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TEXAS GULF COAST REGIONAL AIRPORT
TXDOT SOLICITATION NO.: RFQ-2412ANGLE-00001

Texas Department of Transportation
Aviation Division
Request for Qualifications (RFQ) for
Professional Engineering Services

Brazoria County, through its agent, the Texas Department of Transportation (TxDOT), intends to engage a professional engineering firm for services pursuant to Chapter 2254, Subchapter A, of the Government Code. TxDOT Aviation Division will solicit and receive qualification statements for the current aviation project as described below.

Current Project: Brazoria County; TxDOT CSJ/Project No.: RFQ-2412ANGLE-00001.
The TxDOT Project Manager is Robert Johnson, P.E.

Scope: Provide engineering and design services, including construction administration, to:

1. Reconstruct Parallel Taxiway A (from Runway 35 to Taxiway B).
2. Rehabilitate Parallel Taxiway A (from Taxiway B to Runway 17).
3. Rehabilitate Connector Taxiway B, E, G.
4. Realign Connector Taxiway C.
5. Install Runway 17-35 Medium Intensity Runway Lights.
6. Install Taxiway Medium Intensity Taxiway Lights.
7. Install Signs.
8. Install Precision Approach Path Indicators, Wind-Cone, Beacon, and Vault.

The Agent, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all respondents that it will affirmatively ensure that for any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit in response to this solicitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

The proposed contract is subject to 49 CFR Part 26 concerning the participation of Disadvantaged Business Enterprises (DBE).

The DBE goal for the design phase of the current project is 7.5% The goal will be re-set for the construction phase.

Utilizing multiple engineering/design and construction grants over the course of the next five years, future scope of work items at the Texas Gulf Coast Regional Airport may include the following: Fuel farm improvements.

Brazoria County reserves the right to determine which of the services listed above may or may not be awarded to the successful firm and to initiate additional procurement action for any of the services listed above.

To assist in your qualification statement preparation, the criteria, project diagram, and most recent Airport Layout Plan are available online at *http://www.dot.state.tx.us/avn/avninfo/notice/consult/index.html* by selecting "Texas Gulf Coast Regional Airport" The qualification statement should address a technical approach for the current scope only. Firms shall use page 4, Recent Airport Experience, to list relevant past projects.

AVN-550 Preparation Instructions:

Interested firms shall utilize the latest version of Form AVN-550, titled "Qualifications for Aviation Architectural/Engineering Services". The form may be requested from TxDOT, Aviation Division, 125 E. 11th Street, Austin, Texas 78701-2483, phone number, (800)68-PILOT (74568). The form may be emailed by request or downloaded from the TxDOT website at *http://www.txdot.gov/inside-txdot/division/aviation/projects.html*. The form may not be altered in any way and must not contain Quick Response (QR) codes or links. The form fields must be completed in black font, without changing the existing font size or color, and must not contain any bold or italicized words. If a firm is non-compliant, the submittal of AVN-550 will be deemed as non-responsive. Firms must carefully follow the instructions provided on each page of the form. Qualifications shall not exceed the number of pages in the AVN-550 template. The AVN-550 consists of eight pages of data plus one optional illustration page. A prime provider may only submit one AVN-550. If a prime provider submits more than one AVN-550 or submits a cover page with the AVN-550, that provider will be disqualified. Responses to this solicitation WILL NOT BE ACCEPTED IN ANY OTHER FORMAT.

ATTENTION: To ensure utilization of the latest version of Form AVN-550, firms are encouraged to download Form AVN-550 from the TxDOT website as addressed above. Utilization of Form AVN-550 from a previous download may not be the exact same format. Form AVN-550 is a PDF Template.

The Form AVN-550 must be completed accurately to include the correct Airport Name and TxDOT Project ID number. The completed Form AVN-550 must be received in the TxDOT Aviation eGrants system no later than April 18, 2024, 2:00 p.m. (CDST). Electronic facsimiles or forms sent by email or regular/overnight mail will not be accepted.

Firms that wish to submit a response to this solicitation must be a user in the TxDOT Aviation eGrants system no later than one business day before the solicitation due date. To request access to eGrants, please complete the Contact Us web form located at *http://txdot.gov/government/funding/egrants-2016/aviation.html*

An instructional video on how to respond to a solicitation in eGrants is available at *http://txdot.gov/government/funding/egrants-2016/aviation.html*

Step by step instructions on how to respond to a solicitation in eGrants will also be posted in the RFQ packet at *http://www.dot.state.tx.us/avn/avninfo/notice/consult/index.htm*.

The consultant selection committee will be composed of local government representatives. The final selection by the committee will generally be made following the completion of review of AVN-550s. The committee will review all AVN-550s and rate and rank each. The Evaluation Criteria for Engineering Qualifications can be found at *http://www.txdot.gov/inside-txdot/division/aviation/projects.html* under Information for Consultants. All firms will be notified and the top rated firm will be contacted to begin fee negotiations for the design and bidding phases. The selection committee does, however, reserve the right to conduct interviews for the top-rated firms if the committee deems it necessary. If interviews are conducted, selection will be made following interviews.

Please contact TxDOT Aviation for any technical or procedural questions at (800)-68-PILOT (74568). For procedural questions, please contact Sheri Quinlan, Contract Specialist. For technical questions, please contact Robert Johnson, P.E., Project Manager.

For questions regarding responding to this solicitation in eGrants, please contact the TxDOT Aviation help desk at 1-800-687-4568 or *avn-egrantshelp@txdot.gov*.

EVALUATION CRITERIA FOR ARCHITECTURAL/ENGINEERING QUALIFICATIONS

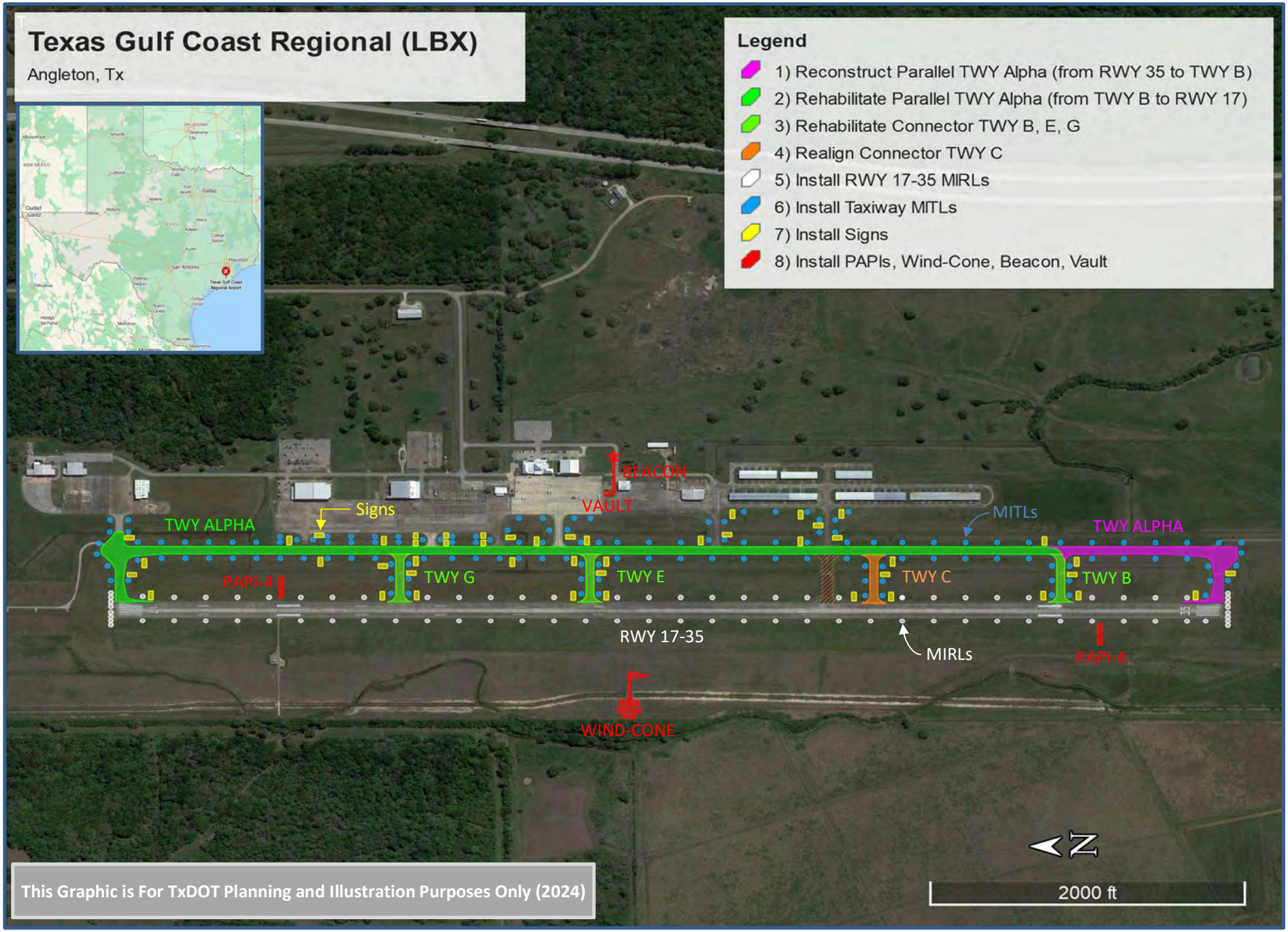
TxDOT Aviation recommends that the Selection Committee, in evaluating detailed qualifications from the listed architects/engineers, use the following criteria. They should suffice for most projects. You will notice that we have proposed scoring values for each criterion. Should there be special circumstances, criteria and their respective scoring values may be adjusted. Your TxDOT project manager will be glad to help should this be the case.

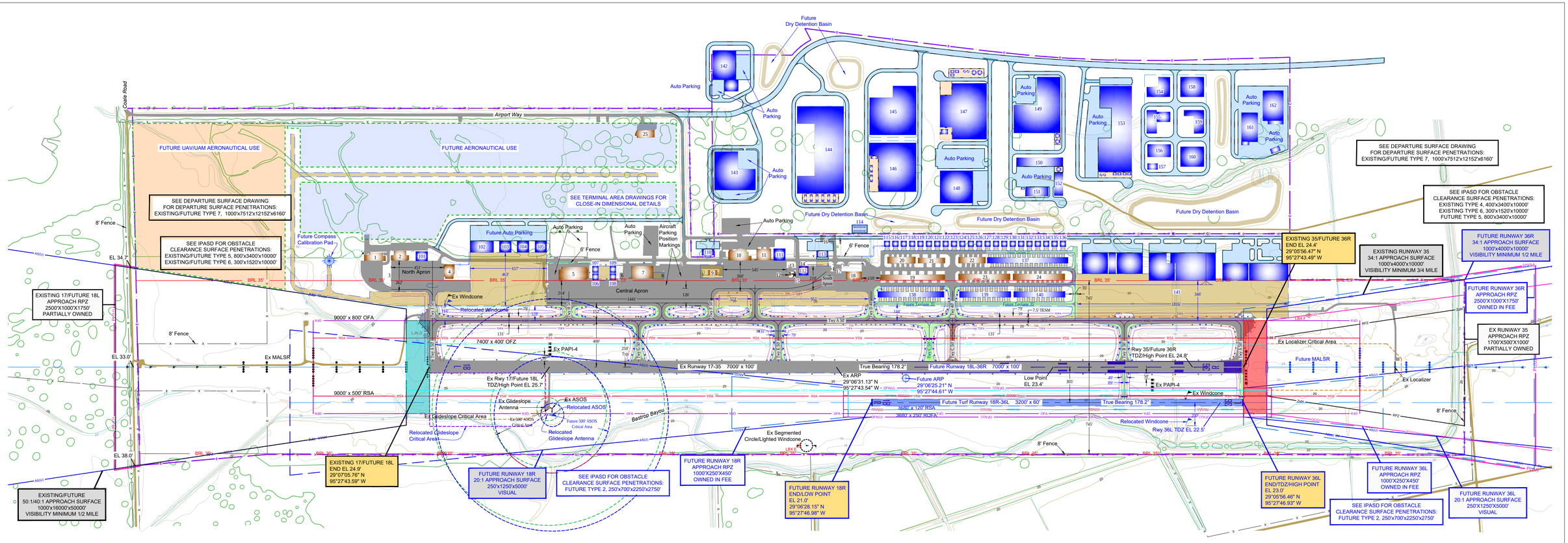
1. **Recent experience of the project team with comparable airport projects within the past ten years.**
   (25 points)
   Do the qualifications indicate that the project team has recent direct experience on other general aviation airports designing similar improvements to those proposed at this location? [Sources of information: Aviation Project Design Team Form, Recent Relevant Airport Experience Form, and possibly the Optional Summary.]

2. **Proposed technical approach (30 points)**
   Does the architect/engineer provide evidence of understanding of the project; and any unique architectural/engineering aspects associated with the proposed project and how to address them? [Sources of information: Proposed Technical Approach to Project, and possibly the Optional Summary.]

3. **Project design schedule and ability to meet schedules and deadlines (25 points)**
   Does the proposed design team have sufficient time to work on this project? Has the firm demonstrated an ability to meet design schedules in the past? Reasonableness of proposed schedule [Sources of information: Aviation Project Design Team Form, Recent Relevant Airport Experience Form, Project Design Schedule Form and possibly the Optional Summary.]

4. **Construction Management Experience (20 points)**
   The architect/engineer will oversee the airport construction. Therefore, it is critical that the architect/engineer be involved in the day-to-day construction activities through a full-time resident project representative and periodic site visits. What evidence do the qualifications provide as to the architect/engineer's commitment to proactive and consistent representation during construction? [Source of information: Relevant Airport Experience form; proposed Technical Approach to Project; and possibly the Optional Summary]


Texas Gulf Coast Regional (LBX)
Angleton, Tx
Legend
1) Reconstruct Parallel TWY Alpha (from RWY 35 to TWY B)
2) Rehabilitate Parallel TWY Alpha (from TWY B to RWY 17)
3) Rehabilitate Connector TWY B, E, G
4) Realign Connector TWY C
5) Install RWY 17-35 MIRLs
6) Install Taxiway MITLs
7) Install Signs
8) Install PAPIs, Wind-Cone, Beacon, Vault
BEACON
VAULT
Signs
TWY ALPHA
MITLs
TWY ALPHA
PAPI-4
TWY G
TWY E
TWY C
TWY B
RWY 17-35
MIRLs
PAPI-4
WIND-CONE
N
2000 ft
This Graphic is For TxDOT Planning and Illustration Purposes Only (2024)



FUTURE AIRPORT FACILITIES

#	Facility Name	Top Elevation ft. agl*
101	Conventional Hangar	32.0
102	Conventional Hangar	32.0
103	Conventional Hangar	32.0
104	Conventional Hangar	32.0
105	Conventional Hangar	32.0
106	Box Hangar	30.0
107	Box Hangar	30.0
108	Box Hangar	30.0
109	Box Hangar	30.0
110	Restaurant	32.0
111	Conventional Hangar	36.0
112	Conventional Hangar	36.0
113	ARFF	30.0
114	Consolidated Fuel Farm	15.0
115	Box Hangar	30.0
116	Box Hangar	30.0
117	Box Hangar	30.0
118	Box Hangar	30.0
119	Box Hangar	30.0
120	Box Hangar	30.0
121	Box Hangar	30.0
122	Box Hangar	30.0
123	Box Hangar	30.0
124	Box Hangar	30.0
125	Box Hangar	30.0
126	Box Hangar	30.0
127	Box Hangar	30.0
128	Box Hangar	30.0
129	Box Hangar	30.0
130	Box Hangar	30.0
131	Box Hangar	30.0
132	Box Hangar	30.0

*Top elevation estimated based off common structure

FUTURE AIRPORT FACILITIES

#	Facility Name	Top Elevation ft. agl*
133	Box Hangar	30.0
134	Box Hangar	30.0
135	Box Hangar	30.0
136	Box Hangar	30.0
137	T-Hangar	17.0
138	T-Hangar	17.0
139	T-Hangar	17.0
140	T-Hangar	17.0
141	Aircraft Maintenance/Repair/Overhaul or Manufacturing Complex	36.0
142	Electronics Manufacturing	24.0
143	Electronics Manufacturing	24.0
144	Warehouse Distribution	32.0
145	Warehouse Distribution	32.0
146	Warehouse Distribution	32.0
147	Warehouse Distribution	32.0
148	Warehouse Distribution	32.0
149	Electronics Manufacturing	24.0
150	Electronics Manufacturing	17.0
151	Electronics Manufacturing	17.0
152	Electronics Manufacturing	17.0
153	Electronics Manufacturing	24.0
154	Auto Part Manufacturing	17.0
155	Auto Part Manufacturing	17.0
156	Auto Part Manufacturing	17.0
157	Auto Part Manufacturing	17.0
158	Auto Part Manufacturing	17.0
159	Auto Part Manufacturing	17.0
160	Auto Part Manufacturing	17.0
161	Auto Part Manufacturing	17.0
162	Auto Part Manufacturing	17.0

*Top elevation estimated based off common structure

EXISTING AIRPORT FACILITES

#	Facility Name	Top Elevation ft. msl
1	CONVENTIONAL HANGAR	61.2
2	CONVENTIONAL HANGAR	53.7
3	FUEL FACILITY	32.0*
4	CONVENTIONAL HANGAR	50.5
5	CONVENTIONAL HANGAR	61.4
6	FUEL FACILITY	28.3*
7	CONVENTIONAL HANGAR	55.8
8	FUEL FACILITY	32.0*
9	RESTAURANT (TBR)	61.4
10	TERMINAL BUILDING	61.4
11	CONVENTIONAL HANGAR	47.7
12	ELECTRICAL VAULT	9.9
13	ADS-B STATION	Unknown
14	ARFF (TBR)	45.3
15	AIRPORT BEACON	79.3
16	AIRPORT MAINTENANCE (TBR)	34.3
17	FUEL FACILITY	29.1
18	CONVENTIONAL HANGAR	44.4
19	14 UNIT T-HANGAR	38.5
20	10 UNIT T-HANGAR	41.2
21	6 UNIT T-HANGAR	39.4
22	10 UNIT T-HANGAR	36.5
23	20 UNIT T-HANGAR	36.1
24	20 UNIT T-HANGAR	36.6
25	AIRPORT MAINTENANCE SHOP	Unknown

TBR = To be removed

*Top elevation estimated based off common structure height

SURVEY MONUMENTS (PACS/SACS)

DESIGNATION	PERMANENT INDENTIFIER	LATITUDE	LONGITUDE
LBX E	AB3196	29° 06' 34.294"	95° 27' 51.165"
LBX F	AH3515	29° 05' 50.929"	95° 27' 38.481"
LJN D	AW7091	29° 06' 06.114"	95° 27' 40.535"
LJN A	AW7089	29° 06' 50.168"	95° 27' 36.239"

GENERAL NOTES:

1. PLANIMETRIC DATA FROM GEODETIX, INC, SAN ANTONIO, TX DATED MAY 2009.
2. HORIZONTAL DATUM: NORTH AMERICAN DATUM 1983 - NAD83; VERTICAL DATUM: NORTH AMERICAN DATUM 1988 - NAVD88.
3. OTHER DATA SOURCES CONSULTED INCLUDE THE FAA DATA SHEET http://webdatasheet.faa.gov/, U.S. TERMINAL PROCEDURES, AIRPORT MASTER RECORD FORM 5010, AND THE FAA AIRPORT FACILITY DIRECTORY.
4. THE EXISTING AND FUTURE TAXIWAY EDGE SAFETY MARGIN (TESM) FOR EXISTING 17-35/FUTURE 18L-36R RUNWAY IS 7.5'.
5. NO ATCT LINE OF SIGHT/SHADOW STUDY (FAA ORDER 6480.4) WAS CONDUCTED FOR THIS ALP.
6. SEE INNER PORTION OF THE APPROACH SURFACE DRAWINGS FOR THRESHOLD SITING SURFACE PENETRATIONS.
7. SEE TERMINAL AREA DRAWING FOR CLOSE-IN AND DIMENSIONAL DETAILS.

LEGEND

EXISTING	ULTIMATE	DESCRIPTION
		AIRPORT PROPERTY LINE
	N/A	AIRPORT PROPERTY LINE AND FENCELINE
N/A		DEVELOPMENT RESERVE
		SECTION CORNERS
	N/A	AIRPORT REFERENCE POINT (ARP)
	N/A	AIRPORT BEACON
		ASOS
BRL 35'		BUILDING RESTRICTION LINE (35')
		ASOS CRITICAL AREA
		ILS CRITICAL AREAS
		STRUCTURES ON AIRPORT
		STRUCTURE OFF AIRPORT
N/A		ABANDON/REMOVE
		HOLD MARKING
		FENCE LINE
		RUNWAY PAVEMENT
		TAXIWAY PAVEMENT
		APRON PAVEMENT
	REMOVATION	PACS AND SACS
OFA	OFA(U)	OBJECT FREE AREA
RSA	RSA(U)	RUNWAY SAFETY AREA
OFZ	OFZ(U)	OBSTACLE FREE ZONE
		PRECISION OBSTACLE FREE ZONE
RPZ		RUNWAY PROTECTION ZONE
TOFA	TOFA(U)	TAXIWAY OBJECT FREE AREA
TSA	TSA(U)	TAXIWAY/TAXILANE SAFETY AREA
	SAME	PAPI
		MIRL/MITL
		ROADS/PARKING PAVED
	SAME	ROADS/PARKING UNPAVED
	SAME	TREELINE
400	400	TOPOGRAPHIC CONTOURS

NORTH

Magnetic Declination 2° 19' East ± 0°21' Annual Rate of Change 0° 7' West (Source: NOAA, NCEI, July 15, 2020

0 400 800

SCALE IN FEET

NO.	REVISIONS	BY	CHK'D	DATE

TEXAS DEPARTMENT OF TRANSPORTATION
AVIATION DIVISION

ALP APPROVED ACCORDING TO FAA AC 150/5300-13A PLUS THE REQUIREMENTS OF A FAVORABLE ENVIRONMENTAL FINDING AND FAA NRA STUDY PRIOR TO THE START OF ANY LAND ACQUISITION OR CONSTRUCTION ON AIRPORT PROPERTY.

DocuSigned by: EA6A4EF01FA5423...

10/17/2022

Dan Harmon, DIRECTOR, AVIATION DIVISION — DATE

AIRPORT SPONSOR

CURRENT AND FUTURE DEVELOPMENT DEPICTED ON THIS ALP IS APPROVED AND SUPPORTED BY AIRPORT SPONSOR

SPONSOR ACKNOWLEDGES APPROVAL OF ALP BY TXDOT DOES NOT CONSTITUTE A COMMITMENT TO FUNDING.

DocuSigned by: 19E561208679490...

11/1/2022

SIGNATURE — DATE

Aviation Director

TITLE, AIRPORT SPONSOR'S REPRESENTATIVE

PREPARED BY:

12920 Metcalf Avenue
Suite 200
Overland Park, KS 66213
(816) 524-3500, Fax (2575)
Coffman Phoenix Office:
4835 E. Cactus Road
Suite 235
Scottsdale, Az. 85254
(602) 993-6999, Fax (7196)

Coffman Associates — Airport Consultants — www.coffmanassociates.com

E. PFEIFER — SEPTEMBER 2022 — DESIGNED BY — DATE

D. PRZYBYCIEN — SEPTEMBER 2022 — DRAWN BY — DATE

AIRPORT LAYOUT PLAN DRAWING

TEXAS GULF COAST REGIONAL AIRPORT (LBX)

ANGLETON/LAKE JACKSON, TEXAS

Texas Department of Transportation — Aviation Division

SHEET 3 OF 17

Instructions for Responding to an RFQ Solicitation

Texas Department of Transportation

Aviation Division

eGrants Workflow:	RFQ Response
eGrants Role:	Subgrantee Administrator (SA) Subgrantee Staff (SS)
eGrants link **eGrants help:**	https://apps2.dot.state.tx.us/apps/egrants2/logout2.aspx eGrants help desk Monday – Friday 8AM – 4PM CD/ST (excluding state/federal holidays) avn-egrantshelp@txdot.gov or 1-800-687-4568

STEP	ROLE	ACTIONS	NOTES
01	SA	Go to View Opportunities. a. Select Apply Now to the opportunity b. The RFQ Response Menu is opened	Very important to click on the name of the document and not the organization name Make a note of the opportunity due date to ensure you respond in time
02	SA/SS	Click on View, Edit and Complete Forms a. Select RFQ Applicant Form b. Confirm Project information and address c. Upload AVN-550, 550D, 551 or 551D PLEASE MAKE SURE YOU SELECT THE CORRECT PDF FILE BEFORE CHANGING STATUS.* d. Hit Save	You should print the proposal document to a PDF so that it becomes un-editable. Or, you may upload a scanned copy of the AVN-550, 550D, 551, or 551D.
03	SA	When you are ready to submit your response, click on Save and submit to CS review YOU ARE DONE	You will get an email saying the response was successfully submitted; the status must be changed to RFQ Response in CS Review by the due date and time posted in the solicitation.
04	SA/SS	WAIT UNTIL A SELECTION NOTIFICATION IS SENT TO YOU	
05	SS/SA	AFTER SELECTION NOTIFICATION IS RECEIVED Log in to view status of response. Once the scores are verified, TxDOT will move the response to an interview, selected or not selected status of which you can log in to see the status of your response.	The selection notification will refer users to eGrants to view the status of their response. User may also view the TxDOT website for selection information.

*If the responder posts the incorrect file.

- If status has been changed and the due date for the response has not expired, contact the help desk to ask for the status to be administratively changed back to Response in Process.
- If the incorrect file was posted, the incorrect file may be deleted and the correct one posted as long as the status has not been changed to Response in CS Review. Respondent will need to check the “delete” box and hit save. The page refreshes. Then post the correct file, save, and change the status.

If you are not set up in eGrants and wish to respond to a posted solicitation, you may contact the aviation help desk for assistance by using the webform available at eGrants Help Desk Form

Some organizations will have many user members. Each organization should determine which user member will submit the completed avn-550, 550D, 551, or 551D in eGrants. after the opportunity is selected for the organization, it will no longer appear on any other user’s home page unless the initiating user cancels the response.

Address: 814 Thornwick Drive
Houston, TX 77079
Phone: 281-630-1888
E-mail: tdodson@Civil-PEs.com
TBPE Firm No.: F-18997

Urgent	✈ For review	Please comment	Please reply	Please recycle

TECHNICAL MEMORANDUM – FINAL

Date:	October 31, 2023		
To:	Robert Johnson, PE		
From:	Thomas D Dodson, PE TD	Proj.No.:	2212ANGLE| 4222AVNAFI Work Order 1
Re:	Texas Gulf Coast Regional Airport – Condition Assessment of Taxiway A and Connectors	Civil PEs Proj.No.:	2212ANGLE
Cc:	File		

In accordance with the scope of services proposed in the assessment of the pavement of Taxiway A and its connectors, below is a discussion of the criteria used and calculations resulting in a program-level project scale and cost estimate for capital improvement programming. The purpose of this technical memorandum is to identify the pavement's structural capacity, provide a conceptual design for repairs, and estimate the construction cost of those designs. This discussion is arranged into topics listed below:

Executive Summary

A key component to assessing the rehabilitation needs of pavement at Texas Gulf Coast Regional Airport is the current aircraft traffic, and what design requirements will be in place with the determination of traffic levels and types. While a lengthy traffic history was available through the Traffic Flow Management System Counts (TFMSC), a new traffic data source from the airport's VirTower system, collected since February of 2023, was also available. With a comparison of the two sources, a full year of expected traffic data was extrapolated. The derived traffic data showed that a Dual Wheel, 100,000 lb. aircraft cohort easily met the 500 annual operations limit to be deemed the design aircraft. This design aircraft, along with a similarly derived fleet of lesser-weight aircraft were compiled into a fleet mix of traffic for the pavement analysis and rehabilitation design.

The existing taxiway pavement at the airport consists of three pavement sections, based on when the pavements were constructed and/or repaired. Using the thicknesses measured from the cores and HWD, pavement section layer strengths were derived using the FAA's "BAKFAA" software. These pavement sections, evaluated as both with standard pavement section materials, determined by back-calculation and statistically adjusted methods were found to have insufficient strength and require some level or rehabilitation to carry the existing traffic the airport currently experiences, much less the future.

-continued-

Numerous pavement sections were evaluated for rehabilitation. The recommended sections are:

Section Number	Pavement Section	Weight Rating	Comments
1	Remove 21", Asphalt (4") on Cement-Treated Base (5") on Quality Base (12")	S-79, D-100, 2D-157	Full-depth Rehabilitation
2	Mill and Replace Asphalt (4")	S-93, D-139, 2D-209	Existing base and subbase are significant in thickness
3	Mill and Replace Asphalt (4")	S-111, D-169, 2D-250, 2D/2D2-697	Existing base and subbase are significant

The recommended options in each Section will total approximately $7,223,000 to construct. Other services, along with escalation at 8% for two years, brings the total project cost to just under $10 million.

Description	Cost
Construction	$7,223,000
RPR, CA Services, Material Testing	475,000
Contingency	770,000
2 yrs. Escalation	1,410,000
Grand Total	$ 9,878,000

Contingency, professional services, and testing should be included for a programmed total cost of $9,900,000. These costs are based on FY 2025 escalated values.

The discussion below details the methodologies and calculations carried out with this analysis. There are also four (4) attachments. They are:

Attachment 1	Pavement Evaluation Study (HWD Preliminary Results)
Attachment 2	Material Strength Calculations (Backcalculation Results)
Attachment 3	Geotechnical and Pavement Evaluation (Soils Report)
Attachment 4	FAARFIELD Pavement Designs

Project Development Criteria

The following assessment follows published methods and procedures published by the Federal Aviation Administration (FAA) in the assessment and design of pavement repairs. Design parameters utilize FAA pavement design software "FAARFIELD", latest edition. The following specific Advisory Circulars apply:

Table 1 - Criteria for Analysis

Document	Title	Notes
	Traffic Flow Management System	Annual Data – using 12 months from July 2022 through June 2023
150/5320-6D	Pavement Design	FAARFIELD Version 2.18
150/5000-17	Critical Aircraft and Regular Use Determination	An operation is an arrival or a departure, but since the pavement design is based on departures only, we used departures only for convenience.

Traffic levels have been previously reported. For the conceptual design to follow, using all the reported aircraft models creates a computational issue as FAARFIELD models each aircraft as input. Instead, we use generic aircraft configured by FAARFIELD to fill 14 different aircraft configurations – both single- and dual-wheel aircraft. For the sake of design requirements for the pavement, the traffic is based on critical aircraft being a generic dual-wheel, 100,000 lb. aircraft. The traffic mix for pavement design based on aircraft weight groups listed in the FAARFIELD software is as follows, using annual departures:

Table 2 - Design Traffic Mix

Aircraft Weight Group	12 Mos Departures
S-5	340
S-10	200
S-12.5	110
S-15	13
S-20	44
S-25	2
D-15	113
D-20	16
D-25	36
D-30	26
D-40	73
D-50	2
D-75	10
D-100	860

Taxiway Pavement Assessment

A review of plans from previous projects, confirmed by the cores taken, shows that there are primarily three pavement sections along Taxiway A and its connectors.

For the sake of the discussion in this assessment, the Sections are:

Table 3 - Summary of Existing Pavement Sections

	Section	Location	Project(s)
Section 1	Previously overlaid new construction pavement (About Sta 0+ to Sta 12+)	On the south end of the airfield (up to Connector Taxiway B)	Original Construction in AIP Project 3-48-0238-10-93
			Overlaid in TxDOT CSJ 0212ANGLE
Section 2	A reconstructed pavement (About Sta 13+ to Sta 61+ and Sta 72+ to Sta 75+)	Taxiway A from TW B to past TW G, and again from south of TW J north and to the runway	Reconstructed to subgrade in TxDOT CSJ 0212ANGLE
		All Connector Taxiways	
Section 3	A previously overlaid pavement reconstruction. (About Sta 62+ to Sta 71+)	Taxiway A from north of TW G to just south of TW J	Patch reconstructed to subgrade in AIP Project 3-48-0238-13-95
			Overlaid in TxDOT CSJ 0212ANGLE

The Sections are located as shown in Figure 2.

Figure 1 - Pavement Layout by Sections

Heavy Weight Deflectometer Analysis

Heavy-weight Deflectometer (HWD) measures were taken on July 18, 2023, using a Dyna R-80 trailer-mounted deflectometer. Two drops were performed at each setup, with passes about 10 feet off the centerline of the taxiways on both sides. One set of drops was in the 30,000-pound range and another around 40,000 pounds. There is an additional evaluation of the HWD data, presented in Attachment 1 - Pavement Evaluation Study of Parallel Taxiway (Taxiway A) Texas Regional Gulf Coast Regional Airport (LBX), with our additional analysis discussed below.

Measured deflections in the 30,000-pound range were small and varied widely. The data was collected, but we only back-calculated pavement course strengths from the 40,000-pound drop data for this analysis. Backcalculation of the

HWD measures to determine the modulus of each pavement section was modeled through the FAA "BAKFAA" program. This program utilizes "seed" strength values for various parts of the pavement sections. For the discussion below, a comparison of the material measures versus the "seed" values is made to reference whether the material may be suitable for re-use in the new pavement design.

The complete tabulation of the backcalculated results are included in **Attachment 2**, organized by Section and Taxiway.

Backcalculation Results: TW A South of TW B (Section 1)

Section 1 was cored during this site investigation in one location, near Station 6+00 of our measures along TW A. The results effectively matched the pavement section as indicated in the overlay plans from Project 0212ANGLE:

2" Asphalt Overlay
4.5" Original Asphalt Surface
7" Quality Base (P-209)
~25" Lime Stabilized Soil

These measured section thicknesses were input as the pavement layers into BAKFAA.

Due to the relatively short length of this portion of the taxiway, only 12 and 13 drop locations were measured on the right and left sides, respectively.

Using the pavement sections listed above, we utilized the FAA's backcalculation model BAKFAA, version 3.4.2[1]. For Section 1, we conducted two backcalculations of the pavement. The first backcalculation allowed the program to determine the modulus value of the two asphalt layers and the two underlying layers.

The total reported values from each backcalculation were also averaged for the section, and a standard deviation was subtracted from the average to report as an "85th percentile" value. However, due to the high variability of the backcalculated values in the surface asphalt, underlying asphalt, and base, using one standard deviation would result in unrealistically low values. Instead, we limited the standard deviation deduction to no more than 50% of the average. The limitation on the reduction made the lowest reported value to be no less than half the calculated average and is reported as a "corrected percentile" instead. The subgrade in Section 1 did not vary as much, and the 85th percentile value was reported for it.

Additionally, because the subgrade measures were made via a dynamic (HWD) loading, listed subgrade strengths are reduced to 1/2 the backcalculated strength. This is a conservative value for the static-load strength of the clay material in the subgrade[2]. The results of the backcalculation of the section strengths are shown in Table 4:

Table 4 - Section 1: Full Backcalculation Results – Corrected or 85th Percentile

	Seed Value	Left Backcalc	Right Backcalc	Average
Surface Asphalt	200,000 psi	106,211 psi	143,121 psi	124,666 psi
Base Asphalt	400,000 psi	130,330 psi	203,822 psi	167,076 psi

[1] https://www.airporttech.tc.faa.gov/Products/Airport-Safety-Papers-Publications/Airport-Safety-Detail/ArtMID/3682/ArticleID/11/BAKFAA-330

[2] From NCHRP Report 372, as referenced in AC150/5320-6G, Appendix C, paragraph 3.14.7.

	Seed Value	Left Backcalc	Right Backcalc	Average
Base	75,000 psi	59,156 psi	64,990 psi	62,073 psi
Subgrade*	9,000 psi	8,023 psi	8,516 psi	8,269 psi

* Value is reduced to ½ the back calculated value

A second backcalculation model was also run, holding the strength value of the asphalt surface material rather than letting the program back-calculate a value. This run did not yield useful results, so inclusion in this report was discarded.

Back-calculation Results: TW A North of TW B and All Connectors (Section 2)

Most of the taxiway pavement at the airport is comprised of Section 2. Taxiway A alone had 56 and 60 drop locations to the right and left of the centerline, respectively. As noted above, this pavement section was part of a taxiway-wide reconstruction and widening project constructed before 2004. The pavement section consists of the following layers:

4.7" Asphalt
8" Quality Base (P-209)
15.2" Granular Base (P-154)
~25" Lime Stabilized Soil

There are several locations where this pavement section occurs on the taxiway system at the airport:

- Taxiway A from Taxiway B to approximately 1000 feet south of TW H
- Connector Taxiways B, C, D, E, G, and the north connector to RW17
- The northern connector Taxiway A to the runway.

The backcalculation results of the asphalt, base, and subbase varied widely, while the subgrade showed consistent results. As we did in Section 1, we applied a modified approach to using a standard deviation deduction that was no more than 50% of the average for the calculated results for all the drops. This 50% limitation is applied to the base and subbase. The subgrade had a low variability at around 25%. The strengths used for the design of Section 2 are listed in Table 5.

Table 5 - Section 2: Full Backcalculation Results – Corrected or 85th Percentile

Sta 13+ to 61+	Seed Value	Left Backcalc	Right Backcalc	Average
Surface Asphalt	200,000 psi	217,747 psi	244,846 psi	231,297 psi
Base	75,000 psi	73,547 psi	88,358 psi	80,952 psi
Subbase	40,000 psi	15,422 psi	14,958 psi	15,190 psi
Subgrade*	9,000 psi	10,638 psi	6,962 psi	8,800 psi

* Value is reduced to ½ the back calculated value

The results, when compared to Section 1, are similar and are near the "seed" value expected for the material.

Back-calculation Results: Taxiway A North of Taxiway G (Section 3)

Section 3 pavement represents a reasonably small but still significant portion of Taxiway A that needs analysis to ensure this pavement is rehabilitated to function for the future as it represents a significant part of the operation (being along the route for the predominant departures at the airport) of the airfield pavement. This pavement was

reconstructed in a project funded in 1995 and was overlaid with the construction of CSJ 0212ANGLE. The pavement section is as follows:

2” Asphalt Overlay
4.5” Original Asphalt Surface
18.5” Quality Base (P-209)
~12” Lime Stabilized Soil

Section 3 had 22 and 18 drops on the left and right sides of the centerline, respectively. The values reported below in Table 6 show the section items’ corrected and 85th percentile values.

Table 6 - Section 3: Full Backcalculation Results – Corrected or 85th Percentile

	Seed Value	Left Backcalc	Right Backcalc	Average
Surface Asphalt	200,000 psi	182,281 psi	184,526 psi	183,403 psi
Base Asphalt	400,000 psi	228,561 psi	331,172 psi	279,867 psi
Base	75,000 psi	61,528 psi	62,795 psi	62,161 psi
Subgrade*	9,000 psi	9,991 psi	9,421 psi	9,706 psi

* Value is reduced to ½ the back calculated value

The surface, base asphalt, and base material varied enough that the standard deviation exceeded 50% of the average, so the results reported in Table 6 are corrected, while the subgrade did not, resulting in only about 17% of the average. The base material, run in the model as a P-209 material, yielded a backcalculated result of about 83% of the seed value as P-209 base. Nonetheless, it is a very thick base material section – over one-and-a-half feet thick.

Site Visit and Existing Condition

On June 28 and 29, 2023, our geotechnical subconsultant cored pavements along Taxiways A and B to measure the pavement section and carry out Dynamic Cone Penetrometer (DCP) testing of the subgrade. Commentary and results of that fieldwork are discussed below and are included in Attachment 3 – Geotechnical and Pavement Evaluation Study of Parallel Taxiway.

Dynamic Cone Penetrometer Measures

Each of the six core locations was tested at the subgrade level using a dynamic cone penetrometer.

Figure 2 - DCP Field Testing

The data was used to confirm the existing subgrade strength. The strength is discussed in Attachment 2, but we summarized the values from the DCP and compared them to the backcalculated values. The backcalculated modulus values are uncorrected since DCP, like HWD, are dynamic measures of soil strength.

Table 7 - DCP and Backcalculated Subgrade Measures

Location	DCP Result (Modulus in psi)	Backcalculated Subgrade (Modulus in psi)
Bore 1B	13,000	21,900
Bore 2B	19,700	10,500
Bore 3B	19,400	19,300
Bore 4B	16,500	21,900
Bore 5B	16,900	27,000
Bore 6B	13,600	21,900

More study is needed to determine whether these two measures differ significantly. The reported backcalculated values above are specific to the drop location nearest the borehole, and the values do not include the 85th percentile reduction applied during the design process below.

FAARFIELD Design

As discussed above, each section was used with the BAKFAA software to determine the strength of the existing pavement layers. The next step in the process is to design rehabilitation that could fit with the existing pavement and meet the traffic volume already determined. The FAARFIELD program also sets minimum layer thicknesses, most particularly asphalt at 4", CTB at 5", and P-220 as a stabilized base at 12". Using minimum thicknesses can cause the pavement section to be much stronger than required. Since there is an existing pavement, most of the "design" is confirmation that the pavement section meets the design traffic and weights. Many of the following pavement sections utilize the FAARFIELD "Life" calculation. Any pavement life exceeding 20 years is considered sufficient to carry the design traffic. When new pavement sections (like concrete) are introduced, a design is run to determine the needed thickness of the parts of the new design section.

Since the design traffic has aircraft over 100,000 lbs, the design sections are required to include a stabilized base layer under the surface course[3]. We designed the pavements accounting for the backcalculated strength of the subgrade but made no assumptions that the lime-stabilized subgrade functioned as any part of the pavement section. When the design only involves an overlay (like a rehabilitation), we did not consider the addition of a stabilized base. Further investigation should be taken during design to determine if overlay design without a stabilized base beneath it constitutes a Modification of Standards (MOS). This analysis provides multiple options for pavement rehabilitation strategies through each of the three sections. All of the data output from the FAARFIELD design runs, including design reports, life calculations, PCR, and 5010 outputs are included in Attachment 4.

Section 1

As a first run, we conducted a life calculation using the subgrade, base, and original asphalt strengths from the backcalculated value listed above. Then, we used the FAARFIELD standard pavement layer for the asphalt overlay (current surface). The results were disappointing when using the traffic mix set for this analysis. The performance characteristics, consisting of the calculated pavement life, Pavement Classification Rating (PCR), and single, dual, and dual-tandem wheel weight limits (as 5010 data fields) are tabulated below:

Section 1: Existing Pavement Section Performance	
Section	Asphalt (6.5") on Base (7")
Life	0 years
PCR	152/F/D/X/T
5010 Data	S-39, D-55

While the distress of the pavement in Section 1 is not readily apparent, significant materials are needed to strengthen the pavement section to carry the anticipated traffic. Below is a discussion on rehabilitation strategies, working with the existing pavement section when possible.

Option 1 – Remove all asphalt and some base to replace with P-304 Cement Treated Base and P-401 Asphalt

The first option under Section 1 rehabilitation is to remove the existing asphalt surface and original surfacing, then add new material to meet the stabilized base requirement and strengthen the overall pavement. The minimum thickness for asphalt is four (4) inches, and for cement-treated base is five (5) inches. Using this pavement section leaves only 4 ½ inches of remaining existing base. Upon running the FAARFIELD design using part of this existing base, the result is that there is not enough base to follow this section. The result of this option would be a full reconstruction (probably being able to keep the existing lime-stabilized subgrade but removing the top 7 ½ inches) made up of quality base (P-209) at 12 inches, cement-treated base (P-304) at five (5) inches, and asphalt surface (P-401) at four (4) inches. The performance characteristics of this section are:

Section 1: Rehabilitation Option 1	
Section	Asphalt (4") on Cement-Treated Base (5") on Quality Base (12")
Life	20 years
PCR	322/F/D/X/T
5010 Data	S-79, D-100, 2D-157

[3] FAA AC 150/5320-6G, paragraph 3.5.1.

This design section does not recycle any portion of the existing pavement.

Option 2 – Remove part or all the asphalt and overlay with asphalt.

The second option under Section 1 rehabilitation is strengthening the pavement with an asphalt overlay. The FAARFIELD design for asphalt overlay, when keeping some part of the original asphalt surface, requires two (2) inches as the minimum thickness of the remaining asphalt. For this design, we kept the bottommost two inches of the original asphalt and let the software design the required overlay to achieve the strength needed. The results are that 9 ½ inches of new asphalt are needed, resulting in a grade change of +5 inches. The performance characteristics of this section are as follows:

Section 1: Rehabilitation Option 2	
Section	Asphalt (9.5") on milled existing pavement
Life	20 years
PCR	327/F/D/X/T
5010 Data	S-80, D-102, 2D-159

A grade change of five inches is significant, given the relatively flat nature of the airfield. Additional engineering analysis is needed to verify if such an overlay could be achieved.

Option 3 – Remove surface and recycle in-situ base with P-220 Cement Treated Soil Base Course and P-501 Concrete Surface

The last option under Section 1 involves the idea of milling much of the surface and mixing the bottommost 12 inches of pavement (consisting of seven (7) inches of base and five (5) inches of asphalt) to form a stabilized base under the concrete. While life-cycle cost analysis is not part of the scope of this memo, we conducted concrete pavement designs for each Section to determine the pavement thickness needed to switch from asphalt to concrete. Concrete would also bring the taxiway to the same surface material as the adjacent runway. The resulting design from FAARFIELD was a 10 ½ inch concrete pavement over the stabilized base.

Section 1: Rehabilitation Option 3	
Section	Concrete (10.5") on Cement Treated Soil Base (12") via recycling of existing base
Life	20 years
PCR	333/R/D/X/T
5010 Data	S-87, D-105, 2D-172

This section adds 9 inches to the grade of the taxiway compared to the existing one. Such a rise in grade is probably not allowable. However, removing the pavement to lower the top of the subgrade (our field investigation found ~25 inches of lime-stabilized subgrade) to make room for the section could be a way to recycle this material to re-use it.

Section 2

For Section 2 pavement, we also conducted a life calculation using the subgrade strength and standard strengths for P-154 subbase, P-304 cement treated base, and P-401 asphalt at the layer thicknesses as found using the field investigation and listed in the backcalculation models discussed above. The result was surprising. At the traffic levels listed in the earlier technical memo, the Section 2 pavement has a life of over 50 years – which should not be treated

as a quantitative value – but indicates that the pavement section has sufficient strength to carry the current and anticipated traffic for the airport. We know the pavement's surface is distressed and needs renewal, but it is encouraging to know that pavement reconstruction is not required for much of the taxiway pavement.

Section 2: Existing Pavement Section Performance	
Section	Asphalt (4.7") on Quality Base (8") on Subbase (15.2")
Life	>>20 years
PCR	405/F/C/X/T
5010 Data	S-100, D-153, 2D-225, 2D/2D2-644

Given the condition of the surface of the taxiway, some rehabilitation is warranted. The following discussion provides some options for each pavement section.

Option 1 – Remove surface and some base to replace with P-304 Cement Treated Base and P-401 Asphalt

The first option under Section 2 rehabilitation is to remove enough of the existing pavement section to install a new layer of cement-treated base (as P-304 with a bond-breaker) under a new asphalt surface. Such a stabilized base was used in the runway pavement during its reconstruction. The results of the FAARFIELD design for this option yielded that a minimal layer of P-304 cement-treated base of five (5) inches was needed under a new four (4) inch asphalt surface.

Section 2: Rehabilitation Option 1	
Section	New Asphalt (4") on Cement Treated Base (5") on the existing base
Life	>>20 years
PCR	431/F/C/X/T
5010 Data	S-106, D-161, 2D-238, 2D/2D2-671

This pavement section typifies the over-design that can occur when minimum pavement sections are required.

Option 2 – Remove surface and recycle in-situ base with P-220 Cement Treated Soil Base Course and P-401 Asphalt

The second option under Section 2 rehabilitation is to remove enough of the existing pavement section to install a new layer of stabilized base under a new asphalt surface. This meets the requirements of the stabilized pavement section for aircraft weights but instead recycles the existing material. For this section design, we used a conservative assumption of the modulus value of the stabilized base, selecting half the CBR=100 value as outlined in the specification, using a modulus of 75,000 psi for the stabilized base (CBR=50). This value is already very close to the backcalculated value of the base material in its current section. The FAARFIELD results for this section are as follows:

Section 2: Rehabilitation Option 2	
Section	New Asphalt (4"), Cement Treated Soil Base (12") via recycling of existing base
Life	>>20 years
PCR	422/F/C/X/T

5010 Data	S-104, D-158, 2D-233, 2D/2D2-662

Stabilizing the base with some cement (but not creating a rigid pavement structure) would be beneficial for the long-term performance of the pavement, reducing the chances that a rigid layer will reflectively crack through the asphalt surface. A constructability review of the possibilities of recycling the section should be undertaken. Since the taxiway alignment is not changing, windrowing to stabilize part of the section may pose a logistical challenge on an active airfield.

Option 3 – Remove surface and overlay with P-401 Asphalt

The last option under Section 2 rehabilitation is to replace the existing pavement with an asphalt overlay that meets the design. Since this section relies on the existing pavement courses below the surfacing, we used the backcalculated values for the base, subbase, and subgrade and let FAARFIELD compute an asphalt thickness that gets over twenty (20) years on life calculation. We do this because the FAARFIELD program cannot design an overlay with the existing section removed (milled) but must leave at least two inches of the lowest asphalt. The results are much like the life calculation run on the existing pavement section. Because the course moduli values were not drastically different than the standard strength values provided by FAARFIELD on the sections for subbase and base, the overlay needed is the same as the existing pavement thickness of four (4) inches. The section is summarized below:

Section 2: Rehabilitation Option 3	
Section	Mill and Replace Asphalt (4")
Life	>>20 years
PCR	373/F/C/X/T
5010 Data	S-93, D-139, 2D-209

This rehabilitation method would likely be the fastest construction method, requiring only the existing surface to be milled and new pavement installed in its place to the same grade. Milling only three inches would result in a net one-inch gain in pavement elevation. However, confirmation that grades do not exceed the elevation of the adjacent part of the runway needs to be made to ensure airspace issues are not created with the pavement rehabilitation.

Option 4 – Remove surface and recycle in-situ base with P-220 Cement Treated Soil Base Course and P-501 Concrete Surface

The last option under Section 2 rehabilitation is to replace the existing pavement with a concrete pavement section.

Using the backcalculated values for subgrade and subbase, we designed a section using a stabilized soil-cement base. Using the stabilized base specified in P-220, we set the modulus to meet the CBR=100 full-strength value (150,000 psi). The resulting section has a ten (10) inch concrete surface with a twelve (12) inch P-220 stabilized base on the remaining subbase. The performance characteristics of the section are as follows:

Section 2: Rehabilitation Option 4	
Section	Concrete Pavement (10") on Cement Treated Soil Base (12") via recycling of existing base
Life	24 years
PCR	311/R/C/W/T

5010 Data	S-84, D-102, 2D-178

Section 3

Much like Section 1, Section 3 was first run in FAARFIELD in a Life calculation using the measured subgrade, base, and original asphalt strength from the backcalculation measures above, along with standard values for the asphalt overlay. The resulting life, PCR, and strength ratings are surprisingly high.

Section 3: Existing Pavement Section Performance	
Section	Asphalt (6.5") on Base (18.5")
Life	>>>20 years
PCR	455/F/C/X/T
5010 Data	S-111, D-169, 2D-250, 2D/2D2-697

Option 1 – Mill 4" and replace with 4" P-401 Asphalt Surfacing

The performance characteristics are as follows for the existing section, and with a mill and replace 4" asphalt section:

Section 3: Rehabilitation Option 1	
Section	New Asphalt (4") on existing Asphalt (2.5") on Base (18.5")
Life	>>>20 years
PCR	455/F/C/X/T
5010 Data	S-111, D-169, 2D-250, 2D/2D2-697

Such values, like Section 2, do not require pavement strengthening. Renewal of the surface is all that should be programmed for this section of pavement. For the next section on costs, a mill and fill of four (4) inches of asphalt is programmed for pricing.

Option 2 – Remove surface and recycle in-situ base with P-220 Cement Treated Soil Base Course and P-501 Concrete Surface

In keeping with the other two sections, the only other option to present is for a concrete pavement surface design that fits with the existing pavement section. Since the aircraft weights are over 100,000 lbs and this would be considered a new section, adding a stabilized base beneath the concrete is warranted. Recycling the top 12 inches of the existing base, using specification P-220, is included in this design. There is little of the existing base that is not part of the recycling if the grade is maintained, but the new section is not thicker than the existing one. The performance characteristics of the concrete section are as follows:

Section 3: Rehabilitation Option 2	
Section	Concrete Pavement (9.5") on Cement Treated Soil Base (12") via recycling of existing base
Life	>20 years
PCR	301/R/C/W/T
5010 Data	S-82, D-99, 2D-174

Pricing

Pricing is pulled from the current (August 2023) unit pricing for the significant items consisting of:

- Cement Stabilization
- Flexible Base
- Asphalt
- Concrete

Other costs are wrapped into a significant contingency (50%) for the programming. We compared some recent project bid costs to the major items, and when electrical, drainage, and earthwork items are not also a part of the project, the major pavement items approach a level of half of the total project cost. For this project, we do not anticipate needing significant drainage or grading. We also do not expect a significant electrical or lighting component to the project. Therefore, we believe a 50% contingency on the project is appropriate.

Program Level Estimates of Capital Project

For project programming, the extent of the taxiway project is broken into three areas, matching the three Sections discussed above. The areas of each Section are:

Section 1: 9,820 SY
Section 2: 40,570 SY
Section 3: 5,820 SY

The areas are depicted in the layout shown in Figure 2 above.

For Asphalt, the lowest unit cost items for each Section were included and multiplied by the area of each Section. The results, summarized by Section and totaled, including construction professional services and escalation, are in Table 7 below. Please note that this work would be considered rehabilitation as these pavements do not include installing a stabilized base but only replacing the asphalt surface. Also, since the project's construction is not expected until Fiscal Year 2025, pricing includes anticipated inflation for two years.

Table 8 - Project Construction Costs (Asphalt) for Programming

Summary of Project Costs by Option (Asphalt)			
Section 1	Total Area of 9820 SY	Most Economical Cost by Option 2: Asphalt (9.5") on milled existing pavement at $186 per SY	$1,826,520
Section 2	Total Area of 40570 SY	Most Economical Cost by Option 3: Mill and Replace Asphalt (4") at $89 per SY	$3,610,730
Section 3	Total Area of 5820 SY	Most Economical Cost by Option 1: Mill and Replace Asphalt (4") at $89 per SY	$517,980
		Construction Total	$5,956,000
		RPR, Matls Testing, and Construction Admin	$475,000
		10% Contingency	$644,000
		2 year's Escalation (8%)	$1,178,000
		Program Project Total	$8,253,000

If the desire is to strengthen the pavement section where feasible (Section 3 may not) by adding a stabilized base layer, recycling existing base material would be an option, but it adds more than 37% to the construction project total.

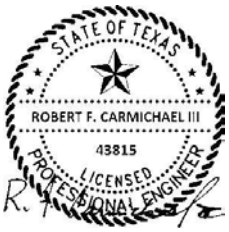
We also determined a project cost for concrete since the runway was constructed in concrete in 2007. Those costs are similarly calculated using the unit costs for concrete instead of asphalt.

Table 9 - Project Construction Costs (Concrete) for Programming

Summary of Project Costs by Option (Concrete)			
Section 1	Total Area of 9820 SY	Option 3: Concrete (10.5") on Cement Treated Soil Base (12") via recycling of existing base at $348 per SY	$3,417,400
Section 2	Total Area of 40570 SY	Option 4: Concrete Pavement (10") on Cement Treated Soil Base (12") via recycling of existing base at $345 per SY	$13,996,700
Section 3	Total Area of 5820 SY	Option 2: Concrete Pavement (10") on Cement Treated Soil Base (12") via recycling of existing base at $345 per SY	$2,007,900
		Construction Total	$19,422,000
		RPR, Matls Testing, and Construction Admin	$1,156,000
		10% Contingency	$2,058,000
		2 year's Escalation (8%)	$3,767,000
		Program Project Total	$26,403,000

ATTACHMENT 1

Memorandum



10-30-2023

Date: October 30, 2023

To: Mr. Thomas D. Dodson, PE, Civil PEs, LLC.

From: Frank Carmichael III, PE, and Mahsa Beizaei, PhD, EIT, HVJ Associates

HVJ Project: HG-22-10070.1

Subject: Pavement Evaluation Study of Parallel Taxiway (Taxiway A) Texas Regional Gulf Coast Regional Airport (LBX)

The scope of work is to provide estimates of layer strengths in terms of modulus values calculated using non-destructive Falling weight Deflectometer (FWD) deflection test data and FAA BAKFAA 3.4 software for Civil PEs' use in preparing the pavement design analyses.

1 Typical Sections

Existing pavement sections were determined based on information from boring logs provided by HVJ SCTx regarding pavement layer thicknesses and material type. **Table 1** shows the identified pavement sections at each boring. The pavement boring logs and layout are included in the HVJ SCTx geotechnical study report in **Appendix A**.

Table 1. Airport Pavement Sections

Boring	Taxiway	Thickness (in.)		
		HMAC	Flex Base	Lime Stabilized Clay
B-1B	A	6	7	25
B-2B	A	4.5	23.5	12
B-3B	A	4.5	23	10
B-4B	A	6.5	18.5	12
B-5B	A	5	23	7
B-6B	B	4	23	10

2 Deflection Data and Backcalculation Analysis of Existing Pavement

Falling Weight Deflectometer (FWD) – HVJ collected deflection data with the FWD on July 21, 2023. The FWD data was collected to estimate the subgrade stiffness of existing pavement layers. Deflection tests were conducted at an average of 100-foot intervals on all taxiways, the parallel Taxiway A, and connecting taxiways B, C, E, and G. Pavement with higher deflection values indicate less stiff pavement structures and lower levels of support, while areas with lower deflection values indicate stiffer pavements and higher levels of support. The NDT deflection plots for the taxiways are available in **Appendix B**. The following table presents the NDT deflection statistics for different Taxiways.

Table 2. FWD Deflections Summary

Taxiway	Normalized Deflection (mils)	
	W1	**W7**
A Left	11.00	1.29
A Right	10.25	1.31
B Left	11.57	1.29
B Right	12.94	1.43
C Left	10.48	1.17
C Right	10.43	1.18
E Left	14.07	1.53
E Right	12.97	1.43
G Left	10.52	1.21
G Right	12.03	1.19
Average	11.63	1.30
STD	1.33	0.12
COV	11.44	9.59

BAKFAA 3.4.1 – Layer stiffness was estimated using the FAA BAKFAA software to analyze FWD data collected. BAKFAA Version 3.4.1 outputs are provided in **Appendix C**.

The pavement structures were modeled in BAKFAA using the reported pavement layers, shown in **Table 1**. As the COV of the FWD measured deflections are small based on **Table 2**, one representative cross section was considered as 4.0" of HMAC over 23.0" of flexible base in the backcalculation procedure. A summary of the BAKFAA backcalculated moduli of the pavement layers for all taxiways tested with representative layer thicknesses is presented in **Table 3**.

Table 3. BAKFAA Backcalculated Layer Modulus

Section	Modulus (ksi)		
	HMAC	Base	Subgrade
Taxiway A Left	1362.4	51.6	24.0
Taxiway A Right	1632.0	50.5	24.9
Taxiway B Left	1228.0	42.7	20.3
Taxiway B Right	998.8	38.7	21.0
Taxiway C Left	1357.4	54.3	21.7
Taxiway C Right	1570.0	45.4	25.7
Taxiway E Left	1310.3	27.5	17.6
Taxiway E Right	1239.1	39.2	16.5
Taxiway G Left	1379.8	49.8	22.9
Taxiway G Right	1556.9	29.9	26.3
Average	1363.5	43.0	22.1
STD	189.2	9.2	3.3
COV	13.9	21.3	15.0
Min	998.8	27.5	16.5
Max	1632.0	54.3	26.3

3 Limitations

This investigation was performed for the exclusive use of Civil PEs, LLC, for purposes of pavement design on parallel taxiway at Texas Regional Gulf Coast Airport (LBX) in Angleton, Texas. HVJ Associates, Inc. has endeavored to comply with generally accepted engineering practice common in the local area. HVJ Associates, Inc. makes no warranty, express or implied. The analyses and recommendations contained in this report are based on data obtained from non-destructive deflection testing of the pavement using the FWD and data supplied by HVJ HOU on pavement borings.

Appendix A

HVJ SCTx Geotechnical Study Report

SEE ATTACHMENT 3

APPENDIX C

CBR TEST RESULT

CBR (CALIFORNIA BEARING RATIO) OF LABORATORY COMPACTED SOILS ASTM D-1883

Project: Evaluation Study of Parallel Taxiway

Sample Location: Composite sample, Flexible Base

Liquid Limit: N/A **Plastic Limit:** N/A **Plasticity Index:** N/A

Method of Compaction: ☒ ASTM D698
☐ ASTM D1557

Sample Condition: ☒ soaked ☐ unsoaked

No. of Blows:	**10**	**25**	**65**
Dry Density Before Soaking (pcf):	109.5	114.3	123.5
Dry Density After Soaking (pcf):	113.0	115.7	123.0
Moisture Content:			
Before Compaction (%):	7.44	7.62	7.97
Top 1-inch Layer After Soaking (%):	11.02	11.11	11.27
Swell (%):	0.15	0.09	0.04
Bearing Ratio (%): (☒ soaked ☐ unsoaked)	4.17	13.30	40.03

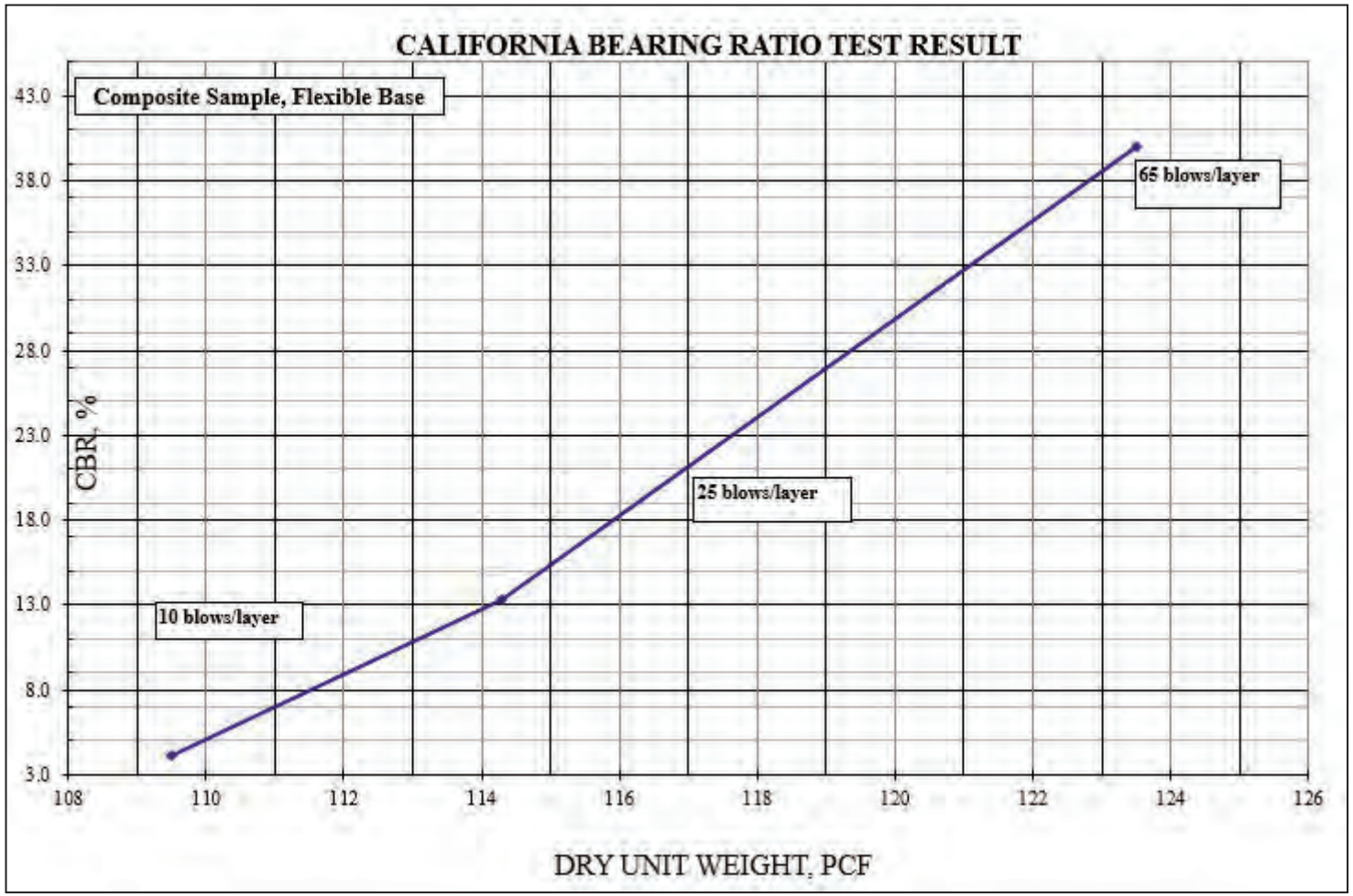
Surcharge: 10 lbs.

HVJ ASSOCIATES
6120 S. Dairy Ashford Road
Houston, Texas 77072-1010
281.933.7388 Ph
281.933.7293 Fax

DATE: 09/06/2023	APPROVED BY: PD	PREPARED BY: RA

CBR TEST RESULTS
EVALUATION STUDY OF PARALLEL TAXIWAY

PROJECT NO.: HG2210070.1	DRAWING NO.: PLATE-1



HVJ ASSOCIATES
6120 S. Dairy Ashford Road
Houston, Texas 77072-1010
281.933.7388 Ph
281.933.7293 Fax

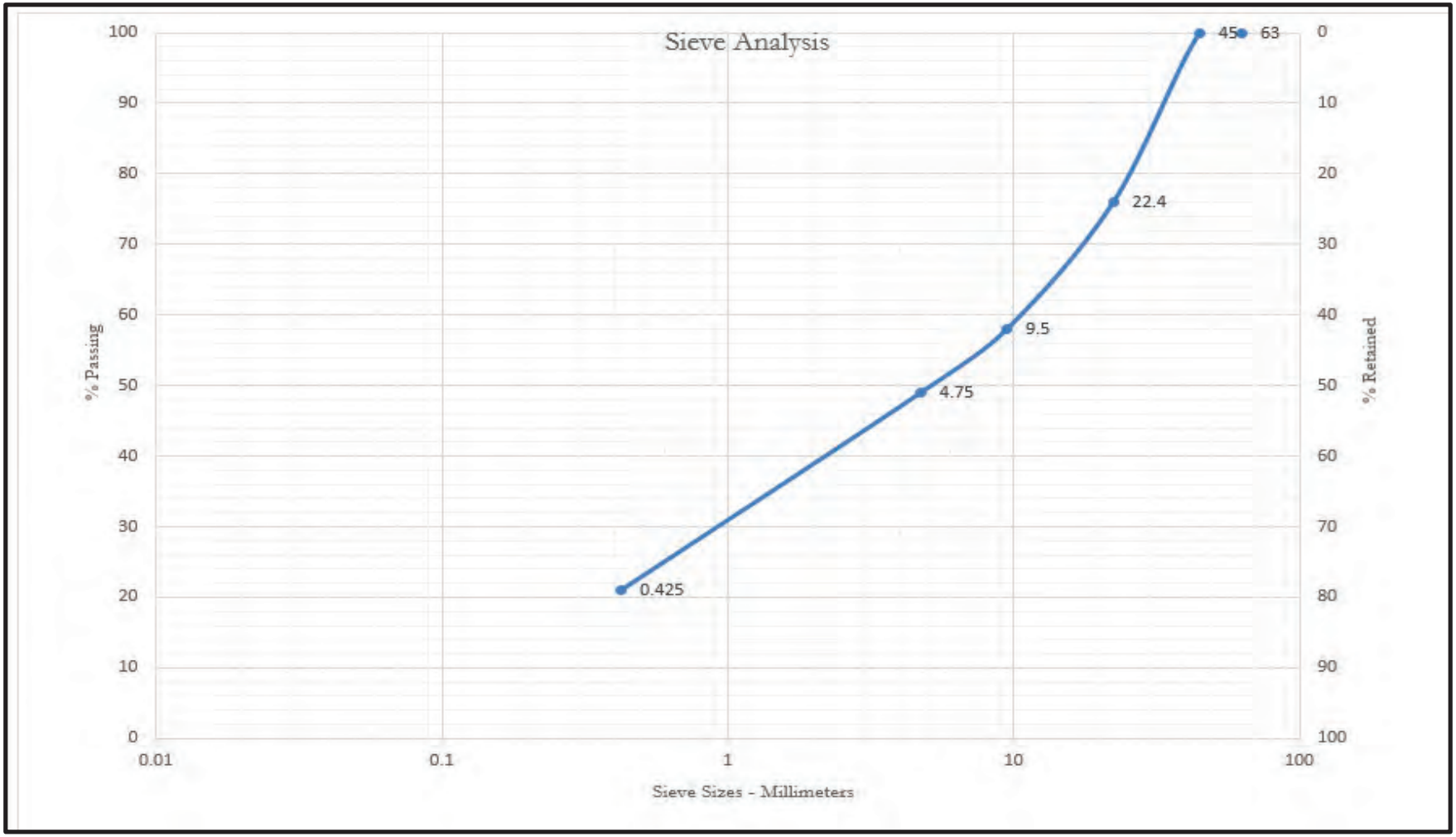
DATE: 09/06/2023	APPROVED BY: PD	PREPARED BY: RA

CBR TEST RESULTS
EVALUATION STUDY OF PARALLEL TAXIWAY

PROJECT NO.: HG2210070.1	DRAWING NO.: APPENDIX -C2

APPENDIX D

SIEVE ANALYSIS



HVJ ASSOCIATES
6120 S. Dairy Ashford Road
Houston, Texas 77072-1010
281.933.7388 Ph
281.933.7293 Fax

DATE: 09/05/2023	APPROVED BY: PD	PREPARED BY: RA

SIEVE ANALYSIS (FLEXIBLE BASE)
EVALUATION STUDY OF PARALLEL TAXIWAY

PROJECT NO.: HG2210070.1	DRAWING NO.: APPENDIX D

APPENDIX E

DCP TEST RESULTS

TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

Refresh Workbook

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID:	Near 1-B	SAMPLED DATE:	08/07/2023
TEST NUMBER:		LETTING DATE:	
SAMPLE STATUS:		CONTROLLING CSJ:	
COUNTY:	Brazoria	SPEC YEAR:	2014
SAMPLED BY:	Edgar	SPEC ITEM:	
SAMPLE LOCATION:	Parallel Taxiway	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Lime Stabilized, Clay		
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	

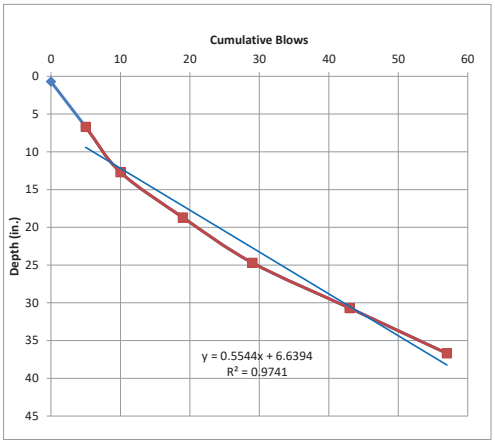
COURSE\LIFT:		STATION:		DIST. FROM CL:	
Long. (x):	95°27'39.1"W	Latitude (y):	29°05'59.9"N	Elev. (z):	

Material Classification:	All other types	Weather:	Cloudy
Hammer Weight:	8-KG [17.6-lbs.]	Water Table Depth (ft.):	
Pavement Conditions:		Depth of zero point below surface (in.):	0.50
Design Modulus (E) ksi:			

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	1.2	0	0.70				
5	7.2	5	6.70	6.4	8.4	YES	YES
5	13.2	10	12.70	6.4	8.4	YES	YES
9	19.2	19	18.70	12.3	12.7	YES	YES
10	25.2	29	24.70	13.8	13.7	YES	YES
14	31.2	43	30.70	20.1	17.4	YES	YES
14	37.2	57	36.70	20.1	17.4	YES	YES
					13.0	YES - Review Proof Rolling	Eavg. ≥ E design ?

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	13.0		



Remarks:

6" Asphalt
33" Base

Test Method:	Tested By:	Tested Date:
D6951	Edgar	09/11/2023

Test Stamp Code:	Omit Test:	Completed Date:	Reviewed By:
J.E.			

Locked By:	TxDOT:	District:	Area:

Authorized By:	Authorized Date:

TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

Refresh Workbook

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID:	Near 2-B	SAMPLED DATE:	08/07/2023
TEST NUMBER:		LETTING DATE:	
SAMPLE STATUS:		CONTROLLING CSJ:	
COUNTY:	Brazoria	SPEC YEAR:	2014
SAMPLED BY:	Edgar	SPEC ITEM:	
SAMPLE LOCATION:	Parallel Taxiway	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Lime Stabilized, Clay		
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	

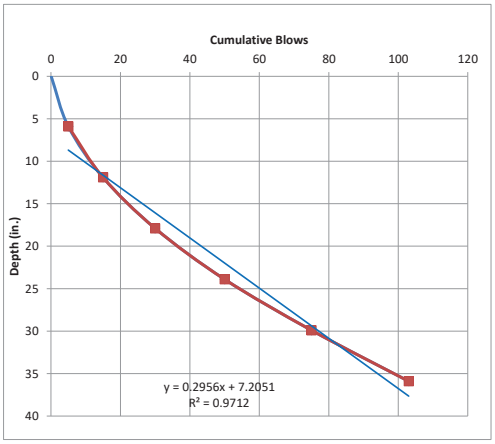
COURSE\LIFT:		STATION:		DIST. FROM CL:	
Long. (x):	95°27'38.9"W	Latitude (y):	29°6'24.2"N	Elev. (z):	

Material Classification:	All other types	Weather:	Cloudy
Hammer Weight:	8-KG [17.6-lbs.]	Water Table Depth (ft.):	
Pavement Conditions:		Depth of zero point below surface (in.):	0.50
Design Modulus (E) ksi:			

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	0.4	0	-0.10				
5	6.4	5	5.90	6.4	8.4	YES	YES
10	12.4	15	11.90	13.8	13.7	YES	YES
15	18.4	30	17.90	21.8	18.3	YES	YES
20	24.4	50	23.90	30.0	22.5	YES	YES
25	30.4	75	29.90	38.6	26.4	YES	YES
28	36.4	103	35.90	43.8	28.6	YES	YES
					19.7	YES - Review Proof Rolling	Eavg. ≥ E design ?

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	19.7		



Remarks:
4.5" Asphalt
35.5" Base

Test Method:	Tested By:	Tested Date:
D6951	Edgar	09/11/2023

Test Stamp Code:	Omit Test:	Completed Date:	Reviewed By:
J.E.			

Locked By:	TxDOT:	District:	Area:

Authorized By:	Authorized Date:

TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

Refresh Workbook

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID:	Near 3-B	SAMPLED DATE:	08/07/2023
TEST NUMBER:		LETTING DATE:	
SAMPLE STATUS:		CONTROLLING CSJ:	
COUNTY:	Brazoria	SPEC YEAR:	2014
SAMPLED BY:	Edgar	SPEC ITEM:	
SAMPLE LOCATION:	Parallel Taxiway	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Lime Stabilized, Clay		
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	

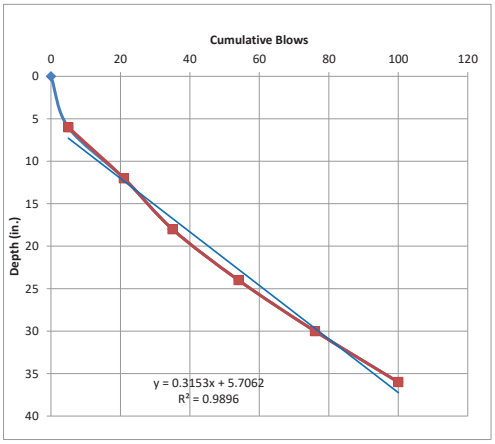
COURSE\LIFT:		STATION:		DIST. FROM CL:	
Long. (x):	95°27'38.9"W	Latitude (y):	29°6'24.2"N	Elev. (z):	

Material Classification:	All other types	Weather:	Cloudy
Hammer Weight:	8-KG [17.6-lbs.]	Water Table Depth (ft.):	
Pavement Conditions:		Depth of zero point below surface (in.):	0.50
Design Modulus (E) ksi:			

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	0.5	0	0.00				
5	6.5	5	6.00	6.4	8.4	YES	YES
16	12.5	21	12.00	23.4	19.2	YES	YES
14	18.5	35	18.00	20.1	17.4	YES	YES
19	24.5	54	24.00	28.4	21.7	YES	YES
22	30.5	76	30.00	33.4	24.1	YES	YES
24	36.5	100	36.00	36.8	25.6	YES	YES
					19.4	YES - Review Proof Rolling	Eavg. ≥ E design ?

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	19.4		



Remarks:

4.5" Asphalt
33" Base

Test Method:	Tested By:	Tested Date:
D6951	Edgar	09/11/2023

Test Stamp Code:	Omit Test:	Completed Date:	Reviewed By:
J.E.			

Locked By:	TxDOT:	District:	Area:

Authorized By:	Authorized Date:

TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

Refresh Workbook

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID:	Near 4-B	SAMPLED DATE:	08/07/2023
TEST NUMBER:		LETTING DATE:	
SAMPLE STATUS:		CONTROLLING CSJ:	
COUNTY:	Brazoria	SPEC YEAR:	2014
SAMPLED BY:	Edgar	SPEC ITEM:	
SAMPLE LOCATION:	Parallel Taxiway	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Lime Stabilized, Clay		
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	

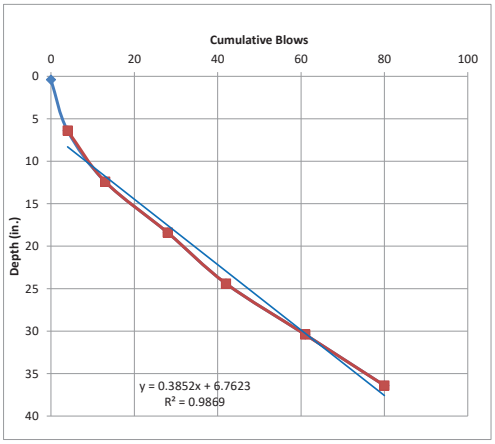
COURSE\LIFT:		STATION:		DIST. FROM CL:	
Long. (x):	95°27'39.2"W	Latitude (y):	29°6'58.6"N	Elev. (z):	

Material Classification:	All other types	Weather:	Cloudy
Hammer Weight:	8-KG [17.6-lbs.]	Water Table Depth (ft.):	
Pavement Conditions:		Depth of zero point below surface (in.):	0.50
Design Modulus (E) ksi:			

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	0.9	0	0.40				
4	6.9	4	6.40	5.0	7.1	YES	YES
9	12.9	13	12.40	12.3	12.7	YES	YES
15	18.9	28	18.40	21.8	18.3	YES	YES
14	24.9	42	24.40	20.1	17.4	YES	YES
19	30.9	61	30.40	28.4	21.7	YES	YES
19	36.9	80	36.40	28.4	21.7	YES	YES
					16.5	YES - Review Proof Rolling	Eavg. ≥ E design ?

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	16.5		



Remarks:

6.5" Asphalt
30.5" Base

Test Method:	Tested By:	Tested Date:
D6951	Edgar	09/11/2023

Test Stamp Code:	Omit Test:	Completed Date:	Reviewed By:
J.E.			

Locked By:	TxDOT:	District:	Area:

Authorized By:	Authorized Date:

TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

Refresh Workbook

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID:	Near 5-B	SAMPLED DATE:	08/07/2023
TEST NUMBER:		LETTING DATE:	
SAMPLE STATUS:		CONTROLLING CSJ:	
COUNTY:	Brazoria	SPEC YEAR:	2014
SAMPLED BY:	Edgar	SPEC ITEM:	
SAMPLE LOCATION:	Parallel Taxiway	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Lime Stabilized, Clay		
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	

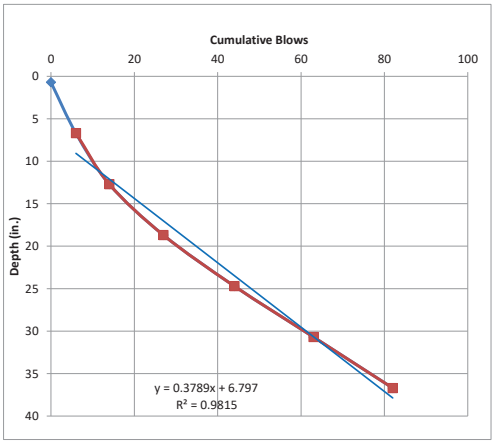
COURSE\LIFT:		STATION:		DIST. FROM CL:	
Long. (x):	95°27'39.5"W	Latitude (y):	29°7'5.4"N	Elev. (z):	

Material Classification:	All other types	Weather:	Cloudy
Hammer Weight:	8-KG [17.6-lbs.]	Water Table Depth (ft.):	
Pavement Conditions:		Depth of zero point below surface (in.):	0.50
Design Modulus (E) ksi:			

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	1.2	0	0.70				
6	7.2	6	6.70	7.8	9.5	YES	YES
8	13.2	14	12.70	10.8	11.7	YES	YES
13	19.2	27	18.70	18.5	16.5	YES	YES
17	25.2	44	24.70	25.0	20.0	YES	YES
19	31.2	63	30.70	28.4	21.7	YES	YES
19	37.2	82	36.70	28.4	21.7	YES	YES
					16.9	YES - Review Proof Rolling	Eavg. ≥ E design ?

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	16.9		



Remarks:

5" Asphalt
30" Base

Test Method:	Tested By:	Tested Date:
D6951	Edgar	09/11/2023

Test Stamp Code:	Omit Test:	Completed Date:	Reviewed By:
J.E.			

Locked By:	TxDOT:	District:	Area:

Authorized By:	Authorized Date:

TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

Refresh Workbook

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID:	Near 6-B	SAMPLED DATE:	08/07/2023
TEST NUMBER:		LETTING DATE:	
SAMPLE STATUS:		CONTROLLING CSJ:	
COUNTY:	Brazoria	SPEC YEAR:	2014
SAMPLED BY:	Edgar	SPEC ITEM:	
SAMPLE LOCATION:	Parallel Taxiway	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Lime Stabilized, Clay		
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	

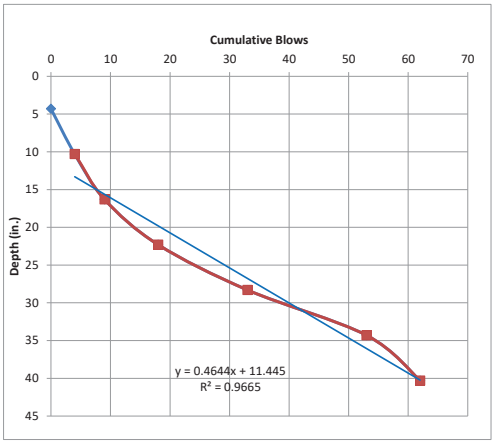
COURSE\LIFT:		STATION:		DIST. FROM CL:	
Long. (x):	95°27'40.5"W	Latitude (y):	29°6'6.5"N	Elev. (z):	

Material Classification:	All other types	Weather:	Cloudy
Hammer Weight:	8-KG [17.6-lbs.]	Water Table Depth (ft.):	
Pavement Conditions:		Depth of zero point below surface (in.):	0.50
Design Modulus (E) ksi:			

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	4.8	0	4.30				
4	10.8	4	10.30	5.0	7.1	YES	YES
5	16.8	9	16.30	6.4	8.4	YES	YES
9	22.8	18	22.30	12.3	12.7	YES	YES
15	28.8	33	28.30	21.8	18.3	YES	YES
20	34.8	53	34.30	30.0	22.5	YES	YES
9	40.8	62	40.30	12.3	12.7	YES	YES
					13.6	YES - Review Proof Rolling	Eavg. ≥ E design ?

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	13.6		



Remarks:

5" Asphalt
30" Base

Test Method:	Tested By:	Tested Date:
D6951	Edgar	09/11/2023

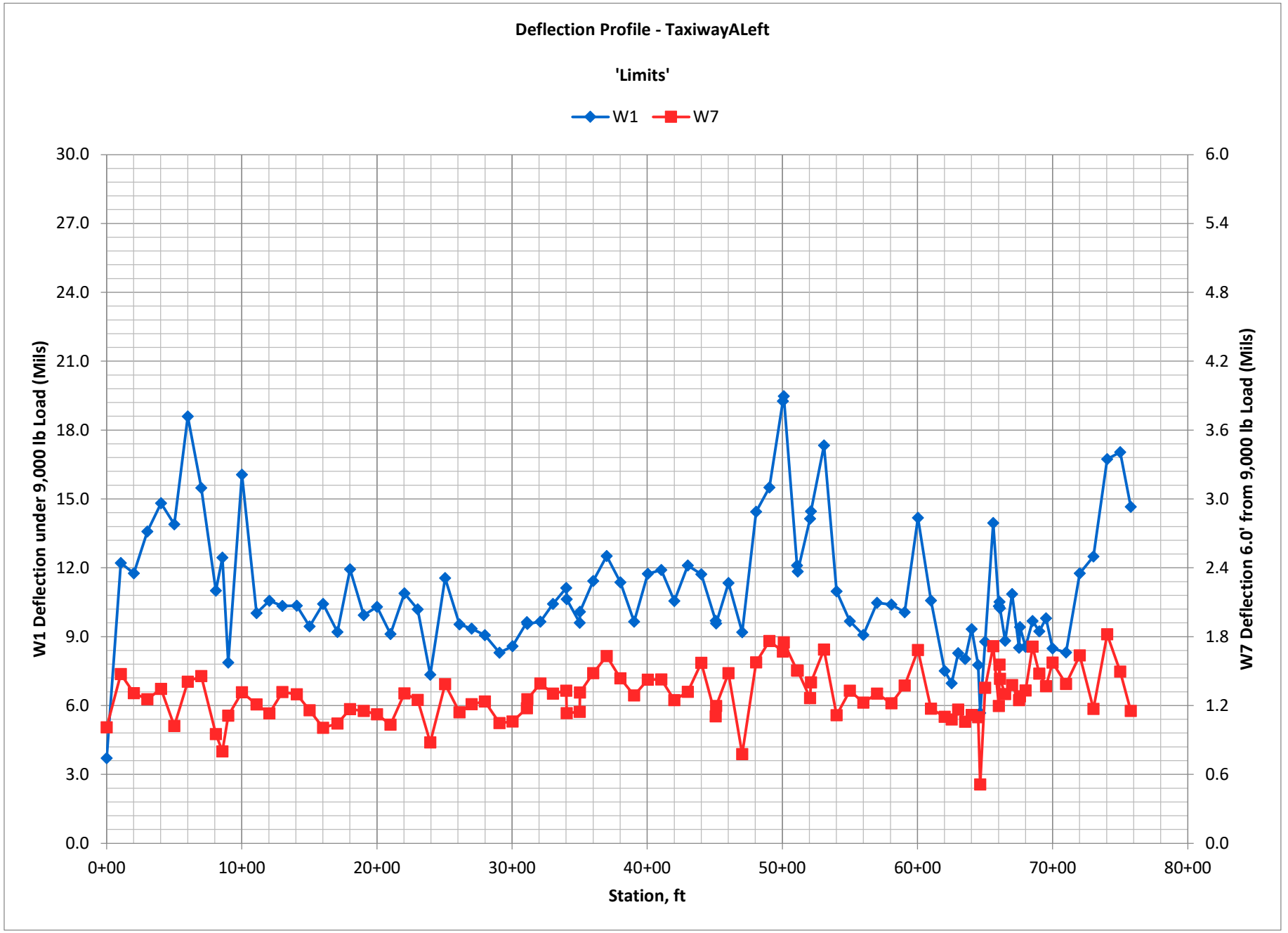
Test Stamp Code:	Omit Test:	Completed Date:	Reviewed By:
J.E.			

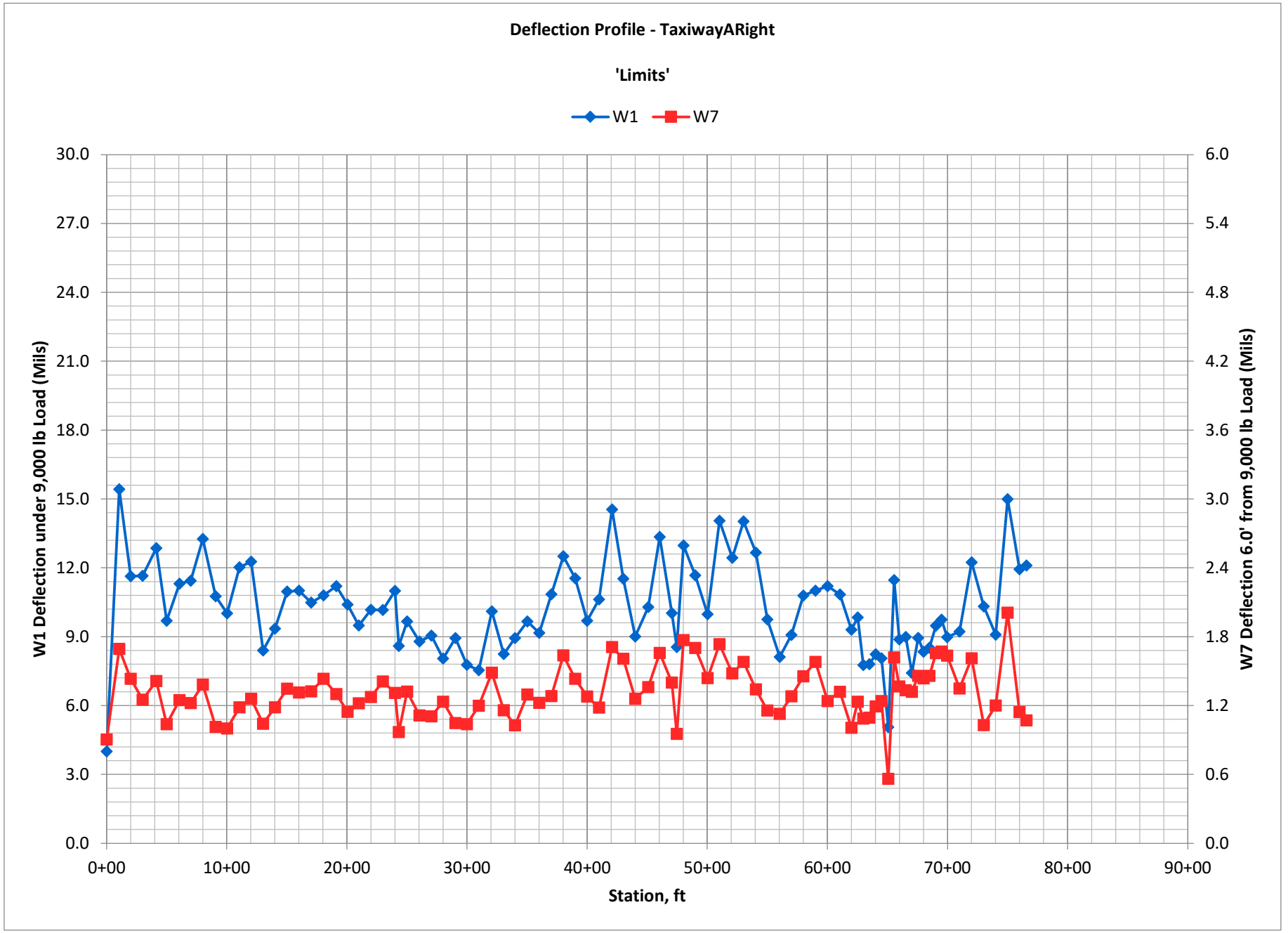
Locked By:	TxDOT:	District:	Area:

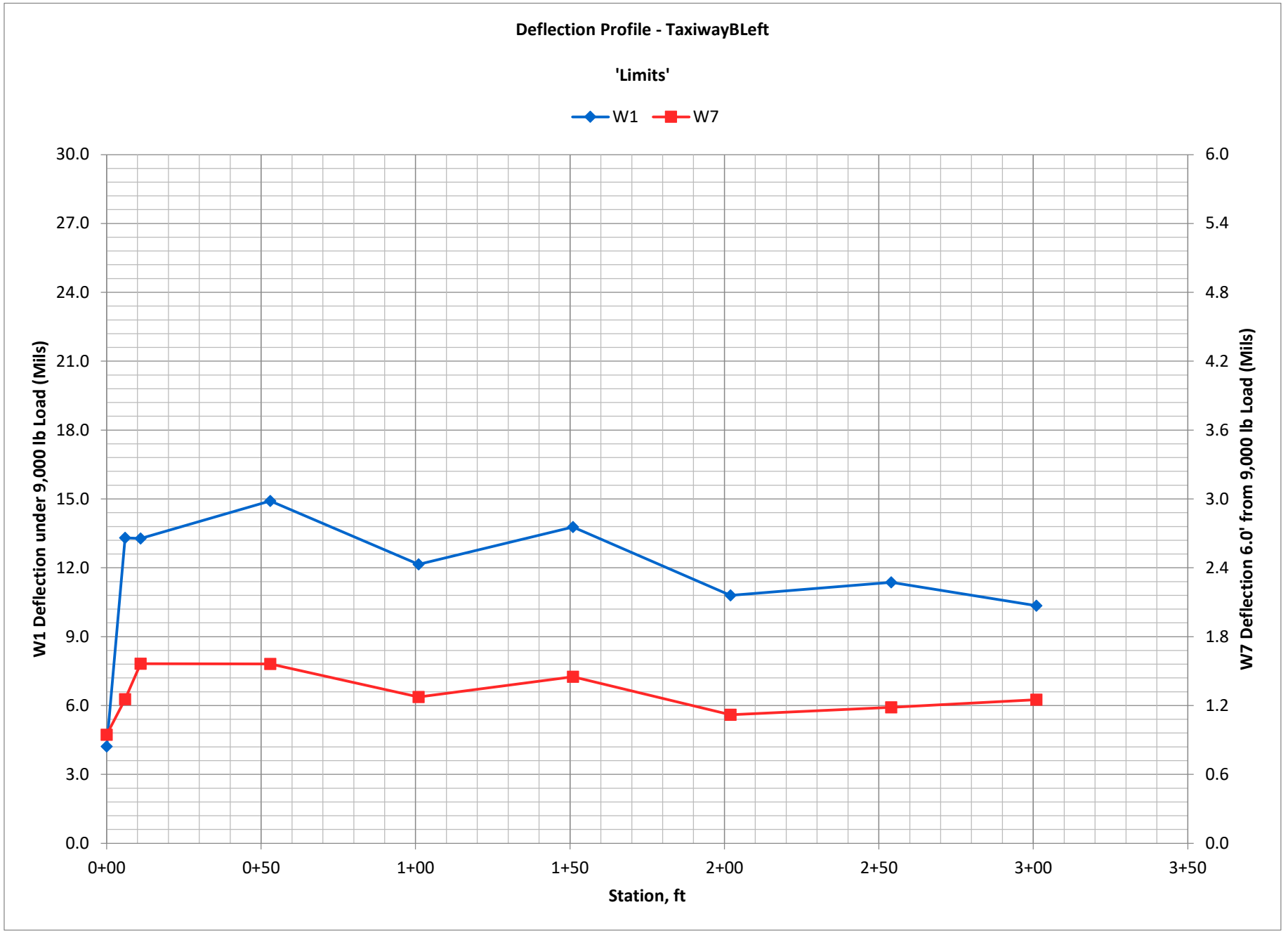
Authorized By:	Authorized Date:

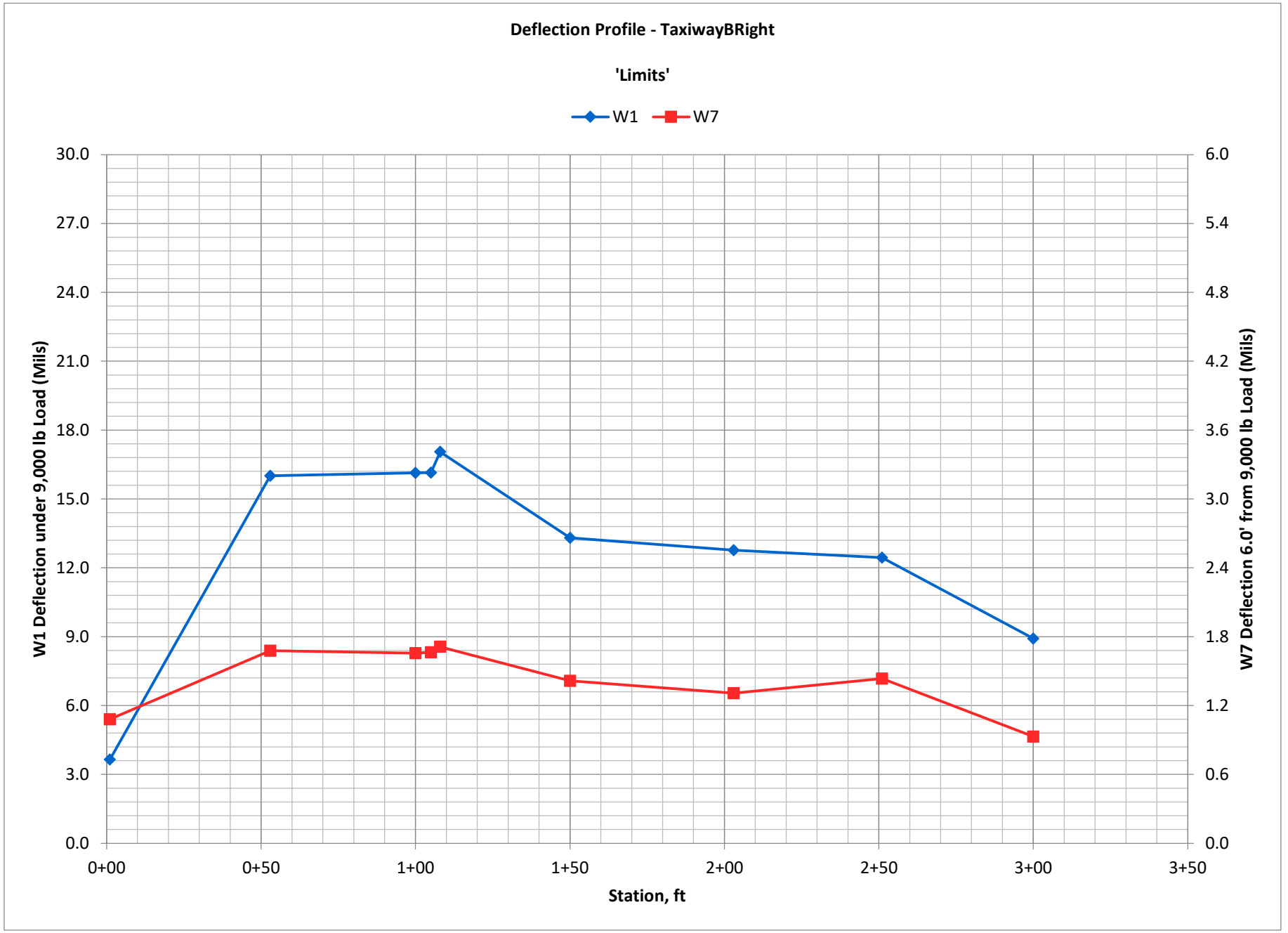
Appendix B

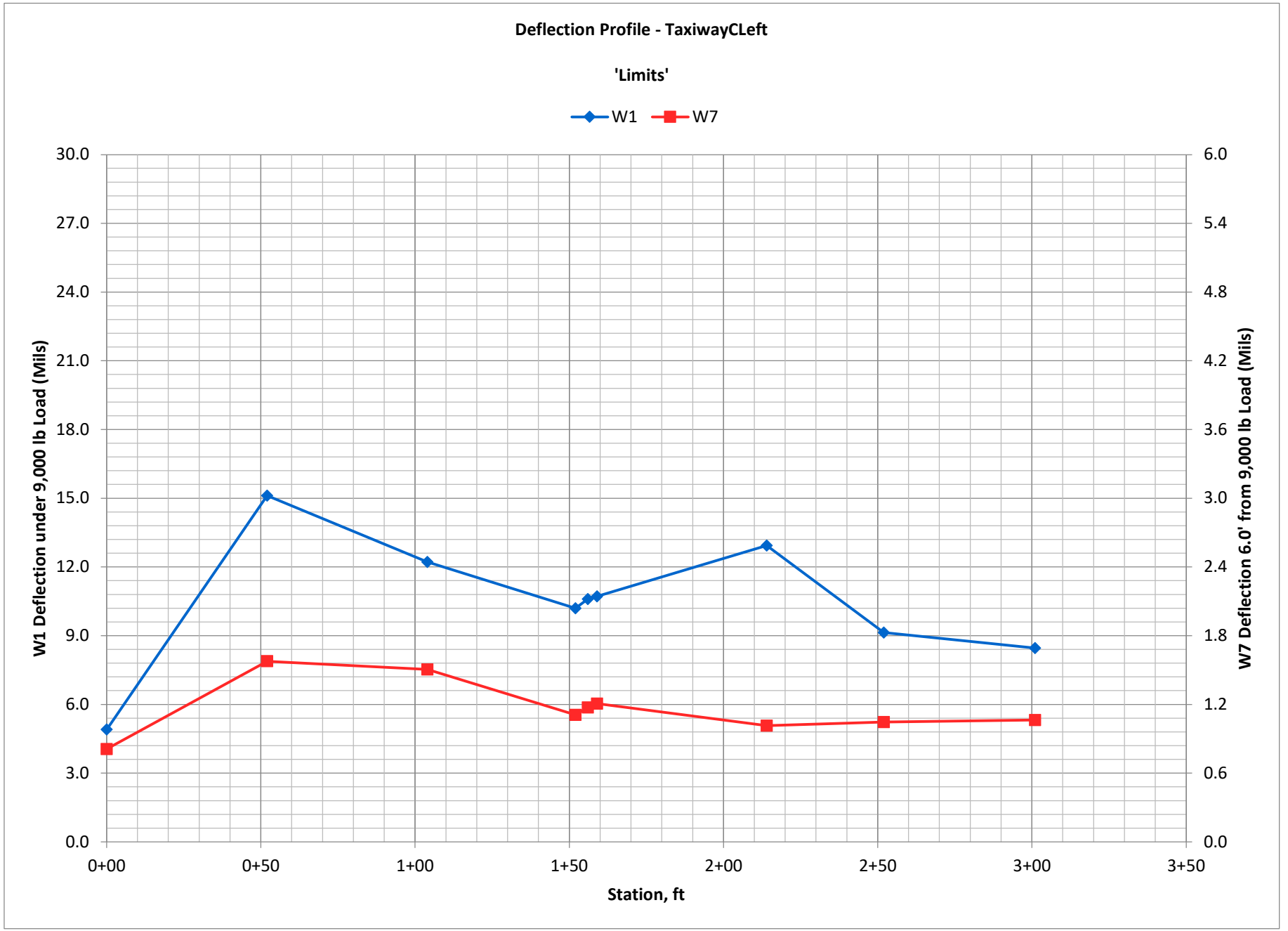
NDT Plots

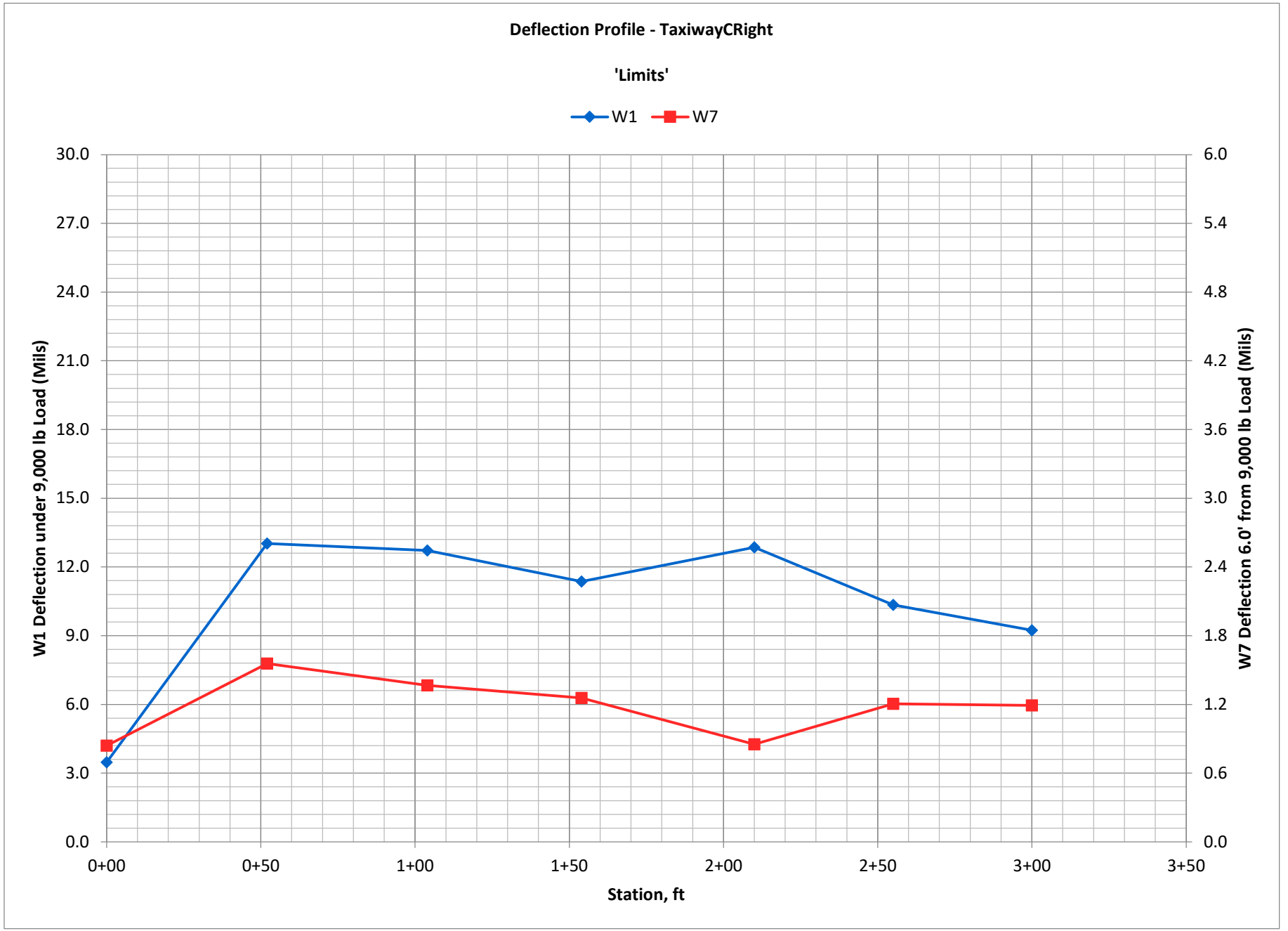

Deflection Profile - TaxiwayALeft
'Limits'
W1
W7
W1 Deflection under 9,000 lb Load (Mils)
W7 Deflection 6.0' from 9,000 lb Load (Mils)
Station, ft
30.0
27.0
24.0
21.0
18.0
15.0
12.0
9.0
6.0
3.0
0.0
6.0
5.4
4.8
4.2
3.6
3.0
2.4
1.8
1.2
0.6
0.0
0+00
10+00
20+00
30+00
40+00
50+00
60+00
70+00
80+00

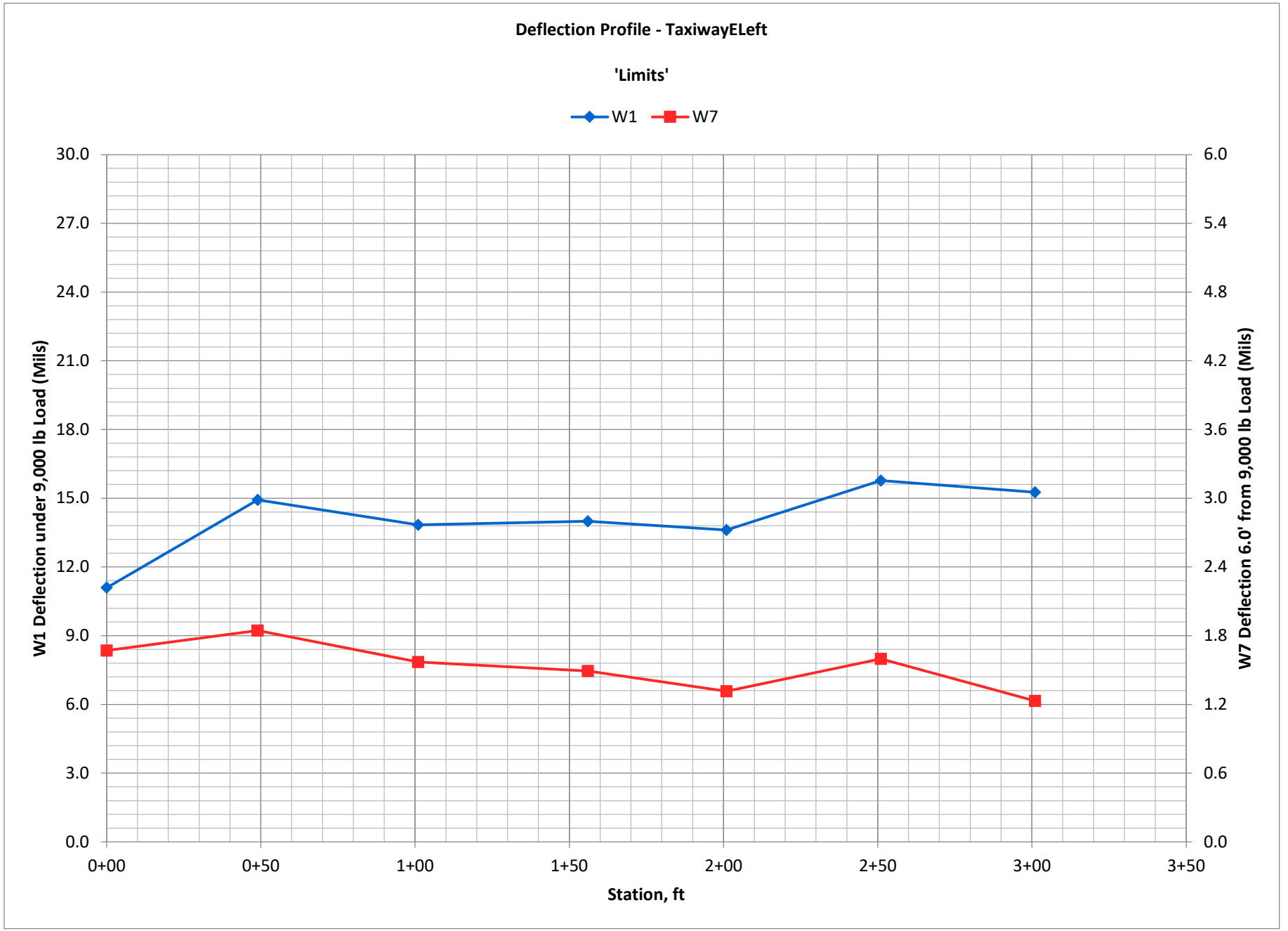

Deflection Profile - TaxiwayARight
'Limits'
W1
W7
W1 Deflection under 9,000 lb Load (Mils)
W7 Deflection 6.0' from 9,000 lb Load (Mils)
Station, ft
30.0
27.0
24.0
21.0
18.0
15.0
12.0
9.0
6.0
3.0
0.0
6.0
5.4
4.8
4.2
3.6
3.0
2.4
1.8
1.2
0.6
0.0
0+00
10+00
20+00
30+00
40+00
50+00
60+00
70+00
80+00
90+00

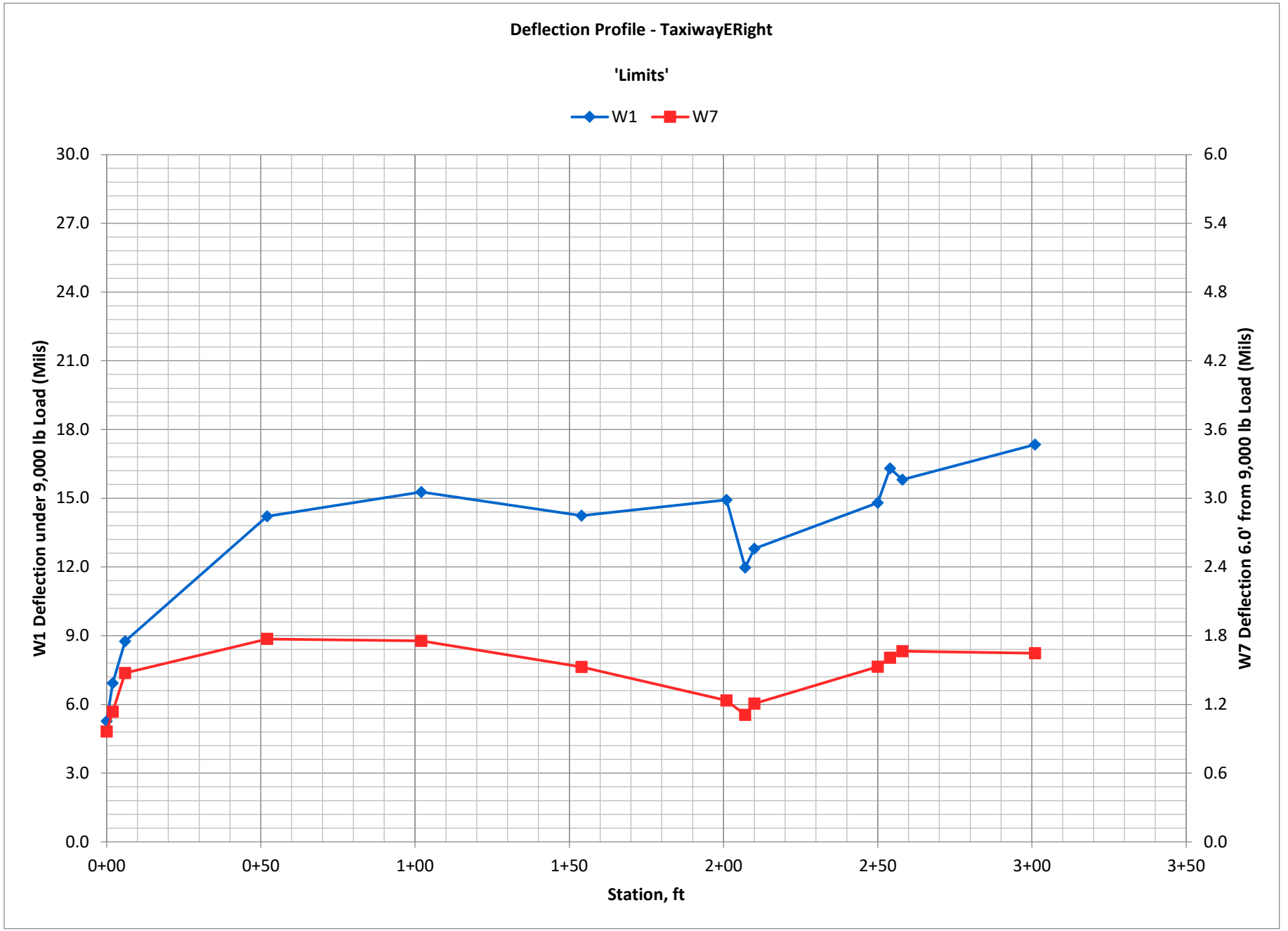

Deflection Profile - TaxiwayBLeft
'Limits'
W1
W7
W1 Deflection under 9,000 lb Load (Mils)
W7 Deflection 6.0' from 9,000 lb Load (Mils)
30.0
27.0
24.0
21.0
18.0
15.0
12.0
9.0
6.0
3.0
0.0
6.0
5.4
4.8
4.2
3.6
3.0
2.4
1.8
1.2
0.6
0.0
0+00
0+50
1+00
1+50
2+00
2+50
3+00
3+50
Station, ft

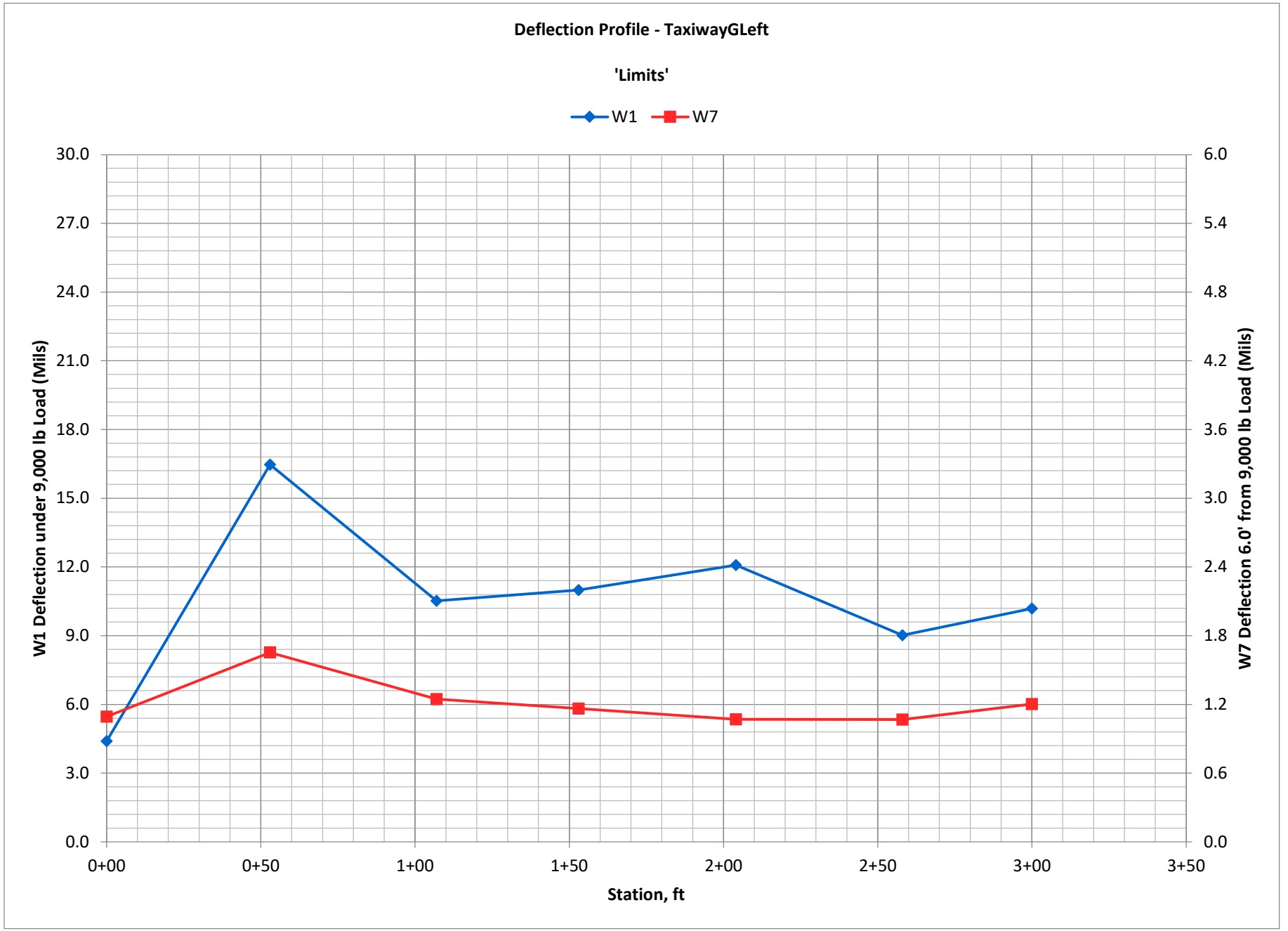

Deflection Profile - TaxiwayBRight
'Limits'
W1
W7
30.0
27.0
24.0
21.0
18.0
15.0
12.0
9.0
6.0
3.0
0.0
6.0
5.4
4.8
4.2
3.6
3.0
2.4
1.8
1.2
0.6
0.0
W1 Deflection under 9,000 lb Load (Mils)
W7 Deflection 6.0' from 9,000 lb Load (Mils)
0+00
0+50
1+00
1+50
2+00
2+50
3+00
3+50
Station, ft

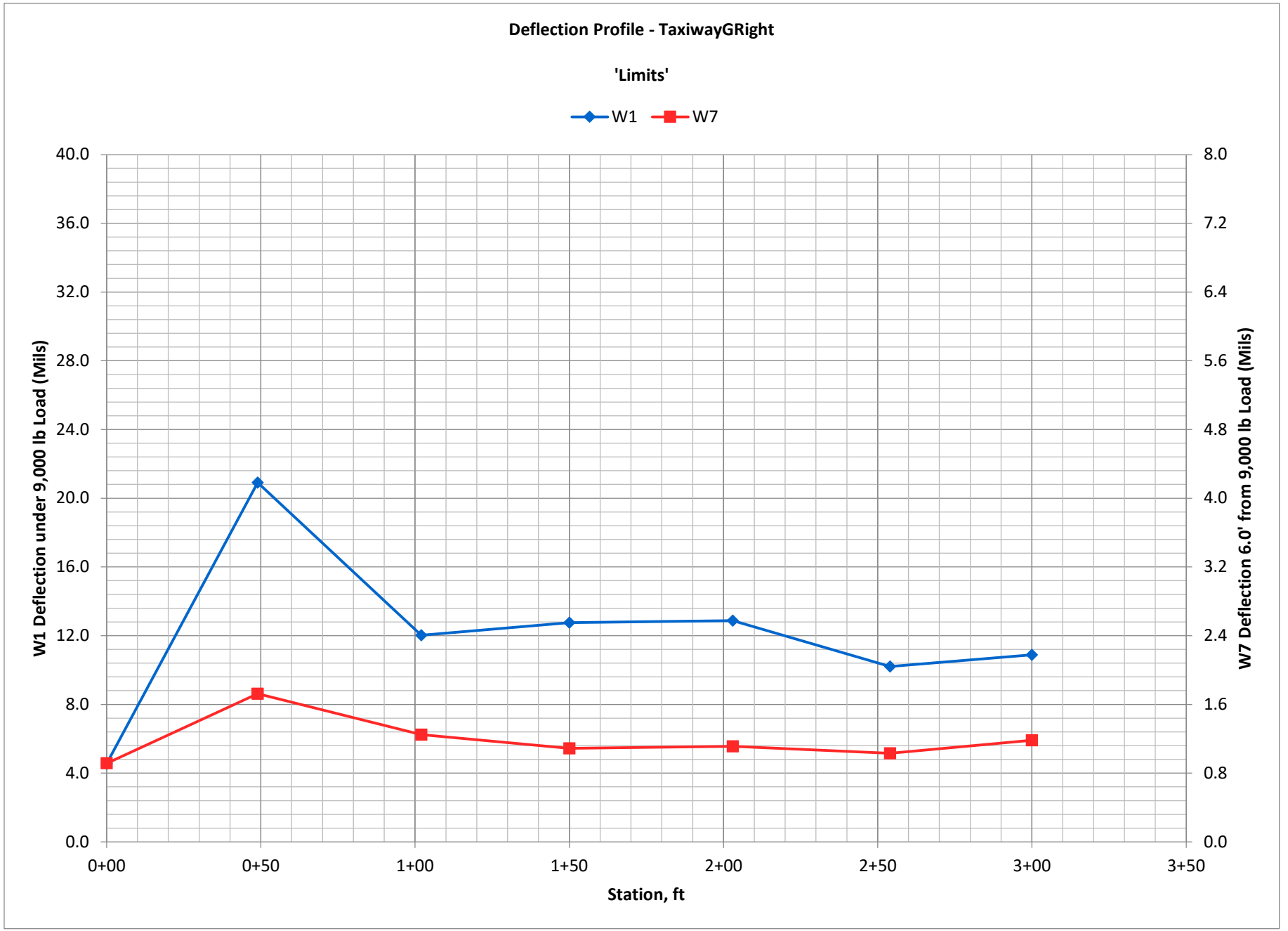

Deflection Profile - TaxiwayCLeft
'Limits'
W1
W7
30.0
27.0
24.0
21.0
18.0
15.0
12.0
9.0
6.0
3.0
0.0
6.0
5.4
4.8
4.2
3.6
3.0
2.4
1.8
1.2
0.6
0.0
W1 Deflection under 9,000 lb Load (Mils)
W7 Deflection 6.0' from 9,000 lb Load (Mils)
0+00
0+50
1+00
1+50
2+00
2+50
3+00
3+50
Station, ft


Deflection Profile - TaxiwayCRight
'Limits'
W1
W7
30.0
27.0
24.0
21.0
18.0
15.0
12.0
9.0
6.0
3.0
0.0
6.0
5.4
4.8
4.2
3.6
3.0
2.4
1.8
1.2
0.6
0.0
W1 Deflection under 9,000 lb Load (Mils)
W7 Deflection 6.0' from 9,000 lb Load (Mils)
0+00
0+50
1+00
1+50
2+00
2+50
3+00
3+50
Station, ft


Deflection Profile - TaxiwayELeft
'Limits'
W1
W7
30.0
27.0
24.0
21.0
18.0
15.0
12.0
9.0
6.0
3.0
0.0
6.0
5.4
4.8
4.2
3.6
3.0
2.4
1.8
1.2
0.6
0.0
W1 Deflection under 9,000 lb Load (Mils)
W7 Deflection 6.0' from 9,000 lb Load (Mils)
0+00
0+50
1+00
1+50
2+00
2+50
3+00
3+50
Station, ft


Deflection Profile - TaxiwayERight
'Limits'
W1
W7
W1 Deflection under 9,000 lb Load (Mils)
W7 Deflection 6.0' from 9,000 lb Load (Mils)
30.0
27.0
24.0
21.0
18.0
15.0
12.0
9.0
6.0
3.0
0.0
6.0
5.4
4.8
4.2
3.6
3.0
2.4
1.8
1.2
0.6
0.0
0+00
0+50
1+00
1+50
2+00
2+50
3+00
3+50
Station, ft


Deflection Profile - TaxiwayGLeft
'Limits'
W1
W7
W1 Deflection under 9,000 lb Load (Mils)
W7 Deflection 6.0' from 9,000 lb Load (Mils)
30.0
27.0
24.0
21.0
18.0
15.0
12.0
9.0
6.0
3.0
0.0
6.0
5.4
4.8
4.2
3.6
3.0
2.4
1.8
1.2
0.6
0.0
0+00
0+50
1+00
1+50
2+00
2+50
3+00
3+50
Station, ft


Deflection Profile - TaxiwayGRight
'Limits'
W1
W7
40.0
36.0
32.0
28.0
24.0
20.0
16.0
12.0
8.0
4.0
0.0
8.0
7.2
6.4
5.6
4.8
4.0
3.2
2.4
1.6
0.8
0.0
W1 Deflection under 9,000 lb Load (Mils)
W7 Deflection 6.0' from 9,000 lb Load (Mils)
0+00
0+50
1+00
1+50
2+00
2+50
3+00
3+50
Station, ft

Appendix C
BAKFAA Backcalculation Outputs

Taxiway A Left:

Structure Information

Layer	Geometric Mean Modulus, psi	Arithmetic Mean Modulus, psi	Poisson's	Interface	Thickness, in	Changeable?
1	∞	1,362,374	0.35	1.00	4.00	Yes
2	∞	51,569	0.35	1.00	23.00	Yes
3	∞	24,041	0.40	1.00	0.00	Yes

In batch mode, FWD data displayed is for last point only.

Station = 7578
Plate Radius = 5.91 in
Plate Load = 41,901 lbf
ISM = 644 kip/in

Sensor	1	2	3	4	5	6	7
Offset, in	0.0	12.0	24.0	36.0	48.0	60.0	72.0
Meas Defl, mil	65.0	41.3	23.1	16.4	10.6	6.3	5.9
Calc Defl, mil	64.7	42.0	23.0	14.4	10.4	8.2	6.8

RMS Error (%) = 13.8
Number of Iterations = 161
Point Comment = Comment:

Taxiway A Right:

Structure Information

Layer	Geometric Mean Modulus, psi	Arithmetic Mean Modulus, psi	Poisson's	Interface	Thickness, in	Changeable?
1	∞	1,631,998	0.35	1.00	4.00	Yes
2	∞	50,515	0.35	1.00	23.00	Yes
3	∞	24,929	0.40	1.00	0.00	Yes

In batch mode, FWD data displayed is for last point only.

Station = 7657
Plate Radius = 5.91 in
Plate Load = 42,788 lbf
ISM = 758 kip/in

Sensor	1	2	3	4	5	6	7
Offset, in	0.0	12.0	24.0	36.0	48.0	60.0	72.0
Meas Defl, mil	56.4	37.1	22.6	14.1	9.1	6.2	4.7
Calc Defl, mil	55.9	38.5	21.8	13.2	9.1	7.0	5.8

RMS Error (%) = 10.2
Number of Iterations = 185
Point Comment = Comment:

Taxiway B Left:

Structure Information

Layer	Geometric Mean Modulus, psi	Arithmetic Mean Modulus, psi	Poisson's	Interface	Thickness, in	Changeable?
1	1,228,021	1,320,633	0.35	1.00	4.00	Yes
2	42,710	49,707	0.35	1.00	23.00	Yes
3	20,272	20,820	0.40	1.00	0.00	Yes

In batch mode, FWD data displayed is for last point only.

Station = 301
Plate Radius = 5.91 in
Plate Load = 42,821 lbf
ISM = 909 kip/in

Sensor	1	2	3	4	5	6	7
Offset, in	0.0	12.0	24.0	36.0	48.0	60.0	72.0
Meas Defl, mil	47.1	30.4	18.7	16.3	9.3	6.5	5.7
Calc Defl, mil	47.0	31.0	18.8	13.2	10.1	8.2	6.8

RMS Error (%) = 14.7
Number of Iterations = 128
Point Comment = Comment:

Taxiway B Right:

Structure Information

Layer	Geometric Mean Modulus, psi	Arithmetic Mean Modulus, psi	Poisson's	Interface	Thickness, in	Changeable?
1	998,797	1,143,948	0.35	1.00	4.00	Yes
2	38,691	87,061	0.35	1.00	23.00	Yes
3	20,973	21,748	0.40	1.00	0.00	Yes

In batch mode, FWD data displayed is for last point only.

Station = 300
Plate Radius = 5.91 in
Plate Load = 43,007 lbf
ISM = 1,023 kip/in

Sensor	1	2	3	4	5	6	7
Offset, in	0.0	12.0	24.0	36.0	48.0	60.0	72.0
Meas Defl, mil	42.1	24.6	14.1	12.6	6.4	4.8	4.0
Calc Defl, mil	42.0	24.8	14.1	9.8	7.5	6.0	5.0

RMS Error (%) = 17.7
Number of Iterations = 152
Point Comment = Comment:

Taxiway C Left:

Structure Information

Layer	Geometric Mean Modulus, psi	Arithmetic Mean Modulus, psi	Poisson's	Interface	Thickness, in	Changeable?
1	1,357,438	1,627,130	0.35	1.00	4.00	Yes
2	54,284	74,050	0.35	1.00	23.00	Yes
3	21,658	22,537	0.40	1.00	0.00	Yes

In batch mode, FWD data displayed is for last point only.

Station = 301
Plate Radius = 5.91 in
Plate Load = 43,018 lbf
ISM = 1,116 kip/in

Sensor	1	2	3	4	5	6	7
Offset, in	0.0	12.0	24.0	36.0	48.0	60.0	72.0
Meas Defl, mil	38.6	23.6	14.0	11.9	8.0	6.1	4.9
Calc Defl, mil	38.6	23.6	14.4	10.5	8.2	6.7	5.6

RMS Error (%) = 7.7
Number of Iterations = 151
Point Comment = Comment:

Taxiway C Right:

Structure Information

Layer	Geometric Mean Modulus, psi	Arithmetic Mean Modulus, psi	Poisson's	Interface	Thickness, in	Changeable?
1	1,569,986	1,707,761	0.35	1.00	4.00	Yes
2	45,391	66,084	0.35	1.00	23.00	Yes
3	25,704	26,098	0.40	1.00	0.00	Yes

In batch mode, FWD data displayed is for last point only.

Station = 300
Plate Radius = 5.91 in
Plate Load = 42,843 lbf
ISM = 986 kip/in

Sensor	1	2	3	4	5	6	7
Offset, in	0.0	12.0	24.0	36.0	48.0	60.0	72.0
Meas Defl, mil	43.5	27.1	16.7	12.2	8.7	7.6	5.5
Calc Defl, mil	43.4	27.3	16.5	11.7	9.1	7.4	6.2

RMS Error (%) = 5.0
Number of Iterations = 156
Point Comment = Comment:

Taxiway E Left:

Structure Information

Layer	Geometric Mean Modulus, psi	Arithmetic Mean Modulus, psi	Poisson's	Interface	Thickness, in	Changeable?
1	1,310,316	1,371,176	0.35	1.00	4.00	Yes
2	27,453	29,038	0.35	1.00	23.00	Yes
3	17,567	17,903	0.40	1.00	0.00	Yes

In batch mode, FWD data displayed is for last point only.

Station = 301
Plate Radius = 5.91 in
Plate Load = 41,671 lbf
ISM = 613 kip/in

Sensor	1	2	3	4	5	6	7
Offset, in	0.0	12.0	24.0	36.0	48.0	60.0	72.0
Meas Defl, mil	68.0	46.0	25.9	20.7	12.0	8.5	6.3
Calc Defl, mil	67.8	46.6	27.0	17.1	12.3	9.7	8.0

RMS Error (%) = 13.6
Number of Iterations = 149
Point Comment = Comment:

Taxiway E Right:

Structure Information

Layer	Geometric Mean Modulus, psi	Arithmetic Mean Modulus, psi	Poisson's	Interface	Thickness, in	Changeable?
1	1,239,079	1,523,244	0.35	1.00	4.00	Yes
2	39,188	52,084	0.35	1.00	23.00	Yes
3	16,471	16,866	0.40	1.00	0.00	Yes

In batch mode, FWD data displayed is for last point only.

Station = 301
Plate Radius = 5.91 in
Plate Load = 41,112 lbf
ISM = 502 kip/in

Sensor	1	2	3	4	5	6	7
Offset, in	0.0	12.0	24.0	36.0	48.0	60.0	72.0
Meas Defl, mil	81.9	54.7	31.9	23.7	14.4	9.9	7.3
Calc Defl, mil	81.4	55.9	32.2	20.3	14.5	11.3	9.4

RMS Error (%) = 13.5
Number of Iterations = 119
Point Comment = Comment:

Taxiway G Left:

Structure Information

Layer	Geometric Mean Modulus, psi	Arithmetic Mean Modulus, psi	Poisson's	Interface	Thickness, in	Changeable?
1	1,379,841	1,495,066	0.35	1.00	4.00	Yes
2	49,769	63,420	0.35	1.00	23.00	Yes
3	22,857	23,596	0.40	1.00	0.00	Yes

In batch mode, FWD data displayed is for last point only.

Station = 300
Plate Radius = 5.91 in
Plate Load = 42,843 lbf
ISM = 924 kip/in

Sensor	1	2	3	4	5	6	7
Offset, in	0.0	12.0	24.0	36.0	48.0	60.0	72.0
Meas Defl, mil	46.4	29.8	19.7	14.6	10.0	6.9	5.3
Calc Defl, mil	46.3	30.8	18.7	13.1	10.0	8.1	6.7

RMS Error (%) = 13.0
Number of Iterations = 138
Point Comment = Comment:

Taxiway G Right:

Structure Information

Layer	Geometric Mean Modulus, psi	Arithmetic Mean Modulus, psi	Poisson's	Interface	Thickness, in	Changeable?
1	1,556,854	1,753,056	0.35	1.00	4.00	Yes
2	29,911	49,080	0.35	1.00	23.00	Yes
3	26,283	26,586	0.40	1.00	0.00	Yes

In batch mode, FWD data displayed is for last point only.

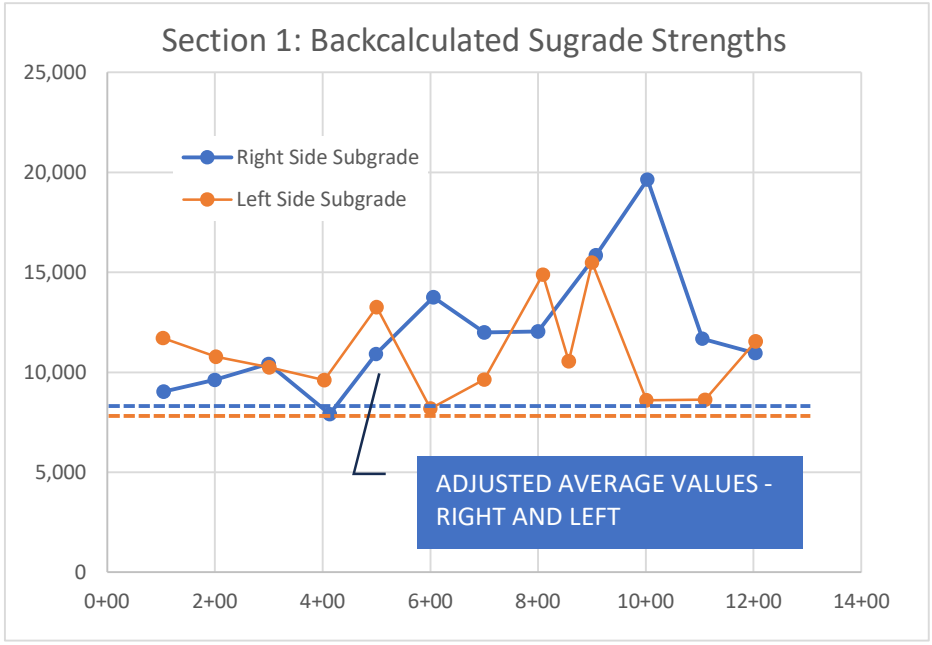
Station = 300
Plate Radius = 5.91 in
Plate Load = 42,591 lbf
ISM = 867 kip/in

Sensor	1	2	3	4	5	6	7
Offset, in	0.0	12.0	24.0	36.0	48.0	60.0	72.0
Meas Defl, mil	49.1	28.7	17.0	13.5	8.7	6.4	5.5
Calc Defl, mil	49.1	29.0	16.8	11.9	9.2	7.4	6.2

RMS Error (%) = 9.0
Number of Iterations = 112
Point Comment = Comment:

ATTACHMENT 2
Material Strength Calcs
Section 1 - Taxiway A

	Left Backcalc	Right Backcalc	Average
Surface Asphalt	106211 psi	143121 psi	124666 psi
Base Asphalt	130330 psi	203822 psi	167076 psi
Base	59156 psi	64990 psi	62073 psi
Subgrade*	8,023	8,516	8,269



DMI - ft	Layer 1 Typ	Layer Thick	Backcalcula	Seed Modul	Layer 2 Typ	Layer Thick	Backcalcula	Seed Modul	Layer 3 Typ	Layer Thick	Backcalcula	Seed Modul	Layer 4 Typ	Backcalcula	Seed Modul	Corrected S	Poisson's R	Interface Pa	Changeable	Remarks	LTE Case
0+00	P-401/P-40	2	772,118	200,000	P-401/P-40	4.5	1,298,457	400,000	P-209	7	468,132	75,000	Low Strengt	48,765	9,000	24,383	0.4	1	Yes	--Comment:	
1+05	P-401/P-40	2	344,851	200,000	P-401/P-40	4.5	471,795	400,000	P-209	7	12,503	75,000	Low Strengt	18,060	9,000	9,030	0.4	1	Yes		
2+00	P-401/P-40	2	159,543	200,000	P-401/P-40	4.5	319,822	400,000	P-209	7	116,370	75,000	Low Strengt	19,249	9,000	9,625	0.4	1	Yes		
3+00	P-401/P-40	2	206,598	200,000	P-401/P-40	4.5	203,041	400,000	P-209	7	111,288	75,000	Low Strengt	20,819	9,000	10,410	0.4	1	Yes		
4+13	P-401/P-40	2	193,772	200,000	P-401/P-40	4.5	320,978	400,000	P-209	7	107,651	75,000	Low Strengt	15,819	9,000	7,910	0.4	1	Yes		
4+99	P-401/P-40	2	292,045	200,000	P-401/P-40	4.5	287,800	400,000	P-209	7	148,128	75,000	Low Strengt	21,836	9,000	10,918	0.4	1	Yes		
6+06	P-401/P-40	2	521,589	200,000	P-401/P-40	4.5	287,322	400,000	P-209	7	53,436	75,000	Low Strengt	27,501	9,000	13,751	0.4	1	Yes	Bore 1B	
7+00	P-401/P-40	2	237,853	200,000	P-401/P-40	4.5	330,175	400,000	P-209	7	89,072	75,000	Low Strengt	23,984	9,000	11,992	0.4	1	Yes		
8+00	P-401/P-40	2	316,517	200,000	P-401/P-40	4.5	185,730	400,000	P-209	7	41,178	75,000	Low Strengt	24,086	9,000	12,043	0.4	1	Yes		
9+07	P-401/P-40	2	214,295	200,000	P-401/P-40	4.5	1,356,336	400,000	P-209	7	16,113	75,000	Low Strengt	31,692	9,000	15,846	0.4	1	Yes	--Comment:	'Drop 7
10+03	P-401/P-40	2	124,386	200,000	P-401/P-40	4.5	87,389	400,000	P-209	7	262,001	75,000	Low Strengt	39,268	9,000	19,634	0.4	1	Yes	--Comment:	
11+05	P-401/P-40	2	32,935	200,000	P-401/P-40	4.5	26,493	400,000	P-209	7	138,433	75,000	Low Strengt	23,352	9,000	11,676	0.4	1	Yes		
12+03	P-401/P-40	2	304,634	200,000	P-401/P-40	4.5	124,030	400,000	P-209	7	125,447	75,000	Low Strengt	21,929	9,000	10,965	0.4	1	Yes		
Section 1 Avg			286,241	+86,241			407,644	+7,644			129,981	+54,981		25,874	+16,874	12,937					
	Std Deviation		180,813	50%	Std Deviation		408,292	50%	Std Deviation		116,162	50%		Std Deviation		4,421	34%				
	Adjusted Value		143,121		Adjusted Value		203,822		Adjusted Value		64,990			Adjusted Value		8,516					

DMI - ft	LTE Case 2	LTE Case 3	Measured D	Measured D	Measured D	Measured D	Measured D	Measured D	Measured D	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I
0+00			19.2	12.73	9.64	7.34	6.18	5.46	4.43	18.95	13.73	9.98	7.35	5.56	4.34	3.52
1+05			73.92	53.77	30.74	20.48	13.23	8.62	7.71	75.56	51.78	30.69	19.16	13.35	10.3	8.5
2+00			56.62	39.7	26.36	16.6	12.62	8.21	6.69	57.41	37.57	25.47	17.97	13.29	10.33	8.42
3+00			58.11	38.3	24.63	14.75	11.09	8.12	5.9	58.64	36.02	23.91	16.74	12.35	9.61	7.85
4+13			63.03	45.12	28.57	17.8	13.09	25.62	6.42	63.42	43.57	30.28	21.7	16.17	12.59	10.23
4+99			47.84	40.46	16.68	18.38	8.29	6.87	5.3	49.91	32.81	22.64	16.19	12.05	9.38	7.63
6+06			50.65	30.79	18.82	11.7	9.28	7.46	5.87	50.69	30.85	18.54	12.37	9.04	7.08	5.83
7+00			52.38	32.67	18.96	18.67	10	7.47	5.81	52.09	32.85	21.08	14.48	10.63	8.28	6.79
8+00			64.86	36.49	21.64	14.03	10.08	7.2	6.28	64.83	36.64	21.09	13.89	10.15	7.98	6.59
9+07			52.91	26.8	16	11.16	7.83	6.17	4.96	47.68	32.57	18.98	11.44	7.78	5.96	4.94
10+03			48.88	19.85	13.06	8.98	7.02	6.43	4.95	48.83	20.43	13.18	8.98	6.54	5.08	4.17
11+05			118.16	36.31	21.75	13.57	9.69	8.56	5.78	118.3	35.21	22.08	14.75	10.67	8.29	6.87
12+03			59.31	35.06	22.94	15.22	10.93	7.8	6.02	59.43	33.84	22.47	15.83	11.74	9.16	7.48

Section 1 Av

Section 1 - Taxiway A

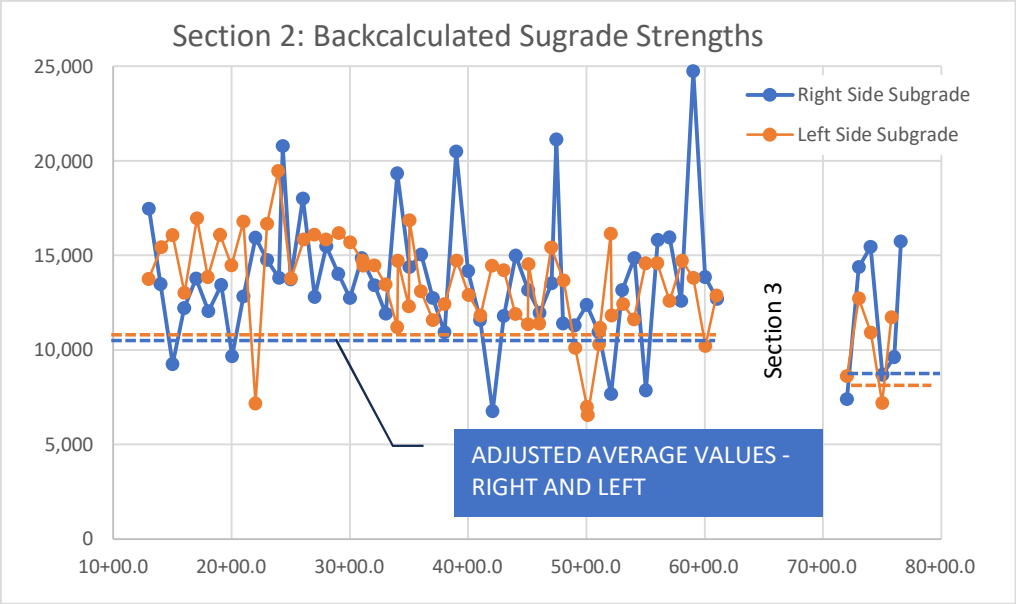
DMI - ft	Layer 1 Typ	Layer Thick	Backcalcula	Seed Modulus	Layer 2 Typ	Layer Thick	Backcalcula	Seed Modul	Layer 3 Typ	Layer Thick	Backcalcula	Seed Modul	Layer 4 Typ	Layer Thick	Backcalcula	Seed Modul	Corrected S	Poisson's R	Interface Pa	Changeable	Remarks
0+00	P-401/P-40:	2	751,135	200000	P-401/P-40:	4.5	1,268,119	400000	P-209	7	451,601	75000	Low Strengt	0	47,067	9000	23,534	0.4	1	Yes	--Comment:
1+04	P-401/P-40:	2	430,744	200000	P-401/P-40:	4.5	179,083	400000	P-209	7	78,686	75000	Low Strengt	0	23,427	9000	11,714	0.4	1	Yes	
2+02	P-401/P-40:	2	14,976	200000	P-401/P-40:	4.5	37,562	400000	P-209	7	94,058	75000	Low Strengt	0	21,555	9000	10,778	0.4	1	Yes	
3+01	P-401/P-40:	2	128,047	200000	P-401/P-40:	4.5	178,923	400000	P-209	7	90,337	75000	Low Strengt	0	20,498	9000	10,249	0.4	1	Yes	
4+03	P-401/P-40:	2	81,604	200000	P-401/P-40:	4.5	98,287	400000	P-209	7	10,704	75000	Low Strengt	0	19,205	9000	9,603	0.4	1	Yes	
5+00	P-401/P-40:	2	69,769	200000	P-401/P-40:	4.5	21,082	400000	P-209	7	56,403	75000	Low Strengt	0	26,529	9000	13,265	0.4	1	Yes	
6+00	P-401/P-40:	2	31,434	200000	P-401/P-40:	4.5	42,165	400000	P-209	7	67,589	75000	Low Strengt	0	16,377	9000	8,189	0.4	1	Yes	Bore 1B
7+00	P-401/P-40:	2	39,017	200000	P-401/P-40:	4.5	27,411	400000	P-209	7	76,980	75000	Low Strengt	0	19,259	9000	9,630	0.4	1	Yes	
8+09	P-401/P-40:	2	686,644	200000	P-401/P-40:	4.5	366,615	400000	P-209	7	20,116	75000	Low Strengt	0	29,775	9000	14,888	0.4	1	Yes	
8+57	P-401/P-40:	2	69,842	200000	P-401/P-40:	4.5	240,320	400000	P-209	7	109,089	75000	Low Strengt	0	21,108	9000	10,554	0.4	1	Yes	--Comment:
9+00	P-401/P-40:	2	120,031	200000	P-401/P-40:	4.5	458,624	400000	P-209	7	235,591	75000	Low Strengt	0	30,968	9000	15,484	0.4	1	Yes	--Comment:
10+01	P-401/P-40:	2	74,409	200000	P-401/P-40:	4.5	95,041	400000	P-209	7	13,183	75000	Low Strengt	0	17,189	9000	8,595	0.4	1	Yes	
11+10	P-401/P-40:	2	319,442	200000	P-401/P-40:	4.5	602,841	400000	P-209	7	156,593	75000	Low Strengt	0	17,244	9000	8,622	0.4	1	Yes	
12+04	P-401/P-40:	2	156,816	200000	P-401/P-40:	4.5	33,159	400000	P-209	7	195,434	75000	Low Strengt	0	23,088	9000	11,544	0.4	1	Yes	
Section 1 Avg			212,422	+12,422			260,659	(-139,341)			118,312	+43,312			23,806	+14,806	11,903				
	Std Deviation		234,766	50%	Std Deviation		328,535	50%	Std Deviation		112,015	50%		Std Deviation			3,880	33%			
	Adjusted Value		106,211		Adjusted Value		130,330		Adjusted Value		59,156			Adjusted Value			8,023				

DMI - ft	LTE Case '	LTE Case 2	LTE Case 3	Measured D	Measured D	Measured D	Measured D	Measured D	Measured D	Measured D	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I
0+00				17.94	12.28	8.84	14.69	6.65	5.8	5.09	19.62	14.23	10.34	7.63	5.77	4.51	3.66
1+04				56.34	33.48	20.91	14.72	10.54	8.35	6.84	56.37	33.3	21.09	14.55	10.73	8.39	6.88
2+02				129	39.22	24.47	15.11	11.57	7.84	6.29	129.1	39.03	23.73	15.74	11.32	8.77	7.35
3+01				64.54	40.55	24.93	15.34	9.74	7.57	6.09	65.18	37.9	24.31	16.71	12.25	9.53	7.81
4+03				129	60.44	28.71	15.77	12.27	9	6.44	128.87	60.86	27.24	16.35	12.04	9.66	8.1
5+00				129	33.81	19.69	11.45	8.98	6.46	5.49	129	33.75	18.63	12.35	9.09	7.17	5.96
6+00				121.13	55.11	28.37	14.75	9.86	6.98	6.58	121.81	49.41	30.2	20.22	14.68	11.43	9.46
7+00				129	46.37	25	14.99	11	8.94	6.8	128.91	43.35	26.17	17.46	12.7	9.91	8.21
8+09				54.57	33.94	19.11	11.06	8.72	6.32	5	54.54	34.02	18.83	11.57	8.16	6.38	5.3
8+57	'Drop 8			60.88	40.35	23.2	13.45	8.04	5.3	4.11	61.74	35.44	23.05	15.88	11.62	9.02	7.4
9+00				38.59	24.61	15.99	10.87	8.03	6.6	5.36	38.73	23.77	16.28	11.51	8.49	6.58	5.36
10+01				129	60.84	33.69	19.19	10.9	7.52	6	128.83	61.93	29.62	18.36	13.49	10.76	9
11+10				50.46	36.41	23.33	37.78	9.61	7.02	5.62	50.43	37.5	27.36	20.22	15.31	11.98	9.72
12+04				88.32	35.52	22.05	13.3	9	6.68	5.1	88.41	33.35	21.79	15.02	11.06	8.63	7.07

Section 1 A\

Sta 13+ to 61+	Left Backcalc	Right Backcalc	Average
Surface Asphalt	217,747	244,846	231,297
Base	73,547	88,358	80,952
Subbase	15,422	14,958	15,190
Subgrade	10,638	10,443	10,541

Sta 72+ to 75+	Left Backcalc	Right Backcalc	Average
Surface Asphalt	215,998	287,017	251,507
Base	41,484	51,352	46,418
Subbase	12,538	20,016	16,277
Subgrade	8,197	8,480	8,339



Section 2 - Taxiway A

DMI - ft	Layer 1 Typ	Layer Thick	Backcalcula	Seed Modulus	Layer 2 Typ	Layer Thick	Backcalcula	Seed Modul	Layer 3 Typ	Layer Thick	Backcalcula	Seed Modul	Layer 4 Typ	Layer Thick	Backcalcula	Seed Modulus	- psi	Measured D	Measured D	Measured D	Measured D
13+02.0	P-401/P-40	4.7	726,256	200000	P-209	8	69,310	75000	P-154	15.2	53,737	40000	Low Strengt	0	34,937	9000	17,469	38.54	24.24	13.75	8.67
14+01.0	P-401/P-40	4.7	287,236	200000	P-209	8	151,259	75000	P-154	15.2	38,600	40000	Low Strengt	0	26,945	9000	13,473	44.5	26.37	16.39	15.17
15+02.0	P-401/P-40	4.7	221,536	200000	P-209	8	152,014	75000	P-154	15.2	45,072	40000	Low Strengt	0	18,475	9000	9,238	50.24	33.49	21.65	25.55
16+01.0	P-401/P-40	4.7	411,429	200000	P-209	8	167,812	75000	P-154	15.2	16,195	40000	Low Strengt	0	24,423	9000	12,212	50.15	33.42	21.9	15.49
17+02.0	P-401/P-40	4.7	302,536	200000	P-209	8	186,162	75000	P-154	15.2	18,032	40000	Low Strengt	0	27,540	9000	13,770	48.33	31.9	19.47	14.06
18+05.0	P-401/P-40	4.7	326,556	200000	P-209	8	167,941	75000	P-154	15.2	20,935	40000	Low Strengt	0	24,080	9000	12,040	49.52	32.38	20.75	15.7
19+12.0	P-401/P-40	4.7	320,581	200000	P-209	8	188,486	75000	P-154	15.2	13,564	40000	Low Strengt	0	26,858	9000	13,429	50.79	34.58	21.18	15.11
20+05.0	P-401/P-40	4.7	300,086	200000	P-209	8	146,800	75000	P-154	15.2	41,307	40000	Low Strengt	0	19,341	9000	9,671	48.28	31.77	18.78	30.13
21+00.0	P-401/P-40	4.7	356,598	200000	P-209	8	184,726	75000	P-154	15.2	27,208	40000	Low Strengt	0	25,647	9000	12,824	44.4	28.03	18.92	18.33
22+01.0	P-401/P-40	4.7	371,575	200000	P-209	8	162,969	75000	P-154	15.2	15,183	40000	Low Strengt	0	31,861	9000	15,931	47.65	32.14	18.12	12.96
23+00.0	P-401/P-40	4.7	268,741	200000	P-209	8	212,885	75000	P-154	15.2	17,323	40000	Low Strengt	0	29,516	9000	14,758	46.95	31.04	18.9	12.46
24+01.0	P-401/P-40	4.7	339,777	200000	P-209	8	191,617	75000	P-154	15.2	11,693	40000	Low Strengt	0	27,605	9000	13,803	51.13	34.85	21.84	16.1
24+33.0	P-401/P-40	4.7	500,075	200000	P-209	8	180,434	75000	P-154	15.2	16,942	40000	Low Strengt	0	41,564	9000	20,782	39.67	26.68	15.05	10.55
25+01.0	P-401/P-40	4.7	393,805	200000	P-209	8	172,036	75000	P-154	15.2	21,262	40000	Low Strengt	0	27,462	9000	13,731	45.16	30.25	18.48	13.55
26+04.0	P-401/P-40	4.7	470,397	200000	P-209	8	172,061	75000	P-154	15.2	22,901	40000	Low Strengt	0	36,006	9000	18,003	40.57	25.46	14.48	9.86
27+03.0	P-401/P-40	4.7	328,354	200000	P-209	8	126,572	75000	P-154	15.2	49,541	40000	Low Strengt	0	25,586	9000	12,793	42.91	27.76	16.45	16.62
28+01.0	P-401/P-40	4.7	350,937	200000	P-209	8	195,109	75000	P-154	15.2	39,915	40000	Low Strengt	0	30,965	9000	15,483	37.48	24.23	15.74	11.22
29+03.0	P-401/P-40	4.7	365,773	200000	P-209	8	179,452	75000	P-154	15.2	57,144	40000	Low Strengt	0	28,036	9000	14,018	36.91	23.16	14.15	15.14
30+00.0	P-401/P-40	4.7	358,561	200000	P-209	8	194,165	75000	P-154	15.2	68,011	40000	Low Strengt	0	25,481	9000	12,741	36.33	23.19	14.85	19.34
30+99.0	P-401/P-40	4.7	427,620	200000	P-209	8	152,384	75000	P-154	15.2	64,920	40000	Low Strengt	0	29,704	9000	14,852	34.84	23.27	15.17	10.14
32+07.0	P-401/P-40	4.7	341,010	200000	P-209	8	169,888	75000	P-154	15.2	21,889	40000	Low Strengt	0	26,821	9000	13,411	46.81	30.72	19.34	13.22
33+05.0	P-401/P-40	4.7	376,571	200000	P-209	8	174,016	75000	P-154	15.2	61,684	40000	Low Strengt	0	23,825	9000	11,913	38.67	24.91	15.32	21.07
34+00.0	P-401/P-40	4.7	400,945	200000	P-209	8	189,875	75000	P-154	15.2	23,553	40000	Low Strengt	0	38,656	9000	19,328	38.82	25.17	13.54	9.56
35+03.0	P-401/P-40	4.7	363,818	200000	P-209	8	163,801	75000	P-154	15.2	23,315	40000	Low Strengt	0	28,760	9000	14,380	44.9	29.2	17.76	12.61
36+02.0	P-401/P-40	4.7	441,666	200000	P-209	8	163,963	75000	P-154	15.2	23,421	40000	Low Strengt	0	30,082	9000	15,041	42.91	27.08	18.56	11.81
37+02.0	P-401/P-40	4.7	355,881	200000	P-209	8	173,734	75000	P-154	15.2	16,679	40000	Low Strengt	0	25,483	9000	12,742	49.62	31.76	20.41	20.71
38+01.0	P-401/P-40	4.7	418,870	200000	P-209	8	136,485	75000	P-154	15.2	11,531	40000	Low Strengt	0	21,845	9000	10,923	57.84	39.97	26.6	17.35
39+00.0	P-401/P-40	4.7	340,962	200000	P-209	8	229,895	75000	P-154	15.2	5,408	40000	Low Strengt	0	40,986	9000	20,493	52.95	37.2	24.19	16.05
40+00.0	P-401/P-40	4.7	417,299	200000	P-209	8	169,824	75000	P-154	15.2	19,485	40000	Low Strengt	0	28,328	9000	14,164	45.73	29.86	19.8	13.26
41+00.0	P-401/P-40	4.7	372,856	200000	P-209	8	34,912	75000	P-154	15.2	77,573	40000	Low Strengt	0	23,156	9000	11,578	57.35	32.72	19.93	13.49
42+08.0	P-401/P-40	4.7	298,638	200000	P-209	8	35,607	75000	P-154	15.2	81,321	40000	Low Strengt	0	13,503	9000	6,752	66.5	48.06	31.11	21.11
43+02.0	P-401/P-40	4.7	261,249	200000	P-209	8	247,383	75000	P-154	15.2	11,328	40000	Low Strengt	0	23,586	9000	11,793	52.57	37.15	24.42	15.91
44+01.0	P-401/P-40	4.7	401,737	200000	P-209	8	205,498	75000	P-154	15.2	21,586	40000	Low Strengt	0	29,972	9000	14,986	41.81	27.6	17.73	13.12
45+08.0	P-401/P-40	4.7	323,178	200000	P-209	8	188,809	75000	P-154	15.2	16,596	40000	Low Strengt	0	26,330	9000	13,165	49.05	32.08	21.33	14.9
46+04.0	P-401/P-40	4.7	342,167	200000	P-209	8	175,171	75000	P-154	15.2	6,876	40000	Low Strengt	0	23,919	9000	11,960	60.71	42.96	28.7	19.55
47+05.0	P-401/P-40	4.7	562,375	200000	P-209	8	114,160	75000	P-154	15.2	25,202	40000	Low Strengt	0	27,046	9000	13,523	46.15	29.73	19.13	13.05
47+46.0	P-401/P-40	4.7	527,467	200000	P-209	8	57,626	75000	P-154	15.2	55,667	40000	Low Strengt	0	42,250	9000	21,125	40.54	22.07	11.26	7.01
48+02.0	P-401/P-40	4.7	383,546	200000	P-209	8	162,041	75000	P-154	15.2	8,171	40000	Low Strengt	0	22,785	9000	11,393	59.04	43.5	27.18	18.21
49+00.0	P-401/P-40	4.7	296,815	200000	P-209	8	221,517	75000	P-154	15.2	11,766	40000	Low Strengt	0	22,583	9000	11,292	53.51	37.28	23.21	20.65
50+02.0	P-401/P-40	4.7	473,279	200000	P-209	8	156,637	75000	P-154	15.2	21,459	40000	Low Strengt	0	24,735	9000	12,368	46.36	31.88	19.04	16.04
51+02.0	P-401/P-40	4.7	409,242	200000	P-209	8	125,237	75000	P-154	15.2	7,985	40000	Low Strengt	0	21,874	9000	10,937	64.01	45.38	28.78	19.6
52+09.0	P-401/P-40	4.7	183,329	200000	P-209	8	95,530	75000	P-154	15.2	83,016	40000	Low Strengt	0	15,316	9000	7,658	55.54	40.71	24.36	16.94
53+02.0	P-401/P-40	4.7	188,506	200000	P-209	8	225,751	75000	P-154	15.2	5,860	40000	Low Strengt	0	26,311	9000	13,156	64.11	46.17	27.79	19.17
54+05.0	P-401/P-40	4.7	465,523	200000	P-209	8	114,853	75000	P-154	15.2	7,960	40000	Low Strengt	0	29,726	9000	14,863	59.49	41.94	25.02	14.83
55+01.0	P-401/P-40	4.7	307,958	200000	P-209	8	162,948	75000	P-154	15.2	81,936	40000	Low Strengt	0	15,707	9000	7,854	45.12	31.01	18.7	34.56
56+03.0	P-401/P-40	4.7	1,148,280	200000	P-209	8	51,980	75000	P-154	15.2	70,031	40000	Low Strengt	0	31,619	9000	15,810	36.82	23.63	14.23	9.91
57+01.0	P-401/P-40	4.7	428,390	200000	P-209	8	227,414	75000	P-154	15.2	14,873	40000	Low Strengt	0	31,886	9000	15,943	42.28	29.5	19.03	11.98
58+00.0	P-401/P-40	4.7	413,305	200000	P-209	8	183,626	75000	P-154	15.2	13,683	40000	Low Strengt	0	25,168	9000	12,584	49.84	34.23	22.77	14.98

59+01.0	P-401/P-40	4.7	193,506	200000	P-209	8	618,189	75000	P-154	15.2	3,564	40000	Low Strengt	0	49,485	9000	24,743	50.45	36.59	26.35	16.84
60+02.0	P-401/P-40	4.7	570,964	200000	P-209	8	135,569	75000	P-154	15.2	11,473	40000	Low Strengt	0	27,694	9000	13,847	51.65	35.08	22.61	16.02
61+04.0	P-401/P-40	4.7	481,490	200000	P-209	8	102,263	75000	P-154	15.2	21,323	40000	Low Strengt	0	25,394	9000	12,697	51.57	32.21	21.54	14.3
72+02.0	P-401/P-40	4.7	225,837	200000	P-209	8	112,808	75000	P-154	15.2	48,320	40000	Low Strengt	0	14,788	9000	7,394	55.58	39.77	24.71	32.76
73+02.0	P-401/P-40	4.7	352,087	200000	P-209	8	155,650	75000	P-154	15.2	21,907	40000	Low Strengt	0	28,760	9000	14,380	46.13	28.79	18.17	13.76
74+01.0	P-401/P-40	4.7	464,112	200000	P-209	8	171,320	75000	P-154	15.2	22,095	40000	Low Strengt	0	30,902	9000	15,451	41.86	27.34	17.47	12.2
75+01.0	P-401/P-40	4.7	1,499,610	200000	P-209	8	6,043	75000	P-154	15.2	94,699	40000	Low Strengt	0	17,374	9000	8,687	67.47	48.15	32.07	18.47
76+00.0	P-401/P-40	4.7	304,396	200000	P-209	8	80,819	75000	P-154	15.2	42,624	40000	Low Strengt	0	19,244	9000	9,622	54.96	34.78	19.67	27.48
76+57.0	P-401/P-40	4.7	598,156	200000	P-209	8	89,582	75000	P-154	15.2	10,544	40000	Low Strengt	0	31,453	9000	15,727	56.43	37.13	22.64	14.06

Section 2 Sta 13+ to 61+		390,574	+190,574		168,008	+93,008		29,916	(-10,084)		27,586	+18,586	13,793						
	Std Deviation	145,727	37.3%	Std Deviation	79,650	47.4%	Std Deviation	22,959	50.0%	Std Deviation	6,699	24.3%	3,350	24.3%					
	85th Percentile	244,846		85th Percentile	88,358		Corrected Percentile	14,958		85th Percentile	20,886	h Percentile	10,443						
Section 2 Sta 72+ to 75+		574,033	+374,033		102,704	+27,704		40,032	+32		23,754	+14,754	11,877						
	Std Deviation	430,612	50.0%	Std Deviation	54,173	50.0%	Std Deviation	27,640	50.0%	Std Deviation	6,793	28.6%	3,396	28.6%					
	Corrected Percentile	287,017		Corrected Percentile	51,352		Corrected Percentile	20,016		85th Percentile	16,961	h Percentile	8,480						

Section 2 - Taxiway A

DMI - ft	Measured D	Measured D	Measured D	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I
13+02.0	7.38	6.11	4.94	39.12	23.22	13.62	9.47	7.22	5.79	4.81
14+01.0	9.2	7.31	5.34	44.46	26.38	17.57	12.64	9.6	7.62	6.28
15+02.0	11.5	7.72	6.58	51.7	31.78	22.8	17.4	13.74	11.15	9.28
16+01.0	11.81	8.31	6.28	49.77	33.47	22.57	15.63	11.26	8.53	6.81
17+02.0	10.11	7.71	6.2	48.5	31.01	20.56	14.01	9.98	7.54	6.03
18+05.0	11.56	8.66	6.27	49.54	32.05	21.59	15.13	11.1	8.56	6.93
19+12.0	11.64	7.35	6.13	51.02	33.64	22.45	15.17	10.61	7.84	6.17
20+05.0	9.65	6.52	5.54	49.37	31.36	22.21	16.8	13.2	10.68	8.87
21+00.0	9.31	6.54	5.62	44.48	28.65	19.5	13.9	10.37	8.09	6.6
22+01.0	9.08	6.42	5.75	48	30.73	19.64	12.87	8.84	6.5	5.13
23+00.0	9.91	6.95	6.34	47.23	29.9	19.83	13.38	9.42	7.04	5.6
24+01.0	11.11	7.44	5.81	51.28	34.3	22.91	15.37	10.6	7.72	6
24+33.0	7.04	4.66	4.68	40.03	25.63	16.03	10.27	6.91	5	3.91
25+01.0	10.17	7.4	6.3	45.34	29.41	19.53	13.51	9.8	7.5	6.05
26+04.0	7.39	5.99	4.86	39.96	25.24	16.06	10.72	7.57	5.72	4.59
27+03.0	8.56	6.79	5.18	43.95	25.94	17.39	12.86	9.99	8.05	6.68
28+01.0	8.68	6.15	5.8	38.1	23.27	15.64	11.21	8.45	6.67	5.48
29+03.0	8.8	6.15	4.93	37.18	22.64	15.68	11.73	9.16	7.39	6.13
30+00.0	7.03	6.08	5.02	36.85	22.88	16.42	12.62	10.04	8.19	6.84
30+99.0	8.57	6.63	5.63	35.93	21.54	14.63	10.96	8.6	6.97	5.8
32+07.0	9.79	8.17	6.8	46.99	29.97	19.88	13.77	10.01	7.69	6.22
33+05.0	8.55	6.3	5.5	39.12	24.58	17.55	13.47	10.71	8.74	7.3
34+00.0	7.3	5.47	4.8	38.89	23.98	15.19	10.05	7.05	5.3	4.26
35+03.0	9.34	7.3	6.17	45.1	28.44	18.6	12.79	9.28	7.12	5.77
36+02.0	9.2	6.51	5.59	42.81	27.45	17.91	12.29	8.89	6.82	5.51
37+02.0	9.25	6.64	6.06	49.51	32.61	21.82	15	10.75	8.13	6.49
38+01.0	13.3	9.81	7.33	57.94	39.68	26.54	18.11	12.8	9.52	7.51
39+00.0	11.53	7.95	6.91	53.43	37.08	24.87	15.95	10	6.36	4.3
40+00.0	9.55	7.73	5.76	45.73	29.84	19.68	13.47	9.67	7.34	5.89
41+00.0	9.53	6.84	5.33	58.26	30.87	17.89	13.38	10.68	8.74	7.32
42+08.0	15.07	8.94	7.37	69.98	40.06	26.65	21.29	17.55	14.68	12.47
43+02.0	13.5	8.58	7.17	52.88	35.98	25.1	17.39	12.29	9.07	7.08
44+01.0	9.05	6.76	5.69	41.87	27.3	18.28	12.63	9.11	6.94	5.57
45+08.0	10.55	7.89	6.19	49.04	32.05	21.48	14.72	10.5	7.91	6.31
46+04.0	13.73	8.68	7.4	60.84	42.61	29.09	19.56	13.27	9.35	7
47+05.0	10.37	6.91	6.09	46.1	29.84	19.1	13.17	9.68	7.53	6.14
47+46.0	5.85	5.24	4.35	40.73	21.51	11.43	7.69	5.81	4.64	3.86
48+02.0	14.5	8.94	7.97	59.62	41.7	28.37	19.23	13.27	9.56	7.31
49+00.0	12.62	7.87	7.66	53.5	36.7	25.58	17.82	12.7	9.44	7.41
50+02.0	11.24	7.58	6.74	46.54	31.06	20.89	14.68	10.8	8.34	6.76
51+02.0	14.17	9.45	7.59	64.28	44.59	29.61	19.74	13.5	9.7	7.45
52+09.0	12.54	8.2	6.17	56.66	32.31	23.96	19.37	15.96	13.31	11.27
53+02.0	13.04	7.73	7.19	64.89	43.7	29.76	19.53	12.78	8.67	6.31
54+05.0	10.99	7.25	5.94	60.04	40.55	25.53	16.07	10.38	7.14	5.36
55+01.0	9.68	7.13	5.41	45.52	29.83	22.97	18.71	15.52	13.03	11.08
56+03.0	8.29	6.3	5.01	36.83	23.61	14.23	10.07	7.83	6.36	5.31
57+01.0	9.48	6.53	5.89	42.6	28.65	19.25	13.04	9.1	6.69	5.23
58+00.0	11.48	8.16	6.87	49.72	33.91	23.01	15.83	11.25	8.39	6.62

59+01.0	12.17	7.96	7.23	50.79	36.14	26.52	18.08	11.73	7.39	4.67
60+02.0	10.96	6.55	5.89	51.45	35.33	22.99	15.21	10.43	7.58	5.9
61+04.0	10.78	7.27	6.12	51.37	32.91	20.8	14.15	10.28	7.94	6.46
72+02.0	12.35	8.66	7.02	58.09	36.15	26.31	20.58	16.58	13.64	11.45
73+02.0	9.93	6.37	4.91	46.06	28.88	18.71	12.75	9.18	7.02	5.68
74+01.0	8.68	6.56	5.51	41.91	27.13	17.73	12.11	8.7	6.63	5.34
75+01.0	15.97	9.32	9.05	66.93	49.54	30.63	19.64	14	10.98	9.11
76+00.0	9.02	5.31	5.37	55.82	33.13	22	16.42	12.9	10.46	8.72
76+57.0	9.09	6.23	4.74	56.31	37.42	22.54	13.89	9.02	6.38	4.95

Section 2 St

Section 2 St

Section 2 - Taxiway A

DMI - ft	Layer 1 Typ	Layer Thick	Backcalcula	Seed Modulus	Layer 2 Typ	Layer Thick	Backcalcula	Seed Modul	Layer 3 Typ	Layer Thick	Backcalcula	Seed Modul	Layer 4 Typ	Layer Thick	Backcalcu	Seed Modulus	- Corrected S	Measured D	Measured D	Measured D	Measured D
13+00.0	P-401/P-40	4.7	315,418	200000	P-209	8	185,196	75000	P-154	15.2	17,738	40000	Low Strengt	0	27,476	9000	13,738	47.44	31.48	20.48	13.67
14+07.0	P-401/P-40	4.7	396,724	200000	P-209	8	171,338	75000	P-154	15.2	14,536	40000	Low Strengt	0	30,868	9000	15,434	47.11	31.74	19.87	12.08
15+02.0	P-401/P-40	4.7	407,079	200000	P-209	8	164,781	75000	P-154	15.2	22,554	40000	Low Strengt	0	32,122	9000	16,061	42.68	27.26	17.24	11.38
16+02.0	P-401/P-40	4.7	1,169,343	200000	P-209	8	17,717	75000	P-154	15.2	109,969	40000	Low Strengt	0	26,020	9000	13,010	48.26	30.34	18.06	14.65
17+08.0	P-401/P-40	4.7	311,282	200000	P-209	8	188,742	75000	P-154	15.2	24,958	40000	Low Strengt	0	33,893	9000	16,947	41.76	25.57	16.07	10.81
18+01.0	P-401/P-40	4.7	539,289	200000	P-209	8	84,779	75000	P-154	15.2	16,202	40000	Low Strengt	0	27,712	9000	13,856	54.49	34.46	20.89	14.97
19+03.0	P-401/P-40	4.7	324,948	200000	P-209	8	155,486	75000	P-154	15.2	21,488	40000	Low Strengt	0	32,158	9000	16,079	45.48	28.71	16.91	10.8
20+00.0	P-401/P-40	4.7	1,386,613	200000	P-209	8	11,341	75000	P-154	15.2	268,462	40000	Low Strengt	0	28,931	9000	14,466	47.67	29.58	18.71	11.66
21+00.0	P-401/P-40	4.7	437,562	200000	P-209	8	129,449	75000	P-154	15.2	29,433	40000	Low Strengt	0	33,588	9000	16,794	41.81	25.73	15.02	11.13
22+03.0	P-401/P-40	4.7	285,560	200000	P-209	8	144,292	75000	P-154	15.2	73,280	40000	Low Strengt	0	14,333	9000	7,167	50.56	31.77	19.94	44.09
23+01.0	P-401/P-40	4.7	297,724	200000	P-209	8	179,378	75000	P-154	15.2	16,844	40000	Low Strengt	0	33,322	9000	16,661	46.41	30.03	17.8	11.09
23+95.0	P-401/P-40	4.7	344,535	200000	P-209	8	177,245	75000	P-154	15.2	48,918	40000	Low Strengt	0	38,896	9000	19,448	33.74	21.43	13.14	8.76
25+04.0	P-401/P-40	4.7	421,685	200000	P-209	8	126,957	75000	P-154	15.2	13,756	40000	Low Strengt	0	27,552	9000	13,776	52.95	34.5	21.96	14.62
26+11.0	P-401/P-40	4.7	379,663	200000	P-209	8	159,896	75000	P-154	15.2	21,660	40000	Low Strengt	0	31,684	9000	15,842	44.14	28.04	17.52	11.51
27+01.0	P-401/P-40	4.7	398,792	200000	P-209	8	181,772	75000	P-154	15.2	18,891	40000	Low Strengt	0	32,184	9000	16,092	43.15	28.59	17.6	11.86
27+99.0	P-401/P-40	4.7	328,429	200000	P-209	8	153,274	75000	P-154	15.2	31,729	40000	Low Strengt	0	31,692	9000	15,846	42.32	25.69	15.43	11.14
29+07.0	P-401/P-40	4.7	384,299	200000	P-209	8	157,521	75000	P-154	15.2	40,538	40000	Low Strengt	0	32,336	9000	16,168	38.65	23.31	14.69	10.89
30+04.0	P-401/P-40	4.7	379,120	200000	P-209	8	62,835	75000	P-154	15.2	65,133	40000	Low Strengt	0	31,383	9000	15,692	45.71	24.01	14.85	10.37
31+10.0	P-401/P-40	4.7	465,189	200000	P-209	8	224,783	75000	P-154	15.2	15,447	40000	Low Strengt	0	29,418	9000	14,709	43.41	29.17	18.02	13.19
31+13.0	P-401/P-40	4.7	439,851	200000	P-209	8	219,299	75000	P-154	15.2	16,736	40000	Low Strengt	0	28,920	9000	14,460	42.45	29.1	19.68	13.35
32+09.0	P-401/P-40	4.7	377,539	200000	P-209	8	196,270	75000	P-154	15.2	19,782	40000	Low Strengt	0	28,930	9000	14,465	43.56	29.47	18.5	12.13
33+03.0	P-401/P-40	4.7	329,791	200000	P-209	8	172,525	75000	P-154	15.2	20,263	40000	Low Strengt	0	26,905	9000	13,453	47.2	30.2	20.08	13.37
34+01.0	P-401/P-40	4.7	324,640	200000	P-209	8	182,041	75000	P-154	15.2	19,462	40000	Low Strengt	0	22,406	9000	11,203	50.69	32.26	19.81	21.96
34+05.0	P-401/P-40	4.7	314,929	200000	P-209	8	161,432	75000	P-154	15.2	18,233	40000	Low Strengt	0	29,411	9000	14,706	47.55	30.81	17.55	13.85
35+00.0	P-401/P-40	4.7	409,985	200000	P-209	8	169,013	75000	P-154	15.2	28,377	40000	Low Strengt	0	24,591	9000	12,296	44.49	27.76	18.35	19.24
35+03.0	P-401/P-40	4.7	402,712	200000	P-209	8	176,821	75000	P-154	15.2	13,877	40000	Low Strengt	0	33,705	9000	16,853	44.77	33.23	16.59	9.92
36+01.0	P-401/P-40	4.7	525,238	200000	P-209	8	67,880	75000	P-154	15.2	20,058	40000	Low Strengt	0	26,206	9000	13,103	56.11	34.72	21.12	13.87
37+01.0	P-401/P-40	4.7	838,186	200000	P-209	8	52,864	75000	P-154	15.2	16,878	40000	Low Strengt	0	23,156	9000	11,578	57.65	39.19	24.02	15.43
38+01.0	P-401/P-40	4.7	322,903	200000	P-209	8	190,566	75000	P-154	15.2	12,678	40000	Low Strengt	0	24,850	9000	12,425	51.98	35.49	23.24	15.7
39+03.0	P-401/P-40	4.7	513,784	200000	P-209	8	152,047	75000	P-154	15.2	17,962	40000	Low Strengt	0	29,450	9000	14,725	44.74	30.17	19.01	12.5
40+04.0	P-401/P-40	4.7	380,161	200000	P-209	8	203,364	75000	P-154	15.2	7,916	40000	Low Strengt	0	25,797	9000	12,899	54.22	37.65	24.61	20.63
41+04.0	P-401/P-40	4.7	411,042	200000	P-209	8	32,784	75000	P-154	15.2	79,602	40000	Low Strengt	0	23,628	9000	11,814	54.32	34.53	19.35	12.28
42+01.0	P-401/P-40	4.7	379,712	200000	P-209	8	159,569	75000	P-154	15.2	16,722	40000	Low Strengt	0	28,918	9000	14,459	47.71	31.56	19.4	13.01
43+00.0	P-401/P-40	4.7	499,165	200000	P-209	8	98,673	75000	P-154	15.2	13,479	40000	Low Strengt	0	28,411	9000	14,206	54.35	36.06	21.75	13.06
44+00.0	P-401/P-40	4.7	855,273	200000	P-209	8	105,669	75000	P-154	15.2	11,689	40000	Low Strengt	0	23,772	9000	11,886	52.84	37.81	25.11	16.69
45+06.0	P-401/P-40	4.7	296,862	200000	P-209	8	165,731	75000	P-154	15.2	43,160	40000	Low Strengt	0	22,686	9000	11,343	44.08	27.91	16.49	23.23
45+10.0	P-401/P-40	4.7	452,684	200000	P-209	8	197,584	75000	P-154	15.2	19,141	40000	Low Strengt	0	29,065	9000	14,533	43.34	27.52	17.33	11.72
46+01.0	P-401/P-40	4.7	284,975	200000	P-209	8	220,325	75000	P-154	15.2	14,550	40000	Low Strengt	0	22,790	9000	11,395	51.26	34.96	23.27	17.31
47+03.0	P-401/P-40	4.7	394,796	200000	P-209	8	39,333	75000	P-154	15.2	163,455	40000	Low Strengt	0	30,830	9000	15,415	44.71	25.72	14.35	10.28
48+06.0	P-401/P-40	4.7	300,839	200000	P-209	8	120,262	75000	P-154	15.2	6,932	40000	Low Strengt	0	27,350	9000	13,675	66.04	46.2	26.57	16.98
49+05.0	P-401/P-40	4.7	322,631	200000	P-209	8	183,045	75000	P-154	15.2	4,579	40000	Low Strengt	0	20,205	9000	10,103	69.64	49.6	31.67	31.35
50+04.0	P-401/P-40	4.7	120,329	200000	P-209	8	13,072	75000	P-154	15.2	37,533	40000	Low Strengt	0	13,951	9000	6,976	129	59.76	35.31	19.94
50+10.0	P-401/P-40	4.7	114,732	200000	P-209	8	66,063	75000	P-154	15.2	22,039	40000	Low Strengt	0	13,098	9000	6,549	83.64	60.11	36.45	24.16
51+08.0	P-401/P-40	4.7	290,307	200000	P-209	8	302,280	75000	P-154	15.2	8,979	40000	Low Strengt	0	20,586	9000	10,293	54.62	36.97	24.01	28.68
51+14.0	P-401/P-40	4.7	405,418	200000	P-209	8	122,589	75000	P-154	15.2	17,014	40000	Low Strengt	0	22,350	9000	11,175	54.19	35.38	23.71	16.09
52+05.0	P-401/P-40	4.7	394,074	200000	P-209	8	207,122	75000	P-154	15.2	3,478	40000	Low Strengt	0	32,270	9000	16,135	63.77	43.47	25.6	34.06
52+12.0	P-401/P-40	4.7	1,140,775	200000	P-209	8	13,585	75000	P-154	15.2	20,059	40000	Low Strengt	0	23,636	9000	11,818	64.9	44.95	25.3	15.64
53+09.0	P-401/P-40	4.7	260,804	200000	P-209	8	141,172	75000	P-154	15.2	3,654	40000	Low Strengt	0	24,833	9000	12,417	78.63	53.8	32.64	31.51

54+01.0	P-401/P-40	4.7	372,584	200000	P-209	8	59,736	75000	P-154	15.2	57,644	40000	Low Strengt	0	23,198	9000	11,599	49.85	32.36	19.63	13
54+99.0	P-401/P-40	4.7	461,205	200000	P-209	8	234,072	75000	P-154	15.2	14,429	40000	Low Strengt	0	29,154	9000	14,577	44.24	29.81	18.5	11.91
55+99.0	P-401/P-40	4.7	374,248	200000	P-209	8	147,983	75000	P-154	15.2	32,805	40000	Low Strengt	0	29,168	9000	14,584	42.24	26.39	16.43	11.53
57+01.0	P-401/P-40	4.7	327,580	200000	P-209	8	176,117	75000	P-154	15.2	18,028	40000	Low Strengt	0	25,183	9000	12,592	49.13	32.37	20.9	14.75
58+08.0	P-401/P-40	4.7	350,188	200000	P-209	8	219,850	75000	P-154	15.2	12,792	40000	Low Strengt	0	29,424	9000	14,712	46.78	31.9	20.73	14.24
59+05.0	P-401/P-40	4.7	409,886	200000	P-209	8	189,760	75000	P-154	15.2	16,366	40000	Low Strengt	0	27,601	9000	13,801	45.5	31.63	19.31	13.93
60+04.0	P-401/P-40	4.7	910,328	200000	P-209	8	50,781	75000	P-154	15.2	12,864	40000	Low Strengt	0	20,401	9000	10,201	62.96	43.82	27.8	18.41
61+00.0	P-401/P-40	4.7	321,144	200000	P-209	8	160,012	75000	P-154	15.2	21,308	40000	Low Strengt	0	25,746	9000	12,873	48.19	31.34	19.37	13.96
72+01.0	P-401/P-40	4.7	290,732	200000	P-209	8	97,766	75000	P-154	15.2	41,207	40000	Low Strengt	0	17,217	9000	8,609	53.55	37.67	26.04	18.46
73+02.0	P-401/P-40	4.7	406,792	200000	P-209	8	125,220	75000	P-154	15.2	13,124	40000	Low Strengt	0	25,430	9000	12,715	54.74	36.26	21.83	16.85
74+03.0	P-401/P-40	4.7	328,703	200000	P-209	8	124,713	75000	P-154	15.2	5,176	40000	Low Strengt	0	21,816	9000	10,908	72.39	51.97	32.45	23.18
75+00.0	P-401/P-40	4.7	212,910	200000	P-209	8	37,247	75000	P-154	15.2	47,080	40000	Low Strengt	0	14,398	9000	7,199	74.93	49.05	29.58	20.53
75+78.0	P-401/P-40	4.7	721,448	200000	P-209	8	29,889	75000	P-154	15.2	18,791	40000	Low Strengt	0	23,447	9000	11,724	65.02	41.32	23.1	16.38
Section 2 Sta 13+ to 61+			435,494	+235,494			138,736	+63,736			30,843	(-9,157)			26,565	+17,565	13,282				
	Std Deviation		230,806	50.0%		Std Deviation	65,189	47.0%		Std Deviation	40,266	50.0%		Std Deviation	5,288	19.9%	2,644	20%			
	Corrected Percentile		217,747			85th Percentile	73,547			Corrected Percentile	15,422				21,277	85th Percentile	10,638				
Section 2 Sta 72+ to 75+			392,117	+192,117			82,967	+7,967			25,076	(-14,924)			20,462	+11,462	10,231				
	Std Deviation		176,119	44.9%		Std Deviation	41,604	50.0%		Std Deviation	16,265	50.0%		Std Deviation	4,068	19.9%	2,034	19.9%			
	85th Percentile		215,998			Corrected Percentile	41,484			Corrected Percentile	12,538				16,394	85th Percentile	8,197				

Section 2 - Taxiway A

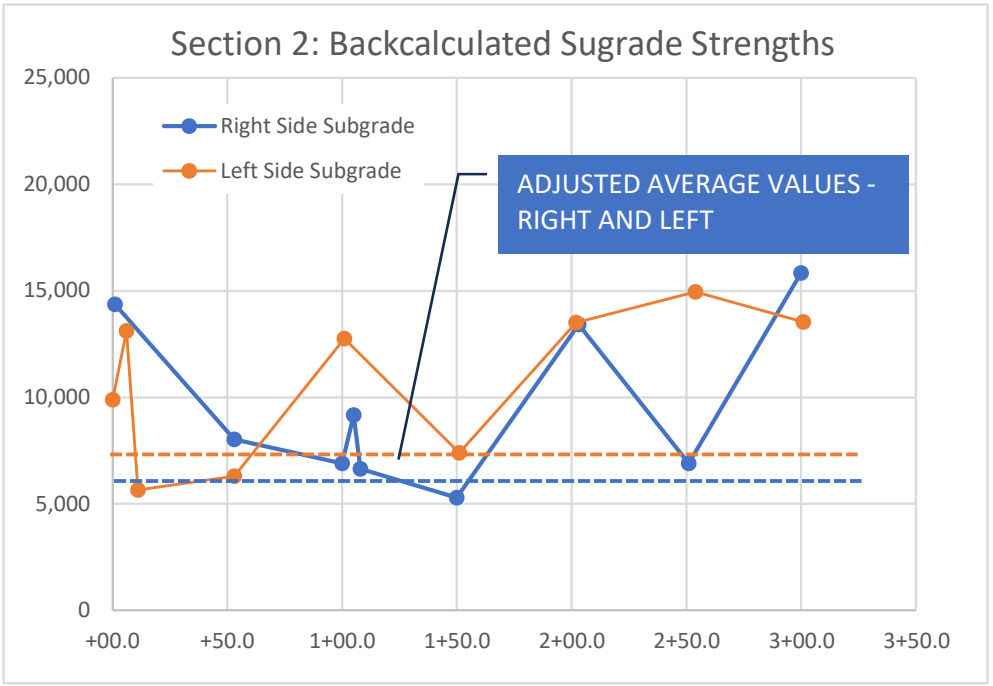
DMI - ft	Measured D	Measured D	Measured D	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated Deflection D7 mil
13+00.0	10.11	7.89	6.04	47.9	30.81	20.45	13.94	9.93	7.49	5.99
14+07.0	9.94	6.36	6.08	47.39	30.96	20.09	13.3	9.18	6.74	5.3
15+02.0	8.02	6.75	5.43	42.79	26.94	17.32	11.7	8.36	6.35	5.12
16+02.0	8.43	6.28	4.87	47.94	31.29	17.77	11.96	9.25	7.57	6.35
17+08.0	8.04	6.26	4.72	41.79	25.34	16.32	11.02	7.88	6	4.85
18+01.0	8.79	7.02	5.33	54.28	34.92	21.12	13.63	9.47	7.13	5.74
19+03.0	8.8	6.67	5.35	45.73	27.86	17.62	11.73	8.3	6.29	5.07
20+00.0	8.17	5.94	4.91	47.05	31.2	17.16	10.93	8.32	6.85	5.77
21+00.0	7.77	5.9	4.96	41.9	25.31	15.72	10.64	7.74	6	4.9
22+03.0	9.49	6.89	6.12	50.08	32.8	25.17	20.47	16.97	14.24	12.1
23+01.0	8.29	6.46	5.65	46.74	28.95	18.45	12.06	8.3	6.13	4.86
23+95.0	6.43	4.91	3.97	34.82	19.71	12.65	8.9	6.67	5.26	4.33
25+04.0	9.81	7.31	5.95	52.94	34.55	21.98	14.45	9.98	7.38	5.84
26+11.0	8.76	6.72	5.06	44.28	27.68	17.72	11.91	8.47	6.43	5.18
27+01.0	8.18	6.73	5.68	43.38	27.84	18.08	12.13	8.54	6.4	5.1
27+99.0	7.89	6.75	5.76	42.4	25.18	16.15	11.16	8.21	6.4	5.23
29+07.0	8.19	6.42	4.86	38.69	23.12	15.05	10.66	8.01	6.32	5.2
30+04.0	7.56	5.89	5.04	45.8	23.99	14.13	10.25	7.99	6.46	5.38
31+10.0	9	5.98	6.11	42.36	28.95	19.73	13.59	9.64	7.17	5.65
31+13.0	9.68	7.57	5.76	42.66	28.86	19.62	13.55	9.66	7.24	5.74
32+09.0	9.8	7.17	6.37	43.83	28.55	19.06	13.11	9.41	7.13	5.72
33+03.0	10.17	7.76	5.96	47.22	30.17	19.99	13.75	9.93	7.58	6.11
34+01.0	10.61	7.52	5.92	49.91	33.06	22.73	16.1	11.86	9.15	7.39
34+05.0	9.43	6.45	5.34	47.75	29.89	19.25	12.87	9.07	6.83	5.47
35+00.0	8.96	6.98	5.58	44.01	28.72	19.59	14.08	10.59	8.32	6.8
35+03.0	9.44	6.4	6.11	45.68	29.73	19.11	12.47	8.46	6.13	4.78
36+01.0	9.81	6.29	6.82	56	35.11	20.81	13.6	9.72	7.49	6.12
37+01.0	11.08	7.83	7.43	57.66	39.28	23.88	15.53	10.99	8.41	6.84
38+01.0	12.13	7.83	6.99	52.09	34.94	23.65	16.15	11.37	8.42	6.62
39+03.0	9.57	6.96	5.81	44.91	29.68	19.28	13.01	9.22	6.94	5.55
40+04.0	11.61	7.87	6.31	53.94	37.95	26.11	17.72	12.14	8.63	6.5
41+04.0	8.48	6.52	6.25	56.51	30.35	17.34	12.87	10.27	8.41	7.05
42+01.0	10.01	7.19	5.54	47.87	30.9	20.05	13.44	9.45	7.07	5.64
43+00.0	10.15	6.95	5.9	54.65	35.54	21.81	13.98	9.52	7.01	5.57
44+00.0	11.74	8.19	7.29	52.83	37.88	24.94	16.77	11.73	8.67	6.82
45+06.0	8.61	6.61	5.18	44.54	27.67	19.35	14.44	11.23	9.03	7.48
45+10.0	9.06	6.93	5.5	41.93	27.94	18.76	12.95	9.3	7.04	5.62
46+01.0	12.14	9.27	7.02	51.32	34.56	24.01	16.82	12.13	9.15	7.27
47+03.0	6.1	4.89	3.93	46.03	22.27	12.71	9.87	8.01	6.59	5.54
48+06.0	11.21	7.36	7.04	66.78	44.07	27.9	17.53	11.25	7.68	5.73
49+05.0	15.39	9.96	7.81	68.77	50.2	35.58	24.55	16.84	11.78	8.63
50+04.0	13.24	7.97	7.89	130.18	58.13	29.35	21.4	16.88	13.66	11.39
50+10.0	13.22	8.33	7.25	89.11	50.03	33.14	24.08	18.47	14.75	12.2
51+08.0	13.13	8.98	6.71	53.53	38.58	28.15	20.16	14.53	10.77	8.34
51+14.0	11.58	9.53	6.57	54.1	35.65	23.44	16.15	11.7	8.96	7.23
52+05.0	9.07	6.69	6.39	62.14	45.75	32.13	21.58	14.07	9.12	6.07
52+12.0	10.67	7	6.21	64.82	45.07	25.56	15.15	10.22	7.8	6.44
53+09.0	13.27	8	7.07	77.81	54.68	36.86	23.91	15.25	9.9	6.81

54+01.0	9.19	7.13	5.43	51.47	28.91	18.06	13.43	10.59	8.63	7.21
54+99.0	9.2	5.9	5.61	42.65	29.38	20.15	13.9	9.84	7.29	5.71
55+99.0	8.7	7.78	5.6	42.4	25.91	16.89	11.87	8.85	6.95	5.7
57+01.0	11.5	7.91	6.23	49.17	32.03	21.47	14.84	10.7	8.14	6.53
58+08.0	9.64	7.75	5.46	46.91	31.42	21.15	14.27	9.89	7.21	5.61
59+05.0	10.59	6.97	6.57	45.75	30.54	20.49	14.05	10	7.5	5.96
60+04.0	13.44	8.52	7.31	62.65	44.36	27.74	18.09	12.64	9.53	7.67
61+00.0	10.81	8.12	5.98	48.35	30.68	20.3	14.04	10.22	7.86	6.36
72+01.0	13.47	10.56	7.3	55.67	34.41	23.83	18.07	14.28	11.63	9.7
73+02.0	11.64	6.64	6.06	54.69	36.01	23.16	15.37	10.69	7.93	6.28
74+03.0	15.04	8.85	8.39	72.7	50.86	33.95	22.29	14.72	10.11	7.43
75+00.0	12.57	8.17	6.84	77.47	42.18	26.89	20.54	16.44	13.49	11.32
75+78.0	10.56	6.29	5.85	64.59	41.91	23.48	14.61	10.31	8	6.6

Section 2 St

Section 2 St

Sta 0+50 to 3+	Left Backcalc	Right Backcalc	Average
Surface Asphalt	239,800	369,583	304,691
Base	76,682	68,258	72,470
Subbase	39,967	64,004	51,985
Subgrade	7,451	5,736	6,594



DMI - ft	Layer 1 Typ	Layer Thick	Backcalcula	Seed Modulus	Layer 2 Typ	Layer Thick	Backcalcula	Seed Modul	Layer 3 Typ	Layer Thick	Backcalcula	Seed Modul	Layer 4 Typ	Layer Thick	Backcalcula	Seed Modul	Corrected S	Measured D	Measured D	Measured D	Measured D
+01.0	P-401/P-40	4	1,158,420	200000	P-209	8	676,168	75000	P-154	15	390,933	40000	User Define	0	28,724	4500	14,362	11.66	8.72	10.52	6.78
+53.0	P-401/P-40	4	794,090	200000	P-209	8	11,358	75000	P-154	15	161,893	40000	User Define	0	16,053	4500	8,027	49.04	30.15	21.17	12.96
1+00.0	P-401/P-40	4	437,602	200000	P-209	8	22,518	75000	P-154	15	100,180	40000	User Define	0	13,805	4500	6,903	49.65	30.72	23.35	13.63
1+05.0	P-401/P-40	4	1,760,063	200000	P-209	8	10,480	75000	P-154	15	24,604	40000	User Define	0	18,349	4500	9,175	48.88	27.71	23.25	12.89
1+08.0	P-401/P-40	4	222,784	200000	P-209	8	24,892	75000	P-154	15	126,814	40000	User Define	0	13,292	4500	6,646	48.43	27.81	23.72	14.59
1+50.0	P-401/P-40	4	433,726	200000	P-209	8	223,911	75000	P-154	15	126,779	40000	User Define	0	10,594	4500	5,297	36.53	21.64	17.46	10.41
2+03.0	P-401/P-40	4	436,714	200000	P-209	8	146,394	75000	P-154	15	10,318	40000	User Define	0	26,837	4500	13,419	38.31	23.89	15.45	10.43
2+51.0	P-401/P-40	4	232,540	200000	P-209	8	68,568	75000	P-154	15	143,241	40000	User Define	0	13,803	4500	6,902	37.35	21.63	28.23	11.91
3+00.0	P-401/P-40	4	1,176,551	200000	P-209	8	44,357	75000	P-154	15	67,304	40000	User Define	0	31,685	4500	15,843	24.56	14.1	12.63	6.39

Section 2 Sta 13+ to 61+			739,166	+539,166			136,516	+61,516			128,007	+88,007			19,238	+14,738	8,841				
	Std Deviation		495,688	50.0%		Std Deviation	202,505	50.0%		Std Deviation	105,154	50.0%		Std Deviation	7,324	38.1%	3,105	35.1%			
	Corrected Percentile		369,583			Corrected Percentile	68,258			Corrected Percentile	64,004			85th Percentile	11,914	h Percentile	5,736				

DMI - ft	Measured D	Measured D	Measured D	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I
+01.0	6.02	5.22	16.52	12.32	10.43	9.07	7.92	6.93	6.08	6.28
+53.0	7.48	7.6	74.89	44.9	24.27	17.49	14.35	11.95	10.06	9.28
1+00.0	6.92	7.87	76.06	41.92	25.59	20.29	16.73	13.95	11.85	6.81
1+05.0	6.77	6.83	70.09	50.16	29.46	18.25	12.8	9.99	8.3	6.03
1+08.0	7.42	7.12	84.05	40.03	25.79	21.25	17.62	14.75	12.54	
1+50.0	6.81	6.48	44.9	33.2	27.81	24.03	20.86	18.17	15.89	
2+03.0	8.11	6.03	57.1	37.86	24.2	15.69	10.6	7.67	5.99	
2+51.0	8.43	6.31	57.71	31.78	24.1	20.23	17.07	14.5	12.44	
3+00.0	4.76	4.02	41.86	24.98	14.08	9.87	7.69	6.26	5.24	4.95

Section 2 St

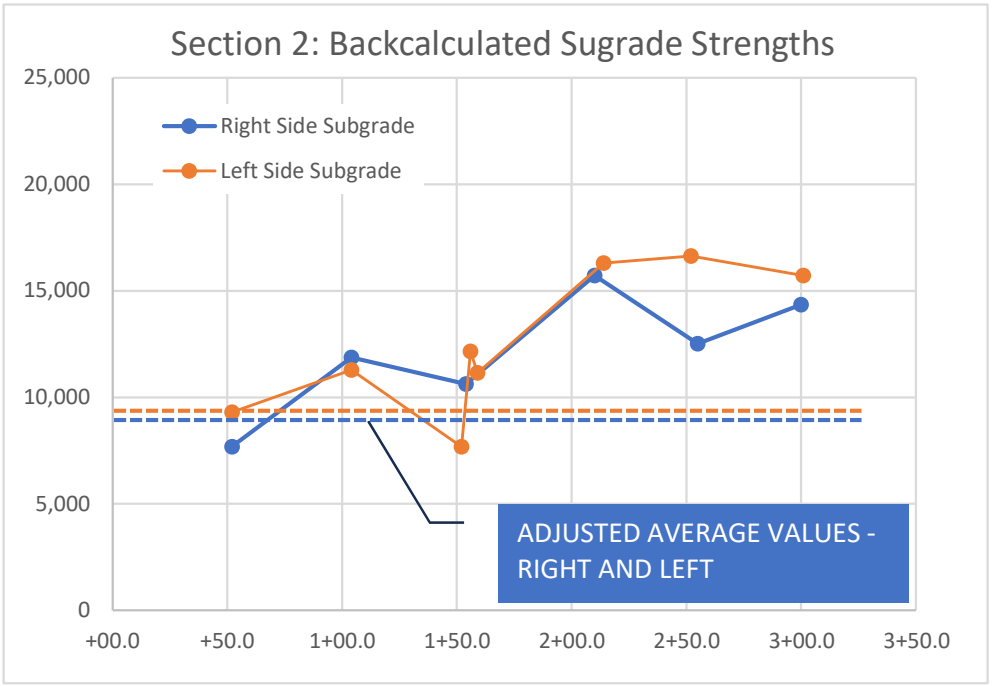
Section 2 - Taxiway B

DMI - ft	Layer 1 Typ	Layer Thick	Backcalcula	Seed Modulus	Layer 2 Typ	Layer Thick	Backcalcula	Seed Modu	Layer 3 Typ	Layer Thick	Backcalcula	Seed Modu	Layer 4 Typ	Layer Thick	Backcalcula	Seed Modu	Corrected S	Measured D	Measured D	Measured D	Measured D
+00.0	P-401/P-40	4	799,204	200000	P-209	8	450,251	75000	P-154	15	259,991	40000	User Define	0	19,774	4500	9,887	13.4	10.18	41.65	8.68
+06.0	P-401/P-40	4	700,162	200000	P-209	8	173,463	75000	P-154	15	5,668	40000	User Define	0	26,234	4500	13,117	41.24	25.04	25.87	11.89
+11.0	P-401/P-40	4	255,011	200000	P-209	8	74,508	75000	P-154	15	119,959	40000	User Define	0	11,311	4500	5,656	42.55	25.77	40.62	12.5
+53.0	P-401/P-40	4	200,949	200000	P-209	8	52,374	75000	P-154	15	111,346	40000	User Define	0	12,598	4500	6,299	46.87	30.87	20.2	13.96
1+01.0	P-401/P-40	4	399,400	200000	P-209	8	131,681	75000	P-154	15	14,977	40000	User Define	0	25,510	4500	12,755	35.93	22.35	14.74	10.34
1+51.0	P-401/P-40	4	145,667	200000	P-209	8	56,038	75000	P-154	15	156,160	40000	User Define	0	14,803	4500	7,402	40.44	23.92	19.45	11.52
2+02.0	P-401/P-40	4	302,492	200000	P-209	8	165,513	75000	P-154	15	20,707	40000	User Define	0	27,030	4500	13,515	30.84	17.02	18.72	8.65
2+54.0	P-401/P-40	4	547,180	200000	P-209	8	131,975	75000	P-154	15	13,895	40000	User Define	0	29,908	4500	14,954	33.67	20.07	14	9.01
3+01.0	P-401/P-40	4	966,329	200000	P-209	8	144,474	75000	P-154	15	16,700	40000	User Define	0	27,092	4500	13,546	30.39	18.65	16.33	9.3

Section 2 Sta 0+50 to 3+	479,599	+279,599		153,364	+78,364		79,934	+39,934		21,584	+17,084	10,792			
Std Deviation	272,777	50.0%	Std Deviation	113,328	50.0%	Std Deviation	83,281	50.0%	Std Deviation	6,682	31.0%	3,341	31%		
Corrected Percentile	239,800		Corrected Percentile	76,682		Corrected Percentile	39,967			14,902	h Percentile	7,451			

DMI - ft	Measured D	Measured D	Measured D	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I
+00.0	7.47	4.84	24.1	17.91	15.12	13.13	11.45	10	8.77
+06.0	6.68	6.45	57.57	42.05	28.66	19.18	12.84	8.87	6.48
+11.0	7.37	6.85	60.35	36.2	28.1	23.72	20.16	17.25	14.87
+53.0	9.85	7.37	68.83	36.72	27.02	22.42	18.76	15.84	13.53
1+01.0	8.5	6.07	56	35.68	22.54	14.9	10.47	7.89	6.36
1+51.0	6.97	6.15	65.42	31.32	23.41	19.55	16.36	13.78	11.74
2+02.0	5.96	5.07	49.68	30.69	19.76	13.37	9.62	7.39	6.01
2+54.0	6.39	5.61	51.69	33.41	20.7	13.34	9.12	6.74	5.37
3+01.0	6.53	5.65	45.67	31.57	20.59	13.99	9.99	7.57	6.07

Sta 0+50 to 3+	Left Backcalc	Right Backcalc	Average
Surface Asphalt	266,542	233,193	249,867
Base	46,874	35,341	41,108
Subbase	31,580	38,565	35,072
Subgrade	9,393	9,073	9,233



DMI - ft	Layer 1 Typ	Layer Thick	Backcalcula	Seed Modulus	Layer 2 Typ	Layer Thick	Backcalcula	Seed Modu	Layer 3 Typ	Layer Thick	Backcalcula	Seed Modu	Layer 4 Typ	Layer Thick	Backcalcula	Seed Modu
+52.0	P-401/P-40	4.7	162,621	200000	P-209	8	82,046	75000	P-154	15.2	75,045	40000	Low Strengt	0	15,378	9000
1+04.0	P-401/P-40	4.7	654,812	200000	P-209	8	59,023	75000	P-154	15.2	17,714	40000	Low Strengt	0	23,744	9000
1+54.0	P-401/P-40	4.7	278,121	200000	P-209	8	57,243	75000	P-154	15.2	74,639	40000	Low Strengt	0	21,252	9000
2+10.0	P-401/P-40	4.7	367,145	200000	P-209	8	114,384	75000	P-154	15.2	8,864	40000	Low Strengt	0	31,440	9000
2+55.0	P-401/P-40	4.7	869,231	200000	P-209	8	19,818	75000	P-154	15.2	209,389	40000	Low Strengt	0	25,027	9000
3+00.0	P-401/P-40	4.7	363,220	200000	P-209	8	141,935	75000	P-154	15.2	30,345	40000	Low Strengt	0	28,711	9000
Section 2 Sta 13+ to 61+			466,386	+266,386			66,503	(-8,497)			77,130	+37,130			23,368	+14,368
		Std Deviation	258,980	50.0%		Std Deviation	31,162	46.9%		Std Deviation	71,685	50.0%		Std Deviation	5,222	22.3%
		Corrected Percentile	233,193			85th Percentile	35,341			Corrected Percentile	38,565			85th Percentile	18,146 h	Percentile

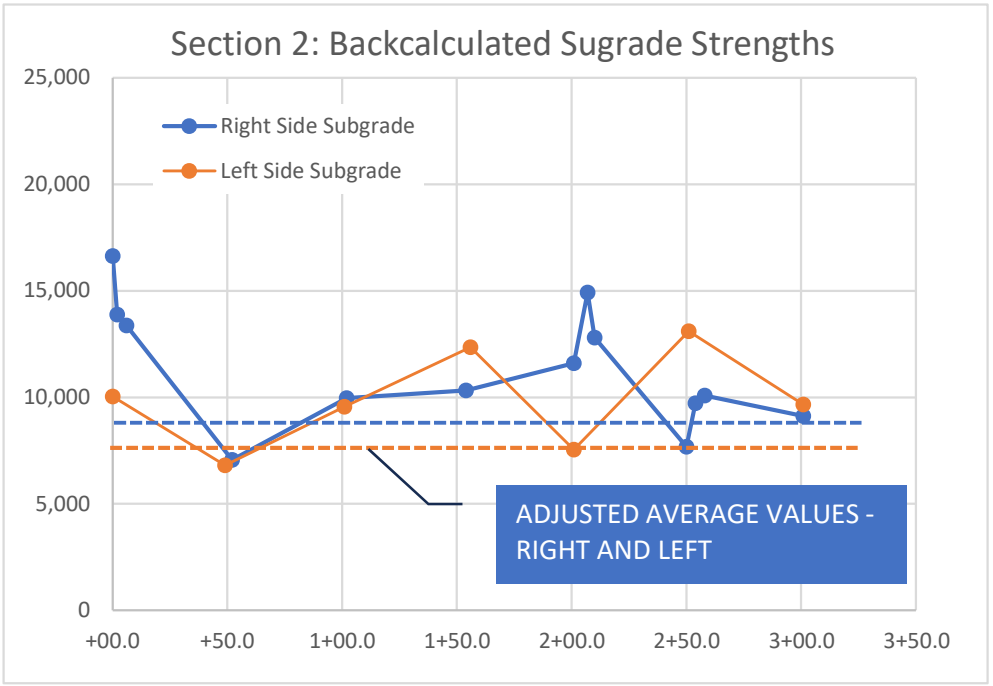
DMI - ft	Corrected S	Measured D	Measured D	Measured D	Measured D	Measured D	Measured D	Measured D	Calculated D	Calculated D	Calculated D	Calculated D	Calculated D	Calculated D	Calculated D
+52.0	7,689	41.08	22.9	20.78	10.99	7.37	6.25	60.23	33.06	23.98	19.19	15.69	13.02	10.99	6.28
1+04.0	11,872	37.94	21.7	16.53	10.73	7.12	6.22	57.66	37.87	22.77	14.86	10.57	8.12	6.62	9.28
1+54.0	10,626	33.61	18.58	15.19	9.32	6.66	5.69	53.98	28.69	18.52	14.26	11.45	9.41	7.9	6.81
2+10.0	15,720	38.11	21.83	17.53	8.44	6.41	3.92	59.13	38.29	23.52	14.53	9.31	6.43	4.89	6.03
2+55.0	12,514	28.66	16.22	12.63	9.52	7.35	5.33	47.46	28.73	16.07	11.61	9.44	7.85	6.6	6.93
3+00.0	14,356	27.13	16.66	12.21	8.69	7.6	5.54	43.61	26.62	17.24	12.03	8.92	6.98	5.71	4.95

Section 2 St	11,684	
	2,611	22.3%
	9,073	

DMI - ft	Layer 1 Typ	Layer Thick	Backcalcula	Seed Modulus	Layer 2 Typ	Layer Thick	Backcalcula	Seed Modu	Layer 3 Typ	Layer Thick	Backcalcula	Seed Modu	Layer 4 Typ	Layer Thick	Backcalcula	Seed Modu
+52.0	P-401/P-40	4.7	1,189,372	200000	P-209	8	5,940	75000	P-154	15.2	188,365	40000	Low Strengt	0	18,602	9000
1+04.0	P-401/P-40	4.7	358,557	200000	P-209	8	112,212	75000	P-154	15.2	14,364	40000	Low Strengt	0	22,569	9000
1+52.0	P-401/P-40	4.7	301,474	200000	P-209	8	158,476	75000	P-154	15.2	80,060	40000	Low Strengt	0	15,365	9000
1+56.0	P-401/P-40	4.7	317,043	200000	P-209	8	169,095	75000	P-154	15.2	19,715	40000	Low Strengt	0	24,330	9000
1+59.0	P-401/P-40	4.7	379,158	200000	P-209	8	48,070	75000	P-154	15.2	85,653	40000	Low Strengt	0	22,318	9000
2+14.0	P-401/P-40	4.7	929,796	200000	P-209	8	10,892	75000	P-154	15.2	41,977	40000	Low Strengt	0	32,614	9000
2+52.0	P-401/P-40	4.7	379,174	200000	P-209	8	105,833	75000	P-154	15.2	32,345	40000	Low Strengt	0	33,288	9000
3+01.0	P-401/P-40	4.7	410,097	200000	P-209	8	139,471	75000	P-154	15.2	42,797	40000	Low Strengt	0	31,430	9000
Section 2 Sta 0+50 to 3+			533,084	+333,084			93,749	+18,749			63,160	+23,160			25,065	+16,065
	Std Deviation		312,526	50.0%	Std Deviation		60,318	50.0%	Std Deviation		53,091	50.0%	Std Deviation		6,278	25.0%
	Corrected Percentile		266,542		Corrected Percentile		46,874		Corrected Percentile		31,580				18,787 h	Percentile

DMI - ft	Corrected S	Measured D	Measured D	Measured D	Measured D	Measured D	Measured D	Measured D	Calculated D	Calculated D	Calculated D	Calculated D	Calculated D	Calculated D	Calculated D
+52.0	9,301	46.85	27.11	19.8	12.76	9.01	7.11	67.67	47.63	27.59	17.29	12.61	10.18	8.57	5.99
1+04.0	11,285	38	24.08	17.13	11.56	8.82	6.79	58.47	37.98	24.47	16.47	11.69	8.83	7.08	5.3
1+52.0	7,683	29.76	17.76	33.68	9.1	7.11	5.37	45.88	30.06	23.12	18.84	15.63	13.12	11.15	5.12
1+56.0	12,165	31.13	18.46	22.17	8.88	6.1	5.59	48.56	31.39	21.08	14.68	10.69	8.21	6.62	6.35
1+59.0	11,159	31.22	18.39	14.05	8.64	6.88	5.47	50.51	27.57	17.24	13.25	10.68	8.79	7.4	4.85
2+14.0	16,307	37.17	19.63	11.23	6.43	4.73	4.61	60.41	38.18	18.79	10.35	7.1	5.65	4.76	5.74
2+52.0	16,644	25.62	15.04	10.68	7.51	6.1	4.79	44.27	25.46	15.37	10.39	7.62	5.96	4.89	5.07
3+01.0	15,715	23.61	14.01	11.86	8.04	6.12	4.9	38.77	23.12	14.96	10.65	8.06	6.4	5.28	5.77
Section 2 St	12,532														
	3,139	25%													
	9,393														

Sta 0+50 to 3+	Left Backcalc	Right Backcalc	Average
Surface Asphalt	208,710	254,544	231,627
Base	57,027	68,773	62,900
Subbase	31,315	19,430	25,372
Subgrade	7,745	8,734	8,240



DMI - ft	Layer 1 Typ	Layer Thick	Backcalcula	Seed Modulus	Layer 2 Typ	Layer Thick	Backcalcula	Seed Modul	Layer 3 Typ	Layer Thick	Backcalcula	Seed Modul	Layer 4 Typ	Layer Thick	Backcalcula	Seed Modul	Corrected S	Measured D	Measured D	Measured D	Measured D
+00.0	P-401/P-40	4.7	428,117	200000	P-209	8	301,909	75000	P-154	15.2	140,852	40000	Low Strengt	0	33,266	9000	16,633	10.9	8.61	7.85	6.48
+02.0	P-401/P-40	4.7	219,069	200000	P-209	8	504,992	75000	P-154	15.2	55,522	40000	Low Strengt	0	27,776	9000	13,888	16.2	12.33	9.7	7.34
+06.0	P-401/P-40	4.7	495,876	200000	P-209	8	393,463	75000	P-154	15.2	7,912	40000	Low Strengt	0	26,764	9000	13,382	26.08	17.43	12.65	9.14
+52.0	P-401/P-40	4.7	271,220	200000	P-209	8	40,240	75000	P-154	15.2	67,847	40000	Low Strengt	0	14,119	9000	7,060	35.32	22.45	16	10.65
1+02.0	P-401/P-40	4.7	257,803	200000	P-209	8	103,414	75000	P-154	15.2	9,793	40000	Low Strengt	0	19,934	9000	9,967	36.94	22.4	15.11	10.63
1+54.0	P-401/P-40	4.7	519,530	200000	P-209	8	88,372	75000	P-154	15.2	9,166	40000	Low Strengt	0	20,656	9000	10,328	35.23	23.31	15.06	10.24
2+01.0	P-401/P-40	4.7	729,492	200000	P-209	8	30,732	75000	P-154	15.2	13,928	40000	Low Strengt	0	23,205	9000	11,603	35.1	20.07	13.17	8.57
2+07.0	P-401/P-40	4.7	530,733	200000	P-209	8	81,799	75000	P-154	15.2	12,820	40000	Low Strengt	0	29,848	9000	14,924	28.29	16.76	9.89	6.84
2+10.0	P-401/P-40	4.7	377,208	200000	P-209	8	60,906	75000	P-154	15.2	21,723	40000	Low Strengt	0	25,623	9000	12,812	27.52	15.65	11.07	7.39
2+50.0	P-401/P-40	4.7	282,454	200000	P-209	8	28,804	75000	P-154	15.2	78,100	40000	Low Strengt	0	15,359	9000	7,680	35.69	19.3	19.45	8.63
2+54.0	P-401/P-40	4.7	862,198	200000	P-209	8	7,221	75000	P-154	15.2	69,683	40000	Low Strengt	0	19,439	9000	9,720	38.6	21.31	13.68	8.81
2+58.0	P-401/P-40	4.7	275,823	200000	P-209	8	89,365	75000	P-154	15.2	9,569	40000	Low Strengt	0	20,172	9000	10,086	37.42	22.61	14.99	10.07
3+01.0	P-401/P-40	4.7	470,142	200000	P-209	8	56,893	75000	P-154	15.2	8,256	40000	Low Strengt	0	18,256	9000	9,128	42.73	25.44	17.54	11.32
Section 2 Sta 13+ to 61+			439,974	+239,974			137,547	+62,547			38,859	(-1,141)			22,647	+13,647	11,507				
	Std Deviation		185,430	42.1%	Std Deviation		151,557	50.0%	Std Deviation		39,304	50.0%	Std Deviation		5,477	24.2%	2,773	24.1%			
	85th Percentile		254,544		Corrected Percentile		68,773		Corrected Percentile		19,430		85th Percentile		17,171	h Percentile	8,734				

DMI - ft	Measured D	Measured D	Measured D	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I
+00.0	5.31	3.65	19.6	12.02	9.03	7.2	5.88	4.88	4.11	6.28
+02.0	5.78	4.25	25.98	16.34	12.24	9.29	7.24	5.79	4.78	9.28
+06.0	7.59	5.39	32.59	24.53	18.21	13.18	9.48	6.93	5.23	6.81
+52.0	8.32	6.48	54.09	30.66	20.37	16.07	13.13	10.92	9.23	6.03
1+02.0	8.11	6.37	55.72	36.09	23.2	15.31	10.58	7.8	6.16	
1+54.0	8.01	5.54	51.52	35.65	22.96	15.13	10.4	7.61	5.96	
2+01.0	5.34	4.5	54.01	35.8	20.19	12.23	8.31	6.3	5.15	
2+07.0	5.47	4.03	43.59	28.1	16.66	10.35	6.91	5.04	4	
2+10.0	5.85	4.41	46.77	27.54	15.91	10.42	7.53	5.86	4.82	
2+50.0	6.15	5.58	56.4	30.55	18.95	14.79	12.05	9.98	8.42	
2+54.0	7.41	5.79	58.56	39.04	21.19	12.86	9.31	7.49	6.28	
2+58.0	8.25	6	57.16	36.81	23.18	15.08	10.33	7.6	6.01	6.93
3+01.0	8.59	5.93	62.5	42.47	26.21	16.76	11.36	8.31	6.57	4.95

Section 2 St

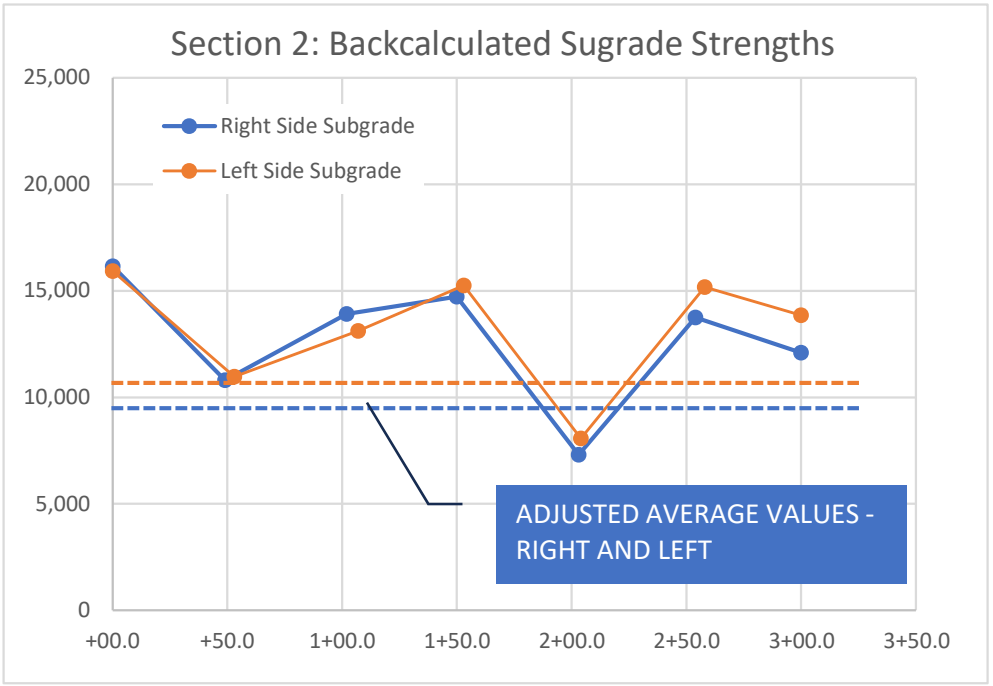
Section 2 - Taxiway E

DMI - ft	Layer 1 Typ	Layer Thick	Backcalcula	Seed Modulus	Layer 2 Typ	Layer Thick	Backcalcula	Seed Modul	Layer 3 Typ	Layer Thick	Backcalcula	Seed Modul	Layer 4 Typ	Layer Thick	Backcalcula	Seed Modul	Corrected S	Measured D	Measured D	Measured D	Measured D
+00.0	P-401/P-40	4.7	248,569	200000	P-209	8	66,151	75000	P-154	15.2	80,640	40000	Low Strengt	0	20,090	9000	10,045	28.96	17.26	15.67	11.99
+49.0	P-401/P-40	4.7	256,948	200000	P-209	8	53,856	75000	P-154	15.2	38,133	40000	Low Strengt	0	13,617	9000	6,809	48.84	29.65	25.06	15.62
1+01.0	P-401/P-40	4.7	579,434	200000	P-209	8	56,198	75000	P-154	15.2	17,233	40000	Low Strengt	0	19,106	9000	9,553	42.03	26.72	18.91	13.11
1+56.0	P-401/P-40	4.7	247,810	200000	P-209	8	171,873	75000	P-154	15.2	6,790	40000	Low Strengt	0	24,709	9000	12,355	43.28	28.03	19.44	12.85
2+01.0	P-401/P-40	4.7	202,340	200000	P-209	8	51,134	75000	P-154	15.2	80,645	40000	Low Strengt	0	15,098	9000	7,549	42.07	26.96	17.63	11.37
2+51.0	P-401/P-40	4.7	209,674	200000	P-209	8	393,320	75000	P-154	15.2	2,222	40000	Low Strengt	0	26,222	9000	13,111	50.03	31.72	43.7	15.51
3+01.0	P-401/P-40	4.7	1,177,169	200000	P-209	8	5,846	75000	P-154	15.2	212,744	40000	Low Strengt	0	19,343	9000	9,672	46	25.91	20.72	11.98
Section 2 Sta 0+50 to 3+			417,421	+217,421			114,054	+39,054			62,630	+22,630			19,741	+10,741	9,870				
	Std Deviation		332,934	50.0%	Std Deviation		123,211	50.0%	Std Deviation		68,255	50.0%	Std Deviation		4,250	21.5%	2,125	22%			
	Corrected Percentile		208,710		Corrected Percentile		57,027		Corrected Percentile		31,315				15,491	h Percentile	7,745				

DMI - ft	Measured D	Measured D	Measured D	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I
+00.0	8.41	7.5	51.75	27.66	18.6	14.56	11.78	9.72	8.17	5.99
+49.0	9.29	8.63	71.69	42.96	28.81	21.94	17.49	14.33	12.01	5.3
1+01.0	9.7	7.35	64.26	42.74	26.51	17.87	13.02	10.12	8.28	5.12
1+56.0	8.59	6.24	63.67	43.01	28.78	18.9	12.55	8.73	6.52	6.35
2+01.0	9.8	5.3	64.89	34.79	23.99	19.2	15.74	13.1	11.08	4.85
2+51.0	8.67	7.24	69.4	52.84	40.06	28.68	19.75	13.31	8.97	5.74
3+01.0	8.47	6.26	67.37	47.1	26.95	16.71	12.16	9.84	8.3	5.07

Section 2 St

Sta 0+50 to 3+	Left Backcalc	Right Backcalc	Average
Surface Asphalt	273,707	301,676	287,691
Base	72,894	49,665	61,279
Subbase	29,613	39,653	34,633
Subgrade	10,602	9,853	10,228



DMI - ft	Layer 1 Typ	Layer Thick	Backcalcula	Seed Modulus	Layer 2 Typ	Layer Thick	Backcalcula	Seed Modu	Layer 3 Typ	Layer Thick	Backcalcula	Seed Modu	Layer 4 Typ	Layer Thick	Backcalcula	Seed Modu	Corrected S	Measured D	Measured D	Measured D	Measured D
+00.0	P-401/P-40	4.7	567,611	200000	P-209	8	379,103	75000	P-154	15.2	185,525	40000	Low Strengt	0	32,303	9000	16,152	14.69	10.45	10.25	7.34
+49.0	P-401/P-40	4.7	842,643	200000	P-209	8	40,467	75000	P-154	15.2	3,481	40000	Low Strengt	0	21,605	9000	10,803	66.85	41.37	29.45	16.29
1+02.0	P-401/P-40	4.7	413,493	200000	P-209	8	89,859	75000	P-154	15.2	16,045	40000	Low Strengt	0	27,824	9000	13,912	35.08	20.3	13.91	9.13
1+50.0	P-401/P-40	4.7	487,260	200000	P-209	8	57,664	75000	P-154	15.2	16,090	40000	Low Strengt	0	29,469	9000	14,735	36.59	20.63	12	8.56
2+03.0	P-401/P-40	4.7	180,733	200000	P-209	8	70,602	75000	P-154	15.2	60,820	40000	Low Strengt	0	14,611	9000	7,306	52.1	20.69	22.87	8.78
2+54.0	P-401/P-40	4.7	969,710	200000	P-209	8	17,244	75000	P-154	15.2	165,306	40000	Low Strengt	0	27,514	9000	13,757	28.83	16.94	12.35	7.74
3+00.0	P-401/P-40	4.7	407,718	200000	P-209	8	40,364	75000	P-154	15.2	107,874	40000	Low Strengt	0	24,187	9000	12,094	28.72	17.04	13.48	8.7
Section 2 Sta	13+ to 61+		552,738	+352,738			99,329	+24,329			79,306	+39,306			25,359	+16,359	12,777				
Std Deviation			251,063	45.4%	Std Deviation		116,253	50.0%	Std Deviation		69,266	50.0%	Std Deviation		5,436	21.4%	2,924	22.9%			
85th Percentile			301,676		Corrected Percentile		49,665		Corrected Percentile		39,653		85th Percentile		19,923	h Percentile	9,853				

DMI - ft	Measured D	Measured D	Measured D	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I
+00.0	5.81	4.34	21.68	14.16	11.06	9.07	7.55	6.36	5.41	6.28
+49.0	7.37	6.69	90.76	67.85	42.98	26.06	15.72	9.9	6.86	9.28
1+02.0	7.16	5.69	55.7	34.72	20.9	13.45	9.33	7.02	5.65	6.81
1+50.0	7.28	4.73	59.77	36.56	20.42	12.52	8.54	6.44	5.24	6.03
2+03.0	5.95	5.04	64.59	36.25	25.67	20.28	16.48	13.63	11.47	
2+54.0	6.3	5.06	47.93	29.57	16.03	10.93	8.65	7.14	5.98	6.93
3+00.0	6.43	5.5	50.15	26.61	16.01	12.32	9.97	8.22	6.91	4.95

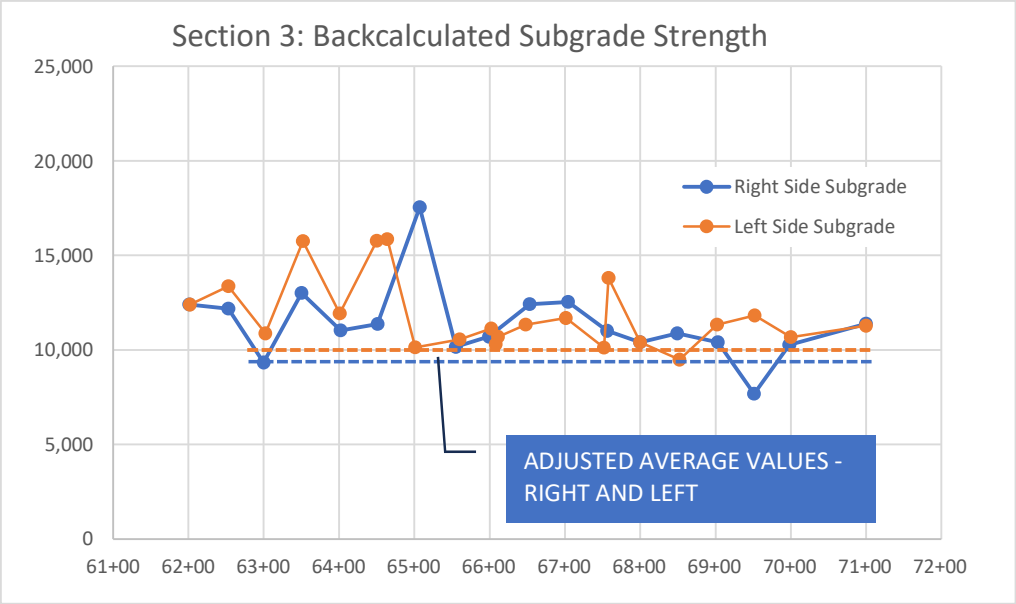
Section 2 St

DMI - ft	Layer 1 Typ	Layer Thick	Backcalcula	Seed Modulus	Layer 2 Typ	Layer Thick	Backcalcula	Seed Modul	Layer 3 Typ	Layer Thick	Backcalcula	Seed Modul	Layer 4 Typ	Layer Thick	Backcalcula	Seed Modul	Corrected S	Measured D	Measured D	Measured D	Measured D
+00.0	P-401/P-40	4.7	562,961	200000	P-209	8	375,178	75000	P-154	15.2	184,307	40000	Low Strengt	0	31,852	9000	15,926	14.55	12.5	9.55	7.23
+53.0	P-401/P-40	4.7	431,124	200000	P-209	8	88,537	75000	P-154	15.2	5,473	40000	Low Strengt	0	21,952	9000	10,976	53.22	33.1	21.84	14.27
1+07.0	P-401/P-40	4.7	1,193,460	200000	P-209	8	15,956	75000	P-154	15.2	121,136	40000	Low Strengt	0	26,242	9000	13,121	30.73	18.62	11.98	8.97
1+53.0	P-401/P-40	4.7	481,600	200000	P-209	8	103,163	75000	P-154	15.2	16,122	40000	Low Strengt	0	30,497	9000	15,249	32.63	19.6	12.44	8.55
2+04.0	P-401/P-40	4.7	225,558	200000	P-209	8	105,089	75000	P-154	15.2	48,748	40000	Low Strengt	0	16,156	9000	8,078	35.98	20.92	36.69	9.32
2+58.0	P-401/P-40	4.7	542,112	200000	P-209	8	164,208	75000	P-154	15.2	20,553	40000	Low Strengt	0	30,367	9000	15,184	28.27	17.77	11.73	8.94
3+00.0	P-401/P-40	4.7	395,080	200000	P-209	8	168,387	75000	P-154	15.2	18,236	40000	Low Strengt	0	27,710	9000	13,855	29.8	19.7	14.56	9.97
Section 2 Sta 0+50 to 3+			547,414	+347,414			145,788	+70,788			59,225	+19,225			26,397	+17,397	13,198				
	Std Deviation		283,422	50.0%	Std Deviation		104,933	50.0%	Std Deviation		62,691	50.0%	Std Deviation		5,192	19.7%	2,596	20%			
	Corrected Percentile		273,707		Corrected Percentile		72,894		Corrected Percentile		29,613				21,204	h Percentile	10,602				

DMI - ft	Measured D	Measured D	Measured D	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I
+00.0	6.11	4.77	22.04	14.41	11.26	9.24	7.7	6.48	5.52	5.99
+53.0	9.48	7.08	75.52	52.68	33.85	21.6	14.03	9.6	7.12	5.3
1+07.0	7.04	5.77	48.05	31.46	17.73	11.79	9.08	7.43	6.23	5.12
1+53.0	6.54	5.61	51.02	32.4	19.7	12.65	8.71	6.49	5.19	6.35
2+04.0	5.73	5.29	56.87	34.38	24.5	18.97	15.19	12.45	10.42	4.85
2+58.0	7.15	5.56	41.84	27.67	18.12	12.36	8.86	6.72	5.4	5.74
3+00.0	6.93	5.29	46.27	30.19	19.92	13.6	9.72	7.35	5.89	5.07

Section 2 St

Sta 62+ to 71+	Left Backcalc	Right Backcalc	Average
Surface Asphalt	182,281	184,526	183,403
Base	228,561	331,172	279,867
Subbase	61,528	62,795	62,161
Subgrade	9,991	9,421	9,706



Section 3 - Taxiway A

DMI - ft	Layer 1 Typ	Layer Thick	Backcalcula	Seed Modulus	Layer 2 Typ	Layer Thick	Backcalcula	Seed Modul	Layer 3 Typ	Layer Thick	Backcalcula	Seed Modul	Layer 4 Typ	Layer Thick	Backcalcula	Seed Modulus	- psi	Measured D	Measured D	Measured D	Measured D
62+01.0	P-401/P-40	2	394,182	200000	P-401/P-40	4.5	88,911	400000	P-209	18.5	200,935	75000	Low Strengt	0	24,803	9000	12,402	42.49	24.57	15.07	10.41
62+53.0	P-401/P-40	2	235,254	200000	P-401/P-40	4.5	189,648	400000	P-209	18.5	81,554	75000	Low Strengt	0	24,355	9000	12,178	46.89	30.78	15.19	10.41
63+00.0	P-401/P-40	2	383,555	200000	P-401/P-40	4.5	1,019,142	400000	P-209	18.5	202,013	75000	Low Strengt	0	18,651	9000	9,326	36.53	24.63	15.05	11.49
63+50.0	P-401/P-40	2	421,066	200000	P-401/P-40	4.5	230,326	400000	P-209	18.5	134,322	75000	Low Strengt	0	26,028	9000	13,014	35.97	23.46	15.53	11.13
64+02.0	P-401/P-40	2	491,411	200000	P-401/P-40	4.5	147,600	400000	P-209	18.5	173,992	75000	Low Strengt	0	22,064	9000	11,032	38.86	25.93	17.63	12.29
64+51.0	P-401/P-40	2	184,048	200000	P-401/P-40	4.5	225,246	400000	P-209	18.5	186,001	75000	Low Strengt	0	22,744	9000	11,372	37.14	25.02	17.16	12.11
65+07.0	P-401/P-40	2	711,501	200000	P-401/P-40	4.5	2,112,088	400000	P-209	18.5	426,565	75000	Low Strengt	0	35,090	9000	17,545	22.77	12.53	5.63	3.02
65+55.0	P-401/P-40	2	613,481	200000	P-401/P-40	4.5	1,376,288	400000	P-209	18.5	26,946	75000	Low Strengt	0	20,308	9000	10,154	47.69	35.5	25.43	17.26
65+99.0	P-401/P-40	2	307,652	200000	P-401/P-40	4.5	582,013	400000	P-209	18.5	58,323	75000	Low Strengt	0	21,391	9000	10,696	45.72	29.91	20.44	18.57
66+53.0	P-401/P-40	2	267,774	200000	P-401/P-40	4.5	910,272	400000	P-209	18.5	51,900	75000	Low Strengt	0	24,838	9000	12,419	42.31	28.74	18.91	12.63
67+04.0	P-401/P-40	2	329,042	200000	P-401/P-40	4.5	432,769	400000	P-209	18.5	124,327	75000	Low Strengt	0	25,069	9000	12,535	33.93	23.73	16.55	11.53
67+56.0	P-401/P-40	2	134,822	200000	P-401/P-40	4.5	411,056	400000	P-209	18.5	104,590	75000	Low Strengt	0	22,003	9000	11,002	41.71	27.25	18.48	13.5
68+00.0	P-401/P-40	2	210,679	200000	P-401/P-40	4.5	396,775	400000	P-209	18.5	118,136	75000	Low Strengt	0	20,818	9000	10,409	38.82	28.2	19.65	14.89
68+49.0	P-401/P-40	2	262,654	200000	P-401/P-40	4.5	871,302	400000	P-209	18.5	73,904	75000	Low Strengt	0	21,742	9000	10,871	40.25	27.81	18.98	15.28
69+03.0	P-401/P-40	2	643,825	200000	P-401/P-40	4.5	1,097,888	400000	P-209	18.5	40,149	75000	Low Strengt	0	20,790	9000	10,395	43.71	32.82	22.56	15.13
69+51.0	P-401/P-40	2	254,978	200000	P-401/P-40	4.5	560,683	400000	P-209	18.5	96,773	75000	Low Strengt	0	15,343	9000	7,672	44.99	30.97	21.78	30.21
69+98.0	P-401/P-40	2	348,891	200000	P-401/P-40	4.5	901,123	400000	P-209	18.5	58,043	75000	Low Strengt	0	20,518	9000	10,259	43.21	30.43	21.02	16.88
71+00.0	P-401/P-40	2	122,191	200000	P-401/P-40	4.5	369,075	400000	P-209	18.5	102,140	75000	Low Strengt	0	22,770	9000	11,385	42.44	27.89	18.52	13.42
Section 3 Sta 62+ to 71+			350,945	+150,945			662,345	+262,345			125,590	+50,590			22,740	+13,740	11,370				
	Std Deviation		166,419	47.4%	Std Deviation		504,134	50.0%	Std Deviation		90,126	50.0%	Std Deviation		3,899	17.1%	1,949	17.1%			
	85th Percentile		184,526		Corrected Percentile		331,172		Corrected Percentile		62,795		85th Percentile		18,841	h Percentile	9,421				

Section 3 - Taxiway A

DMI - ft	Measured D	Measured D	Measured D	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I
62+01.0	8.3	5.51	4.78	42.78	19.78	15.34	12.5	10.27	8.53	7.17
62+53.0	10.14	7.47	5.59	47.78	25.9	17.49	13.26	10.46	8.47	7.04
63+00.0	7.69	6.26	5.17	29.7	22.19	17.93	15.09	12.82	10.96	9.44
63+50.0	8.04	7.35	5.28	36.41	20.96	15.29	12.11	9.81	8.07	6.76
64+02.0	9.28	7	5.51	39.14	21.73	16.82	13.77	11.4	9.52	8.05
64+51.0	9.02	7.86	5.76	37.43	21.49	16.71	13.64	11.23	9.32	7.85
65+07.0	2.44	2.36	2.61	15.18	11.44	9.36	7.94	6.79	5.83	5.05
65+55.0	12.92	9.72	7.44	47.4	36.3	24.8	17.24	12.64	9.83	8.02
65+99.0	10.42	8.69	6.31	45.66	30.51	20.49	15.11	11.78	9.52	7.92
66+53.0	10.69	8.52	6.32	42.31	28.73	18.72	13.3	10.15	8.12	6.73
67+04.0	10.02	7.74	6.19	34.62	21.95	15.94	12.56	10.16	8.36	7.01
67+56.0	10.81	9.28	6.86	42.26	25.52	18.31	14.32	11.51	9.43	7.9
68+00.0	10.69	8.59	6.8	39.95	25.34	18.74	14.92	12.14	10.03	8.43
68+49.0	12.01	9.07	7.31	40.25	27.78	19.38	14.64	11.58	9.43	7.87
69+03.0	13.25	9.56	7.92	43.75	32.66	22.44	16.09	12.21	9.71	8.02
69+51.0	13.53	10.27	7.8	45.3	31.89	24.14	19.44	16	13.35	11.3
69+98.0	12.54	9.11	7.49	43.14	30.66	21.16	15.68	12.25	9.91	8.25
71+00.0	9.64	7.76	5.97	43.26	25.3	17.96	13.96	11.17	9.12	7.63

Section 3 St

Section 3 - Taxiway A

DMI - ft	Layer 1 Typ	Layer Thick	Backcalcula	Seed Modulus	Layer 2 Typ	Layer Thick	Backcalcula	Seed Modul	Layer 3 Typ	Layer Thick	Backcalcula	Seed Modul	Layer 4 Typ	Layer Thick	Backcalcu	Seed Modulus	- Corrected S	Measured D	Measured D	Measured D	Measured D
62+02.0	P-401/P-40	2	284,024	200000	P-401/P-40	4.5	179,725	400000	P-209	18.5	194,728	75000	Low Strengt	0	24,790	9000	12,395	35.85	21.2	14.35	16.3
62+53.0	P-401/P-40	2	288,745	200000	P-401/P-40	4.5	229,045	400000	P-209	18.5	220,296	75000	Low Strengt	0	26,725	9000	13,363	31.33	21.95	13.86	10.46
63+02.0	P-401/P-40	2	341,780	200000	P-401/P-40	4.5	200,243	400000	P-209	18.5	150,309	75000	Low Strengt	0	21,742	9000	10,871	38.44	27.73	17.81	13.35
63+52.0	P-401/P-40	2	379,669	200000	P-401/P-40	4.5	735,870	400000	P-209	18.5	57,927	75000	Low Strengt	0	31,502	9000	15,751	37	24.31	14.48	10.98
64+01.0	P-401/P-40	2	381,707	200000	P-401/P-40	4.5	106,043	400000	P-209	18.5	168,457	75000	Low Strengt	0	23,848	9000	11,924	42.28	25.14	15.17	10.96
64+50.0	P-401/P-40	2	611,503	200000	P-401/P-40	4.5	496,884	400000	P-209	18.5	69,370	75000	Low Strengt	0	31,532	9000	15,766	35.26	22.23	14.23	11.04
64+64.0	P-401/P-40	2	645,007	200000	P-401/P-40	4.5	1,882,238	400000	P-209	18.5	380,016	75000	Low Strengt	0	31,707	9000	15,854	25.64	14.02	6.15	4.65
65+01.0	P-401/P-40	2	284,669	200000	P-401/P-40	4.5	254,401	400000	P-209	18.5	129,173	75000	Low Strengt	0	20,261	9000	10,131	40.33	27.47	19.49	14.79
65+60.0	P-401/P-40	2	227,462	200000	P-401/P-40	4.5	419,158	400000	P-209	18.5	26,461	75000	Low Strengt	0	21,105	9000	10,553	64.07	40.93	23.61	15.87
66+02.0	P-401/P-40	2	330,917	200000	P-401/P-40	4.5	417,782	400000	P-209	18.5	54,331	75000	Low Strengt	0	22,263	9000	11,132	47.4	30.09	20.64	14.37
66+08.0	P-401/P-40	2	310,080	200000	P-401/P-40	4.5	335,824	400000	P-209	18.5	67,452	75000	Low Strengt	0	20,581	9000	10,291	47.46	28.63	18.26	20.19
66+11.0	P-401/P-40	2	339,026	200000	P-401/P-40	4.5	370,492	400000	P-209	18.5	63,638	75000	Low Strengt	0	21,366	9000	10,683	46.64	28.02	18.79	17.66
66+48.0	P-401/P-40	2	495,988	200000	P-401/P-40	4.5	104,883	400000	P-209	18.5	196,821	75000	Low Strengt	0	22,678	9000	11,339	40.5	24.04	16.17	11.93
67+01.0	P-401/P-40	2	62,530	200000	P-401/P-40	4.5	217,663	400000	P-209	18.5	115,657	75000	Low Strengt	0	23,368	9000	11,684	48.62	25.1	16.95	13.22
67+52.0	P-401/P-40	2	161,902	200000	P-401/P-40	4.5	541,064	400000	P-209	18.5	115,829	75000	Low Strengt	0	20,239	9000	10,120	38.92	26.15	17.68	22.96
67+58.0	P-401/P-40	2	137,983	200000	P-401/P-40	4.5	1,114,693	400000	P-209	18.5	43,486	75000	Low Strengt	0	27,621	9000	13,811	44.24	28.55	18.11	12.28
68+00.0	P-401/P-40	2	432,802	200000	P-401/P-40	4.5	182,509	400000	P-209	18.5	144,404	75000	Low Strengt	0	20,814	9000	10,407	39.88	26.14	17.01	15.98
68+52.0	P-401/P-40	2	410,456	200000	P-401/P-40	4.5	557,733	400000	P-209	18.5	65,204	75000	Low Strengt	0	18,970	9000	9,485	44.84	30.96	21.65	16.68
69+02.0	P-401/P-40	2	431,283	200000	P-401/P-40	4.5	552,438	400000	P-209	18.5	68,311	75000	Low Strengt	0	22,682	9000	11,341	40.87	27.49	18.57	13.83
69+52.0	P-401/P-40	2	271,975	200000	P-401/P-40	4.5	126,003	400000	P-209	18.5	135,030	75000	Low Strengt	0	23,623	9000	11,812	44.03	24.5	14.96	12.24
70+00.0	P-401/P-40	2	893,599	200000	P-401/P-40	4.5	842,936	400000	P-209	18.5	55,125	75000	Low Strengt	0	21,346	9000	10,673	39.6	28.62	20.57	15.47
71+00.0	P-401/P-40	2	221,484	200000	P-401/P-40	4.5	189,078	400000	P-209	18.5	185,203	75000	Low Strengt	0	22,545	9000	11,273	37.5	24.04	17.1	12.03
Section 3 Sta 62+ to 71+			361,118	+161,118			457,123	+57,123			123,056	+48,056			23,696	+14,696	11,848				
Std Deviation			178,837	49.5%	Std Deviation		401,167	50.0%	Std Deviation		79,362	50.0%	Std Deviation		3,714	15.7%	1,857	16%			
85th Percentile			182,281		Corrected Percentile		228,561		Corrected Percentile		61,528				19,982	85th Percentile	9,991				

Section 3 - Taxiway A

DMI - ft	Measured D	Measured D	Measured D	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated I	Calculated Deflection D7 mil
62+02.0	8.48	6.37	4.93	35.92	19.79	15.32	12.48	10.26	8.51	7.16
62+53.0	7.18	5.98	5	31.73	18.07	14.07	11.51	9.48	7.89	6.64
63+02.0	8.56	7.57	5.36	39.11	22.86	17.4	14.1	11.58	9.62	8.1
63+52.0	8.37	6.49	4.74	37.02	24.05	15.12	10.56	8	6.38	5.29
64+01.0	8.86	6.99	5.77	42.48	20.95	15.96	12.91	10.57	8.75	7.35
64+50.0	7.82	6.13	5	35.26	22.28	14.34	10.34	7.97	6.41	5.32
64+64.0	2.33	2.55	2.24	16.8	12.66	10.33	8.76	7.48	6.43	5.56
65+01.0	11.04	8.34	6.4	40.75	24.96	18.79	15.13	12.38	10.27	8.64
65+60.0	13	7.68	7.57	64.13	40.78	24.01	15.79	11.57	9.13	7.56
66+02.0	11.29	8.73	6.7	47.43	30.29	19.79	14.42	11.18	9	7.48
66+08.0	11.5	8.46	6.89	47.1	29.59	20.18	15.25	12.06	9.8	8.17
66+11.0	11.04	8.91	7.52	46.01	29.2	19.66	14.7	11.55	9.36	7.8
66+48.0	9.49	7.48	5.89	40.78	20.63	16.12	13.25	10.98	9.18	7.77
67+01.0	10.5	8.62	6.69	48.71	24.11	17.36	13.58	10.83	8.8	7.35
67+52.0	9.67	7.06	5.68	39.54	25.57	18.93	15.07	12.28	10.16	8.56
67+58.0	8.85	7.07	5.67	44.25	28.69	17.82	12.11	9	7.13	5.9
68+00.0	10.45	8.46	6.42	40.18	23.51	17.91	14.55	11.98	9.97	8.41
68+52.0	13.06	11.56	7.78	44.87	30.98	21.72	16.5	13.1	10.69	8.93
69+02.0	11.26	9.24	7.15	40.89	27.4	18.72	14	11.01	8.94	7.45
69+52.0	10.98	8.44	6.51	44.1	22.45	16.61	13.21	10.68	8.77	7.33
70+00.0	11.35	9.78	7.31	39.49	28.97	20.29	15.06	11.73	9.48	7.88
71+00.0	9.87	8.14	5.94	37.8	21.32	16.59	13.56	11.16	9.27	7.8

Section 3 St

ATTACHMENT 3

GEOTECHNICAL STUDY

GEOTECHNICAL AND PAVEMENT EVALUATION STUDY OF PARALLEL TAXIWAY

TEXAS REGIONAL GULF COAST REGIONAL AIRPORT (LBX)

BRAZORIA COUNTY, TEXAS

SUBMITTED TO

CIVIL PES, LLC

814 THORNWICK DRIVE

HOUSTON TX 77079

BY

HVJ ASSOCIATES, INC.

HOUSTON, TEXAS

OCTOBER 30, 2023

REPORT NO. HG2210070.1

HVJ ASSOCIATES

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Dallas
San Antonio

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October 30, 2023

Mr. Thomas D. Dodson, PE
President
Civil PEs, LLC.
814 Thornwick Drive
Houston, TX 77079

Re: Geotechnical and Pavement Evaluation Study of Parallel Taxiway
Texas Regional Gulf Coast Regional Airport (LBX)
Angleton, Brazoria County
Owner: Brazoria County
HVJ Report No. HG2210070.1

Dear Mr. Dodson:

Submitted herein is the report of our geotechnical investigation for the above referenced project. The study was performed in accordance with proposal number HG2210070.1 dated March 15, 2023 (Revised on March 21, 2023) and is subject to the limitations presented in this report.

It has been a pleasure to work with you on this project and we appreciate the opportunity to be of service. Please notify us if there are questions or if we may be of further assistance.

Sincerely,

HVJ ASSOCIATES, INC.
Texas Firm Registration No. F-000646

Anil K. Raavi, PE
Professional Services Manager

Rakib Ahmed, Ph.D, EIT
Staff Engineer

AR/RA

10/30/2023

The seal appearing on this document was authorized by Anil K. Raavi, PE 122152 on October 30, 2023. Alteration of a sealed document without proper notification to the responsible engineer is an offense under the Texas Engineering Practice Act.

TABLE OF CONTENTS

PLATES

APPENDICES

1 EXECUTIVE SUMMARY

HVJ Associates, Inc. (HVJ) was retained by Civil PEs, LLC to perform geotechnical investigation for evaluating the parallel taxiway located adjacent to Runway 17-35 at the Texas Regional Gulf Coast Regional Airport (LBX) located at 8015 Airport Road in Angleton, Texas. A site vicinity map is presented on Plate 1.

The purpose of this study was to perform a geotechnical investigation and provide exploration data of the taxiway for rehabilitation of the taxiway by overlay or if a new taxiway needs to be constructed. Pavement thickness design and construction phase services are not part of HVJ's scope of work for this project. A separate memorandum will be submitted at later date with back calculated modulus values using Falling Weight Deflector (FWD) test data. Subsurface conditions at the site were investigated by six (6) soil borings to a depth of about 11 feet below existing grade. Based on the subsurface conditions revealed by the soil borings, the findings and recommendations of this report are summarized below:

1. The pavement thickness consisted of asphalt (4"-6.5"), flexible base (7"-23.5") and lime stabilized clay (7"-25").

2. Firm to very stiff cohesive soils (CH) were generally observed from the surface to the termination depth of the borings. Details of the subsurface stratigraphy encountered in the borings are shown on the boring logs presented in Appendix A.

3. Groundwater was not observed during drilling and shortly after drilling operation. . It should be noted that groundwater levels determined during drilling may not accurately reflect the groundwater conditions during construction, and therefore should only be considered as approximate.

Please note that this executive summary does not fully relate our findings and opinions. Those findings and opinions are only presented through our full report.

2 INTRODUCTION

2.1 Project Description

HVJ Associates, Inc. (HVJ) was retained by Civil PEs, LLC to perform geotechnical investigation for evaluating the parallel taxiway located adjacent to Runway 17-35 at the Texas Regional Gulf Coast Regional Airport (LBX) located at 8015 Airport Road in Angleton, Texas. A site vicinity map is presented on Plate 1.

The purpose of this study was to perform a geotechnical investigation and provide exploration data of the taxiway for rehabilitation of the taxiway by overlay or if a new taxiway needs to be constructed. Pavement thickness design and construction phase services are not part of HVJ's scope of work for this project. A separate memorandum will be submitted at later date with back calculated modulus values using Falling Weight Deflector (FWD) test data.

2.2 Geotechnical Investigation Program

The objectives of this study were to gather information on subsurface conditions of the existing taxiway. The following objectives were accomplished:

- Drilling and field testing six soil borings, labeled as B-1B to B-6B, to a depth of approximately 11 feet below the existing grade to investigate soil stratigraphy and obtain samples for laboratory testing and
- Performing laboratory tests on soil samples to determine the index and engineering properties of the soils.
- Performing one California Bearing Ratio (CBR) test and six Dynamic Cone Penetration (DCP) tests to evaluate the subgrade beneath the pavement.

Subsequent sections of this report contain descriptions of the field exploration and laboratory testing program.

3 FIELD EXPLORATION

3.1 General

The field exploration program undertaken for the project was performed between August 7, 2023 and August 8, 2023. Subsurface conditions at the site were evaluated by drilling six borings to a depth of about 11 feet. The pavement was cored before starting the drilling operation. The borings were drilled using dry auger drilling techniques with the use of a truck mounted drilling equipment. Pavement was backfilled with quickrete and borings were backfilled with bentonite chips upon completion of drilling. The approximate boring locations are shown in Plate 2 of this report.

3.2 Sampling Methods

Soil samples were obtained continuously to a depth of 11 feet. Cohesive soil samples were obtained with a three-inch thin walled (Shelby) tube sampler in general accordance with ASTM D1587 standard. Each sample was removed from the sampler in the field, carefully examined, and then classified. The shear strength of the cohesive soils was estimated by a hand penetrometer in the field. Suitable portions of each sample were sealed and packaged for transportation to our laboratory.

Detailed descriptions of the materials encountered in the borings with a key to the terms and symbols used for soil classification are given on the boring logs presented in Appendix A.

3.3 Survey Data

The survey data of the boring locations was not available at the time of writing this report. The GPS coordinates obtained by a hand-held GPS device and approximate elevations estimated from Google Earth are included in the table below and also presented on the boring logs in Appendix A.

Table 3-1 – Boring Details

Structure	Boring No.	Depth, Feet	GPS Coordinates		Elevation, feet
			Latitude	Longitude	
Taxiway	B-1	11	29°5'59.8" N	95°27'39.2" W	17
	B-2	11	29°6'24.30" N	95°27'38.9" W	14
	B-3	11	29°6'43.0" N	95°27'39.3" W	14
	B-4	11	29°6'58.8" N	95°27'39.5" W	14
	B-5	11	29°7'5.5" N	95°27'39.4" W	14
	B-6	11	29°6'6.6" N	95°27'40.3" W	17

3.4 Groundwater Observations

Groundwater levels in the borings were observed during drilling operations. Drilling was suspended for 10 minutes, and groundwater levels after five and ten minutes were measured. Table 2-2 summarizes the groundwater level measurements taken at the boring locations.

Table 3-2 – Groundwater Readings

Boring	Groundwater Depth below Existing Grade, Feet		
	During Drilling	5 Minutes after Drilling	10 Minutes after Drilling
B-1B	Dry	Dry	Dry
B-2B	Dry	Dry	Dry
B-3B	Dry	Dry	Dry
B-4B	Dry	Dry	Dry
B-5B	Dry	Dry	Dry
B-6B	Dry	Dry	Dry

It should be noted that groundwater levels determined during drilling may not accurately reflect the true groundwater conditions, and therefore should only be considered as approximate.

4 LABORATORY TESTING

4.1 General

Selected soil samples were tested in the laboratory to determine applicable physical and engineering properties. Tests were performed according to the relevant ASTM Standards. The laboratory program included moisture content, Atterberg limits, percent finer than No. 200 sieve, dry density, sieve Analysis and laboratory CBR.

The moisture content, Atterberg limits and percent finer than No. 200 sieve results were utilized to verify field classifications by the Unified Soils Classification System. Sieve analysis were performed to obtain gradation curve and CBR tests were performed to estimate the subgrade strength. The type and number of tests performed for this investigation are summarized in Table 3-1.

Table 4-1 – Type and Number of Laboratory Tests

Type of Test	Number of Tests
Moisture Content (ASTM D2216)	12
Atterberg Limits (ASTM D4318)	6
Percent Passing No. 200 Sieve (ASTM D1140)	6
Sieve Analysis (Tex-110E)	1
Laboratory CBR (ASTM D1883)	1

The laboratory test results are presented on the boring logs in Appendix A. A summary of laboratory test results is provided in Appendix B. The conversion between pocket penetrometer readings obtained in the field to the shear strength parameters presented in the boring logs were obtained using a conversion factor of 1/3.

4.2 Sieve Analysis

We performed sieve analysis on the composite flexible base sample collected from the upper 4 feet below existing ground. The test results are presented in Appendix D.

4.3 California Bearing Ratio Tests

One California Bearing Ratio (CBR) test was performed on the composite flexible base sample and the results are presented in Appendix C. The composite sample is prepared using the flexible base samples obtained from multiple pavement cores. The results are presented in the table below.

Table 4-3 – CBR Test Results

Type of Sample (Depth)	Dry Density Before Soaking (pcf)	Dry Density After Soaking (pcf)	Blows	CBR
Composite -Flexible Base	109.5	113	10	4.17
Composite -Flexible Base	114.3	115.7	25	13.3
Composite -Flexible Base	123.5	123	65	40.03

5 SITE CHARACTERIZATION

5.1 General Geology

A review of the Bureau of Economic Geology, University of Texas at Austin, Geologic Atlas of Texas Houston Sheet, Paul Weaver Memorial Edition (Revised in 1982) indicates that the project site is located in Alluvial formation in vicinity of Beaumont Formation. A geologic map is presented on Plate 3.

The Alluvial soils (Qal) are heterogeneous in nature containing interbedded layers of clay, silt and sand. The depositional features include point-bar, natural levee, stream channel, backswamp, coastal marsh, mud-flat and narrow beach deposits.

5.2 Soil Stratigraphy

HVJ's interpretation of soil and groundwater conditions at the project site is based on information obtained at the drilled boring locations. Significant variations in areas not explored by the project borings may require re-evaluation of our findings. Details of the subsurface soil stratigraphy are shown on the boring logs presented in Appendix A.

Firm to very stiff cohesive soils (CH) were generally observed from the surface to the termination depth of the borings. Details of the subsurface stratigraphy encountered in the borings are shown on the boring logs presented in Appendix A.

5.3 Existing Pavement Thickness

The pavement thickness information obtained at the pavement core locations is summarized in the following table.

Table 5-1 – Existing Pavement Thicknesses

Boring	Asphalt (Inches)	Flexible Base (Inches)	Lime Stabilized Clay (Inches)
B-1B	6	7	25
B-2B	4.5	23.5	12
B-3B	4.5	23	10
B-4B	6.5	18.5	12
B-5B	5	23	7
B-6B	4	23	10

5.4 DCP Test Results

Six Dynamic Cone Penetrometer (DCP) tests were performed in accordance with ASTM D6951 near the boring locations. DCP test results are presented in Appendix E.

DCP tests were performed after coring through the pavement, base and stabilized subgrade. The depths cored below which DCP tests were conducted varied from 36.1 to 36.3 inches. In the DCP tests, the penetration rate was fairly consistent.

6 LIMITATIONS

This investigation was performed for the exclusive use of Civil PEs, LLC for the geotechnical evaluation Study of Parallel Taxiway in Brazoria County, Texas. HVJ has endeavored to comply with generally accepted geotechnical engineering practice common in the local area. HVJ makes no warranty, expressed or implied. The analyses and recommendations contained in this report are based on data obtained from subsurface exploration, laboratory testing, the project information provided to us and our experience with similar soils and site conditions. The methods used indicate subsurface conditions only at the specific locations where samples were obtained, only at the time they were obtained, and only to the depths penetrated. Samples cannot be relied on to accurately reflect the strata variations that usually exist between sampling locations. Should any subsurface

conditions other than those described in our boring logs be encountered, HVJ should be immediately notified so that further investigation and supplemental recommendations can be provided.

PLATES

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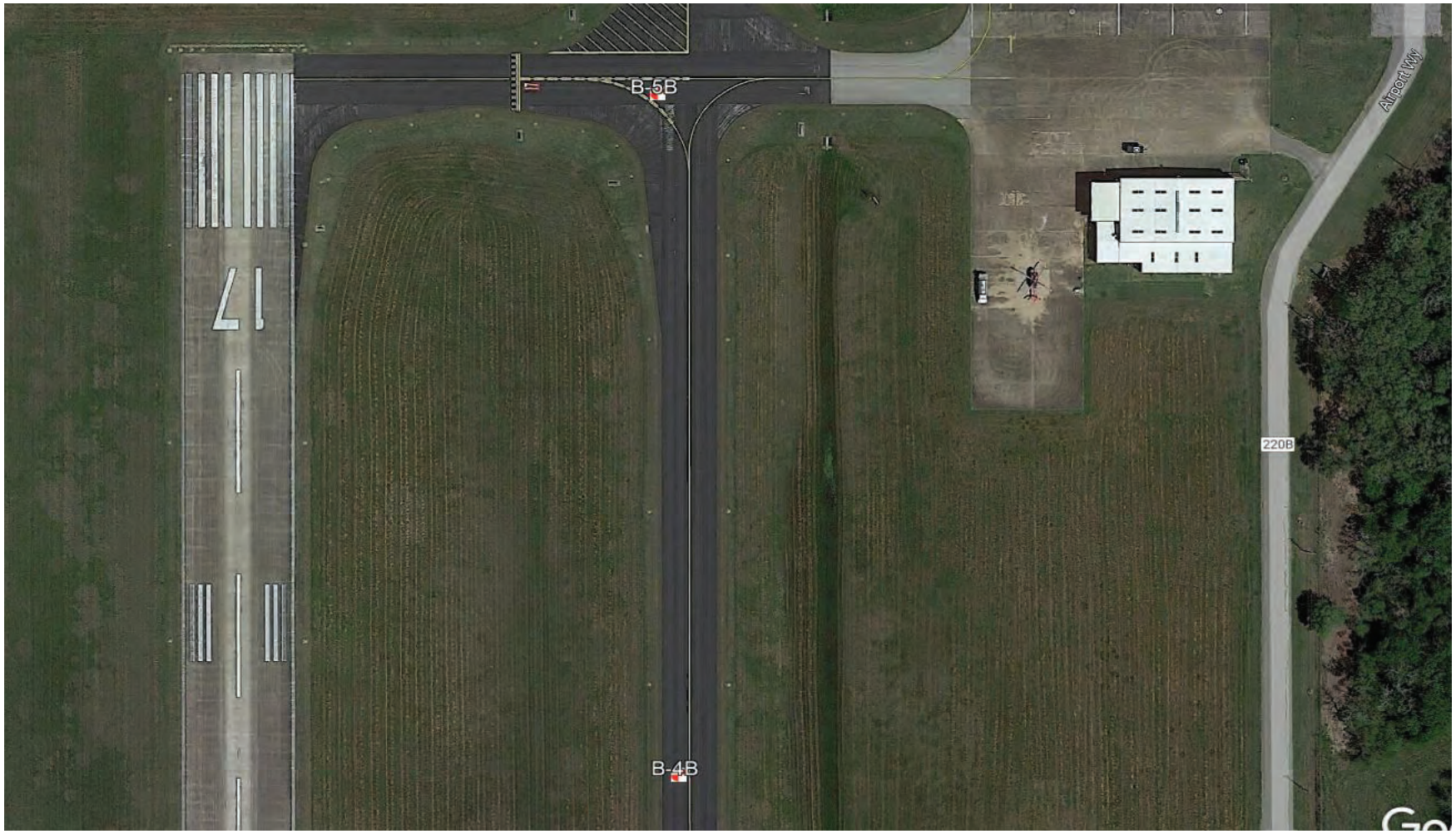
DATE: 09/05/2023	APPROVED BY: PD	PREPARED BY: RA

SITE VICINITY MAP
EVALUATION STUDY OF PARALLEL TAXIWAY

PROJECT NO.: HG2210070.1	DRAWING NO.: PLATE 1



LEGEND:

APPROXIMATE BORING LOCATIONS (11' DEPTH)

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DATE: 09/05/2023	APPROVED BY: PD	PREPARED BY: PD

PLAN OF BORINGS
EVALUATION STUDY OF PARALLEL TAXIWAY

PROJECT NO.: HG2210070.1	DRAWING NO.: PLATE 2-A

LEGEND:

APPROXIMATE BORING LOCATIONS (11' DEPTH)

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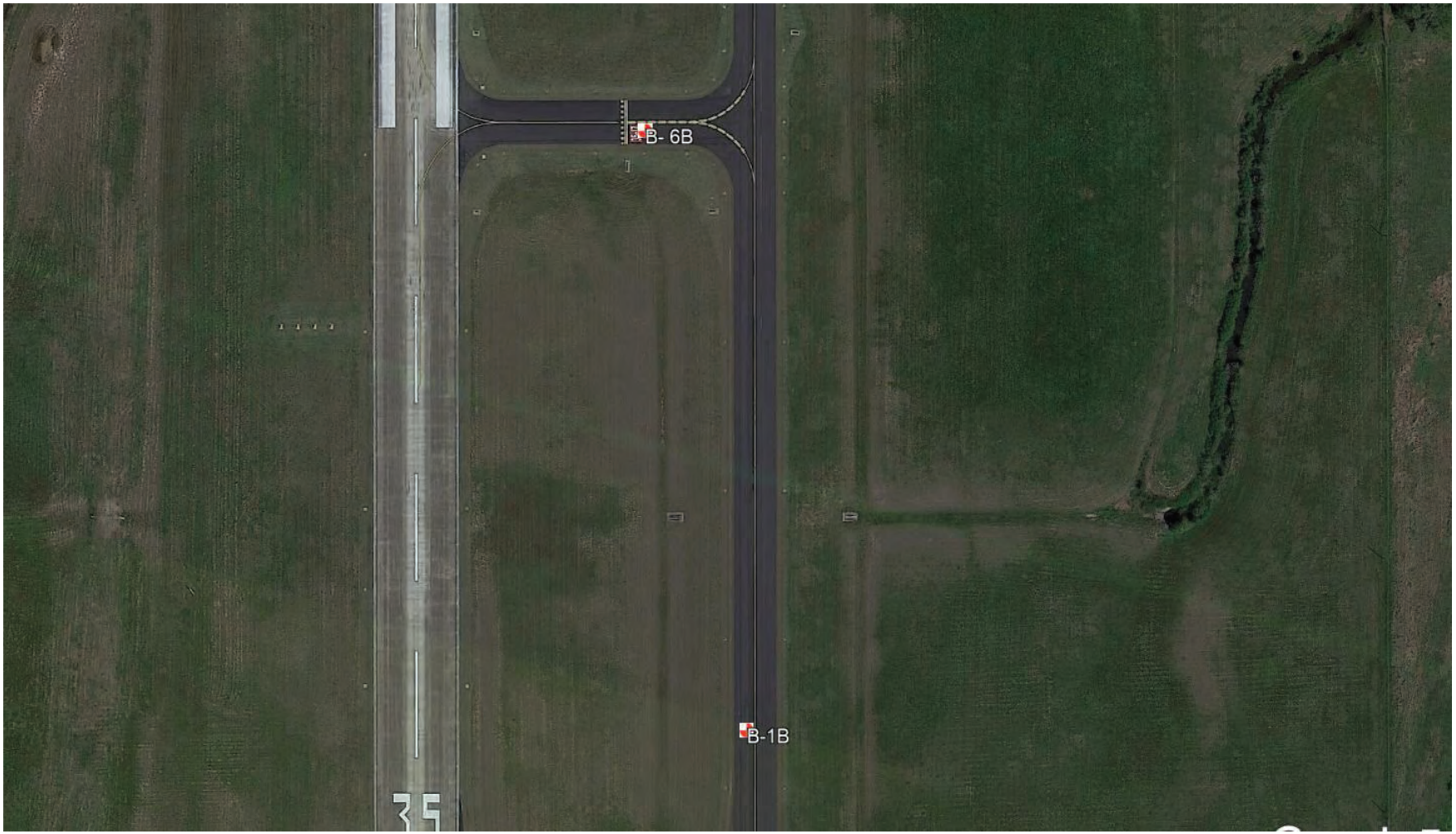
DATE: 09/05/2023	APPROVED BY: PD	PREPARED BY: PD

PLAN OF BORINGS
EVALUATION STUDY OF PARALLEL TAXIWAY

PROJECT NO.: HG2210070.1	DRAWING NO. PLATE 2-B



LEGEND:

APPROXIMATE BORING LOCATIONS (11' DEPTH)

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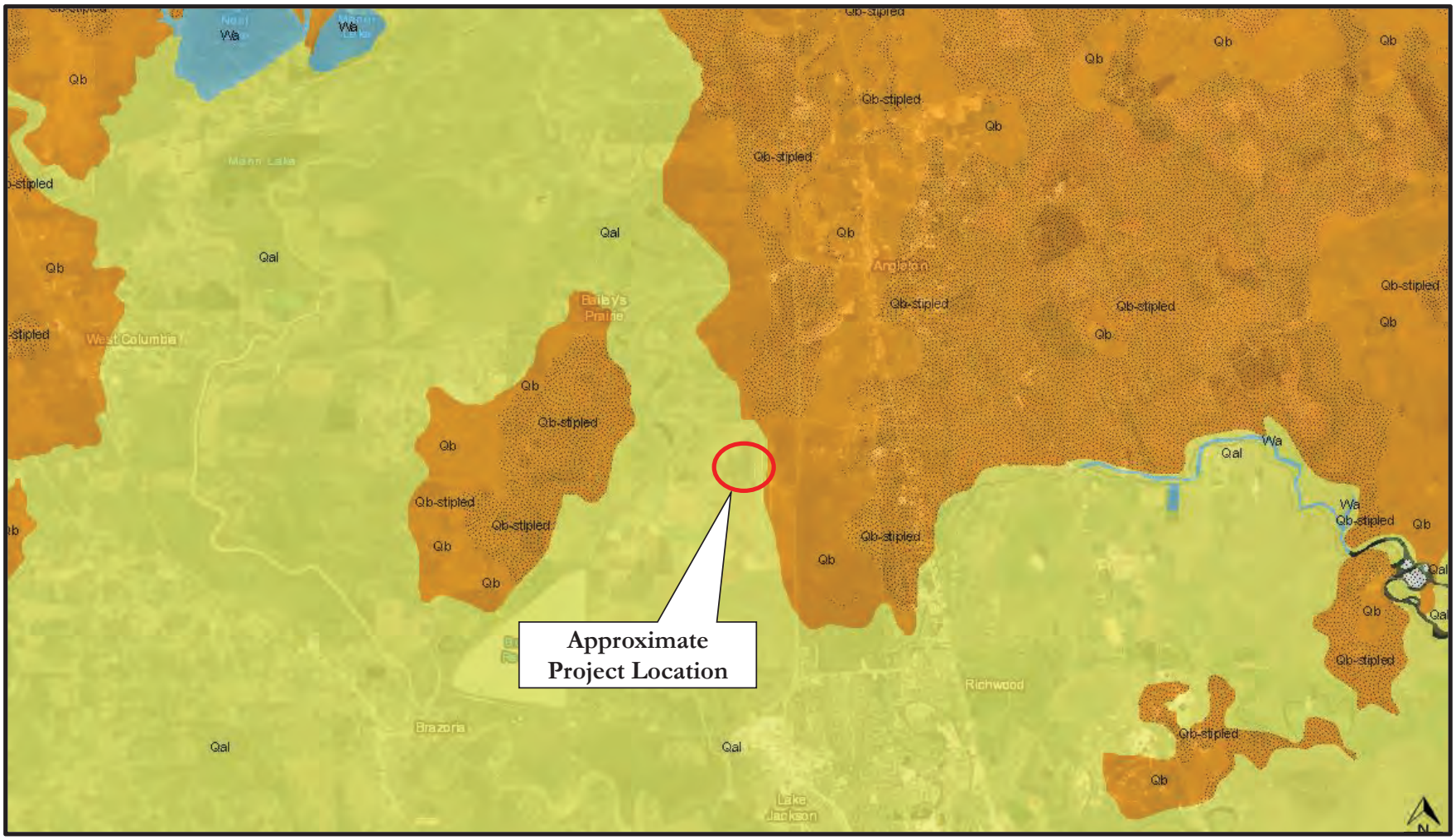
DATE: 09/05/2023	APPROVED BY: PD	PREPARED BY: PD

PLAN OF BORINGS
EVALUATION STUDY OF PARALLEL TAXIWAY

PROJECT NO.: HG2210070.1	DRAWING NO.: PLATE 2-C



Source: mrdata.usgs.gov/geology/state/state.php?state=TX

Alluvium Formation – Floodplain deposits, including low terrace deposits 3-8 feet above floodplain subject to flooding; clay, silt, sand, gravel, and organic matter; silt and clay, calcareous, dark gray to dark brown; sand, largely quartz, gravel, siliceous, mostly chert, quartzite, and petrified wood, along Colorado River much limestone, igneous, and metamorphic rock, probably mostly reworked from terrace deposits, fluviatile morphology well preserved with point bars, oxbows, and abandoned channel segments.

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DATE: 09/05/2023	APPROVED BY: PD	PREPARED BY: RA

GEOLOGIC MAP
EVALUATION STUDY OF PARALLEL TAXIWAY

PROJECT NO.: HG2210070.1	DRAWING NO.: PLATE 3

APPENDIX A

BORING LOGS AND KEY TO TERMS & SYMBOLS

LOG OF BORING B-1B

PROJECT: Evaluation Study of Parallel Taxiway
LOCATION: 29.099944; -95.460889
STATION: N/A
OFFSET: N/A
SURFACE ELEVATION: N/A

PROJECT NO.: HG2210070.1

COMPLETION DEPTH: 11 FT

DATE: 8/7/2023

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: 0 TO 11 FT
WET ROTARY: N/A TO N/A FT

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.5 1.0 1.5 2.0 2.5

ELEVATION, FT	DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
	0			Pavement: 6" Asphalt, 7" Flexible Base, 25" Lime Stabilized Clay							
	5			Stiff, dark gray and brown, FAT CLAY (CH)			97	27			
	10			- w/ gravel at 7'-9'		92.9		32	76	25	51

DEPTH TO WATER IN BORING:
▽ FREE WATER DURING DRILLING: ---
▼ WATER DEPTH 24 HOURS AFTER DRILLING: ---

Note: Survey information not available

Drilled By: Soil Tech Logged By: Edgar/Jobin

HVJ Associates, Inc.

COH HG2210070.1.GPJ 8/24/23

LOG OF BORING B-2B

PROJECT: Evaluation Study of Parallel Taxiway
LOCATION: 29.10675; -95.460806
STATION: N/A
OFFSET: N/A
SURFACE ELEVATION: N/A

PROJECT NO.: HG2210070.1

COMPLETION DEPTH: 11 FT

DATE: 8/8/2023

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: 0 TO 11 FT
WET ROTARY: N/A TO N/A FT

ELEVATION, FT	DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, TSF
	0			Pavement: 4.5" Asphalt, 23.5" Flexible Base, 12" Lime Stabilized Clay								
	5			Stiff to very stiff, dark gray and brown, FAT CLAY (CH)			88	34				
						92.7		31	76	24	52	
	10											

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.5 1.0 1.5 2.0 2.5

DEPTH TO WATER IN BORING:
▽ FREE WATER DURING DRILLING: ---
▼ WATER DEPTH 24 HOURS AFTER DRILLING: ---

Note: Survey information not available

Drilled By: Soil Tech Logged By: Edgar/Jobin

HVJ Associates, Inc.

COH HG2210070.1.GPJ 8/24/23

LOG OF BORING B-3B

PROJECT: Evaluation Study of Parallel Taxiway
LOCATION: 29.111944; -95.460889
STATION: N/A
OFFSET: N/A
SURFACE ELEVATION: N/A

PROJECT NO.: HG2210070.1

COMPLETION DEPTH: 11 FT

DATE: 8/8/2023

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: 0 TO 11 FT
WET ROTARY: N/A TO N/A FT

ELEVATION, FT	DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
	0			Pavement: 4.5" Asphalt, 23" Flexible Base, 10" Lime Stabilized Clay							
	5			Stiff to very stiff, dark gray and brown, FAT CLAY WITH SAND (CH)			83	38			
	10			-w/ gravel at 9'-11'		77.3		20	53	18	35

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.5 1.0 1.5 2.0 2.5

DEPTH TO WATER IN BORING:
▽ FREE WATER DURING DRILLING: ---
▼ WATER DEPTH 24 HOURS AFTER DRILLING: ---

Note: Survey information not available

Drilled By: Soil Tech Logged By: Edgar/Jobin

HVJ Associates, Inc.

COH HG2210070.1.GPJ 8/24/23

LOG OF BORING B-4B

PROJECT: Evaluation Study of Parallel Taxiway
LOCATION: 29.116333; -95.460972
STATION: N/A
OFFSET: N/A
SURFACE ELEVATION: N/A

PROJECT NO.: HG2210070.1

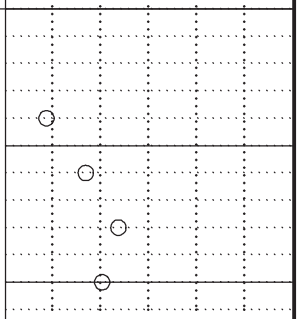
COMPLETION DEPTH: 11 FT

DATE: 8/8/2023

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: 0 TO 11 FT
WET ROTARY: N/A TO N/A FT

ELEVATION, FT	DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
	0			Pavement: 6.5" Asphalt, 18.5" Flexible Base, 12" Lime Stabilized Clay							
	5			Firm to very stiff, dark gray and brown, FAT CLAY (CH)			90	30			
				- w/ silt seams at 7'-11'							
	10					86.9		21	56	18	38

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.5 1.0 1.5 2.0 2.5



DEPTH TO WATER IN BORING:
▽ FREE WATER DURING DRILLING: ---
▼ WATER DEPTH 24 HOURS AFTER DRILLING: ---

Note: Survey information not available

Drilled By: Soil Tech Logged By: Edgar/Jobin

HVJ Associates, Inc.

COH HG2210070.1.GPJ 8/24/23

LOG OF BORING B-5B

PROJECT: Evaluation Study of Parallel Taxiway
LOCATION: 29.118194; -95.460944
STATION: N/A
OFFSET: N/A
SURFACE ELEVATION: N/A

PROJECT NO.: HG2210070.1

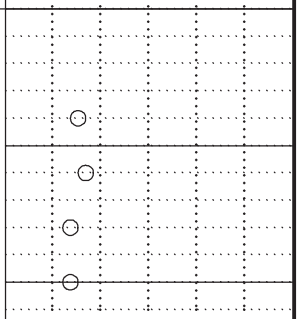
COMPLETION DEPTH: 11 FT

DATE: 8/8/2023

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: 0 TO 11 FT
WET ROTARY: N/A TO N/A FT

ELEVATION, FT	DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
	0			Pavement: 5" Asphalt, 23" Flexible Base, 7" Lime Stabilized Clay							
	5			Stiff, dark gray and brown, FAT CLAY (CH)		90.4	86	32 25	64	21	43
	10			-w/ gravel at 9'-11'							

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.5 1.0 1.5 2.0 2.5



DEPTH TO WATER IN BORING:
▽ FREE WATER DURING DRILLING: ---
▼ WATER DEPTH 24 HOURS AFTER DRILLING: ---

Note: Survey information not available

Drilled By: Soil Tech Logged By: Edgar/Jobin

HVJ Associates, Inc.

COH HG2210070.1.GPJ 8/24/23

LOG OF BORING B-6B

PROJECT: Evaluation Study of Parallel Taxiway
LOCATION: 29.101833; -95.461194
STATION: N/A
OFFSET: N/A
SURFACE ELEVATION: N/A

PROJECT NO.: HG2210070.1

COMPLETION DEPTH: 11 FT

DATE: 8/7/2023

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: 0 TO 11 FT
WET ROTARY: N/A TO N/A FT

ELEVATION, FT	DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, TSF
	0			Pavement: 4" Asphalt, 23" Flexible Base, 10" Lime Stabilized Clay								
	5			Stiff to very stiff, dark gray and brown, FAT CLAY WITH SAND (CH)			83	38				
	10					72.8		18	53	17	36	

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.5 1.0 1.5 2.0 2.5

DEPTH TO WATER IN BORING:
▽ FREE WATER DURING DRILLING: ---
▼ WATER DEPTH 24 HOURS AFTER DRILLING: ---

Note: Survey information not available

Drilled By: Soil Tech Logged By: Edgar/Jobin

HVJ Associates, Inc.

COH HG2210070.1.GPJ 8/24/23

SOIL SYMBOLS

Soil Types


Clay


Silt


Sand


Gravel

Modifiers


Clayey


Silty


Sandy


Cemented

Construction Materials


Asphaltic Concrete


Stabilized Base


Fill or Debris


Portland Cement Concrete

SAMPLER TYPES

Thin Walled Shelby Tube


No Recovery


Auger


Split Barrel


Core


Liner Tube


Jar Sample

WATER LEVEL SYMBOLS


Groundwater level after drilling in open borehole or piezometer


Groundwater level determined during drilling operations

SOIL GRAIN SIZE

Classification	Particle Size	Particle Size or Sieve No. (U.S. Standard)
Clay	< 0.002 mm	< 0.002 mm
Silt	0.002 - 0.075 mm	0.002 mm - #200 sieve
Sand	0.075 - 4.75 mm	#200 sieve - #4 sieve
Gravel	4.75 - 75 mm	#4 sieve - 3 in.
Cobble	75 - 200 mm	3 in. - 8 in.
Boulder	> 200 mm	> 8 in.

DENSITY OF COHESIONLESS SOILS

Descriptive Term	Penetration Resistance "N" * Blows/Foot
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	> 50

CONSISTENCY OF COHESIVE SOILS

Consistency	Undrained Shear Strength (tsf)	Penetration Resistance "N" * Blows/Foot
Very Soft	0 - 0.125	0 - 2
Soft	0.125 - 0.25	2 - 4
Firm	0.25 - 0.5	4 - 8
Stiff	0.5 - 1.0	8 - 16
Very Stiff	1.0 - 2.0	16 - 32
Hard	> 2.0	> 32

PENETRATION RESISTANCE

3/6	Blows required to penetrate each of three consecutive 6-inch increments per ASTM D-1586 *
50/4"	If more than 50 blows are required, driving is discontinued and penetration at 50 blows is noted
0/18"	Sampler penetrated full depth under weight of drill rods and hammer

* The N value is taken as the blows required to penetrate the final 12 inches

TERMS DESCRIBING SOIL STRUCTURE

Slickensided	Fracture planes appear polished or glossy, sometimes striated
Fissured	Breaks along definite planes of fracture with little resistance to fracturing
Inclusion	Small pockets of different soils, such as small lenses of sand scattered through a mass of clay
Parting	Inclusion less than 1/4 inch thick extending through the sample
Seam	Inclusion 1/4 inch to 3 inches thick extending through the sample
Layer	Inclusion greater than 3 inches thick extending through the sample
Laminated	Soil sample composed of alternating partings of different soil type
Stratified	Soil sample composed of alternating seams or layers of different soil type
Intermixed	Soil sample composed of pockets of different soil type and laminated or stratified structure is not evident
Calcareous	Having appreciable quantities of calcium carbonate
Ferrous	Having appreciable quantities of iron
Nodule	A small mass of irregular shape

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KEY TO TERMS AND SYMBOLS USED ON BORING LOGS

PROJECT NO.: HG2210070.1

DRAWING NO.: PLATE A-7

APPENDIX B

SUMMARY OF LABORATORY TEST RESULTS

Company Name: HVJ Associates, Inc.
Project: Evaluation Study of Parallel Taxiway
Location: Angleton, Texas
Project Number: HG2210070.1

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	% Passing #200 Sieve	Moisture content (%)	Dry Density (pcf)	Shear Strength (Pocket Pen) (tsf)
B-1B	4					27	97	0.58
B-1B	6							0.67
B-1B	8	76	25	51	92.9	32		0.50
B-1B	10							0.92
B-2B	4.5					34	88	1.25
B-2B	6	76	24	52	92.7	31		0.83
B-2B	8							1.08
B-2B	10							1.17
B-3B	4					38	83	0.58
B-3B	6							0.50
B-3B	8	53	18	35	77.3	20		0.92
B-3B	10							1.17
B-4B	4					30	90	0.42
B-4B	6							0.83
B-4B	8							1.17
B-4B	10	56	18	38	86.9	21		1.00
B-5B	4					32	86	0.75
B-5B	6	64	21	43	90.4	25		0.83
B-5B	8							0.67
B-5B	10							0.67
B-6B	4					38	83	0.50
B-6B	6							0.67
B-6B	8	53	17	36	72.8	18		1.17
B-6B	10							1.33
Total		**6**	**6**	**6**	**6**	**12**	**6**	**24**

APPENDIX C

CBR TEST RESULT

CBR (CALIFORNIA BEARING RATIO) OF LABORATORY COMPACTED SOILS ASTM D-1883

Project: Evaluation Study of Parallel Taxiway

Sample Location: Composite sample, Flexible Base

Liquid Limit: N/A **Plastic Limit:** N/A **Plasticity Index:** N/A

Method of Compaction: ☒ ASTM D698
☐ ASTM D1557

Sample Condition: ☒ soaked ☐ unsoaked

No. of Blows:	**10**	**25**	**65**
Dry Density Before Soaking (pcf):	109.5	114.3	123.5
Dry Density After Soaking (pcf):	113.0	115.7	123.0
Moisture Content:			
Before Compaction (%):	7.44	7.62	7.97
Top 1-inch Layer After Soaking (%):	11.02	11.11	11.27
Swell (%):	0.15	0.09	0.04
Bearing Ratio (%): (☒ soaked ☐ unsoaked)	4.17	13.30	40.03

Surcharge: 10 lbs.

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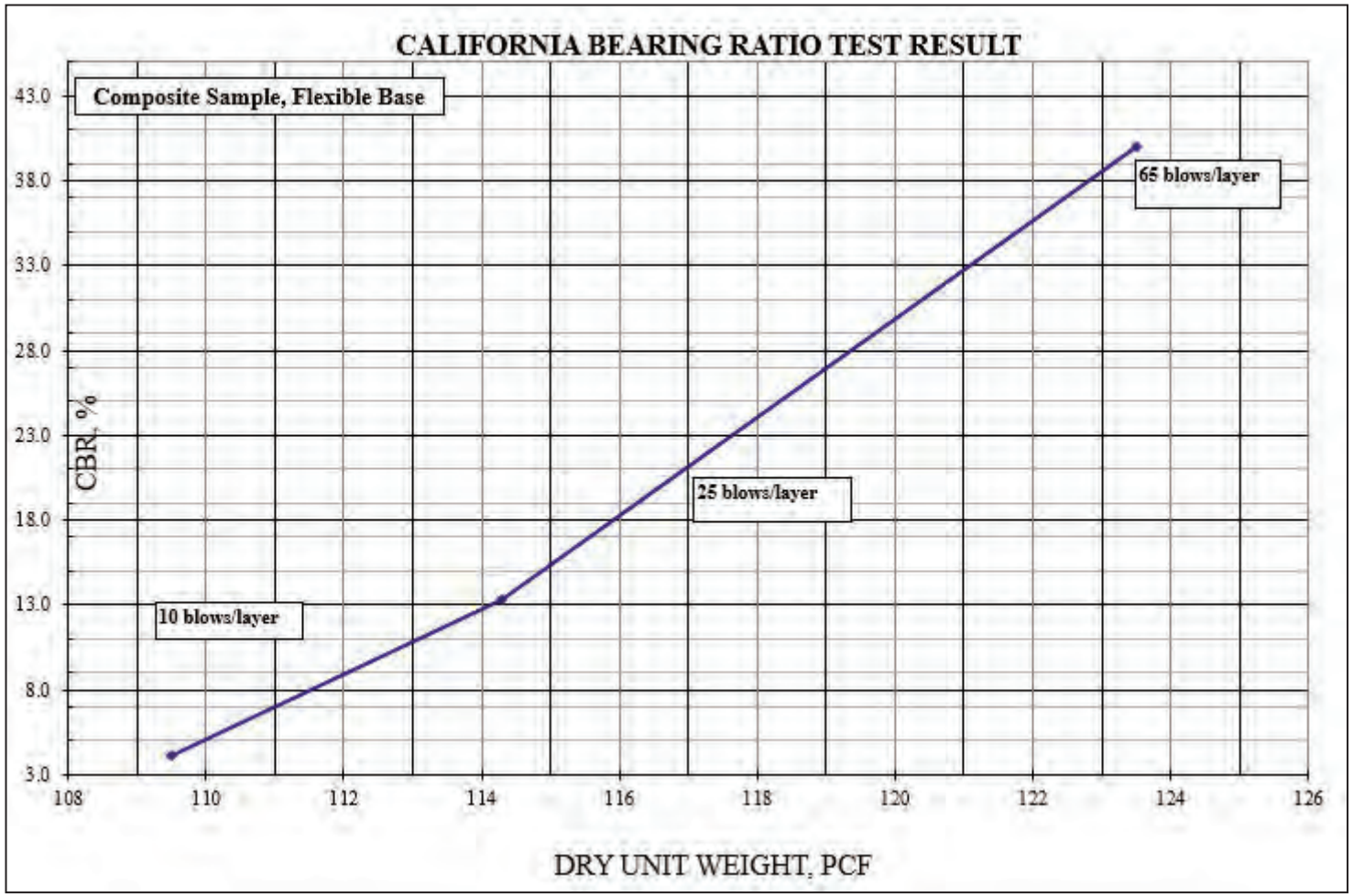
DATE: 09/06/2023	APPROVED BY: PD	PREPARED BY: RA

CBR TEST RESULTS
EVALUATION STUDY OF PARALLEL TAXIWAY

PROJECT NO.: HG2210070.1	DRAWING NO.: PLATE-1



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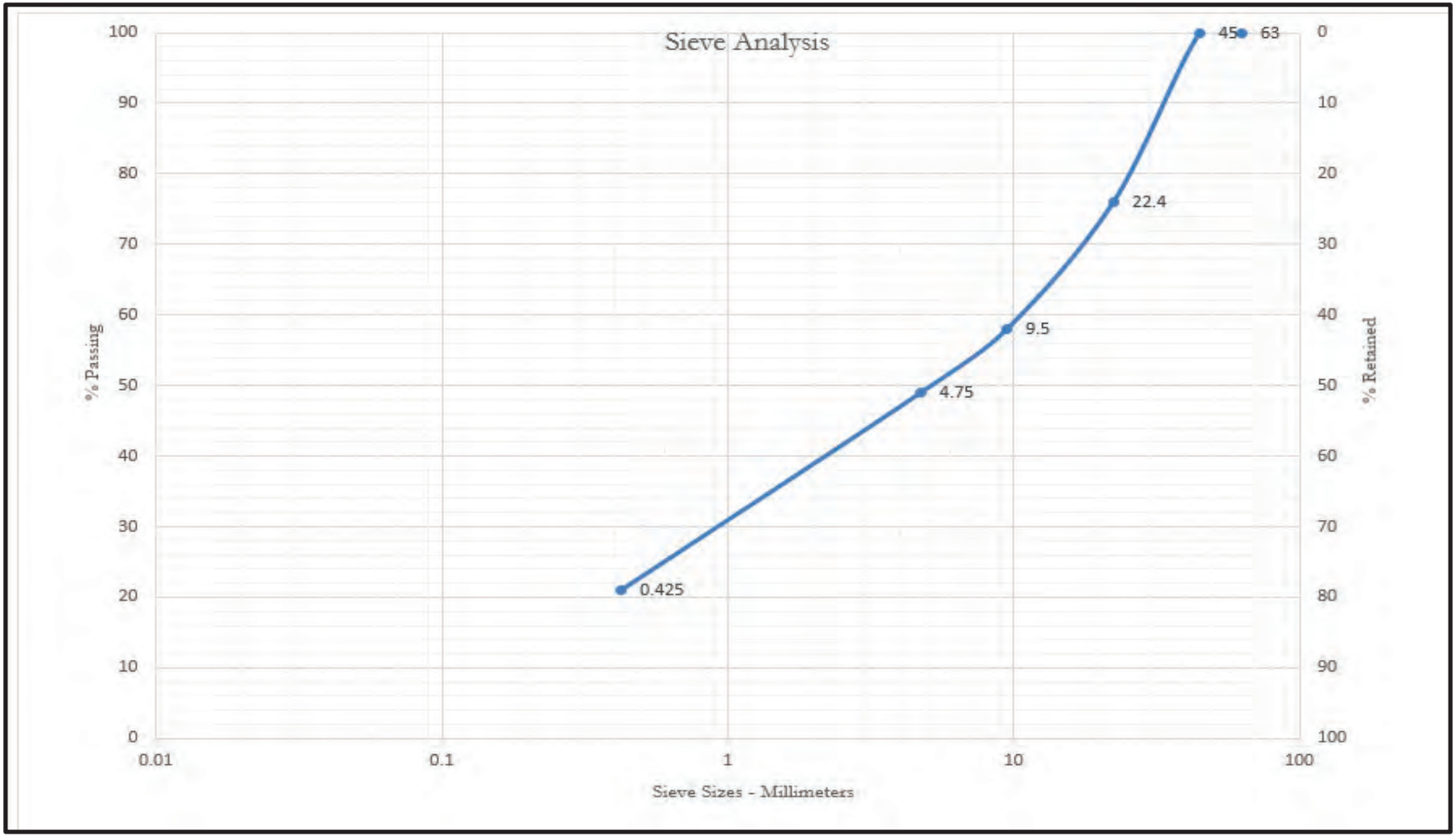
CBR TEST RESULTS
EVALUATION STUDY OF PARALLEL TAXIWAY

PROJECT NO.: HG2210070.1	DRAWING NO.: APPENDIX -C2

APPENDIX D

SIEVE ANALYSIS



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DATE: 09/05/2023	APPROVED BY: PD	PREPARED BY: RA

SIEVE ANALYSIS (FLEXIBLE BASE)
EVALUATION STUDY OF PARALLEL TAXIWAY

PROJECT NO.: HG2210070.1	DRAWING NO.: APPENDIX D

APPENDIX E

DCP TEST RESULTS

TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

Refresh Workbook

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID:	Near 1-B	SAMPLED DATE:	08/07/2023
TEST NUMBER:		LETTING DATE:	
SAMPLE STATUS:		CONTROLLING CSJ:	
COUNTY:	Brazoria	SPEC YEAR:	2014
SAMPLED BY:	Edgar	SPEC ITEM:	
SAMPLE LOCATION:	Parallel Taxiway	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Lime Stabilized, Clay		
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	

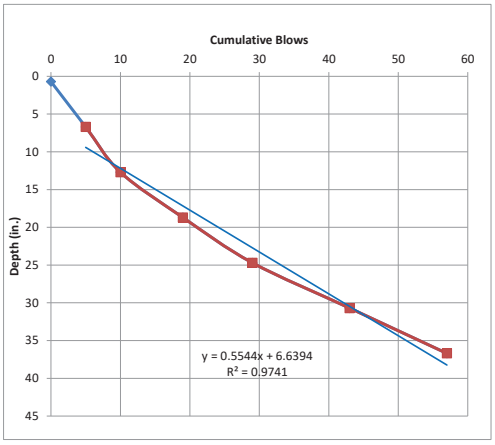
COURSE\LIFT:		STATION:		DIST. FROM CL:	
Long. (x):	95°27'39.1"W	Latitude (y):	29°05'59.9"N	Elev. (z):	

Material Classification:	All other types	Weather:	Cloudy
Hammer Weight:	8-KG [17.6-lbs.]	Water Table Depth (ft.):	
Pavement Conditions:		Depth of zero point below surface (in.):	0.50
Design Modulus (E) ksi:			

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	1.2	0	0.70				
5	7.2	5	6.70	6.4	8.4	YES	YES
5	13.2	10	12.70	6.4	8.4	YES	YES
9	19.2	19	18.70	12.3	12.7	YES	YES
10	25.2	29	24.70	13.8	13.7	YES	YES
14	31.2	43	30.70	20.1	17.4	YES	YES
14	37.2	57	36.70	20.1	17.4	YES	YES
					13.0	YES - Review Proof Rolling	Eavg. ≥ E design ?

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	13.0		



Remarks:

6" Asphalt
33" Base

Test Method:	Tested By:	Tested Date:
D6951	Edgar	09/11/2023

Test Stamp Code:	Omit Test:	Completed Date:	Reviewed By:
J.E.			

Locked By:	TxDOT:	District:	Area:

Authorized By:	Authorized Date:

TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

Refresh Workbook

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID:	Near 2-B	SAMPLED DATE:	08/07/2023
TEST NUMBER:		LETTING DATE:	
SAMPLE STATUS:		CONTROLLING CSJ:	
COUNTY:	Brazoria	SPEC YEAR:	2014
SAMPLED BY:	Edgar	SPEC ITEM:	
SAMPLE LOCATION:	Parallel Taxiway	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Lime Stabilized, Clay		
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	

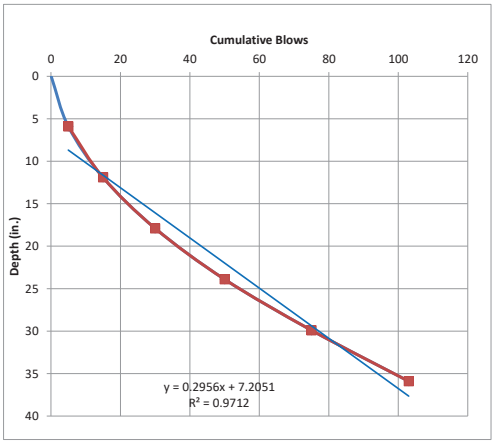
COURSE\LIFT:		STATION:		DIST. FROM CL:	
Long. (x):	95°27'38.9"W	Latitude (y):	29°6'24.2"N	Elev. (z):	

Material Classification:	All other types	Weather:	Cloudy
Hammer Weight:	8-KG [17.6-lbs.]	Water Table Depth (ft.):	
Pavement Conditions:		Depth of zero point below surface (in.):	0.50
Design Modulus (E) ksi:			

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	0.4	0	-0.10				
5	6.4	5	5.90	6.4	8.4	YES	YES
10	12.4	15	11.90	13.8	13.7	YES	YES
15	18.4	30	17.90	21.8	18.3	YES	YES
20	24.4	50	23.90	30.0	22.5	YES	YES
25	30.4	75	29.90	38.6	26.4	YES	YES
28	36.4	103	35.90	43.8	28.6	YES	YES
					19.7	YES - Review Proof Rolling	Eavg. ≥ E design ?

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	19.7		



Remarks:
4.5" Asphalt
35.5" Base

Test Method:	Tested By:	Tested Date:
D6951	Edgar	09/11/2023

Test Stamp Code:	Omit Test:	Completed Date:	Reviewed By:
J.E.			

Locked By:	TxDOT:	District:	Area:

Authorized By:	Authorized Date:

TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

Refresh Workbook

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID:	Near 3-B	SAMPLED DATE:	08/07/2023
TEST NUMBER:		LETTING DATE:	
SAMPLE STATUS:		CONTROLLING CSJ:	
COUNTY:	Brazoria	SPEC YEAR:	2014
SAMPLED BY:	Edgar	SPEC ITEM:	
SAMPLE LOCATION:	Parallel Taxiway	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Lime Stabilized, Clay		
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	

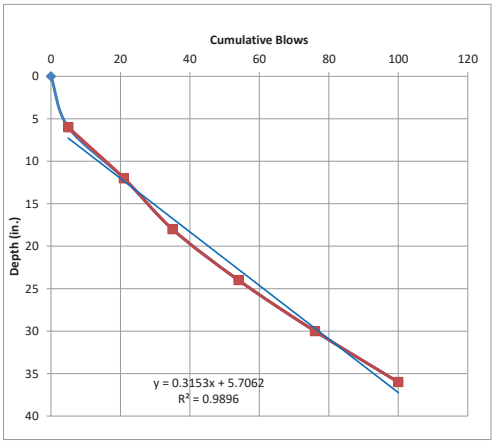
COURSE\LIFT:		STATION:		DIST. FROM CL:	
Long. (x):	95°27'38.9"W	Latitude (y):	29°6'24.2"N	Elev. (z):	

Material Classification:	All other types	Weather:	Cloudy
Hammer Weight:	8-KG [17.6-lbs.]	Water Table Depth (ft.):	
Pavement Conditions:		Depth of zero point below surface (in.):	0.50
Design Modulus (E) ksi:			

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	0.5	0	0.00				
5	6.5	5	6.00	6.4	8.4	YES	YES
16	12.5	21	12.00	23.4	19.2	YES	YES
14	18.5	35	18.00	20.1	17.4	YES	YES
19	24.5	54	24.00	28.4	21.7	YES	YES
22	30.5	76	30.00	33.4	24.1	YES	YES
24	36.5	100	36.00	36.8	25.6	YES	YES
					19.4	YES - Review Proof Rolling	Eavg. ≥ E design ?

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	19.4		



Remarks:

4.5" Asphalt
33" Base

Test Method:	Tested By:	Tested Date:
D6951	Edgar	09/11/2023

Test Stamp Code:	Omit Test:	Completed Date:	Reviewed By:
J.E.			

Locked By:	TxDOT:	District:	Area:

Authorized By:	Authorized Date:

TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

Refresh Workbook

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID:	Near 4-B	SAMPLED DATE:	08/07/2023
TEST NUMBER:		LETTING DATE:	
SAMPLE STATUS:		CONTROLLING CSJ:	
COUNTY:	Brazoria	SPEC YEAR:	2014
SAMPLED BY:	Edgar	SPEC ITEM:	
SAMPLE LOCATION:	Parallel Taxiway	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Lime Stabilized, Clay		
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	

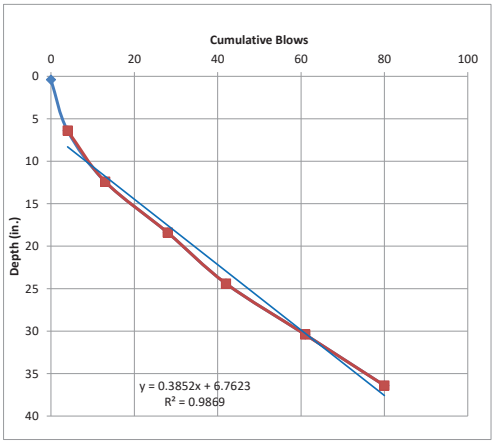
COURSE\LIFT:		STATION:		DIST. FROM CL:	
Long. (x):	95°27'39.2"W	Latitude (y):	29°6'58.6"N	Elev. (z):	

Material Classification:	All other types	Weather:	Cloudy
Hammer Weight:	8-KG [17.6-lbs.]	Water Table Depth (ft.):	
Pavement Conditions:		Depth of zero point below surface (in.):	0.50
Design Modulus (E) ksi:			

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	0.9	0	0.40				
4	6.9	4	6.40	5.0	7.1	YES	YES
9	12.9	13	12.40	12.3	12.7	YES	YES
15	18.9	28	18.40	21.8	18.3	YES	YES
14	24.9	42	24.40	20.1	17.4	YES	YES
19	30.9	61	30.40	28.4	21.7	YES	YES
19	36.9	80	36.40	28.4	21.7	YES	YES
					16.5	YES - Review Proof Rolling	Eavg. ≥ E design ?

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	16.5		



Remarks:

6.5" Asphalt
30.5" Base

Test Method:	Tested By:	Tested Date:
D6951	Edgar	09/11/2023

Test Stamp Code:	Omit Test:	Completed Date:	Reviewed By:
J.E.			

Locked By:	TxDOT:	District:	Area:

Authorized By:	Authorized Date:

TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

Refresh Workbook

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID:	Near 5-B	SAMPLED DATE:	08/07/2023
TEST NUMBER:		LETTING DATE:	
SAMPLE STATUS:		CONTROLLING CSJ:	
COUNTY:	Brazoria	SPEC YEAR:	2014
SAMPLED BY:	Edgar	SPEC ITEM:	
SAMPLE LOCATION:	Parallel Taxiway	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Lime Stabilized, Clay		
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	

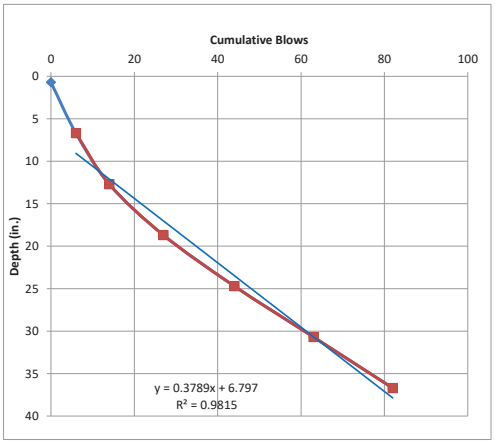
COURSE\LIFT:		STATION:		DIST. FROM CL:	
Long. (x):	95°27'39.5"W	Latitude (y):	29°7'5.4"N	Elev. (z):	

Material Classification:	All other types	Weather:	Cloudy
Hammer Weight:	8-KG [17.6-lbs.]	Water Table Depth (ft.):	
Pavement Conditions:		Depth of zero point below surface (in.):	0.50
Design Modulus (E) ksi:			

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	1.2	0	0.70				
6	7.2	6	6.70	7.8	9.5	YES	YES
8	13.2	14	12.70	10.8	11.7	YES	YES
13	19.2	27	18.70	18.5	16.5	YES	YES
17	25.2	44	24.70	25.0	20.0	YES	YES
19	31.2	63	30.70	28.4	21.7	YES	YES
19	37.2	82	36.70	28.4	21.7	YES	YES
					16.9	YES - Review Proof Rolling	Eavg. ≥ E design ?

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	16.9		



Remarks:

5" Asphalt
30" Base

Test Method:	Tested By:	Tested Date:
D6951	Edgar	09/11/2023

Test Stamp Code:	Omit Test:	Completed Date:	Reviewed By:
J.E.			

Locked By:	TxDOT:	District:	Area:

Authorized By:	Authorized Date:

TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

Refresh Workbook

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID:	Near 6-B	SAMPLED DATE:	08/07/2023
TEST NUMBER:		LETTING DATE:	
SAMPLE STATUS:		CONTROLLING CSJ:	
COUNTY:	Brazoria	SPEC YEAR:	2014
SAMPLED BY:	Edgar	SPEC ITEM:	
SAMPLE LOCATION:	Parallel Taxiway	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Lime Stabilized, Clay		
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	

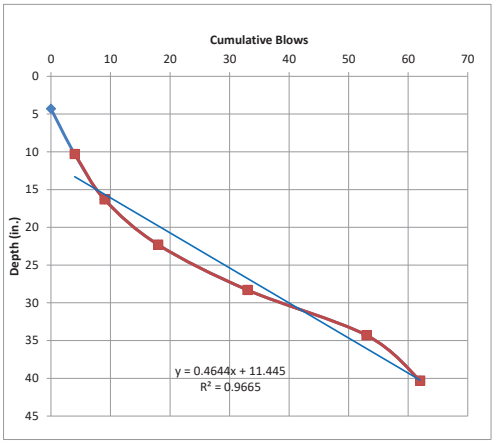
COURSE\LIFT:		STATION:		DIST. FROM CL:	
Long. (x):	95°27'40.5"W	Latitude (y):	29°6'6.5"N	Elev. (z):	

Material Classification:	All other types	Weather:	Cloudy
Hammer Weight:	8-KG [17.6-lbs.]	Water Table Depth (ft.):	
Pavement Conditions:		Depth of zero point below surface (in.):	0.50
Design Modulus (E) ksi:			

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	4.8	0	4.30				
4	10.8	4	10.30	5.0	7.1	YES	YES
5	16.8	9	16.30	6.4	8.4	YES	YES
9	22.8	18	22.30	12.3	12.7	YES	YES
15	28.8	33	28.30	21.8	18.3	YES	YES
20	34.8	53	34.30	30.0	22.5	YES	YES
9	40.8	62	40.30	12.3	12.7	YES	YES
					13.6	YES - Review Proof Rolling	Eavg. ≥ E design ?

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	13.6		



Remarks:

5" Asphalt
30" Base

Test Method:	Tested By:	Tested Date:
D6951	Edgar	09/11/2023

Test Stamp Code:	Omit Test:	Completed Date:	Reviewed By:
J.E.			

Locked By:	TxDOT:	District:	Area:

Authorized By:	Authorized Date:

ATTACHMENT 4

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 2212ANGLE - Section 1

Section: Exist Section 1

This file name = PCR Results for HMA on Flexible 2023-09-18 15:30:58

Evaluation pavement type is flexible and design program is FAARFIELD.

Section name: Exist Section 1 in job file: 2212ANGLE - Section 1.JOB.xml

Units = US Customary

Analysis Type: HMA on Flexible

Subgrade Modulus =8,270psi (Subgrade Category is D)

Evaluation Pavement Thickness = 13.5 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 2

CDF = 121.570

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lbs)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	S-5	5,000	95.00	50	340	1,656
2	S-10	10,000	95.00	50	200	1,166
3	S-12.5	12,500	95.00	50	110	684
4	S-15	15,000	95.00	50	13	85
5	S-20	20,000	95.00	75	44	279
6	S-25	25,000	95.00	100	2	12
7	D-15	15,000	95.00	55	113	1,053
8	D-20	20,000	95.00	65	16	157
9	D-25	25,000	95.00	75	36	388
10	D-30	30,000	95.00	85	26	285
11	D-40	40,000	95.00	90	73	834
12	D-50	50,000	95.00	80	2	25
13	D-75	75,000	95.00	110	10	130
14	D-100	100,000	95.00	140	860	11,230

Results Table 2. PCR Value

No.	Aircraft Name	Critical aircraft Total equiv. departures	Max allowable Gross Weight of critical aircraft (lbs)	ACR Thick at max. MGW (in.)	PCR/F/D
1	D-100	861	57,935	19.1	151.7

Results Table 3. HMA on Flexible ACR at Indicated Gross Weight and Strength

No.	Aircraft Name	Gross Weight (lbs)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (D)	ACR/F/D
1	S-5	5,000	95.00	50	5.1	17
2	S-10	10,000	95.00	50	8.7	35.1
3	S-12.5	12,500	95.00	50	9.9	43.8
4	S-15	15,000	95.00	50	11.0	52.4
5	S-20	20,000	95.00	75	13.6	76.5
6	S-25	25,000	95.00	100	15.7	100
7	D-15	15,000	95.00	55	9.6	41.1
8	D-20	20,000	95.00	65	11.7	57.9
9	D-25	25,000	95.00	75	12.4	64.4
10	D-30	30,000	95.00	85	14.4	84.8
11	D-40	40,000	95.00	90	17.7	126.8
12	D-50	50,000	95.00	80	18.1	132
13	D-75	75,000	95.00	110	22.3	231.3
14	D-100	100,000	95.00	140	25.5	321.8

Federal Aviation Administration FAARFIELD 2.0 Form 5010

FAARFIELD 2.0.18 (Build 05/26/2022)

RUNWAY DATA

Job Name: 2212ANGLE - Section 1

Section: Exist Section 1

Gross Weight (In THSDS)

35 S	39
36 D	55
37 2D	0
38 2D/2D2	0

39 PCR	152/F/D/X/T

Federal Aviation Administration FAARFIELD 2.0 Section Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 2212ANGLE - Section 1

Section: Strengthen Option 1

Analysis Type: New Flexible

Last Run: Thickness Design 2023-09-18 17:11:46

Design Life = 20 Years

Total thickness to the top of the subgrade = 21.0in.

Pavement Structure Information by Layer

No.	Type	Thickness (in.)	Modulus (psi)	Poisson's Ratio	Strength R (psi)
1	P-401/P-403 HMA Surface	4.0	200,000	0.35	0
2	P-304 Cement Treated Base	5.0	500,000	0.2	0
3	P-209 Crushed Aggregate	12.0	32,208	0.35	0
4	Subgrade	0	8,270	0.35	0

Airplane Information

No.	Name	Gross Wt. (lbs)	Annual Departures	% Annual Growth
1	S-5	5,000	340	5
2	S-10	10,000	200	5
3	S-12.5	12,500	110	5
4	S-15	15,000	13	5
5	S-20	20,000	44	5
6	S-25	25,000	2	5
7	D-15	15,000	113	5
8	D-20	20,000	16	5
9	D-25	25,000	36	5
10	D-30	30,000	26	5
11	D-40	40,000	73	5
12	D-50	50,000	2	5
13	D-75	75,000	10	5
14	D-100	100,000	860	5

Additional Airplane Information

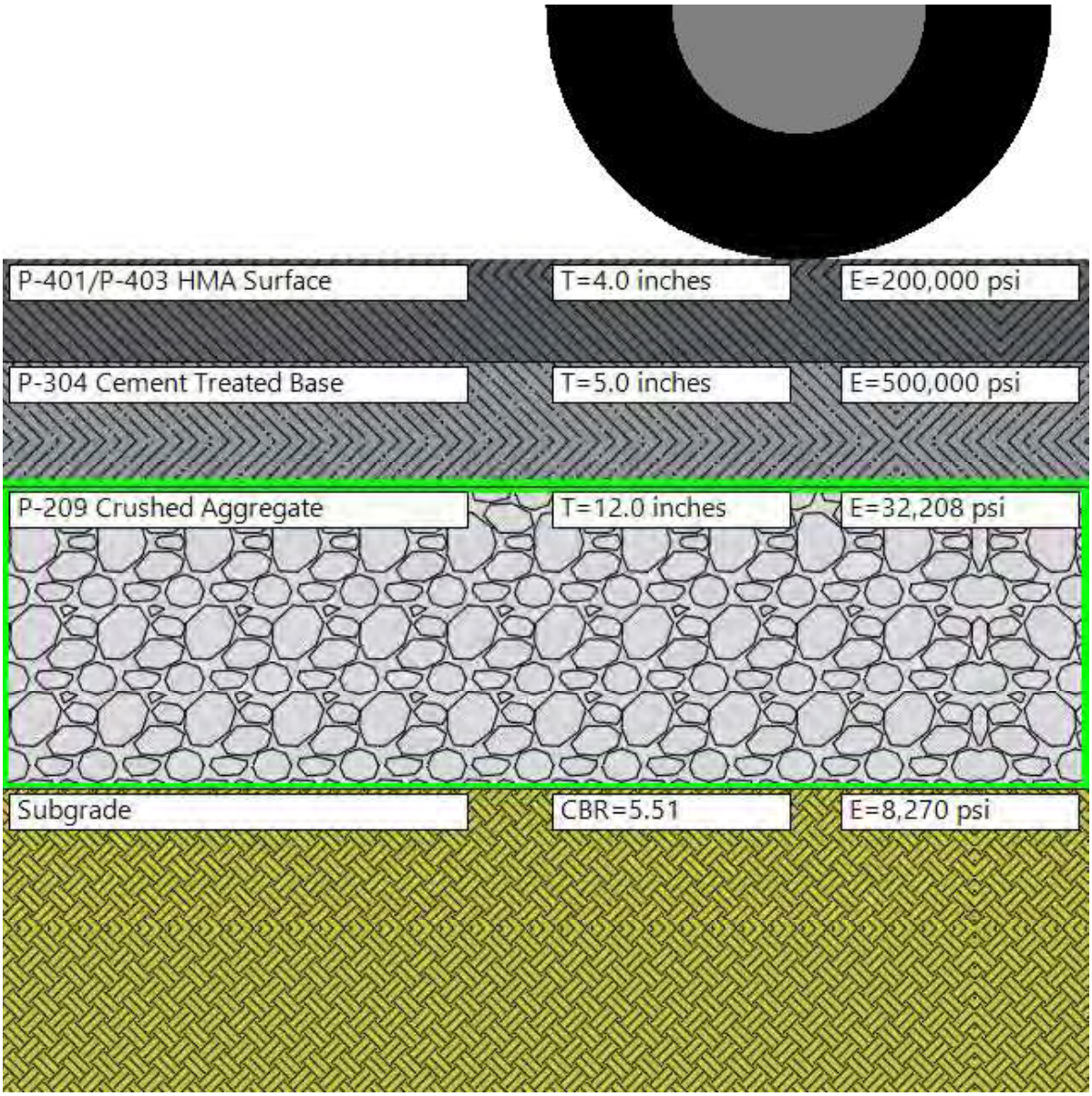
Subgrade CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	S-5	0.00	0.00	2.94
2	S-10	0.00	0.00	2.71
3	S-12.5	0.00	0.00	2.62
4	S-15	0.00	0.00	2.55
5	S-20	0.00	0.00	2.6
6	S-25	0.00	0.00	2.62
7	D-15	0.00	0.00	2.11
8	D-20	0.00	0.00	2.04
9	D-25	0.00	0.00	1.91
10	D-30	0.00	0.00	1.9
11	D-40	0.00	0.00	1.87
12	D-50	0.00	0.00	1.66
13	D-75	0.00	0.00	1.62
14	D-100	1.00	1.00	1.57

HMA CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	S-5	0.00	0.00	7.65
2	S-10	0.00	0.00	6.13
3	S-12.5	0.00	0.00	5.68
4	S-15	0.00	0.00	5.33
5	S-20	0.00	0.00	5.56
6	S-25	0.00	0.00	5.68
7	D-15	0.00	0.00	3.56
8	D-20	0.00	0.00	3.41
9	D-25	0.00	0.00	3.36
10	D-30	0.00	0.00	3.29
11	D-40	0.00	0.00	3.05
12	D-50	0.00	0.00	2.74
13	D-75	0.00	0.00	2.67
14	D-100	0.00	0.00	2.66

User Is responsible For checking frost protection requirements.


P-401/P-403 HMA Surface
T=4.0 inches
E=200,000 psi
P-304 Cement Treated Base
T=5.0 inches
E=500,000 psi
P-209 Crushed Aggregate
T=12.0 inches
E=32,208 psi
Subgrade
CBR=5.51
E=8,270 psi

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 2212ANGLE - Section 1

Section: Strengthen Option 1

This file name = PCR Results for New Flexible 2023-09-18 17:21:09

Evaluation pavement type is flexible and design program is FAARFIELD.

Section name: Strengthen Option 1 in job file: 2212ANGLE - Section 1.JOB.xml

Units = US Customary

Analysis Type: New Flexible

Subgrade Modulus =8,270psi (Subgrade Category is D)

Evaluation Pavement Thickness = 21.0 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 2

CDF = 1.000

No aircraft have 4 or more wheels per gear.

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lbs)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	S-5	5,000	95.00	50	340	1,333
2	S-10	10,000	95.00	50	200	978
3	S-12.5	12,500	95.00	50	110	581
4	S-15	15,000	95.00	50	13	73
5	S-20	20,000	95.00	75	44	238
6	S-25	25,000	95.00	100	2	11
7	D-15	15,000	95.00	55	113	952
8	D-20	20,000	95.00	65	16	141
9	D-25	25,000	95.00	75	36	322
10	D-30	30,000	95.00	85	26	237
11	D-40	40,000	95.00	90	73	719
12	D-50	50,000	95.00	80	2	22
13	D-75	75,000	95.00	110	10	112
14	D-100	100,000	95.00	140	860	9,717

Results Table 2. PCR Value

No.	Aircraft Name	Critical aircraft Total equiv. departures	Max allowable Gross Weight of critical aircraft (lbs)	ACR Thick at max. MGW (in.)	PCR/F/D
1	D-100	860	100,000	25.5	321.8

Results Table 3. New Flexible ACR at Indicated Gross Weight and Strength

No.	Aircraft Name	Gross Weight (lbs)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (D)	ACR/F/D
1	S-5	5,000	95.00	50	5.1	17
2	S-10	10,000	95.00	50	8.7	35.1
3	S-12.5	12,500	95.00	50	9.9	43.8
4	S-15	15,000	95.00	50	11.0	52.4
5	S-20	20,000	95.00	75	13.6	76.5
6	S-25	25,000	95.00	100	15.7	100
7	D-15	15,000	95.00	55	9.6	41.1
8	D-20	20,000	95.00	65	11.7	57.9
9	D-25	25,000	95.00	75	12.4	64.4
10	D-30	30,000	95.00	85	14.4	84.8
11	D-40	40,000	95.00	90	17.7	126.8
12	D-50	50,000	95.00	80	18.1	132
13	D-75	75,000	95.00	110	22.3	231.3
14	D-100	100,000	95.00	140	25.5	321.8

Federal Aviation Administration FAARFIELD 2.0 Form 5010

FAARFIELD 2.0.18 (Build 05/26/2022)

RUNWAY DATA

Job Name: 2212ANGLE - Section 1

Section: Strengthen Option 1

Gross Weight (In THSDS)

35 S	79
36 D	100
37 2D	157
38 2D/2D2	0

39 PCR	322/F/D/X/T

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 2212ANGLE - Section 1

Section: Asphalt OL Option 2

This file name = PCR Results for HMA on Flexible 2023-09-18 17:35:31

Evaluation pavement type is flexible and design program is FAARFIELD.

Section name: Asphalt OL Option 2 in job file: 2212ANGLE - Section 1.JOB.xml

Units = US Customary

Analysis Type: HMA on Flexible

Subgrade Modulus =8,270psi (Subgrade Category is D)

Evaluation Pavement Thickness = 18.5 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 2

CDF = 0.830

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lbs)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	S-5	5,000	95.00	50	340	2,295
2	S-10	10,000	95.00	50	200	1,539
3	S-12.5	12,500	95.00	50	110	888
4	S-15	15,000	95.00	50	13	109
5	S-20	20,000	95.00	75	44	360
6	S-25	25,000	95.00	100	2	16
7	D-15	15,000	95.00	55	113	1,252
8	D-20	20,000	95.00	65	16	185
9	D-25	25,000	95.00	75	36	457
10	D-30	30,000	95.00	85	26	332
11	D-40	40,000	95.00	90	73	956
12	D-50	50,000	95.00	80	2	31
13	D-75	75,000	95.00	110	10	158
14	D-100	100,000	95.00	140	860	14,183

Results Table 2. PCR Value

No.	Aircraft Name	Critical aircraft Total equiv. departures	Max allowable Gross Weight of critical aircraft (lbs)	ACR Thick at max. MGW (in.)	PCR/F/D
1	D-100	860	101,192	25.7	326.9

Results Table 3. HMA on Flexible ACR at Indicated Gross Weight and Strength

No.	Aircraft Name	Gross Weight (lbs)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (D)	ACR/F/D
1	S-5	5,000	95.00	50	5.1	16.9
2	S-10	10,000	95.00	50	8.7	35.1
3	S-12.5	12,500	95.00	50	9.9	43.8
4	S-15	15,000	95.00	50	11.0	52.3
5	S-20	20,000	95.00	75	13.6	76.5
6	S-25	25,000	95.00	100	15.7	100
7	D-15	15,000	95.00	55	9.6	41.1
8	D-20	20,000	95.00	65	11.7	57.9
9	D-25	25,000	95.00	75	12.4	64.4
10	D-30	30,000	95.00	85	14.4	84.8
11	D-40	40,000	95.00	90	17.7	126.8
12	D-50	50,000	95.00	80	18.1	132
13	D-75	75,000	95.00	110	22.3	231.3
14	D-100	100,000	95.00	140	25.5	321.8

Federal Aviation Administration FAARFIELD 2.0 Form 5010

FAARFIELD 2.0.18 (Build 05/26/2022)

RUNWAY DATA

Job Name: 2212ANGLE - Section 1

Section: Asphalt OL Option 2

Gross Weight (In THSDS)

35 S	80
36 D	102
37 2D	159
38 2D/2D2	0

39 PCR	327/F/D/X/T

Federal Aviation Administration FAARFIELD 2.0 Section Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 2212ANGLE - Section 1

Section: Concrete Section Option 3

Analysis Type: New Rigid

Last Run: Thickness Design 2023-09-18 18:16:50

Design Life = 20 Years

Total thickness to the top of the subgrade = 22.2in.

Pavement Structure Information by Layer

No.	Type	Thickness (in.)	Modulus (psi)	Poisson's Ratio	Strength R (psi)
1	P-501 PCC Surface	10.2	4,000,000	0.15	650
2	User Defined	12.0	150,000	0.35	0
3	Subgrade	0	8,270	0.4	0

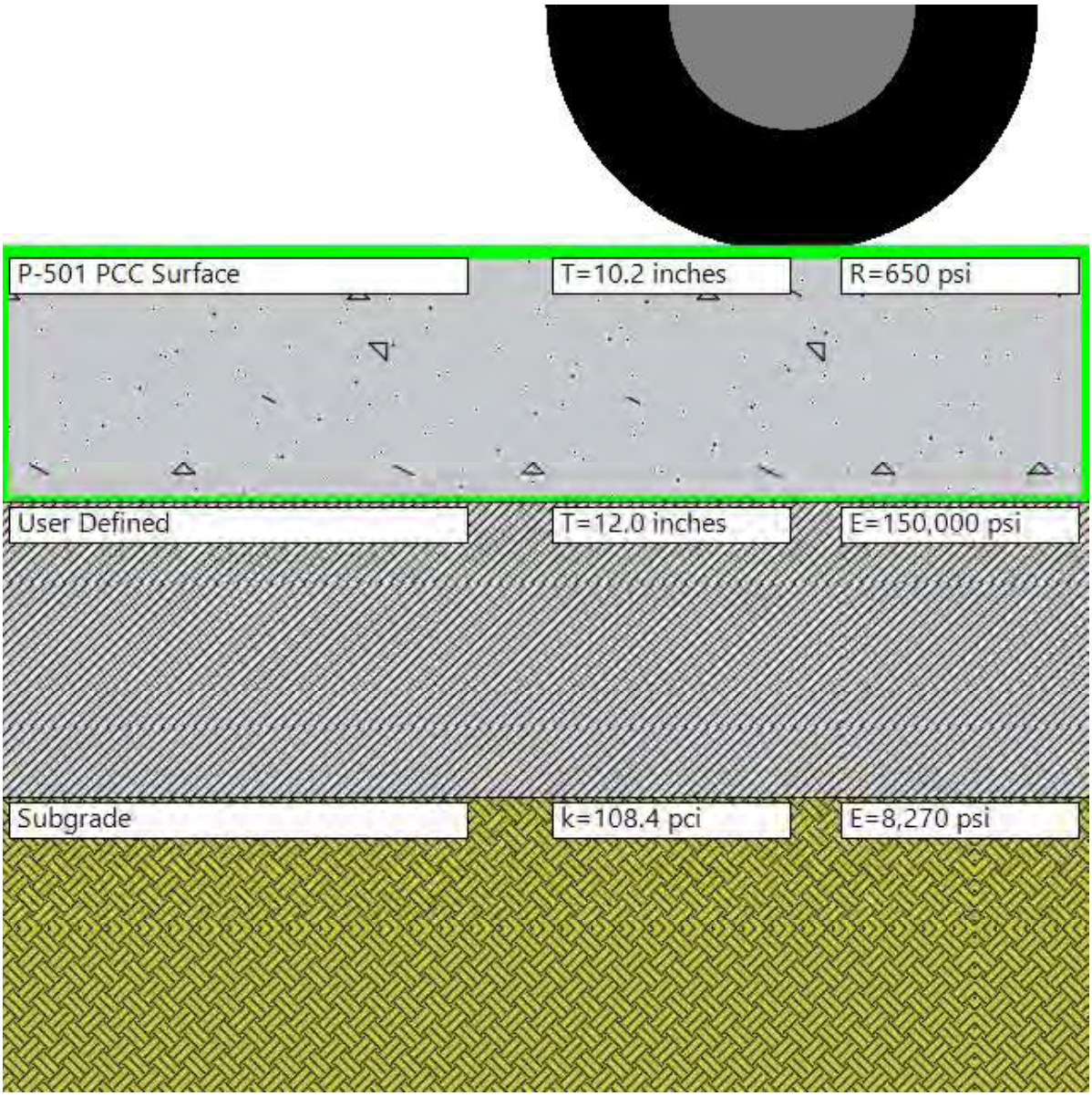
Airplane Information

No.	Name	Gross Wt. (lbs)	Annual Departures	% Annual Growth
1	S-5	5,000	340	5
2	S-10	10,000	200	5
3	S-12.5	12,500	110	5
4	S-15	15,000	13	5
5	S-20	20,000	44	5
6	S-25	25,000	2	5
7	D-15	15,000	113	5
8	D-20	20,000	16	5
9	D-25	25,000	36	5
10	D-30	30,000	26	5
11	D-40	40,000	73	5
12	D-50	50,000	2	5
13	D-75	75,000	10	5
14	D-100	100,000	860	5

Additional Airplane Information

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	S-5	0.00	0.00	12.6
2	S-10	0.00	0.00	8.92
3	S-12.5	0.00	0.00	7.99
4	S-15	0.00	0.00	7.3
5	S-20	0.00	0.00	7.74
6	S-25	0.00	0.00	7.99
7	D-15	0.00	0.00	5.48
8	D-20	0.00	0.00	5.18
9	D-25	0.00	0.00	5.03
10	D-30	0.00	0.00	4.89
11	D-40	0.00	0.00	4.36
12	D-50	0.00	0.00	3.73
13	D-75	0.00	0.00	3.6
14	D-100	1.00	1.00	3.55

User Is responsible For checking frost protection requirements.


P-501 PCC Surface
T=10.2 inches
R=650 psi
User Defined
T=12.0 inches
E=150,000 psi
Subgrade
k=108.4 pci
E=8,270 psi

Federal Aviation Administration FAARFIELD 2.0 Form 5010

FAARFIELD 2.0.18 (Build 05/26/2022)

RUNWAY DATA

Job Name: 2212ANGLE - Section 1

Section: Concrete Section Option 3

Gross Weight (In THSDS)

35 S	87
36 D	105
37 2D	172
38 2D/2D2	0

39 PCR	333/R/D/W/T

Federal Aviation Administration FAARFIELD 2.0 Section Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 2212ANGLE - Section 2

Section: Exist Section 2

Analysis Type: New Flexible

Last Run: Life Analysis 2023-09-20 10:20:38

Calculated Life = 2,231.1 Years

Total thickness to the top of the subgrade = 27.9in.

Pavement Structure Information by Layer

No.	Type	Thickness (in.)	Modulus (psi)	Poisson's Ratio	Strength R (psi)
1	P-401/P-403 HMA Surface	4.7	200,000	0.35	0
2	User Defined	8.0	80,900	0.35	0
3	User Defined	15.2	15,200	0.35	0
4	Subgrade	0	10,500	0.35	0

Airplane Information

No.	Name	Gross Wt. (lbs)	Annual Departures	% Annual Growth
1	S-5	5,000	340	5
2	S-10	10,000	200	5
3	S-12.5	12,500	110	5
4	S-15	15,000	13	5
5	S-20	20,000	44	5
6	S-25	25,000	2	5
7	D-15	15,000	113	5
8	D-20	20,000	16	5
9	D-25	25,000	36	5
10	D-30	30,000	26	5
11	D-40	40,000	73	5
12	D-50	50,000	2	5
13	D-75	75,000	10	5
14	D-100	100,000	860	5

Additional Airplane Information

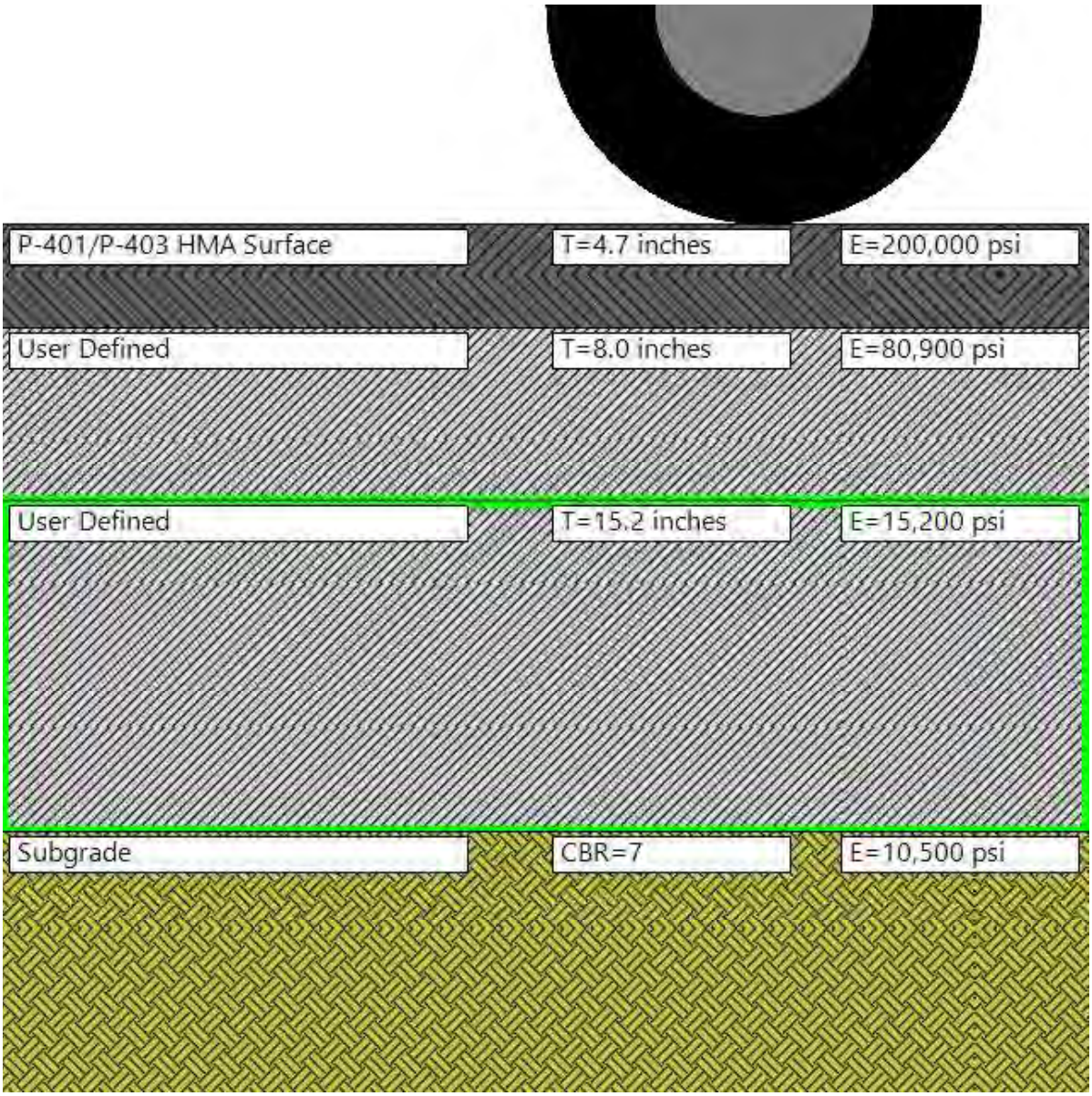
Subgrade CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	S-5	0.00	0.00	2.39
2	S-10	0.00	0.00	2.24
3	S-12.5	0.00	0.00	2.18
4	S-15	0.00	0.00	2.14
5	S-20	0.00	0.00	2.17
6	S-25	0.00	0.00	2.18
7	D-15	0.00	0.00	1.84
8	D-20	0.00	0.00	1.79
9	D-25	0.00	0.00	1.69
10	D-30	0.00	0.00	1.69
11	D-40	0.00	0.00	1.66
12	D-50	0.00	0.00	1.51
13	D-75	0.00	0.00	1.48
14	D-100	0.00	0.00	1.44

HMA CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	S-5	0.00	0.00	7.16
2	S-10	0.00	0.00	5.82
3	S-12.5	0.00	0.00	5.41
4	S-15	0.00	0.00	5.09
5	S-20	0.00	0.00	5.30
6	S-25	0.00	0.00	5.41
7	D-15	0.00	0.00	3.46
8	D-20	0.00	0.00	3.26
9	D-25	0.00	0.00	3.17
10	D-30	0.00	0.00	3.12
11	D-40	0.00	0.00	2.89
12	D-50	0.00	0.00	2.62
13	D-75	0.00	0.00	2.56
14	D-100	0.01	0.01	2.54

User Is responsible For checking frost protection requirements.


P-401/P-403 HMA Surface
T=4.7 inches
E=200,000 psi
User Defined
T=8.0 inches
E=80,900 psi
User Defined
T=15.2 inches
E=15,200 psi
Subgrade
CBR=7
E=10,500 psi

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 2212ANGLE - Section 2

Section: Exist Section 2

This file name = PCR Results for New Flexible 2023-09-20 10:21:44

Evaluation pavement type is flexible and design program is FAARFIELD.

Section name: Exist Section 2 in job file: 2212ANGLE - Section 2.JOB.xml

Units = US Customary

Analysis Type: New Flexible

Subgrade Modulus =10,500psi (Subgrade Category is C)

Evaluation Pavement Thickness = 27.9 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 2

CDF = 0.000

No aircraft have 4 or more wheels per gear.

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lbs)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	S-5	5,000	95.00	50	340	1,424
2	S-10	10,000	95.00	50	200	1,031
3	S-12.5	12,500	95.00	50	110	610
4	S-15	15,000	95.00	50	13	77
5	S-20	20,000	95.00	75	44	249
6	S-25	25,000	95.00	100	2	11
7	D-15	15,000	95.00	55	113	981
8	D-20	20,000	95.00	65	16	147
9	D-25	25,000	95.00	75	36	340
10	D-30	30,000	95.00	85	26	250
11	D-40	40,000	95.00	90	73	757
12	D-50	50,000	95.00	80	2	23
13	D-75	75,000	95.00	110	10	117
14	D-100	100,000	95.00	140	860	10,144

Results Table 2. PCR Value

No.	Aircraft Name	Critical aircraft Total equiv. departures	Max allowable Gross Weight of critical aircraft (lbs)	ACR Thick at max. MGW (in.)	PCR/F/C
1	D-100	860	130,843	24.0	405.0

Results Table 3. New Flexible ACR at Indicated Gross Weight and Strength

No.	Aircraft Name	Gross Weight (lbs)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (C)	ACR/F/C
1	S-5	5,000	95.00	50	4.6	15.7
2	S-10	10,000	95.00	50	6.4	30.3
3	S-12.5	12,500	95.00	50	7.4	38
4	S-15	15,000	95.00	50	8.3	45.6
5	S-20	20,000	95.00	75	10.7	71.3
6	S-25	25,000	95.00	100	12.5	95.9
7	D-15	15,000	95.00	55	6.4	30.5
8	D-20	20,000	95.00	65	8.2	44.8
9	D-25	25,000	95.00	75	8.9	51.5
10	D-30	30,000	95.00	85	10.3	67
11	D-40	40,000	95.00	90	13.0	103.6
12	D-50	50,000	95.00	80	13.3	108.1
13	D-75	75,000	95.00	110	17.8	189.5
14	D-100	100,000	95.00	140	20.6	272.5

Federal Aviation Administration FAARFIELD 2.0 Form 5010

FAARFIELD 2.0.18 (Build 05/26/2022)

RUNWAY DATA

Job Name: 2212ANGLE - Section 2

Section: Exist Section 2

Gross Weight (In THSDS)

35 S	100
36 D	153
37 2D	225
38 2D/2D2	644

39 PCR	405/F/C/X/T

Federal Aviation Administration FAARFIELD 2.0 Section Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 2212ANGLE - Section 2

Section: Strengthen CTB Option 1

Analysis Type: New Flexible

Last Run: Life Analysis 2023-09-20 10:26:21

Calculated Life = 12,163.8 Years

Total thickness to the top of the subgrade = 27.2in.

Pavement Structure Information by Layer

No.	Type	Thickness (in.)	Modulus (psi)	Poisson's Ratio	Strength R (psi)
1	P-401/P-403 HMA Surface	4.0	200,000	0.35	0
2	P-304 Cement Treated Base	5.0	500,000	0.2	0
3	P-154 Uncrushed Aggregate	18.2	19,112	0.35	0
4	Subgrade	0	10,500	0.35	0

Airplane Information

No.	Name	Gross Wt. (lbs)	Annual Departures	% Annual Growth
1	S-5	5,000	340	5
2	S-10	10,000	200	5
3	S-12.5	12,500	110	5
4	S-15	15,000	13	5
5	S-20	20,000	44	5
6	S-25	25,000	2	5
7	D-15	15,000	113	5
8	D-20	20,000	16	5
9	D-25	25,000	36	5
10	D-30	30,000	26	5
11	D-40	40,000	73	5
12	D-50	50,000	2	5
13	D-75	75,000	10	5
14	D-100	100,000	860	5

Additional Airplane Information

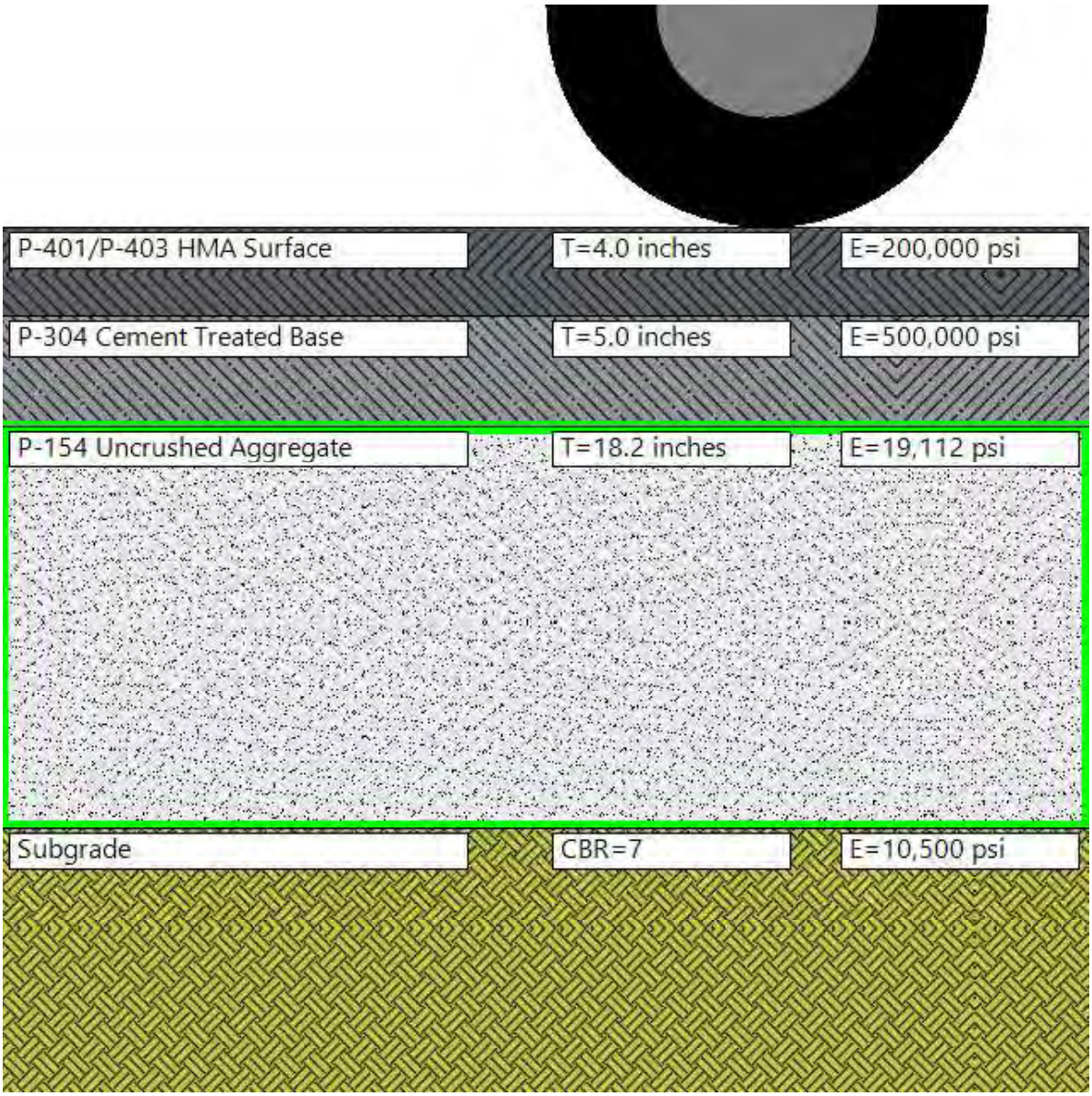
Subgrade CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	S-5	0.00	0.00	2.43
2	S-10	0.00	0.00	2.28
3	S-12.5	0.00	0.00	2.22
4	S-15	0.00	0.00	2.17
5	S-20	0.00	0.00	2.2
6	S-25	0.00	0.00	2.22
7	D-15	0.00	0.00	1.86
8	D-20	0.00	0.00	1.81
9	D-25	0.00	0.00	1.71
10	D-30	0.00	0.00	1.71
11	D-40	0.00	0.00	1.68
12	D-50	0.00	0.00	1.52
13	D-75	0.00	0.00	1.49
14	D-100	0.00	0.00	1.45

HMA CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	S-5	0.00	0.00	7.65
2	S-10	0.00	0.00	6.13
3	S-12.5	0.00	0.00	5.68
4	S-15	0.00	0.00	5.33
5	S-20	0.00	0.00	5.56
6	S-25	0.00	0.00	5.68
7	D-15	0.00	0.00	3.56
8	D-20	0.00	0.00	3.41
9	D-25	0.00	0.00	3.36
10	D-30	0.00	0.00	3.29
11	D-40	0.00	0.00	3.05
12	D-50	0.00	0.00	2.74
13	D-75	0.00	0.00	2.67
14	D-100	0.00	0.00	2.66

User Is responsible For checking frost protection requirements.


P-401/P-403 HMA Surface
T=4.0 inches
E=200,000 psi
P-304 Cement Treated Base
T=5.0 inches
E=500,000 psi
P-154 Uncrushed Aggregate
T=18.2 inches
E=19,112 psi
Subgrade
CBR=7
E=10,500 psi

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 2212ANGLE - Section 2

Section: Strengthen CTB Option 1

This file name = PCR Results for New Flexible 2023-09-20 10:27:11

Evaluation pavement type is flexible and design program is FAARFIELD.

Section name: Strengthen CTB Option 1 in job file: 2212ANGLE - Section 2.JOB.xml

Units = US Customary

Analysis Type: New Flexible

Subgrade Modulus =10,500psi (Subgrade Category is C)

Evaluation Pavement Thickness = 27.2 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 2

CDF = 0.000

No aircraft have 4 or more wheels per gear.

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lbs)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	S-5	5,000	95.00	50	340	1,333
2	S-10	10,000	95.00	50	200	978
3	S-12.5	12,500	95.00	50	110	581
4	S-15	15,000	95.00	50	13	73
5	S-20	20,000	95.00	75	44	238
6	S-25	25,000	95.00	100	2	11
7	D-15	15,000	95.00	55	113	952
8	D-20	20,000	95.00	65	16	141
9	D-25	25,000	95.00	75	36	322
10	D-30	30,000	95.00	85	26	237
11	D-40	40,000	95.00	90	73	719
12	D-50	50,000	95.00	80	2	22
13	D-75	75,000	95.00	110	10	112
14	D-100	100,000	95.00	140	860	9,717

Results Table 2. PCR Value

No.	Aircraft Name	Critical aircraft Total equiv. departures	Max allowable Gross Weight of critical aircraft (lbs)	ACR Thick at max. MGW (in.)	PCR/F/C
1	D-100	860	136,738	24.7	430.7

Results Table 3. New Flexible ACR at Indicated Gross Weight and Strength

No.	Aircraft Name	Gross Weight (lbs)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (C)	ACR/F/C
1	S-5	5,000	95.00	50	4.6	15.7
2	S-10	10,000	95.00	50	6.4	30.3
3	S-12.5	12,500	95.00	50	7.4	38
4	S-15	15,000	95.00	50	8.3	45.6
5	S-20	20,000	95.00	75	10.7	71.3
6	S-25	25,000	95.00	100	12.5	95.9
7	D-15	15,000	95.00	55	6.4	30.5
8	D-20	20,000	95.00	65	8.2	44.8
9	D-25	25,000	95.00	75	8.9	51.5
10	D-30	30,000	95.00	85	10.3	67
11	D-40	40,000	95.00	90	13.0	103.6
12	D-50	50,000	95.00	80	13.3	108.1
13	D-75	75,000	95.00	110	17.8	189.5
14	D-100	100,000	95.00	140	20.6	272.5

Federal Aviation Administration FAARFIELD 2.0 Form 5010

FAARFIELD 2.0.18 (Build 05/26/2022)

RUNWAY DATA

Job Name: 2212ANGLE - Section 2

Section: Strengthen CTB Option 1

Gross Weight (In THSDS)

35 S	106
36 D	161
37 2D	238
38 2D/2D2	671

39 PCR	431/F/C/X/T

Federal Aviation Administration FAARFIELD 2.0 Section Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 2212ANGLE - Section 2

Section: Strengthen Recycling Option 2

Analysis Type: New Flexible

Last Run: Life Analysis 2023-09-20 10:29:30

Calculated Life = 6,118.2 Years

Total thickness to the top of the subgrade = 27.0in.

Pavement Structure Information by Layer

No.	Type	Thickness (in.)	Modulus (psi)	Poisson's Ratio	Strength R (psi)
1	P-401/P-403 HMA Surface	4.0	200,000	0.35	0
2	User Defined	12.0	75,000	0.35	0
3	P-154 Uncrushed Aggregate	11.0	17,137	0.35	0
4	Subgrade	0	10,500	0.35	0

Airplane Information

No.	Name	Gross Wt. (lbs)	Annual Departures	% Annual Growth
1	S-5	5,000	340	5
2	S-10	10,000	200	5
3	S-12.5	12,500	110	5
4	S-15	15,000	13	5
5	S-20	20,000	44	5
6	S-25	25,000	2	5
7	D-15	15,000	113	5
8	D-20	20,000	16	5
9	D-25	25,000	36	5
10	D-30	30,000	26	5
11	D-40	40,000	73	5
12	D-50	50,000	2	5
13	D-75	75,000	10	5
14	D-100	100,000	860	5

Additional Airplane Information

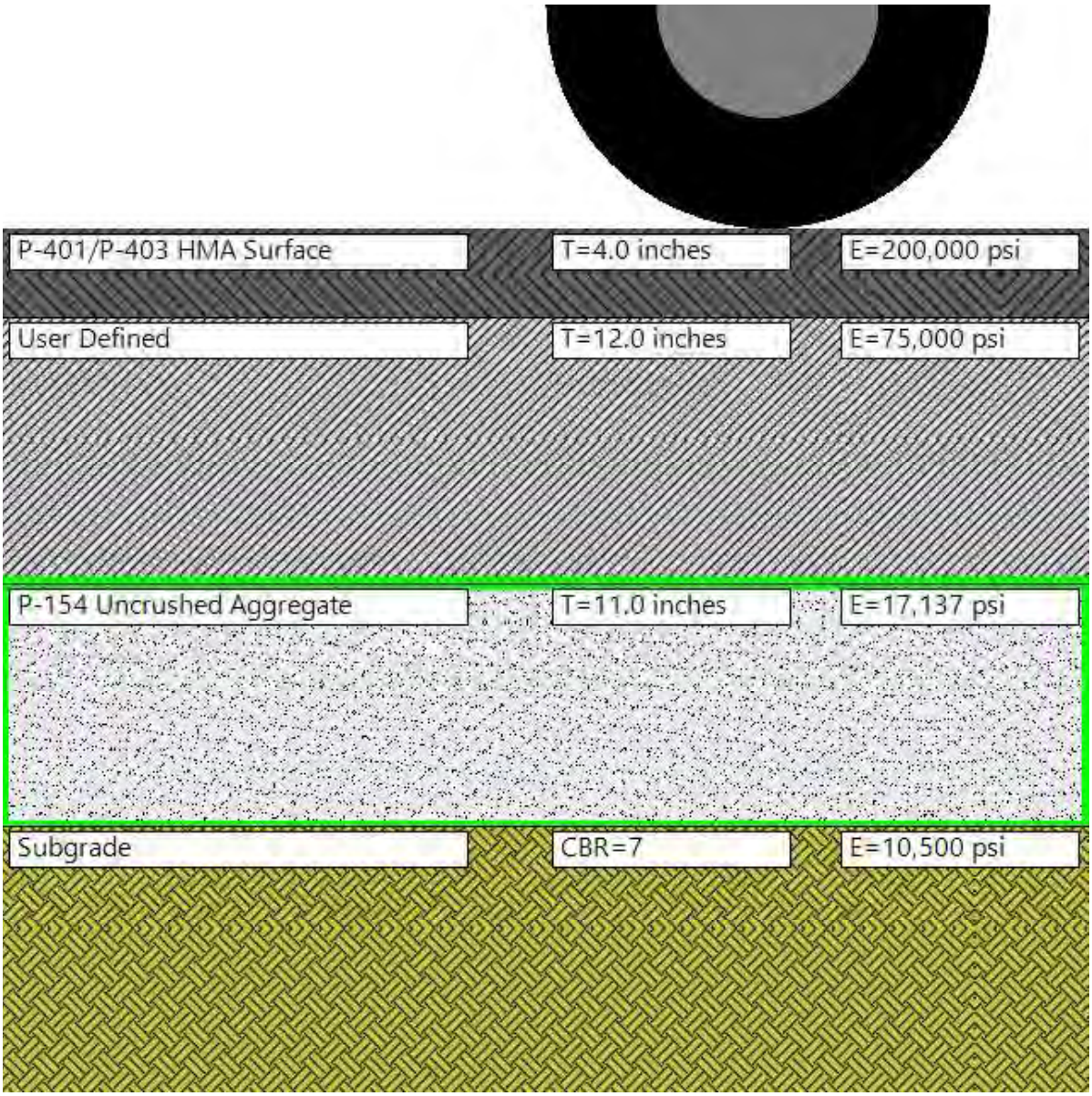
Subgrade CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	S-5	0.00	0.00	2.45
2	S-10	0.00	0.00	2.29
3	S-12.5	0.00	0.00	2.23
4	S-15	0.00	0.00	2.18
5	S-20	0.00	0.00	2.21
6	S-25	0.00	0.00	2.23
7	D-15	0.00	0.00	1.87
8	D-20	0.00	0.00	1.82
9	D-25	0.00	0.00	1.72
10	D-30	0.00	0.00	1.71
11	D-40	0.00	0.00	1.69
12	D-50	0.00	0.00	1.52
13	D-75	0.00	0.00	1.5
14	D-100	0.00	0.00	1.46

HMA CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	S-5	0.00	0.00	7.65
2	S-10	0.00	0.00	6.13
3	S-12.5	0.00	0.00	5.68
4	S-15	0.00	0.00	5.33
5	S-20	0.00	0.00	5.56
6	S-25	0.00	0.00	5.68
7	D-15	0.00	0.00	3.56
8	D-20	0.00	0.00	3.41
9	D-25	0.00	0.00	3.36
10	D-30	0.00	0.00	3.29
11	D-40	0.00	0.00	3.05
12	D-50	0.00	0.00	2.74
13	D-75	0.00	0.00	2.67
14	D-100	0.00	0.00	2.66

User Is responsible For checking frost protection requirements.


P-401/P-403 HMA Surface
T=4.0 inches
E=200,000 psi
User Defined
T=12.0 inches
E=75,000 psi
P-154 Uncrushed Aggregate
T=11.0 inches
E=17,137 psi
Subgrade
CBR=7
E=10,500 psi

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 2212ANGLE - Section 2

Section: Strengthen Recycling Option 2

This file name = PCR Results for New Flexible 2023-09-20 10:30:14

Evaluation pavement type is flexible and design program is FAARFIELD.

Section name: Strengthen Recycling Option 2 in job file: 2212ANGLE - Section 2.JOB.xml

Units = US Customary

Analysis Type: New Flexible

Subgrade Modulus =10,500psi (Subgrade Category is C)

Evaluation Pavement Thickness = 27.0 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 2

CDF = 0.000

No aircraft have 4 or more wheels per gear.

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lbs)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	S-5	5,000	95.00	50	340	1,333
2	S-10	10,000	95.00	50	200	978
3	S-12.5	12,500	95.00	50	110	581
4	S-15	15,000	95.00	50	13	73
5	S-20	20,000	95.00	75	44	238
6	S-25	25,000	95.00	100	2	11
7	D-15	15,000	95.00	55	113	952
8	D-20	20,000	95.00	65	16	141
9	D-25	25,000	95.00	75	36	322
10	D-30	30,000	95.00	85	26	237
11	D-40	40,000	95.00	90	73	719
12	D-50	50,000	95.00	80	2	22
13	D-75	75,000	95.00	110	10	112
14	D-100	100,000	95.00	140	860	9,717

Results Table 2. PCR Value

No.	Aircraft Name	Critical aircraft Total equiv. departures	Max allowable Gross Weight of critical aircraft (lbs)	ACR Thick at max. MGW (in.)	PCR/F/C
1	D-100	860	134,688	24.5	421.8

Results Table 3. New Flexible ACR at Indicated Gross Weight and Strength

No.	Aircraft Name	Gross Weight (lbs)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (C)	ACR/F/C
1	S-5	5,000	95.00	50	4.6	15.7
2	S-10	10,000	95.00	50	6.4	30.3
3	S-12.5	12,500	95.00	50	7.4	38
4	S-15	15,000	95.00	50	8.3	45.6
5	S-20	20,000	95.00	75	10.7	71.3
6	S-25	25,000	95.00	100	12.5	95.9
7	D-15	15,000	95.00	55	6.4	30.5
8	D-20	20,000	95.00	65	8.2	44.8
9	D-25	25,000	95.00	75	8.9	51.5
10	D-30	30,000	95.00	85	10.3	67
11	D-40	40,000	95.00	90	13.0	103.6
12	D-50	50,000	95.00	80	13.3	108.1
13	D-75	75,000	95.00	110	17.8	189.5
14	D-100	100,000	95.00	140	20.6	272.5

Federal Aviation Administration FAARFIELD 2.0 Form 5010

FAARFIELD 2.0.18 (Build 05/26/2022)

RUNWAY DATA

Job Name: 2212ANGLE - Section 2

Section: Strengthen Recycling Option 2

Gross Weight (In THSDS)

35 S	104
36 D	158
37 2D	233
38 2D/2D2	662

39 PCR	422/F/C/X/T

Federal Aviation Administration FAARFIELD 2.0 Section Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 2212ANGLE - Section 2

Section: Asphalt OL Option 3

Analysis Type: New Flexible

Last Run: Life Analysis 2023-09-20 10:31:54

Calculated Life = 496.2 Years

Total thickness to the top of the subgrade = 27.2in.

Pavement Structure Information by Layer

No.	Type	Thickness (in.)	Modulus (psi)	Poisson's Ratio	Strength R (psi)
1	P-401/P-403 HMA Surface	4.0	200,000	0.35	0
2	User Defined	8.0	80,950	0.35	0
3	User Defined	15.2	15,190	0.35	0
4	Subgrade	0	10,500	0.35	0

Airplane Information

No.	Name	Gross Wt. (lbs)	Annual Departures	% Annual Growth
1	S-5	5,000	340	5
2	S-10	10,000	200	5
3	S-12.5	12,500	110	5
4	S-15	15,000	13	5
5	S-20	20,000	44	5
6	S-25	25,000	2	5
7	D-15	15,000	113	5
8	D-20	20,000	16	5
9	D-25	25,000	36	5
10	D-30	30,000	26	5
11	D-40	40,000	73	5
12	D-50	50,000	2	5
13	D-75	75,000	10	5
14	D-100	100,000	860	5

Additional Airplane Information

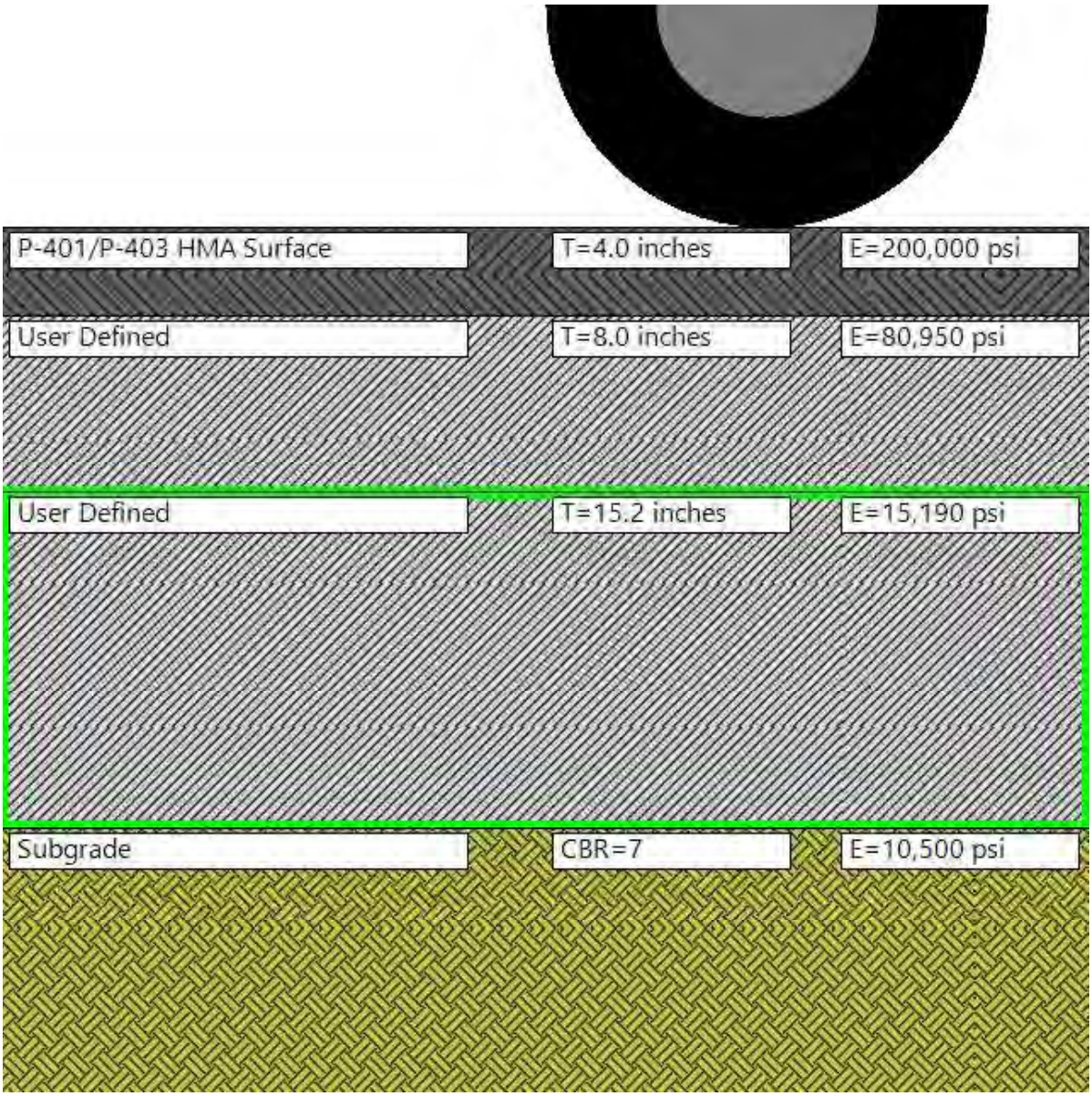
Subgrade CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	S-5	0.00	0.00	2.43
2	S-10	0.00	0.00	2.28
3	S-12.5	0.00	0.00	2.22
4	S-15	0.00	0.00	2.17
5	S-20	0.00	0.00	2.2
6	S-25	0.00	0.00	2.22
7	D-15	0.00	0.00	1.86
8	D-20	0.00	0.00	1.81
9	D-25	0.00	0.00	1.71
10	D-30	0.00	0.00	1.71
11	D-40	0.00	0.00	1.68
12	D-50	0.00	0.00	1.52
13	D-75	0.00	0.00	1.49
14	D-100	0.00	0.00	1.45

HMA CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	S-5	0.00	0.00	7.65
2	S-10	0.00	0.00	6.13
3	S-12.5	0.00	0.00	5.68
4	S-15	0.00	0.00	5.33
5	S-20	0.00	0.00	5.56
6	S-25	0.00	0.00	5.68
7	D-15	0.00	0.00	3.56
8	D-20	0.00	0.00	3.41
9	D-25	0.00	0.00	3.36
10	D-30	0.00	0.00	3.29
11	D-40	0.00	0.00	3.05
12	D-50	0.00	0.00	2.74
13	D-75	0.00	0.00	2.67
14	D-100	0.00	0.00	2.66

User Is responsible For checking frost protection requirements.


P-401/P-403 HMA Surface
T=4.0 inches
E=200,000 psi
User Defined
T=8.0 inches
E=80,950 psi
User Defined
T=15.2 inches
E=15,190 psi
Subgrade
CBR=7
E=10,500 psi

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 2212ANGLE - Section 2

Section: Asphalt OL Option 3

This file name = PCR Results for New Flexible 2023-09-20 10:33:03

Evaluation pavement type is flexible and design program is FAARFIELD.

Section name: Asphalt OL Option 3 in job file: 2212ANGLE - Section 2.JOB.xml

Units = US Customary

Analysis Type: New Flexible

Subgrade Modulus =10,500psi (Subgrade Category is C)

Evaluation Pavement Thickness = 27.2 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 2

CDF = 0.000

No aircraft have 4 or more wheels per gear.

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lbs)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	S-5	5,000	95.00	50	340	1,333
2	S-10	10,000	95.00	50	200	978
3	S-12.5	12,500	95.00	50	110	581
4	S-15	15,000	95.00	50	13	73
5	S-20	20,000	95.00	75	44	238
6	S-25	25,000	95.00	100	2	11
7	D-15	15,000	95.00	55	113	952
8	D-20	20,000	95.00	65	16	141
9	D-25	25,000	95.00	75	36	322
10	D-30	30,000	95.00	85	26	237
11	D-40	40,000	95.00	90	73	719
12	D-50	50,000	95.00	80	2	22
13	D-75	75,000	95.00	110	10	112
14	D-100	100,000	95.00	140	860	9,717

Results Table 2. PCR Value

No.	Aircraft Name	Critical aircraft Total equiv. departures	Max allowable Gross Weight of critical aircraft (lbs)	ACR Thick at max. MGW (in.)	PCR/F/C
1	D-100	860	123,551	23.2	373.1

Results Table 3. New Flexible ACR at Indicated Gross Weight and Strength

No.	Aircraft Name	Gross Weight (lbs)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (C)	ACR/F/C
1	S-5	5,000	95.00	50	4.6	15.7
2	S-10	10,000	95.00	50	6.4	30.3
3	S-12.5	12,500	95.00	50	7.4	38
4	S-15	15,000	95.00	50	8.3	45.6
5	S-20	20,000	95.00	75	10.7	71.3
6	S-25	25,000	95.00	100	12.5	95.9
7	D-15	15,000	95.00	55	6.4	30.5
8	D-20	20,000	95.00	65	8.2	44.8
9	D-25	25,000	95.00	75	8.9	51.5
10	D-30	30,000	95.00	85	10.3	67
11	D-40	40,000	95.00	90	13.0	103.6
12	D-50	50,000	95.00	80	13.3	108.1
13	D-75	75,000	95.00	110	17.8	189.5
14	D-100	100,000	95.00	140	20.6	272.5

Federal Aviation Administration FAARFIELD 2.0 Form 5010

FAARFIELD 2.0.18 (Build 05/26/2022)

RUNWAY DATA

Job Name: 2212ANGLE - Section 2

Section: Asphalt OL Option 3

Gross Weight (In THSDS)

35 S	93
36 D	139
37 2D	209
38 2D/2D2	0

39 PCR	373/F/C/X/T

Federal Aviation Administration FAARFIELD 2.0 Section Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 2212ANGLE - Section 2

Section: Concrete Section Option 4

Analysis Type: New Rigid

Last Run: Thickness Design 2023-09-20 10:48:05

Design Life = 20 Years

Total thickness to the top of the subgrade = 26.9in.

Pavement Structure Information by Layer

No.	Type	Thickness (in.)	Modulus (psi)	Poisson's Ratio	Strength R (psi)
1	P-501 PCC Surface	9.9	4,000,000	0.15	650
2	User Defined	12.0	150,000	0.35	0
3	User Defined	5.0	15,200	0.35	0
4	Subgrade	0	10,500	0.4	0

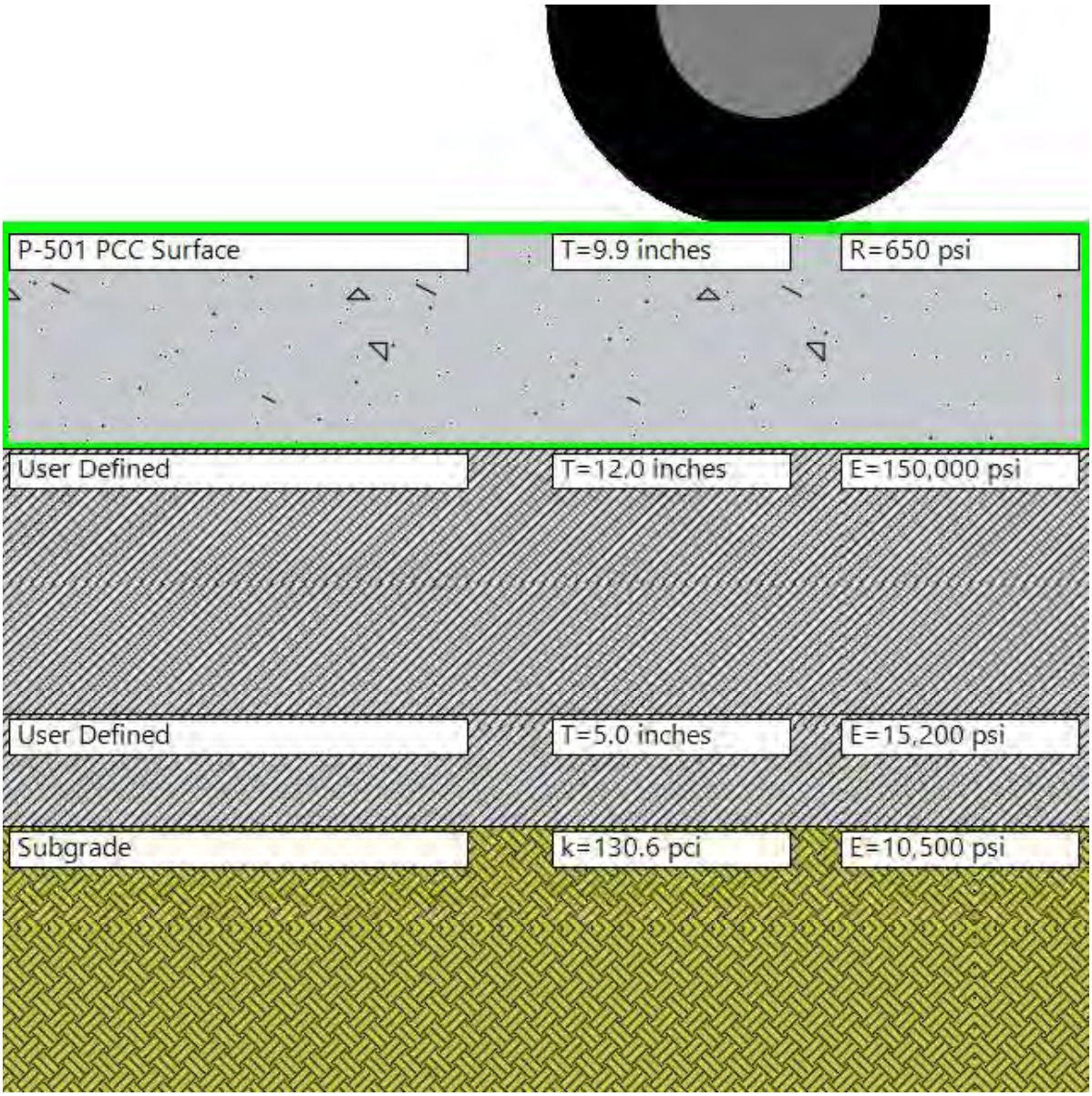
Airplane Information

No.	Name	Gross Wt. (lbs)	Annual Departures	% Annual Growth
1	S-5	5,000	340	5
2	S-10	10,000	200	5
3	S-12.5	12,500	110	5
4	S-15	15,000	13	5
5	S-20	20,000	44	5
6	S-25	25,000	2	5
7	D-15	15,000	113	5
8	D-20	20,000	16	5
9	D-25	25,000	36	5
10	D-30	30,000	26	5
11	D-40	40,000	73	5
12	D-50	50,000	2	5
13	D-75	75,000	10	5
14	D-100	100,000	860	5

Additional Airplane Information

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	S-5	0.00	0.00	12.6
2	S-10	0.00	0.00	8.92
3	S-12.5	0.00	0.00	7.99
4	S-15	0.00	0.00	7.3
5	S-20	0.00	0.00	7.74
6	S-25	0.00	0.00	7.99
7	D-15	0.00	0.00	5.48
8	D-20	0.00	0.00	5.18
9	D-25	0.00	0.00	5.03
10	D-30	0.00	0.00	4.89
11	D-40	0.00	0.00	4.36
12	D-50	0.00	0.00	3.73
13	D-75	0.00	0.00	3.6
14	D-100	1.00	1.00	3.55

User Is responsible For checking frost protection requirements.


P-501 PCC Surface
T=9.9 inches
R=650 psi
User Defined
T=12.0 inches
E=150,000 psi
User Defined
T=5.0 inches
E=15,200 psi
Subgrade
k=130.6 pci
E=10,500 psi

Federal Aviation Administration FAARFIELD 2.0 Section Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 2212ANGLE - Section 2

Section: Concrete Section Option 4

Analysis Type: New Rigid

Last Run: Life Analysis 2023-09-20 11:00:11

Calculated Life = 24.2 Years

Total thickness to the top of the subgrade = 27.0in.

Pavement Structure Information by Layer

No.	Type	Thickness (in.)	Modulus (psi)	Poisson's Ratio	Strength R (psi)
1	P-501 PCC Surface	10.0	4,000,000	0.15	650
2	User Defined	12.0	150,000	0.35	0
3	User Defined	5.0	15,200	0.35	0
4	Subgrade	0	10,500	0.4	0

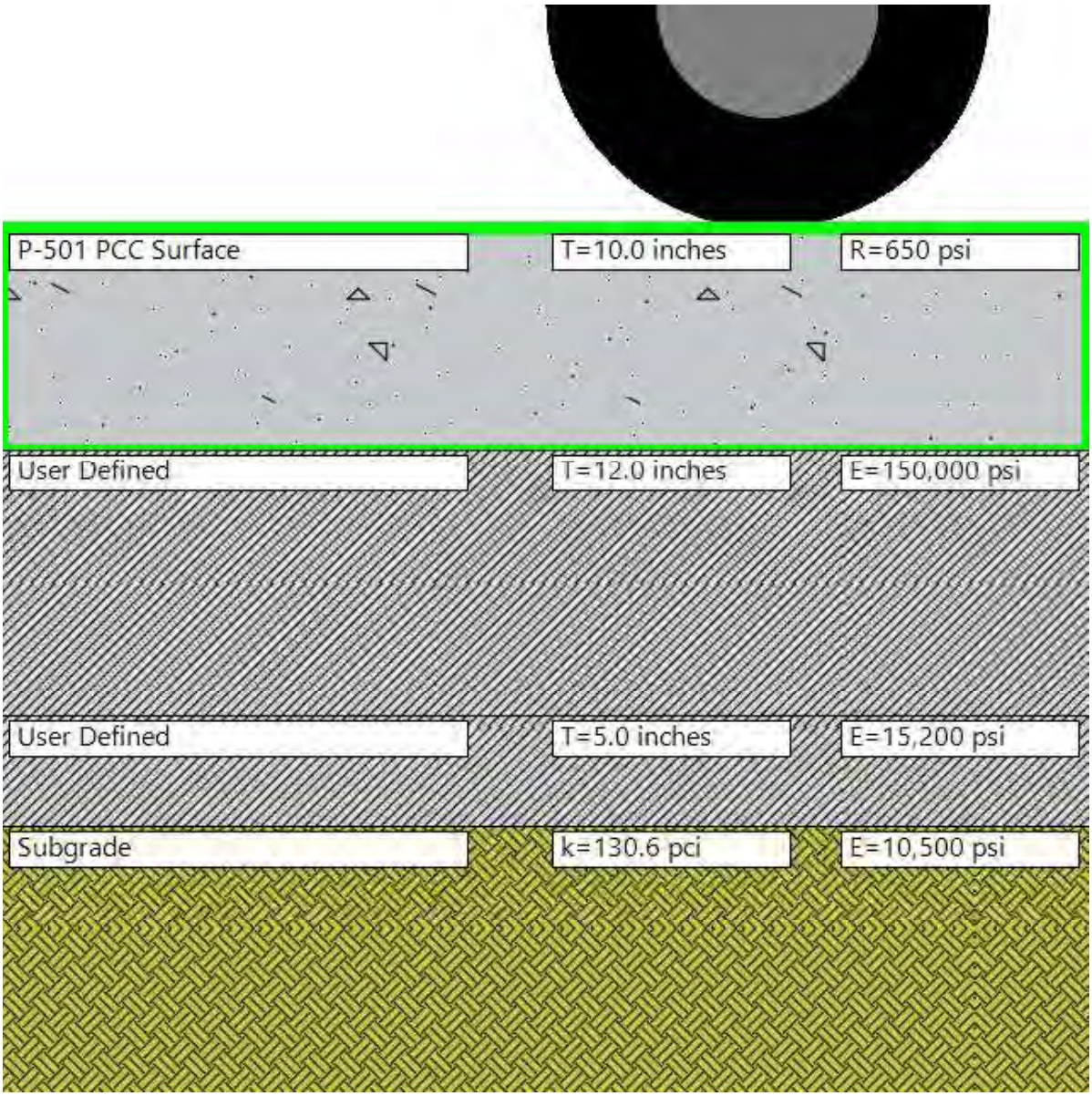
Airplane Information

No.	Name	Gross Wt. (lbs)	Annual Departures	% Annual Growth
1	S-5	5,000	340	5
2	S-10	10,000	200	5
3	S-12.5	12,500	110	5
4	S-15	15,000	13	5
5	S-20	20,000	44	5
6	S-25	25,000	2	5
7	D-15	15,000	113	5
8	D-20	20,000	16	5
9	D-25	25,000	36	5
10	D-30	30,000	26	5
11	D-40	40,000	73	5
12	D-50	50,000	2	5
13	D-75	75,000	10	5
14	D-100	100,000	860	5

Additional Airplane Information

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	S-5	0.00	0.00	12.6
2	S-10	0.00	0.00	8.92
3	S-12.5	0.00	0.00	7.99
4	S-15	0.00	0.00	7.3
5	S-20	0.00	0.00	7.74
6	S-25	0.00	0.00	7.99
7	D-15	0.00	0.00	5.48
8	D-20	0.00	0.00	5.18
9	D-25	0.00	0.00	5.03
10	D-30	0.00	0.00	4.89
11	D-40	0.00	0.00	4.36
12	D-50	0.00	0.00	3.73
13	D-75	0.00	0.00	3.6
14	D-100	0.77	0.77	3.55

User Is responsible For checking frost protection requirements.


P-501 PCC Surface
T=10.0 inches
R=650 psi
User Defined
T=12.0 inches
E=150,000 psi
User Defined
T=5.0 inches
E=15,200 psi
Subgrade
k=130.6 pci
E=10,500 psi

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 2212ANGLE - Section 2

Section: Concrete Section Option 4

This file name = PCR Results for New Rigid 2023-09-20 11:17:14

Evaluation pavement type is rigid and design program is FAARFIELD.

Section name: Concrete Section Option 4 in job file: 2212ANGLE - Section 2.JOB.xml

Units = US Customary

Analysis Type: New Rigid

Subgrade Modulus =10,500psi (Subgrade Category is C)

Evaluation Pavement Thickness = 27.0 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 2

CDF = 0.770

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lbs)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	S-5	5,000	95.00	50	340	810
2	S-10	10,000	95.00	50	200	672
3	S-12.5	12,500	95.00	50	110	413
4	S-15	15,000	95.00	50	13	53
5	S-20	20,000	95.00	75	44	171
6	S-25	25,000	95.00	100	2	8
7	D-15	15,000	95.00	55	113	618
8	D-20	20,000	95.00	65	16	93
9	D-25	25,000	95.00	75	36	215
10	D-30	30,000	95.00	85	26	160
11	D-40	40,000	95.00	90	73	502
12	D-50	50,000	95.00	80	2	16
13	D-75	75,000	95.00	110	10	83
14	D-100	100,000	95.00	140	860	7,259

Results Table 2. PCR Value

No.	Aircraft Name	Critical aircraft Total equiv. departures	Max allowable Gross Weight of critical aircraft (lbs)	ACR Thick at max. MGW (in.)	PCR/R/C
1	D-100	852	101,487	10.4	311.2

Results Table 3. New Rigid ACR at Indicated Gross Weight and Strength

No.	Aircraft Name	Gross Weight (lbs)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (C)	ACR/R/C
1	S-5	5,000	95.00	50	2.0	10.4
2	S-10	10,000	95.00	50	2.4	19.8
3	S-12.5	12,500	95.00	50	2.8	26.1
4	S-15	15,000	95.00	50	3.2	32.3
5	S-20	20,000	95.00	75	4.4	57.6
6	S-25	25,000	95.00	100	5.3	83.1
7	D-15	15,000	95.00	55	3.0	28.3
8	D-20	20,000	95.00	65	3.8	43.9
9	D-25	25,000	95.00	75	4.3	55.8
10	D-30	30,000	95.00	85	5.0	73.9
11	D-40	40,000	95.00	90	6.1	107.8
12	D-50	50,000	95.00	80	6.4	120.7
13	D-75	75,000	95.00	110	8.6	212.8
14	D-100	100,000	95.00	140	10.4	305.8

Federal Aviation Administration FAARFIELD 2.0 Form 5010

FAARFIELD 2.0.18 (Build 05/26/2022)

RUNWAY DATA

Job Name: 2212ANGLE - Section 2

Section: Concrete Section Option 4

Gross Weight (In THSDS)

35 S	84
36 D	102
37 2D	178
38 2D/2D2	0

39 PCR	311/R/C/W/T

Federal Aviation Administration FAARFIELD 2.0 Section Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 2212ANGLE - Section 3

Section: Exist Section 3

Analysis Type: HMA on Flexible

Last Run: Life Analysis 2023-09-19 09:51:01

Calculated Life = 28,888.5 Years

Total thickness to the top of the subgrade = 25.0in.

Pavement Structure Information by Layer

No.	Type	Thickness (in.)	Modulus (psi)	Poisson's Ratio	Strength R (psi)
1	P-401/P-403 HMA Overlay	2.0	200,000	0.35	0
2	User Defined	4.5	279,870	0.35	0
3	User Defined	18.5	62,000	0.35	0
4	Subgrade	0	9,700	0.35	0

Airplane Information

No.	Name	Gross Wt. (lbs)	Annual Departures	% Annual Growth
1	S-5	5,000	340	5
2	S-10	10,000	200	5
3	S-12.5	12,500	110	5
4	S-15	15,000	13	5
5	S-20	20,000	44	5
6	S-25	25,000	2	5
7	D-15	15,000	113	5
8	D-20	20,000	16	5
9	D-25	25,000	36	5
10	D-30	30,000	26	5
11	D-40	40,000	73	5
12	D-50	50,000	2	5
13	D-75	75,000	10	5
14	D-100	100,000	860	5

Additional Airplane Information

Subgrade CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	S-5	0.00	0.00	2.59
2	S-10	0.00	0.00	2.41
3	S-12.5	0.00	0.00	2.34
4	S-15	0.00	0.00	2.29
5	S-20	0.00	0.00	2.33
6	S-25	0.00	0.00	2.34
7	D-15	0.00	0.00	1.94
8	D-20	0.00	0.00	1.88
9	D-25	0.00	0.00	1.78
10	D-30	0.00	0.00	1.77
11	D-40	0.00	0.00	1.74
12	D-50	0.00	0.00	1.56
13	D-75	0.00	0.00	1.53
14	D-100	0.00	0.00	1.49

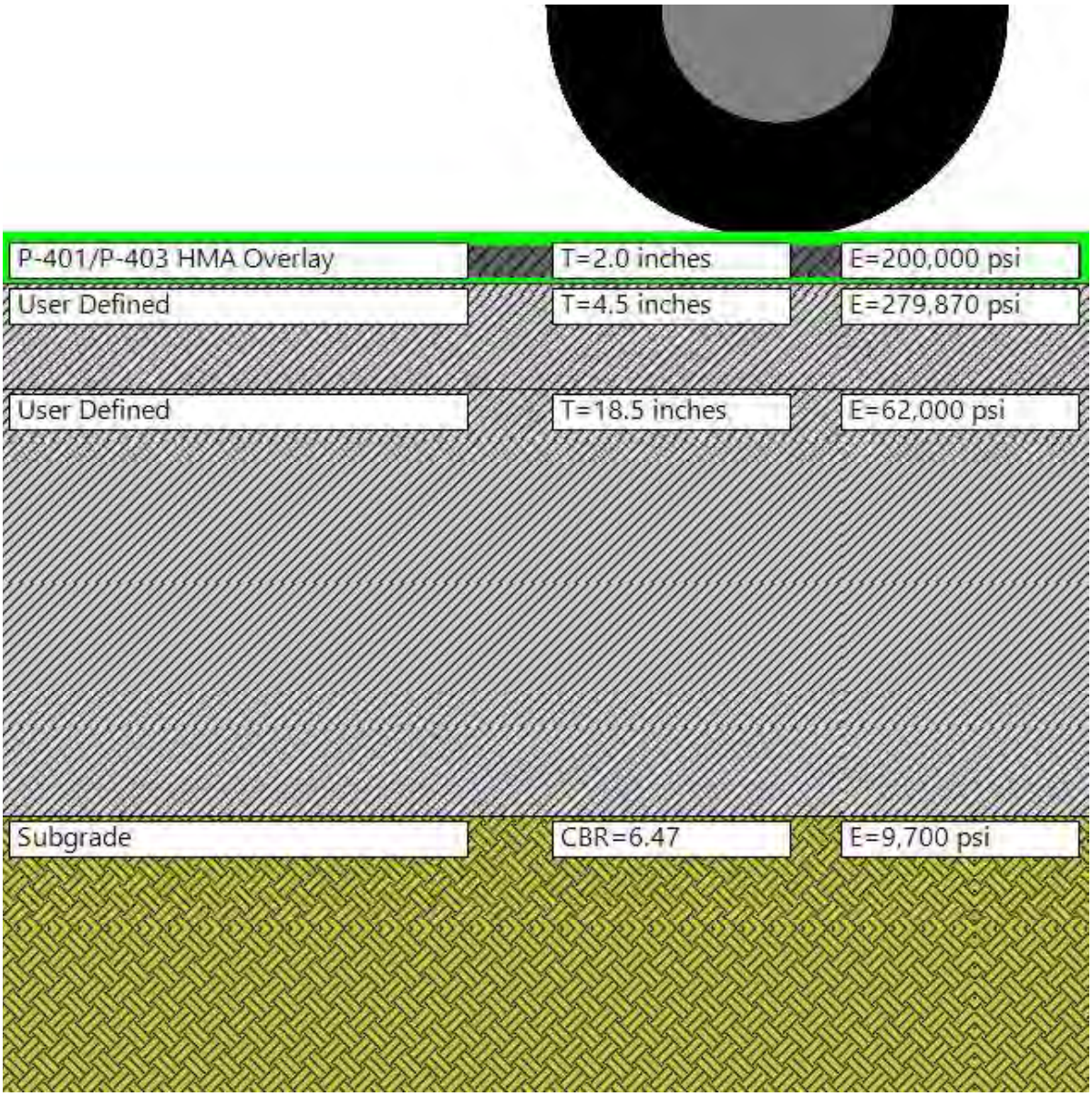
Overlay HMA CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	S-5	0.00	0.00	9.53
2	S-10	0.00	0.00	7.27
3	S-12.5	0.00	0.00	6.64
4	S-15	0.00	0.00	6.16
5	S-20	0.00	0.00	6.47
6	S-25	0.00	0.00	6.64
7	D-15	0.00	0.00	4.30
8	D-20	0.00	0.00	4.11
9	D-25	0.00	0.00	4.03
10	D-30	0.00	0.00	3.94
11	D-40	0.00	0.00	3.59
12	D-50	0.00	0.00	3.16
13	D-75	0.00	0.00	3.06
14	D-100	0.00	0.00	3.04

HMA CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	S-5	0.00	0.00	6.16
2	S-10	0.00	0.00	5.14
3	S-12.5	0.00	0.00	4.82
4	S-15	0.00	0.00	4.57
5	S-20	0.00	0.00	4.73
6	S-25	0.00	0.00	4.82
7	D-15	0.00	0.00	3.22
8	D-20	0.00	0.00	3.05
9	D-25	0.00	0.00	2.78
10	D-30	0.00	0.00	2.74
11	D-40	0.00	0.00	2.63
12	D-50	0.00	0.00	2.35
13	D-75	0.00	0.00	2.30
14	D-100	0.00	0.00	2.30

User Is responsible For checking frost protection requirements.


P-401/P-403 HMA Overlay
T=2.0 inches
E=200,000 psi
User Defined
T=4.5 inches
E=279,870 psi
User Defined
T=18.5 inches
E=62,000 psi
Subgrade
CBR=6.47
E=9,700 psi

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 2212ANGLE - Section 3

Section: Exist Section 3

This file name = PCR Results for HMA on Flexible 2023-09-19 09:39:08

Evaluation pavement type is flexible and design program is FAARFIELD.

Section name: Exist Section 3 in job file: 2212ANGLE - Section 3.JOB.xml

Units = US Customary

Analysis Type: HMA on Flexible

Subgrade Modulus =9,700psi (Subgrade Category is C)

Evaluation Pavement Thickness = 25.0 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 2

CDF = 0.000

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lbs)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	S-5	5,000	95.00	50	340	1,656
2	S-10	10,000	95.00	50	200	1,166
3	S-12.5	12,500	95.00	50	110	684
4	S-15	15,000	95.00	50	13	85
5	S-20	20,000	95.00	75	44	279
6	S-25	25,000	95.00	100	2	12
7	D-15	15,000	95.00	55	113	1,053
8	D-20	20,000	95.00	65	16	157
9	D-25	25,000	95.00	75	36	388
10	D-30	30,000	95.00	85	26	285
11	D-40	40,000	95.00	90	73	834
12	D-50	50,000	95.00	80	2	25
13	D-75	75,000	95.00	110	10	130
14	D-100	100,000	95.00	140	860	11,230

Results Table 2. PCR Value

No.	Aircraft Name	Critical aircraft Total equiv. departures	Max allowable Gross Weight of critical aircraft (lbs)	ACR Thick at max. MGW (in.)	PCR/F/C
1	D-100	860	142,183	25.3	454.5

Results Table 3. HMA on Flexible ACR at Indicated Gross Weight and Strength

No.	Aircraft Name	Gross Weight (lbs)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (C)	ACR/F/C
1	S-5	5,000	95.00	50	4.6	15.7
2	S-10	10,000	95.00	50	6.4	30.3
3	S-12.5	12,500	95.00	50	7.4	38
4	S-15	15,000	95.00	50	8.3	45.6
5	S-20	20,000	95.00	75	10.7	71.3
6	S-25	25,000	95.00	100	12.5	95.9
7	D-15	15,000	95.00	55	6.4	30.5
8	D-20	20,000	95.00	65	8.2	44.8
9	D-25	25,000	95.00	75	8.9	51.5
10	D-30	30,000	95.00	85	10.3	67
11	D-40	40,000	95.00	90	13.0	103.6
12	D-50	50,000	95.00	80	13.3	108.1
13	D-75	75,000	95.00	110	17.8	189.5
14	D-100	100,000	95.00	140	20.6	272.5

Federal Aviation Administration FAARFIELD 2.0 Form 5010

FAARFIELD 2.0.18 (Build 05/26/2022)

RUNWAY DATA

Job Name: 2212ANGLE - Section 3

Section: Exist Section 3

Gross Weight (In THSDS)

35 S	111
36 D	169
37 2D	250
38 2D/2D2	697
39 PCR	455/F/C/X/T

Federal Aviation Administration FAARFIELD 2.0 Section Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 2212ANGLE - Section 3

Section: Concete Option 1

Analysis Type: New Rigid

Last Run: Life Analysis 2023-09-19 10:10:13

Calculated Life = 33.7 Years

Total thickness to the top of the subgrade = 25.0in.

Pavement Structure Information by Layer

No.	Type	Thickness (in.)	Modulus (psi)	Poisson's Ratio	Strength R (psi)
1	P-501 PCC Surface	9.5	4,000,000	0.15	650
2	User Defined	12.0	150,000	0.35	0
3	User Defined	3.5	62,000	0.35	0
4	Subgrade	0	9,700	0.4	0

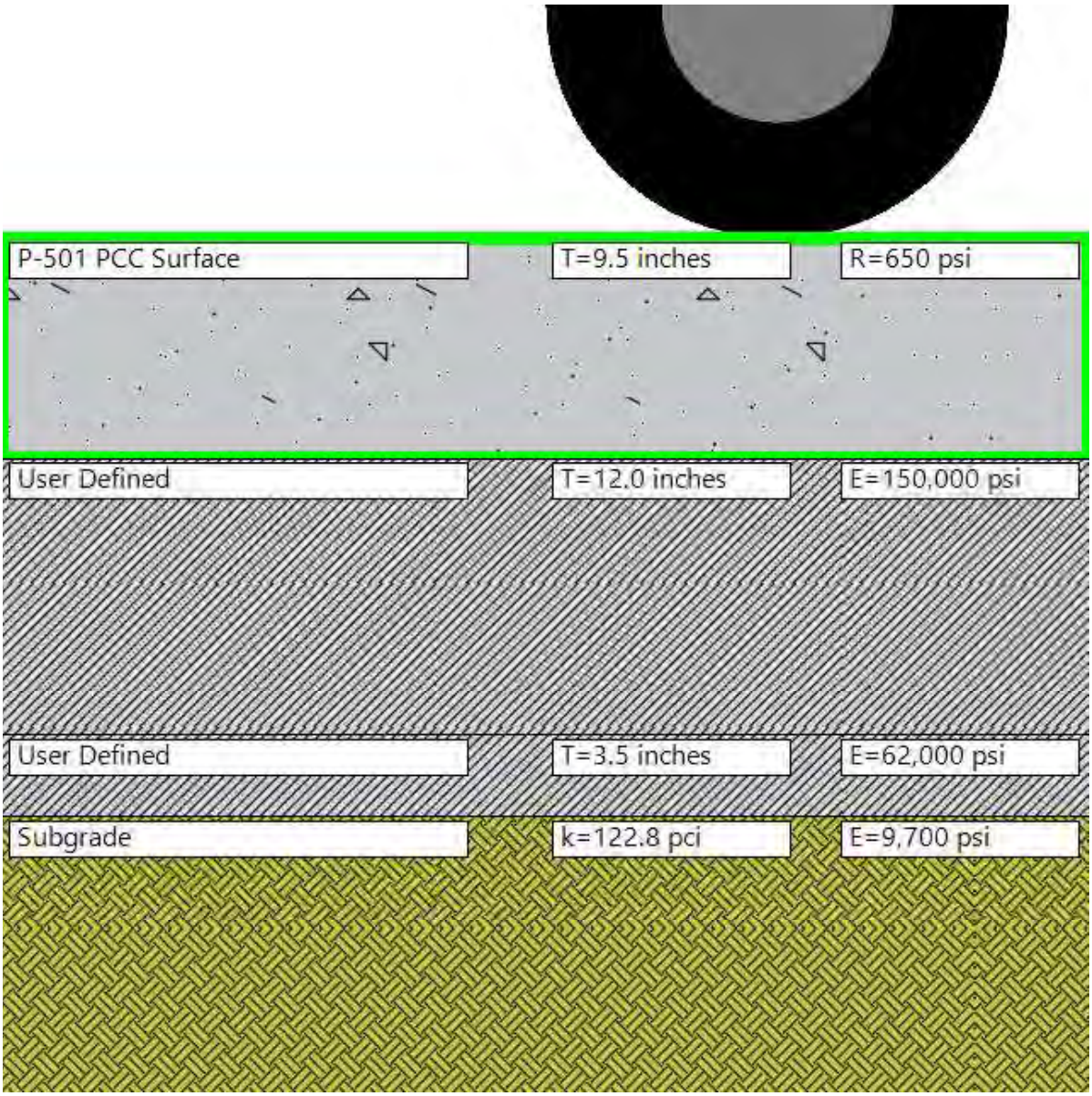
Airplane Information

No.	Name	Gross Wt. (lbs)	Annual Departures	% Annual Growth
1	S-5	5,000	340	5
2	S-10	10,000	200	5
3	S-12.5	12,500	110	5
4	S-15	15,000	13	5
5	S-20	20,000	44	5
6	S-25	25,000	2	5
7	D-15	15,000	113	5
8	D-20	20,000	16	5
9	D-25	25,000	36	5
10	D-30	30,000	26	5
11	D-40	40,000	73	5
12	D-50	50,000	2	5
13	D-75	75,000	10	5
14	D-100	100,000	860	5

Additional Airplane Information

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	S-5	0.00	0.00	12.6
2	S-10	0.00	0.00	8.92
3	S-12.5	0.00	0.00	7.99
4	S-15	0.00	0.00	7.3
5	S-20	0.00	0.00	7.74
6	S-25	0.00	0.00	7.99
7	D-15	0.00	0.00	5.48
8	D-20	0.00	0.00	5.18
9	D-25	0.00	0.00	5.03
10	D-30	0.00	0.00	4.89
11	D-40	0.00	0.00	4.36
12	D-50	0.00	0.00	3.73
13	D-75	0.00	0.00	3.6
14	D-100	0.48	0.48	3.55

User Is responsible For checking frost protection requirements.


P-501 PCC Surface
T=9.5 inches
R=650 psi
User Defined
T=12.0 inches
E=150,000 psi
User Defined
T=3.5 inches
E=62,000 psi
Subgrade
k=122.8 pci
E=9,700 psi

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 2212ANGLE - Section 3

Section: Concete Option 1

This file name = PCR Results for New Rigid 2023-09-20 15:25:04

Evaluation pavement type is rigid and design program is FAARFIELD.

Section name: Concete Option 1 in job file: 2212ANGLE - Section 3.JOB.xml

Units = US Customary

Analysis Type: New Rigid

Subgrade Modulus =9,700psi (Subgrade Category is C)

Evaluation Pavement Thickness = 25.0 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 2

CDF = 1.230

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lbs)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	S-5	5,000	95.00	50	340	810
2	S-10	10,000	95.00	50	200	672
3	S-12.5	12,500	95.00	50	110	413
4	S-15	15,000	95.00	50	13	53
5	S-20	20,000	95.00	75	44	171
6	S-25	25,000	95.00	100	2	8
7	D-15	15,000	95.00	55	113	618
8	D-20	20,000	95.00	65	16	93
9	D-25	25,000	95.00	75	36	215
10	D-30	30,000	95.00	85	26	160
11	D-40	40,000	95.00	90	73	502
12	D-50	50,000	95.00	80	2	16
13	D-75	75,000	95.00	110	10	83
14	D-100	100,000	95.00	140	860	7,259

Results Table 2. PCR Value

No.	Aircraft Name	Critical aircraft Total equiv. departures	Max allowable Gross Weight of critical aircraft (lbs)	ACR Thick at max. MGW (in.)	PCR/R/C
1	D-100	855	98,791	10.3	301.1

Results Table 3. New Rigid ACR at Indicated Gross Weight and Strength

No.	Aircraft Name	Gross Weight (lbs)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (C)	ACR/R/C
1	S-5	5,000	95.00	50	2.0	10.4
2	S-10	10,000	95.00	50	2.4	19.8
3	S-12.5	12,500	95.00	50	2.8	26.1
4	S-15	15,000	95.00	50	3.2	32.3
5	S-20	20,000	95.00	75	4.4	57.6
6	S-25	25,000	95.00	100	5.3	83.1
7	D-15	15,000	95.00	55	3.0	28.3
8	D-20	20,000	95.00	65	3.8	43.9
9	D-25	25,000	95.00	75	4.3	55.8
10	D-30	30,000	95.00	85	5.0	73.9
11	D-40	40,000	95.00	90	6.1	107.8
12	D-50	50,000	95.00	80	6.4	120.7
13	D-75	75,000	95.00	110	8.6	212.8
14	D-100	100,000	95.00	140	10.4	305.8

Federal Aviation Administration FAARFIELD 2.0 Form 5010

FAARFIELD 2.0.18 (Build 05/26/2022)

RUNWAY DATA

Job Name: 2212ANGLE - Section 3

Section: Concete Option 1

Gross Weight (In THSDS)

35 S	82
36 D	99
37 2D	174
38 2D/2D2	0

39 PCR	301/R/C/W/T