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| Agency |
| Pavement Management Plan |
|  |

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| --- |
| Prepared by: [Author name]  Submitted to OCTA: [Date] |

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# Pavement Management Plan Certification

The City/County of Type Here certifies that it has a Pavement Management Plan in conformance with the criteria stated in the Orange County Transportation Authority Ordinance No. 3. This ordinance requires that a Pavement Management Plan be in place and maintained to qualify for allocation of revenues generated from renewed   
Measure M2.

The plan was developed by Type here\* using Type here, a pavement management system, confirming to American Society of Testing and Materials (ASTM) Standard D6433, and contains, at a minimum, the following elements:

* Inventory of MPAH and local routes reviewed and updated biennially. The last update of the inventory was completed on Month, Year for Arterial (MPAH) streets and Month, Year for local streets.
* Assessment of pavement condition for all routes in the system, updated biennially. The last field review of pavement condition was completed on Month, Year.
* Percentage of all sections of pavement needing:
  + Preventative Maintenance: Type here%
  + Rehabilitation: Type here%
  + Reconstruction: Type here%
* Budget needs for Preventative Maintenance, Rehabilitation, and/or Reconstruction of deficient sections of pavement for:
  + Current biennial period $Type here
  + Following biennial period $Type here
* Funds budgeted or available for Preventative Maintenance, Rehabilitation, and/or Reconstruction:
  + Current biennial period $Type here
  + Following biennial period $Type here
* Backlog by year of unfunded pavement rehabilitation, restoration, and reconstruction needs.
* The Pavement Management Plan is consistent with countywide pavement condition assessment standards as described in the OCTA Countywide Pavement Management Plan Guidelines adopted by the OCTA Board of Directors.

\*An electronic copy of the Pavement Management Plan (with Micro Paver or StreetSaver compatible files) has been, or will be, submitted with the certification statement.

A copy of this certification is being provided to the Orange County Transportation Authority.

**Submitted by:**

|  |  |  |
| --- | --- | --- |
| Click here to enter text. |  | Click here to enter text. |
| Name (Print) |  | Jurisdiction |
|  |  |  |
|  |  | Click here to enter a date. |
| Signed |  | Date |
| Click here to enter text. |  |  |
| Title (Public Works Director and/or City Engineer) |  |  |

# Executive Summary

Click here to enter text.

# Background (Optional)

Click here to enter text.

# Current Pavement Conditions (PCI)

|  |  |  |
| --- | --- | --- |
| **Current Network PCI** | **Current MPAH PCI** | **Current Local PCI** |
| Click here to enter | Click here to enter | Click here to enter |

# Projected Pavement Conditions (PCI)

Should be by projected PCI by year under existing or expected funding levels for next seven fiscal years (“Today” is before June 30, 2022).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fiscal Year** | **Current Funding** | **Entire Network PCI** | **MPAH** | **Local** |
| **Today** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |
| **2023-24** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |
| **2024-25** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |
| **2025-26** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |
| **2026-27** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |
| **2027-28** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |
| **2028-29** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |
| **2029-30** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |

# Alternative Funding Levels

## Maintain Existing Average Network PCI

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fiscal Year** | **Maintain Funding** | **Entire Network PCI** | **MPAH** | **Local** |
| **Today** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |
| **2023-24** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |
| **2024-25** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |
| **2025-26** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |
| **2026-27** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |
| **2027-28** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |
| **2028-29** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |
| **2029-30** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |

## Improve Average Network PCI

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fiscal Year** | **Current Funding** | **Entire Network PCI** | **MPAH** | **Local** |
| **Today** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |
| **2023-24** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |
| **2024-25** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |
| **2025-26** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |
| **2026-27** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |
| **2027-28** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |
| **2028-29** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |
| **2029-30** | Click here to enter | Click here to enter | Click here to enter | Click here to enter |

# Current and Projected Backlog by Year of Pavement Maintenance Needs

|  |  |  |  |
| --- | --- | --- | --- |
| **Fiscal Year** | **Current Funding Backlog** | **Maintain PCI Backlog** | **Increase PCI Backlog** |
| **Current** | Click here to enter | Click here to enter | Click here to enter |
| **2023-24** | Click here to enter | Click here to enter | Click here to enter |
| **2024-25** | Click here to enter | Click here to enter | Click here to enter |
| **2025-26** | Click here to enter | Click here to enter | Click here to enter |
| **2026-27** | Click here to enter | Click here to enter | Click here to enter |
| **2027-28** | Click here to enter | Click here to enter | Click here to enter |
| **2028-29** | Click here to enter | Click here to enter | Click here to enter |
| **2029-30** | Click here to enter | Click here to enter | Click here to enter |

# Centerline Mileage

|  |  |  |
| --- | --- | --- |
| **Entire Pavement Network** | **MPAH** | **Local Roads** |
| Click here to enter | Click here to enter | Click here to enter |

# Percentage of Network in Each of Five Condition Categories Based on Centerline Miles

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Condition Category** | **PCI Range** | **Network** | **Percent Area of Total Pavement** | **Area of Pavement (sf)** | **Percent Centerline Mileage of Network** | **Centerline Mileage of Network** |
| **Very Good** | **86-100** | *MPAH* | Click here to enter% | Click here to enter | Click here to enter% | Click here to enter |
| *Local* | Click here to enter% | Click here to enter | Click here to enter |
| **Good** | **75-85** | *MPAH* | Click here to enter% | Click here to enter | Click here to enter% | Click here to enter |
| *Local* | Click here to enter% | Click here to enter | Click here to enter |
| **Fair** | **60-74** | *MPAH* | Click here to enter% | Click here to enter | Click here to enter% | Click here to enter |
| *Local* | Click here to enter% | Click here to enter | Click here to enter |
| **Poor** | **41-59** | *MPAH* | Click here to enter% | Click here to enter | Click here to enter% | Click here to enter |
| *Local* | Click here to enter% | Click here to enter | Click here to enter |
| **Very Poor** | **0-40** | *MPAH* | Click here to enter% | Click here to enter | Click here to enter% | Click here to enter |
| *Local* | Click here to enter% | Click here to enter | Click here to enter |

# Reduction in Local Match

A local agency match reduction of 10% of the eligible cost for Project O submitted for consideration of funding through the Comprehensive Transportation Funding Programs (CTFP) call for projects is available if the local agency either:

1. Shows measurable improvement of paved road conditions during the previous reporting period defined as an overall weighted (by area) average system improvement of one Pavement Condition Index (PCI) point with no reduction in the overall weighted (by area) average PCI in the Master Plan of Arterial Highways (MPAH) or local street categories;

*or*

1. Have road pavement conditions during the previous reporting period, within the highest 20% of the scale for road pavement conditions in conformance with OCTA Ordinance No. 3, defined as a PCI of 75 or higher, otherwise defined as in “good condition”.

If applicable, please use the space below to justify the local agency’s eligibility for a reduction in Local Match based on the statement above.

Click here to enter text.

# Appendix A – Seven-Year Road Maintenance and Rehabilitation Plan Based on Current *or* Expected Funding Level and Maintenance of Current System PCIs

The seven-year plan for road maintenance and rehabilitation should be based on current and projected budget. Street sections selected for treatment should be identified here. Specific data to be submitted should follow the format below:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **MPAH** | | | | | | | | |
|  | **Limits of Work** | |  | | | | | |
| **Street Name** | **From** | **To** | **Length of Segment** | **Width of Segment** | **Pavement Area** | **Type of Treatment** | **Cost of Treatment** | **Year of Treatment** |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **LOCAL** | | | | | | | | |
|  | **Limits of Work** | |  | | | | | |
| **Street Name** | **From** | **To** | **Length of Segment** | **Width of Segment** | **Pavement Area** | **Type of Treatment** | **Cost of Treatment** | **Year of Treatment** |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |

Please attach the seven-year road maintenance and rehabilitation plan, following the above template, after this sheet. The plan should be labeled Appendix A.

# Appendix B – Complete Listing of Current Street Conditions

A complete listing of current pavement conditions should be included in this report. Specific data to be submitted should follow the format below:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **MPAH** | | | | | | |
| **Street Name** | **From** | **To** | **Width of Segment** | **Area** | **Current PCI** | **Most Recent Inspection Date** |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **LOCAL** | | | | | | |
| **Street Name** | **From** | **To** | **Width of Segment** | **Area** | **Current PCI** | **Most Recent Inspection Date** |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

Please attach the complete street listing, following the above template, after this sheet. The pages should be labeled Appendix B.

# Appendix C – GIS Digital Data

## Introduction

The OCTA GIS Section maintains a spatial inventory of transportation infrastructure which mostly consists of major arterial streets, roads, and highways. A key component of road information is pavement condition. Maintaining an inventory of pavement condition will enhance OCTA’s GIS visualization and analysis capabilities and assist in understanding the transportation investment needs throughout the region. Therefore, a GIS dataset in digital format should be included in this report.

If the agency is unable to provide pavement data in the requested GIS format, a request for exception must be submitted by the agency. When requesting an exception, the agency must provide a letter signed by the Public Works Director with an explanation and a timeline of when the agency will have capabilities of providing pavement data in the required GIS digital format.

## Structure of GIS Data

The GIS dataset must consist of linear geographic features that represent road/street segments. All segments that are part of the report should be included in the GIS dataset. The attribute information of each segment should generally follow the format of the Complete Listing of Current Street Conditions in Appendix B above.

The GIS data requirements are discussed below. Most commercial and open-source GIS software provide industry-standard tools to manage GIS data to meet these requirements.

**GIS Digital Data Format**

The GIS data must be submitted in either one of the following formats:

* Esri Shapefile, or
* Esri File Geodatabase

**Metadata**

The GIS data are required to have associated metadata. The minimum metadata items required are:

* Title of Dataset
* Tags (A set of words that can be used by GIS to search for the resource. For example: “pavement”, “transportation”, “roads”)
* Summary (A brief purpose statement of the dataset)
* Description (A brief narrative of the dataset’s content)
* Credits (A recognition of those who created or contributed to the resource)

**Spatial Geometry Type**

The spatial geometry of the segment features must be lines that represent the roadway centerline as accurately as possible.

**Projection**

The GIS data must have spatial reference information and have its coordinate system identified and embedded in or associated with the data file(s). All GIS data submitted to OCTA should be in the following projected coordinate system:

* NAD 1983 State Plane California VI FIPS 0406 (US Feet) - More information about this system can be found at: <https://spatialreference.org/ref/epsg/nad83-california-zone-6-ftus/>

**GIS Feature Attributes**

The required segment attributes are:

* Street name
* Unique segment identifier (Segment ID from original source if available)
* Name of intersecting road at the beginning of a segment
* Name of intersecting road at the end of the segment
* Current pavement condition index (PCI)
* Current PCI inspection date
* Length of road segment in feet
* Width of road segment in feet
* Paved area of road segment in square feet or square yards
* Projected PCI at end of Seven-Year Road Maintenance and Rehabilitation Plan

Additional attributes such as number of through travel lanes, direction of travel and pavement surface type may be provided. An example of a GIS attribute table for road segments is shown below (Note that there are additional attributes such as surface, functional class, and number of travel lanes).

Graphical user interface

Description automatically generated with medium confidence

# Appendix D – Quality Assurance/Quality Control Plan

## Introduction

When performing data collection in any field, the need for quality control is paramount as it is essential for accurate planning, analysis and design. This is particularly true for collecting pavement distress data for a pavement management system.

The Quality Assurance/Quality Control (QA/QC) Plan establishes minimum quality standards for performance and procedures for updates of the pavement management system.

If applicable, utilize the space below to include information on the agency’s QA/QC policies:

Click here to enter text.

## Objectives

This document constitutes a formal QA/QC Plan for the City/County. It was prepared on Select date and last revised on Select date.

Specifically, it is intended for the Year Applicable Pavement Management Plan Update. The focus is on the collection of network-level pavement distress data (defined by National Cooperative Highway Research Program (NCHRP) Synthesis 401 Quality Management of Pavement Data Collection, as “Network-level data collection involves collection of large quantities of pavement condition data, which is often converted to individual condition indices or aggregated into composite condition indices.”)

This document also addresses the QA/QC plan requirements of the Orange County Transportation Authority (OCTA)’s “Countywide Pavement Management Plan Guidelines” (section 2.4), adopted in May 2010.

## Structure of QA/QC Plan

The following components are addressed in this QA/QC Plan:

* Condition survey procedures used
* Accuracy required for data collection
* Inspector qualifications and experience
* Safety

## Condition Survey Procedures

The governing document in performing condition surveys for the Enter agency nameis ASTM D6433 “Standard Practice for Roads and Parking Lots Pavement Condition Index (PCI) Surveys.” Both asphalt concrete (AC) and Portland cement concrete (PCC) pavements are included in this protocol. The following distresses are collected for each pavement type.

**Asphalt Concrete AC Pavements**

1. Alligator (fatigue) cracking
2. Bleeding
3. Block cracking
4. Bumps and sags
5. Corrugation
6. Depression
7. Edge cracking
8. Joint reflection cracking
9. Lane/Shoulder drop off
10. Longitudinal & Transverse cracking
11. Patching and utility cut patching
12. Polished aggregate
13. Potholes
14. Railroad crossing
15. Rutting
16. Shoving
17. Slippage cracking
18. Swell
19. Weathering
20. Raveling

**Portland Cement Concrete (Jointed)**

1. Blowup/buckling
2. Corner breaks
3. Divided slab
4. Durability (“D”) cracking
5. Faulting
6. Joint seal damage
7. Lane/shoulder drop off
8. Linear cracking
9. Patching (large) and utility cuts
10. Patching (small)
11. Polished aggregate
12. Popouts
13. Pumping
14. Punchout
15. Railroad crossing
16. Scaling, map cracking and crazing
17. Shrinkage cracks
18. Spalling (corner)
19. Spalling (joint)

Any exceptions to the above procedures are discussed before any surveys are performed. They are documented in the paragraphs below.

*[Note to agency: these are usually related to distresses or situations that are not covered in the manuals. Examples include roller check marks or edge cracking on streets with no curbs and gutters. Others include the raveling of surface seals or the use of open-graded asphalt concrete mixes where the surface appears to have large voids present. Any modifications must be documented and included in this document. Photos are extremely helpful.]*

All surveys are performed as Indicate type of surveys – walking, windshield, semi-automated etc. surveys, and a minimum 10% sampling rate is utilized. Field crews are typically composed of Click here to enter field crew information *(Typically a one-person crew on residential streets and some collectors, and up to two-person crews for major arterials, depending on traffic volumes and speeds. Edit as appropriate)*. The safety of field personnel is paramount in all instances.

The sample unit selected must be representative of the entire pavement section. This assumes that the section is homogenous; if it is not homogeneous, then the section must be split according to the criteria agreed upon by the agency. Typically, the criteria used are:

* Pavement condition
* Construction age, if known
* Maintenance history, if known
* Traffic volumes (or functional classification as a surrogate)
* Surface types (e.g. asphalt concrete or Portland cement concrete)
* Geometric elements (e.g. widths)

Any modifications to the section inventory data are documented in the pavement management report.

A sample unit must be between 2,500 ± 1,000 square feet in conformance with ASTM D6433 protocols. Typical sample unit dimensions are 100 feet long by the width of the street. Streets that are wider than 40 feet wide will have shorter lengths (generally 50 feet) or if they are divided by a raised median, separate sample units will be taken in each direction.

Any pavement areas that are not representative of the section will be noted and surveyed as an additional sample unit.

## Accuracy Required for Data Collection

The accuracy required for data collection has two components, both of which are further described in the following paragraphs.

* Re-inspections
* PCI comparisons with past surveys

## Random and Systematic Re-Inspections

**Random Re-inspections**

Random re-inspections will include a representative selection across the following categories:

* + Functional classes (i.e. MPAH, locals);
  + Surface types (e.g. asphalt concrete or Portland cement concrete);
  + Pavement conditions (e.g. good, fair, poor);
  + Inspectors;
  + Geographical areas, if applicable.

**Systematic Re-inspections**

For systematic re-inspections, this could be due to noticed trends such as specific treatment types (e.g. open-graded mixes), a specific inspector or geographical area. In such cases, more than 5% will be re-inspected.

**Acceptability Criteria**

At the time of re-inspection, the actual distresses will be re-inspected and verified, and any corrections made, if necessary. Distress types and severities must be the same and re-measured quantities within ±10% of the original measured quantity.

If corrections are required on more than 10% of the re-inspected sample unit, then an additional 5% will be re-inspected. This will continue until more than 95% of the re-inspected sections meet the acceptability criteria.

## PCI Comparison with Past Surveys

As another level of quality control, the new PCIs are compared with the previous PCIs. If they differ by more than ±10 PCI points, these sections are automatically flagged for further investigation.

**If PCI Increases 10 points**

The section is investigated to see if a maintenance and rehabilitation event has occurred since the last survey, but has not been recorded. Typically, it may include activities such as:

* + Crack sealing activities – changes medium or high severity cracking to low severity
  + Patching activities – alligator cracking that has been removed and patched, so that the resultant PCI is increased.
  + Surface seals
  + Overlay
  + Others

Therefore, an up to date maintenance and rehabilitation history file in the pavement management database is desirable, both for historical accuracy as well as to provide additional quality control.

**If PCI decreases 10 points**

The section is checked to see if the average deterioration rate (usually 3 to 4 points per year) is exceeded. If the drop in PCI is within range of what is acceptable, no further action is required. If the drop is more than the acceptable range, a re-inspection will be performed. The default performance curves in the pavement management software form the basis for what is acceptable.

## Inspector’s Qualifications and Experience

The Enter agency here inspectors have attended formal training on pavement condition distress surveys. This training was conducted prior to performing any work using the ASTM D6433 protocols, consistent with OCTA’s requirements.

|  |  |  |
| --- | --- | --- |
| **Inspector Name** | **Date of ASTM D6433 Training** | **Training Conducted By:** |
| Click here to enter | Click here to enter | Click here to enter |
| Click here to enter | Click here to enter | Click here to enter |
| Click here to enter | Click here to enter | Click here to enter |
| Click here to enter | Click here to enter | Click here to enter |

Resumes of the technicians utilized on this project are included as an attachment.

## Safety Procedures

The Enter agency here administers a health and safety program in compliance with the Cal Occupational Safety and Health Administration (OSHA) Title VIII, Section 3203. The program is documented in Enter document name here.

Generally, the safety procedures include (Edit as applicable to agency):

* Inspectors to wear Class 2 or 3 safety vest at all times;
* Flashing beacon on all vehicles utilized for surveys; and
* Stopped vehicles to be parked at locations away from moving traffic (e.g. nearby parking, shoulders, etc.).
* Enter safety protocol here

On streets where there is a high volume of traffic or high speeds, additional measures may be necessary, such as:

* Surveys to occur during off-peak periods or on weekends;
* Additional inspector to watch out for traffic; and
* Traffic flaggers in extreme cases.

**Attachment** – Appendix C: Resumes of Field Inspectors

---End of QA/QC Plan---

# Appendix E – Pavement Management Data Files

The Pavement Management data files shall be submitted to OCTA in spreadsheet format. This must include the following information:

* Street name and limits for all public streets
* Street identifiers (Branch ID, Section ID)
* Direction (if applicable)
* Beginning and ending of each section
* Length, widths, and true areas
* Functional Classification (MPAH, Local)
* Number of travel lanes
* PCI and date of inspection
* Type of recommended treatment
* Cost of recommended treatment
* Street geometry as linear features

The Pavement Management data files are attached here on a CD/flash drive, or included as Appendix D

# Appendix F – GIS Maps – Current Conditions (Optional)

If included, attach and label Appendix E.