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# MORVA DRIVE/MORVA COURT
# CSA R-1982-2

## ENGINEER'S REPORT


Alameda County
Public Works Agency
399 Elmhurst Street
Hayward, CA 94544

March 2022

PROPOSED SERVICE CHARGE INCREASE
FISCAL YEARS 2022/23; 2023/24

**MORVA DRIVE/MORVA COURT**

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**MORVA DRIVE/MORVA COURT**

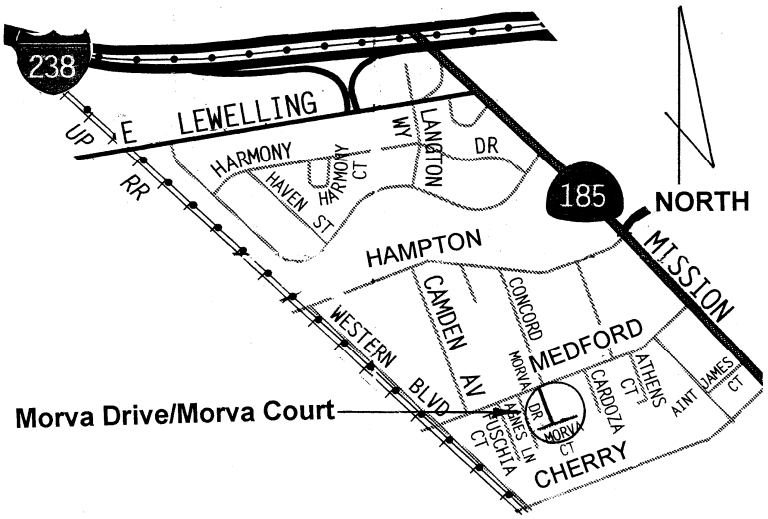
INCREASE OF ROAD MAINTENANCE SERVICE CHARGE, FISCAL YEARS 2022/23 and 2023/24

## Background

The Morva Drive / Morva Court County Service Area (CSA) was established by the County of Alameda (County) Board of Supervisors in June 1983, to provide a financing mechanism for road maintenance services for Morva Court and Morva Drive, which are private roads. These roads serve 20 residences located on 13 low to middle income properties.

The CSA is located in the Eden Area, of unincorporated Hayward, southerly of Medford Avenue, between Mission Boulevard and the BART tracks.

**VICINITY MAP**



Morva Drive and Morva Court are the only access points that the properties within the CSA have to Medford Avenue, a County-owned and maintained roadway. The existing service charge, $250, is levied equally against each living unit within each parcel within the CSA annually. Seven parcels in the CSA have one living unit, five parcels have two living units, and one parcel has four living units. This amount is established yearly by the annual report prepared for the CSA and was approved by the property owners in 2006/07 by a ballot and under the annual report approved by the Board of Supervisors. The roadways within the CSA are in need of repair and resurfacing. Based on the County Public Works Agency's field review, this larger maintenance project would require milling of the existing asphalt surface and replacement with a new asphalt surface. Based on the findings within this report it would take 7 years to accumulate enough funds to fund this project at the current service charge level. Property owners within the CSA have expressed a need to increase this service charge to accumulate enough money to pay for this maintenance work and incidental costs to fund this project earlier.

## Description & Costs of Proposed Improvements

The maintenance work in the CSA that the County Public Works Agency provides is generally limited to roadway resurfacing and base repair of the existing surface of Morva Drive and Morva Court. Property owners within the CSA have requested that the County provide a complete base repair and roadway resurfacing of both roadways within the CSA. This report is prepared to determine what the costs associated with this request would be, to analyze the timelines to accumulate the required funds, and to describe a proposed service charge increase to allow this major maintenance project to be completed on a timely basis.

Detailed plans and specifications are included for reference, subject to any changes based on field conditions. The work to be done consists, in general, of: providing traffic control; providing construction area signs; water pollution control; crack sealing; pavement patching; furnishing and applying water; dust control; hauling excavated or removed materials; disposal of materials;

milling of the existing asphalt surface and replacement with a new asphalt surface; notifying neighborhood residents about the work; videotaping the project area prior to construction; cleaning the site and miscellaneous things; and furnishing all labor, materials, tools, equipment, mechanical workmanship, transportation and services necessary to be done in order to perform a complete job in all respects.

In general, the complete pavement rehabilitation project would entail removal of the existing asphalt surface and placement of a new surface. This would entail milling 2 inches of the existing surface and paving a new 2-inch level of asphalt pavement. The total surface area of pavement replacement is 9,000 square feet of surface. Based on these dimensions the project estimate would be:

| Bid Item | Unit Amount | Cost per unit | Total Cost |
|---|---|---|---|
| Milling | 1,000 square yards (SY) | $14/(SY) | $14,000 |
| Asphalt pavement | 125 Ton | $400/Ton | $50,000 |
| Total Cost | | | $64,000 |

This cost is for construction only. Adding in 15% for Engineering and construction management, the total cost of the project is estimated to be at least $74,000.

The $74,000 estimate is further supported by bids that the County has received. The County prepared a project specification for advertisement of the pavement rehabilitation described above and received three bids ranging from $62,005 from Burch Construction Company to $76,050 from Malachi Paving and Grading. The price bid was based on a lump sum project cost.

## Recommended Service Charge Increase

The CSA has both a capital replacement fund and a yearly maintenance fund. Any unspent moneys in the yearly maintenance fund transfer to the capital maintenance fund to ensure that both minor annual maintenance and major maintenance services can be funded. The capital replacement fund is used to provide the required major maintenance services on the roadways

including base repair and roadway resurfacing. Accumulating funds in the capital replacement fund at the current rate will extend far beyond the life of the original pavement. The pavement has deteriorated to a point that replacement is necessary. Based on the $74,000 estimate for construction costs, engineering, and construction management, the properties would need to accumulate an additional $39,000 to fund the complete repair and resurfacing of the roadways. The options available to accumulate these funds are:

| **Current Service Charge per Living Unit** | **Additional Service Charge per Living Unit** | **Total Service Charge** | **Years to Accumulate $35,000** |
|---|---|---|---|
| $250 | $0 | $250 | 7 years |
| $250 | $250 | $500 | 3.5 years |
| $250 | $750 | $1,000 | 2 years |
| $250 | $1,500 | $1,750 | 1 year |

The County's recommendation is to increase the total Service Charge to the property owners by $750.00, raising the total Service Charge to $1,000. This will require the Service Charge to be charged to the property owners for FY 2022/23 and FY 2023/24 to accumulate the $74,000 needed to complete the repairs and resurfacing. After FY 23/24 the annual service charge would revert back to $250.00 per living unit.

## Identification of Parcels Subject to Service Charge

The number of living units for each parcel are described in the chart below.

| **Parcel No** | **Address** | **Living Units** | **Existing Service Charge** | **FY 2022/23 Proposed Service Charge** | **FY 2023/24 Proposed Service Charge** | **FY 2024/25 Proposed Service Charge** |
|---|---|---|---|---|---|---|
| 414 0066 021 00 | 20501 Morva Drive, Hayward, CA 94541 | 1 | $250 | $1,000 | $1,000 | $250 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 414 0066 022 00 | 20549 Morva Drive, Hayward, CA 94541 | 1 | $250 | $1,000 | $1,000 | $250 |
| 414 0066 023 00 | 20653 Morva Drive, Hayward, CA 94541 | 2 | $500 | $2,000 | $2,000 | $500 |
| 414 0066 024 00 | 653 Morva Court, Hayward, CA 94541 | 1 | $250 | $1,000 | $1,000 | $250 |
| 414 0066 025 00 | 659 Morva Court, Hayward, CA 94541 | 1 | $250 | $1,000 | $1,000 | $250 |
| 414 0066 026 00 | 665, 667, 669, and 671 Morva Court, Hayward, CA 94541 | 4 | $1,000 | $4,000 | $4,000 | $1,000 |
| 414 0066 027 00 | 679 and 677 Morva Court, Hayward, CA 94541 | 2 | $500 | $2,000 | $2,000 | $500 |
| 414 0066 028 00 | 681 and 683 Morva Court, Hayward, CA 94541 | 2 | $500 | $2,000 | $2,000 | $500 |
| 414 0066 030 00 | 684 and 686 Morva Court, Hayward, CA 94541 | 2 | $500 | $2,000 | $2,000 | $500 |
| 414 0066 031 00 | 688 and 690 Morva Court, Hayward, CA 94541 | 2 | $500 | $2,000 | $2,000 | $500 |
| 414 0066 032 00 | 20652 Morva Drive, Hayward CA 94541 | 1 | $250 | $1,000 | $1,000 | $250 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 414 0066 033 00 | 20548 Morva Drive, Hayward, CA 94541 | 1 | $250 | $1,000 | $1,000 | $250 |
| 414 0066 034 00 | 709 Medford Ave., Hayward, CA 94541 | 1 | $250 | $1,000 | $1,000 | $250 |
| Collected per Fiscal Year | | | $5,250 | $21,000 | $21,000 | $5,250 |

## Method of Service Charge

The Service Charge, if approved by the voters, would be collected under the tax rolls collected annually for each property within the boundary of the CSA.

Revenues derived from the service charge shall be used to fund the major maintenance project described above, and any amount exceeding the maintenance project costs shall be used to replenish the capital replacement fund. The revenues received from the increase is more than the estimated cost of the work. This is required to fund any temporary repair that may be required while the funds are being collected. Revenues from the service charge will not be used for any other purpose than funding maintenance services. Following Fiscal Year FY 2023/24 the service charge will revert to $250 per living unit, and the revenues collected will not exceed the costs of the maintenance services provided to the CSA.

## Basis of Calculation of Service Charge

The additional amount of service charge needed was determined based on the following quantities:

| Bid Item | Unit Amount | Cost per unit | Total Cost |
|---|---|---|---|
| Milling | 1,000SY | $14/SY | $14,000 |
| Asphalt pavement | 125 Ton | $400/Ton | $50,000 |
| Total Cost | | | $64,000 |

This is quantity costs only. The breakdown in costs required to complete the project include:

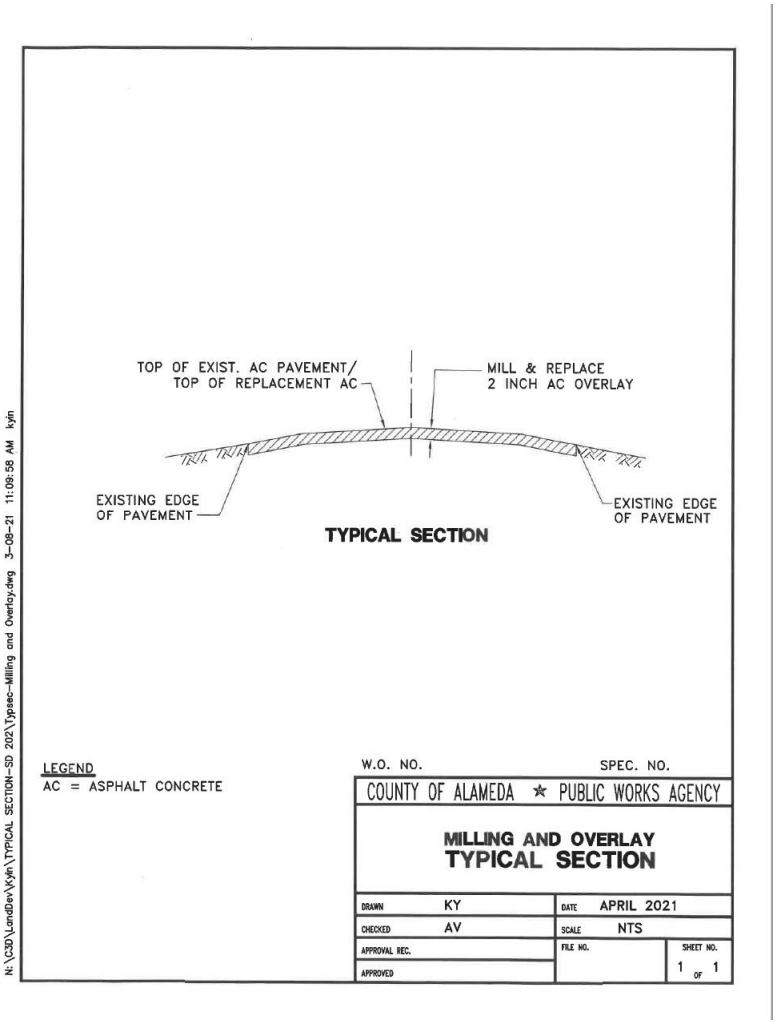
| | |
|---|---|
| Construction Costs | $64,000 |
| Engineering/Construction Management | $10,000 |
| Total Costs | $74,000 |
| Less Accumulated Funds in CSA | $35,000 |
| Amount required to complete Project | $39,000 |

## Proportional Cost of the Services Attributable to each Parcel

The CSA was established by the County of Alameda under Resolution No. 0-83-123, adopted May 10, 1983, where the Board of Supervisors declared its intention to establish a county service area for road maintenance services on Morva Drive and Morva Court. The maintenance services funded by this CSA benefit only the parcels that access onto the private roadways of Morva Drive and Morva Court. There is no through access for the general public through this CSA. The cost of the maintenance services has been equally shared by the living units, which benefit from and use the services equally. The living units on each parcel are single family residences. Per the Trip Generation Manual, 10th Edition, prepared by the Institute of Traffic Engineers, each single-family residence contributes equally to the amount of vehicular traffic that would be generated by the living units within the CSA boundaries. The service is equally utilized by the living units, with costs and benefits proportionally shared by equal division. This service directly benefits the parcels on the streets, which are otherwise responsible for maintaining these streets.

The proposed service charge reflects the estimated cost of the improvements, divided proportionally and equally by the number of living units. Should the actual bids for the maintenance project come in lower than estimated, then any remainder will be used to replenish the capital replacement fund.

# Project Plan and Specifications




**JOB TITLE**

ROADWAY REPAIRS ON MORVA DRIVE AND MORVA COURT IN THE CHERRYLAND DISTRICT ALAMEDA COUNTY, CALIFORNIA

## a. SUMMARY OF BID ITEMS

| Item | Description | Quantity | Unit |
|---|---|---|---|
| 1. * | Milling | 1,000 | SY |
| 2. * | Asphalt Pavement | 125 | TON |

The price bid includes all items of work to complete the project as described in the project specifications and shown on the project plan sheet including mobilization, demobilization, and all State, Federal, and other taxes applicable to the project.

## MILLING

Existing asphalt concrete adjacent to the edge of pavement shall be ground and removed to the depths and widths indicated on the plans and/or as directed by the Engineer without ripping or tearing of the underlying or adjacent asphalt concrete. Existing asphalt concrete adjacent to existing asphalt concrete curb or dikes shall be removed as directed by the Engineer.

The grinding machine shall be designed and built specifically for grinding of bituminous pavement and shall be capable of cutting to the desired depth and slope and shall have the capability of spraying water at the cutting drum to minimize the dust.

The grinding machine shall be demonstrated to the Engineer before production work begins.

The Contractor shall remove from the roadbed all residues from the milling operations by sweeping.

Resurfacing operation shall commence within three (3) calendar days after the initial milling operation is started on any roadway.

At milling locations where asphalt concrete exists on top of existing P.C.C. gutter, the Contractor shall remove such existing asphalt concrete.

The Contractor shall "sweep" the entire street with metal detectors before milling to locate buried structures. The cost for sweeping the entire street with metal detectors shall be included in the prices paid for various items of work.

The depth of milling, as specified on the plans and these special provisions, at portland cement concrete gutter shall be measured from the lip of gutter. The depth of milling will not be measured from the surface of the existing asphalt concrete. Additional depth of milling due to extra asphalt concrete over the lip of gutter will not be measured or paid for.

Milling widths wider than shown on plans will not be measured or paid for.

The quantity of milling to be paid for will be determined by field measurement to the nearest 0.1 square yard.

Payment of milling will be made as bid per square yard for Milling.

The price bid for Milling shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved in milling the existing asphalt concrete, including lowering existing utilities, sweeping the roadbed and disposing of the removed asphalt concrete and residues, as specified herein, and as directed by the Engineer.

## ASPHALT CONCRETE

Asphalt concrete shall conform to Section 39, "Asphalt Concrete," of the Standard Specifications and these special provisions. Amendments to Section 39 do not apply.

RAP aggregate may be substituted for a part of the virgin aggregate in a quantity not to exceed fifteen percent (15%) by weight of the aggregate blend.

Asphalt binder shall comply with Section 92, “Asphalts,” of the Standard Specifications. Asphalt binder shall be PG 64-10 unless otherwise noted.

Asphalt concrete for surfacing shall be Type A. The aggregate for asphalt concrete shall conform to the grading specified for ½” Maximum size aggregate, Medium grading.

The Contractor shall submit a current (less than one year old) asphalt concrete mix design from two separate sources (primary source and backup source) for asphalt concrete proposed to be used. The asphalt concrete mix design shall have an air void ratio between 3% and 5%. Contractor shall allow ten (10) calendar days for County’s review of mix design.

Asphalt concrete for dikes shall be Type A, 3/8” Maximum size aggregate.

The amount of asphalt binder used in asphalt concrete placed in dikes, gutters, gutter flares, overside drains and aprons at the ends of drainage structures shall be increased one percent by weight of the aggregate over the amount of asphalt binder determined for use in asphalt concrete placed on the traveled way.

The use of any equipment for placing dikes that leaves ridges, indentations, or other objectionable marks in the surface or fails to provide a finished workmanlike uniform job shall be discontinued and other acceptable equipment furnished by the Contractor.

Spreading by blading equipment consisting of motor graders will not be permitted.

Liquid asphalt for use as a prime coat shall be Grade SC-70 unless otherwise directed by the Engineer.

Liquid asphalt prime coat shall be applied to granular bases. In exceptional cases, during wet weather construction, asphaltic paint binder of mixing-type emulsion may be used in lieu of prime coat on granular bases, but only if approved or directed by the Engineer. If asphaltic paint binder of mixing-type emulsion is used, water shall be added to the material and mixed therewith in such proportion that the resulting mixture will contain not more than 50 percent of added water. The exact quantity of added water will be determined by the Engineer. The application of the resulting mixture shall be such that the original emulsion will be spread at the specified rate.

Seal coats shall conform to Section 39-7.02, “Seal Coat,” of the Standard Specifications except that when directed by the Engineer, the Contractor shall apply a fog seal coat to the entire pavement area.

Asphalt concrete pavers for the project shall have an un-extended screed width of eight feet.

The Contractor will be required to furnish a minimum of two 8 ton rollers for each asphalt paver.

Resurfacing operation shall commence within three (3) calendar days after the initial key cut or milling operation is started on any road.

The Contractor will be required to place a “Tack Coat” of liquid asphalt on the existing pavement immediately prior to resurfacing.

The asphalt concrete resurfacing area to receive fabric shall be sprayed with steam-refined pavement asphalt Type PG 70-10.

The traveled way shall be paved first on those streets as shown on the plans, as specified in these special provisions, or as directed by the Engineer. The final lift of asphalt concrete shall be placed in the direction of traffic travel.

Asphalt concrete placed in layers of 0.15-foot or less in compacted thickness or widths of less than 5 feet shall be spread and compacted with the equipment and by the methods conforming to the provisions in Section 39, "Asphalt Concrete," of the Standard Specifications. Other asphalt concrete shall be compacted and finished in conformance with the provisions in Section 39 and the following:

A. The provisions in Section 39-5.02, "Compacting Equipment," of the Standard Specifications shall not apply.
B. The Contractor shall furnish a sufficient number of rollers to obtain the compaction specified in these special provisions and the surface finish required by the Standard Specifications and these special provisions.
C. Rollers shall be equipped with pads and water systems that prevent sticking of asphalt mixtures to the pneumatic-tired or steel-tired wheels. A parting agent that will not damage the asphalt mixture may be used.
D. The second paragraph in Section 39-6.01, "General Requirements," of the Standard Specifications shall not apply.
E. Asphalt concrete and asphalt concrete base shall be compacted by any means to obtain the specified relative compaction before the temperature of the mixture drops below 150° F. Additional rolling to achieve the specified relative compaction will not be permitted after the temperature of the mixture drops below 150° F or once the pavement is opened to public traffic. When vibratory rollers are used as finish rollers the vibratory unit shall be turned off.
F. The fifth and seventh through tenth paragraphs of Section 39-6.03, "Compacting," of the Standard Specifications shall not apply.
G. Asphalt concrete and asphalt concrete base shall be compacted to a relative compaction of not less than 95.0 percent or more than 97.0 percent and shall be finished to the lines, grades, and cross section shown on the plans. In-place density of asphalt concrete and asphalt concrete base will be determined prior to opening the pavement to public traffic.
H. Relative compaction will be determined by California Test 375.
I. If the test results for a quantity of asphalt concrete or asphalt concrete base indicate that the relative compaction is below 95.0 percent or above 97.0 percent, the Contractor will be notified. Asphalt concrete or asphalt concrete base spreading operations shall not continue until the Contractor has notified the Engineer of the adjustment that will be made in order to meet the specified relative compaction.
J. If the test results for a quantity of asphalt concrete or asphalt concrete base indicate that the relative compaction is less than 95.0 percent or above 97.0 percent, the asphalt concrete or asphalt concrete base represented by that quantity shall be removed, except as otherwise provided in these special provisions. If requested by the Contractor and approved by the Engineer, asphalt concrete or asphalt concrete base with a relative compaction between 93.0 percent and 95.0 percent, or between 97.0 percent and 99.0 percent may remain in place and the County will deduct the amount of reduced compensation from moneys due, or that may become due, the Contractor under the contract for the quantity with relative compaction between 93.0 percent and 95.0 percent, or between 97.0 percent and 99.0 percent. The amount of reduced compensation will be calculated using the total tons in the

quantity with relative compaction between 93.0 percent and 95.0 percent, or between 97.0 percent and 99.0 percent multiplied by the contract price per ton for asphalt concrete or asphalt concrete base involved multiplied by the following compensation factors:

| Relative compaction (%) | Reduced payment factor | Relative compaction (%) | Reduced payment factor |
|---|---|---|---|
| 95.0 | 0.0000 | 97.0 | 0.0000 |
| 94.9 | 0.0125 | 97.1 | 0.0125 |
| 94.8 | 0.0250 | 97.2 | 0.0250 |
| 94.7 | 0.0375 | 97.3 | 0.0375 |
| 94.6 | 0.0500 | 97.4 | 0.0500 |
| 94.5 | 0.0625 | 97.5 | 0.0625 |
| 94.4 | 0.0750 | 97.6 | 0.0750 |
| 94.3 | 0.0875 | 97.7 | 0.0875 |
| 94.2 | 0.1000 | 97.8 | 0.1000 |
| 94.1 | 0.1125 | 97.9 | 0.1125 |
| 94.0 | 0.1250 | 98.0 | 0.1250 |
| 93.9 | 0.1375 | 98.1 | 0.1375 |
| 93.8 | 0.1500 | 98.2 | 0.1500 |
| 93.7 | 0.1625 | 98.3 | 0.1625 |
| 93.6 | 0.1750 | 98.4 | 0.1750 |
| 93.5 | 0.1875 | 98.5 | 0.1875 |
| 93.4 | 0.2000 | 98.6 | 0.2000 |
| 93.3 | 0.2125 | 98.7 | 0.2125 |
| 93.2 | 0.2250 | 98.8 | 0.2250 |
| 93.1 | 0.2375 | 98.9 | 0.2375 |
| 93.0 | 0.2500 | 99.0 | 0.2500 |
| <93.0 | Remove and replace | > 99.0 | Remove and replace |

No single compaction test shall represent more than 275 tons or one day's production, whichever is smaller.

When approved by the Engineer, shoulder and variable transition areas may be paved using a self-propelled spreader equipped with an approved extension wing or approved non-self-propelled spreader (Layton box or equal).

The area to which paint binder and asphalt resurfacing fabric has been applied shall be closed to public traffic. Care shall be taken to avoid tracking binder material onto existing pavement surfaces beyond the limits of construction.

The Contractor shall schedule his paving operations such that each layer of asphalt concrete is placed on all contiguous lanes of a traveled way each work shift. Additional asphalt concrete shall be placed along the traverse edge at the end of each lane and along the exposed longitudinal edges between adjacent lanes, hand raked and compacted to form temporary conforms. Kraft paper, or other approved bond breaker, may be placed under the conform tapers to facilitate the removal of the taper when paving operations resume.

Additional asphalt concrete surfacing material shall be placed along the edge of the surfacing at road connections and private drives, hand raked, if necessary, and compacted to form smooth tapered

conforms. Full compensation for furnishing all labor and tools and doing all the work necessary to hand rake said conforms shall be considered as included in the contract prices paid per ton for Asphalt Concrete and no additional compensation will be allowed therefor.

The quantity of asphalt concrete to be paid for will be measured by the ton. The weight shall be the combined weight of the aggregate and asphalt binder.

The quantity of liquid asphalt and asphalt emulsion will not be measured or paid for. Full compensation for liquid asphalt and asphalt emulsion will be considered included in the prices paid for the various other items of work and no additional compensation will be allowed.

Payment for asphalt concrete will be made as bid per ton for Asphalt Concrete, Type A.

The price per ton for Asphalt Concrete shall include full compensation for furnishing all labor, materials, including tack coat, tools, equipment and incidentals and for doing all the work involved in furnishing and placing asphalt concrete, complete in place, as specified herein, and as directed by the Engineer.

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Water furnished and applied to tacky asphaltic emulsion and for mixing-type asphaltic emulsion will not be paid for and full compensation therefor will be considered as included in the contract price paid for asphalt concrete.

## ASPHALTS

Section 92, "Asphalts," of the Standard Specifications, shall not apply.

DESCRIPTION

Asphalt shall consist of refined petroleum or a mixture of refined liquid asphalt and refined solid asphalt, prepared from crude petroleum. Asphalt shall be:

A. Free from residues caused by the artificial distillation of coal, coal tar, or paraffin.
B. Free from water.
C. Homogeneous.

MATERIALS

### *General*

The Contractor shall furnish asphalt under the Department's "Certification Program for Suppliers of Asphalt." The Department maintains the program requirements, procedures, and a list of approved suppliers at:

http://www.dot.ca.gov/hq/esc/Translab/fpmcoc.htm

The Contractor shall ensure the safe transportation, storage, use, and disposal of asphalt.

The Contractor shall prevent the formation of carbonized particles caused by overheating asphalt during manufacturing or construction.

### *Grades*

Performance graded (PG) asphalt binder shall conform to the following:

Performance Graded Asphalt Binder

| Property | AASHTO Test Method | Specification Grade PG 58-22 [a] | PG 64-10 | PG 64-16 | PG 64-28 | PG 70-10 |
|---|---|---|---|---|---|---|
| Original Binder | | | | | | |
| Flash Point, Minimum °C | T48 | 230 | 230 | 230 | 230 | 230 |
| Solubility, Minimum % [b] | T44 | 99 | 99 | 99 | 99 | 99 |
| Viscosity at 135°C, [c] | T316 | | | | | |
| Maximum, Pa·s | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Dynamic Shear, | T315 | | | | | |
| Test Temp. at 10 rad/s, °C | | 58 | 64 | 64 | 64 | 70 |
| Minimum G*/sin(delta), kPa | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| RTFO Test, [e] | T240 | | | | | |
| Mass Loss, Maximum, % | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| RTFO Test Aged Binder | | | | | | |
| Dynamic Shear, | T315 | | | | | |
| Test Temp. at 10 rad/s, °C | | 58 | 64 | 64 | 64 | 70 |
| Minimum G*/sin(delta), kPa | | 2.20 | 2.20 | 2.20 | 2.20 | 2.20 |
| Ductility at 25°C | T51 | | | | | |
| Minimum, cm | | 75 | 75 | 75 | 75 | 75 |
| PAV [f] Aging, | R28 | | | | | |
| Temperature, °C | | 100 | 100 | 100 | 100 | 110 |
| RTFO Test and PAV Aged Binder | | | | | | |
| Dynamic Shear, | T315 | | | | | |
| Test Temp. at 10 rad/s, °C | | 22 [d] | 31 [d] | 28 [d] | 22 [d] | 34 [d] |
| Maximum G*/sin(delta), kPa | | 5000 | 5000 | 5000 | 5000 | 5000 |
| Creep Stiffness, | T313 | | | | | |
| Test Temperature, °C | | -12 | 0 | -6 | -18 | 0 |
| Maximum S-value, Mpa | | 300 | 300 | 300 | 300 | 300 |
| Minimum M-value | | 0.300 | 0.300 | 0.300 | 0.300 | 0.300 |

Notes:

a. For use as asphalt rubber base stock for high mountain and high desert area.
b. The Engineer will waive this specification if the supplier is a Quality Supplier as defined by the Department's "Certification Program for Suppliers of Asphalt."
c. The Engineer will waive this specification if the supplier certifies the asphalt binder can be adequately pumped and mixed at temperatures meeting applicable safety standards.
d. Test the sample at 3°C higher if it fails at the specified test temperature. G*sin(delta) shall remain 5000 kPa maximum.
e. "RTFO Test" means the asphaltic residue obtained using the Rolling Thin Film Oven Test, AASHTO Test Method T240 or ASTM Designation: D 2872. Residue from mass change determination may be used for other tests.
f. "PAV" means Pressurized Aging Vessel.

Performance based asphalt (PBA) binder shall conform to the following:

Performance Based Asphalt Binder

| Property | AASHTO Test Method | Specification Grade PBA 6a | PBA 6a(mod) | PBA 6b | PBA 7 |
|---|---|---|---|---|---|
| Absolute Viscosity (60°C), Pa·s(x$10^{-1}$)[a] | T202 | | | | |
| Original Binder, Minimum | | 2000 | 2000 | 2000 | 1100 |
| RTFO Aged Residue [b] , Minimum | | 5000 | 5000 | 5000 | 3000 |
| Kinematic Viscosity (135°C), $m^2/s$(x$10^{-6}$) | T201 | | | | |
| Original Binder, Maximum | | 2000 | 2000 | 2000 | 2000 |
| RTFO Aged Residue, Minimum | | 275 | 275 | 275 | 275 |
| Absolute Viscosity Ratio (60°C), Maximum | — | | | | |
| RTFO Test Visc./Orig. Visc. | | 4.0 | 4.0 | 4.0 | 4.0 |
| Flash Point, Cleveland Open Cup, °C, [d] | T48 | | | | |
| Original Binder, Minimum | | 232 | 232 | 232 | 232 |
| Mass Loss After RTFO Test, % | T240 | 0.60 | 0.60 | 0.60 | 0.60 |
| Solubility in Trichloroethylene, % [c] | T44 | | | | |
| Original Binder, Minimum | | Report | Report | Report | Report |
| Ductility (25°C, 5 cm/min), cm | T51 | | | | |
| RTFO Test Aged Residue [b], Minimum | | 60 | 60 | 60 | 75 |
| On RTFO Test Aged Residue, °C: | [f] | | | | |
| 1 to 10 rad/sec: SSD ≥ 0 and Phase Angle (at 1 rad/sec) < 72° | | — | 35 | — | — |
| On Residue from | R28 | | | | |
| PAV [g] at temp., °C | | 100 | 100 | 100 | 110 |
| Or Residue from Tilt Oven[f] (@113°C), hours | | 36 | 36 | 36 | 72 |
| [e] SSD ≥ -115(SSV)-50.6, °C | [f] | — | — | — | 25 |
| Stiffness, | T313 | | | | |
| Test Temperature, °C | | -24 | -24 | -30 | -6 |
| Maximum S-value, MPa | | 300 | 300 | 300 | 300 |
| Minimum M-value | | 0.300 | 0.300 | 0.300 | 0.300 |

Notes:

a. Absolute viscosity (60°C) will be determined at one $sec^{-1}$ using ASTM Designation: D 4957 with Asphalt Institute vacuum capillary viscometers.
b. "RTFO Aged Residue" means the asphaltic residue obtained using the Rolling Thin Film Oven Test (RTFO Test), AASHTO Test Method T240 or ASTM Designation: D 2872.
c. There is no requirement; however results of the test shall be part of the certified copy of test results furnished with the Certificate of Compliance.
d. "Residue from Tilt Oven " means the asphalt obtained using California Test 374, Method B, "Method for Determining Asphalt Durability Using the California Tilt-Oven Durability Test."
e. "SSD" means Shear Susceptibility of Delta; "SSV" means Shear Susceptibility of Viscosity.
f. California Test 381.
g. "PAV" means Pressurized Aging Vessel.

### *Sampling*

The Contractor shall provide a sampling device in the asphalt feed line connecting the plant storage tanks to the asphalt weighing system or spray bar. The sampling device shall be accessible between

600 mm and 750 mm above the platform. The Contractor shall provide a receptacle for flushing the sampling device.

The sampling device shall include a valve:

A. With a diameter between 10 mm and 20 mm.
B. Manufactured in a manner that a one-liter sample may be taken slowly at any time during plant operations.
C. Maintained in good condition.

The Contractor shall replace failed valves.

In the presence of the Engineer, the Contractor will take 2 one-liter samples per operating day. The Contractor shall provide round, friction top, one-liter containers for storing samples.

APPLYING ASPHALT

Unless otherwise specified, the Contractor shall heat and apply asphalt in conformance with the provisions in Section 93, "Liquid Asphalts."

The Contractor shall apply paving asphalt at a temperature between 120°C and 190°C. The Engineer will determine the exact temperature of paving asphalt.

MEASUREMENT

If asphalt is paid as a contract work item on a mass basis, the Department will measure asphalt by the ton under the provisions for determining the mass for payment of liquid asphalt in Section 93, "Liquid Asphalt."

The Engineer will determine the mass of asphalt from volumetric measurements if the Contractor:

A. Uses partial loads of asphalt.
B. Uses asphalt at locations other than a mixing plant and no suitable scales are available within 35 km.
C. Delivers asphalt meeting either of the following:

    1. In calibrated trucks and each tank is accompanied by its measuring stick and calibration card.
    2. In trucks equipped with a calibrated thermometer that determines the asphalt temperature at the time of delivery and equipped with a vehicle tank meter meeting Section 9-1.01, "Measurement of Quantities," for weighing, measuring, and metering devices.

If the Contractor furnishes asphalt concrete from a mixing plant producing material for only one project, the Department will determine the amount of asphalt from volumetric measurements by measuring the amount in the tank at the start and the end of the project provided the tank is calibrated and equipped with its measuring stick and calibration card. The Engineer will determine pay quantities in conformance with the following:

A. Before converting the volume to mass, the Engineer will reduce the volume measured to that which the asphalt would occupy at 15°C.

B. The Engineer will use 981 L and 1020 g/L for the average weight and volume for both PG and PBA grades of asphalt at 15°C.
C. The Engineer will use the Conversion Table in Section 93, "Liquid Asphalts," and the following table

Average Mass and Volumes of Paving Asphalt

| Grade | Liters per Tonne at 15° C | Grams per Liter at 15°C |
|---|---|---|
| PG 58-22 | 981 | 1020 |
| PG 64-10 | 981 | 1020 |
| PG 64-16 | 981 | 1020 |
| PG 64-28 | 981 | 1020 |
| PG 70-10 | 981 | 1020 |
| PBA 6a | 981 | 1020 |
| PBA 6a (mod) | 981 | 1020 |
| PBA 6b | 981 | 1020 |
| PBA 7 | 981 | 1020 |

Full compensation for applying asphalt emulsion shall be considered as included in the prices paid for the various items of work and no additional compensation will be allowed therefor.