INTERNATIONAL ROAD DYNAMICS INC.

LTPP SPS PHASE II

WEIGH-IN-MOTION SITE ACCEPTABILITY ASSESSMENT REPORT

ARIZONA SPS-1
LTPP ID 040100
JULY 29, 2005
CLIN 1001 TASK ORDER 3

CONTRACT NO. DTFH61-05-D-00001

U.S. Department of Transportation
Federal Highway Administration

LONG TERM Pavement PERFORMANCE

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1.0 EXECUTIVE SUMMARY

The Arizona SPS-1 site was visited on July 22nd, 2005, by the CLIN 1 team and a Weigh-in-Motion (WIM) site acceptability assessment was performed. This site is located approximately 19 miles North of Kingman on US-93 in Mojave County. This assessment resulted in the selection and evaluation of a WIM site for the Northbound outside lane at Mile Post 52.5. The selected scale location is within SPS test section 040160 at 444 feet from the start of the section. This is 108 feet in advance of the existing PAT bending plates which are installed in all four lanes. Based upon the CLIN 1 team's site evaluation and discussions with the State, it is recommended that a new WIM site utilizing Bending Plate technology be installed. Installing the scales at the selected location precludes the need for the State to install a new PCC WIM slab at another location.

The selected WIM site is located on a tangent section of the roadway and the grade is relatively flat (<0.5%). Vehicles track smoothly through this area at speeds between 60 and 70 MPH. Traffic flow is light on this four lane highway.

The existing roadway pavement at the SPS-1 location is asphalt concrete (AC) at various thicknesses. Within these AC test sections, the State constructed (1993) an 854 foot Portland Cement Concrete (PCC) slab to accommodate both the 040160 PCC test section and a PAT bending plate WIM system. It is proposed to utilize a portion of this existing PCC slab in advance of the existing scales as the 400 foot "WIM Pavement" in which new bending plates can be installed following some minor repair work and blanket grinding.

Power service should be available from existing overhead lines crossing the roadway 100 feet North of the proposed WIM cabinet location. Telephone service should be available from a service point located adjacent to the existing WIM controller cabinet. The State will need to access these available sources and provide power and phone service points within 25 feet of the proposed new cabinet location.

Based upon the CLIN 1 team's on-site observations, it is recommended that the State perform joint sealant repairs throughout the PCC slab as well as at the AC/PCC transverse cold joints at each end of the slab. Additionally, based upon the team's on-site observations and review of the Phase I contractor's analysis of profiler data, it is recommended that the PCC slab be blanket ground from 325 feet upstream to 75 feet downstream of the new scale location prior to the installation of the new WIM system. The smoothness of the existing PCC WIM slab is questionable and as a result WIM accuracy may or may not be met. Upon completion of these corrective actions, a follow-up evaluation of the pavement should be made. Such evaluation should include visual observation of the PCC WIM slab's structural stability and visual observation of trucks passing through the site. In addition to these visual observations, an analysis of new profile data should be made by the team. Upon confirmation that corrective actions have brought the pavement up to acceptable condition in terms of structural

soundness and smoothness such that the pavement is adequate for the WIM system to meet accuracy requirements, this site can be instrumented with WIM.

2.0 EXISTING ROADWAY

2.1 PAVEMENT AND GEOMETRICS

The SPS-1 is a flexible pavement study. The existing asphalt concrete (AC) roadway at the study location consists of four lanes, two lanes in each direction (Northbound and Southbound). The SPS-1 test sections and the WIM site evaluated by the CLIN 1 team are in the Northbound outside lane. The AC pavement through the SPS test sections varies in thickness. The shoulders are also AC. The eastbound lane is striped for a 14 foot width with an 8 foot wide outside AC shoulder. The horizontal alignment is tangent with minimal grade (less than 0.5%). In regard to cross slope, the two adjacent Northbound lanes slope +/- 2% toward the outside shoulder.

2.2 EXISTING PCC SLAB

Within the AC roadway, the State installed (1993) 854 foot non-reinforced jointed PCC slabs for both Northbound lanes as well as both shoulders to accommodate the installation of both the PCC test section 040160 in the outside lane and staggered PAT bending plates in both lanes. The slab thickness is 10 inches and the transverse weakened plane joints are perpendicular with a spacing pattern of 15'-17-'15'-13'. These joints are doweled. The centerline of the existing bending plates is 652 feet downstream from the beginning of the PCC slab.

2.3 OBSERVED TRAFFIC OPERATING CHARACTERISTICS

The light traffic flow exhibited good lane discipline, staying well within the lane and shoulder line markings. Very few heavy commercial vehicles passed through the site during the time of the assessment. This portion of US-93 is not currently being utilized as a "long haul" route due to the prohibition of commercial vehicles from the roadways near Hoover Dam.

Traffic is free flowing at all times at speeds between 60 and 70 MPH (posted speed limit is 65 MPH for all traffic). There are no signals or merging in the WIM site vicinity. There is at grade access to and from County Road 125 (to the community of Chloride), including a median paved crossover, approximately 1100 feet upstream of the WIM site. However, mainline traffic is so light any CR 125 traffic movements have no effect on traffic flow. Trucks are "cruising" through the site at constant speeds. In that there are no on/off locations between the WIM site and the SPS site, the truck traffic composition at the WIM site is the same as that at the SPS test site.

3.0 SITE CONFORMANCE TO EVALUATION CRITERIA

3.1 PAVEMENT TYPE AND CONDITION- REQUIRES ATTENTION

The existing AC pavement in advance of the 854 foot PCC slab appears to be in stable condition, although there is much longitudinal and transverse cracking evident. Although extensive hairline surface cracking was noted throughout the existing PCC slab, the slab appears to be in good condition. A couple transverse random cracks across the lane were also noted, but the pavement at these locations appear to be stable. Although some spalling of the transverse weakened plane joints was noted, such spalling should not pose a structural problem. However, several of these joints need cleaning and resealing. The AC/PCC cold joints at each end of the PCC slab also need cleaning and sealing.

3.2 OBSERVED PAVEMENT SMOOTHNESS- REQUIRES ATTENTION

The smoothness of the 400 foot portion of the existing PCC slab designated as the “WIM Pavement” (325 feet upstream to 75 feet downstream of the selected scale location) needs to be improved to facilitate the new WIM system’s meeting accuracy requirements and should be blanket ground. Although in theory any vehicle body motion effected by the large “dip” in the AC pavement’s profile immediately preceding the PCC slab’s leading edge (+/-540 feet in advance of the proposed new scale location) should dampen out before vehicles reach the scales, it is strongly recommended that this dip in the profile be corrected. It is further recommended that any pavement patching or replacement be followed by pavement grinding, including the AC/PCC transverse cold joints in conjunction with the grinding of the “WIM Pavement” section of pavement. Following pavement grinding, a reassessment of both the pavement’s structural stability and smoothness should be made.

3.3 ANALYSIS OF PAVEMENT PROFILE DATA- REQUIRES ATTENTION

Profile data was collected by the RSC on 2/11/ 2004 and a profile data analysis was performed by the Phase I contractor (Phase I Contractor Assessment Report 3/15/2004). The results of this analysis indicate that the smoothness of this pavement does not ensure that WIM accuracies meeting SPS accuracies are achievable and supports the above noted recommendation that the 400 foot “WIM Pavement” portion of the PCC slab be blanket ground prior to installation of the new WIM scales.

3.4 ROADWAY GEOMETRICS- PASS

The WIM site is located within a long tangent section of the roadway, grade is minimal, and the lane in which the sensors are to be installed is greater than 12 feet wide. The pavement cross slope is adequate for proper roadway drainage.

3.5 TRAFFIC OPERATING CHARACTERISTICS- PASS

The general traffic pattern is free flowing with good lane discipline. There are no interchanges or signals affecting traffic flow. The truck traffic is cruising through the site and staying within the lane lines.

3.6 TRUCK TRAFFIC COMPARISON BETWEEN WIM AND TEST SITE- PASS

There are no major exit/entrance locations between the WIM site and the SPS-1 pavement test sections that would alter the truck traffic composition between the WIM site and the test sites.

3.7 POTENTIAL WIM INTERFERENCE SOURCES- PASS

Overhead power lines cross the roadway 100 feet North of the proposed WIM system location. These are the standard “service” lines and will not interfere with system performance.

3.8 ACCESS TO POWER AND PHONE SERVICES- PASS

Both power and phone appear to be readily accessible The State will need to provide service points within 25 feet of the proposed WIM cabinet location.

3.9 EQUIPMENT INSTALLATION CAPABILITY- PASS

There is an adequate location for the WIM controller cabinet at the site adjacent to the highway right-of-way fence. This location would provide over 65 feet clearance from the roadway. There is good visibility from the cabinet location of the sensors and approaching vehicles. There is adequate room adjacent to the cabinet location for service facilities. Roadway drainage is very good. The existence of culverts and topography of the site area indicate a potential for ponding or movement of water adjacent to the base of the roadway embankment. The selected location for the cabinet is on higher ground and any chance of ponding water at the cabinet would appear to be minimal. There is adequate topography for scale pit drainage. The width and structural stability of the adjacent lane and its shoulder allow a lane closure and traffic shift which will provide safe clearance in the work zone from live traffic during installation of the WIM system.

3.10 POTENTIAL TRAFFIC CONTROL / WORK ZONE SAFETY ISSUES- PASS

The traffic control should go smoothly, given the good approaching sight distance, the lack of nearby intersections or interchanges, and the ability to move traffic’s left wheels onto the adjacent lane’s median shoulder. No other work zone safety issues are foreseen at this rural site.

3.11 TRUCK CIRCUIT – PASS

The nearest usable Northbound truck turnaround is a median crossover which is located 1.2 miles downstream of the WIM site.

The nearest useable Southbound truck turnaround is a median crossover which is located 1.9 miles upstream of the WIM site.

The test truck round trip circuit route is 6.2 miles. There are no foreseen potential restrictions. Both of the turnaround locations are well signed and easily maneuvered due to the median crossovers' having left turn pockets off of the traveled way. The estimated lap time is 15 minutes.

Figure 1: Truck Circuit Map

3.12 RECOMMENDATIONS ON SITE ACCEPTANCE / CORRECTIVE ACTIONS

The State will need to extend existing power and phone services to service points within 25 feet of the proposed WIM cabinet location.

The existing 854 foot PCC slab appears to be in fair condition and a portion of this slab can be utilized for the 400 foot "WIM Pavement" in-lieu of the State's installing another 400 foot PCC WIM slab at another location. By locating the new scales 108 feet in advance of the existing bending plates, the new plates will still have 544 feet of structurally sound PCC pavement in advance of the scales and the blanket grinding of the 400 foot "WIM Pavement" section will end just in advance of the old WIM system's lead loop.

Based upon both on-site visual observations and an analysis of pavement profiling data, there is indication that the lack of adequate surface smoothness of the existing PCC slab may cause suspension dynamics in the trucks traversing the site sufficiently large enough to cause inaccurate weight estimate measurements by the WIM system. Due to this, corrective action to the smoothness of the 400 foot "WIM Pavement" portion of the existing PCC slab prior to the installation of the WIM system's scales should be performed. Such corrective action should be a blanket grinding of the PCC slab from 325 feet in advance of to 75 feet following the new scale location. Additionally, the PCC slab's transverse joints should be cleaned and resealed.

These recommended pavement corrective actions, properly carried out, should satisfy FHWA's recommendation and preference that the WIM system's scales be installed in PCC pavement with such pavement being structurally sound and smooth 325 ft. prior to and 75 ft. following the scales.

Notwithstanding FHWA's recommendation and preference, it is also highly recommended that the AC pavement profile problem immediately preceding the PCC slab's transverse PCC/AC cold joint in advance of the WIM scales be corrected and that following pavement rehabilitation the PCC/AC cold joint be ground smooth.

4.0 TRAFFIC DATA REVIEW

Vehicle distributions of all trucks (FHWA Class 4 and higher) : 5.8%

Vehicle distributions for heavy trucks (FHWA Class 6 and higher) : 2.2%

Volume of trucks comprising of 10 % or more of truck population

Class 5 vehicles : 57.8%
Class 9 vehicles : 17.7%

Volume of heavy trucks comprising 10 % or more of heavy truck population

Class 6 vehicles : 10.5%
Class 8 vehicles : 21.8%
Class 9 vehicles : 46.3%
Class 13 vehicles : 12.6% **(**Does not conform to on-site observations)

The 2004 NB traffic data indicates the AADT to be 4271

The above distributions and volumes have been compiled from WIM traffic data provided by the Arizona Department of Transportation.

5.0 PAVEMENT EVALUATION

In determining WIM site acceptability, visual on-site observation of both the existing AC pavement and the 854 foot PCC slab was made by the CLIN 1 Team. Additionally, the analysis of the then current profile data performed by the Phase I contractor (Phase I Contractor Assessment Report, 3/15/2004) was reviewed.

5.1 SURFACE CONDITION

The site evaluation concentrated efforts on the range of pavement from 900 feet prior to and 100 feet following the proposed WIM scale location. Pictures were taken to document the surface condition, several of which are presented in Appendix E.

5.1.1 PCC PAVEMENT 325 FEET IN ADVANCE OF AND 75 FEET FOLLOWING THE PROPOSED WIM SCALE LOCATION (" WIM PAVEMENT")

In 1993 the State constructed 854 foot PCC slabs in both Northbound lanes. The initial portion of this slab in the outside lane was utilized for the SPS 040160 test section and the latter portion of the slab in both lanes was utilized for the installation of staggered PAT bending plates. All four of the bending plates (both lanes) are still intact, although it is noted that there is cracking of the pavement immediately adjacent to each side of each trench formed by pavement demolition for the conduits across the lanes and shoulders utilized for the in pavement sensors' leads and bending plate pit drainage (epoxy backfilled). However, this cracking does not appear to be unstable and is well beyond the end of the "WIM Pavement" section.

The "WIM Pavement" portion of this slab was determined by marking a point immediately in advance of the existing WIM system's lead loop as the end of the blanket grind to be performed and backing the new WIM system in from that point. This resulted in having 544 feet of structurally sound PCC pavement in advance of the new scale location, 325 feet of which is included in the "WIM Pavement" section. There is random hairline surface cracking throughout the 400 foot "WIM Pavement" section which would not appear to be cause for concern. There is a random transverse crack going across the lane 103 feet in advance of the new scale location but the pavement at this point appears to be stable. There is another random transverse crack across the lane right at the end of the "WIM Pavement" section (75 feet past the new scale location) but the pavement at this point also appears to be stable. These cracks may look uglier in cold weather if they open up a bit (it was well over 100° F during the assessment), but do not appear to be a cause for concern.

The entire PCC slab, including the "WIM Pavement", has perpendicular transverse weakened plane joints with a spacing pattern of 15'-13'-15'-17'. Some

of these joints exhibit spalling, but not to a point of concern. Although these joints are sealed, several are in need of cleaning and sealant replacement.

5.1.2 AC PAVEMENT UPSTREAM AND DOWNSTREAM OF "WIM PAVEMENT" SECTION

The upstream pavement included in the surface evaluation included 65 feet of AC pavement and 365 feet of PCC pavement. The AC portion has quite a bit of both transverse and longitudinal cracking in the wearing course but the pavement appears to be structurally stable. The upstream AC/PCC cold joint appears to be structurally stable but needs some sealant work. The upstream PCC pavement, like the "WIM Pavement" section, has random hairline surface cracking throughout the section which would not appear to be cause for concern. The transverse joints have some spalling and need sealant replacement.

The 25 foot PCC downstream pavement is also similar to the upstream and "WIM pavement" sections and, as previously noted, contains a random transverse crack crossing the lane at the start of the section.

5.1.3 SHOULDER CONDITION

The shoulder adjacent to the PCC slab is also constructed of PCC and the shoulder adjacent to the approaching AC pavement is dense grade AC. The PCC shoulder is in good condition, showing no distress conditions of any consequence. However the joints could use a cleaning and resealing. The AC shoulder pavement, like the mainline pavement, displays cracking but appears stable.

5.2 SURFACE PROFILE

Spot grinding of the existing 854 foot PCC slab has been performed over the first 485 feet of the slab and blanket grinding has been performed from the 485 foot point to +/- 100 feet beyond the existing WIM scales. Observations of trucks and other vehicle types approaching and passing through the selected new WIM scale location (535 feet from the start of the slab) indicated some body motion through the portion of pavement from 170 feet to 90 feet in advance of the new scale location. This portion of pavement is within the area of spot grinding and it would appear, based upon the grinding marks on the pavement, that a full blanket grind would eliminate the minor pavement profile "holes" effecting the noted body motion in crossing vehicles. Major body motion was observed in the AC pavement immediately in advance of the start of the PCC slab. Although this "long wavelength" profile problem is +/- 540 feet in advance of the planned scale location and, in theory, should not be detrimental to WIM scale accuracy, it is somewhat of a concern for the CLIN 1 team. Several automobile "drive throughs" by the CLIN 1 team members appeared to confirm the above noted observations. Some vehicle body motion could be felt as well as some suspension "chatter". The most recent Profile data was collected by the RSC on 2/11/2004. Based upon the profile evaluation performed by the Phase I contractor, (Assessment

Report 3/15/2004), the Arizona SPS-1 WIM site pavement smoothness does not ensure that WIM accuracies meeting SPS accuracies are achievable. More current profile data or evaluation is not required until such time that corrective action is taken to smooth out the 400 foot "WIM Pavement" portion of the existing PCC slab. This should be performed using a blanket grinder.

5.3 SUMMARY OF RESULTS

Based upon the on-site observations of the CLIN 1 team and the Phase 1 evaluation of the pavement profile data, it is recommended that the pavement profile smoothness of the 400 foot "WIM Pavement" portion of the existing 854 foot PCC slab be improved by blanket grinding. It is also recommended that the PCC slab's joints be inspected by the State and that cleaning and resealing be performed on those joints as deemed necessary. The CLIN 1 team would also feel much more "comfortable" with the WIM system installation if the State would smoothen out the profile of the AC pavement immediately in advance of the PCC pavement section.

Upon completion of these corrective actions, the site will need to be re-evaluated for both pavement structural integrity as well as smoothness. In addition to an on-site pavement assessment, new profiling data will need to be provided to our team for analysis. Once the on-site observations and the profile data analysis verify that the pavement can be deemed acceptable, this site can be instrumented with a new WIM system.

6.0 PROPOSED WIM SITE- INFORMATION

6.1 LOCATION – US-93, MP 52.5

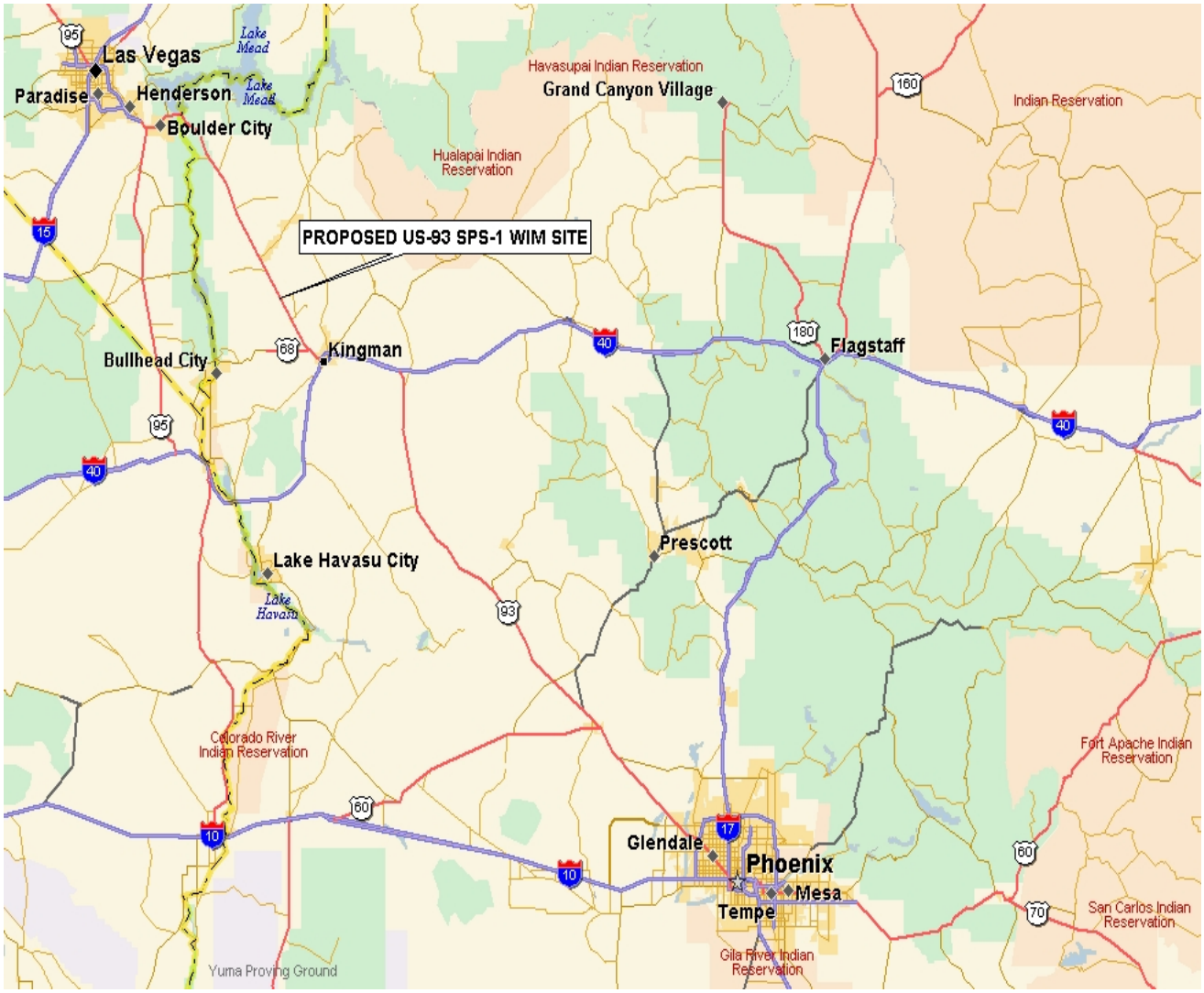


Figure 2: Map of the US-93 WIM Site

Figure 3: Map of the US-93 WIM Site at Milepost 52.5

The LTPP SPS-1 test sections are located approximately 19 miles North of Kingman near the community of Chloride in the Northbound outside lane of US-93.

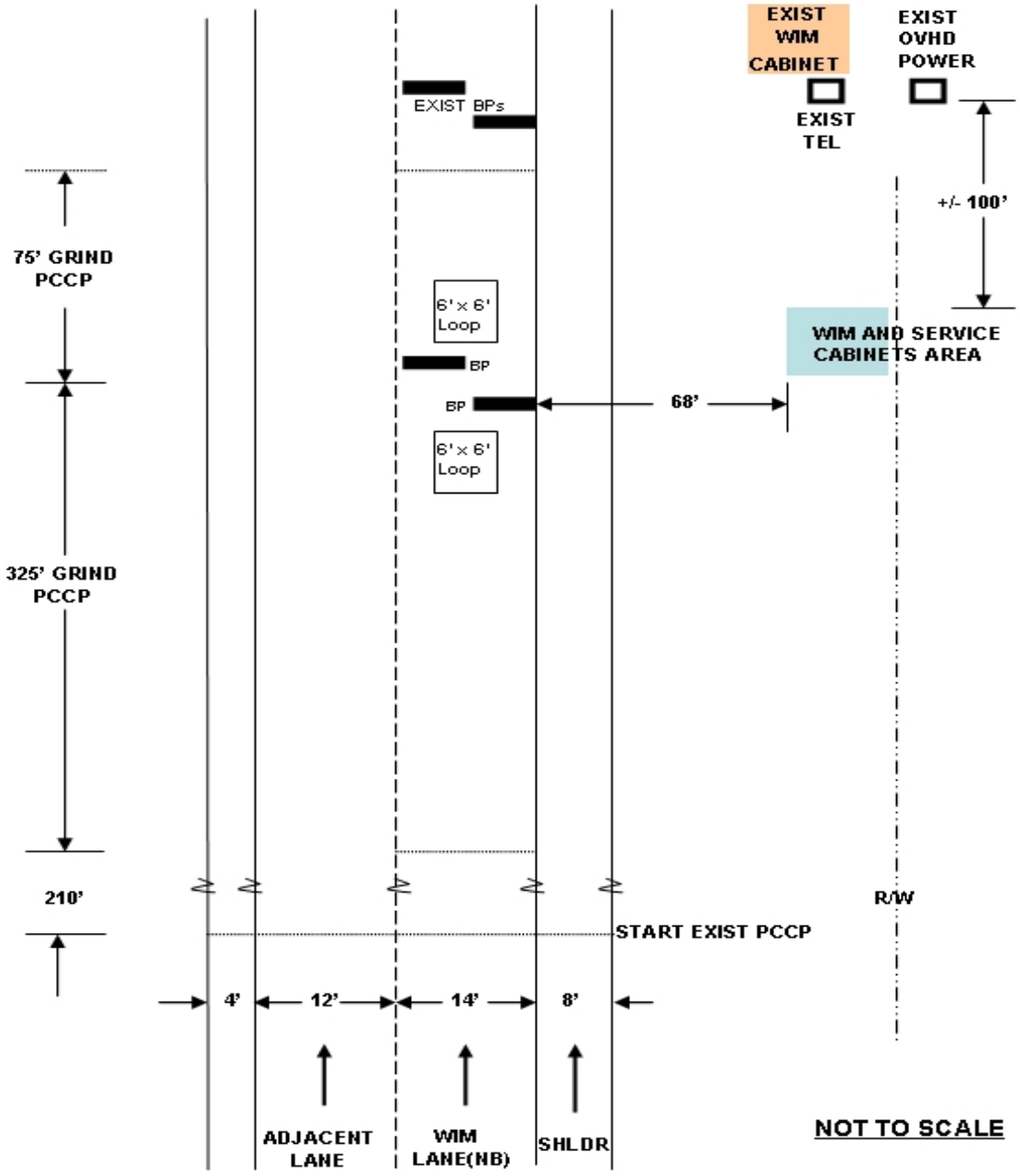
The location for the proposed WIM system installation is the Northbound outside lane at milepost 52.5, 108 feet upstream of the existing WIM scales. The system's controller cabinet will be located adjacent to the Right-of-Way fence at 68 feet off of the edge of traveled way..

7.0 RECOMMENDED WIM TECHNOLOGY

Based upon the site conditions and discussions with the State, the bending plate technology is recommended for use at this site. It will fit the accuracy expectations of the State and provide the best value in terms of performance with minimal down time.

The centerline of the bending plate weigh pads should be installed approximately 108 feet uptream of the centerline of the existing staggered bending plates. This location has been marked with a “WIM” in white paint on the outside shoulder. During the CLIN 2 design stage, the layout of the existing transverse weakened plane joints will be analyzed to best fit the in-road sensors among the joints to optimize constructability and structural stability.

7.1 RECOMMENDED LOCATION AND LAYOUT FOR THE WIM SYSTEM



Proposed WIM Scales Location

N35° 23.99' W114° 15.67'

Figure 4: Proposed WIM Site Layout

A.0 COORDINATION DETAILS

Task Order #3, which authorized the CLIN 1001 "Determine Acceptability of Proposed Site" for the Arizona SPS-1 Site (LTPP ID 040100), was issued on May 27, 2005.

Contacts were made with interested parties as follows:

- Contracting Officer's Technical Representative (COTR)
  - Debbie Walker – FHWA-LTPP ph: 202-493-3068
  - Initial contact made July 5, 2005
- State Highway Agency (SHA)
  - Estomih (Tom) Kombe – ADOT ph: 602-712-3135
  - Initial contact made July 5, 2005
- LTPP Regional Support Contractor (RSC)
  - Jason Puccinelli – RSC/Nichols ph: 775-329-4955
  - Initial contact made July 5, 2005
- FHWA Division Office
  - Alan Hansen – FHWA Div Rep ph: 602-379-3645 x108
  - Initial contact made July 5, 2005

The "Pre-Visit Handout Guide" was distributed on July 5, 2005, to the following individuals:

- Debbie Walker
- Estomih (Tom) Kombe
- Jason Puccinelli
- Alan Hansen

A briefing session was held on July 19, 2005, at 1:30 PM at the Arizona Transportation Research Center, 2739 East Washington Street, Phoenix, Arizona. Roy Czinku (IRD) and Estomih (Tom) Kombe (ADOT) were in attendance.

The site was visited on July 22, 2005, by Roy Czinku (IRD) and Rich Quinley (WIMTECH).

INTERNATIONAL ROAD DYNAMICS INC.

LTPP SPS PHASE II

WEIGH-IN-MOTION SITE ACCEPTABILITY PRE-VISIT HANDOUT GUIDE

ARIZONA SPS-1
LTPP ID 040100

Date: July 19, 2005

CONTRACT NO. DTFH61-05-D-00001

U.S. Department of Transportation
Federal Highway Administration

LONG TERM PAVEMENT PERFORMANCE

B.0 PRE-VISIT HANDOUT GUIDE

B.1 SCHEDULE

a. Briefing session
   i. Meeting is scheduled for 1:30 p.m. July 19, 2005 at the Arizona Transportation Research Center, 2739 East Washington Street, Phoenix, Arizona
b. Site visit
   i. July 22, 2005

B.2 BRIEFING SESSION JULY 19, 2005, POINTS OF CONTACT, PHONE NO

a. Contracting Officer's Technical Representative (COTR)
   i. Debbie Walker – FHWA-LTPP ph: 202-493-3068
b. State Highway Agency (SHA)
   i. Estomih (Tom) Kombe – SHA/ADOT ph: 602-712-3135
c. LTPP Regional Support Contractor (RSC)
   i. Jason Puccinelli – RSC/Nichols ph: 775-329-4955
d. FHWA Division Office
   i. Alan Hansen – FHWA Div Rep ph: 602-379-3645 x108

B.3 INFORMATION REQUESTS

a. From COTR
   i. FHWA Division contact person
   ii. New pavement profile from RSC if recent profile data unavailable
b. From RSC
   i. SHA contact person
   ii. SPS roadway section layouts (plan view and/or stationing or mileposts)
   iii. Recent pavement profile data (within the past year)
c. From SHA
   i. As-built info on roadway at proposed site
      1. Pavement cross section and structural section
      2. Alignment and grade
      3. Any utilities located in WIM install work area
   ii. Location and general availability of power and phone services, service providers, service provider contacts and phone numbers (may be beneficial if power and phone utility reps be requested to participate in briefing session and/or site visit)
   iii. Will SHA agree to extend power and phone services from existing available access points to demarcation points near planned controller cabinet location?
   iv. If existing roadway pavement is AC or inadequate PCC will SHA consider replacement with 400' PCC slab if recommended per site assessment?

v. What permits will be needed to install equipment and what are procedures and time frames for obtainment?
vi. Required cabinet clear zone from edge of traveled way?
vii. If no detour routing available at proposed site (or three or more adjacent lanes), will SHA permit shifting inside lane traffic partially onto inside shoulder to provide safe clearance during installation in outside lane?
viii. Historic truck traffic data?

B.4 SITE LOCATION INFORMATION

a. Proposed WIM site
   i. US-93 Mile Post 52.5 NB Outside Lane
b. Briefing session location
   i. Arizona Transportation Research Center, 2739 East Washington Street, Phoenix, Arizona 1:30 p.m. July 19, 2005
c. Nearest major airport
   i. MaCarran International Airport, Las Vegas, Nevada located 85 miles from site.

Distribution --- COTR, RSC, SHA, FHWA Division, Site Assessment Team

INTERNATIONAL ROAD DYNAMICS INC.

LTPP SPS PHASE II

WEIGH-IN-MOTION SITE ACCEPTABILITY

SITE VISIT EVALUATION FORM

ARIZONA SPS-1
LTPP ID 040100

Date of Site Visit: July 22, 2005

CONTRACT NO. DTFH61-05-D-00001

U.S. Department of Transportation
Federal Highway Administration

LONG TERM Pavement PERFORMANCE

C.0 SITE EVALUATION FORM

C.1 PROPOSED WIM LOCATION

Proposed WIM Site Location – 4 Lane Roadway (2 Lanes each Direction)

Route: US-93 Mile Post: 52.5 Direction: NB Lane: Outside

Proposed WIM Site is within SPS Test Section 040160 located 444 feet downstream of the start of SPS Test Section 040160. The Site is located in the County of Mojave.

C.1.1 EXISTING ROADWAY SURROUNDING THE PROPOSED WIM SITE

Type Pavement: PCC Pavement Age: 12 years old

Lane Width: 14 ft drive lane, 12 ft pass lane Thickness: 10 inches

Observed Structural Soundness: Good Observed Smoothness: Poor in spots

Outside NB Shoulder Type: PCC Width: 8 feet

Outside NB Shoulder Condition: Good

Inside NB Shoulder Type: PCC Width: 4 feet

Inside NB Shoulder Condition: Good

C.1.2 PAVEMENT 325' PRIOR AND 75' FOLLOWING PROPOSED WIM SCALE LOCATION

Type: PCC Structural Soundness: Good Smoothness: Fair

Thickness: 10 inches Jointed or Continuous: Jointed – dowelled

Notes/Comments on Pavement:

The State has installed an 854 foot PCC slab in 1993 to accommodate the WIM System. The slab is in fair condition. The proposed WIM location is marked as 544 feet from the leading edge of the PCC slab. The existing WIM is located 652 feet from the leading edge of the PCC slab. There is random hairline surface cracking which does not appear to be a cause for concern. One random transverse crack crosses both lanes approximately 103 feet in advance of the proposed WIM location. Although spot grinding and some blanket grinding of the PCCP had been performed in the past, the roadway is rough between 90 feet and 170 feet in advance of the proposed WIM location. A complete blanket grind of the PCC slab area 325 feet in advance and 75 feet trailing the proposed WIM location will be required. There is some minor spalling of the transverse joints and resealing/ maintenance

of these joints need to be performed. The AC/PCC joint leading and trailing the PCC slab is in rough condition and requires sealing and maintenance as well. Grinding should be performed at the leading edge of the slab to try and smooth out a dip located at this point. Transverse joints are cut in a 17'-15'-13'-15' pattern on perpendicular. Based on previous profiling the roadway does not currently meet required smoothness specifications.

C.1.3 ROADWAY GEOMETRICS

Horizontal Alignment Straightaway Grade Minimal Grade(0.5%)

Cross-slope Approximately 2.0% Lane width 14 ft drive lane, 12 ft pass lane

C.1.4 OBSERVED TRAFFIC OPERATING CHARACTERISTICS

Passing, merging, not following lane lines? Good Lane Discipline - occasional passing

Stop and go traffic, congestion periods? Free Flowing at all Times

Traffic signals or interchanges affecting traffic flow? No Signals or Merging

Other adverse traffic flow conditions? None, Traffic Flow is Light

Truck traffic at "cruising" speed and no lugging? No Lugging, Smooth Flow

Truck traffic staying within lane lines? Yes, Trucks Track within Lane Lines

Observed truck suspension or body motion dynamics? Yes, blanket grinding required

Truck traffic composition same at WIM site and SPS site? Yes

Truck traffic on/off locations between WIM site and SPS site? None

Posted Speed Limit: 65 MPH

Observed Truck Speeds: 60 – 70 MPH

Notes/Comments on Geometrics and/or Traffic Operating Characteristics:
The site is located on a long straightaway with no curves immediately before or after the WIM location. The grade is relatively flat throughout the area 900 feet upstream and 100 feet downstream of the site. Vehicles track smoothly through this area at speeds between 60 and 70 MPH (posted speed is 65 MPH). There is very good lane discipline at this site. Traffic flow is light on this four lane, (two each direction) roadway. There are currently very few trucks that run through this site due to Hoover Dam restrictions.

C.1.5 ACCESS TO UTILITY SERVICES

Potential source(s) for power: Power service poles cross highway approximately 100 feet downstream of the proposed WIM location.

Potential source(s) for telephone: An existing telephone service is located approximately 100 feet downstream of the proposed WIM location which appears to

service the existing WIM site.

C.1.6 EQUIPMENT INSTALLATION CAPABILITY

Adequate location for controller cabinet? Yes, Large area adjacent to right of way fence

Distance from edge of traveled way to cabinet? 68 feet off Roadway

Visibility from cabinet of sensors and approaching vehicles? Very good

Adequate location for service facilities? Yes, Large area adjacent to right of way

Adequate drainage for scale pits? Yes

Adequate roadway and overall site drainage? Yes

Potential for ponding or flooding at cabinet or pullboxes? Minimal

Potential for traffic control problems during installation? Minimal

Ability to provide safe clearance in work zone from live traffic via:

- ☑ OK from State Agency to use opposite shoulder for traffic shift
- ☐ Multiple Adjacent Lanes

Notes/Comments on Equipment Installation Capability:
The roadway traffic flow is light. We will have to work closely with the State to coordinate lane closures. There is 4 feet available on inside lane shoulder to accommodate a traffic shift.

C.1.7 POTENTIAL WIM SENSOR/EQUIPMENT INTERFERENCE SOURCES

Overhead power lines? 100 feet downstream of proposed WIM location. This will not pose a problem

Adjacent railroad? None

C.1.8 CONDITIONS FOR USE OF TEST TRUCKS FOR CALIBRATION AND EVALUATIONS

Direction NB - Nearest usable truck turnaround location:

Crossroad Distance from WIM: 1.2 Miles

Direction SB - Nearest usable truck turnaround location:

Crossroad Distance from WIM: 1.9 Miles

Circuit travel distance: 6.2 Miles Estimated lap time: 10 Minutes

Potential circuit route restrictions? None

Identification and location of trucking firm and certified static scales:

Name TA Kingman Contact Tim Curry

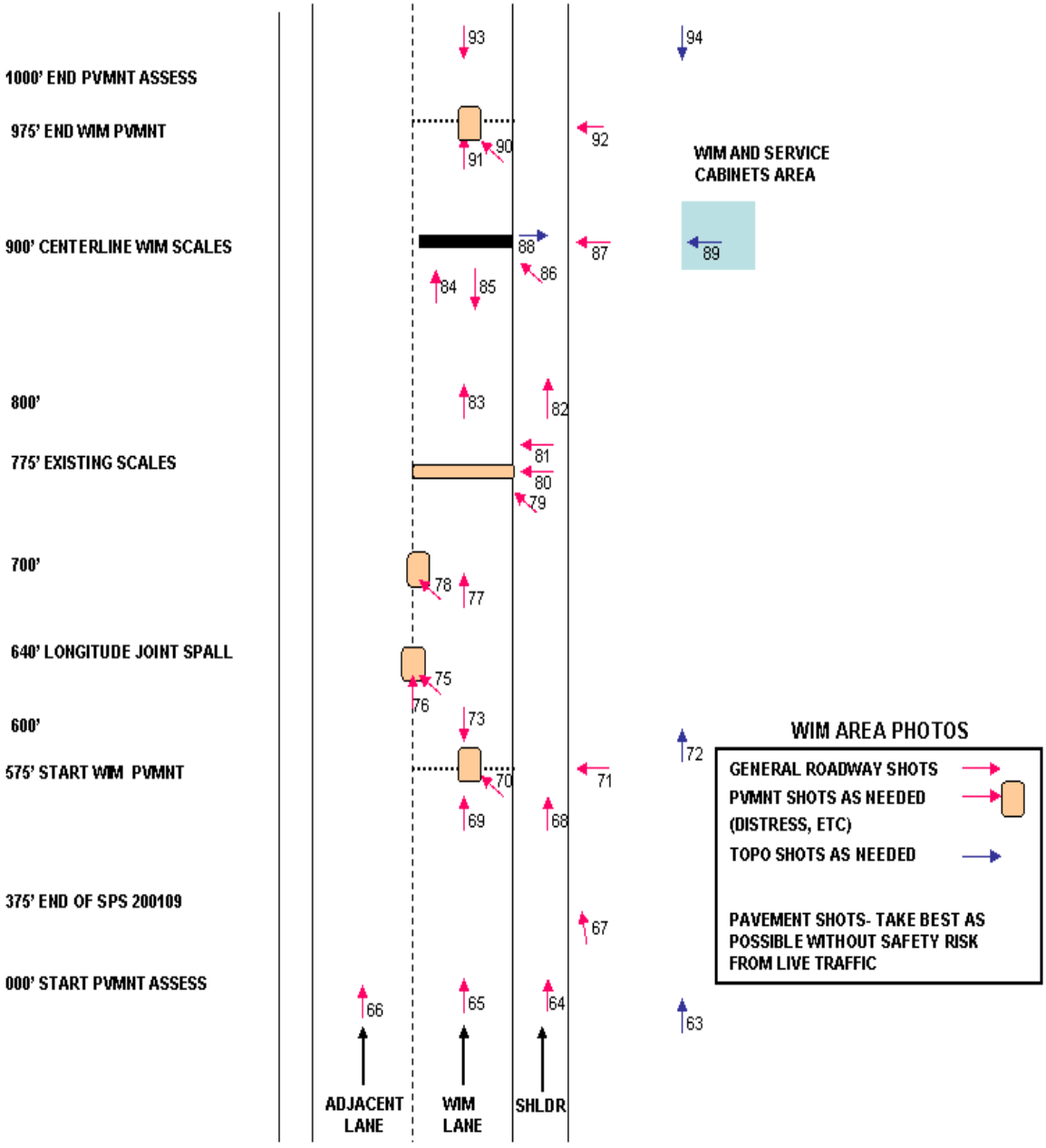
Address I-40 exit 48, Kingman, Arizona

Phone 928-753-7600 Hours 24 hours.

Notes/Comments on Test Truck Circuit and Static Weighing Facility

TA Kingman is located approximately 20 miles from the Proposed WIM Site. They can recommend hauling companies that have 3S2 Tractor Trailer Air Ride vehicles and drivers available given 2-3 weeks notice. They have a certified static scale located at their facility.

C.1.9 LOCATION LOG OF PHOTOS



C.2 EQUIPMENT AND MATERIALS

☑ Site Evaluation Forms
☑ Graph paper and note paper
☑ Clipboard
☑ Pens & pencils
☐ Small stapler
☑ Digital camera, with PC cable
☑ GPS receiver
☑ Notebook PC
☑ Calculator
☑ Cell phone
☑ Site Pre-visit Handout Guide
☑ Metal tape measure (25 ft.)
☑ Measuring wheel (ft.) and/or 100 ft. rag tape
☑ Folding rule (6 foot)
☑ Hand level
☑ Small torpedo level
☑ Keel markers
☑ Spray can white paint
☑ String Line
☑ Line Level
☑ Hammer and Concrete Nails
☐ _____

Request furnish on-site by Highway Agency:
☐ Spray can white paint
☐ Lath, 4 ft.
☐ Hammer
☐ Misc. small tools
☑ Keys for known Agency service cabinets
Note: Key for existing cabinet is a standard Type II

Proper attire for field work and expected weather:
☑ Durable shoes
☐ Cold weather layering
☐ Rain gear
☐ _____

Safety equipment per State Highway Agency requirements:
☑ Hard hat
☑ Safety vest – type Hi-Vis Safety Yellow
☑ Steel toe shoes
☐ Other required equipment _____

D.0 SHEET 17

Sheet 17	*STATE_CODE	LTPP
LTPP Traffic Data	*SPS PROJECT ID	040100
WIM SITE INVENTORY	*SPS WIM ID	SPS-1

1.* ROUTE US-93 MILEPOST 52.5 LTPP DIRECTION - N S E W

2.* WIM SITE DESCRIPTION - Grade < 0.5 % Sag vertical Y / N
Nearest SPS section upstream of the site 040160
Distance from sensor to nearest upstream SPS Section 444 ft

3.* LANE CONFIGURATION
Lanes in LTPP direction 2 Lanes NB Lane width 14 ft

Median - 1 – painted
2 – physical barrier
→ 3 – grass
4 – none

Shoulder - 1 – curb and gutter
→ 2 – paved AC
3 – paved PCC
4 – unpaved
5 – none

Shoulder width 10 ft

4.* PAVEMENT TYPE AC pavement with 854 foot PCC slab - doweled

8. RAMPS OR INTERSECTIONS
Intersection/driveway within 300 m upstream of sensor location Y / N - distance No
Intersection/driveway within 300 m downstream of sensor location Y / N- distance No
Is shoulder routinely used for turns or passing? Y / N No

Form completed by: Roy Czinku - IRD Date: July 22, 2005

E.0 PHOTOGRAPHS

E.1.1 ROADWAY APPROACHING PCC SLAB

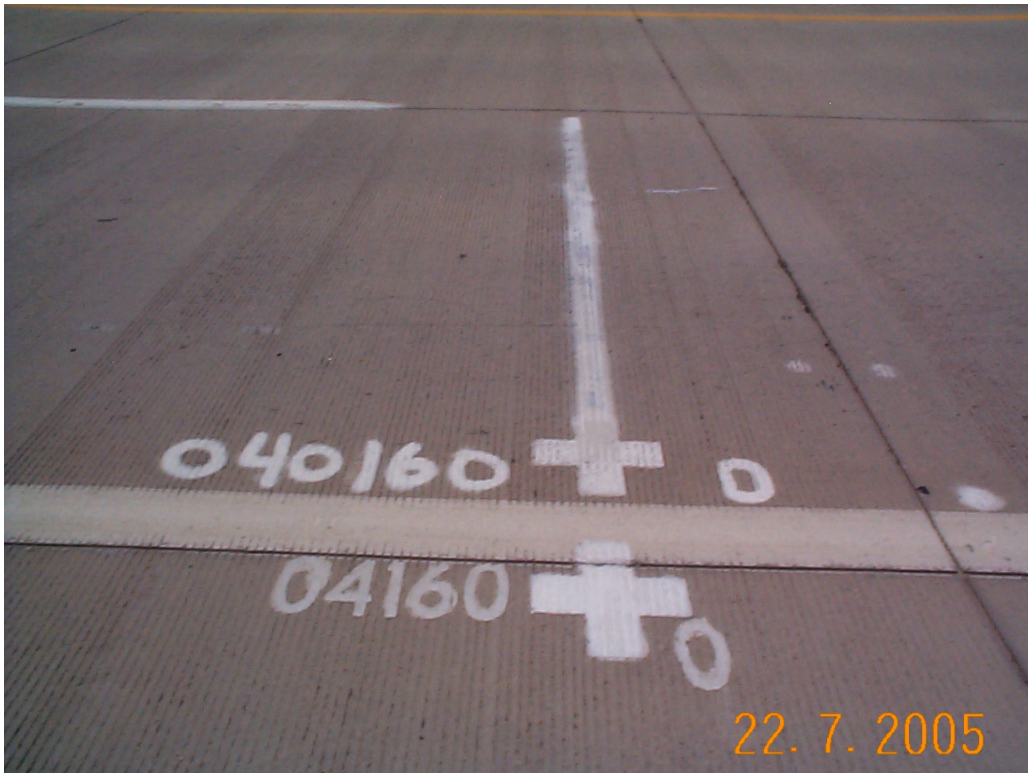
E.1.2 LONGITUDINAL AND TRANSVERSE CRACKING IN AC APPROACH PAVEMENT

E.1.3 SPS-1 MARKER NEAR START OF PCC SLAB

E.1.4 START PCC PAVEMENT SLAB

E.1.5 PCC/AC COLD JOINT AT LEADING EDGE OF PCC SLAB

E.1.6 START 040160 TEST SECTION



E.1.7 START 400 FOOT "WIM PAVEMENT" SECTION

E.1.8 APPROACH TO "WIM PAVEMENT", FACING UPSTREAM

E.1.9 RANDOM HAIRLINE SURFACE CRACKING IN WIM PAVEMENT, TYP.

E.1.10 JOINT NEEDING CLEANING AND RESEALING IN WIM PAVEMENT, TYP.

E.1.11 "HOLE" LEFT DURING GRINDING OF PCC SLAB, TYP.

E.1.12 RANDOM TRANSVERSE CRACK ACROSS LANE 103' IN ADVANCE NEW SCALES

E.1.13 RECOMMENDED LOCATION FOR CENTERLINE NEW SCALES

E.1.14 END WIM PAVEMENT SECTION OF PCC SLAB, FACING DOWNSTREAM

E.1.15 END WIM PAVEMENT SECTION OF PCC SLAB, FACING UPSTREAM

E.1.16 EXIST BENDING PLATES JUST DOWNSTREAM FROM WIM PAVEMENT SECTION

E.1.17 RECOMMENDED LOCATION FOR NEW CABINET

E.1.18 EXISTING WIM CABINET (SHARING FENCED ENCLOSURE WITH WEATHER STATION)

E.1.19 POTENTIAL POWER SOURCE

E.1.20 EXISTING TELEPHONE SERVICE ADJACENT EXIST WIM CABINET