE EDGE ABUTS EXISTING CONCRETE.
  7. USE TRANSVERSE TRENCH (TYPE B) SURFACE REPLACEMENT WHERE A LONGITUDINAL TRENCH (TYPE A) CROSSES A STREET OR GOES THROUGH AN INTERSECTION.
  8. COPPER OR POLYETHYLENE WATER PIPES EXPOSED IN TRENCHES TO BE BACKFILLED WITH CLSM SHALL BE WRAPPED WITH MIN 3/4" THICK CLOSED CELL FOAM INSULATION OR 3/4" WIDE BLACK INSULATION BEFORE PLACING CLSM.

DETAIL NO.  
**200-1**

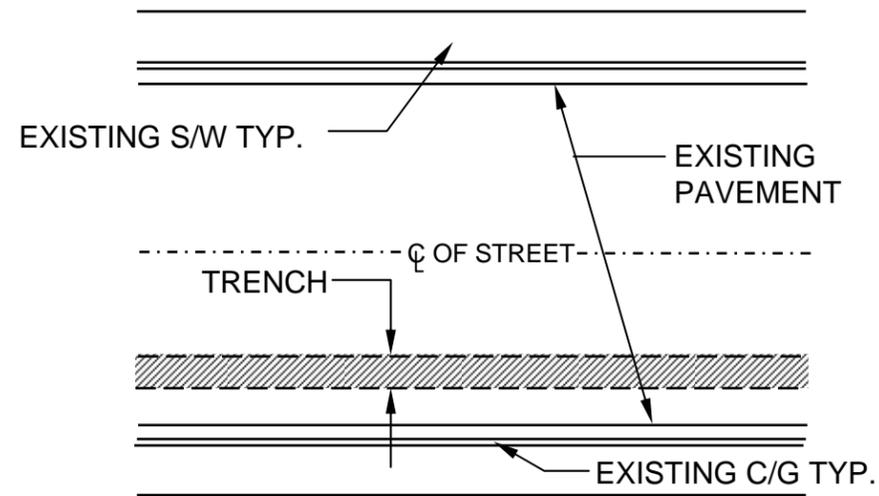
**MARICOPA ASSOCIATION of GOVERNMENTS** STANDARD DETAIL ENGLISH

**BACKFILL, PAVEMENT AND SURFACE REPLACEMENT**

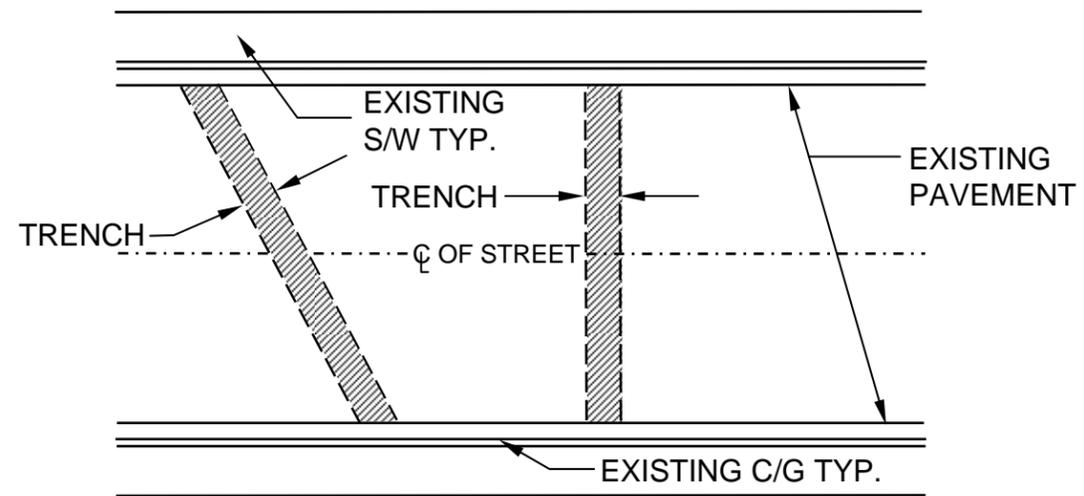
REVISED  
**1/7/09 DRAFT**

DETAIL NO.  
**200-1**

**TYPE "A" LONGITUDINAL TRENCH**  
 (trench in pavement parallel to traffic)



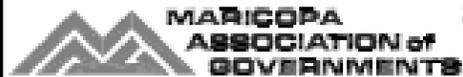
**TYPE "B" TRANSVERSE TRENCH**  
 (trench in pavement not parallel to traffic)



NOTES:

1. SEE DETAIL 200-1 FOR DETAILED TRENCH REPAIR REQUIREMENTS FOR TRENCH TYPES NOTED HEREIN.
2. SEE MAG DETAIL 211 FOR REQUIREMENTS REGARDING THE USE OF PLATING OF TRANSVERSE TRENCHES. USE OF STEEL PLATES SHALL NOT EXCEED 72 HOURS AFTER COMPLETION OF BACKFILL AND PRIOR TO FINAL PATCHING.
3. IF REQUIRED BY AGENCY, USE TYPE B MODIFIED TRENCH IN LIEU OF TYPE B FOR TRANSVERSE TRENCH REPAIR.

DETAIL NO.  
**200-1**



STANDARD DETAIL  
**ENGLISH**

**BACKFILL, PAVEMENT  
 AND SURFACE REPLACEMENT**

REVISED  
**1/7/09  
 DRAFT**

DETAIL NO.  
**200-2**

SECTION 336

PAVEMENT MATCHING AND SURFACING REPLACEMENT

336.1 DESCRIPTION:

Street and alley pavement and surfacing within the Contracting Agency's rights-of-way, removed by construction activities or to be widened or matched in connection with the improvement of Public Works, shall be placed as shown on the plans and applicable standard details, in accordance with this specification and/or the special provisions.

Asphalt concrete pavement replacement shall be constructed in accordance with Type A, B, ~~D or E~~ <sup>roadway or B Modified</sup> of ~~standard details~~ <sup>Standard Detail 200 and</sup>, as indicated in the Contracting Agency Special Provisions or on the plans, ~~and as required by Sections 321 and 710.~~

Portland cement concrete pavement replacement shall be in accordance with Type C of the Standard Details, <sup>200</sup> and as required by Sections ~~505 and 725.~~ <sup>324.</sup>

~~ABC or decomposed granite~~ <sup>All other</sup> surface replacement shall be constructed in accordance with Type ~~F~~ <sup>in the right-of-way but not in paved roadways</sup> of ~~standard details~~ <sup>D of Standard Detail 200 and</sup>, as indicated in the Contracting Agency Special Provisions or on the plans ~~and in Section 702.~~

Temporary pavement replacement shall be constructed as required ~~below.~~ <sup>herein</sup>

Pavements to be matched by construction of new pavements adjacent to or at the ends of a project shall be saw cut in accordance with these specifications and where shown on the plans.

Pavement and surfacing replacement within ADOT rights-of-way shall be constructed in accordance with their permits and/or specification requirements.

336.2 MATERIALS AND CONSTRUCTION METHODS:

Materials and construction methods used in the replacement of pavement and surfacing shall conform to the requirements of all applicable standard details and specifications, latest revisions.

**336.2.1 Pavement Widening or Extensions:** Existing pavements which are to be matched by pavement widening or pavement extension shall be trimmed to a neat true line with straight vertical edges free from irregularities with a saw specifically designed for this purpose. The minimum depth of cut shall be 1 1/2 inches or D/4, whichever is greater.

The existing pavement shall be cut and trimmed after placement of required ABC and just prior to placement of asphalt concrete for pavement widening or extension, and the trimmed edges shall be painted with a light coating of asphalt cement or emulsified asphalt immediately prior to constructing the new abutting asphalt concrete pavements. No extra payment shall be provided for these items and all costs incurred in performing this work shall be incidental to the widening or pavement extension.

The exact point of matching, termination, and overlay may be adjusted in the field, if necessary, by the Engineer or designated representative.

**336.2.2 Pavement to be Removed:** Existing asphalt pavement to be removed for trenches or for other underground construction or repairs shall be cut by a device capable of making a neat, straight and smooth cut without damaging adjacent pavement that is not to be removed. The Engineer's decision as to the acceptability of the cutting device and manner of operation shall be final. If saw cutting, only, is to be utilized, it will be so specified in the plans or special provisions.

In lieu of cutting trenches across driveways, curbs and gutters, sidewalks, alley entrances, and other types of pavements, the Contractor may, when approved by the Engineer, elect to tunnel or bore under such structures and pavements.

When installations are within the street pavement and essentially parallel to the center line of the street, the Contractor, with approval of the Engineer, may elect to bore or tunnel all or a portion of the installation. In such installations, the seal coat requirements, as discussed in Section 336.2.4, will be modified as follows:

(A) If the pavement cuts (bore pits, recovery pits, etc.) are 300 feet or more apart, the bore or tunneled distance will not be considered as part of the open trench and the seal coat may not be required.

(B) If the pavement cuts (bore pits, recovery pits, etc.) are less than 300 feet apart, the distance between the cuts will be considered the same as a trench cut and the distance will be added to any trench cut distances.

**336.2.3 Temporary Pavement Replacement:** Temporary pavement replacement, as required in Section 601, may be with cold-mix asphalt concrete, with a minimum thickness of 2 inches, using aggregate grading in accordance with Section 710.

Permanent pavement replacement shall replace temporary repairs within 5 working days after completion of temporary work.

Temporary pavement replacement shall be used in lieu of immediate placement of single course permanent replacement or the first course of two course pavement replacement only on transverse lines such as spur connections to inlets, driveways, road crossings, etc., when required by the Engineer, by utilities or others who subcontract their permanent pavement replacement, under special prior arrangement; or for emergency conditions where it may be required by the Engineer. Temporary pavement replacement shall be placed during the same shift in which the backfill to be covered is completed.

Rolling of the temporary pavement replacement shall conform to the following:

(A) Initial or breakdown rolling shall be followed by rolling with a pneumatic-tired roller. Final compaction and finish rolling shall be done by means of a tandem power roller.

(B) On small areas or where equipment specified above is not available or is impractical, the Engineer will approve the use of small vibrating rollers or vibrating plate type compactors provided comparable compaction is obtained.

The surface of the temporary pavement shall be finished off flush with the adjacent pavement.

#### 336.2.4 Permanent Pavement Replacement and Adjustments:

(336.2.4.1 rearranged – new text in green)

~~336.2.4.1 Permanent Pavement Replacement:~~ Pavement replacement for cuts essentially parallel to the street centerline and greater than 50 feet in length shall be two course pavement replacement as hereinafter specified. For cuts greater than 600 feet in length the entire area shall then be seal coated in accordance with Section 330 (coated chips) or as otherwise specified. This seal coat shall extend from the edge of pavement or lip of gutter to the street centerline except that on residential streets less than 36 feet face to face of curb or where the pavement patch straddles the centerline, the entire width of street shall be seal coated.

**336.2.4.1 Permanent Pavement Replacement:** Pavement replacement for longitudinal cuts (essentially parallel to the street centerline) greater than 50 feet in length and transverse cuts of any length shall be at least a two-course pavement replacement as specified herein. Pavement replacement for longitudinal cuts parallel to the street centerline less than 50 feet in length, transverse cuts, bell holes and similar small areas may be a single course provided the layer thickness complies with requirements of Section 321.5.4. All pavement replacement shall match gradation and thickness of the existing pavement. These one course Pavement patches replacement shall be compacted with a vibratory roller to the same density specified for asphalt concrete pavements in Section 321.

~~In lieu of placing the seal coat as required previously, and with approval of the Contracting Agency, the Contractor may deposit with the Contracting Agency for credit to the Street Maintenance Department, a negotiated agreed upon amount. The Street Maintenance Department will incorporate this work into their street maintenance program.~~

Unless otherwise noted, pavement replacement shall comply with the following:

~~Pavement replacement for cuts parallel to the street centerline less than 50 feet in length, transverse cuts, bell holes and similar small areas shall match gradation and thickness of the existing pavement. These one course pavement patches shall be compacted with a vibratory roller to the same density specified for asphalt concrete pavements.~~

(A) Single course pavement replacement shall consist of a 12.5 mm or 19 mm mix placed and finished as directed by the Engineer in accordance with Section 710.

~~Laying of single course or the base course of the asphalt concrete pavement replacement where a two course replacement is applicable shall never be more than 600 feet behind the ABC placed for the pavement replacement.~~

(B) The base course(s) of two a multi-course pavement replacement shall consist of a 19 mm mix in accordance with Section 710.

~~The trench must be compacted to its required density, and required ABC must be in place prior to the placement of the asphalt concrete.~~

(C) The surface course of a multi-course pavement replacement shall consist of a 9.5 mm or 12.5 mm mix in accordance with Section 710 as specified by the Engineer to match the existing surface. The surface course shall not be placed sooner than 2 weeks after the base course, except where the trench crosses a signalized intersection. In this case the surface course shall be placed within 48 hours, or the crossing pavement replacement shall be a single course as specified above.

~~Single course replacement shall consist of a 12.5 mm or 19 mm mix placed and finished as directed by the Engineer.~~

(D) Where the base course is to be placed with non-compactive equipment, it shall be not less than 2 inches in thickness and the material shall be immediately rolled with a pneumatic-tired roller. The surface course shall be of sufficient depth to provide the total required compaction thickness of the two courses, but not more than 1 inch.

~~The base course of two course pavement replacement shall consist of a 19 mm mix in accordance with Section 710.~~

SECTION 336

Where the base course is to be placed with non-compactive equipment, it shall be not less than 2 inches in thickness and the material shall be immediately rolled with a pneumatic-tired roller. The surface course shall be of sufficient depth to provide the total required compacted thickness of the two courses, but not more than 1 inch.

Where the trench is 6 feet or more in width, all courses, single or both courses of the two course pavement replacement, shall be laid with a self-propelled compacting, spreading equipment. When the trench is from 6 to 8 feet in width, the self-propelled compacting, spreading equipment shall not be wider than 8 feet. All courses, except the surface course, shall be of a compacted thickness of not less than 1 1/2 inches.

The surface course shall consist of a 9.5 mm mix in accordance with Section 710 as specified by the Engineer to match the existing surface. The surface course shall not be placed sooner than 2 weeks after the base course, except where the trench crosses a signalized intersection. In this case the surface course shall be placed within 48 hours, or the crossing pavement replacement shall be single course as specified above.

Placement of the surface course is to be by means which will result in a surface texture satisfactory to the Engineer, and flush with the existing pavement.

Where deep lift asphalt concrete (asphalt concrete base and asphalt concrete wearing course) exists, the base course replacement shall be made in lifts not exceeding 6 inches in compacted thickness to within 1/2 inch of the finish grade.

**336.2.4.2 Adjustments:** When new or existing manholes, valves, survey monuments, clean outs, etc. fall within the limits of the permanent pavement replacement as discussed in this Section, the Contractor shall be responsible for adjusting the various items to the new pavement surface or as directed by the Engineer. This will include but not be limited to slurry and chip seals.

The Contractor will coordinate with the Engineer and with representatives of the various utilities regarding the adjustment and inspection of the work. The Contractor shall be responsible for obtaining and complying with all specifications, special requirements, details, etc. of the Utility Company regarding the adjustments. When adjusting the Agency's utilities, survey monuments, etc., the adjustment will comply with these Specifications and Details.

The work will be done in compliance with OSHA standards and regulations regarding confined space entry.

The Contractor shall remove all material attached to the lids and/or covers including that of prior work. The method of removal shall be approved by the Engineer and/or the Utility Representative.

**336.3 TYPES AND LOCATIONS OF PAVEMENT AND SURFACING REPLACEMENT:**

Normally, the type of pavement replacement and backfill required will be noted on the plans or specified in other portions of the contract documents and construction will be in accordance with Detail 200. This detail requires that a 12 inches "T" Top be utilized when normal traffic flow is perpendicular to any one of the four sides of the trench excavation. Therefore, Type A pavement replacement will require a "T" Top whenever the trench crosses a street or goes through an intersection and at the end(s) if they terminate in the street. Type B pavement replacement will require the "T" Top on the sides that are perpendicular to normal traffic flow.

Details 200-1 and 200-2.

} Placed as Notes 6 and 7 in Detail 200-1

If a type is not noted on the plans or specified in the special provisions, the following criteria will govern:

Type A pavement replacement, including the "T" Top, will be utilized on all streets where the excavation is parallel to the centerline of the street. Use type B pavement replacement whenever a longitudinal trench crosses a street or goes through an intersection.

essentially longitudinal or

or at an angle

Type B pavement replacement, including the "T" Top, will be utilized on all streets where the excavation is transverse to the centerline of the street.

Type C pavement replacement will be used to match existing portland cement concrete pavement.

will be utilized to repair asphalt concrete, portland concrete and aggregate surfaces in the right-of-way, but not in paved roadways. It may also

Type D pavement replacement may be used when the condition of the existing pavement does not justify construction of Type A or B. Prior written approval of the Engineer is required. for this condition.

(E) Where the trench is 6 feet or more in width, all courses, single or both courses of the two course pavement replacement shall be laid placed with a self-propelled compacting, spreading and compacting equipment. When the trench is from 6 to 8 feet in width, the self-propelled compacting, spreading and compacting equipment shall not be wider than 8 feet. All courses, except the surface course, shall be of a compacted thickness of not less than 1 1/2 inches.

(F) Placement of the surface course is to be by means which will result in a surface texture satisfactory to the Engineer, and flush with the existing pavement.

(G) Where deep lift asphalt concrete (asphalt concrete base and asphalt concrete wearing course) exists, the base course replacement shall be made in lifts not exceeding 6 inches in compacted thickness to within 1/2 inch of the finished grade.

The pavement replacement surface shall not vary more than 1/4 inch from the lower edge of a straightedge placed across the replacement pavement surface between edges of the existing matched surfaces. When the pavement replacement includes replacement of the roadway crown, the surface smoothness shall comply with requirements of Section 321.

Laying of a single course or the base course(s) of the asphalt concrete pavement replacement where a two course replacement is applicable shall never be more than 600 feet behind the ABC placement for the pavement replacement.

The trench must be compacted to its required density, and required ABC must be in place and compacted prior to the placement of the asphalt concrete.

For cuts greater than 600 feet in length the entire area shall then be seal coated in accordance with Section 330 (coated chips) or as otherwise specified. This seal coat shall extend from the edge of pavement or lip of gutter to the street centerline except that on residential streets less than 36 feet face-to-face of curb or where pavement patch straddles the centerline, the entire width of street shall be seal coated.

In lieu of placing the seal coat as required previously, and with approval of the Contracting Agency, the Contractor may deposit with the Contracting Agency for credit to the Street Maintenance Department, a negotiated agreed upon amount. The Street Maintenance Department will incorporate this work into their street maintenance program.

SECTION 336

~~Type F pavement replacement will be utilized to match existing ABC or decomposed granite roadways.~~

Where a longitudinal trench is partly in pavement, the pavement shall be replaced to the outside edge of the existing pavement, on a straight line, as indicated on the plans. Measurements for payment shall be from the inner limit of pay width allowed below, to the outside edge of the existing pavement as defined herein.

Where no part of a trench is in pavement, surfacing replacement will only be specified where existing surfacing materials have been removed.

When a trench cut is in aggregate surfaced area, the surfacing replacement shall be of a like type and depth as the existing material, compacted to the densities required in Section 601.

**336.4 MEASUREMENT:**

Measurement for payment and surfacing replacement shall be by the square yard, based upon actual field measurement of the area covered except as noted below.

(A) In computing pay quantities for replacement Types ~~A, B, and F~~, pay widths will be based on the actual field measured width, however the boundaries of the measurement will not extend further than 1/2 the distance, either side, from the centerline of the pipe as depicted on Table 601-1, Maximum Width At Top Of Pipe Greater Than O.D. Of Barrel.

B Modified and E

(B) In computing pay quantities for replacement Types ~~C, D, E, and T~~, pay widths will be based on the actual field measured width, however the boundaries of the measurement will not extend further than 1/2 the distance plus 12 inches, either side, from the centerline of the pipe as depicted on Table 601-1, Maximum Width At Top Of Pipe Greater Than O.D. Of Barrel.

A, B, C and D

(C) Where a longitudinal trench is partly in pavement, computations of pay quantities shall be based on the limitations specified above.

(D) The length of pavement and surfacing replacement shall be measured through any manhole, valve box, or other structure constructed in the pipe line, and any pavement or surface replacement and/or seal treatment in excess of the above pay widths shall be considered and included in the bid item for such structure.

(E) Any pavement replacement in excess of the specified pay widths necessitated by the installation of valves, tapping sleeves and valves, valve by-passes, and concrete thrust blocks shall be included in the bid price for these items.

(F) When special provisions allow deviations from the trench widths specified in Section 601, the above allowed pay widths for pavement replacement may be altered where so specified.

(G) Measurement of pavement and surfacing replacement shall be made along the finished surface of the ground to the nearest foot, and shall be computed to the nearest square yard.

**336.5 PAYMENT:**

Direct payment for pavement or surfacing replacement will be made for replacement over all pipe trench cuts except as otherwise allowed in the special provisions. Payment for replacements over other work shall be included in the cost of constructing that work, in accordance with the applicable standard details and specifications.

Payment for temporary pavement replacement shall be included in the cost of the pipe.

When a Contractor has the option of either jacking and/or boring or open cut construction, and elects to construct a pipeline by the jacking and/or boring method, he will be paid for the replacement of such items of work as pavement, curb and gutter, sidewalk, driveway, and alley entrances, as allowed for open cut construction.

End of Section

SECTION 601

The Contractor shall be entirely responsible for safeguarding and maintaining all conflicting utilities that are shown on the plans (Sections 107 and 105 apply). This includes overhead wires and cables and their supporting poles whether they are inside or outside of the open trench. If, in the course of work, a conflicting utility line that was not shown on the plans is discovered, the Contracting Agency will either negotiate with the owner for relocation, relocate the utility, change the alignment and grade of the trench or as a last resort, declare the conflict as "extra work" to be accomplished by the Contractor in accordance with Section 104.

**601.3.2 Irrigation Ditches, Pipes and Structures:** The Contractor shall contact the owners of all irrigation facilities, and make arrangements for necessary construction clearances and/or dry-up periods.

All irrigation ditches, dikes, headgates, pipe, valves, checks, etc., damaged or removed by the Contractor, shall be restored to their original condition or better, by the Contractor at no additional cost to the Contracting Agency.

**601.3.3 Building, Foundations and Structures:** Where trenches are located adjacent to building, foundations, and structures, the Contractor shall take all necessary precaution against damage to them. The Contractor shall be liable for any damage caused by the construction.

Except where authorized in the special provisions or in writing by the Engineer, water settling of backfill material in trenches adjacent to structures will not be permitted.

**601.3.4 Permanent Pipe Supports:** Permanent pipe supports for the various types and sizes of sewer, water and utility lines shall conform to the Standard Details or the details shown on the plans. Such pipe supports shall be erected at the locations shown on the plans and/or at any other locations as necessary as determined by the Engineer.

**601.3.5 Electronic, Telephonic, Telegraphic, Electrical, Oil and Gas Lines:** These underground facilities shall be adequately supported by the Contractor. Support for plastic pipes shall be continuous along the bottom of the pipe. Support for metal pipe and electrical conduit may be continuous or nylon webbing may be used for suspension at no greater than ten-foot intervals.

The Contractor shall avoid damaging the plastic pipe, pipeways or conduits during trench backfilling and during foundation and bedding placement.

There will be no measurement or payment for this work. The Contractor will include all associated costs in the unit bid price for the conduit installation.

**601.4 FOUNDATION, BEDDING, BACKFILLING AND COMPACTION:**

**601.4.1 Foundation:** The material upon which the conduit or structure is to be placed shall be accurately finished to the grade or dimensions shown on the plans or as directed by the Engineer. The bottom portion of the trench shall be brought to grade so that the conduit or structure will be continuously in contact with the material on which it is being placed. If rocky or unsuitable soil is encountered, Subsection 601.2.5 applies.

**601.4.2 Bedding:** Bedding shall consist of granular material containing no pieces larger than 1 1/2 inches and free of broken concrete, broken pavement, wood or other deleterious material. Open graded rock will not be used without the written approval of the Engineer.

← Recycled or reclaimed asphalt concrete shall not be used.

Where water consolidation is used, bedding for conduits, 24 inches or less in I.D., may be placed in one lift. For larger conduits the first lift shall not exceed the springline of the pipe.

Where mechanical compaction is used, the moisture content shall be such that the specified compaction can be obtained. The first lift shall be 8 inches or two-thirds of the distance to the springline whichever is greater. Succeeding lifts shall not exceed 2 feet loose and extreme care will be taken to prevent damage to or movement of the conduit by the compaction equipment.

← Bedding for underground utilities exposed during construction shall be restored in compliance with the requirements established by the utility owner.

**601.4.3 Backfill:** Backfill shall be sound earthen material free from broken concrete, broken pavement, wood or other deleterious material. Unless otherwise specified, this may be native material with no piece larger than 4 inches, select material or aggregate base course. Backfill under street pavement shall be constructed per Detail 200 with the type of replacement noted on the plans

← Recycled or reclaimed asphalt concrete shall not be used.

SECTION 601

or in the special provisions. Unless otherwise noted, backfill under single curb, curb and gutter, sidewalk, driveways, valley gutters, etc. shall be the same as the adjacent street pavement.

Where water consolidation is used, backfill will be placed in lifts as required in the following table prior to settlement.

| Trench Width | Backfill Lifts   |
|--------------|------------------|
| 18" to 24"   | Not to exceed 4' |
| 25" to 36"   | Not to exceed 6' |
| Over 36"     | Not to exceed 8' |

The above backfill lift limitations are not applicable when water saturation is done by the jetting method.

Where mechanical compaction is used, backfill shall be placed in lifts the height of which shall not exceed that which can be effectively compacted depending on the type of material, type of equipment and methods used, and under no circumstances shall exceed 4 feet.

Backfill, around utilities that are exposed during trench excavation, shall be placed in accordance with the bedding methods.

**601.4.4 Compaction Densities:** Unless otherwise provided in the plans and/or special provisions, the trench backfill shall be thoroughly compacted to not less than the densities in Table 601-2 when tested and determined by AASHTO T-99 and T-191 or ASTM D-2922 and D-3017. When AASHTO T-99, method A or B, and T-191 are used for density determination, MAG Detail 190 will be used for rock correction.

The density required will depend on the Type shown on the plans and/or called for in the special provisions. Density required for each type shall comply to Table 601-2.

Utilities installed within a future roadway prism or within an unsurfaced alley shall be in accordance with Type E of Standard Detail 200 unless otherwise noted.

| Backfill Type | Location   | From Surface To 2 feet Below Surface      | From 2 feet Below Surface To 1 foot Above Top of Pipe | From 1 foot Above Top of Pipe to Bottom of Trench |
|---------------|--|---|---|---|
| I             | Under any existing or proposed pavement, curb, gutter, sidewalk, or such construction included in the contract, or when any part of the trench excavation is within 2' of the above. | 100% for granular<br>95% for non-granular | 90%   | 90%   |
| II            | On any utility easement, street, road or alley right-of-way outside limits of (I).   | 85%                                       | 85%   | 90%   |
| III           | Around any structures or exposed utilities.  | 95% in all cases                          |   |   |

Add a comma between "easement" and "street"

Note: The type required will generally be shown on the plans and the plans will govern. Where no type is shown on the plans the type shall comply with Table 601-2.

A consideration in determining the backfill Types as shown on the plans, is based on the trench widths as shown in the Contract Documents. If these trench widths increase beyond those widths referred to above and fall within the 2-foot limit of paved surfaces and other improvements due to construction exigencies, the backfill designation for that portion within the 2-foot limit of such improvements shall be Type I even though Type II backfill is shown on the plans.