# PAVEMENT DESIGN CRITERIA

# FOR

# CITY OF PUEBLO
# COLORADO

DEPARTMENT OF PUBLIC WORKS
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ADOPTED JANUARY 26, 2004

RESOLUTION NO. 10041

A RESOLUTION ADOPTING AND APPROVING PAVEMENT DESIGN CRITERIA FOR THE CITY OF PUEBLO DATED DECEMBER 2003.

BE IT RESOLVED BY THE CITY COUNCIL OF PUEBLO, that:

SECTION 1.

Pursuant to and in furtherance of Sections 4-2-2(i), 12-4-(7), 12-4-6(b)(2)(g) and 12-4-7(J)(2) of the Pueblo Municipal Code, as amended, and upon recommendation by the City Engineer, the Council does hereby adopt and approve PAVEMENT DESIGN CRITERIA FOR THE CITY OF PUEBLO, DATED DECEMBER 2003, a true copy of which is attached hereto and made a part hereof by reference (hereinafter referred to as the "Pavement Design Criteria"). The Council declares that the design and construction of all classifications of streets within the public right of way and all private streets, alleys, or access roads constructed on private property which are subject to a public access easement for all subdivision (and resubdivisions) approved by the City Council after the date of approval of this Resolution shall comply with said Pavement Design Criteria and all other provisions of Title 12 of the Pueblo Municipal Code as amended.

SECTION 2.

After adoption of this Resolution, a true copy of the Pavement Design Criteria shall be maintained on file in the office of the City Clerk for public inspection. Copies of the Pavement Design Criteria shall be made available through the City's Department of Public Works for purchase by the public at a moderate price.

SECTION 3.

This Resolution shall become effective immediately upon adoption.

INTRODUCED: January 26, 2004

BY: Michael Occhiato
COUNCIL PERSON

APPROVED:
PRESIDENT OF CITY COUNCIL

ATTESTED BY:
CITY CLERK

# I N D E X

# PAVEMENT DESIGN CRITERIA
# FOR
# THE CITY OF PUEBLO

## CHAPTER 1. GENERAL PROVISIONS

### 1.1 Jurisdiction

The pavement design criteria set forth in this manual is adopted pursuant to the authority of Sections 4-2-2(i), 12-4-2(7), 12-4-6(b)(2)(g) and 12-4-7(J)(2) of the Pueblo Municipal Code, and shall apply to the design and construction of all classifications of streets and alleys constructed within the public right-of-way, and those private streets, alleys, or access roads constructed on private property which are subject to a public access easement.

### 1.2 Purpose and Intent

It is the purpose and intent of the pavement design criteria contained in this manual to promote the health, safety, convenience, and general welfare of the people of Pueblo, Colorado. They are not intended, nor should they be construed, to create any new rights, remedies, or benefits for any person, firm, corporation or entity.

All Master Development Plans, Subdivision, Resubdivisions, Planned Unit Developments, Special Area Plans, or other proposed construction submitted for approval under the provisions of Title 12, Chapter 4 of the Pueblo Municipal Code shall comply with the pavement design criteria set forth herein. All pavement designs, analyses, and reports shall be prepared under the supervision of a Professional Engineer (Engineer), licensed as such in the State of Colorado.

### 1.3 Permits and Other Requirements

The developer, land owner and/or land owner's representative shall be required to obtain all permits required by Federal, State, or local Agencies in conjunction with work covered under this manual, and shall be required to comply with requirements which may be imposed directly by such agencies or which may be indirectly necessitated in order for the City to comply with any system wide permit which may be issued to the City.

### 1.4 Liability

The adoption of this manual shall not create any duty to any person, firm, corporation, or other entity with regard to the application, enforcement or nonenforcement of this manual. No persons, firm, corporation, or other entity shall have a private right of action, claim or civil liability

remedy against the City of Pueblo, or its officers, employees or agents, for any damage arising out of or in any way connected with the adoption, application, enforcement, or nonenforcement of this manual. Nothing in this manual shall be construed to create any liability under, or to waive any of the immunities, limitations on liability, or other provisions of, the Governmental Immunity Act, C. R. S. 24-10-101 et seq., or to waive any immunities or limitations on liability otherwise available to the City of Pueblo or its officers, employees or agents.

Review and approval by the City of pavement improvements proposed in submittals does not relieve the engineer who designed such improvements from his professional responsibilities for the adequacy of the design of said improvements.

# CHAPTER 2 - GEOTECHNICAL INVESTIGATION FOR PAVEMENT DESIGN

## 2.1 General

The purpose of this chapter is to present the City of Pueblo (City) requirements for geotechnical investigations for pavement design on all streets within the City. The requirements outlined hereafter are the minimum accepted standard for geotechnical investigations and reports submitted to the City whether pavement design is being performed by the City or by the owner / developer.

## 2.2 Geotechnical Investigation

### 2.2.1 Field Investigation

The field investigation shall consist of borings or other suitable methods of sampling the subgrade soils at horizontal spacings not greater than about 350 feet; however, a minimum of one boring shall be obtained for any roadway segment. A roadway segment is defined as a portion of roadway beginning at an intersection and ending at the next intersection or a termination point such as a cul-de-sac. Where proposed roadways include 2 or more lanes in each direction, boring locations shall be alternated between direction of travel at horizontal spacings not greater than about 250 feet. The City may require more frequent testing at its discretion.

Borings shall be taken to a minimum depth of 10 feet below the design subgrade elevation. Samples of each material type encountered in each boring shall be collected for testing.

Borings shall be performed after roadways have been rough graded and installation of utilities within the roadways have been completed. Samples collected should be representative of the soils and bedrock conditions present, including utility trench backfill, imported fill materials, and native subgrade materials.

The City may allow borings to be performed prior to completion of rough grading and utility installation, provided proposed fill materials (if required) for roadway construction can be clearly identified and sampled, utility trenches will be backfilled with excavated materials, and borings extend to a minimum depth of 10 feet below the design subgrade elevation.

If borings are performed prior to completion of rough grading and utility installation, the owner / developer shall submit a signed and sealed letter from the geotechnical engineer upon completion of rough grading confirming the conditions observed subsequent to rough grading do not change the pavement design recommendations. In addition, the City may require additional sampling be performed as rough grading

and utility installation are completed to confirm that similar conditions to those identified in the report exist.

No paving shall be performed until a Pavement Release Form has been issued by the City Engineer.

### 2.2.2 Classification Testing

Subgrade samples collected from each boring and proposed borrow site shall be tested for the following properties:

- Liquid Limit
- Plastic Limit
- Percent Swell
- Percent Passing 200 Sieve
- Gradation (AASHTO A-1 and A-3 soils)
- Moisture Content

The results of these tests shall be used to calculate the AASHTO Classification and Group Index in accordance with AASHTO method M-145.

### 2.2.3 Soil Grouping

To facilitate laboratory testing for Hveem Stabilometer (R-value) and California Bearing Ratio (CBR), field samples can be combined to form composite samples. Composite samples shall be obtained by combining soils with the same AASHTO Classification. The difference between the highest and lowest Group Index value of soil samples used in a composite sample shall not exceed 10. As such, where the difference in Group Index values within a given classification exceeds 10, it may be necessary to create more than one composite sample within a given AASHTO Classification. Composite samples shall be subject to Classification Testing as outlined in Section 2.2.2.

### 2.2.4 Subgrade Support Testing

Individual subgrade or composite samples shall be tested to determine the subgrade support value using Hveem Stabilometer (R-value). The design R-value shall be for 300 pounds per square inch (psi) exudation pressure. Reported data for each sample shall include test procedure reference, dry density and moisture content, expansion pressure, and exudation pressure with corrected R-value curve showing the 300 psi design R-value.

As an alternative, subgrade support values can be determined using the California Bearing Ratio (CBR) test. Reported data for each sample shall include test procedure reference, values requested in AASHTO T-193, stress versus penetration curves, CBR versus dry density curves and Proctor curves.

### 2.2.5 Swell Testing

Relatively undisturbed or remolded samples representative of potentially expansive subgrade materials shall be tested for percent swell. Samples shall be remolded to not less than the minimum recommended compaction criteria specified by the geotechnical engineer at not more than the lowest recommended moisture content. Swell tests shall generally be performed under a surcharge pressure of 150 pounds per square foot (psf). However, the surcharge pressure may be modified as determined by the geotechnical engineer to account for predicted overburden conditions.

# CHAPTER 3 - PAVEMENT DESIGN CRITERIA

## 3.1 General

The purpose of this chapter is to present the City of Pueblo (City) requirements for pavement design on all streets within the City. The requirements outlined hereafter are the minimum accepted standard for pavement design and reports submitted to the City.

## 3.2 Design Factors

**TABLE 3-1**
**FLEXIBLE PAVEMENT DESIGN CRITERIA**

| Road Classification (See Section 3.2.1) | 20-Year Design Period Traffic Criteria | | Serviceability Index | | | Reliability | Default Composite Section | | Default Full-Depth Section |
|---|---|---|---|---|---|---|---|---|---|
| | EDLA | ESAL | $P_o$ | $P_t$ | ΔPSI | % | Layer (inch) | | Layer (inch) |
| | | | | | | | HMA | ABC | HMA |
| **LOCAL** | | | | | | | | | |
| Residential Cul-de-sac | 3 | 21,900 | 4.5 | 2.0 | 2.5 | 80 | 3 | 6 | 5 |
| Country Residential Lane | 5 | 36,500 | 4.5 | 2.0 | 2.5 | 80 | 4 | 6 | 5½ |
| Local Street – Local 30' | 10 | 73,000 | 4.5 | 2.0 | 2.5 | 85 | 4 | 9 | 6½ |
| Local Street – Local 32' | 10 | 73,000 | 4.5 | 2.0 | 2.5 | 85 | 4 | 9 | 6½ |
| Local Street – Local 36' | 7 | 51,100 | 4.5 | 2.0 | 2.5 | 85 | 4 | 8 | 6 |
| Local Street – Local Business 36' or Bus Route | 10 | 73,000 | 4.5 | 2.0 | 2.5 | 85 | 4 | 9 | 6½ |
| Alley - Residential | 10 | 73,000 | 4.5 | 2.0 | 2.5 | 85 | 4 | 9 | 6½ |
| Alley - Commercial | 25 | 182,500 | 4.5 | 2.0 | 2.5 | 85 | 5 | 9 | 7 |
| Industrial - Commercial | 50 | 365,000 | 4.5 | 2.0 | 2.5 | 85 | 5 | 11 | 8 |
| **COLLECTOR** | | | | | | | | | |
| Neighborhood Collector | 25 | 182,500 | 4.5 | 2.3 | 2.2 | 85 | 5 | 9 | 7 |
| Mixed Use Collector | 50 | 365,000 | 4.5 | 2.3 | 2.2 | 90 | 5½ | 11 | 8½ |
| Business Collector | 50 | 365,000 | 4.5 | 2.3 | 2.2 | 95 | 6 | 11 | 9 |
| Industrial - Commercial | 100 | 730,000 | 4.5 | 2.3 | 2.2 | 90 | 6 | 13 | 9½ |
| **ARTERIAL** | | | | | | | | | |
| Minor Arterial | 200 | 1,460,000 | 4.5 | 2.5 | 2.0 | 95 | 7 | 16 | 11 |
| Principal Arterial | 300 | 2,190,000 | 4.5 | 2.5 | 2.0 | 95 | 7½ | 16 | 11½ |

Notes: EDLA – Equivalent Daily Load Application; ESAL – Equivalent Single Axle Load; $P_o$ – Initial Serviceability Index; $P_t$ – Terminal Serviceability Index; ΔPSI – Total Change in Serviceability Index; HMA – Hot Mix Asphalt; ABC – Aggregate Base Course (Class 6)

### 3.2.1 Road Classification

Road Classifications presented above are generally based on the Roadway Classification Design Standards and Policies adopted by the Pueblo City Council on January 27, 2003. Roadway classifications shall be designated and approved by the Director of Public Works. Modification of road classifications is not generally allowed by the City; however, consideration may be given to adjusting Equivalent Daily Load Applications (EDLA) values upon receipt of a project specific traffic study approved by the City.

### 3.2.2 Equivalent Daily Load Application

Equivalent Daily Load Applications (EDLA) and Equivalent Single Axle Loads (ESAL) units are based on a 20-year design period and 18-kip axle loading for the design lane. The EDLA and ESAL values provided in Table 3-1 are considered minimum values and the City may require the use of higher EDLA values at its discretion. Modification of the minimum EDLA values may be considered with a project specific traffic study, which includes applicable growth factors and considerations for construction traffic, and is approved by the City.

### 3.2.3 Serviceability Index

The Initial ($P_o$), Terminal ($P_t$), and Total Change ($\Delta$PSI) Serviceability Index values are provide in Table 3-1.

### 3.2.4 Reliability and Standard Deviation

Reliability factors for given road classifications are provided in Table 3-1. A standard deviation ($S_o$) value of 0.45 should be included in pavement design calculations.

### 3.2.5 Default Pavement Sections

Composite default pavement sections may be used without performing a project specific soils investigation for pavement design provided the owner / developer can demonstrate that moderately to highly expansive soils (Less than 3% swell under a 150 pound per square foot surcharge load), shallow bedrock, high groundwater or other factors that could affect the design or performance of the pavement system are not present. The default values are based on an R-value of 5 for the design parameters shown for each road classification. The composite section is given in inches as hot mix asphalt (HMA) over aggregate base course (ABC).

The full-depth section is given as HMA over compacted subgrade (Article 9.3.09 Compaction, Pueblo Standard Construction Specifications). Full-depth pavement sections may be used in areas with subgrade materials comprised of AASHTO classification A-1 or A-3 subgrade soils. In areas where subgrade soils do not meet AASHTO classification A-1 or A-3, full-depth pavement sections should be underlain by a minimum of 4 inches of ABC.

### 3.2.6 Flexible Pavement Strength Coefficients

Table 3-2, below, contains standard design coefficients for selected pavement materials. If materials other than those indicated in Table 3-2 are proposed for use in the paving section, the materials must be approved by the City Engineer in advance. In addition, design coefficients must be verified by pre-design laboratory test data and confirmed in the field in general accordance with AASHTO Method T 274 and ASTM D 4123.

**TABLE 3-2**
**STRENGTH COEFFICIENTS**

| Component | Limiting Criteria | Coefficient |
|---|---|---|
| **Surface Course Materials** | | |
| Plant Mix Seal Coat | | 0.25 |
| HMA (Grading C or CX) | | 0.44 |
| Existing Bituminous Pavement | Higher values may be possible based on deflection testing | 0.20 |
| **Suggrade, Subbase and Base Materials** | | |
| Class 5 or 6 Aggregate Base Course (Article 8.2, Pueblo SCS) | R-value ≥ 77 | 0.12 |
| Class 1 Subbase Course (Article 8.2, Pueblo SCS) | R-value ≥ 69 | 0.09 |
| Cement Treated Aggregate Base Course | 7-day test ≥ 650 psi<br>7-day test = 400 – 649 psi<br>7-day test ≤ 399 psi | 0.23<br>0.20<br>0.15 |
| Hydrated Lime Treated Aggregate Base Course | R-value ≥ 84<br>R-value = 78 - 83 | 0.14<br>0.12 |
| Fly Ash Treated Subgrade | 7-day test ≥ 150 psi | 0.10 |
| Lime Treated Subgrade | 7-day test ≥ 450 psi<br>7-day test = 350 – 449 psi<br>7-day test = 275 – 349 psi<br>7-day test = 200 – 274 psi<br>7-day test = 125 – 199 psi | 0.15<br>0.14<br>0.13<br>0.12<br>0.11 |

7-day test – Unconfined compressive strength after 7-day cure (ASTM D5102-96, D5239, D6236); SCS – Standard Construction Specifications.

### 3.2.7 Drainage Coefficient

Drainage conditions within the City are generally assumed to be fair, as defined by AASHTO. As such, a drainage coefficient of 0.9 may be used where fair drainage conditions. Poor to very poor drainage conditions, as defined by AASHTO should be assumed in areas where seasonal groundwater levels are anticipated to be within 5

feet of pavement subgrade, or where subgrade soil or bedrock conditions indicate less than fair drainage may be possible.

Use of good to excellent drainage conditions, as defined by AASHTO, must be accompanied by a drainage report acceptable to the City.

### 3.2.8 Minimum Pavement Sections

| Minimum Pavement Sections | | |
|---|---|---|
| Roadway Designation | Residential cul-de-sac, country lane, and local streets not including bus routes (Inches) | All other classes of roadway and bus routes (Inches) |
| Asphalt concrete over Class 5 or 6 aggregate base course | 3/6 | 4/6 |
| Portland cement concrete over compacted subgrade | 5 | 6 |

Note: Bus routes shall be designated by City Engineer.

## 3.3 Soil Problem Mitigation

Mitigation plans for soil problems revealed by the soils investigation shall be submitted to the City Engineer as part of the pavement design report. The following specific factors shall be addressed:

### 3.3.1 Mitigation Plans and Approval

All special problems found in soils investigation (e.g., expansion, frost, soluble sulfates, shallow bedrock, heave, groundwater, soil instability, utility backfill, etc.) shall be addressed in the mitigation plans. All mitigation procedures must be approved by the City Engineer prior to their implementation.

### 3.3.2 Mitigation for Swell

If the average swell is 3.0 percent or greater (150 pound per square foot surcharge), the pavement design report must provide mitigation measures. The mitigation measures shall reduce swell potential under the public improvements to an acceptable level of less than 3.0 percent. The swell test report shall specify sample conditions, surcharge pressures, and other key testing factors.

### 3.3.3 Swell Mitigation Measures

Possible measures for mitigation may include the following:

**A. Over-Excavation** - Over-excavation and replacement with suitable non-expansive or low-expansive material to a depth sufficient to mitigate expansion is a common mitigation method.

**B. Chemical Treatment** - Chemical treatment may be used to mitigate expansive characteristics of the soil.

**C. Moisture Treatments** - Condition with moisture and compact to an appropriate level of compaction for the expansive condition, including stability requirements.

**D. Other Procedures** - Other procedures, including those outlined by the Colorado Department of Transportation or the Colorado Asphalt Pavement Association may be proposed for review and approval by the City Engineer.

### 3.3.4 Mitigation of Unstable Subgrade (Examples)

**A. Over-Excavation** - Over-excavation and replacement with suitable non-expansive material to a depth sufficient to stabilize the subgrade is a common mitigation method.

**B. Chemical Treatment** - Chemical treatment to eliminate unstable characteristics of the soil is another common mitigation method.

**C. Other Procedures** - Other procedures may be proposed for review and approval by the City Engineer.

### 3.3.5 Specific Mitigation Requirements

**A. Extent of Mitigation** - Moisture treatment alone may not be sufficient. If soil problem mitigation is made, the soil treatment shall extend to the back of curb, or to the back of walk for attached or monolithic walk. For detached walk, separate mitigation procedures may be required.

**B. Approval of Chemical Treatment** - Mitigation procedures that alter existing soil conditions (such as lime, fly ash, or cement treatment) shall follow an approved mix design process. Additional testing is required to verify that no swell is introduced in the chemical treatment.

## 3.4 Pavement Design Procedures

### 3.4.1 Flexible Pavement Design

Flexible pavement design (asphalt concrete) shall be based on the procedures outlined in the AASHTO Guide for Design of Pavement Structures 1993. Pavement designs should be based on the criteria established in Section 3.2. Designs may be performed using nomographs or approved software programs based on the AASHTO design procedures. The basic design procedure is outlined below.

- Confirm the roadway classification and corresponding EDLA values in Table 3-1 with the City.

- Determine the serviceability index (SI) and reliability for the roadway classification as indicated in Table 3-1.

- Convert the R-value or CBR to Resilient Modulus using the AASHTO conversion.

- Determine the pavement section structural number (SN) using approved AASHTO pavement design software or nomographs.

- Determine the thickness of the pavement structure using the general AASHTO equation:

$$SN = a_1D_1 + a_2D_2m_2 + a_3D_3m_3$$

where

$a_1, a_2, a_3$ = layer coefficients representative of surface, base, and subbase courses, respectively. (See Table 3-2)

$D_1, D_2, D_3$ = actual thickness (in inches) of surface, base and subbase courses, respectively.

$m_2, m_3$ = drainage coefficients for base and subbase layers, respectively. (See Section 3.2.7)

Total asphalt thickness selected shall not be less than that given in Section 3.2.8, and the aggregate base course thickness selected shall not exceed 3 times the total asphalt concrete thickness selected.

### 3.4.2 Rigid Pavement Design

Rigid pavement design (Portland cement concrete) shall be based on the procedures outlined in the AASHTO Guide for Design of Pavement Structures 1993. Rigid pavement designs are a function of the structural quality of the subgrade soils (R-value or CBR), traffic loading (EDLA) and strength of concrete. Designs may be performed using nomographs or approved software programs based on the AASHTO design procedures. The basic design procedure is outlined below.

- Confirm the roadway classification and corresponding EDLA values in Table 3-1 with the City.

- Determine the serviceability index (SI) and reliability for the roadway classification as indicated in Table 3-1.

- The reliability factor for design of all concrete pavements shall be 95 percent.

- The working stress of the concrete is to be obtained from laboratory tests. The minimum flexural strength ($M_R$) of concrete shall be 600 psi at 28 days as determined in accordance with AASHTO T 97. The working stress shall not exceed 80 percent of the 28 day flexural strength. As an alternative, flexural strength can be computed from the compressive strength ($f_c$) of the concrete by the following formula:

$$M_R \cong 2.3 f'_c{}^{0.67}$$

- Estimate the R-value or CBR to Modulus of Subgrade Reaction (k) using the procedure outlined by AASHTO.
- The standard deviation for design of concrete pavements shall be 0.35.

- Determine the pavement section structural number (SN) using approved AASHTO pavement design software or nomographs.

- Determine the slab thickness. A minimum slab thickness of 5 inches is required.

- Provide joint design in accordance with the current Colorado Department of Transportation Standard Plans.

## 3.5 Pavement Design Report

### 3.5.1 Required Information for Pavement Design Report

After completion of field investigation, laboratory testing, and engineering design, a report summarizing the data collected and pavement section calculations shall be prepared by or under the supervision of a Professional Engineer registered in the State of Colorado. The information listed below shall be required for all pavement design reports.

- Vicinity map showing the area of investigation.
- Scaled drawings showing street names and the location of borings.
- Tabular listing of laboratory test data required in section 2.2.2.
- R-value or CBR test results as required in section 2.2.4.
- Boring logs with AASHTO Classifications and Group Index Values.

- A discussion of soil, bedrock and groundwater conditions, including anticipated seasonal variation in groundwater levels.
- A discussion of utility trench backfill, including results of field density testing. If report is prepared prior to completion of utility trench backfill, it will be necessary to submit field density test results and a statement by the geotechnical engineer that utility trench backfill has been placed in general accordance with the Standard Construction Specifications of the City of Pueblo. Additionally, the geotechnical engineer shall provide a statement confirming the conditions observed subsequent to utility trench backfill placement do not change the pavement design recommendations. This report can be included in the pavement design report or submitted separately to the City for review prior to construction of the pavement section.
- A discussion of potential subgrade soil problems and recommended mitigation measures. Include mix design test results where chemical stabilization is required.
- Recommendations relative to preparation of subgrade prior to paving, including options for cold weather construction, chemical stabilization, and mitigation of unstable subgrade observed during proof-rolling operations.
- Pavement design calculations including computer printouts and nomographs showing all design coefficients. It should be noted, the City reserves the right to verify pavement calculations submitted through independent analyses.
- Statement by the geotechnical engineer that the pavement design is in conformance with the City of Pueblo Pavement Design Criteria.
- Engineer seal and signature

## 3.6 Special Considerations

### 3.6.1 Staged Construction

This is an alternative to the owner / developer to provide a minimum thickness of pavement during construction, and after repairs, construct the final lift of asphalt, providing for a new finished pavement surface. If the full pavement section is not to be placed immediately, a pavement design for staged construction may be required by the City. The staged construction design must include asphalt thickness for each proposed stage. Calculations, traffic values (EDLA), and construction truck traffic values supporting the staged design must also be submitted.

It should be noted that where staged construction is proposed, the reliability factor must be increased such that the overall reliability for the staged construction is equal to or greater than that shown in Table 3-1. If a two stage construction plan is proposed for a minor collector with a reliability factor of 85%, each stage would need to be designed for a reliability of 85% or 92%.

For staged construction, accommodations must be provided for the paved surface to drain with no water left standing on the pavement after a period of 24 hours.

Where staged constructions is proposed, the final stage of construction shall be performed at the end of the 2-year warranty period, after all warranty repairs have been made. Warranty period begins from the date of acceptance of improvements by the City. The contractor shall pave a minimum 1 inch overlay. Overlay thickness should generally be not less than 3 times the maximum aggregate size in the asphalt concrete mix.

The report shall instruct the Contractor to pave ½ inch less than the required pavement section at initial construction, leaving the finish asphalt ½ inch below the design crown elevation. After a period of 2 years from acceptance of improvements by the City, and after all warranty repairs have been made, the Contractor shall perform a tapered milling of the outside 4 feet of pavement along gutters prior to placing the minimum 1 inch overlay.

All manholes, valve boxes and monument boxes shall be set at grade for the interim paving surface. Manholes and valve boxes must be adjusted to final grade prior to placement of the final overlay.

The above shall be accomplished before the City accepts the streets.