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CITY OF HOUSTON

Sylvester Turner
Mayor

HOUSTON AIRPORT SYSTEM

George Bush Intercontinental ~ William P. Hobby ~ Ellington Airport

Mario C. Diaz
Director of Aviation

August 4, 2023

SUBJECT: **Letter of Clarification No. 4**

REFERENCE: Request for Competitive Sealed Proposal (CSP) Rehabilitation of Taxiways SA & SB at George Bush Intercontinental Airport; Solicitation No. HJA-TXSASB-2023-022; Project No. 646A

To: All Prospective Respondents:

This Letter of Clarification is issued for the following reasons:

I. **Extend the proposal due date from August 10, 2023, to August 18, 2023, at 2:00 P.M. (CT).**

II. **Replace and add the following:**

1. **Replace** Document 00410 **with Revised Document 00410 – Bid Form**
2. **Replace** Drawings General Sections G01.02, G01.04, G01.05, G02.01 and Civil Sections C 07.26, C07.29, C07.31, C07.40, C07.41, C10.02 and C10.04 with **Revised Drawings General Sections G01.02, G01.04, G01.05, G02.01 and Revised Civil Sections C07.26, C07.29, C07.31, C07.40, C07.41, C10.02 and C10.04.**
3. **Insert New Drawing Civil Section C07.26A.**
4. **Replace** Drawings Electrical Sections E01.01, E01.02, E03.10 and E04.01 through E04.09 with **Revised Drawings Electrical Sections E01.01, E01.02, E03.10 and E04.01 through E04.09.**
5. **Replace** Drawings Cross Sections from X01.01 through X02.65, X03.02 through X03.05, X04.02 through X08.03, X09.03 and X10.03 with **Revised Drawings Cross Sections from X01.01 through X02.65, X03.02 through X03.05, X04.02 through X08.03, X09.03 and X10.03.**
6. **Replace** Specification Numbers P-209 'Crushed Aggregate Base Course', P-307 'Cement Treated Permeable Base Course (CTPB)', L-125 'Installation of Airport Lighting Systems', SS-300 'Basic Electrical Requirements', SS-301 'Electrical Demolition and Relocation Work' and SS-310 'Airport Lighting Systems' with **Revised Specification Numbers P-209 'Crushed Aggregate Base Course', P-307 'Cement Treated Permeable Base Course (CTPB)', L-125 'Installation of Airport Lighting Systems', SS-300 'Basic Electrical Requirements', SS-301 'Electrical Demolition and Relocation Work' and SS-310 'Airport Lighting Systems'.**
7. **Add new Sinkhole Photos (Attached).**

III. **Respond** to questions.

Council Members: Amy Peck Tarsha Jackson Abbie Kamin Carolyn Evans-Shabazz Dave Martin Tiffany D. Thomas Mary Nan Huffman Karla Cisneros Robert Gallegos Edward Pollard Martha Castex-Tatum Mike Knox David W. Robinson Michael Kubosh Letitia Plummer Sallie Alcorn
Controller: Chris B. Brown

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1. **Question:** Will HAS allow the GC to redefine the project phasing to maximize efficiency and schedule?

   Response: Yes, the GC may submit proposed changes, but the final decision will be up to HAS based on operational needs.

2. **Question:** When will HAS provide the Electrical scope revisions that were mentioned during the pre-submittal meeting?

   Response: Please refer to previous Letter of Clarification No. 3, dated July 7, 2023.

3. **Question:** Will HAS establish an Oil price index item in the contract, if requested? This should protect both HAS and the GC?

   Response: No.

4. **Question:** Will HAS consider an alternate Asphalt Binder in leu of the 82-22 listed in the Specifications? We would recommend a 76-22 Asphalt Binder?

   Response: Binder shall be as specified in this solicitation.

5. **Question:** If HAS will not consider an alternate Asphalt Binder, would HAS approve an additive such as Evotherm or an equivalent to be used in the mix?

   Response: The use of an alternate asphalt binder will not be considered. However, the use of Evotherm as an antistrip and or potential other items may be reviewed to assist with the placement of the material.

6. **Question:** Regarding the type of geogrid called for in pay item P-209-5.5. The specification doesn't provide physical properties, it rather lists ASTM D4759 for geogrid selection, which I don't believe is appropriate. The standard is used to determine if a product is in conformance with specifications, however, a product specification is still needed to determine conformance?

   Response: Geogrid shall meet ASTM D4759, but properties will be provided.

7. **Question:** The project manual section 5 Contractor Access iv states a maximum of 3 vehicles or 2 18-wheel trucks per escort will be permitted. It goes on further to state that the contractor shall provide a minimum of 2 escorts for each convoy. If a convoy is 2 18-wheel trucks, does that require 1 escort or 2?

   Response: It requires 2 escorts.

8. **Question:** Are percentages allowed on all DBE forms, in lieu of dollar amounts?

   Response: Yes. For example, please note: If the Prime lists a DBE for 5% and submits a proposal for the project for $1,000,000, HAS OBO will provide the equivalent dollar value of 5% of the prime's total contract proposal value. Should the contract value increase due to change orders, the 5% commitment will increase the dollar value for the DBE, accordingly.

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9. **Question:** Does the airport have an anticipated onsite stockpile location for the excess excavated material?

   Response: Excess excavation shall be hauled off-site; may be allowed to temporary stockpile with the prior approval from HAS operations. Stockpiled locations need to have 7460's completed as well as identified in advance in the CSPP.

10. **Question:** Form 00470D contains the DBE Letter of Intent - if this form is required in the proposal package, is an original signature from the Sub or Supplier required?

    Response: Yes. All DBE forms require the wet signature from the sub-contractor or supplier.

11. **Question:** Attachment H has conflicting DBE Goals: Document 00470D states the goal is 24%. Document 00801 states the goal is 5%. Please confirm which one is correct.

    Response: Document 00801 revised to 24% DBE Goal (Attached).

12. **Question:** Please confirm how the work associated with the Sinkhole Repair Detail 1 on sheet C 07.40, the Slope Stabilization Repair Detail 1 on sheet C07.41 and the Sinkhole Repair Detail 2 sheet C07.41 is compensated, and which bid item the work items fall under?

    Response: This work shall be compensated through the individual materials needed for the repairs (P-307, 02378-4.1, P-209-5.3, P-209-5.4, P-209-5.5, etc.).

13. **Question:** Forms 00700-General Standards and 00701 FAA General Contract Provisions found in Attachment H require no action from the bidders. Are both documents to be printed and included in each proposal package?

    Response: No.

14. **Question:** Form 00810 Wage Rates is requesting information typically provided post award. Please confirm if the document is required to be completed and included in the proposal package?

    Response: No, unless there are pages that require a wet signature.

15. **Question:** Form 00807 Contractors Requirement for DBE Program, 1.02 Submittals states that the Letter(s) of Intent are to be provided within 10 days of the NTP. Please confirm they are not required for the proposal package.

    Response: Letters of Intent must be submitted at the time of proposal submittal.

16. **Question:** Form 00470D, Contract Compliance DBE Utilization Report page, please confirm this page is not required in the proposal package?

    Response: Form 470D IS A REQUIRED DOCUMENT. Please read, complete, and submit with all proposals. Primes shall list all participating DBEs to be used for credit on this form.

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Please note: For any form provided in the proposal package, please acknowledge the form by completing all required fields, signing, and returning it in your proposal submittal.

17. **Question:** The vertical on the cross sections provided in the Drawings appears to be incorrect. Please verify.

    Response: The thickness of the base layer has been revised and attached to this LOC.

18. **Question:** Bid Item 28 Unclassified Excavation shows a quantity of 388,350 cy. Please provide the end areas that show the breakdown of the excavation quantities.

    Response: This item includes excavation required per cross sections included in the plans, as well as excavation required for the sinkhole repairs, and detention pond grading. Detention pond could not be modeled and cut in cross sections due to the lack of available survey data. This quantity is an estimate based on the required detention capacity.

19. **Question:** The Project Site Plan shows item 11 under the base bid to "Expand existing ditch P detention pond". Please indicate where this expansion takes place?

    Response: Proposed detention pond shall expand on the existing detention pond east of Runway 27 end. No design was performed due to lack of survey information.

20. **Question:** Please clarify submittal instructions. Section 1.1 of the CSP and Section 26.5. Which submittal process is accurate for this project, Section 1.1.1 – 1.1.3 OR Section 26.5? Please clarify.

    Response: Section 1.1.1 is correct. Additionally, see attached revised General Information page with updated submittal location. Revised Section 26.5 page is also attached.

21. **Question:** 34.0 Submission Requirements has Section 5, Staffing/Key Personnel referring to 14.1? Is that correct? It appears duplicative of Section 4, Company Experience. If it is correct, how are both Sections 4 and 5 worth 30 points each? Please clarify.

    Response: 30-points is for both Section 4 and Section 5 combined (Experience & Reputation of Proposer).

22. **Question:** Would it be possible to provide an overall Acknowledgment Form instead of submitting individual clarifications forms for sections 00700, 00701, 00800, 00801, 00806, 00807 with the proposal, considering the substantial size the proposal would reach with each section comprising 10+ pages and the requirement for multiple copies?

    Response: No, documents 00700, 00701, 00800, 00801, 00806 and 00807 do not need to be submitted with proposal, except any pages that require a wet signature.

23. **Question**: FAA General Contract Provisions Section 30-02 paragraph 2 states “If the Owner elects to proceed with an award of contract, the Owner will make award to the responsible bidder whose bid, conforming with all the material terms and conditions of the bid documents, is the lowest in price” In the Project Manual Section 13.1 that’s that the “award of this contract will be made to the Proposer offering the best value to the City” and provides a table for the scoring criteria. Please clarify the basis for award.

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Response: HAS obtained authorization from the FAA for Competitive Sealed Proposal Award (CSP) of this project. The award of this contract will be made to the Proposer offering the best value to the City.

24. **Question:** Sheet G02.01 of the plan set Note 3 states "All contractor vehicles that are required to operate on or across active taxiways, taxi lanes, aprons, critical NAVAIDS areas, and runway approach/departure or protection zones shall do so under the direct control of an IAH Airport operations escort vehicle. Additionally, in the Project Manual section 3.12 states "if required, HAS will escort Contractor to the work area." Please clarify will HAS be providing the escort vehicles for the construction of this contract or will the contractor be required to provide escorts for the prosecution of the work?

    Response: HAS will provide escort ONLY when crossing active taxiways, taxi lanes, aprons, critical NAVAIDS areas, and runway approach/departure or protection zones as stated. Contractor would provide escorts inside work areas and areas that are closed to aircraft traffic.

25. **Question:** Sheet G02.01 of the plan set Note 3 states "The contractor shall provide a minimum of two escorts for all hauling activities: A lead escort necessary to meet minimum escorting requirements and a trailer escort required for monitoring potential FOD at all times." Please clarify will 2, BOTH a lead and a trailing escort, be required for each hauling operation?

    Response: That is correct, both escorts shall be required.

26. **Question:** Sheet G02.01 Note 4 states that "No runway closures shall be allowed under this construction project." Please clarify this note as it is clear from the plans that runway closures will be required for the construction of the project.

    Response: Under Note 4, delete; "No runway closures shall be allowed under this construction project."

27. **Question:** Sheet G02.01 Note 6 states the contractor shall always provide a minimum of 2 vacuum trucks during construction "but goes on to say, "AND shall provide a vacuum truck behind all hauling operations to and from the individual work areas." Additionally, it states that contractor shall provide a vacuum truck at all active crossings using flaggers as well as an additional backup vacuum truck. This note seems to indicate that multiple trucks beyond the typical requirement of 2 trucks is required to be on site. Please confirm that the requirement to provide 2 trucks always governs and that as it pertains to FOD the contractor will be required to manage that with additional trucks if necessary?

    Response: That is correct, 2 trucks is the minimum amount, even when no hauling or construction work is occurring. Additional trucks will be required for hauling operations.

28. **Question:** Section 00800 Article 8.1.6.1 states that the "Contractor shall credit the city by change order for inspection services for overtime work or work performed on Sundays or legal holidays." With this contract being a calendar day schedule and an aggressive one at that, additionally several of the phases show the work hours as "24/7". Please clarify will the

contractor be responsible for inspection fees for work on Sundays and legal holidays. If so, please also provide the fee schedule for the inspection fees.

Response: Delete Section 8.1.6.1. (Attached).

29. **Question:** Sheet C07.40 detail 1 on the sinkhole repairs shows the sinkholes to be filled up to 2' from the top with P-307 Cement Treated Permeable Base. Would it be acceptable to use Cement Stabilized Sand with a 100-psi compressive strength in 48 hours?

    Response: No. P-153 does not provide permeability and would block existing weep holes. P-307 is specified because of its permeability.

30. **Question:** Sheet C07.40 detail 1 on the sinkhole repairs shows the sinkholes to be filled up to 2' from the top with P-307 Cement Treated Permeable Base. Would it be acceptable to use P-153 CLSM of 100-200 psi in lieu of P-307 CTPB?

    Response: Please refer to the response provided in Question #29.

31. **Question:** P-152-2.2 states "When the volume of the excavation exceeds that required to construct the embankments to the grades as indicated on the plans, the excess shall be used to grade the areas of ultimate development or disposed as directed by the RPR. When the volume of excavation is not sufficient for constructing the embankments to the grades indicated, the deficiency shall be obtained from borrow areas." Please indicate the location that HAS would like the excess excavated material to be stockpiled. And please clarify the stockpiling requirements and restraints. (i.e., Any compaction requirements or stockpile height restraints).

    Response: Please refer to the response provided in Question #9.

32. **Question:** P-152-2.4 Drainage excavation states "All satisfactory material shall be placed in embankment fills; unsuitable material shall be placed in designated waste areas or as directed by the RPR." Pleas identify the waste areas designated for unsuitable material.

    Response: Unsuitable material shall be hauled off-site.

33. **Question:** The proposed cross sections in the plans show a consistent roughly 17' wide by 4.5' deep trench cut in all the taxiway widening sections (see sheets X01.01-X08.03). It would appear in the cross section that this is to be backfilled with aggregate base. This however is inconsistent with the typical sections (sheets C03.01-C03.02) which only shows a 15" thick course of aggregate base on existing subgrade. Please clarify the sections for the widening. If the cross sections govern and not the typical sections, please clarify how the P-209 aggregate base course for that 17' wide by 4.5' deep trench section is to be paid for.

    Response: The aggregate base depth shown in the cross sections was inaccurate. Typical section governs. Cross sections have been revised and provided in this LOC #4.

34. **Question:** P-209-3.6 states "Work on base course shall not be conducted when the subgrade or subbase is wet…" Is it the intent that the contractor completely dries out the subgrade prior to placing any base?

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Response: Contractor should work with subgrade that is at optimum moisture with no excess water or standing water.

35. **Question:** With regards to specification P-209, would recycle materials meeting the specifications of P-219 be acceptable in lieu of P-209 for Taxiway Widening Sections?

    Response: P-209 should be used under aircraft pavement sections. The source of the potential P-219 is unknown as is the ASR potential.

36. **Question:** With regards to specification P-209, would recycle materials meeting the specifications of P-219 be acceptable in lieu of P-209 for Slope Stabilization Sections and certain Sinkhole Repair Sections?

    Response: Yes.

37. **Question:** With regards to specification P-307, would recycle materials like crushed concrete be acceptable for the coarse aggregate provided it meets the same gradation requirements as outlined in the specification?

    Response: Yes.

38. **Question:** With regards to specification P-307, with this material being used to fill sinkholes as shown on sheet C07.40, it would appear the specification is written more for a horizontal application and not for what it is being called for on the plans. With that said can you please clarify some areas of the specification as it relates to the application being called for in the plans P-307-4.7 Placing states “The CTPB shall be installed in 6” lifts.” Given the application here will the contractor be held to the 6” lifts specification when filling sinkholes?

    Response: The material primarily needs to be placed in a manner so that the permeability is retained.

39. **Question:** With regards to specification P-307, with this material being used to fill sinkholes as shown on sheet C07.40, it would appear the specification is written more for a horizontal application and not for what it is being called for on the plans. With that said can you please clarify some areas of the specification as it relates to the application being called for in the plans. P-307-5.1. a under sampling and testing it states that compressive strength tests will be done for each 1200 SY. Given that we are working more in a volume scenario than horizontally what are the sampling requirement intervals.

    Response: P-307-5.1. b requirements can be disregarded. Intent is to stabilize soils and maintain permeability to weep holes for relieving any hydrostatic pressures.

40. **Question:** With regards to specification P-307, with this material being used to fill sinkholes as shown on sheet C07.40, it would appear the specification is written more for a horizontal application and not for what it is being called for on the plans. With that said can you please clarify some areas of the specification as it relates to the application being called for in the plans. P-307-5.1.b calls for the thickness sampling requirements. Given the volume scenario we are using will the contractor be required to take cores and test for thickness in the sinkhole repairs?

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Response: Please refer to the response provided in Question #39.

41. **Question:** With regards to specification P-307, with this material being used to fill sinkholes as shown on sheet C07.40, it would appear the specification is written more for a horizontal application and not for what it is being called for on the plans. With that said can you please clarify some areas of the specification as it relates to the application being called for in the plans. P-307-6.1 ad P-307-7.1. The method of measurement is being called out as the number of SY of material placed however the payment is to be paid for by the CY. Please clarify the measurement and payment requirements.

    Response: Measurement and payment should be both in CY.

42. **Question:** P-401-4.11 and P-403-4.10 outlines the requirements for application of Prime and Tack Coats and references placement in accordance with Item P-603. Section P-603.5-1 states that the tack coat is subsidiary to P-403. With both P-401 and P-403 outlined in the project please consider providing bid items in the bid form for P-603 Prime and Tack Coats.

    Response: P-603 shall be subsidiary as stated.

43. **Question:** Referencing specification section P-403 states RAP shall not be used. This matches what is outlined in the P-401 Surface Course Pavement as well. Would it be acceptable to use Recycled Asphalt Pavement (RAP) in the Base Course only on?

    Response: RAP shall not be used.

44. **Question:** P-501-2.12 outlines the requirement for the Bond Breaker as a Number 89 Choke Stone layer. Would a double coat of cure or a filter fabric layer be acceptable as a bond breaker for the Concrete pavement in lieu of the #89 choke stone?

    Response: No, this requirement is a standard for all construction at HAS airports.

45. **Question:** Regarding the concrete pavement and panel replacement bid items. Typically, HAS provides 2 separate pay items for Reinforced and Unreinforced panels. Is it the intent that all reinforcing in identified panels is subsidiary to the single bid item?

    Response: That is correct.

46. **Question:** Please provide a detail for dowel bar baskets for contraction joints in the P-501 concrete pavement?

    Response: Added detail on Sheet C10.04, Attached to this LOC #4.

47. **Question:** Sheet C03.01 Detail 2 states that upon removal of existing 12”-15” steel reinforced PCC “if poor base is encountered, remove to sound base prior to concrete pour. This shall be subsidiary.” Please clarify the intent of this note. The state of the existing base beneath existing PCC is both unknowable and uncontrollable by the contractor. Please consider adding in a bid item or an allowance item to account for the repairs to existing base beneath removed PCC or for the additional concrete yield to account for potential increased depths.

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Response: The estimated PCC quantity required for this repair does include contingency to account for potential increased depths in the rare instance additional base needs to be removed.

48. **Question:** Referencing sheets C03.01 and C03.02, please confirm that the only subgrade stabilization required for the project will be to scarify and recompact existing subgrade to a depth of 12" and that no lime or cement stabilization is required for existing subgrade?

    Response: This is correct.

49. **Question:** Please confirm the scaling on C10.02. When using takeoff software's and applying the scale in the upper right-hand corner, the defined lengths on the joint layout do not match. The panels are called out as a 17.5' width but being scaled they show more like 12.5' wide?

    Response: The scaling on sheet C10.02 is," = 40'. The sheet has been updated (Attached).

50. **Question:** In the Prebid and section 1 of the Project Manual states that the proposer shall submit Two (2) hard copies of the proposal package including 1 original as well as Seven (7) USB flash drives containing a scanned copy of the original package. However, section 26 of the Project Manual states to submit One (1) Original and Ten (10) hard copies as well as Ten (10) USB thumb drives. Please clarify the discrepancy between the number of hard copies and flash drives to be submitted by the proposer.

    Response: Please refer to the response provided in Question #20.

51. **Question:** Section 34.1.13 calls for the proposer to submit financial capabilities in the form of audited financials. However, section 20-02 in Attachment H states that "unless otherwise specified, a bidder may submit evidence that they are prequalified with the State Highway Division" as evidence of financial responsibility in lieu of the certified statements or reports. Please clarify will evidence of prequalification with the Texas DOT satisfy the evidence of financial capabilities.

    Response: Please see Doc 00701 revised page (Attached).

52. **Question:** Section P-401-2.3 calls for an asphalt binder Performance Grade (PG) 82-22. On the FAA Website regarding P-401 it states: "In general, the Engineer should choose a PG-asphalt binder that has been approved for use in the vicinity by the State DOT and is locally available. In general, a high reliability (98 percent) on both the high and low temperature categories is sufficiently conservative." (5370p401 (faa.gov)) This grade binder is not commonly used in this area and presents some potential challenges. One such challenge is it tends to cool faster than other grades. With much of the asphalt paving anticipated in the winter months we would like to request the use of PG 76-22 in lieu of the stated 82-22.

    Response: Please refer to the response provided in Question #4.

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53. **Question:** Referencing sheet C07.50 detail 2 on the concrete pilot channel, the rebar reinforcing calls for #4 bars on 12" on centers each way. Would 6 x 6 Welded Wire Mesh be an acceptable alternative?

    Response: No, please use #4 at 12" O.C. each way.

54. **Question:** Referencing sheet C07.41 detail 1 on the slope stabilization repair step 1 shows to excavate to the toe of the channel and to firm soils. Please clarify if firm soils are encountered prior to the toe of the channel will the contractor still be required to excavate to the toe of the channel?

    Response: Please excavate to toe. Will correct/clarify callout in plans.

55. **Question:** Referencing sheet C07.41 detail 1 on the slope stabilization repair step 1 shows placing rock fill in the bottom 1' lift per specification P-154. Section P-154 is not included in the documents provided by HAS. Please provide the referenced spec section and provide clarity on the specifications for the rock material required for the bottom 1' section?

    Response: The details on sheet C07.41 have been updated to reference the correct material, P-209. Updated drawings are included in this LOC #4.

56. **Question:** Referencing sheet C07.41 details on slope stabilization requires excavating to the toe of the channel. How is this excavation to be paid?

    Response: This excavation will be paid under P-152 Unclassified Excavation.

57. **Question:** Referencing sheet C07.31 calls for 6" Cement Stabilized Sand beneath all slope paving. Where is the placement of this material to be paid for?

    Response: Updated plans and quantities to use P-209, Crushed Aggregate Base Course instead.

58. **Question:** Referencing sheet C07.31 calls for rebar #4 bars on 12" centers. Would a 6 x 6 Welded Wire Mesh be an acceptable alternative for the slope paving?

    Response: Please refer to the response provided in Question #53.

59. **Question:** Drainage details on sheet C07.29 show bedding detail for CMP to be 6" on all sides. However, the bedding detail on sheet C07.51 shows 12" on all sides. Please clarify the bedding for the 24" CMP?

    Response: Please use 12" on all sides.

60. **Question:** Please provide the bedding and backfill details for the Reinforced Concrete Boxes.

    Response: Updated drainage details, included RCB bedding and backfill details.

61. **Question:** Please provide the connection details for the Reinforced Concrete Box connections onto the existing boxes.

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Response: TxDOT Standard Detail SCP-MD.

62. **Question:** Referencing sheet C07.40 on the detail regarding the modify the curb opening. Please clarify the size of rebar and the depths to be drilled into the concrete. Please add all known dimensions.

    Response: Updated C07.40, provided additional detail (Attached).

63. **Question:** Please clarify the payment and unit for the modify the curb opening bid item. There appears to be about 1214 LF of curb area. It would appear via the detail on sheet C07.40 that we are to close-up every other opening. With these being about every 8' there should be about 75 each hole to close-up. Please clarify how the contractor will get paid for this work.

    Response: This work is paid for under Item No. 44, P-610-6.2, Modify Curb Opening. Openings occur every 10 ft with approximate dimensions of 1 ft long x 6 inches deep x 6 inches tall. The curb stretch is 1,213.8 LF, and we're closing the gaps every 20 ft. 1213.8 LF / 20 LF = 61 openings. Bid form has been updated with this quantity.

64. **Question:** Referencing sheet C03.03 the details regarding the asphalt crack repairs. With the difference in repairs depending on the severity of the crack as well as the unknown qty of each, please clarify the LF qty of each type to be used for estimating purposes.

    Response: Asphalt crack repairs are quantified under item P-101-5.9. This quantity is for all asphalt cracks, regardless of the severity level. No detailed inspection was performed to itemize crack severity.

65. **Question:** Referencing section 35.2 of the Project Manual in the documents to be submitted within 10 business days after Notice of Intent to Award requires 00520 Agreement. We are unable to find this document in the files provided. Please provide the 00520 Agreement for contractor review.

    Response: Document 00520 Agreement will be provided as an attachment with the Notice of Intent to Award (NOITA) to the shortlisted firm.

66. **Question:** Are contractor escorts and gate guards intended to be paid for under the "Flaggers" bid item or Traffic Control?

    Response: They will be paid under "Flagmen- Bid Item No. 2" under Spec 01555-1.04B (as shown)

67. **Question:** E02 Series drawings Demolition Keyed Notes #109 calls for existing airfield conduit or duct and cable to remain. Except for the new cables to the signs, Hi-Speed new Duct bank and new Base Cans, where else is Item # 65 – 30,000 ft. (L-108-5.1) No. 8 AWG, 5kV, L-824, Type C Cable to be installed?

    Response: Refer to previous Letter of Clarification #3, dated July 7, 2023, for revised cable removal and reinstallation scope and revised cable quantity.

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68. **Question:** Can you provide a drawing where the L-824C to be installed?

Response: Please refer to the response provided in Question #67.

69. **Question:** Sheet E04.02 Note 9, states "Maximum of (3) three rings may be stacked together to bring the light fixtures to the correct elevation." Our record shows more than one extension on existing centerline Base Cans. Do we have to remove all the extension(S) from the bottom sections or Base Cans? If your answer is no, how are going to meet the three ring requirements? Example: adding just a flange ring and a pair of dial a bevel ring will meet the three rings max but we still must add spacer(s) for height adjustments at the new asphalt. - Can a Bid Line Item be added for Top Sections? Can Bid Line Items be added for Spacer Rings.

Response: Refer to revised detail 2 on sheet E04.02 in Letter of Clarification #3, dated July 7, 2023, to clarify the need to remove existing top sections of cans and install new top sections.

70. **Question:** Sheet E04.02 Detail 2 shows Multi-Adapter Ring. Are you referring to HAS Standard Top Section with Multi-Hole Adapter Ring for existing and new Base Cans?

Response: Yes. This a requirement for the installation of the new can top section. Spacer rings that are installed may be installed between the top and bottom sections of the light bases.

71. **Question:** Sheet E04.02, detail 3 calls to abandon existing cable in place. This cable must be intercepted at the nearest pull box and respliced to complete the circuit. Please clarify?

Response: This detail has been revised in this Letter of Clarification #4 to show the existing cable being removed in accordance with the scope changes made in previous Letter of Clarification #3, dated July 7, 2023.

72. **Question:** Sheet E04.02 if the Existing Base Cans does not have grounding lug. Can you provide a detail to ground to the existing Base Cans? Can a Bid Line Item be added for a retrofit ground lug on existing base can?

Response: Yes, additional notes have been added to the details on sheet E04.02 detailing the process of installing a retrofit grounding bracket. A bid item has been added to cover this work.

73. **Question:** Sheet E04.03 detail 3 Base mounted sign. Note 13 states "All new signs shall be installed and bolted to a Unistrut 1 5/8" x 1 5/8" galvanized". Sign detail calls for Stainless Steel Expansion bolts. Which type of anchoring will be required? Provide Expansion bolts size if this will be required.?

Response: Detail 3/sheet E04.03 has been revised in this Letter of Clarification #4 to remove the stainless-steel expansion bolts and show the channel strut anchored to the concrete pad and the sign leg flanges anchored to the channel strut.

74. **Question:** Sheet E04.05 Detail 2 states “Adjustment height 3” minimum. Contractor shall verify in the field the proper adjustment of each light prior to any work. If the adjustment require lesser height, are we still to install the minimum height of 3”?

Response: This Letter of Clarification #4 shows the details that the top section of the light base will be replaced in a similar fashion to the centerline lights in the asphalt pavement areas.

75. **Question:** Can a Bid Line Item be added to repair broken bolts on Base Cans where New light fixtures are installed on existing Light Base or flange ring?

Response: Yes, a bid item to account for removing broken bolts has been included.

76. **Question:** Can a Bid Line Item be added to remove broken bolts connecting Top and Bottom Sections?

Response: Yes, a bid item to account for removing broken top/bottom section bolts has been included.

77. **Question:** Bid Item – SS-310-5.2 Mobile Photometric Testing; Are we required to test all new light fixtures installed on existing light base where no adjustment to the Base Can is done? If yes, how do we get compensated to adjust the Base Cans and pay the vendor for a second trip to test the corrected base can?

Response: Yes, all new lights are required to be photometrically tested. For the asphalt areas, the contractor will be fully responsible for edge and centerline lights passing the photometric tests. For the concrete areas, the contractor shall be responsible for correcting light fixture issues that cause a failed test. If a test were to fail due to the existing pavement or infrastructure, the contractor shall report this to the Airport and the Engineer; but shall not be responsible for corrective action or a second photometric test.

78. **Question:** HAS have a number system for all Airfield Lighting Fixtures. Can you provide drawings with the light fixture numbering sequence, fixture types and color?

Response: Light fixture numbering will be coordinated with the airport in construction. All taxiway edges are omnidirectional blue, taxiway centerlines have lens colors identified. If a taxiway centerline light does not show lens colors, it shall be considered a green/green output light fixture.

79. **Question:** Sheet E03.06 Keyed Note #208 shows Two Manhole per location between station 2037+00 and 20387+00. Are these double manholes to be paid per each? i.e., single manhole with two frame and cover per location or two individual manholes?

Response: Each manhole of a double manhole structure shall be considered a single quantity for the purposes of quantifying the number of adjusted junction structures.

80. **Question:** There is a conflict on mobilization payment between Specification section 01502 Part 1 and C-105 Method of payment. Which method of payment will be used in this contract?

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Response: Mobilization shall be paid under specification C-105.

81. **Question**: Is Bid Item # 81 (L-125-5.6) for New Base Can in New Pavement?

Response: Yes, this is for new pavement areas and for pavement repair areas.

82. **Question:** Installation Keyed Notes#208 states to adjust existing pull box to grade. Can you provide the Pull boxes, Handholes and Manholes sizes and load rating? Can you provide details of the extensions on the structure?

Response: The Contractor shall provide shop drawings for the adjustment of each junction structure type encountered in the project area per note added to detail 2/sheet E04.05.

83. **Question:** Bid Line Items SS-301-5.4 and SS-301-5.5 calls for the Base Top Sections to be removed. Are these Base Top Sections to be Reinstalled?

Response: No, these top sections will be properly disposed of by contractor.

84. **Question:** On a recent order for In-Pavement Lights, we learned that the lead time for In-pavement fixtures was seven months. With this long lead time, will HAS consider issuing a procurement Change Order before Notice to Proceed?

Response: No procurement change order will be issued for this project prior to an Administrative Notice to Proceed (ANTP). A construction NTP shall be issued subsequently based on contractor's procurement lead time.

85. **Question:** The existing top sections (can extensions) may have a flange ring built in the Base Can extension. The flange ring cannot be removed. The entire top section must be cored to remove the Top Section with flange ring. How will the General Contractor mill the asphalt at this light location if the top section is not removed?

Response: Refer to previous Letter of Clarification 3, dated July 7, 2023, change on detail 2/sheet E04.02 for clarified requirement that all top sections be removed in asphalt areas.

86. **Question**: Revised Bid Form in Addendum 3 included pavement/asphalt repair at WC, NK, WP, and south ramp. All these areas will require temporary electrical work. Can a Bid Line Item be added for Temporary Electrical for each area shown on drawing G04.00?

Response: Added SS-310-5.3 bid item for add alt temp electrical work.

87. **Question:** Directional boring specification SS-305-2.1 states "Polyethylene Conduit shall conform to SDR 11 type. Drawing E04.09 Detail 1, shows the conduit to be 2" PVC. Is the 18" casing polyethylene?

Response: The 18" casing shall be steel. See revised detail 1/sheet E04.09 (Attached).

88. **Question:** L-858 Sign pad details on drawings E04.03 and E04.04 shows a rectangular sign pad. This is a HAS standard. Are all the new sign pads to be built per these details?

Response: Yes, all new sign bases shall be constructed according to these details. The sign base details shown on sheet E04.07 has been removed in Letter of Clarification #4.

89. **Question:** Drawing 04.07 note 1 refers to sheet EP-100 series. These sheets are not included in the drawing set. Can you provide the EP-100 series drawing?

Response: The reference to the EP-100 series of sheets was erroneous. These details have been removed from the plan sheet via Letter of Clarification #4.

90. **Question:** Would you consider extending the question deadline since the original bid submission day was push to August 10, 2023?

Response: Submittal due date is extended to August 18, 2023, and deadline for questions had expired.

91. **Question:** Sheet 4 of the plans shows a Spec NO 01210 CASH ALLOWANCES LS-1…… What is this for as it is not in the bid form? Are there Associated Dollars that are to go with the allowances?

Response: This line item is included in bid form 410-B Table D Cash Allowance Table.

92. **Question:** How are you coming up with the excavation Quantity of 388,350 CY the takeoff is not indicative of this magnitude of Quantity? That Qnty would indicate a cut of 3.6' after all demo is removed**?**

Response: This item includes excavation required per cross sections included in the plans, as well as excavation required for the sinkhole repairs, and detention pond grading. Detention pond could not be modeled and cut in cross sections due to the lack of available survey data. This quantity is an estimate based on the required detention capacity.

93. **Question**: If this is correct, how are you paying for the embankment that is needed to get back to grade?

Response: Per construction specification P-152, excavated material will be used for embankment and fill areas. Excess material shall be hauled off-site. Earthwork will only be paid for once excavated (P-152-4.1), and this payment will also include embanking the material where needed or disposing of it when not needed.

94. **Question:** Is there existing materials on site that are available to the Contractor for Embankment? If yes, where is it stored and will it meet the spec?

Response: This project will be a net cut earthwork project. Excess material shall be hauled off-site.

95. **Question:** Per the grading and drainage plans. CMP is to be removed. Is the intent for the CMP to be removed and replace?

Response: The CMP is to be removed and replaced with "prop backslope swale outfall structure" (detail on Sheet C07.27).

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96. **Question:** Bid Item 60 “Install 24” open cut, Complete in place” shows bid item quantity for 2,170 LF. Please review this quantity.

    Response: The quantity is correct. The 24" CMP are for the backslope interceptors shown on the Backslope Swale Plans, sheet C07.44 to C07.49.

97. **Question:** Can you provide Flow line elevations or profiles for the CMP?

    Response: The upstream flowline is dependent on the backslope swale grading (following detail on Sheet C07.50). For the downstream flowline, please set at 1' above the existing conc channel bottom (see detail on Sheet C07.51).

98. **Question:** Bid Item 62 “Hydroseeding” shows bid item quantity for 61 AC. Please review this quantity.

    Response: This quantity is correct. It includes hydroseeding required for the proposed detention pond.

99. **Question:** Bid Item 63 “Sodding” shows bid item quantity for 63,930 SY. Please review this quantity.

    Response: This quantity is correct. It includes sodding required for the proposed detention pond.

100. **Question:** Bid Item 32 “Separation Geotextile (Slope Stabilization)” is the owner bid item quantity in the right unit?

     Response: Correct quantity should be 16,106 SY, Bid Form 410B is revised.

101. **Question:** Bid Item 33 “Geogrid (Slope Stabilization)” is the owner bid item quantity in the right unit?

     Response: The quantity is incorrect. Correct quantity should be 2,618 SY, Bid Form 410B is revised (Attached).

102. **Question:** Where is the Sinkhole rehabilitation to be paid for?

     Response: This work shall be compensated through the individual materials needed for the repairs (P-307, 02378-4.1, P-209-5.3, P-209-5.4, P-209-5.5, etc.).

103. **Question:** Can the owner provide pictures of the Sinkhole locations?

     Response: Sinkhole locations are shown on the drawing, photos are attached.

104. **Question:** Can a BCS sheet be provided for the 10 EA wingwalls?

     Response: A BCS sheet is provided in this LOC #4 (Attached).

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105. **Question:** Can you please provide a complete drawing of existing utilities to show where the required steel plates will be located? How are the steel plates to be paid for?

Response: See Sheets C01.01-C01.12 for approximate locations of utilities. Contractor will need to provide locates prior to work. This project does not include any proposed utilities improvements (except for electrical and drainage scope shown in their respective sheets). There is no proposed utility work requiring the installation of steel plates. Contractor may use steel plates to cover holes in case of unexpected work suspension. This will not be paid separately.

106. **Question:** General notes 1 question #14 if work is halted by the owner, a time extension or a stop work order will be issued but no compensation in contract price for the delays. Is this correct?

Response: That is correct.

107. **Question:** Can we work in phases 1,4,5,6,7 concurrently?

Response: GC may submit proposed changes, but the final decision will be up to HAS based on operational needs.

108. **Question:** Are you able to provide a required number of escorts, sweepers, water trucks for each phase of the work and the total number of standby escorts, sweepers, and water trucks?

Response: This appears to be a means and methods. GC should review work and determine what is needed.

109. **Question:** Section 1.0 of CSP states for Submittals that there are 2 hard copies and 7 thumb drives to be turned in for the bid, however section 26.5 is in direct conflict and states that you need to have 10 hard copies with 10 thumb drives. Which is the correct information needed to turn in for a qualified bid?

Response: Please refer to the response provided in Question #20.

110. **Question:** Please give us a revised list of required documents and the hierarchy of the documents, as what is in the original CSP is very conflicting with the list of required documents per Doc 00410A BID FORM-PART A.

Response: Competitive Sealed Proposals (CSP) are a combination of an Invitation to Bid (ITB) and a Request for Proposal (RFP). The requested documents marked in Doc 00410 Bid Form Part A (included in Attachment H), shall be part of your proposal submission in a separate envelope marked Attachment H – Miscellaneous Documents.

111. **Question:** How are you grading on schedule per your scoring table if we are not required to submit a schedule at time of bid?

Response: Grading criteria has been updated and added to revised CSP Section 14.3" (Attached).

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112. **Question:** How are you grading on Financial Stability if we are not submitting this with the bid or to the same person at the same location.

Response: Financial Statement shall be submitted with the proposal submission and shall be graded as a Pass/Fail.

113. **Question:** What is your anticipated award date? (For schedule basis)

Response: Tentative award date is an estimation based on other factors before a final decision is made and is not available at this time.

114. **Question:** When do you anticipate giving the Notice to proceed (NTP) after award?

Response: Notice to Proceeds are usually issued two to three weeks after award.

115. **Question:** Are we required to compile a complete Proposal submission per the CSP sections 34.0 (34.1 – 34.17.1.3.5) As these items are NOT required per the 00410A Revised on 7-6-23?

Response: Yes.

116. **Question:** Section 14.1 Submittal requirements and reputation of proposer- is sheet 00480 satisfying that requirement or are there other documents needed?

Response: No, Doc 00480 is the Reference Verification Form. Vendor shall follow what is required in Section 14.1 with their proposal submission.

117. **Question:** Section 14.3 Proposers ability to meet or better project milestone- How will this be graded per the itemized list under the heading as the drawing approval, fab & delivery, installation, and acceptance, over all completion…… these items are not able to be turned in at time of bid. Please explain the intent of this item.

Response: Please refer to the response provided in Question #111.

118. **Question:** DBE Participation under section 14.5 is a pass/fail based on submitted forms and letter of intent. What submitted forms are needed other than the letter of intent included in document 470D?

Response: Please refer to the response provided in Question #16.

119. **Question:** Section 14.4 Financial Strength of Contractor (Pass/Fail) based on items listed Liquidity Ratio, Debt Ratio, Operational Ratio, Profitability Ratio, and Asset Turnover. How is this graded as it is not required to be turned in per sheet 410A Bid Form Part A?

Response: Proposers must provide a Financial Statement as stated in this solicitation. HAS Finance Department will review firm's submittal and perform an evaluation of the proposers' Financial Statement.

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120. **Question:** Document 00480 Reference Verification has an attachment sample form SCM-1 Reverence Verification Telephone interview. Who is to fill the attachment for the SCM-1 the Airport Personnel, Agency Name or the Contractor?

    Response: Vendor shall complete Doc 00480 Reference Verification Form and Supply Chain Management (SCM) will complete the SCM-1 form when doing reference checks. The sample is for information purposes.

121. **Question:** Per item 35 City required Documents, what are we to do with the 00700 General standard? There is no location for signatures on this form. Are we to include in proposal and thumb drives?

    Response: No, Doc 00700 General Standard is for each vendor to be familiar with City of Houston standards and does not need to be submitted with your proposal.

122. **Question:** Per item 35 City required Documents, what are we to do with the 00701 ac 150/5370-10H FAA general contract provisions? There is no location for signatures on this form. Are we to include in proposal and thumb drives?

    Response: No, Doc 00701 is for each vendor to be familiar with FAA general contract provisions and does not need to be submitted with your proposal.

123. **Question:** Per item 35 City required Documents, what are we to do with the 00800 Supplemental to General Standards? There is no location for signatures on this form. Are we to include in proposal and thumb drives?

    Response: No, Doc 00800 is for each vendor to be familiar with the supplemental to general standards (i.e., insurance requirements, liquidated damages, etc., and does not need to be submitted with your proposal.

124. **Question:** Per item 35 City required Documents, what are we to do with the 00801supplementary conditions for Project Funded by AIP Grant? There is a location for signatures on this form however it is not required to be submitted per document 00410A?

    Response: Vendor shall include with their submittal from Doc 00801, a wet signature on page 00801-22.

125. **Question:** Per item 35 City required Documents, what are we to do with the 00806-AIP DBE Program? There is no location for signatures on this form. Are we to include in proposal and thumb drives?

    Response: No, Doc 00806 is for each vendor to be familiar with and does not need to be submitted with your proposal.

126. **Question:** Per item 35 City required Documents, what are we to do with the 00807 Contractor requirements for DBE as there is conflicting information? There is no location for signatures on this form. Are we to include in proposal and thumb drives? This is also listed to be turned in 10 days after notice of intent to award the contract. This then references document 00600 which was not provided in the bid documents and asks for the DBE letter

of intent. This brings up another question is the LOI due at time of bid per 00410A or is it Due per document 00807 10 days after notice of award?

Response: No, Doc 00807 is for each vendor to be familiar, understand certain requirements, and does not need to be submitted with your proposal unless there is a page that requires your signature. Document 00600 will be provided as an attachment with the Notice of Intent to Award (NOITA) to the shortlisted firm.

127. **Question:** Document 00600 which is not provided is also to be turned into the OBO office and the city engineer? Where is the City Engineer? What original documents are to be included from 00806 as that document only discusses the program and is not including additional documentation?

Response: No, Doc 00600 will provide as a post-proposal required document at time of issuing the NOITA. The HAS City Engineer is listed on Doc 00520 Agreement (post-proposal require documents). Concerning document 00806, please refer to the response provided in Question #125.

128. **Question:** Per item 35 City required Documents, what are we to do with the 00810 Wage Rates? There is a location for signatures on this form, however not required per 00410A? Are we to include in proposal and thumb drives?

Response: Please provide from Doc 00810, a completed Exhibit B and/or C with your proposal submission (include in envelope with Attachment H – Miscellaneous Forms).

129. **Question:** Per item 35 City required Documents, what are we to do with the 00840 POP? There is no location for signatures on this form and it is not listed on the 00410A to be turned in? Are we to include in proposal and thumb drives?

Response: No, Doc 00840 doesn't need to be included with your proposal submission.

130. **Question:** Sheet G01.05 in the items of work note 11 states that we are to expand existing Ditch P Detention Pond. Where is the Pond and where are the grading and cross sections for it?

Response: Proposed detention pond shall expand on the existing detention pond east of Runway 27 end. No design was performed due to lack of survey information.

131. **Question:** How are you paying for the Temp Haul route shown to be constructed on sheet G02.06? Is it to be permanent? What is the detail for construction?

Response: Temporary haul routes are paid for under C-105-6.1 Mobilization. This route is temporary, for the duration of the project. The Contractor shall make their own determination regarding the haul route construction. Contractor shall restore existing conditions at the end of the project.

132. **Question:** Where will the remove and replace existing concrete panel (backslope plans) pe paid?

Response: P-101, Concrete Slope Paving Removal and Disposal.

133. **Question:** There are several other interceptors' structure's locations with CMP leading down into the existing concrete channel. Will there be a need to, "remove and replace existing concrete panel" in these locations?

Response:
If this is in reference to Grading & Drainage Plans – the existing CMPs and conc slope paving are to be removed. They are replaced by "Prop Backslope Swale Outfall Structure" (Detail Sheet C07.27) and paid for under P-610-6.1, Concrete Slope Paving.

If this is in reference to Backslope Swale Plans – the existing "interceptors" are spillways/flumes with no CMPs. These structures are to remain.

134. **Question:** We are coming up with 60% more wing wall cy vs the bid quantity, how did you measure the Cy? Did you include the footing and the toe?

Response: Quantities updated in LOC #4. Previously 729 CY, updated to 1130 CY. Updated quantity includes footing and toe.

135. **Question:** Is the wing wall footing and toe all included in the CY quantity on the bid sheet?

Response: Yes, quantity updated in this LOC (Attached).

136. **Question:** Where will removing the 2 locations of driveway concrete be paid?

Response: Under P-101-5.5 Concrete Pavement Removal (12"-15" Depth).

137. **Question:** Per sheet C09.04 shows the limits of seeding not going out to the existing channel. Will the seeding be extended to the existing channel?

Response: Seeding will include the affected grading areas of the project. The existing channel is not included as part of this project.

138. **Question:** Per sheet G02.06 note 5 can you please provide a proposed typical section?

Response: Contractor shall use industry standard orange and white traffic control delineator posts.

139. **Question:** Please provide backfill and box culvert typical sections for class 5 culverts?

Response: Additional details added in this LOC. Please see Sheet C07.26, Detail 4.

140. **Question:** How is the Additive alternate going to affect the days for substantial completion?

Response: No additional time shall be added.

141. **Question:** The Bid Form Qty. for Unclassified Excavation (P-152-4.1) is grossly higher than our take-off of this activity, approx. 300,000 cubic yards higher. The Earthwork

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Specifications state that the excavation will be paid based on “plan quantity” and that if the Contractor disturbs the existing ground with no notification to the Engineer of possible errors, then the Contractor accepts the final quantities detailed on the plan and Bid Form. While we feel being paid “plan quantity” is an appropriate method of payment/measurement for this activity, the variance is just too great to appropriately bid this bid-item. Please take a closer look at the Bid Form Qty. for Unclassified Excavation.

Response: This quantity includes the following work:
Detention Pond Grading: 222,640 CY
Sinkhole Repairs: 448 CY
Slope Stabilization: 5,369 CY
Backfill and Regrade: 2,087 CY
Pavement widening and infield grading: 56,075.53 CY.
Contingency (~10%): 28,660.47 CY
Total: 315,280 CY

142. **Question:** For the P401 & P403 is there an option to provide a PG 76-22 Mix instead of the PG 82-22?

Response: Due to the slow movement and dynamic turning of the aircraft we will be using PG82-22 liquid asphalt.

When issued, Letters of Clarification (LOC(s) shall automatically become part of the solicitation documents and shall supersede any previous specification(s) and/or provision(s) in conflict with these LOC(s). LOC(s) will be incorporated into the Contract as applicable. It is the responsibility of the respondents to ensure that it has obtained all such LOC(s). By submitting a response on this project, respondents shall be deemed to have received all LOC(s).

If further clarification is needed regarding this solicitation, please contact Jorge Ardines, Sr. Procurement Specialist, via email at jorge.ardines@houstontx.gov.

DS DE

DocuSigned by:
Cathy Vander Plaats
02232028DE99414...

Cathy Vander Plaats
Aviation Procurement Officer
Houston Airport System

DS

CVP/ja

cc: Alfredo Oracion
Dallas Evans
Solicitation File

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Attachments:

1) Revised Document 00410.
2) Revised General and Civil Drawings.
3) Drawing No. C07.26A.
4) Revised Electrical Drawings.
5) Revised Cross Section Drawings.
6) Revised Specifications.
7) Sinkhole Photos.
8) Revised CSP General Information page.
9) Revised CSP Section 14.3 page.
10) Revised CSP Section 26.1 and 26.5 page.
11) Revised Doc 00701 Section 20-2 page.
12) Revised Document 00800 deleted Article 8.1.6.1.
13) Revised Document 00801.

Document 00410A

BID FORM – PART A

To: **The Honorable Mayor and City Council of the City of Houston**
City Hall Annex
900 Bagby Street
Houston, Texas 77002

Project: Rehabilitation of Taxiways SA & SB
Project No.: PN 0646A
Bidder: _____
(Print or type full name of business entity, such as corporation, LLC, etc)

1.0 OFFER

A. Total Bid Price: Having examined the Project location and all matters referred to in Bid Documents for the Project, we, the undersigned, offer to enter into a Contract to perform the Work for the Total Bid Price shown on the signature page of this Document

B. Security Deposit: Included with the Bid is a Security Deposit in the amount of 10 percent of the Total Bid Price subject to terms described in Document 00200 – Instructions to Bidders.

C. Period for Bid Acceptance: This offer is open to acceptance and is irrevocable for 180 days from Bid Date. That period may be extended by mutual written agreement of the City and Bidder.

D. Addenda: All Addenda have been received. Modifications to Bid Documents have been considered and all related costs are included in the Total Bid Price.

E. Bid Supplements: The following documents are attached:

[X] Security Deposit *(as defined in Document 00200 – Instructions to Bidders)*
[X] Document 00450 - Bidder's Statement of MWSBE Status
[X] Document 00454 - Affidavit of Non-interest
[X] Document 00455 - Ownership Information Form
[X] Document 00456 - Bidder's Certificate of Compliance with Buy American Program *(required for AIP funded project)*
[X] Document 00457 – Conflicts of Interest Questionnaire (CIQ)
[X] Document 00458 - Bidder's Certificate Regarding Foreign Trade Restriction *(required for AIP funded project)*
[X] Document 00459 - Contractor's Statement Regarding Previous Contracts Subject to EEO *(required for AIP funded project)*
[X] Document 00460 – Pay or Play Acknowledgement Form (POP 1-A)
[ ] Document 00461 – Hire Houston First Affidavit
[ ] Document 00470 – Bidder's MWSBE Participation Plan *(required unless no MWSBE participation goal is provided in Document 00800* (the "Goal")*)*.
[X] Document 00470D - Bidder's DBE Participation Plan *(required for AIP funded project)*

[ ] Document 00471 – Bidder's Record of Good Faith Efforts *(required if the goal in Bidder's Participation Plan–Document 00470 is lower than the Goal).*
[ ] Document 00472 – Bidder's Goal Deviation Request *(required if the goal in Bidder's Participation Plan–Document 00470 is lower than the Goal).*
[X] Document 00480 – Form SCM-1 Reference Verification
[X] Document 00481 – Non-Collusion Statement
[ ] Document 00842 – Letter of Intent
[ ] Others as listed: _____

2.0 CONTRACT TIME

A. If offer is accepted, Contractor shall achieve Date of Substantial Completion within 298 days after Date of Commencement of the Work, subject to adjustments of Contract Time as provided in the Contract.

Document 00410B

BID FORM – PART B

1.0 TOTAL BID PRICE HAS BEEN CALCULATED BY BIDDER, USING THE FOLLOWING COMPONENT PRICES AND PROCESS (PRINT OR TYPE NUMERICAL AMOUNTS):

A. STIPULATED PRICE: $N/A

(Total Bid Price; minus Base Unit Prices, Extra Unit Prices, Cash Allowances and All Alternates, if any)

B. BASE UNIT PRICE TABLE:

Item No.	Spec Ref.	Base Unit Short Title	Unit of Measure	Estimated Quantity	Unit Price (this column controls)	Total in figures
1	01555-1.04A	Traffic Control and Regulation, Excluding Flagmen	LS	1		
2	01555-1.04B	Flagmen	LS	1		
3	SS-130-4.1	Trench and Excavation Safety Systems	LF	85		
4	SS-300-5.1	Lockout/Tagout and Constant Current Regulator Calibration Procedures	LS	1		
4A	SS-300-5.2	Removal/Repair of Broken Bolt, in Place	EA	235		
4B	SS-300-5.3	Retrofit Ground Lug to Existing Can, Installed	EA	235		
5	SS-301-5.1	Existing Base Mounted Edge Light, Removed	EA	495		
6	SS-301-5.2	Existing In-Pavement Centerline Light, Removed	EA	456		
7	SS-301-5.3	Existing Base Mounted Guidance Sign, Removed	EA	28		
8	SS-301-5.4	Existing Base Mounted Edge Light, Removed, Base Top Section, Removed	EA	50		
9	SS-301-5.5	Existing In-Pavement Centerline Light, Removed, Base Top Section, Removed	EA	754		
10	SS-301-5.6	Existing L-852G Runway Guard Light, Relocated on New Base	EA	5		
11	SS-301-5.7	Abandoned Sign Foundation, Demolished	EA	2		

11A	SS-301-5.8	Existing Electrical Conduit, 1-Way 2"C, Cleared	LF	10,000		
11B	SS-301-5.9	Existing Electrical Conduit, 1-Way 4"C, Cleared	LF	10,000		
12	SS-305-5.1	Directional Boring, 16-Way 2"C Polyethylene Conduits	LF	1,350		
13	SS-310-5.1	Temporary Airfield Lighting	LS	1		
14	SS-310-5.2	Mobile Photometric Testing	LS	1		
15	C-100-14.1	Contractor Quality Control Program (CQCP)	LS	1		
16	C-102-5.1a	Filter Dam Type II	LF	60		
17	C-102-5.1b	Reinforced Silt Fence	LF	24,112		
18	C-105-6.1	Mobilization	LS	1		
19	P-101-5.1	Asphalt Milling (1" and Variable Depth)	SY	66,760		
20	P-101-5.2	Asphalt Milling (2" and Variable Depth)	SY	204,600		
21	P-101-5.3	Asphalt Milling (5" and Variable Depth)	SY	45,370		
22	P-101-5.4	Full-Depth Asphalt Shoulder Removal	SY	4,920		
23	P-101-5.5	Concrete Pavement Removal (12”-15” Depth)	SY	550		
24	P-101-5.6	Remove and Dispose 24" CMP	LF	625		
25	P-101-5.7	Concrete Slope Paving Removal and Disposal	SY	9,218		
26	P-101-5.8	Concrete Headwall Removal	EA	10		
27	P-101-5.9	Asphalt Crack Repair	LF	140,000		
28	P-152-4.1	Unclassified Excavation	CY	315,280		
29	P-209-5.1	6" Crushed Aggregate Base Course	SY	16,010		
30	P-209-5.2	15" Crushed Aggregate Base Course	SY	81,360		
31	P-209-5.3	Aggregate Base Course (Slope Stabilization)	CY	1,343		
32	P-209-5.4	Separation Geotextile (Slope Stabilization)	SY	16,106		
33	P-209-5.5	Geogrid (Slope Stabilization)	SY	2,618		

34	P-304-8.1	6" Cement-Treated Base Course	SY	12,620		
35	P-307-7.1	6" Cement Treated Permeable Base	CY	350		
36	P-401-8.1	Bituminous Surface Course	TON	40,230		
37	P-403-8.1	Bituminous Base Course	TON	40,750		
38	P-501-8.1	10" Portland Cement Concrete Pavement	SY	410		
39	P-501-8.2	12"-15" Portland Cement Concrete Pavement	SY	550		
40	P-501-8.3	15" Portland Cement Concrete Pavement	SY	12,240		
41	P-501-8.4	Concrete Pavement Partial Depth Repair	SF	2,000		
42	P-501-8.5	Concrete Pavement Crack Repair	LF	3,000		
43	P-610-6.1	Concrete Slope Paving	SY	14,904		
44	P-610-6.2	Modify Curb Opening	EA	61		
45	P-610-6.3	Concrete Pilot Channel	SY	11,490		
46	P-610-6.4	Interceptor Structure	SY	289		
47	P-620-5.1a	Taxiway Pavement Marking with Reflective Beads (Yellow)	SF	87,900		
48	P-620-5.1b	Taxiway Pavement Marking with Reflective Beads (Black)	SF	113,400		
49	P-620-5.1c	Thermoplastic Surface Painted Runway Direction Signs	EA	18		
50	P-620-5.1d	Thermoplastic Surface Painted Apron Control Marking Signs	EA	2		
51	P-620-5.1e	Surface Preparation	SF	201,300		
52	P-620-5.1f	Temporary Taxiway Pavement Markings (Yellow)	SF	14,200		
53	P-620-5.1g	Temporary Taxiway Pavement Markings (Black)	SF	24,400		
54	P-620-5.1h	Temporary Taxiway Pavement Markings Removal	SF	4,700		
55	P-620-5.1i	Removal of Existing Pavement Marking	SF	1,500		

56	D-701-5.1	Install 6'x5' RCB (Class V) Open Cut, Complete in Place	LF	63		
57	D-701-5.2	Install 7'x5' RCB (Class V) Open Cut, Complete in Place	LF	65		
58	D-701-5.3	Install 8'x4' RCB (Class V) Open Cut, Complete in Place	LF	151		
59	D-701-5.4	Install 10'x7' RCB (Class V) Open Cut, Complete in Place	LF	28		
60	D-701-5.5	Install 24" CMP Open Cut, Complete in Place	LF	2,170		
61	D-752-5.1	Install Wingwall, Complete in Place	CY	1,130		
62	T-901-5.1	Hydroseeding	AC	61.0		
63	T-904-5.1	Sodding	SY	63,930		
64	L-108-5.1	No. 8 AWG, 5 kV, L-824, Type C Cable, Installed in Trench, Duct Bank or Conduit	LF	177,400		
65	L-108-5.2	No. 6 AWG, Solid, Bare Copper Counterpoise Wire, Installed in Trench, Above the Duct Bank or Conduit, Including Connections/Terminations	LF	3,000		
66	L-110-5.1	Flowable Fill Encased Electrical Conduit, 1W-2"C	LF	1,900		
67	L-110-5.2	Non-Encased Electrical Conduit, 1W-2"C	LF	150		
68	L-110-5.3	Concrete Encased Electrical Conduit, 1W-2"C	LF	1,150		
69	L-110-5.4	Concrete Encased Electrical Conduit, 1W-2"C with Saw Kerf Pavement Repair	LF	450		
70	L-110-5.5	Non-Encased Electrical Duct Bank, 16W-2"C	LF	225		
71	L-110-5.6	Non-Encased Electrical Duct Bank, 2W-2"C	LF	280		
72	L-110-5.7	Flowable Filll Encased Electrical Duct Bank, 2W-2"C	LF	650		
73	L-115-5.1	Existing Electrical Junction Structure/Manhole Adjusted to New Grade	EA	64		

74	L-115-5.2	4'x4'x4' Aircraft-Rated Handhole, Installed	EA	4		
75	L-115-5.3	L-868 Blank Cover with Spacers, Installed	EA	5		
76	L-125-5.1	L-852C/D(L) Taxiway Centerline Light, Installed on Adjusted Light Base	EA	754		
77	L-125-5.2	L-852C/D(L) Taxiway Centerline Light, Installed on Existing Light Base	EA	442		
78	L-125-5.3	L-861T(L) Base Mounted Taxiway Edge Light, Installed on Adjusted Light Base	EA	407		
79	L-125-5.4	L-861T(L) Base Mounted Taxiway Edge Light, Installed on Existing Light Base	EA	88		
80	L-125-5.5	L-858(L) Base Mounted Guidance Sign, Installed	EA	28		
81	L-125-5.6	L-852C/D(L) Taxiway Centerline Light, Installed on New Light Base	EA	38		
82	L-125-5.7	L-852G(L) In-Pavement Runway Guard Light, Installed	EA	62		
83	L-125-5.8	L-861T(L) Base Mounted Taxiway Edge Light, Installed on New Base in Existing Pavement	EA	18		
84	L-125-5.9	L-861T(L) Base Mounted Taxiway Edge Light, Installed on New Base in New Pavement	EA	23		
85	L-125-5.10	L-852C/D(L) Taxiway Centerline Light, Installed on New Base in Existing Pavement	EA	18		
86	L-125-5.11	Update Sign Legend	EA	1		
86A	L-125-5.12	L-852C/D(L) Taxiway Centerline Light, Installed on New Base in Existing Pavement with Mill and Overlay	EA	18		
87	02378-4.1	Riprap Gradation No. 1, including Topsoil	TON	230		
TOTAL BASE UNIT PRICES						$_____

C. EXTRA UNIT PRICE TABLE: N/A

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D. CASH ALLOWANCE TABLE:

Item No.	Spec Ref.	Cash Allowance Short Title	Cash Allowance in figures (1)
	01210	Cash Allowance Item 1 – Building Permit, Additional Flaggers, Barricades, Site Conditions and specific safety conditions improvements	$600,000
	01210	Cash Allowance Item 2 – Clean Air Incentive	$200,000
	01210	Cash Allowance Item 3 – Duct Bank and Telecommunication Cable Relocation	$200,000
TOTAL CASH ALLOWANCES			$1,000,000

(1) Fixed Unit Price determined prior to Bid. Cannot be adjusted by the Bidder.

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E. ALTERNATES TABLE: N/A

Item No.	Spec Ref.	Base Unit Short Title	Unit of Measure	Estimated Quantity	Unit Price (this column controls)	Total in figures
1	P-101-5.2	Asphalt Milling (2" and Variable Depth)	SY	565		
2	P-101-5.10	Concrete Pavement Removal (14”-20” Depth)	SY	445		
3	P-401-8.1	Bituminous Surface Course	TON	145		
4	P-501-8.4	Concrete Pavement Partial Depth Repair	SF	500		
5	P-501-8.5	Concrete Pavement Crack Repair	LF	500		
6	P-501-8.6	Concrete Pavement Crack Repair (Epoxy Injection)	LF	400		
7	P-501-8.7	14”-20" Portland Cement Concrete Pavement	SY	445		
8	P-501-8.8	Concrete Joint Seal Repair	LF	5,000		
9	P-620-5.1a	Taxiway Pavement Marking with Reflective Beads (Yellow)	SF	2,000		
10	P-620-5.1b	Taxiway Pavement Marking with Reflective Beads (Black)	SF	2,000		
11	P-620-5.1f	Temporary Taxiway Pavement Markings (Yellow)	SF	2,115		
12	P-620-5.1g	Temporary Taxiway Pavement Markings (Black)	SF	2,115		
13	P-620-5.1h	Temporary Taxiway Pavement Markings Removal	SF	4,230		
14	SS-310-5.3	Temporary Airfield Lighting (Additive Alternate 1)	LS	1		
TOTAL BASE UNIT PRICES						$_____

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F. TOTAL BID PRICE: **$**_____
(Add Totals for Stipulated Price, Base Unit Price, Extra Unit Price, Cash Allowance, and All Alternates, if any)

2.0 SIGNATURES: By signing this Document, I agree that I have received and reviewed all Addenda and considered all costs associated with the Addenda in calculating the Total Bid Price.

Bidder: _____
(Print or type full name of your proprietorship, partnership, corporation, or joint venture.*)

**By: _____
Signature Date

Name: _____
(Print or type name) Title

Address: _____
(Mailing)

_____
(Street, if different)

Telephone and Fax Number: _____
(Print or type numbers)

* If Bid is a joint venture, add additional Bid Form signature sheets for each member of the joint venture.

** Bidder certifies that the only person or parties interested in this offer as principals are those named above. Bidder has not directly or indirectly entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding.

Note: This document constitutes a government record, as defined by § 37.01 of the Texas Penal Code. Submission of a false government record is punishable as provided in § 37.10 of the Texas Penal Code.

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G01.02	INDEX OF SHEETS I
G01.03	INDEX OF SHEETS II
G01.04	SUMMARY OF QUANTITIES
G01.05	PROJECT SITE PLAN
G01.06	SURVEY CONTROL PLAN
G02.01	GENERAL CONTRACT, SAFETY, & SECURITY NOTES I
G02.02	GENERAL CONTRACT, SAFETY, & SECURITY NOTES II
G02.03	GENERAL CONTRACT, SAFETY, & SECURITY DETAILS I
G02.04	GENERAL CONTRACT, SAFETY, & SECURITY DETAILS II
G02.05	OVERALL PHASING PLAN
G02.06	PHASING PLAN – PHASE 1
G02.07	PHASING PLAN – PHASE 2
G02.08	PHASING PLAN – PHASE 3
G02.09	PHASING PLAN – PHASE 4 OVERVIEW
G02.10	PHASING PLAN – PHASE 4
G02.11	PHASING PLAN – PHASE 4 (CONT'D)
G02.12	PHASING PLAN – PHASE 5
G02.13	PHASING PLAN – PHASE 6
G02.14	PHASING PLAN – PHASE 7
G03.01	TEMPORARY MARKING, SIGNAGE AND LIGHTING PLAN – PHASE 1
G03.02	TEMPORARY MARKING, SIGNAGE AND LIGHTING PLAN – PHASES 2 & 3
G03.03	TEMPORARY MARKING, SIGNAGE AND LIGHTING PLAN – PHASE 3
G03.04	TEMPORARY MARKING, SIGNAGE AND LIGHTING PLAN – PHASE 4
G03.05	TEMPORARY MARKING, SIGNAGE AND LIGHTING PLAN – PHASE 5
G03.06	TEMPORARY MARKING, SIGNAGE AND LIGHTING PLAN – PHASE 5 (CONT'D)
G03.07	TEMPORARY MARKING, SIGNAGE AND LIGHTING PLAN – PHASE 6
G03.08	TEMPORARY MARKING, SIGNAGE AND LIGHTING PLAN – PHASE 6 (CONT'D)
G03.09	TEMPORARY MARKING, SIGNAGE AND LIGHTING PLAN – PHASE 7
G03.10	TEMPORARY MARKING, SIGNAGE AND LIGHTING PLAN – PHASE 7 (CONT'D)
G04.00	ADDITIVE ALTERNATE 1 PHASING PLAN – OVERALL HAUL ROUTES
G04.01	ADDITIVE ALTERNATE 1 PHASING PLAN – PAVEMENT REHAB 1
G04.02	ADDITIVE ALTERNATE 1 PHASING PLAN – PAVEMENT REHAB 2
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G04.04	ADDITIVE ALTERNATE 1 PHASING PLAN – PAVEMENT REHAB 4
G04.05	ADDITIVE ALTERNATE 1 PHASING PLAN – PAVEMENT REHAB 5
G04.06	ADDITIVE ALTERNATE 1 PHASING PLAN – PAVEMENT REHAB 6
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C01.03	EXISTING CONDITIONS III
C01.04	EXISTING CONDITIONS IV
C01.05	EXISTING CONDITIONS V
C01.06	EXISTING CONDITIONS VI
C01.07	EXISTING CONDITIONS VII
C01.08	EXISTING CONDITIONS VIII
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C02.05	DEMOLITION PLAN V
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C02.07	DEMOLITION PLAN VII
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C02.10	DEMOLITION PLAN X
C02.11	DEMOLITION PLAN XI
C02.12	DEMOLITION PLAN XII
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C02.14	DEMOLITION POINT TABLES II
C02.15	DEMOLITION POINT TABLES III
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C03.02	TYPICAL SECTIONS II
C03.03	TYPICAL SECTIONS III
C03.04	TYPICAL SECTIONS IV
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C07.01	GRADING & DRAINAGE PLAN I
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C07.08	GRADING & DRAINAGE PLAN VIII
C07.09	GRADING & DRAINAGE PLAN IX
C07.10	GRADING & DRAINAGE PLAN X
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C07.19	DRAINAGE PROFILES V
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C07.22	DRAINAGE PROFILES VIII
C07.23	DRAINAGE PROFILES IX
C07.24	DRAINAGE PROFILES X
C07.25	DRAINAGE DETAILS I
C07.26	DRAINAGE DETAILS II
C07.26A	DRAINAGE DETAILS II.A
C07.27	DRAINAGE DETAILS III
C07.28	DRAINAGE DETAILS IV
C07.29	DRAINAGE DETAILS V
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C07.40	SINKHOLE DETAILS I
C07.41	SINKHOLE DETAILS II
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C08.11	TELECOMMUNICATIONS PLAN XI
C08.12	TELECOMMUNICATIONS PLAN XII

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 200
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 1	07/06/23	JEF
2	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

INDEX OF SHEETS I

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 1"
DATE:	07/24/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	G01.02

HAS FILE: C:\Users\dogranato\onedrive – garver\0646.2\01 – General\Sheet Files\0646G01.02.dwg
PLOT DATE: 3/10/2022 11:09:43 AM

BASE BID

ITEM NO.	SPEC. NO.	DESCRIPTION	UNIT	ESTIMATED QUANTITY
	01210	Cash Allowances	LS	1
1	01555-1.04A	Traffic Control and Regulation, Excluding Flagmen	LS	1
2	01555-1.04B	Flagmen	LS	1
3	SS-130-4.1	Trench and Excavation Safety Systems	LF	85
4	SS-300-5.1	Lockout/Tagout and Constant Current Regulator Calibration Procedures	LS	1
4A	***SS-300-5.2***	***Removal/Repair of Broken Bolt, in Place***	***EA***	***235***
4B	***SS-300-5.3***	***Retrofit Ground Lug to Existing Can, Installed***	***EA***	***235***
5	SS-301-5.1	Existing Base Mounted Edge Light, Removed	EA	***495***
6	SS-301-5.2	Existing In-Pavement Centerline Light, Removed	EA	456
7	SS-301-5.3	Existing Base Mounted Guidance Sign, Removed	EA	28
8	SS-301-5.4	Existing Base Mounted Edge Light, Removed, Base Top Section, Removed	EA	***50***
9	SS-301-5.5	Existing In-Pavement Centerline Light, Removed, Base Top Section, Removed	EA	754
10	SS-301-5.6	Existing L-852G Runway Guard Light, Relocated on New Base	EA	5
11	SS-301-5.7	Abandoned Sign Foundation, Demolished	EA	2
11A	***SS-301-5.8***	***Existing Electrical Conduit, 1-Way 2"C, Cleared***	***LF***	***10,000***
11B	***SS-301-5.9***	***Existing Electrical Conduit, 1-Way 4"C, Cleared***	***LF***	***10,000***
12	SS-305-5.1	Directional Boring, 16-Way 2"C Polyethylene Conduits	LF	1,350
13	SS-310-5.1	Temporary Airfield Lighting	LS	1
14	SS-310-5.2	Mobile Photometric Testing	LS	1
15	C-100-14.1	Contractor Quality Control Program (CQCP)	LS	1
16	C-102-5.1a	Filter Dam Type II	LF	60
17	C-102-5.1b	Reinforced Silt Fence	LF	24,112
18	C-105-6.1	Mobilization	LS	1
19	P-101-5.1	Asphalt Milling (1" and Variable Depth)	SY	66,760
20	P-101-5.2	Asphalt Milling (2" and Variable Depth)	SY	204,600
21	P-101-5.3	Asphalt Milling (5" and Variable Depth)	SY	45,370
22	P-101-5.4	Full-Depth Asphalt Shoulder Removal	SY	4,920
23	P-101-5.5	Concrete Pavement Removal (12"-15" Depth)	SY	550
24	P-101-5.6	Remove and Dispose 24" CMP	LF	625
25	P-101-5.7	Concrete Slope Paving Removal and Disposal	SY	***9,218***
26	P-101-5.8	Concrete Headwall Removal	EA	10
27	P-101-5.9	Asphalt Crack Repair	LF	140,000
28	P-152-4.1	Unclassified Excavation	CY	***315,280***
29	P-209-5.1	6" Crushed Aggregate Base Course	SY	***16,010***
30	P-209-5.2	15" Crushed Aggregate Base Course	SY	81,360
31	P-209-5.3	Aggregate Base Course (Slope Stabilization)	CY	1,343
32	P-209-5.4	Separation Geotextile (Slope Stabilization)	SY	***16,106***
33	P-209-5.5	Geogrid (Slope Stabilization)	SY	***2,618***
34	P-304-8.1	6" Cement-Treated Base Course	SY	12,620
35	P-307-7.1	6" Cement Treated Permeable Base	CY	350

BASE BID (CONT'D)

ITEM NO.	SPEC. NO.	DESCRIPTION	UNIT	ESTIMATED QUANTITY
36	P-401-8.1	Bituminous Surface Course	TON	40,230
37	P-403-8.1	Bituminous Base Course	TON	40,750
38	P-501-8.1	10" Portland Cement Concrete Pavement	SY	410
39	P-501-8.2	12"-15" Portland Cement Concrete Pavement	SY	550
40	P-501-8.3	15" Portland Cement Concrete Pavement	SY	12,240
41	P-501-8.4	Concrete Pavement Partial Depth Repair	SF	2,000
42	P-501-8.5	Concrete Pavement Crack Repair	LF	3,000
43	P-610-6.1	Concrete Slope Paving	SY	***14,904***
44	P-610-6.2	Modify Curb Opening	EA	***61***
45	P-610-6.3	Concrete Pilot Channel	SY	***11,490***
46	P-610-6.4	Interceptor Structure	SY	***289***
47	P-620-5.1a	Taxiway Pavement Marking with Reflective Beads (Yellow)	SF	87,900
48	P-620-5.1b	Taxiway Pavement Marking with Reflective Beads (Black)	SF	113,400
49	P-620-5.1c	Thermoplastic Surface Painted Runway Direction Signs	EA	18
50	P-620-5.1d	Thermoplastic Surface Painted Apron Control Marking Signs	EA	2
51	P-620-5.1e	Surface Preparation	SF	201,300
52	P-620-5.1f	Temporary Taxiway Pavement Markings (Yellow)	SF	14,200
53	P-620-5.1g	Temporary Taxiway Pavement Markings (Black)	SF	24,400
54	P-620-5.1h	Temporary Taxiway Pavement Markings Removal	SF	4,700
55	P-620-5.1i	Removal of Existing Pavement Marking	SF	1,500
56	D-701-5.1	Install 6'x5' RCB (Class V) Open Cut, Complete in Place	LF	63
57	D-701-5.2	Install 7'x5' RCB (Class V) Open Cut, Complete in Place	LF	65
58	D-701-5.3	Install 8'x4' RCB (Class V) Open Cut, Complete in Place	LF	151
59	D-701-5.4	Install 10'x7' RCB (Class V) Open Cut, Complete in Place	LF	28
60	D-701-5.5	Install 24" CMP Open Cut, Complete in Place	LF	2,170
61	D-752-5.1	Install Wingwall, Complete in Place	CY	***1,130***
62	T-901-5.1	Hydroseeding	AC	61.0
63	T-904-5.1	Sodding	SY	63,930
64	L-108-5.1	No. 8 AWG, 5 kV, L-824, Type C Cable, Installed in Trench, Duct Bank or Conduit	LF	177,400
65	L-108-5.2	No. 6 AWG, Solid, Bare Copper Counterpoise Wire, Installed in Trench, Above the Duct Bank or Conduit, Including Connections/Terminations	LF	3,000
66	L-110-5.1	Flowable Fill Encased Electrical Conduit, 1W-2"C	LF	1,900
67	L-110-5.2	Non-Encased Electrical Conduit, 1W-2"C	LF	150
68	L-110-5.3	Concrete Encased Electrical Conduit, 1W-2"C	LF	1,150
69	L-110-5.4	Concrete Encased Electrical Conduit, 1W-2"C with Saw Kerf Pavement Repair	LF	450
70	L-110-5.5	Non-Encased Electrical Duct Bank, 16W-2"C	LF	225
71	L-110-5.6	Non-Encased Electrical Duct Bank, 2W-2"C	LF	280
72	L-110-5.7	Flowable Filll Encased Electrical Duct Bank, 2W-2"C	LF	650

BASE BID (CONT'D)

ITEM NO.	SPEC. NO.	DESCRIPTION	UNIT	ESTIMATED QUANTITY
73	L-115-5.1	Existing Electrical Junction Structure/Manhole Adjusted to New Grade	EA	***64***
74	L-115-5.2	4'x4'x4' Aircraft-Rated Handhole, Installed	EA	4
75	L-115-5.3	L-868 Blank Cover with Spacers, Installed	EA	5
76	L-125-5.1	L-852C/D(L) Taxiway Centerline Light, Installed on Adjusted Light Base	EA	754
77	L-125-5.2	L-852C/D(L) Taxiway Centerline Light, Installed on Existing Light Base	EA	442
78	L-125-5.3	L-861T(L) Base Mounted Taxiway Edge Light, Installed on Adjusted Light Base	EA	407
79	L-125-5.4	L-861T(L) Base Mounted Taxiway Edge Light, Installed on Existing Light Base	EA	88
80	L-125-5.5	L-858(L) Base Mounted Guidance Sign, Installed	EA	28
81	L-125-5.6	L-852C/D(L) Taxiway Centerline Light, Installed on New Light Base	EA	***38***
82	L-125-5.7	L-852G(L) In-Pavement Runway Guard Light, Installed	EA	62
83	L-125-5.8	L-861T(L) Base Mounted Taxiway Edge Light, Installed on New Base in Existing Pavement	EA	18
84	L-125-5.9	L-861T(L) Base Mounted Taxiway Edge Light, Installed on New Base in New Pavement	EA	23
85	L-125-5.10	L-852C/D(L) Taxiway Centerline Light, Installed on New Base in Existing Pavement	EA	18
86	L-125-5.11	Update Sign Legend	EA	1
86A	***L-125-5.12***	***L-852C/D(L) Taxiway Centerline Light, Installed on New Base in Existing Pavement with Mill and***	***EA***	***18***
87	02378-4.1	Riprap Gradation No. 1, including Topsoil	TON	***230***

ADDITIVE ALTERNATE #1

ITEM NO.	SPEC. NO.	DESCRIPTION	UNIT	ESTIMATED QUANTITY
1	P-101-5.2	Asphalt Milling (2" and Variable Depth)	SY	565
2	P-101-5.10	Concrete Pavement Removal (14"-20" Depth)	SY	445
3	P-401-8.1	Bituminous Surface Course	TON	145
4	P-501-8.4	Concrete Pavement Partial Depth Repair	SF	500
5	P-501-8.5	Concrete Pavement Crack Repair	LF	500
6	P-501-8.6	Concrete Pavement Crack Repair (Epoxy Injection)	LF	400
7	P-501-8.7	14"-20" Portland Cement Concrete Pavement	SY	445
8	P-501-8.8	Concrete Joint Seal Repair	LF	5,000
9	P-620-5.1a	Taxiway Pavement Marking with Reflective Beads (Yellow)	SF	2,000
10	P-620-5.1b	Taxiway Pavement Marking with Reflective Beads (Black)	SF	2,000
11	P-620-5.1f	Temporary Taxiway Pavement Markings (Yellow)	SF	2,115
12	P-620-5.1g	Temporary Taxiway Pavement Markings (Black)	SF	2,115
13	P-620-5.1h	Temporary Taxiway Pavement Markings Removal	SF	4,230
14	***SS-310-5.3***	***Temporary Airfield Lighting (Additive Alternate 1)***	***LS***	***1***

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 200
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 1	07/06/23	JEF
2	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SUMMARY OF QUANTITIES

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 1"
DATE:	07/24/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO. 0646A
A.I.P. NO. XXXX
C.I.P. NO. A-0515
H.A.S. NO. 20C0646A
SHEET NO. **G01.04**

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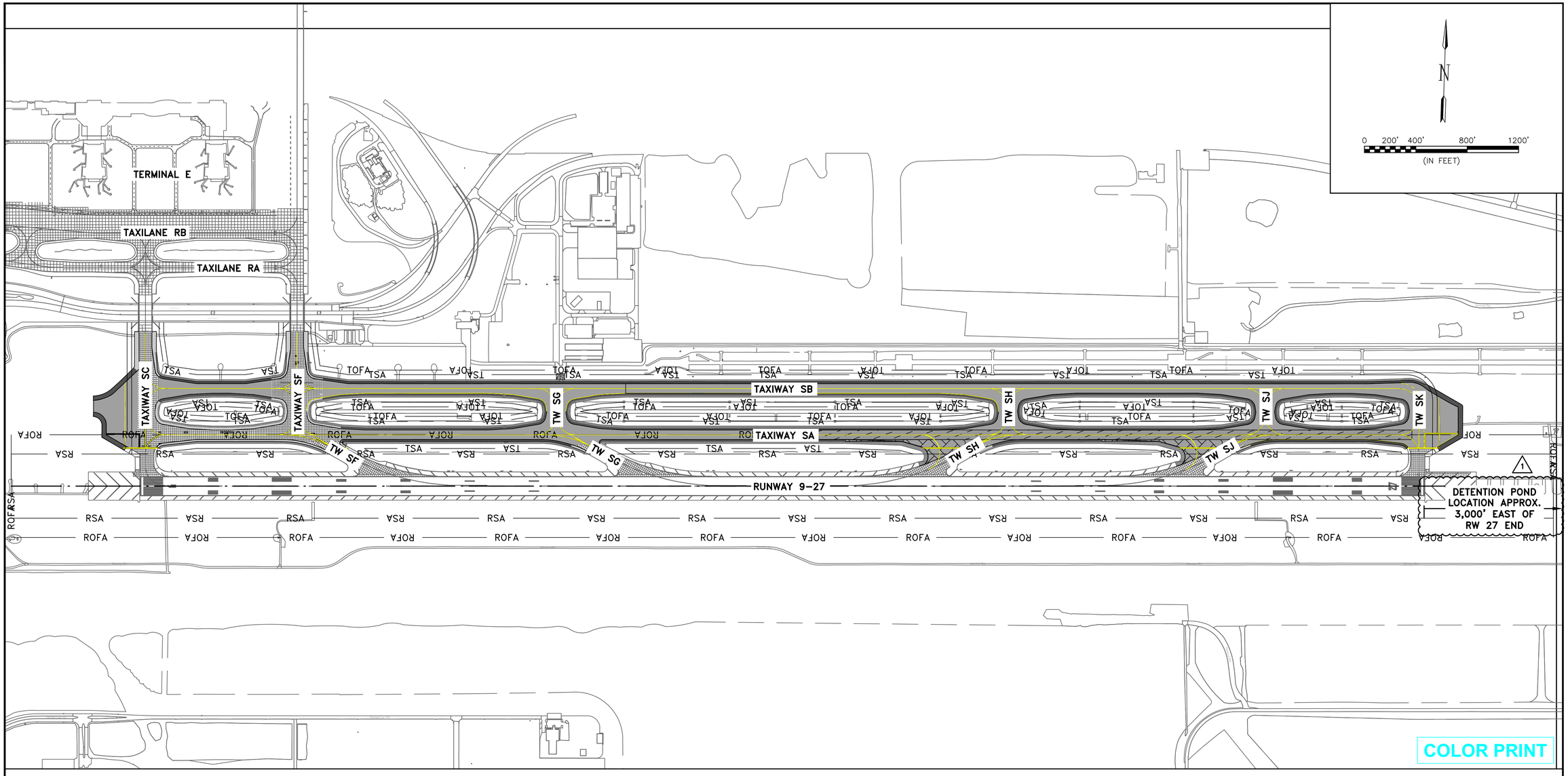

LEGEND

- PROPOSED TAXIWAY MILL (2") & OVERLAY (3")
- PROPOSED TAXIWAY MILL (5") & OVERLAY (6")
- PROPOSED SHOULDER MILL (1") & OVERLAY (2")
- PROPOSED SHOULDER WIDENING
- PROPOSED CONCRETE SLAB REPLACEMENT (12"–15")
- PROPOSED FULL DEPTH CONCRETE SECTION
- — RSA — RUNWAY SAFETY AREA
- – ROFA – RUNWAY OBJECT FREE AREA
- — TSA — TAXIWAY SAFETY AREA
- – TOFA – TAXIWAY OBJECT FREE AREA

NOTES:

1. THE CONTRACTOR ACCESS AND HAUL ROUTE SHALL BE AS LAID OUT IN THE OVERALL PHASING PLAN (SEE SHEET G02.04)
2. THE CONTRACTOR MUST ADHERE TO THE GENERAL CONTRACT, SAFETY, & SECURITY NOTES ON SHEETS G02.01–G02.02.
3. UNDERGROUND UTILITIES EXIST WITHIN AND ADJACENT TO THE LIMITS OF CONSTRUCTION. AN ATTEMPT HAS BEEN MADE TO LOCATE THESE UTILITIES ON THE PLANS. ALL EXISTING UTILITIES MAY NOT BE SHOWN ON THE PLANS, AND THE LOCATION OF THE UTILITIES SHOWN MAY VARY FROM THE LOCATION SHOWN ON THE PLANS. PRIOR TO BEGINNING ANY TYPE OF EXCAVATION, THE CONTRACTOR SHALL CONTACT AIRPORT MAINTENANCE AND LOCAL UTILITY TO MAKE ARRANGEMENTS FOR THE LOCATION OF THE UTILITY ON THE GROUND. THE CONTRACTOR SHALL MAINTAIN THE UTILITY LOCATION MARKINGS UNTIL THEY ARE NO LONGER NECESSARY.

ITEMS OF WORK

BASE BID:

1. 2" VARIABLE MILL AND 3" VARIABLE OVERLAY OF THE EXISTING ASPHALT TAXIWAY PAVEMENT.
2. 5" VARIABLE MILL AND 6" VARIABLE OVERLAY OF THE EXISTING ASPHALT TAXIWAY PAVEMENT.
3. 1" MILL AND 2" OVERLAY OF THE EXISTING ASPHALT SHOULDER PAVEMENT.
4. FULL DEPTH ASPHALT CONSTRUCTION FOR ASPHALT SHOULDER WIDENING.
5. CONCRETE PANEL REPLACEMENT OF IDENTIFIED TAXIWAY SLABS.
6. CONSTRUCTION OF FULL DEPTH CONCRETE PAVEMENT FOR FILLET EXPANSION.
7. CONCRETE CRACKS AND PARTIAL DEPTH REPAIRS AS IDENTIFIED/MARKED BY CONTRACTOR AND APPROVED/DIRECTED BY THE RPR.
8. REPLACEMENT OF TAXIWAY EDGE AND CENTERLINE LIGHTS.
9. REPLACEMENT OF ELECTRICAL CABLES.
10. INSTALLATION OF NEW AIRFIELD GUIDANCE SIGNS.
11. DRAINAGE IMPROVEMENTS TO ACCOMMODATE WIDENED SHOULDERS.
12. EXPAND EXISTING DITCH P DETENTION POND. DETENTION POND LOCATION IS EAST OF RUNWAY 27 END.

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KEYMAP

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HOUSTON AIRPORTS

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12141 Wickchester Lane
Suite 200
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REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

PROJECT SITE PLAN

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 400'
DATE:	07/24/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	G01.05

GARVER
TBPE Registration No. F-5713

AIRPORT SAFETY REQUIREMENTS

1. THE CONTRACTOR SHALL ACQUAINT HIS SUPERVISORS AND EMPLOYEES WITH THE AIRPORT ACTIVITY AND OPERATIONS THAT ARE INHERENT TO THIS ACTIVE AIR CARRIER AIRPORT AND SHALL CONDUCT THE CONSTRUCTION ACTIVITIES TO CONFORM TO ALL ROUTINE AND EMERGENCY AIR TRAFFIC REQUIREMENTS AND GUIDELINES ON SAFETY AND SECURITY AS SPECIFIED HEREIN.

2. ALL CONTRACTOR VEHICLES THAT ARE AUTHORIZED TO OPERATE ON THE AIRPORT IN THE ACTIVE AIRPORT OPERATIONS AREA (AOA) SHALL DISPLAY IN FULL VIEW A FLASHING YELLOW BEACON, AND ABOVE THE VEHICLE, A 3' X 3' OR LARGER, ORANGE AND WHITE CHECKERBOARD FLAG, EACH CHECKERBOARD COLOR BEING 1–FOOT SQUARE, (SEE FAA AC 150/5210–5D) AND ESCORTED UNDER THE CONTROL OF AN AUTHORIZED CONTRACTOR ESCORT. CONTRACTOR VEHCILES OPERATING ON ACTIVE PAVEMENTS IN THE MOVEMENT AREA SHALL BE UNDER THE CONTROL OF A GEORGE BUSH INTERCONTINENTAL (IAH) AIRPORT OPERATIONS ESCORT. CONTRACTOR SHALL COORDINATE A MINIMUM OF 48 HOURS IN ADVANCE TO REQUEST AN IAH AIRPORT OPERATIONS ESCORT. ANY VEHICLE OPERATING IN THE ACTIVE AOA DURING THE HOURS OF DARKNESS SHALL BE EQUIPPED WITH A FLASHING YELLOW BEACON, MOUNTED ON TOP OF THE VEHICLE AND OF SUCH INTENSITY TO CONFORM TO LOCAL CODES FOR MAINTENANCE AND EMERGENCY VEHICLES. ALL EQUIPMENT REQUIRED TO REMAIN WITHIN THE AOA DURING THE PERFORMANCE OF THIS CONTRACT SHALL BE EQUIPPED WITH YELLOW BEACONS.

3. ALL AOA CONSTRUCTION VEHICLES SHALL BE OPERATED BY A BADGED EMPLOYEE WITH DRIVING PRIVILEGES OR BE ESCORTED BY A VEHICLE OPERATED BY A BADGED EMPLOYEE WITH DRIVING AND ESCORT PRIVILEGES WHEN ENTERING THE AOA. ALL CONTRACTOR VEHICLES THAT ARE REQUIRED TO OPERATE ON OR ACROSS ACTIVE RUNWAYS, TAXIWAYS, TAXILANES, APRONS, CRITICAL NAVAIDS AREAS, AND RUNWAY APPROACH/DEPARTURE OR PROTECTION ZONES, SHALL DO SO UNDER THE DIRECT CONTROL OF AN IAH AIRPORT OPERATIONS ESCORT VEHICLE. WHILE IT IS PREFERRED THAT EACH CONSTRUCTION VEHICLE HAVE ITS OWN CONTRACTOR–PROVIDED ESCORT, A MAXIMUM OF 3 VEHICLES PER ESCORT AND 2 18–WHEEL TRUCKS PER ESCORT WILL BE ALLOWED. THE CONTRACTOR SHALL PROVIDE A MINIMUM OF TWO ESCORTS FOR ALL HAULING ACTIVITIES; A LEAD ESCORT NECESSARY TO MEET THE MINIMUM ESCORTING REQUIREMENTS AND A TRAILING ESCORT REQUIRED FOR MONITORING POTENTIAL FOD AT ALL TIMES. ALL VEHICLES AND OPERATORS SHALL BE APPROVED BY IAH AIRPORT. ALL VEHICLES SHALL BE MARKED AND LIGHTED AS DESCRIBED IN PARAGRAPH NO. 2 IN AIRPORT SAFETY REQUIREMENTS. ANYONE DRIVING ON ACTIVE MOVEMENT AREAS SHALL BE REQUIRED TO COMPLETE ENHANCED DRIVER TRAINING FROM IAH AIRSIDE OPERATIONS.

4. NO RUNWAY, TAXIWAY, TAXILANE, APRON, OR AIRPORT VEHICLE SERVICE ROAD (VSR) SHALL BE CLOSED WITHOUT WRITTEN APPROVAL OF IAH AIRPORT OPERATIONS THROUGH THE HOUSTON AIRPORT SYSTEM (HAS) PROJECT MANAGER. TO ENABLE NECESSARY "NOTICES TO AIRMEN" (NOTAMS) OR ADVISORIES TO AIRPORT OPERATORS OR TENANTS, A MINIMUM OF 72 HOURS WRITTEN NOTICE REQUESTING CLOSURE SHALL BE DIRECTED TO IAH AIRPORT OPERATIONS. PLEASE NOTE THAT RUNWAY CLOSURES SHALL BE MINIMIZED. 1

5. ANY CONSTRUCTION ACTIVITY WITHIN 250 FEET OF AN ACTIVE RUNWAY CENTERLINE OR 142.5 FEET AN ACTIVE TAXIWAY CENTERLINE, OR OPEN EXCAVATIONS IN EXCESS OF THREE INCHES DEEP AND SLOPES GREATER THAN 5% WITHIN THE ABOVE AREAS, WILL REQUIRE CLOSURE OF THE AFFECTED RUNWAY, TAXIWAY OR TAXILANE, UNLESS OTHERWISE APPROVED BY IAH AIRPORT OPERATIONS THROUGH THE HAS PROJECT MANAGER. CLOSURE REQUIRES THE SAME PROVISIONS AS PARAGRAPH NO. 4 IN AIRPORT SAFETY REQUIREMENTS.

6. DEBRIS, WASTE, AND LOOSE MATERIAL CAPABLE OF CAUSING DAMAGE TO AIRCRAFT LANDING GEARS, PROPELLERS, OR BEING INGESTED INTO JET ENGINES, SHALL NOT BE ALLOWED IN THE AOA. IF THESE MATERIALS ARE OBSERVED TO BE IN THE AOA, THEY SHALL BE REMOVED IMMEDIATELY AND/OR CONTINUOUSLY BY THE CONTRACTOR DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE A MINIMUM OF 2 VACUUM TRUCKS AT ALL TIMES DURING THIS CONTRACT AND SHALL PROVIDE A VACUUM TRUCK BEHIND ALL HAULING OPERATIONS TO AND FROM THE INDIVIDUAL WORK AREAS AT ALL TIMES. THE CONTRACTOR SHALL PROVIDE A VACUUM TRUCK AT ALL ACTIVE CROSSINGS USING CONTRACTOR FLAGGERS AS WELL AS AN ADDITIONAL BACKUP VACUUM TRUCK.

7. THE CONTRACTOR WILL ARRANGE WITH IAH AIRPORT OPERATIONS THROUGH THE HAS PROJECT MANAGER FOR INSPECTION PRIOR TO REOPENING FOR AIRCRAFT USE OF ANY RUNWAY, TAXIWAY OR TAXILANE THAT HAS BEEN CLOSED FOR CONSTRUCTION, ON OR ADJACENT THERETO, OR THAT HAS BEEN USED FOR A CROSSING POINT OR HAUL ROUTE BY THE CONTRACTOR. THE CONTRACTOR SHALL PERFORM PRE– AND POST–INSPECTIONS ON A DAILY BASIS AND PROVIDE A WRITTEN CHECKLIST TO THE HAS CONSTRUCTION MANAGER AND IAH AIRPORT OPERATIONS DOCUMENTING FOD INSPECTION AND CLEAN–UP, SECURITY, SAFETY AND OBJECT FREE AREA INSPECTIONS, AND SIGNAGE, LIGHTING, BARRICADE PLACEMENT AND OPERATIONS, AND VERIFY ALL BARRICADES ARE SECURED FROM MOVEMENT, THROUGHOUT THE DURATION OF THIS CONTRACT. ANY UNSAFE CONDITIONS SHALL BE CORRECTED IMMEDIATELY BY THE CONTRACTOR IN ACCORDANCE WITH THE CONTRACT.

8. THE CONTRACTOR IS DIRECTED TO COMPLY WITH AND ACQUAINT THEIR EMPLOYEES WITH THE FOLLOWING SAFETY GUIDELINES, RELATED MATERIALS, AND FAA ADVISORY CIRCULARS:

   • 150/5200–18C, OR LATEST EDITION, "AIRPORT SAFETY – SELF INSPECTION"
   • 150/5210–5D, OR LATEST EDITION, "PAINTING, MARKING & LIGHTING OF VEHICLES USED ON AN AIRPORT"
   • 150/5370–2G, OR LATEST EDITION, "OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION"

   THESE DOCUMENTS AND RELATED REQUIREMENTS ARE REFERENCED THROUGHOUT THE CONTRACT SPECIFICATIONS.

9. THE CONTRACTOR IS HEREBY INFORMED THAT THERE ARE INSTALLED ON THE AIRPORT FAA NAVAIDS, NATIONAL WEATHER SERVICE FACILITIES; AIRFIELD LIGHTING SYSTEMS; ELECTRIC CABLES AND CONTROLS RELATING TO SUCH NAVAIDS AND FACILITIES. SUCH NAVAIDS, NATIONAL WEATHER SERVICE AND OTHER FACILITIES, AND ELECTRIC CABLES MUST BE FULLY PROTECTED DURING THE ENTIRE CONSTRUCTION CONTRACT. WORK UNDER THIS CONTRACT CAN BE ACCOMPLISHED IN THE VICINITY OF THESE FACILITIES AND CABLES ONLY AT APPROVED PERIODS OF TIME.

10. APPROVAL IS SUBJECT TO WITHDRAWAL AT ANY TIME BECAUSE OF CHANGE IN THE WEATHER, EMERGENCY CONDITIONS ON THE EXISTING AIRFIELD AREAS, ANTICIPATION OF EMERGENCY CONDITIONS, AND FOR ANY OTHER REASON DETERMINED BY IAH AIRPORT OPERATIONS ACTING UNDER THE ORDERS AND INSTRUCTIONS OF THE OWNER AND THE DESIGNATED FAA REPRESENTATIVE. ANY INSTRUCTIONS TO THE CONTRACTOR TO CLEAR ANY GIVEN AREA, AT ANY TIME, BY IAH AIRPORT OPERATIONS, THE OWNER OR THE FAA CONTROL TOWER (BY RADIO OR OTHER MEANS) SHALL BE IMMEDIATELY EXECUTED. CONSTRUCTION WORK WILL COMMENCE IN THE CLEARED AREA ONLY WHEN ADDITIONAL INSTRUCTIONS ARE ISSUED BY THE OWNER.

11. POWER AND CONTROL CABLES LEADING TO AND FROM ANY FAA NAVAIDS, NATIONAL WEATHER SERVICE AND OTHER FACILITIES, WILL BE MARKED IN THE FIELD BY THE LOCAL FAA AIRWAY FACILITIES SECTOR PERSONNEL BEFORE ANY WORK IN THEIR GENERAL VICINITY IS STARTED BY THE CONTRACTOR. THEREAFTER, THROUGH THE ENTIRE TIME OF THIS CONSTRUCTION CONTRACT, THE CONTRACTOR SHALL NOT ALLOW ANY CONSTRUCTION EQUIPMENT TO CROSS THESE CABLES WITHOUT FIRST PROTECTING THE CABLE WITH STEEL PLATES, OR SIMILAR STRUCTURAL DEVICES, EXTENDING THREE (3') FEET ON EITHER SIDE OF THE MARKED CABLE ROUTE. ALL EXCAVATION WITHIN THREE (3') FEET OF EXISTING CABLES SHALL BE ACCOMPLISHED BY NON–INTRUSIVE EXCAVATION ONLY. HAS COMMUNICATION REPAIRS REQUIRE THE APPROVAL OF SHAWN SUSKI.

12. THE CONTRACTOR SHALL PROTECT FAA NAVAID, NATIONAL WEATHER SERVICE AND OTHER FACILITIES, AND CABLES AT ALL TIMES. ANY UNDERGROUND UTILITIES DISCOVERED DURING CONSTRUCTION NOT SHOWN ON THE PLANS SHALL BE REPORTED TO HAS PROJECT MANAGER AND IAH AIRPORT OPERATIONS IMMEDIATELY.

13. THE CONTRACTOR SHALL IMMEDIATELY REPAIR AT THEIR OWN EXPENSE, WITH IDENTICAL MATERIAL BY SKILLED EMPLOYEES, ANY UNDERGROUND CABLES SERVING FAA NAVAIDS, NATIONAL WEATHER SERVICE AND OTHER AIRPORT FACILITIES, WHICH ARE DAMAGED BY THEIR EMPLOYEES, EQUIPMENT, OR CONSTRUCTION ACTIVITIES. PRIOR APPROVAL OF THE FAA MUST BE OBTAINED FOR THE MATERIALS, EMPLOYEES, TIME OF DAY OR NIGHT, METHOD OF REPAIRS, AND FOR ANY TEMPORARY OR PERMANENT REPAIRS THE CONTRACTOR PROPOSES TO MAKE TO ANY FAA NAVAID OR FACILITIES DAMAGED BY THE CONTRACTOR. PRIOR APPROVAL OF THE ENGINEER MUST BE OBTAINED FOR THE MATERIALS, EMPLOYEES, TIME OF DAY OR NIGHT, AND FOR THE METHOD OF REPAIRS FOR ANY TEMPORARY OR PERMANENT REPAIRS THE CONTRACTOR PROPOSES TO MAKE TO ANY OTHER AIRPORT FACILITIES AND CABLES DAMAGED BY THE CONTRACTOR. SHOULD THE REPAIR REQUIRE SPLICING, IT SHALL BE SPLICED AT THE DISCRETION OF THE LOCAL FAA AIRWAY FACILITIES SECTOR MANAGER AS TO WHO SHALL PERFORM THE WORK. WHERE THE FAA PERFORMS THE WORK, IT SHALL BE AT THE CONTRACTOR'S EXPENSE. NO WORK SHALL BE BACKFILLED OR COVERED PRIOR TO APPROVAL BY THE FAA AIRWAY FACILITIES SECTOR MANAGER AND/OR HAS PROJECT MANAGER FOR IAH OWNED FACILITIES.

14. CONSTRUCTION DURING THE PROJECT MAY BE HALTED AT ANY TIME BY THE OWNER, AND/OR IAH AIRPORT OPERATIONS IF IT IS DETERMINED TO BE IN THE BEST INTEREST OF AIRPORT OPERATIONS SAFETY OR SECURITY. THE CONTRACTOR MAY BE DIRECTED TO REMOVE EQUIPMENT AND/OR EVACUATE THE SITE IN ORDER TO ENABLE AIRCRAFT OPERATIONS FOR COMMERCIAL OR GENERAL AVIATION. NECESSARY EXTENSIONS IN CONTRACT TIME WILL BE GRANTED OR A STOP WORK ORDER WILL BE ISSUED DUE TO THESE DELAYS. HOWEVER, THERE WILL BE NO ADJUSTMENTS IN CONTRACT PRICE DUE TO THESE DELAYS. IN ADDITION TO THE ABOVE, THE FOLLOWING SPECIAL REQUIREMENTS WILL APPLY FOR ALL CONSTRUCTION PHASES:

   A. A PRE–ACTIVITY MEETING SHALL BE HELD PRIOR TO THE START OF ANY PHASE, OR WHEN DEVIATIONS OR CHANGES FROM THE CONTRACT DOCUMENTS OCCUR, AND A DAILY SAFETY MEETING SHALL BE HELD PRIOR TO AND AT THE COMPLETION OF EACH WORK PERIOD, BETWEEN IAH AIRPORT OPERATIONS AND THE CONTRACTOR'S SUPERINTENDENT TO DISCUSS REQUIREMENTS FOR THE NEXT PHASE, WORK SHIFT OR WORK AREA. ANY WORK OR OPERATION, EITHER NEW OR OUT OF THE ORDINARY, SHALL REQUIRE A SAFETY/PRE–ACTIVITY MEETING.

   B. THE CONTRACTOR SHALL INCORPORATE A SAFETY PLAN SPECIFIC TO DAYTIME AND NIGHTTIME CONSTRUCTION OPERATIONS IN THE SAFETY PLAN COMPLIANCE DOCUMENT (SPCD), AS WELL AS A CONTINGENCY PLAN TO ADDRESS CASES OF ABNORMAL FAILURES OR UNEXPECTED SITUATIONS USING APPENDIX D OF AC 150/5370–2G AS A GUIDE.

   C. TRUCK HAUL ROUTES ON THE AIRFIELD SHALL BE DELINEATED WITH LIGHTED BARRICADES, SIGNAGE, OR OTHER MEANS APPROVED BY THE ENGINEER, HAS PROJECT MANAGER, AND IAH AIRPORT OPERATIONS TO CLEARLY MARK THE ROUTES TO THE WORK SITE. THE CONTRACTOR SHALL PARTICIPATE IN AN ENHANCED MOVEMENT AREA DRIVER TRAINING COURSE ADMINISTERED BY IAH AIRPORT OPERATIONS AND SHALL CONTINUOUSLY BRIEF ALL CONTRACTOR EMPLOYEES, SUPPLIERS, AND SUBCONTRACTORS ON THE HAUL ROUTES TO BE UTILZIED, BOTH PRIMARY AND ALTERNATE ROUTES, THROUGHOUT THE DURATION OF THIS CONTRACT.

15. THE CONTRACTOR SHALL ALSO SUBMIT A DESTRUCTIVE/INCLEMENT WEATHER PLAN TO SET FORTH GENERAL GUIDANCE AND INFORMATION FOR THE CONTRACTOR TO COORDINATE PREPAREDNESS PLANS WHEN DESTRUCTIVE/INCLEMENT WEATHER THREATENS THE GEORGE BUSH INTERCONTINENTAL AIRPORT ENVIRONMENT.

16. ALL COMMUNICATION WITH THE AIRPORT TRAFFIC CONTROL TOWER OR OTHER ELEMENTS OF THE AIRPORT SHALL BE THROUGH IAH AIRPORT OPERATIONS.

17. THE CONTRACTOR SHALL INSTALL ALL REQUIRED BARRICADES AT DESIGNATED PLAN LOCATIONS, HAVE ALL ACCESS GATES GUARDED AND LOCKABLE, AND HAVE ALL EQUIPMENT EITHER FLAGGED AND FITTED WITH FLASHING YELLOW DOME–TYPE LIGHTS ON TOP OF THE VEHICLES, AS REQUIRED FOR DAYTIME AND NIGHTTIME CONSTRUCTION ACTIVITIES. ALL OF THESE ITEMS SHALL BE INTEGRATED AS A PART OF THE SPCD. THE CONTRACTOR SHALL INSTALL THE COMPONENTS OF THE SPCD AT THE APPROPRIATE TIMES AS SPECIFIED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL INSPECT EVERY ASPECT OF THE SPCD ON AT LEAST A DAILY BASIS AND ENSURE ALL COMPONENTS ARE FUNCTIONING PROPERLY. IAH AIRPORT OPERATIONS SHALL ALSO INSPECT THE SYSTEM DAILY AND IF ANY DEFICIENCIES ARE NOTED, THE CONTRACTOR SHALL IMMEDIATELY TAKE STEPS TO CORRECT ANY AND ALL DEFICIENCIES. THE CONTRACTOR SHALL VISUALLY CHECK BARRICADE FLASHING LIGHTS ON A DAILY BASIS, 60 MINUTES BEFORE SUNSET FOR PROPER OPERATIONS. CONTRACTOR SHALL IMMEDIATELY REPLACE LIGHTS, BATTERIES, AND LAMPS AS DEEMED NECESSARY BY THE CONTRACTOR OR IAH AIRPORT OPERATIONS. THE SYSTEM ELEMENTS TO BE INSPECTED AND DEFICIENCIES NOTED ARE AS FOLLOWS:

   • BARRICADES SHALL BE ESTABLISHED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, SECURED FROM MOVEMENT AND FILLED WITH WATER. ALL FLASHING WARNING LIGHTS SHALL BE OPERATING PROPERLY.
   • ALL CONTRACTOR PERSONNEL AND EQUIPMENT ACCESS GATES STAFFED AND SECURITY PROCEDURES IN PLACE.
   • ALL EQUIPMENT OUTFITTED WITH FLASHING YELLOW DOME–TYPE LIGHTS, MARKINGS AND FLAGGING.
   • CONTRACTOR USE OF AUTHORIZED AIRPORT ACCESS GATES CHECKED.

   ANY OF THE ABOVE SAFETY AND SECURITY ITEMS FOUND TO BE DEFICIENT AT THE BEGINNING OF THE DAY BY IAH AIRPORT OPERATIONS STAFF WILL RESULT IN THAT DAY'S PRORATED SAFETY AND SECURITY BID ITEM LOST AND BEING DEDUCTED PERMANENTLY FROM THE CONTRACTOR'S EARNINGS. THE CONTRACTOR SHALL ENSURE ALL SAFETY AND SECURITY ITEMS ARE IN PROPER WORKING ORDER EACH DAY DUE TO THE HEIGHTENED SECURITY STATUS OF THE AIRPORT AND THE CONSIDERABLE LIABILITY ASSOCIATED WITH THE SAFETY AND SECURITY ELEMENTS REQUIRED FOR THE WORK.

18. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO ENSURE THE SAFETY OF OPERATING AIRCRAFT AS WELL AS THEIR OWN EQUIPMENT AND PERSONNEL. SPECIAL CONSIDERATIONS SHOULD BE GIVEN TO FLIGHT SCHEDULES AND MISCELLANEOUS AIRCRAFT OPERATIONS. THE CONTRACTOR SHALL OBEY ALL INSTRUCTIONS AS TO ROUTES TO BE TAKEN BY EQUIPMENT TRAVELING WITHIN THE AIRPORT OPERATIONS AREA AND KEEP SUCH VEHICLES AND EQUIPMENT MARKED WITH THE SPECIFIED AIRPORT SAFETY FLAGS, MARKINGS, AND FLASHING YELLOW BEACONS. THE CONTRACTOR SHALL MAKE HIS OWN ESTIMATE OF ALL DIFFICULTIES TO BE ENCOUNTERED. EQUIPMENT NOT ACTUALLY IN OPERATION SHALL BE KEPT CLEAR OF ALL AIRCRAFT OPERATING AREAS. PERSONNEL SHALL NOT ENTER AREAS OF THE AIRPORT WHERE AIRCRAFT ARE OPERATING WITHOUT SPECIFIC PERMISSION. ALL EQUIPMENT SHALL REMAIN CLEAR OF ALL ACTIVE SAFETY AND OBJECT FREE AREAS.

19. THE CONTRACTOR SHALL TAKE ALL STEPS TO PROTECT THE EXISTING RUNWAY, TAXIWAY AND TAXILANE LIGHTS, UNDERGROUND CABLES AS WELL AS ALL COMMERCIAL AND AIRPORT UTILITIES DURING CONSTRUCTION IN ORDER TO ENSURE CONTINUOUS OPERATION OF LIGHTS, NAVAIDS AND UTILITY SERVICES AT ALL TIMES.

20. MATERIALS STORED OR STOCKPILED ON THE AIRPORT SHALL BE SO PLACED AND THE WORK SHALL, AT ALL TIMES, BE SO CONDUCTED AS TO CAUSE NO GREATER OBSTRUCTION TO THE AIR AND GROUND TRAFFIC THAN IS CONSIDERED NECESSARY BY THE ENGINEER. STOCKPILED MATERIALS SHALL NOT BE STOCKPILED WITHIN THE RUNWAY SAFETY AREA (RSA), OBSTACLE FREE ZONE (OFZ) OR OBJECT FREE AREA (OFA) OF ANY OPERATIONAL RUNWAY, TAXIWAY OR TAXILANE. STOCKPILING MATERIAL OF ANY HEIGHT WITHIN THE AIRCRAFT OPERATIONS AREA (AOA) REQUIRES A 7460–1. IF APPROVED, STOCKPILED MATERIAL MUST BE PROPERLY MARKED AND LIGHTED AND PROTECTED FROM DISLODGEMENT BY WIND, JET BLAST, PROP WASH, OR OTHER FORCES.

21. THE CONTRACTOR SHALL ERECT AND MAINTAIN ALL NECESSARY BARRICADES, SIGNS, AND CAUTION LIGHTS FOR THE PROTECTION OF THE WORK AND THE SAFETY OF THE TRAVELING PUBLIC FOR BOTH VEHICULAR AND AIR TRAFFIC IN ACCORDANCE WITH THE SPECIFICATIONS (AC 150/5370–2G, OR LATEST EDITION) AND THE CSPP.

22. CLOSED RUNWAYS, TAXIWAYS OR TAXILANES SHALL BE BARRICADED OFF AT ALL INTERSECTIONS WITH ACTIVE RUNWAYS, TAXIWAYS OR TAXILANES. THE CONTRACTOR SHALL HAVE PERSONNEL ON CALL 24 HOURS PER DAY FOR EMERGENCY MAINTENANCE OF AIRPORT HAZARD LIGHTING AND BARRICADES.

23. IAH AIRPORT OPERATIONS AND THE HOUSTON AIRPORT SYSTEM (HAS) SHALL, AT ALL TIMES, HAVE COMPLETE JURISDICTION OVER THE SAFETY OF ALL AIRCRAFT OPERATIONS DURING THE WORK. WHEREVER THE SAFETY OF AIR TRAFFIC IS CONCERNED, THE DECISIONS OF THE AIRPORT DIRECTOR, OR DESIGNATED REPRESENTATIVE, SHALL BE FINAL AS TO METHODS, PROCEDURES AND MEASURES USED.

24. FOR ANY RESTRICTIONS TO AIRCRAFT OPERATIONS, HAS SHALL GIVE PROPER NOTICE TO THE NEAREST FAA FLIGHT SERVICE STATION PRIOR TO THE START OF WORK, AND FOR ANY SUBSEQUENT CHANGES NEEDED IN THE NOTAM WHICH MAY BE ISSUED DURING THE PERIOD OF WORK.

25. THE CONTRACTOR SHALL CONTACT THE FAA TECHNICAL OPERATIONS, TO PROVIDE FIELD LOCATIONS OF EXISTING FACILITY CABLES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NON–INTRUSIVE EXCAVATION TO LOCATE FAA CABLING, AND PROTECTION OF THOSE CABLES THROUGHOUT THE PROJECT.

26. UNDER NO CIRCUMSTANCES WILL THERE BE ANY MOVEMENT OF CONTRACTOR VEHICLES AND/OR EQUIPMENT ACROSS ANY ACTIVE AIRFIELD PAVEMENTS AT ANY TIME UNLESS UNDER ESCORT BY IAH AIRPORT OPERATIONS. FLAGGERS SHALL BE REQUIRED AT ALL ACTIVE TAXIWAY/TAXILANE CROSSINGS UNLESS THE TAXIWAY/TAXILANE IS CLOSED. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR BE PERMITTED TO CROSS ANY RUNWAY WITHOUT PRIOR APPROVAL AND UNDER ESCORT OF IAH AIRPORT OPERATIONS.

27. ALL PERSONNEL OPERATING A VEHICLE WITHIN THE AOA SHALL OBTAIN ALL NECESSARY SIDA, RAMP, NON–MOVEMENT AND MOVEMENT AIRFIELD DRIVER TRAINING AS REQUIRED BY IAH AIRPORT OPERATIONS PERSONNEL. CONTRACTOR WILL BE ISSUED SPECIFIC GATE ACCESS AND HAUL ROUTE CARDS IDENTIFYING THE APPROVED ACCESS LOCATIONS AND HAUL ROUTES.

28. THE CONTRACTOR SHALL CONFINE HIS PERSONNEL, EQUIPMENT, OPERATIONS AND TRAVEL TO THE AREA WITHIN THE DEFINED WORK LIMITS SHOWN ON THE PLANS. ALL EQUIPMENT NOT NECESSARY FOR OPERATION DURING NON–WORKING HOURS SHALL BE RELOCATED TO THE STORGAGE AND STAGING AREA.

29. THE CONTRACTOR SHALL INFORM ALL CONSTRUCTION PERSONNEL AS TO THE PROPER ROUTES, SPEEDS AND PROCEDURES FOR TRANSPORTING EQUIPMENT AND MATERIALS TO THE CONSTRUCTION SITE; AND ALL RESTRICTIONS TO MOVEMENT OF EQUIPMENT OR PERSONNEL WITHIN THE AIR OPERATIONS AREA. ALL PERSONNEL SHALL BE ADVISED OF ANY CHANGES IN AIRPORT OPERATIONS ON A DAILY BASIS, AND MORE OFTEN IF NECESSARY, THAT MAY FURTHER RESTRICT THEIR MOVEMENT.

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HOUSTON AIRPORTS

Jacobs
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WWW.JACOBS.COM
TEXAS P.E. FIRM F–2966

REVISIONS		
NO.	DESCRIPTION	DATE BY
1	ADD. 2	07/24/23 JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

GENERAL CONTRACT, SAFETY, & SECURITY NOTES I

PROJECT MGR:	DT
DESIGNER:	TM
DRAWN BY:	TM
CHECK BY:	DT
SCALE:	N/A
DATE:	07/24/2023

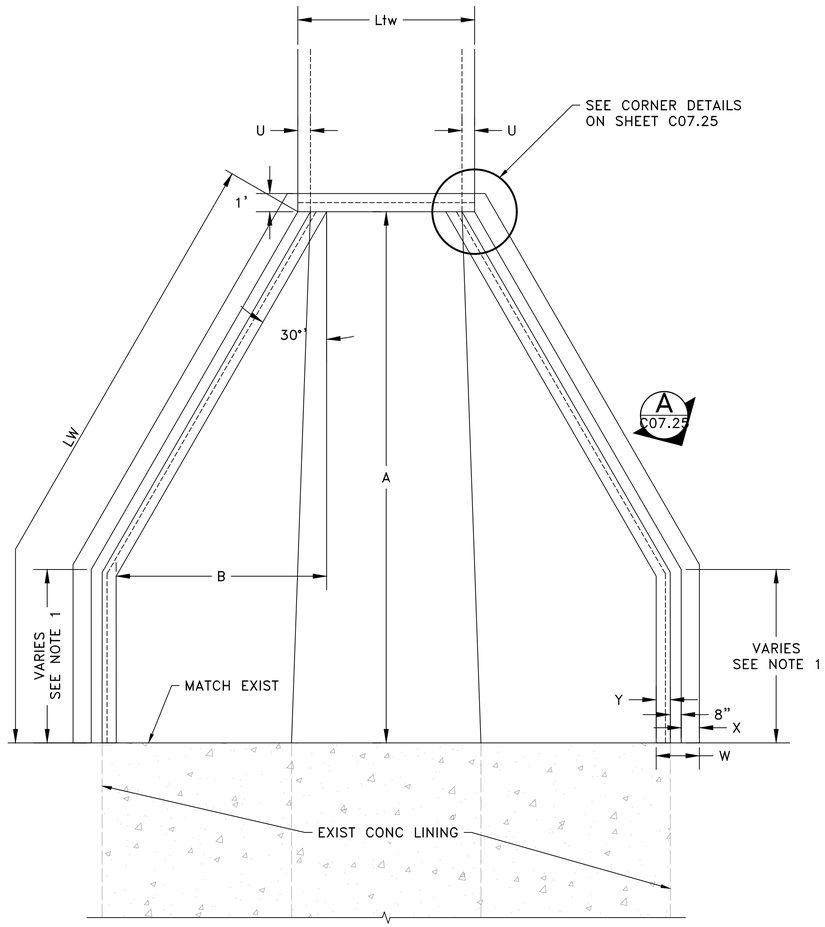
STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY:	JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

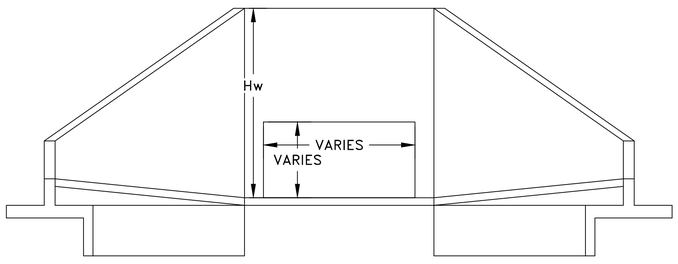
PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	G02.01

GARVER
TBPE Registration No. F-5713



1 C07.26 HEADWALL AND WINGWALL DETAIL PLAN

SCALE: NTS

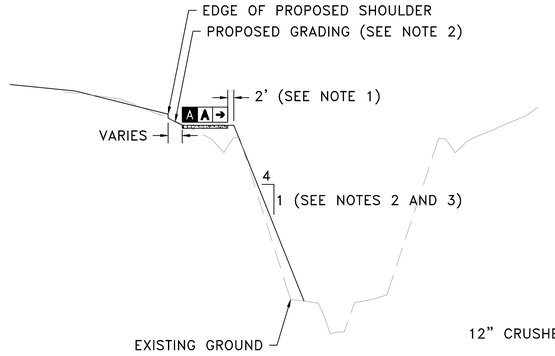


2 C07.26 HEADWALL AND WINGWALL DETAIL ELEVATION

SCALE: NTS

NOTES

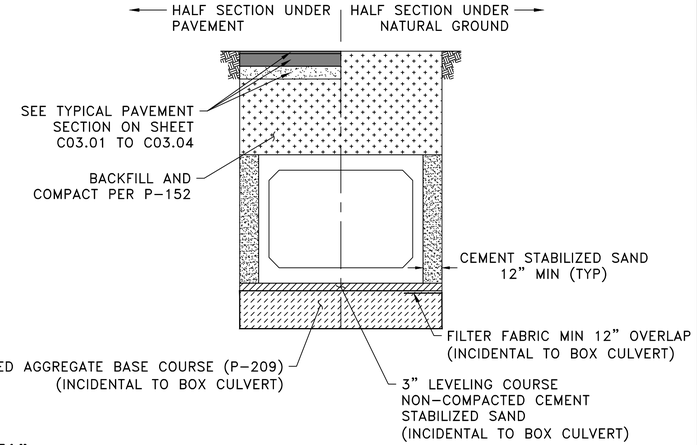
1. SEE WINGWALL LIMITS AND ELEVATIONS ON DRAINAGE PROFILES SHEETS C07.15 TO C07.24



3 C07.26 GRADING AROUND SIGN STRUCTURES DETAIL

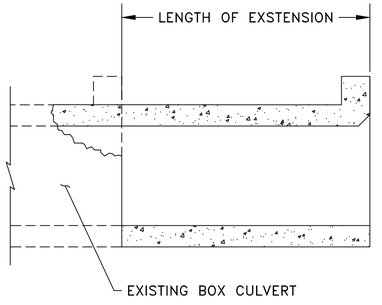
SCALE: NONE

1. MAINTAIN LEVEL GRADE 2-FEET AROUND SIGN BASE
2. IF WITHIN TSA, GRADE 1.5% TO 5% TO TSA
3. IF OUTSIDE OF TSA, GRADE 4:1 AND TIE-IN TO PROPOSED GROUND OR EXISTING GROUND.



4 C07.26 BOX CULVERT BEDDING DETAIL

SCALE: NTS

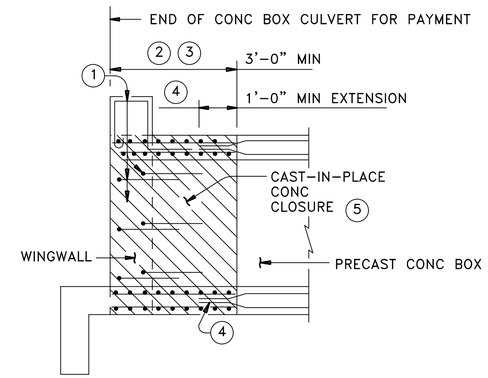


5 C07.26 BOX CULVERT LENGTHENING DETAIL

SCALE: NTS

NOTES

1. BREAK BACK THE TOP SLAB TO PROVIDE A 1'-10" MINIMUM LAP OF THE EXISTING LONGITUDINAL BARS WITH THE LONGITUDINAL BARS IN THE EXTENSION. BREAK BACK WINGS AND APRON AS NECESSARY TO INSTALL THE EXTENSION. CLEAN AND EXTEND THE EXPOSED WINGWALL AND APRON REINFORCING INTO THE EXTENSION.



6 C07.26 WINGWALL CONNECTION

SCALE: NTS

NOTES

1. EXTEND CURB, WINGWALL, OR SAFETY END TREATMENT REINFORCING INTO CONCRETE CLOSURE. BEND OR TRIM, AS NECESSARY, ANY REINFORCING THAT DOES NOT FIT INTO CLOSURE AREA.
2. PROVIDE A 3'-0" MIN CAST-IN-PLACE CONCRETE CLOSURE. BREAK BACK BOXES IN THE FIELD OR CAST BOXES SHORT. PROVIDE BANDS OF REINFORCING IN THE CLOSURE THAT ARE THE SAME SIZE AND SPACING AS IN THE PRECAST BOX SECTION. PROVIDE #4 LONGITUDINAL REINFORCEMENT SPACED AT 12 INCHES MAX WITHIN THE CLOSURE. EXCEPT WHERE SHOWN OTHERWISE, CONSTRUCT THE CAST-IN-PLACE CLOSURE FLUSH WITH THE INSIDE AND OUTSIDE FACES OF THE PRECAST BOX SECTION.
3. FOR MULTIPLE UNIT PLACEMENTS, ADJUST THE LENGTH OF THE CLOSURE FOR THE INTERIOR WALLS AS NECESSARY. PROVIDE A 3'-0" MIN CAST-IN-PLACE CLOSURE IN THE TOP SLAB, BOTTOM SLAB, AND EXTERIOR WALL. SEE SECTION B-B DETAIL WHEN INTERIOR WALLS ARE CAST FULL LENGTH.
4. EXTEND PRECAST BOX REINFORCING A MINIMUM OF 1'-0" INTO CONCRETE CLOSURE (TYP).
5. ANY ADDITIONAL CONCRETE AND REINFORCING REQUIRED FOR THE CLOSURES WILL BE CONSIDERED SUBSIDIARY TO THE BOX CULVERT FOR PAYMENT.

HOUSTON AIRPORTS

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TBPE FIRM No. F-14087

REVISIONS			
NO.	DESCRIPTION	DATE	BY
1	ADD. 2 REVISED AND ADDED DETAILS	07/24/23	NRP

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

DRAINAGE DETAILS II

PROJECT MGR:	NRP
DESIGNER:	HSC
DRAWN BY:	HSC
CHECK BY:	NRP
SCALE:	N/A
DATE:	07/24/2023

STATE OF TEXAS
NAWA RAJ PANTHI
103690
LICENSED
PROFESSIONAL ENGINEER
7/24/2023

APPROVED BY:	JEF
DIRECTOR HOUSTON AIRPORT SYSTEM	
PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	C07.26

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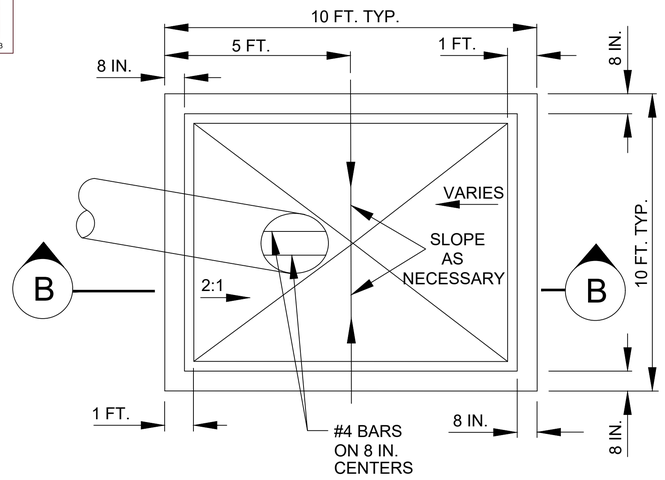
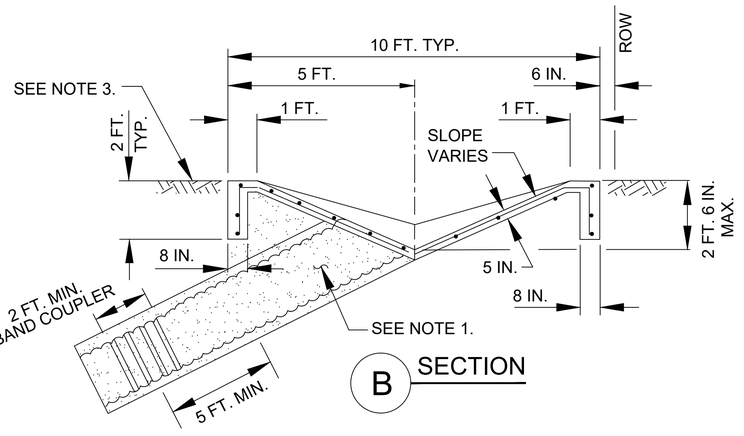
GARVER
TBPE Registration No. F-5713

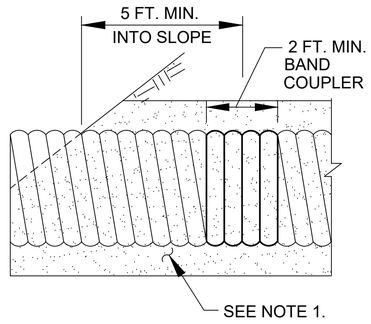


PLAN

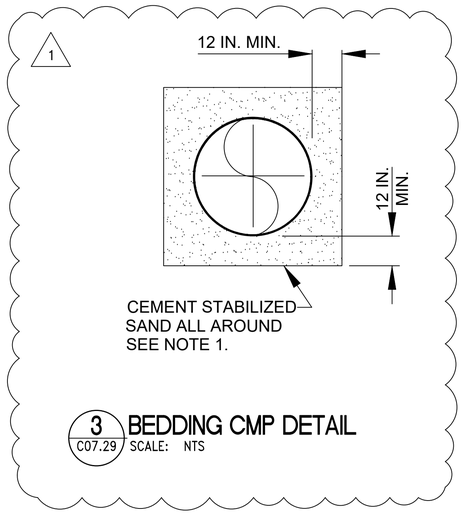


B SECTION

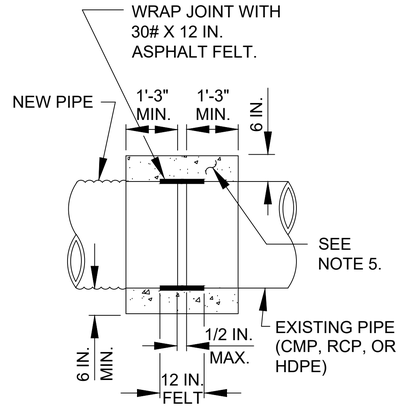
1 / C07.29 TYPICAL BACKSLOPE INTERCEPTOR STRUCTURE
SCALE: NTS

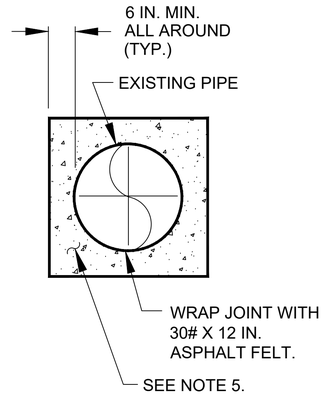


2 / C07.29 CMP BAND COUPLER DETAIL
SCALE: NTS



3 / C07.29 BEDDING CMP DETAIL
SCALE: NTS





4 / C07.29 CONCRETE COLLAR DETAIL
SCALE: NTS

NOTES

1. BACKSLOPE INTERCEPTOR STRUCTURE FOR REMOVING AND RELOCATING EXISTING INTERCEPTORS AND FOR BACKSLOPE SWALES.
2. PROVIDE AND PLACE CEMENT STABILIZED SAND COMPACTED PER P-152.
3. CONCRETE SHALL BE STRUCTURAL CONCRETE IN ACCORDANCE WITH P-610.
4. INTERCEPTOR STRUCTURES:
   - 4.1. ADJUST LENGTH AND WIDTH IN FIELD AS NECESSARY.
   - 4.2. 2-FEET DEEP X 8-INCH WIDE TOE ALL AROUND THE STRUCTURE.
   - 4.3. STEEL REINFORCING-#4 BARS (GRADE 60) AT 12 INCHES ON CENTER EACH WAY.
   - 4.4. ANY INTERCEPTOR OUTFALL PIPE LARGER THAN MAXIMUM SIZE INDICATED REQUIRES A SEPARATE DETAIL.
   - 4.5. MATCH TOP OF CONCRETE WITH NATURAL GROUND.
5. BACKSLOPE SWALE AND INTERCEPTOR STRUCTURE ELEVATIONS AND LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE. FINAL ELEVATIONS AND LOCATIONS SHALL BE FIELD VERIFIED BY THE ENGINEER PRIOR TO INSTALLATION.
6. STRUCTURAL CONCRETE WITH #4 BARS (GRADE 60) 12 INCH O.C. EACH WAY, 3 ROWS MIN. EACH WAY. - FOR COLLARS ONLY. WAIT A MINIMUM OF 24 HOURS AFTER PLACING CONCRETE TO BACKFILL.

HOUSTON AIRPORTS

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TBPE FIRM No. F-14087

REVISIONS			
NO.	DESCRIPTION	DATE	BY
1	ADD. 2 EDITED DIMENSION	07/24/23	NRP

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

DRAINAGE DETAILS V

PROJECT MGR:	NRP
DESIGNER:	HSC
DRAWN BY:	HSC
CHECK BY:	NRP
SCALE:	N/A
DATE:	07/24/2023

STATE OF TEXAS
NAWA RAJ PANTHI
103690
LICENSED
PROFESSIONAL ENGINEER
7/24/2023

APPROVED BY:	JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	C07.29

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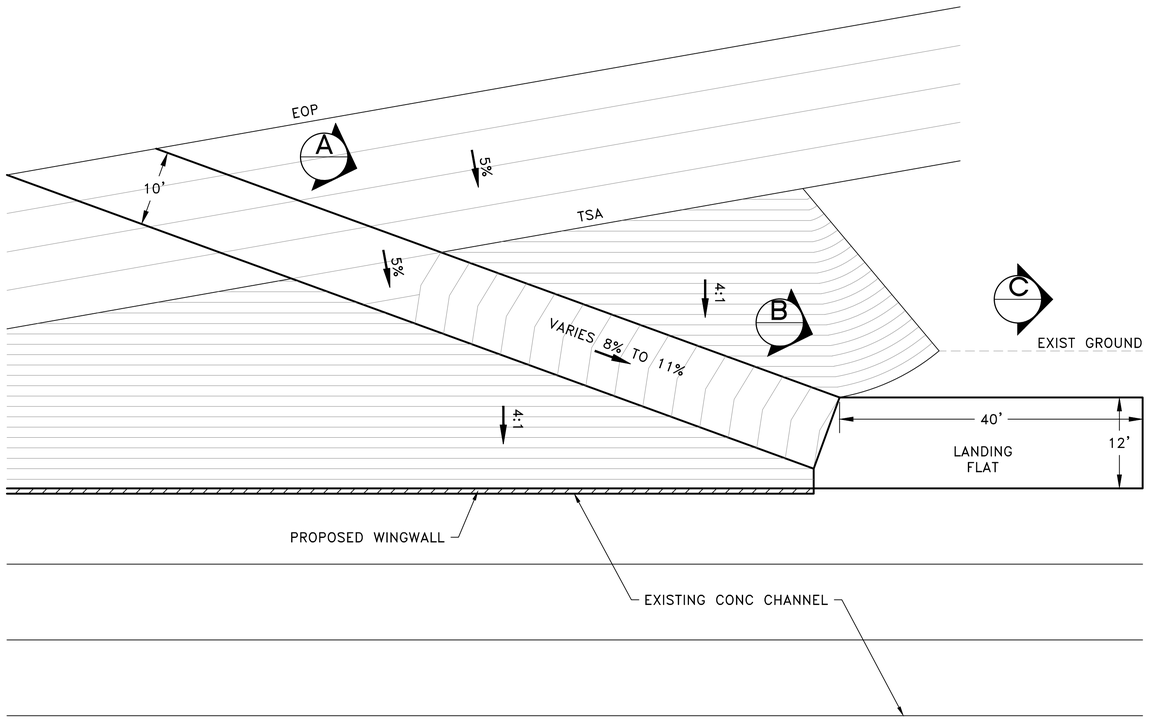
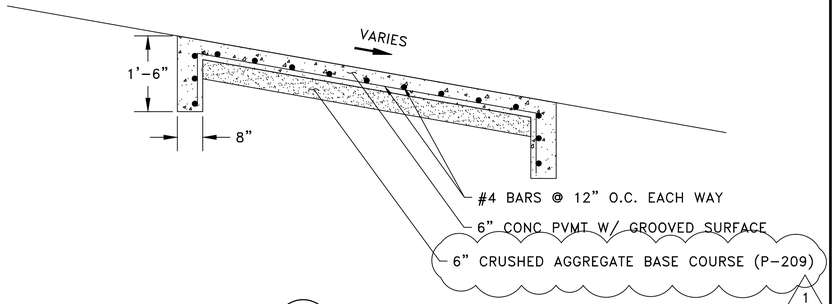
GARVER
TBPE Registration No. F-5713



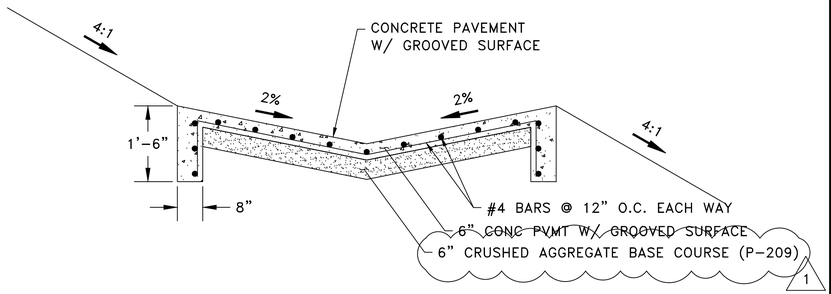
1 C07.31 TYPICAL MAINT RAMP AND LANDING DETAIL
SCALE: NTS

NOTES 1

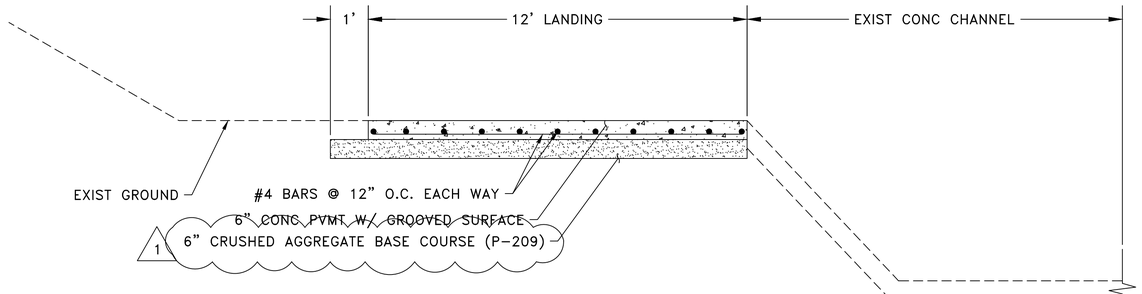
1. PROVIDE AND PLACE CRUSHED AGGREGATE BASE COURSE PER P-209.
2. CONCRETE SHALL BE STRUCTURAL CONCRETE IN ACCORDANCE WITH P-610.
3. STRUCTURAL CONCRETE WITH #4 BARS (GRADE 60) 12 INCH O.C. EACH WAY, 3 ROWS MIN. EACH WAY.



A C07.31 SECTION A
SCALE: NTS



B C07.31 SECTION B
SCALE: NTS



C C07.31 SECTION C
SCALE: NTS

HOUSTON AIRPORTS
HT&J LLC
10351 STELLA LINK RD
HOUSTON, TEXAS 77025
(832) 767-0090
TBPE FIRM No. F-14087

REVISIONS			
NO.	DESCRIPTION	DATE	BY
1	ADD. 2 REVISED DETAIL CALLOUTS	07/24/23	NRP

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

DRAINAGE DETAILS VII

PROJECT MGR:	NRP
DESIGNER:	HSC
DRAWN BY:	HSC
CHECK BY:	NRP
SCALE:	N/A
DATE:	07/24/2023

STATE OF TEXAS
NAWA RAJ PANTHI
103690
LICENSED
PROFESSIONAL ENGINEER
7/24/2023

APPROVED BY:	JEF
	DIRECTOR HOUSTON AIRPORT SYSTEM
PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	C07.31

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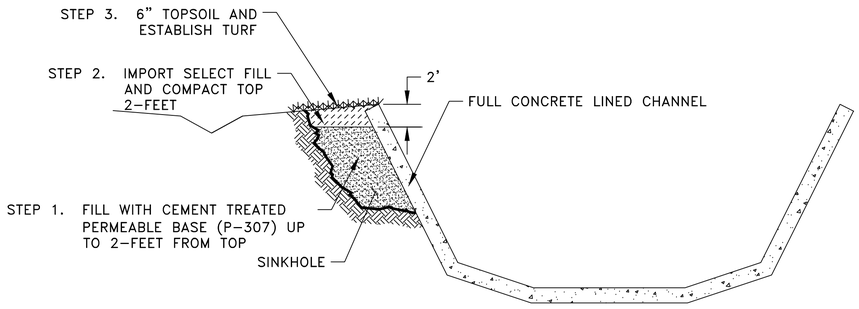

1 C07.40 SINKHOLE REPAIR DETAIL
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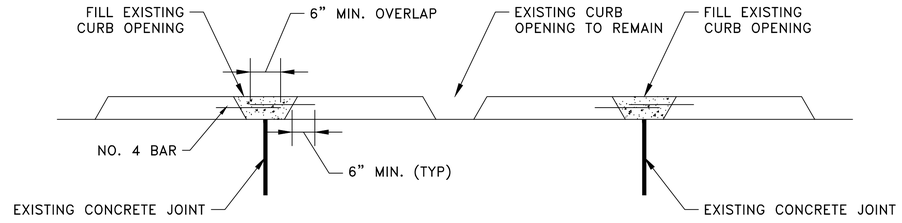
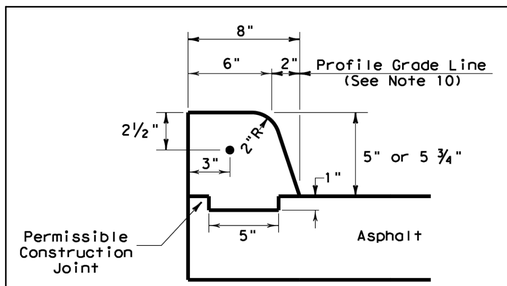


2 C07.40 MODIFY CURB OPENING DETAIL
SCALE: NTS



NOTES

1. CONC SHALL BE CLASS A
2. REINFORCING BARS SHALL BE NO. 4
3. PROVIDE 6" MIN SPLICE OVERLAP
4. PROVIDE 6" MIN EMBEDMENT INTO EXIST CONC CURBS. REINFORCING BAR MAY BE DRILLED AND GROUTED IN PLACE

HOUSTON AIRPORTS

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TBPE FIRM No. F-14087

REVISIONS			
NO.	DESCRIPTION	DATE	BY
1	ADD. 2 REVISED DETAIL	07/24/23	NRP

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SINKHOLE DETAILS I

PROJECT MGR:	NRP
DESIGNER:	HSC
DRAWN BY:	HSC
CHECK BY:	NRP
SCALE:	N/A
DATE:	07/24/2023

STATE OF TEXAS
NAWA RAJ PANTHI
103690
LICENSED PROFESSIONAL ENGINEER
7/24/2023

APPROVED BY:	JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	C07.40

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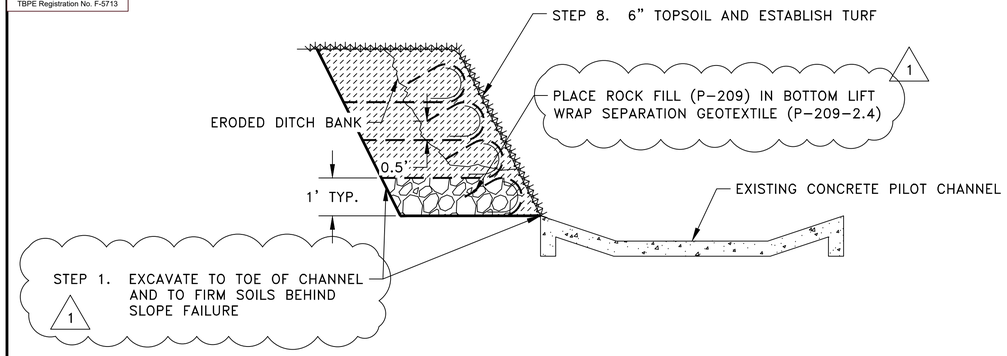
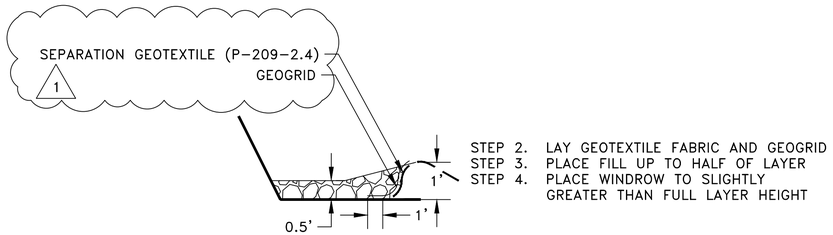
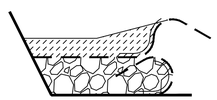
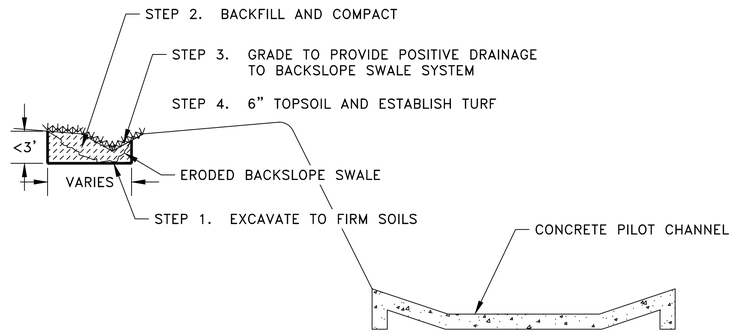
TBPE Registration No. F-5713



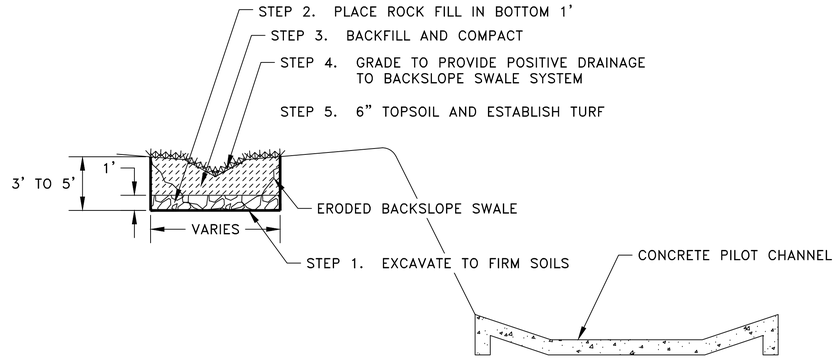




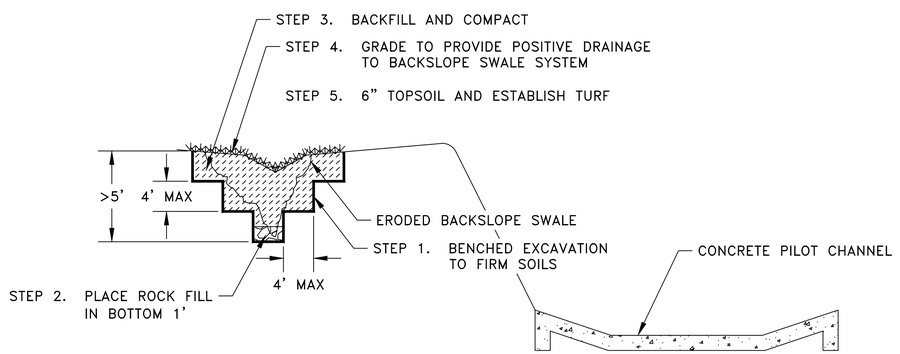
STEP 7. REPEAT STEPS 2 TO 6 FOR
SUBSEQUENT LAYERS



MEDIUM SINKHOLES 3' TO 5' DEPTH



LARGE SINKHOLES >5' DEPTH



1 C07.41 SLOPE STABILIZATION REPAIR DETAIL
SCALE: NTS

2 C07.41 BACKFILL AND REGRADE DETAIL
SCALE: NTS

HOUSTON AIRPORTS
HT&J LLC
10351 STELLA LINK RD
HOUSTON, TEXAS 77025
(832) 767-0090
TBPE FIRM No. F-14087

REVISIONS		
NO.	DESCRIPTION	DATE BY
1	ADD. 2 REVISED DETAIL CALLOUTS	07/24/23 NRP

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SINKHOLE DETAILS II

PROJECT MGR:	NRP
DESIGNER:	HSC
DRAWN BY:	HSC
CHECK BY:	NRP
SCALE:	N/A
DATE:	07/24/2023

STATE OF TEXAS
NAWA RAJ PANTHI
103690
LICENSED
PROFESSIONAL ENGINEER
7/24/2023

APPROVED BY:	JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	C07.41

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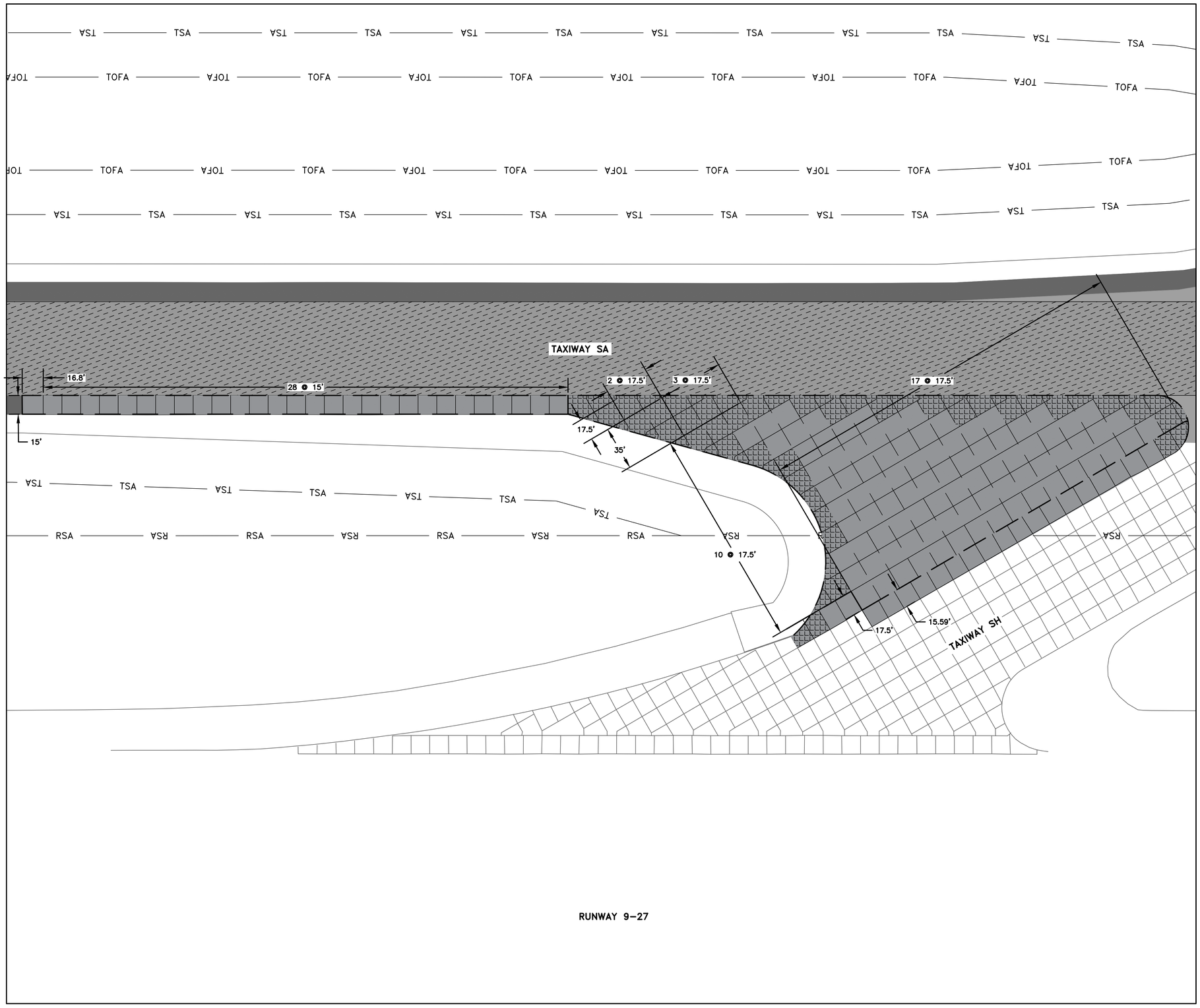
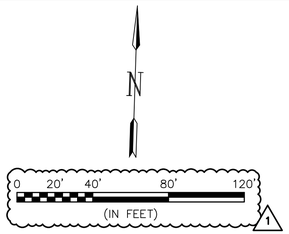


RUNWAY 9–27



LEGEND

- PROPOSED ASPHALT TAXIWAY MILL & OVERLAY
- PROPOSED ASPHALT SHOULDER MILL & OVERLAY
- PROPOSED DEEP ASPHALT TAXIWAY MILL & OVERLAY
- PROPOSED ASPHALT SHOULDER CONSTRUCTION
- PROPOSED CONCRETE SLAB REPLACEMENT (12"–15")
- PROPOSED REINFORCED CONCRETE PANEL
- PROPOSED FULL DEPTH CONCRETE PAVEMENT
- RSA — RUNWAY SAFETY AREA
- TSA — TAXIWAY SAFETY AREA
- TOFA — TAXIWAY OBJECT FREE AREA
- TYPE "A–1" REINFORCED ISOLATION JOINT
- TYPE "C" DOWELED CONTRACTION JOINT
- TYPE "E" DOWELED CONSTRUCTION JOINT

NOTES:

1. SEE SHEET C10.01 FOR NOTES.

KEYMAP

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PLOT DATE: 3/10/2022 11:09:43 AM

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 200
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

JOINT PLAN I

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 40'
DATE:	07/24/2023

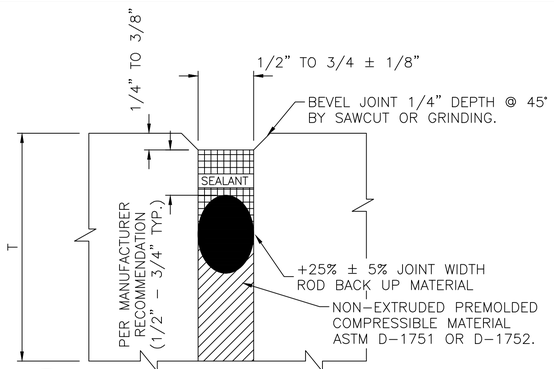
STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

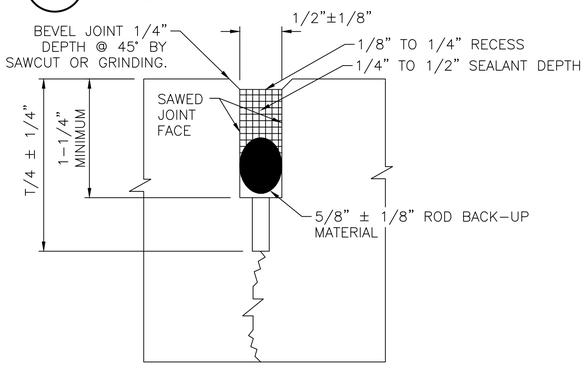
APPROVED BY:	JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

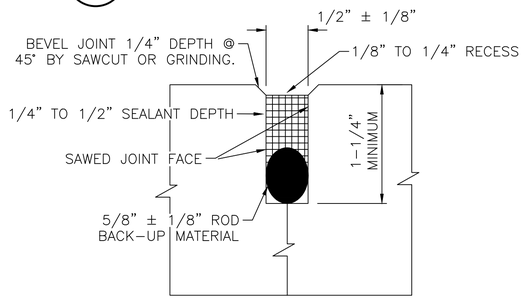
PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	C10.02



1 C10.04 **DETAIL 1 – ISOLATION JOINTS**
SCALE: NONE



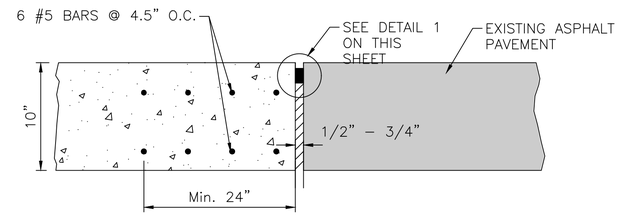
2 C10.04 **DETAIL 2 – CONTRACTION JOINTS**
SCALE: NONE

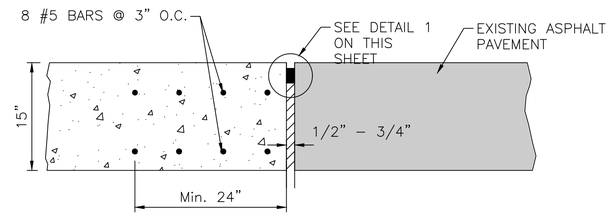


3 C10.04 **DETAIL 3 – CONSTRUCTION JOINTS**
SCALE: NONE

4 C10.04 **DOWEL BAR SPECIFICATIONS**
SCALE: NONE

SLAB THICKNESS	DOWEL DIAMETER	DOWEL LENGTH	DOWEL SPACING
6" TO 7"	3/4"	18"	12"
7.5" TO 12"	1"	18"	12"
12.5" TO 16"	1 1/4"	20"	15"
16.5" TO 20"	1 1/2"	20"	18"
20.5" TO 24"	2"	24"	18"

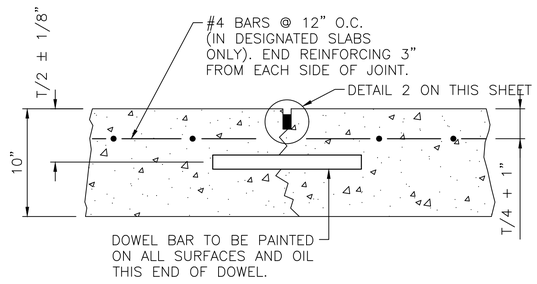




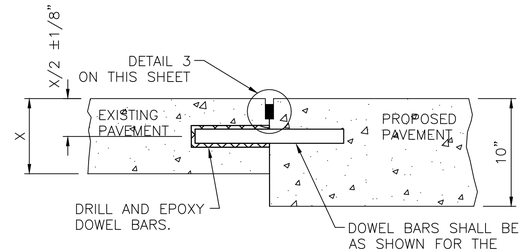
NOTE:

1. REINFORCING STEEL SHALL ONLY BE INSTALLED IN SLABS IDENTIFIED IN THE JOINT LAYOUT PLAN SHEETS.

5 C10.04 **TYPE A–1 REINFORCED ISOLATION JOINT AT EXISTING ASPHALT PAVEMENT**
SCALE: NONE



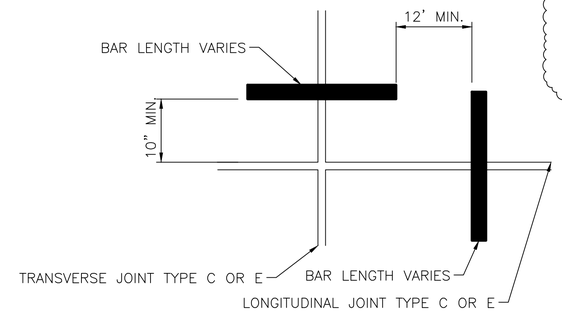
6 C10.04 **TYPE C – DOWELED CONTRACTION JOINT**
SCALE: NONE



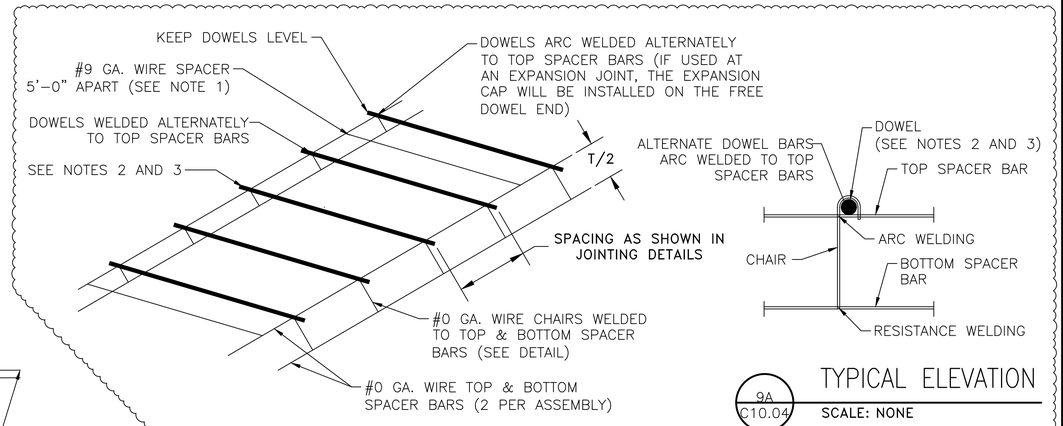
NOTE:

THICKNESS "X" OF EXISTING PAVEMENT IS UNKNOWN.

7 C10.04 **TYPE E – DOWELED CONSTRUCTION JOINT AT EXISTING/PROPOSED PAVEMENT**
SCALE: NONE



8 C10.04 **DOWEL BARS AT SLAB CORNERS (PLAN VIEW)**
SCALE: NONE



9A C10.04 **TYPICAL ELEVATION**
SCALE: NONE

NOTES:

1. #9 GA. WIRE SPACER BAR ARC WELDED TO THE BOTTOM OF TOP SPACER BAR. (MAY BE MECHANICALLY ATTACHED IN LIEU OF WELDING) 3 REQUIRED PER UNIT. THIS WIRE MUST BE CUT OR REMOVE PRIOR TO PLACING PC CONCRETE.
2. DOWEL BAR DIAMETER, LENGTH, AND SPACING SHALL BE AS SHOWN ON THE DIMENSION TABLE.
3. DOWELS SHALL BE EPOXY COATED FULL LENGTH OF DOWEL. A LUBRICANT BOND BREAKER SHALL BE APPLIED TO THE EPOXY COATED DOWEL IMMEDIATELY PRIOR TO PAVING.

9 C10.04 **DOWEL BASKET ASSEMBLY DETAIL**
SCALE: NONE

1

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 200
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

JOINT DETAILS I

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 1"
DATE:	07/24/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY:	JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	C10.04

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PLOT DATE: 3/10/2022 11:09:43 AM

HEADWALL	DESCRIPTION OF BOX CULVERT	MAX FILL HEIGHT	APPLICABLE BOX CULVERT STANDARD (3)	APPLICABLE WINGWALL	SKEW ANGLE	SIDE SLOPE OR CHANNEL SLOPE RATIO	T CULVERT TOP SLAB THICKNESS	U CULVERT WALL THICKNESS	C ESTIMATED CURB HEIGHT	HW HEIGHT OF WINGWALL	A CURB TO END OF WINGWALL	B OFFSET OF END OF WINGWALL	LW LENGTH OF LONGEST WINGWALL	LTW CULVERT TOEWALL LENGTH	ATW ANCHOR TOEWALL LENGTH	RIPRAP APRON	CLASS "C" CONC (CURB) (1)	CLASS "C" CONC (WINGWALL) (2)	TOTAL WINGWALL AREA
		(FT)				(SL:1)	(IN)	(IN)	(FT)	(FT)	(FT)	(FT)	(FT)	(FT)	(FT)	(CY)	(CY)	(CY)	(SF)
HW01	7 X 5 RCB	6.2	SCP-7	FW-0 (MODIFIED)	0	4:1	8.0	8.0	4.4	10.3	37.2	2.8	38.3	10.4	N/A	N/A		24.1	534.9
HW02 (NORTH WING)	7 X 5 RCB	5.8	SCP-7	FW-0 (MODIFIED)	0	4:1	8.0	8.0	4.60	10.5	211.0	8.7	213.2	9.7	N/A	N/A		77.5	1445.2
HW02 (SOUTH WING)										10.5	127.4	8.9	129.6					48.4	869.3
HW03	3 – 10 X 7 RCB	3.0	SCP-10	SW-0	0	4:1	10.0	10.0	2.3	10.3	42.0	0.0	42.0	37.3	N/A	N/A		32.8	447.8
HW04 (NORTH WING)	8 X 4 RCB	6.8	SCP-8	FW-0 (MODIFIED)	0	4:1	8.0	8.0	5.2	10.2	208.9	9.2	211.2	10.7	N/A	N/A		76.6	1412.5
HW04 (SOUTH WING)										10.2	143.2	7.9	145.2					53.8	967.1
HW05 (NORTH WING)	8 X 4 RCB	7.0	SCP-8	FW-0 (MODIFIED)	0	4:1	8.0	8.0	5.7	10.6	209.7	7.9	211.7	10.7	N/A	N/A		78.2	1465.2
HW05 (SOUTH WING)										10.6	144.0	8.2	146.1					55.0	999.6
HW06 (NORTH WING)	6 X 5 RCB	6.1	SCP-6	FW-0 (MODIFIED)	0	4:1	7.0	7.0	4.7	10.5	222.5	9.6	225.0	8.5	N/A	N/A		83.6	1624.9
HW06 (SOUTH WING)										10.5	129.2	9.3	131.5					49.4	915.9
HW07 (NORTH WING)	6 X 5 RCB	6.3	SCP-6	FW-0 (MODIFIED)	0	4:1	7.0	7.0	4.9	10.7	215.6	9.3	218.0	8.5	N/A	N/A		79.4	1504.2
HW07 (SOUTH WING)										10.7	128.6	9.4	130.8					49.3	915.4
HW08 (NORTH WING)	8 X 4 RCB	7.3	SCP-8	FW-0 (MODIFIED)	0	4:1	8.0	8.0	5.7	10.6	219.3	7.6	221.2	10.7	N/A	N/A		81.2	1518.4
HW08 (SOUTH WING)										10.6	132.7	9.0	135.0					50.6	902.1
HW09 (NORTH WING)	8 X 4 RCB	7.4	SCP-8	FW-0 (MODIFIED)	0	4:1	8.0	8.0	5.8	10.8	248.2	8.3	250.3	10.7	N/A	N/A		90.8	1692.0
HW09 (SOUTH WING)										10.8	145.9	8.0	147.9					55.6	1008.4
HW10 (NORTH WING)	8 X 4 RCB	8.0	SCP-8	FW-0 (MODIFIED)	0	4:1	8.0	8.0	6.7	11.5	247.9	8.3	250.0	10.7	N/A	N/A		95.0	1853.0
HW10 (SOUTH WING)										11.5	119.1	8.0	121.1					48.4	899.1

NOTES

1. SKEW = 0° ON SW–0, FW–0, SETB–CD, SETB–SW–0 STANDARD SHEETS;
   30° MAXIMUM FOR SAFETY END TREATMENT
2. SL:1 = HORIZONTAL : 1 VERTICAL
   2.1. SIDE SLOPE AT CULVERT FOR FLARED OR STRAIGHT WINGWALLS
   2.2. CHANNEL SLOPE FOR PARALLEL WINGWALLS
   2.3. SLOPE MUST BE 3:1 OR FLATTER FOR SAFETY END TREATMENTS
3. T = BOX CULVERT TOP SLAB THICKNESS. DIMENSION CAN BE FOUND ON APPLICABLE BOX CULVERT STANDARD SHEET
4. U = BOX CULVERT WALL THICKNESS. DIMENSION CAN BE FOUND ON THE APPLICABLE BOX CULVERT STANDARD SHEET
5. C = CURB HEIGHT
6. SEE APPLICABLE WING OR END TREATMENT STANDARD SHEETS FOR CALCULATIONS OF HW, A, B, LW, LTW, ATW, AND TOTAL WINGWALL AREA
7. HW = HEIGHT OF WINGWALL
8. A = DISTANCE FROM FACE OF CURB TO END OF WINGWALL (NOT APPLICABLE TO PARALLEL OR STRAIGHT WINGWALLS)
9. B = OFFSET OF END OF WINGWALL (NOT APPLICABLE TO PARALLEL OR STRAIGHT WINGWALLS)
   B OFFSET IS ALSO OFFSET AT WHICH WINGWALL FLARES BEND AND BECOME PARALLEL WITH EXIST CONC CHANNEL
10. LW = LENGTH OF LONGEST WINGWALL
    LW MEASUREMENT IS ALIGNED WITH, AND INCLUDES WINGWALL BEND
11. LTW = LENGTH OF CULVERT TOEWALL (NOT APPLICABLE WHEN USING RIPRAP APRON)
12. ATW = LENGTH OF ANCHOR TOEWALL (APPLICABLE TO SAFETY END TREATMENT ONLY)

(1) CONCRETE VOLUME SHOWN IS FOR BOX CULVERT CURB ONLY. FOR CURBS USING THE BOX CULVERT RAIL MOUNTING DETAILS (RAC) STANDARD SHEET QUANTITIES MUST BE INCREASED BY A FACTOR OF 2.25. IF CLASS S CONCRETE IS REQUIRED FOR THE TOP SLAB OF THE CULVERT, ALSO PROVIDE CLASS S CONCRETE FOR THE CURB. CURB CONCRETE IS CONSIDERED PART OF THE BOX CULVERT FOR PAYMENT

(2) CONCRETE VOLUME SHOWN IS TOTAL OF WINGS, FOOTINGS, CULVERT TOEWALL (IF ANY), ANCHOR TOEWALLS (IF ANY), AND WINGWALL TOEWALLS. RIPRAP APRONS, CULVERTS, AND CURB QUANTITIES ARE NOT INCLUDED.

(3) REGARDLESS OF THE TYPE OF CULVERT SHOWN ON THIS SHEET, THE CONTRACTOR HAS THE OPTION OF FURNISHING CAST–IN–PLACE OR PRECAST CULVERTS UNLESS OTHERWISE SHOWN ELSEWHERE ON THE PLANS. IF THE CONTRACTOR ELECTS TO PROVIDE CULVERTS OF A DIFFERENT TYPE THAN THOSE SHOWN ON THIS SHEET, IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAKE THE NECESSARY ADJUSTMENTS TO THE DIMENSIONS AND QUANTITIES SHOWN.

GARVER
TBPE Registration No. F-5713

HOUSTON AIRPORTS
HT&J LLC
10351 STELLA LINK RD
HOUSTON, TEXAS 77025
(832) 767–0090
TBPE FIRM No. F–14087

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	NRP
	NEW SHEET		

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

DRAINAGE DETAILS II.A

PROJECT MGR:	NRP
DESIGNER:	HSC
DRAWN BY:	HSC
CHECK BY:	NRP
SCALE:	N/A
DATE:	07/24/2023

STATE OF TEXAS
NAWA RAJ PANTHI
103690
LICENSED
PROFESSIONAL ENGINEER
7/24/2023

APPROVED BY:	JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	C07.26A

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PLOT DATE: 3/10/2022 11:08:43 AM

SYMBOL	ITEM DESCRIPTION
———	NEW EQUIPMENT
- - - -	EXISTING EQUIPMENT
×	EXISTING EQUIPMENT TO BE COMPLETELY DEMOLISHED AND REMOVED, AREA TO BE RESTORED
◉	L-861T TAXIWAY EDGE LIGHT
⊗	L-852C/L-852D TAXIWAY CENTERLINE LIGHT
⊛	L-852C TAXIWAY CLEARANCE BAR LIGHT
●	L-867 / L-868 BASE CAN
01	L-858 GUIDANCE SIGN
4W-4"	ELECTRICAL DUCT, NUMBER AND SIZE OF CONDUITS AS INDICATED
▨	PULL BOX
H	HAND HOLE
M	MANHOLE
⏚ ◉	3/4" x 10' COPPER CLAD STEEL GROUND ROD
———	SERIES LIGHTING CIRCUIT WITH COUNTERPOISE, NUMBER OF HASH MARKS INDICATES NUMBER OF CABLES
AFG	ABOVE FINISHED GRADE
AOA	AIRCRAFT OPERATIONS AREA
OFA	OBJECT FREE AREA
OFZ	OBSTACLE FREE ZONE
RSA	RUNWAY SAFETY AREA
TSA	TAXIWAY SAFETY AREA
PC	POINT OF CURVATURE
PE	POLYETHYLENE CONDUIT
PT	POINT OF TANGENCY
DEB	DIRECT EARTH BURIED
WP	WEATHERPROOF
UON	UNLESS OTHERWISE NOTED
(L)	LED EQUIPMENT WHERE INDICATED

CIRCUIT LEGEND

SACL	TW SA CENTERLINE LIGHTS CIRCUIT
SBCL	TW SB CENTERLINE LIGHTS CIRCUIT
SCE	TW SC EDGE LIGHTS CIRCUIT
SHJ	TW SH CENTERLINE LIGHTS CIRCUIT
SCKCL	TW SC CENTERLINE LIGHTS CIRCUIT
27-TDZ	RUNWAY TOUCHDOWN ZONE LIGHTS CIRCUIT
RGL	RUNWAY GUARD LIGHTS CIRCUIT
9-27CL	RUNWAY TOUCHDOWN ZONE LIGHTS CIRCUIT

CAUTION NOTES:

1. UNDERGROUND UTILITIES EXIST WITHIN AND ADJACENT TO THE LIMITS OF CONSTRUCTION. AN ATTEMPT HAS BEEN MADE TO LOCATE THESE UTILITIES ON THE PLANS, HOWEVER, ALL EXISTING UTILITIES MAY NOT BE SHOWN AND THE ACTUAL LOCATIONS OF THE UTILITIES MAY VARY FROM THE LOCATIONS SHOWN. PRIOR TO BEGINNING ANY TYPE OF EXCAVATION, THE CONTRACTOR SHALL CONTACT THE UTILITIES INVOLVED AND MAKE ARRANGEMENTS FOR THE LOCATION OF THE UTILITIES ON THE GROUND. THE CONTRACTOR SHALL MAINTAIN THE UTILITY LOCATION MARKINGS UNTIL THEY ARE NO LONGER NECESSARY.
2. TEXAS STATE LAW, THE UNDERGROUND FACILITIES DAMAGE PREVENTION ACT, REQUIRES TWO WORKING DAYS ADVANCE NOTIFICATION THROUGH THE TEXAS ONE-CALL SYSTEM CENTER BEFORE EXCAVATING USING MECHANIZED EQUIPMENT OR EXPLOSIVES (EXCEPT IN THE CASE OF AN EMERGENCY). THE ONE-CALL SYSTEM PHONE NUMBER IS 1-800-245-4545. THE CONTRACTOR IS ADVISED THAT THERE IS A SEVERE PENALTY FOR NOT MAKING THIS CALL. NOT ALL UTILITY COMPANIES ARE MEMBERS OF THE TEXAS ONE-CALL SYSTEM; THEREFORE, THE CONTRACTOR IS ADVISED TO CONTACT ALL NON-MEMBER UTILITIES AS WELL AS THE ONE-CALL SYSTEM.

ELECTRICAL SAFETY NOTES:

1. SERIES CIRCUITS CAN BE DANGEROUS AND / OR FATAL.
2. LOCKOUT / TAGOUT PROCEDURES SHALL BE FOLLOWED.
3. LIGHTING REGULATORS SHALL BE TURNED OFF, LOCKED, AND TAGGED OUT OF SERVICE BEFORE ANY WORK IS DONE ON THE SERIES CIRCUIT.
4. THE ELECTRICAL RESISTANCE AND INSULATION INTEGRITY OF EACH MODIFIED CIRCUIT SHALL BE TESTED BEFORE THE CIRCUIT IS ENERGIZED.

DEMOLITION NOTES:

1. RESTORE THE DEMOLITION WORK AREAS TO MATCH EXISTING CONDITIONS.
2. LOCATE, IDENTIFY, AND PROTECT EXISTING SERVICES PASSING THROUGH DEMOLITION AREAS AND SERVING OTHER AREAS OUTSIDE THE DEMOLITION LIMITS. MAINTAIN SERVICES TO AREAS OUTSIDE DEMOLITION LIMITS. WHEN SERVICES MUST BE INTERRUPTED, INSTALL TEMPORARY SERVICES FOR AFFECTED AREAS.
3. MAINTAIN AND PROTECT EXISTING SERVICES WHICH TRANSIT THE AREAS AFFECTED BY SELECTIVE DEMOLITION.
4. MAINTAIN CIRCUIT CONTINUITY TO ALL EXISTING SYSTEM EQUIPMENT, DEVICES, ETC., TO REMAIN IN USE WHETHER NOTED ON THE PLANS OR NOT. FIELD VERIFY EXISTING ITEMS TO REMAIN IN USE. WIRING FOR EXISTING DEVICES WHICH MUST BE RE-ROUTED OR WHICH ARE PARTIALLY ABANDONED, SHALL BE RECONNECTED TO SERVICE THE REMAINING DEVICES ON THE CIRCUIT.
5. THE INTENTION OF THE ELECTRICAL DEMOLITION IS TO DISCONNECT AND REMOVE ALL ELECTRICAL WORK MADE VOID BY THE SCOPE OF THE CONSTRUCTION AND ALTERATION. FIELD VERIFY EXACT MATERIAL QUANTITIES REQUIRED TO BE REMOVED.
6. ALL REMOVED MATERIALS, OTHER THAN REMOVED MATERIALS TO BE RELOCATED, OR TURNED OVER TO THE OWNER, SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE PROJECT SITE.
7. COORDINATE ALL DEMOLITION WORK WITH ALL OTHER TRADES.
8. ALL EXISTING ELECTRICAL WORK AND ASSOCIATED RACEWAY AND WIRING WHICH HAS BEEN MADE OBSOLETE BY THE WORK AND / OR IS SHOWN DASHED ON THE ELECTRICAL DEMOLITION DRAWINGS, SHALL BE DISCONNECTED AND REMOVED, UNLESS OTHERWISE NOTED. AN ATTEMPT HAS BEEN MADE TO INDICATE ALL OF THIS WORK, BUT TOTAL ACCURACY IS NOT GUARANTEED.
9. FOR EXISTING ELECTRICAL EQUIPMENT TO BE REMOVED, DEMOLISH ALL EQUIPMENT, DEVICES, CIRCUITS, CONDUITS, BOXES, AND OTHER APPURTENANCES AS REQUIRED FOR A COMPLETE REMOVAL.
10. CUT OFF BOLT PROTRUSIONS, REMOVE ANCHORS, ETC. AT CEILING, FLOOR, OR WALL SURFACES AS REQUIRED. NO SUPPORT ITEMS SHALL BE LEFT IN PLACE.
11. REMOVE, CAP, AND / OR RELOCATE EQUIPMENT, OUTLETS, CONDUIT, WIRE, ETC., WHETHER INDICATED ON THE DRAWINGS OR NOT, AND AS MAY BECOME NECESSARY BECAUSE OF EXISTING FIELD CONDITIONS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VISIBLY EXAMINE ALL EXISTING AREAS DESIGNATED FOR REMOVAL OR MODIFICATION TO DETERMINE THE CONDUIT AND THE WIRING THAT WILL REQUIRE CAPPING AND / OR REMOVAL. THE CONTRACTOR SHALL BE HELD TO HAVING VISITED THE SITE AND TAKEN ALL EXISTING CONDITIONS INTO CONSIDERATION.
12. IN THE DEMOLITION WORK, REMOVE ALL CABLING ASSOCIATED WITH SYSTEMS BEING REMOVED UNDER THIS PROJECT BACK TO SOURCE. NO CABLE SHALL BE LEFT ABANDONED IN PLACE. REMOVE ALL UNUSED AND EMPTY CONDUIT THAT IS EXPOSED OR WITHIN ACCESSIBLE CEILINGS WHICH IS AFFECTED BY AND IS IN THE AREA OF THE WORK OF THIS CONTRACT.
13. WHERE ELECTRICAL EQUIPMENT, CONDUIT, BOXES, AND SUPPORTING HARDWARE ARE REMOVED, PATCH AND FINISH THE SURFACE (WALL AND CEILING) AS REQUIRED TO MATCH THE EXISTING, UNLESS OTHERWISE NOTED.
14. WHERE BURIED CONDUITS EXTENDING OUT OF A CONCRETE SLAB BECOME ABANDONED, CUT AND GRIND THE CONDUITS OFF FLUSH WITH TOP OF SLAB AND PLUG WITH NON-SHRINK WATERPROOF GROUT FILL.
15. IN WALLS OR FLOORS WHERE A FLUSH DEVICE IS BEING REMOVED, BUT THE WALL OR FLOOR REMAINS OR FOR ANY OUTLET WHICH MUST REMAIN, BUT HAS A DEVICE REMOVED, PROVIDE A BLANK METAL COVER OVER THE OUTLET. MATCH THE COLOR AND MATERIAL OF EXISTING REMAINING COVERS IN THE ROOM OR SPACE.
16. WHERE WORK IS TO BE PERFORMED ABOVE EXISTING ACCESSIBLE CEILINGS, CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING CEILING TIES AND GRID WITHOUT DAMAGE, STORAGE OF EXISTING TILES AND GRID WHILE WORK IS BEING PERFORMED, AND INSTALLATION OF EXISTING GRID AND TILES AFTER WORK IS COMPLETED.

2

17. WHEN REMOVING AIRFIELD LIGHTING CABLES FROM EXISTING CONDUITS AND A BLOCKAGE IS ENCOUNTERED, THE CONTRACTOR SHALL CLEAR EXISTING CONDUIT BY METHOD SUBJECT TO THE APPROVAL OF THE AIRPORT.

CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL STAKE THE AIRFIELD LIGHTING SYSTEMS, PRIOR TO INSTALLATION OF ANY TRENCH, CABLE, OR LIGHTING APPARATUS. THE INTENT IS TO STAKE THE INSTALLATION AT THE LOCATIONS INDICATED, NOTING ANY DEVIATION FROM PLAN DIMENSIONS TO THE ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL OBTAIN THE SERVICES OF AN EXPERIENCED AND LICENSED SURVEYOR TO PERFORM THIS WORK.
2. THE ENGINEER WILL PROVIDE ELECTRONIC CADD FILES TO THE CONTRACTOR FOR THIS STAKING WORK. THE CONTRACTOR SHALL STAKE THE ITEMS AND HIS SURVEYOR SHALL PROVIDE A CADD FILE SUBMITTAL BACK TO THE ENGINEER. BASED UPON THIS SUBMITTAL, THE ENGINEER WILL COORDINATE AND PROVIDE DIRECTIONS ON ANY ADJUSTMENTS NECESSARY TO MEET EXISTING FIELD CONDITION REQUIREMENTS AND COMPLY WITH FAA ADVISORY CIRCULAR REQUIREMENTS ON THE LAYOUT AND SPACING OF EQUIPMENT.
3. THE CONTRACTOR AND HIS SURVEYOR SHALL THEN MAKE ANY ELECTRONIC CADD FILE SPACING ADJUSTMENTS AND / OR FIELD STAKING ADJUSTMENTS PRIOR TO INSTALLATION AT NO ADDITIONAL COST TO THE OWNER.
4. THE CONTRACTOR SHALL VERIFY EXACT PAVEMENT EDGE DIMENSIONS WITH THIS INITIAL SURVEY WORK.
5. THE CONTRACTOR SHALL FIELD MARK AND IDENTIFY TAXIWAY POINT OF TANGENCY (PT), POINT OF CURVATURE (PC), AND INTERSECTION POINTS (IP) LOCATIONS AS REQUIRED IN ORDER TO PERFORM TAXIWAY EDGE LIGHT SPACING AND SURVEYING WORK.
6. THE EXISTING AND THE PROPOSED LOCATIONS OF LIGHTING CABLES ARE APPROXIMATE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD LOCATING AND IDENTIFYING THE EXISTING LIGHTING CIRCUITS TO DETERMINE THEIR EXACT ROUTING. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR MAINTAINING THE LIGHTING SYSTEMS IN A WORKING CONDITION UNTIL THE NEW LIGHTING CIRCUITS HAVE BEEN INSTALLED AND TESTED. THE CONTRACTOR SHALL PROACTIVELY AND EXPEDITIOUSLY ACCOMPLISH THIS CABLE IDENTIFICATION WORK PRIOR TO PERFORMING ANY MODIFICATIONS TO THE LIGHTING CIRCUITS. COORDINATE IDENTIFICATION WORK WITH THE OWNER AND ENGINEER AND MAKE ALL CORRECTIONS, ADDITIONS, ETC. ON THE AS-BUILT DRAWINGS.
7. THE CONTRACTOR SHALL BE EXTREMELY CAREFUL WHILE EXCAVATING IN THE AREA OF LIGHTING CIRCUITS. ANY CABLE OR CONDUIT / DUCT WHICH IS NICKED OR DAMAGED DURING EXCAVATION SHALL BE PROPERLY AND EXPEDITIOUSLY SPLICED OR THE LENGTH OF CABLE AND CONDUIT / DUCT REPLACED. A SPLICE OR CONDUIT / DUCT MARKER SHALL BE INSTALLED AT ALL SPLICE OR OTHER REPAIR LOCATIONS MORE THAN 2' AWAY FROM A LIGHT, SIGN, HANDHOLE, MANHOLE, OR JUNCTION STRUCTURE. ALL REPAIR AND / OR REPLACEMENT WORK AND MATERIALS SHALL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER AND TO THE SATISFACTION OF THE OWNER AND ENGINEER.
8. FOR NEW L-824C CABLE INSTALLED ON THIS PROJECT, THE BASIS-OF-DESIGN OUTSIDE DIAMETER THAT WAS USED IS 0.415 INCHES. IF THE CONTRACTOR USES L-824C CABLE WITH A LARGER OUTSIDE DIAMETER, ANY CONDUIT OR DUCT BANK INCREASES IN SIZE NECESSARY TO MAINTAIN CABLE FILL CODE COMPLIANCE SHALL BE INSTALLED AND PAID FOR BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER AND TO THE SATISFACTION OF THE ENGINEER. PAYMENT WILL ONLY BE MADE AT THE BASIS-OF-DESIGN CONDUIT OR DUCT BANK PAY ITEM SHOW ON THE PLANS. AS-BUILT DRAWINGS SHALL BE MARKED UP BY THE CONTRACTOR TO IDENTIFY ANY SIZE CHANGES.
9. ALL ELECTRICAL CABLES SHALL BE CLEARLY IDENTIFIED, LABELED, AND TAGGED AT ALL POINTS WHERE THEY ARE AVAILABLE FOR CONNECTIONS OR INSPECTION, INCLUDING, BUT NOT LIMITED TO MANHOLES, HANDHOLES, PULL BOXES, JUNCTION BOXES, AND LIGHT BASES. ANY NEW TAGGING AND LABELING OF THE NEW AND EXISTING CIRCUITS SHALL BE RECORDED, DOCUMENTED, AND HAVE COPIES SUBMITTED TO THE OWNER'S REPRESENTATIVE FOR THEIR RECORDS.
10. THE CONTRACTOR SHALL PERFORM MEGGER TESTS ON EACH EXISTING SERIES CIRCUIT PRIOR TO ANY WORK ON THE ELECTRICAL SYSTEM AND EACH NEW AND EXISTING SERIES CIRCUIT AFTER THE ACCEPTANCE TEST PERIOD. MEGGER TESTING REQUIREMENTS SHALL BE SUBSIDIARY TO AND PAID FOR BY L-108 PAY ITEMS. THE MEGGER EQUIPMENT SHALL BE CALIBRATED AND UP-TO-DATE AND SHALL BE WITNESSED BY HAS ELECTRICAL INSPECTOR, RECORDED, SIGNED, AND DATED BY CONTRACTOR MASTER ELECTRICIAN RESPONSIBLE FOR PULL PERMIT.
11. THE CONTRACTOR SHALL COORDINATE WITH THE ON-SITE ENGINEER FOR OWNER AND ENGINEER WITNESS OF ALL MEGGER TESTING. THE CONTRACTOR SHALL SUBMIT HIS INITIAL MEGGER TEST REPORTS TO THE OWNER AND ENGINEER PRIOR TO ANY WORK ON THE ELECTRICAL SYSTEM. THIS REPORT SHALL BE APPROVED AND SIGNED BY THE OWNER AND ENGINEER PRIOR TO THE CONTRACTOR PROCEEDING WITH HIS WORK.
12. THE CONTRACTOR SHALL CHECK THE LOAD ON EACH EXISTING REGULATOR PRIOR TO ANY WORK ON THE ELECTRICAL SYSTEM AND ON EACH NEW AND EXISTING REGULATOR AFTER THE ACCEPTANCE TEST PERIOD.
13. THE CONTRACTOR SHALL CALIBRATE EACH NEW AND EXISTING REGULATOR FOLLOWING THE PERFORMED WORK.
14. LOCKOUT / TAGOUT AND CONSTANT CURRENT REGULATOR CALIBRATION PROCEDURES SHALL BE PAID FOR BY SS-300 PAY ITEMS UNLESS OTHERWISE NOTED. THE ELECTRICAL CONTRACTOR SHALL PROVIDE A TYPE WRITTEN LOCKOUT/TAGOUT PROCEDURES SUBMIT TO HAS CHIEF INSPECTOR FOR REVIEW. ON THE LOCKOUT/TAGOUT PROCESS, THE CONTRACTOR SHALL NOTIFY THE HAS ELECTRICAL INSPECTOR AND HAS ELECTRICIAN(S) FOR ASSISTANCE AND VERIFICATION. THIS LOTO HAS TO BE COORDINATED TO HAS AND OPS.
15. CONDUITS AND DUCTS UNDER PAVED AREAS SHALL BE CONCRETE ENCASED.
16. CONDUITS AND DUCTS UNDER NON-PAVED AREAS SHALL BE NON-ENCASED, UNLESS OTHERWISE NOTED.
17. DURING CONSTRUCTION, PROTECT ALL EQUIPMENT, DUCTS, CONDUITS, CABLES, ETC. THAT ARE TO REMAIN IN PLACE. WHERE EXISTING ITEMS ARE CUT, BROKEN, OR DAMAGED, THE CONTRACTOR SHALL REPLACE OR REPAIR PROACTIVELY AND EXPEDITIOUSLY THE ITEMS WITH THE SAME TYPE OF ORIGINAL MATERIAL AND CONSTRUCTION OR BETTER AT NO ADDITIONAL COST TO THE OWNER AND TO THE SATISFACTION OF THE OWNER AND ENGINEER.
18. THE CONTRACTOR SHALL CLEAN THE BOTTOM PIT OF EVERY ELECTRICAL MANHOLE THAT ARE INVOLVED IN THIS PROJECT.

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REVISIONS			
NO.	DESCRIPTION	DATE	BY
1	ADD. 3	7/05/23	MCL
2	ADD. 4	7/21/23	MCL

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

ELECTRICAL NOTES

PROJECT MGR:	JEF
DESIGNER:	RH
DRAWN BY:	RH
CHECK BY:	MCL
SCALE:	NONE
DATE:	07/24/2023

STATE OF TEXAS
MATTHEW C. LEMAY
112269
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY:	JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	E01.01

PLOT DATE: 3/10/2022 11:09:43 AM
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DEMOLITION KEYED NOTES:

101 REMOVE EXISTING BASE MOUNTED TAXIWAY EDGE LIGHT. BASE TO REMAIN DURING MILL AND OVERLAY CONSTRUCTION. (TYP.)

102 REMOVE EXISTING BASE MOUNTED TAXIWAY CENTERLINE LIGHT AND DRAIN IF WATER IS PRESENT. BASE TO REMAIN DURING MILL AND OVERLAY CONSTRUCTION. (TYP.)

103 REMOVE EXISTING BASE MOUNTED CLEARANCE BAR LIGHT. BASE TO REMAIN DURING MILL AND OVERLAY CONSTRUCTION. (TYP. OF 3 LIGHTS PER LOCATION)

104 REMOVE EXISTING BASE MOUNTED GUIDANCE SIGN. DEMOLISH FOUNDATION. (TYP.)

105 REMOVE ELECTRICAL HANDHOLE.

106 REMOVE EXISTING BASE MOUNTED LIGHT. BASE TO REMAIN.

107 EXISTING EDGE OR CENTERLINE LIGHT TO REMAIN. (TYP.)

108 EXISTING AIRFIELD GUIDANCE SIGN TO REMAIN. (TYP.)

109 EXISTING AIRFIELD CONDUIT OR DUCT AND CABLE TO REMAIN. (TYP.)

110 EXISTING ELECTRICAL HANDHOLE, MANHOLE, OR PULL BOX TO REMAIN. (TYP.)

111 EXISTING FAA–OWNED RUNWAY STATUS LIGHTS (RWSL) TO REMAIN.

112 DEMOLISH ABANDONED SIGN FOUNDATION.

113 REMOVE EXISTING CONDUCTORS AND ABANDON ELECTRICAL DUCT BANK IN PLACE.

114 REMOVE COVER OF EXISTING BASE MOUNTED JUNCTION STRUCTURE AND DRAIN IF WATER IS PRESENT. BASE TO REMAIN DURING MILL AND OVERLAY CONSTRUCTION. (TYP.)

115 REMOVE CONDUCTORS FROM EXISTING CONDUIT. CONDUIT TO REMAIN. (TYP.)

INSTALLATION KEYED NOTES:

201 INSTALL NEW L–861T(L) BASE MOUNTED TAXIWAY EDGE LIGHT ON EXISTING LIGHT BASE. (TYP.)

202 INSTALL NEW L–852C(L) BASE MOUNTED TAXIWAY CENTERLINE LIGHT ON EXISTING LIGHT BASE. (TYP. OF STRAIGHT TAXIWAY CENTERLINES IN EXISTING PAVEMENT.)

203 INSTALL NEW L–852D(L) BASE MOUNTED TAXIWAY CENTERLINE LIGHT IN FULL STRENGTH PAVEMENT ON EXISTING LIGHT BASE. (TYP. OF CURVED TAXIWAY CENTERLINES IN EXISTING PAVEMENT.)

204 INSTALL NEW L–858(L) BASE MOUNTED GUIDANCE SIGN. (TYP.)

205 INSTALL NEW L–861T(L) BASE MOUNTED TAXIWAY EDGE LIGHT ON ADJUSTED LIGHT BASE. (TYP.)

206 INSTALL NEW L–852C(L) BASE MOUNTED TAXIWAY CENTERLINE LIGHT ON ADJUSTED LIGHT BASE. (TYP. OF STRAIGHT TAXIWAY CENTERLINES IN NEW PAVEMENT.)

207 INSTALL NEW L–852D(L) BASE MOUNTED TAXIWAY CENTERLINE LIGHT IN FULL STRENGTH PAVEMENT ON ADJUSTED LIGHT BASE. (TYP. OF CURVED TAXIWAY CENTERLINES IN NEW PAVEMENT.)

208 ADJUST EXISTING JUNCTION STRUCTURE TO FINAL GRADE. MAKE ALL NECESSARY CABLE TERMINATIONS.

209 INSTALL NEW L–852C(L) ON NEW L–868 LIGHT BASE IN FULL DEPTH RECONSTRUCTION AREA.

210 INSTALL NEW L–852D(L) ON NEW L–868 LIGHT BASE IN FULL DEPTH RECONSTRUCTION AREA.

211 REINSTALL EXISTING L–852G ON NEW L–868 LIGHT BASE.

212 EXTEND 2" PVC CONDUIT FROM EXISTING SHOULDER TO NEW SIGN LOCATION. INSTALL TWO #8 AWG L–824C CABLES TO NEW SIGN TRANSFORMER AND SPLICE INTO EXISTING CIRCUIT AT THE NEXT JUNCTION LOCATION.

213 INSTALL NEW L–861T(L) TAXIWAY EDGE LIGHT ON NEW BASE IN EXISTING ASPHALT PAVEMENT. (TYP).

214 INSTALL NEW L–861T(L) TAXIWAY EDGE LIGHT ON NEW BASE IN NEW PAVEMENT. (TYP).

215 INSTALL NEW L–852D(L) TAXIWAY CENTERLINE LIGHTING IN EXISTING PAVEMENT WITH MILL AND OVERLAY. (TYP.)

216 INSTALL NEW L–852D(L) TAXIWAY CENTERLINE LIGHT IN NEW CONCRETE PAVEMENT. (TYP.)

217 INSTALL NEW L–852D(L) TAXIWAY CENTERLINE LIGHT IN EXISTING CONCRETE PAVEMENT. (TYP.)

218 CONSTRUCT 1–WAY 2"C CONCRETE ENCASED CONDUIT IN EXISTING PAVEMENT VIA SAW KERF.

219 CONSTRUCT 1–WAY 2"C CONCRETE ENCASED CONDUIT IN NEW PAVEMENT.

220 INSTALL NEW L–852G(L) RUNWAY GUARD LIGHT INSTALLED IN NEW PAVEMENT. (TYP.)

221 CONSTRUCT NEW 16–WAY 2" DIRECTIONALLY BORED DUCT BANK WITH CONDUCTORS AS NOTED.

222 INSTALL NEW 4'x4'x4' AIRCRAFT–RATED HANDHOLE. (TYP.)

223 CONSTRUCT NEW 16–WAY 2" NON–ENCASED DUCT BANK.

224 CONSTRUCT NEW 2–WAY 2"C NON–ENCASED DUCT BANK.

225 CONSTRUCT NEW 2–WAY 2"C FLOWABLE FILL ENCASED DUCT BANK.

226 INSTALL NEW L–868 BLANK COVER AND SPACER RINGS TO BE FLUSH TO PAVEMENT. (TYP.)

227 UPDATE SIGN LEGEND. REFER TO SIGN INDEX.

228 MAINTAIN EXISTING JUNCTION CAN FROM EXISTING SIGN BASE.

229 INSTALL NEW #8 AWG L–824C CABLE WITH EXISTING CONDUIT. (NUMBER OF CONDUCTORS INDICATED BY HASH MARKS)

GENERAL NOTES:

1. ALL ELECTRICIANS WORKING IN THE AIRFIELD SHALL HAVE A VALID ELECTRICAL LICENSE REGISTERED IN THE STATE OF TEXAS TDLR OFFICE. NO ELECTRICIANS SHALL BE WORKING IN THE AIRFIELD WITHOUT ANY TYPE OF LICENSE(S).
2. THE MASTER ELECTRICIAN SHALL BE RESPONSIBLE AND SUPERVISE THEIR LICENSE PERSONNEL UNDER HIS/HER SUPERVISION, FOR THEIR SAFETY AND WORK PERFORMED IN THE AIRFIELD.
3. THE ELECTRICAL CONTRACTOR SHALL PROVIDE COPIES OF THEIR ELECTRICAL LICENSES AND VALID DRIVER LICENSES, TO BE SUBMITTED AND ATTACHED TO THE BID DOCUMENTS.
4. ALL ELECTRICIANS THAT WORK ON THE CONDUCTOR SPLICING, EXOTHERMIC CONNECTIONS AND TORQUE SHALL HAVE AT LEAST (3) YEARS WORK EXPERIENCE UNLESS CAN PROVIDE SOME TYPE OF CERTIFICATION.
5. THE MASTER ELECTRICIAN SHALL BE AVAILABLE AND CONSTANTLY VISIT AND SUPERVISE THE PROJECT.
6. ON PAYMENT OF MATERIALS – THE ELECTRICAL CONTRACTOR SHALL PROVIDE AN EXHIBITS SHOWING THE LENGTH AND MATERIAL DESCRIPTION USED IN EACH PHASE.
7. ALL EXISTING AND NEW BASE CANS SHALL BE CLEAN INSIDE FREE OF DIRT AND WATER BEFORE INSTALLING THE LED FIXTURES AND ISOLATION TRANSFORMERS. DO NOT INSTALL TRANSFORMERS UNTIL THE LED FIXTURES ARE READY TO BE INSTALLED AND PLACED. APPLY AN APPROVED COMPOUND ON BOLT THREADS AND TORQUE ACCORDINGLY PER MANUFACTURER RECOMMENDATIONS. THE LED LIGHT FIXTURES SHALL BE THE FINAL ITEMS TO BE INSTALLED AFTER THE PAVEMENT SURFACE HAS BEEN CLEANED. THE ELECTRICAL CONTRACTOR SHALL CHECK THE LED FIXTURE LENSES BEFORE ENERGIZING AND TURN–OVER TO AIRFIELD OPERATIONS.
8. ALL GROUND BARE CONDUCTOR CONNECTIONS SHALL BE EXOTHERMIC CADWELD ONLY. ONLY A SINGLE GROUND CONDUCTOR ALLOWED ON A SINGLE GROUND LUG. WRAPPED AROUND A 23M TAPE THOROUGHLY THE GROUND LUG BEFORE CONCRETE PLACEMENT.
9. ALL CONDUCTOR(S), GROUND CONDUCTOR CONNECTIONS AND LED FIXTURES SHALL BE TORQUE PER MANUFACTURER REQUIREMENTS. LED FIXTURES (CENTER AND EDGE LIGHTS) BOLTS ARE TO BE TORQUED, WITNESSED BY HAS INSPECTOR, RECORDED, DOCUMENTED, SIGNED AND DATED BY THE MASTER ELECTRICIAN SUBMITTED TO HAS ELECTRICAL INSPECTOR AND O&M MANUALS.
10. CONSTRUCTION NOTES: ALL CONDUITS SHALL BE RUN STRAIGHT, LEVEL AND UNIFORMITY THROUGHOUT INSTALLATION FROM POINT A TO POINT B.
11. CONSTRUCTION NOTES: ALL LIGHTING INSTALL IN THIS PROJECT SHALL BE LED FIXTURES AND MATCH THE TRANSFORMER PER MANUFACTURER RECOMMENDATIONS.
12. THE CONTRACTOR SHALL TRACE EXISTING CABLING SERVING THE TAXIWAY EDGE, TAXIWAY CENTERLINE, AND SIGN CIRCUITS. THESE CIRCUITS SHALL BE REPLACED IN KIND AND CONFIGURATION WHERE THEY ARE FOUND IN THE TAXIWAY FULL–STRENGTH AND SHOULDER PAVEMENT.
13. ALL CABLE REMOVAL COSTS SHALL BE SUBSIDIARY TO THE #8 AWG L–824C PAY ITEM. 2
14. WHEN TORQUING THE BOLTS, THE BOLTS SHALL BE SNUG BEFORE APPLYING THE TORQUE WRENCH. ALL TESTING AND TORQUING MUST BE WITNESSED BY HAS CONSTRUCTION MANAGEMENT ELECTRICAL INSPECTOR AND RECORDED. 2

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REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 3	7/05/23	MCL
2	ADD. 4	7/21/23	MCL

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

ELECTRICAL KEYED NOTES

PROJECT MGR:	JEF
DESIGNER:	RH
DRAWN BY:	RH
CHECK BY:	MCL
SCALE:	NONE
DATE:	07/24/2023

STATE OF TEXAS
MATTHEW C. LEMAY
112269
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	E01.02

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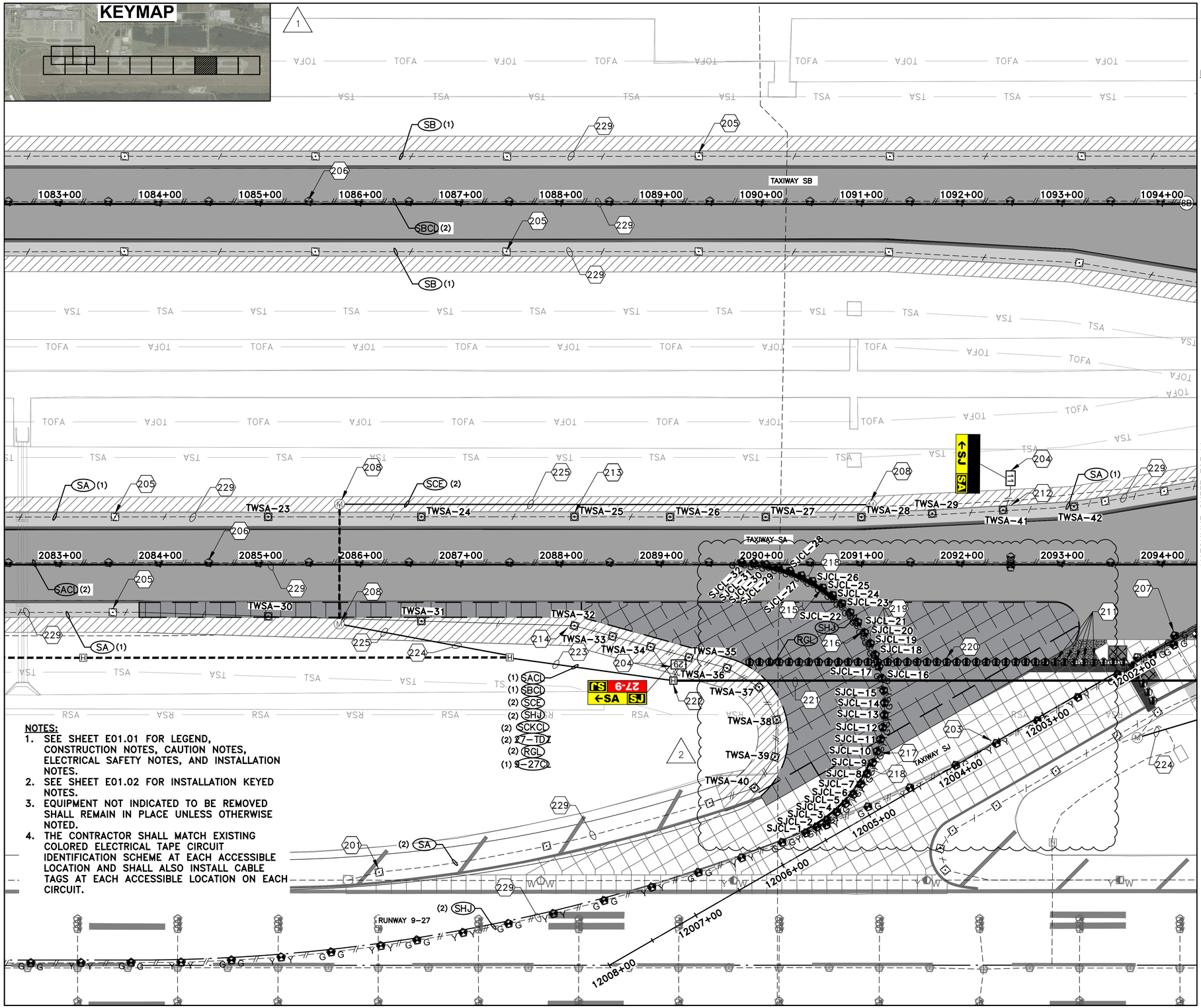
PLOT DATE: 3/10/2022 11:08:43 AM



NOTES:
1. SEE SHEET E01.01 FOR LEGEND, CONSTRUCTION NOTES, CAUTION NOTES, ELECTRICAL SAFETY NOTES, AND INSTALLATION NOTES.
2. SEE SHEET E01.02 FOR INSTALLATION KEYED NOTES.
3. EQUIPMENT NOT INDICATED TO BE REMOVED SHALL REMAIN IN PLACE UNLESS OTHERWISE NOTED.
4. THE CONTRACTOR SHALL MATCH EXISTING COLORED ELECTRICAL TAPE CIRCUIT IDENTIFICATION SCHEME AT EACH ACCESSIBLE LOCATION AND SHALL ALSO INSTALL CABLE TAGS AT EACH ACCESSIBLE LOCATION ON EACH CIRCUIT.

0 25' 50' 100' 150'
(IN FEET)

N

INSTALLATION KEYED NOTES:

201 INSTALL NEW L-861T(L) BASE MOUNTED TAXIWAY EDGE LIGHT ON EXISTING LIGHT BASE. (TYP.)

204 INSTALL NEW L-858(L) BASE MOUNTED GUIDANCE SIGN. (TYP.)

205 INSTALL NEW L-861T(L) BASE MOUNTED TAXIWAY EDGE LIGHT ON ADJUSTED LIGHT BASE. (TYP.)

206 INSTALL NEW L-852C(L) BASE MOUNTED TAXIWAY CENTERLINE LIGHT ON ADJUSTED LIGHT BASE. (TYP. OF STRAIGHT TAXIWAY CENTERLINES IN NEW PAVEMENT.)

207 INSTALL NEW L-852D(L) BASE MOUNTED TAXIWAY CENTERLINE LIGHT IN FULL STRENGTH PAVEMENT ON ADJUSTED LIGHT BASE. (TYP. OF CURVED TAXIWAY CENTERLINES IN NEW PAVEMENT.)

208 ADJUST EXISTING PULL BOX TO FINAL GRADE. MAKE ALL NECESSARY CABLE TERMINATIONS.

211 REINSTALL EXISTING L-852G ON NEW L-868 LIGHT BASE.

212 EXTEND 2" PVC CONDUIT FROM EXISTING SHOULDER TO NEW SIGN LOCATION. INSTALL 2/C #8 AWG L-824C CABLE TO NEW SIGN TRANFORMER AND SPLICE INTO EXISTING CIRCUIT AT THE NEXT JUNCTION LOCATION.

213 INSTALL NEW L-861T TAXIWAY EDGE LIGHT ON NEW BASE IN EXISTING ASPHALT PAVEMENT. (TYP).

214 INSTALL NEW L-861T TAXIWAY EDGE LIGHT ON NEW BASE IN NEW PAVEMENT. (TYP).

215 INSTALL NEW L-852D(L) TAXIWAY CENTERLINE LIGHTING IN EXISTING PAVEMENT WITH MILL AND OVERLAY. (TYP.)

216 INSTALL NEW L-852D(L) TAXIWAY CENTERLINE LIGHT IN NEW CONCRETE PAVEMENT. (TYP.)

217 INSTALL NEW L-852D(L) TAXIWAY CENTERLINE LIGHT IN EXISTING CONCRETE PAVEMENT. (TYP.)

218 CONSTRUCT 1-WAY 2"C CONCRETE ENCASED CONDUIT IN EXISTING PAVEMENT VIA SAW KERF.

219 CONSTRUCT 1-WAY 2"C CONCRETE ENCASED CONDUIT IN NEW PAVEMENT.

220 INSTALL NEW L-852G(L) RUNWAY GUARD LIGHT INSTALLED IN NEW PAVEMENT. (TYP.)

221 CONSTRUCT NEW 16-WAY 2" DIRECTIONALLY BORED DUCT BANK WITH CONDUCTORS AS NOTED.

222 INSTALL NEW 4'x4'x4' AIRCRAFT-RATED HANDHOLE. (TYP.)

223 CONSTRUCT NEW 16-WAY 2" NON-ENCASED DUCT BANK.

224 CONSTRUCT NEW 2-WAY 2"C NON-ENCASED DUCT BANK.

225 CONSTRUCT NEW 2-WAY 2"C FLOWABLE FILL ENCASED DUCT BANK.

229 INSTALL NEW #8 AWG L-824C CABLE WITH EXISTING CONDUIT. (NUMBER OF CONDUCTORS INDICATED BY HASH MARKS)

HOUSTON AIRPORTS

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TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADDENDUM NO. 3	07/05/23	
2	ADDENDUM NO. 4	07/24/23	

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

ELECTRICAL INSTALLATION PLAN X

PROJECT MGR:	JEF
DESIGNER:	RH
DRAWN BY:	RH
CHECK BY:	MCL
SCALE:	1"=50'
DATE:	07/24/2023

STATE OF TEXAS
MATTHEW C. LEMAY
112269
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY:	JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	E03.10

HAS FILE: C:\Users\MCLemay\Garver\IAH - TXYS SA SB REHAB - Aviation - 10646.2\14 - Electrical\Sheet Files\ELECTRICAL INSTALLATION PLAN X.dwg
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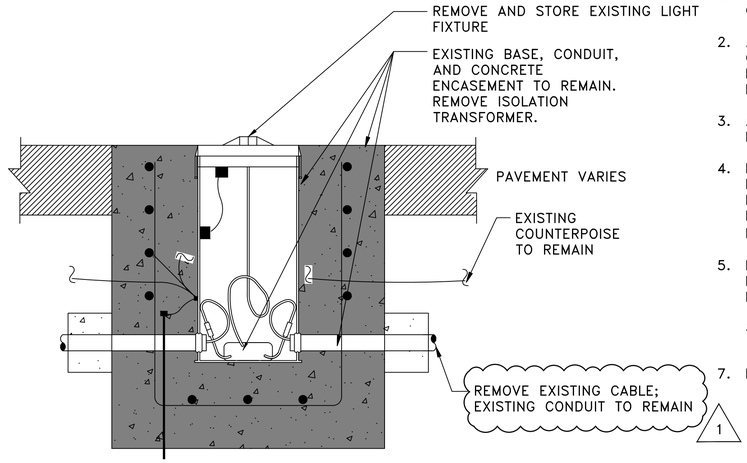
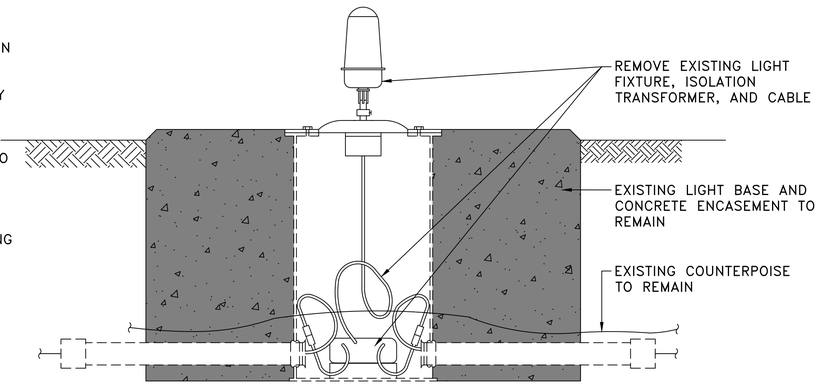


REMOVAL NOTES:

1. THE AIRPORT RESERVES THE RIGHT TO SALVAGE USABLE COMPONENTS.
2. ALL LIGHTING AND DEVICES SHALL BE REMOVED BY THE CONTRACTOR. THE ENGINEER AND AIRPORT WILL REVIEW THE REMOVED EQUIPMENT. ITEMS DESIGNATED AS SALVAGE SHALL THEN BE MOVED AND STORED AS DIRECTED BY AIRPORT.
3. ALL ITEMS THAT ARE NOT TO BE SALVAGED SHALL BE CAREFULLY REMOVED FROM THE AIRPORT AND PROPERLY DISPOSED.
4. FOR FIXTURE REINSTALLATION, REMOVE AND STORE EQUIPMENT. INSTALL NEW STEEL BLANK COVER WITH GASKET AND 6 BOLTS TO PROTECT CAN AND INTERIOR DURING CONSTRUCTION. THEN REINSTALL FIXTURE, BASEPLATE AND NEW EQUIPMENT/APPURTENANCES FOR COMPLETE INSTALLATION.
5. FOR EXISTING LIGHT FIXTURE REINSTALLATIONS, ONLY THE EXISTING LIGHT FIXTURE AND BASE PLATE SHALL BE REUSED. ALL OTHER EQUIPMENT AND APPURTENANCES SHALL BE NEW.
   A. NEVER USE IMPACT WRENCHES/DRILLS WHEN REMOVING OR INSTALLING BOLTS.
7. DETAIL ALSO APPLIES TO ABANDONED INPAVEMENT LIGHT BASES.

1 / E04.01 BASE MOUNTED IN-PAVEMENT LIGHT REMOVAL
SCALE: NONE



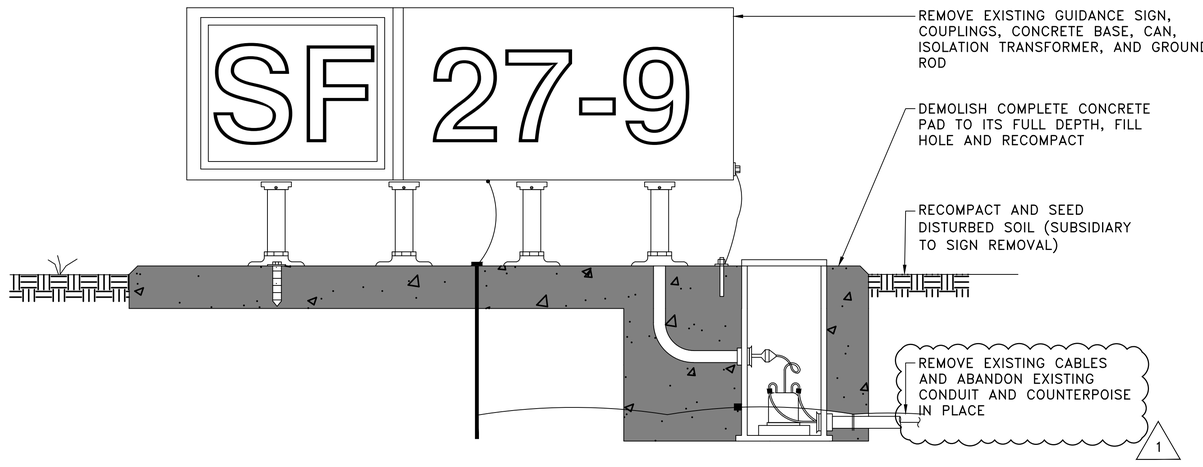
REMOVAL NOTES:

1. THE AIRPORT RESERVES THE RIGHT TO SALVAGE USABLE COMPONENTS.
2. ALL LIGHTING AND DEVICES SHALL BE REMOVED BY THE CONTRACTOR. THE ENGINEER AND AIRPORT WILL REVIEW THE REMOVED EQUIPMENT. ITEMS DESIGNATED AS SALVAGE SHALL THEN BE MOVED AND STORED AS DIRECTED BY AIRPORT.
3. ALL ITEMS THAT ARE NOT TO BE SALVAGED SHALL BE CAREFULLY REMOVED FROM THE AIRPORT AND PROPERLY DISPOSED.

2 / E04.01 BASE MOUNTED EDGE LIGHT REMOVAL, BASE TO REMAIN
SCALE: NONE

REMOVAL NOTES:

1. THE AIRPORT RESERVES THE RIGHT TO SALVAGE USABLE COMPONENTS.
2. ALL LIGHTING AND DEVICES SHALL BE REMOVED BY THE CONTRACTOR. THE ENGINEER AND AIRPORT WILL REVIEW THE REMOVED EQUIPMENT. ITEMS DESIGNATED AS SALVAGE SHALL THEN BE MOVED AND STORED AS DIRECTED BY AIRPORT.
3. ALL ITEMS THAT ARE NOT TO BE SALVAGED SHALL BE CAREFULLY REMOVED FROM THE AIRPORT AND PROPERLY DISPOSED.



3 / E04.01 BASE MOUNTED SIGN REMOVAL
SCALE: NONE

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REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 4	7/24/23	MCL

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

ELECTRICAL DETAILS I

PROJECT MGR:	JEF
DESIGNER:	RH
DRAWN BY:	RH
CHECK BY:	MCL
SCALE:	NONE
DATE:	07/24/2023

STATE OF TEXAS
MATTHEW C. LEMAY
112269
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	E04.01

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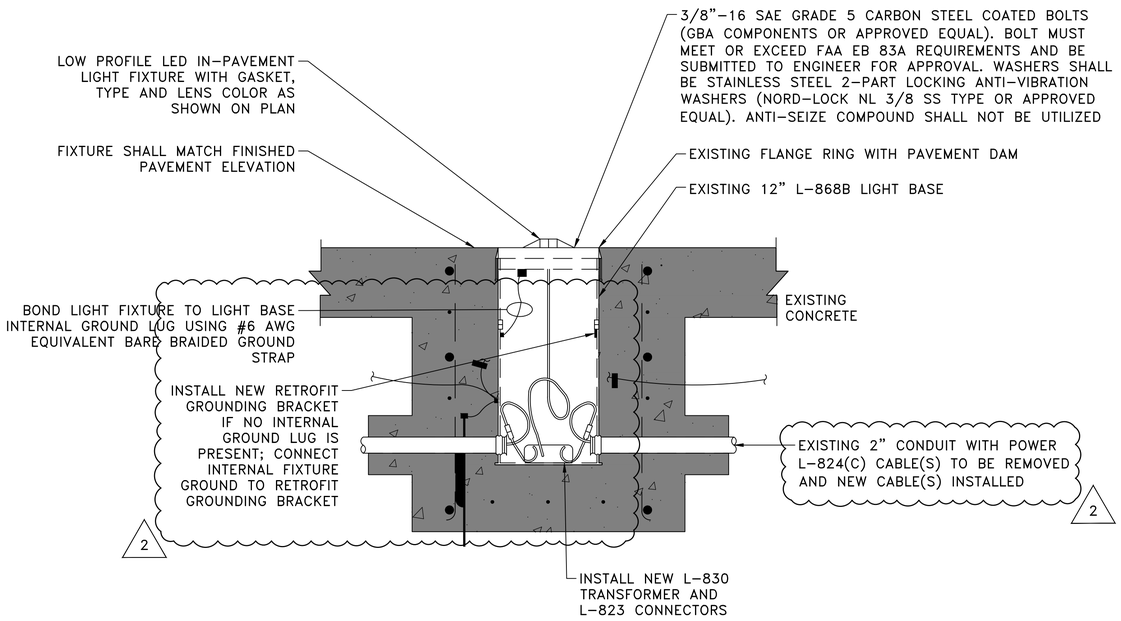
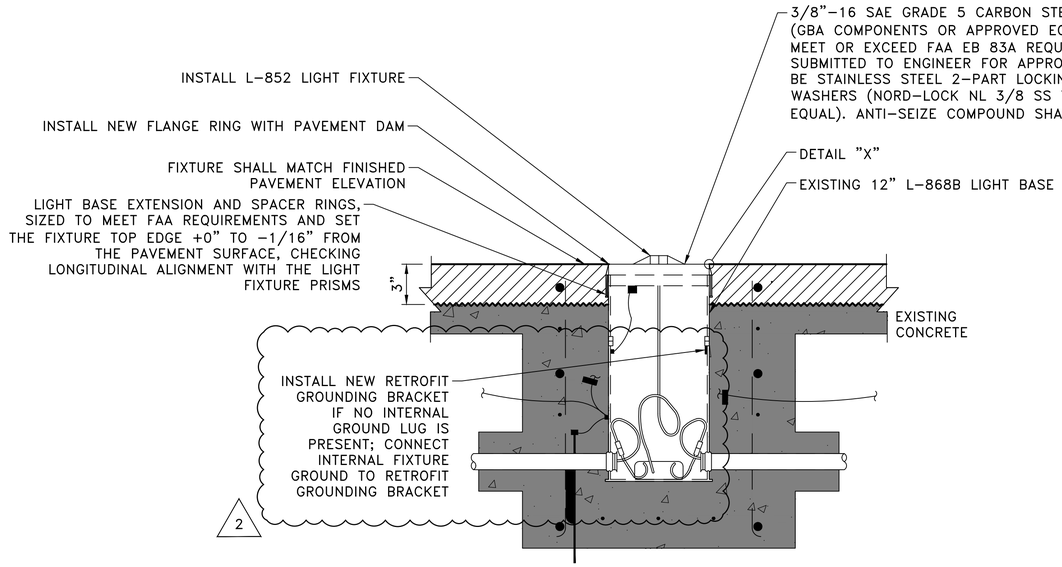
PLOT DATE: 3/10/2022 11:08:43 AM



SECTION VIEW
SCALE: NONE

1 E04.02 BASE MOUNTED IN–PAVEMENT LIGHT INSTALLATION – EXISTING BASE

SCALE: NONE



SECTION VIEW
SCALE: NONE

2 E04.02 BASE MOUNTED IN–PAVEMENT LIGHT – PAVEMENT OVERLAY

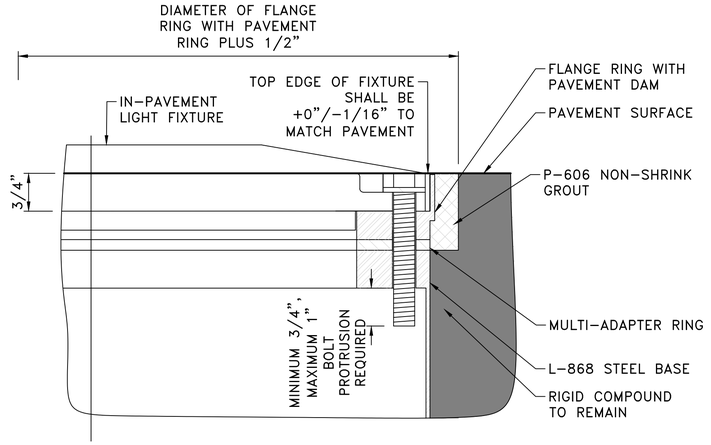
SCALE: NONE

INSTALLATION NOTES:

1. REMOVE AND STORE LIGHT FIXTURE.
2. REMOVE EXISTING FLANGE RING, ANY SPACER RINGS, AND CORE OUT TOP SECTION OF THE CAN AS ASPHALT IS MILLED DOWN. INSTALL BLANK COVER ON BOTTOM SECTION OF THE CAN.
3. PRIOR TO THE ASPHALT OVERLAY, INSTALL NEW TOP SECTION OF CAN WITH MUD PLATE.
4. AFTER ASPHALT OVERLAY, LOCATE CENTER OF CAN VIA MUD PLATE. CORE OUT TOP OF CAN WITH 14" CORE.
5. INSTALLING NEW FLANGE RING AND APPROPRIATE SPACER RINGS TO MATCH TOP OF PAVEMENT ELEVATION.
6. INSTALL SEALANT BETWEEN FLANGE RING AND CONCRETE.
7. AFTER OVERLAY WORK HAS BEEN COMPLETED, REINSTALL EXISTING LIGHT FIXTURE WITH NEW BOLTS.

IN–PAVEMENT NOTES:

1. INSTALL NEW L–823 CONNECTOR KITS WITH HEAT SHRINK AND CABLE TAGS AT ALL LIGHTS.
2. INSTALL IN–PAVEMENT LIGHT FIXTURES WITH NEW APPURTENANCES IN ACCORDANCE WITH FAA GUIDELINES AND MANUFACTURER'S RECOMMENDATIONS FOR A COMPLETE INSTALLATION.
3. SUBMIT FIXTURE AND ACCESSORIES INSTALLATION METHOD SHOP DRAWINGS WITH BOLT TORQUE CALCULATIONS FOR REVIEW AND APPROVAL PRIOR TO STARTING WORK. MINIMUM BOLT TORQUE MUST BE 333 IN–LB ± 10 IN–LBS. TWO WEEKS AFTER INSTALLATION, COORDINATE RUNWAY CLOSURE AND CHECK TORQUE ON ALL FIXTURES.
4. DEMONSTRATE PROPER INSTALLATION LOCATION, ELEVATION, AND ORIENTATION PRIOR TO PAVING WORK.
5. TAKE ALL MEASUREMENTS REQUIRED TO INSTALL NEW FIXTURES IN ACCORDANCE WITH FAA AC AND MANUFACTURER INSTALLATION REQUIREMENTS. ALL WORK MUST BE TO THE SATISFACTION OF THE ENGINEER.
6. UTILIZE A DIGITAL ELECTRONIC TORQUE–ANGLE WRENCH THAT HAS VISUAL AND AUDIBLE WARNINGS SO THAT PRECISE TORQUE AND ROTATION ANGLE CAN BE ACHIEVED. TORQUE BOLTS IN A STAR PATTERN. PROVIDE WRENCH CALIBRATION CERTIFICATE TO ENGINEER PRIOR TO WORK.
7. NEVER USE IMPACT WRENCHES / DRILLS WHEN REMOVING OR INSTALLING BOLTS.
8. A BEVEL SPACER RING OR DIAL–A–BEVEL 2–PIECE SPACER RING MAY BE REQUIRED TO PROPERLY INSTALL FIXTURES ON LIGHT BASES.
9. TO PRESERVE THE LIGHT BASE INTEGRITY AND PROPER BOLT TORQUE, A MAXIMUM OF (3) THREE RINGS MAY BE STACKED TOGETHER TO BRING LIGHT FIXTURES TO THE CORRECT ELEVATION. THIS MAXIMUM LIMIT INCLUDES FLANGE RINGS, SPACER RINGS, AND BEVEL RINGS.
10. THE CONTRACTOR MUST BE RESPONSIBLE TO MEASURE AND DETERMINE THE REQUIRED THICKNESS OF EACH INDIVIDUAL SPACER RING REQUIRED TO PUT THE FIXTURE AT THE CORRECT ELEVATION, AZIMUTH, AND ROTATION PER FAA ADVISORY CIRCULARS.
11. IF IN–PAVEMENT FIXTURE ASSEMBLY OR FAILED PHOTOMETRIC TEST INDICATE AN INCORRECT ELEVATION OR ORIENTATION, THE CONTRACTOR MUST EXPEDITIOUSLY OBTAIN THE CORRECT SPACER RINGS TO CORRECT THE PROBLEM IMMEDIATELY TO THE SATISFACTION OF THE ENGINEER, WHICH WILL INCLUDE A SECOND PHOTOMETRIC TEST. ALL SUCH WORK AND ADDITIONAL TESTING MUST BE PERFORMED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.



DETAIL NOTES:

1. INITIALLY, INSTALL AND TIGHTEN DOWN ALL ITEMS FOR PROPER FIT AND ORIENTATION FOR FINAL INSPECTION AND CHECKING THAT THE ASSEMBLY IS WITHIN TOLERANCE. MARK ALL ITEMS CAREFULLY AND THEN DISASSEMBLE. THEN REASSEMBLE AND INSTALL NEW SEALANTS.

3 E04.02 DETAIL 'X'

SCALE: NONE

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TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 3	7/05/23	MCL
2	ADD. 4	7/24/23	MCL

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

ELECTRICAL DETAILS II

PROJECT MGR:	JEF
DESIGNER:	RH
DRAWN BY:	RH
CHECK BY:	MCL
SCALE:	NONE
DATE:	07/24/2023

STATE OF TEXAS
MATTHEW C. LEMAY
112269
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO. 0646A
A.I.P. NO. XXXX
C.I.P. NO. A-0515
H.A.S. NO. 20C0646A
SHEET NO. E04.02

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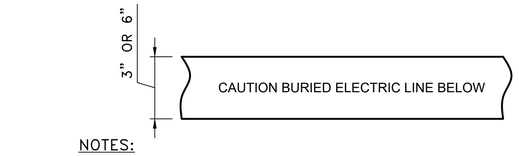
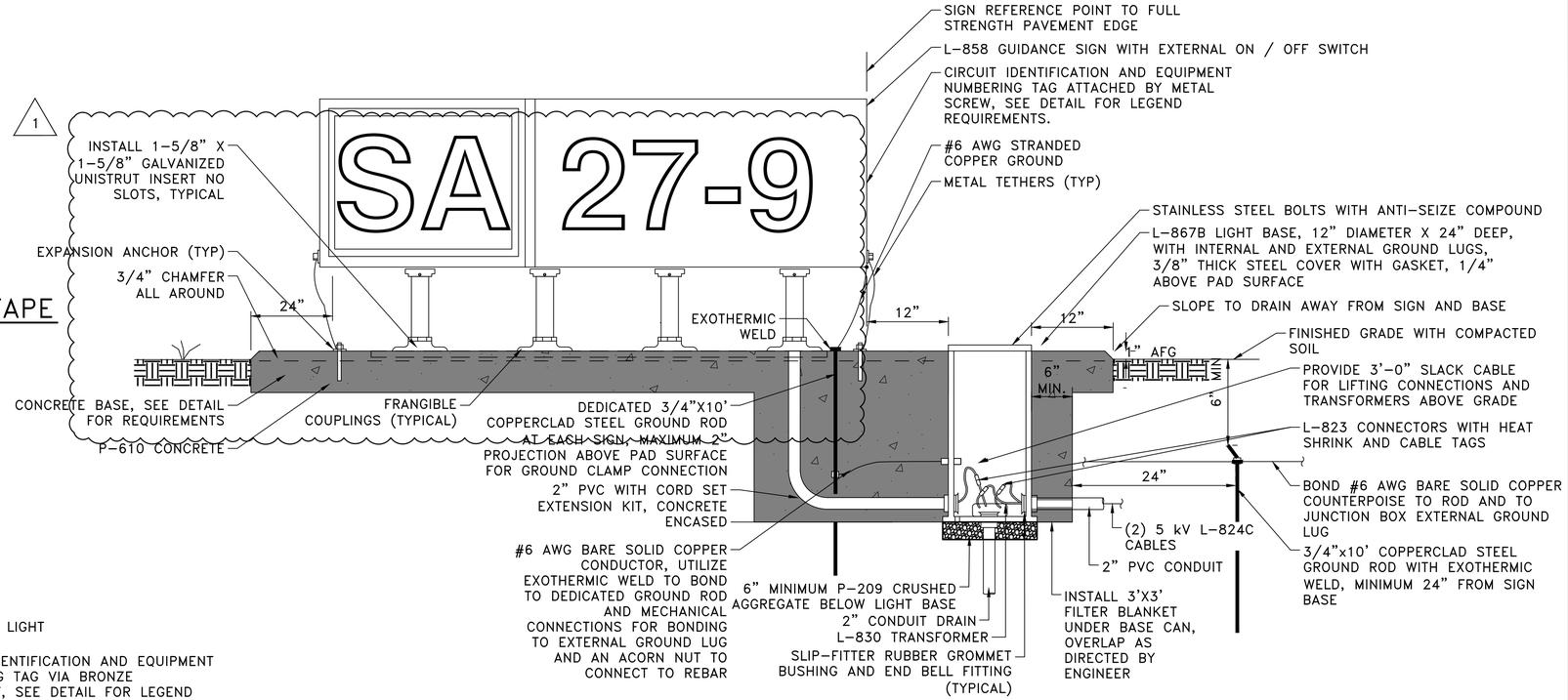


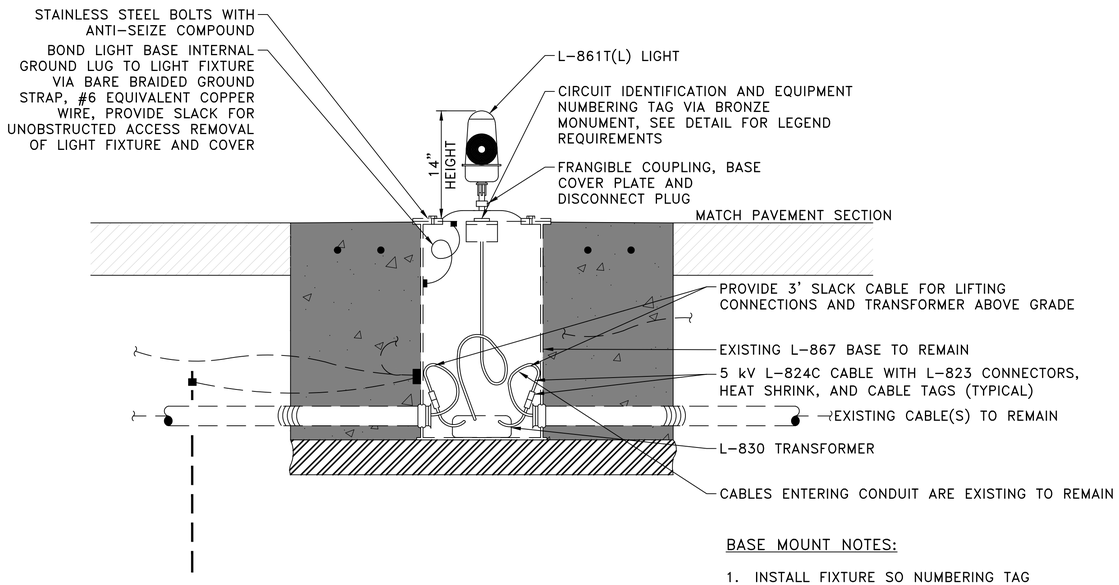
NOTES:

1. POWER MARKING TAPES SHALL BE DETECTABLE TYPE CONSTRUCTION WITH RED BACKGROUND AND BLACK LETTERING.
2. TAPE SHALL BE DETECTABLE, DURABLE, HIGHLY VISIBLE, RESISTANT TO ELEMENTS, MEETING AND / OR EXCEEDING ALL INDUSTRY STANDARDS.
3. PROVIDE MULTIPLE AND / OR WIDER TAPES FOR WIDER DUCT BANKS. COORDINATE WITH ENGINEER.

1 E04.03 UNDERGROUND DETECTABLE WARNING TAPE

SCALE: NONE





BASE MOUNT NOTES:

1. INSTALL FIXTURE SO NUMBERING TAG MONUMENT FACE PAVEMENT EDGE.

2 E04.03 BASE MOUNTED IN–PAVEMENT TAXIWAY EDGE LIGHT INSTALLATION – EXISTING BASE

SCALE: NONE

SIGN NOTES:

1. INSTALL SIGN IN ACCORDANCE WITH FAA GUIDELINES AND MANUFACTURER'S RECOMMENDATIONS.
2. INSTALL NEW L–823 CONNECTOR KITS WITH HEAT SHRINK AND CABLE TAGS AT ALL LIGHTS AND GUIDANCE SIGNS.
3. SUBMIT SIGN AND BASE CAN INSTALLATION METHOD SHOP DRAWINGS FOR REVIEW AND APPROVAL PRIOR TO STARTING WORK.
4. DEMONSTRATE PROPER INSTALLATION LOCATION, ELEVATION, AND ORIENTATION PRIOR TO CONCRETE WORK.
5. COUNTERPOISE SHALL BE BONDED TO LIGHT BASE EXTERNAL GROUND LUG (EQUIPOTENTIAL METHOD LIGHTNING PROTECTION).
6. INSTALL A DEDICATED EQUIPMENT SAFETY GROUND ROD WITH EXOTHERMIC WELD AT EACH SIGN.
7. UTILIZE ONLY EXOTHERMIC WELDS BELOW GRADE.
8. PROVIDE MINIMUM 3'–0" SLACK CABLE FOR EACH CABLE ENTERING LIGHT BASE SO THAT L–823 CONNECTIONS CAN BE LIFTED OUT OF THE BASE ABOVE GRADE.
9. PROVIDE TETHER FOR ALL SIGNS USING 3/16" STAINLESS STEEL AIRCRAFT CABLE AND STAINLESS STEEL HARDWARE. PROVIDE SINGLE MODULE SIGNS WITH ONE TETHER. PROVIDE MULTIPLE MODULE SIGNS WITH A TETHER AT BOTH ENDS.
10. TETHERS AND GROUND BONDING CONDUCTOR SHALL BE SUFFICIENT LENGTH TO ALLOW THE FRANGIBLE COUPLINGS TO OPERATE PROPERLY AND POWER CABLE TO DISCONNECT IF THE SIGN FALLS OVER.
11. RESOD THE DISTURBED AREAS 3'–0" ALL AROUND THE SIGN AND GRADE SOIL TO PROVIDE DRAINAGE AWAY FROM SIGN BASE.
12. FOR SIGN BASES INSTALLED WITHOUT SIGNS, SEAL THE POWER LEG CONDUIT ENTRANCE WATERTIGHT VIA AN APPROVED METHOD THAT CAN BE REMOVED IN THE FUTURE.
13. ALL NEW SIGN SHALL BE INSTALL AND BOLTED TO A UNISTRUT 1–5/8 X 1–5/8 GALVANIZED, NO SLOTS AND EMBEDDED TO THE POURED FOUNDATION.
14. COORDINATE THE SPACING OF THE UNISTRUT IN THE SIGN FOUNDATION WITH THE BOLT CIRCLE DIMENSION OF THE MANUFACTURER OF THE SIGN LEG FLANGE.

1 3 E04.03 BASE MOUNTED SIGN INSTALLATION

SCALE: NONE

HOUSTON AIRPORTS

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(713) 491-8333
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REVISIONS			
NO.	DESCRIPTION	DATE	BY
1	ADD. 4	7/24/23	MCL

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

ELECTRICAL DETAILS III

PROJECT MGR:	JEF
DESIGNER:	RH
DRAWN BY:	RH
CHECK BY:	MCL
SCALE:	NONE
DATE:	07/24/2023

STATE OF TEXAS
MATTHEW C. LEMAY
112269
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY:	JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	E04.03

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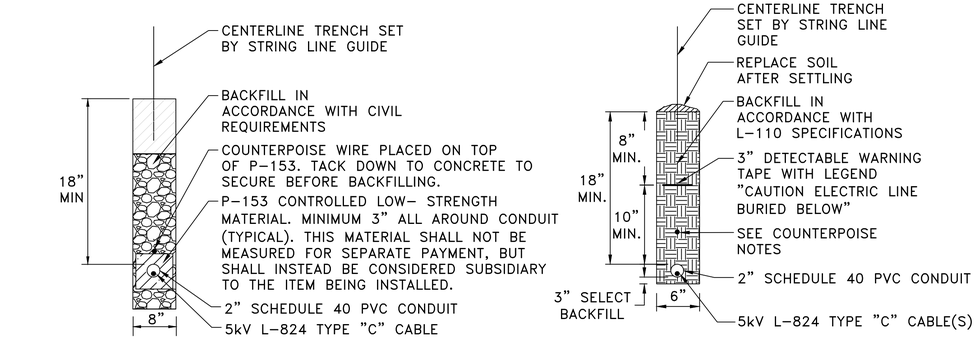
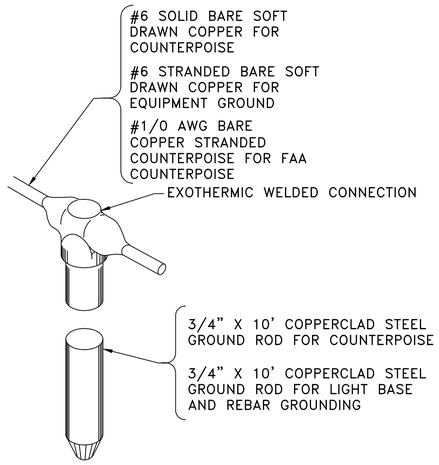


1 TRENCH DETAILS
E04.04 SCALE: NONE

COUNTERPOISE NOTES:

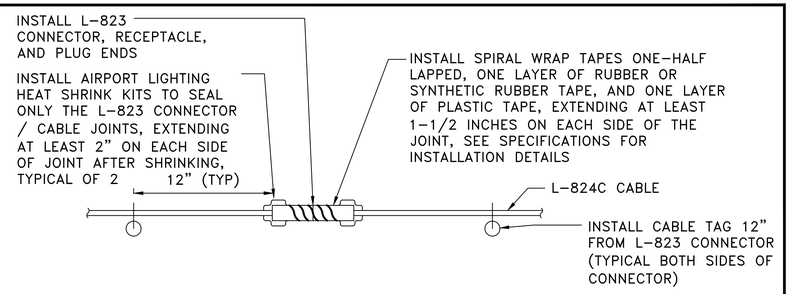
1. COUNTERPOISE GROUND RODS SHALL BE STAINLESS STEEL 3/4" X 10'-0" SIZE, SPACED A MAXIMUM OF 500'-0" APART.
2. CONNECT COUNTERPOISE GROUND RODS AND CONDUCTORS WITH EXOTHERMIC WELDS ONLY.
3. GROUND RODS SHALL BE DRIVEN VERTICALLY FULL DEPTH PLUS 6" COVER MINIMUM.
4. THE COUNTERPOISE SHALL BE INSTALLED 3" MINIMUM ABOVE THE CONDUIT.



2 TYPICAL GROUND ROD CONNECTION
E04.04 SCALE: NONE

GROUND ROD NOTES:

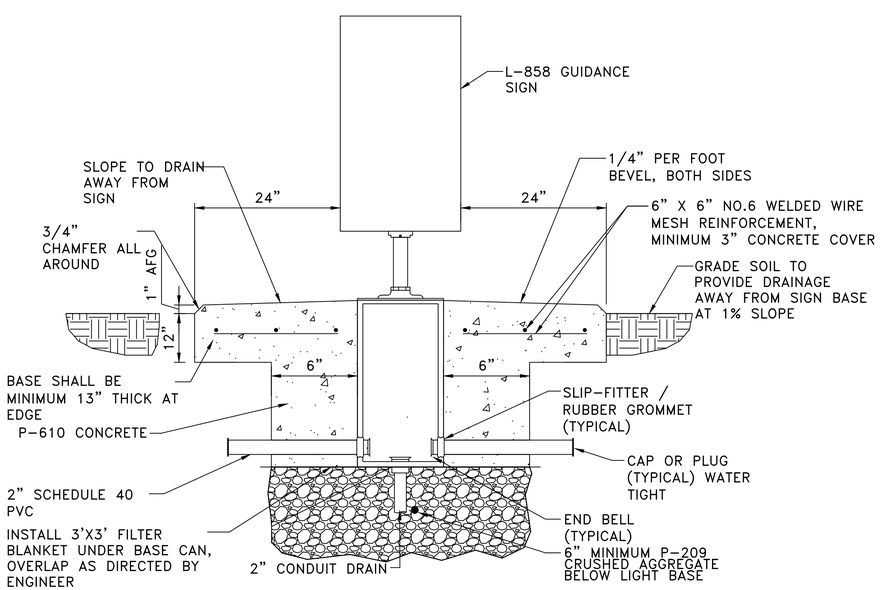
1. GROUND RODS SHALL BE INSTALLED NOT MORE THAN 500 FEET APART FOR COUNTERPOISE AND AS SHOWN ON LAYOUT PLAN SHEETS.
2. ONE GROUND ROD SHALL BE INSTALLED AT EACH LIGHT BASE FOR GROUNDING THE LIGHT BASE AND ASSOCIATED STEEL REINFORCEMENT.



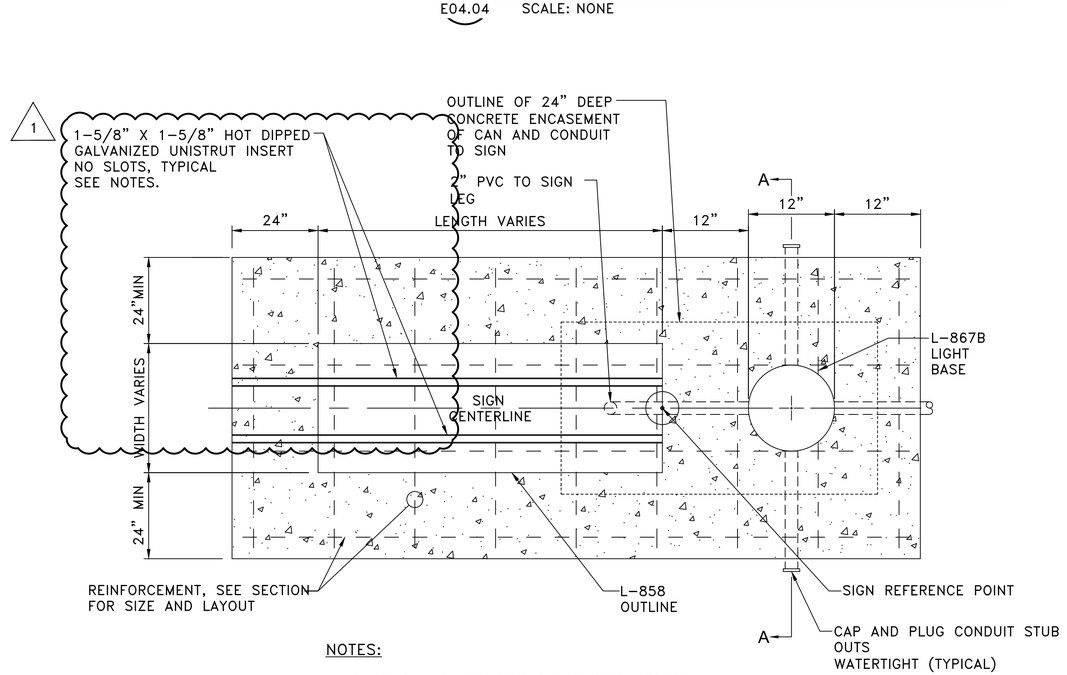
CONNECTOR NOTES:

1. IN-LINE CONNECTIONS OR SPLICES OF UNDERGROUND CABLES WITHIN MANHOLES, HANDHOLES, LIGHT BASES, OR OTHER ACCESSIBLE LOCATIONS SHALL BE MADE USING L-823 CONNECTOR KITS.
2. PROVIDE CABLE IN CONTINUOUS LENGTHS FOR HOME RUNS OR OTHER LONG CABLE RUNS WITHOUT CONNECTIONS, UNLESS AUTHORIZED IN WRITING BY THE ENGINEER OR SHOWN ON THE PLANS.
3. INSTALL 2-PIECE HEAT SHRINK KIT ON PRIMARY CABLE CONNECTORS.
4. DO NOT INSTALL HEAT SHRINK ON SECONDARY CABLE CONNECTORS OF THE ISOLATION TRANSFORMERS.
5. AS AN OPTION, THE CONTRACTOR MAY UTILIZE ENHANCED FAA CERTIFIED L-823 CONNECTOR KITS, SUCH AS THE AMERACE 54 SUPER KIT, OR AN APPROVED EQUAL. THESE KITS DO NOT REQUIRE TAPING OR HEAT SHRINKING. THESE KITS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION REQUIREMENTS. NOTE THAT THE MIXING OF CONNECTOR KITS IS UNACCEPTABLE. THE CONTRACTOR SHALL CLEARLY LIST AND SUBMIT THE CONNECTOR KITS HE PROPOSES TO UTILIZE ON THE PROJECT FOR APPROVAL PRIOR TO ANY FIELD CONSTRUCTION WORK, AND HE SHALL ONLY INSTALL THAT TYPE DURING CONSTRUCTION UNLESS OTHERWISE NOTED BY THE ENGINEER.

3 L-823 CONNECTOR INSTALLATION FOR CAN AND CONDUIT SYSTEM
E04.04 SCALE: NONE



4 SIGN BASE SECTION A-A
E04.04 SCALE: NONE



NOTES:

1. NUMBER AND LOCATION OF INSET UNISTRUTS VARIES ON MANUFACTURER SIZE OF SIGN AND MODULES.

5 SIGN BASE PLAN
E04.04 SCALE: NONE

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REVISIONS

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1	ADD. 4	7/24/23	MCL

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

ELECTRICAL DETAILS IV

PROJECT MGR:	JEF
DESIGNER:	RH
DRAWN BY:	RH
CHECK BY:	MCL
SCALE:	NONE
DATE:	07/24/2023

STATE OF TEXAS
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APPROVED BY: JEF

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SHEET NO.	E04.04

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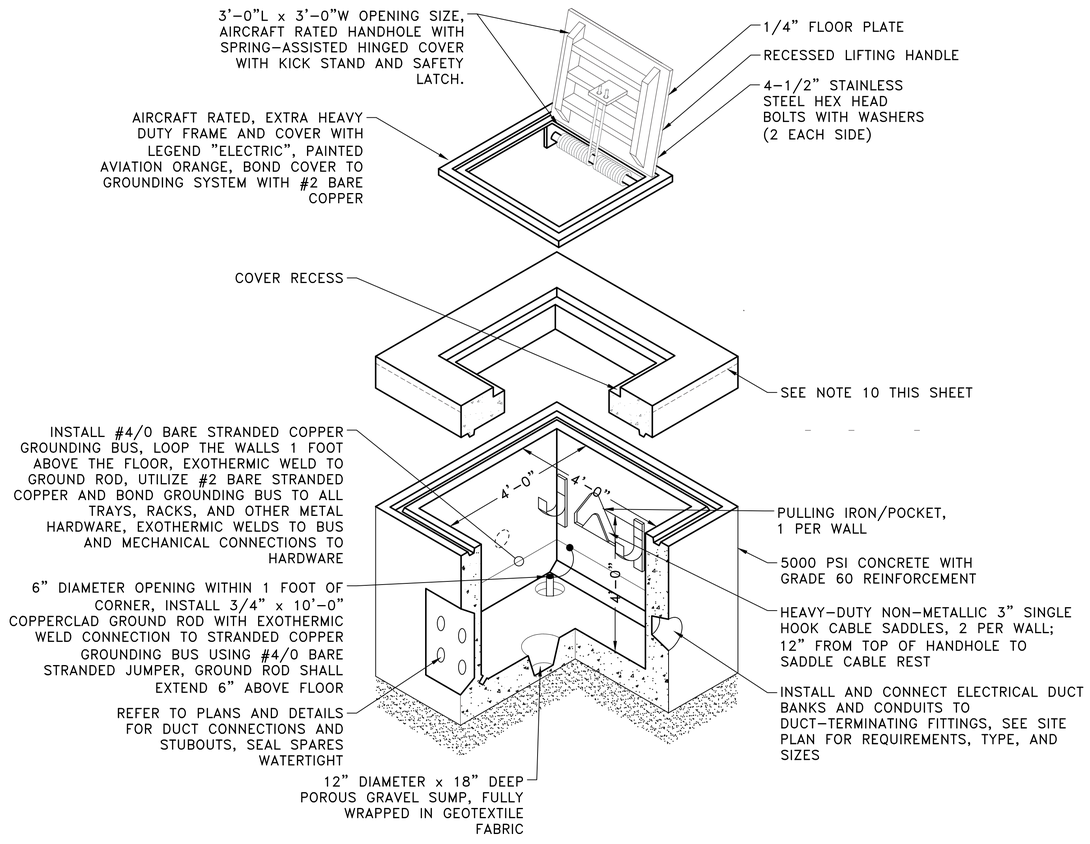
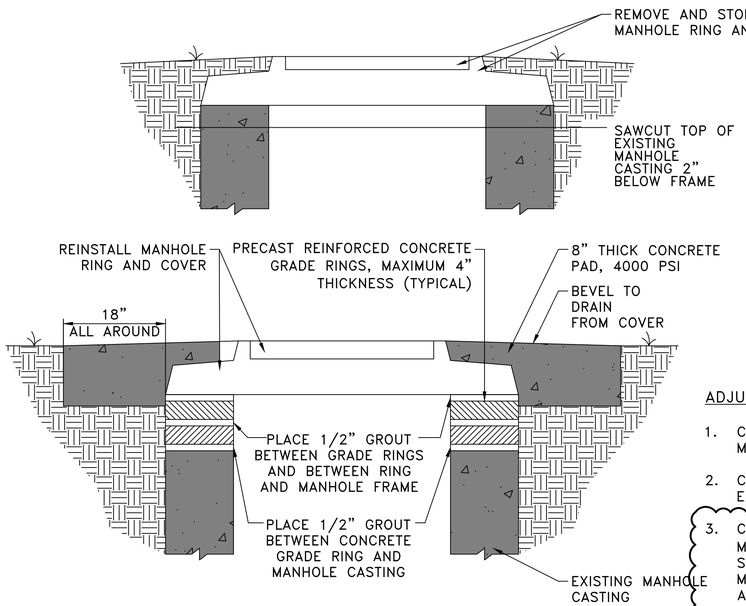


1 E04.05 PREFABRICATED CONCRETE HANDHOLE

SCALE: NONE

HANDHOLE INSTALLATION NOTES:

1. PRECAST AIRCRAFT RATED CONCRETE HANDHOLE AND GALVANIZED STEEL COVER SHALL BE DESIGNED FOR THE FOLLOWING LOADINGS (PER AC 150/5320-6):
   A. HANDHOLE COVERS FOR 100,000 LB. WHEEL LOADS WITH 250 PSI TIRE PRESSURE.
   B. FOR SPANS OF 2 FEET OR LESS IN THE LEAST DIRECTION, A UNIFORM LIVE LOAD OF 250 PSI.
   C. FOR SPANS OF 2 FEET OR GREATER IN THE LEAST DIRECTION, THE DESIGN WILL BE BASED ON THE NUMBER OF WHEELS WHICH WILL FIT THE SPAN. WHEEL LOADS OF 50,000 TO 75,000 LB. SHOULD BE CONSIDERED.
2. ALL CABLE THROUGH HANDHOLE SHALL HAVE SUFFICIENT SLACK SO CABLE AND CONNECTOR CAN BE BROUGHT TO SURFACE FOR SPLICING, PROVIDE MINIMUM 5' SLACK FOR EACH CABLE ENTERING HANDHOLE.
3. EACH CABLE SHALL BE IDENTIFIED WITH WIRE MARKER GIVING CIRCUIT NUMBER.
4. RACK AND SECURE ALL CABLES. MAINTAIN MINIMUM 6" SEPARATION DISTANCE BETWEEN 5kV AND 600V CIRCUITS.
5. TAG LIGHTING CIRCUIT CABLES IN ALL CONCRETE STRUCTURES (TWO REQUIRED PER CABLE).
6. AT ROD OPENING, DRIVE GROUND ROD INTO EARTH LEAVING 6" EXTENDING ABOVE FLOOR. SEAL HOLE WATERTIGHT WITH PORTLAND CEMENT GROUT AROUND ROD.
7. SUBMIT LAYOUT OF EACH HANDHOLE FOR APPROVAL BY ENGINEER, INDICATING ELECTRICAL DUCT, CONDUIT, AND SPARE STUBOUTS.
8. PROVIDE TERMINATORS FOR CONNECTING 2" CONDUITS AND MULTIWAY 2"C DUCT BANKS. CAP CONDUIT AND TERMINATOR SPARES WATERTIGHT.
9. EXCAVATION AND BACKFILL NECESSARY FOR THE CONSTRUCTION OF THE HANDHOLE SHALL BE PERFORMED IN ACCORDANCE WITH THE SPECIFICATION REQUIREMENTS.
10. COVER SHALL BE 1" MAXIMUM ABOVE FINISHED GRADE. AREA SURROUNDING HANDHOLE SHALL BE GRADED TO DRAIN AWAY FROM HANDHOLE.
11. BOND AND GROUND COVER AND FRAME TO ROD USING BRAIDED COPPER GROUND STRAP EQUIVALENT AMPACITY TO #2 AWG STRANDED COPPER WIRE.
12. INSTALL PULLING IRONS IN EACH FACE.
13. GRADE THE AREA AROUND THE HANDHOLE 10' IN ALL DIRECTIONS SUCH TO PREVENT WATER AND DIRT ACCUMULATION ACROSS THE TOP OF THE COVER AND ALLOW WATER TO DRAIN AWAY FROM THE HANDHOLE. COORDINATE WITH GRADING PLAN.
14. SOD THE DISTURBED AREAS 5' ALL AROUND THE STRUCTURE.
15. EXTEND ALL SPARE CONDUIT STUBOUTS A MINIMUM OF 12" BEYOND EDGE OF HOUSEKEEPING PAD.
16. PROVIDE MANUFACTURER DRAWINGS AND STRUCTURAL CALCULATIONS FOR ALL CONCRETE ELEMENTS OF HANDHOLES AND FRAMES AND GRATES.



2 E04.05 MANHOLE ELEVATION ADJUSTMENT

SCALE: NONE

ADJUSTMENT NOTES:

1. COORDINATE GRADE RING THICKNESS TO MATCH THE NEW FINAL GRADE.
2. COORDINATE GRADE RING SIZES TO MATCH EXISTING MANHOLE SIZES.
3. CONTRACTOR SHALL INVESTIGATE EACH MANHOLE/JUNCTION STRUCTURE TYPE AND SUBMIT A SHOP DRAWING TO ILLUSTRATE MEANS AND METHODS TO COMPLETE THE ADJUSTMENT.

1

1

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REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 4	7/24/23	MCL

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

ELECTRICAL DETAILS V

PROJECT MGR:	JEF
DESIGNER:	RH
DRAWN BY:	RH
CHECK BY:	MCL
SCALE:	NONE
DATE:	07/24/2023

STATE OF TEXAS
MATTHEW C. LEMAY
112269
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO. 0646A
A.I.P. NO. XXXX
C.I.P. NO. A-0515
H.A.S. NO. 20C0646A
SHEET NO. **E04.05**

HAS FILE: C:\Users\MCLemay\Garver\AH - TXYS SA SB REHAB - Aviation - 10646.2\14 - Electrical\Sheet Files\ELECTRICAL DETAILS V.dwg
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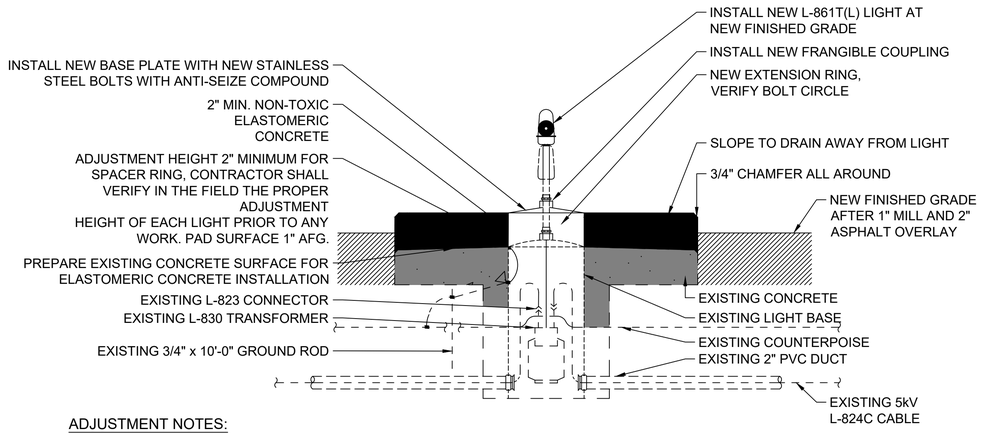

ADJUSTMENT NOTES:

1. DOWEL BARS SHALL HAVE 4" MINIMUM EMBEDMENT INTO THE EXISTING BASE.
2. INSTALL DOWEL BARS TO ANCHOR NEW CONCRETE, MINIMUM 6" FROM EDGE OF BASE, AT 12" O.C. MAXIMUM SPACING AROUND PERIMETER.
3. CONTRACTOR TO PROVIDE INSTALLATION SHOP DRAWING FOR CONSTRUCTION MEANS AND METHODS.

2 / E04.07 BASE MOUNTED EDGE LIGHT ADJUSTMENT

SCALE: NONE

1

HAS FILE: C:\Users\MCLemay\Garver\AH - TXYS SA SB REHAB - Aviation - 10646.2\14 - Electrical\Sheet Files\ELECTRICAL DETAILS VII.dwg
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TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 4	7/21/23	MCL

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

ELECTRICAL DETAILS VII

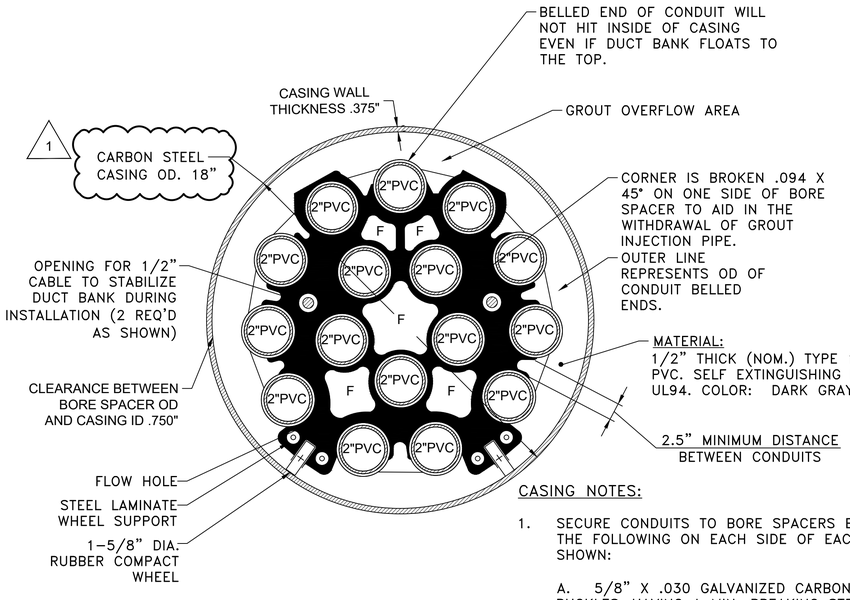
PROJECT MGR:	JEF
DESIGNER:	RH
DRAWN BY:	RH
CHECK BY:	MCL
SCALE:	NONE
DATE:	07/24/2023

STATE OF TEXAS
MATTHEW C. LEMAY
112269
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO. 0646A
A.I.P. NO. XXXX
C.I.P. NO. A-0515
H.A.S. NO. 20C0646A
SHEET NO. E04.07



CASING NOTES:

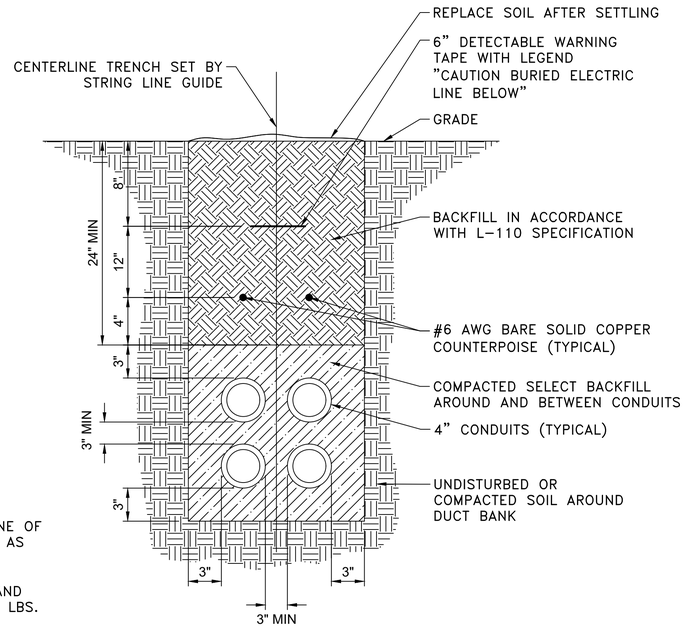
1. SECURE CONDUITS TO BORE SPACERS BY INSTALLING ONE OF THE FOLLOWING ON EACH SIDE OF EACH BORE SPACER AS SHOWN:

   A. 5/8" X .030 GALVANIZED CARBON STEEL BANDS AND BUCKLES HAVING A MIN. BREAKING STRENGTH OF 1405 LBS.

   B. 3/4" WIDE POLYPROPYLENE STRAPPING HAVING A 1400 LB. BREAKING STRENGTH, 7% MAX. STRETCH, AND STEEL SEALS.

2. USE ONE BORE SPACER FOR EVERY 5 FEET OF DUCT BANK.

1 E04.09 CASING TYPE 16-WAY BORING
SCALE: NONE

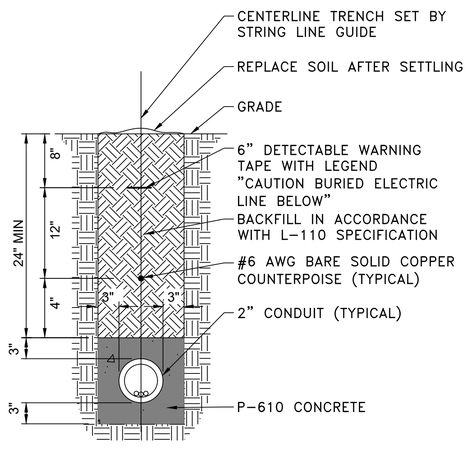


4-WAY

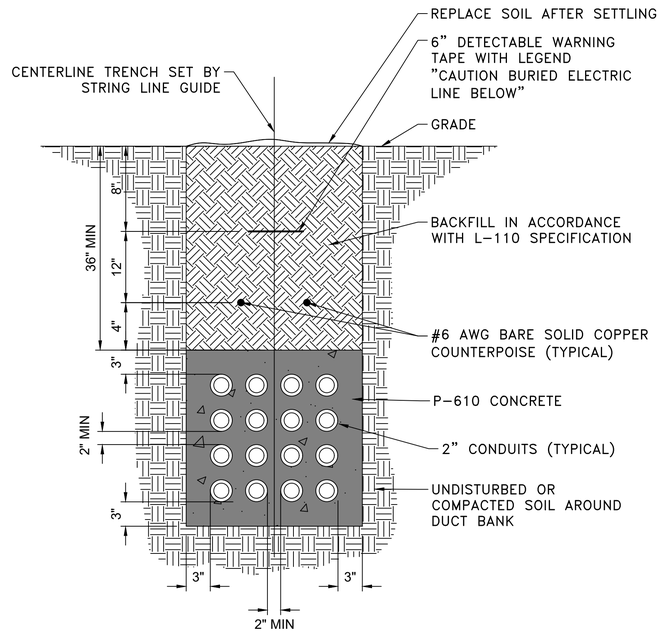
2 E04.09 NON-ENCASED DUCT BANK
SCALE: NONE

NON-ENCASED NOTES:

1. COUNTERPOISE WIRES SHALL BE INSTALLED ABOVE MULTIPLE CONDUITS / DUCT BANKS FOR AIRFIELD LIGHTING CABLES, WITH THE INTENT BEING TO PROVIDE A COMPLETE CONE OF PROTECTION OVER THE AIRFIELD LIGHTING CABLES.
2. INSTALL 3/4" x 10'-0" COPPERCLAD GROUND RODS AT EACH END OF ELECTRICAL DUCT AND BOND COUNTERPOISES USING EXOTHERMIC WELDS.
3. INSTALL CONDUIT SPACERS WITH LOCKING COLLARS AT 5' O.C. SPACING INTERVALS.
4. INSTALL A COUNTERPOISE 4" ABOVE EACH CONDUIT COLUMN.
5. INSTALL DUCT MARKERS IN ACCORDANCE WITH ADVISORY CIRCULAR 150-5340-30 REQUIREMENTS, INCLUDING AT THE END OF DUCT BANKS.
6. SIMILAR FOR OTHER DUCT SIZES.



1-WAY



16-WAY

ENCASED NOTES

1. COUNTERPOISE WIRES SHALL BE INSTALLED ABOVE MULTIPLE CONDUITS / DUCT BANKS FOR AIRFIELD LIGHTING CABLES, WITH THE INTENT BEING TO PROVIDE A COMPLETE CONE OF PROTECTION OVER THE AIRFIELD LIGHTING CABLES.
2. INSTALL 3/4" x 10'-0" COPPERCLAD GROUND RODS AT EACH END OF ELECTRICAL DUCT AND BOND COUNTERPOISES USING EXOTHERMIC WELDS.
3. INSTALL CONDUIT SPACERS WITH LOCKING COLLARS AT 5' O.C. SPACING INTERVALS. INSTALL #4 REINFORCING BARS MINIMUM 6" INTO SOIL TO ANCHOR THE ASSEMBLY PRIOR TO PLACING THE CONCRETE ENCASEMENT.
4. INSTALL A COUNTERPOISE 4" ABOVE EACH CONDUIT COLUMN.
5. INSTALL DUCT MARKERS IN ACCORDANCE WITH ADVISORY CIRCULAR 150/5340-30 REQUIREMENTS, INCLUDING AT THE ENDS OF DUCT BANKS.
6. SIMILAR FOR OTHER DUCT SIZES.

3 E04.09 CONCRETE ENCASED DUCT BANK AND CONDUIT
SCALE: NONE

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NO.	DESCRIPTION	DATE	BY
1	ADD. 4	7/21/23	MCL

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

ELECTRICAL DETAILS IX

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	NONE
DATE:	07/24/2023

STATE OF TEXAS
MATTHEW C. LEMAY
112269
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	E04.09

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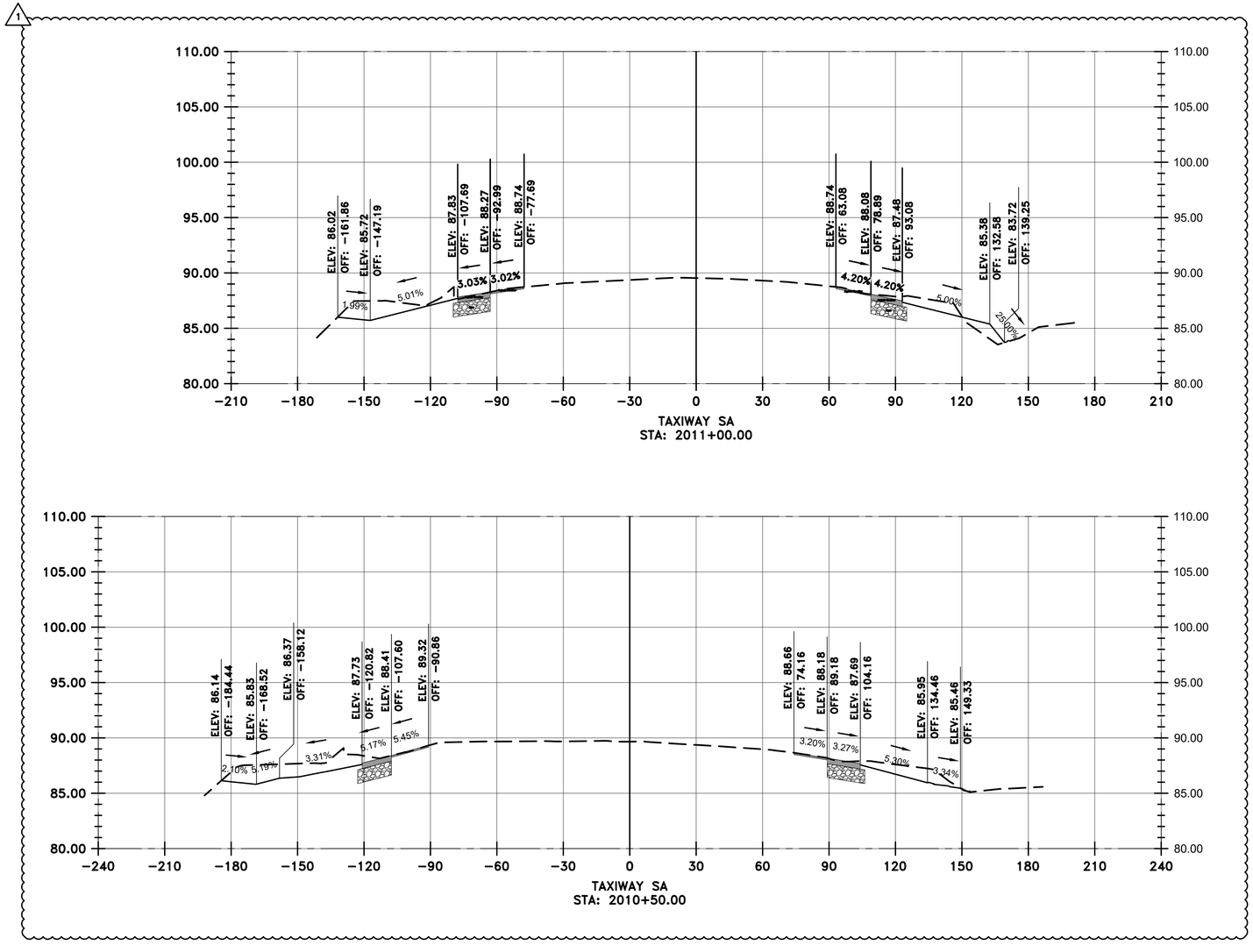

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

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REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 1

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/24/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY:	JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.01

VERTICAL EXAGGERATION = 5

HAS FILE: C:\Users\MHernandez\OneDrive - Garver\Documents - IAH - TXYS SA SB REHAB - Aviation\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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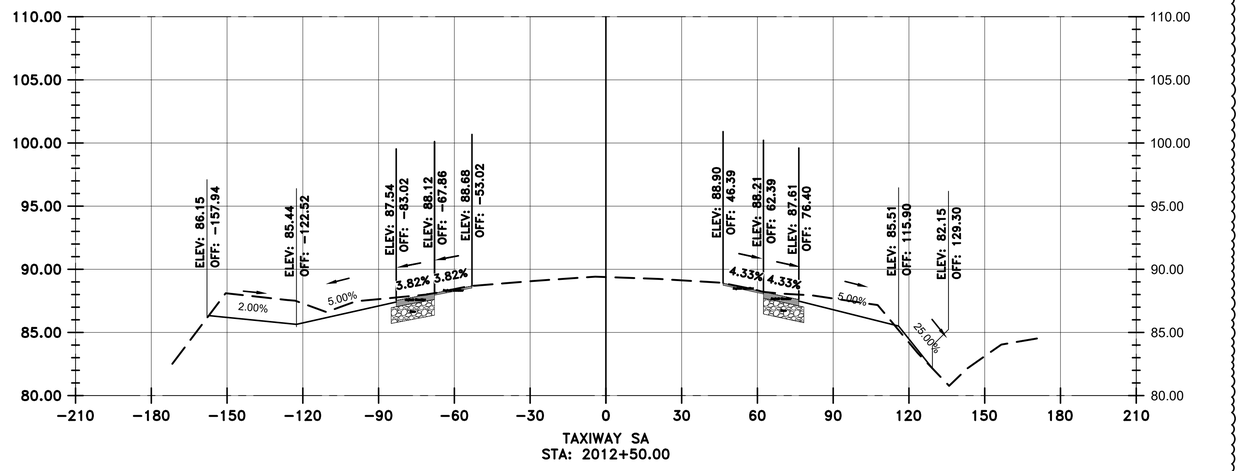

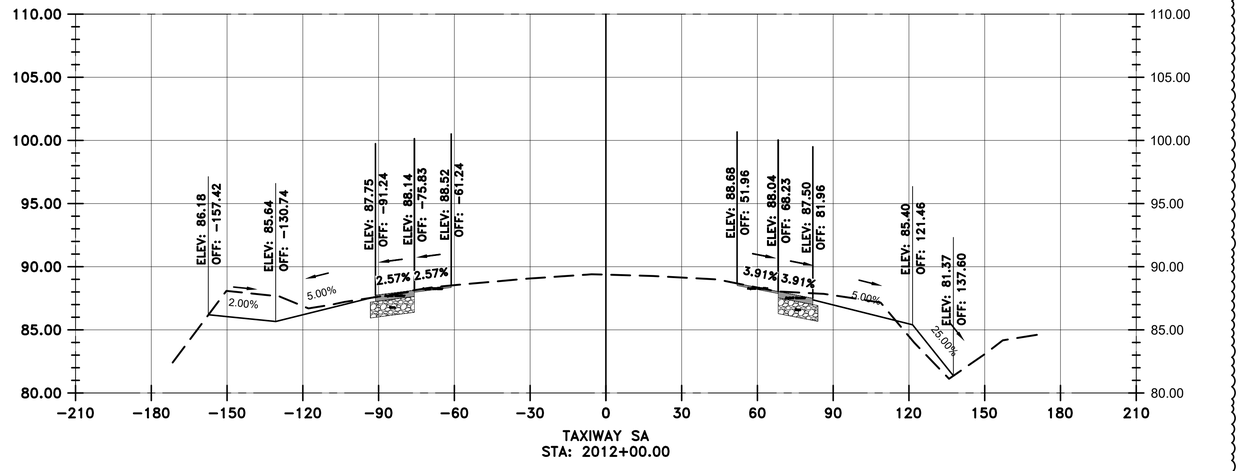

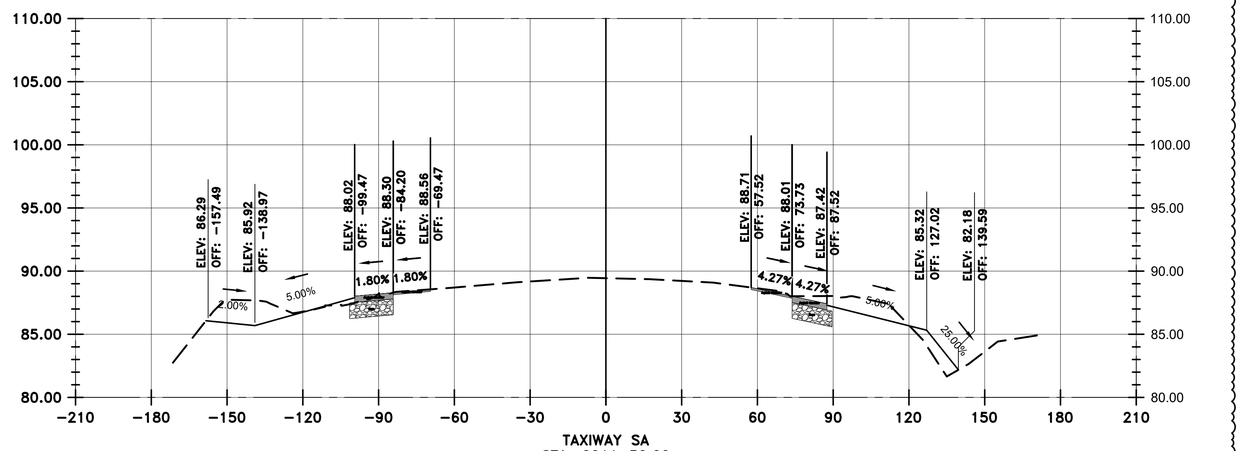

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
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TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 2

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER
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APPROVED BY: JEF

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HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.02

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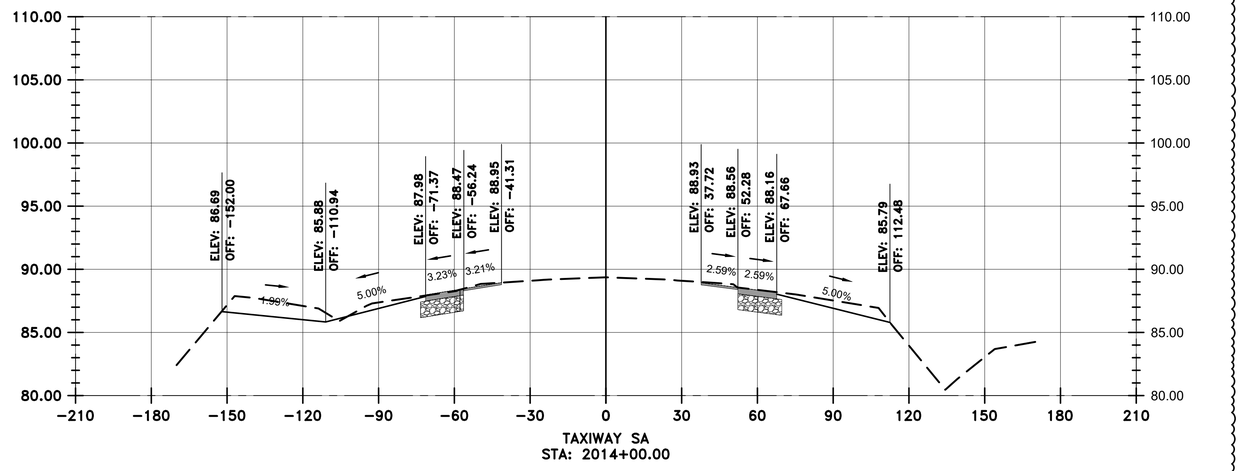

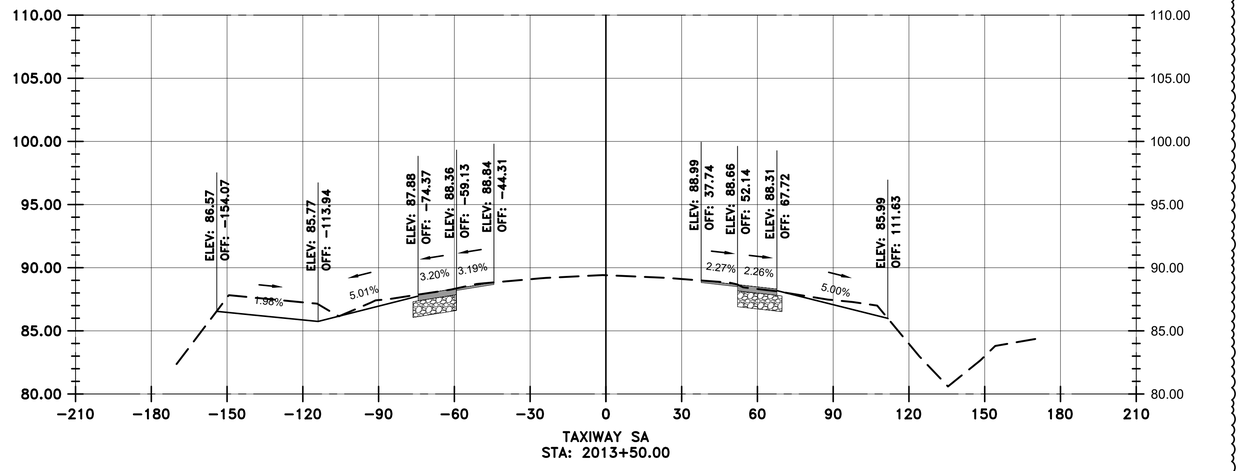

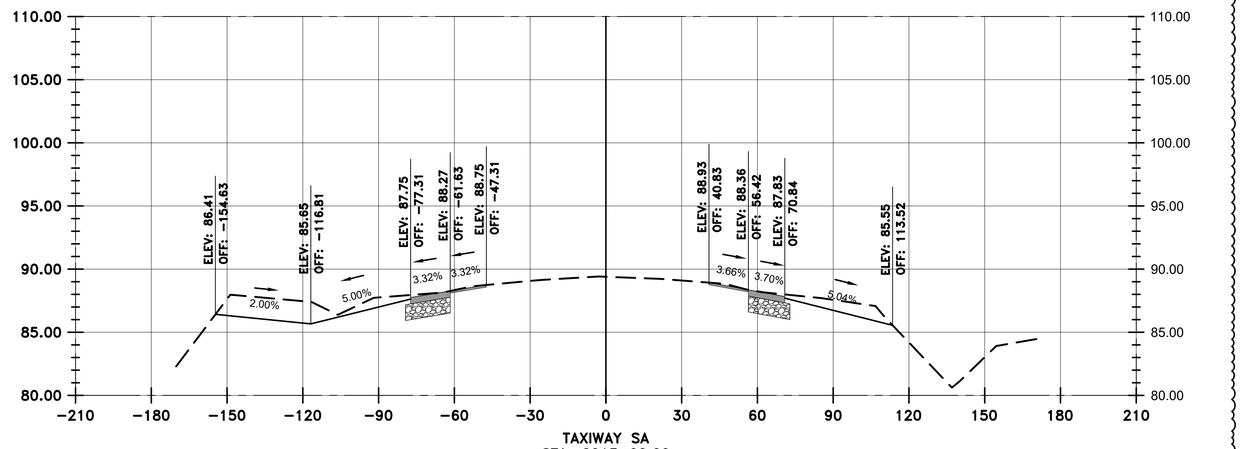

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

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TBPE Registration No. F-5713

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GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 3

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER
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APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.03

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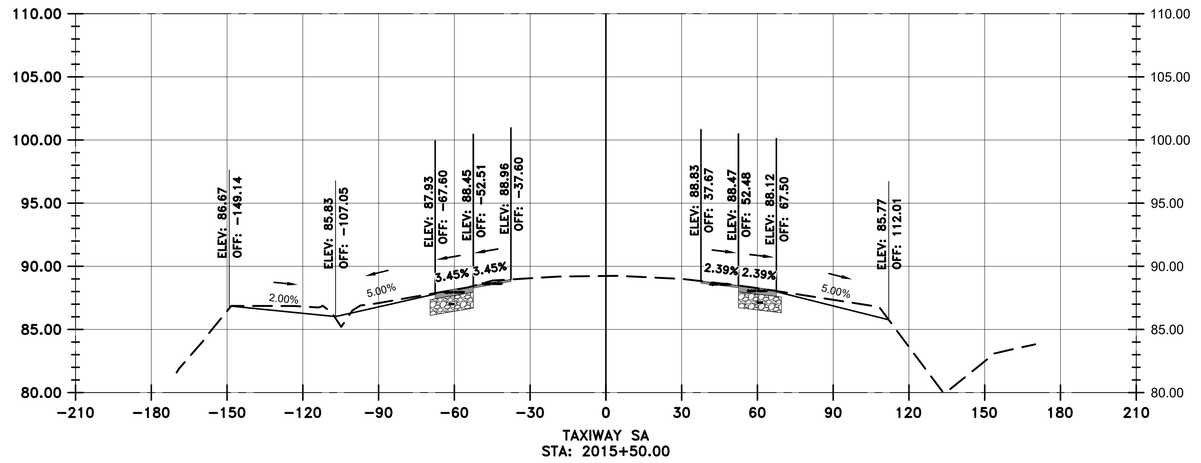

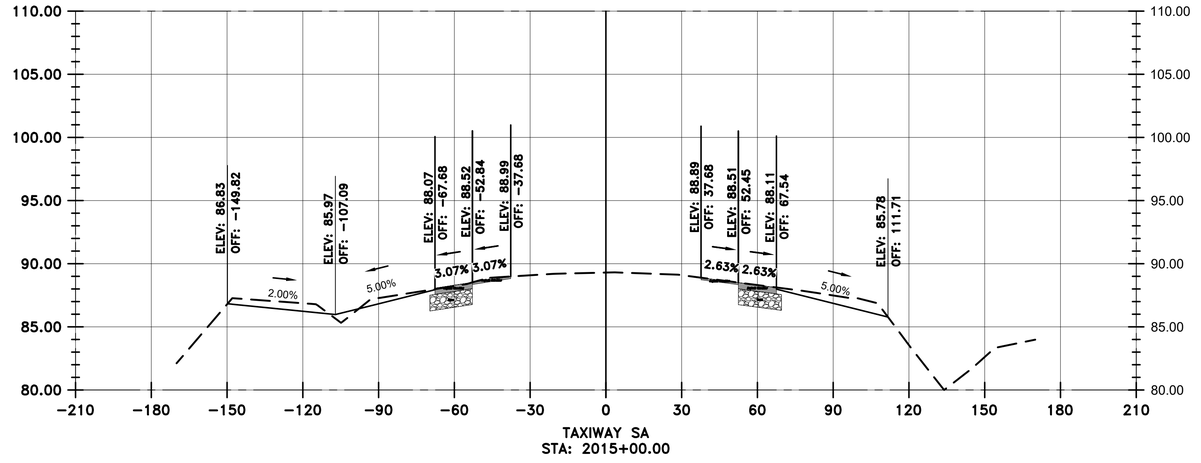

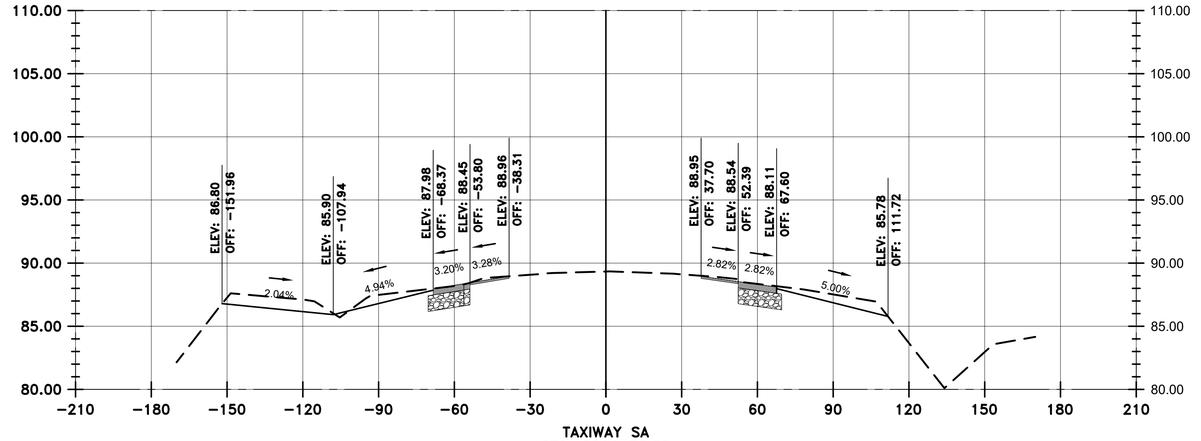

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

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REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 4

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER

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APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.04

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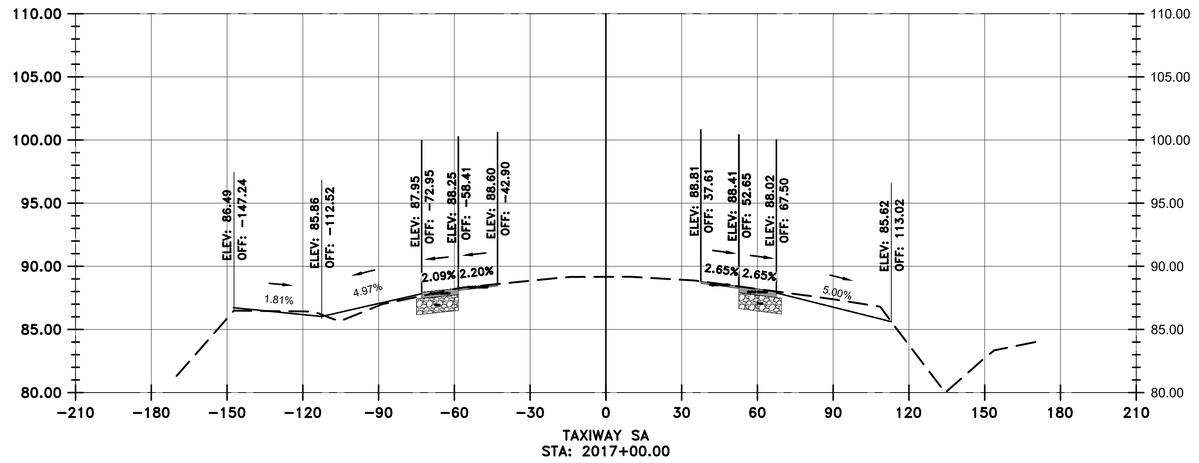

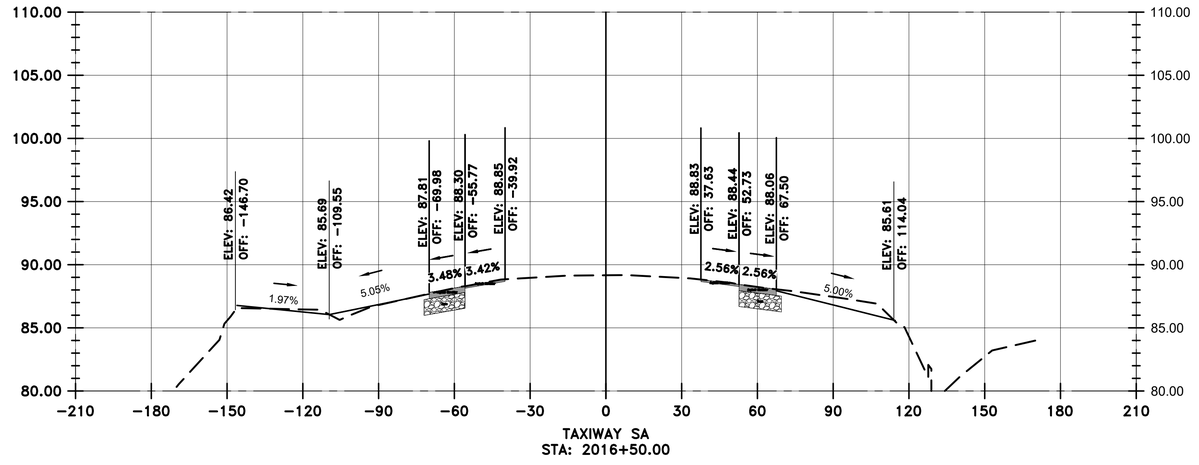

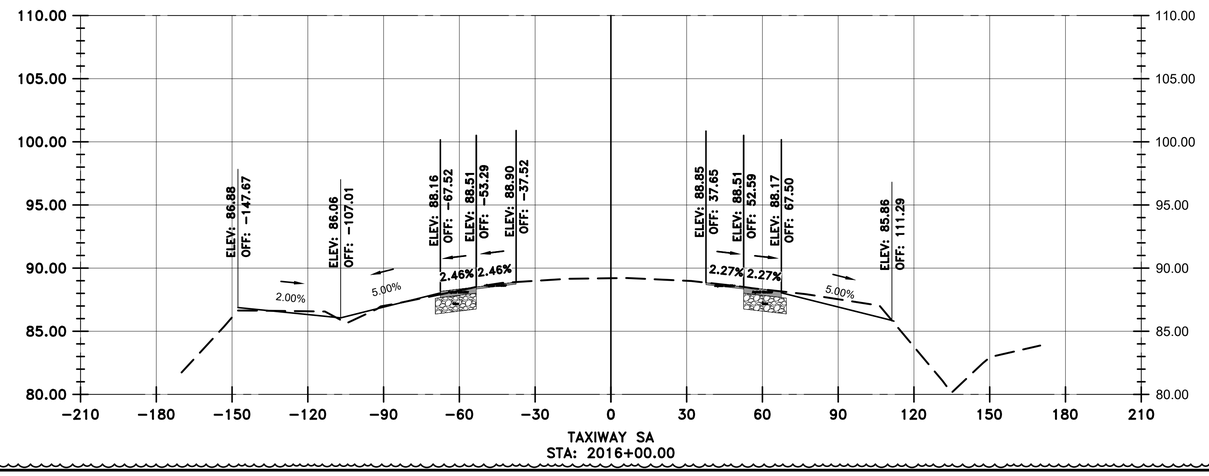

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

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REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 5

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.05

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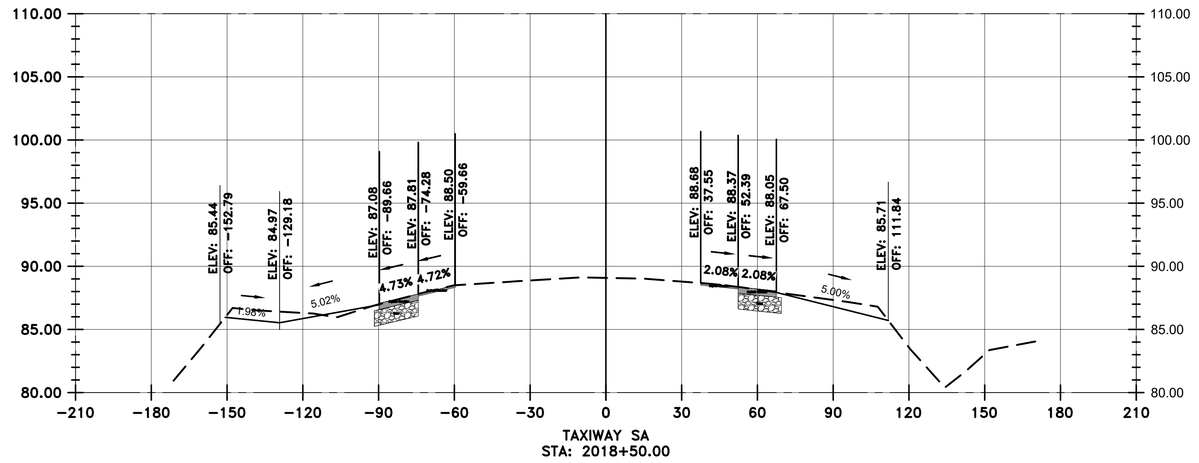

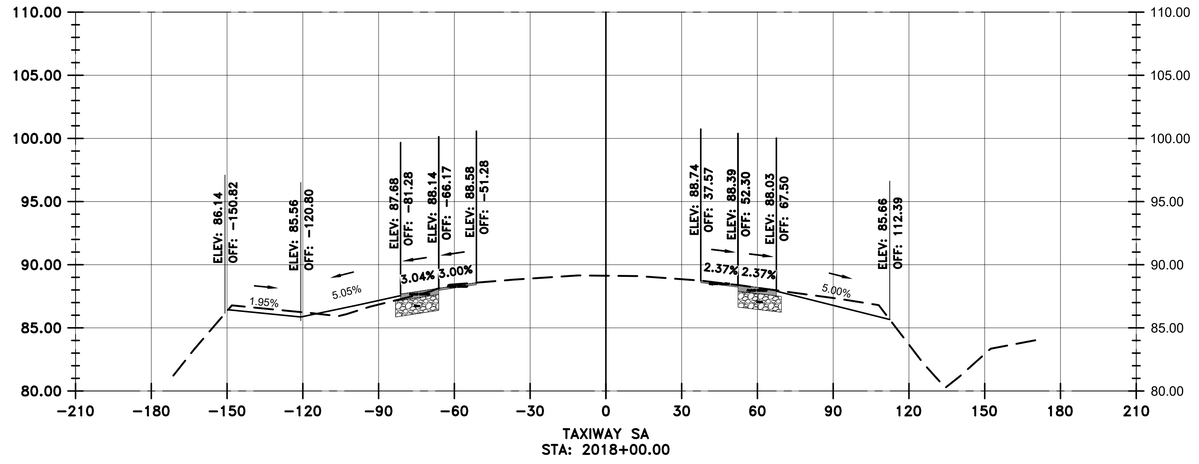

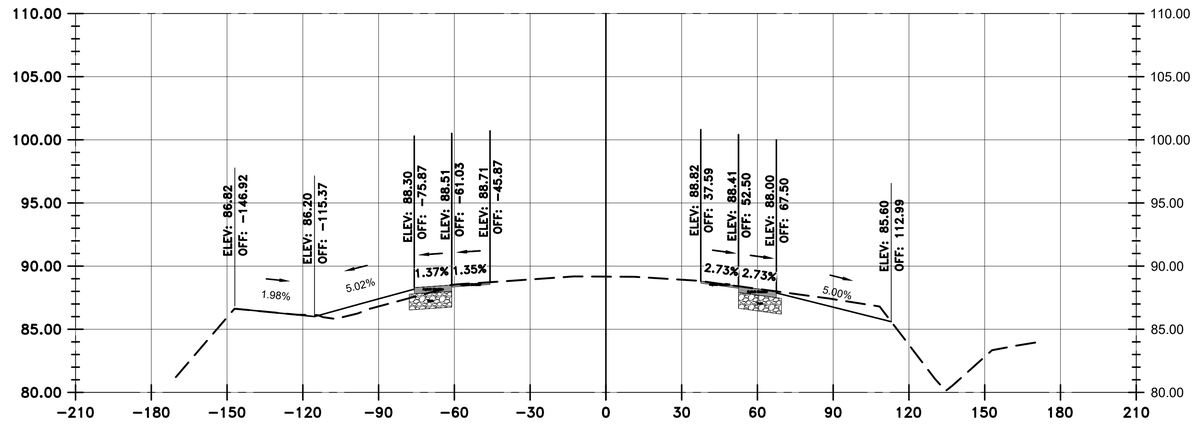

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 6

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.06

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
PLOT DATE: 11/8/2019 3:32:47 PM

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 7

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.07

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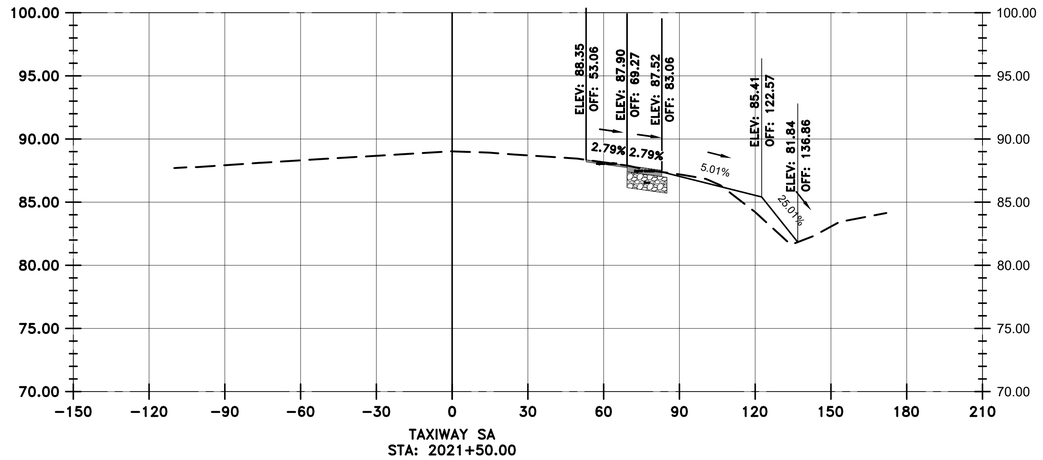
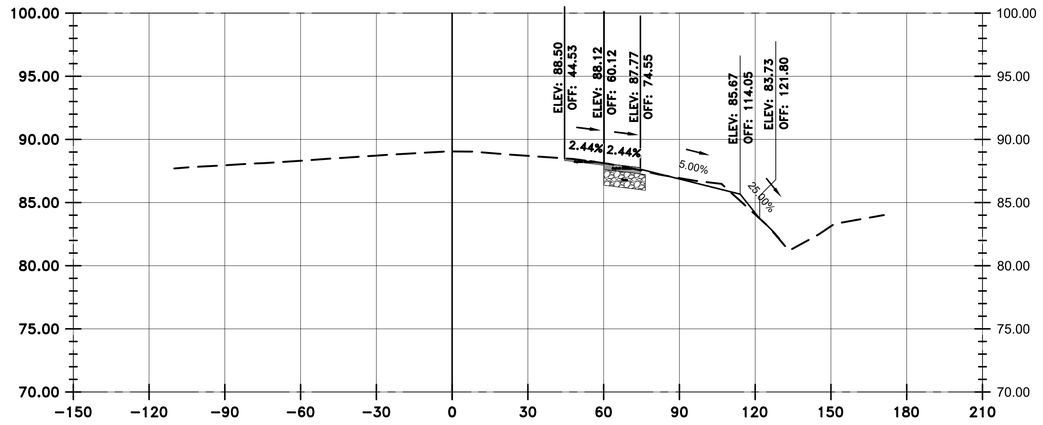


TAXIWAY SA
STA: 2021+50.00



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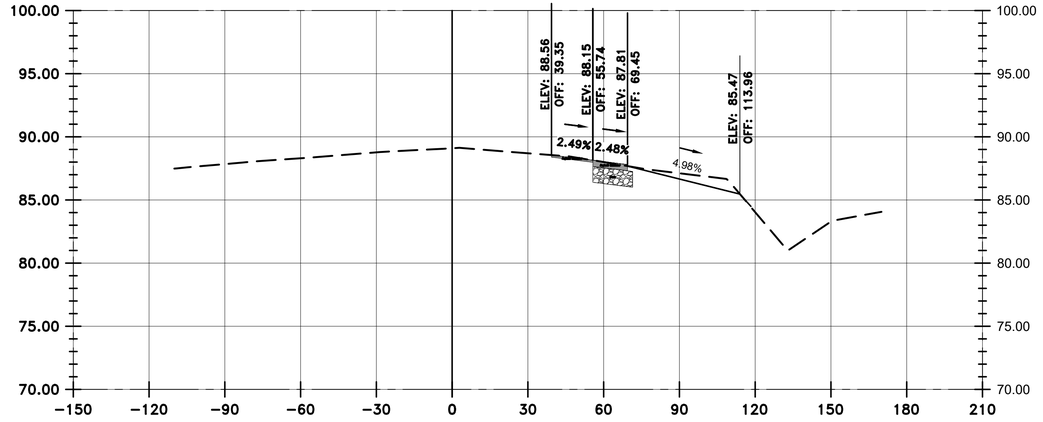
STA: 2021+00.00



TAXIWAY SA
STA: 2020+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 8

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.08

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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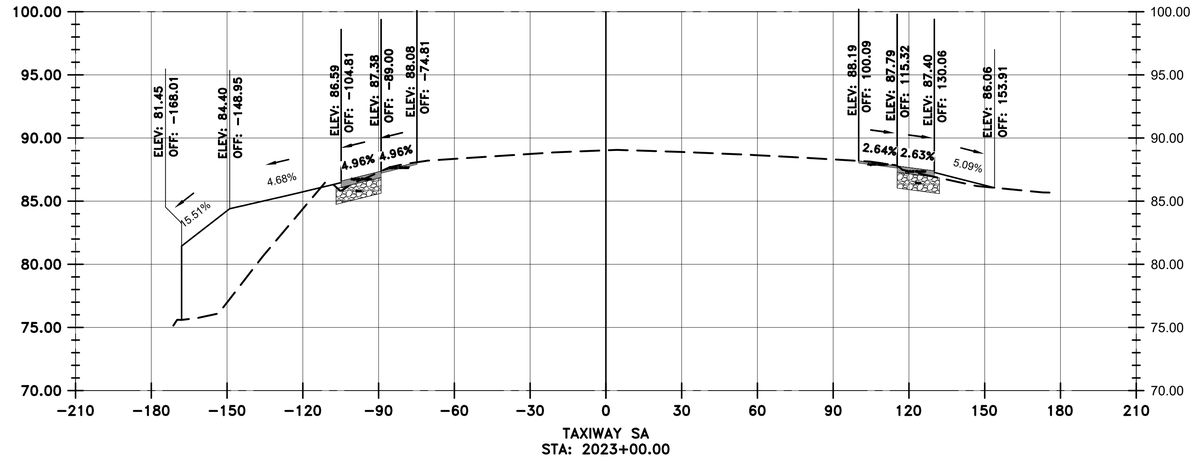

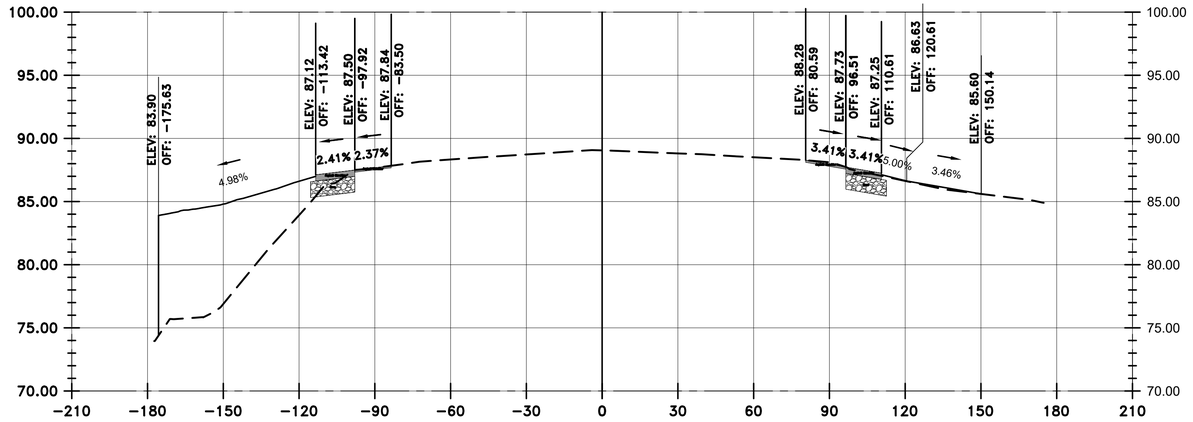

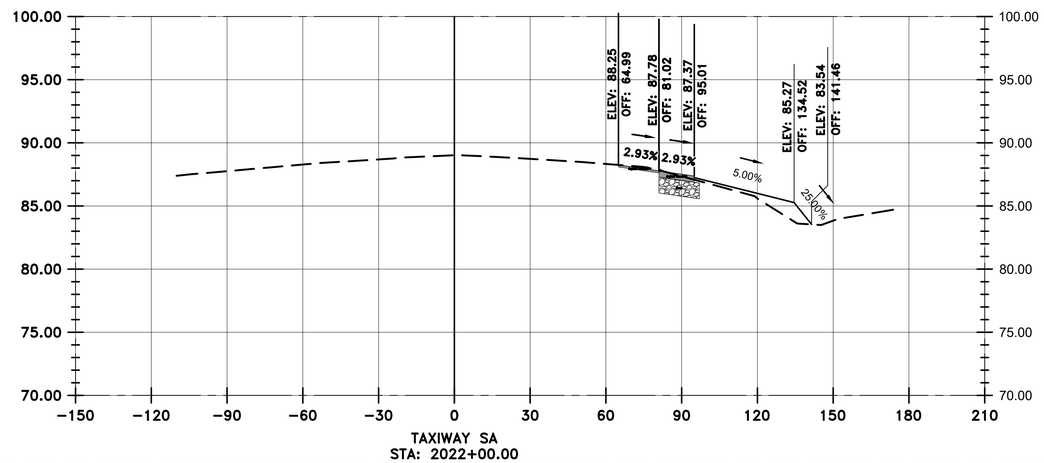

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 9

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.09

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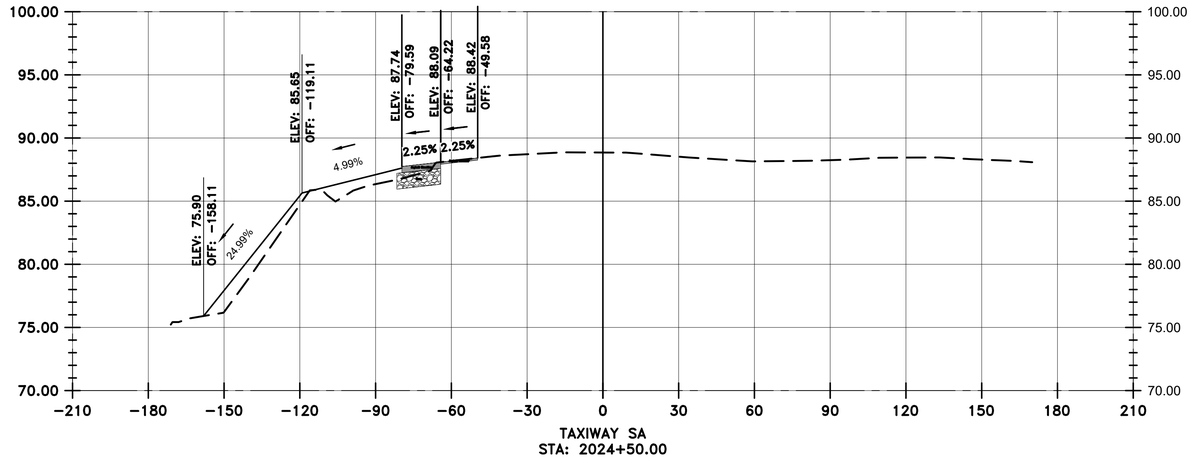

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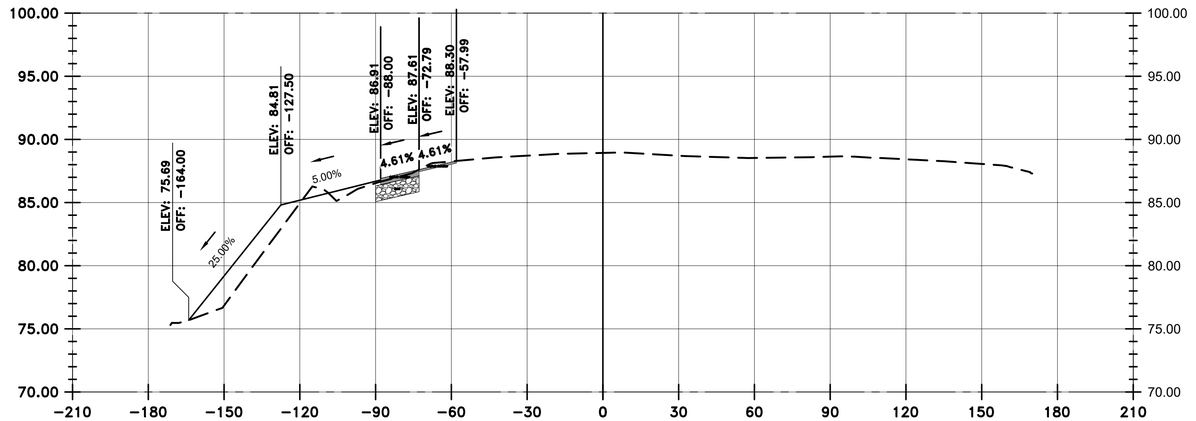
STA: 2024+50.00



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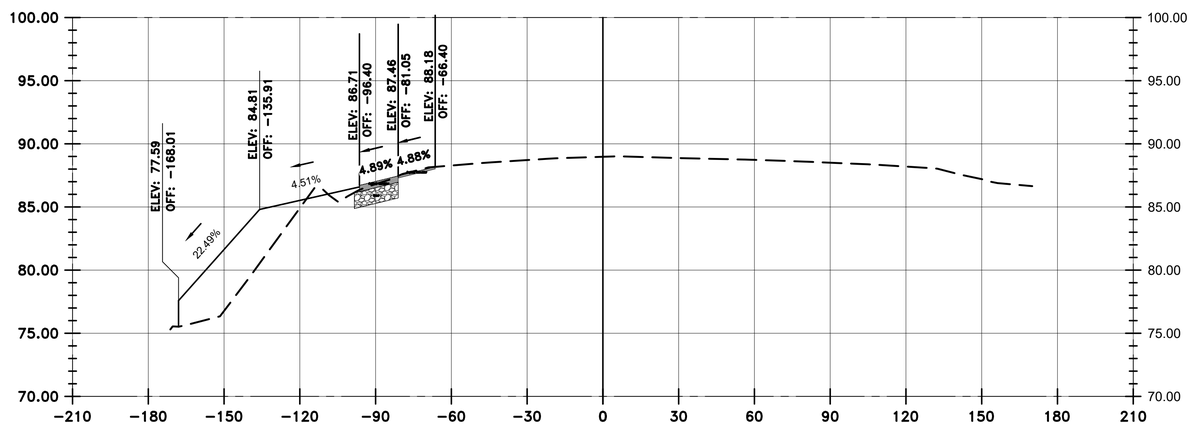
STA: 2024+00.00



TAXIWAY SA
STA: 2023+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 10

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.10

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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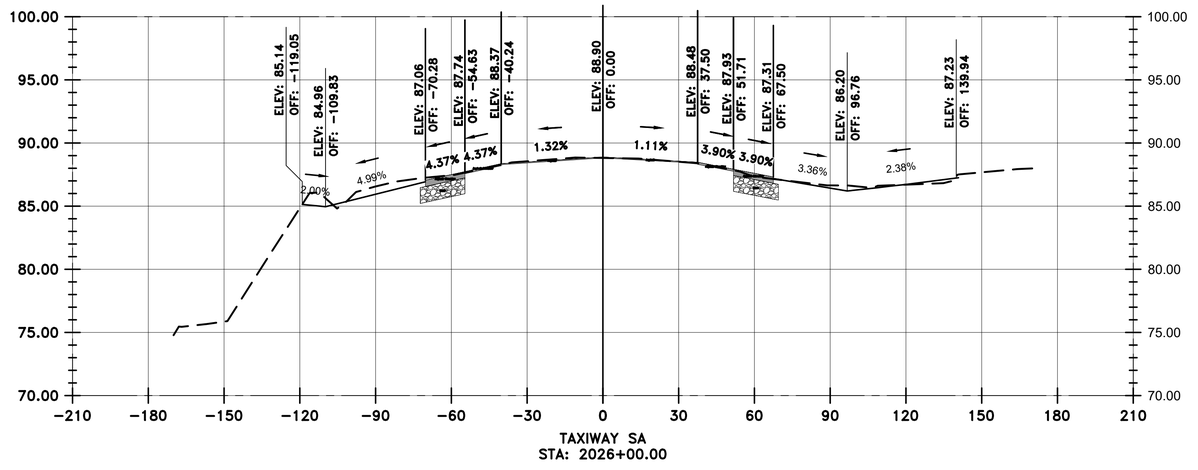

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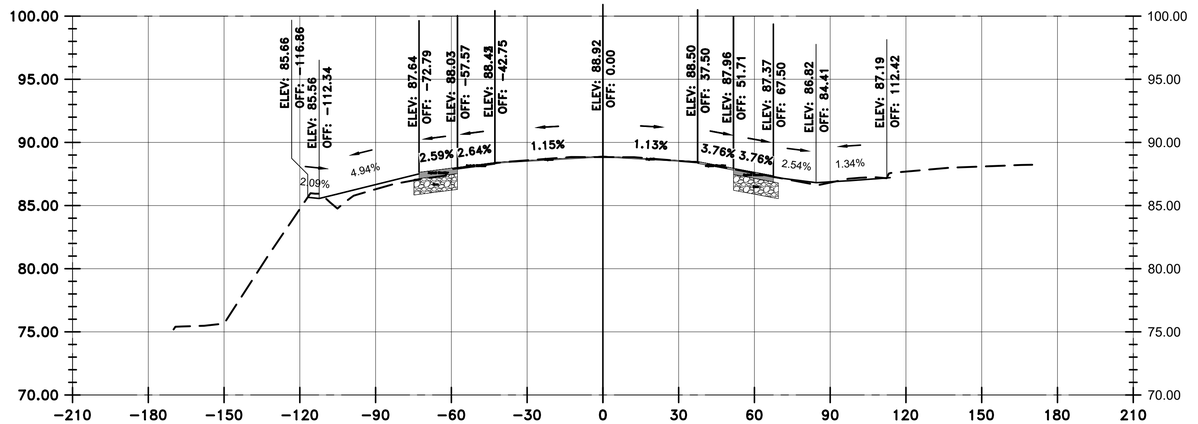
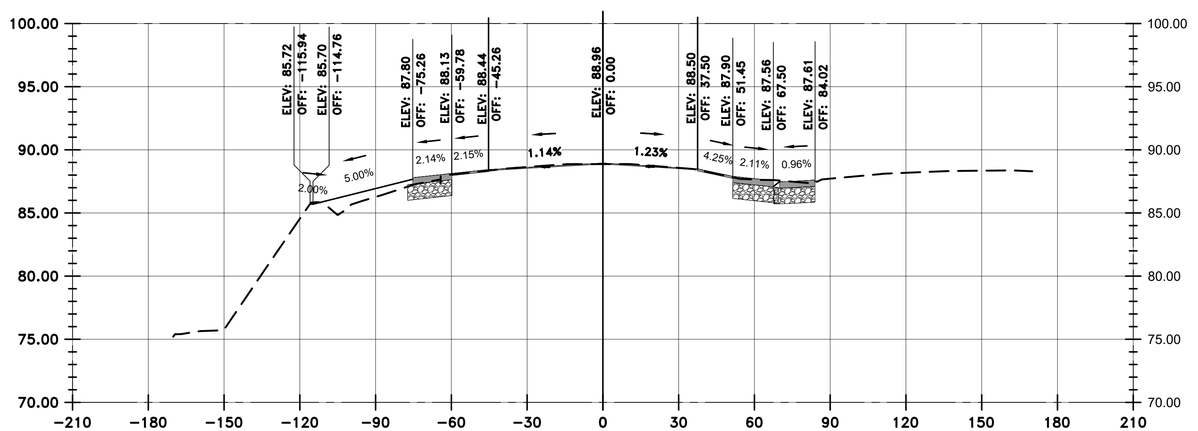


TAXIWAY SA
STA: 2025+50.00



TAXIWAY SA
STA: 2025+00.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 11

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.11

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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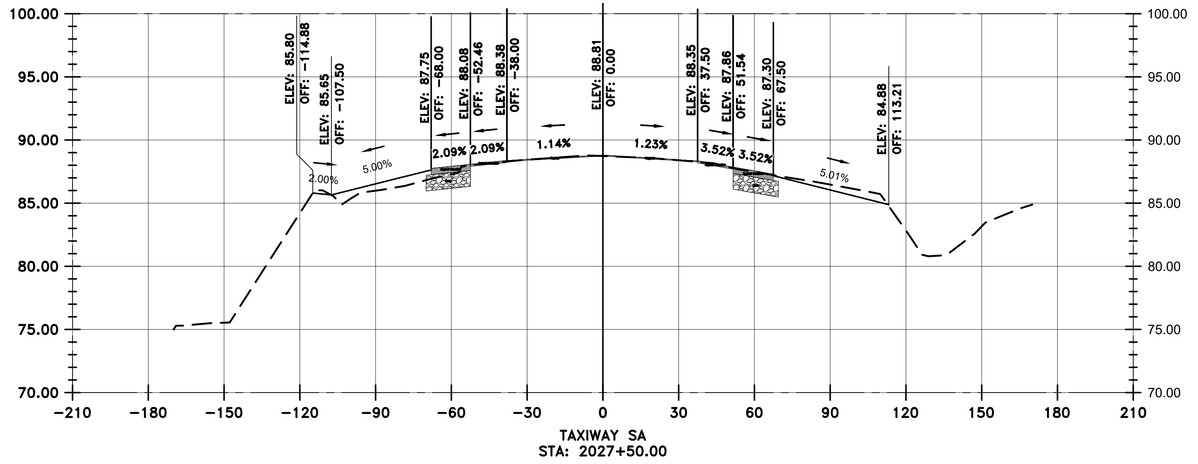
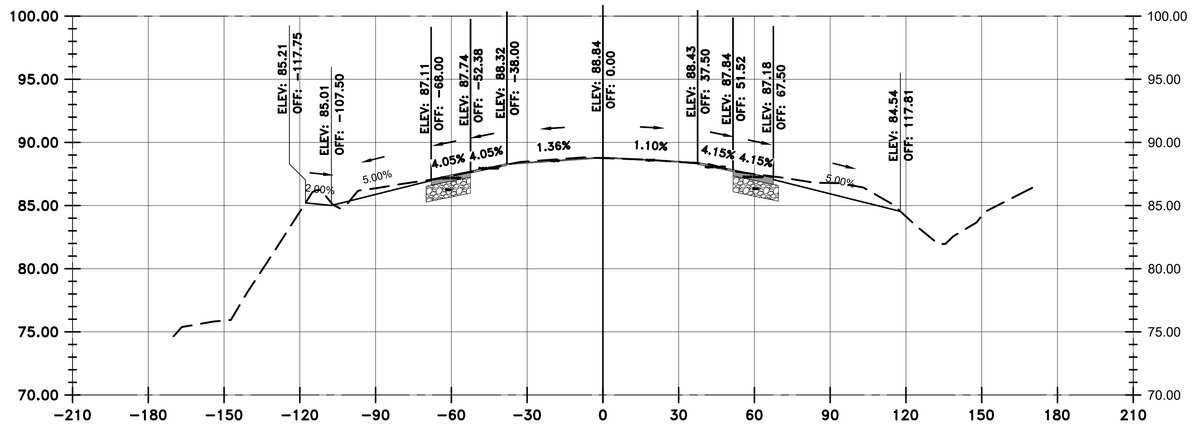


TAXIWAY SA
STA: 2027+50.00



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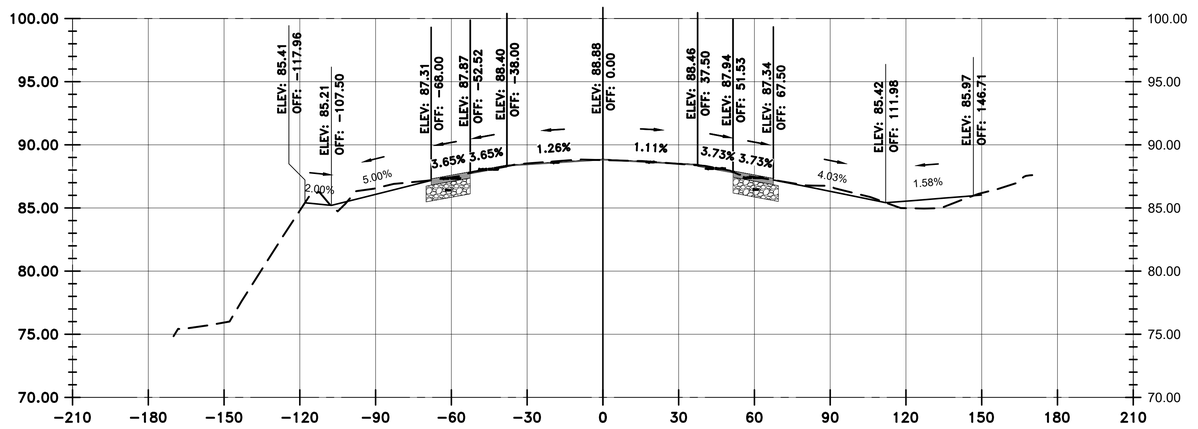
STA: 2027+00.00



TAXIWAY SA
STA: 2026+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 12

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.12

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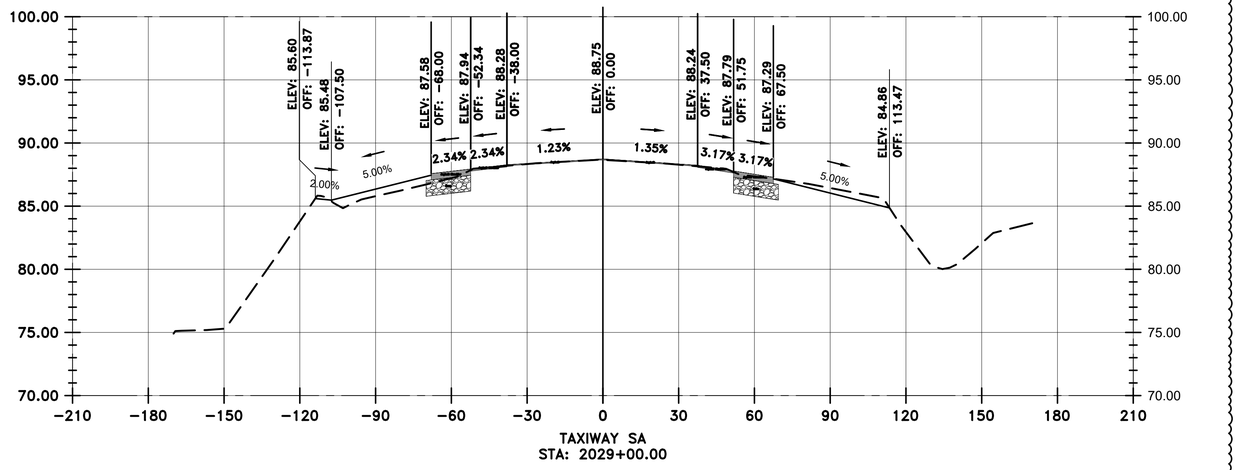

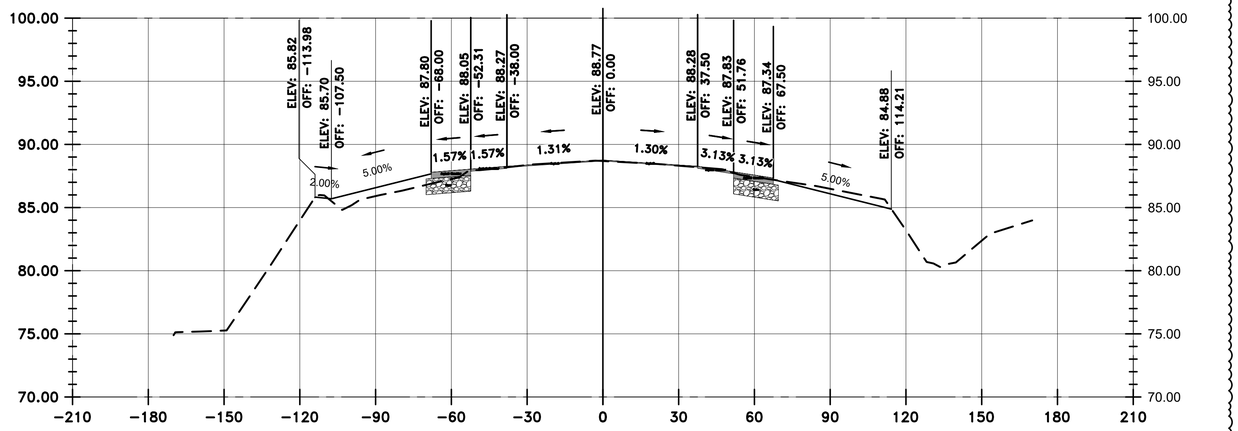

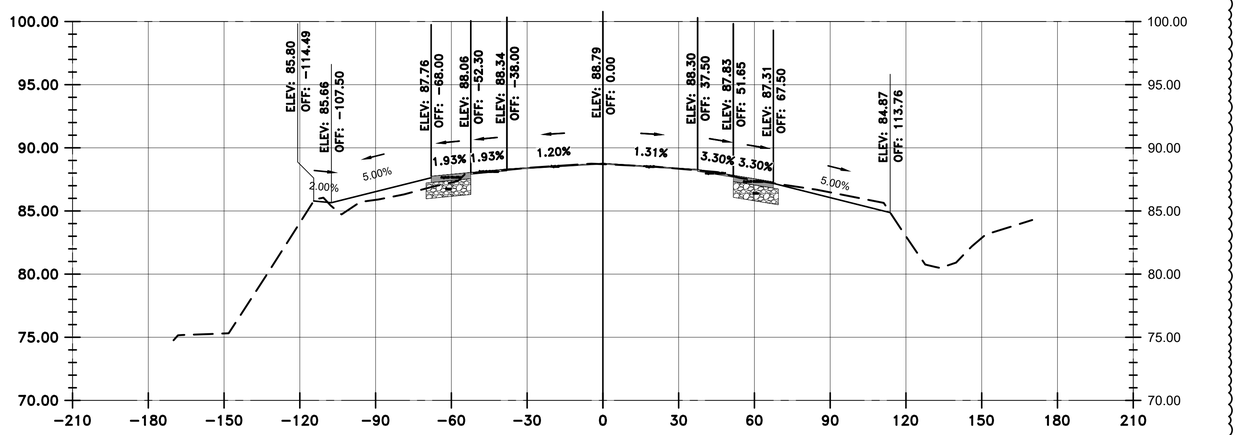

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 13

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.13

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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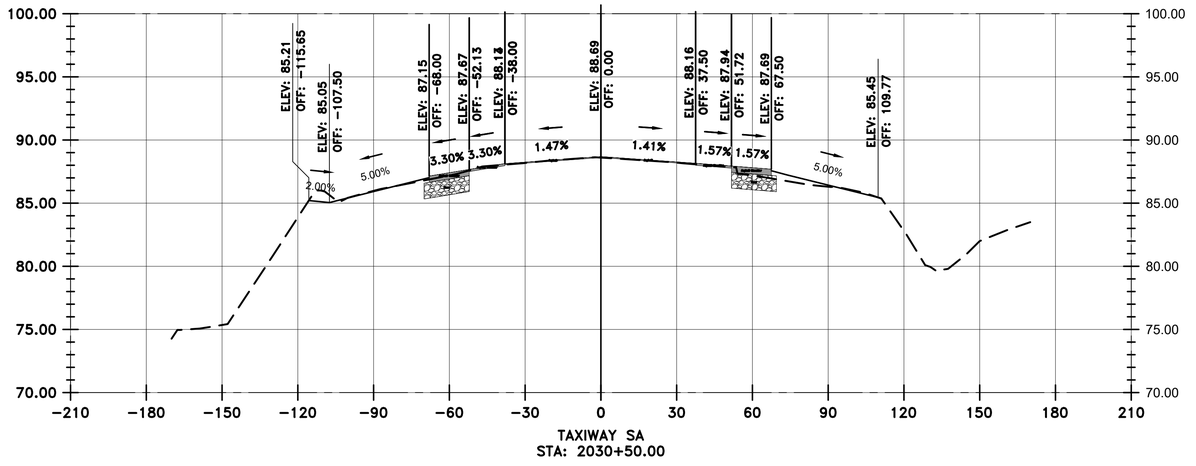

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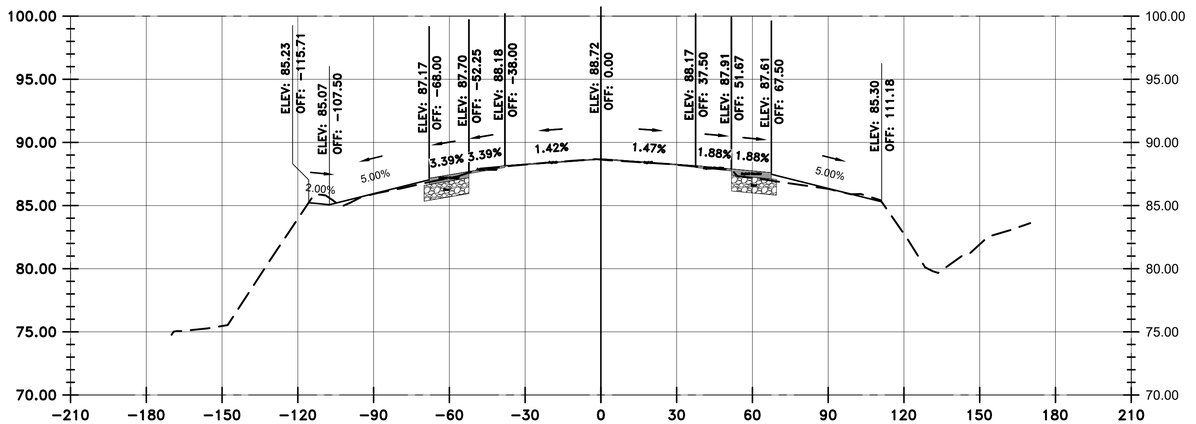
STA: 2030+50.00



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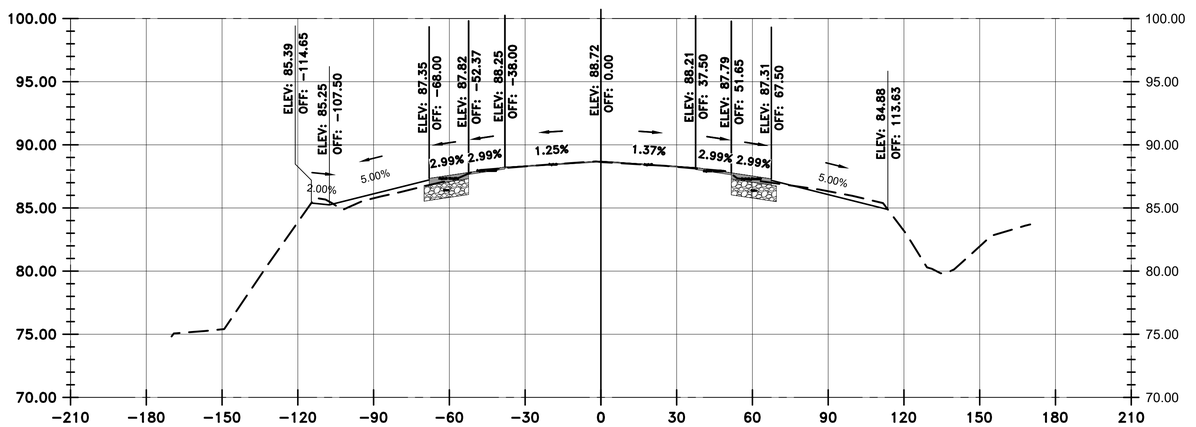
STA: 2030+00.00



TAXIWAY SA
STA: 2029+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 14

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.14

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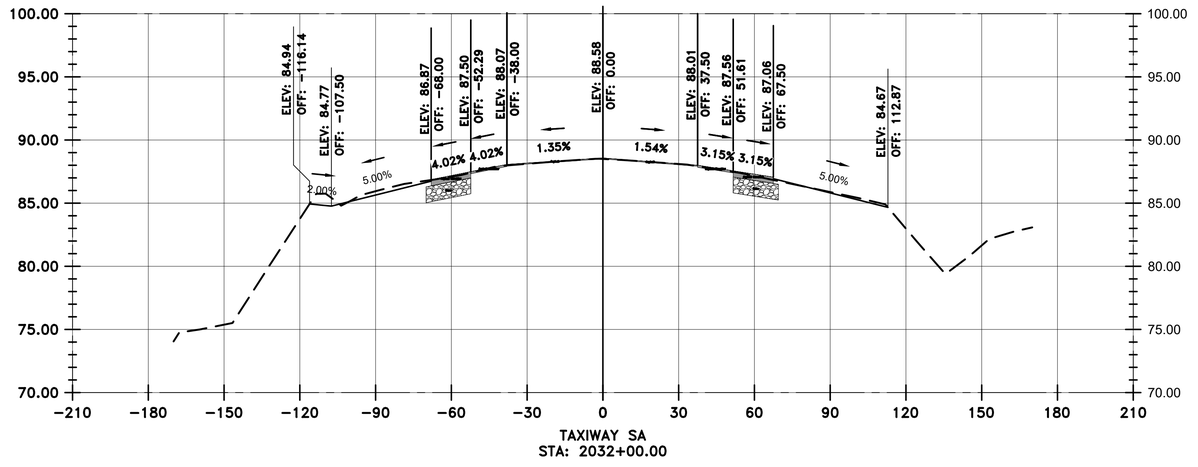
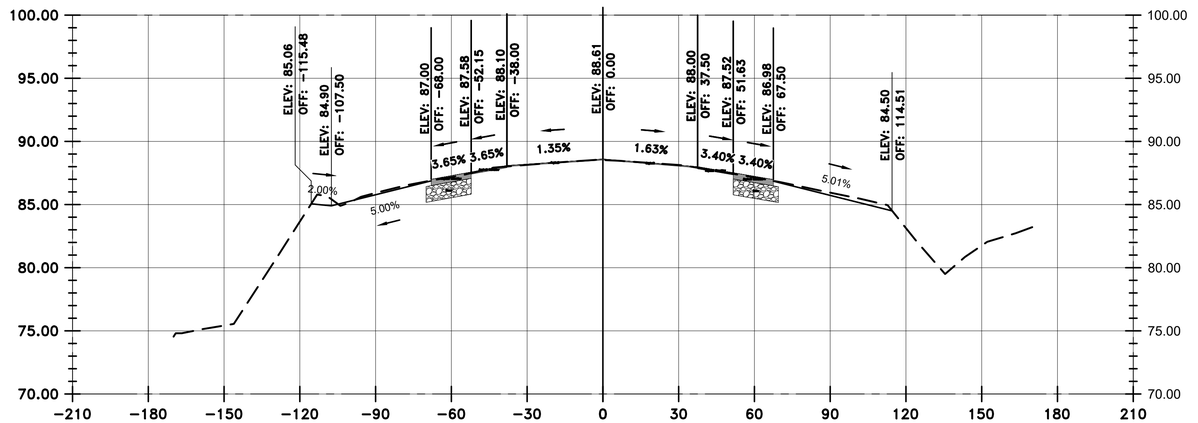
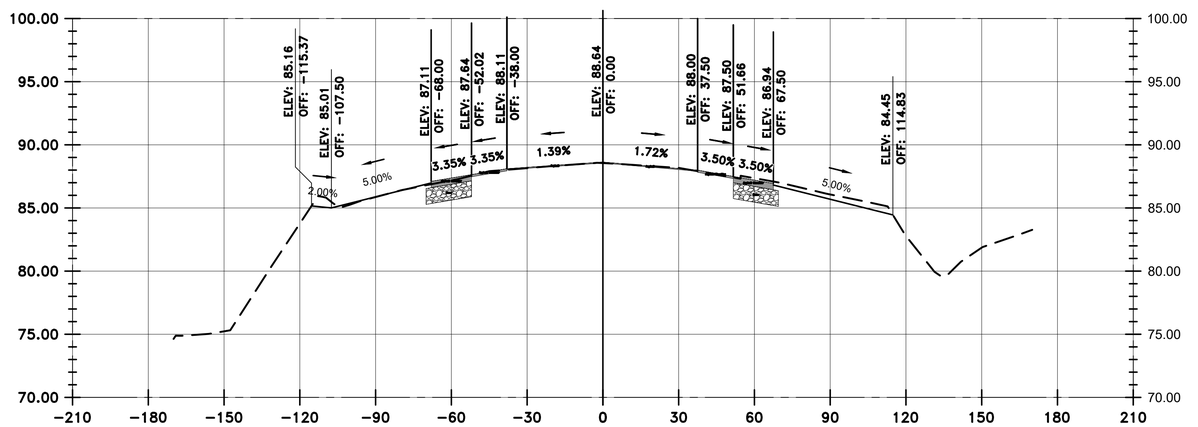


TAXIWAY SA
STA: 2032+00.00



TAXIWAY SA
STA: 2031+50.00



TAXIWAY SA
STA: 2031+00.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 15

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.15

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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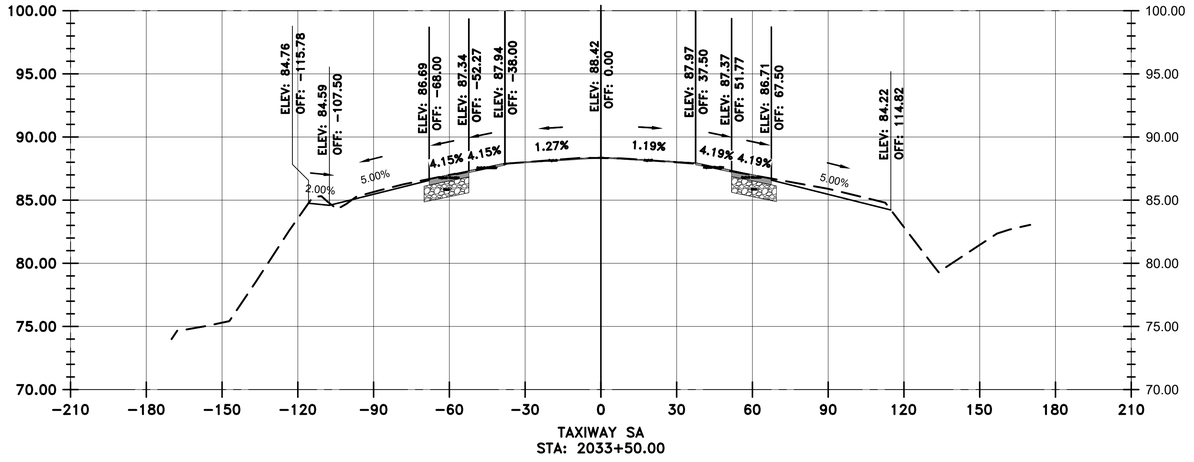
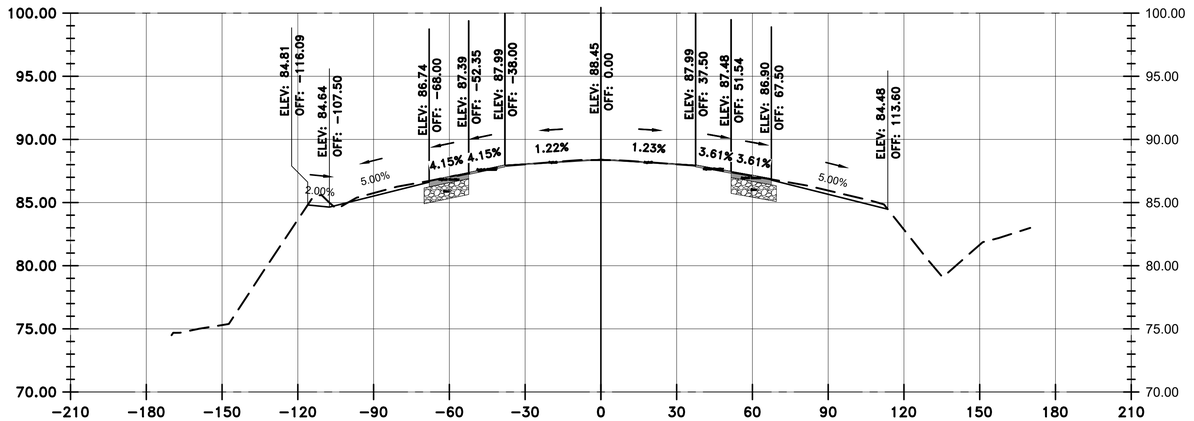


TAXIWAY SA
STA: 2033+50.00



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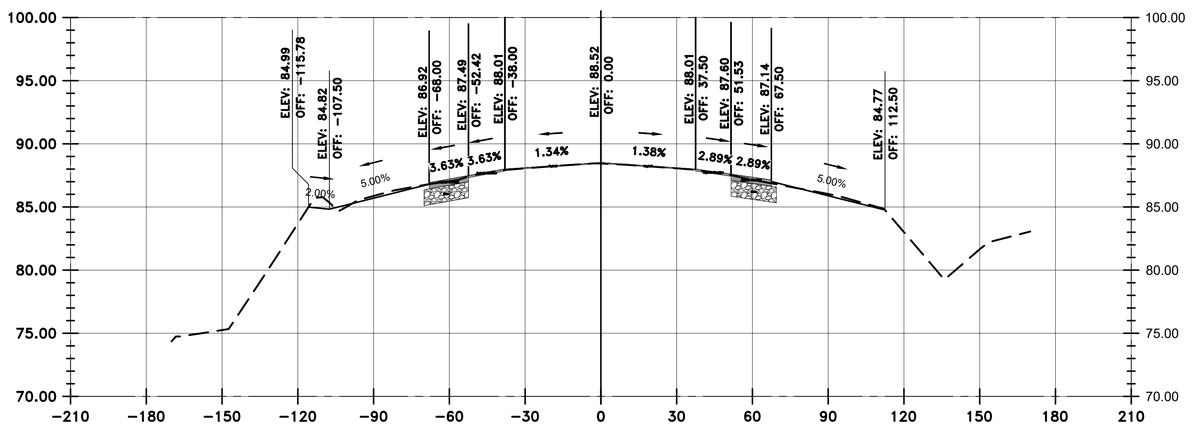

TAXIWAY SA
STA: 2032+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 16

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.16

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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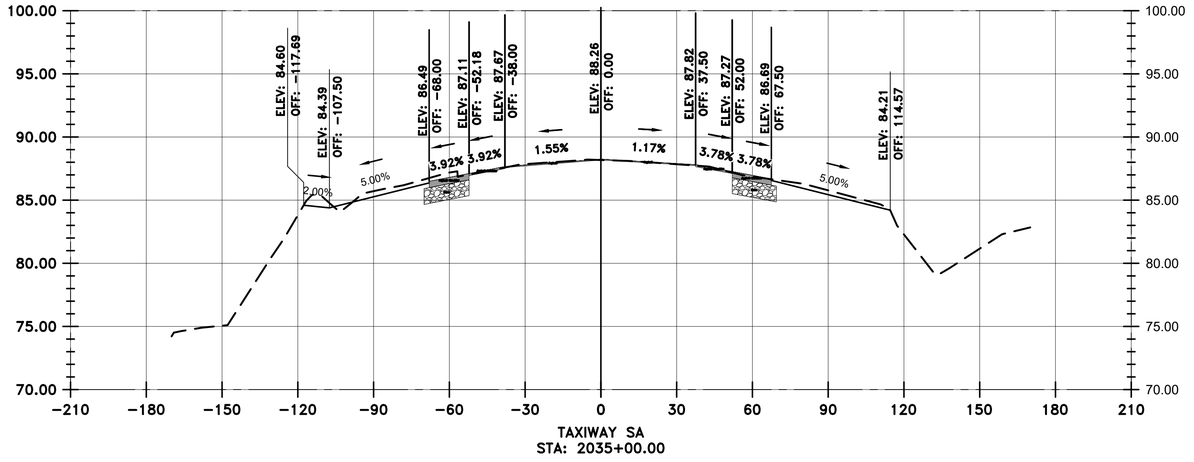

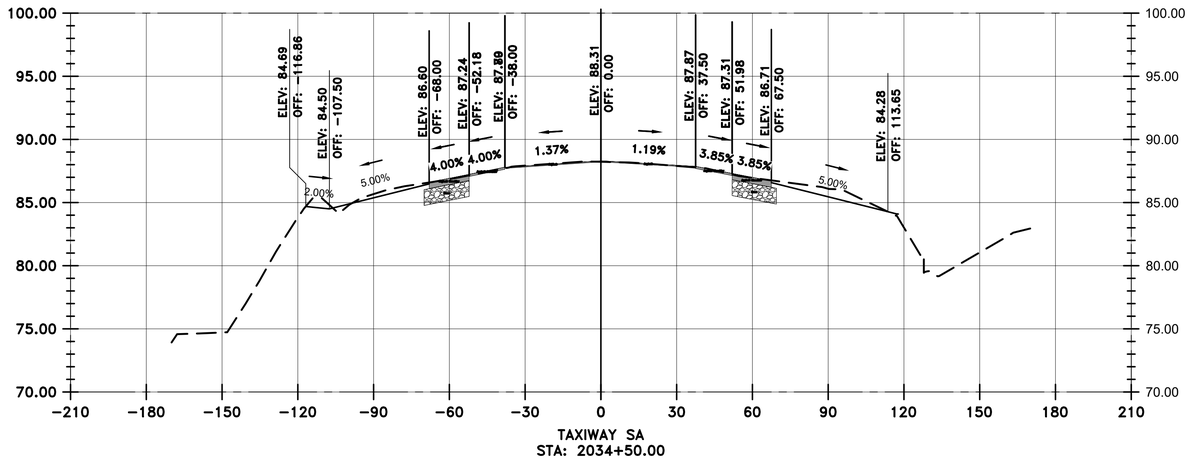

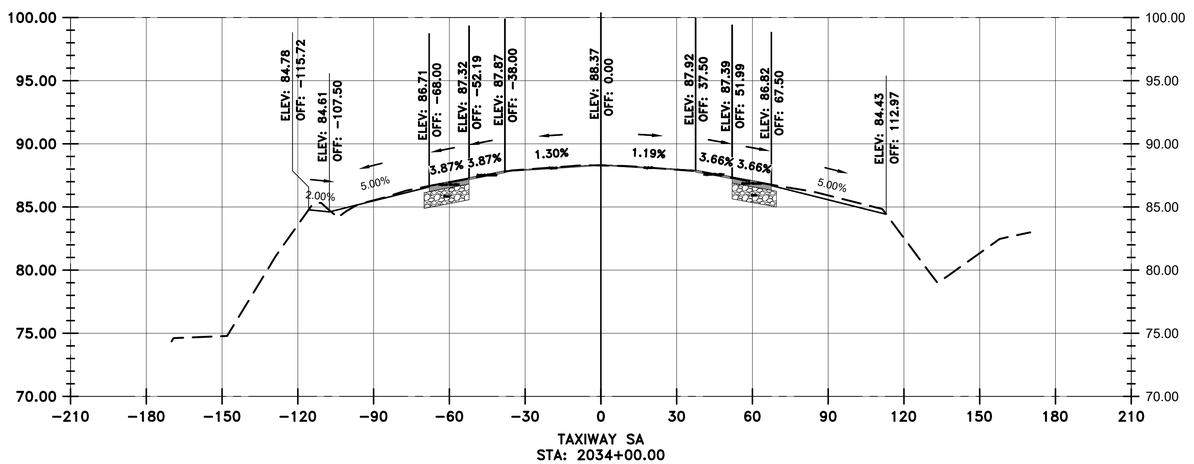

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 17

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.17

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typcial Sections\Model Files\0646GSC.dwg
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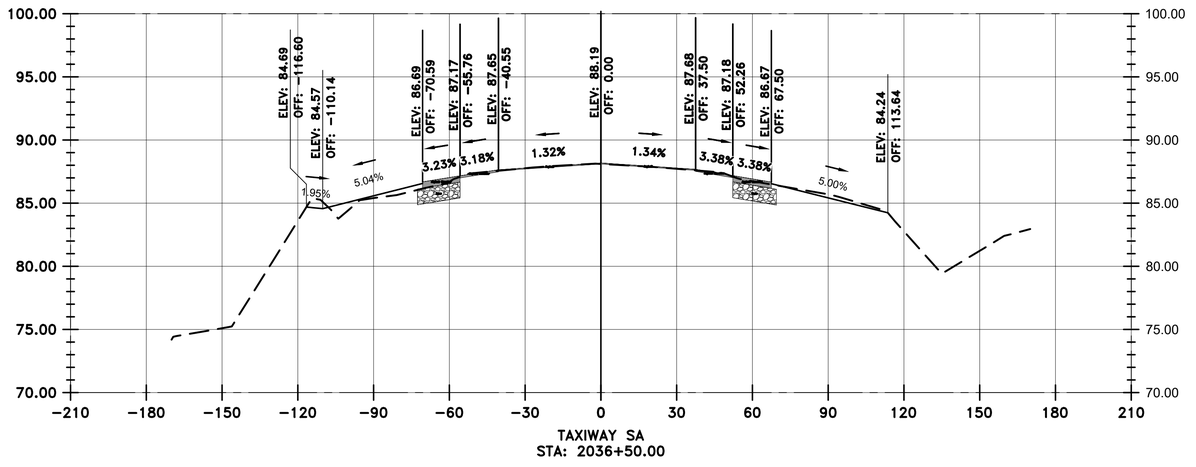

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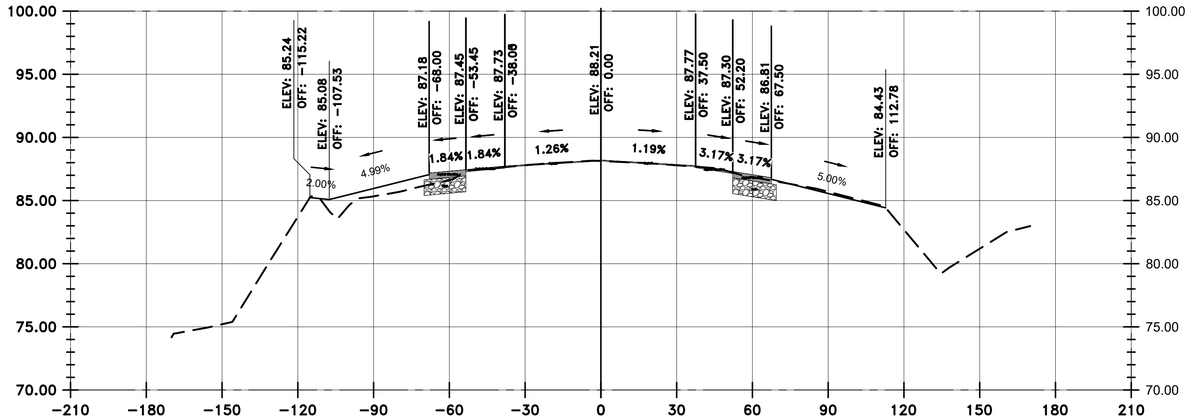
STA: 2036+50.00



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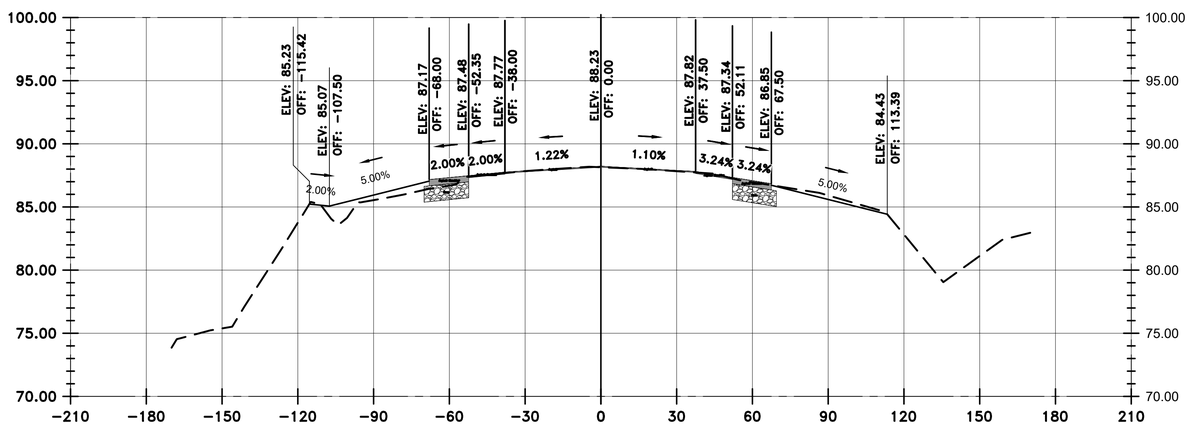

TAXIWAY SA
STA: 2035+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 18

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.18

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646GSC.dwg
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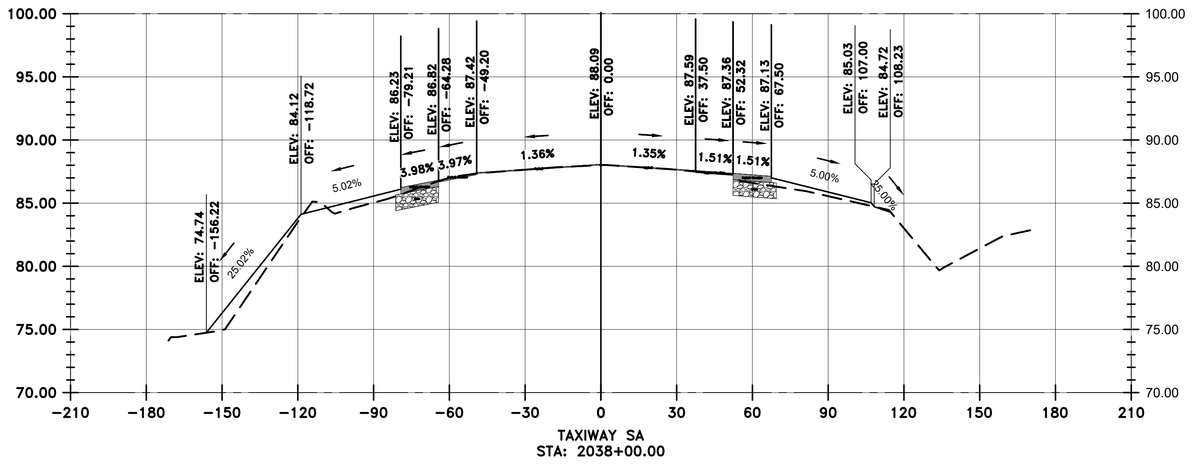

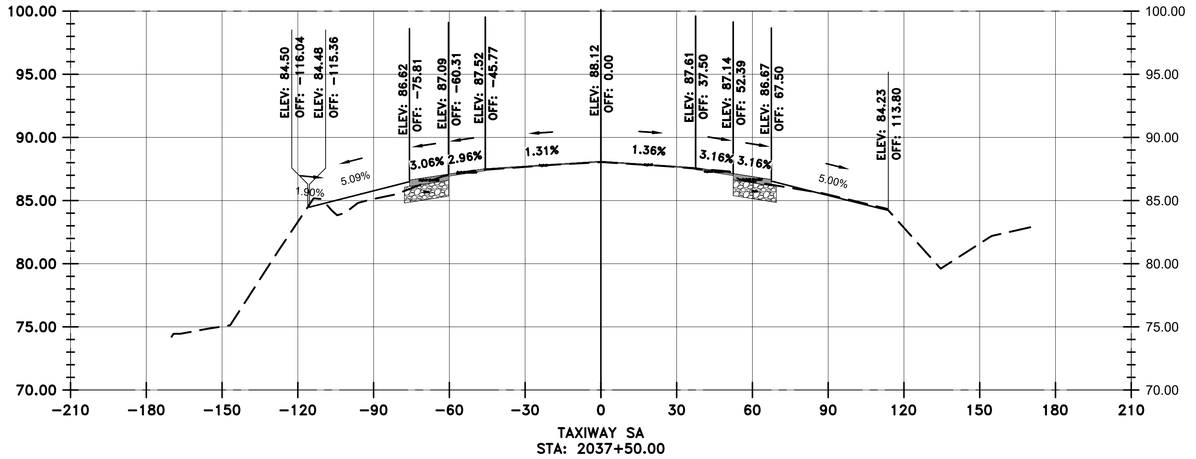

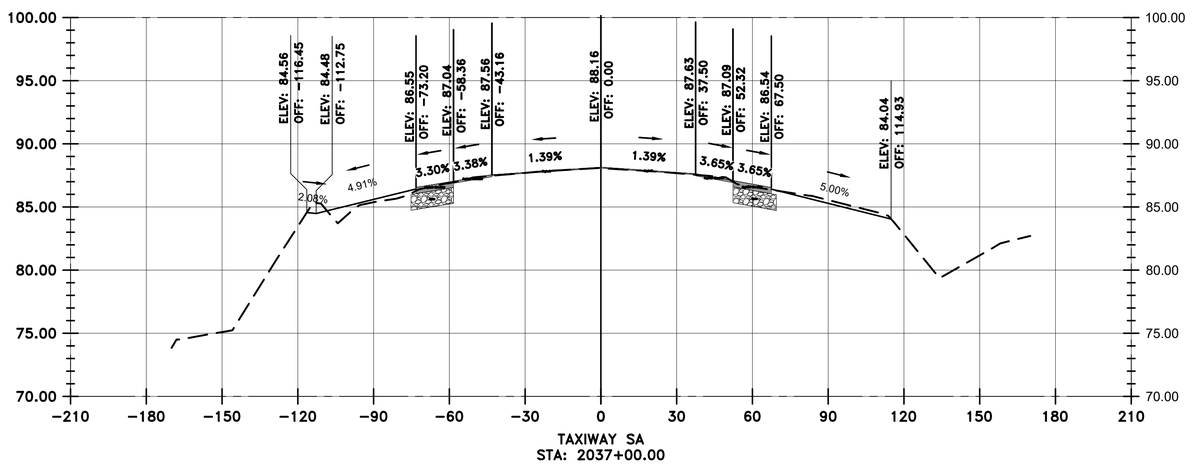

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 19

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.19

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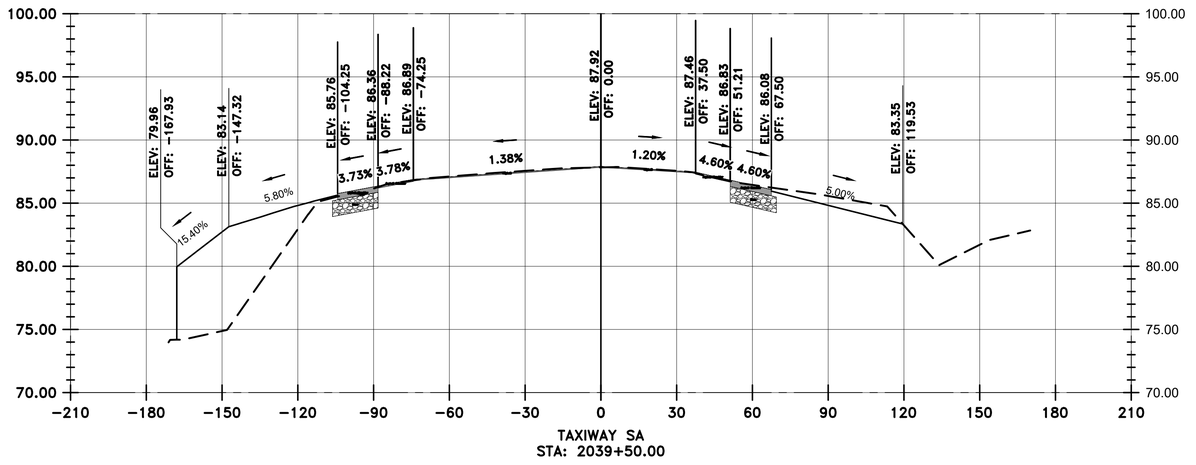
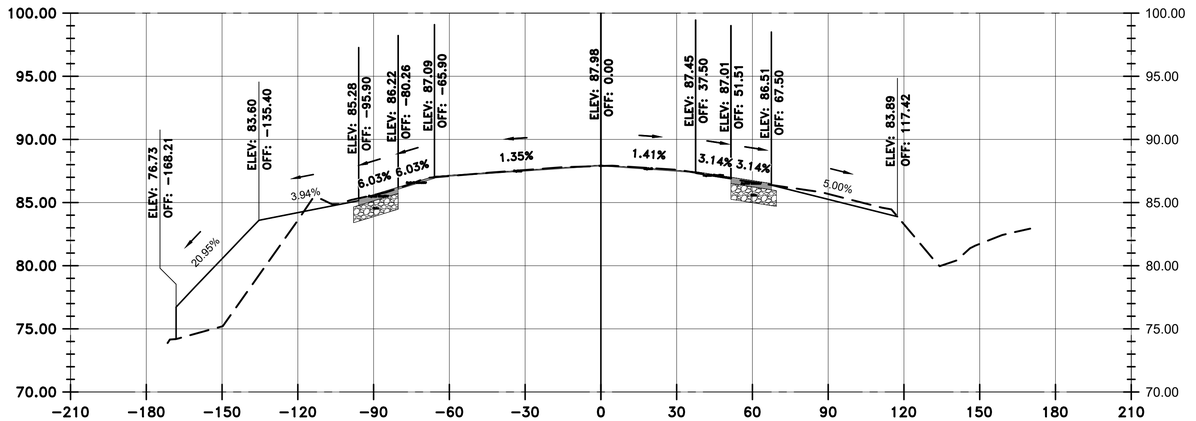


TAXIWAY SA
STA: 2039+50.00



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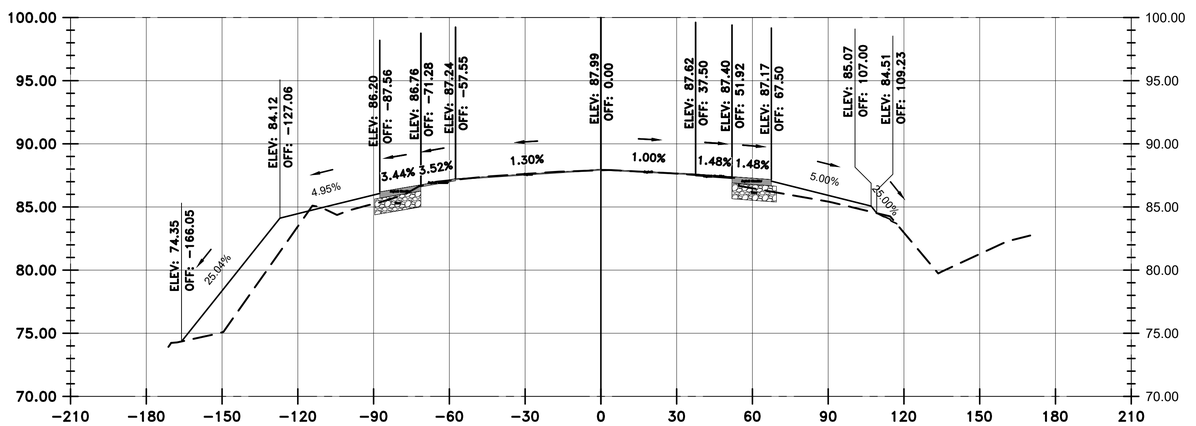

TAXIWAY SA
STA: 2038+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 20

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.20

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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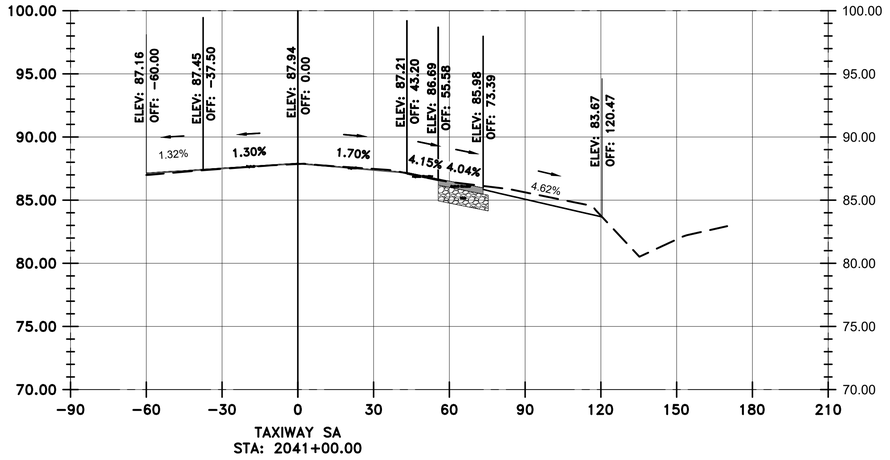

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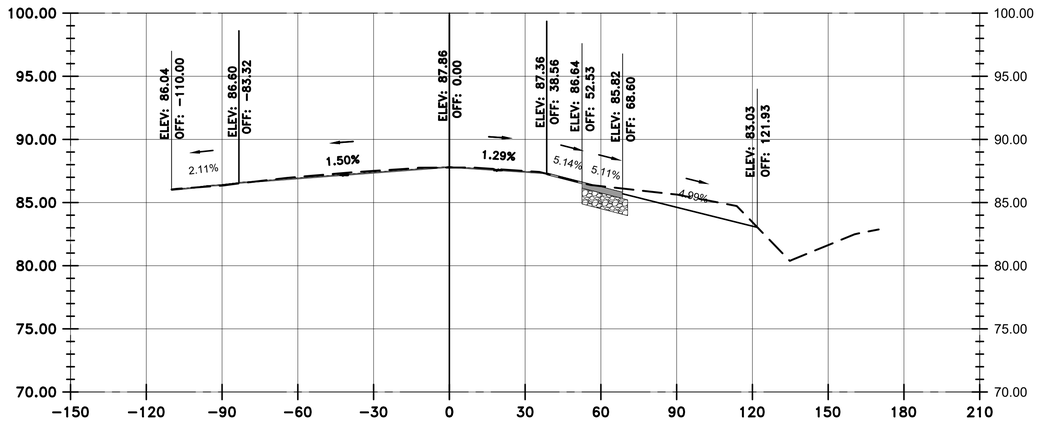

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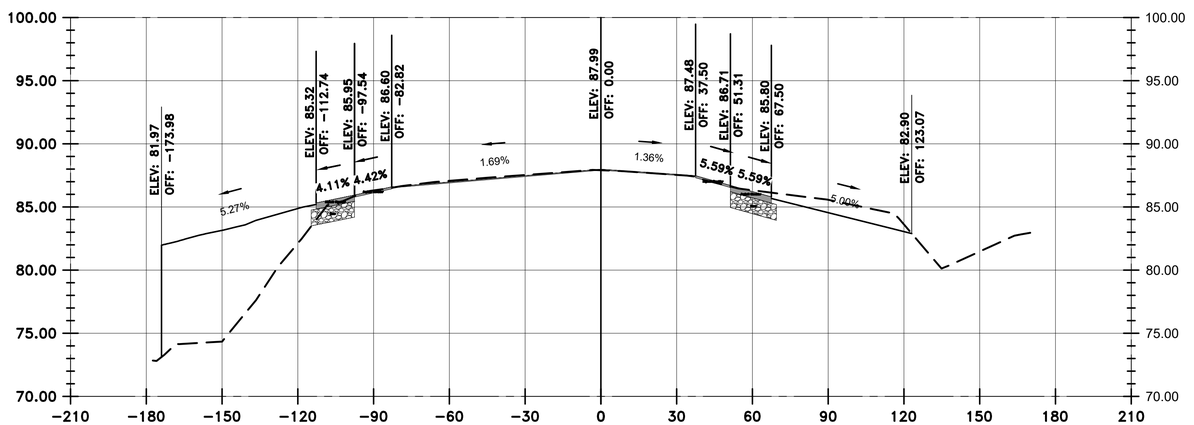

TAXIWAY SA
STA: 2040+00.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 21

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.21

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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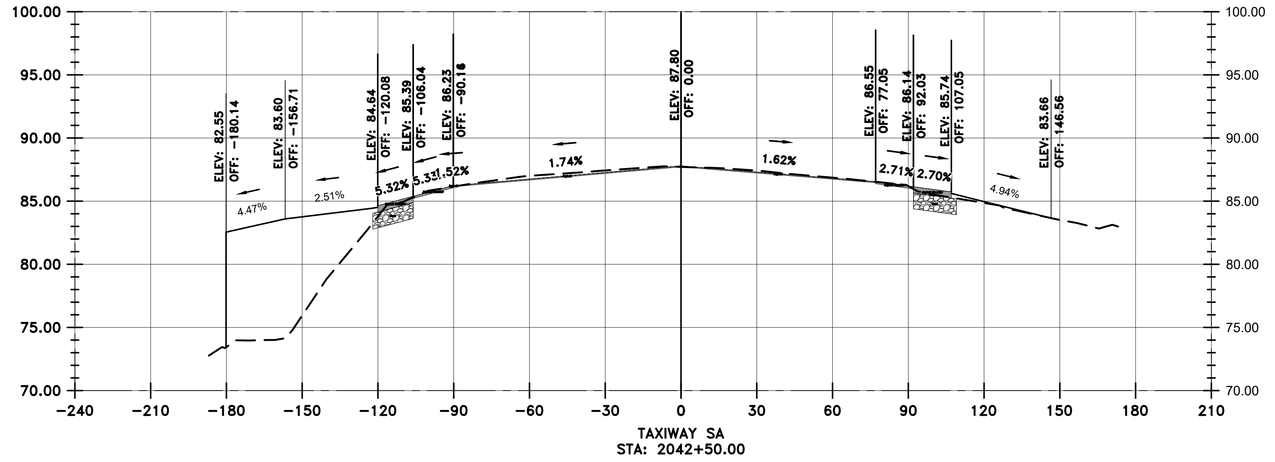

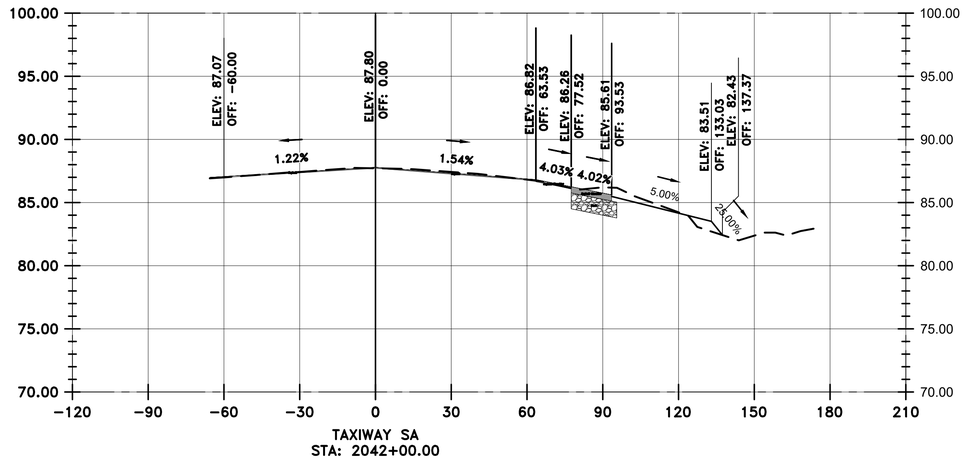

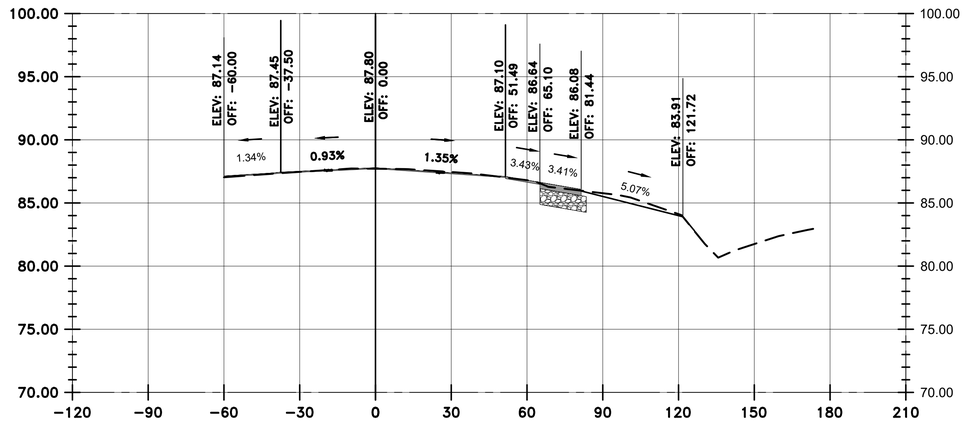

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 22

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.22

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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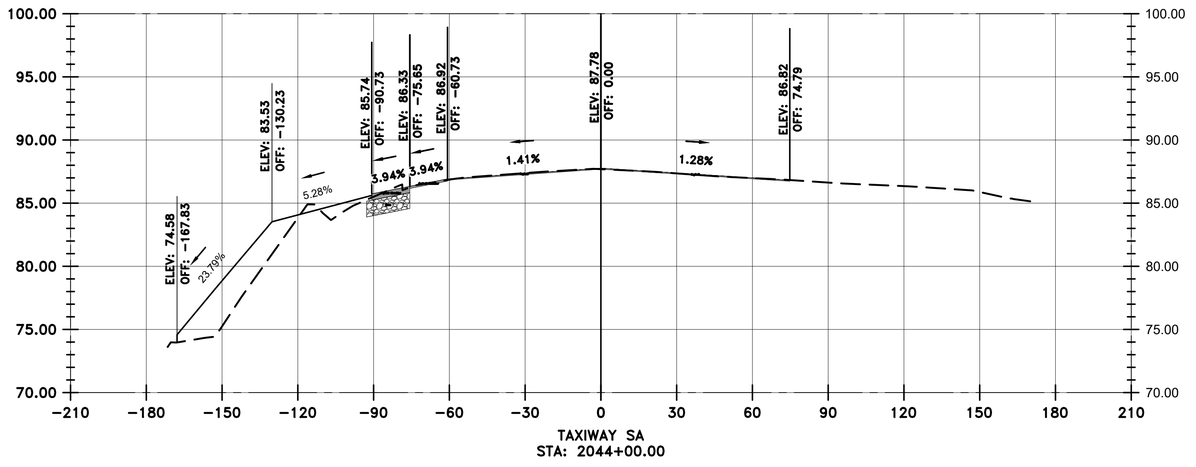
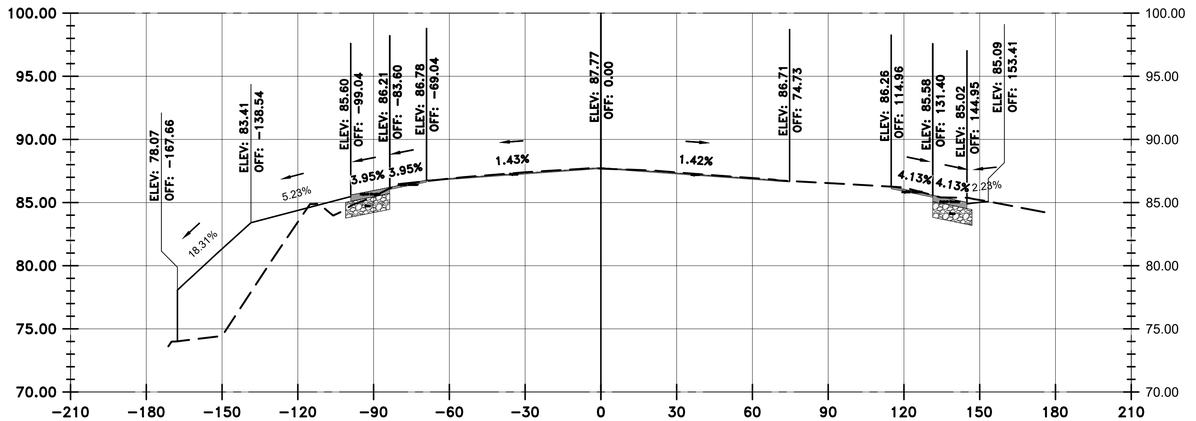


TAXIWAY SA
STA: 2044+00.00



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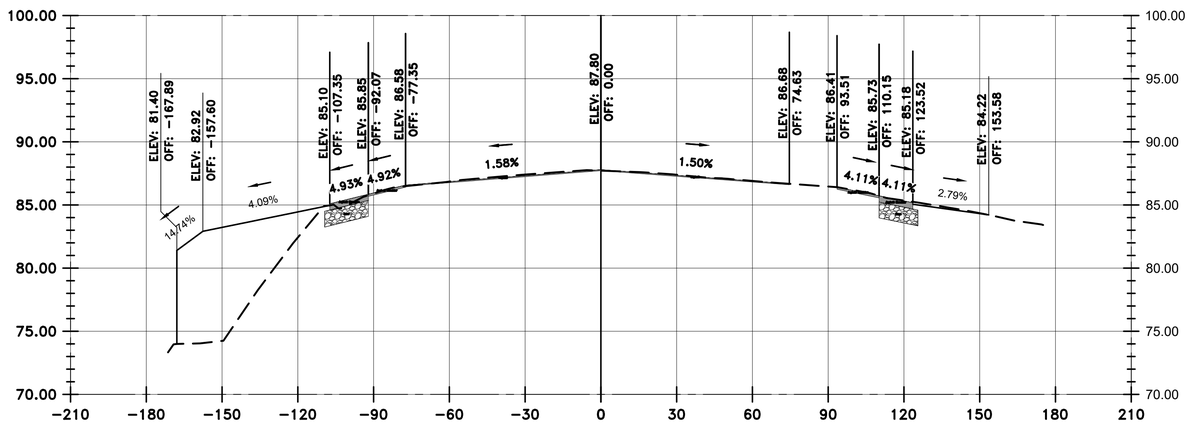
STA: 2043+50.00



TAXIWAY SA
STA: 2043+00.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 23

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.23

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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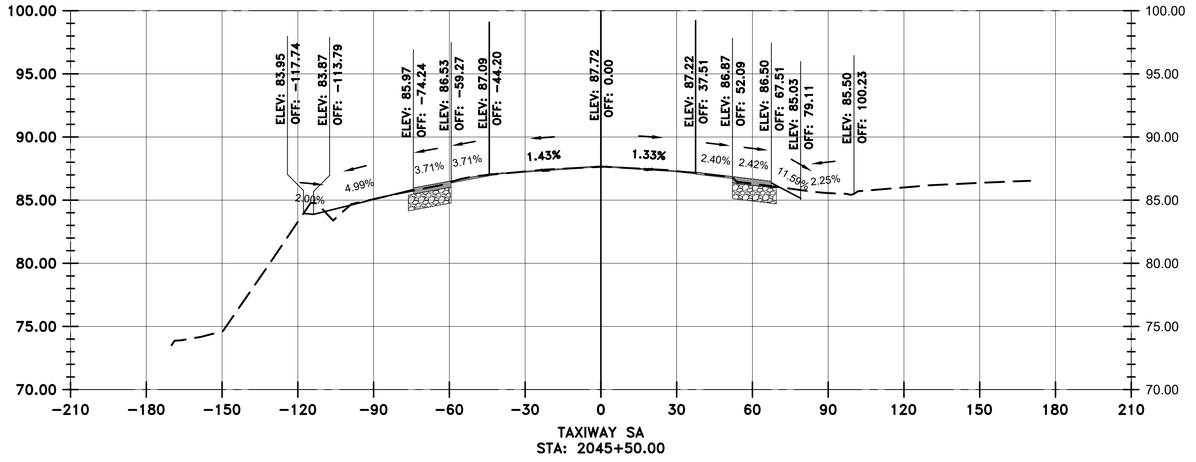

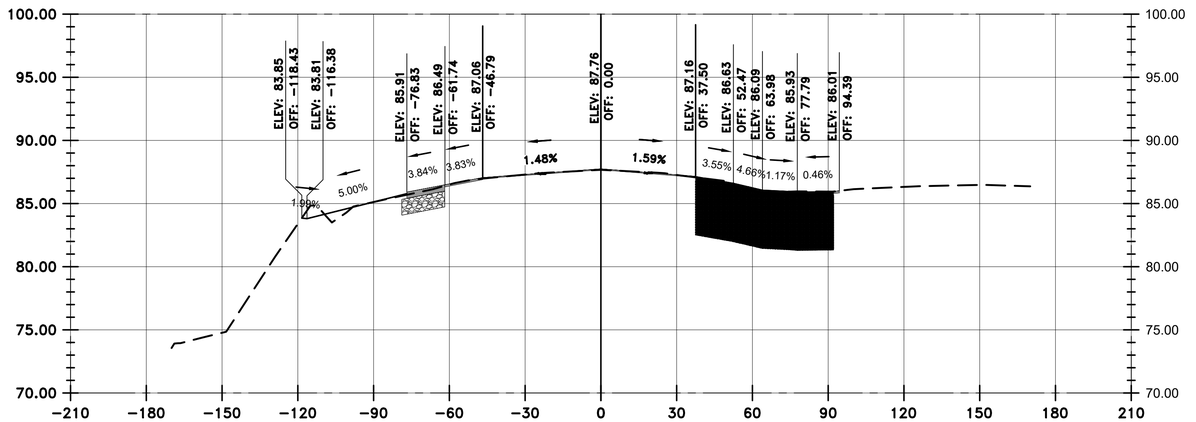

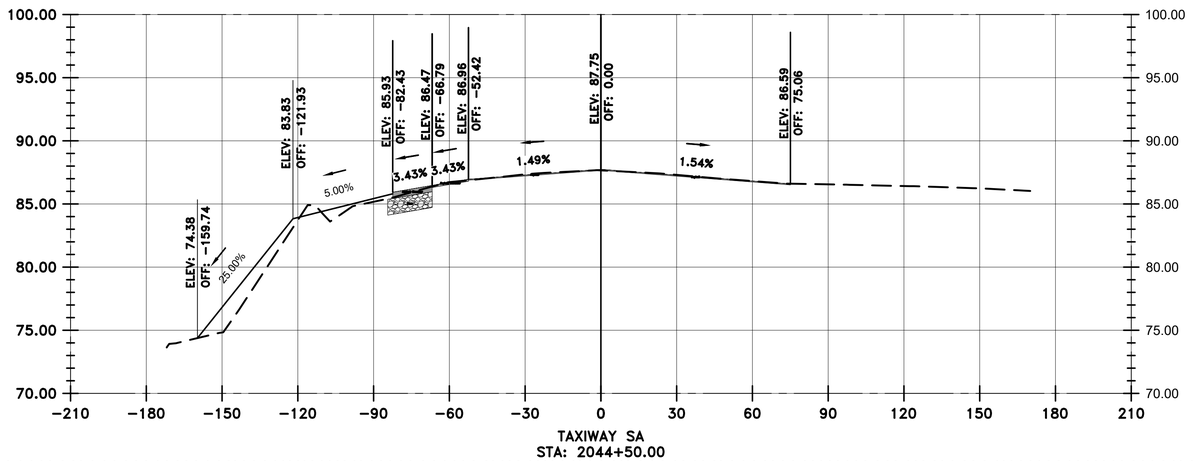

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

VERTICAL EXAGGERATION = 5

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 24

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.24

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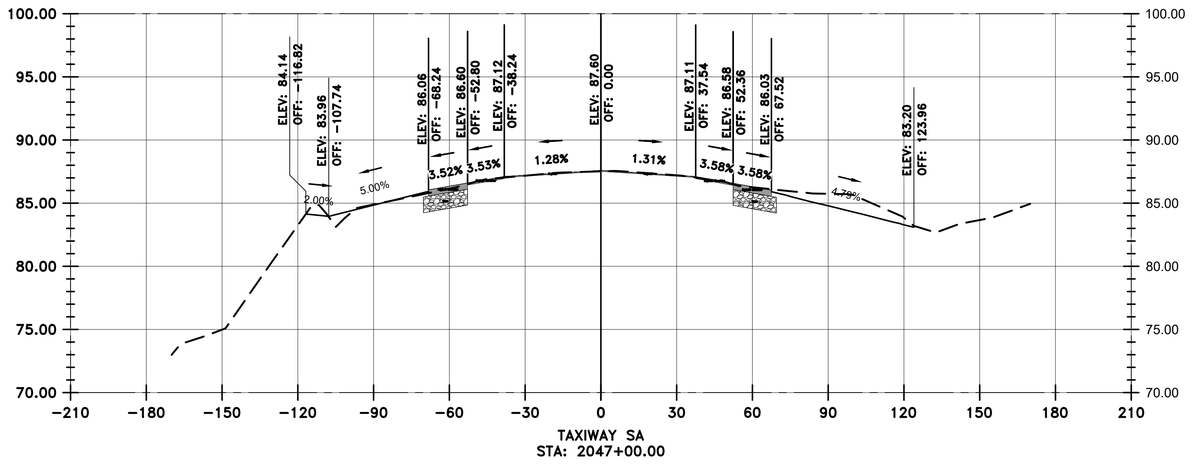

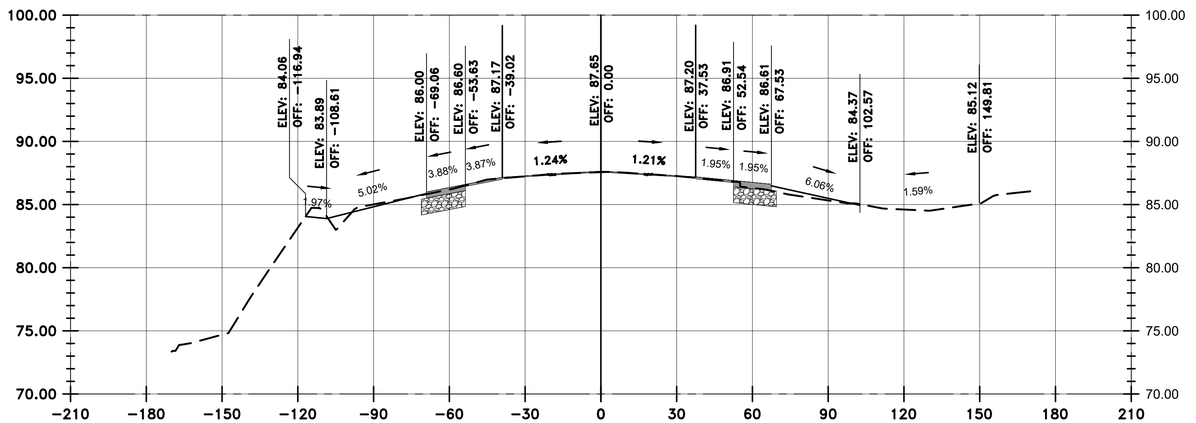

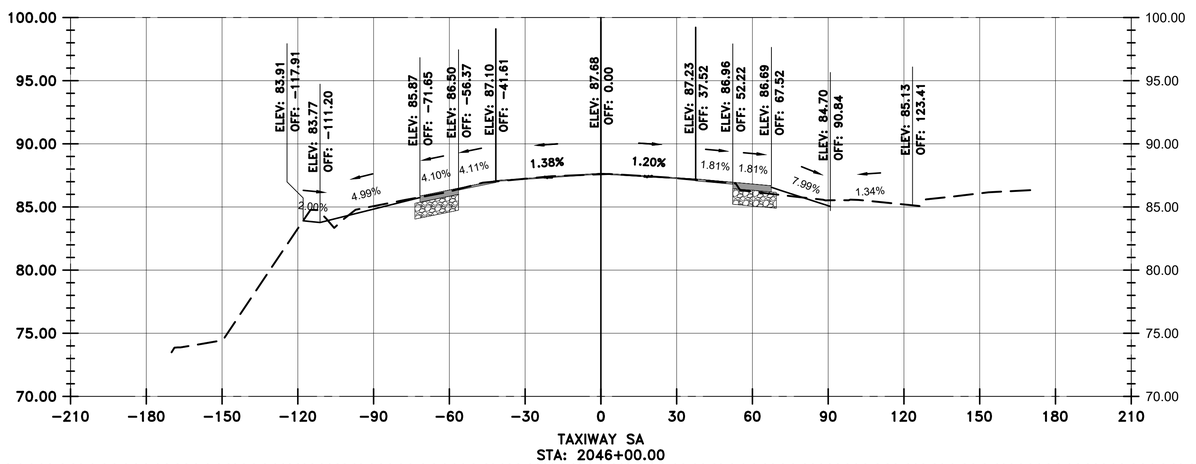

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 25

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.25

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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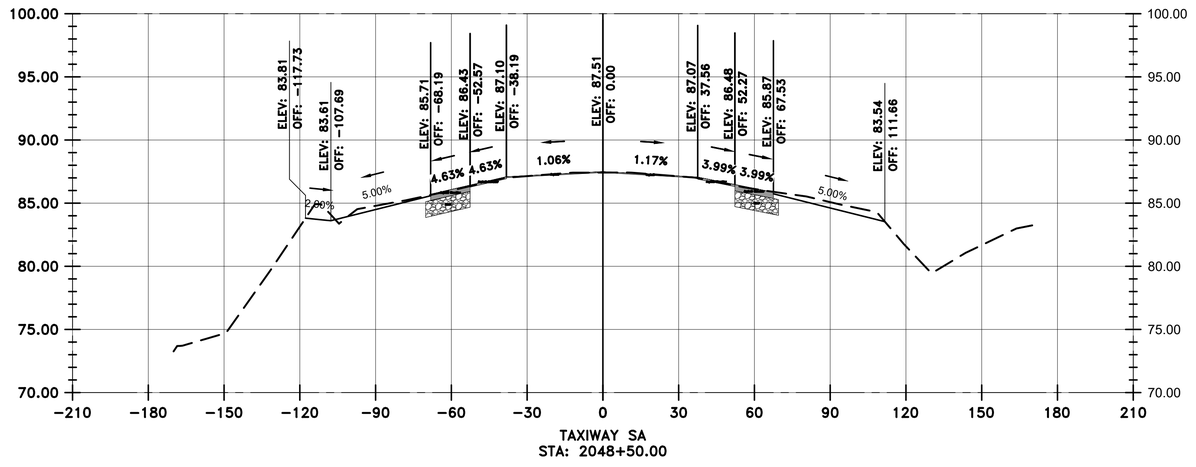

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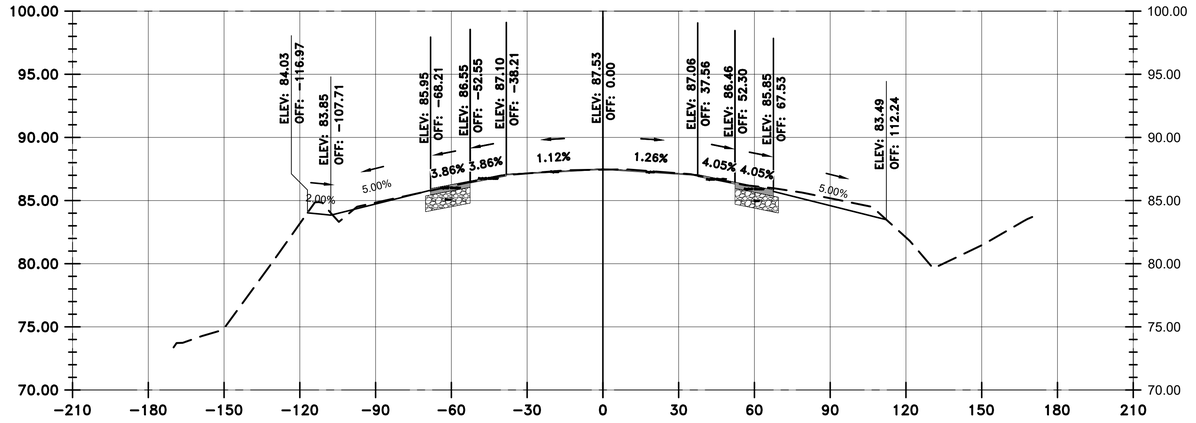
STA: 2048+50.00



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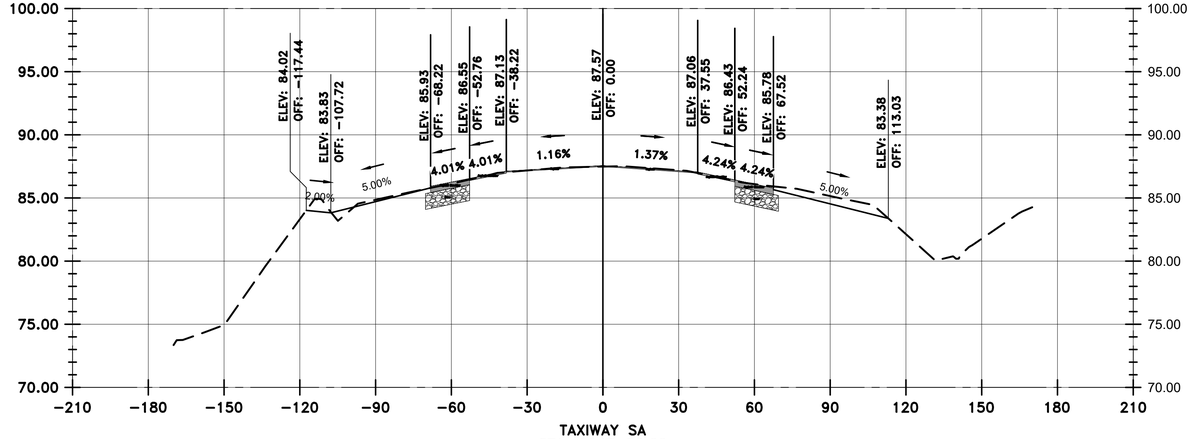
STA: 2048+00.00



TAXIWAY SA
STA: 2047+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 26

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

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DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.26

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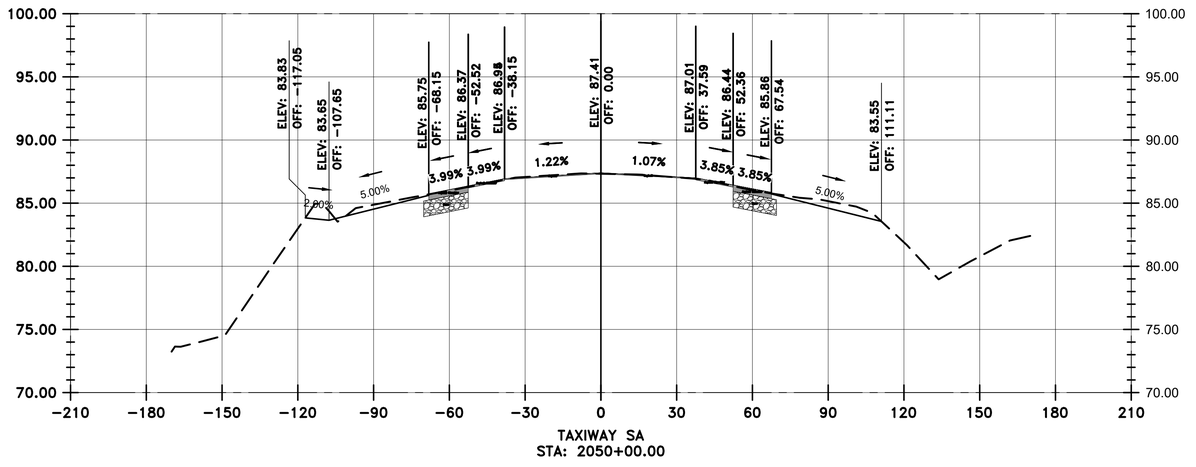

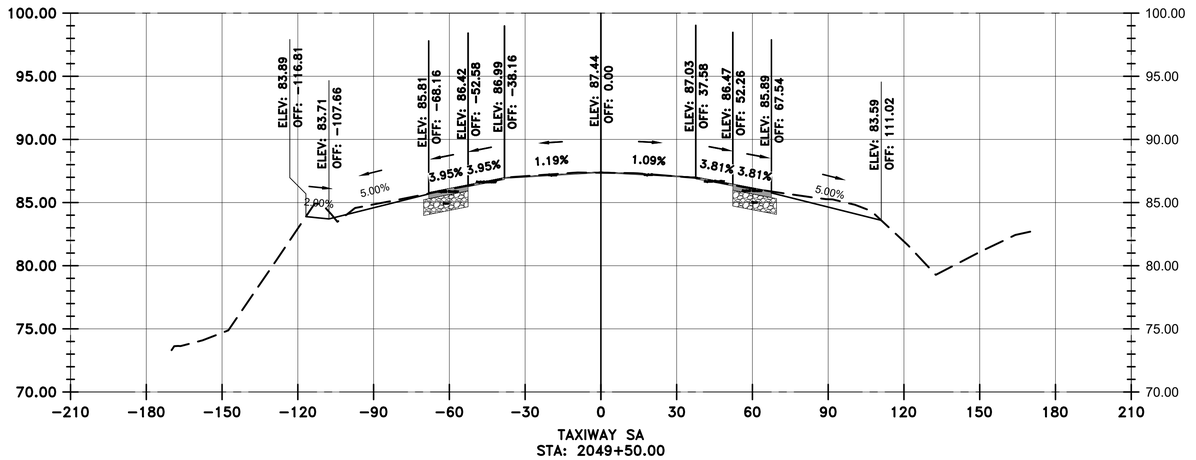

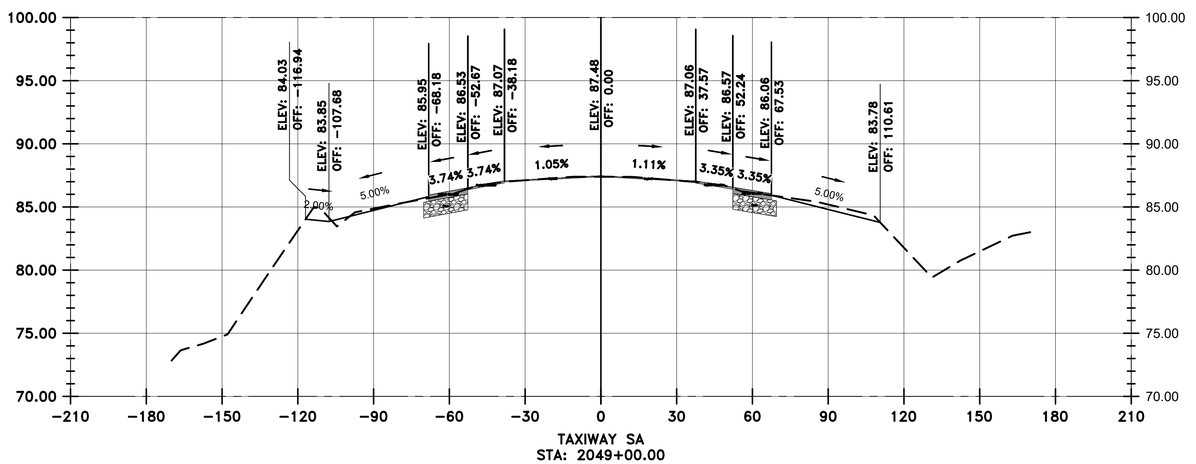

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 27

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.27

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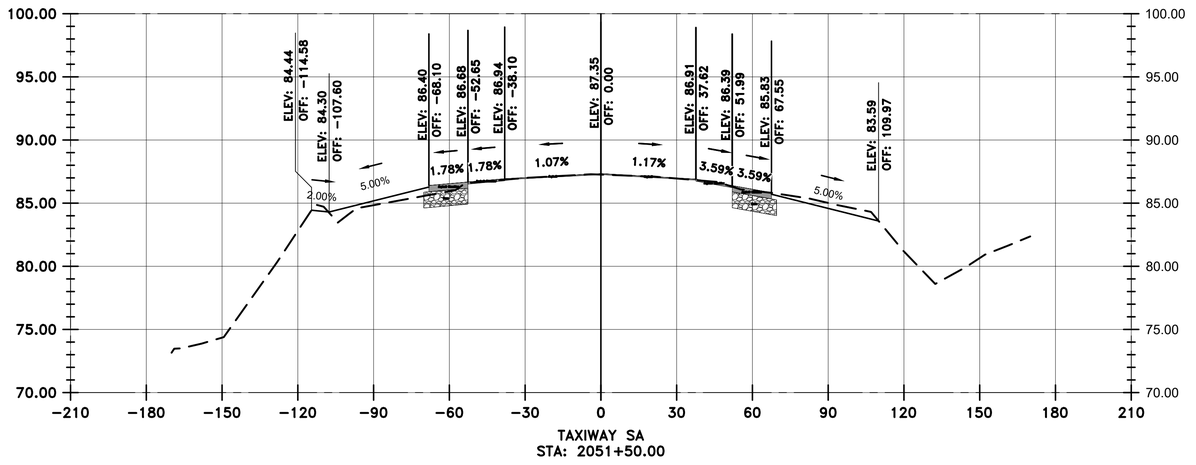

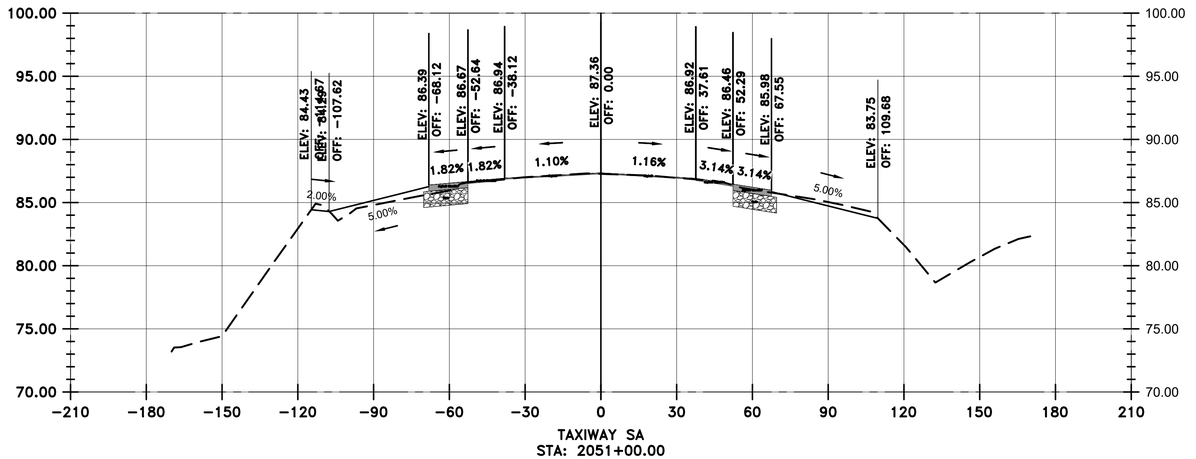

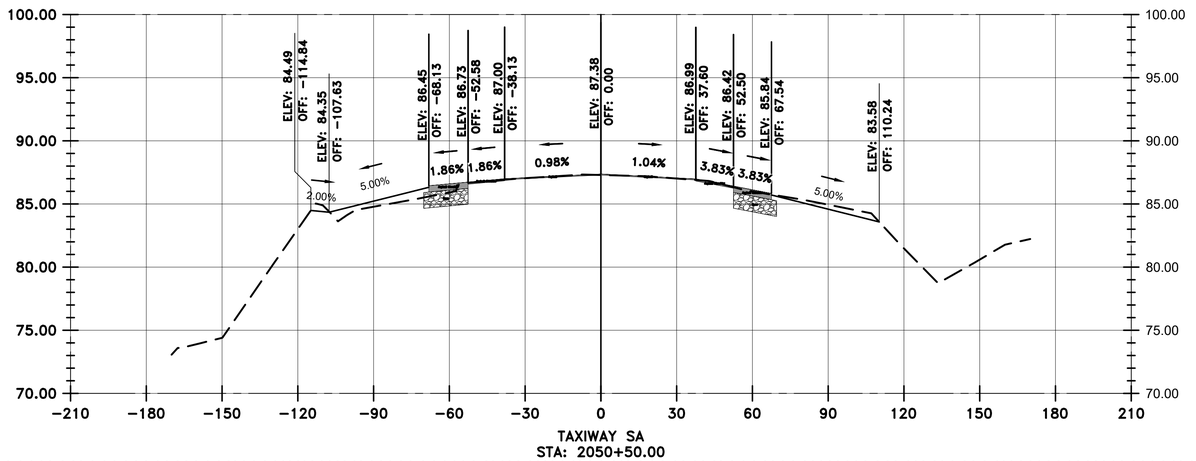

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
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REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 28

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.28

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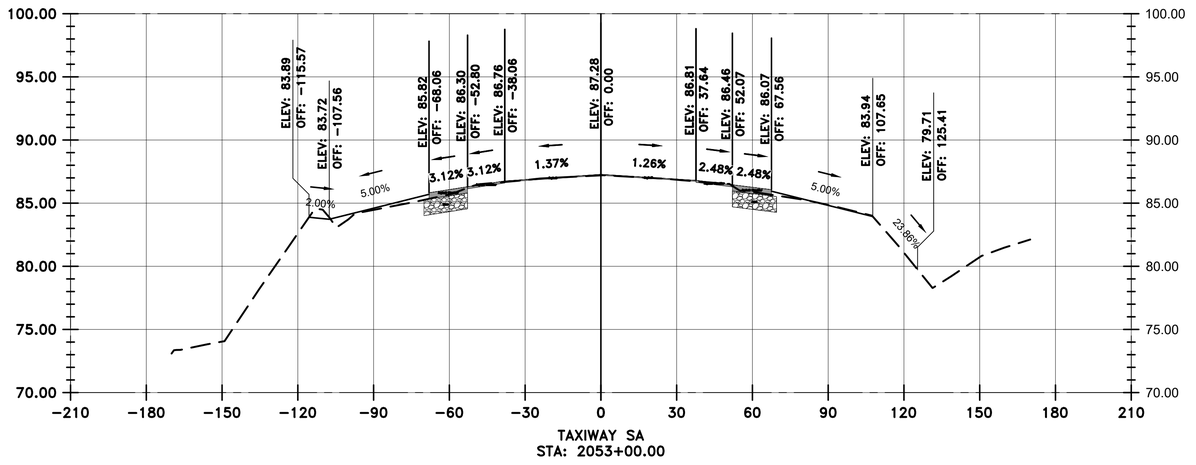

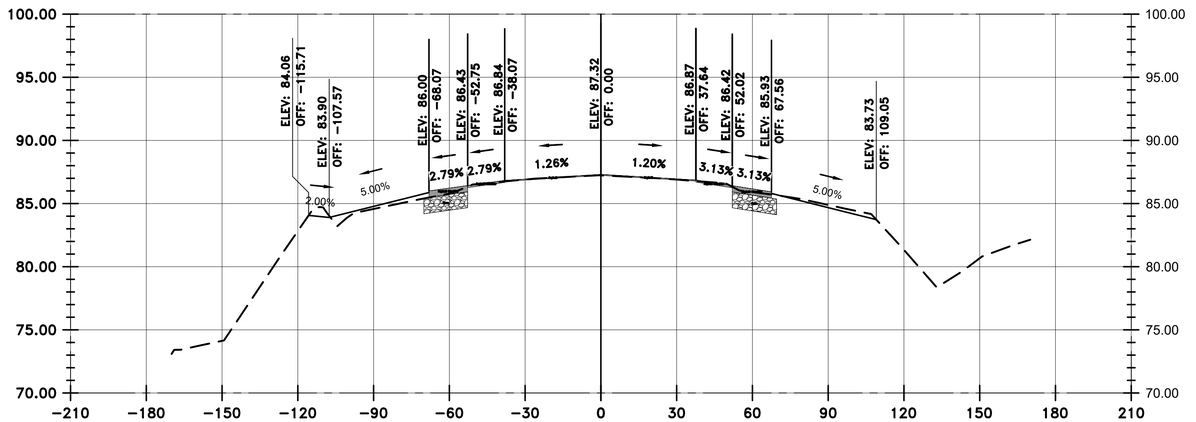

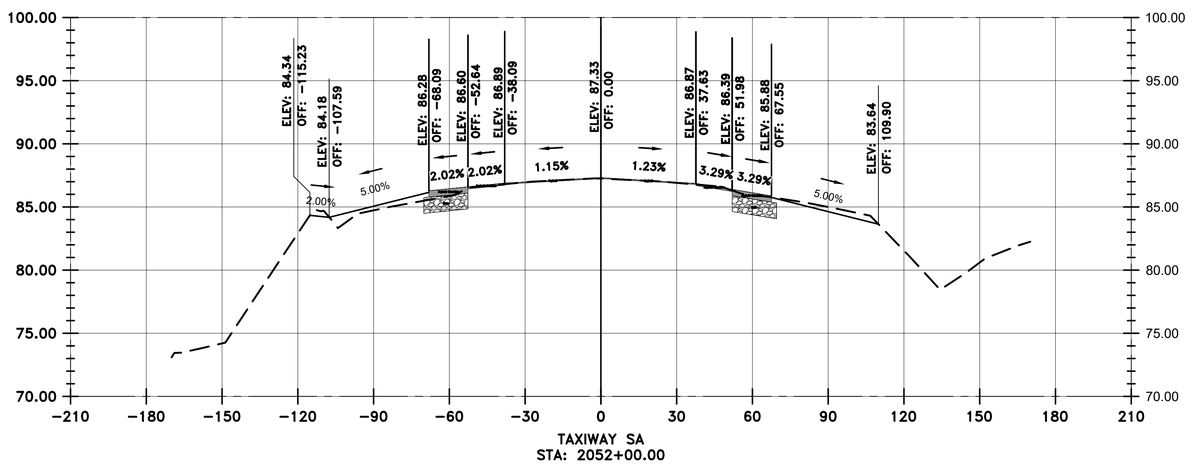

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
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TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 29

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
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APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.29

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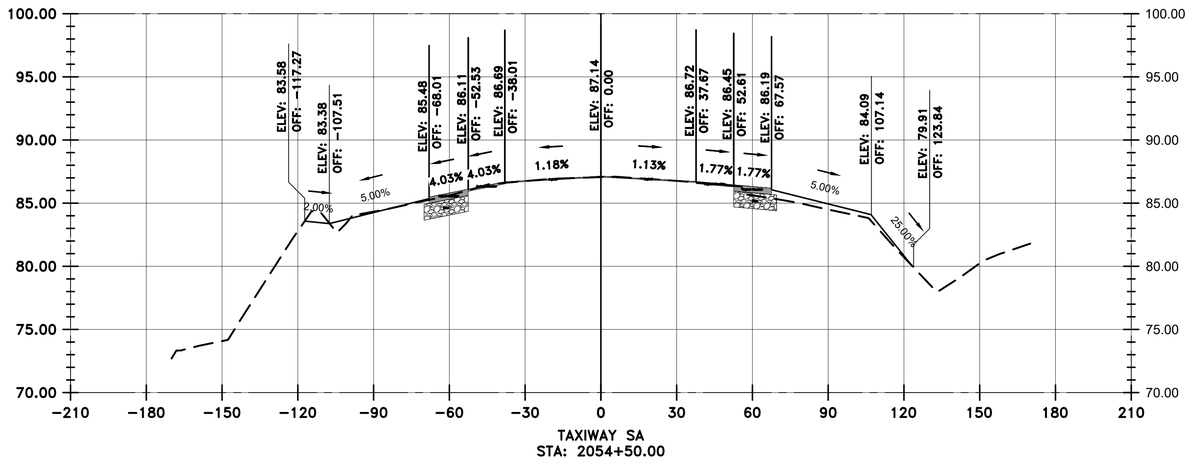

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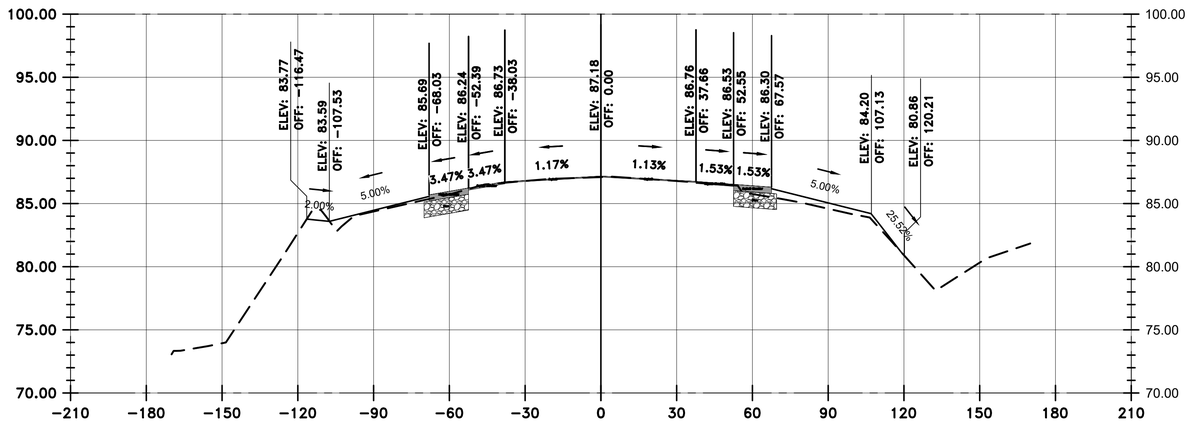
STA: 2054+50.00



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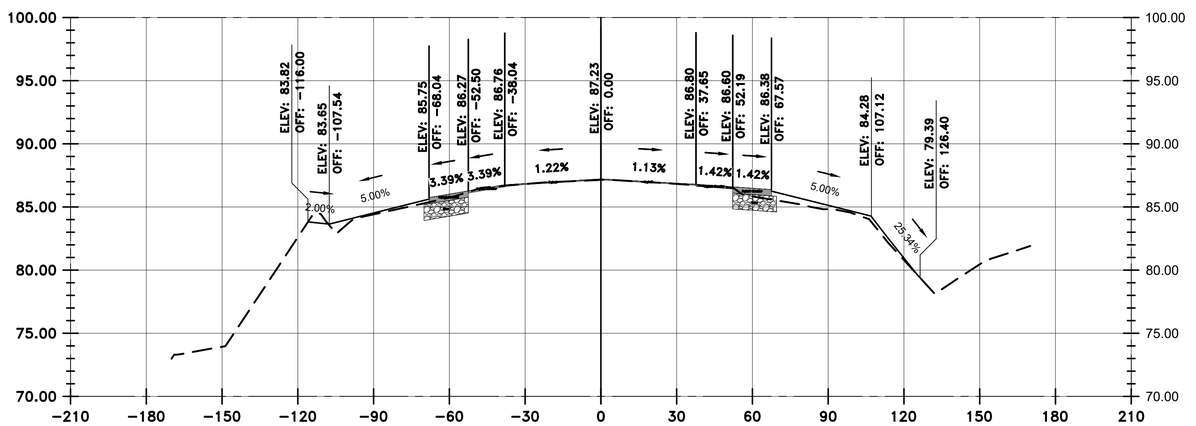

TAXIWAY SA
STA: 2053+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 30

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.30

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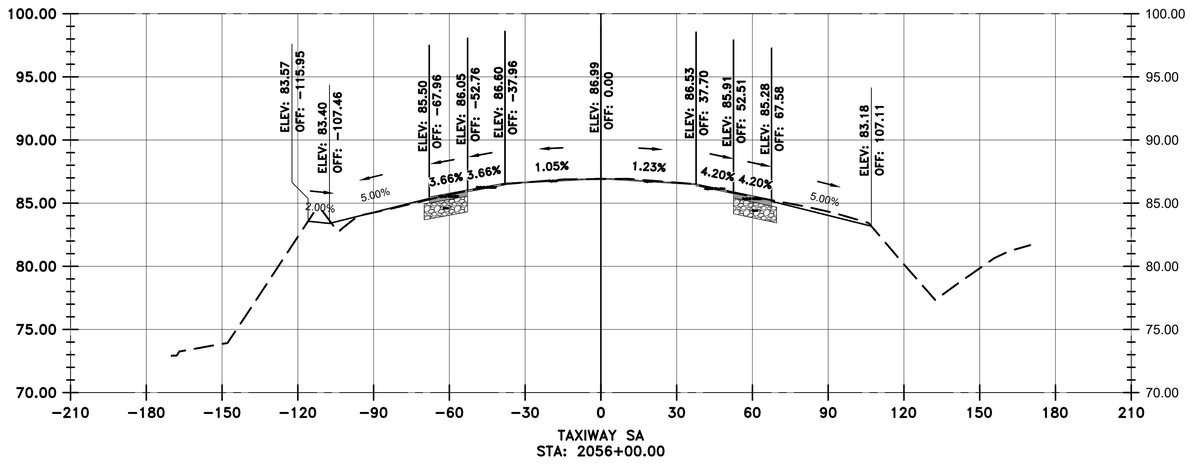

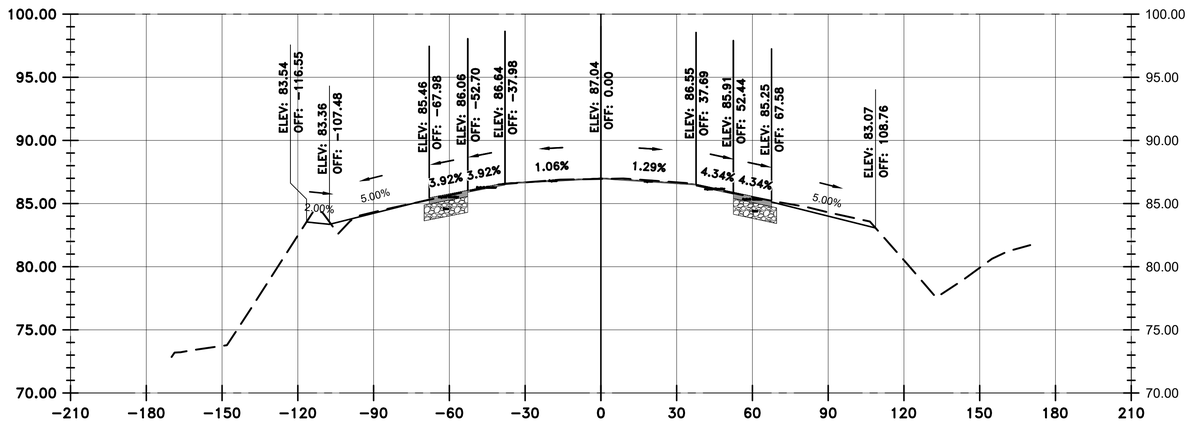

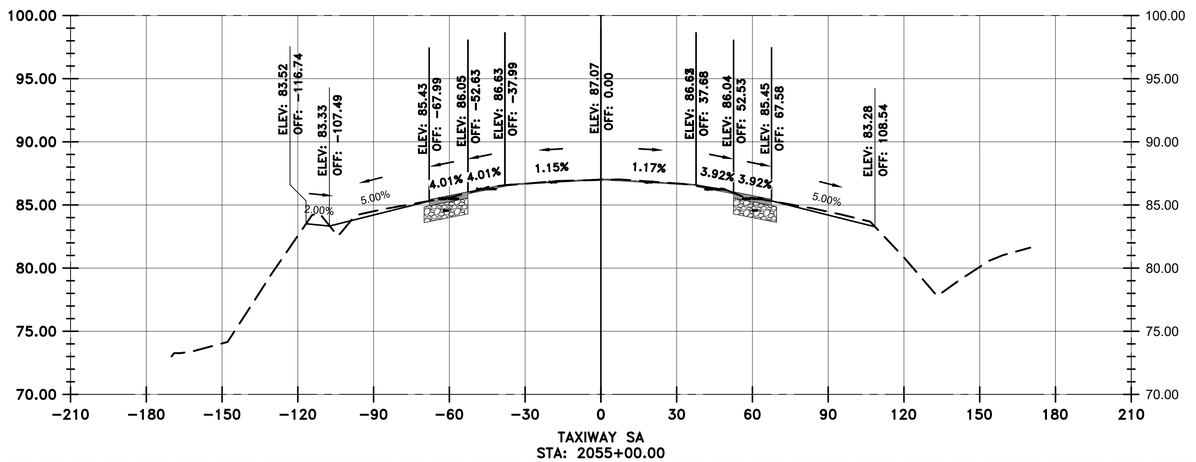

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 31

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.31

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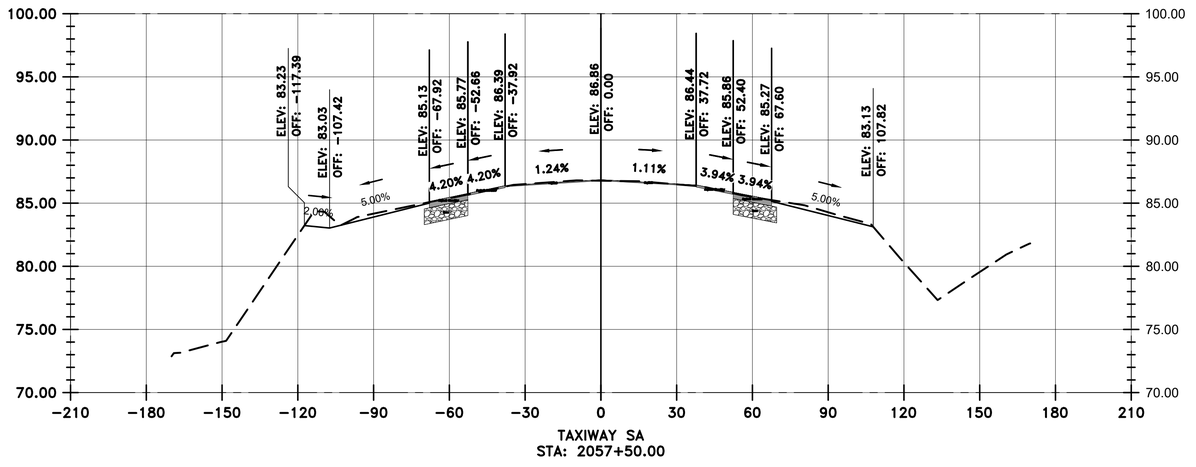

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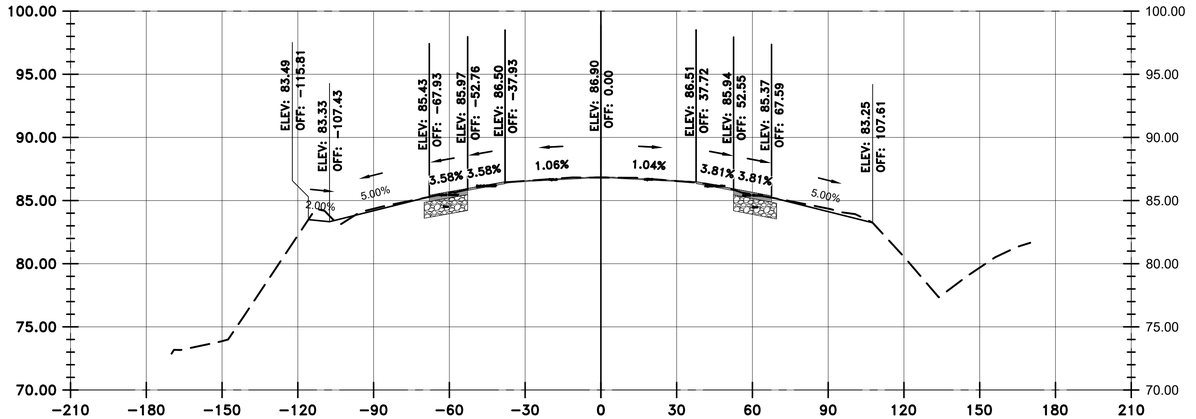
STA: 2057+50.00



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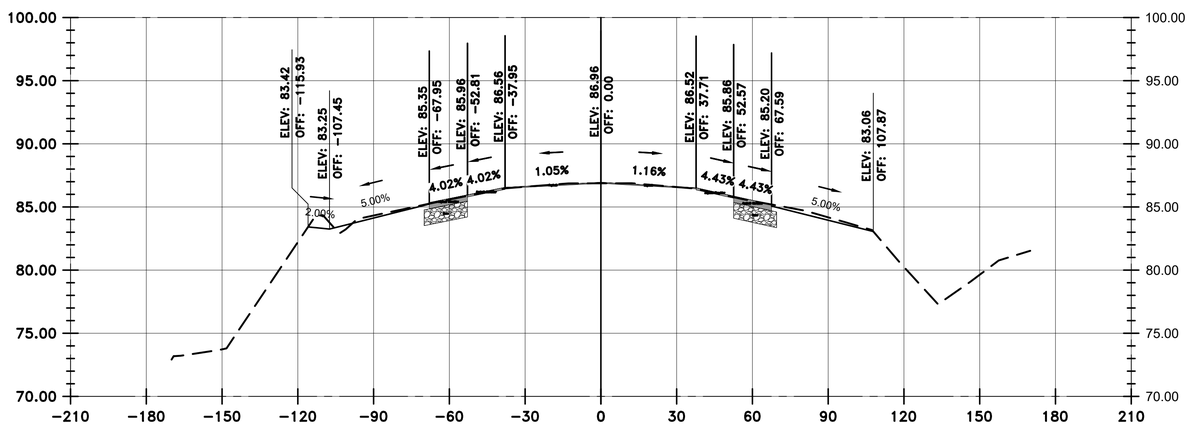

TAXIWAY SA
STA: 2056+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 32

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.32

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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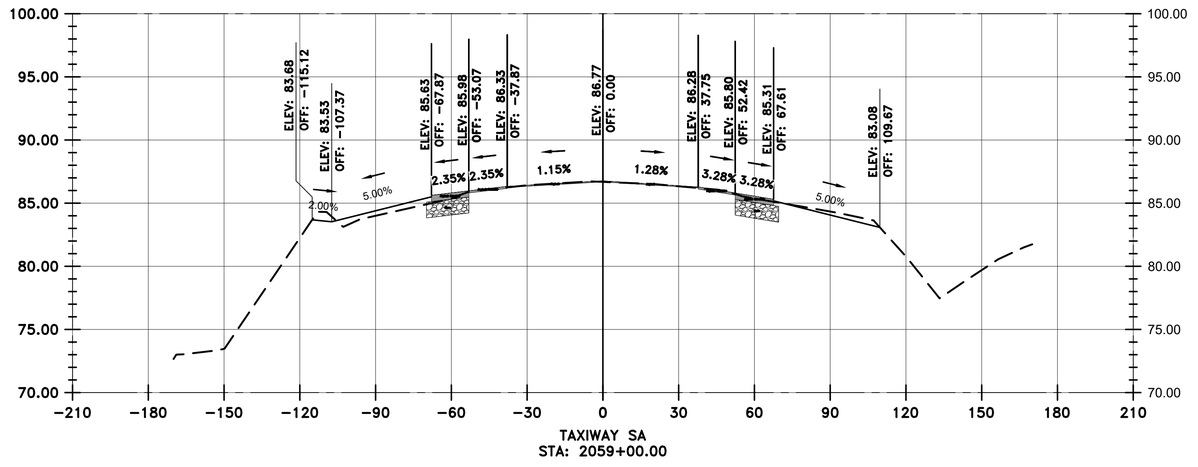

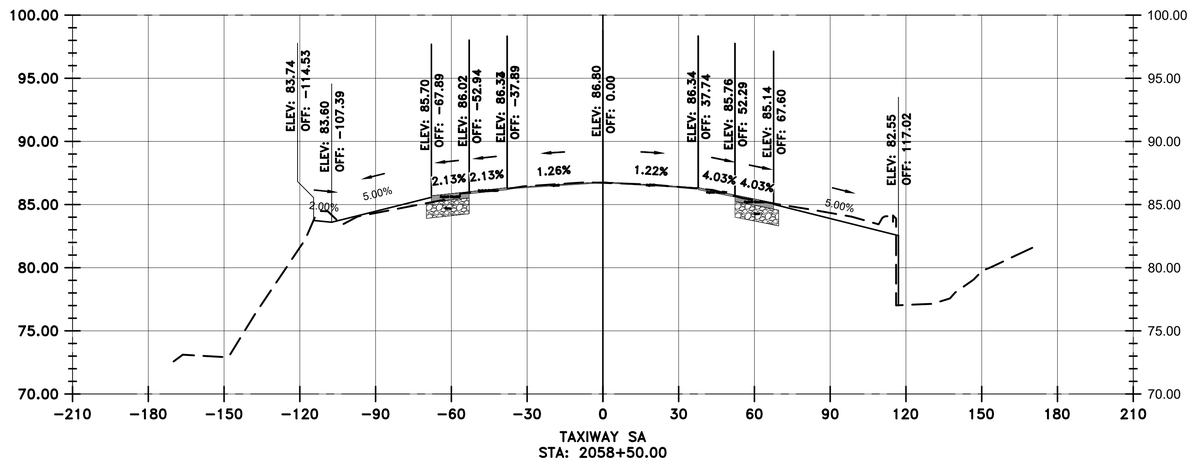

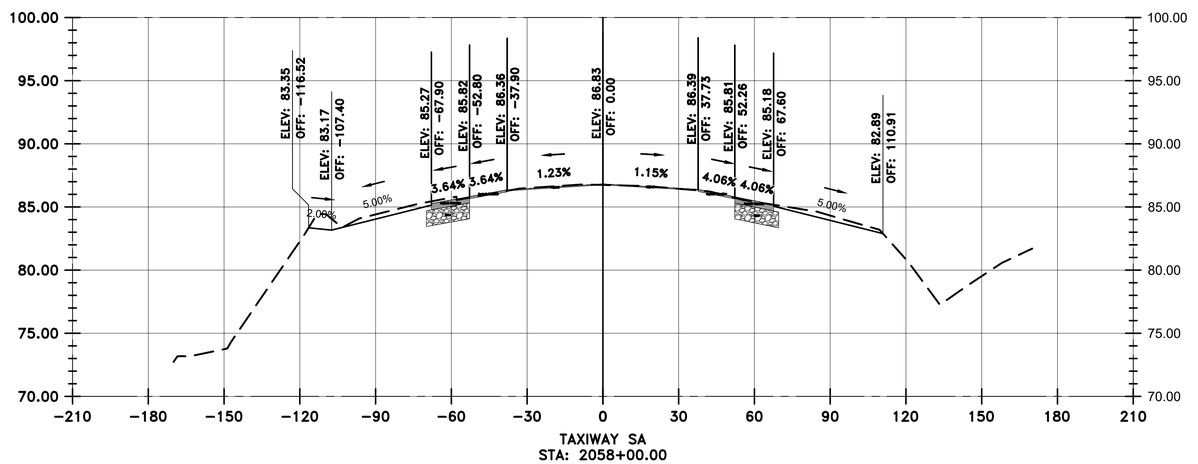

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
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Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 33

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.33

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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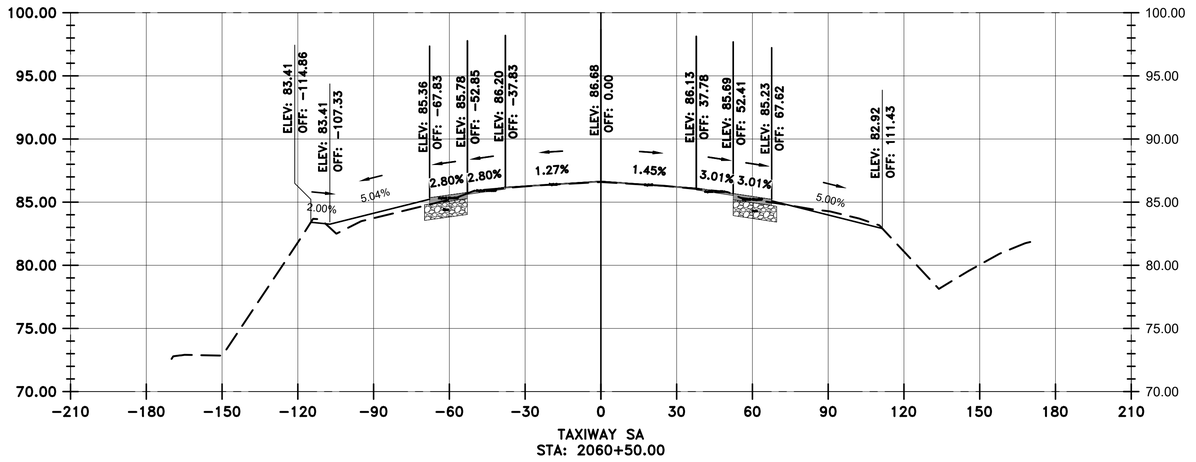

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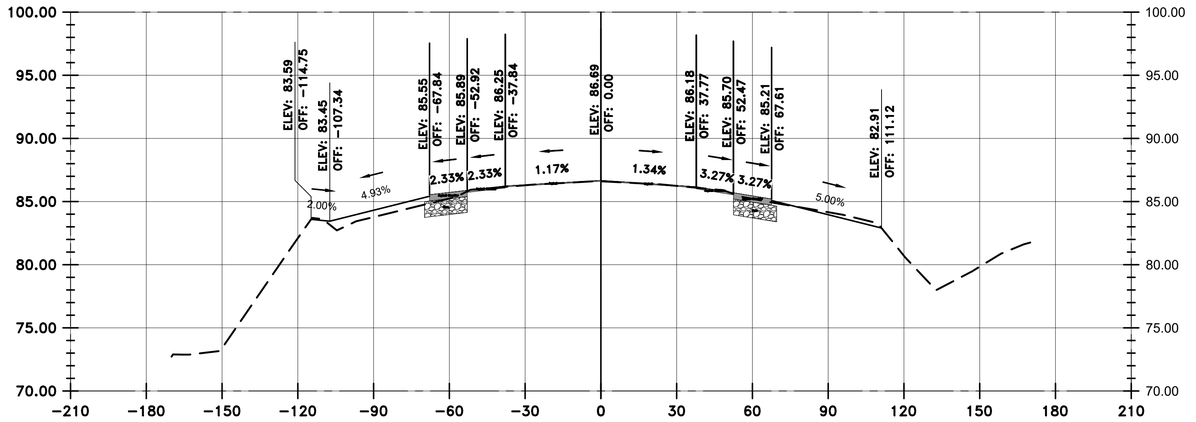
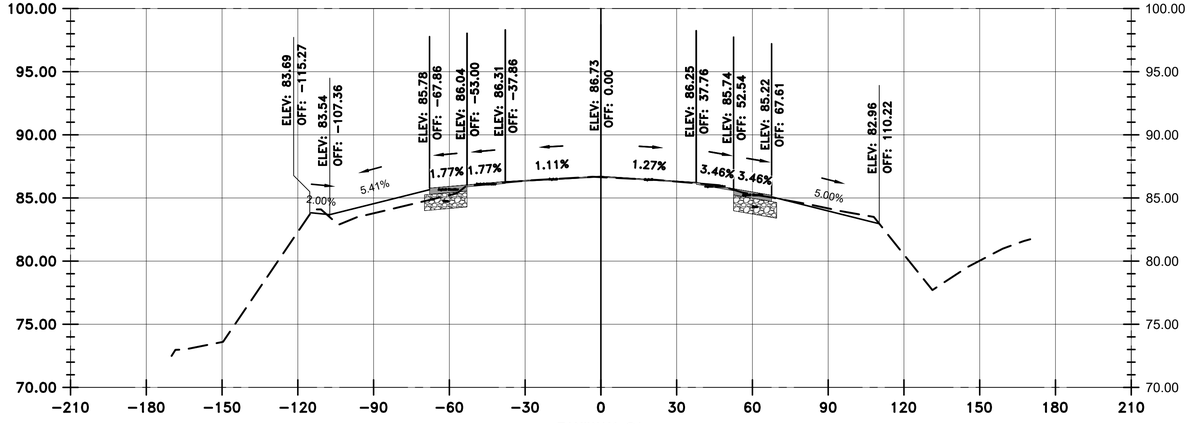
STA: 2060+50.00



TAXIWAY SA
STA: 2060+00.00



TAXIWAY SA
STA: 2059+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 34

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.34

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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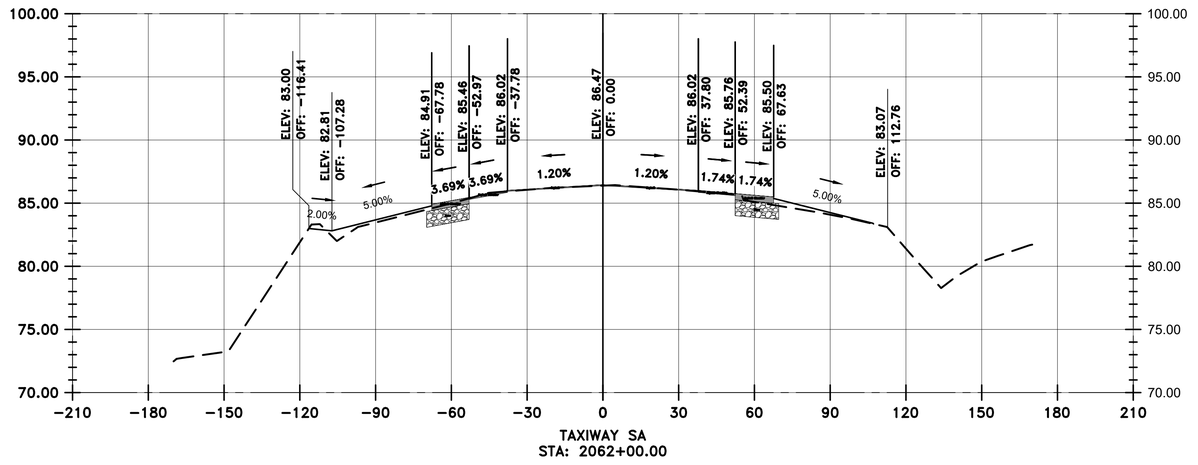

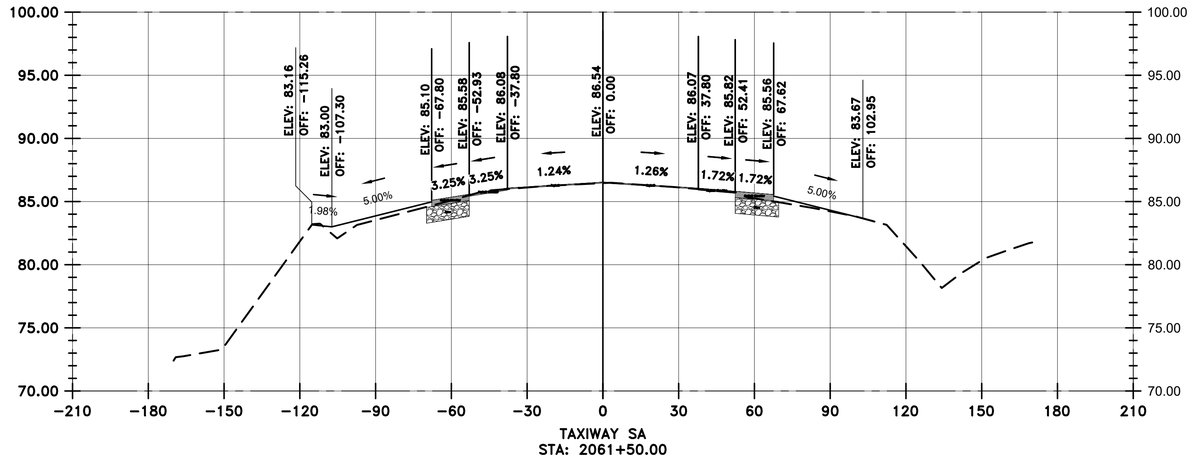

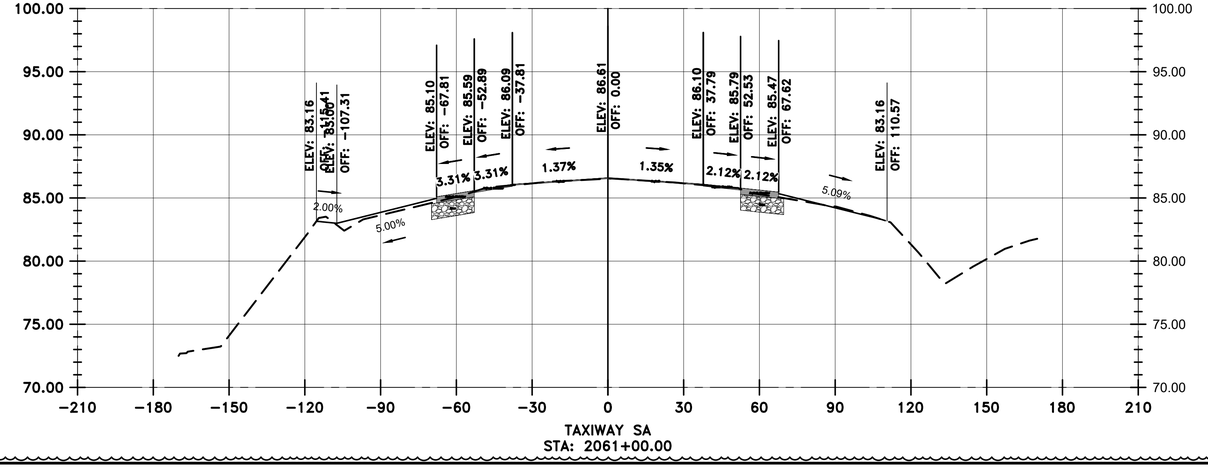

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 35

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.35

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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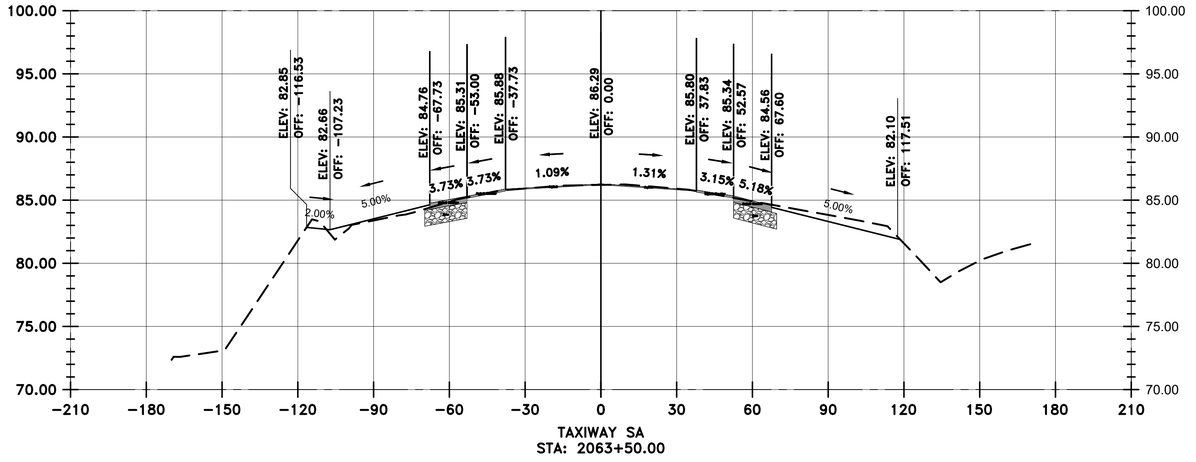
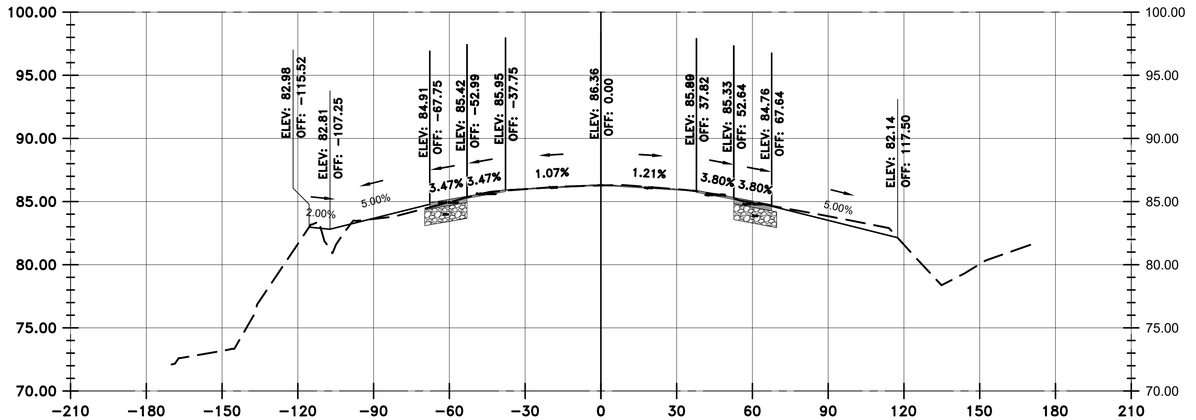


TAXIWAY SA
STA: 2063+50.00



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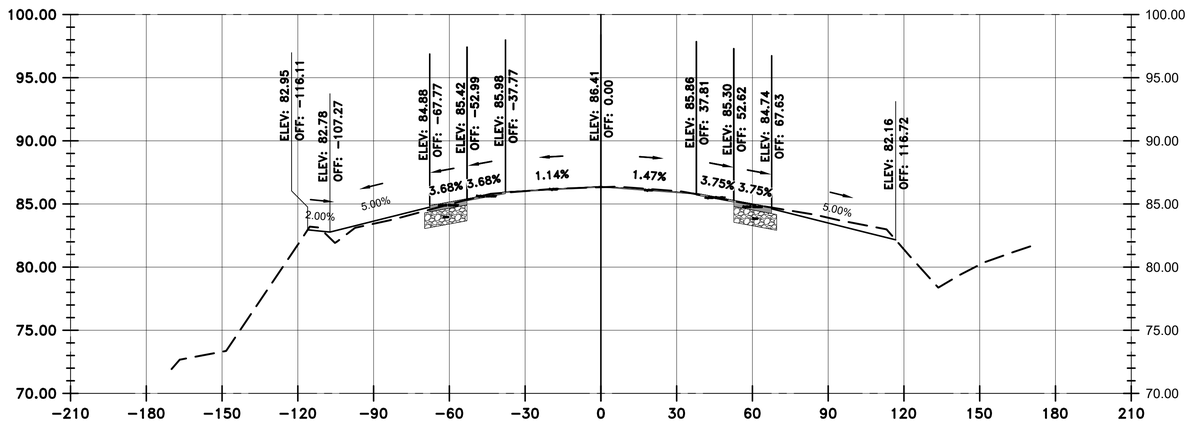
STA: 2063+00.00



TAXIWAY SA
STA: 2062+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 36

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.36

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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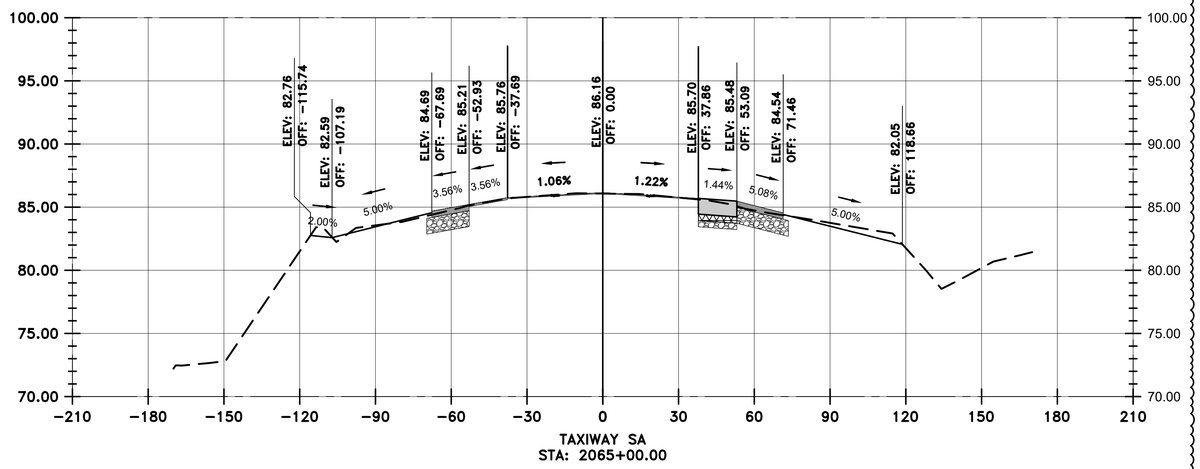

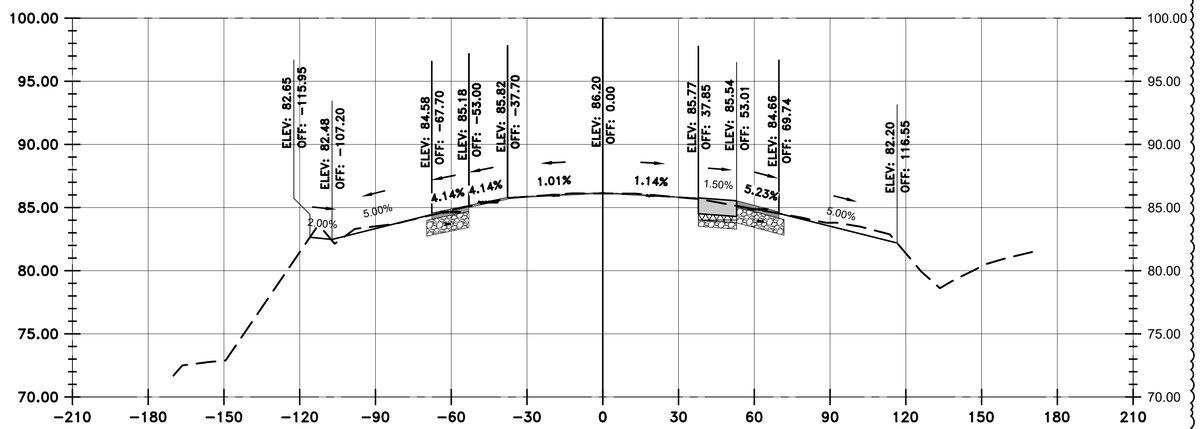

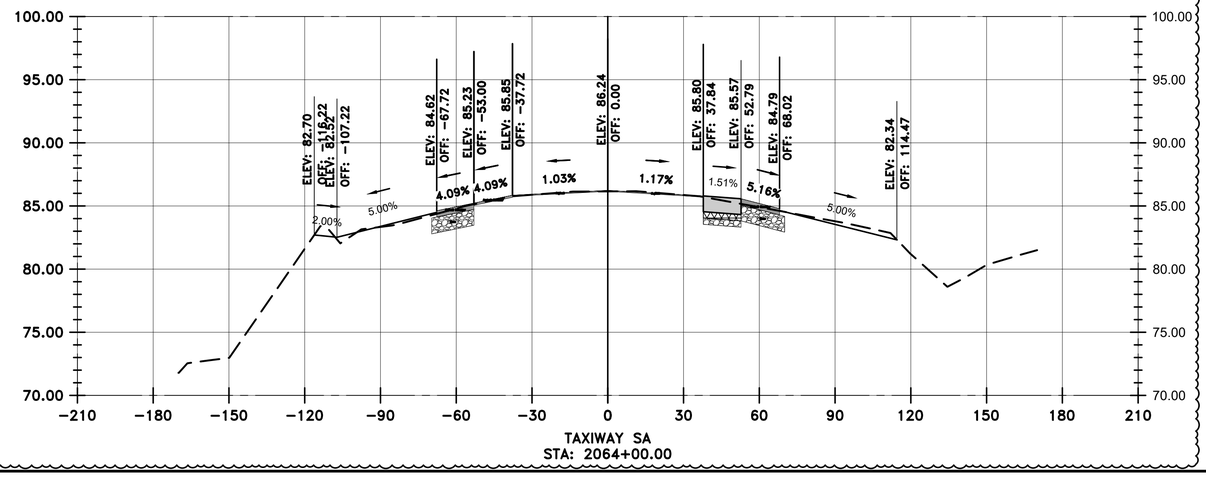

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED CONCRETE
- PROPOSED CEMENT TREATED BASE
- PROPOSED AGGREGATE BASE

VERTICAL EXAGGERATION = 5

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 37

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER

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APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.37

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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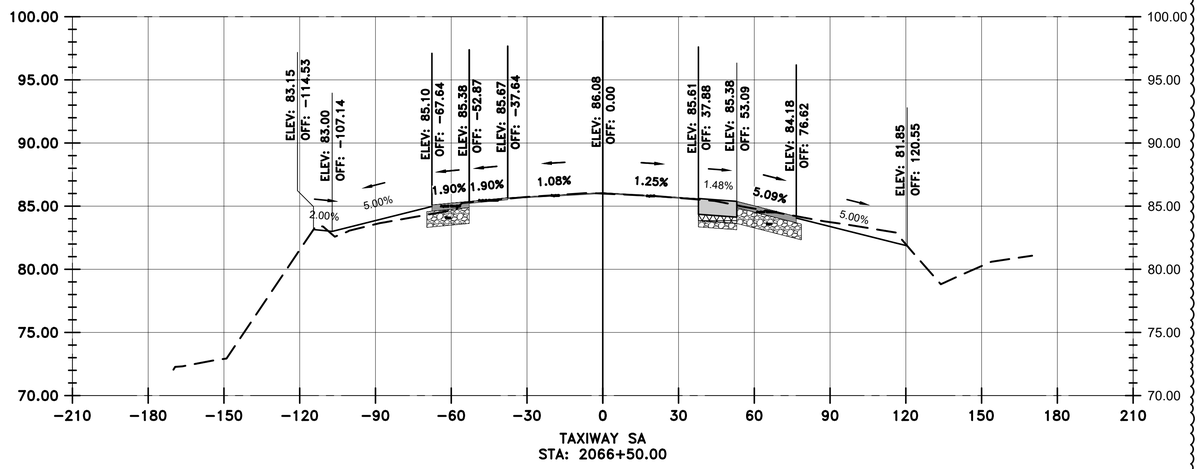

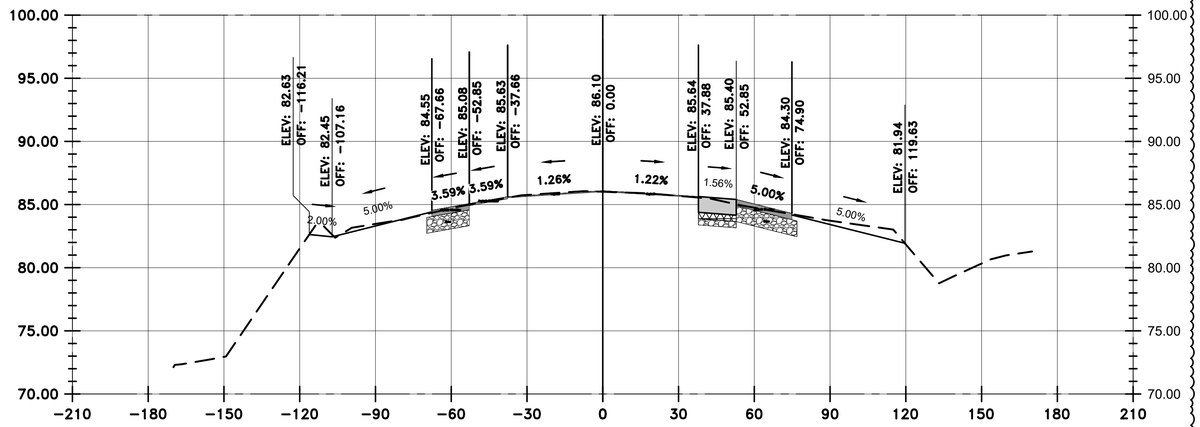

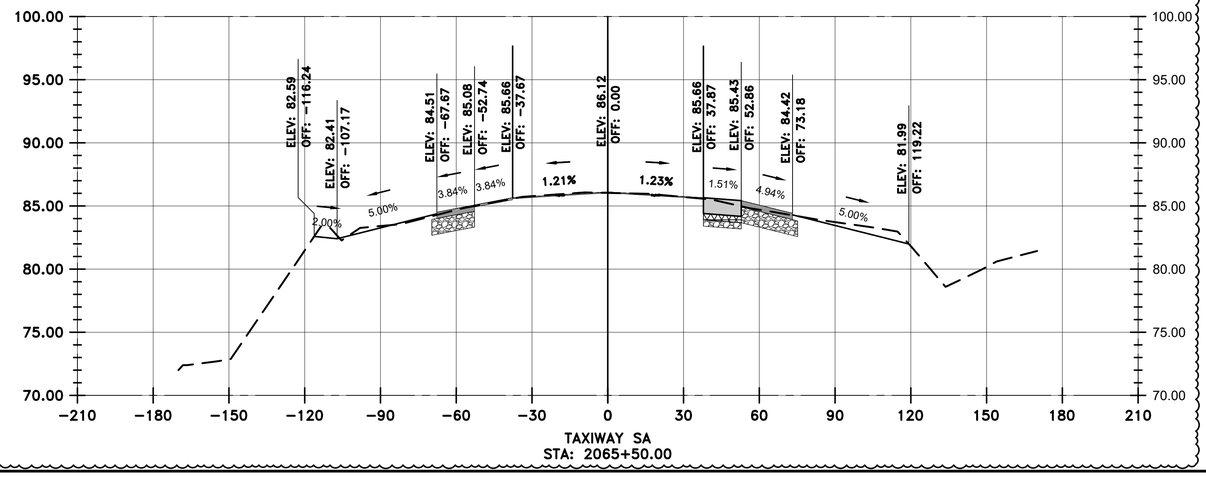

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED CONCRETE
- PROPOSED CEMENT TREATED BASE
- PROPOSED AGGREGATE BASE

VERTICAL EXAGGERATION = 5

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 38

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.38

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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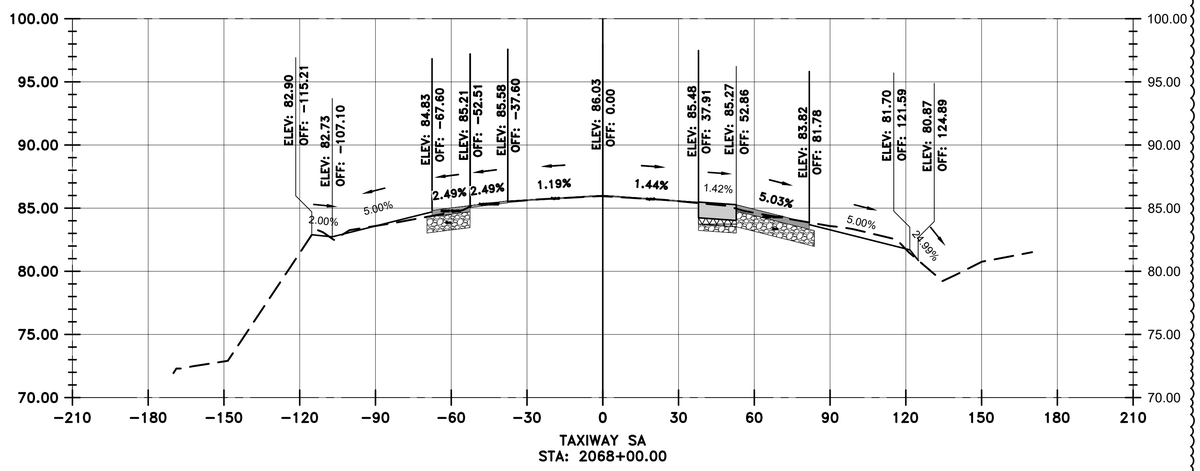

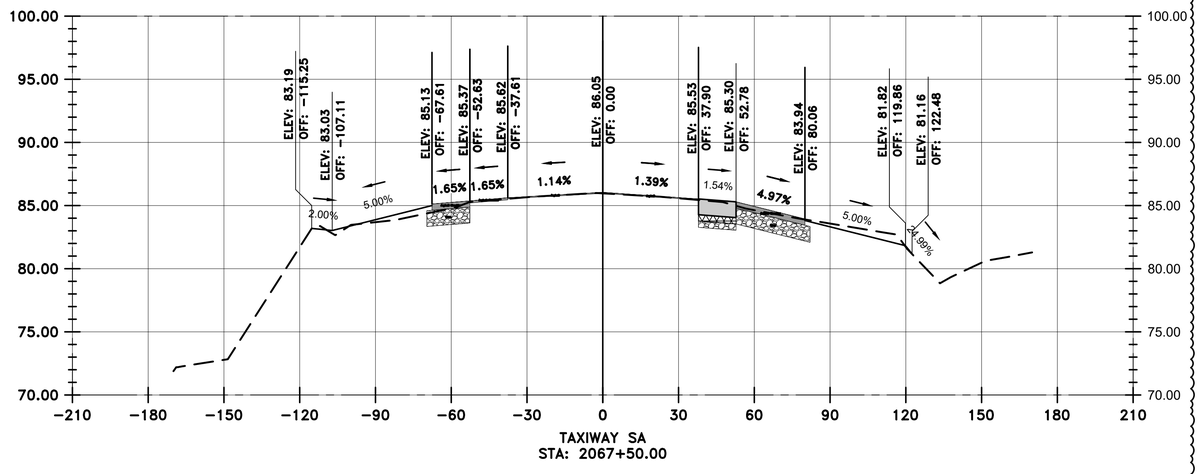

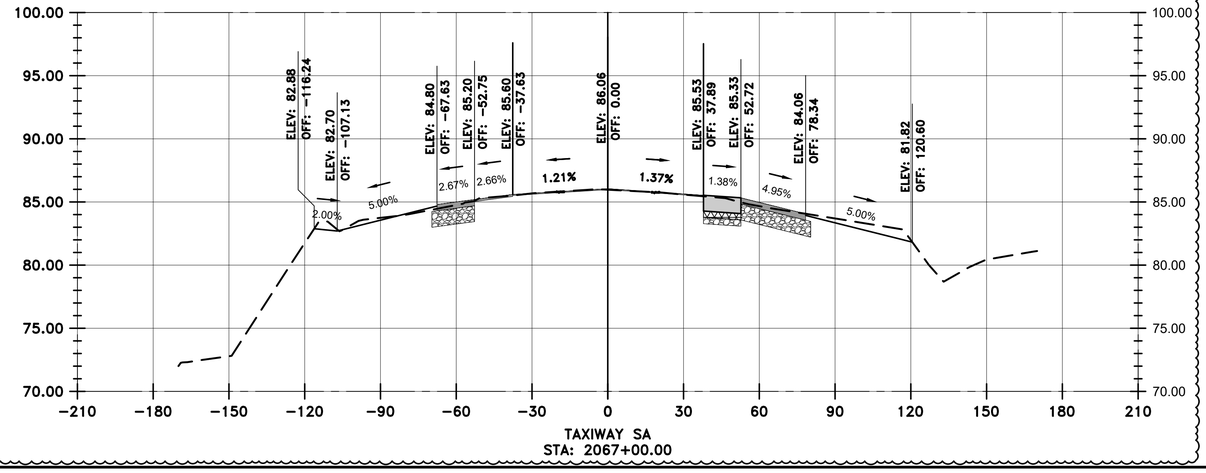

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED CONCRETE
- PROPOSED CEMENT TREATED BASE
- PROPOSED AGGREGATE BASE

VERTICAL EXAGGERATION = 5

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 39

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.39

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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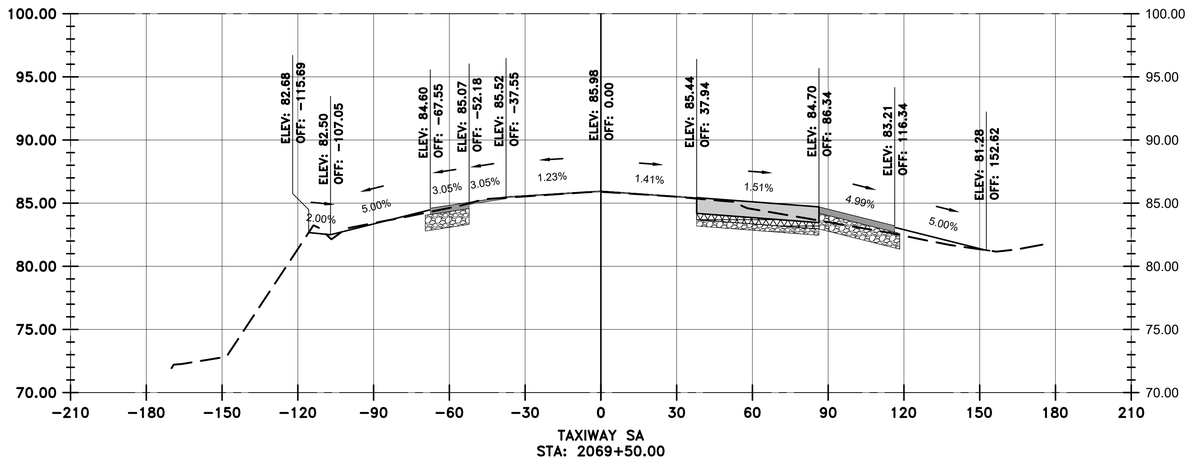

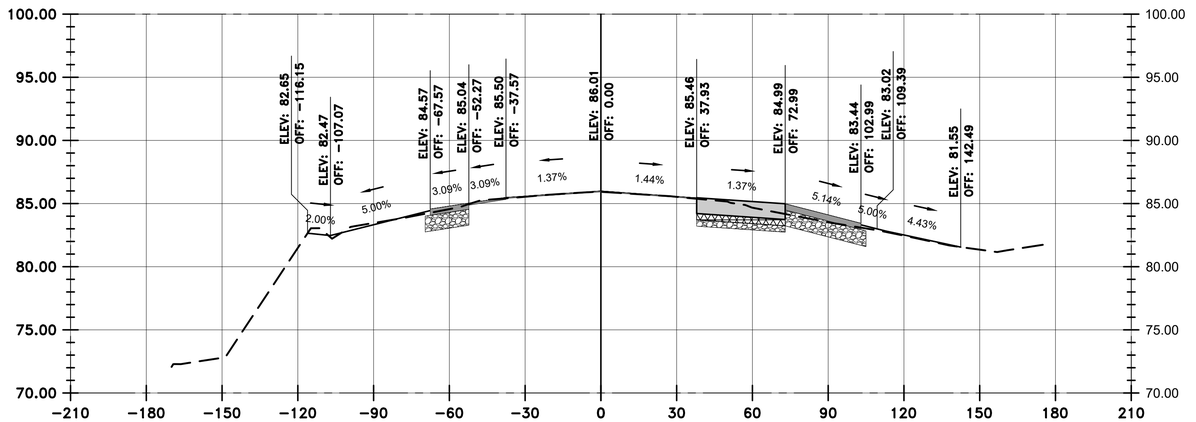

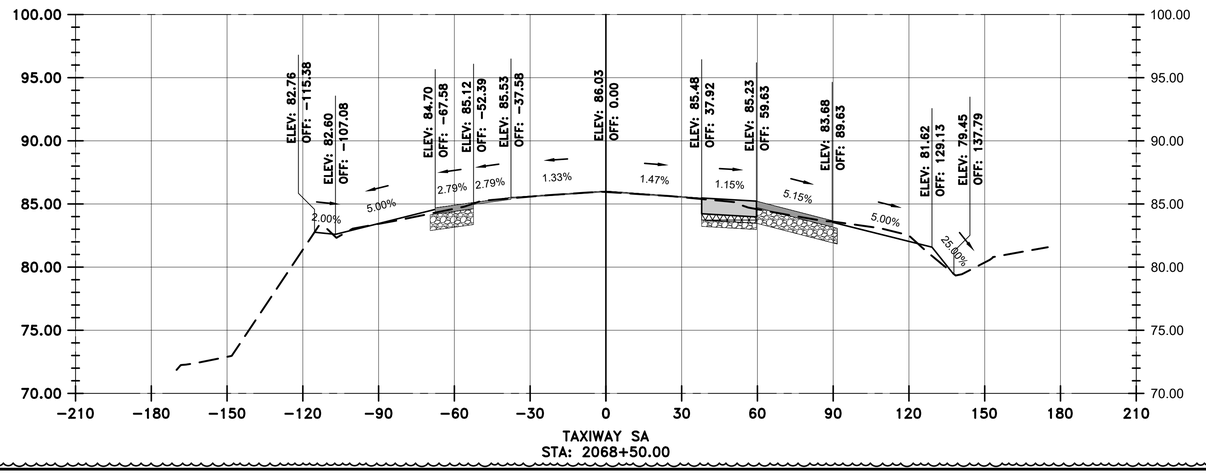

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED CONCRETE
- PROPOSED CEMENT TREATED BASE
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 40

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.40

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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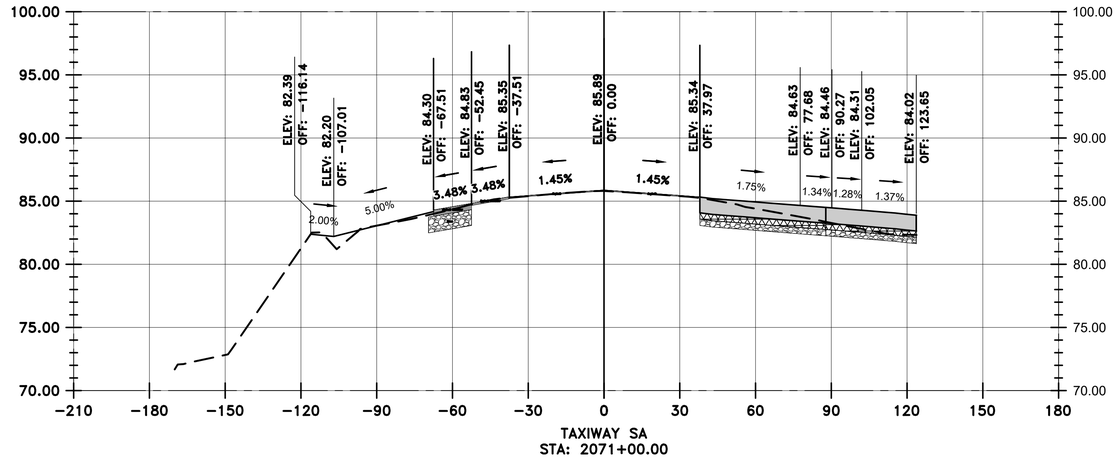
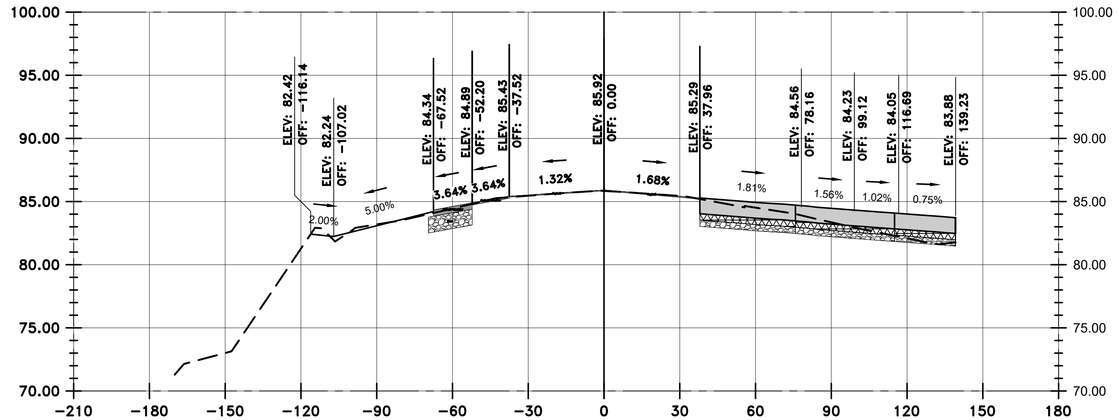
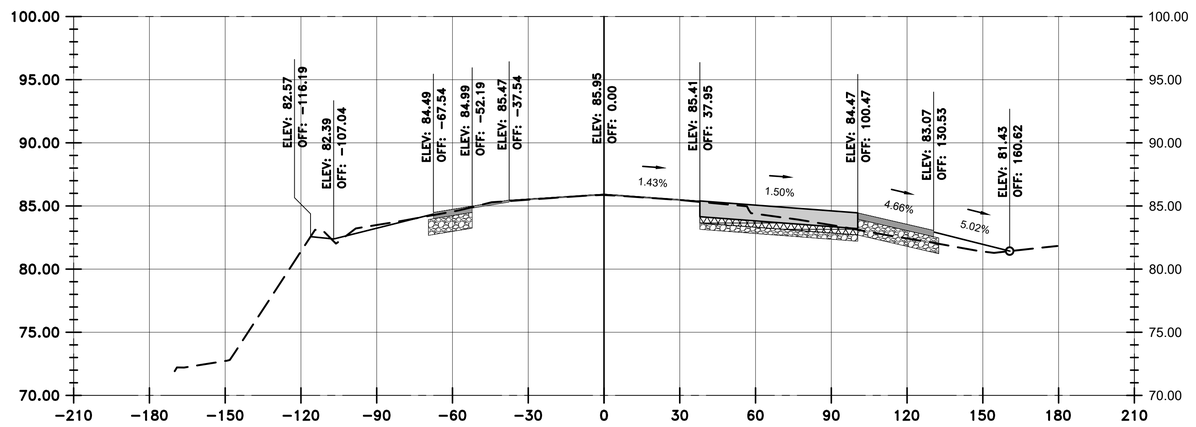


TAXIWAY SA
STA: 2071+00.00



TAXIWAY SA
STA: 2070+50.00



TAXIWAY SA
STA: 2070+00.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED CONCRETE
- PROPOSED CEMENT TREATED BASE
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 41

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER

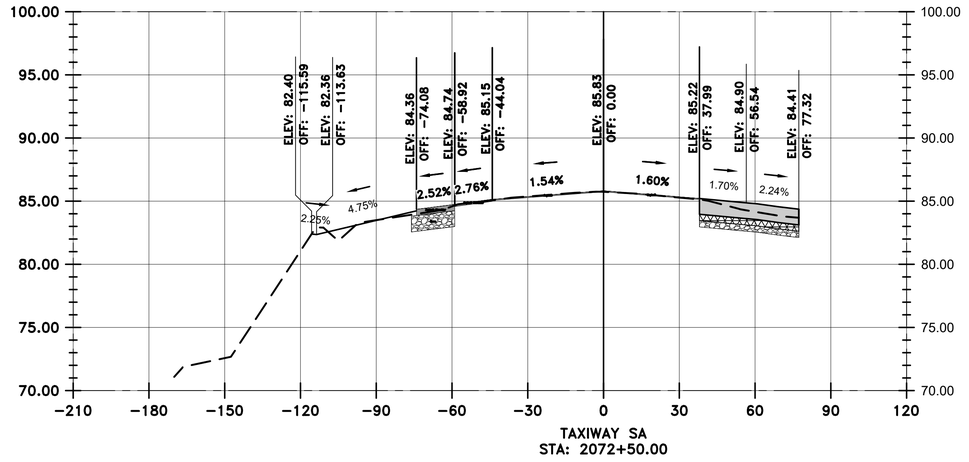
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.41

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
PLOT DATE: 11/8/2019 3:32:47 PM



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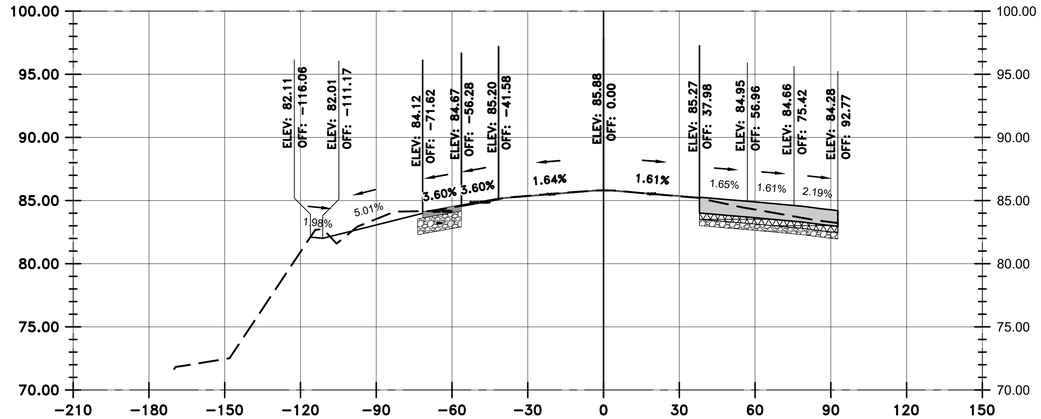
STA: 2072+50.00



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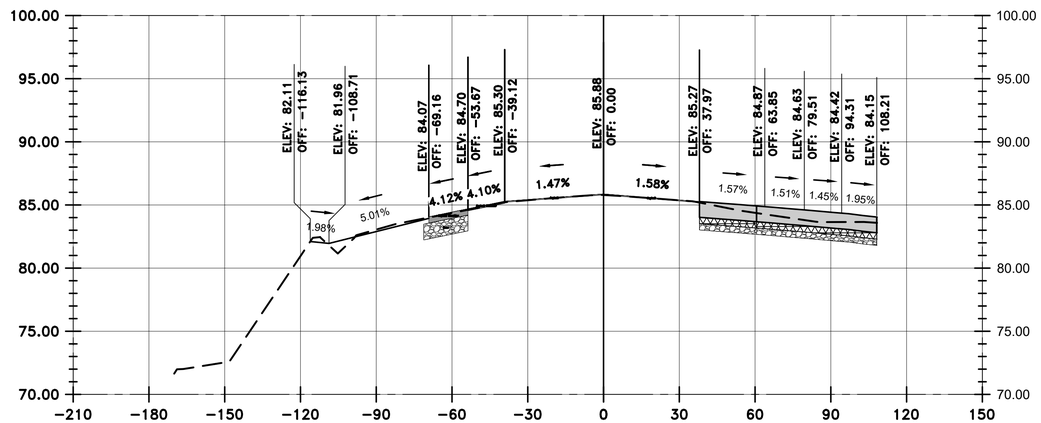
STA: 2072+00.00



TAXIWAY SA
STA: 2071+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED CONCRETE
- PROPOSED CEMENT TREATED BASE
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS			
NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 42

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER

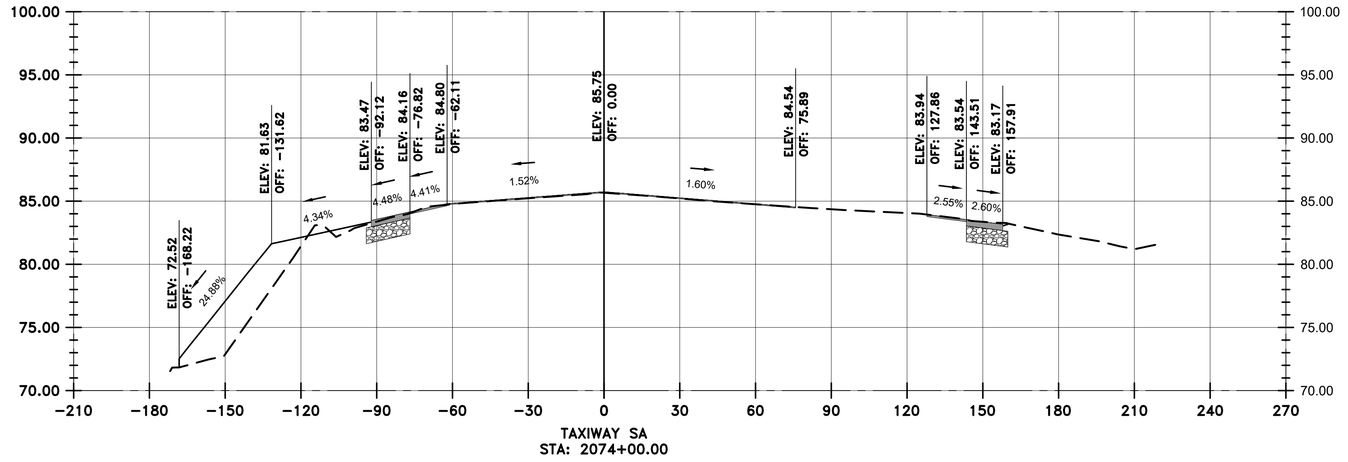
Digitally Signed 07/24/2023

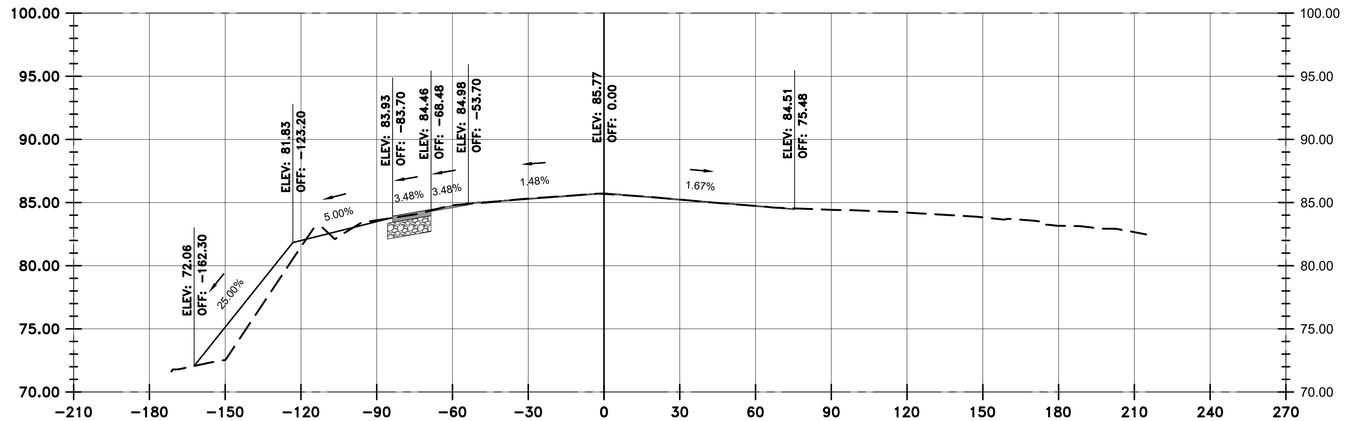
APPROVED BY: JEF

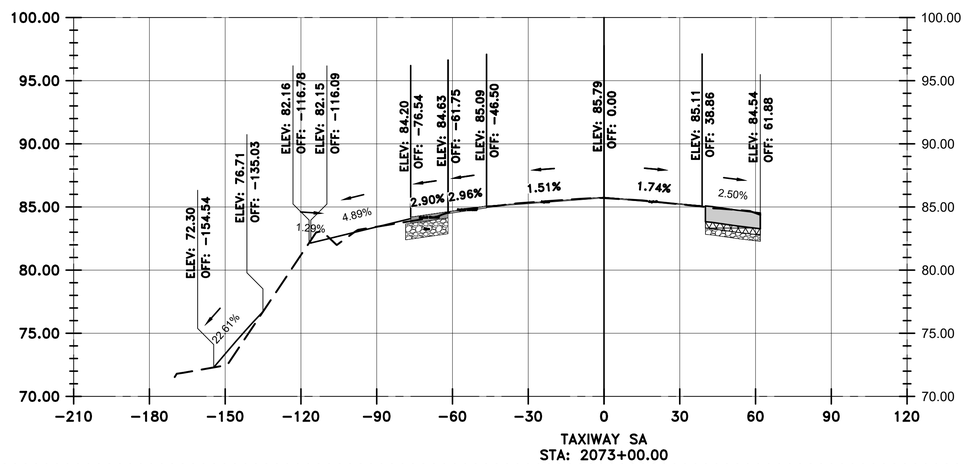
DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.42

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
PLOT DATE: 11/8/2019 3:32:47 PM







LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED CONCRETE
- PROPOSED CEMENT TREATED BASE
- PROPOSED AGGREGATE BASE

VERTICAL EXAGGERATION = 5

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 43

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

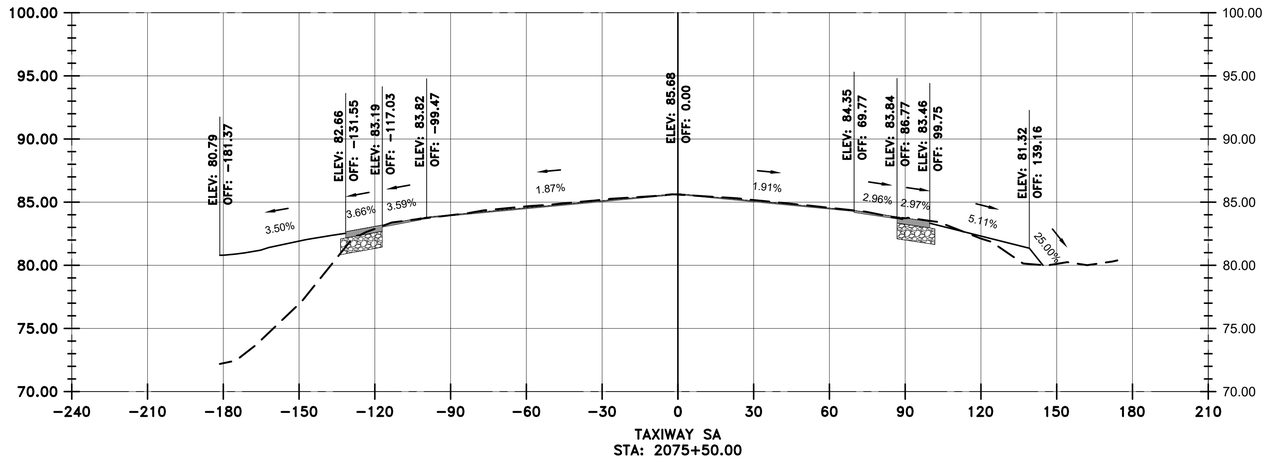
STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

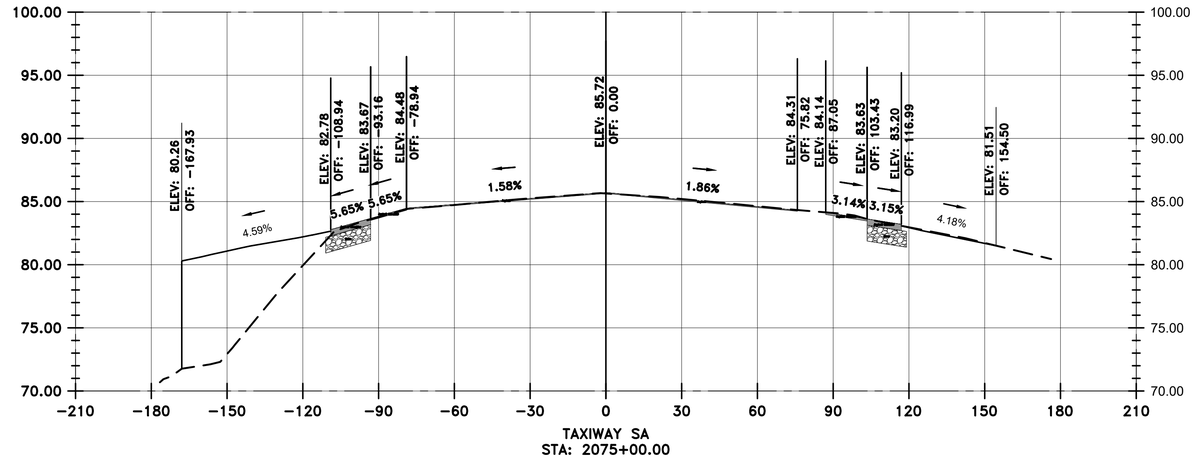
APPROVED BY: JEF

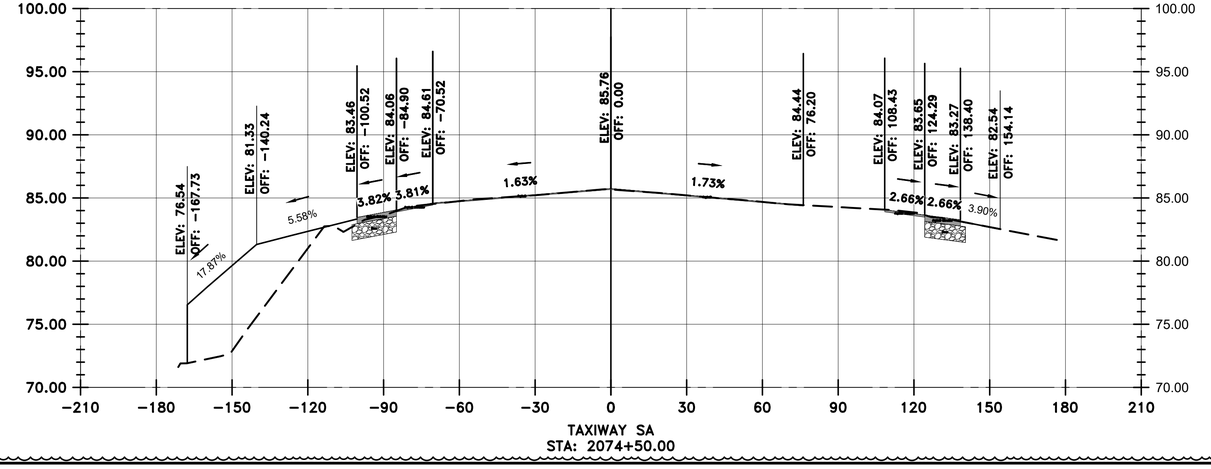
DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.43

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
PLOT DATE: 11/8/2019 3:32:47 PM







VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 44

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.44

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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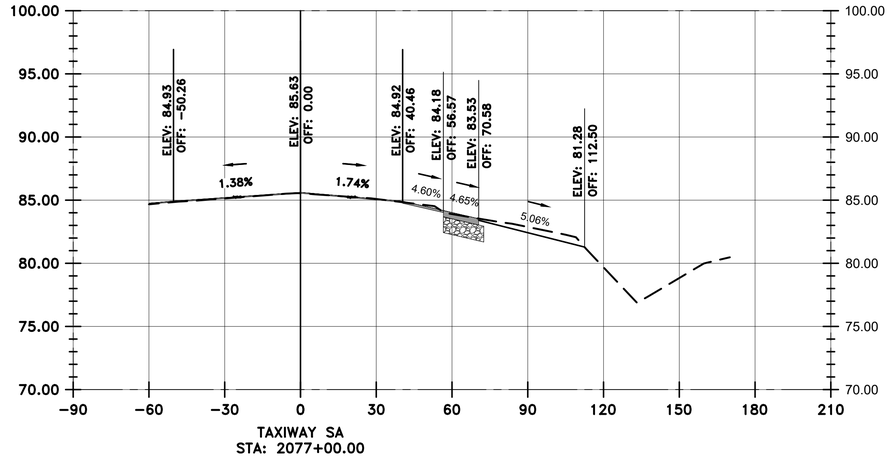

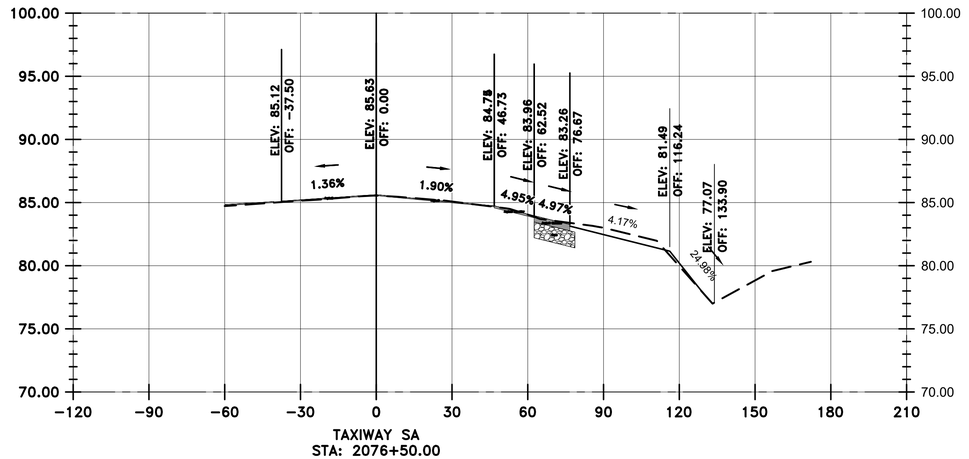

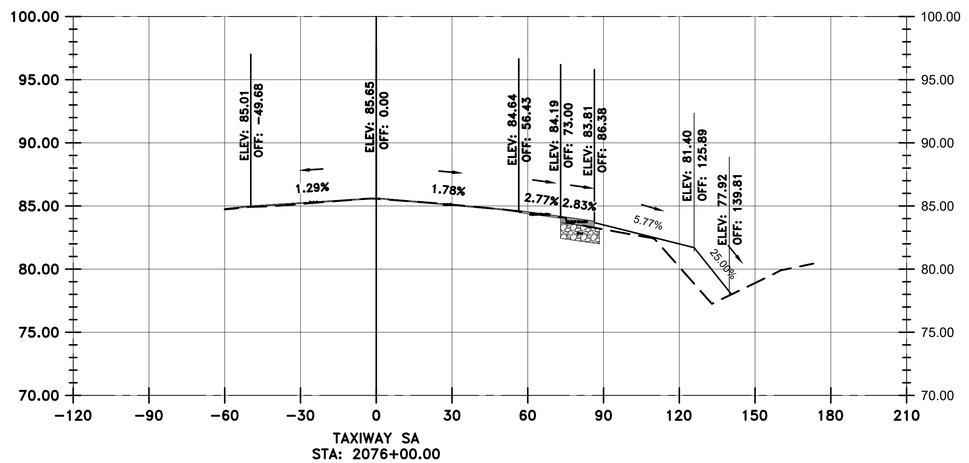

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 45

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.45

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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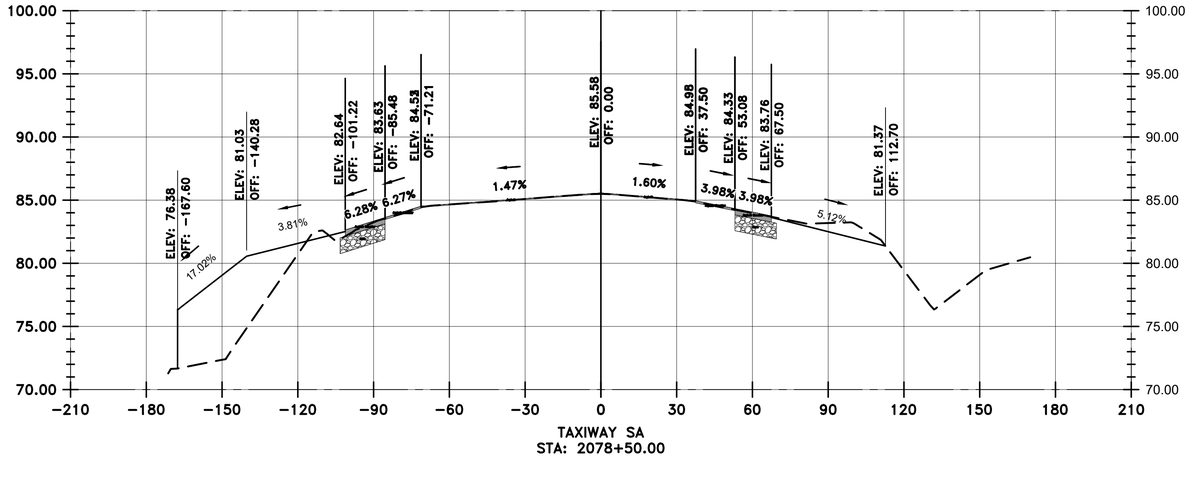
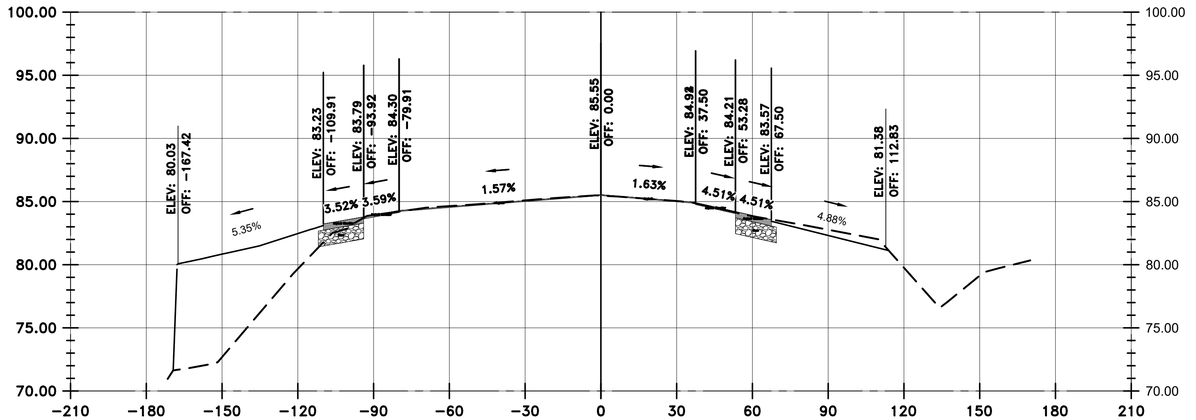
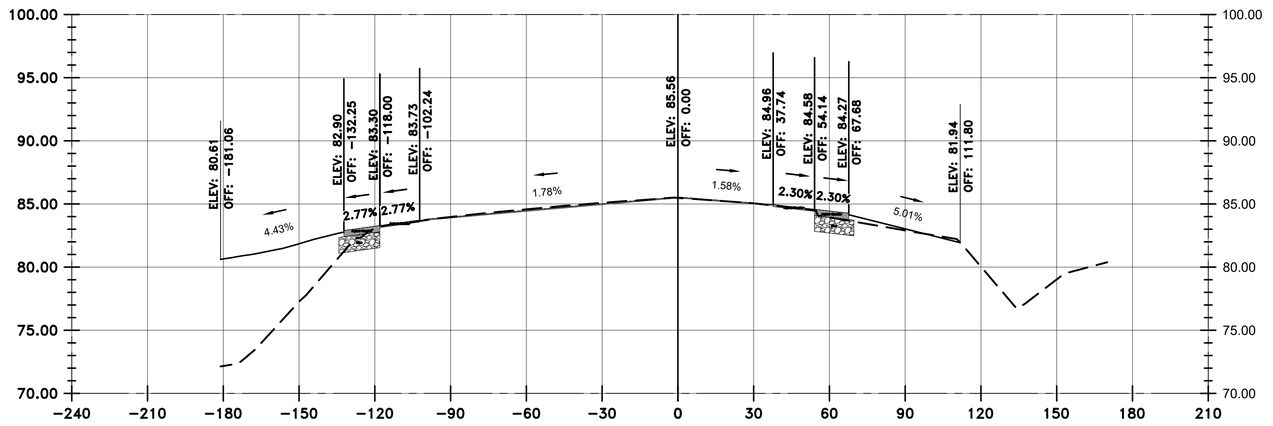






VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 46

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

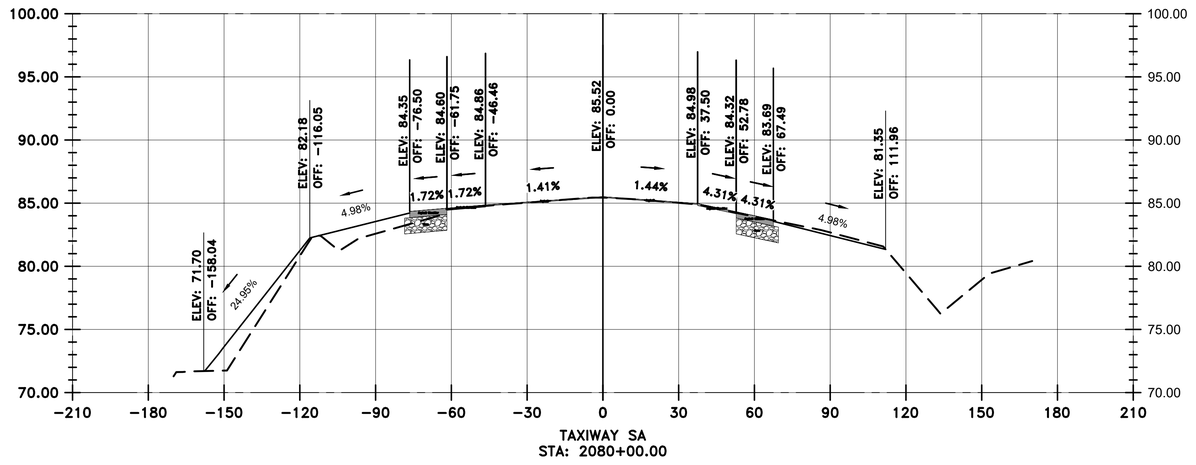
STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

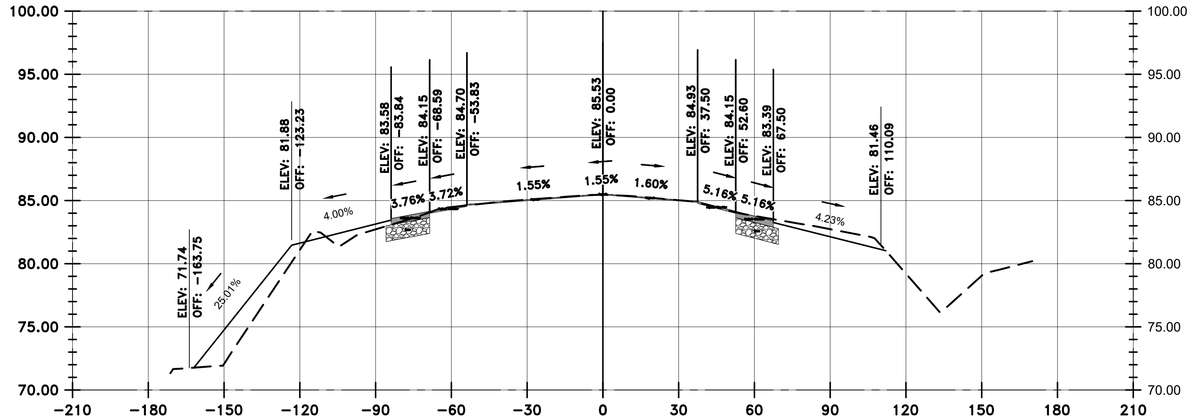
APPROVED BY: JEF

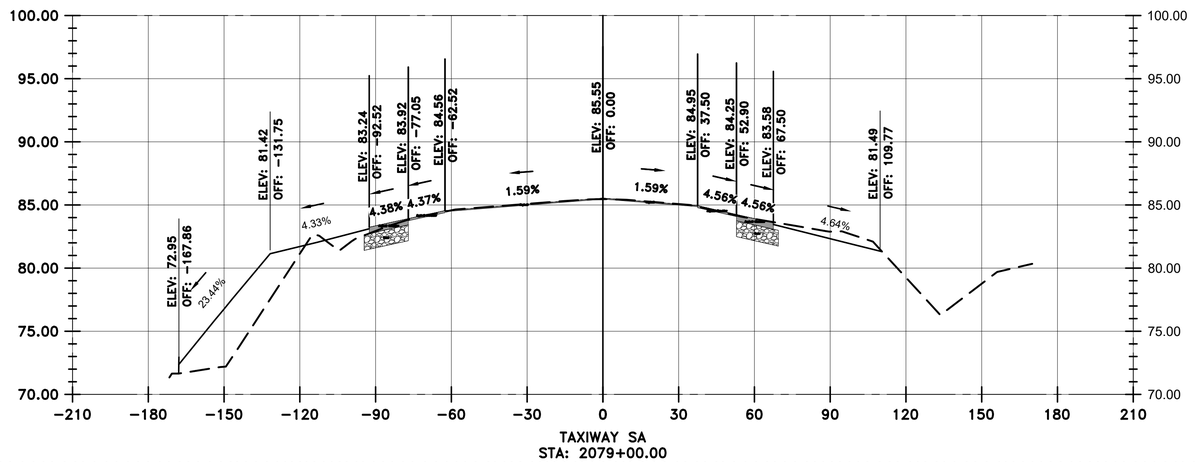
DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.46

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
PLOT DATE: 11/8/2019 3:32:47 PM







VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 47

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

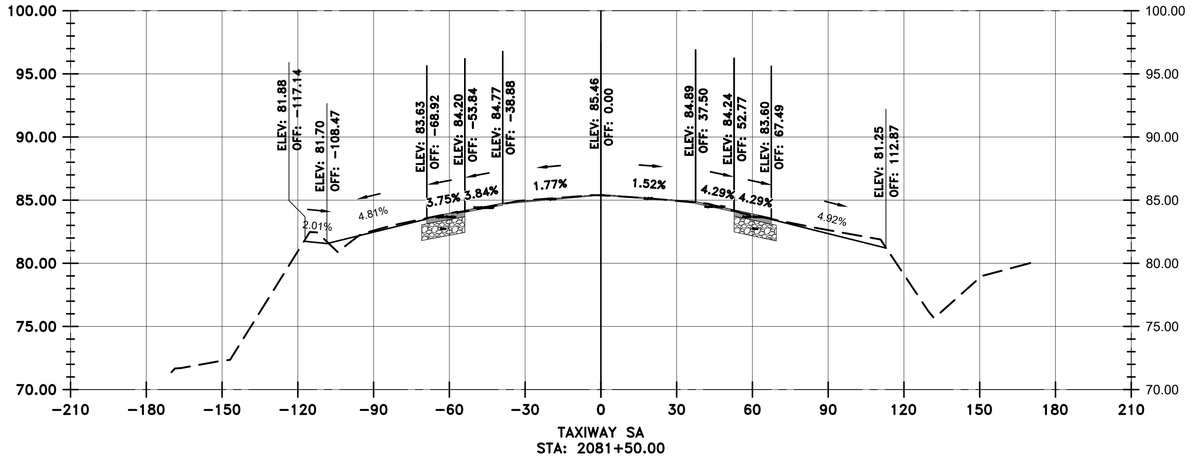
STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

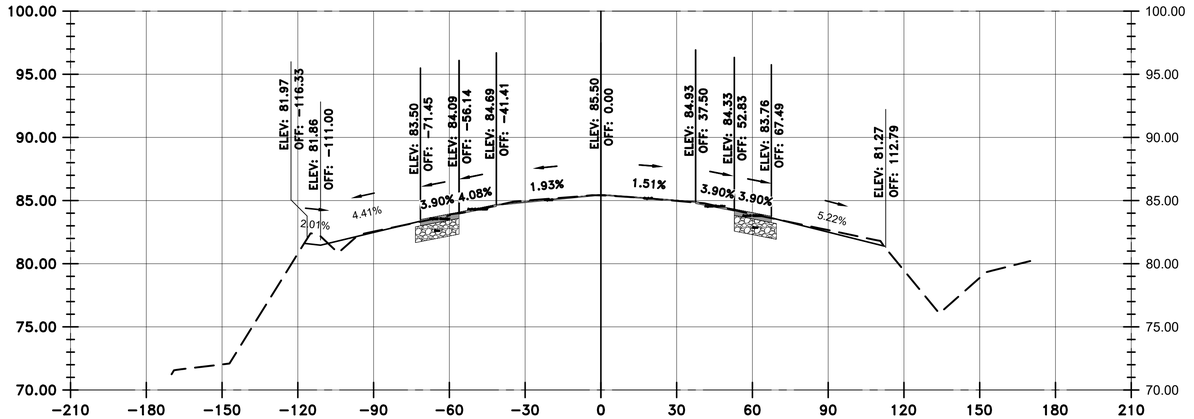
DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.47

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646GSC.dwg
PLOT DATE: 11/8/2019 3:32:47 PM



TAXIWAY SA
STA: 2081+50.00



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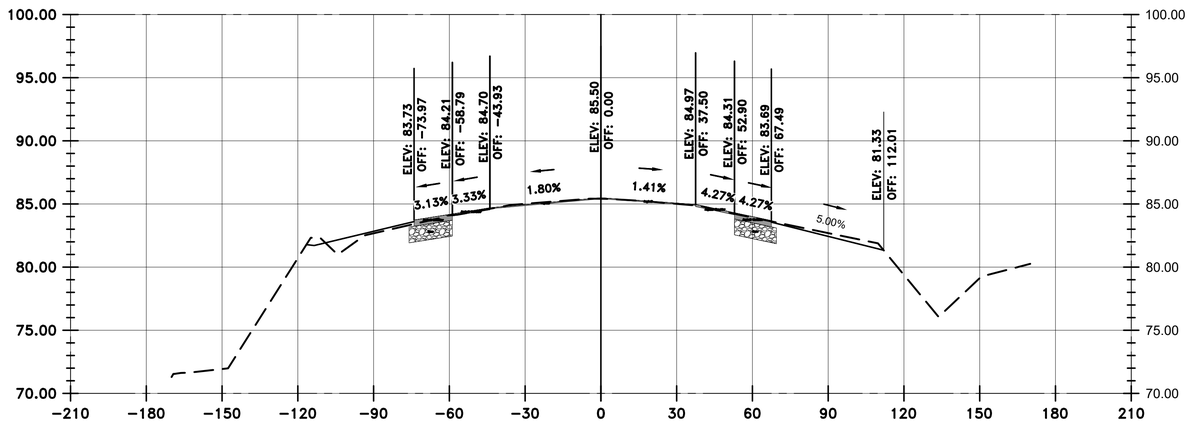
STA: 2081+00.00



TAXIWAY SA
STA: 2080+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 48

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

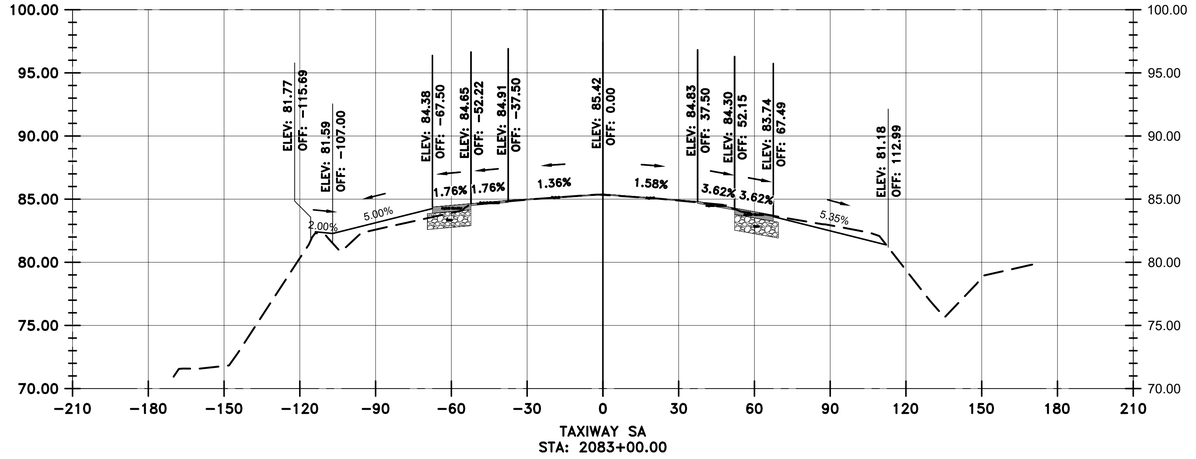
STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

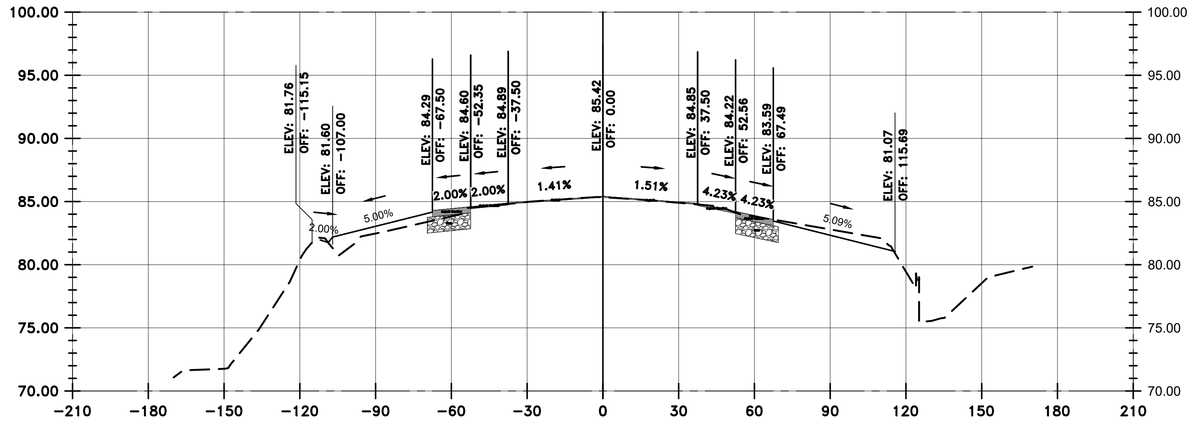
DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.48

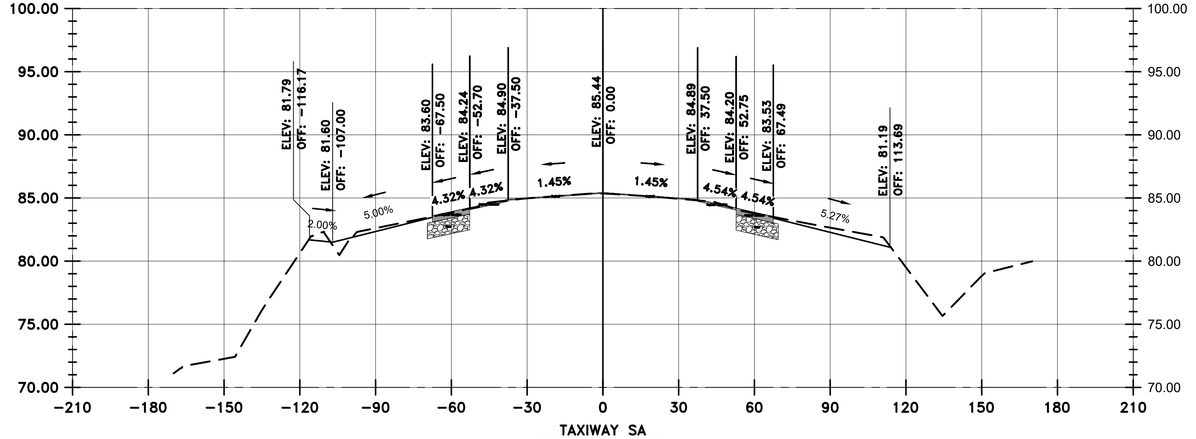
HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
PLOT DATE: 11/8/2019 3:32:47 PM



TAXIWAY SA
STA: 2083+00.00



TAXIWAY SA
STA: 2082+50.00



TAXIWAY SA
STA: 2082+00.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 49

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.49

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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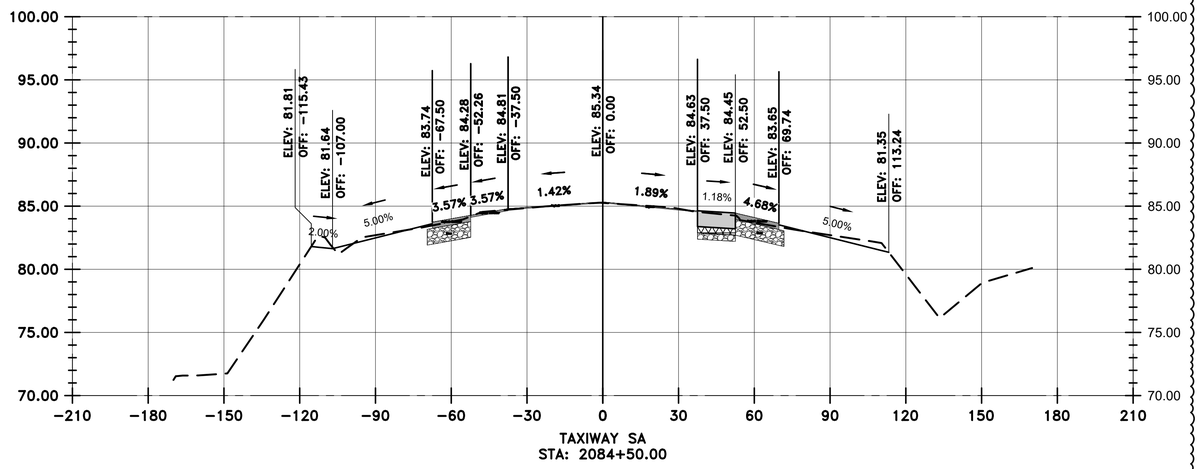
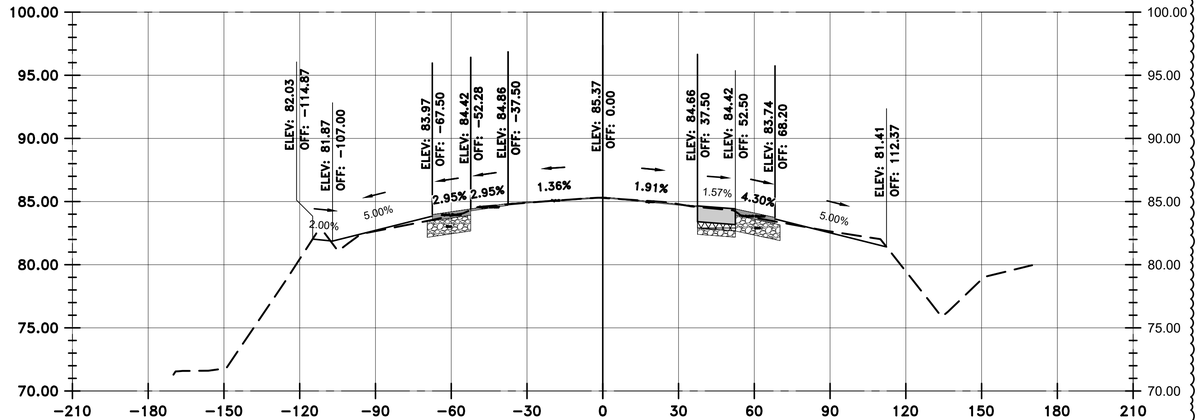
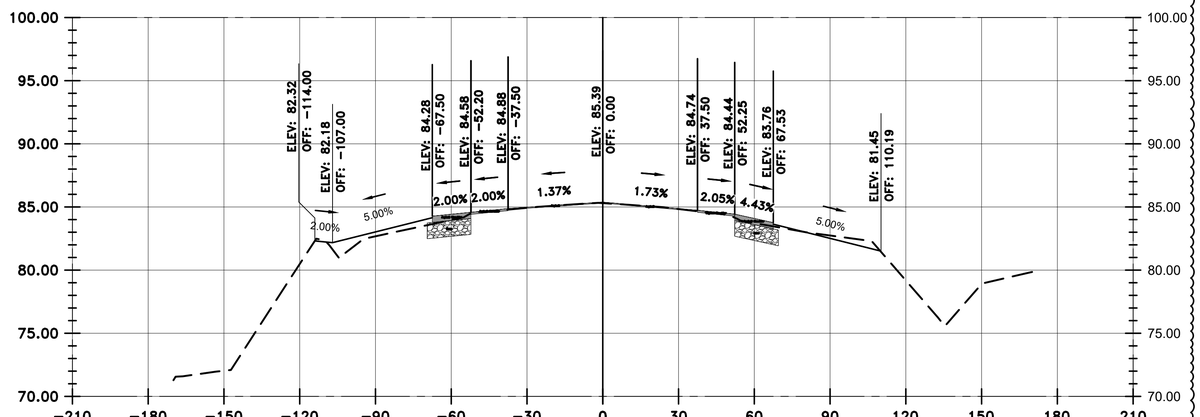


TAXIWAY SA
STA: 2084+50.00



TAXIWAY SA
STA: 2084+00.00



TAXIWAY SA
STA: 2083+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED CONCRETE
- PROPOSED CEMENT TREATED BASE
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 50

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

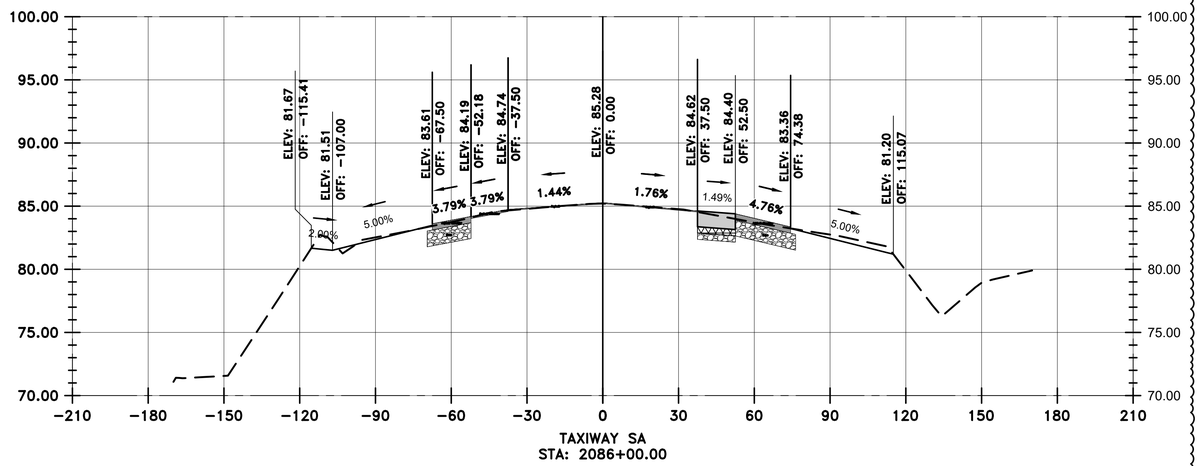
STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

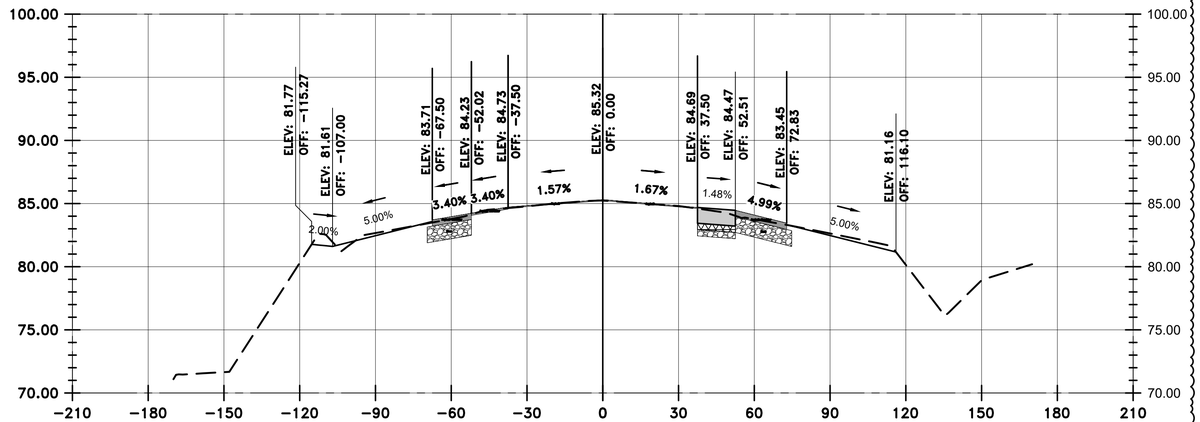
DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.50

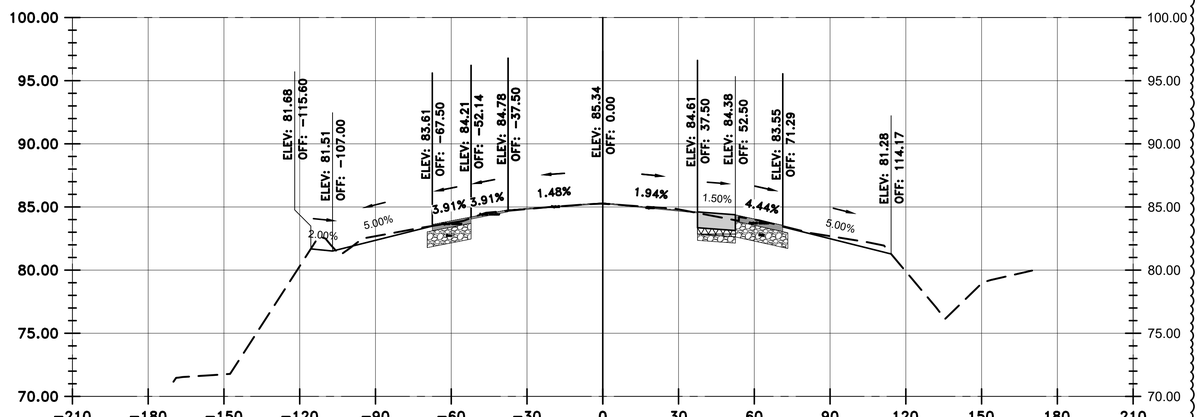
HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
PLOT DATE: 11/8/2019 3:32:47 PM



TAXIWAY SA
STA: 2086+00.00



TAXIWAY SA
STA: 2085+50.00



TAXIWAY SA
STA: 2085+00.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED CONCRETE
- PROPOSED CEMENT TREATED BASE
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 51

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

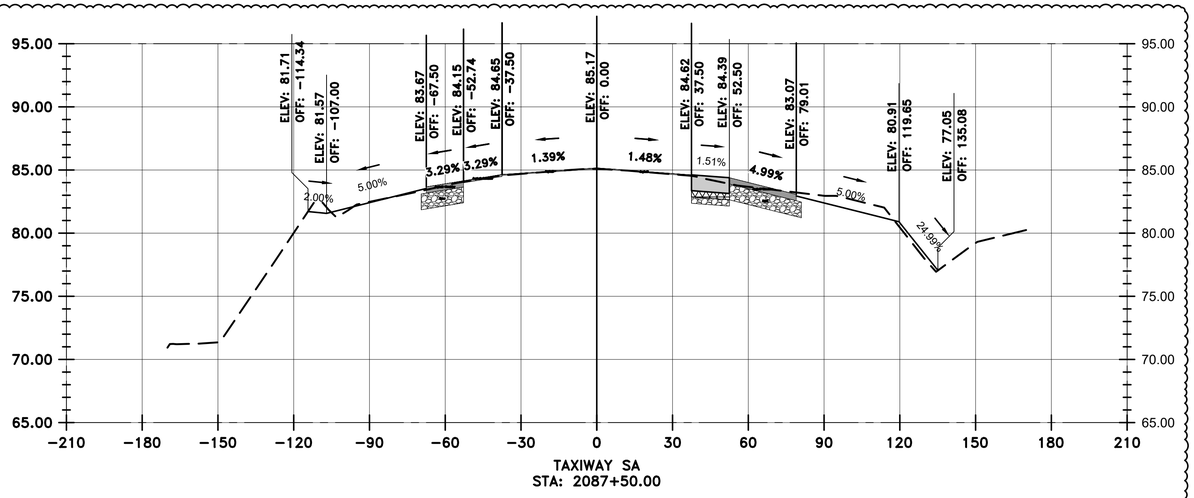
STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

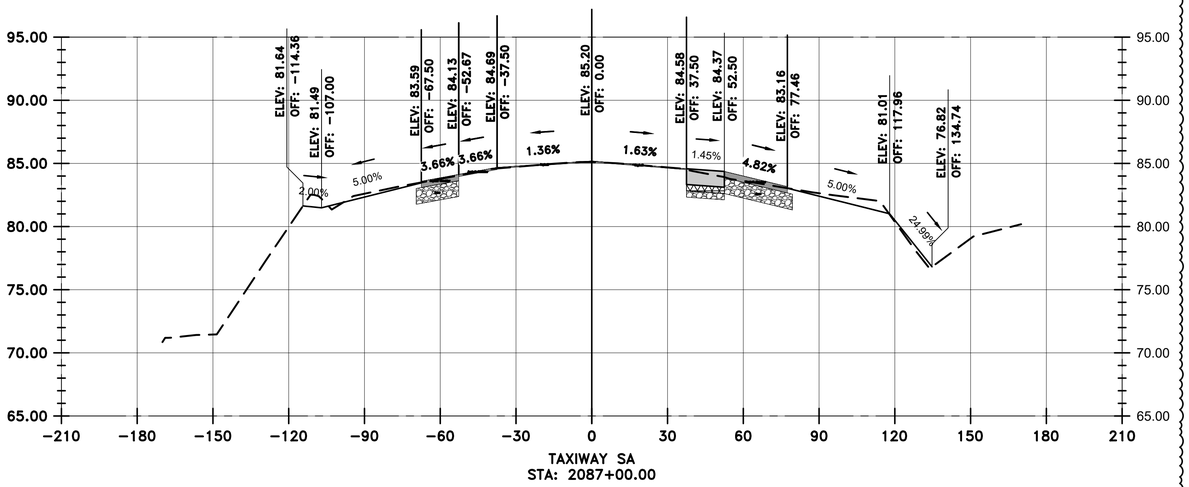
APPROVED BY: JEF

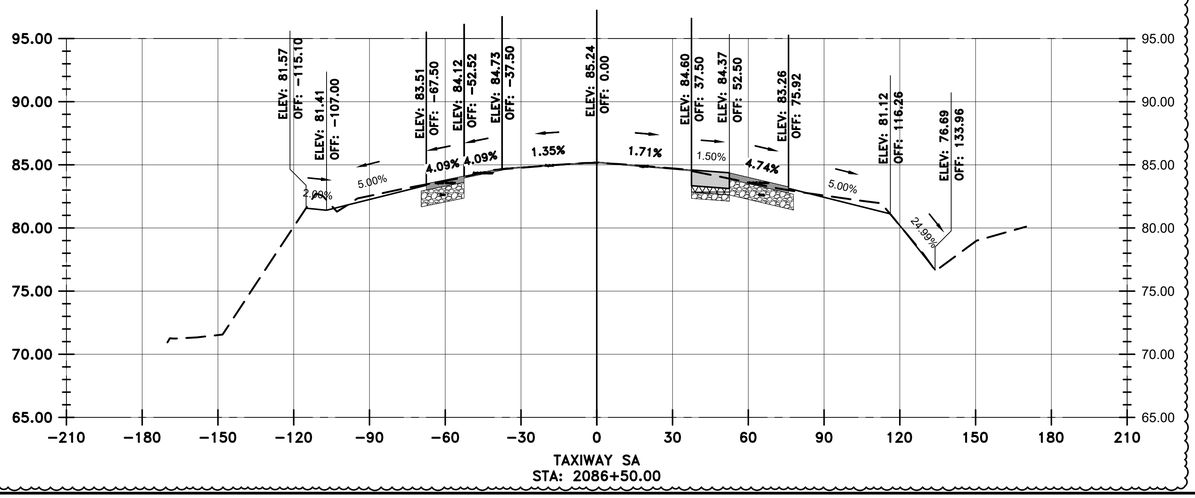
DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.
0646A
A.I.P. NO.
XXXX
C.I.P. NO.
A-0515
H.A.S. NO.
20C0646A
SHEET NO.
X01.51

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
PLOT DATE: 11/8/2019 3:32:47 PM







LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED CONCRETE
- PROPOSED CEMENT TREATED BASE
- PROPOSED AGGREGATE BASE

VERTICAL EXAGGERATION = 5

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
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(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 52

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.52

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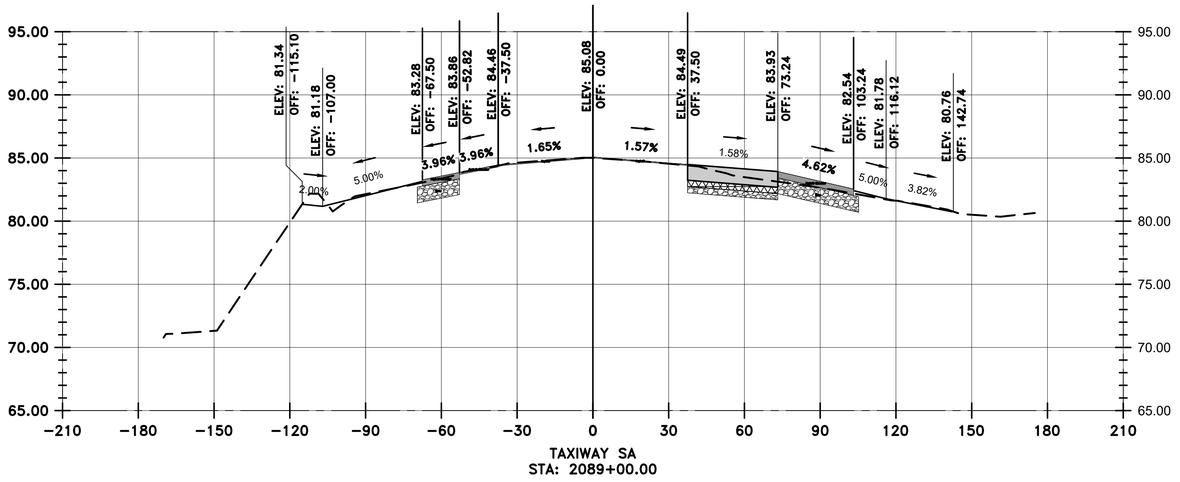

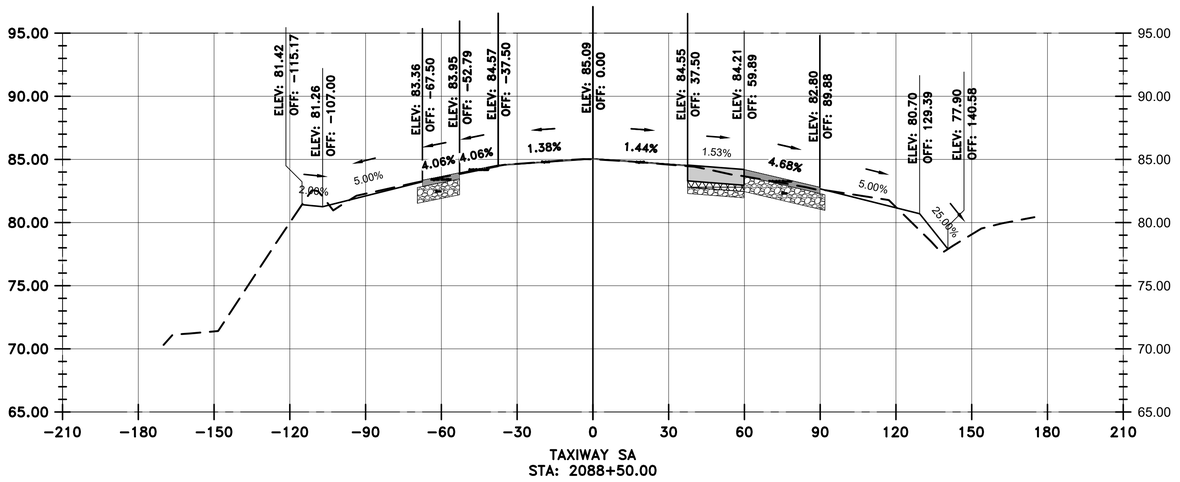

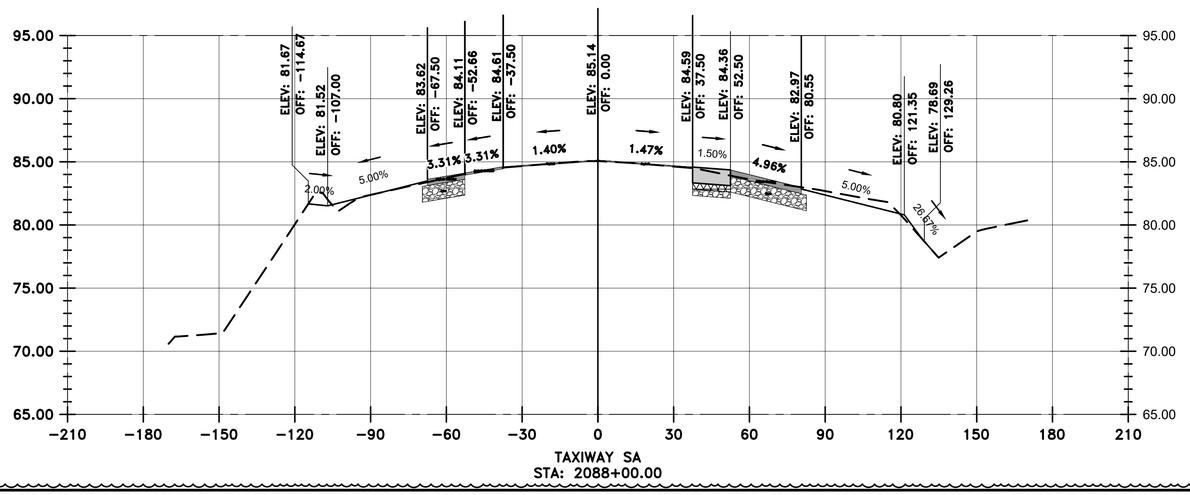

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED CONCRETE
- PROPOSED CEMENT TREATED BASE
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 53

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY:	JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.53

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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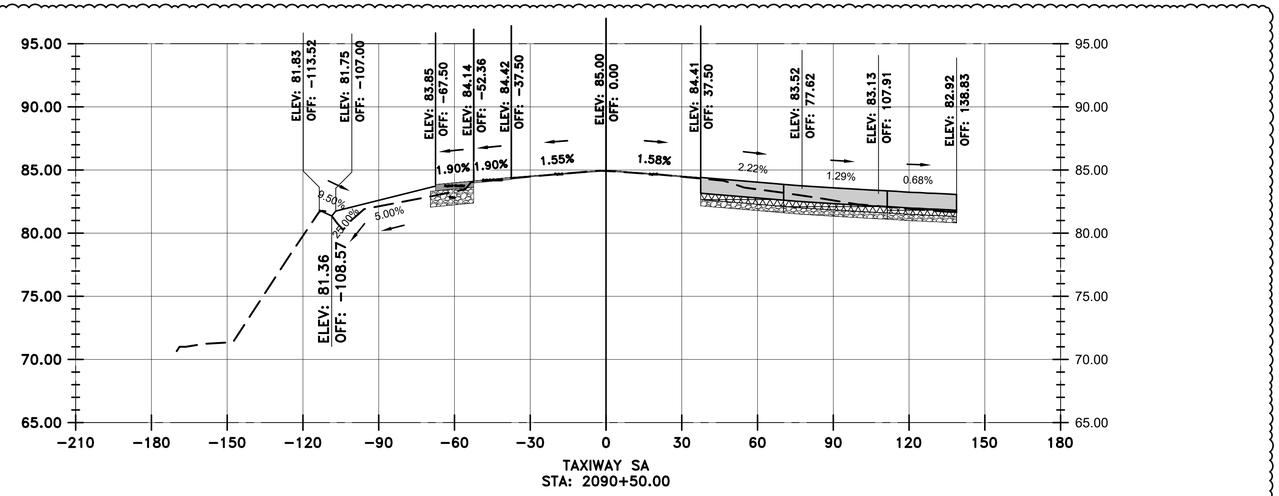
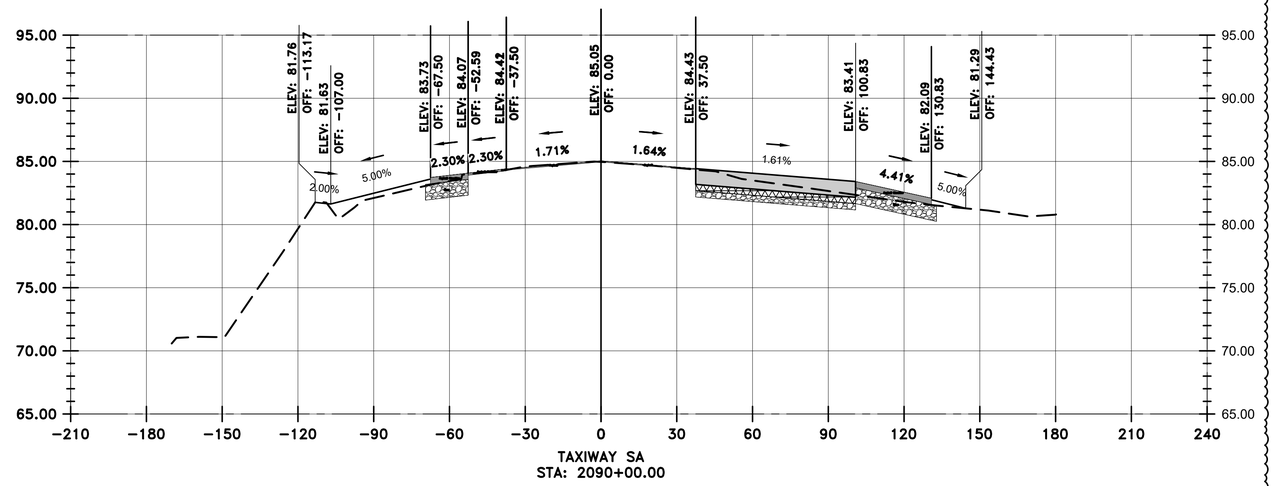


TAXIWAY SA
STA: 2090+50.00



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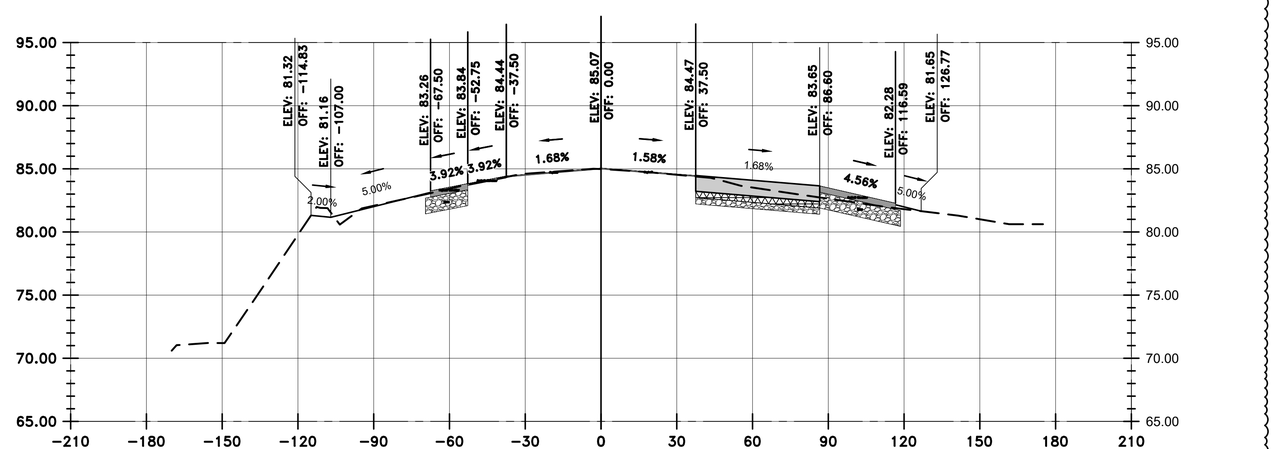
STA: 2090+00.00



TAXIWAY SA
STA: 2089+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED CONCRETE
- PROPOSED CEMENT TREATED BASE
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 54

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.54

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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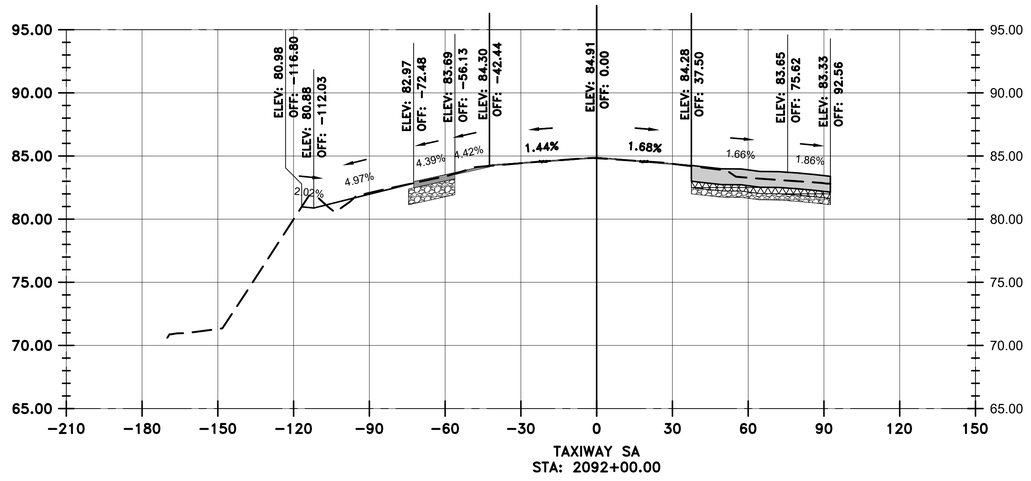

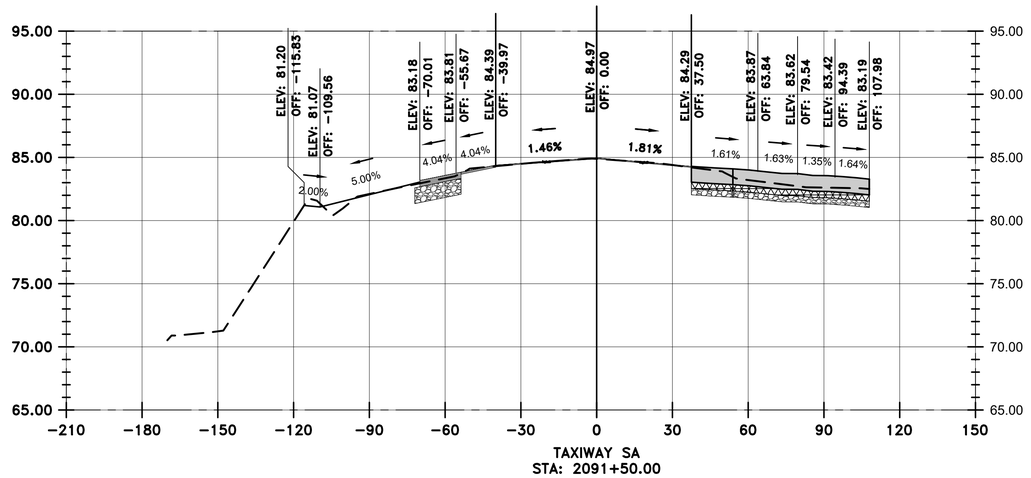

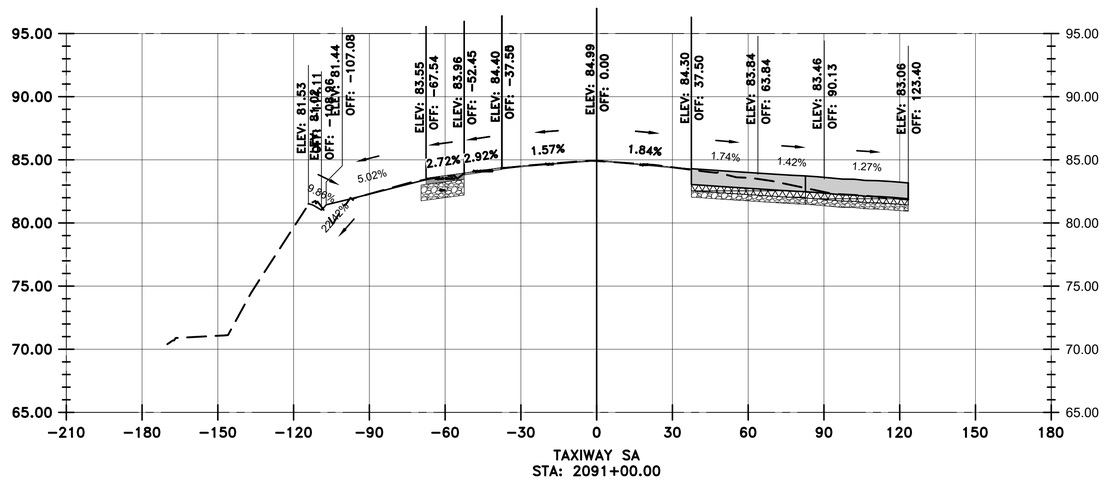

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED CONCRETE
- PROPOSED CEMENT TREATED BASE
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
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(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 55

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.55

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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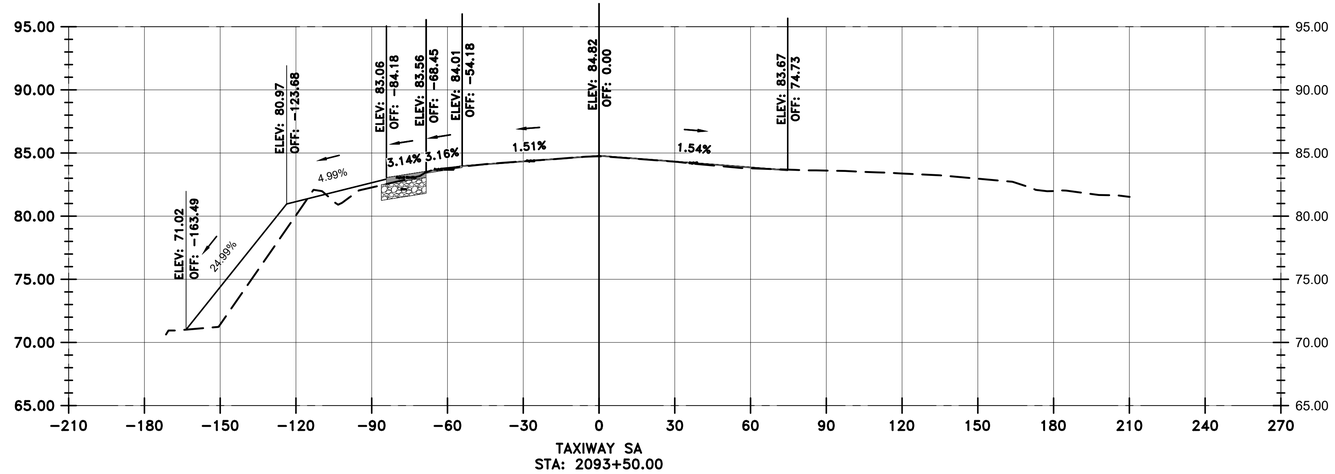
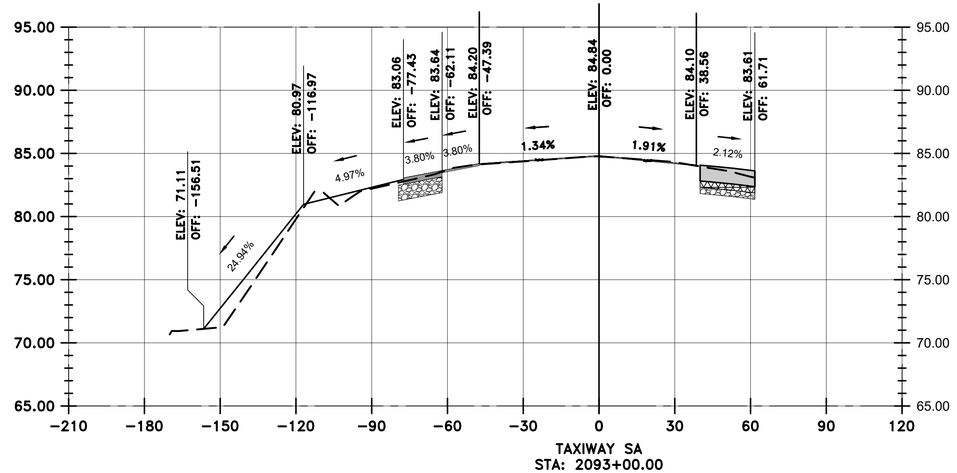


TAXIWAY SA
STA: 2093+50.00



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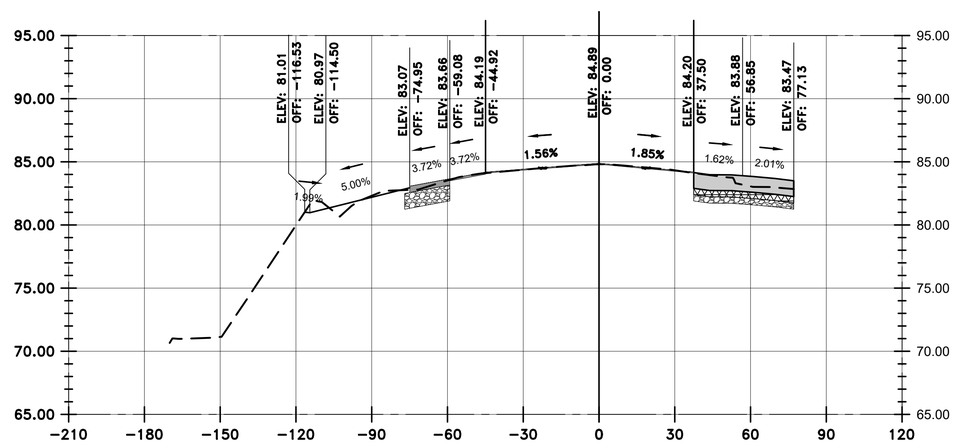
STA: 2093+00.00



TAXIWAY SA
STA: 2092+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED CONCRETE
- PROPOSED CEMENT TREATED BASE
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 56

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.56

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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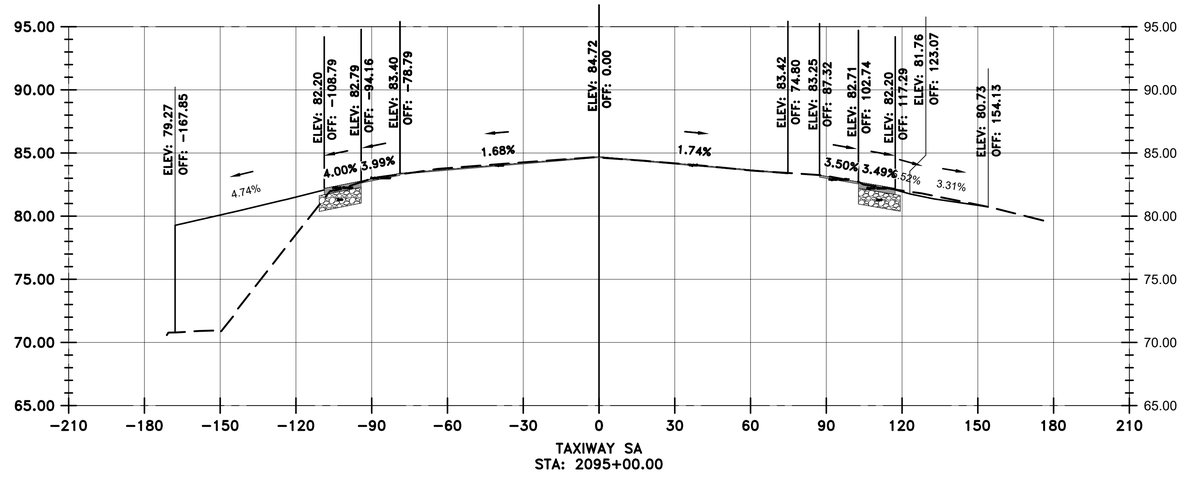

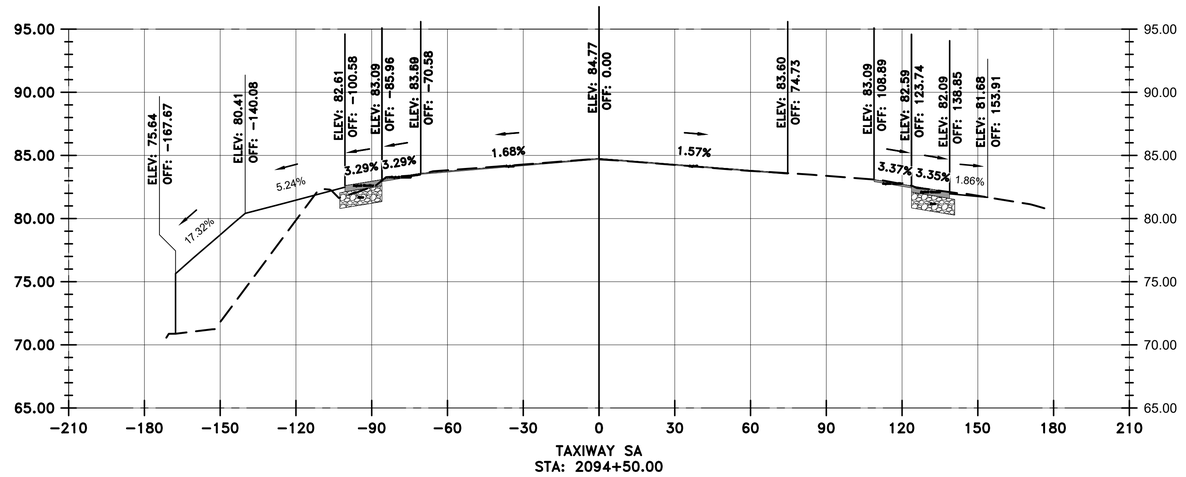

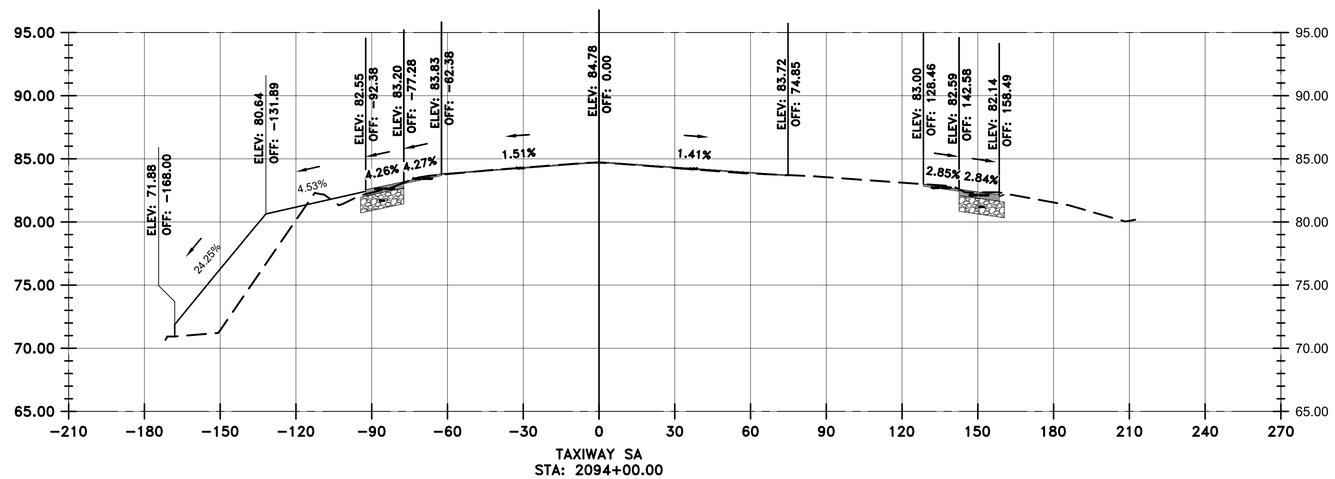

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED CONCRETE
- PROPOSED CEMENT TREATED BASE
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 57

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.57

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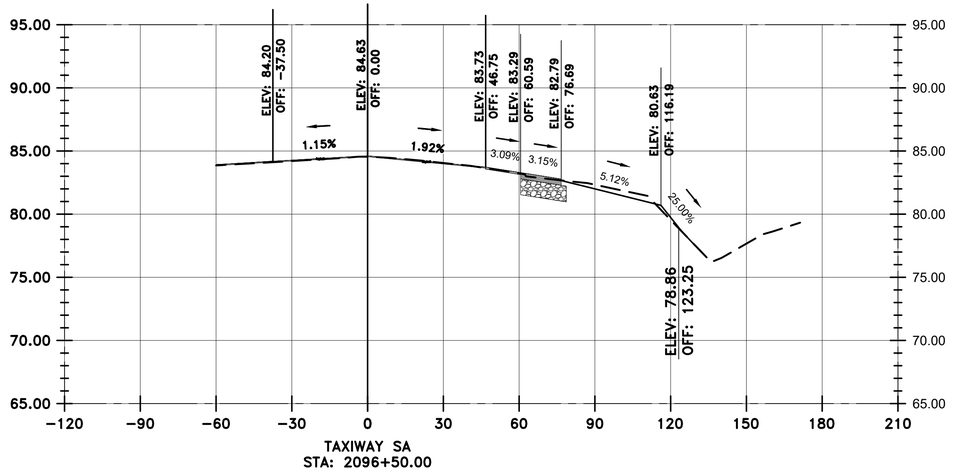

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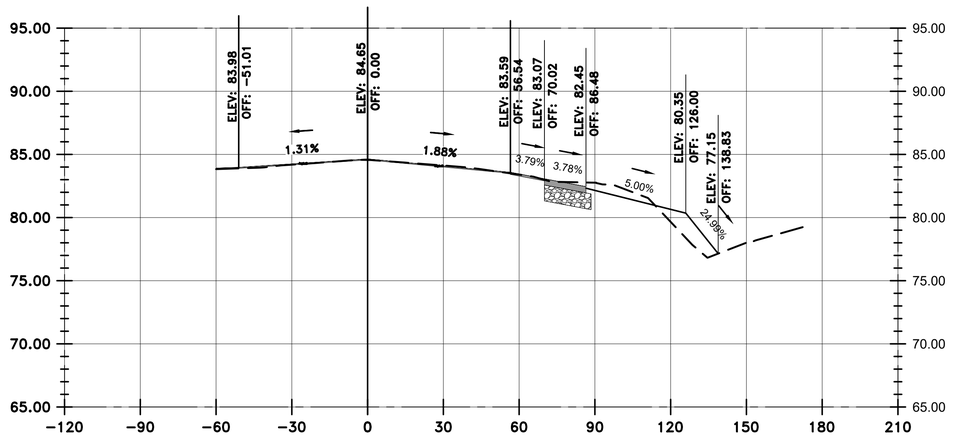
STA: 2096+50.00



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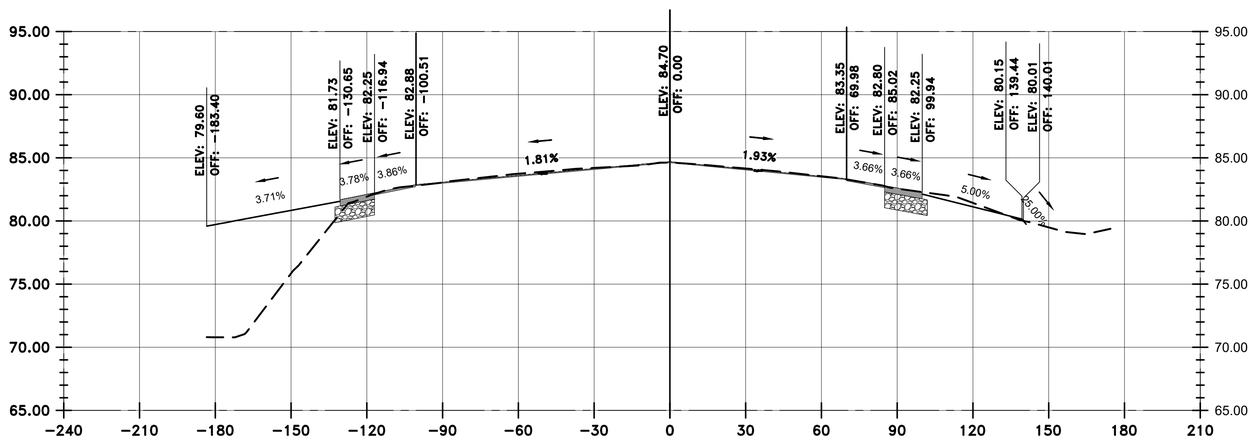
STA: 2096+00.00



TAXIWAY SA
STA: 2095+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 58

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.58

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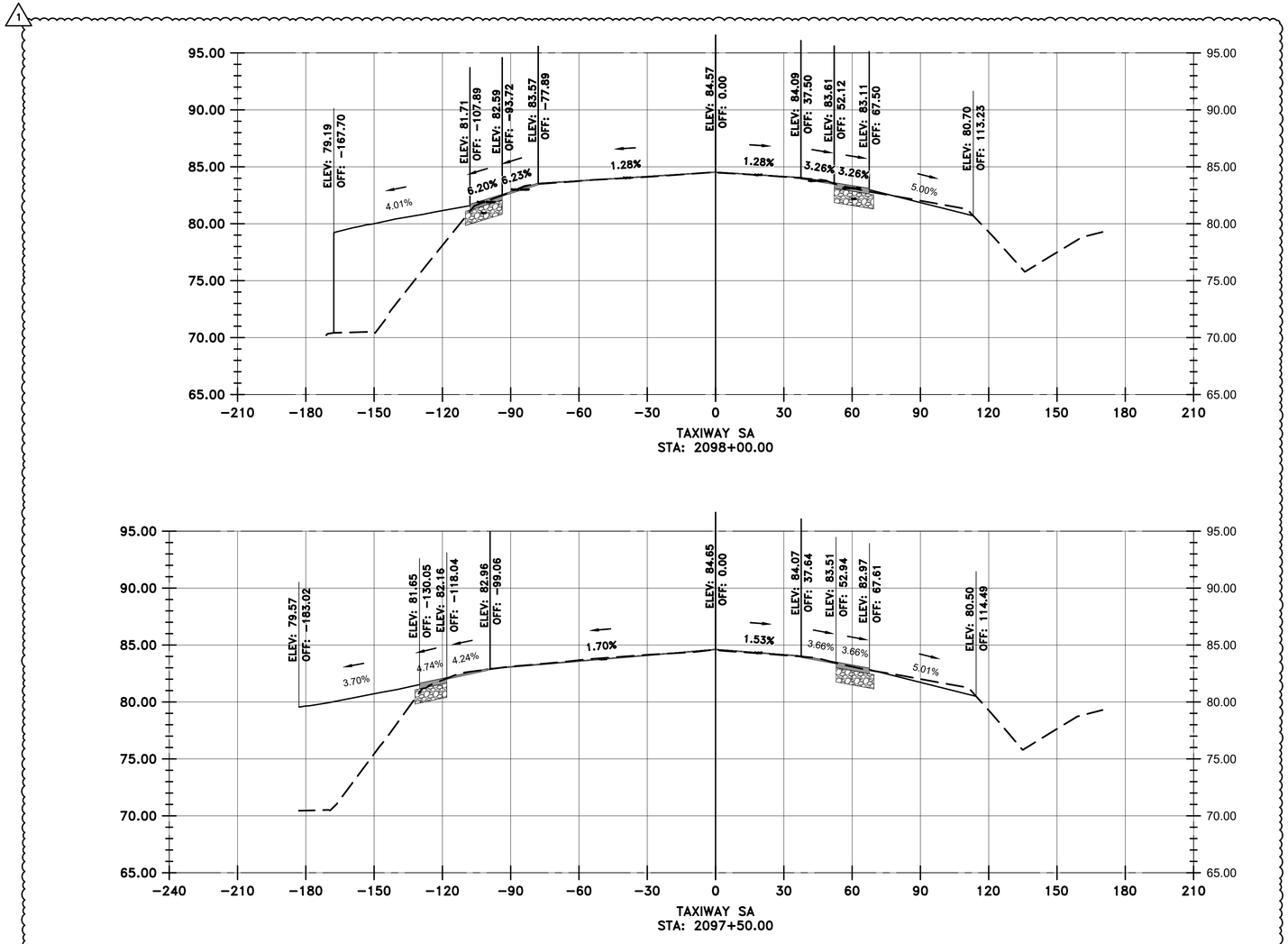

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 59

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.59

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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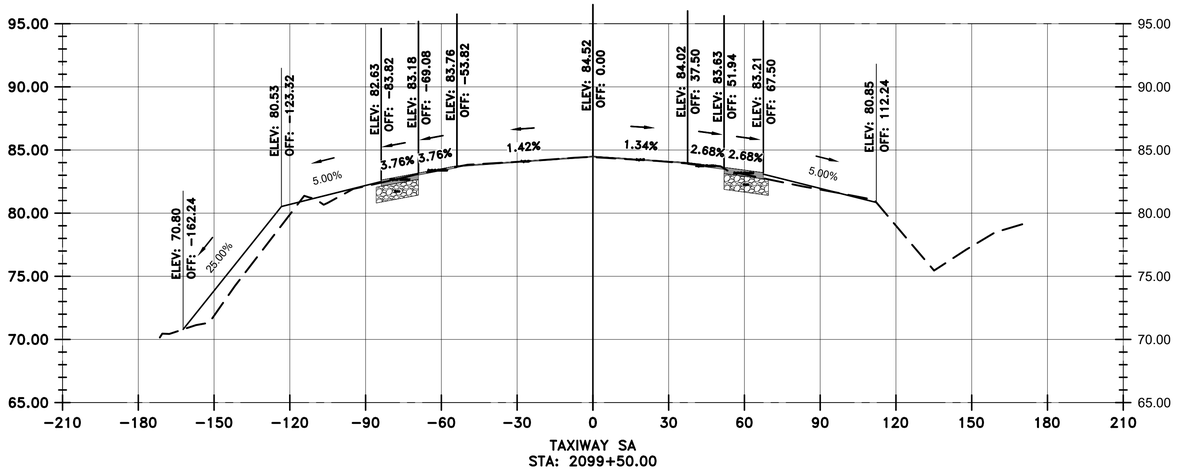

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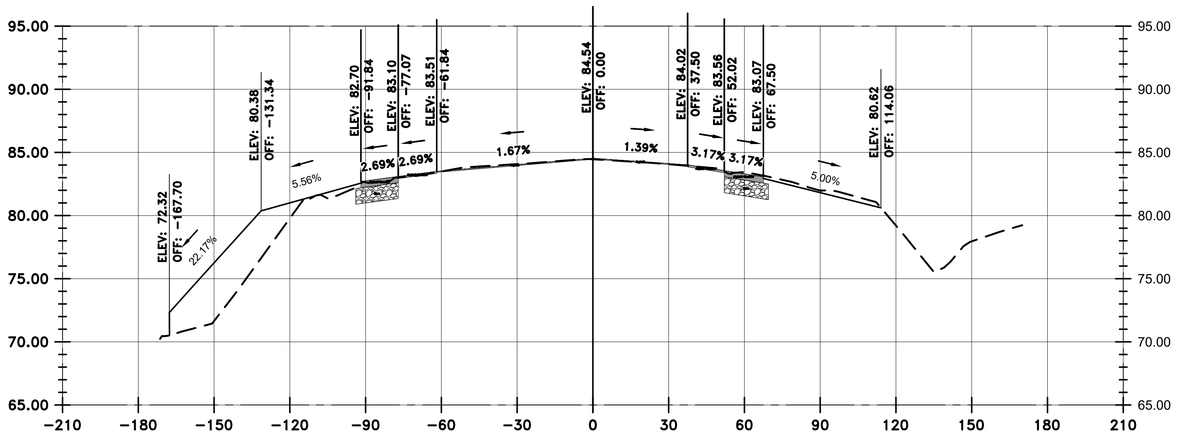
STA: 2099+50.00



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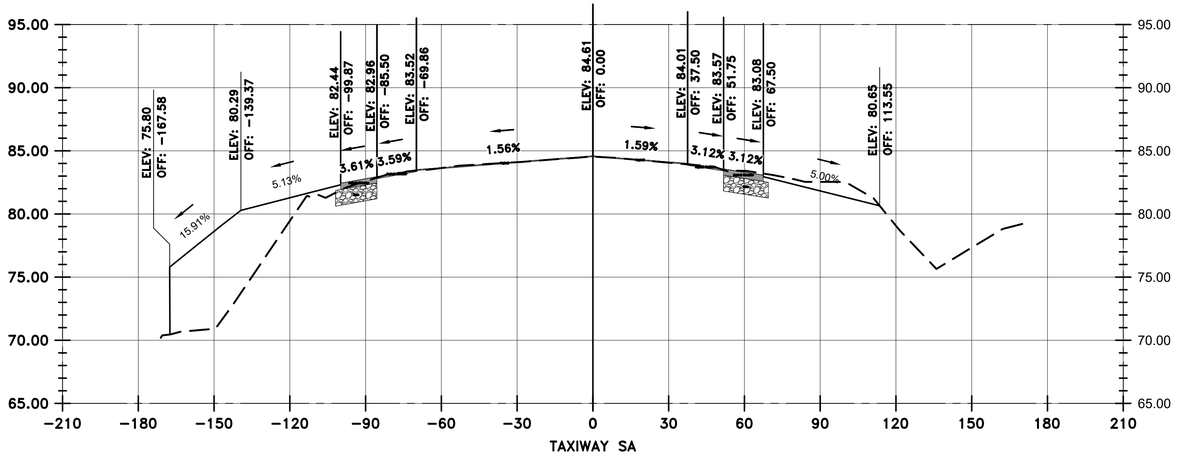
STA: 2099+00.00



TAXIWAY SA
STA: 2098+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 60

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

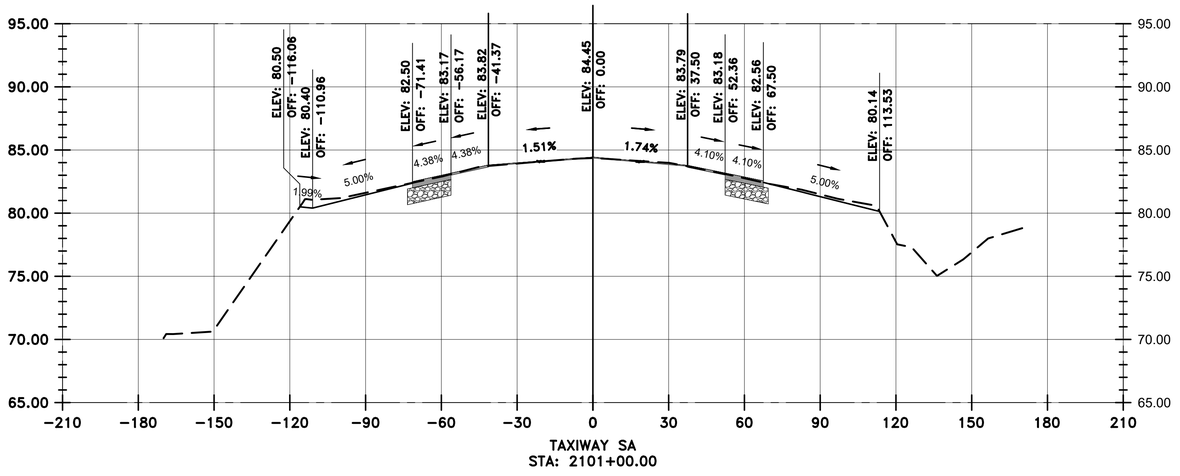
STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

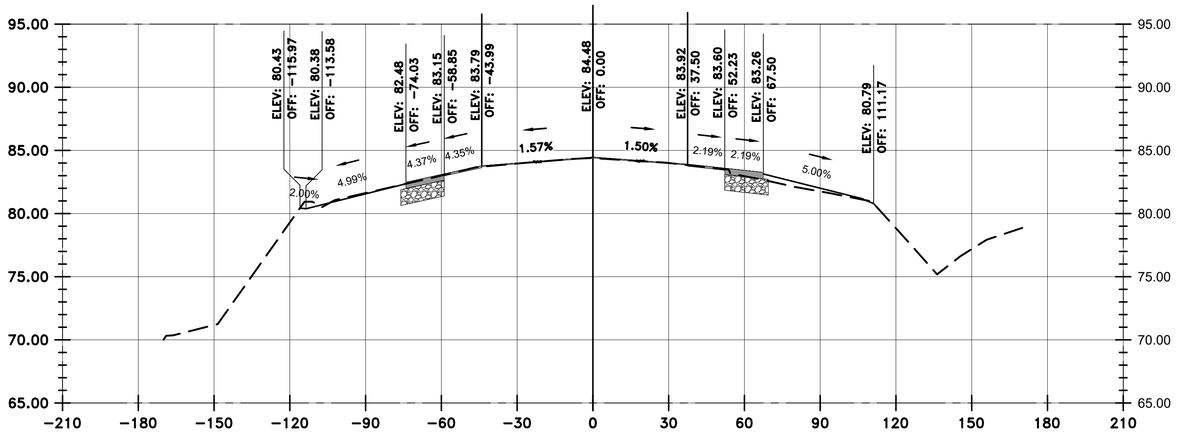
DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.60

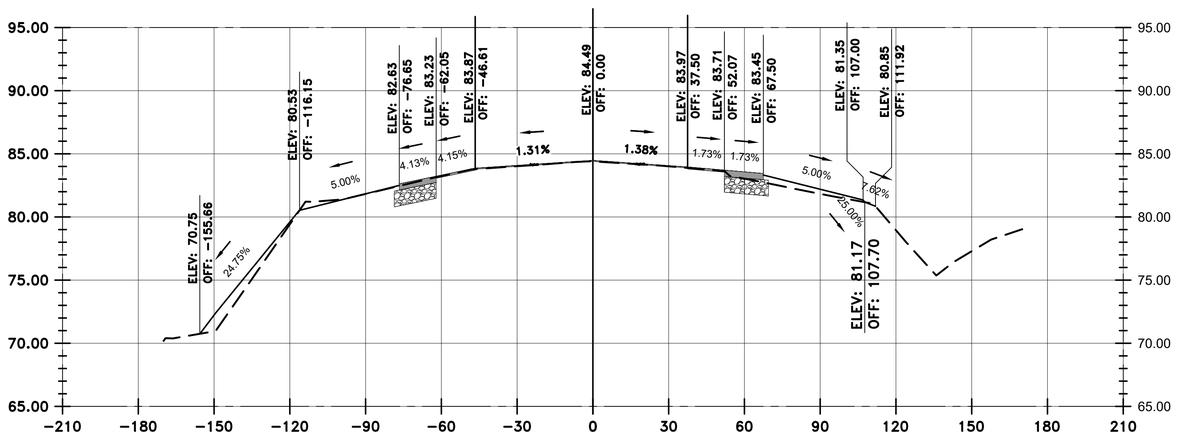
HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
PLOT DATE: 11/8/2019 3:32:47 PM



TAXIWAY SA
STA: 2101+00.00



TAXIWAY SA
STA: 2100+50.00



TAXIWAY SA
STA: 2100+00.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 61

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.61

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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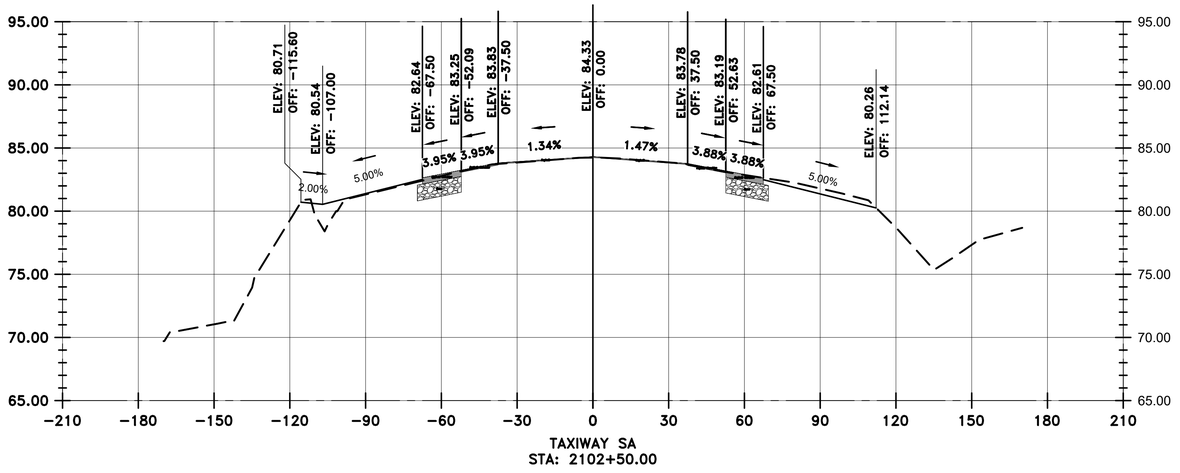

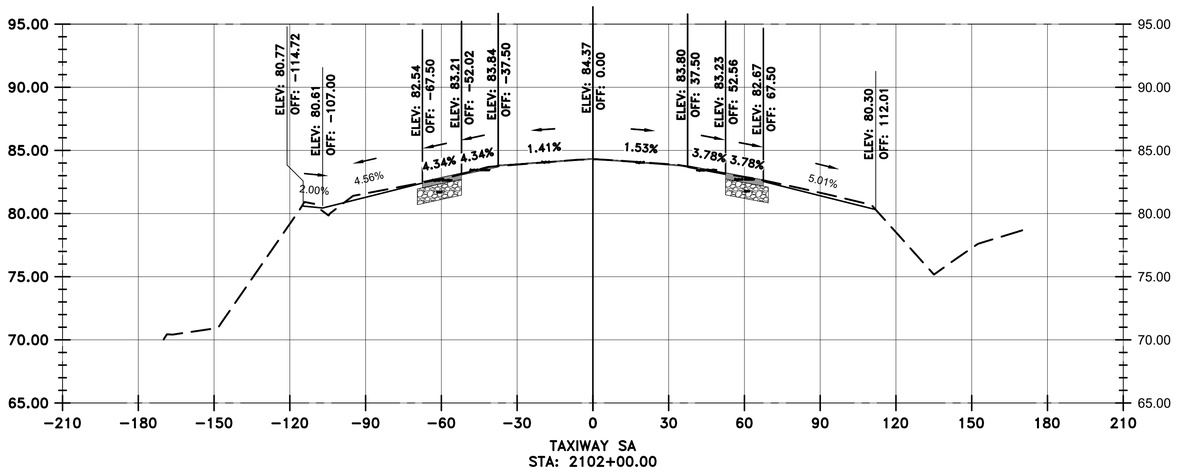

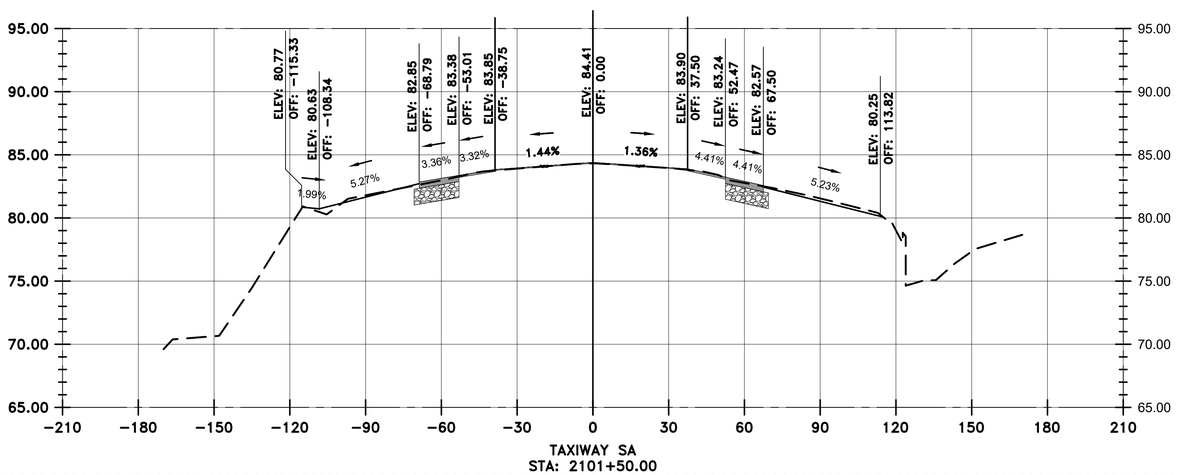

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 62

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.62

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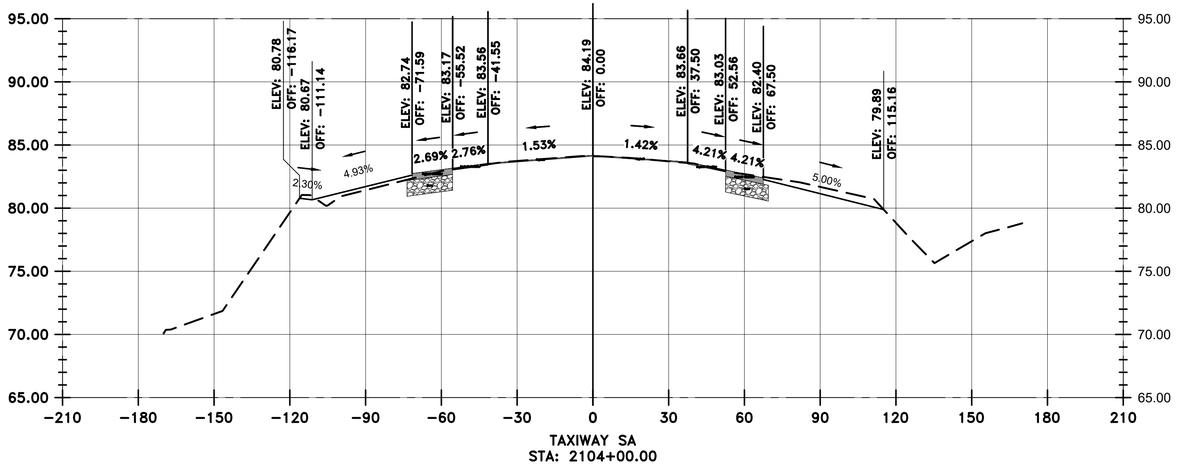
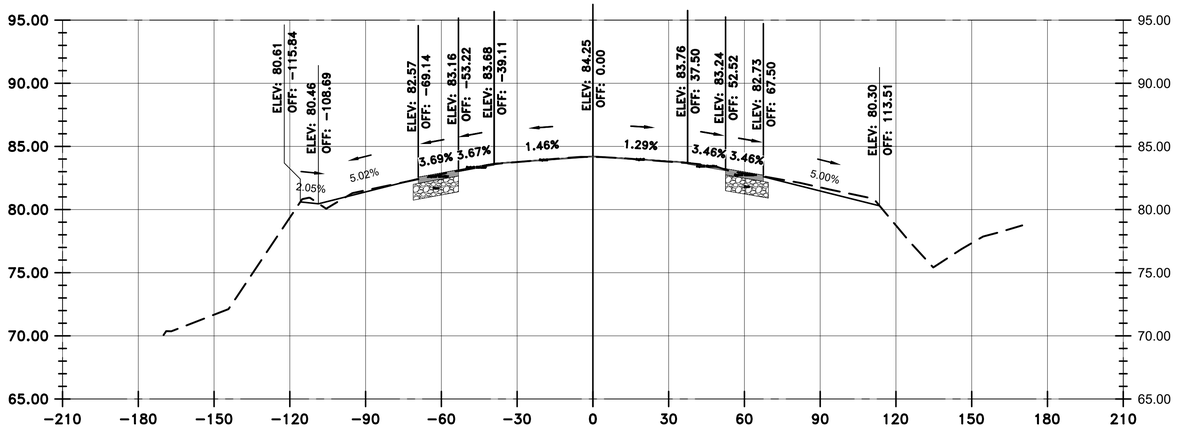
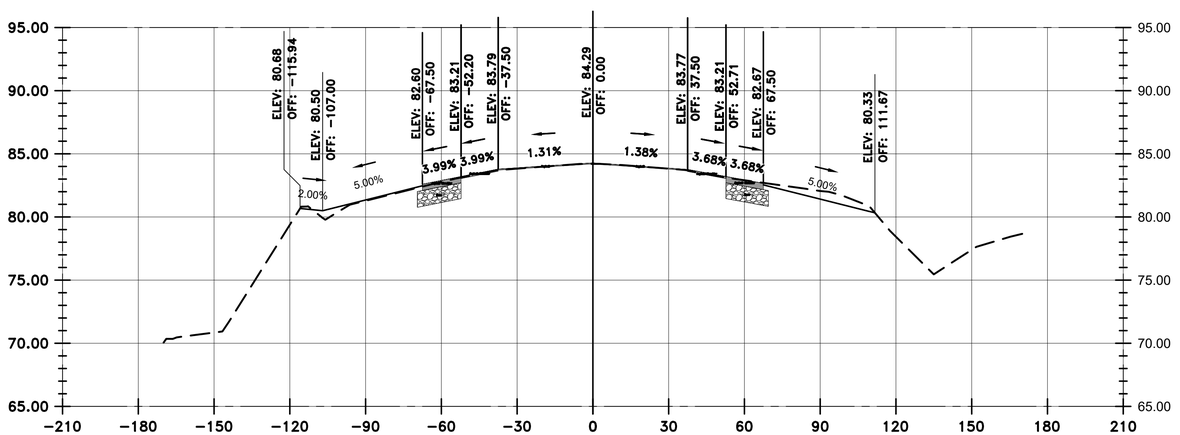


TAXIWAY SA
STA: 2104+00.00



TAXIWAY SA
STA: 2103+50.00



TAXIWAY SA
STA: 2103+00.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 63

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.63

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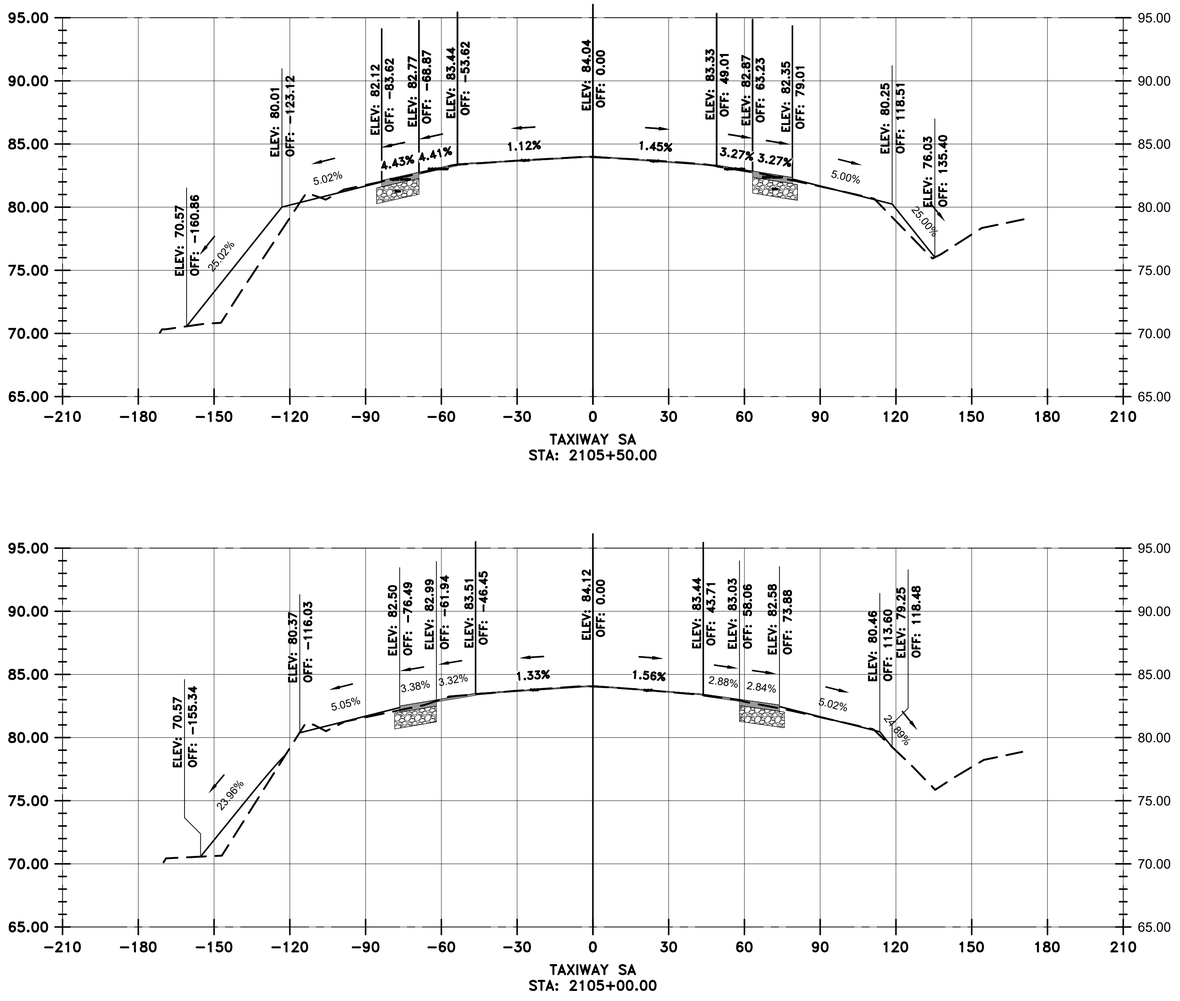

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 64

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1"=10'
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY:	JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.64

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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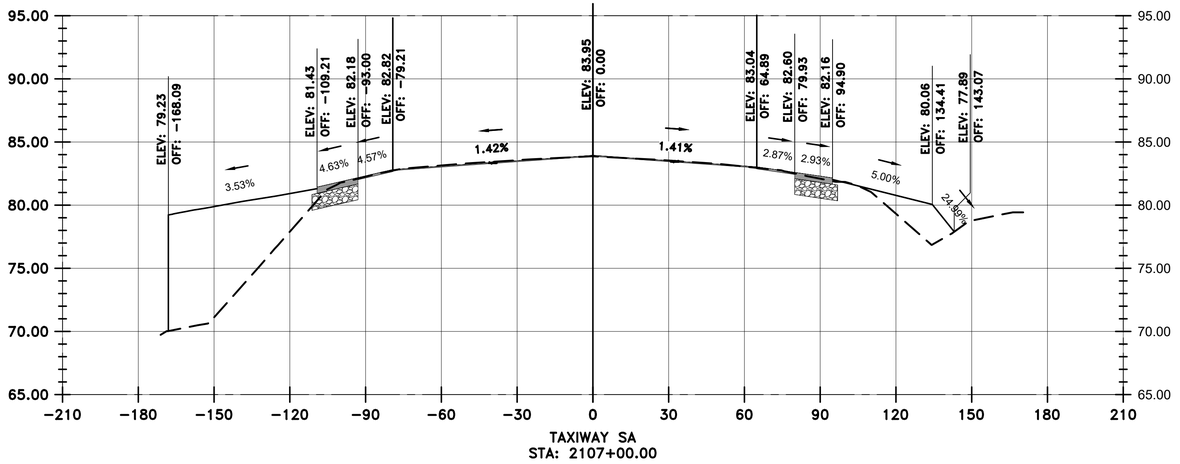

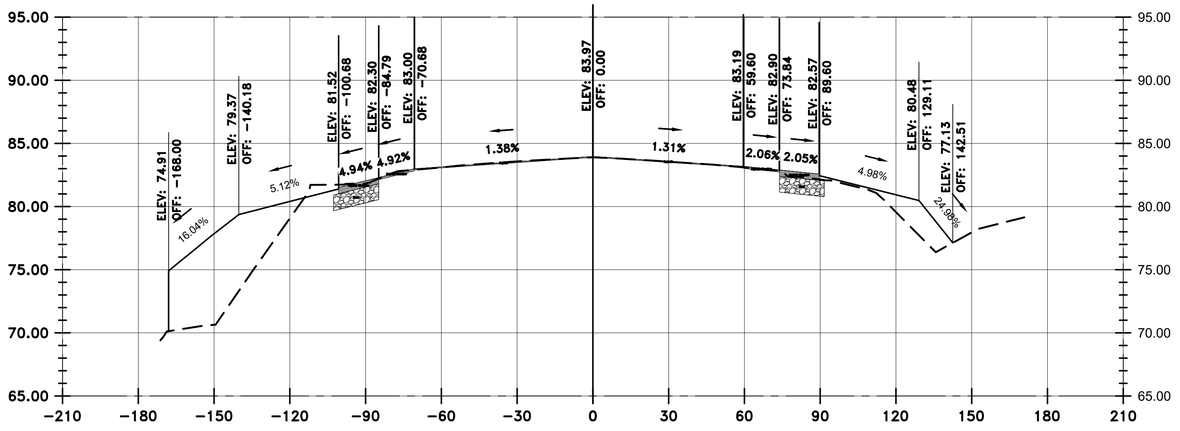

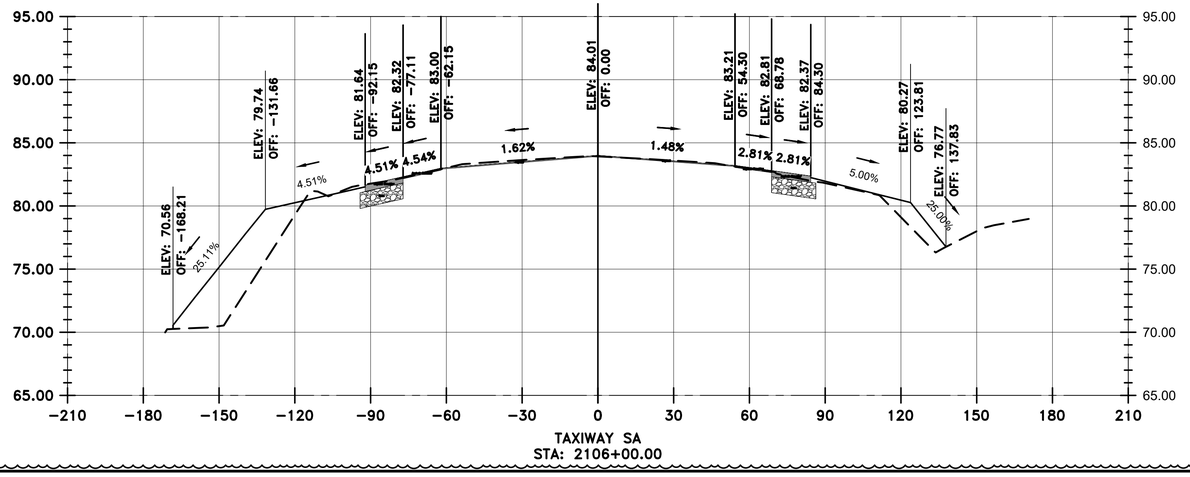

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 65

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X01.65

HAS FILE: C:\Users\DAGranato\OneDrive - Garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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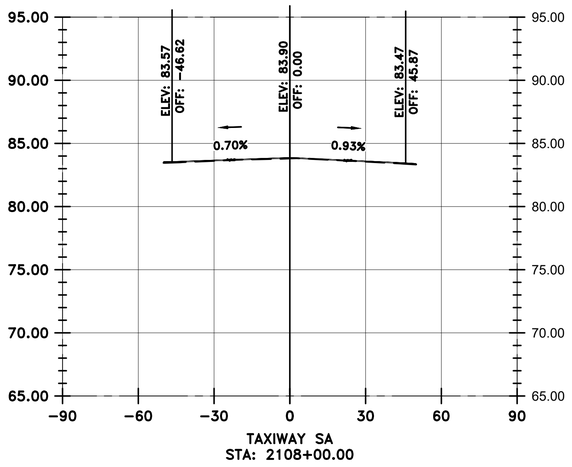

TAXIWAY SA
STA: 2108+00.00

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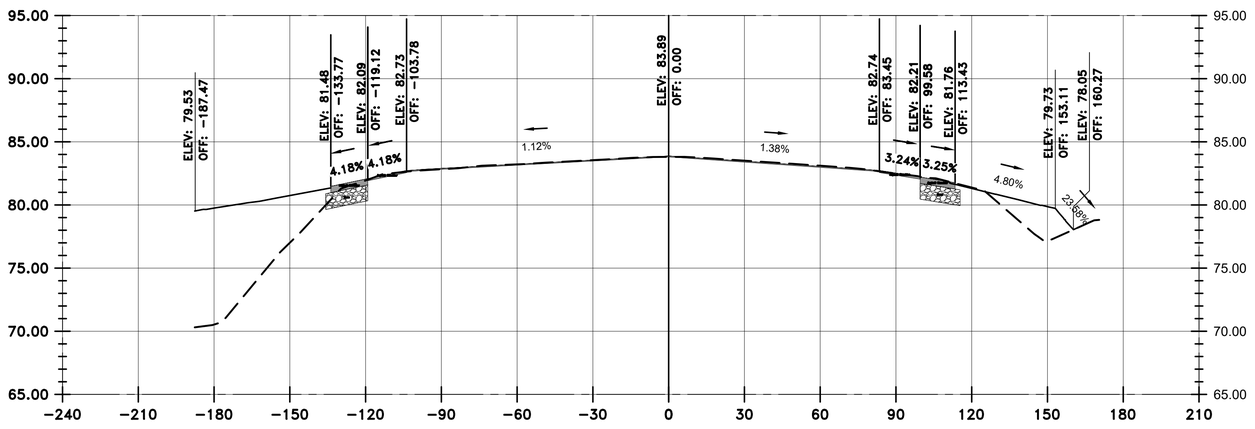

TAXIWAY SA
STA: 2107+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SA CROSS SECTIONS 66

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.
0646A

A.I.P. NO.
XXXX

C.I.P. NO.
A-0515

H.A.S. NO.
20C0646A

SHEET NO.
X01.66

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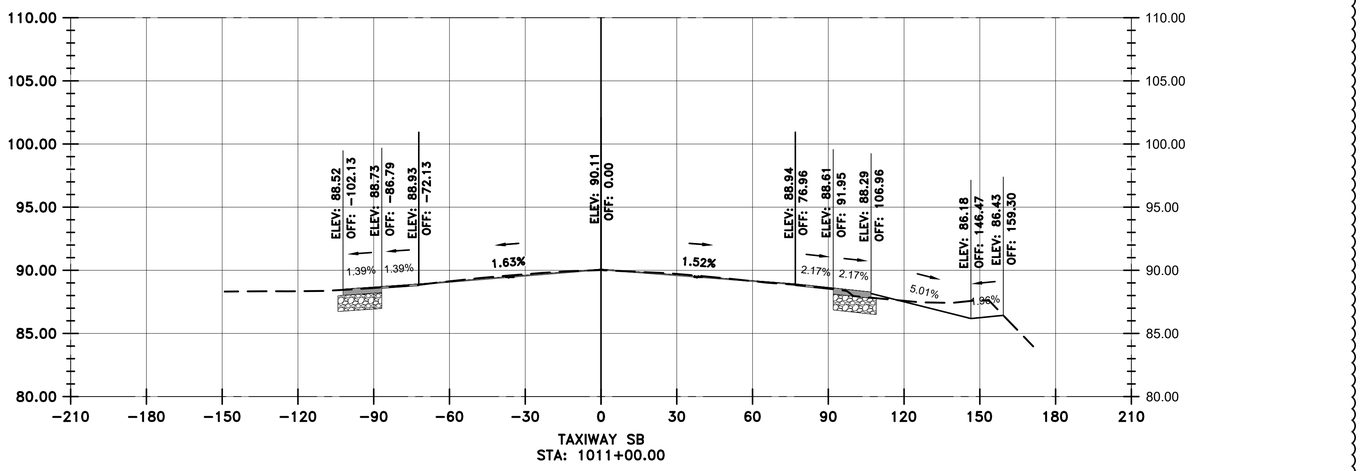

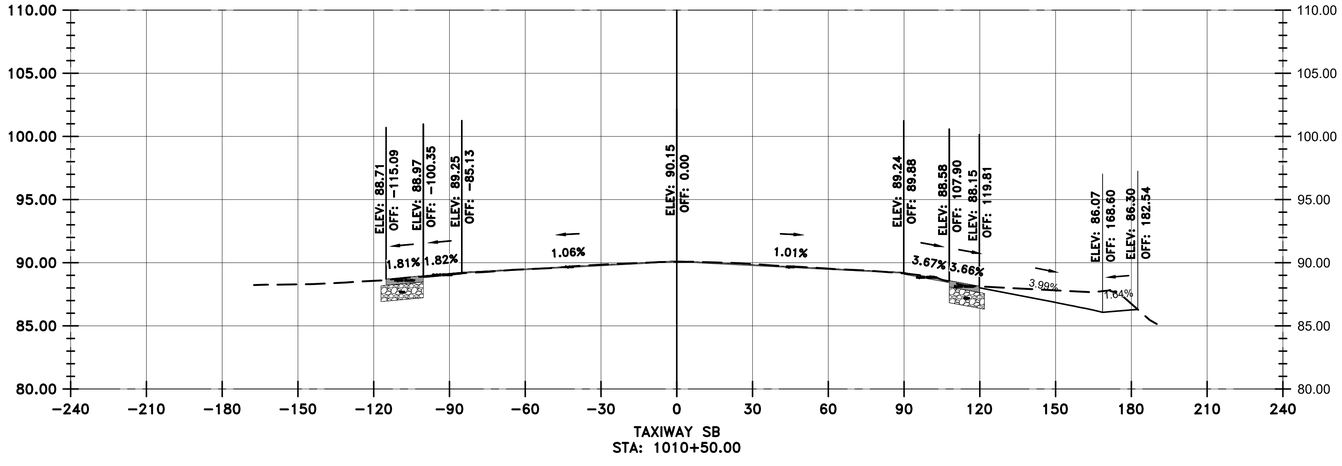

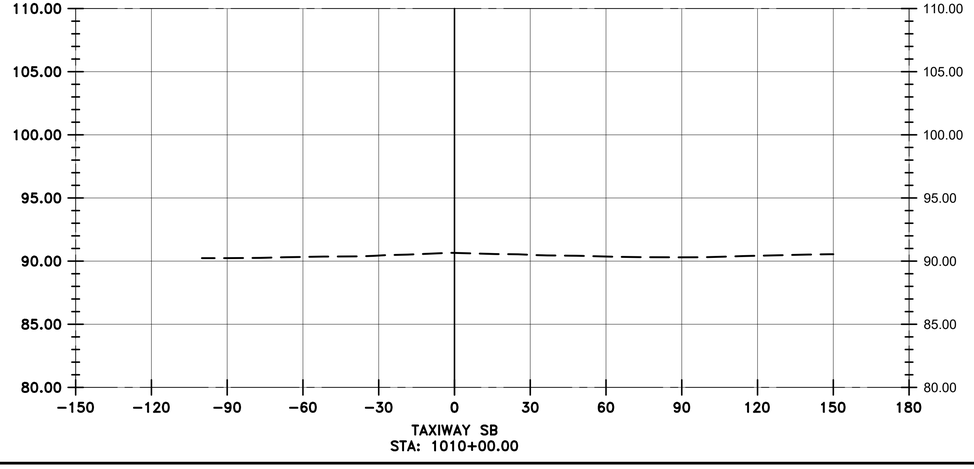

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 1

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.01

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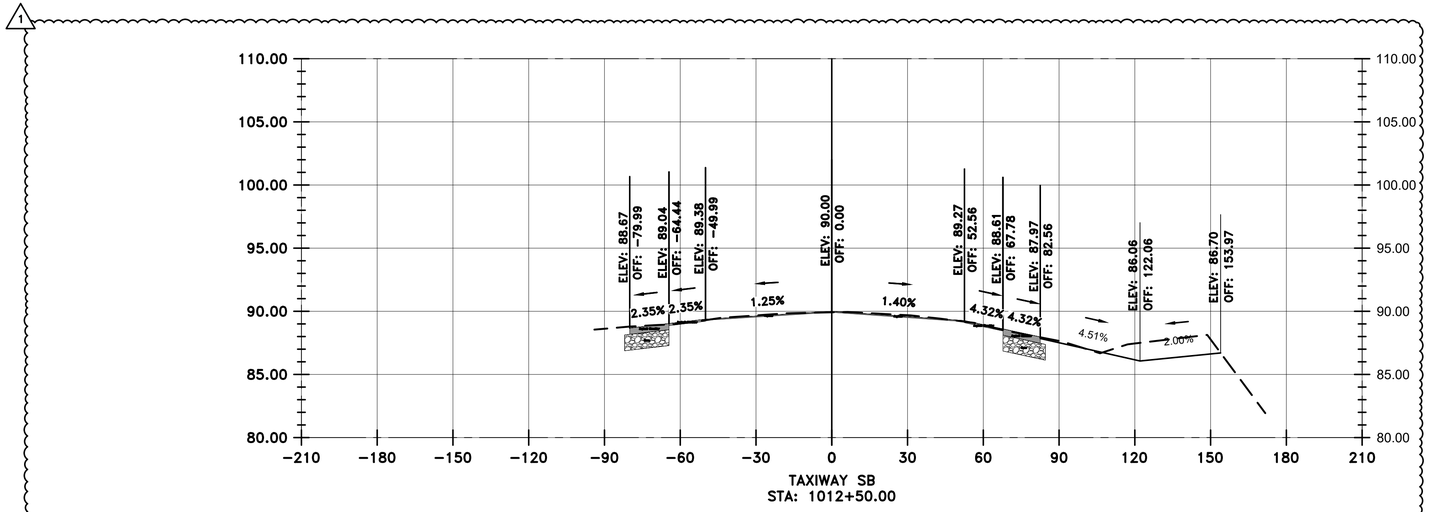
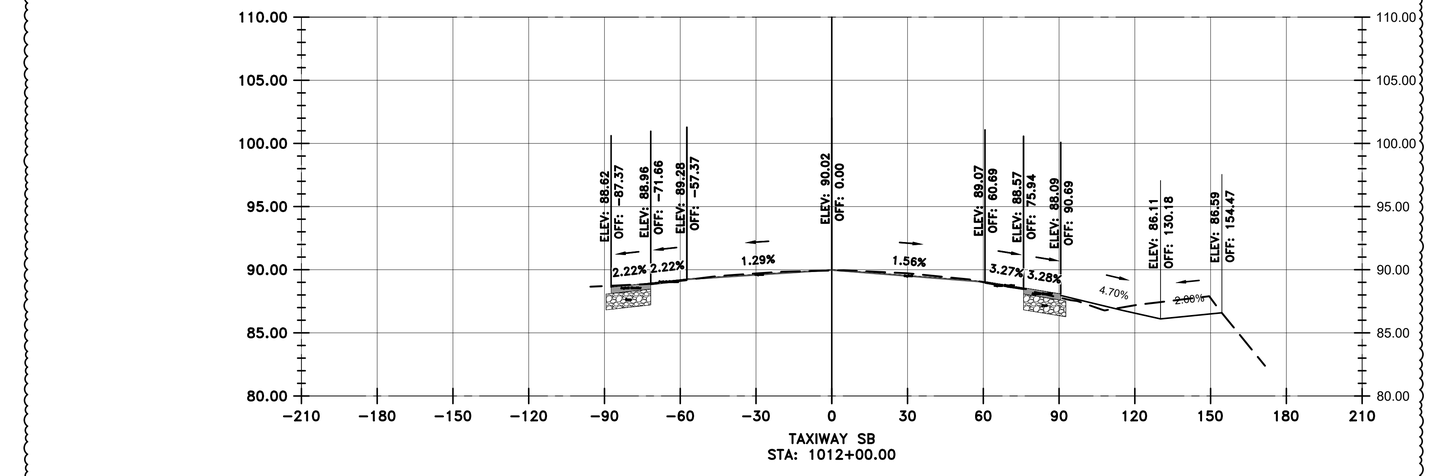
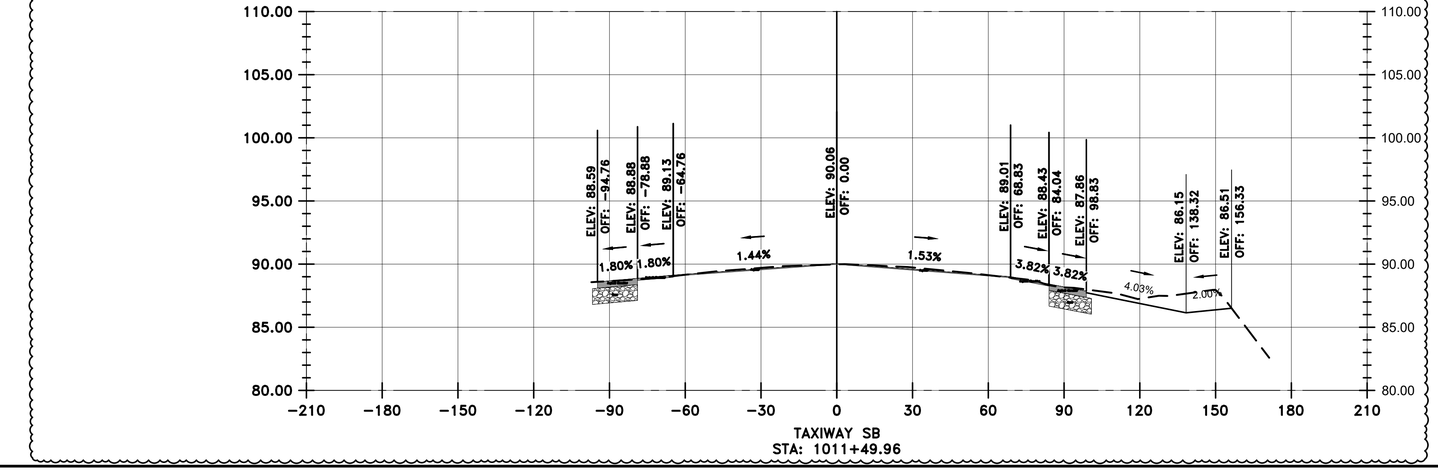






LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

VERTICAL EXAGGERATION = 5

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
PLOT DATE: 11/8/2019 3:32:47 PM

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 2

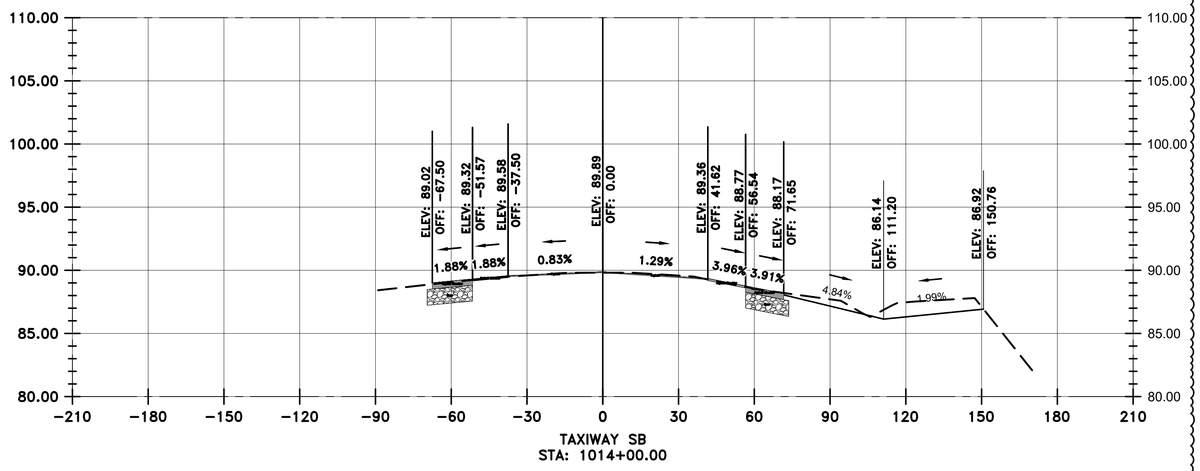
PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

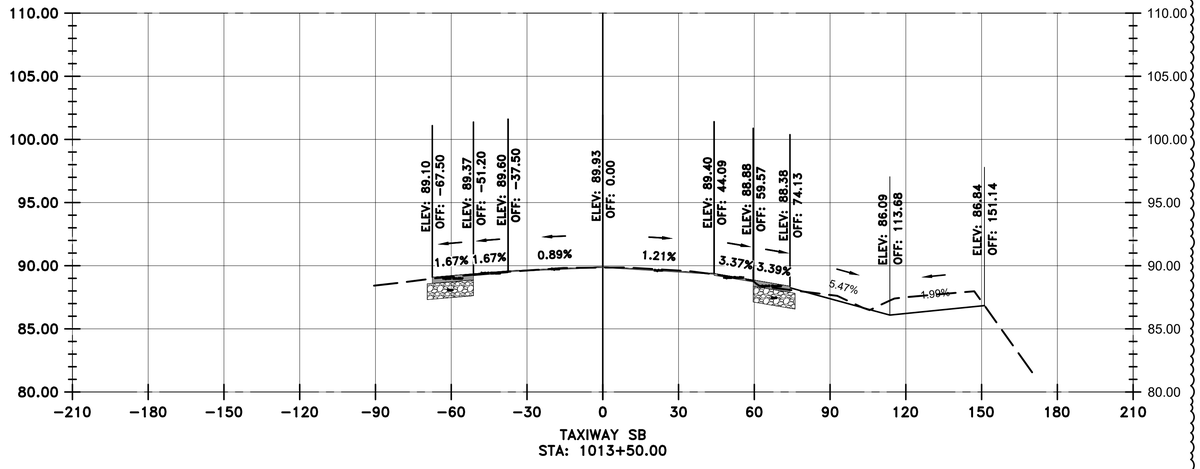
STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

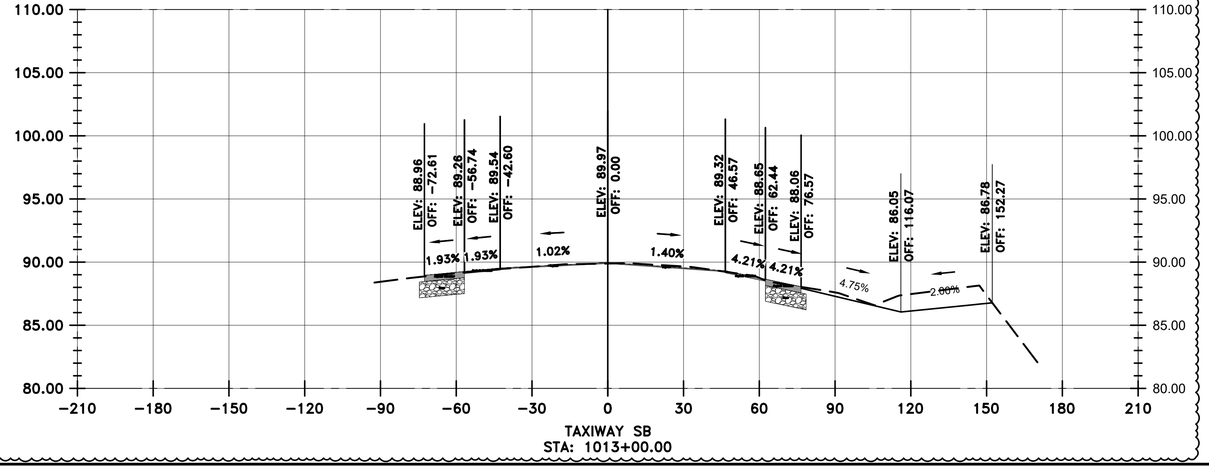
APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.02







VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 3

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

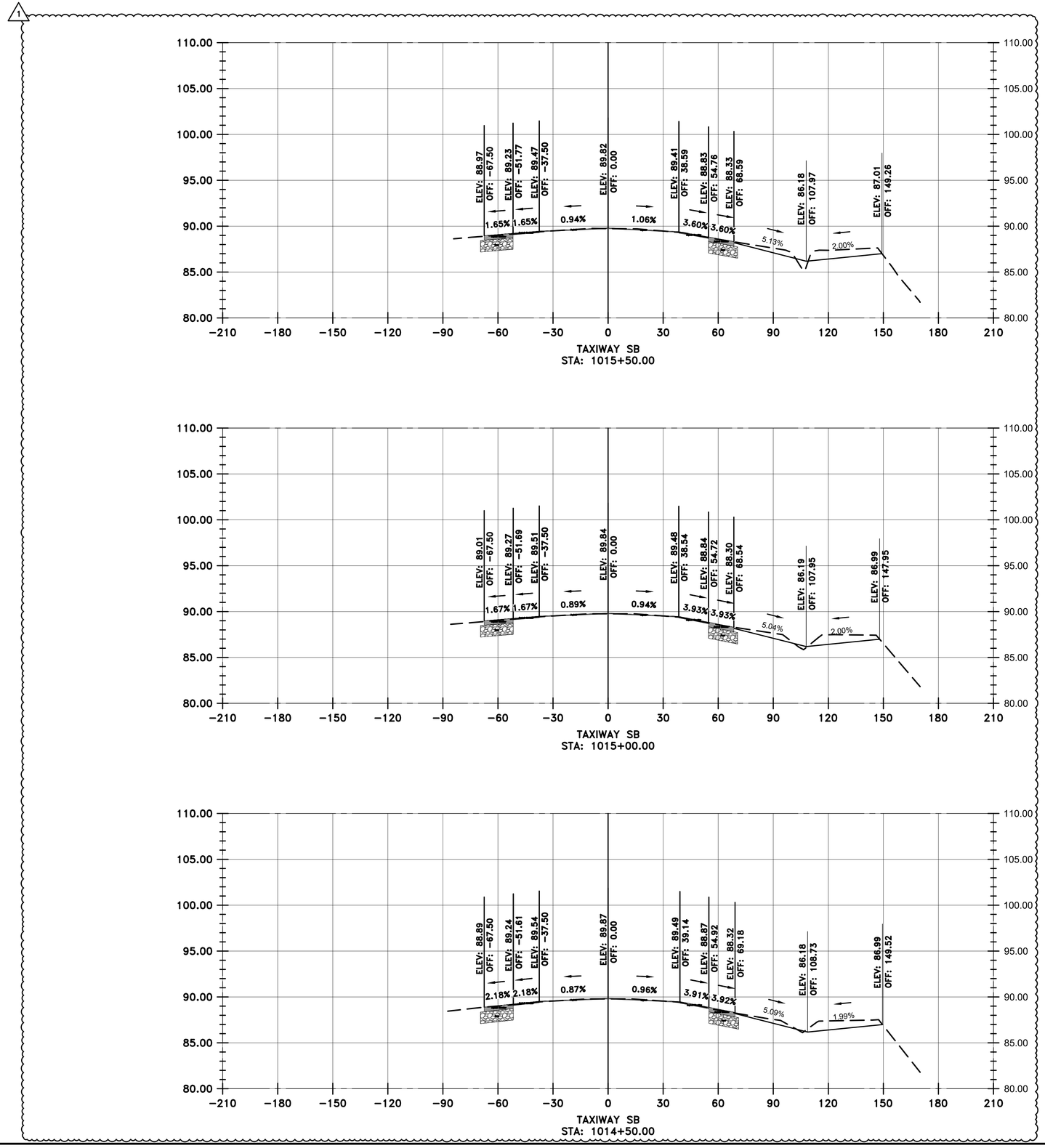
STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.03

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
PLOT DATE: 11/8/2019 3:32:47 PM



LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

VERTICAL EXAGGERATION = 5

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typcial Sections\Model Files\0646GSC.dwg
PLOT DATE: 11/8/2019 3:32:47 PM

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 4

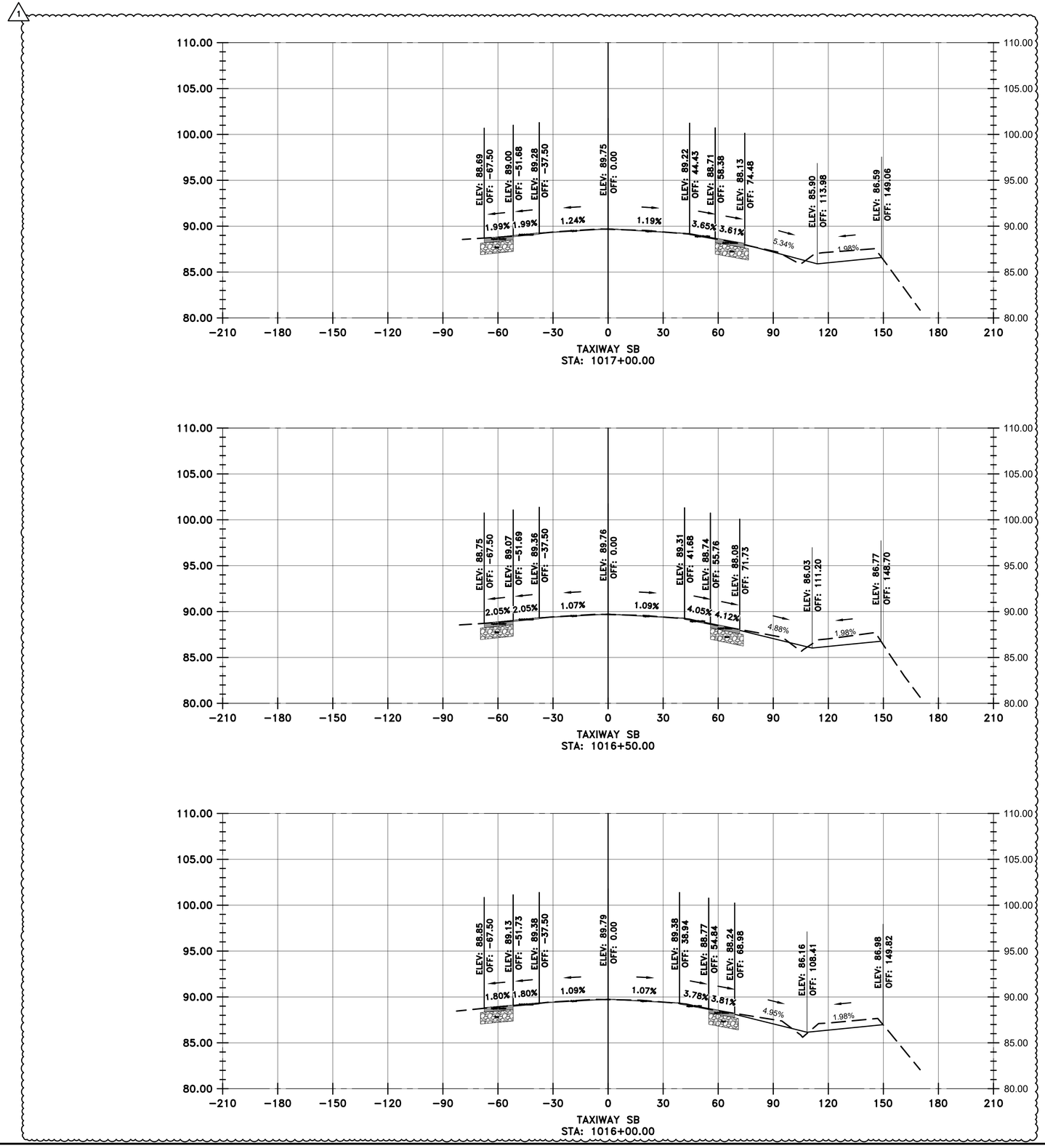
PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.04



VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
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TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 5

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.05

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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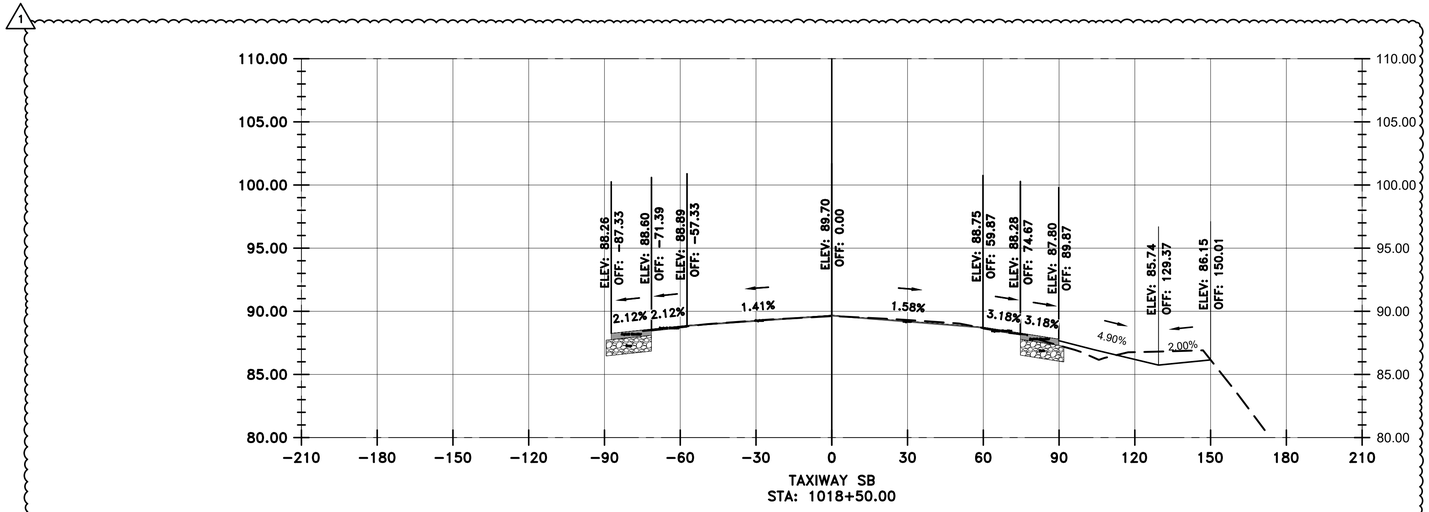

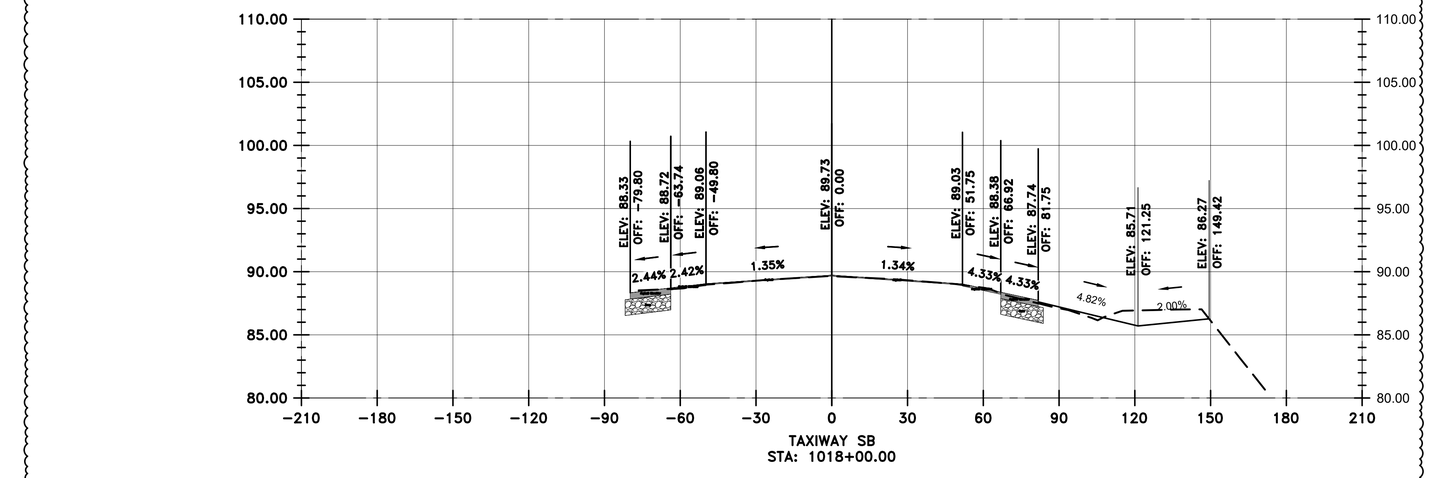

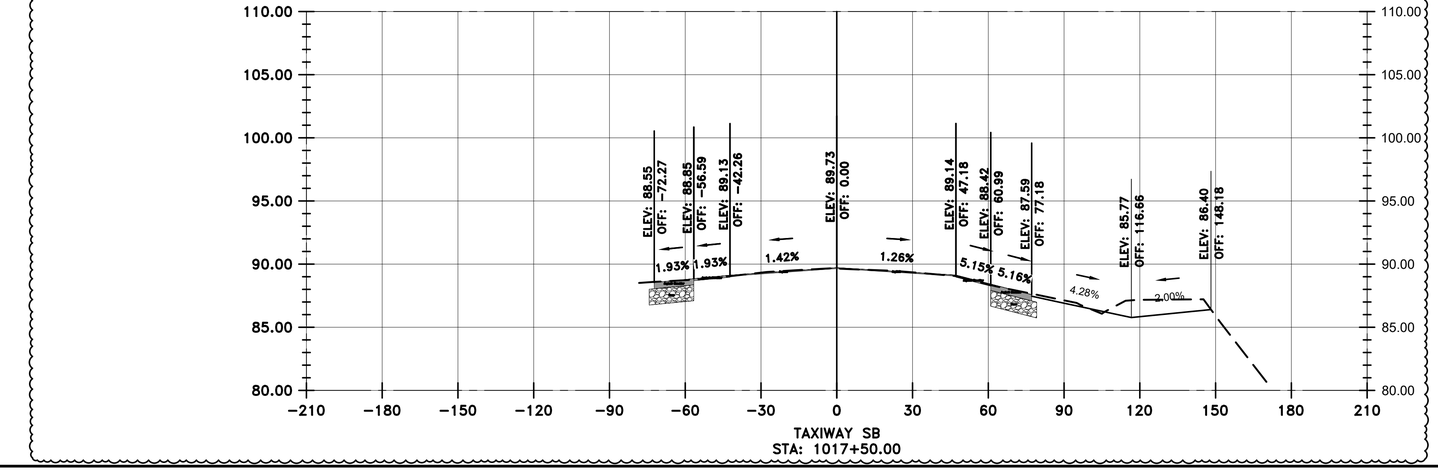

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
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TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 6

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.06

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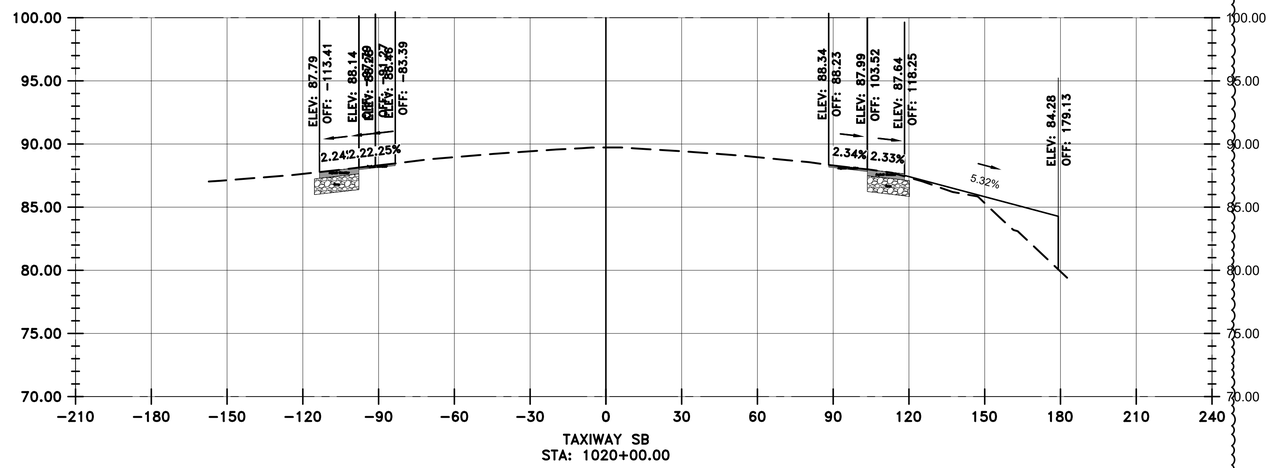

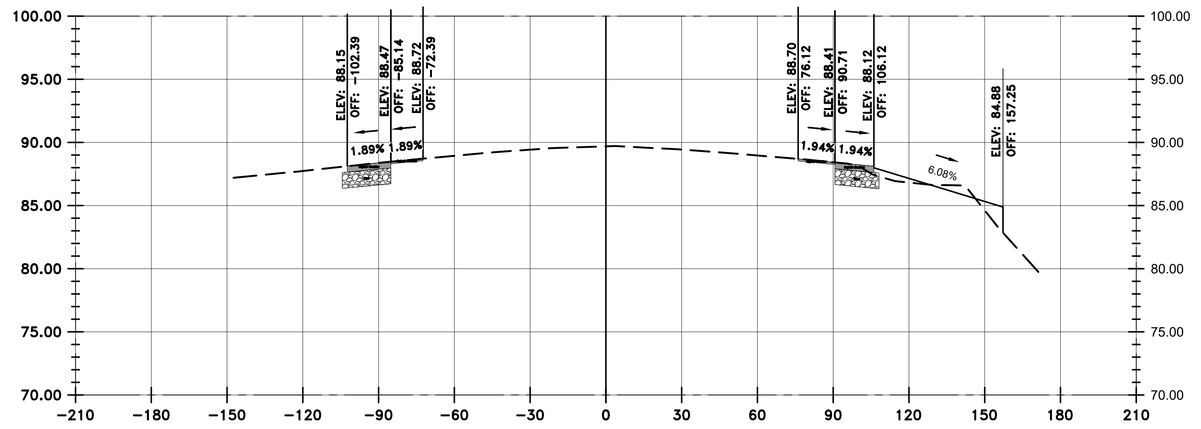

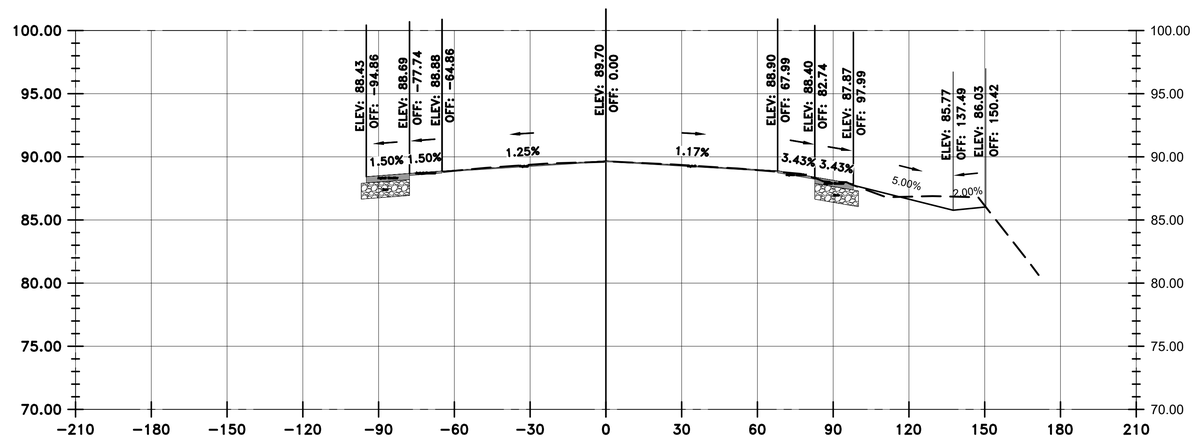

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 7

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.07

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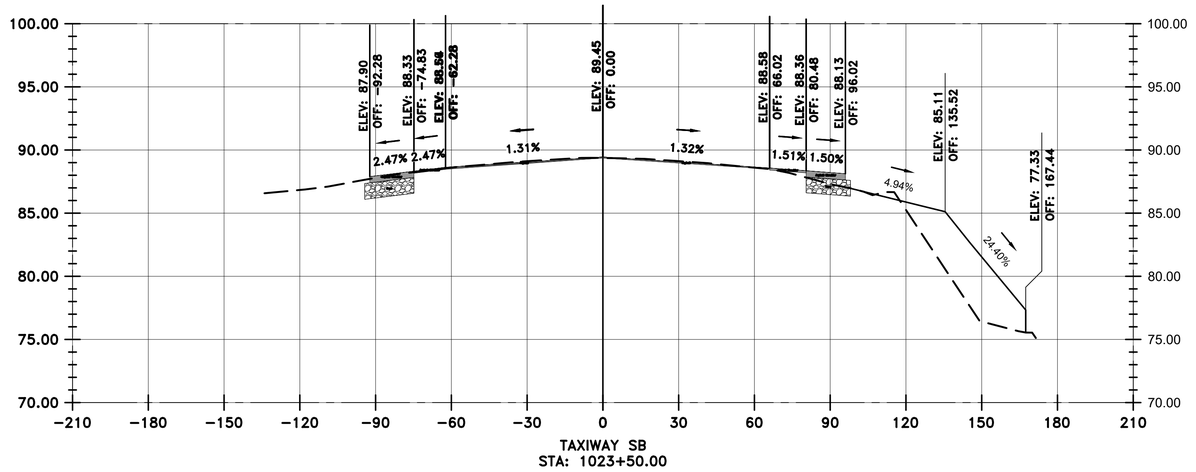

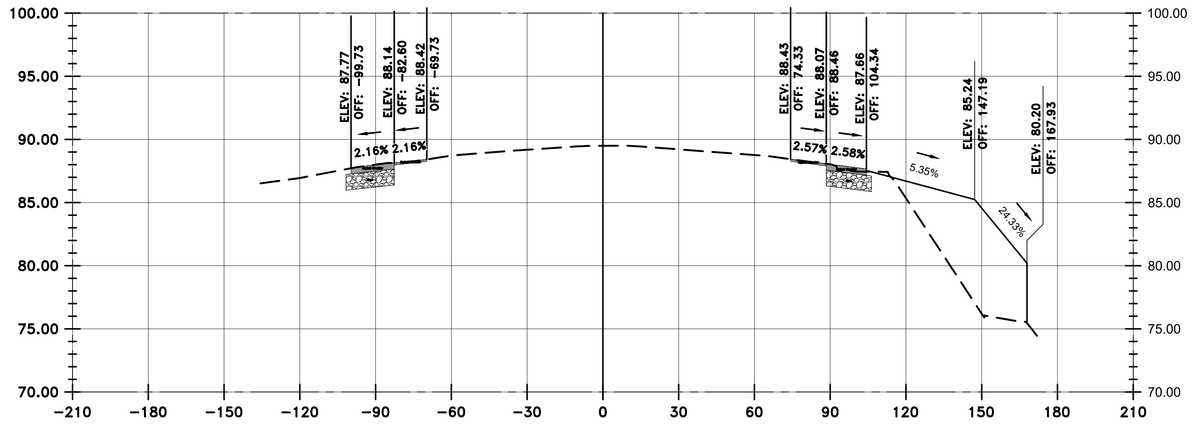

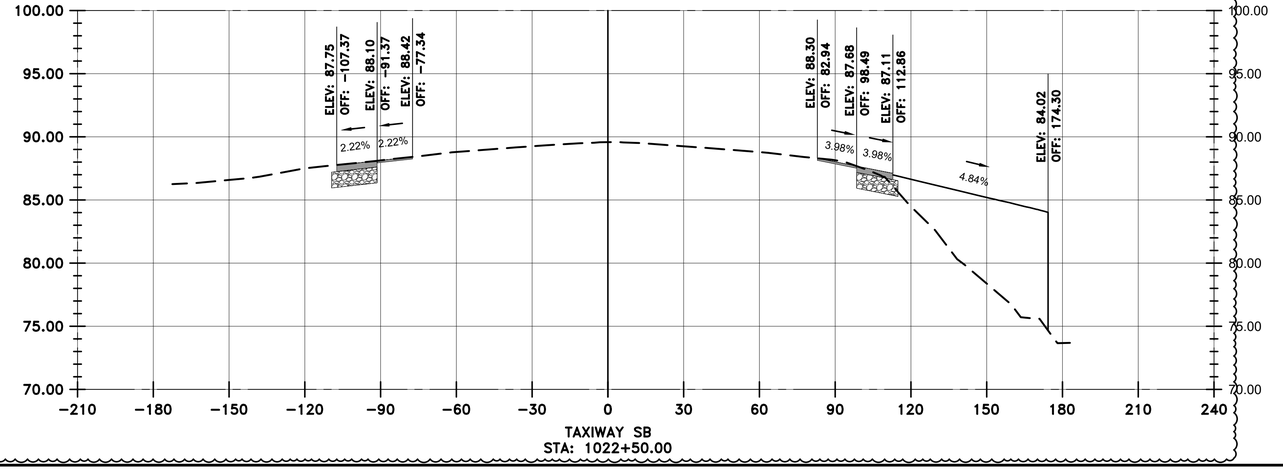

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 8

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER

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DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.08

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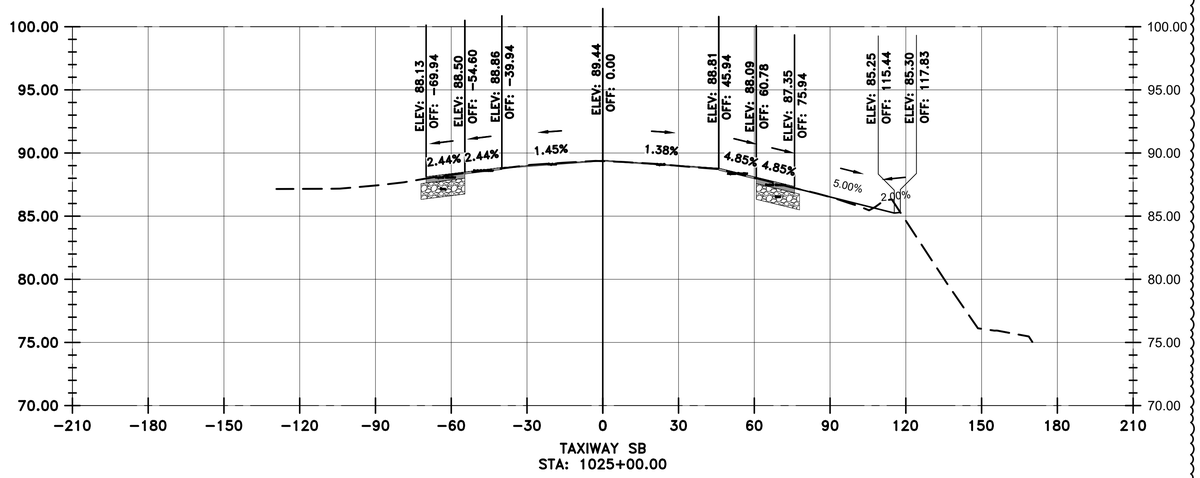

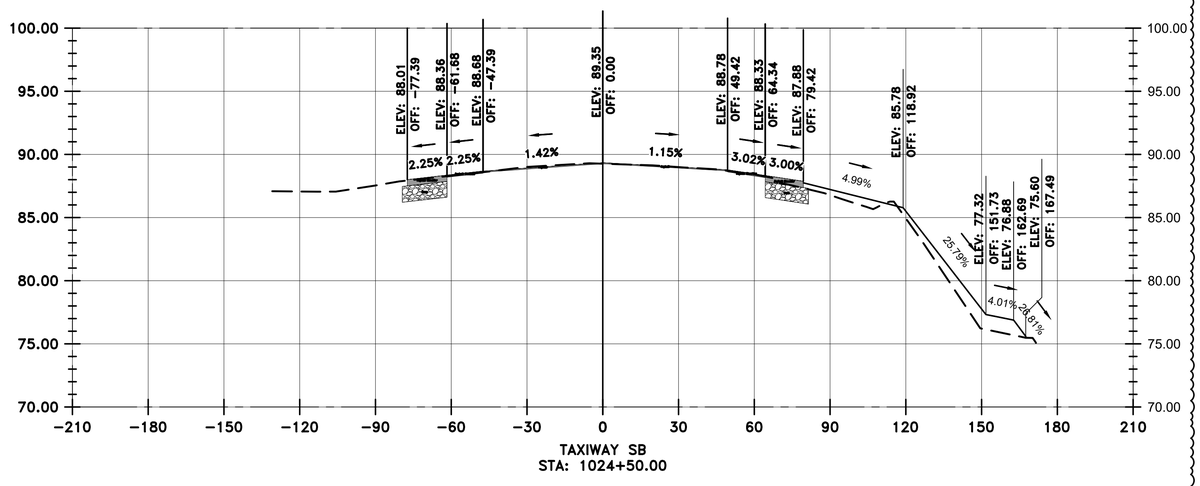

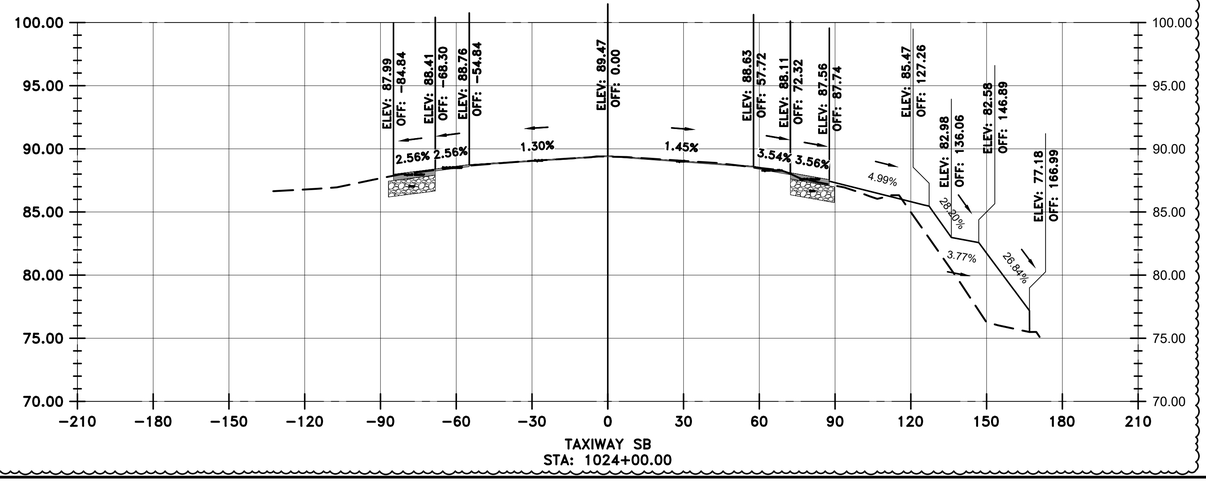

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 9

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

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PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.09

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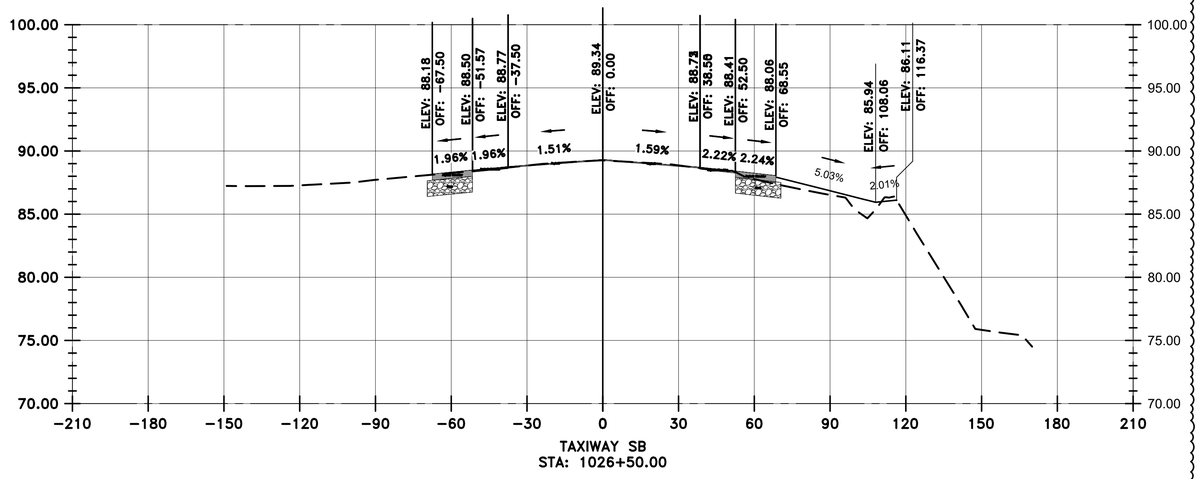
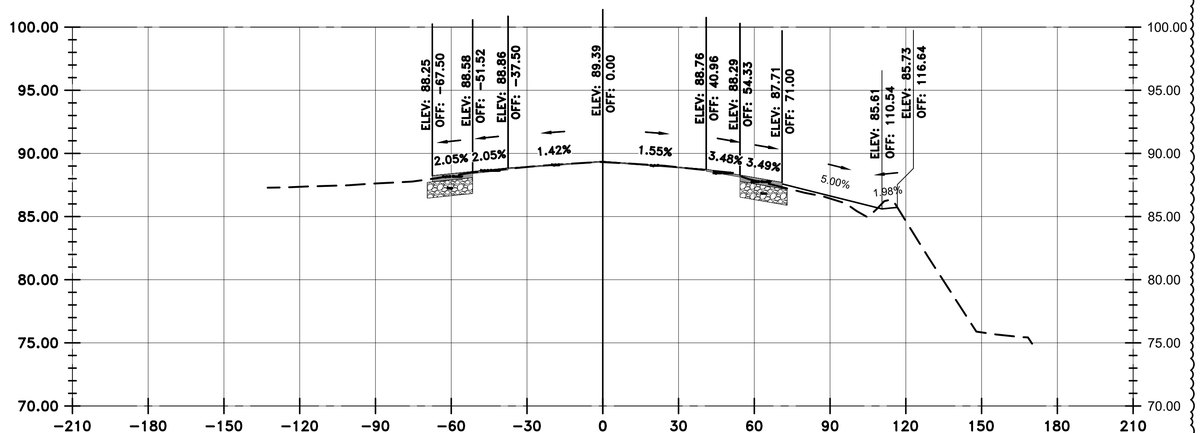


TAXIWAY SB
STA: 1026+50.00



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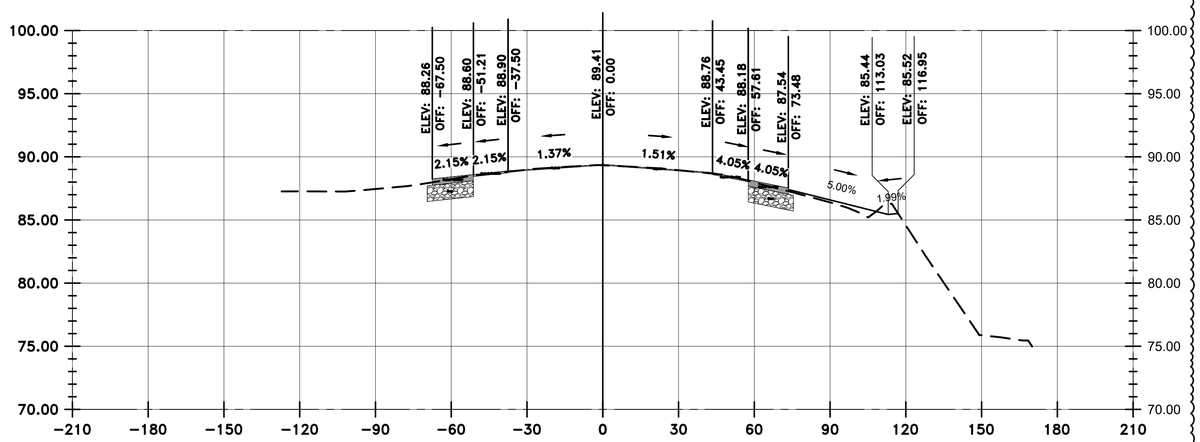
STA: 1026+00.00



TAXIWAY SB
STA: 1025+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

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Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

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1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 10

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
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PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.10

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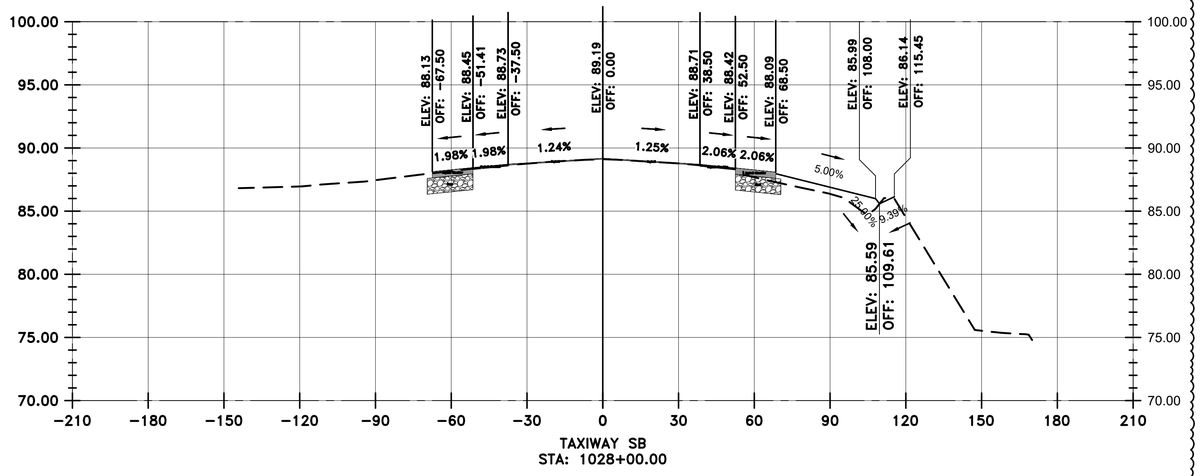

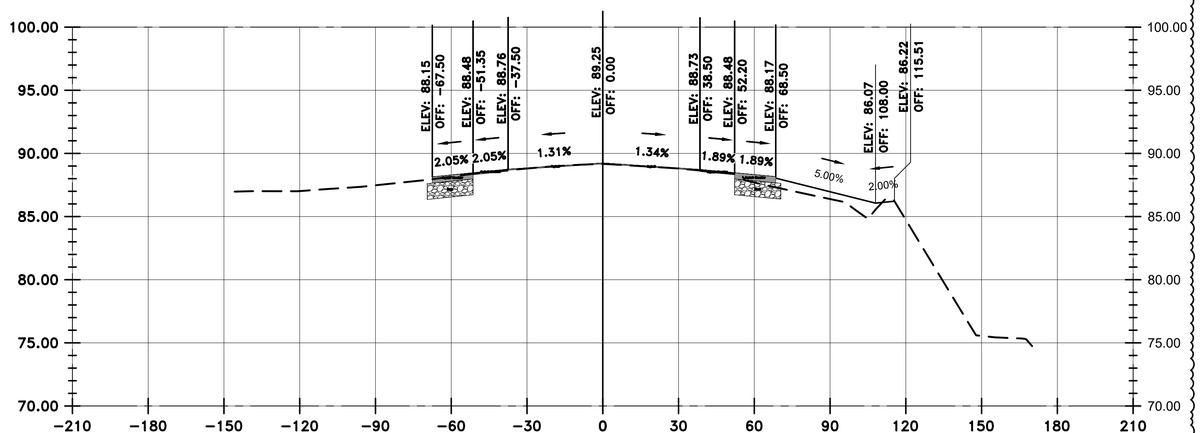

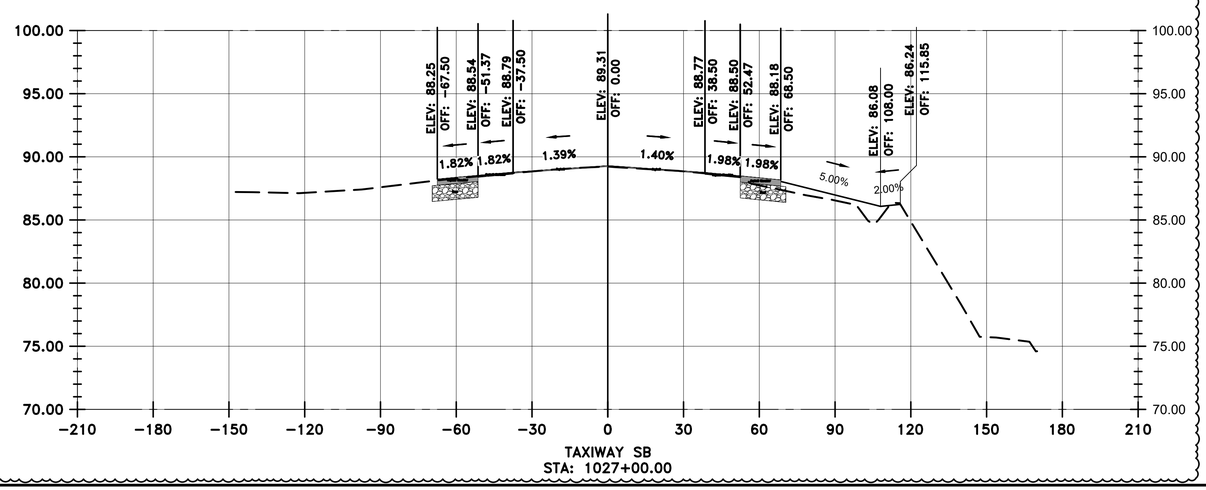

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 11

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
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LICENSED PROFESSIONAL ENGINEER
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PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.11

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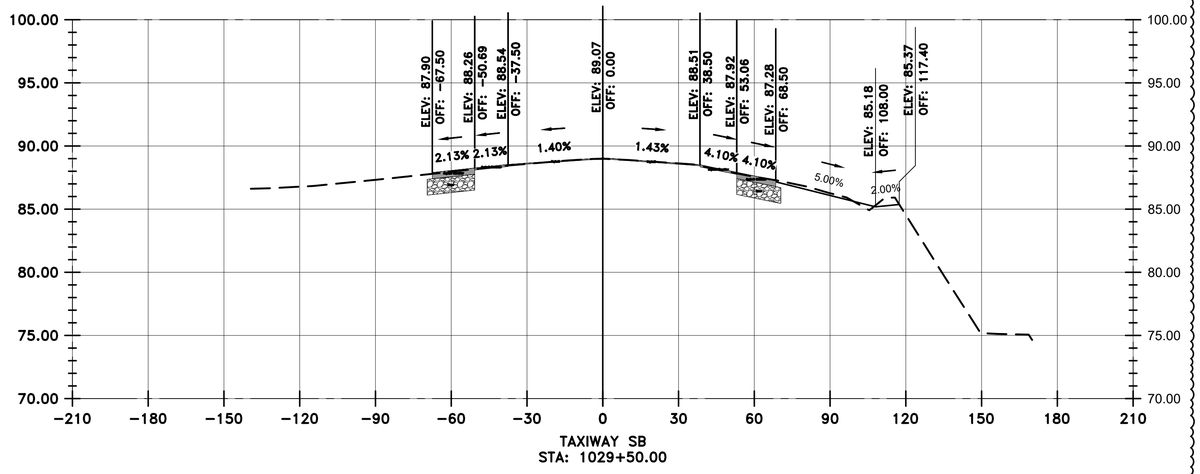

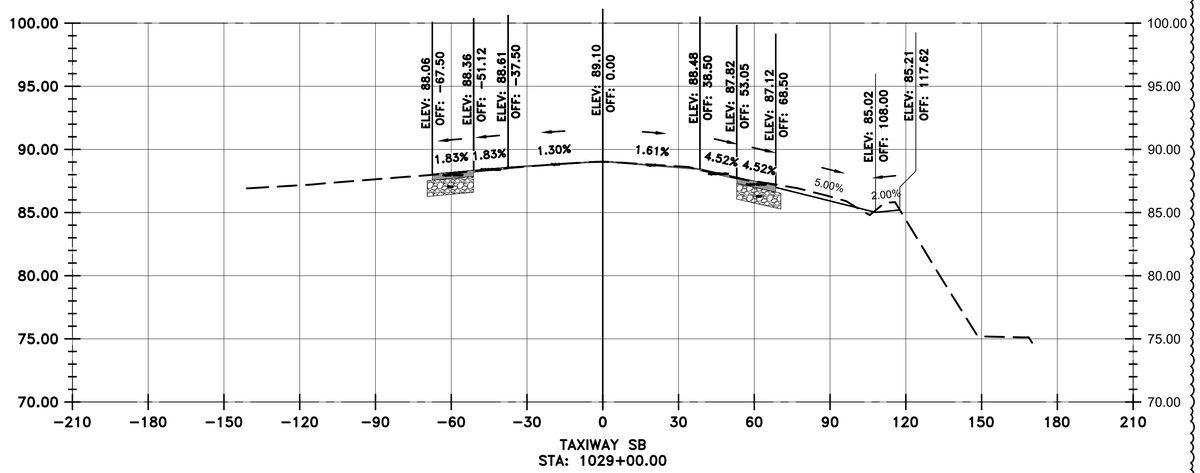

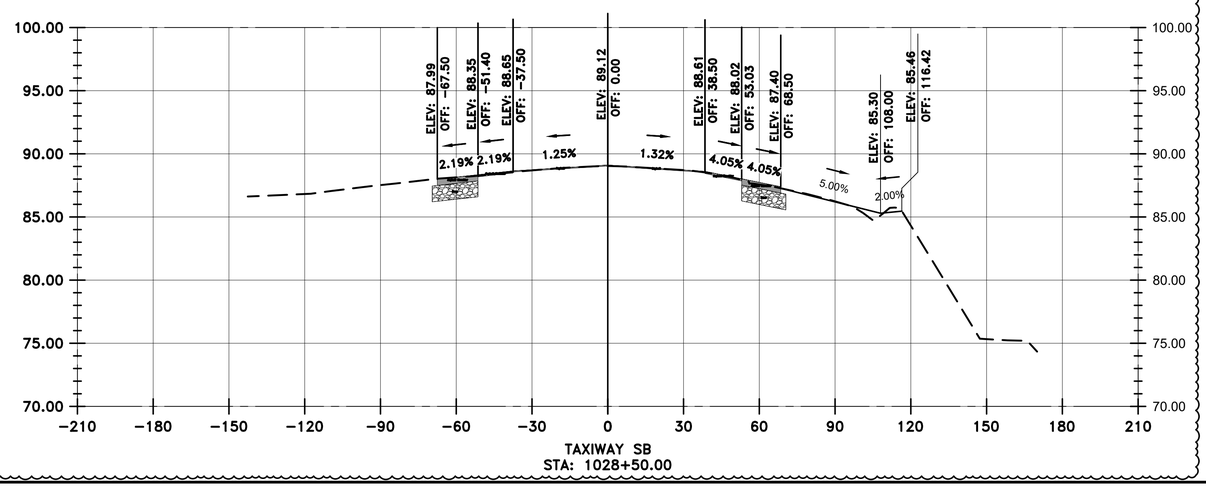

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
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Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 12

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
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APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.12

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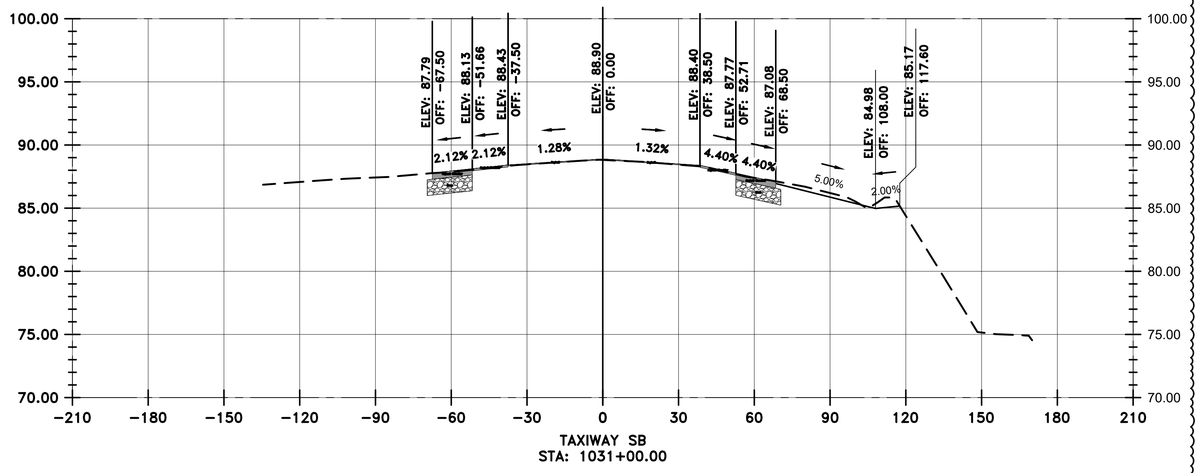

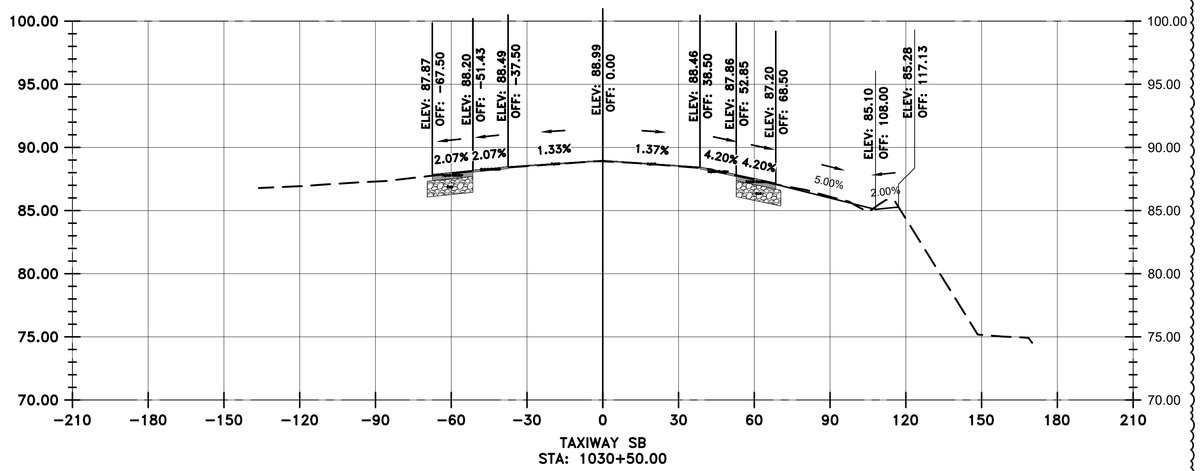

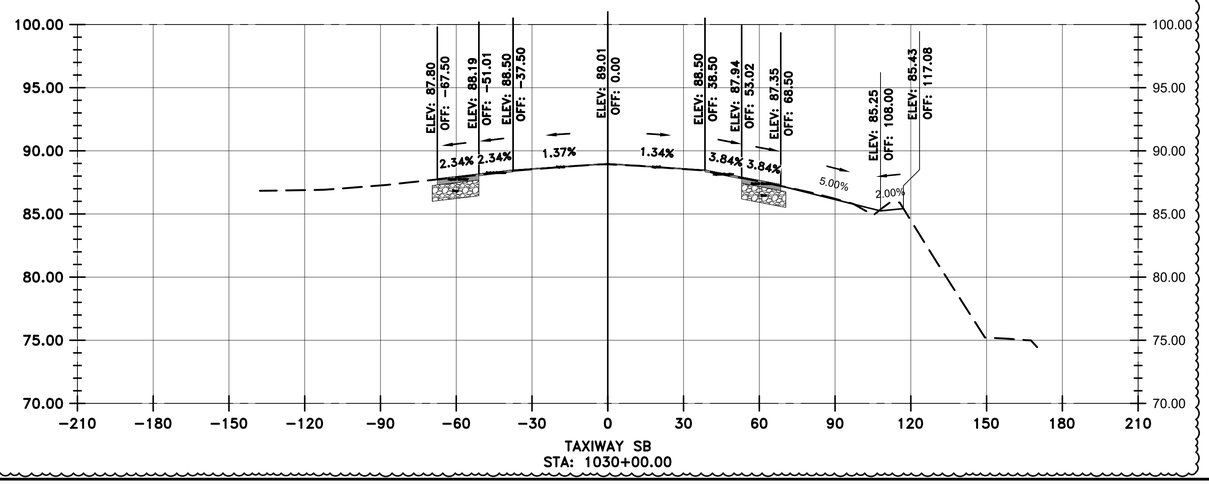

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 13

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
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APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.13

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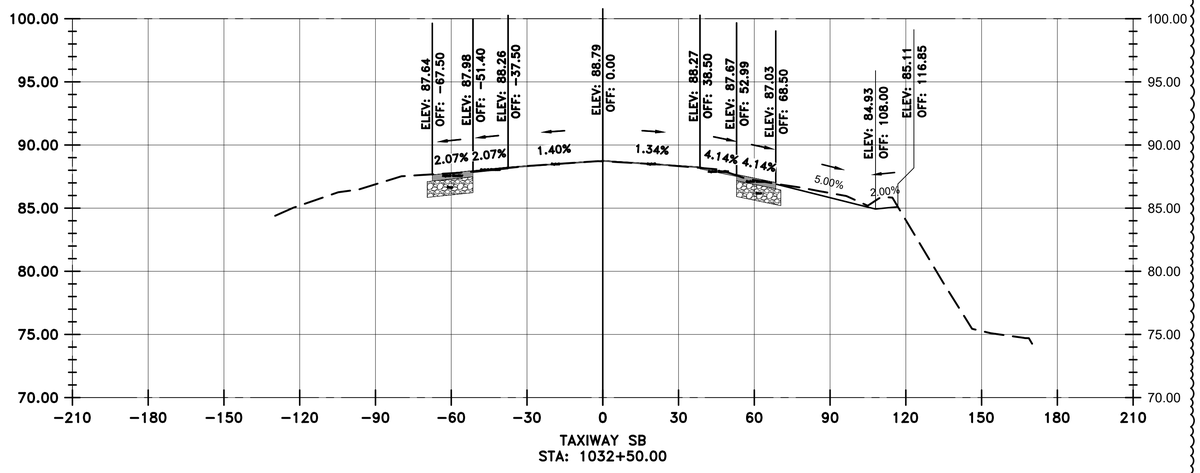

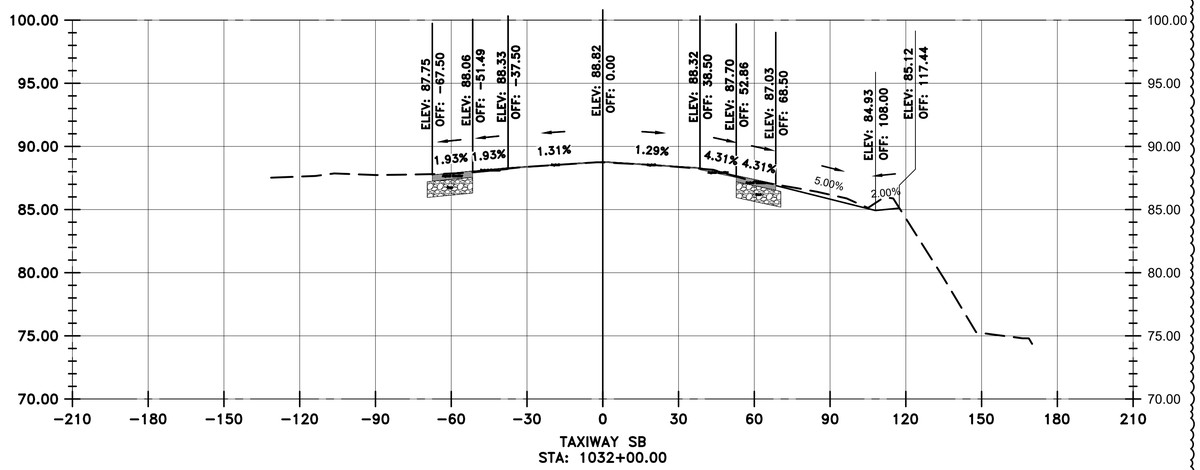

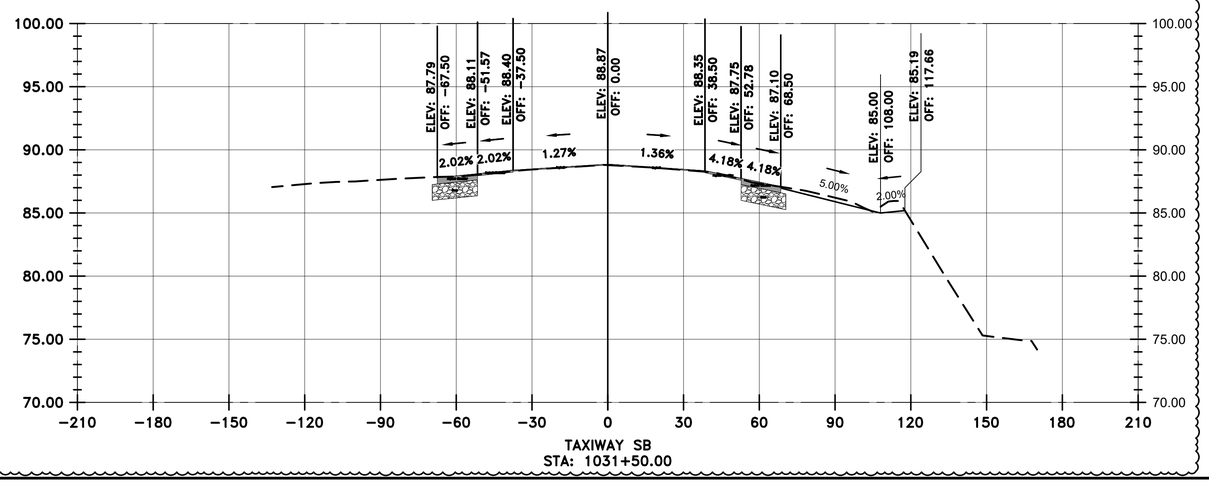

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 14

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.14

HAS FILE: c:\Users\dagonato\onedrive - garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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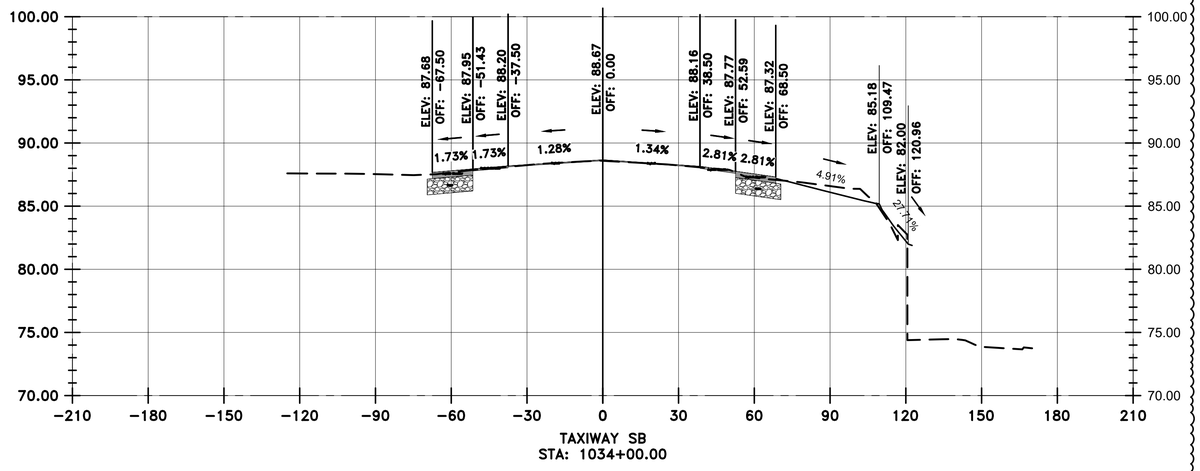

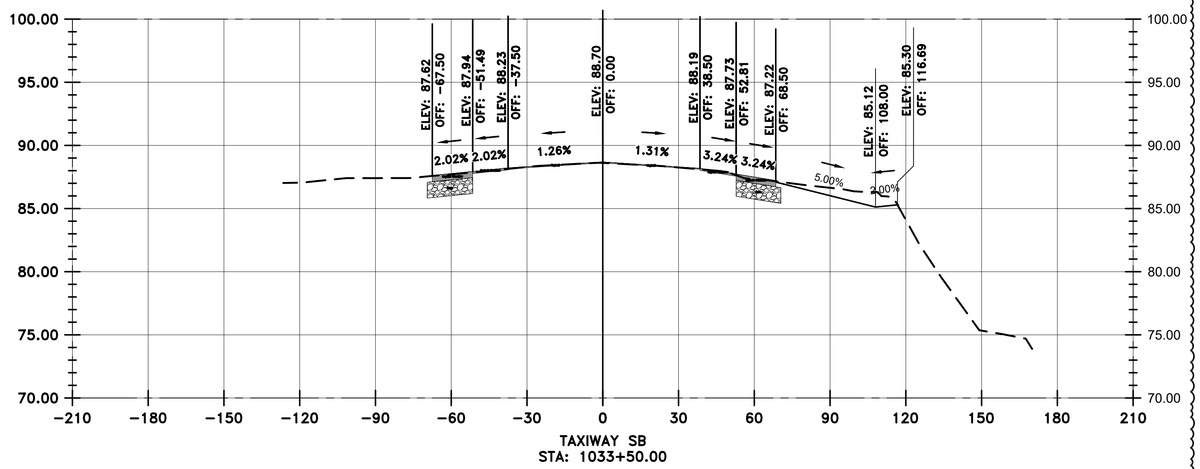

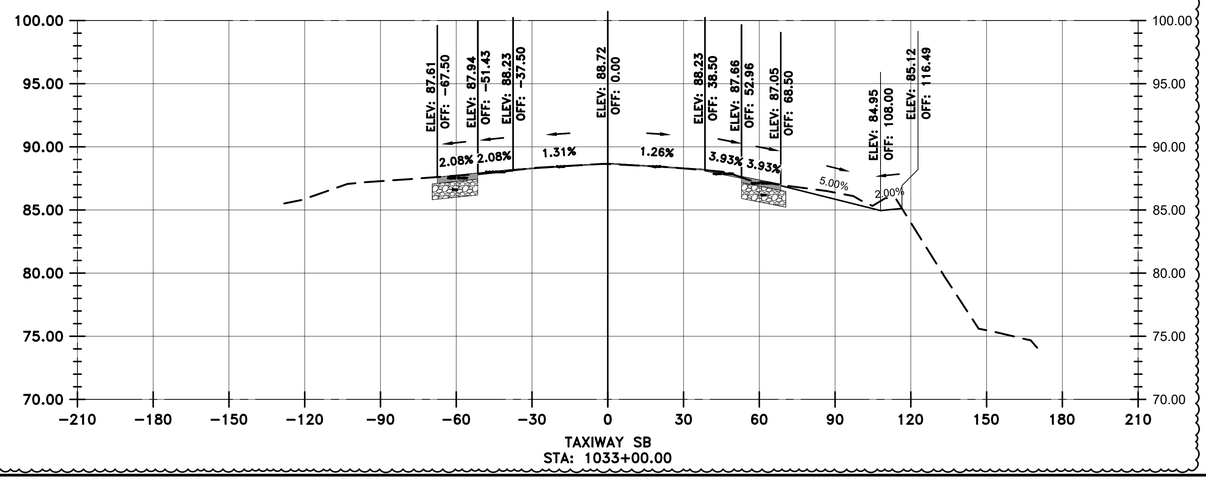

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 15

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER
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APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.15

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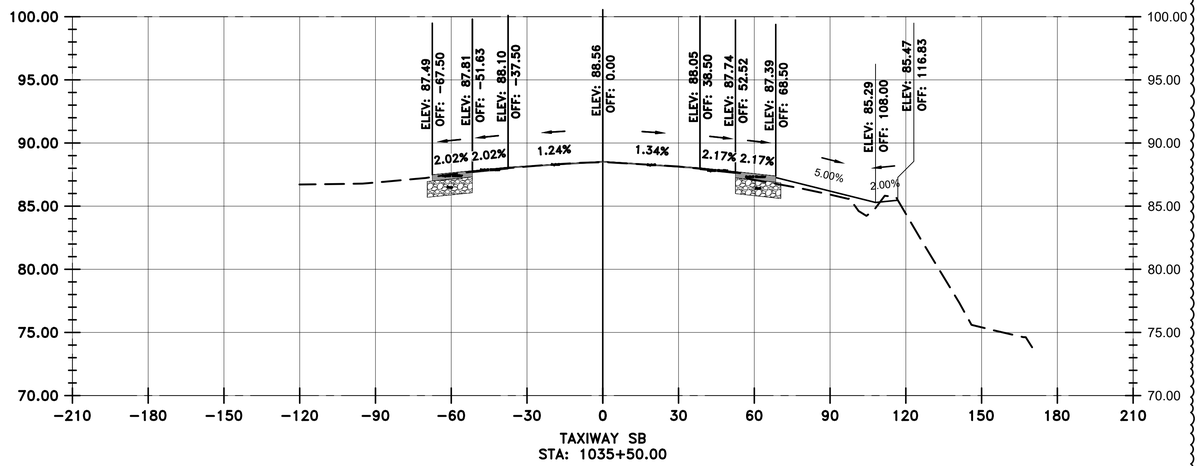

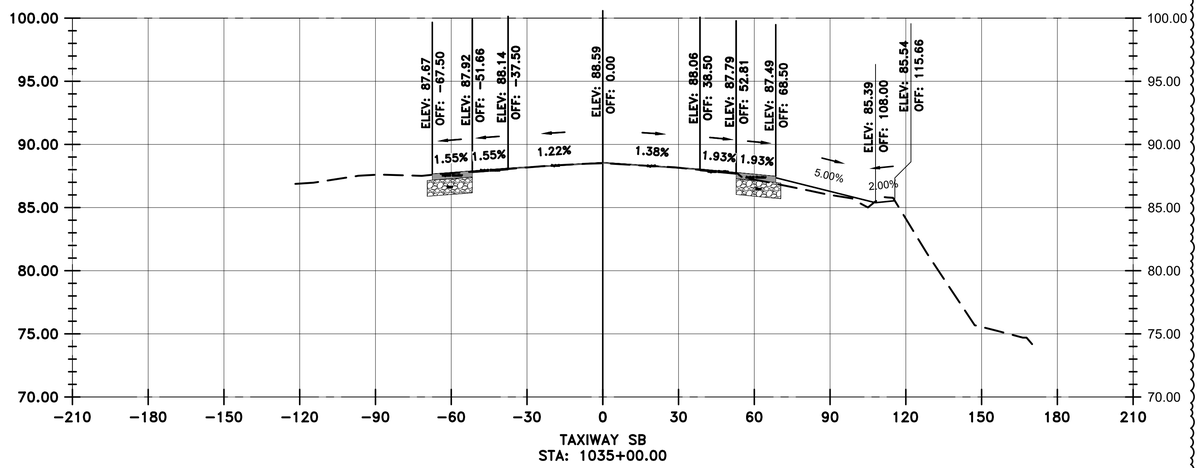

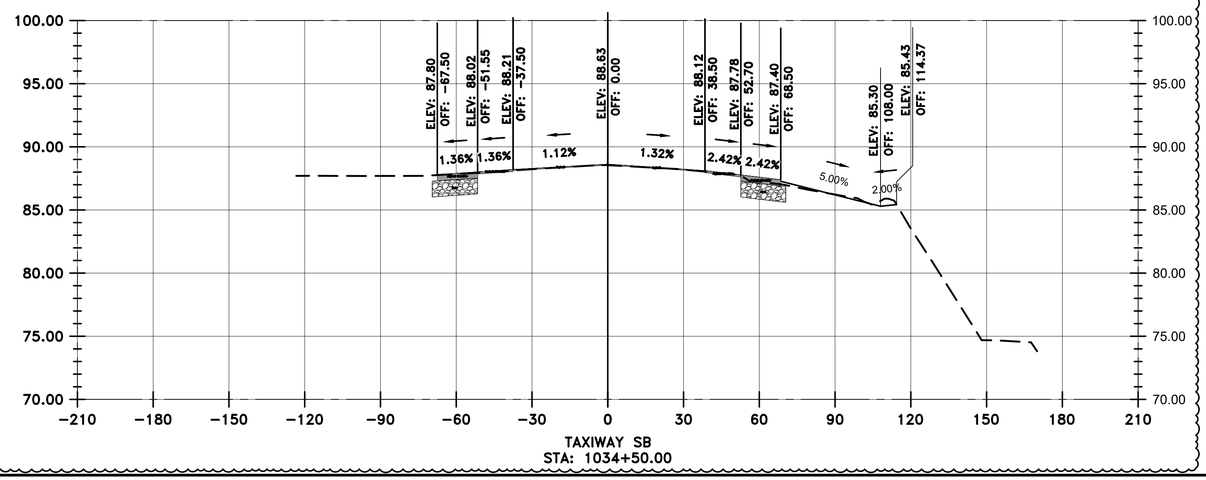

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 16

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.16

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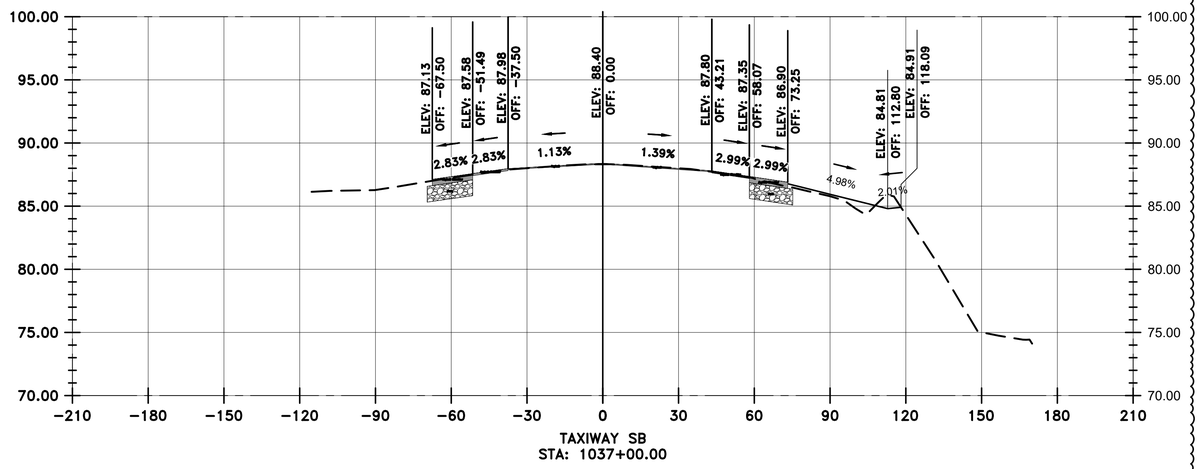

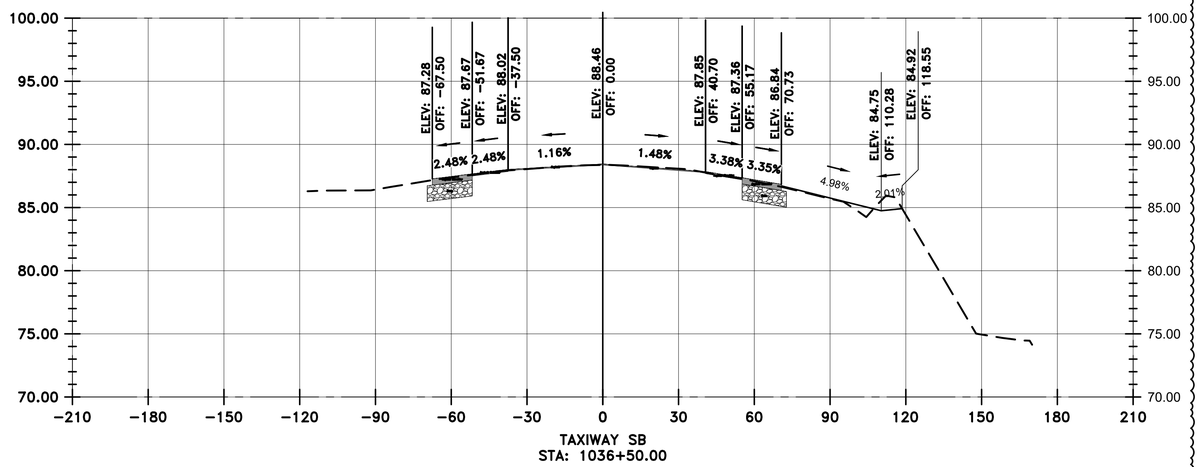

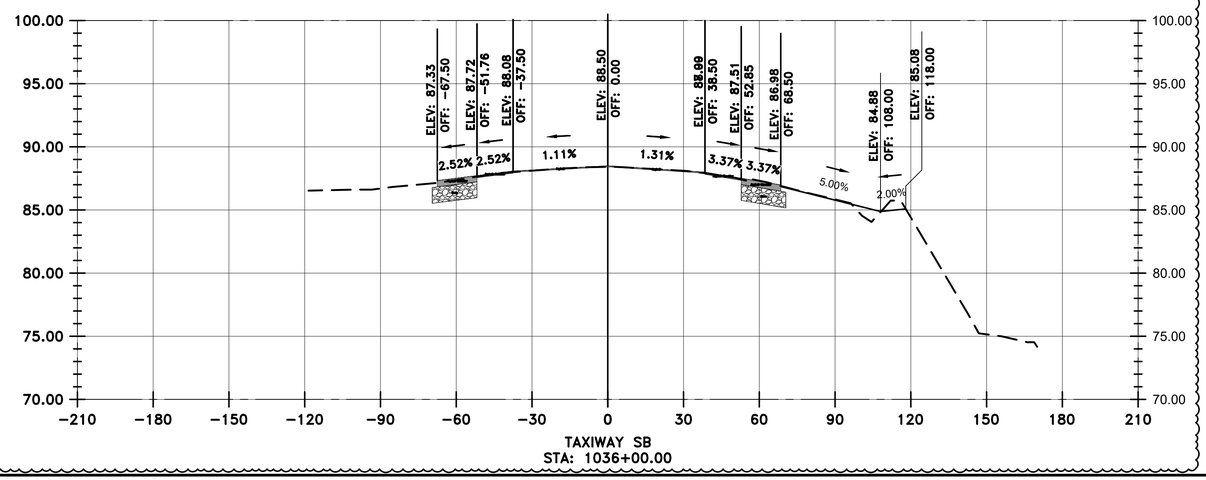

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 17

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.17

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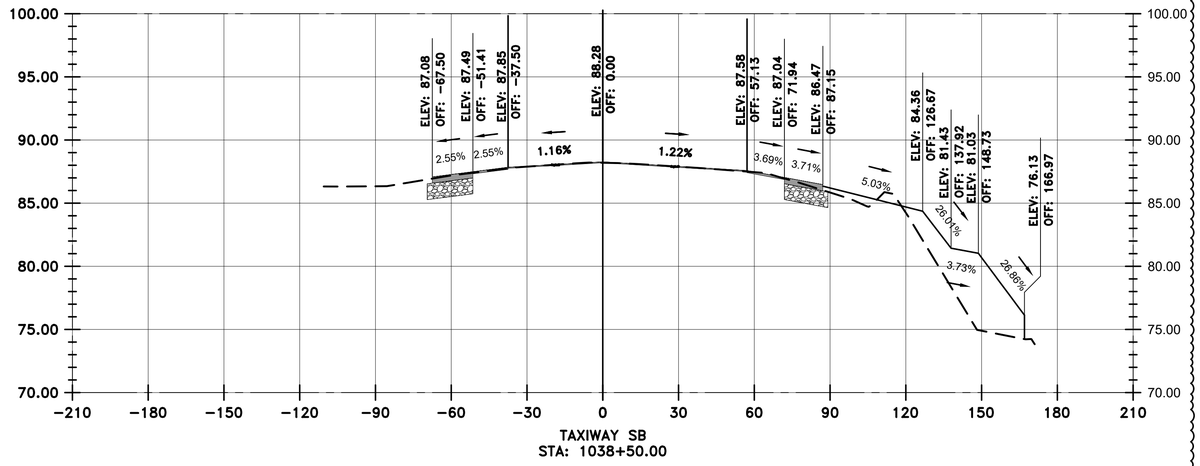

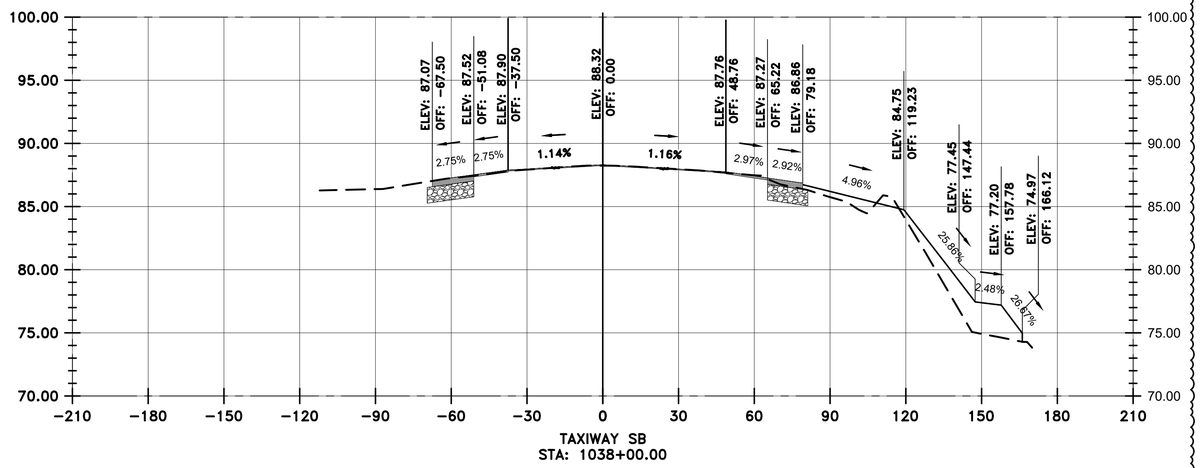

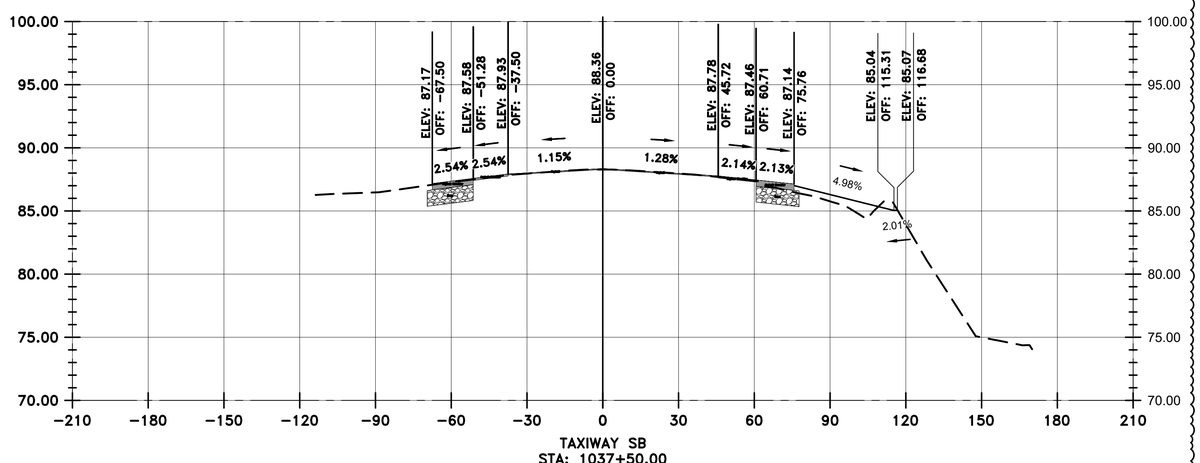

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 18

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.18

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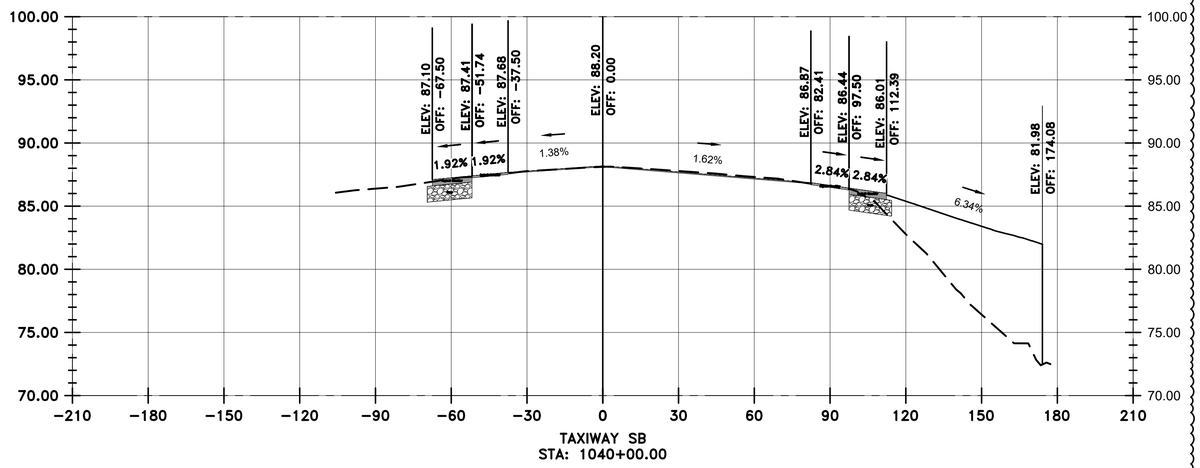

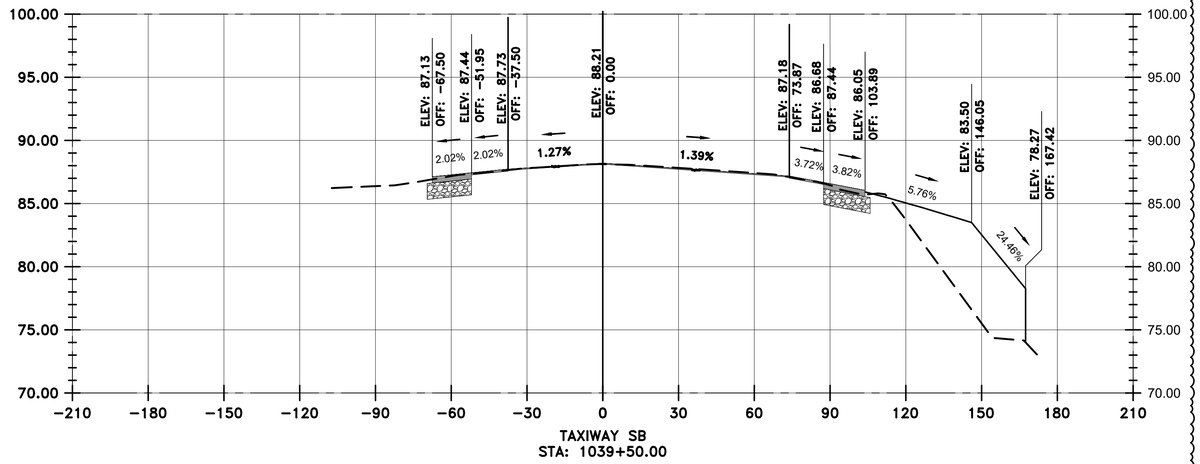

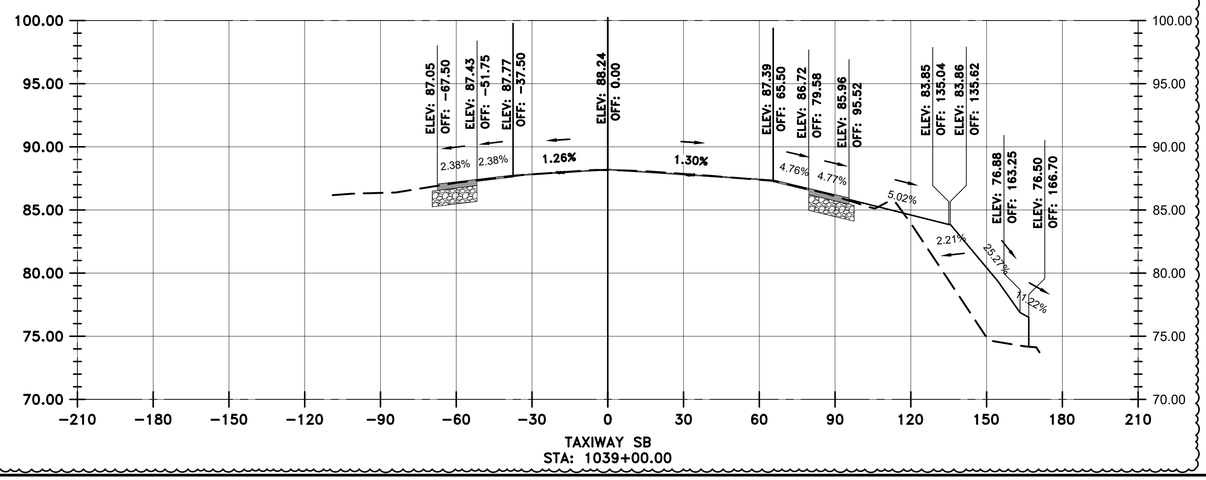

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
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REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 19

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

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JASON E. FRANK
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PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.19

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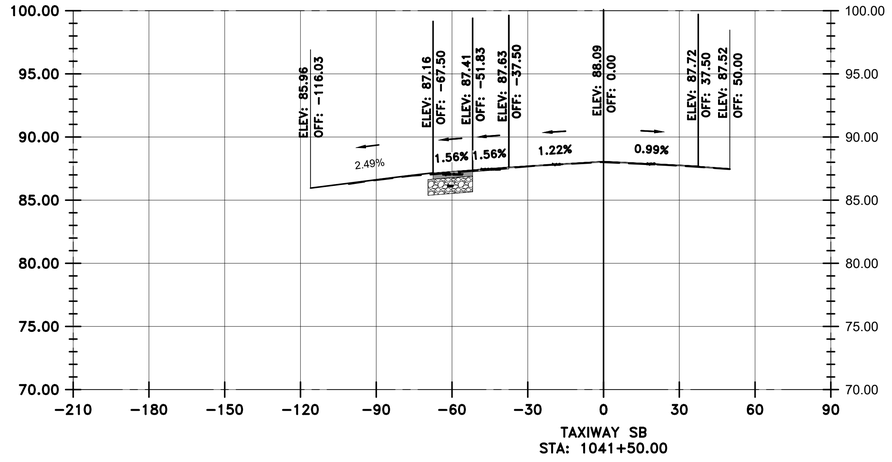
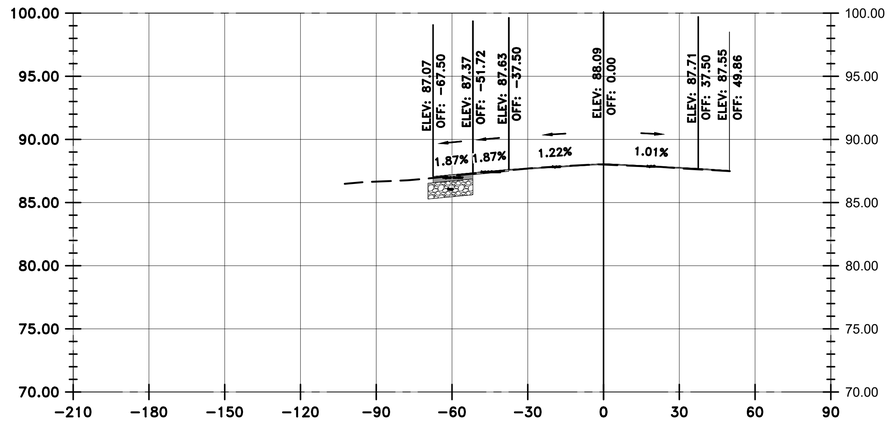
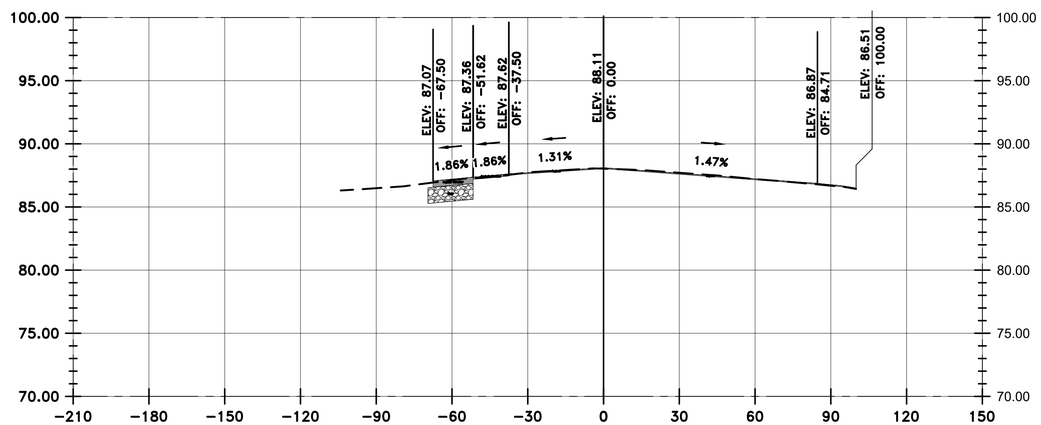


TAXIWAY SB
STA: 1041+50.00



TAXIWAY SB
STA: 1041+00.00



TAXIWAY SB
STA: 1040+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

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GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 20

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
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PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.20

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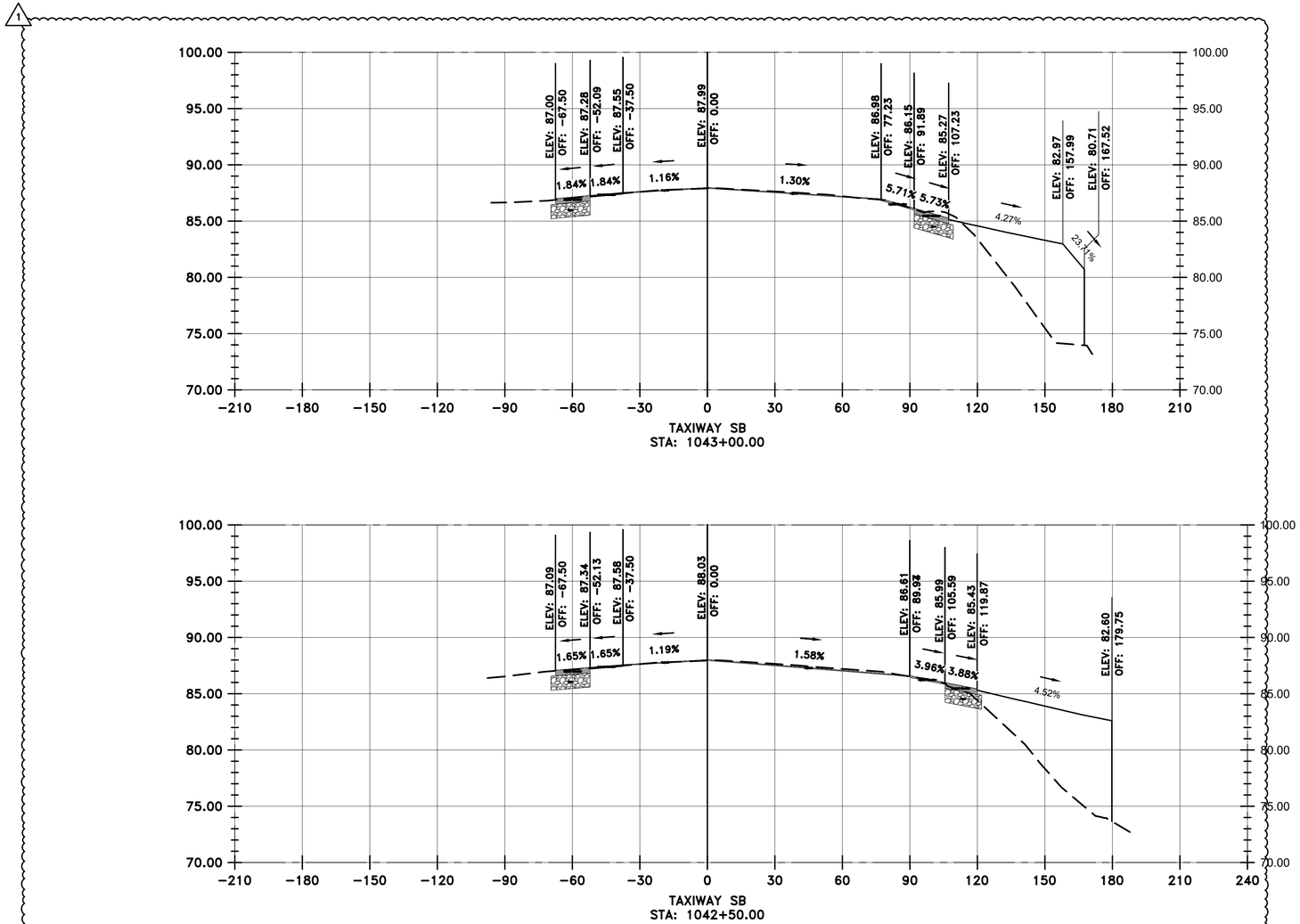

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
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REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 21

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.21

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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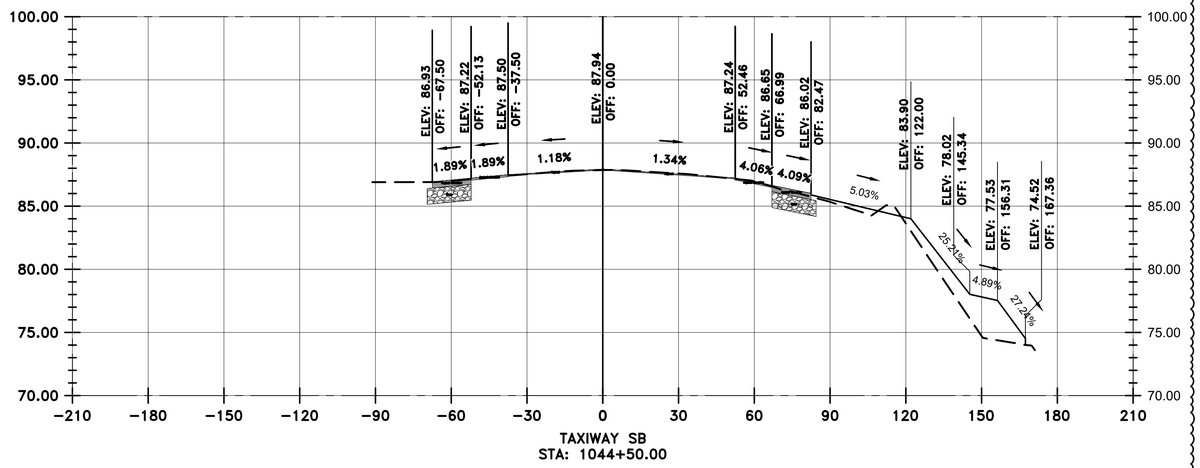

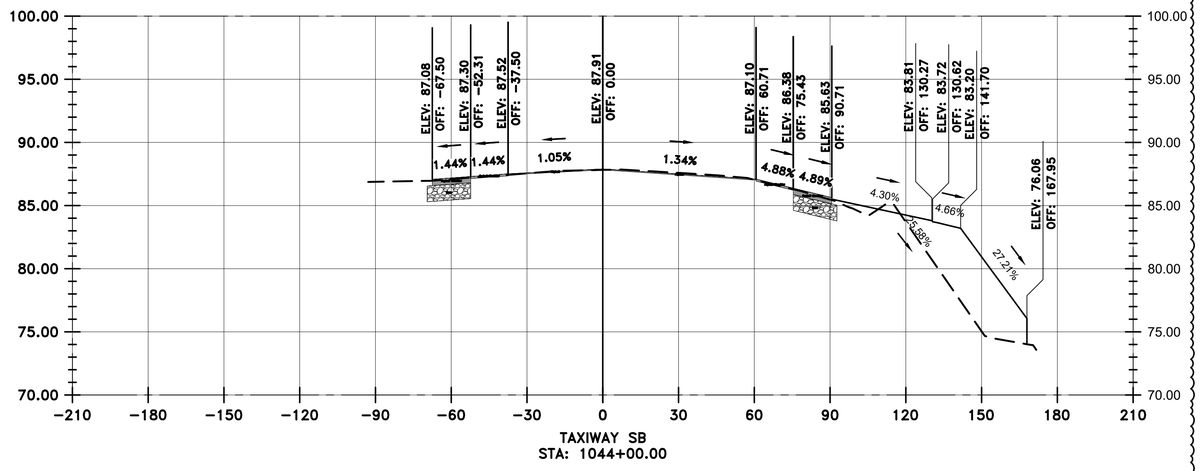

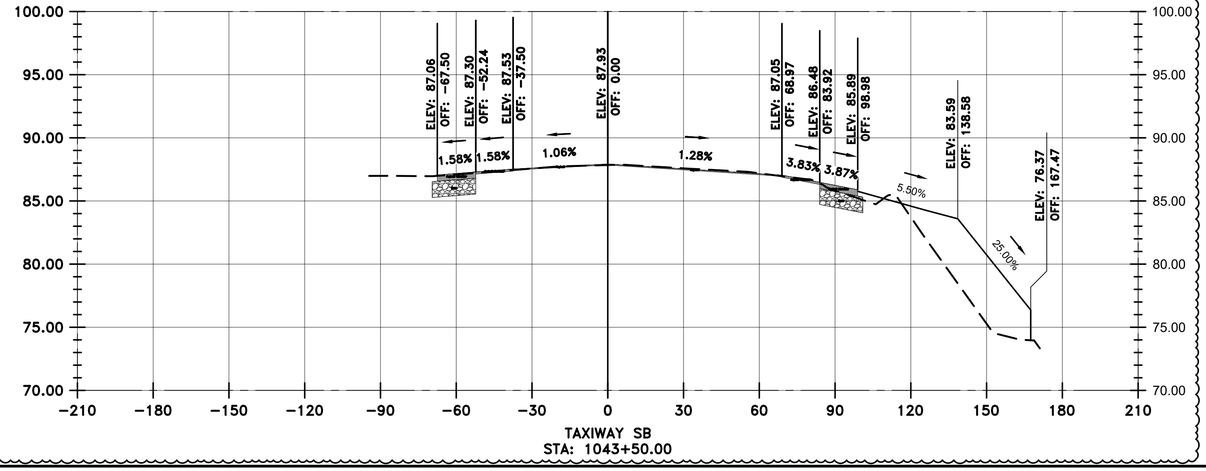

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
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Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 22

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.22

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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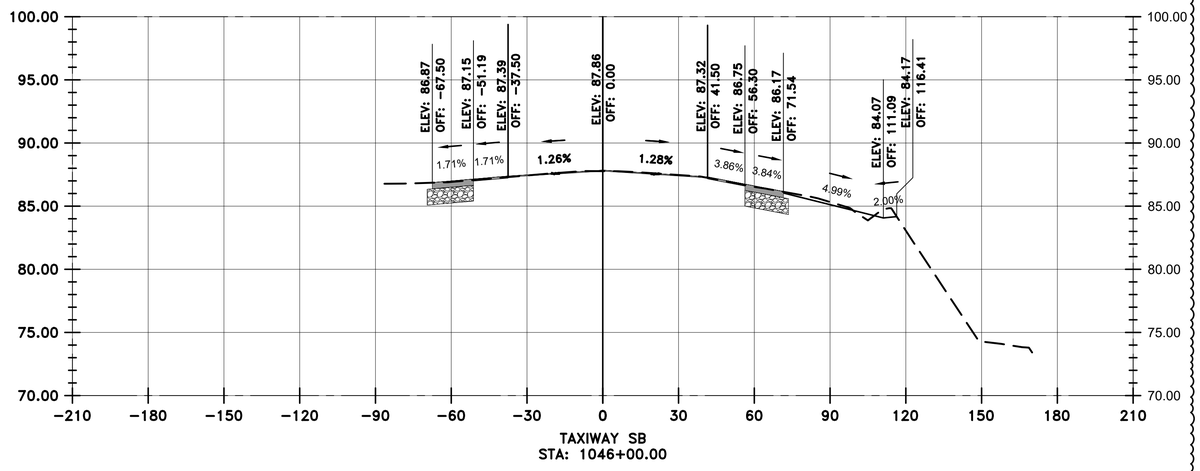

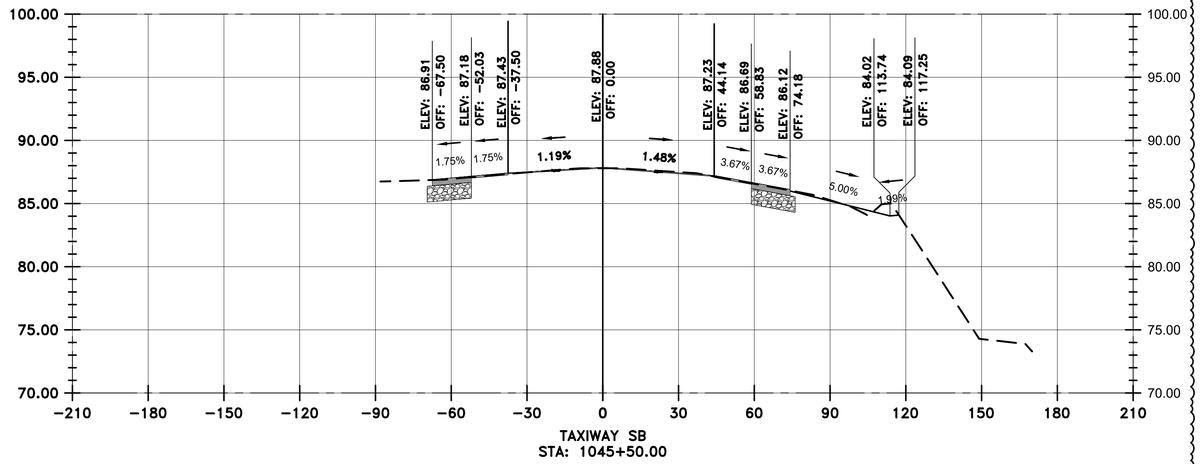

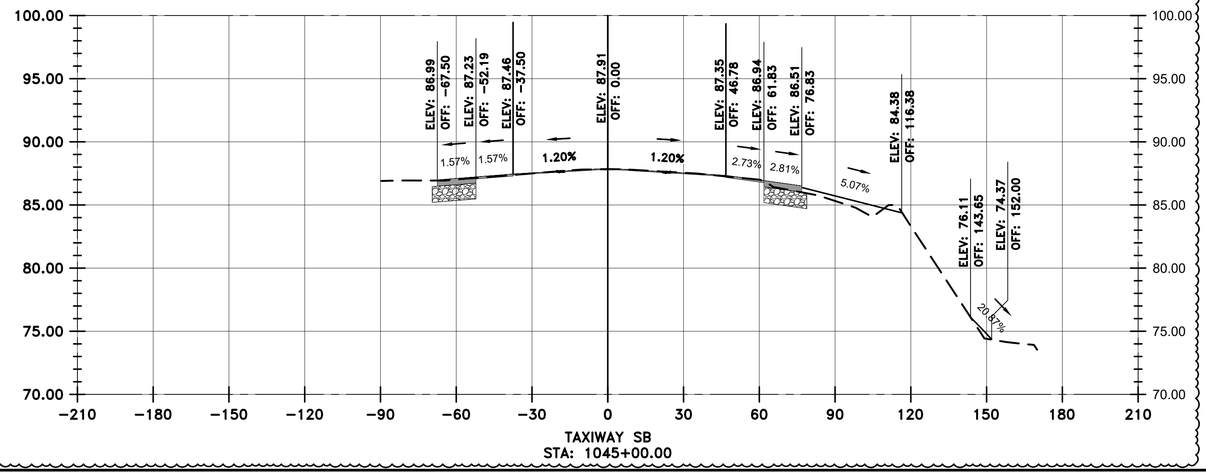

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
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REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 23

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.23

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
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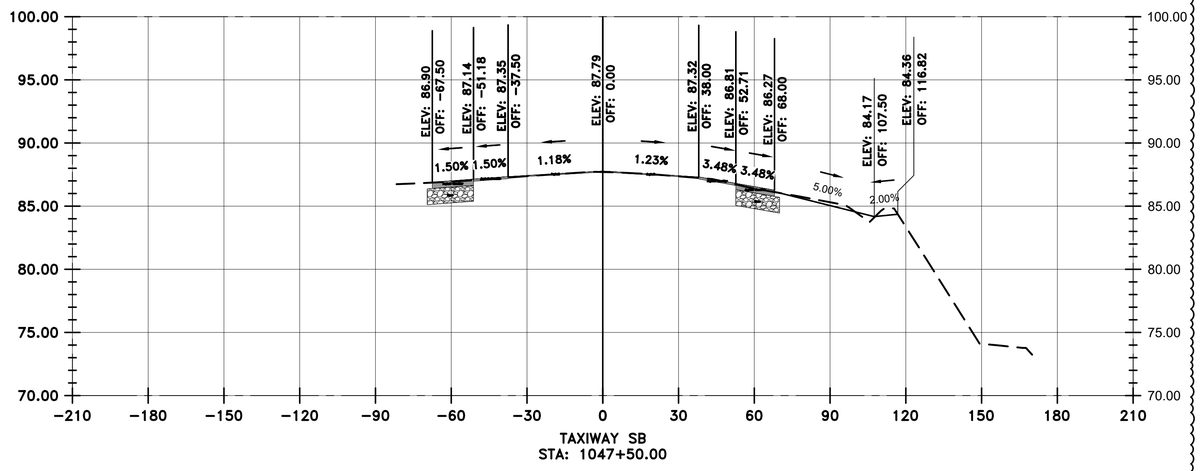

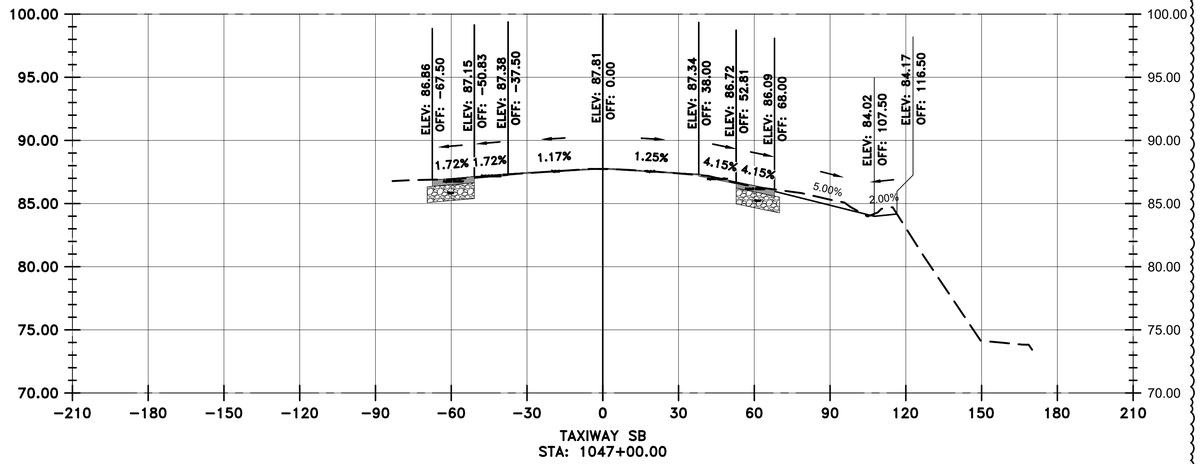

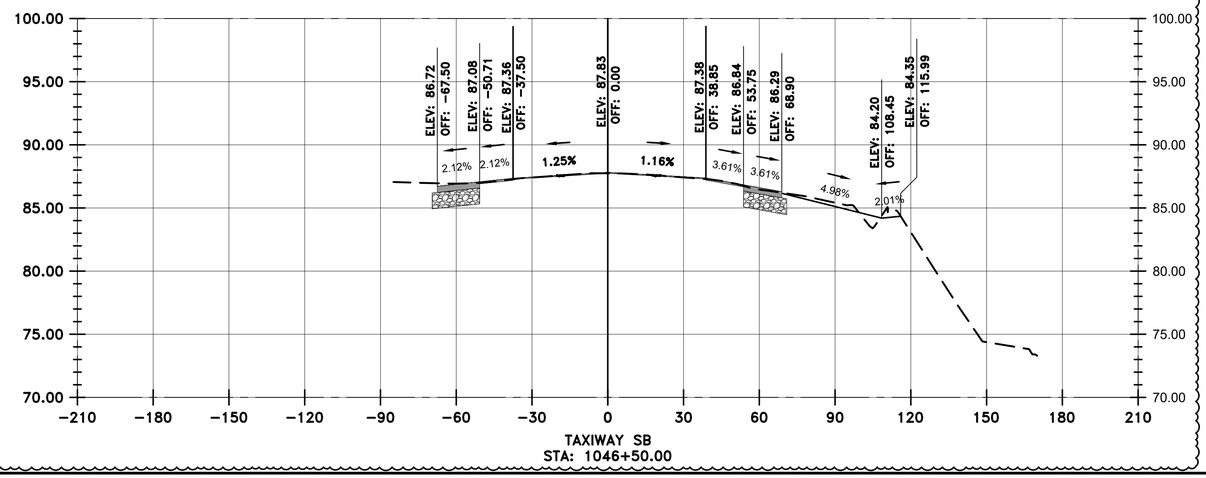

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

VERTICAL EXAGGERATION = 5

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
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TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 24

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.24

HAS FILE: c:\Users\dagonato\onedrive - garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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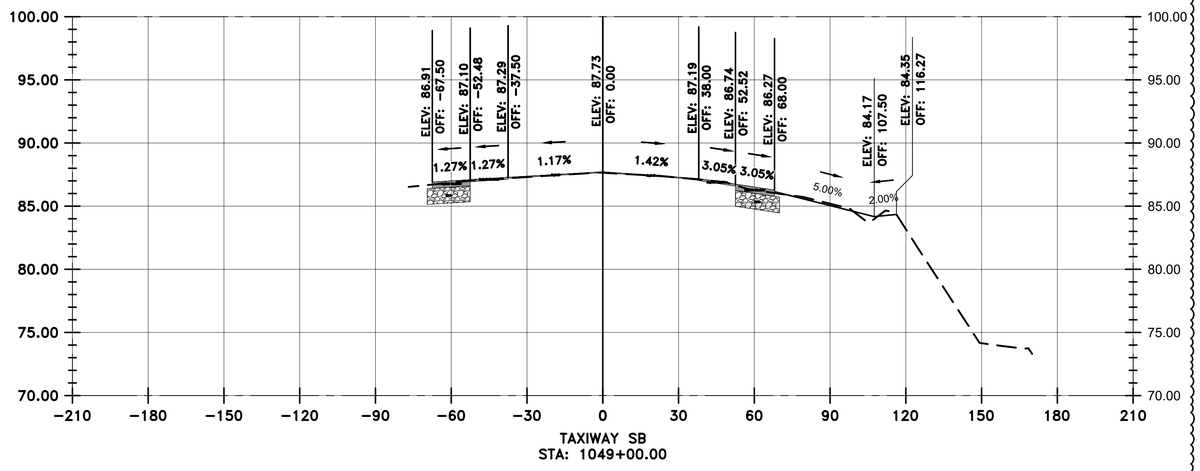

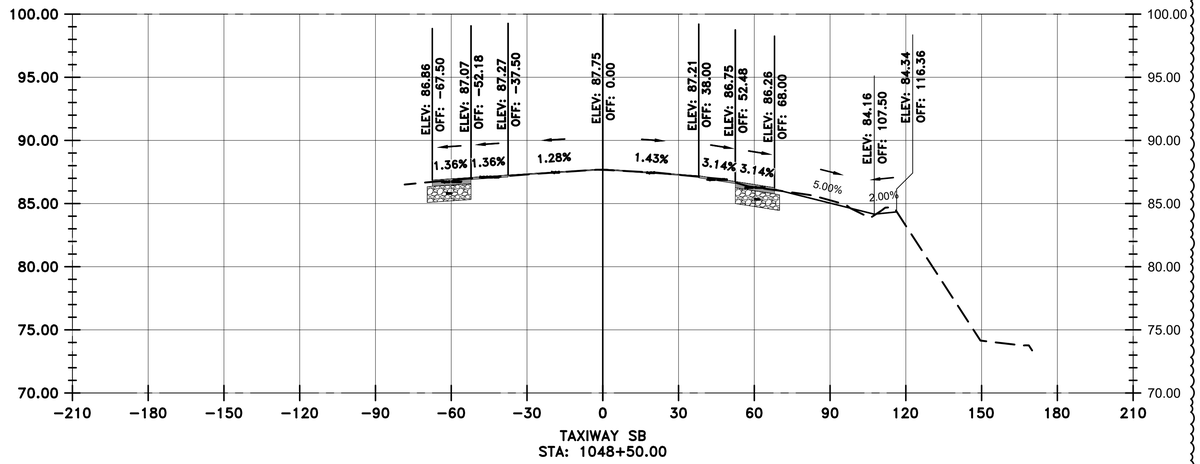

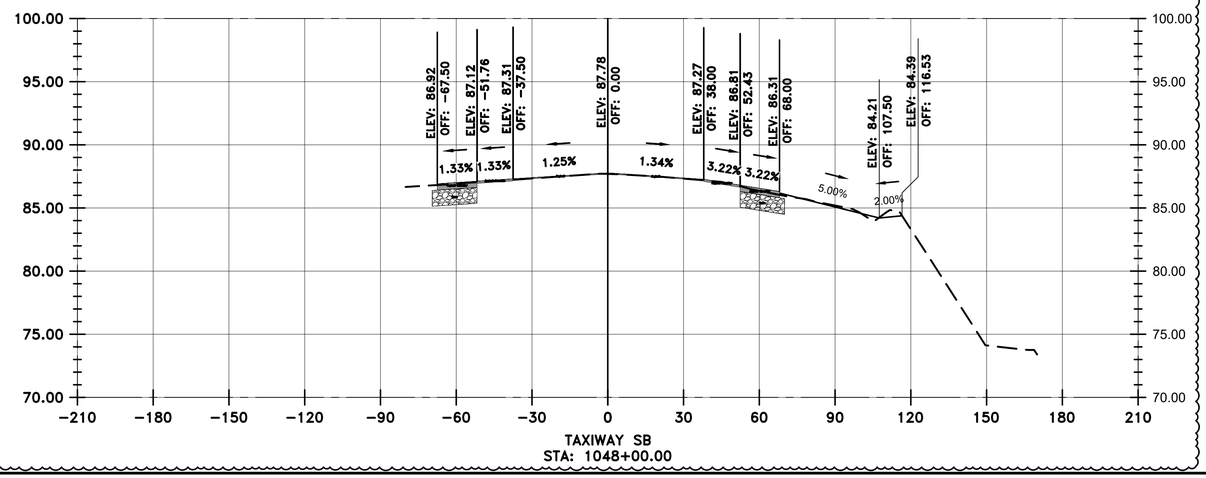

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
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REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 25

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
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Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.25

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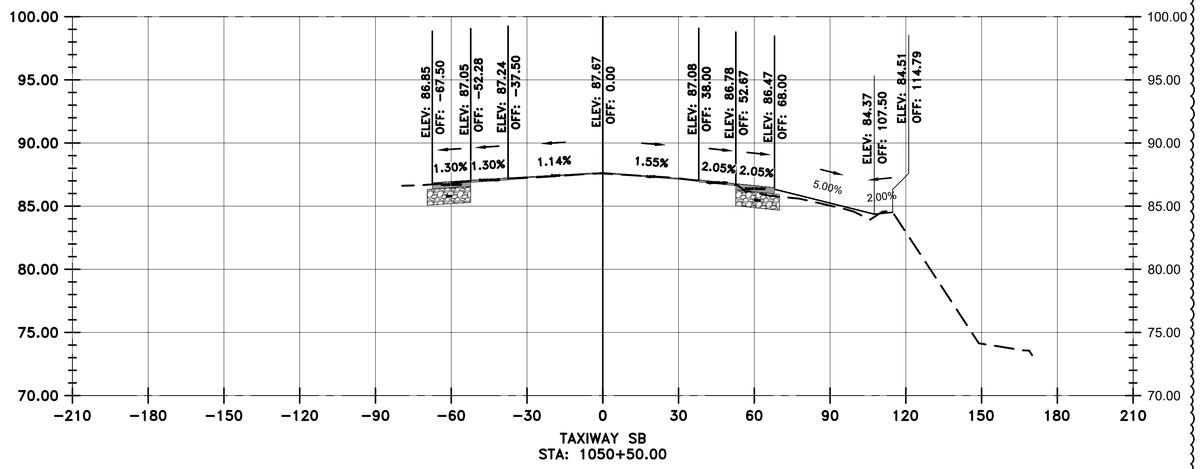

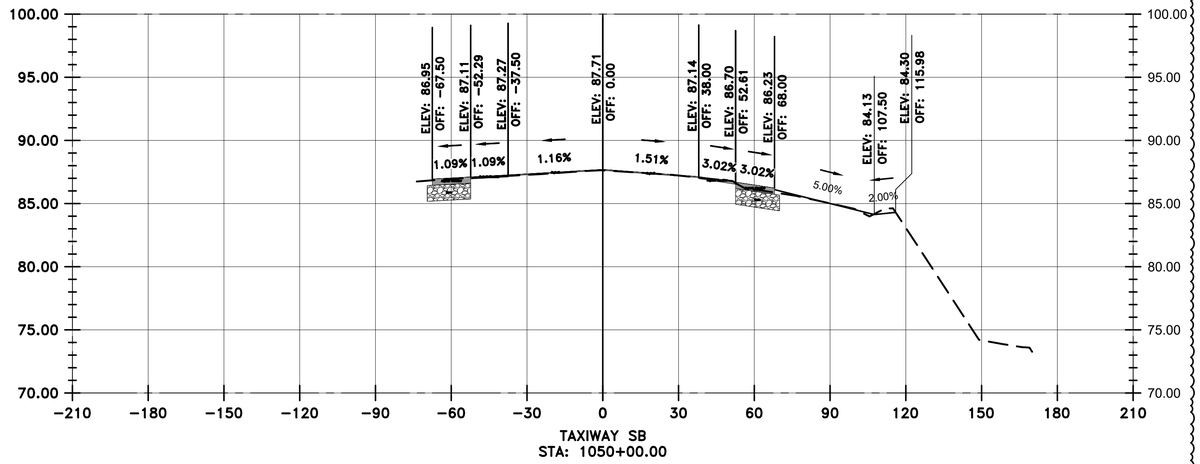

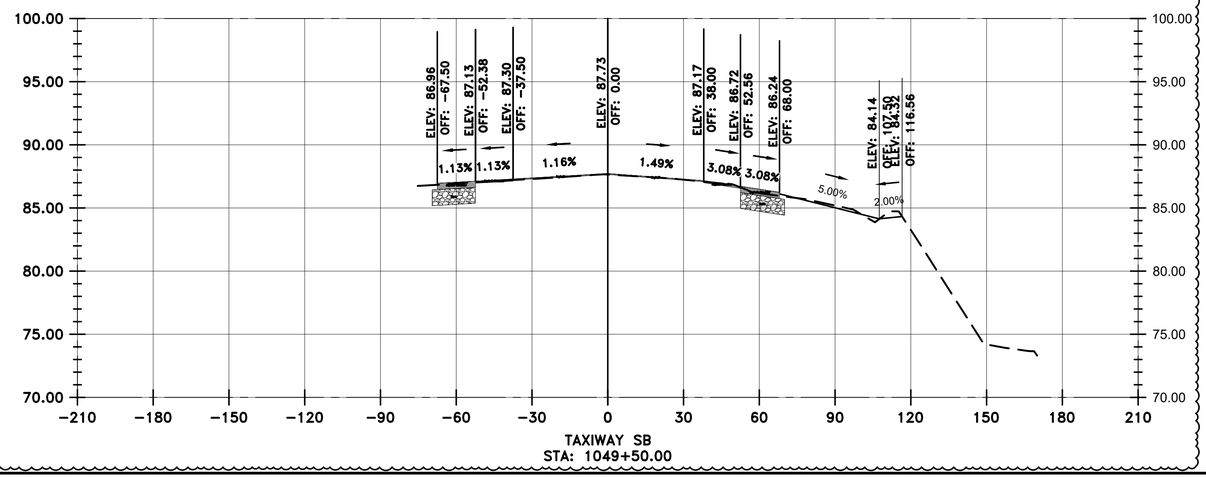

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 26

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.26

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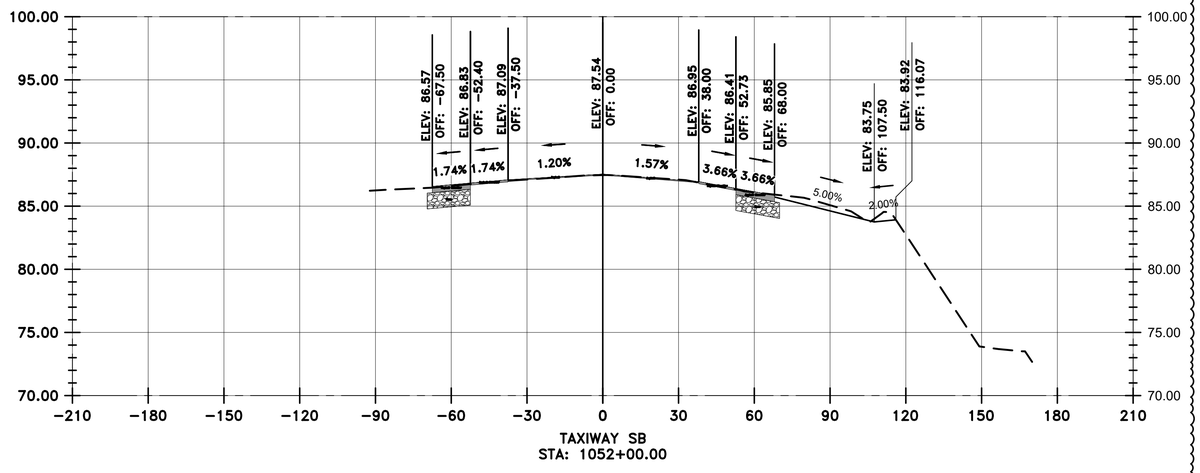

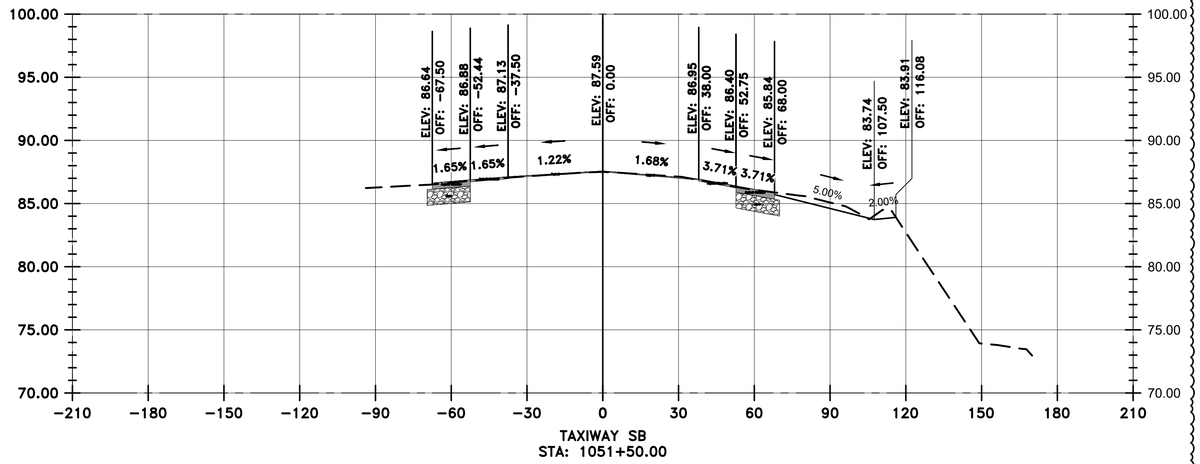

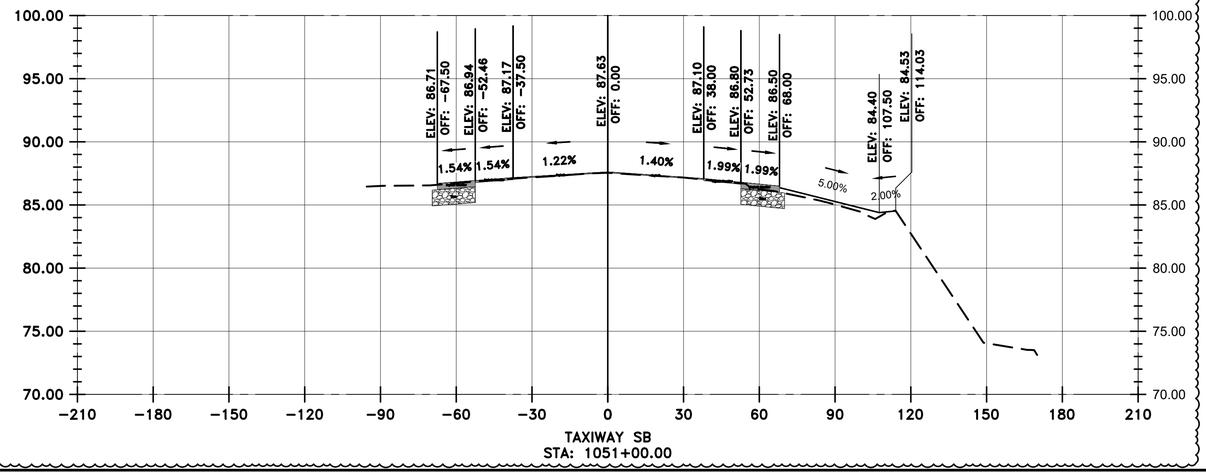

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
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TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 27

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

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87979
LICENSED PROFESSIONAL ENGINEER
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PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.27

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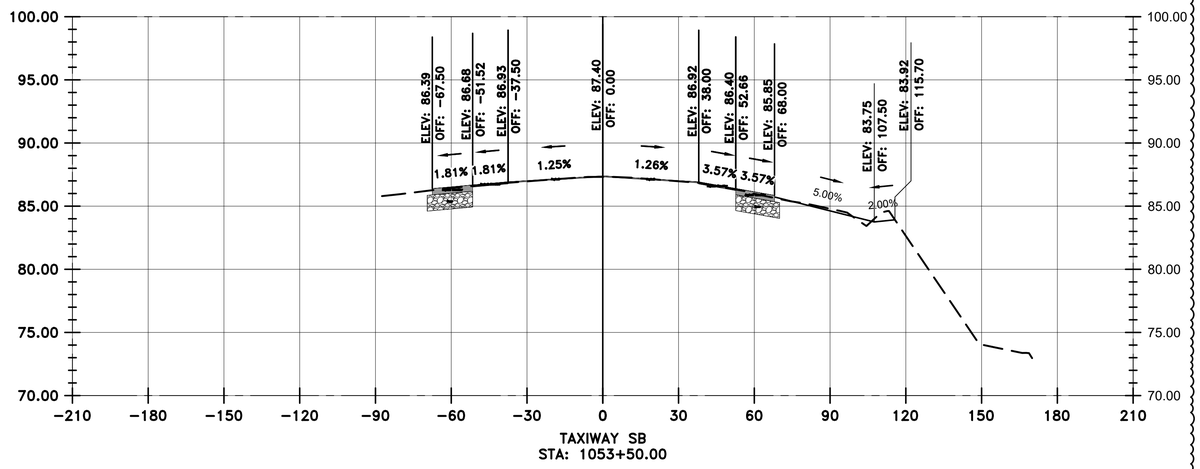

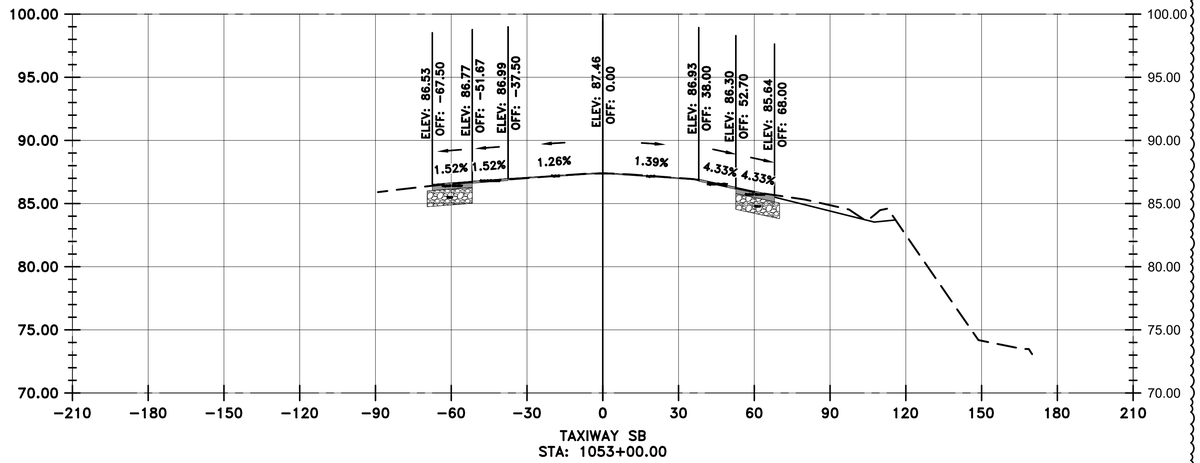

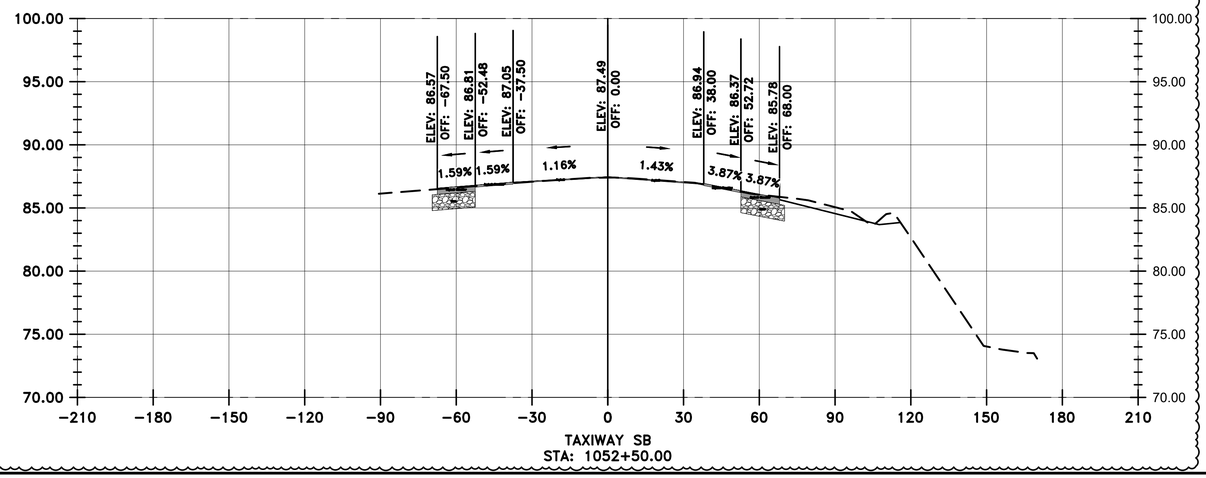

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
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REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 28

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

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PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.28

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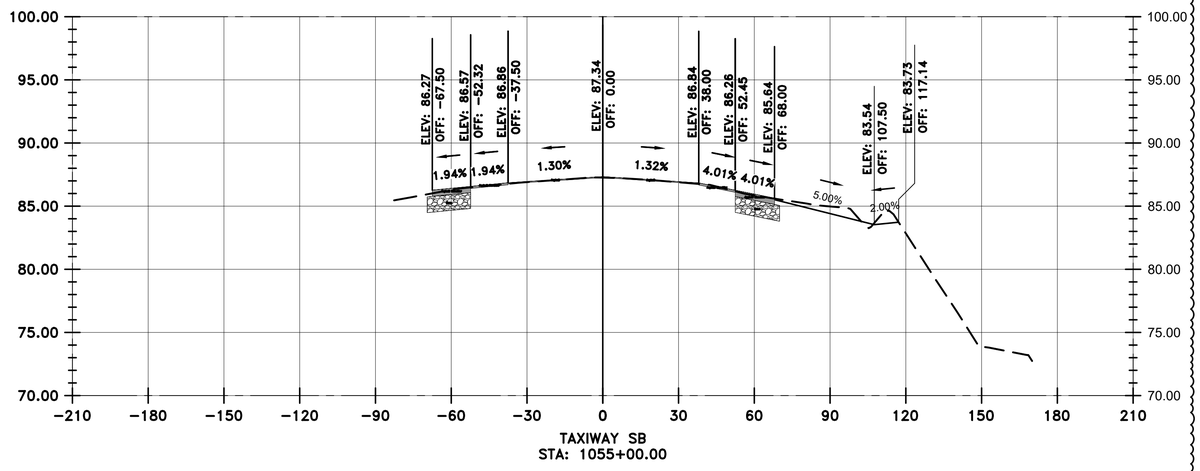

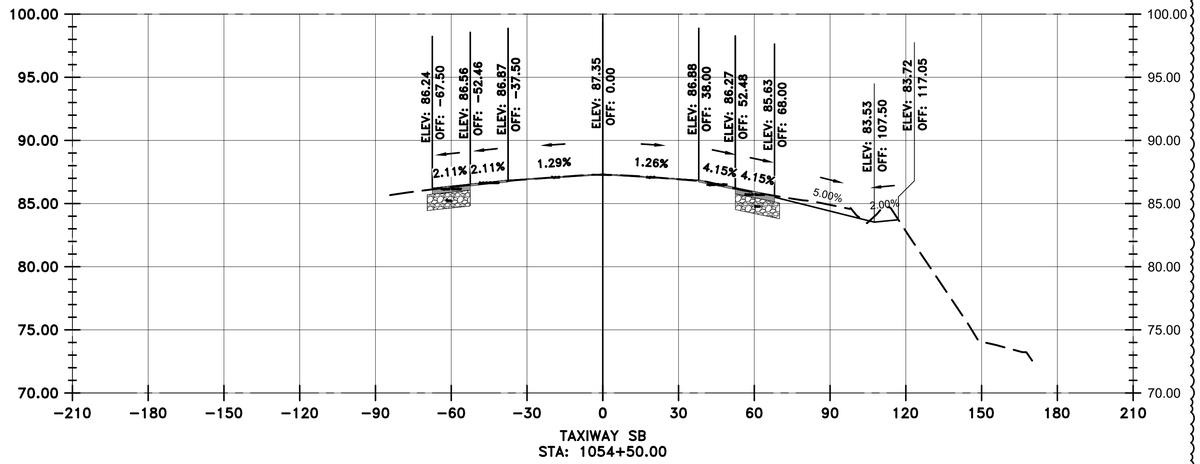

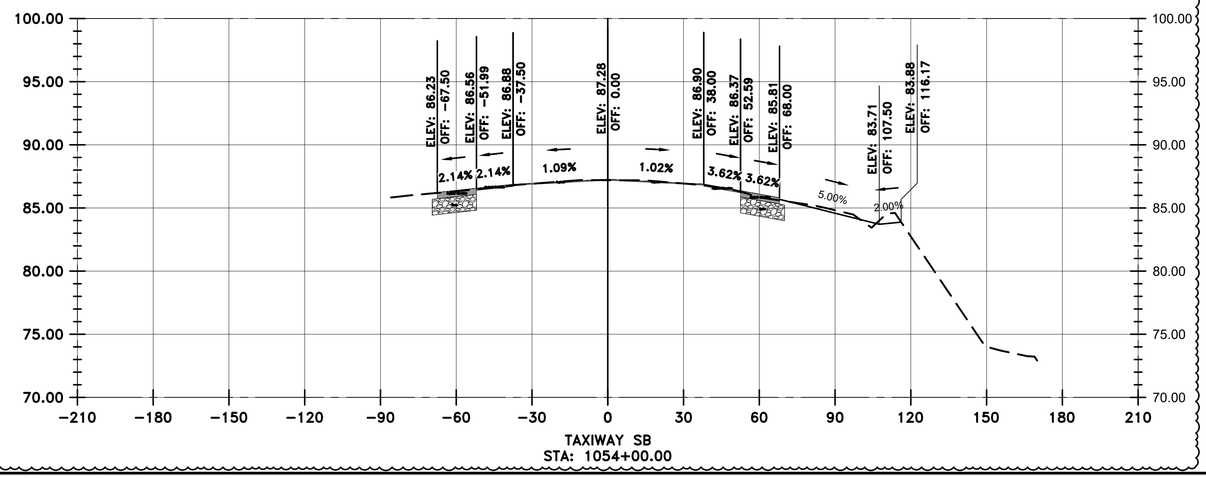

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

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NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 29

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

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PROJECT NO.
0646A

A.I.P. NO.
XXXX

C.I.P. NO.
A-0515

H.A.S. NO.
20C0646A

SHEET NO.
X02.29

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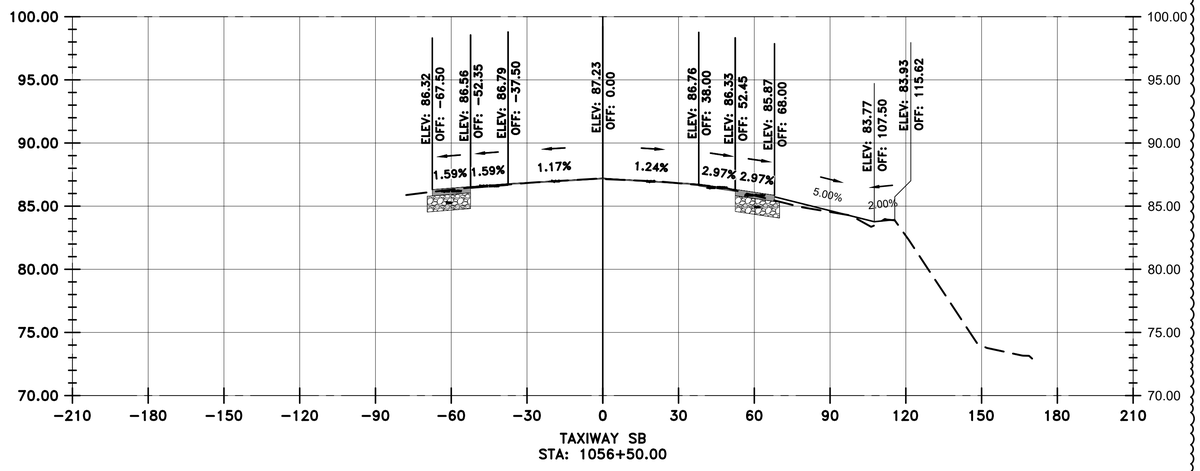

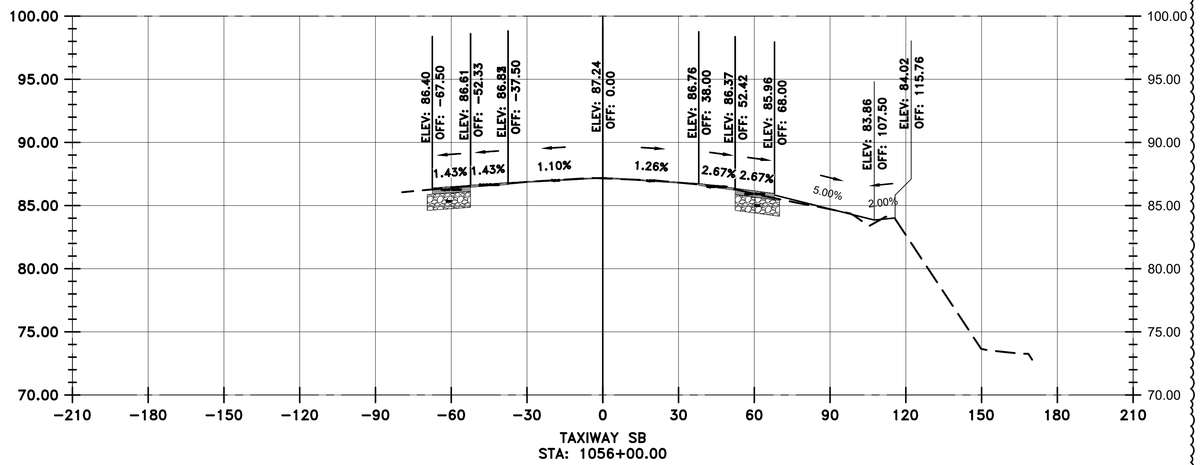

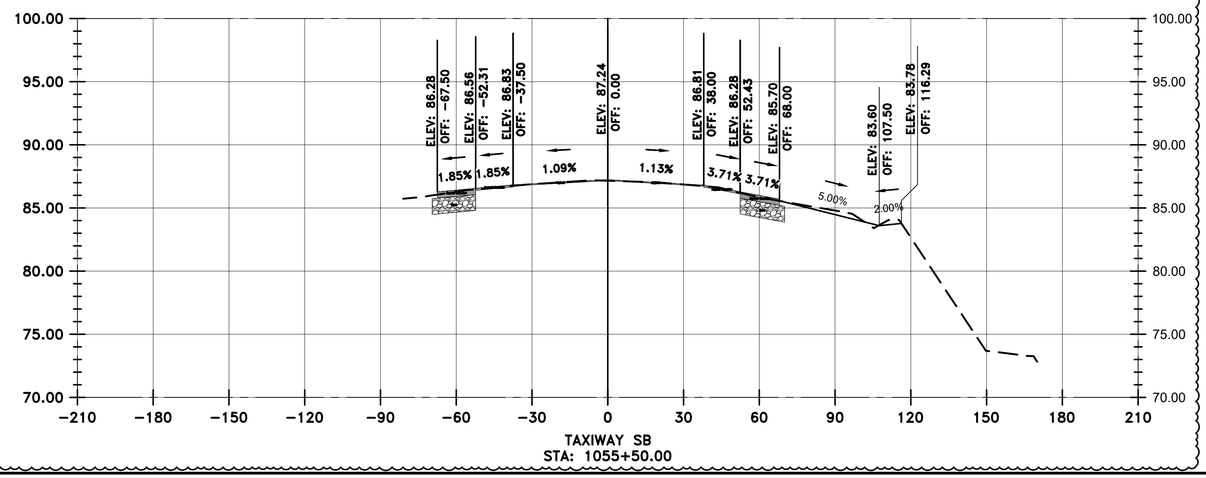

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
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- PROPOSED AGGREGATE BASE

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TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 30

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
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PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.30

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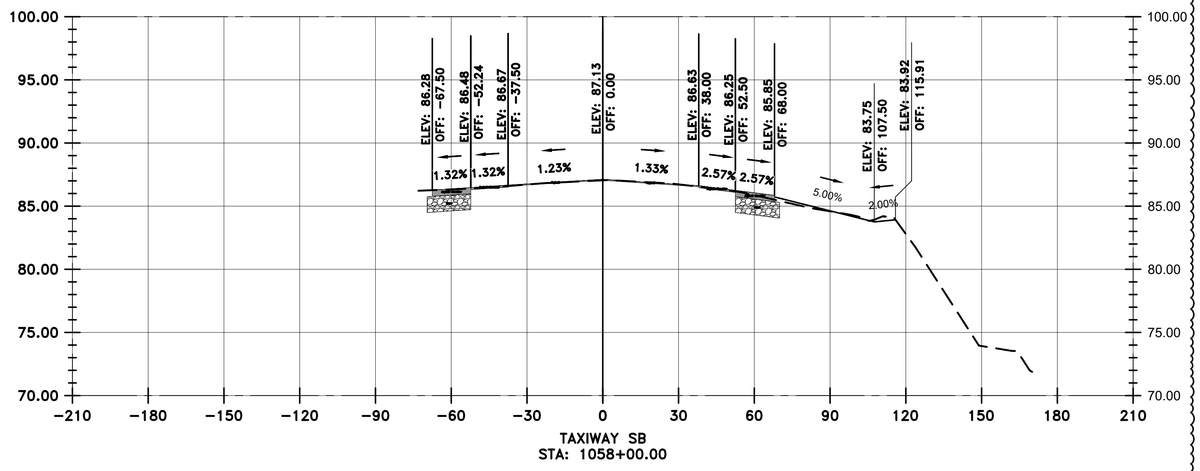

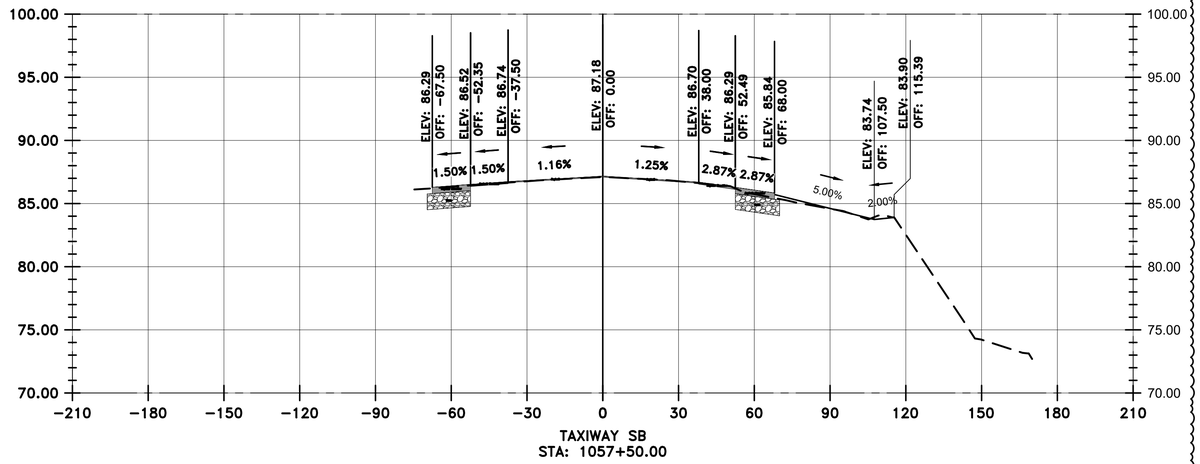

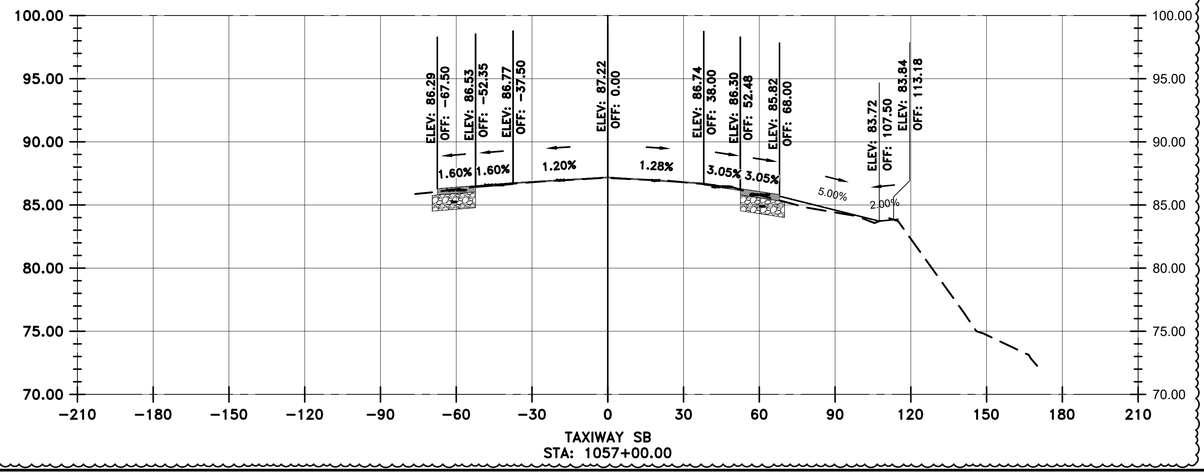

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
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TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 31

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.31

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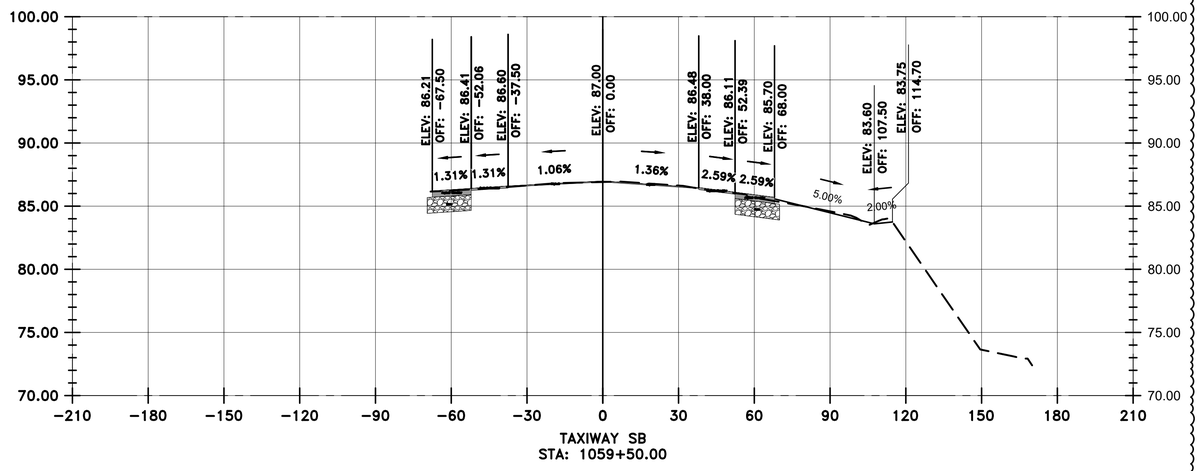

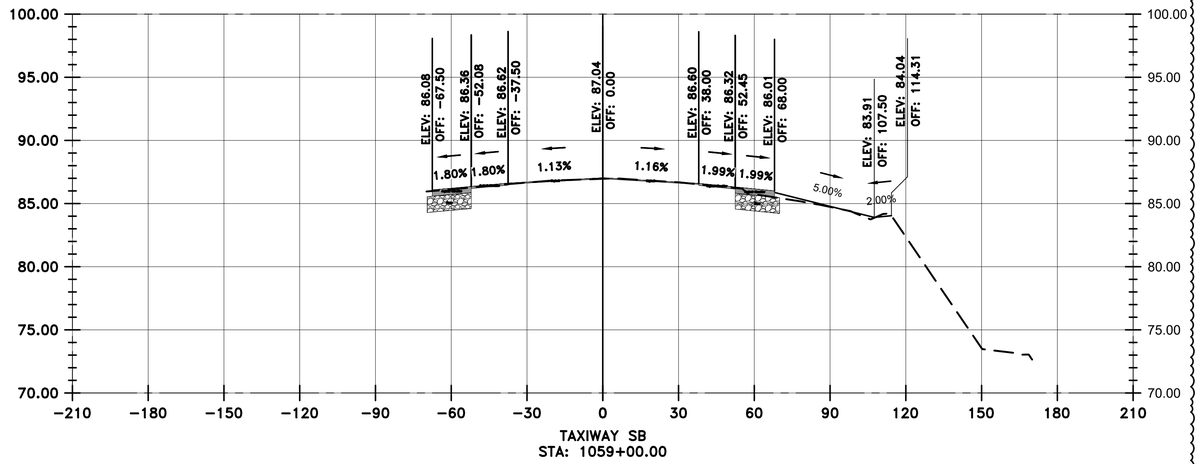

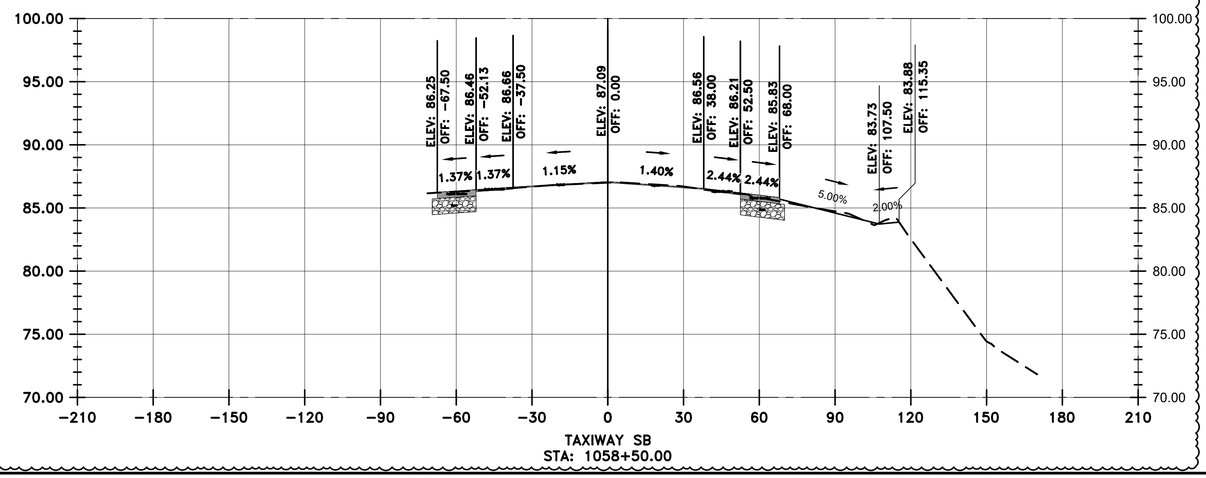

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
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Suite 640
Houston, TX 77079
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TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 32

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
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APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.32

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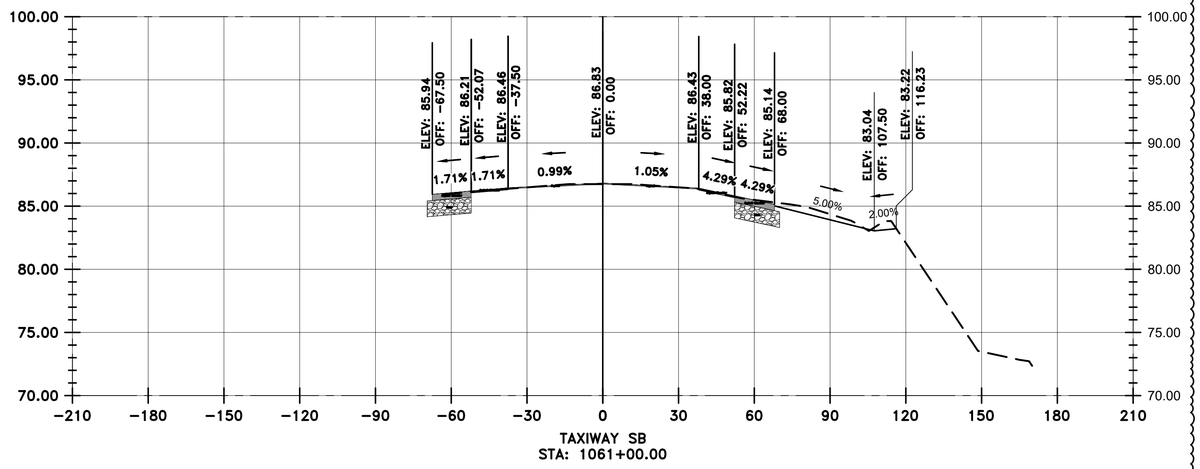

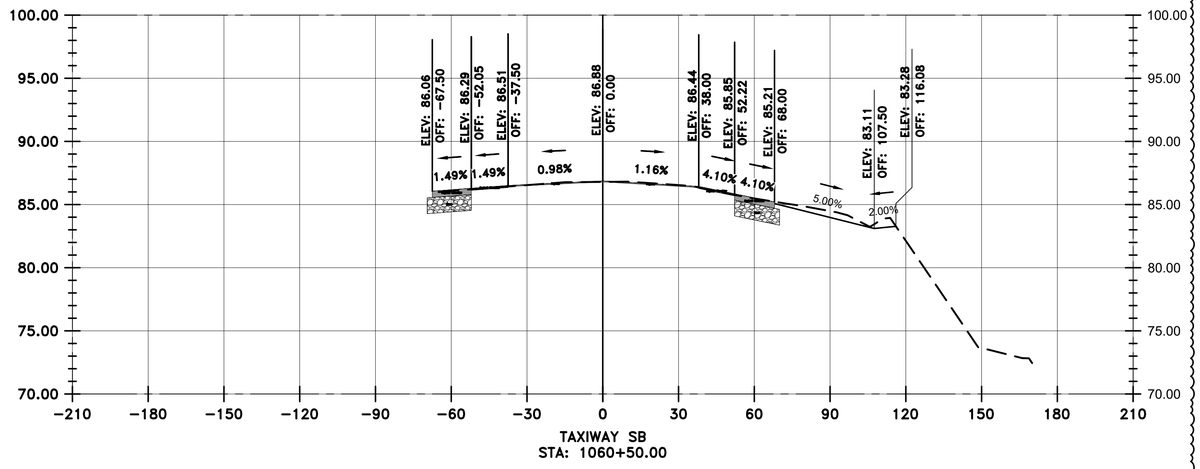

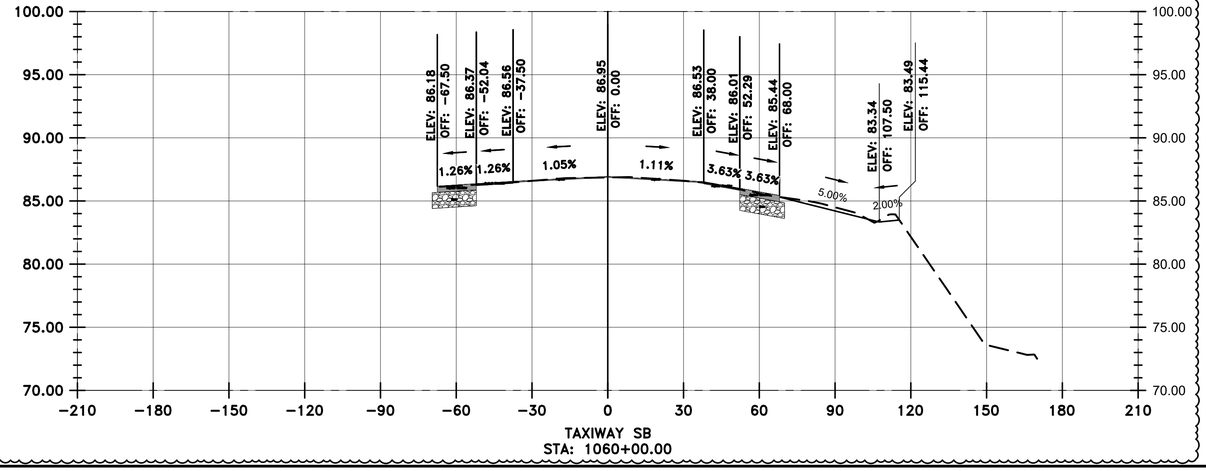

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
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TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 33

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.33

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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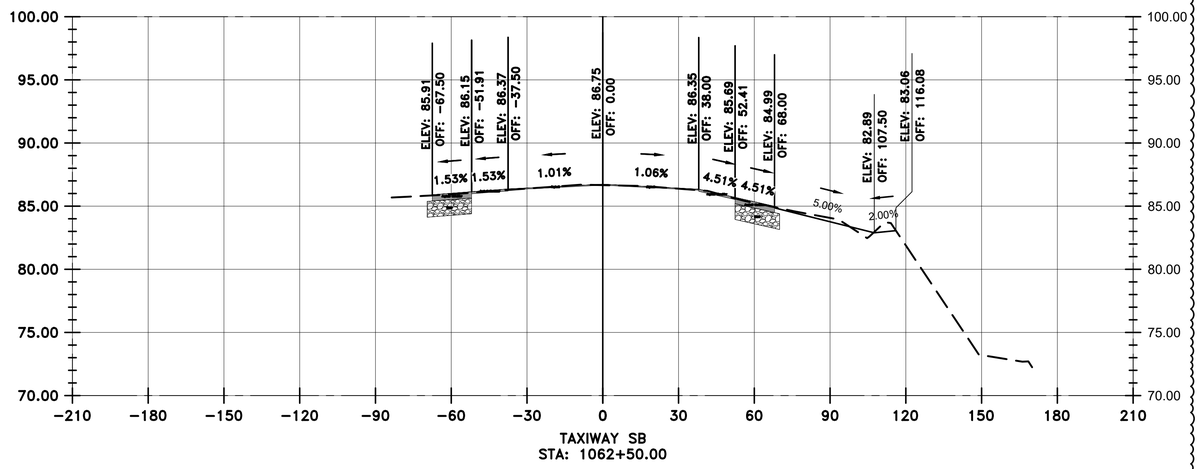

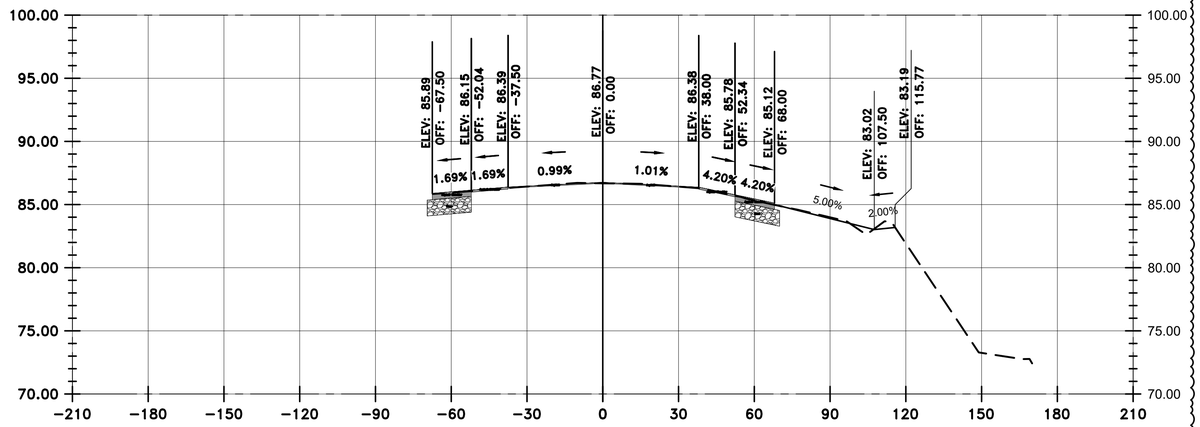

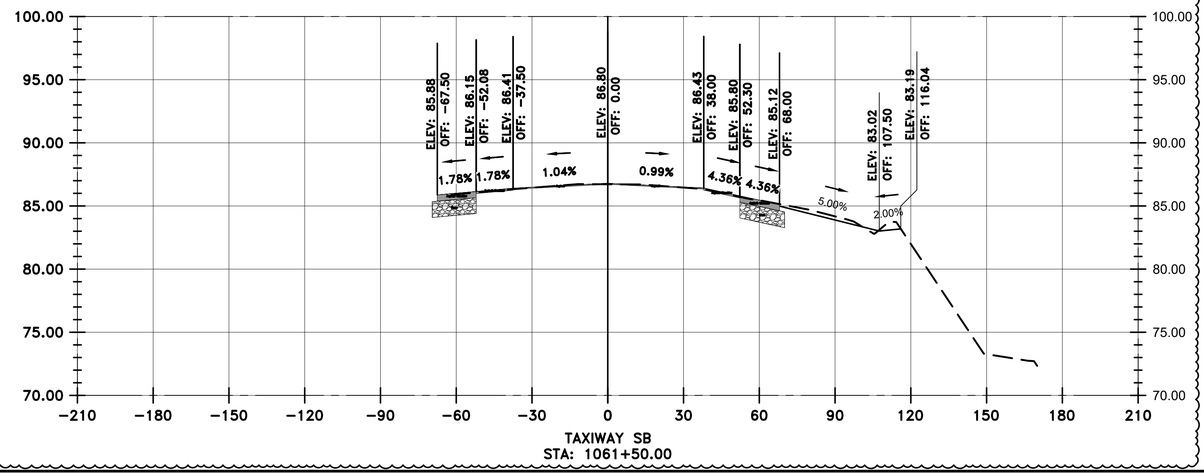

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
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REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 34

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.34

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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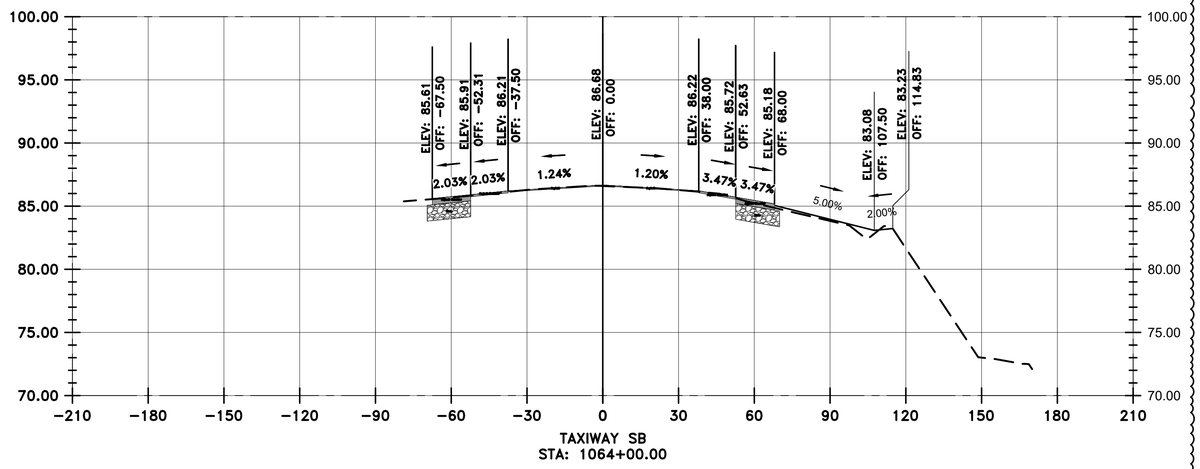

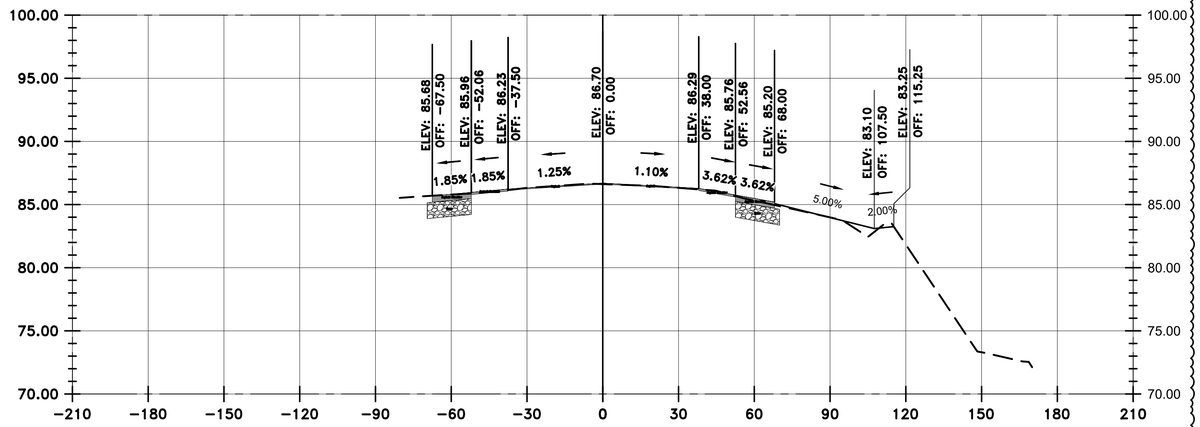

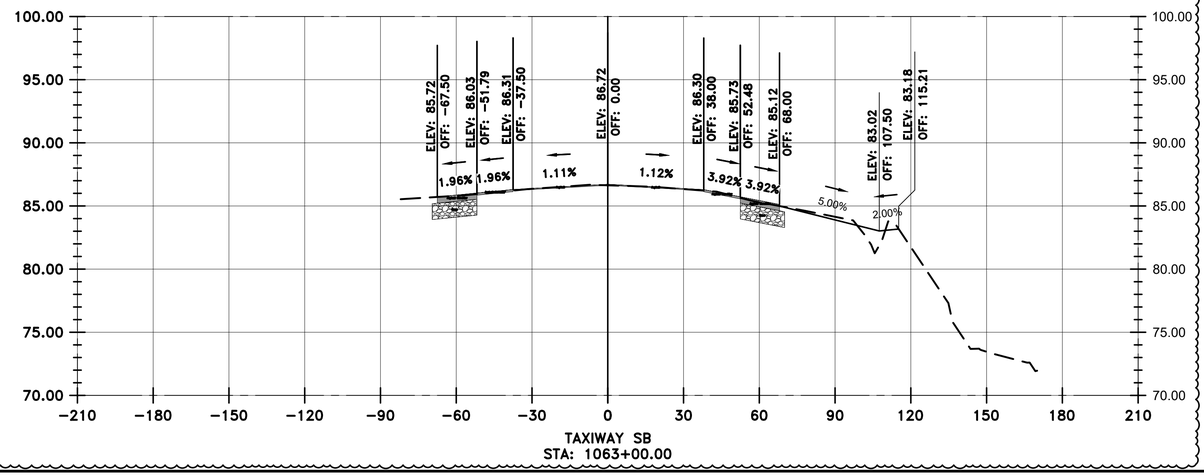

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 35

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY:	JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.35

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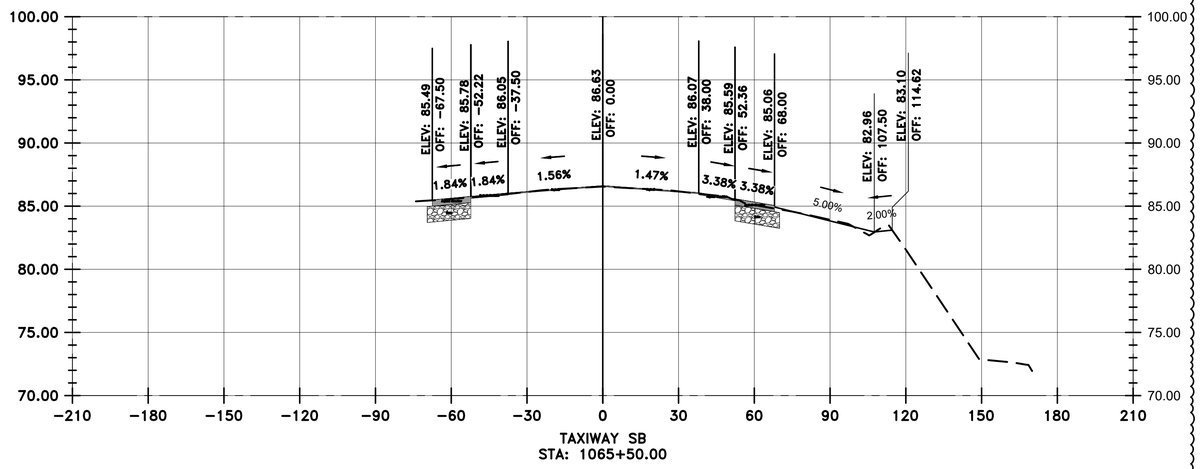

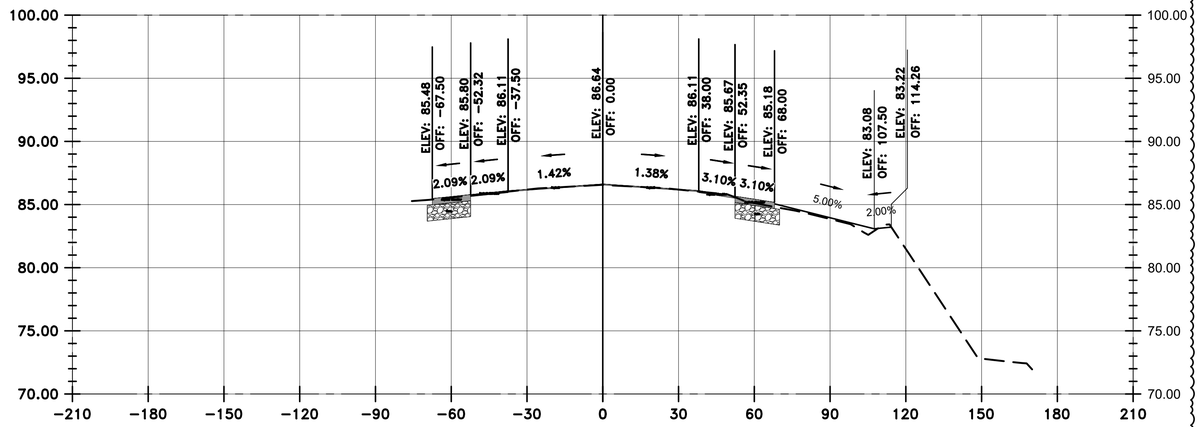

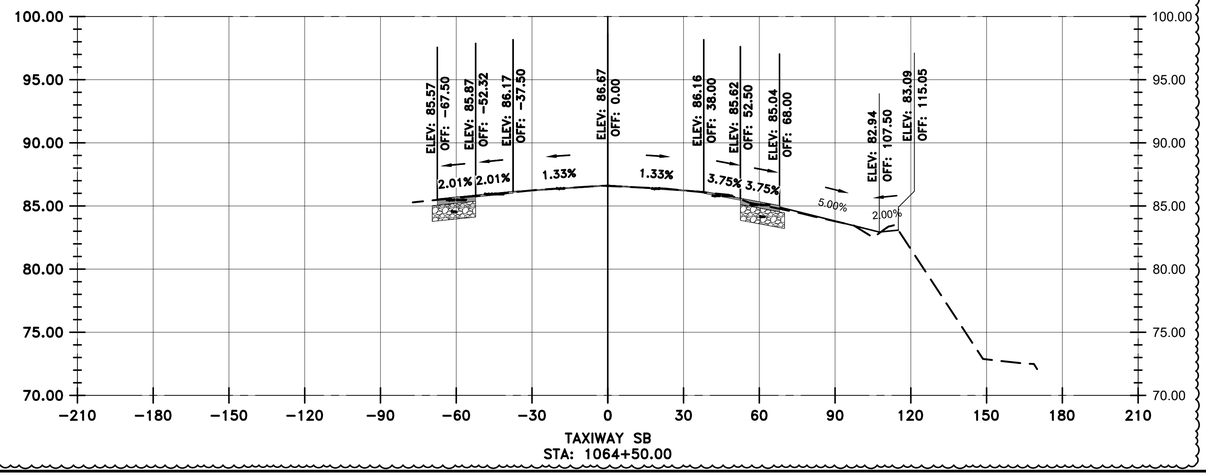

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
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TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 36

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.36

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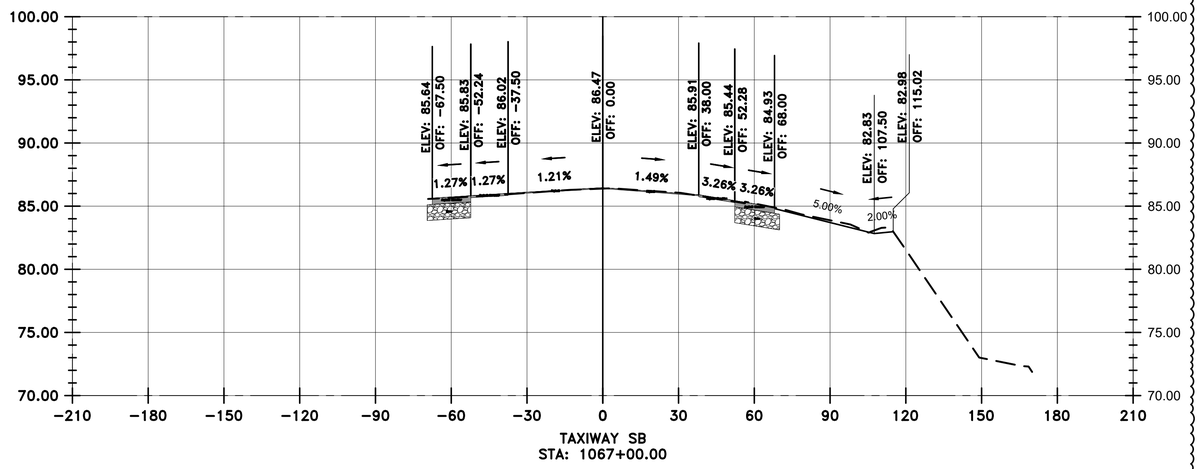

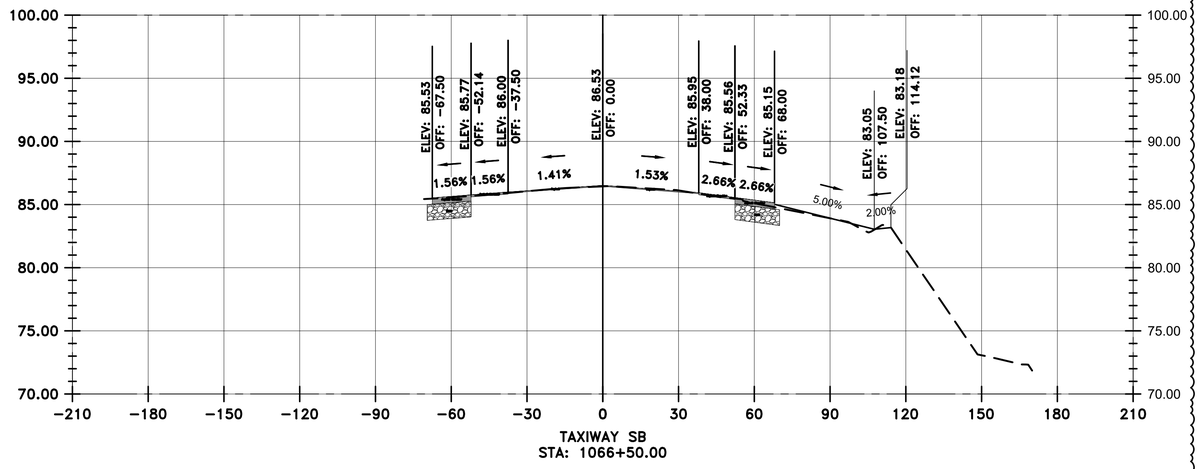

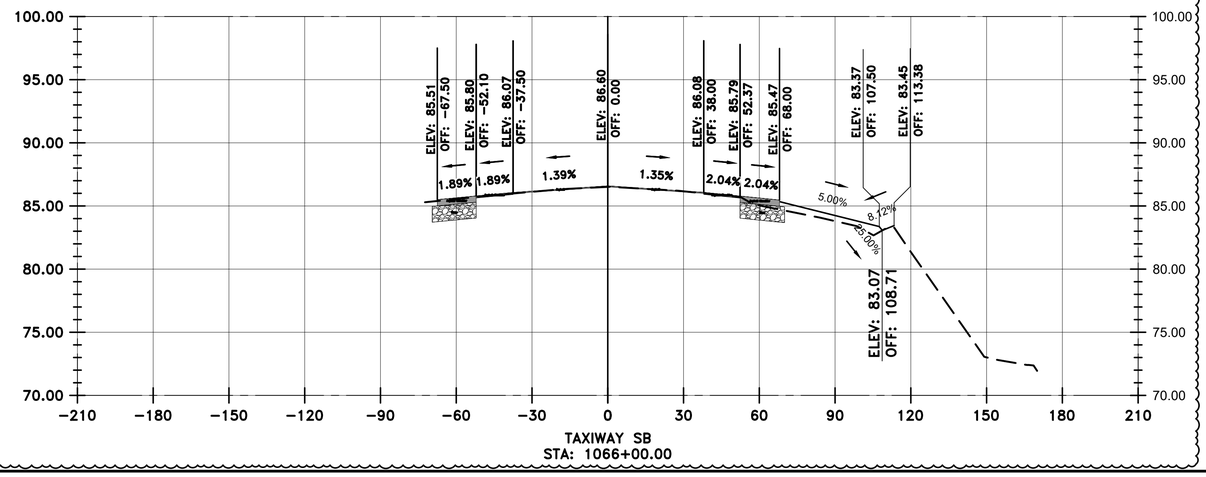

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
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Houston, TX 77079
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TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 37

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.37

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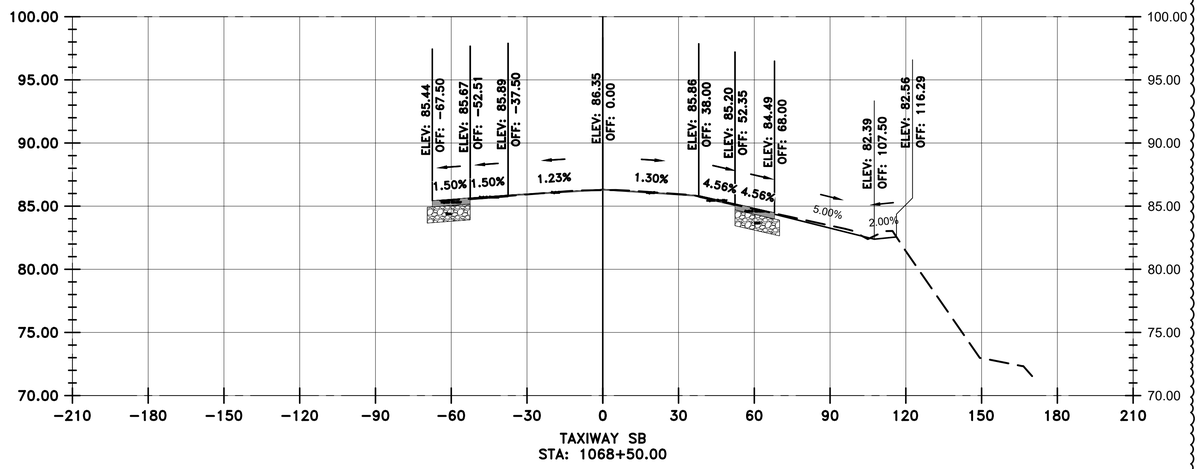

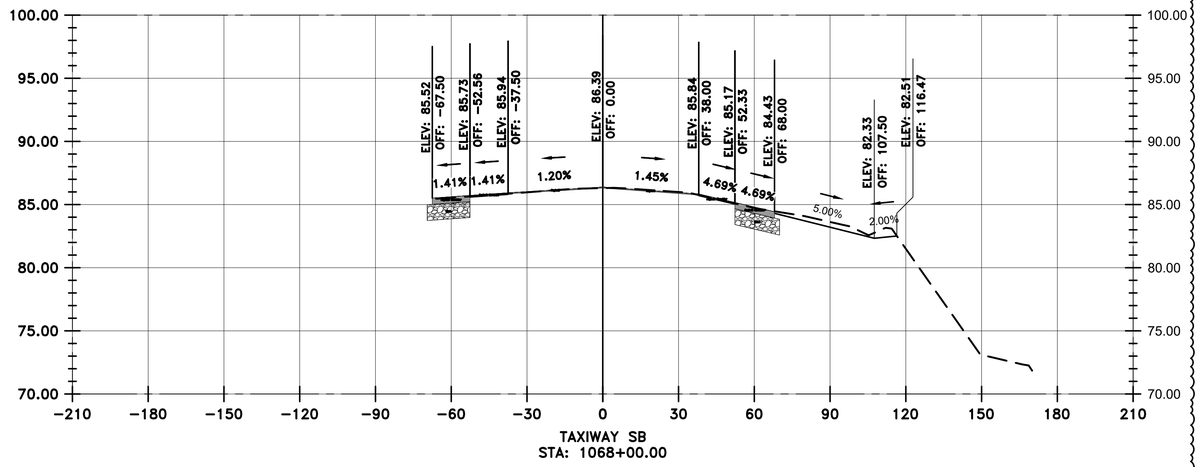

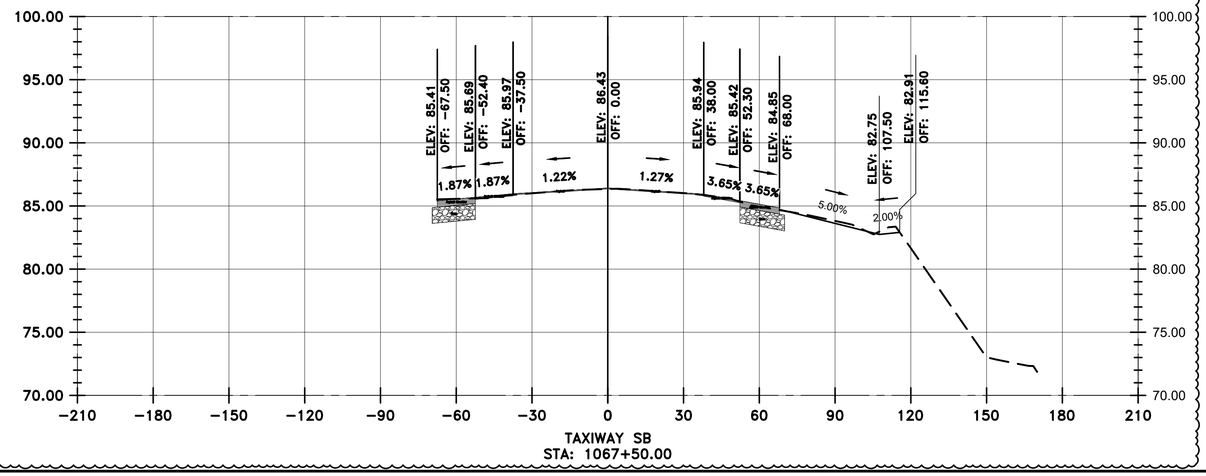

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
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REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 38

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
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APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.38

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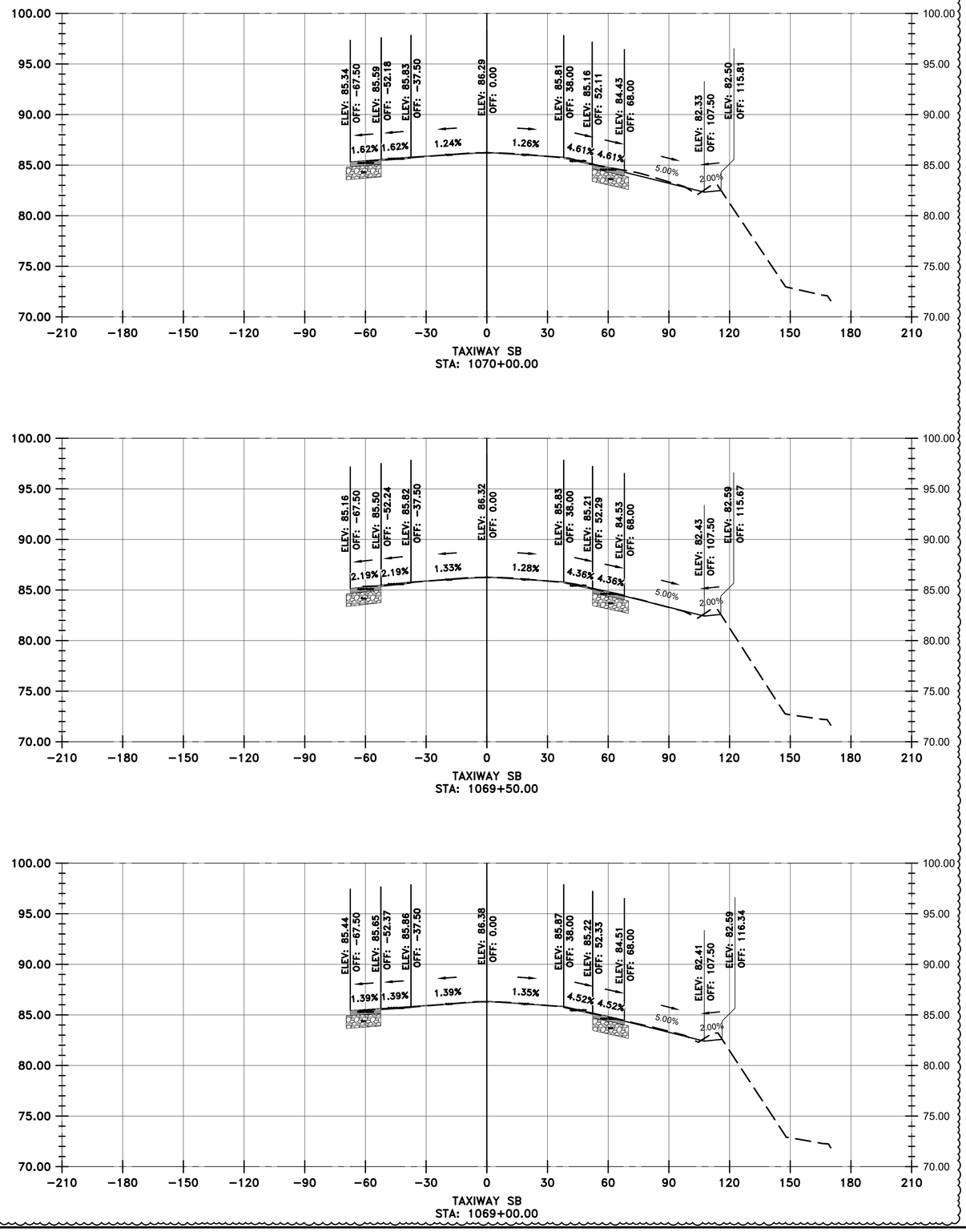

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

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TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 39

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
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PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.39

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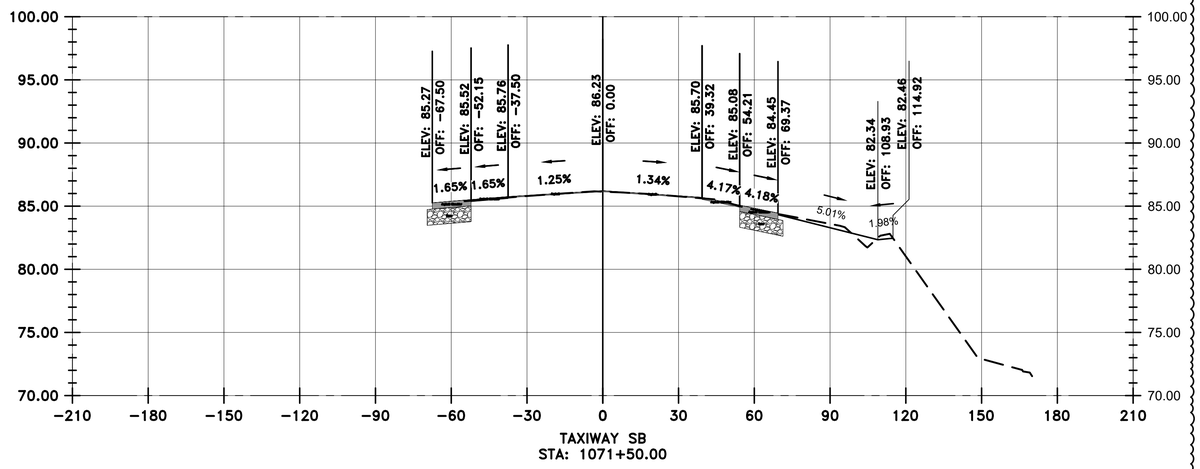

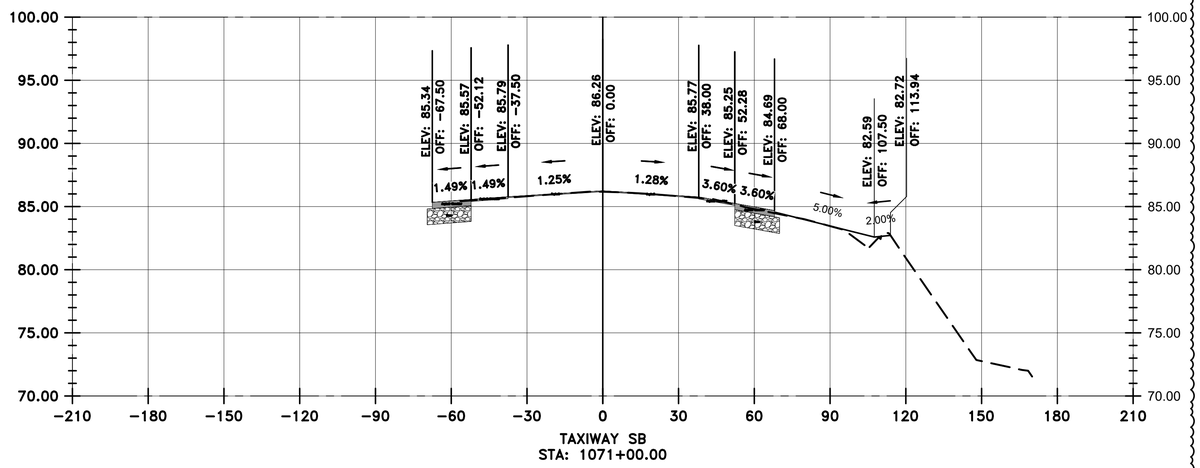

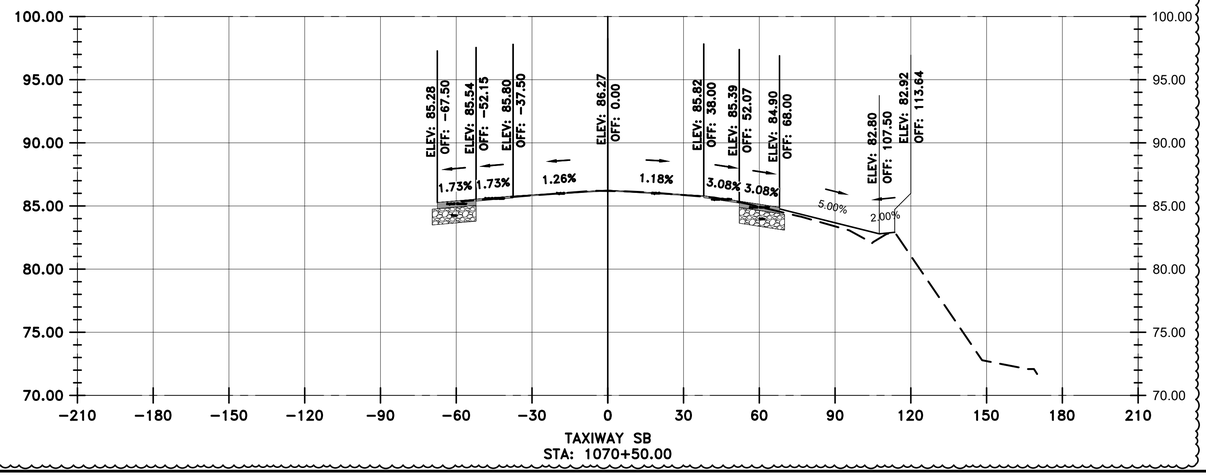

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 40

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.40

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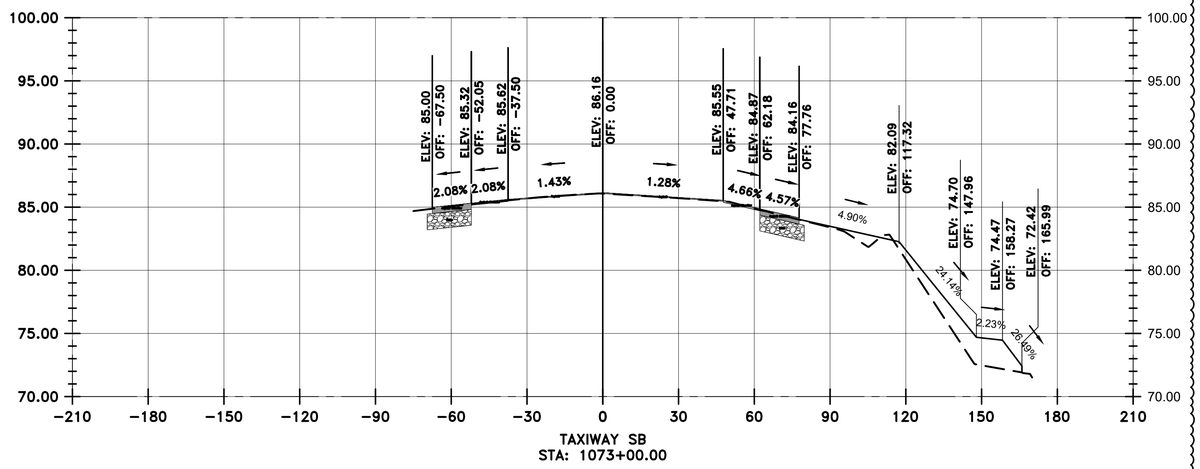

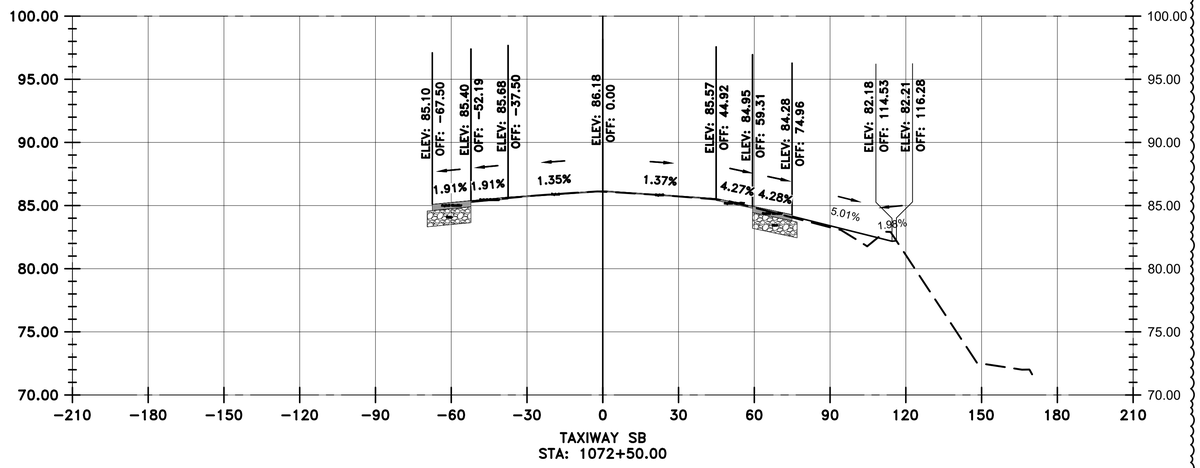

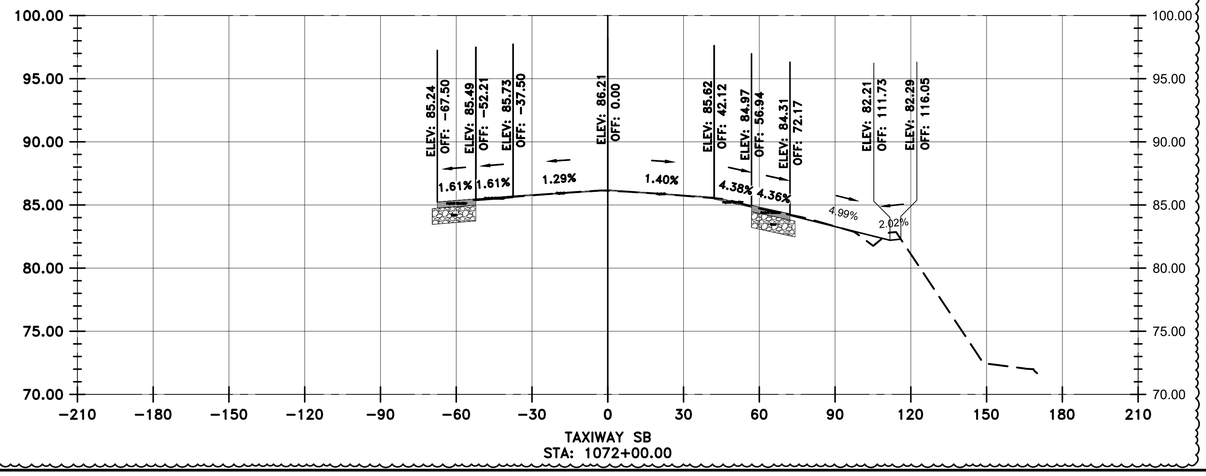

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 41

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY:	JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.41

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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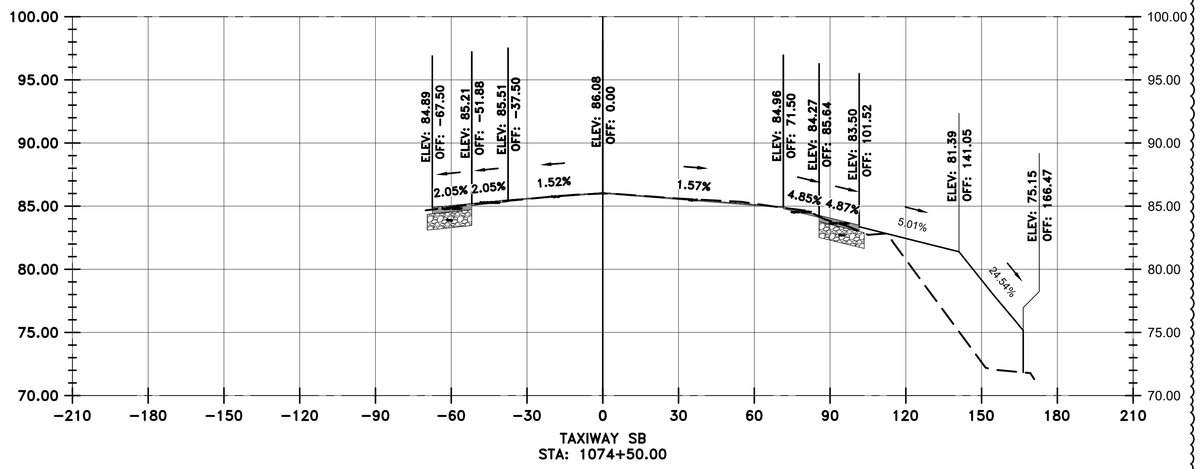

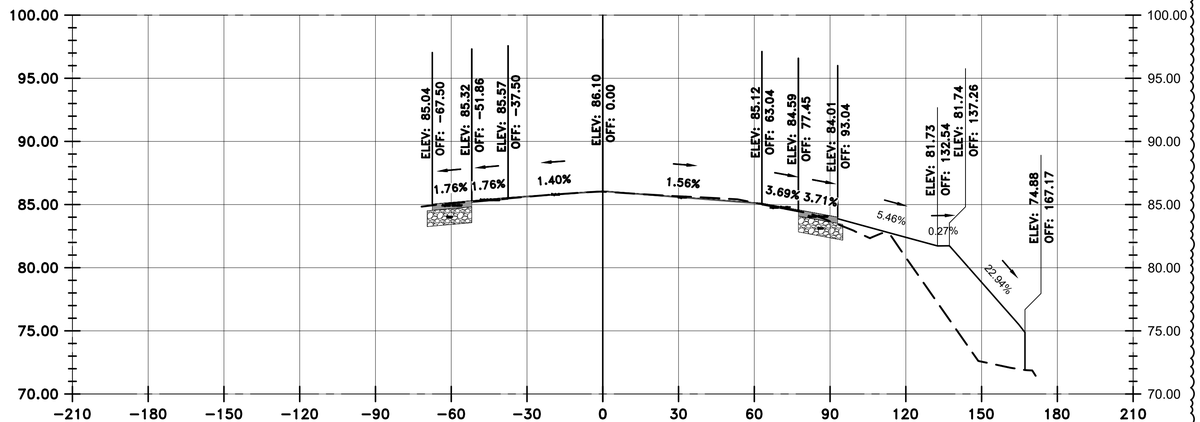

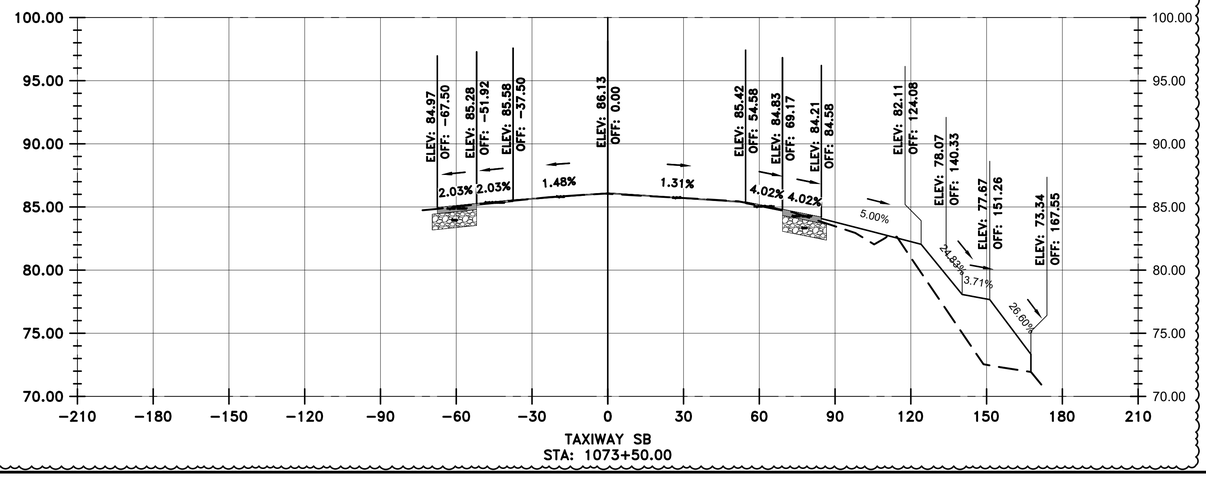

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 42

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.42

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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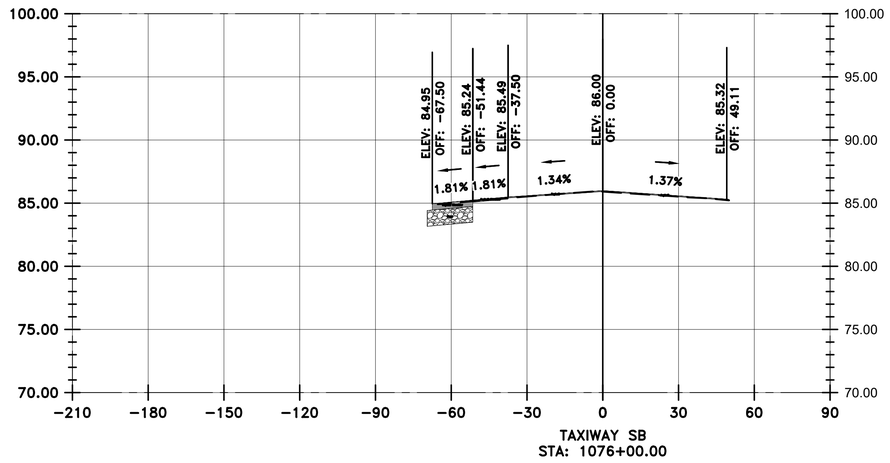

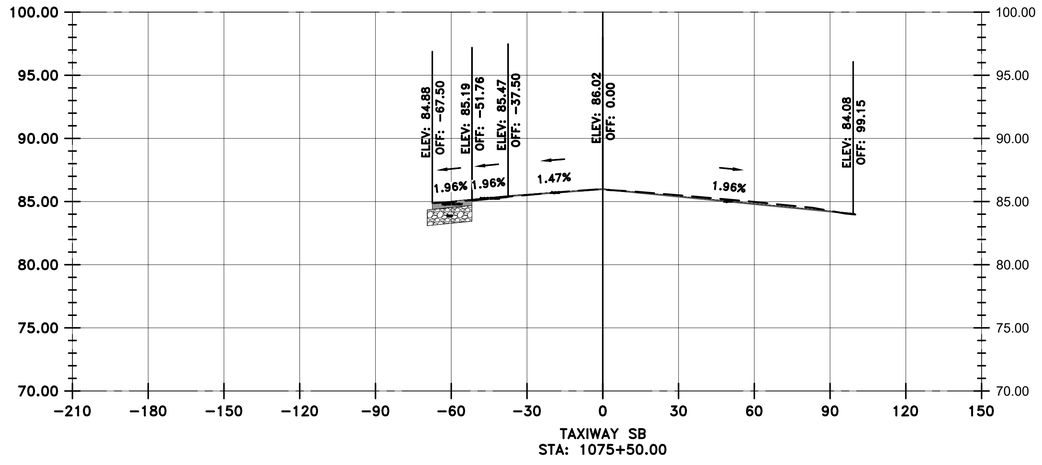

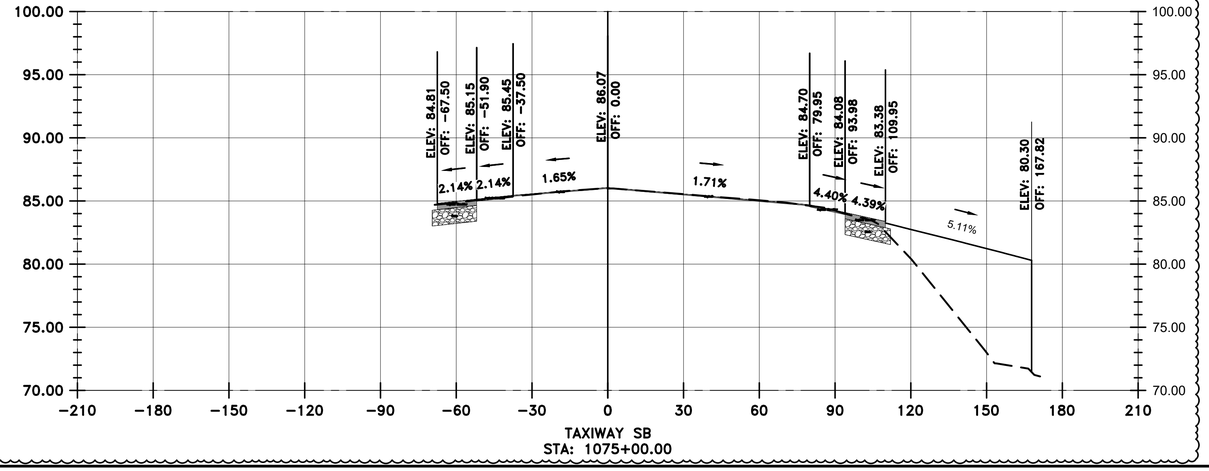

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 43

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.43

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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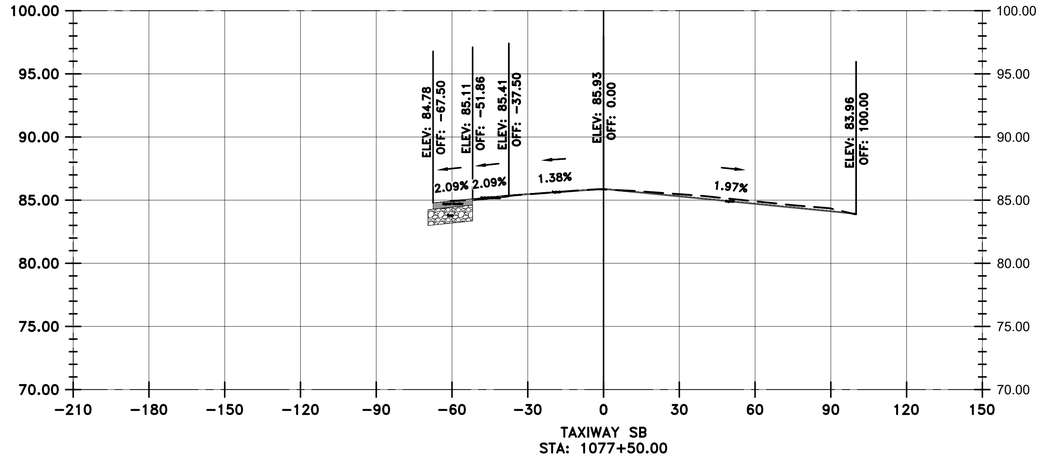
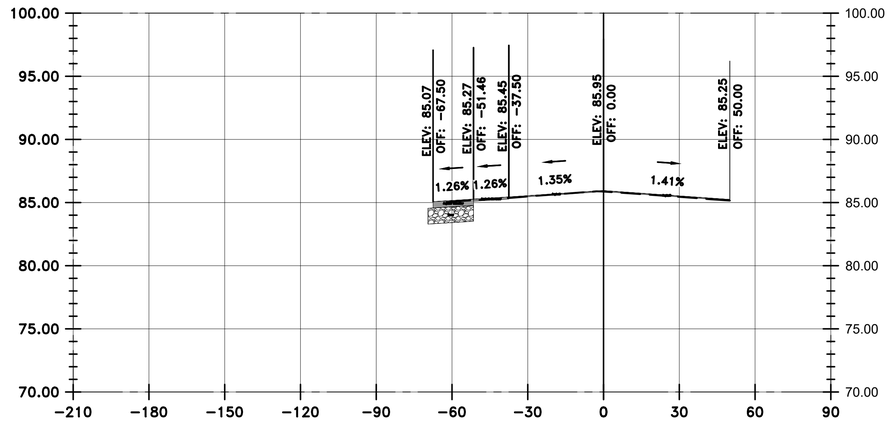
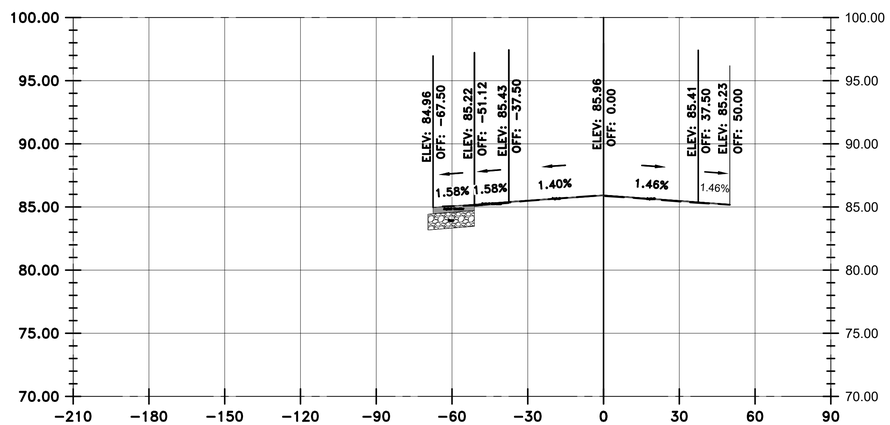


TAXIWAY SB
STA: 1077+50.00



TAXIWAY SB
STA: 1077+00.00



TAXIWAY SB
STA: 1076+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
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TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 44

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.
0646A

A.I.P. NO.
XXXX

C.I.P. NO.
A-0515

H.A.S. NO.
20C0646A

SHEET NO.
X02.44

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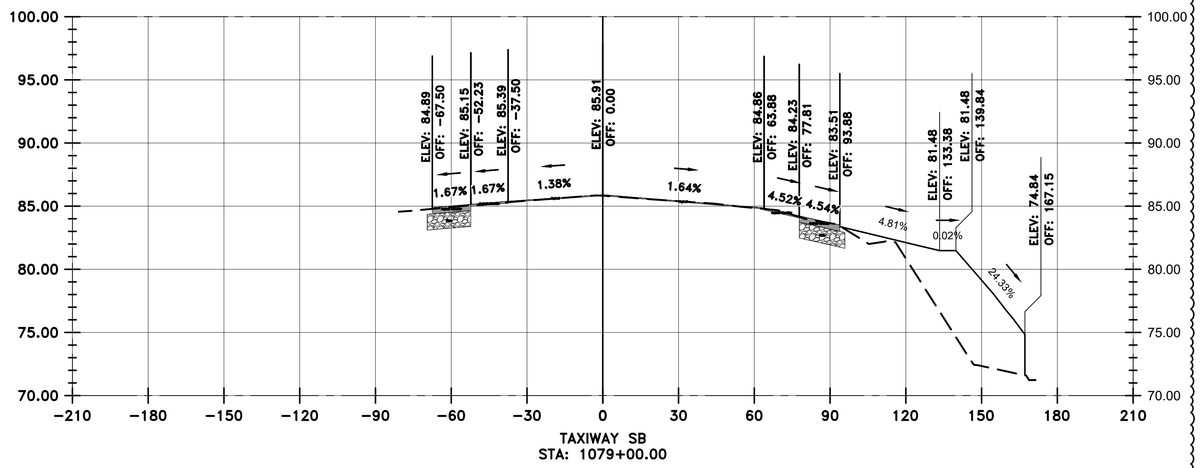

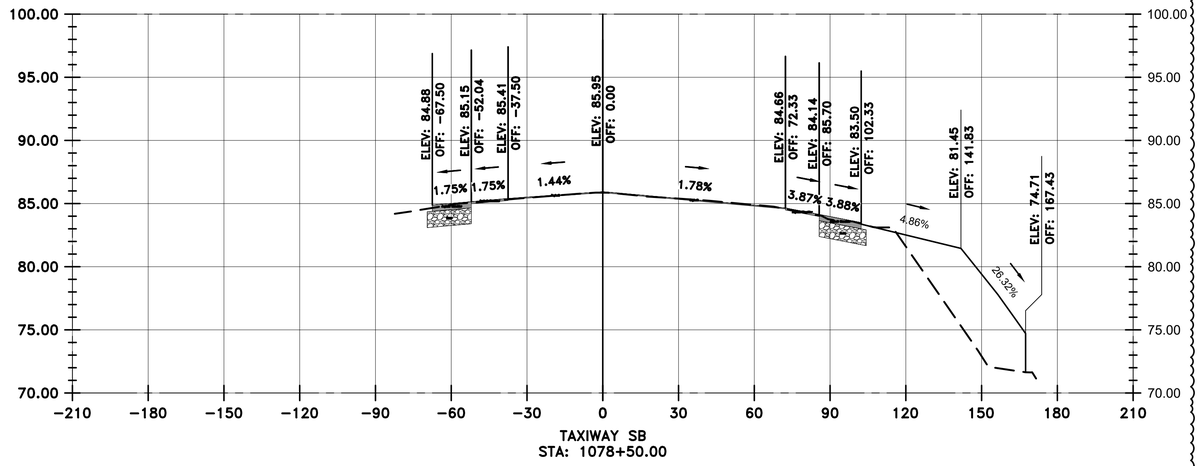

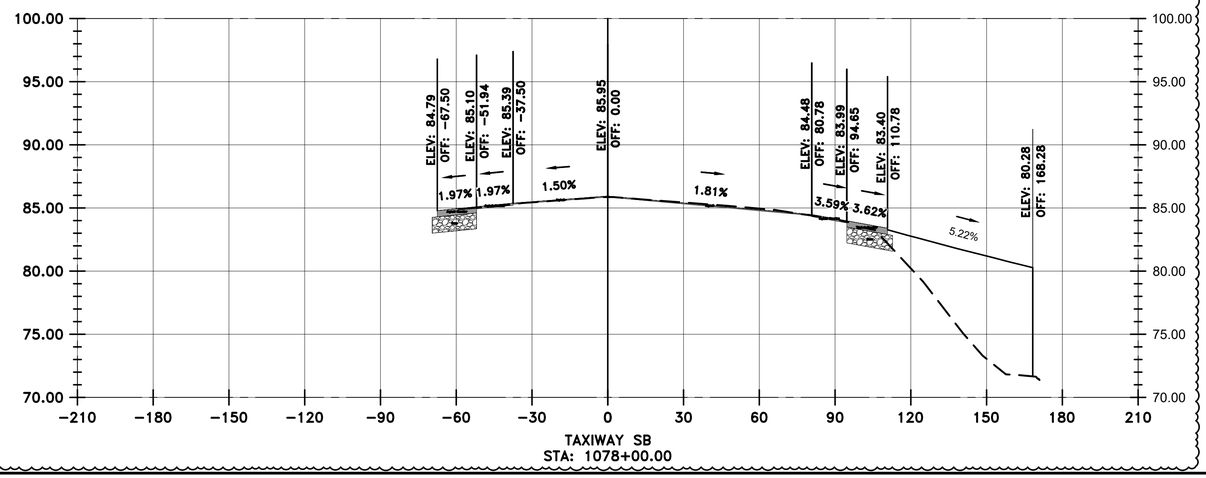

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

VERTICAL EXAGGERATION = 5

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 45

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.45

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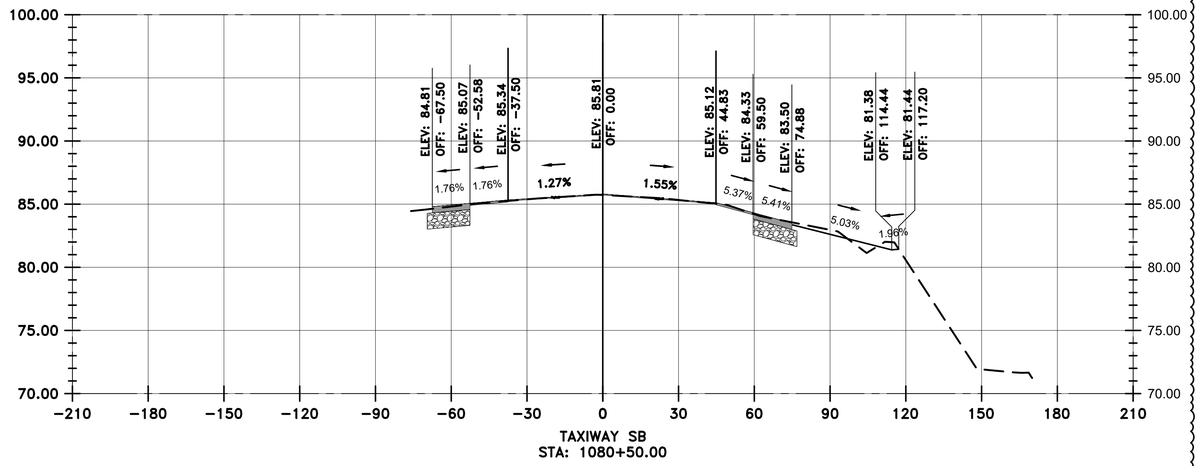

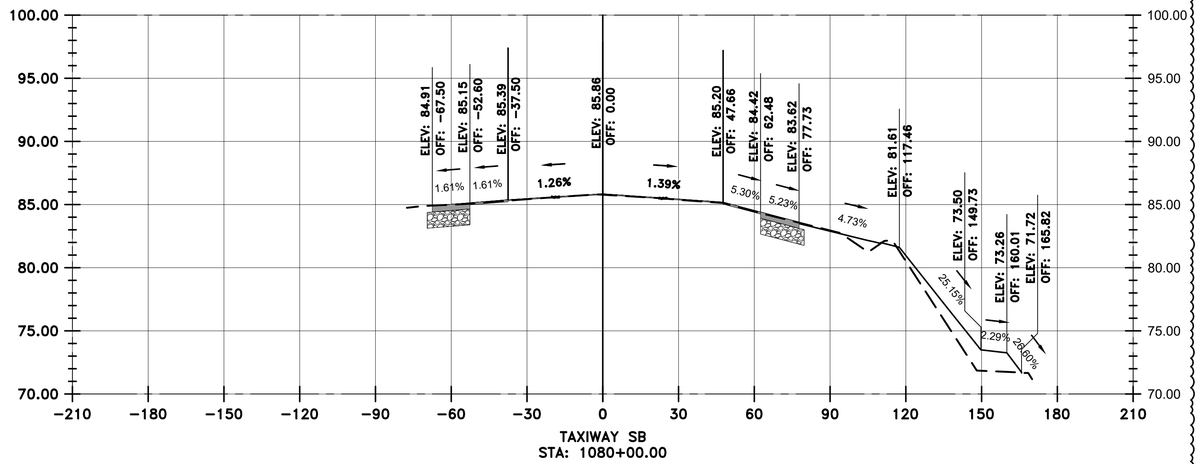

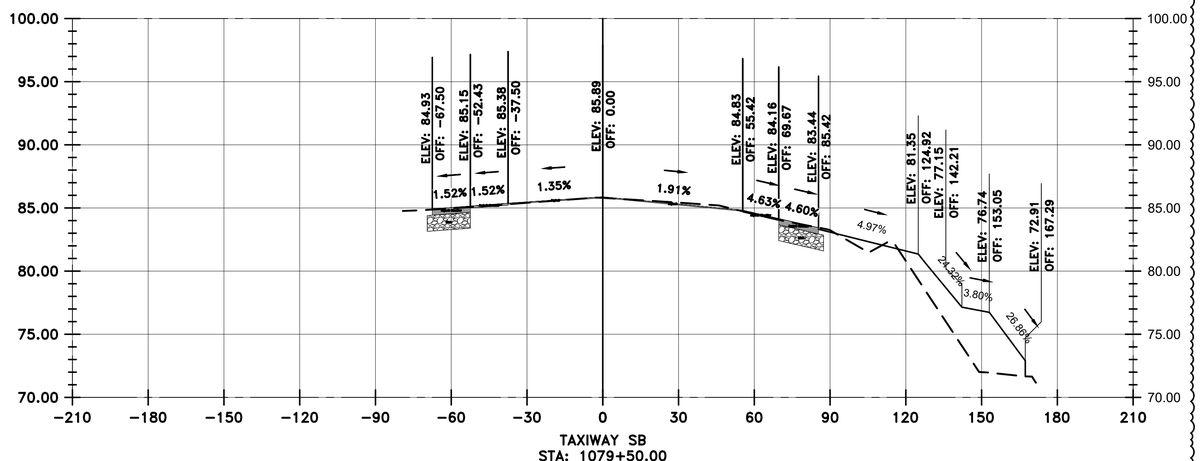

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 46

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.46

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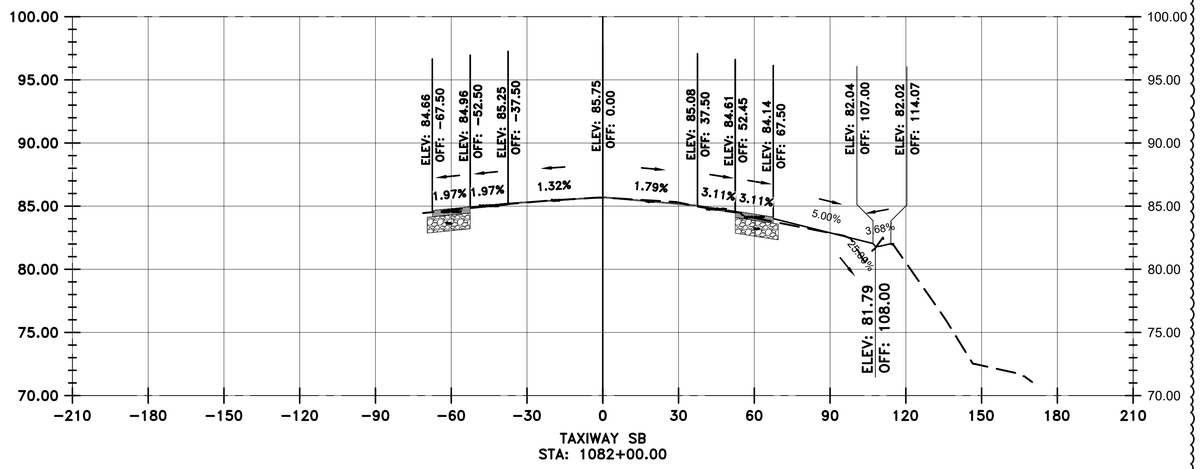

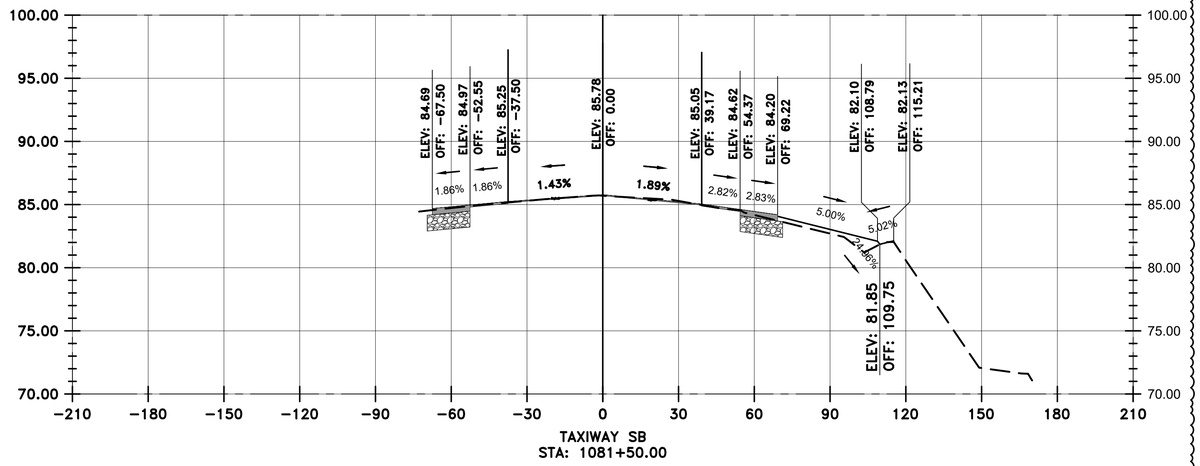

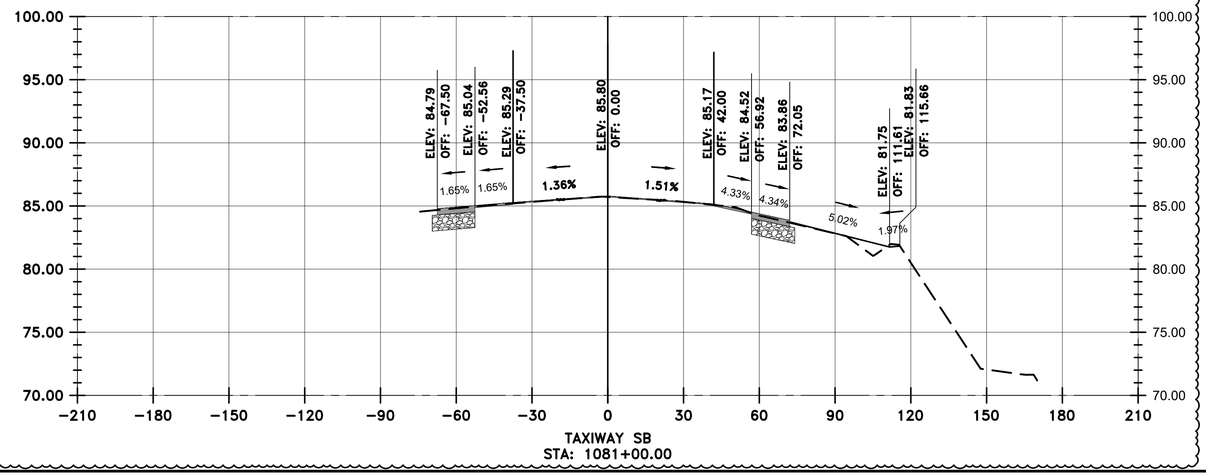

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

VERTICAL EXAGGERATION = 5

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 47

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.47

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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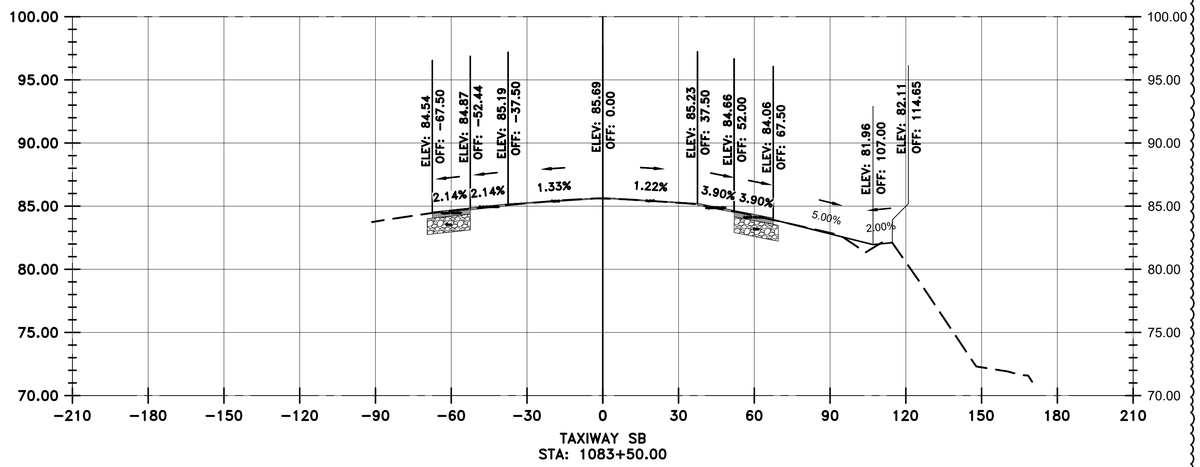
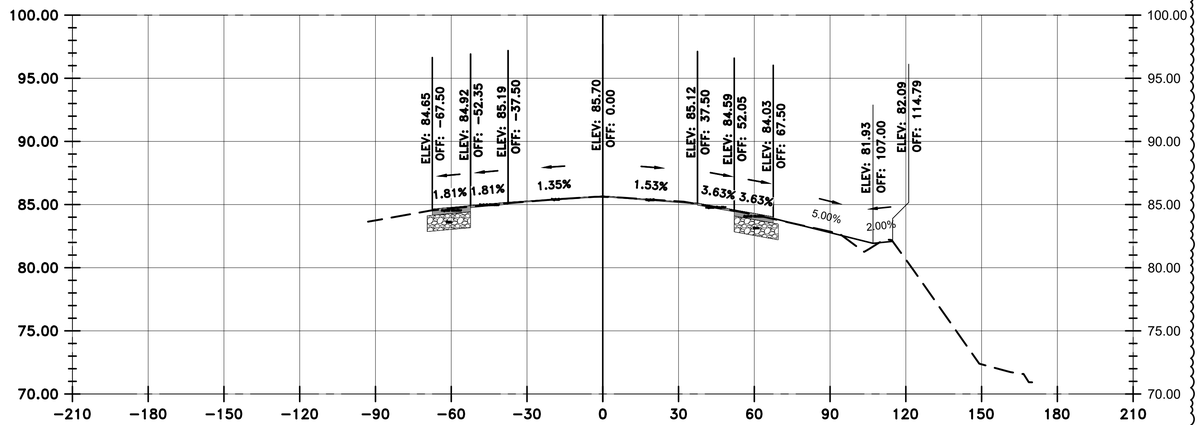
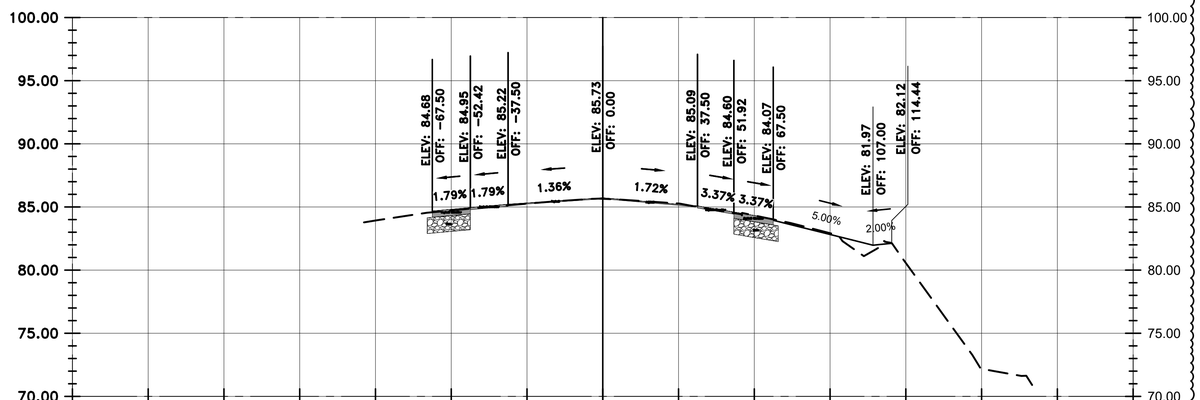


TAXIWAY SB
STA: 1083+50.00



TAXIWAY SB
STA: 1083+00.00



TAXIWAY SB
STA: 1082+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 48

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

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DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.48

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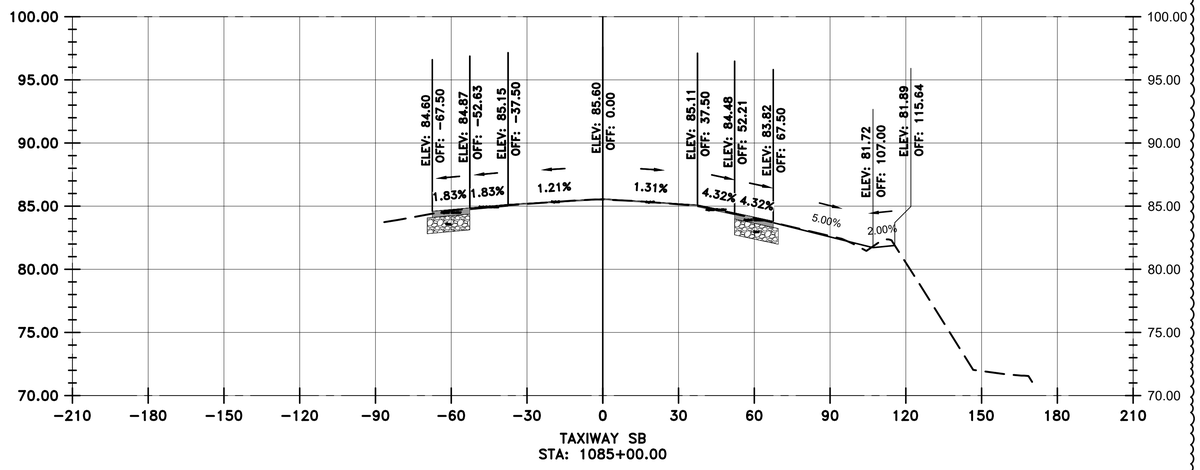

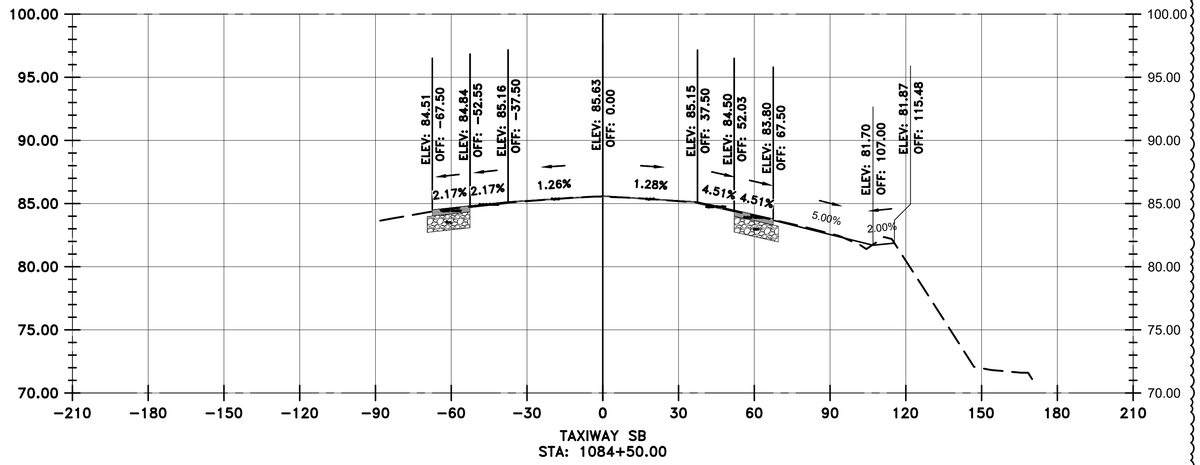

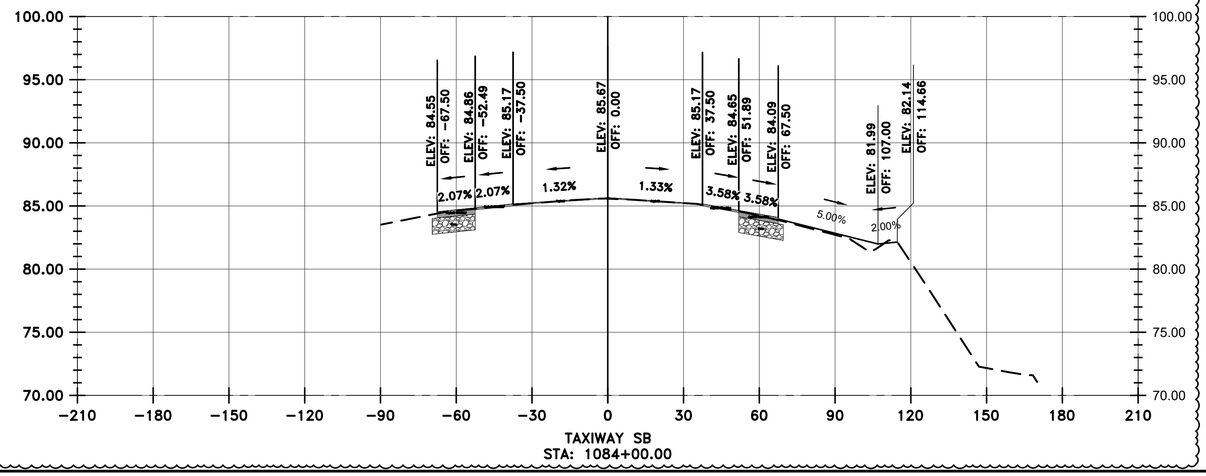

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

VERTICAL EXAGGERATION = 5

HOUSTON AIRPORTS

GARVER
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Houston, TX 77079
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TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 49

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
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APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.49

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
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Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 50

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.50

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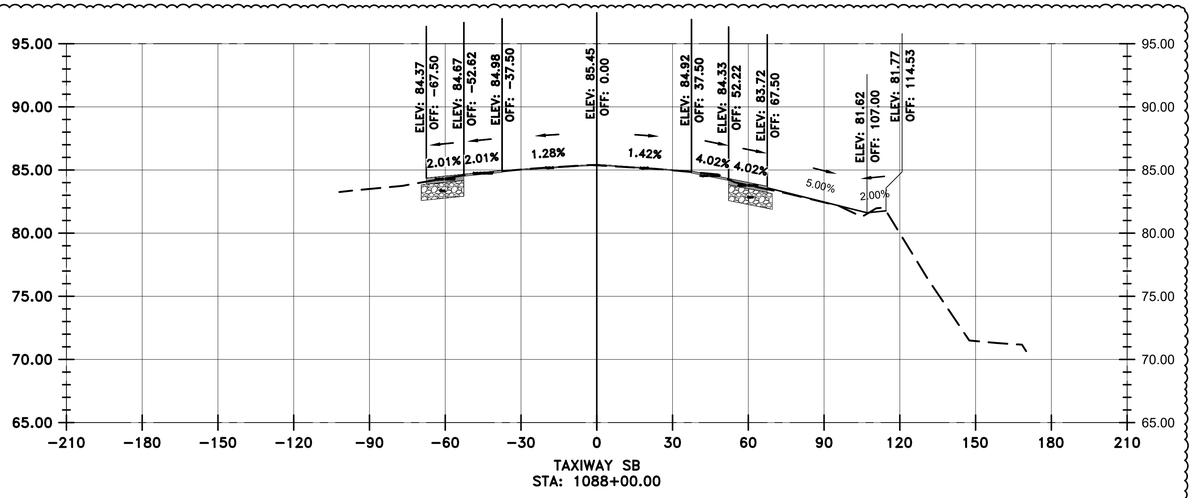

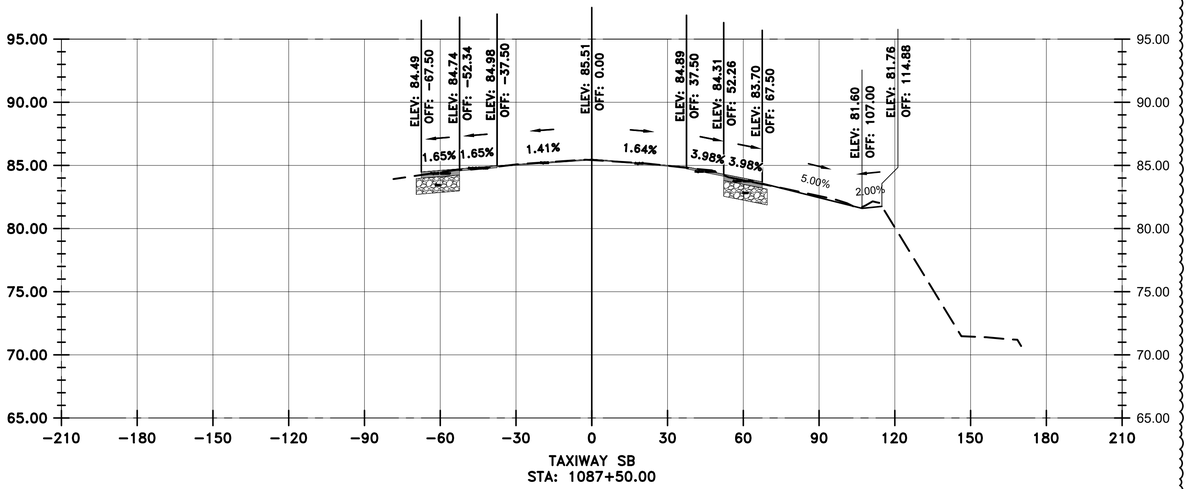

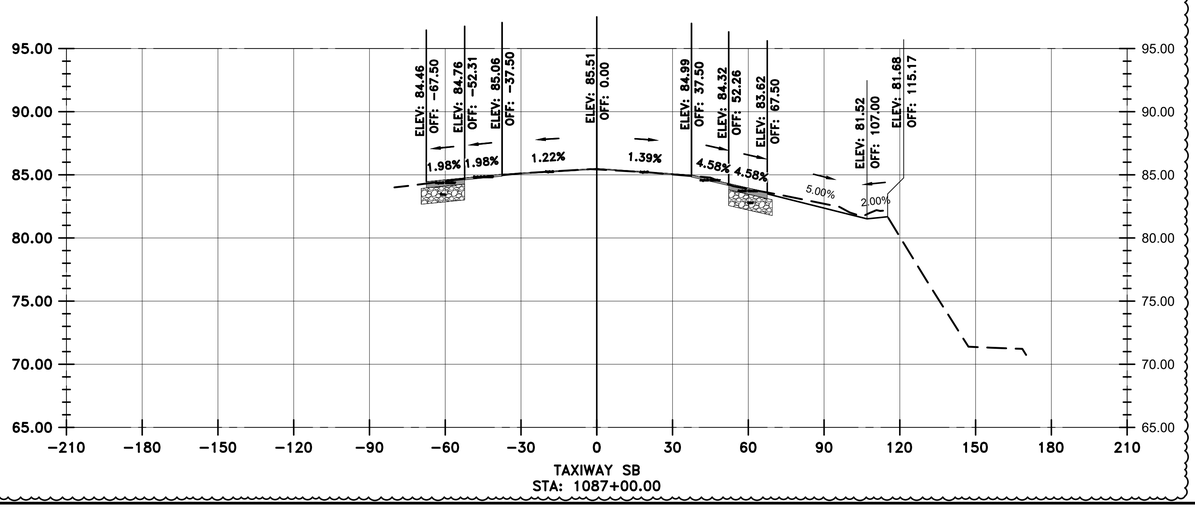

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 51

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.51

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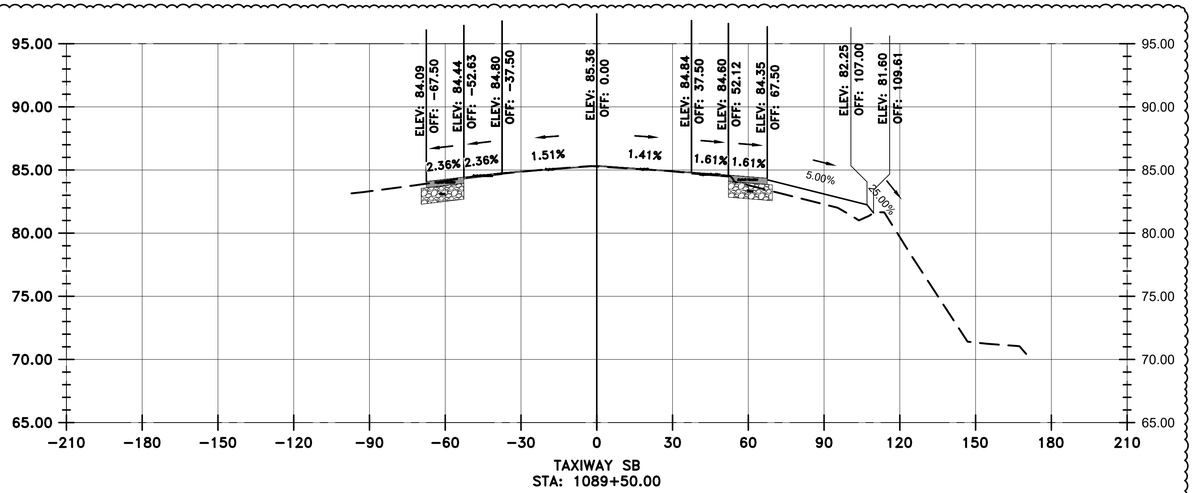

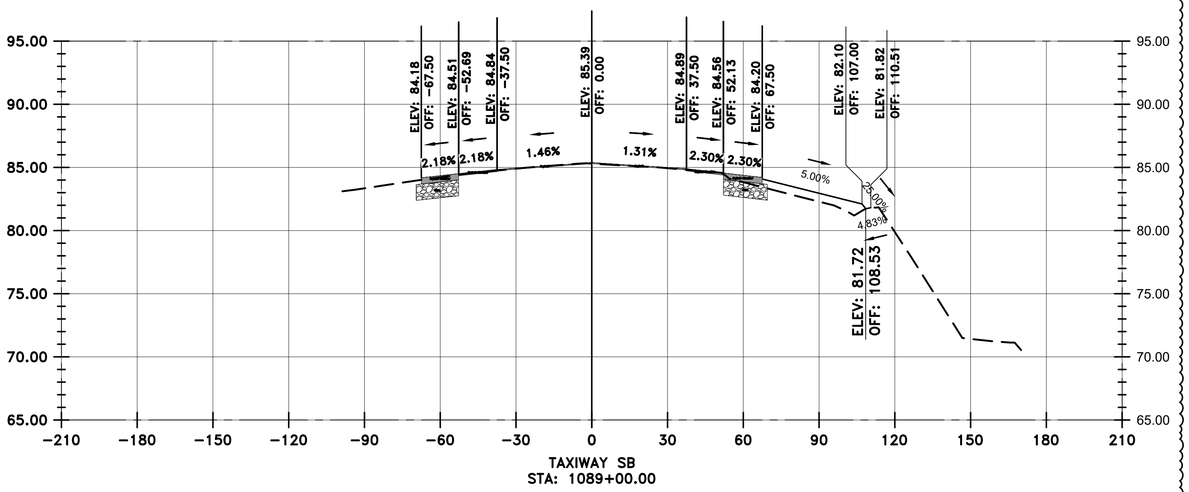

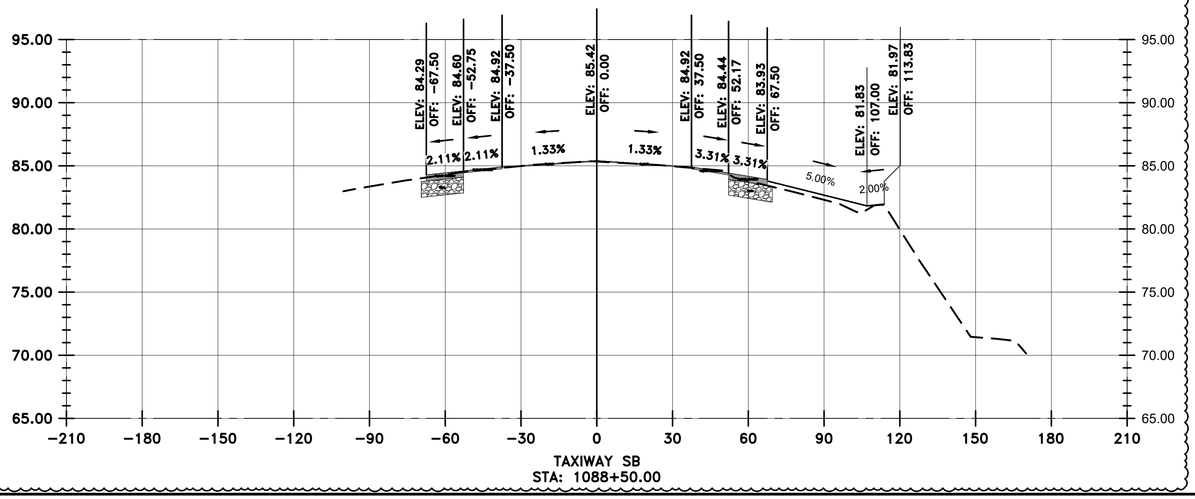

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 52

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.52

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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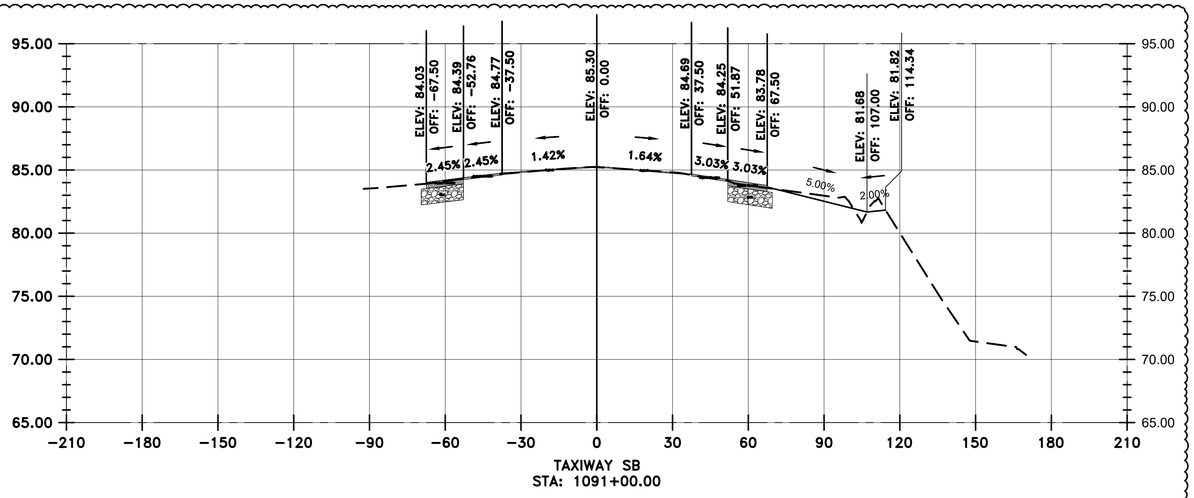

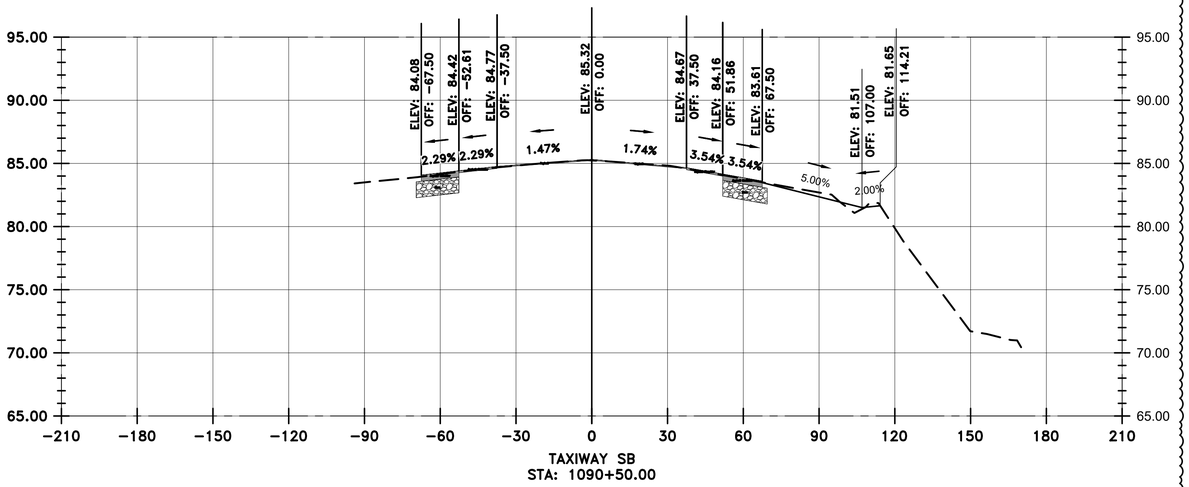

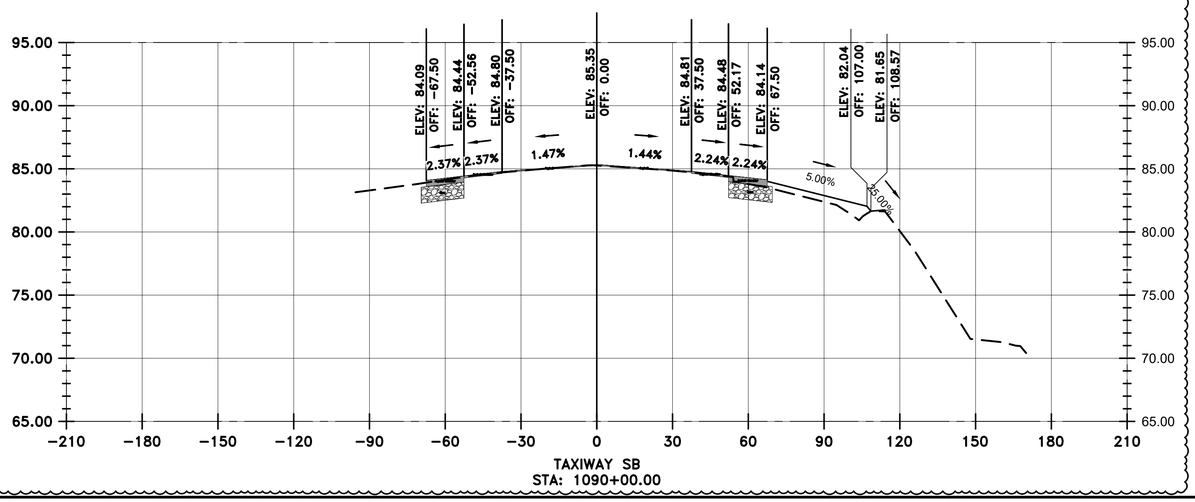

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 53

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.53

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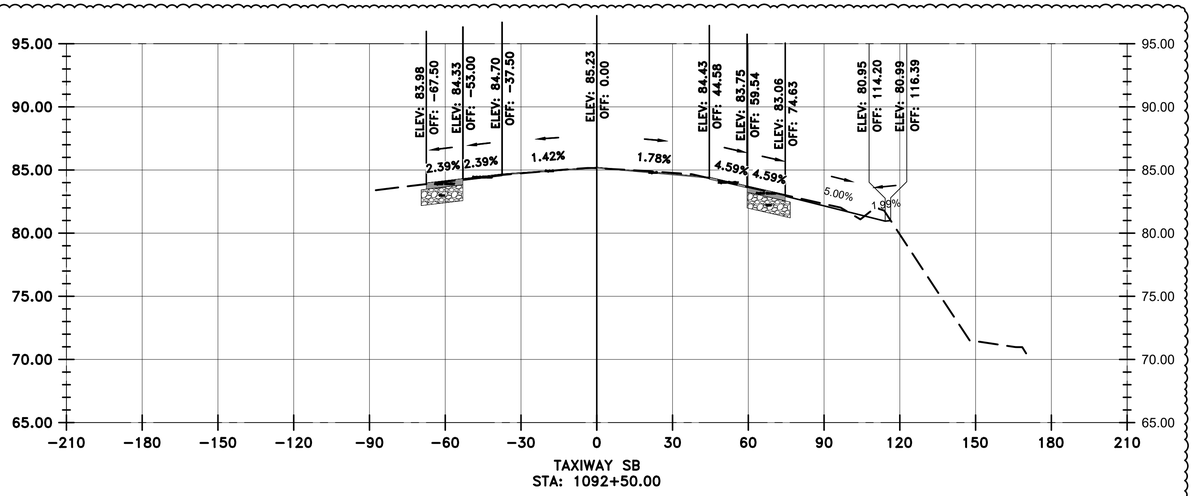

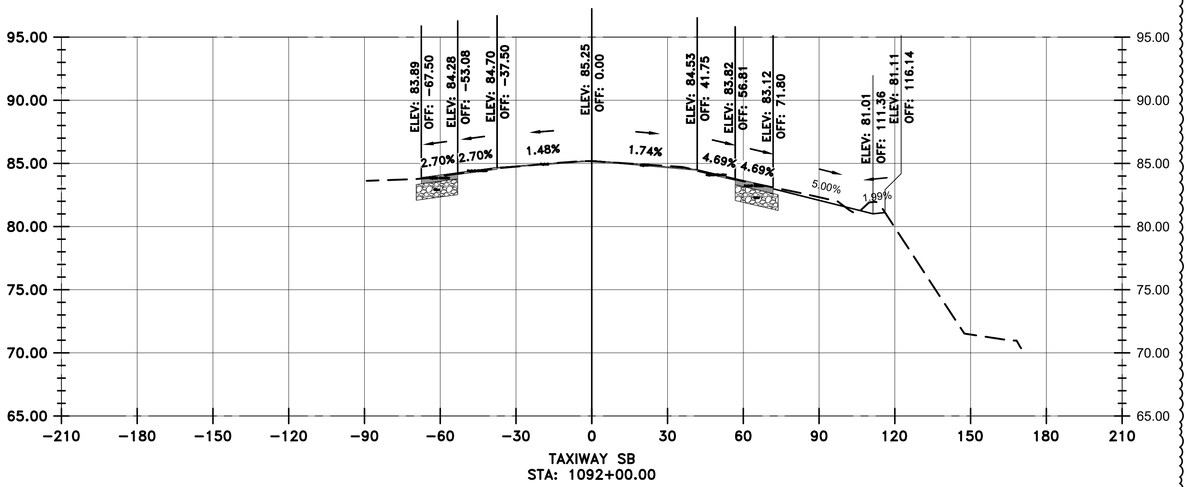

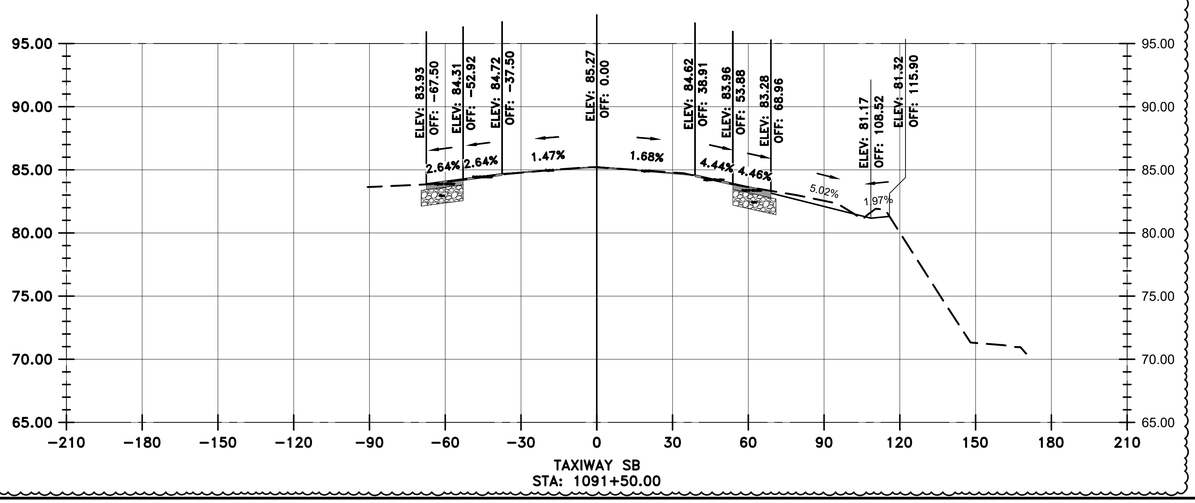

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 54

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.54

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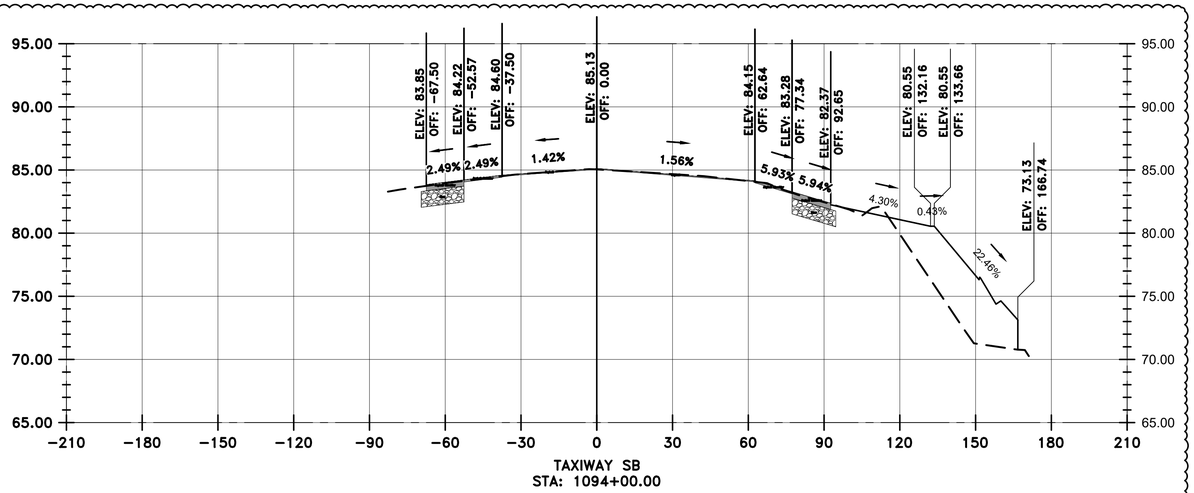

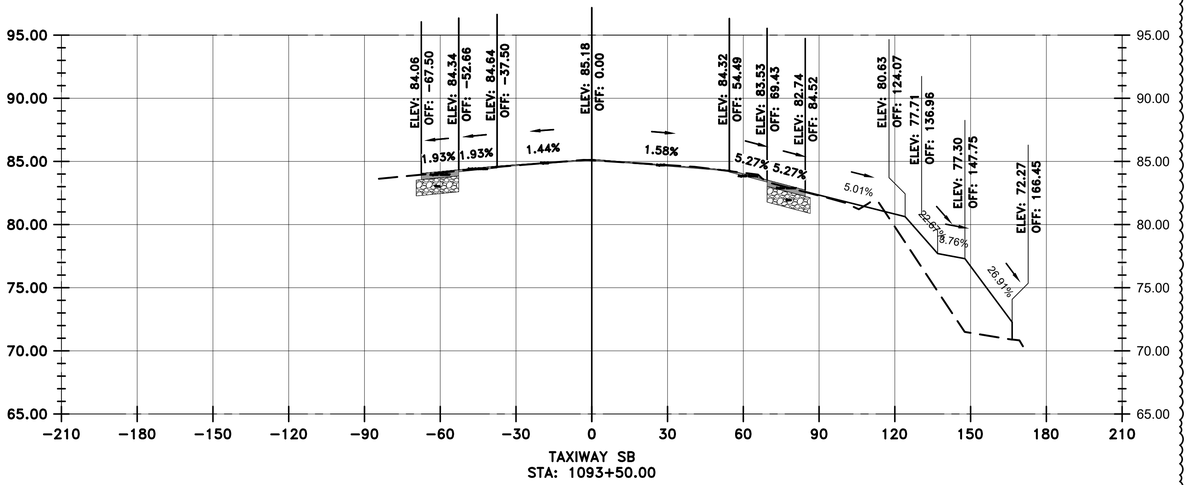

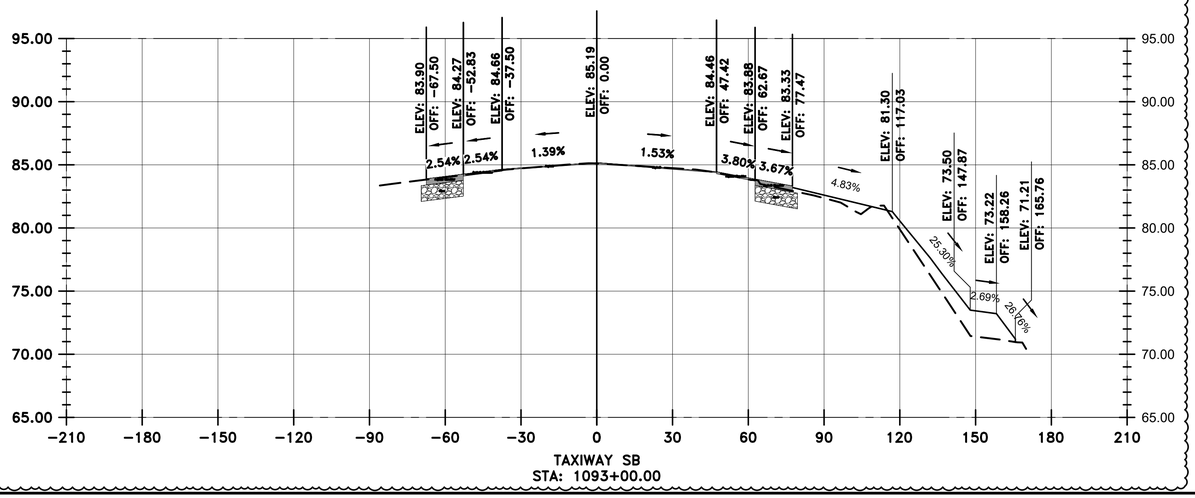

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 55

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.55

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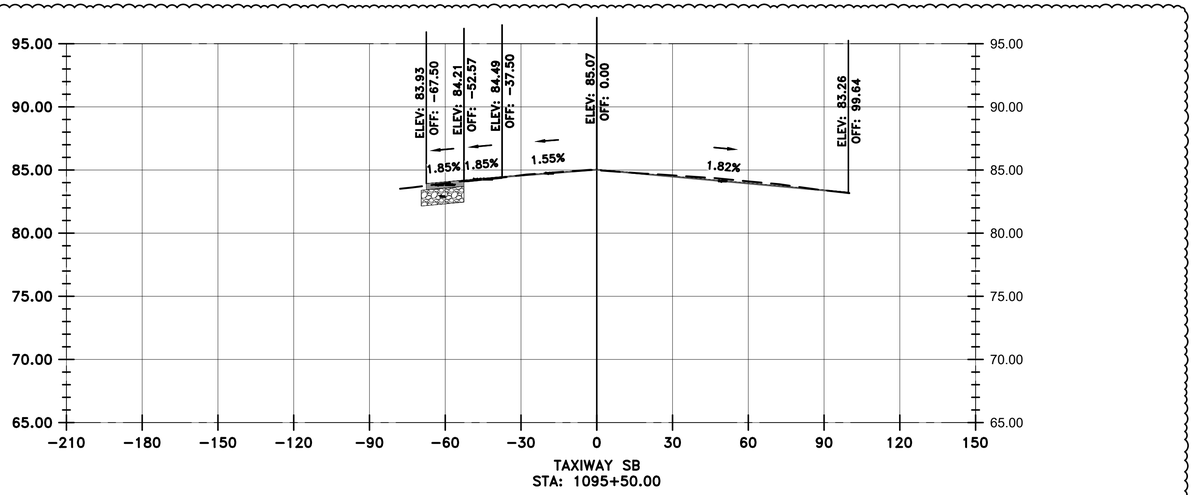
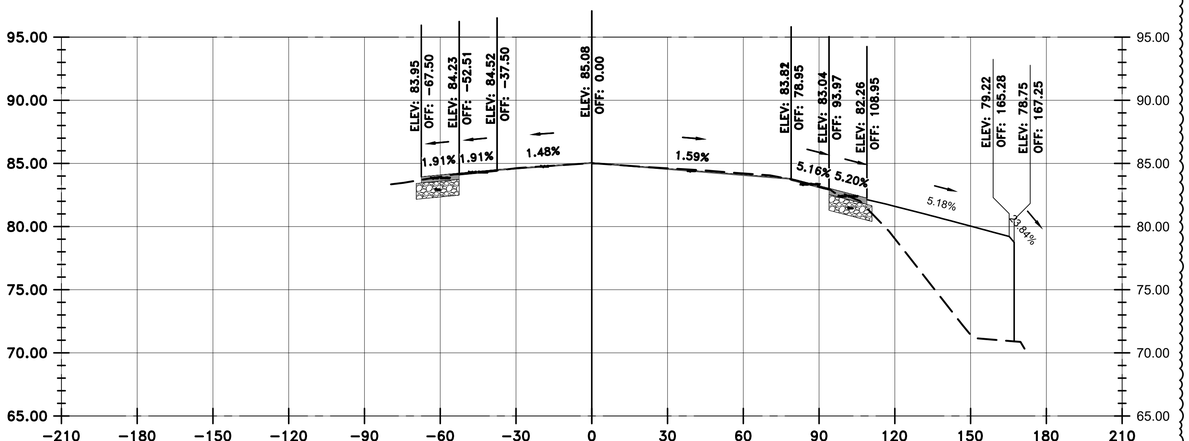


TAXIWAY SB
STA: 1095+50.00



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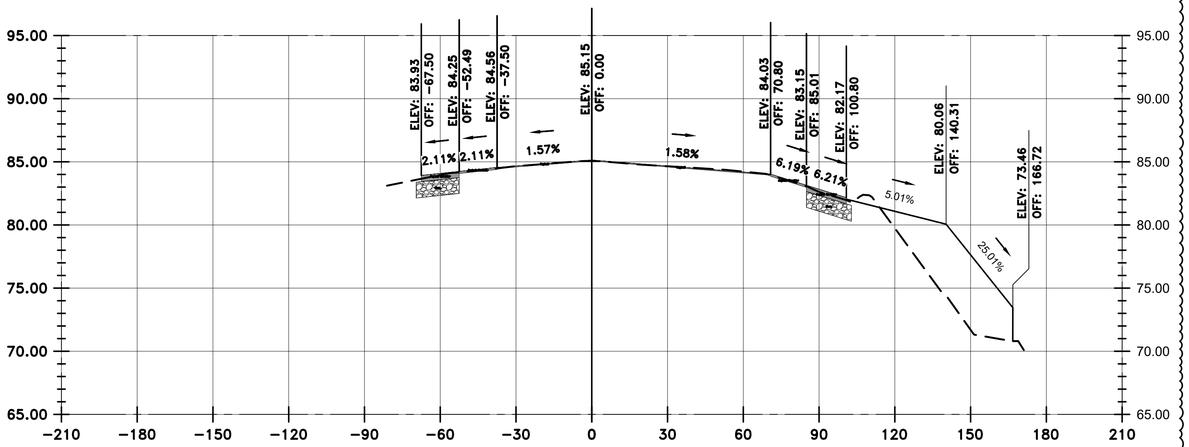

TAXIWAY SB
STA: 1094+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 56

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.56

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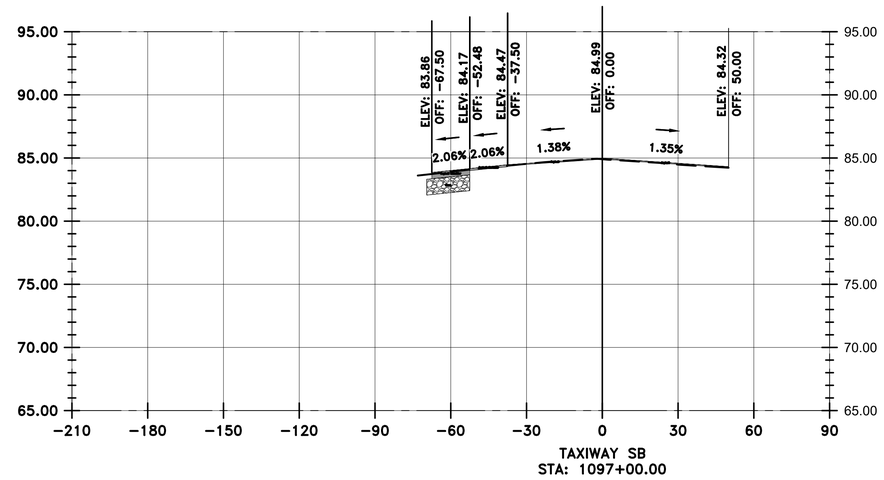

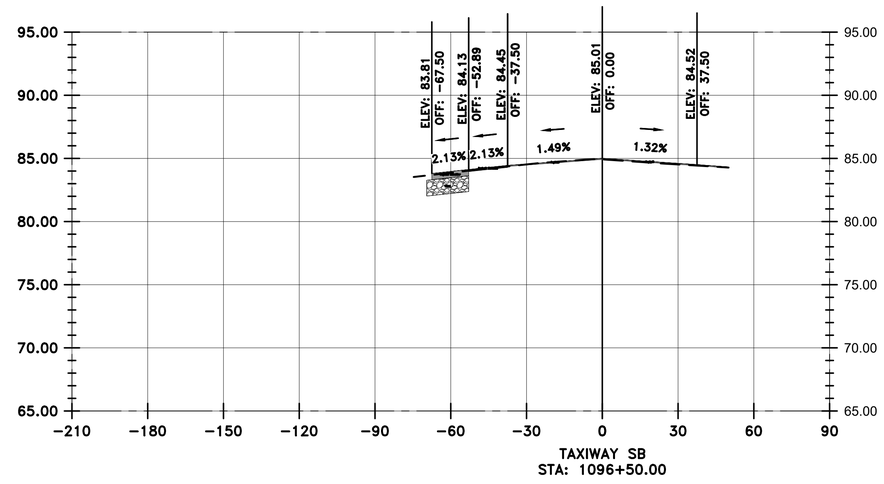

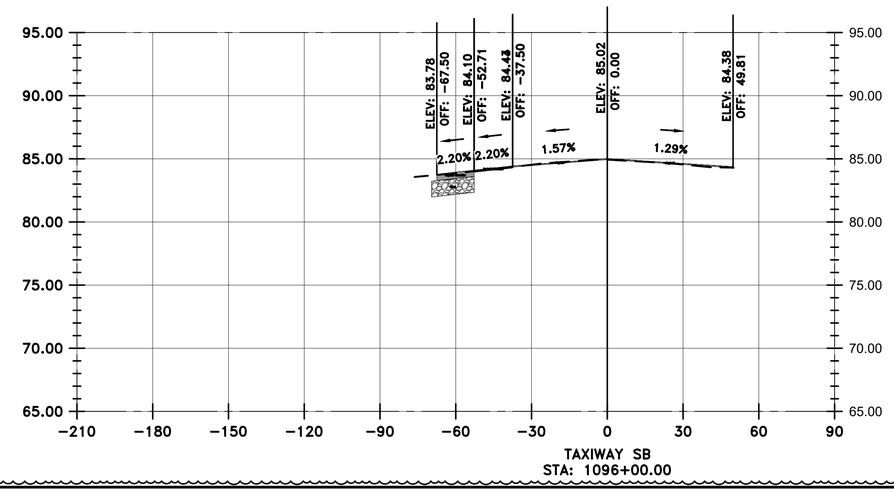

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 57

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.57

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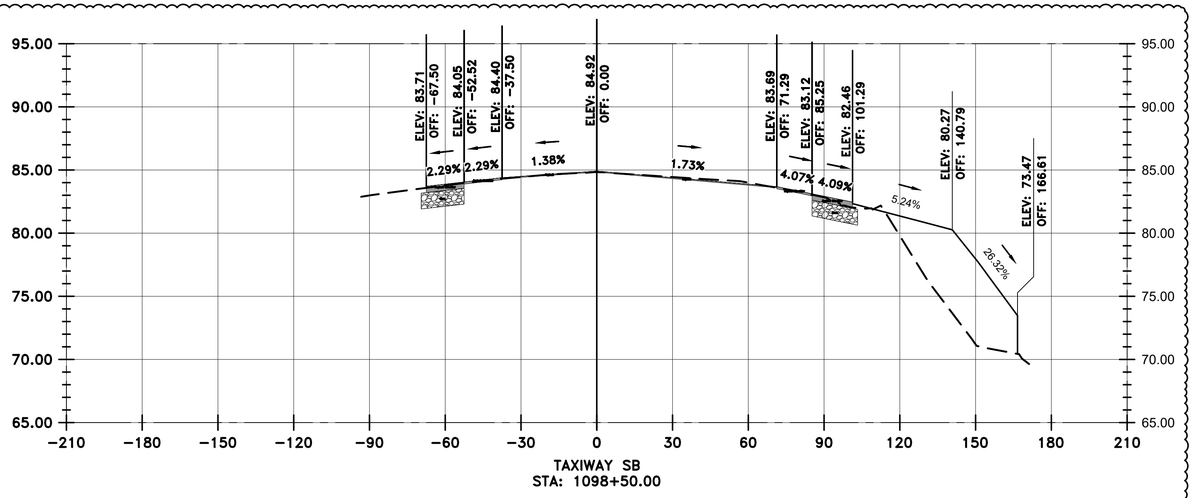

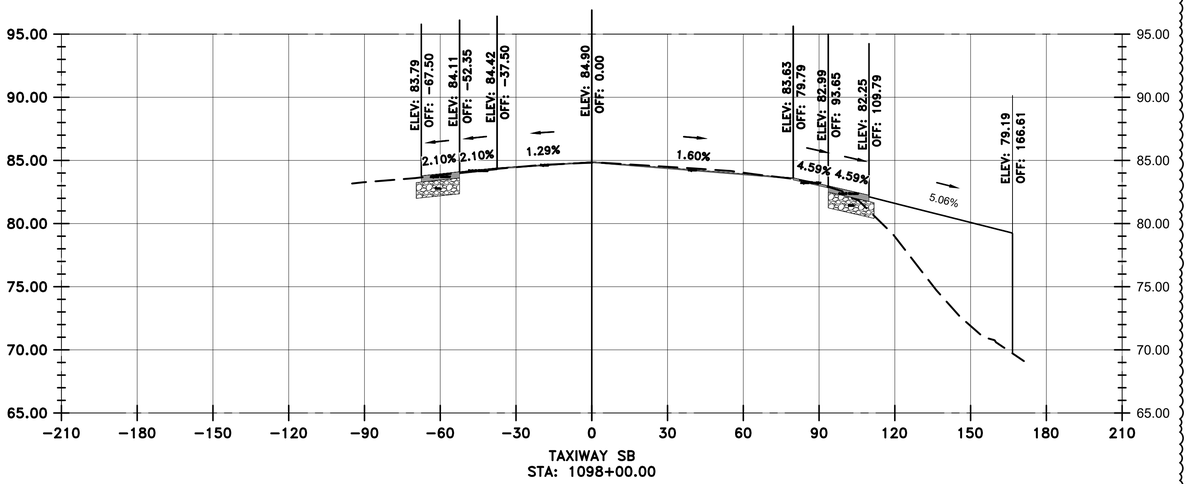

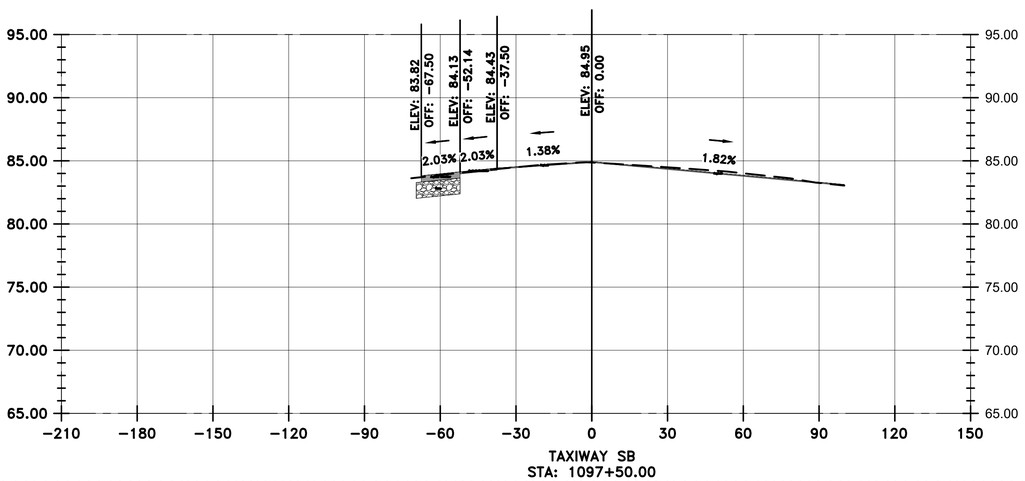

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

VERTICAL EXAGGERATION = 5

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
PLOT DATE: 11/8/2019 3:32:47 PM

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TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 58

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
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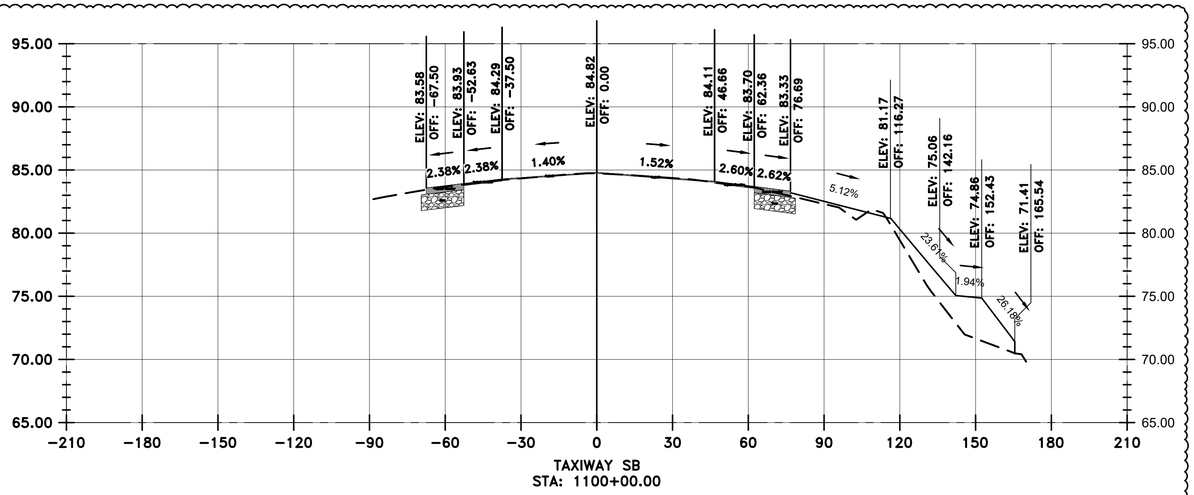
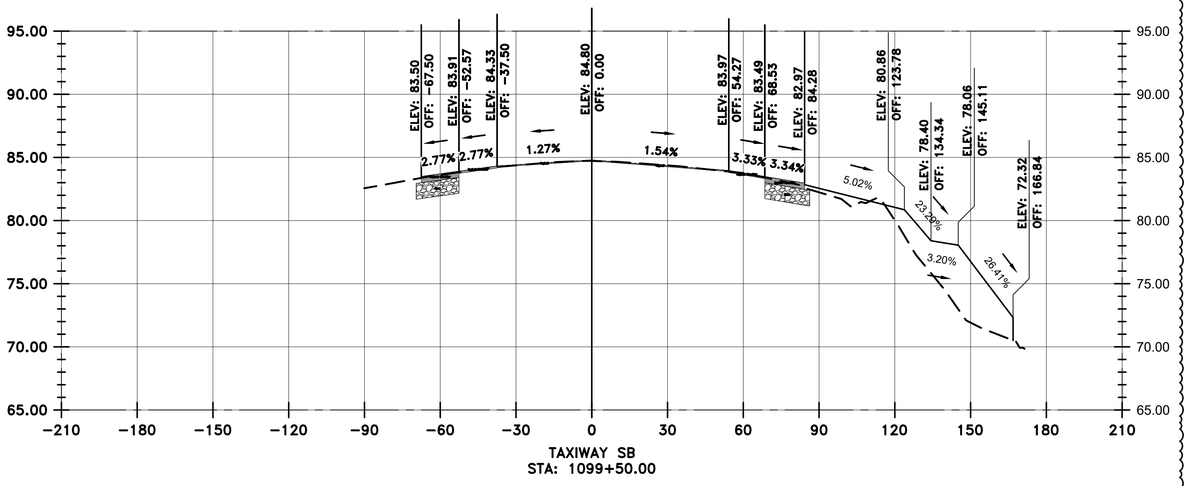
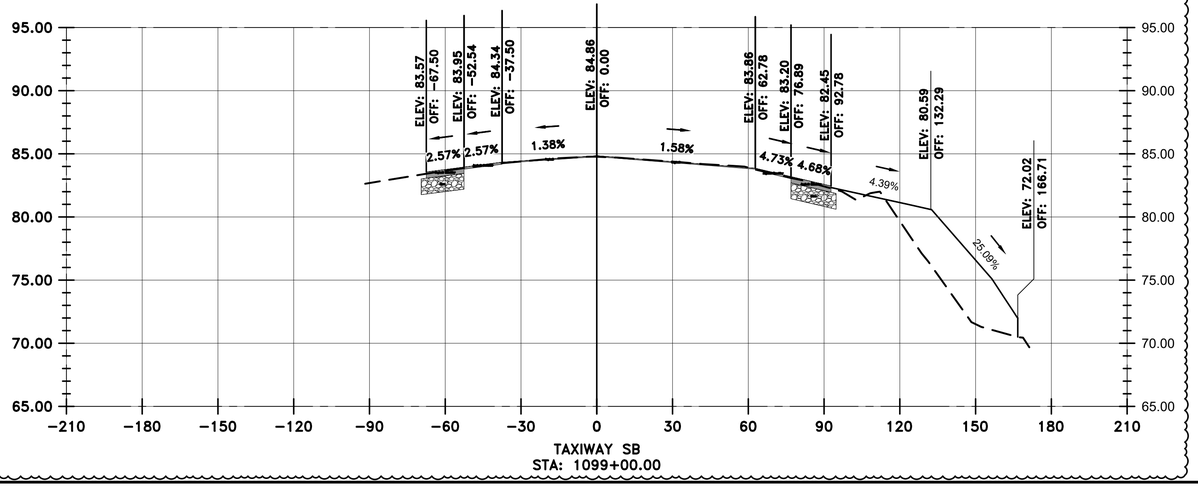
DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.58







VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

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Suite 640
Houston, TX 77079
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TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 59

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER

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DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.59

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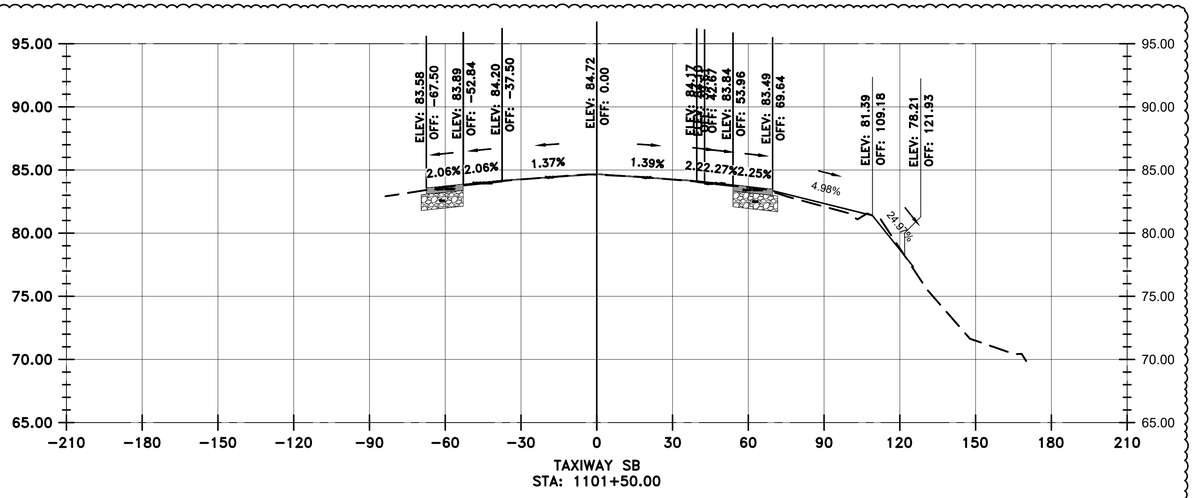

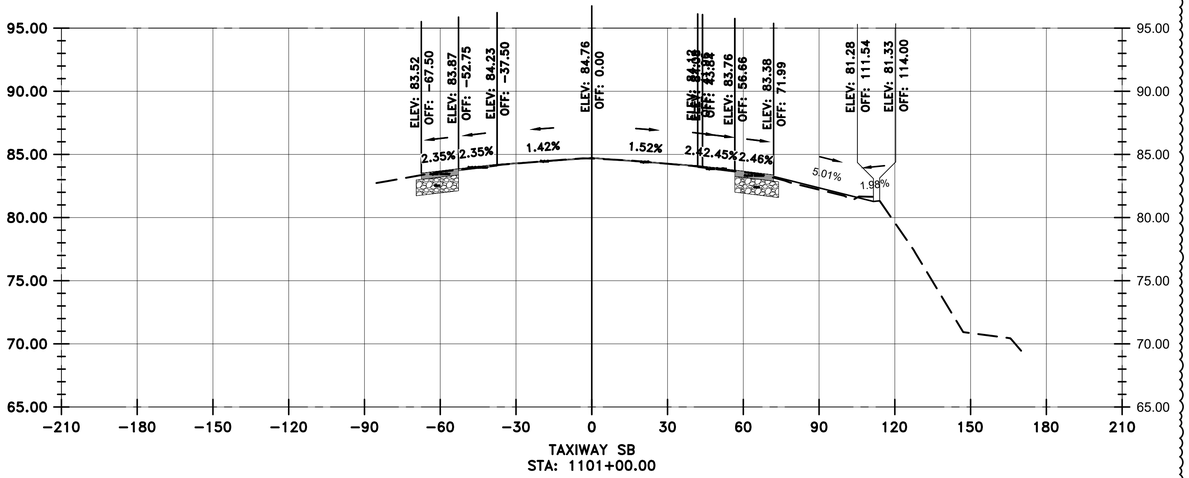

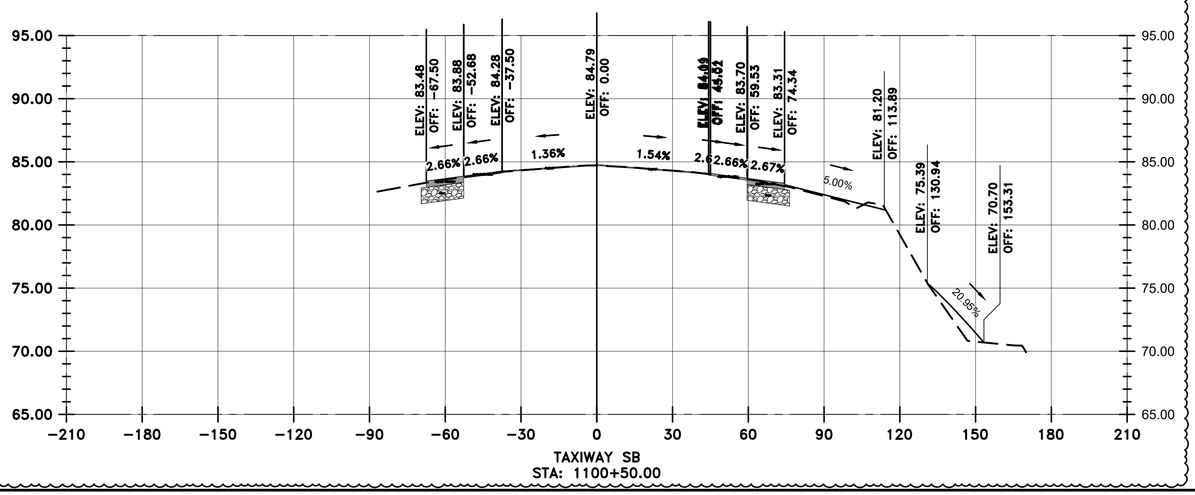

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 60

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.60

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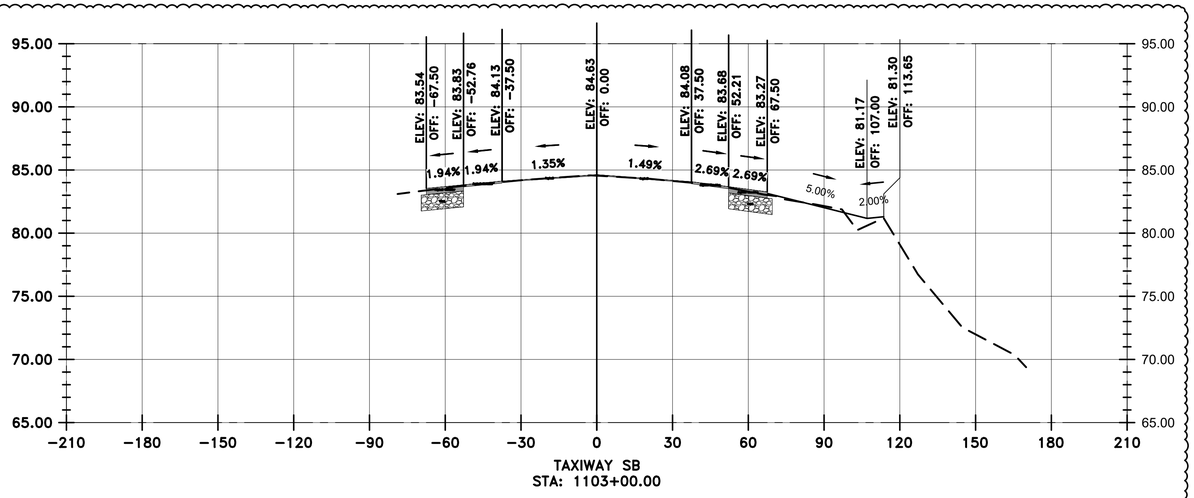

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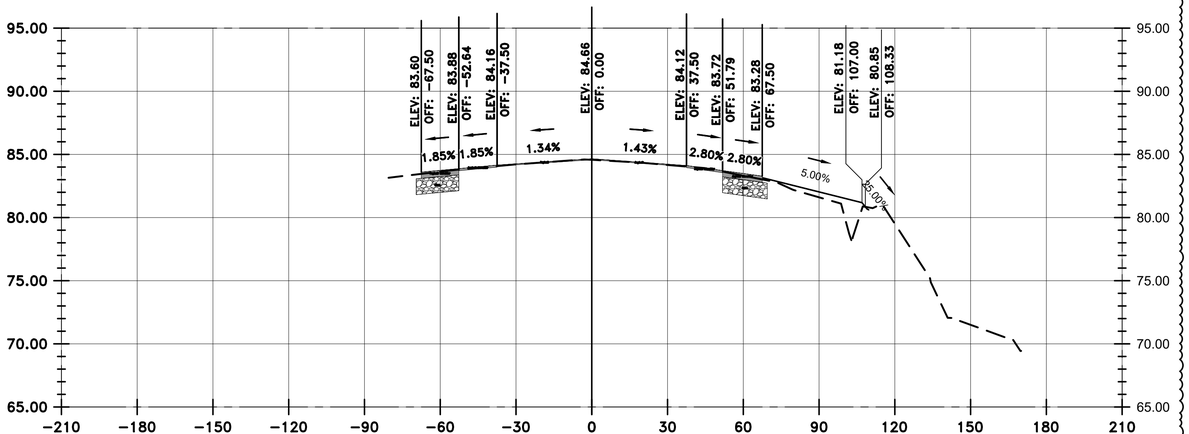
STA: 1103+00.00



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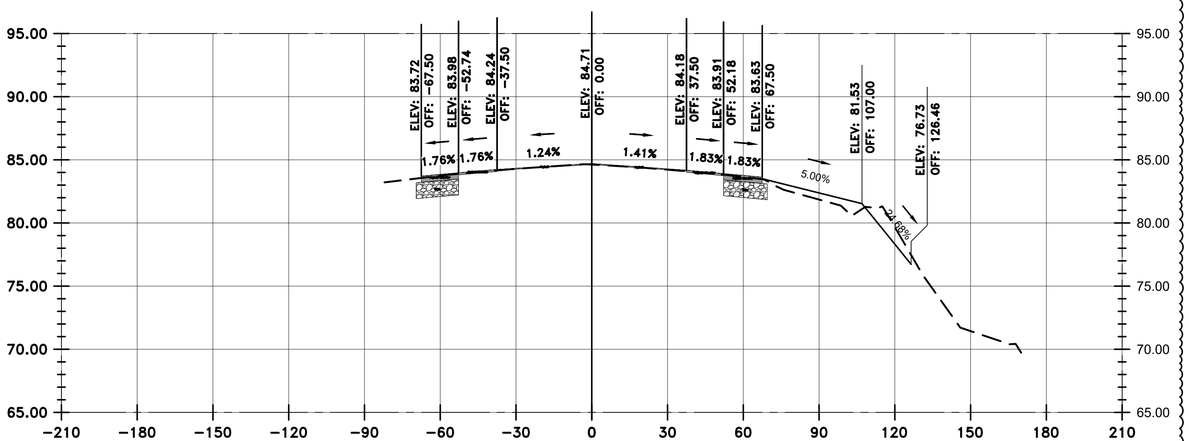
STA: 1102+50.00



TAXIWAY SB
STA: 1102+00.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 61

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.61

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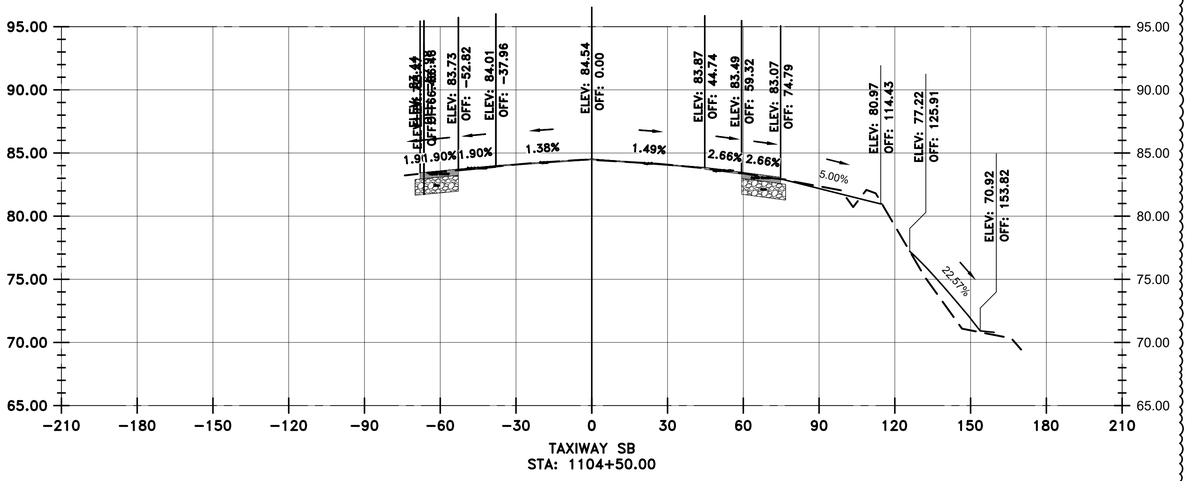

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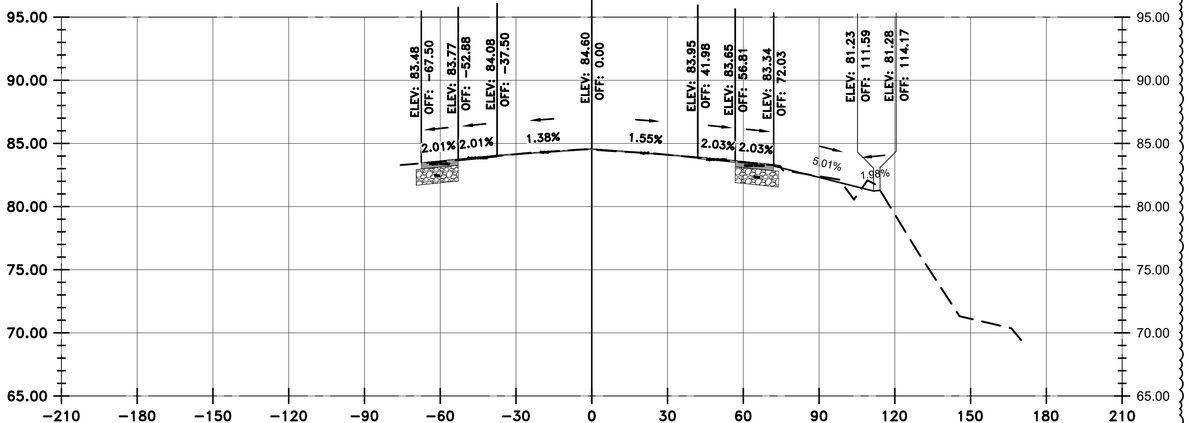
STA: 1104+50.00



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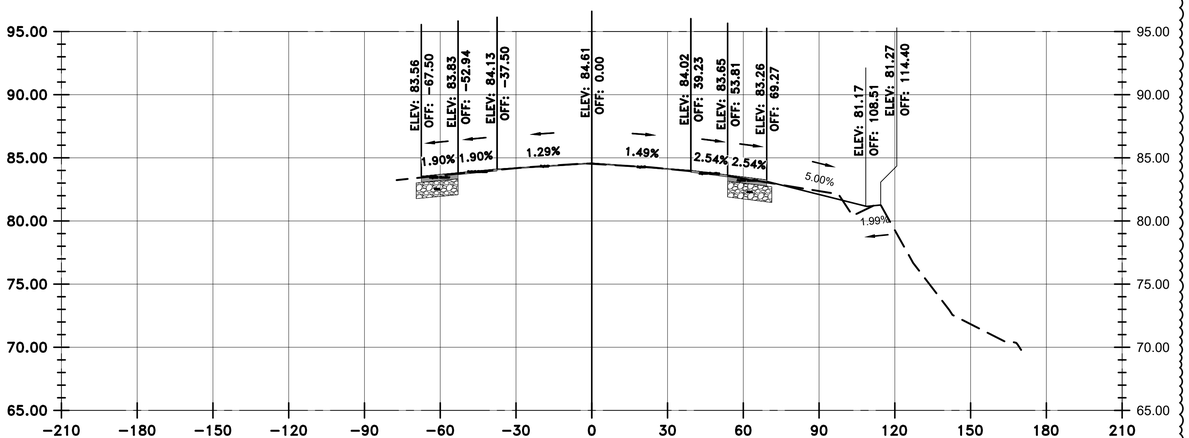

TAXIWAY SB
STA: 1103+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 62

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.62

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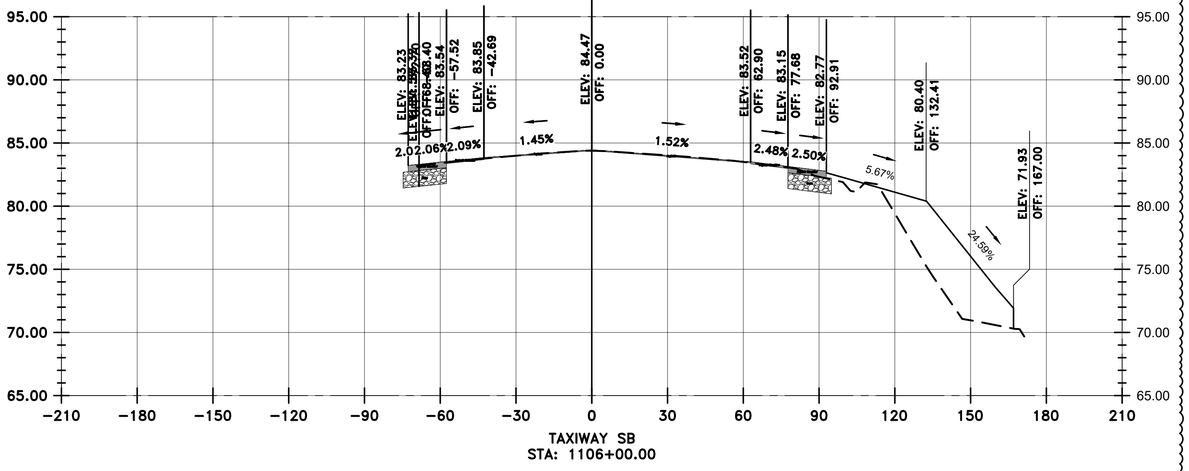

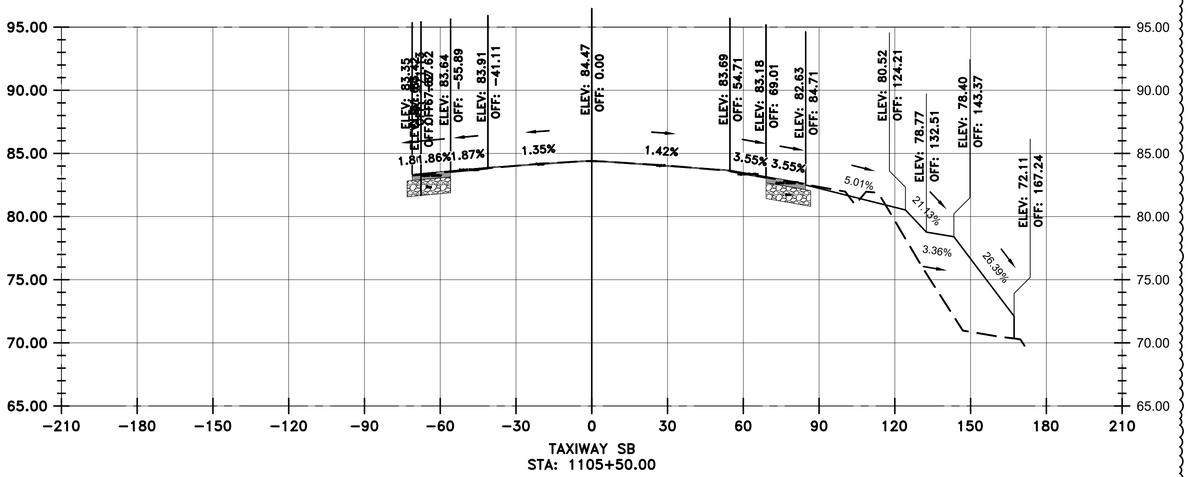

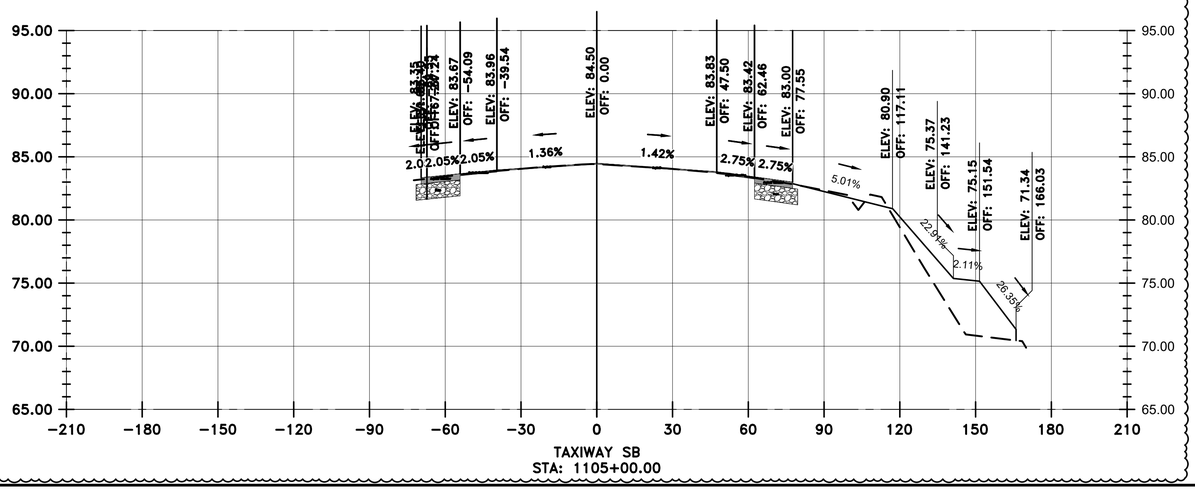

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
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(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 63

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.63

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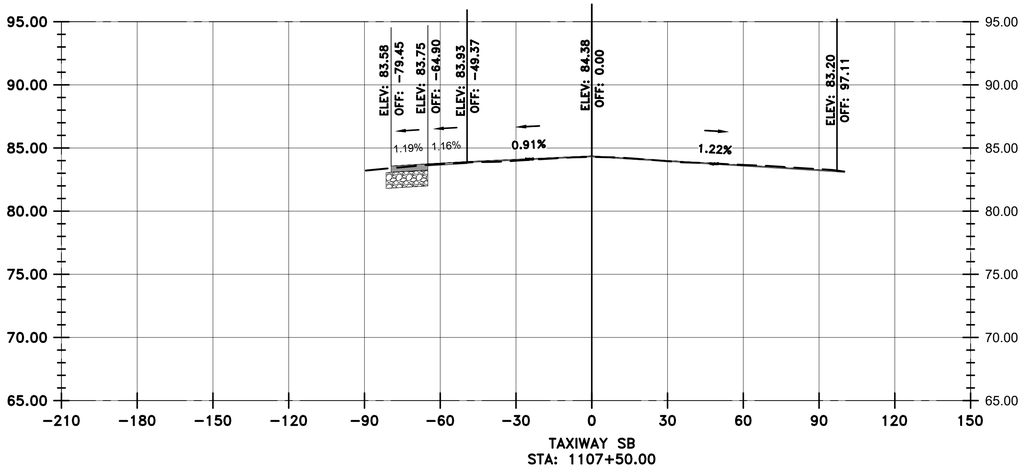
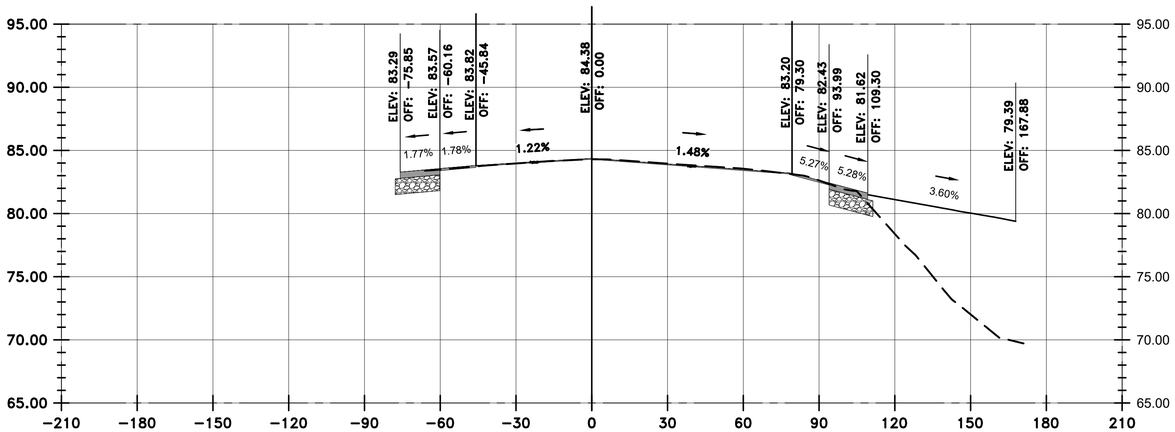
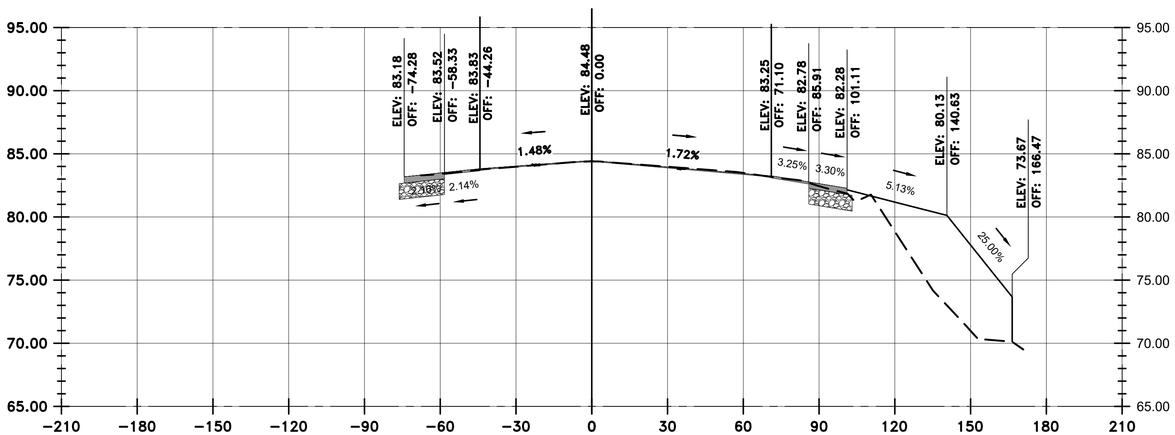


TAXIWAY SB
STA: 1107+50.00



TAXIWAY SB
STA: 1107+00.00



TAXIWAY SB
STA: 1106+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 64

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO. 0646A
A.I.P. NO. XXXX
C.I.P. NO. A-0515
H.A.S. NO. 20C0646A
SHEET NO. **X02.64**

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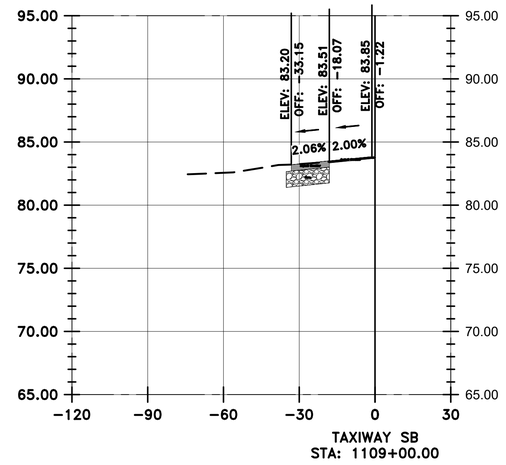
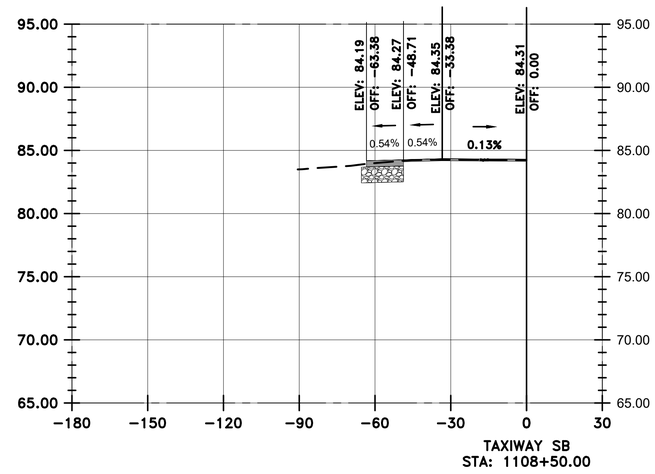
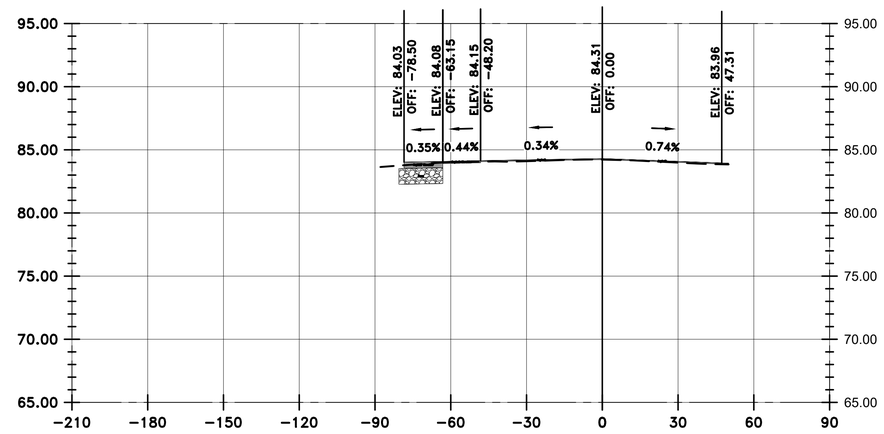
PLOT DATE: 11/8/2019 3:32:47 PM



TAXIWAY SB
STA: 1109+00.00



TAXIWAY SB
STA: 1108+50.00



TAXIWAY SB
STA: 1108+00.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SB CROSS SECTIONS 65

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X02.65

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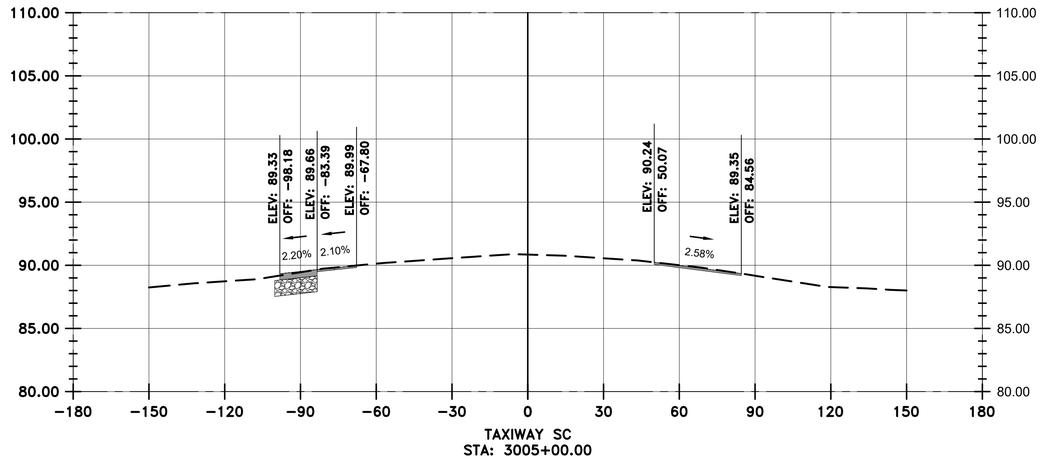

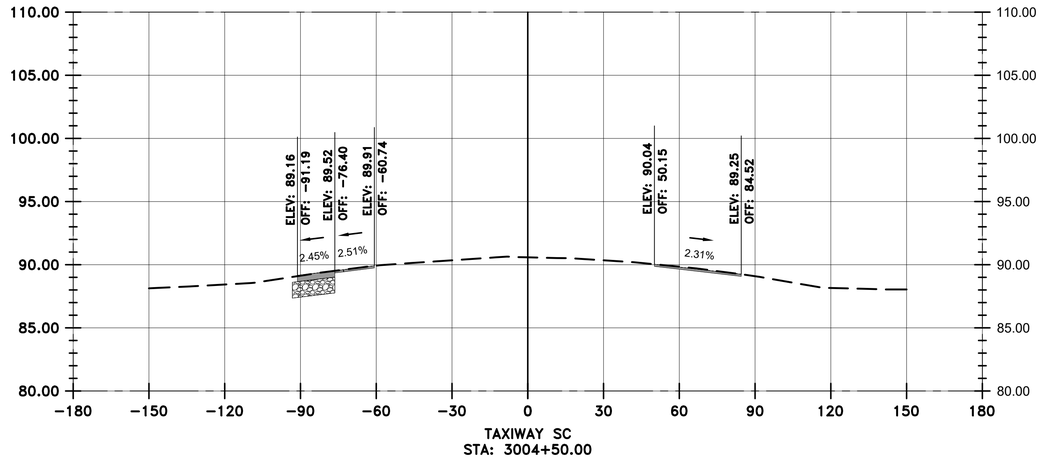

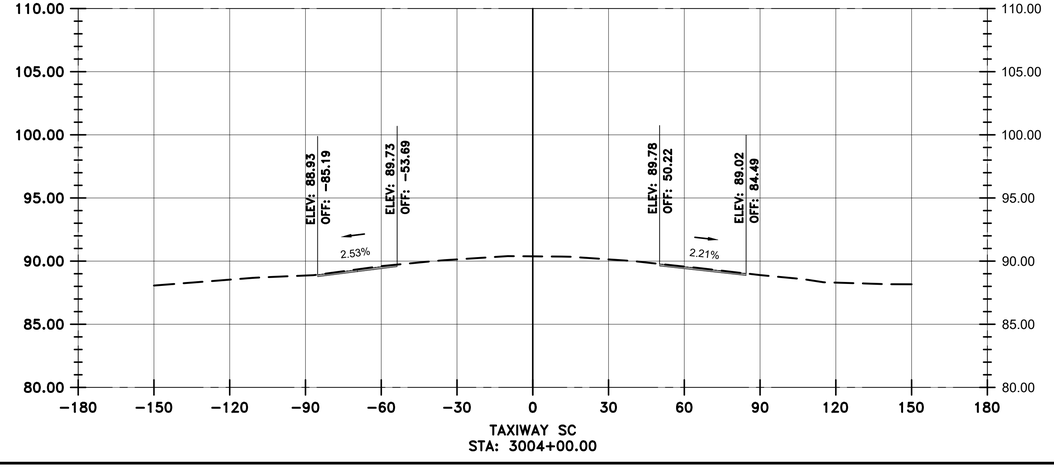

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SC CROSS SECTIONS 2

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X03.02

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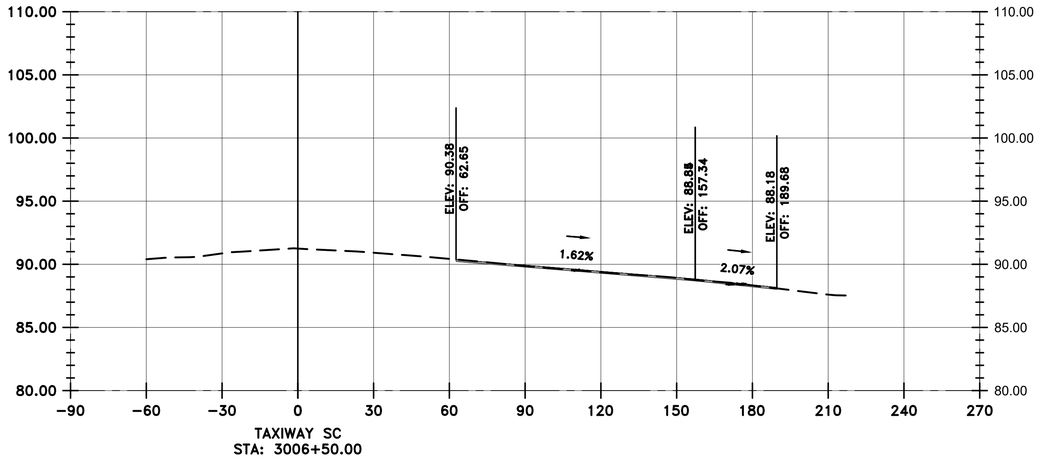

TAXIWAY SC
STA: 3006+50.00

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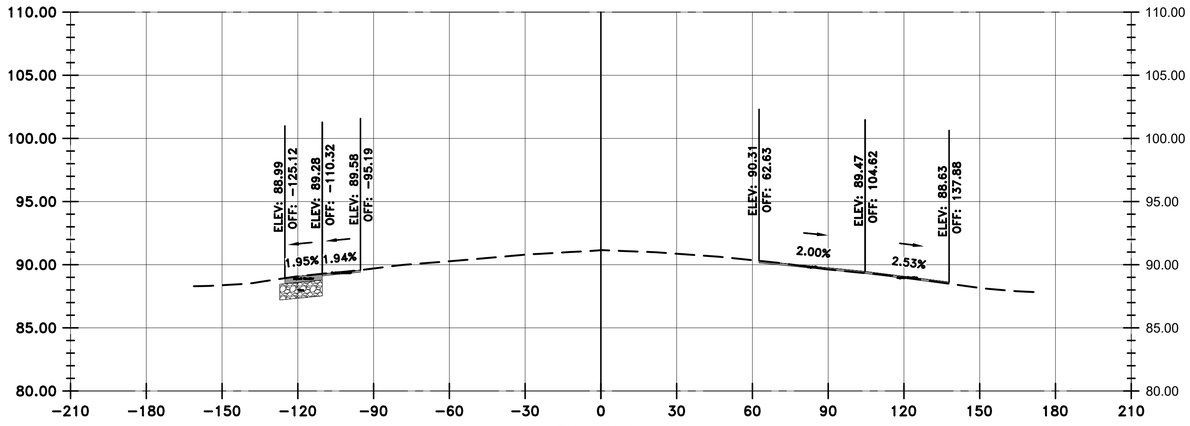
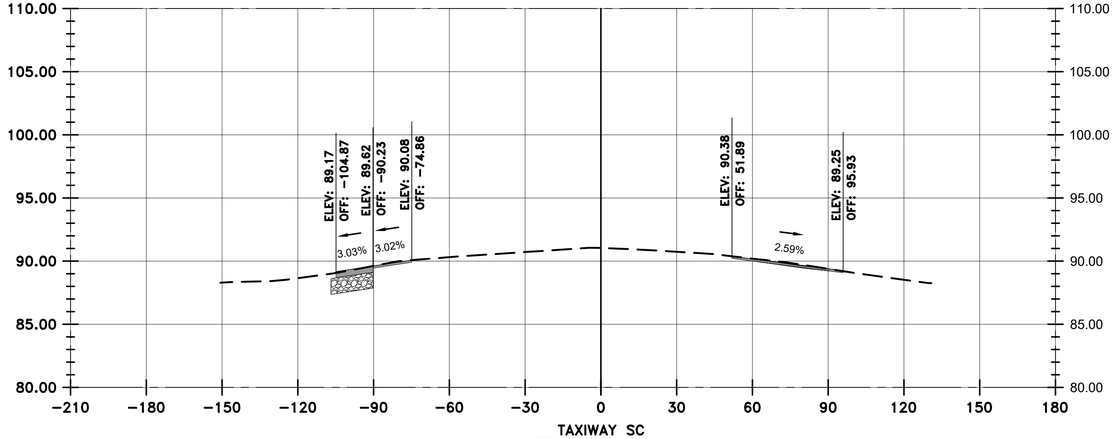


TAXIWAY SC
STA: 3006+00.00



TAXIWAY SC
STA: 3005+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

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12141 Wickchester Lane
Suite 640
Houston, TX 77079
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TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SC CROSS SECTIONS 3

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER

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DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X03.03

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
PLOT DATE: 11/8/2019 3:32:47 PM

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

VERTICAL EXAGGERATION = 5

HOUSTON AIRPORTS

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Suite 640
Houston, TX 77079
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TBPE Registration No. F-5713

REVISIONS			
NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SC CROSS SECTIONS 5

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
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PROFESSIONAL ENGINEER
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APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X03.05

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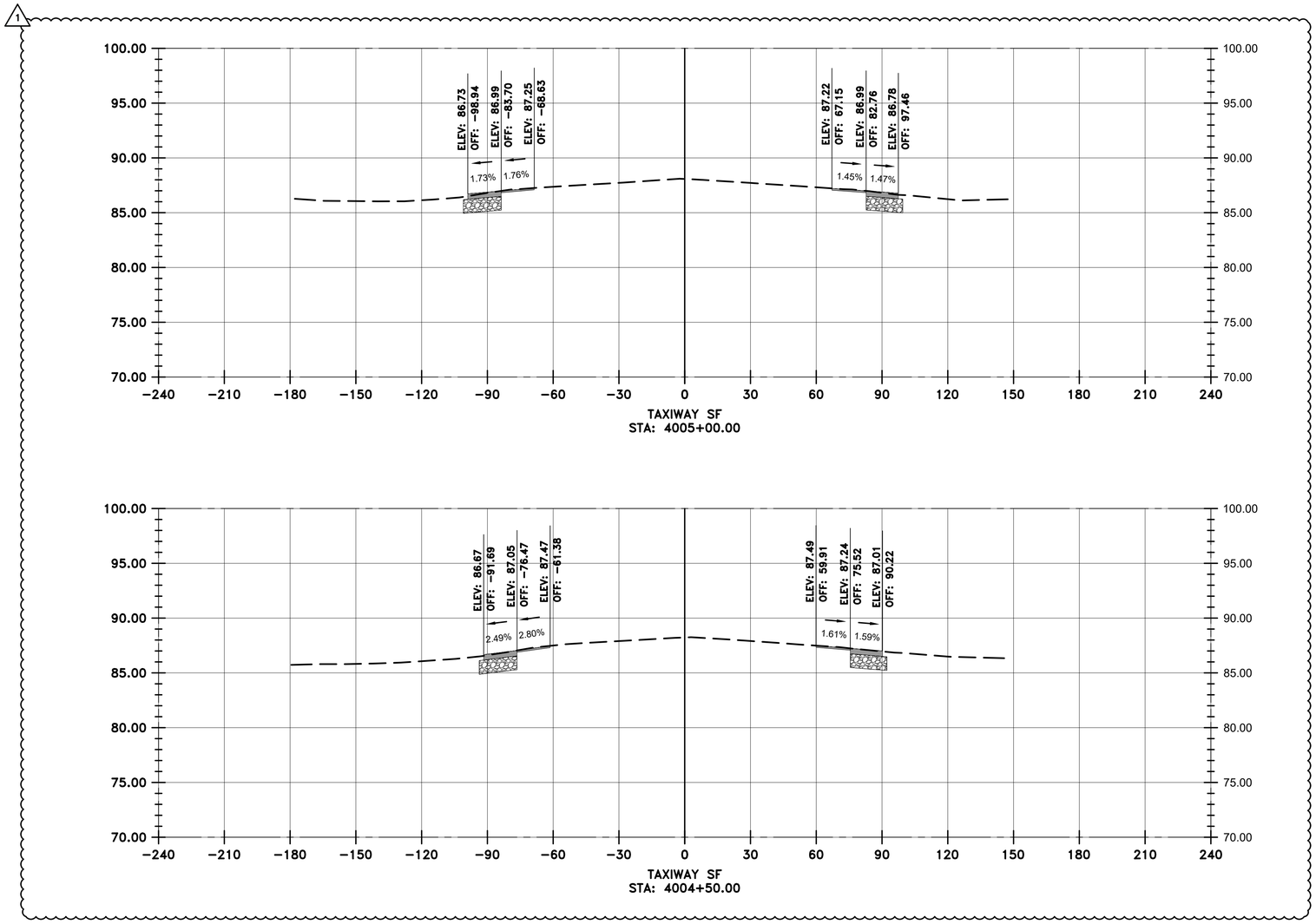

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

VERTICAL EXAGGERATION = 5

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SF CROSS SECTIONS 2

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X04.02

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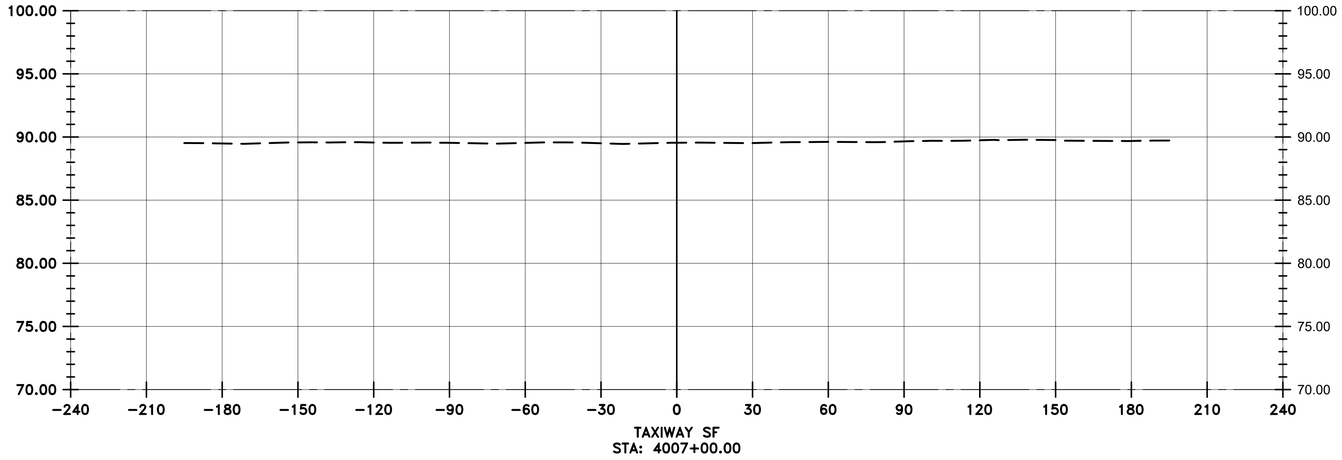

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STA: 4007+00.00

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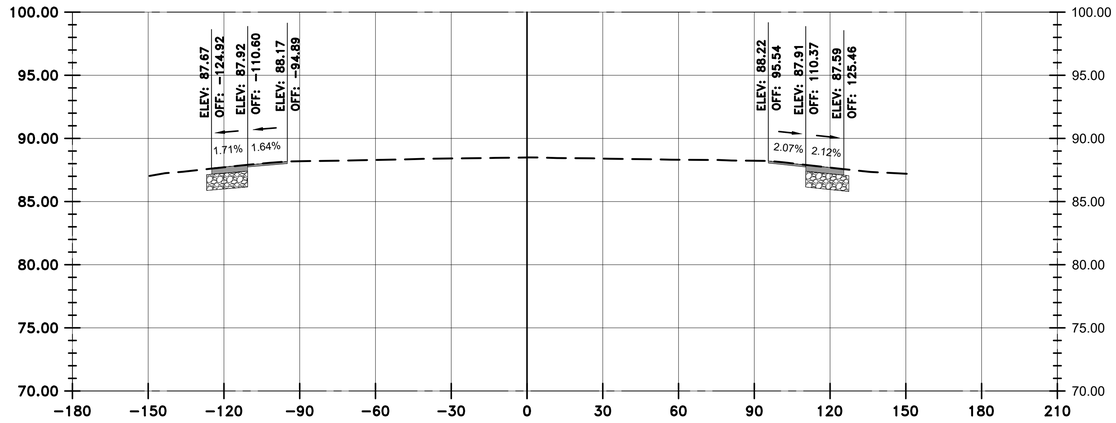
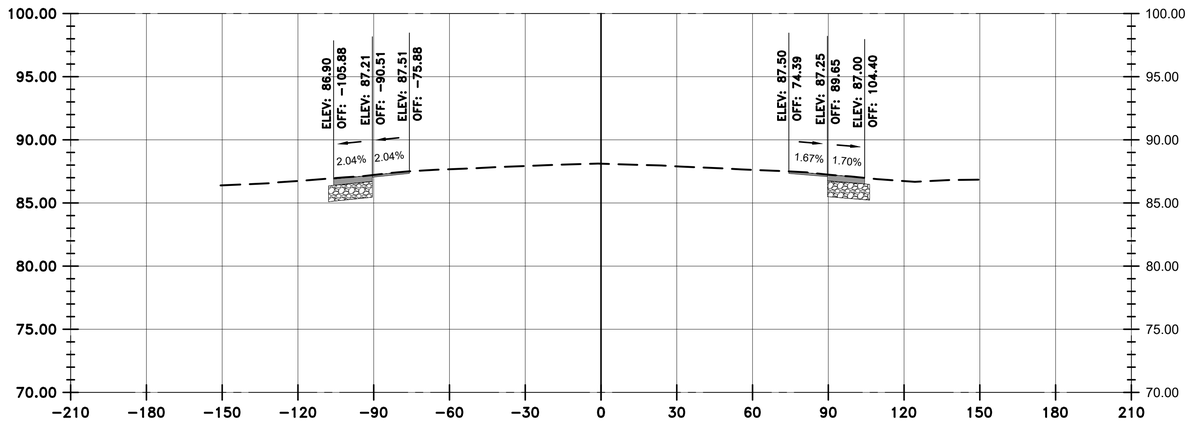


TAXIWAY SF
STA: 4006+00.00



TAXIWAY SF
STA: 4005+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SF CROSS SECTIONS 3

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X04.03

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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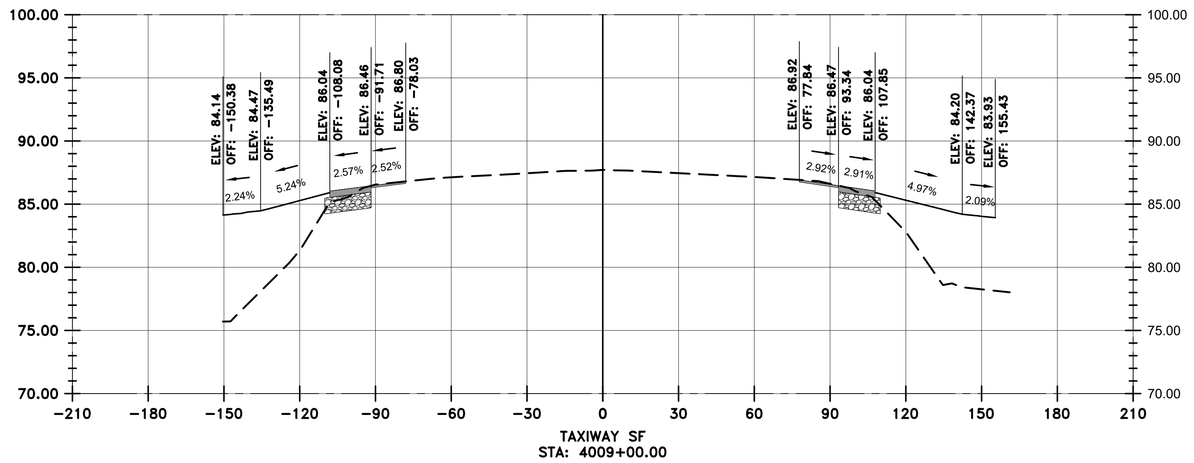

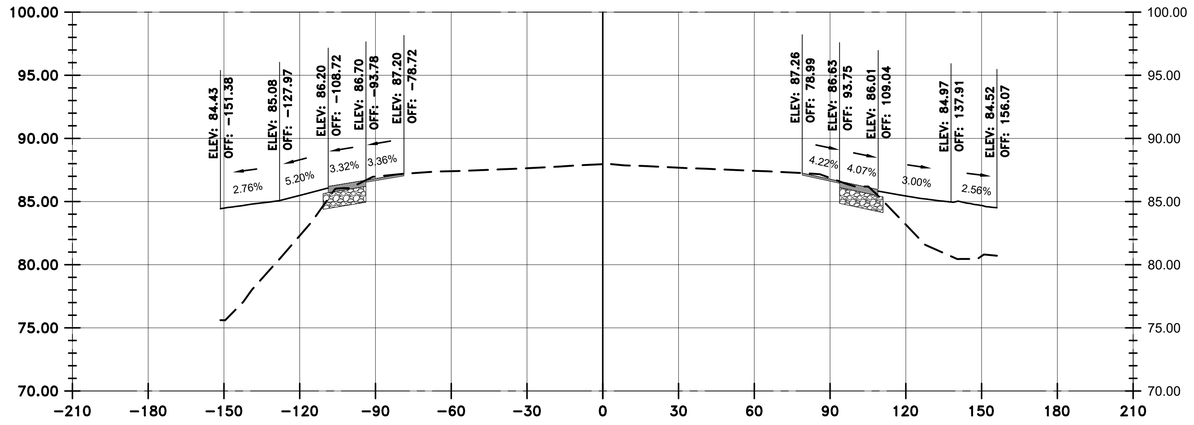

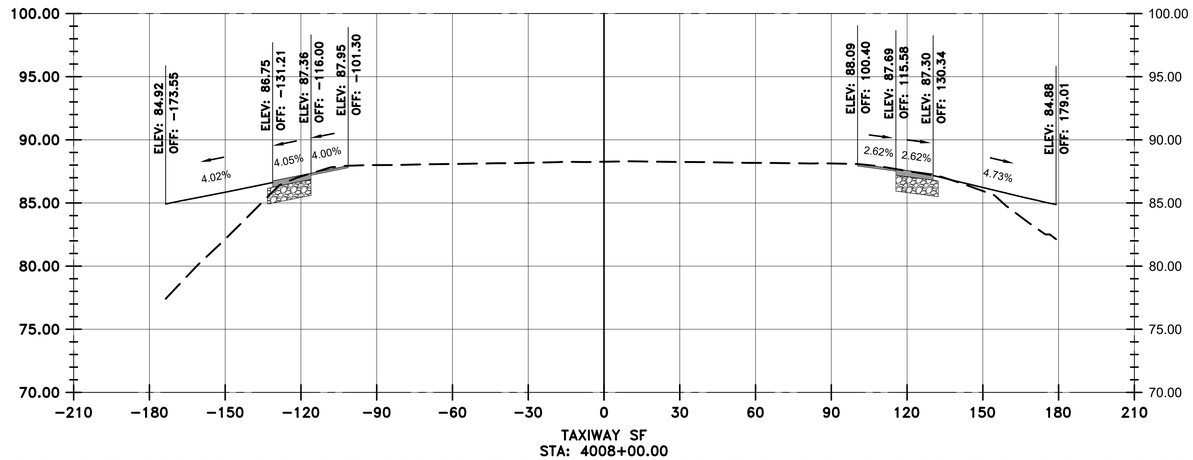

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

VERTICAL EXAGGERATION = 5

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SF CROSS SECTIONS 4

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X04.04

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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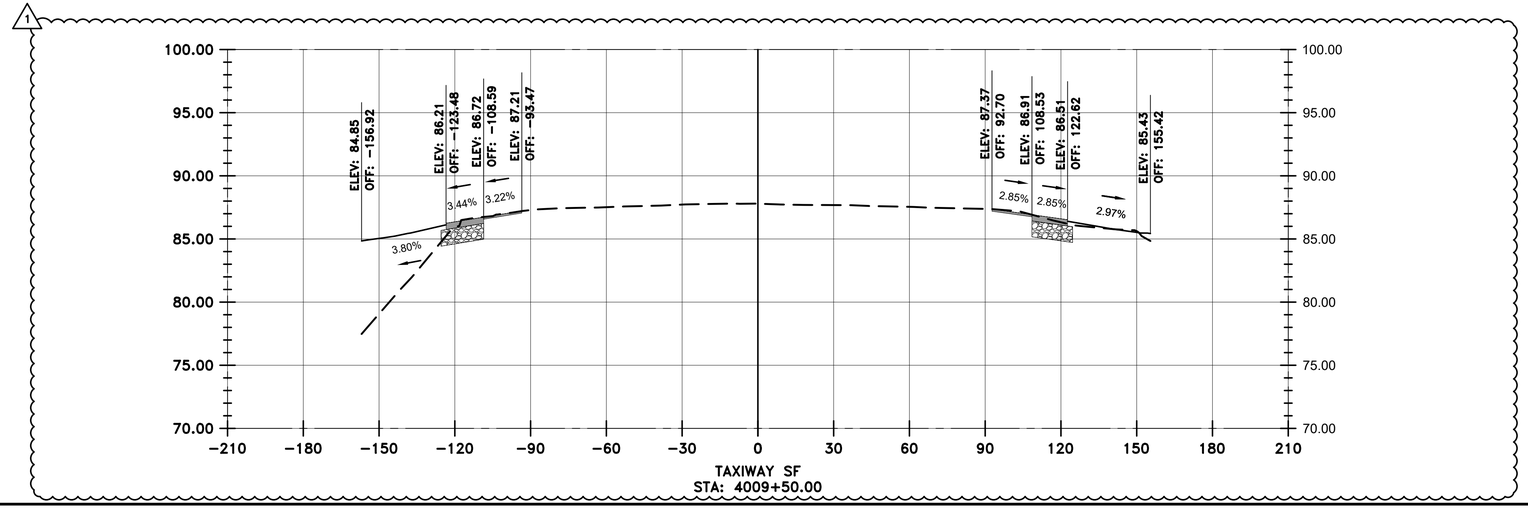
LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE



VERTICAL EXAGGERATION = 5

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SF CROSS SECTIONS 5

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED
PROFESSIONAL ENGINEER

Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X04.05

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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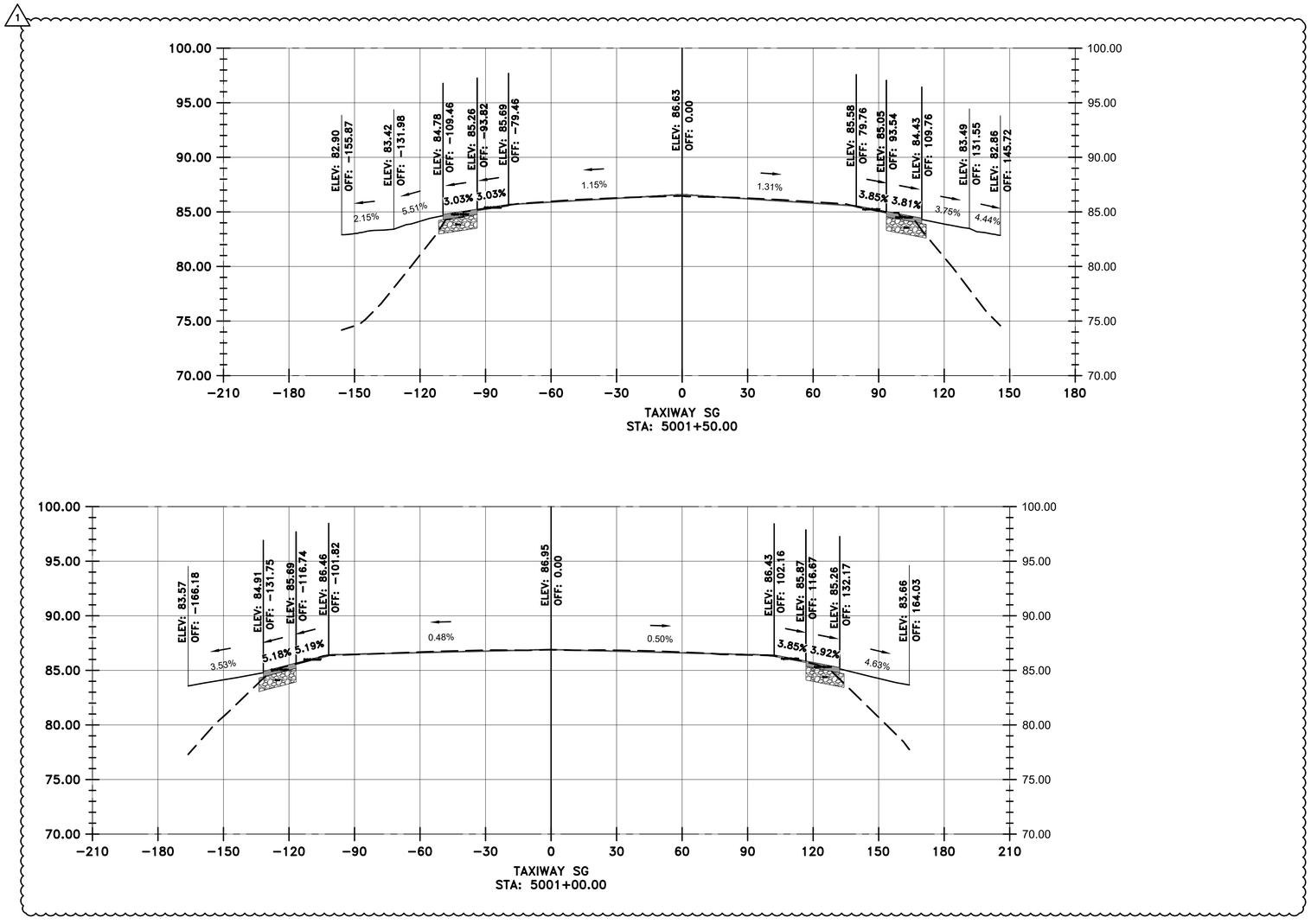


LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

VERTICAL EXAGGERATION = 5

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SG CROSS SECTIONS 1

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

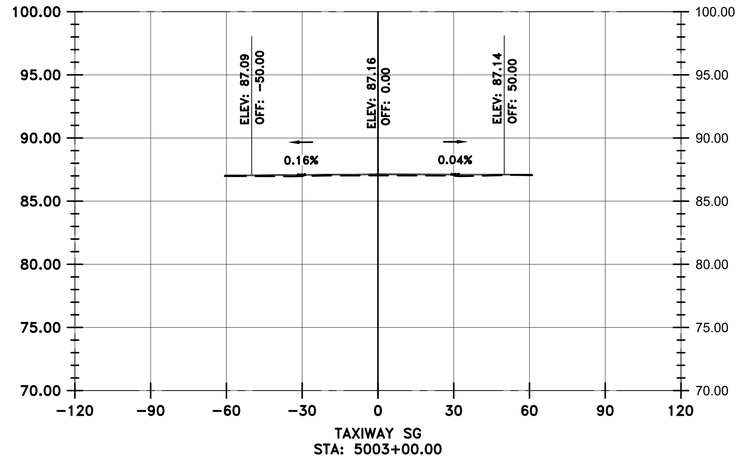
STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X05.01

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typical Sections\Model Files\0646CSC.dwg
PLOT DATE: 11/8/2019 3:32:47 PM



TAXIWAY SG
STA: 5003+00.00

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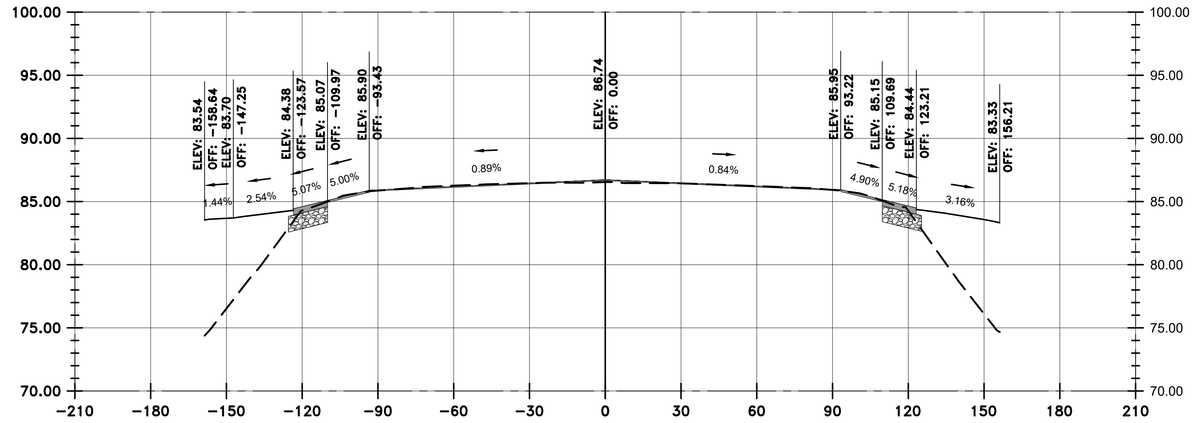
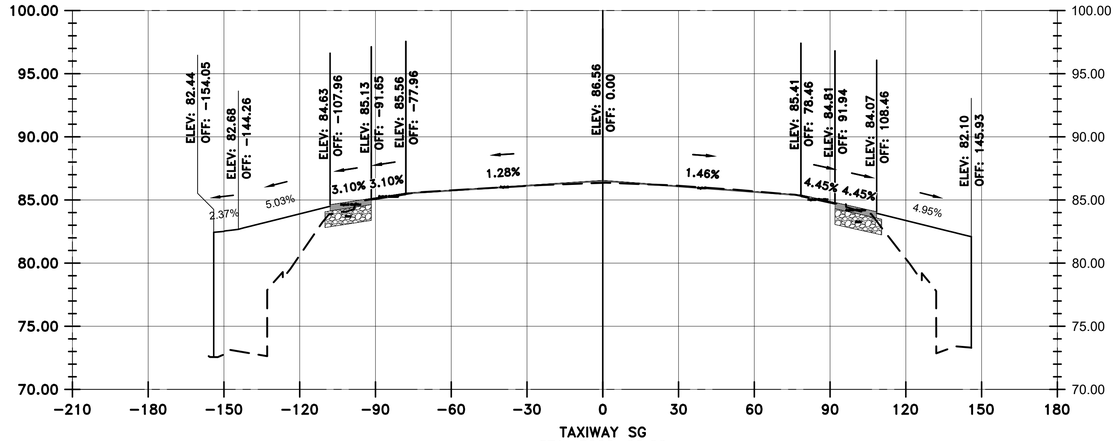


TAXIWAY SG
STA: 5002+50.00



TAXIWAY SG
STA: 5002+00.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS
GARVER
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(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SG CROSS SECTIONS 2

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X05.02

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typcial Sections\Model Files\0646GSC.dwg
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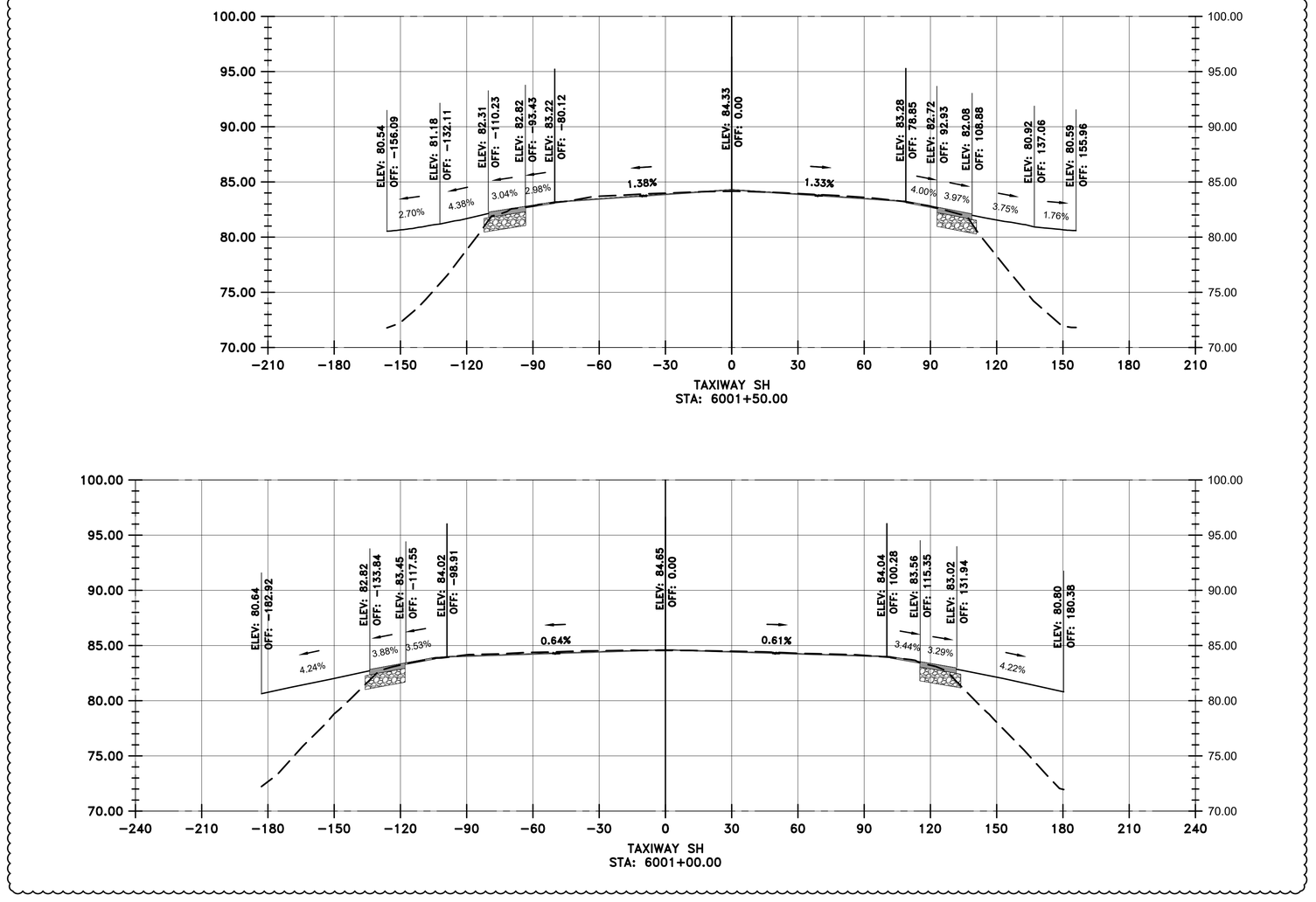

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED ASPHALT
- PROPOSED AGGREGATE BASE

HOUSTON AIRPORTS

GARVER
12141 Wickchester Lane
Suite 640
Houston, TX 77079
(713) 491-8333
TBPE Registration No. F-5713

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADD. 2	07/24/23	JEF

GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SH CROSS SECTIONS 1

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
JASON E. FRANK
87979
LICENSED PROFESSIONAL ENGINEER
Digitally Signed 07/24/2023

APPROVED BY: JEF

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	0646A
A.I.P. NO.	XXXX
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X06.01

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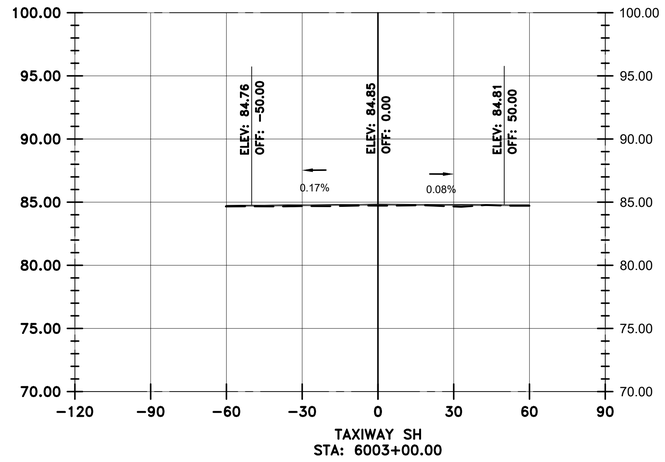

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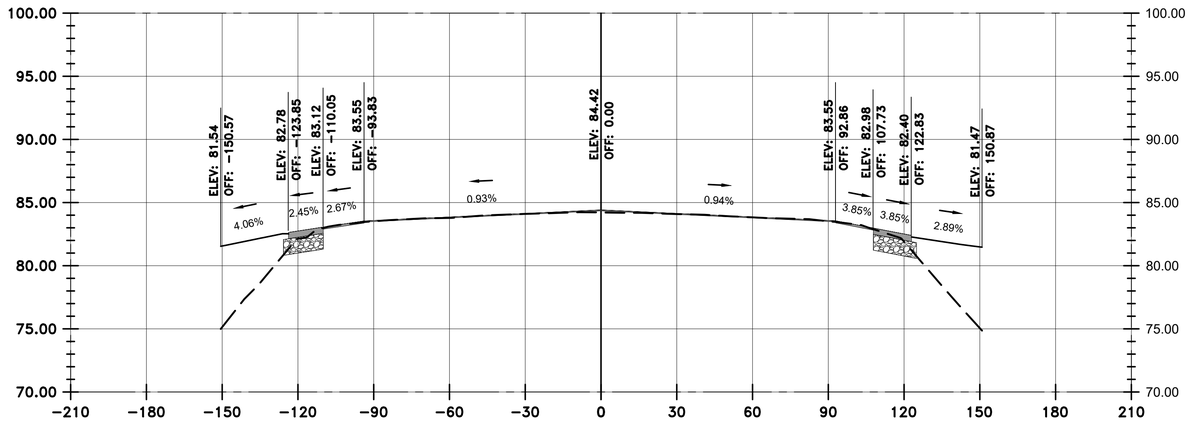

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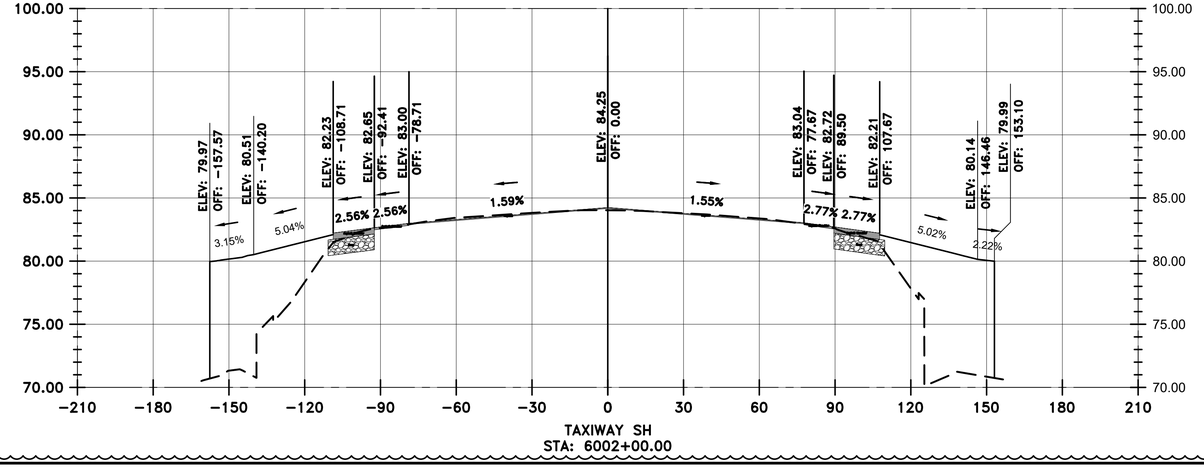

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STA: 6002+00.00

VERTICAL EXAGGERATION = 5

LEGEND

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GEORGE BUSH INTERCONTINENTAL AIRPORT
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SH CROSS SECTIONS 2

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	########
DATE:	07/21/2023

STATE OF TEXAS
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H.A.S. NO.	20C0646A
SHEET NO.	X06.02

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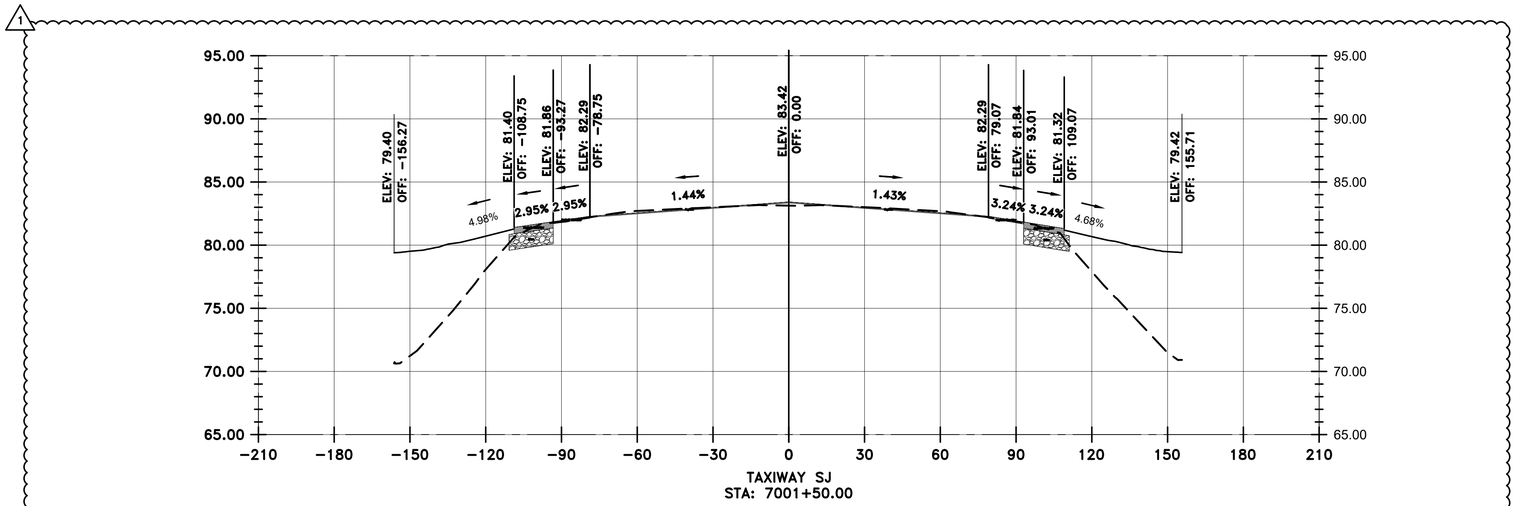

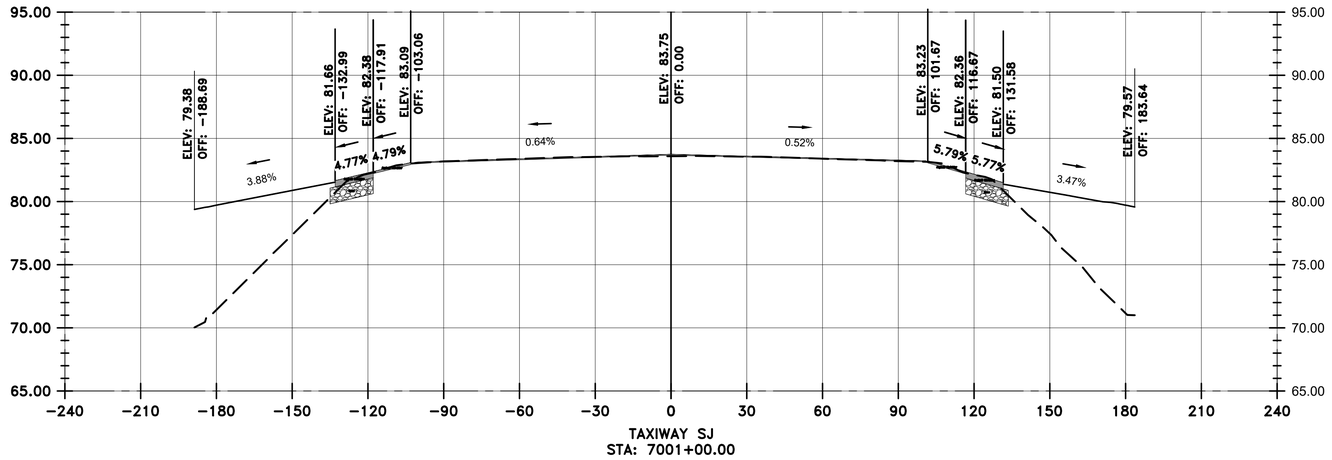

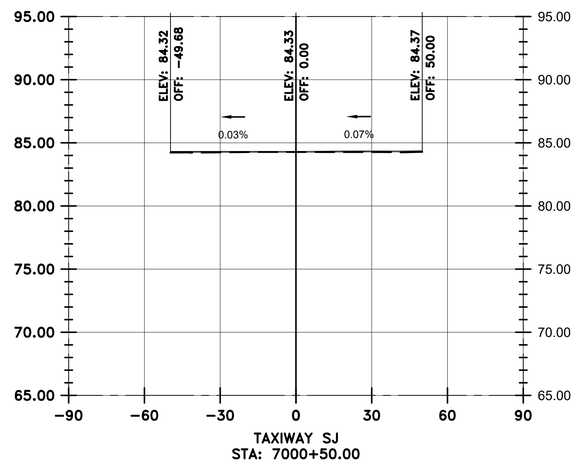

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- PROPOSED AGGREGATE BASE

VERTICAL EXAGGERATION = 5

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GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SJ CROSS SECTIONS 1

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DESIGNER:	KKR
DRAWN BY:	DAG
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STATE OF TEXAS
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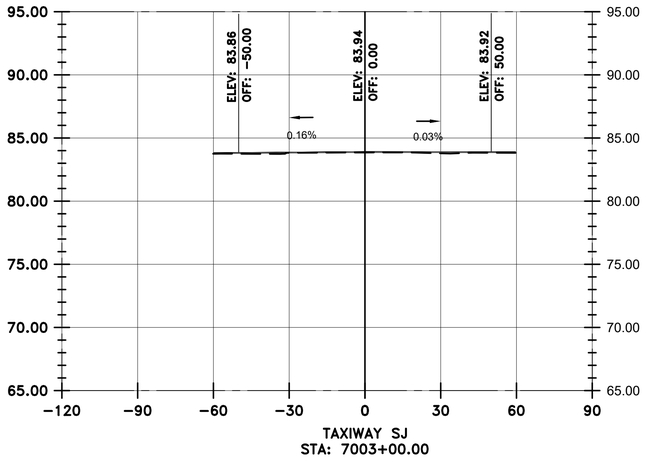

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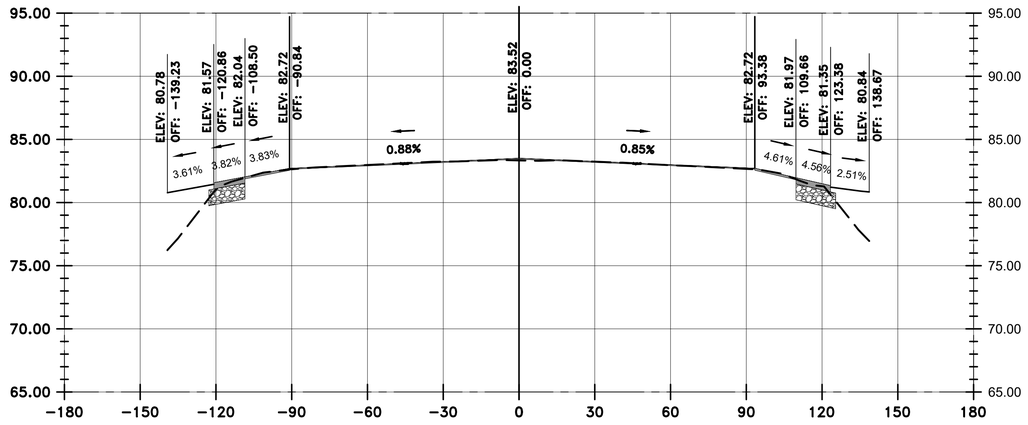

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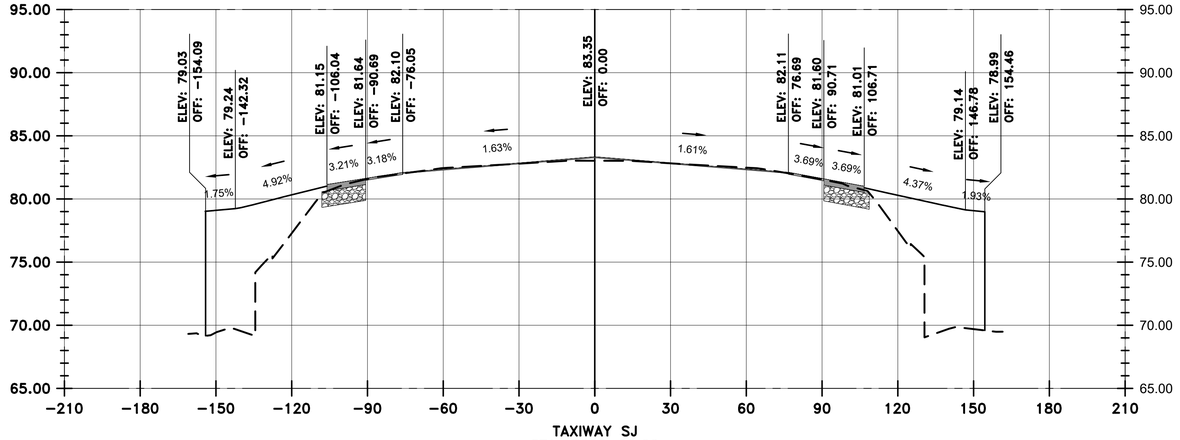

TAXIWAY SJ
STA: 7002+00.00

VERTICAL EXAGGERATION = 5

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GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SJ CROSS SECTIONS 2

PROJECT MGR:	JEF
DESIGNER:	KKR
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SCALE:	########
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SHEET NO.	X07.02

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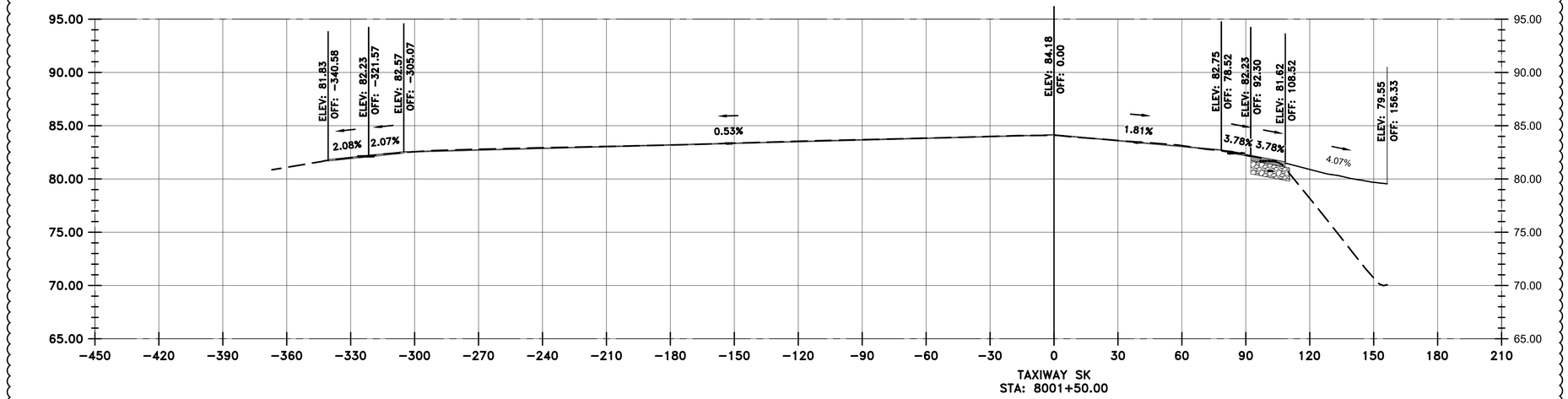

LEGEND

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VERTICAL EXAGGERATION = 5

HAS FILE: c:\Users\dagranato\onedrive - garver\0646.2\06 - Typcial Sections\Model Files\0646CSC.dwg
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GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SK CROSS SECTIONS 1

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DATE:	07/21/2023

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APPROVED BY:	JEF

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PROJECT NO.	0646A
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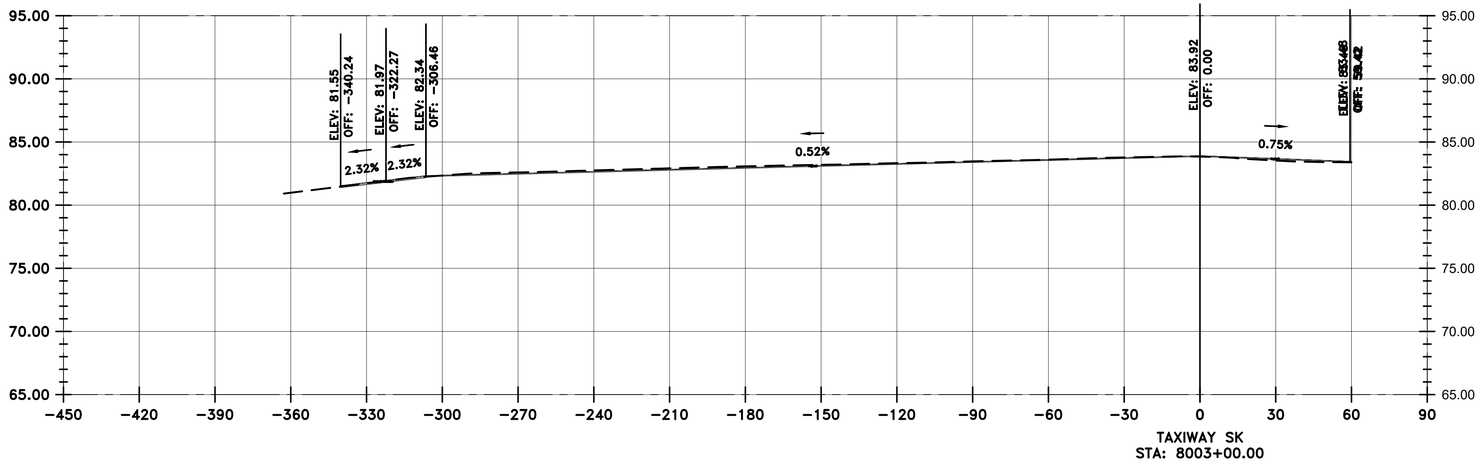
C.I.P. NO.	A-0515
H.A.S. NO.	20C0646A
SHEET NO.	X08.01



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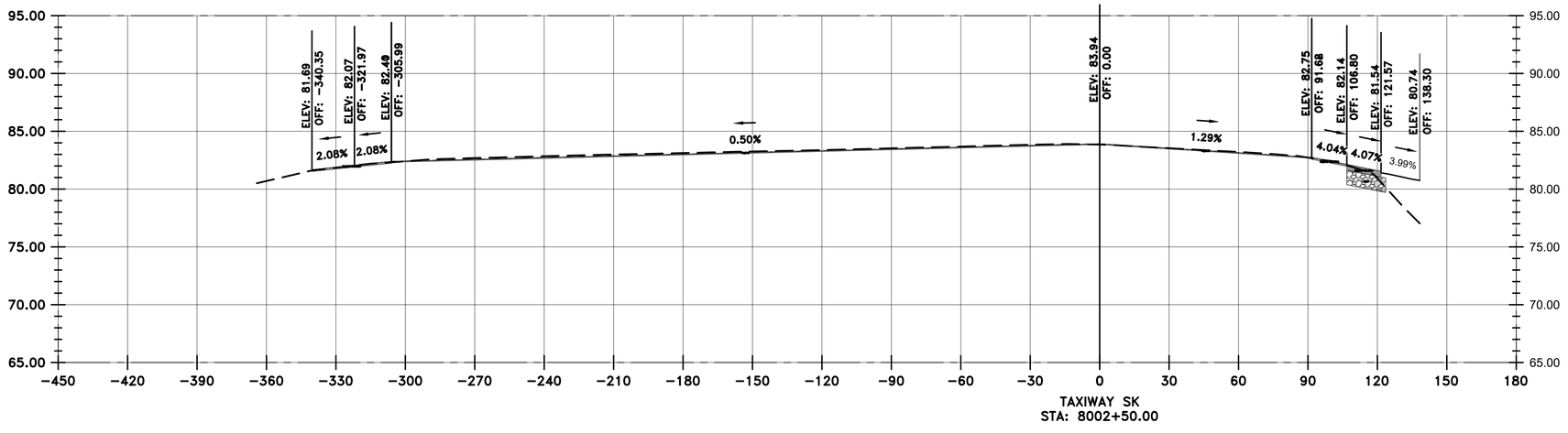

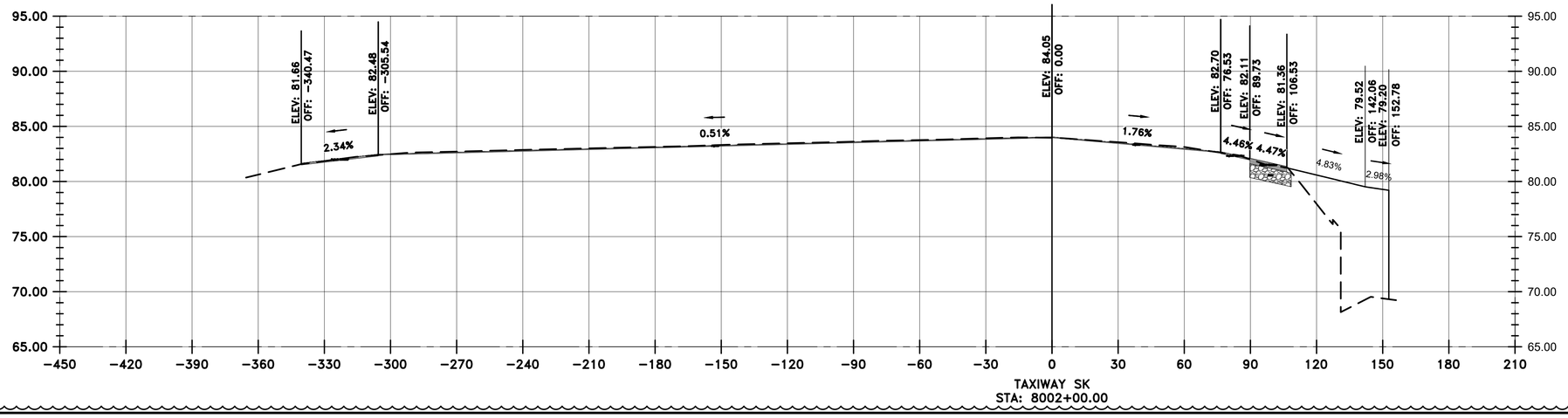

VERTICAL EXAGGERATION = 5

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GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SK CROSS SECTIONS 2

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DESIGNER:	KKR
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SHEET NO.	X08.02

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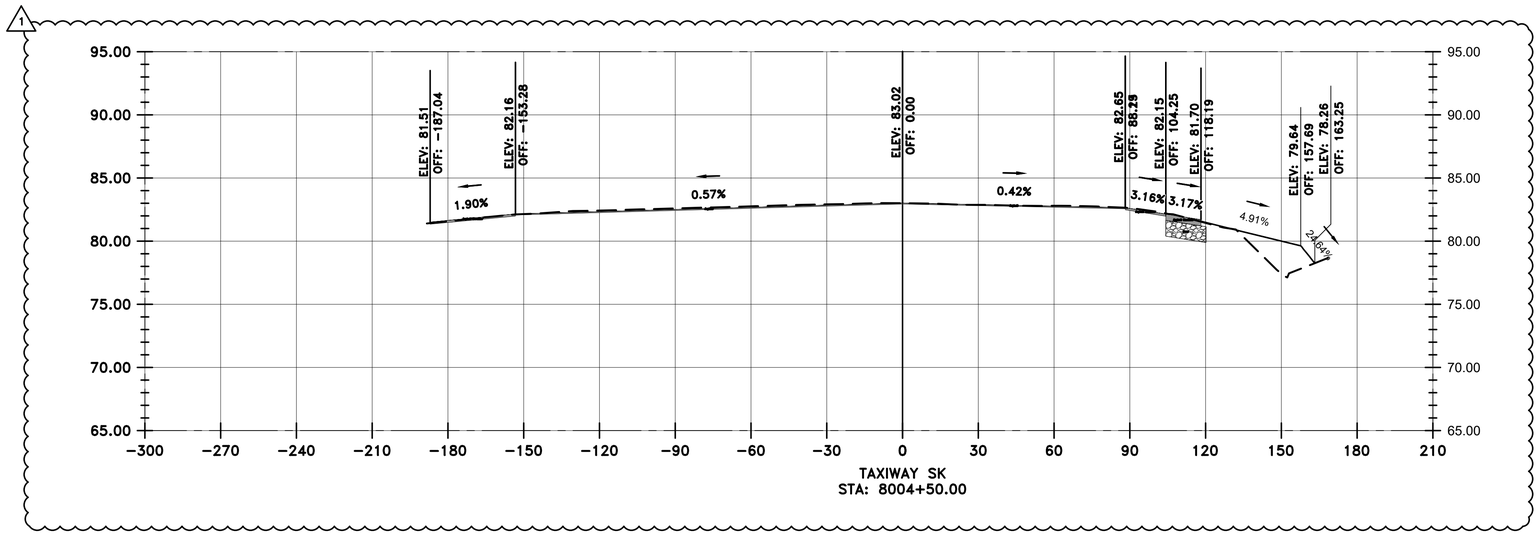

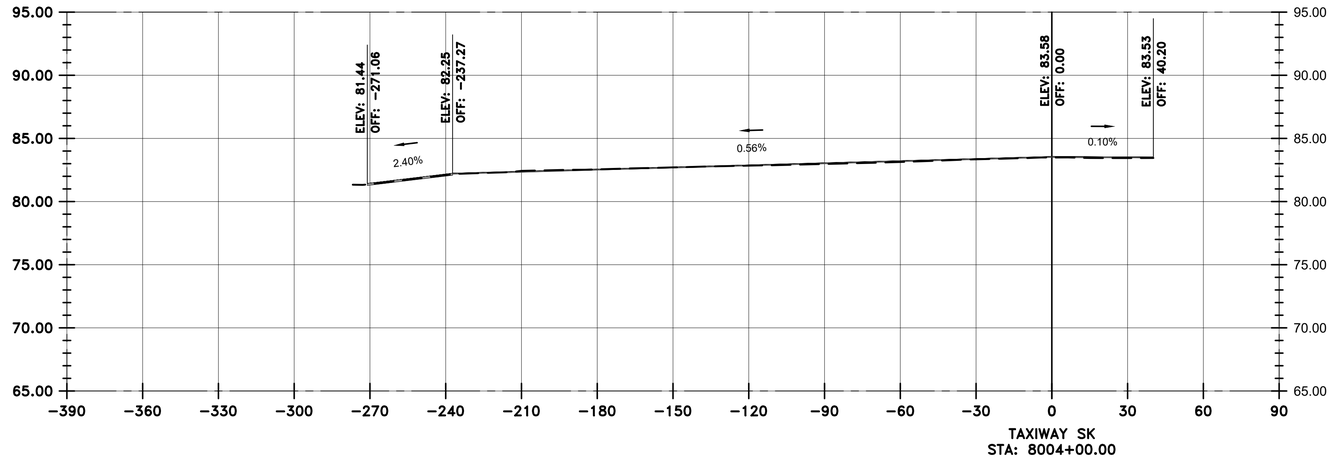

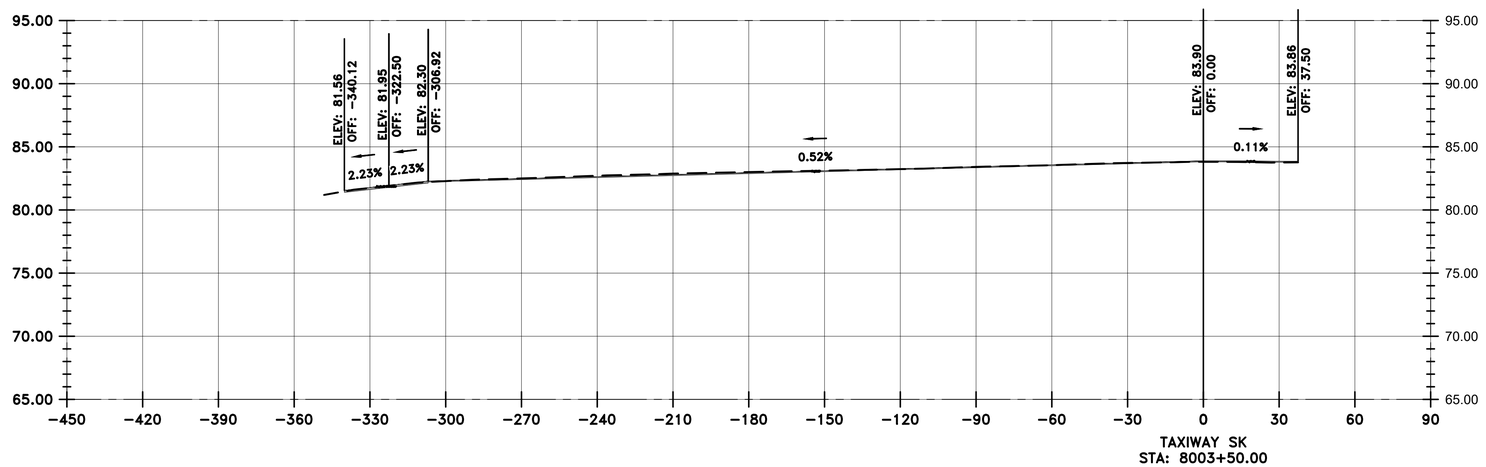

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SK CROSS SECTIONS 3

PROJECT MGR:	JEF
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SHEET NO.	X08.03

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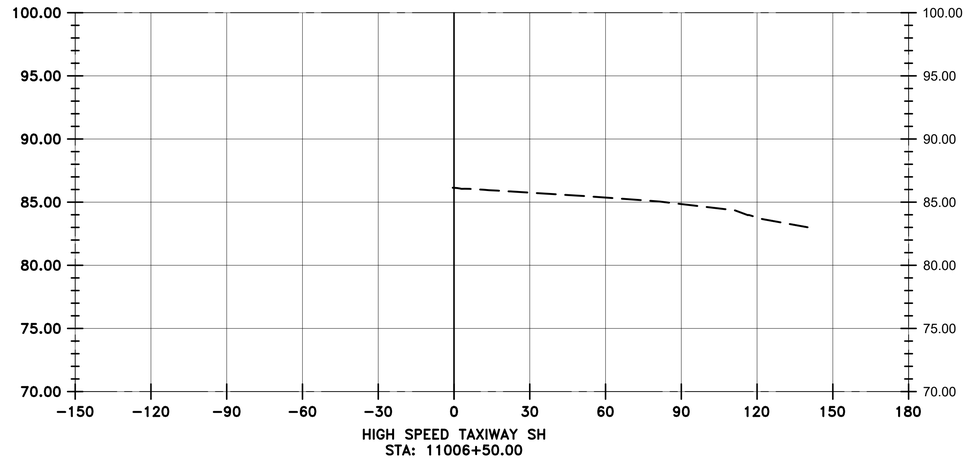

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STA: 11006+50.00

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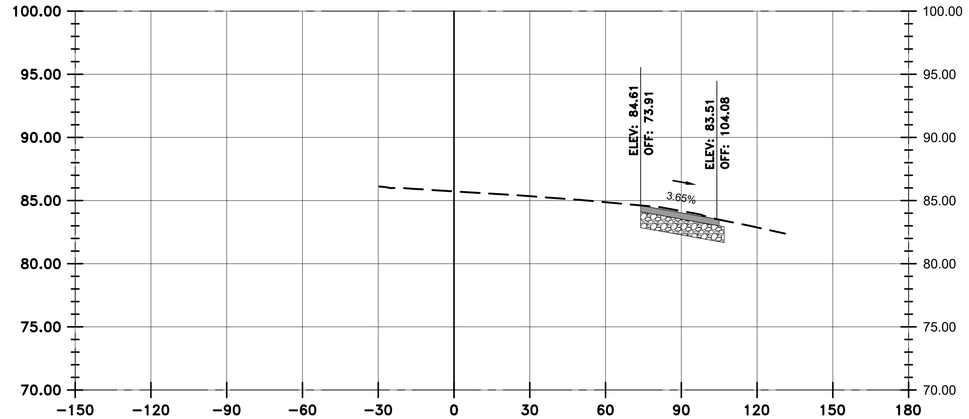

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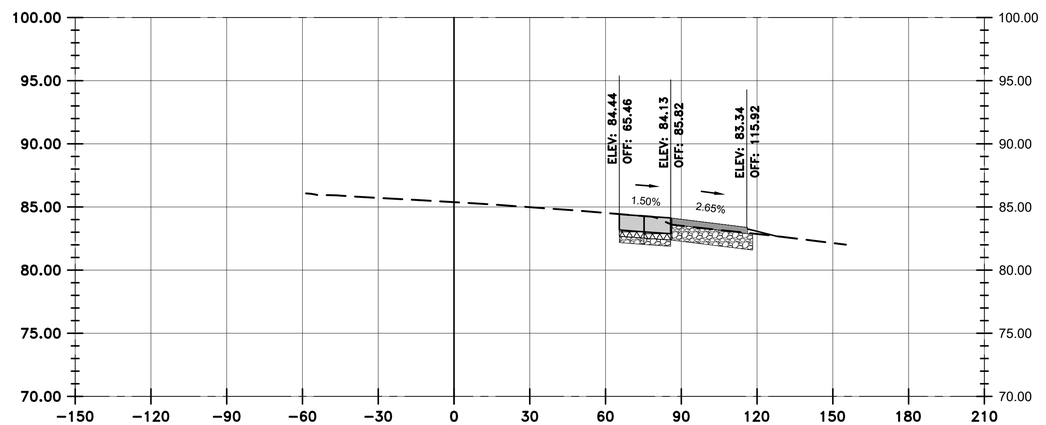

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STA: 11005+50.00

VERTICAL EXAGGERATION = 5

LEGEND

- EXISTING SURFACE
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- PROPOSED ASPHALT
- PROPOSED CONCRETE
- PROPOSED CEMENT TREATED BASE
- PROPOSED AGGREGATE BASE

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GEORGE BUSH INTERCONTINENTAL AIRPORT
REHABILITATION OF TAXIWAYS SA & SB

SH-HS CROSS SECTIONS 3

PROJECT MGR:	JEF
DESIGNER:	KKR
DRAWN BY:	DAG
CHECK BY:	JEF
SCALE:	1" = 30'
DATE:	07/21/2023

STATE OF TEXAS
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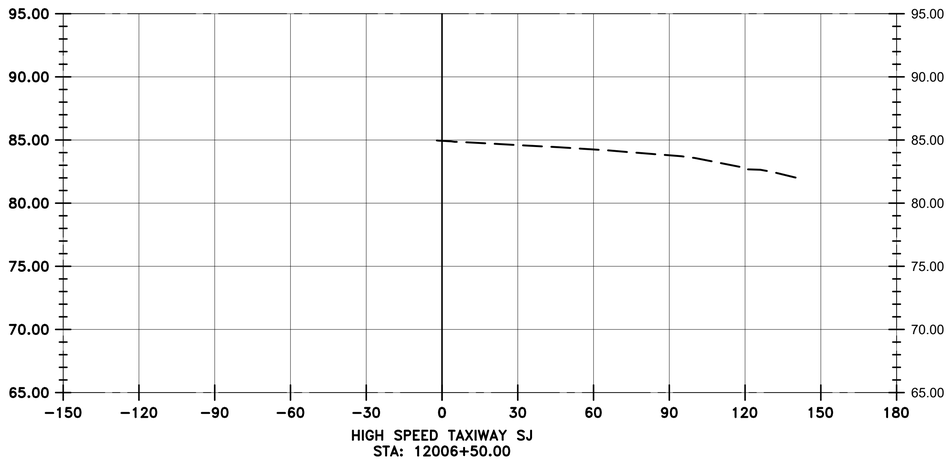

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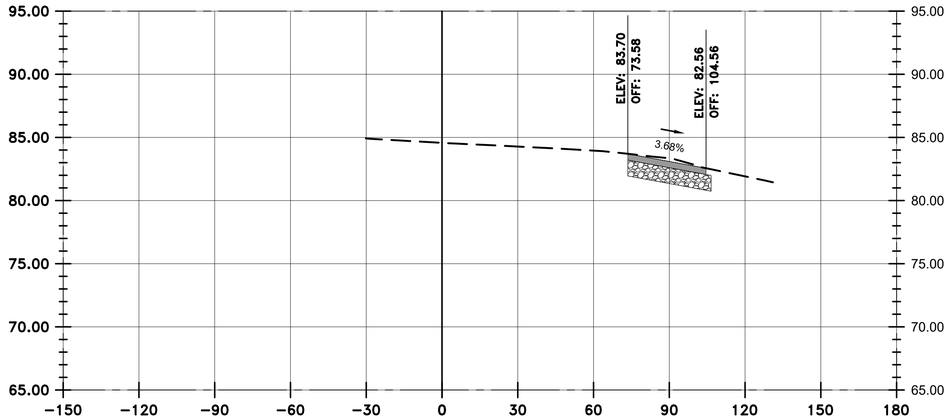

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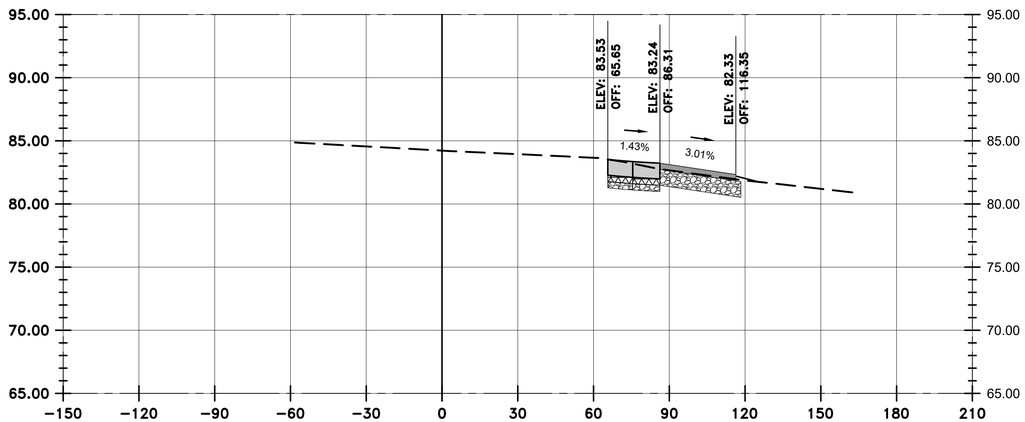

HIGH SPEED TAXIWAY SJ
STA: 12005+50.00

VERTICAL EXAGGERATION = 5

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SJ-HS CROSS SECTIONS 3

PROJECT MGR:	JEF
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ITEM P-209 CRUSHED AGGREGATE BASE COURSE

DESCRIPTION

209-1.1 This item consists of a base course composed of crushed aggregate base constructed on a prepared course in accordance with these specifications and in conformity to the dimensions and typical cross-sections shown on the plans.

MATERIALS

209-2.1 Crushed aggregate base. Crushed aggregate shall consist of clean, sound, durable particles of crushed stone, crushed gravel, and shall be free from coatings of clay, silt, organic material, clay lumps or balls or other deleterious materials or coatings. The method used to produce the crushed gravel shall result in the fractured particles in the finished product as consistent and uniform as practicable. Fine aggregate portion, defined as the portion passing the No. 4 (4.75 mm) sieve shall consist of fines from the coarse aggregate crushing operation. The fine aggregate shall be produced by crushing stone, gravel, that meet the coarse aggregate requirements for wear and soundness. Aggregate base material requirements are listed in the following table.

CRUSHED AGGREGATE BASE MATERIAL REQUIREMENTS

Material Test	Requirement	Standard
Coarse Aggregate		
Resistance to Degradation	Loss: 45% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate **or** Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Percentage of Fractured Particles	Minimum 90% by weight of particles with at least two fractured faces and 98% with at least one fractured face[1]	ASTM D5821
Flat Particles, Elongated Particles, or Flat and Elongated Particles	10% maximum, by weight, of flat, elongated, or flat and elongated particles [2]	ASTM D4791
Clay lumps and friable particles	Less than or equal to 3 percent	ASTM C142
Fine Aggregate		
Liquid limit	Less than or equal to 25	ASTM D4318
Plasticity Index	Not more than five (5)	ASTM D4318

[1] The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

[2] A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

209-2.2 Gradation requirements. The gradation of the aggregate base material shall meet the requirements of the gradation given in the following table when tested per ASTM C117 and ASTM C136. The gradation shall be well graded from coarse to fine and shall not vary from the lower limit on one sieve to the high limit on an adjacent sieve or vice versa.

GRADATION OF AGGREGATE BASE

Sieve Size	Design Range Percentage by Weight passing	Contractor's Final Gradation	Job Control Grading Band Tolerances[1] (Percent)
2 inch (50 mm)	100		0
1-1/2 inch (37.5 mm)	95-100		±5
1 inch (25.0 mm)	70-95		±8
3/4 inch (19.0 mm)	55-85		±8
No. 4 (4.75 mm)	30-60		±8
No. 40[2] (425 µm)	10-30		±5
No. 200[2] (75 µm)	0-10		±3

[1] The "Job Control Grading Band Tolerances for Contractor's Final Gradation" in the table shall be applied to "Contractor's Final Gradation" to establish a job control grading band. The full tolerance still applies if application of the tolerances results in a job control grading band outside the design range.

[2] The fraction of material passing the No 200 (75 µm) sieve shall not exceed two-thirds the fraction passing the No 40 (425 µm) sieve.

209-2.3 Sampling and Testing.

a. Aggregate base materials. The Contractor shall take samples of the aggregate base in accordance with ASTM D75 to verify initial aggregate base requirements and gradation. Material shall meet the requirements in paragraph 209-2.1. This sampling and testing will be the basis for approval of the aggregate base quality requirements.

b. Gradation requirements. The Contractor shall take at least two aggregate base samples per day in the presence of the Resident Project Representative (RPR) to check the final gradation. Sampling shall be per ASTM D75. Material shall meet the requirements in paragraph 209-2.2. The samples shall be taken from the in-place, un-compacted material at sampling points and intervals designated by the RPR.

209-2.4 Separation Geotextile. Separation geotextile shall be Class 2, 0.02 sec^{-1} permittivity per ASTM D4491, Apparent opening size per ASTM D4751 with 0.60 mm maximum average roll value *when used between the P-209 and P-155 layers as shown in the plans*.

209-2.5 Geogrid. Geogrid shall meet the requirements of ASTM D4759 when used as shown in the plans *and the requirements listed in the following table*.

GEOGRID REQUIREMENTS

Property	Units	MD Values	XMD Values
Aperture Dimension	In	1.0	1.3
Minimum Rib Thickness	in	0.05	0.05
Tensile Strength @ 2% Strain	lb/ft	410	620
Tensile Strength @ 5% Strain	lb/ft	810	1,340
Ultimate Tensile Strength	lb/ft	1,310	1,970
Junction Efficiency	%	93	
Flexural Stiffness	mg-cm	750,000	
Aperture Stability	m-N/deg	0.65	
Resistance to Installation Damage	%SC / %SW / %GP	95 / 93 / 90	
Resistance to Long Term Degradation	%	100	
Resistance to UV Degradation	%	100	

Note—MD and CMD do not necessarily refer to the machine (warp) and cross machine (fill) directions in the manufacturing process. They refer, for drawn products, to the more (CMD) or less (MD) highly drawn ribs where the aperture dimensions are unequal.

CONSTRUCTION METHODS

209-3.1 Control strip. The first half-day of construction shall be considered the control strip. The Contractor shall demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of the specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration and approve the lift thickness prior to full production.

Control strips that do not meet specification requirements shall be reworked, re-compacted or removed and replaced at the Contractor's expense. Full operations shall not continue until the control strip has been accepted by the RPR. The Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved by the RPR.

209-3.2 Preparing underlying subgrade and/or subbase. The underlying subgrade and/or subbase shall be checked and accepted by the RPR before base course placing and spreading operations begin. Re-proof rolling of the subgrade or proof rolling of the subbase in accordance with Item P-152, at the Contractor's expense, may be required by the RPR if the Contractor fails to ensure proper drainage or protect the subgrade and/or subbase. Any ruts or soft, yielding areas due to improper drainage conditions, hauling, or any other cause, shall be corrected before the base course is placed. To ensure proper drainage, the spreading of the base shall begin along the centerline of the pavement on a crowned section or on the high side of the pavement with a one-way slope.

209-3.3 Production. The aggregate shall be uniformly blended and, when at a satisfactory moisture content per paragraph 209-3.5, the approved material may be transported directly to the placement.

209-3.4 Placement. The aggregate shall be placed and spread on the prepared underlying layer by spreader boxes or other devices as approved by the RPR, to a uniform thickness and width. The equipment shall have positive thickness controls to minimize the need for additional manipulation of the material.

Dumping from vehicles that require re-handling shall not be permitted. Hauling over the uncompacted base course shall not be permitted.

The aggregate shall meet gradation and moisture requirements prior to compaction. The base course shall be constructed in lifts as established in the control strip, but not less than 4 inches nor more than 12 inches of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications at the Contractor's expense.

209-3.5 Compaction. Immediately after completion of the spreading operations, compact each layer of the base course, as specified, with approved compaction equipment. The number, type, and weight of rollers shall be sufficient to compact the material to the required density within the same day that the aggregate is placed on the subgrade.

The field density of each compacted lift of material shall be at least 100% of the maximum density of laboratory specimens prepared from samples of the base material delivered to the jobsite. The laboratory specimens shall be compacted and tested in accordance with ASTM D1557. The moisture content of the material during placing operations shall be within ±2 percentage points of the optimum moisture content as determined by ASTM D1557. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

209-3.6 Weather limitations. Material shall not be placed unless the ambient air temperature is at least 40°F and rising. Work on base course shall not be conducted when the subgrade or subbase is wet or frozen or the base material contains frozen material.

209-3.7 Maintenance. The base course shall be maintained in a condition that will meet all specification requirements. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, prior to placement of additional material, the Contractor shall verify that materials still meet all specification requirements. Equipment may be routed over completed sections of base course, provided that no damage results and the equipment is routed over the full width of the completed base course. Any damage resulting to the base course from routing equipment over the base course shall be repaired by the Contractor at the Contractor's expense.

209-3.8 Surface tolerances. After the course has been compacted, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches, reshaped and recompacted to grade until the required smoothness and accuracy are obtained and approved by the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense. The smoothness and accuracy requirements specified here apply only to the top layer when base course is constructed in more than one layer.

a. Smoothness. The finished surface shall not vary more than 3/8-inch when tested with a 12-foot straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot straightedge for the full length of each line on a 50-foot grid.

b. Grade. The grade and crown shall be measured on a 50-foot grid and shall be within +0 and -1/2 inch of the specified grade.

209-3.9 Acceptance sampling and testing. Crushed aggregate base course shall be accepted for density and thickness on an area basis. Two tests shall be made for density and thickness for each 1200 square yards. Sampling locations will be determined on a random basis per ASTM D3665

a. Density. The RPR shall perform all density tests.

Each area shall be accepted for density when the field density is at least 100% of the maximum density of laboratory specimens compacted and tested per ASTM 1557. The in-place field density shall be determined per ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. If the specified density is not attained, the area represented by the failed test must be reworked and/or recompacted and two additional random tests made. This procedure shall be followed until the specified density is reached. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

b. Thickness. Depth tests shall be made by test holes at least 3 inches in diameter that extend through the base. The thickness of the base course shall be within +0 and -1/2 inch of the specified thickness as determined by depth tests taken by the Contractor in the presence of the RPR for each area. Where the thickness is deficient by more than 1/2-inch, the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches, adding new material of proper gradation, and the material shall be blended and recompacted to grade. The Contractor shall replace, at his expense, base material where depth tests have been taken.

METHOD OF MEASUREMENT

209-4.1 The quantity of crushed aggregate base course will be determined by measurement of the number of square yards or cubic yards of material actually constructed and accepted by the RPR as complying with the plans and specifications. Base materials shall not be included in any other excavation quantities.

209-4.2 Separation geotextile shall be measured by the number of square yards of materials placed and accepted by the RPR as complying with the plans and specifications excluding seam overlaps and edge anchoring.

209-4.3 Geogrid shall be measured by the number of square yards of materials placed and accepted by the RPR as complying with the plans and specifications excluding seam overlaps and edge anchoring.

BASIS OF PAYMENT

209-5.1 Payment shall be made at the contract unit price per square yard or cubic yard for crushed aggregate base course. This price shall be full compensation for furnishing all materials, for preparing and placing these materials, and for all labor, equipment tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-209-5.1	6” Crushed Aggregate Base Course - per square yard
Item P-209-5.2	15” Crushed Aggregate Base Course - per square yard
Item P-209-5.3	Aggregate Base Course (Slope Stabilization) – per cubic yard
Item P-209-5.4	Separation Geotextile (Slope Stabilization) – per square yard
Item P-209-5.5	Geogrid (Slope Stabilization) – per square yard

References

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C29	Standard Test Method for Bulk Density (“Unit Weight”) and Voids in Aggregate
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate

ASTM C117	Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2700 kN-m/m^3))
ASTM D2167	Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4491	Standard Test Methods for Water Permeability of Geotextiles by Permittivity
ASTM D4643	Standard Test Method for Determination of Water Content of Soil and Rock by Microwave Oven Heating
ASTM D4751	Standard Test Methods for Determining Apparent Opening Size of a Geotextile
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D7928	Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis

American Association of State Highway and Transportation Officials (AASHTO)

M288	Standard Specification for Geosynthetic Specification for Highway Applications

END OF ITEM P-209

ITEM P-307 CEMENT TREATED PERMEABLE BASE COURSE (CTPB)

DESCRIPTION

307-1.1 This item shall consist of an open-graded drainable base composed of mineral aggregate, cement and water mixed in a central mixing plant and placed as fill for sinkhole repairs in accordance with these specifications and shall conform to the details shown in the plans.

MATERIALS

307-2.1 Aggregate. Coarse aggregate shall be crushed gravel or crushed stone and shall meet the gradation requirements of ASTM C33 Size 57. Fine aggregate shall consist of natural sand or manufactured sand meeting the requirements of ASTM C33. The aggregate shall meet the material requirements in the table below.

Aggregate Material Requirements

Material Test	Requirement	Standard
Coarse Aggregate		
Resistance to Degradation	Loss: 40% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate **or** Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88
Flat Particles, Elongated Particles, or Flat and Elongated Particles[1]	10% maximum, by weight, for fraction retained on the ½ inch (12.5mm) sieve and 10% maximum, by weight, for the fraction passing the 1/2-inch (12.5 mm) sieve	ASTM D4791
Clay lumps and friable particles	Less than or equal to 3 percent	ASTM C142
Fine Aggregate		
Clay lumps and friable particles	Less than or equal to 3 percent	ASTM C142
Soundness of Aggregates by Use of Sodium Sulfate **or** Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88

[1] A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

307-2.2 Sampling and testing.

a. Aggregate base materials. The Contractor shall take samples of the aggregate base stockpile in accordance with ASTM D75 to verify initial aggregate base requirements and gradation. Material shall meet the requirements in paragraph 307-2.1. This sampling and testing will be the basis for approval of the aggregate base quality requirements.

b. Gradation requirements. *During production the Contractor shall take at least one aggregate sample per day in the presence of the RPR to check the final gradation. Sampling shall be per ASTM D75. Gradation testing shall be in accordance with ASTM C136 and C117. The gradation shall meet the requirements in paragraph 307-2.1.*

307-2.3 Cement. Cement shall conform to the requirements of ASTM C150, Type I or II; ASTM C595, Type IP, IL, or IS.

The Contractor shall furnish vendor's certified test reports for cement shipped to the project.

307-2.4 Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

307-2.5 Admixtures. The use of any material to be added to the mixture shall be approved by the RPR.

307-2.6 Curing Material. Curing materials shall be a liquid membrane-forming compounds for curing concrete shall conform to the requirements of ASTM C309, Type 2, Class B.

307-2.7 Bond Breaker. Choke stone shall be an ASTM C33 Number 89 stone.

307-2.8 Separation Geotextile. Separation geotextile shall be Class 2 for use in areas around weep hole pipes.

COMPOSITION OF MIXTURE

307-3.1 Mix design. The Mix Design shall be composed of a mixture of aggregate, cement, and water meeting the following requirements:

Mix Design Requirements

Material or Test	Requirements	Standard	
7-day Compressive strength, psi	Between minimum 400 psi and maximum 800 psi	ASTM C31 and ASTM C39	Cylinders in accordance with ASTM C31 and test per ASTM C39
Coefficient of permeability (ft/day)	Between 500 to 1500 ft/day	AASHTO T215	
Water-Cement Ratio	Approx. 0.36		Cement content shall be adequate to hold the material together and meet strength requirements.
Coarse aggregate	Size #57	ASTM C33	
Fine aggregate	Approximately 300 to 400 pounds per cubic yard		As necessary to meet stability while maintaining permeability

The mix design shall include a complete list of materials, including type, brand, source, and amount of cement, fine aggregate, coarse aggregate, water, and cementitious additives, if used. It shall also contain the 3, 7, and 14 day compressive strength test results and the results of the permeability tests. Data shall be provided to the RPR for 7-day breaks to serve as a basis for field testing requirements and comparison.

If the Contractor makes a change in aggregate sources or type of cement, or if cementitious additives are added or deleted from the mix, production of the drainable base course shall be stopped and a new mix design shall be submitted to the RPR for approval at the Contractor’s expense.

307-3.2 Submittals. At least 30 days prior to the placement of the CTPB, the Contractor shall submit certified test reports to the RPR for those materials proposed for use during construction, as well as the mix design information for the material. The certification shall show the specifications and tests for the material, the name of the testing laboratory, the date of the tests, and a statement that the materials comply with the applicable specifications. Tests shall be representative of the material to be used for the project. The submittal package shall include the following:

a. Sources of materials, including aggregate, cement, cementitious additives, curing, and bond-breaking materials.

b. Physical properties of the aggregates, cement, cementitious additives, curing, and bond-breaking materials.

c. Mix design

- Mix identification number
- Aggregate gradation
- Cement content
- Water content
- Content of any additional cementitious materials or additives
- Compressive strength at 3, 7, and 14 days.
- Coefficient of Permeability

No drainable base course material shall be placed until the submittal is accepted in writing by the RPR.

During production, the Contractor shall submit batch tickets for each delivered load.

CONSTRUCTION METHODS

307-4.1 Control strip. The first ~~day~~ of construction shall be considered the control fill. The Contractor shall demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of the specification. Control fills that do not meet specification requirements shall be removed and replaced at the Contractor's expense. Full operations shall not continue until the control strip has been accepted by the RPR. Upon acceptance of the control strip by the RPR, the Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the RPR.

In areas inaccessible to the paver and roller, hand operated vibrator-plate compactors or needle vibrator may be used to seat the aggregate.

The control fill CTPB layer shall be considered acceptable when aggregate is completely coated with cement paste with no evidence of crushing; the surface is firm, unyielding and stable under construction traffic; and the layer meets the field permeability per paragraph 307-3.1.

307-4.2 Weather limitations. The CTPB material shall not be mixed or placed while the air temperature is below 40°F or when conditions indicate that the temperature may fall below 35°F within 24 hours. The CTPB shall not be placed on frozen underlying courses or mixed when aggregate is frozen. The CTPB may not be placed when rainfall is occurring or where rain is imminent. Any CTPB material that has become excessively wet by rain during transport and/or placement will be rejected.

307-4.3 Equipment. All equipment necessary to mix, transport, place, compact, and finish the CTPB material shall be furnished by the Contractor and approved by the RPR. The equipment will be inspected by the RPR prior to the start of construction operations.

307-4.4 Preparation of the underlying course. The underlying course shall be checked and accepted by the RPR before placing operations begin. Prior to placing the material, the final grade should be firm, moist and free of frost. Use of chemicals to eliminate frost will not be permitted. The underlying course shall be wetted in advance of placing the lean concrete base course.

307-4.5 Mixing. The batch plant site, layout, equipment, and provisions for transporting material shall assure a continuous supply of material to the work. Stockpiles shall be constructed in a manner that prevents segregation and intermixing of deleterious materials. Free access to the plant must be provided

to the RPR at all times for inspection of the plant's equipment and operation and for sampling the CTPB mixture and its components.

The mixers shall be examined daily by the Contractor and periodically by the RPR for changes in condition due to accumulation of hard concrete or mortar or wear of blades. The pick-up and throw-over blades shall be replaced as necessary to provide adequate mixing. Aggregate and cement may be proportioned either by weight or volume, and shall be mixed sufficiently to prevent the forming of cement balls when water is added. Batching weights shall be within a tolerance of 1% for cement and 2% for aggregates. The mixing time shall be that required to produce a uniform mixture of aggregate, cement, and water.

307-4.6 Hauling. The CTPB mixture shall be transported from the plant to the job site in trucks or other hauling equipment having beds that are smooth and clean. Truck bed covers shall be provided to protect the CTPB during transport from rain. CTPB material that becomes wet during transport will be rejected.

The elapsed time between the start of moist mixing and the time the CTPB is deposited in-place at the work site shall not exceed (a) 30 minutes when the CTPB is hauled in non-agitating trucks, or (b) 45 minutes when the CTPB is hauled in transit mixers. Re-tempering the CTPB material by adding water or by other means shall not be permitted.

307-4.7 Placing. The CTPB shall be installed in 6 inch lifts *or another thickness approved by the RPR so that the permeability is retained*. Place the CTPB to the specified depth as shown in the plan details.

307-4.9 Compaction. Immediately upon placement of the CTPB, the CTPB material shall be compacted using the approved compaction equipment and roller pattern/sequence, as determined in the approved control fill. If compaction results in undue displacement of the surface, or causes crushing of the aggregate, work shall be stopped until the cause(s) can be determined and corrections are made.

In all places not accessible to the rollers (or the alternative paving machine), the CTPB material shall be compacted with approved mechanical hand-operated tampers.

307-4.11 Curing. The completed drainage layer shall be moist cured for a period of twelve hours followed by application of an impervious membrane curing compound in accordance with paragraph 307-2.6.

307-4.13 Field Permeability. One test shall be performed by the Contractor in the presence of the RPR for *each* 1,200 square yards. Test locations will be determined on a random basis in accordance with ASTM D3665. The permeability of the base will be determined in accordance with ASTM C1701.

307-4.15 Maintenance. The completed drainable base shall be maintained by the Contractor in a condition to meet all specification requirements until the pavement has been placed. Placement of the pavement shall be made within thirty (30) calendar days after placement of the drainage layer. The CTPB shall not be opened to traffic until specimens made in accordance with ASTM C31 and tested in accordance with ASTM C39 show that a 7-day compressive strength of 500 psi has been achieved.

MATERIAL ACCEPTANCE

307-5.1 Sampling and testing. All acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the RPR for each 1200 square yards. Sampling locations will be determined by the RPR on a random basis per ASTM D3665. The Contractor shall bear the cost of providing curing facilities for the strength specimens.

~~**a. Compressive Strength.** One sample CTPB will be taken for compressive strength for each 1200 square yards in accordance with ASTM C172. Two test cylinders will be made and cured from the sample per ASTM C31 and the 7-day compressive strength of each cylinder determined per ASTM C39. The compressive strength will be computed by averaging the two 7-day compressive strengths.~~

~~The Contractor shall provide for the initial curing of cylinders in accordance with ASTM C31 during the 24 hours after molding.~~

~~**b. Thickness.** One core shall be drilled by the Contractor for thickness determination for each 1200 square yards). Thickness will be determined by measuring the depth of core hole.~~

~~Core holes shall be filled by the Contractor with lean concrete base *CTPB material* or non-shrink grout.~~

METHOD OF MEASUREMENT

307-6.1 Measurement. The quantity of CTPB to be paid for shall be the number of cubic yards of material placed, and accepted in the completed base course.

BASIS OF PAYMENT

307-7.1 Payment. Payment will be made at the contract unit price per cubic yard for CTPB as measured by RPR. This price shall be full compensation for furnishing all materials *(including bond breaker)*, for all preparation, mixing, placing, compacting curing and placement of overlaying bond breaker; and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-307-7.1	6" Cement Treated Permeable Base - per cubic yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C174	Standard Test Method for Measuring Thickness of Concrete Elements Using Drilled Concrete Cores
ASTM C595	Standard Specification for Blended Hydraulic Cements
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1701	Standard Test Method for Infiltration Rate of In Place Pervious Concrete
ASTM D3665	Standard Practice for Random Sampling of Construction Materials

ASTM C174	Measuring Thickness of Concrete Elements Using Drilled Concrete Cores
ASTM C150	Standard Specification for Portland Cement
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete

American Association of State Highway and Transportation Officials (AASHTO)

M288	Standard Specification for Geosynthetic Specification for Highway Applications
T215	Standard Method of Test for Permeability of Granular Soils (Constant Head),

END ITEM P-307

ITEM L-125 INSTALLATION OF AIRPORT LIGHTING SYSTEMS

DESCRIPTION

125-1.1 This item shall consist of airport lighting systems furnished and installed in accordance with this specification, the referenced specifications, and the applicable advisory circulars (ACs). The systems shall be installed at the locations and in accordance with the dimensions, design, and details shown in the plans. This item shall include the furnishing of all equipment, materials, services, and incidentals necessary to place the systems in operation as completed units to the satisfaction of the RPR.

EQUIPMENT AND MATERIALS

125-2.1 General.

a. Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified under the Airport Lighting Equipment Certification Program in accordance with AC 150/5345-53, current version. FAA certified airfield lighting shall be compatible with each other to perform in compliance with FAA criteria and the intended operation. If the Contractor provides equipment that does not performs as intended because of incompatibility with the system, the Contractor assumes all costs to correct the system for to operate properly.

b. Manufacturer's certifications shall not relieve the Contractor of their responsibility to provide materials in accordance with these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

c. All materials and equipment used shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Clearly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be clearly made with arrows or circles (highlighting is not acceptable). The Contractor shall be responsible for delays in the project accruing directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be submitted in electronic PDF format, tabbed by specification section. The RPR reserves the right to reject any or all equipment, materials or procedures, which, in the RPR’s opinion, does not meet the system design and the standards and codes, specified herein.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

EQUIPMENT AND MATERIALS

125-2.2 Conduit/Duct. Conduit shall conform to Specification Item L-110 Airport Underground Electrical Duct Banks and Conduits.

125-2.3 Cable and Counterpoise. Cable and Counterpoise shall conform to Item L-108 Underground Power Cable for Airports.

125-2.4 Tape. Rubber and plastic electrical tapes shall be Scotch Electrical Tape Numbers 23 and 88 respectively, as manufactured by 3M Company or an approved equal.

125-2.5 Cable Connections. Cable Connections shall conform to Item L-108 Installation of Underground Cable for Airports.

125-2.6 Retroreflective Markers. Not required.

125-2.7 Runway and Taxiway Lights. Runway and taxiway lights shall conform to the requirements of AC 150/5345-46. Lamps shall be of size and type indicated, or as required by fixture manufacturer for each lighting fixture required under this contract. Filters shall be of colors conforming to the specification for the light concerned or to the standard referenced.

Lights

Type	Class	Mode	Style	Option	Base	Filter	Transformer	Notes
L-861T(L)	1	1	N/A	4	L-867B	Blue	L-830-16	N/A
L-852C(L)	1	1	3	N/A	L-868B	Green/ Green	L-830-17	Bidirectional
L-852D(L)	1	1	3	N/A	L-868B	Green/ Green	L-830-1	Bidirectional
L-852C(L)	1	1	3	N/A	L-868B	Yellow	L-830-17	Unidirectional
L-852G(L)	1	1	3	N/A	L-868B	Yellow	L-830-3	Unidirectional

125-2.8 Runway and Taxiway Signs. Runway and Taxiway Guidance Signs should conform to the requirements of AC 150/5345-44.

Signs

Type	Size	Style	Class	Mode	Notes
L-858(L)	3	5	2	2	N/A

125-2.9 Runway End Identifier Light (REIL). Not required.

125-2.10 Precision Approach Path Indicator (PAPI). Not required**.**

125-2.11 Circuit Selector Cabinet. *Not Required*.

125-2.12 Light Base and Transformer Housings. Light Base and Transformer Housings should conform to the requirements of AC 150/5345-42. Light bases shall be Type L-867 or L-868, Class 1A, Size B shall be provided as indicated or as required to accommodate the fixture or device installed thereon. Base plates, cover plates, and adapter plates shall be provided to accommodate various sizes of fixtures.

125-2.13 Isolation Transformers. Isolation Transformers shall be Type L-830, size as required for each installation. Transformer shall conform to AC 150/5345-47.

INSTALLATION

125-3.1 Installation. The Contractor shall furnish, install, connect and test all equipment, accessories, conduit, cables, wires, buses, grounds and support items necessary to ensure a complete and operable airport lighting system as specified here and shown in the plans.

The equipment installation and mounting shall comply with the requirements of the National Electrical Code and state and local code agencies having jurisdiction.

The Contractor shall install the specified equipment in accordance with the applicable advisory circulars and the details shown on the plans.

See the Supplemental Specifications for additional equipment installation, mounting, and testing requirements

125-3.2 Testing. All lights shall be fully tested by continuous operation for not less than 24 hours as a completed system prior to acceptance. The test shall include operating the constant current regulator in each step not less than 10 times at the beginning and end of the 24-hour test. The fixtures shall illuminate properly during each portion of the test.

125-3.3 Shipping and Storage. Equipment shall be shipped in suitable packing material to prevent damage during shipping. Store and maintain equipment and materials in areas protected from weather and physical damage. Any equipment and materials, in the opinion of the RPR, damaged during construction or storage shall be replaced by the Contractor at no additional cost to the owner. Painted or galvanized surfaces that are damaged shall be repaired in accordance with the manufacturer's recommendations.

125-3.4 Elevated and In-pavement Lights. Water, debris, and other foreign substances shall be removed prior to installing fixture base and light.

A jig or holding device shall be used when installing each light fixture to ensure positioning to the proper elevation, alignment, level control, and azimuth control. Light fixtures shall be oriented with the light beams parallel to the runway or taxiway centerline and facing in the required direction. The outermost edge of fixture shall be level with the surrounding pavement. Surplus sealant or flexible embedding material shall be removed. The holding device shall remain in place until sealant has reached its initial set.

METHOD OF MEASUREMENT

125-4.1 Reflective markers will be measured by the number installed as completed units in place, ready for operation, and accepted by the RPR. Runway and taxiway lights will be measured by the number of each type installed as completed units in place, ready for operation, and accepted by the RPR. Guidance signs will be measured by the number of each type and size installed as completed units, in place, ready for operation, and accepted by the RPR. Runway End Identifier Lights shall be measured by each system *lump sum* installed as a completed unit in place, ready for operation, and accepted by the RPR.

Precision Approach Path Indicator shall be measured by each system *lump sum* installed as a completed unit, in place, ready for operation, and accepted by the RPR. Abbreviated Precision Approach Path Indicator shall be measured by each system installed as a completed unit, in place, ready for operation, and accepted by the RPR.

BASIS OF PAYMENT

125-5.1 Payment will be made at the Contract unit price for each complete runway or taxiway light, guidance sign, reflective marker, runway end identification light, precision approach path indicator, or abbreviated precision approach path indicator installed by the Contractor and accepted by the RPR. This payment will be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools and incidentals necessary to complete this item.

Payment will be made under:

Item L-125-5.1	L-852C/D(L) Taxiway Centerline Light, Installed on Adjusted Light Base -- per Each
Item L-125-5.2	L-852C/D(L) Taxiway Centerline Light, Installed on Existing Light Base -- per Each

Item L-125-5.3	L-861T(L) Base Mounted Taxiway Edge Light, Installed on Adjusted Light Base -- per Each
Item L-125-5.4	L-861T(L) Base Mounted Taxiway Edge Light, Installed on Existing Light Base -- per Each
Item L-125-5.5	L-858(L) Base Mounted Guidance Sign, Installed -- per Each
Item L-125-5.6	L-852C/D(L) Taxiway Centerline Light, Installed on New Light Base -- per Each
Item L-125-5.7	L-852G(L) In-Pavement Runway Guard Light, Installed on New Light Base -- per Each
Item L-125-5.8	L-861T(L) Base Mounted Taxiway Edge Light, Installed on New Base in Existing Pavement – per Each
Item L-125-5.9	L-861T(L) Base Mounted Taxiway Edge Light, Installed on New Base in New Pavement – per Each
Item L-125-5.10	L-852C/D(L) Taxiway Centerline Light, Installed on New Base in Existing Pavement – Per Each
Item L-125-5.11	Update Sign Legend – per Each
Item L-125-5.12	***L-852C/D(L) Taxiway Centerline Light, Installed on New Base in Existing Pavement with Mill and Overlay – Per Each***

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5340-18	Standards for Airport Sign Systems
AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-5	Circuit Selector Switch
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-28	Precision Approach Path Indicator (PAPI) Systems
AC 150/5345-39	Specification for L-853, Runway and Taxiway Retroreflective Markers
AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
AC 150/5345-44	Specification for Runway and Taxiway Signs
AC 150/5345-46	Specification for Runway and Taxiway Light Fixtures

AC 150/5345-47	Specification for Series to Series Isolation Transformers for Airport Lighting Systems
AC 150/5345-51	Specification for Discharge-Type Flashing Light Equipment
AC 150/5345-53	Airport Lighting Equipment Certification Program

Engineering Brief (EB)

EB No. 67	Light Sources Other than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures

END OF ITEM L-125

ITEM SS-300 BASIC ELECTRICAL REQUIREMENTS

DESCRIPTION

300-1.1 This item shall consist of furnishing and installing complete electrical systems as defined in the plans and in these specifications. The work includes the installation, connection and testing of new electrical systems, equipment and all required appurtenances to construct and demonstrate proper operation of the completed electrical systems.

300-1.2 The Contractor shall maintain current copies of all referenced and applicable standards on the job site. The Contractor is responsible to make known to the Engineer any conflict between plans and specifications that he observes or of which he is made aware.

300-1.3 This work shall consist of lockout/tagout and constant current regulator calibration procedures at the airport electrical vault in accordance with the design and details shown in the plans and in compliance with these specification documents.

EQUIPMENT AND MATERIALS

300-2.1 Standards.

a. Applicable National Fire Protection Association (NFPA) codes, including but not limited to:
   (1) NFPA 70 - National Electrical Code.
   (2) NFPA 70E - Standard for Electrical Safety in the Workplace.
   (3) NFPA 101 - Life Safety Code.
   (4) Internet Website: http://www.nfpa.org
b. Applicable Code of Federal Regulations (CFR) codes, including but not limited to:
   (1) 29 CFR 1910 - Occupational Safety and Health Standards (OSHA)
   (2) 29 CFR 1926 - Safety and Health Regulations for Construction.
   (3) Internet Website: http://www.gpoaccess.gov/cfr/index.html
c. ANSI/IEEE C2 - National Electrical Safety Code.
d. NECA 1 – Standard for Good Workmanship in Electrical Construction.
e. Applicable Federal, State and Local Electrical Codes.
f. Applicable Federal, State and Local Energy Codes.
g. Applicable Federal, State and Local Building Codes.
h. Applicable Federal, State and Local Fire Codes.
i. Applicable City Electrical Code.
j. Applicable City Ordinances pertaining to electrical work.
k. Applicable Federal, State and Local - Environmental, Health and Safety Laws and Regulations.

Contractor shall utilize the most current editions of standards, which are current at time of bid and as recognized by the Authority Having Jurisdiction for the respective standard.

300-2.2 General.

a. Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified and listed under Advisory Circular (AC) 150/5345-53, Airport Lighting Equipment Certification Program, current version on the date that the submittals are received by the Engineer. When an equipment advisory circular is being updated and two equipment lists for the same specific equipment are listed in the current certified equipment AC 150/5345-53 addendum, only that equipment qualified to the latest advisory circular will be acceptable.

b. Airport lighting equipment and materials shall also meet the Buy American Preference requirements in 49 USC 50101 and the Aviation Safety and Capacity Expansion Act. The equipment shall be approved and listed on the FAA "Equipment Meeting Buy American Requirements" list located at *www.faa.gov/airports/aip/procurement/federal_contract_provisions/*, current version on the date that the submittals are received by the Engineer, or the Contractor may submit a signed formal letter from the manufacturer that clearly lists the specific equipment, model number, location where it is manufactured, and statement certifying that the equipment and/or materials meet the Buy American Preference requirements.

c. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the Engineer. All equipment and materials shall be new and meet applicable manufacturer's standards. All electrical components and products shall be tested and listed by an OSHA accepted, nationally recognized testing laboratory (NRTL) to conform to the standards indicated in these contract documents and to the industry standards required in the NEC, NEMA, IEEE, UL, and applicable FAA advisory circulars.

d. Manufacturer's certifications shall not relieve the Contractor of the Contractor's responsibility to provide materials in accordance with these specifications and acceptable to the Engineer. Materials supplied and/or installed that do not materially comply with these specifications shall be removed, when directed by the Engineer and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

e. All materials and equipment used to construct this item shall be submitted to the Engineer for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components or electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be boldly and clearly made with arrows or circles (highlighting is not acceptable). Contractor is solely responsible for delays in project accruing directly or indirectly from late submissions or resubmissions of submittals.

f. The data submitted shall be sufficient, in the opinion of the Engineer, to determine compliance with the Contract Documents plans and specifications. The Engineer reserves the right to reject all equipment, materials or procedures, which, in the Engineer's opinion, does not meet the system design and the standards and codes, specified herein.

g. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

(1) All LED light fixtures, except for obstruction lighting, shall be warranted by the manufacturer for a minimum of 4 years after date of installation, final acceptance testing by the Engineer, and Owner's beneficial use of the equipment, inclusive of all electronics. Refer to FAA Engineering Brief No. 67D for additional requirements.

h. After approval of submitted equipment, the Contractor shall supply the following Operation and Maintenance Manual documentation to the Owner. Two (2) complete sets of documentation shall be supplied for each model of equipment. The documentation shall be securely bound in heavy-duty 3-ring binders. The information for each piece of equipment shall be indexed using typewritten label tabs. The

spine of each binder shall have a typewritten label, which indicates the included equipment types. The documentation shall include:

(1) Approved Submittals and Shop Drawings
(2) Cable Splicer Qualifications, Type and Voltage
(3) State Contractors License with Electrical Classification
(4) Master, Journeyman and Apprentice Electrician Licenses and Certifications
(5) Lockout/Tagout Program
(6) Installation Manuals
(7) Operation Manuals
(8) Maintenance Manuals
(9) Parts Lists, including recommended spare parts. Recommended spare parts shall be furnished with the respective equipment.
(10) Ground Rod Impedance Test Reports
(11) Insulation Resistance Test Reports
(12) Regulator Load and Calibration Reports for testing, checking and adjusting all regulators in the electrical vault
(13) Bolt torque requirement shop drawings and calculations

i. After approval of the O&M Manuals, the Contractor shall provide three (3) complete electronic copies of all documentation in Adobe PDF file format on CD-R (non-rewriteable) discs storage media. The electronic files shall contain searchable text and include a hyperlink index for ease in locating information with the PDF file.

j. All requirements herein Item SS-300 shall be applicable to all referenced sections in these contract documents and applicable to all sections, which reference Item SS-300.

k. The Contractor is the single source of responsibility for the installation and integration of the airport's lighting, power, and control systems. New airport lighting equipment and materials shall be fully compatible with all other new and existing airport lighting equipment and systems. Any non-compatible components furnished by the Contractor shall be replaced at no additional cost to the Owner with a similar unit that is approved by the Engineer and compatible with the remainder of the airport lighting system.

300-2.3 Operation and maintenance data.

Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment. Provide bound hard copies and electronic copies as noted in section 300-2.2.

a. Certificate of Substantial Completion, Release and Contractor's Affidavit, executed copies.

b. Final approved equipment submittals, including product data sheets and shop drawings, clearly labeled.

c. Installation manuals: Description of function, installation and calibration manuals, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of all replaceable parts.

d. Operations manuals: Manufacturer's printed operating instructions and procedures to include start-up, break-in, routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; summer and winter operating instructions; and all programming and equipment settings.

e. Maintenance manuals: Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.

f. Service manuals: Servicing instructions and lubrication charts and schedules, including the names and telephone numbers of personnel to contact for both routine periodic and warranty service for equipment and materials provided under this Specification.

g. Final test reports, clearly labeled, including but not limited to, insulation resistance test reports, ground rod impedance test reports, cable pulling tension values logs, and equipment certification tests.

h. Final certified calibration sheets for all equipment and instruments.

i. Preventive maintenance programs for the visual aid facilities and equipment installed in this project, including the applicable equipment sections within Chapter 5 “Preventive Maintenance” from AC 150/5340-26 (latest edition) “Maintenance of Airport Visual Aid Facilities”.

300-2.4 Wire.

Unless otherwise indicated, conductors No. 10 AWG and smaller shall be solid, and conductors No. 8 AWG and larger shall be stranded.

For electrical work of 600 volts or less, all conductors, terminations, terminal blocks, lugs, connectors, devices and equipment shall be listed, marked, and rated 75 degrees C minimum unless otherwise noted.

Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway. Pull ropes and pull wires shall have sufficient tensile strength for the cable(s) to be pulled and installed. Damaged cable or raceway shall be replaced at no additional cost to the Owner. Calculate and do not exceed the maximum allowable pulling tension or maximum allowable sidewall bearing pressure for all conductors and cables.

Install pull wires in empty raceways. Use a polypropylene plastic line with not less than 200-pound tensile strength. Secure and leave at least 12 inches of slack at each end of pull wire to prevent it from slipping back into the conduit. Cap spare raceways with removable tapered plugs, designed for this purpose.

300-2.5 Concrete. Concrete shall conform to Item P-610, Concrete for Miscellaneous Structures, with a minimum 28-day compressive strength of 4000 PSI (unless otherwise noted) using 1-inch (25-mm) maximum size coarse aggregate, as determined by test cylinders made in accordance with ASTM C 31 and tested in accordance with ASTM C 39.

Flowable backfill material may only be used where specifically indicated in the Plan details.

CONSTRUCTION METHODS

300-3.1 Lockout/tagout program. The Contractor shall provide a complete copy of an electrical energy source Lockout/Tagout Program to the Owner, with copy to the Engineer. The document shall clearly identify the on-site master electricians and their contact information, including office and mobile telephone numbers.

The Lockout/Tagout Program shall comply with Part 1910 – Occupational Safety and Health Standards (OSHA) Subpart S – Electrical, and meet the requirements of 29 CFR 1910.147, The Control of Hazardous Energy (Lockout/Tagout), including requirements listed in 1910.331 through 1910.335.

Implementation of the Lockout/Tagout Program and all other related safety requirements are the sole responsibility of the Contractor.

300-3.2 Safety program. The Contractor shall implement an electrical safety program that complies with NFPA 70E and 29 CFR 1926.

Implementation of the Electrical Safety Program, determining and providing proper Personal Protective Equipment (PPE), training and enforcing personnel to wear the prescribed PPE, conducting work area safety inspections (including correcting deficiencies), and all other related safety requirements are the sole responsibility of the Contractor.

All work involved in the preparation and implementation of the safety program will not be measured for separate payment but will be considered subsidiary to the lockout/tagout bid item.

300-3.3 Preconstruction meeting.

A preconstruction meeting will be held with the Airport, FAA, Engineer and Contractor, prior to any work. Complete submittals and shop drawings will be submitted at this time for review. An equipment procurement schedule will be provided by the Contractor with an anticipated field construction start date. The progress construction schedule will be submitted for review each week and shall outline all installation, testing and demolition work.

300-3.4 General.

The Contractor shall be responsible for coordinating all electrical work with the Utility. The Contractor shall provide temporary service conductors and raceway system. The Contractor shall then provide and connect permanent service conductors and raceway system after the completion.

All secondary conductors and controls, signaling and lighting shown in or on buildings are included in this project. Electrical service shall be extended from the service equipment as indicated.

In general, the various electrical equipment and material to be installed by the various trades under this specification shall be run as indicated, as specified herein, as required by particular conditions at the site, and as required to conform to the generally accepted standards to complete the work in a neat and satisfactory manner. The following is a general outline concerning the running of various systems and is to be expected where the drawings or conditions at the buildings necessitate deviating from these standards.

The drawings and specifications are complementary; any work required by one, but not by the other, shall be performed as though required by both.

The Contractor shall maintain copies of all equipment installation manuals on site during construction.

All conduits shall be run exposed in the equipment rooms or run concealed as indicated.

The construction details of the building are illustrated on the drawings. Each Contractor shall thoroughly acquaint himself with the details before submitting his bid as no allowances will be made because of the Contractor's unfamiliarity with these details.

The electrical plans do not give exact locations, etc., and do not show all the offsets, control lines, junction boxes, and other installation details. Each Contractor shall carefully lay out his work at the site to conform to the job conditions, to conform to details of installation supplied by the manufacturers of the equipment to be installed, and thereby to provide complete operating systems.

The electrical plans show diagrammatically the locations of the various electrical outlets and apparatus and the method of circulating and controlling them. Exact locations of these outlets and apparatus shall be determined by reference to the general plans and to all detail drawings, etc., by measurements at the buildings, and in cooperation with other crafts, and in all cases shall be subject to the approval of the Engineer. The Engineer reserves the right to make any reasonable change in location of any outlet or apparatus before installation, without additional cost to the Owner.

These Specifications and the accompanying Drawings are intended to cover systems which will not interfere with the structure of the buildings, which will fit into the several available spaces, and which will insure complete and satisfactory systems. Each bidder shall be responsible for the proper fitting of his material and apparatus into the buildings.

Should the particular equipment which any bidder proposes to install require other space conditions than those indicated on the Drawings, he shall arrange for such space with the Engineer before submitting his bid. Should changes become necessary because of failure to comply with this clause, the Contractor shall make such changes at the Contractor's expense.

Should the particular equipment which any bidder proposes to install require other installation methods, such as larger light base junction structures, etc., he shall include all such equipment and appurtenances in his bid. Should changes become necessary because of failure to coordinate equipment requirements and comply with this clause, the Contractor shall make such changes at the Contractor’s expense.

The Contractor shall be responsible to see that each party furnishes electrical equipment which meets the electrical requirements specified herein and that all systems work together to produce the specified operation.

Where two or more units of the same kind or class of equipment are required, these shall be products of a single manufacturer; however, the component parts need not be the products of one manufacturer.

Each Contractor shall submit working scale drawings of all his apparatus and equipment which in any way varies from these Specifications and Plans, which shall be checked by the Engineer and approved before the work is started, and interferences with the structural conditions shall be corrected by the Contractor before the work proceeds.

Electrical equipment, such as switchgear, switchboards, panelboards, load centers and other power supply equipment, shall not be used as a common enclosure, pull box or junction box for routing conductors of different systems, unless the equipment is specifically designed for this purpose and indicated as such on the Plans.

All electrical equipment shall be securely mounted as indicated in the plans, as required by the contract specifications, as required by guidelines and codes, and as required by the manufacturer using hardware compliant with the environmental conditions.

Interior components of electrical enclosures shall be securely mounted using appropriate hardware within the enclosure. Adhesives or adhesive tapes/strips are not allowed and are prohibited.

Electrical components, including but not limited to, relays, circuit boards, electronics, etc., shall be installed within approved enclosures.

The Contractor shall keep ends of conduits, including those extending through roofs, equipment and fixtures covered or closed with caps or plugs to prevent foreign material from entering during construction.

Where portions of raceways are known to be subjected to different temperatures, where condensation is a problem, and where passing from interior to exterior of a building, the portion of raceway or sleeve shall be filled with an approved material to prevent the circulation of air, prevent condensation, and prevent

moisture entry. Sealing of raceways shall not occur until after the conductors and cables have been installed, tested and accepted by the Engineer.

The Contractor shall install any temporary lines and connections required to maintain electric services and safely remove and dispose of them when complete.

All temporary wiring shall conform to OSHA standards. Remove temporary services when work is complete. Any damage to electrical equipment caused by the Contractor shall be repaired at no cost to the Owner.

All non-current carrying parts and neutrals shall be grounded as indicated on the Drawings or as required by the Codes.

White and/or gray outer finish conductors may only be used as grounded conductors or neutral conductors in accordance with NEC.

Install insulated green equipment grounding conductors with all feeder and branch circuits.

Provide separate insulated equipment grounding conductors from grounding system to each electrical equipment, telecommunication equipment, other special electrical system equipment, and appurtenance item location in accordance with NFPA 70 and other applicable standard requirements.

The bidder shall inspect the site, thoroughly acquaint himself with conditions to be met and work to be accomplished. Failure to comply with this shall not constitute grounds for any additional payments.

Where electrical equipment is installed that causes electrical noise interference with other systems either existing or installed under this contract, the offending equipment shall be equipped with isolating transformers, filters, reactors, shielding, or any other means as required for the satisfactory suppression of the interferences, as determined by the Engineer.

All junction boxes, expansion joints, flexible connections, instruments and similar items requiring servicing or repairs shall be installed in an accessible location.

All salvage and equipment removed by the work shall remain the property of the Owner. Material removed from the project shall be stored on the project site where and as directed. Debris shall be removed from the job site and disposed of by the Contractor.

The Contractor shall maintain his work area clean and orderly at all times. Debris shall be removed promptly. The electrical system shall be thoroughly cleaned inside and outside of all enclosures to remove all metal shavings or other work debris, dust, concrete splatter, plaster, paint and lint.

The Contractor shall do all excavating and backfilling made necessary by electrical work and shall remove all surplus or supply any earth required to establish the proper finished grade.

The Contractor shall do all cutting and patching made necessary by electrical work, but in no case shall he cut through or into any structural member without written permission of the Engineer.

All steel conduits, supports, channels, fittings, nuts, bolts, etc. shall be galvanized, corrosion-resistant type unless otherwise noted.

An approved anti-seize compound shall be used on all threads to prevent equipment and thread damage.

Equipment shall be installed in accordance with manufacturer’s recommendation. Make all final electrical connections and coordinate all items with other trades.

Correct unnecessary damage caused due to installation of work, brought about through carelessness or lack of coordination. All openings, sleeves, and holes to be properly sealed, fire proofed and waterproofed. Any water leaks arising from project construction will be immediately corrected to the satisfaction of the Owner and the Engineer.

300-3.5 Power supply equipment. Electrical equipment, such as switchgear, switchboards, panelboards, load centers, and other power supply equipment, shall not be used as a common enclosure, pull box or junction box for routing conductors of different systems, unless the equipment is specifically designed for this purpose and indicated as such on the Plans.

If shown in the plans, the power supply equipment shall be set on concrete housekeeping pads to provide a minimum space of 3-1/2 inches between the equipment and the floor. All equipment shall be secured to the floor or wall in accordance with the manufacturer's recommendations and these contract document requirements.

300-3.6 Duct and conduit. Conduits shall be galvanized rigid steel unless otherwise indicated or specified. Refer to one-line diagram conduit notes for specific requirements.

Conduit runs shall be one trade size continuously with no reducers allowed. Changing of conduit size is only permitted at manholes, handholes, and boxes and conduit bodies used as outlet, device, junction, or pull boxes, including approved, listed fittings with removable covers.

Use an approved, listed adapter/coupling to convert to other types of conduit. Reducer couplings are not allowed.

For underground service entrance, feeder and branch circuit raceways, offsets and bends over 30 degrees and elbows in Schedule 40 PVC conduit runs shall be Schedule 80 PVC conduit. Underground service entrance PVC conduits shall be concrete encased unless otherwise noted. Underground PVC conduits shall be concrete encased under driveways, roadways, parking lots and other paved areas.

Non-encased conduits shall convert to concrete encased ducts under all paved areas and shall extend at least 3 feet beyond the edges of the pavement unless otherwise noted.

The Contractor shall provide a staked centerline or offset for the duct and manhole system - utilizing the drawings and a site inspection of the existing grounds, grades and utility crossings. The Owner and Engineer shall approve the staking plan that shall be indicated on a drawing submitted for approval before starting any excavation for the ducts. The staking plan shall indicate the proposed location, elevation and dimensions of manholes and handholes. The Engineer reserves the right to adjust duct, manhole and handhole locations and elevations before installation at no additional cost to the Owner.

The bottom surface of trenches shall be essentially smooth and free from coarse aggregate.

Install grounding-and-bonding type bushings and bonding jumpers on all service entrance conduits and on all feeder and branch circuit conduits.

Use conduit bushings at each conduit termination. Where No. 4 AWG or larger ungrounded wire is installed, use insulated bushings.

When EMT is allowed, utilize only steel compression fittings. Die-cast and set-screw fittings shall not be used.

Use double lock nuts at each conduit termination. Use weather tight hubs in damp and wet locations. Sealing lock nuts shall not be used.

Grounding continuity to rigid metal conduit shall be accomplished by grounding bushings/adapters with lugs for connection to grounding counterpoise and/or grounding electrode conductor as defined by NEC.

All exposed wiring shall be run in not less than 1/2 inch (12 mm) galvanized rigid steel conduit. All conduits shall be installed to provide for drainage. Conduit shall be attached to wooden structures with galvanized pipe straps and fastened with galvanized wood screws not less than No. 8 nor less than 1-1/4 inches (31 mm) long. There shall be at least two fastenings for each 10-foot (3 m) length.

Existing ducts may require clearing before use. It is the responsibility of the Contractor to locate the existing ducts, identify empty or partially empty conduits and clear the conduits as required. Where new cable is to be installed in existing duct, the full length of the duct shall be cleared of debris by mechanical means before the installation of the new cable. Acceptable methods of clearing existing ducts include "hydro-jetting" and "roto-rooting." All existing cables in each re-used duct shall be replaced for the length of the duct and properly spliced in a method approved by the Engineer. Clearing of existing duct banks or conduits is incidental to the cable pay item.

Dedicated ground rods shall be installed and exothermically welded to the counterpoise wire at each end of a duct bank crossing under pavement.

For concrete markers, the impression of letters shall be done in a manner, approved by the Engineer, to affect a neat, professional appearance. The letters shall be stenciled neatly. After placement, all markers shall be given one coat of high-visibility aviation orange paint, as approved by the Engineer.

Existing concrete markers or survey pins for runway thresholds, duct/conduit/cable/splice markings, utility line markings, taxiway points of tangency markings, or other similar items shall be removed and reinstalled or replaced, depending on the project work requirements, as required by a registered professional surveyor to the satisfaction of the Owner and the Engineer.

300-3.7 Junction boxes.

Junction cans shall have both internal and external ground lugs. Size (diameter) and depth shall be as specified in the plans.

Galvanized cans shall have an external ground lug for mechanical connection/bolting ground clamps bonding.

300-3.8 Concrete structures.

For concrete structures, each cover and frame shall be galvanized and have a spring assisted, latching mechanism allowing one individual to open the manhole hinged cover(s) using the recessed lifting handles. Covers shall be secured by stainless steel [penta-head] bolts.

For manholes and handholes, cables shall be well supported on the walls using heavy-duty non-metallic cable racks with multiple arms per stanchion and wide type wire ties for securing the cables. Handholes shall have at least one stanchion on each wall and manholes shall have at least two stanchions on each wall. Adjustable arms shall lock into the stanchion. Stanchion and arm lengths shall be appropriate for the manhole or handhole size and the amount of cables to be supported. At least one spare unused arm stall be installed at each stanchion position. Stainless steel hardware shall be used to securely mount and secure the cable racks to the walls.

Manhole and handhole covers shall have custom legends. Coordinate exact text with the Engineer during product submittal reviews.

300-3.9 Backfill, compaction, and restoration. Refer to the backfill, compaction and restoration requirements within Item P-152 where other compaction requirements are specified (under pavements, embankments, etc.)

Trenches shall be backfilled and compacted in 6" layers to 90% maximum density for cohesive soils and to 100% maximum density for non-cohesive soils, as determined by ASTM D1557. The in-place field density shall be determined in accordance with ASTM D1556, D2167, or D6938.

Backfilling from two directions will not be allowed. No backfilling will be accomplished without the approval of the Engineer or Construction Observer. The Contractor shall ensure all trenches are inspected prior to being covered and prior to encasement. Any uninspected trenches which are prematurely covered shall be exposed for inspection at the Engineer and Owner's convenience at no additional cost to the Owner. The Construction Observer will coordinate with the Contractor for advance scheduling of trench inspection.

Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD) and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

All concrete/asphalt pavement removal and repair work shall be installed as separate pay items in accordance with Specification P-101 Preparation and Removal of Existing Pavements.

The subgrade below the removed pavement shall be compacted to 90% maximum density for cohesive soils and to 100% maximum density for non-cohesive soils, as determined by ASTM D1557. The in-place field density shall be determined in accordance with ASTM D1556, D2167, or D2922. Subgrade preparation will not be measured for separate payment, but will be considered subsidiary to Specification P-101 Preparation/Removal of Existing Pavements.

300-3.10 Cable and utility coordination. The existing and the proposed locations of lighting cable are approximate. The Contractor shall be responsible for field locating and identifying the existing lighting circuits to determine their exact routing. The Contractor shall also be responsible for maintaining the lighting systems in a working condition until the new lighting circuits have been installed and tested. The Contractor shall proactively and expeditiously accomplish this cable identification work prior to performing any modifications to the lighting circuits. Coordinate identification work with the Owner and Engineer and make all corrections, additions, etc. on the as-built drawings.

Underground cable and utilities exist within and adjacent to the limits of construction. An attempt has been made to locate these cables and utilities on the Plans. All existing cable and utilities may not be shown on the Plans and the location of the cables and utilities shown may vary from the location shown on the Plans. Prior to beginning of any type of excavation, the Contractor shall contact the utilities, the airport maintenance staff, FAA field personnel and other organizations as required and make arrangements for the location of the utilities on the ground. The Contractor shall maintain the cable and utility location markings until they are no longer required.

The Contractor shall replace or repair any underground cable or utility that has been damaged by the Contractor during excavation to the satisfaction of the owner of the cable or utility at no additional cost to the Owner.

The Contractor shall be responsible for all coordination work associated with existing and new utilities, their marking, their identification, proposed outages/shutoffs, connections, cutovers, etc.

300-3.11 Wiring. The Contractor shall furnish all labor and materials and shall make complete electrical connections in accordance with the wiring diagram furnished with the project plans. The electrical

installation shall conform to the requirements of the latest edition of National Fire Protection Association, NFPA-70, National Electrical Code.

Provide color-coding for phase identification.

Colors for 240/120V Circuits:

a. Phase A: Black
b. Phase B: Red
c. Neutral: White

Colors for 208Y/120V Circuits:

a. Phase A: Black
b. Phase B: Red
c. Phase C: Blue
d. Neutral: White

Colors for 480Y/277V Circuits:

a. Phase A: Brown
b. Phase B: Orange
c. Phase C: Yellow
d. Neutral: Gray

All new electrical cable shall be marked using color-coded plastic electrical tape, which is specifically designed for application on polyethylene-jacketed cable. The tape shall be applied as detailed on the Plans. Marking tape shall be Scotch 35 Vinyl Plastic tape or approved equal.

300-3.12 Marking and labeling. Properly identify all electrical equipment.

Wire/Cable Designation Tape Markers:

a. Indoor Dry Locations: UL Recognized Materials, vinyl or vinyl-cloth, self-adhesive, wraparound, self-laminating, cable/conductor markers with computer printer-generated numbers and letters, minimum 1” width. Provide Brady B-427 with thermal transfer print type or approved equal.

b. Outdoor Locations and Indoor Wet and Damp Locations: White polyolefin, non-adhesive, full circle, heat-shrinkable sleeve, cable/conductor markers with computer printer-generated numbers and letters, minimum 1” width. Provide Brady B-342 with thermal transfer print type or approved equal.

Properly identify all electrical equipment, including but not limited to the following:

a. Switchgear, switchboards, and control panels.
b. Main distribution panel and individual devices within it.
c. Panelboards and individual devices within it.
d. Safety switches and disconnects.
e. Contactors and lighting control center, including all branch circuits.
f. Individually mounted circuit breakers.
g. Starters and relays.
h. Transformers.
i. Generators and automatic transfer switches.

Use permanently attached black phenolic plates with 3/8” white engraved lettering on the face of each, attached with minimum two sheet metal screws. Starters and relays connected under this Specification shall be identified whether furnished under this Specification or under other Specifications of this contract. Plates shall be indoor or outdoor rated as required by installation location.

Panelboard identification plates shall indicate panel by identification name, voltage system, ampacity rating and type, AIC rating, and feeder source description.

Identify each receptacle, light switch, junction box, etc. with panelboard identification and circuit number. For all wiring device covers, use hot, stamped, or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

Identify fire alarm junction boxes with red covers and mechanical control junction boxes with blue covers.

Install all identification as required by current adopted editions of the NFPA 70 - National Electrical Code and NFPA 70E - Standard for Electrical Safety in the Workplace.

300-3.13 Removal and relocation of existing equipment. The Contractor shall carefully remove all salvageable equipment as indicated on the Plans. Any equipment which is damaged during the removal operation shall be subject to a reduction in payment for removal of the equipment. All equipment which is removed during this project shall be transported to a site on the Airfield or removed from the Airfield and properly disposed of as directed by the Owner and the Engineer.

The Contractor shall carefully relocate existing equipment as indicated in the Plans. Any equipment that is damaged during the relocation operation shall be replaced at no additional cost to the Owner.

Any existing electrical equipment, conduit, cables, etc. that is damaged during construction shall be replaced at no additional cost to the Owner to the satisfaction of the Owner and the Engineer.

300-3.14 5 kV and under 600v cable connections. Cable splicing/terminating personnel shall be licensed electricians who have the minimum continuous experience in terminating/splicing medium voltage cable as listed in Item L-108. The qualifications for these airfield lighting cable splicers shall be submitted for review and approval by the Engineer prior to any work. The Engineer may request sample splices be performed in his presence by the proposed personnel to clearly demonstrate that they have the skill and experience to perform this work. Connector kits and cables shall be provided in sufficient quantity by the Contractor in demonstrating these qualifications at no additional cost to the Owner.

Field-attached plug-in splices using FAA certified L-823 plug and receptacle connector kits, properly sized to the cable being used, shall be installed as shown in the plans. This work shall include the taping and heat shrinking. Refer to Item L-108 for additional requirements.

As an option, the Contractor may utilize enhanced FAA certified L-823 connector kits, such as the Amerace 54Super Kit. These kits do not require taping or heat shrinking. These kits shall be installed in accordance with the manufacturer's installation requirements. Note that the mixing of connector kits is unacceptable. The Contractor shall clearly list and submit the connector kits he proposes to utilize on the project for approval prior to any field construction work, and he shall only install that type during construction unless otherwise noted by the Engineer.

For under 600V cable connections of voltage powered circuits, splices whether direct buried or within an underground enclosure shall only utilize approved cast splices, employing a plastic mold and using epoxy resin equivalent to that manufactured by 3M Company, or an approved equivalent.

300-3.15 Certification and performance. Equipment and materials covered by FAA Advisory Circulars are referred to by item numbers and approved equipment is listed within the AC 150/5345-53 Airport Lighting Equipment Certification Program's monthly Addendum, which contains a complete and updated listing of the certified equipment and manufacturers and is listed in the FAA Buy American Preference equipment list, which is also updated monthly. The Contractor shall provide and install new certified equipment that works reliably and efficiently with the existing equipment to remain in service. The Contractor shall provide any additional accessories and/or appurtenances required to provide fully

functional electrical systems to the satisfaction of the Owner and Engineer, at no additional cost to the Owner.

The Contractor shall ascertain that all lighting system components furnished (including FAA certified and approved equipment) are compatible in all respects with each other and the remainder of the new and existing systems. Any non-compatible components furnished by the Contractor shall be replaced at no additional cost to the Owner with a similar unit that is approved by the Engineer and compatible with the remainder of the airport lighting system.

300-3.16 As-built drawings. The Contractor shall keep one (1) full-sized set of prints for As-Built Drawings at the site, in good order, and annotated to show all changes made during the construction process.

The Contractor shall locate all underground and concealed work, identifying all equipment, conduit, circuit numbers, motors, feeders, breakers, switches, and starters. The Contractor will certify accuracy by endorsement. As-Built drawings shall be correct in every detail, so Owner can properly operate, maintain, and repair exposed and concealed work.

The As-Built drawings shall indicate all control system labeling and marking.

The Contractor shall store the As-Built drawings on the site. Drawings shall not be rolled. Make corrections, additions, etc., with pencil, with date and authorization of change.

As-Built drawings must be submitted to Engineer before project will be accepted.

Minor deviations from the Plans and Specifications shall be as approved by the Engineer.

Upon completion of the installation, the Contractor shall adjust the systems to the satisfaction of the Engineer.

300-3.17 Testing.

General Electrical Testing: Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification and certify compliance with test parameters. Tests shall be conducted in the presence of the Engineer and shall be to his/her satisfaction. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest. Perform infrared scan tests and inspections of service and power distribution equipment at the respective buildings and provide reports. Electrical equipment will be considered defective if it does not pass tests and inspections. Reports shall include notations of deficiencies, remedial action taken and observations after remedial action.

System and Equipment Testing: All installations shall be fully tested by continuous operation for not less than 24 hours as completed systems prior to acceptance. These tests shall include the functioning of each control not less than 10 times.

Test equipment and instruments utilized by the Contractor shall have been calibrated following the manufacturer's recommended schedule to verify their accuracy prior to performing the testing work. The Contractor shall provide instrument calibration certificates on test equipment when requested by the Engineer. Retesting work due to inaccurate or defective instruments shall be performed by the Contractor to the satisfaction of the Engineer at no additional cost to the Owner.

a. Regulator Calibration:

The Contractor shall check and calibrate both new and existing regulators utilizing the enclosed "Constant Current Regulator Calibration Report". Refer to the material section on constant current regulators for additional requirements.

New regulators are calibrated at the factory prior to shipping, while existing regulators typically need checks and calibrations on a routine basis so that they do not get out of tolerance. The intent is to check and/or calibrate these regulators using a high accuracy meter prior to energizing and placing the airfield lighting system in service.

Utilize a high accuracy true RMS ammeter with high accuracy clamp-on current probe when making these measurements (use round type probes, accuracy + or – 2% required, sized per the cable diameter and circuit ampacity to achieve the best accuracy). Adjust regulators per manufacturer's instructions to meet the output currents on each brightness step as listed in Tables 5-2 and 5-3 in AC 150/5340-26.

b. Megger Testing:

The Contractor shall perform megger testing on each existing regulator circuit prior to any work on the electrical system. This information shall be recorded and documented by the Contractor and submitted to the Engineer. The Contractor shall perform megger tests on each regulator circuit after the acceptance test period. This acceptance test information shall be recorded and documented by the Contractor and submitted to the Engineer. Megger test shall be performed in accordance with the requirements of Item L-108.

The Contractor shall submit his initial megger test reports on the enclosed "Insulation-Resistance Test Report" form prior to any work on the electrical system. This report shall be submitted to the Engineer and approved by the Owner prior to Contractor proceeding with his work.

After final acceptance testing has been completed, the Contractor shall complete and submit his final megger test reports to the Engineer and insert copies of the initial and final megger test reports in the Operation and Maintenance Manuals.

Megger testing shall be performed using an insulation meter, such as a Fluke 1507 Insulation Resistance Multimeter, Ideal 61-797 Digital Insulation Meter, or approved equal having an insulation test range up to 10 Gigohms or greater.

Insulation resistance testers for 5kV series circuits shall utilize the 1000V DC source output for testing. The test equipment shall be submitted for review and approval by the Engineer prior to performing the tests.

The Contractor shall be responsible to maintain an insulation resistance equal to minimum 80% of the initial testing value through the end of the contract warranty period. This requirement is based on AC 150/5340-26C which states that resistance values inevitably decline over the service life of the circuit and that a 10-20 percent decline per year is considered normal. Note that AC 150/5340-26C cancels AC 150/5340-26B; thus, refer to the current edition of the maintenance AC for requirements in this project.

For existing circuit insulation resistance requirements, refer to "Existing Circuits" section of Item L-108.

The insulation resistance to ground for 600V rated cables shall be not less than 100 Megohms when measured per NETA standards.

The installations shall be tested in operation as a completed unit prior to acceptance. Tests shall include taking megger and voltage readings in accordance with manufacturer's requirements. Testing equipment shall be furnished by the Contractor.

c. Ground Rod Impedance Testing:

The enclosed "Ground Rod Impedance Test Report" form shall be used, and testing shall be performed in the presence of the Engineer.

As-Built drawings shall indicate the location of all installed ground rods. Each ground rod shall have a unique identifier that corresponds with its submitted ground impedance test report.

Three-pole fall-of-potential testers that can measure the ground resistance of a ground rod using auxiliary electrodes (staked testing), such as a Fluke 1621 Earth Ground Tester, shall be used for testing individual dedicated equipment ground rods at fixtures and equipment, or for testing isolated counterpoise ground rods not yet connected to the counterpoise wire.

Clamp-on testers that can measure the ground resistance of a ground rod without using auxiliary ground rods (stakeless testing), such as a Fluke 1630 Earth Ground Clamp Meter or approved equal, shall be used for testing counterpoise ground rods which have already been connected to the counterpoise wire, or ground ring ground rods which have already been connected to the established ground ring system.

Ground impedance test equipment shall be submitted for review and approval by the Engineer prior to performing the tests.

If the ground rod's impedance exceeds 25 ohms, an additional rod shall be driven in a location suitable and approved by the Engineer. However, the additional rod must satisfy the requirements of NEC 250.53 and not be less than 6 feet away from any other ground rod electrode. Additional ground rods shall not be measured for separate payment but shall be considered subsidiary to the counterpoise or respective equipment pay item.

The Contractor shall perform additional tests if required and requested by the Engineer at no additional cost.

The Contractor shall coordinate with the resident Engineer to approve tests daily before proceeding. The Contractor shall fill out a separate test report for each date. Test reports shall be submitted weekly to the Engineer.

Airport lighting equipment and special systems shall be tested in accordance with applicable FAA Advisory Circular requirements and the manufacturer's installation instructions. These tests shall also include those system requirements listed within AC 150/5340-26 Maintenance of Airport Visual Aid Facilities.

300-3.18 Inspection fees and permits. The Contractor shall obtain and pay for all necessary construction permits, licenses, government charges, and inspection fees necessary for prosecution of the Work. Unless otherwise noted, the Contractor shall pay all charges of utility owners for connections for providing permanent service to the Work, ready for subsequent utility account transfer to the Owner after final acceptance.

300-3.19 Work supervision.

State of Texas: The electrical contractor (whether the general contractor or a subcontractor) shall be a licensed contractor in the state of Texas having an electrical classification suitable for performing the work required in these contract documents.

The Contractor shall designate in writing the qualified electrical supervisor who shall provide supervision to all electrical work on this project. The minimum qualifications for the electrical supervisor shall be a master electrician as defined by Texas Electrical Safety and Licensing Advisory Board. The supervisor or his appointed alternate possessing at least a journeyman electrician license shall be on site whenever electrical work is being performed. The qualifications of the electrical supervisor shall be subject to approval of the Owner and the Engineer.

All master and journeyman electricians shall be licensed in accordance with Texas Board requirements. The website located at https://www.tdlr.texas.gov/electricians/eleclaw.htm publishes the text of this statutory requirement. No unlicensed electrical workers shall perform electrical work on this project. Apprentice electricians in a ratio of not more than one apprentice per journeyman electrician will be allowed if the apprentices are licensed and actively participating in an apprenticeship program recognized and approved by the Texas Electrical Safety and Licensing Advisory Board.

300-3.20 Training. The training classes shall be coordinated with the Owner and Engineer in advance of the final acceptance testing. Comprehensive operational and maintenance training materials shall be provided by the equipment manufacturer and the Contractor (see section 2.3 OPERATION AND MAINTENANCE DATA).

a. Operations and Maintenance:
   (1) One class, six (6) hours in length.
   (2) Maximum of six (6) people
   (3) Location – South Electrical Vault
   (4) Equipment
      i. L-861T(L)
      ii. L-852C(L)
      iii. L-852D(L)
      iv. L-858(L)
      v. L-867
      vi. L-830
   (5) Provide O&M manuals
   (6) Provide hands on troubleshooting specifics.

b. Preventive Maintenance Program Recommendations
   (1) List the equipment here.
   (2) Discuss failure scenarios and what to do.
   (3) Provide technical assistance points of contact and phone numbers.

Schedule the training with the Owner at least 10 days in advance and notify the Engineer.

Provide hands-on demonstrations and training of equipment components and functions, including adjusting, operating and maintaining the lighting equipment and systems. Coordinate the training schedule with the Owner in advance, so that the Owner may record the training if desired. Provide 4 hours training for the operational personnel and 4-hours training for the maintenance personnel.

All training sessions shall be recorded, and documentation of training shall be turned over to the Owner as part of the O&M materials at project completion.

METHOD OF MEASUREMENT

300-4.1 The quantity of lockout/tagout and constant current regulator calibration procedures to be paid for shall consist of all lockout/tagout procedure work and all constant current regulator calibration work completed in place, accepted and ready for operation. This item does not include measurement for constant current regulator equipment.

300-4.2 ***The quantity of repair/removal of broken bolts to be paid for shall consist of all labor and materials need to remove a broken or seized bolt from the light base flange of a top section or bottom section and all labor materials needed to repair the bolt socket to receive a new bolt.***

300-4.3 ***The quantity of retrofit ground lug to existing can to be paid shall consist of all labor and materials needed to install a built-to-purpose ground lug retrofit bracket on a flange ring of an existing light base.***

BASIS OF PAYMENT

300-5.1 Payment will be made at the contract unit price for each complete item, measured as provided above, and accepted by the Engineer. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item to the satisfaction of the Engineer.

Lump sum payments will be based on successful completion of three major portions of the work to the satisfaction of the Engineer.

- 50% Infrastructure in the ground is completed, including items such as concrete foundations, reinforcing, conduits, wiring, etc.
- 25% System equipment is installed, equipment is mounted and aimed, support structures installed, wires pulled/terminated between equipment items, system energized and tested, system is fully functional, ready for commissioning.
- 25% System is commissioned and determined to be fully functional to users as approved by the Owner.

Payment will be made under:

Item SS-300-5.1 Lockout/Tagout and Constant Current Regulator Calibration Procedures – per Lump Sum

Item SS-300-5.2 Removal/Repair of Broken Bolt, in Place – per Each

Item SS-300-5.3 Retrofit Ground Lug to Existing Can, Installed – per Each

MATERIAL REQUIREMENTS

Commercial Item Description A-A-59544	Cable and Wire, Electrical (Power, Fixed Installation)
Fed. Spec. W-C-1094	Conduit and Conduit Fittings; Plastic, Rigid
Fed. Spec. W-P-115	Panel, Power Distribution
Fed. Std. 595	Colors
Underwriters	Rigid Metal Conduit

Laboratories Standard 6	
Underwriters Laboratories Standard 514	Fittings for Conduit and Outlet Boxes
Underwriters Laboratories Laboratories Standard 651	Schedule 40 and 80 Rigid PVC Conduit (for Direct Burial)
Underwriters Laboratories Standard 1242	Intermediate Metal Conduit
CFR 1910	Occupational Safety and Health Regulations
CFR 1926	Safety and Health Regulations for Construction
ANSI/IEEE C2	National Electrical Safety Code
NFPA 70	National Electrical Code (NEC)
NFPA 70E	Standard for Electrical Safety in the Workplace
NFPA 101	Life Safety Code
NFPA 780	Standard for the Installation of Lightning Protection Systems
29 CFR 1910	Occupational Safety and Health Standards (OSHA)
29 CFR 1926	Safety and Health Regulations for Construction
Jaquith Industries, Inc.	The Design, Installation, and Maintenance of In-Pavement Airport Lighting

FAA ADVISORY CIRCULARS

AC 150/5300-13	Airport Design
AC 150/5340-18	Standards for Airport Sign Systems
AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-7	Specification for L-824 for Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-42	Specification for Airport Light Base and Transformer Housings, Junction Boxes, and Accessories
AC 150/5345-44	Specification for Taxiway and Runway Signs
AC 150/5345-46	Specification for Runway and Taxiway Light Fixtures
AC 150/5345-47	Isolation Transformers for Airport Lighting Systems
AC 150/5345-53	Airport Lighting Equipment Certification Program

END OF ITEM SS-300

CONSTANT CURRENT REGULATOR CALIBRATION REPORT

Standard Requirements: FAA AC 150/5340-26 (latest edition) Maintenance of Airport Visual Aid Facilities

Owner / Sponsor: _____ Engineer: Garver, LLC

Airport:_____ Contractor: _____

Project Title: _____ Garver Project Number:_____

Vault ID / Location: _____ Date: _____

Weather / Site Conditions: _____ Last Two Weeks of Rain: _____inches

Constant Current Regulator #: _____ Serves: _____

	Completed	Comments
1. Check all control equipment for proper operation.	☐	_____
2. Perform short-circuit test. Record results and recalibrate if necessary.	☐	_____
3. Perform open-circuit test on regulators with open circuit protection. Open circuit protective device should de-energize the regulator. Record results.	☐	_____
4. Check and record regulator input voltage and current.	☐	_____
Input Voltage: _____ Input Current: _____		
5. Check and record regulator output load. (ONLY if regulator has monitoring package)	☐	_____
Volt-Amperes: _____		
6. Check and record output current on each brightness step. If output current is outside of the allowable range, adjust the regulator's on-board potentiometer to re-calibrate the output current within the allowable range. Re-record the new output current on this form.	☐	_____

3-Step CCR 5-Step CCR

B10: _____ B30: _____ B100: _____ 1: _____ 2: _____ 3: _____ 4: _____ 5: _____

Nominal: 4.8A 5.5A 6.6A 2.8A 3.4A 4.1A 5.2A 6.6A

Tested By: _____ (Signature and Date)

Test Equipment: _____ (Manufacturer and Model No.)

Engineer Witness: _____ (Signature and Date)

Owner / Sponsor Witness: _____ (Signature and Date)

INSULATION RESISTANCE TEST REPORT

Owner / Sponsor: _____ Engineer: Garver, LLC_____

Airport:_____ Contractor: _____

Project Title: _____ Garver Project Number:_____

Vault ID / Location: _____ Date Initial / Final Tests: _____

Weather / Site Conditions (Initial Test): _____ Last Two Weeks of Rain:_____inches

Weather / Site Conditions (Final Test): _____ Last Two Weeks of Rain:_____inches

		Initial Test Results		**Final Test Results**	
	Circuit Designation and Color Code	Regulator Size (kW)	Megger Reading Before Field Work (Megohms)	Regulator Size (kW)	Megger Reading After Field Work (Megohms)
1					
2					
3					
4					
5					
6					
Tested By:					
Test Equipment:					
Engineer Witness:					
Owner/Sponsor Witness:					

Provide signature/date and manufacturer/model no. as required in the fields above.

Initial Test Record – Owner Disposition

Owner / Sponsor: _____ (Signature and Date)

Check one only: ☐ Proceed with Installation ☐ Hold

GROUND ROD IMPEDANCE TEST REPORT

Owner / Sponsor: _____ Engineer: Garver, LLC_____

Airport:_____ Contractor: _____

Project Title: _____ Garver Project Number:_____

Date: _____ Weather / Site Conditions: _____

Fall-of-Potential Style Tester (F):
Manufacturer: _____ Model #: _____

Clamp-On Style Tester (C):
Manufacturer: _____ Model #: _____

Ground Rod #	Test Equipment Style (F or C)	Impedance Value (Ohms)	Ground Rod #	Test Equipment Style (F or C)	Impedance Value (Ohms)

Tested By:	
Engineer Witness:	

Provide signature/date in the fields above.

Page _____ of _____

ITEM SS-301 ELECTRICAL DEMOLITION WORK

DESCRIPTION

301-1.1 This item shall consist of the removal and satisfactory disposal of existing runway and taxiway edge lights, in-pavement lights, guidance signs, markers, manholes, handholes, junction structures, racks, pads, equipment, poles, towers, shelters, and other incidentals, all of which are not designated or permitted to remain, in accordance with this specification, the referenced specifications and drawings, and applicable advisory circulars. This work shall include the removal of indicated equipment, materials, and incidentals necessary for a complete item removal, including all restoration work, as a completed unit to the satisfaction of the Engineer.

301-1.2 The Contractor shall maintain current copies of all referenced and applicable standards on the job site. The Contractor is responsible to make known to the Engineer any conflict between plans and specifications that he observes or of which he is made aware.

MATERIALS

301-2.1 All backfill and repair materials used in electrical demolition, repair and restoration work shall comply with the referenced specifications and be approved by the Engineer.

Airport lighting equipment and materials shall meet the requirements outlined in Item SS-300 and Item L-125.

CONSTRUCTION METHODS

301-3.1 General. No demolition shall be started until the removal and/or relocation work has been laid out and approved by the Engineer. All material shall be disposed of off-site. All hauling and disposal will be considered a necessary and incidental part of the work. Hauling cost shall be considered by the Contractor and included in the contract unit price for the pay of items of work involved. No payment will be made separately or directly for hauling on any part of the work.

Equipment removal shall typically include removing the equipment and its accessories, removing foundations/pads, removing existing conduits, conductors and appurtenances, removal of conduit to below grade, and removal of existing circuits back to source. The work shall include restoring the area to match existing, including filling and tamping all holes with earth, and clearing and leveling the site.

The Contractor shall remove all existing underground cable, which is unused or rendered unusable by this project, when such is exposed or made accessible during this work. All such wiring removed shall become property of the Contractor and shall bpe immediately removed from the project. Wiring in conduit shall be removed as indicated or if new wiring is shown to be installed in its place. Existing wiring shall not be reused or reinstalled.

Wiring not exposed shall be abandoned in place, if a reasonable effort will not remove it. No measurement or payment will be made for this cable removal work. Damage to turf or other systems will not be permitted to salvage or retrieve existing cable.

Any damage to electrical equipment, systems, structures, conduits, cables, and accessories or other utilities, designated to remain in place, shall be repaired or replaced expeditiously at no additional cost to the Owner and to the satisfaction of the Owner and Engineer.

Holes, ditches, or other abrupt changes in elevation caused by the removal operations that could obstruct drainage or be considered hazardous or unsightly shall be backfilled, compacted, and left in a workmanlike condition.

Trenches or voids resulting from the removal or demolition of existing electrical equipment or other structures shall be filled with approved material placed in layers in accordance with Item P-152.

Concrete foundations and pads to be removed shall be obliterated full depth.

301-3.2 Removal and/or relocation of light fixtures and equipment. Light fixtures and other equipment which are to be removed shall be carefully excavated. All concrete bases and concrete anchors shall be removed by the Contractor. The removed lights, guidance signs, isolation transformers and wiring harnesses shall then be given to the Owner, or properly disposed of if so directed by the Owner. The ground around the removed lighting equipment shall be backfilled and properly compacted. Light fixtures and equipment which are to be relocated shall be stored on site and reinstalled with new lamps, new transformers, and all other new required accessories as indicated in the plans.

301-3.3 Removal of existing equipment. The Contractor shall carefully remove all salvageable equipment as indicated in the plans. Any equipment that is damaged during the removal and/or relocation operation shall be subject to a reduction in payment for removal and/or relocation of the equipment. All equipment that is removed during this project shall be transported to a site on the Airfield or removed from the Airfield and properly disposed of as directed by the Owner and the Engineer.

301-3.4 Relocation of existing equipment. Existing equipment that is to be relocated shall be carefully disconnected from the existing electrical system. The equipment shall be stored on site in an enclosed area protected from the weather as directed by the Owner and Engineer. The Contractor shall remove existing concrete bases and shall backfill and compact these areas to match existing. The electrical power circuit shall be field located and extended to the new installation location unless otherwise noted in the Plans. Coordinate the extension of the electrical service with the extension of the electrical duct serving the equipment and install duct, splice and cable markers to mark the new complete route.

Refer to the plans for additional installation requirements concerning the relocation of existing lights, signs, systems and incidentals.

Any equipment that is damaged during the relocation operation shall be subject to a reduction in payment for removal and/or relocation of the equipment.

Any equipment that is damaged during the relocation operation shall be repaired or replaced by the Contractor at his expense to the satisfaction of the Owner and Engineer.

301-3.5 Clearing of existing duct banks or conduits. Where new cable is to be installed in an existing duct bank or conduit, the full length of the duct bank or conduit shall be cleared of debris by mechanical means before installation of the new cable. Acceptable means of clearing existing duct banks or conduits may include using a mandrel, “hydro-jetting” method, or “roto-rooting” method as approved by the Engineer.

Where existing cables are being removed from an existing duct bank or conduit and replaced with new cables, the Contractor shall use the existing cable to clear the conduit and to pull in the new cable. No separate payment will be made for clearing these duct banks or conduits or for the existing cable removal. Clearing of these existing duct banks or conduits is incidental to the cable pay item unless otherwise noted.

METHOD OF MEASUREMENT

301-4.1 The quantity of existing lights or guidance signs, removed, to be measured under this item shall be the number of each complete unit removed, and accepted by the Engineer.

This item shall include removing and storing the existing equipment as directed by the Engineer.

Where the light base and concrete structure are indicated to be removed or demolished, the item shall include restoring the area to match existing, including removing the complete concrete item, filling and tamping all holes with earth, and clearing and leveling the site.

Where the light base and concrete structure are to remain, a new blank cover shall be installed for protecting the light base during the construction work. Blank covers shall be removed when the existing equipment is reinstalled and given to the Owner after completion of construction work in the respective area.

301-4.2 The quantity of existing duct bank or conduit, cleared, to be measured under this item, shall be the linear foot of duct bank or conduit cleared using a mandrel or other approved method to remove debris, including swabbing and clearing of each conduit in a duct bank, and installation of pull wires in spare conduits. Separate measurement shall be made for the various types and sizes of duct bank or conduit. Partial payment will not be made for duct bank or conduit that cannot be cleared using a method acceptable to the Engineer. Separate payment will not be made for existing cable removal.

BASIS OF PAYMENT

301-5.1 Payment will be made at the contract unit price for each complete item, measured as provided above, and accepted by the Engineer. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item to the satisfaction of the Engineer.

Payment will be made under:

Item SS-301-5.1	Existing Base Mounted Edge Light, Removed -- per Each
Item SS-301-5.2	Existing In-Pavement Centerline Light, Removed – per Each
Item SS-301-5.3	Existing Base Mounted Guidance Sign, Removed -- per Each
Item SS-301-5.4	Existing Base Mounted Edge Light, Removed, Base Top Section, Removed -- per Each
Item SS-301-5.5	Existing In-Pavement Centerline Light, Removed, Base Top Section, Removed – per Each
Item SS-301-5.6	Existing L-852G Runway Guard Light, Relocated on New Base – per Each
Item SS-301-5.7	Abandoned Sign Foundation, Demolished – per Each
Item SS-301-5.8	***Existing Electrical Conduit, 1-Way 2"C, Cleared – Linear Foot***
Item SS-301-5.9	***Existing Electrical Conduit, 1-Way 4"C, Cleared – Linear Foot***

END OF ITEM SS-301

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ITEM SS-310 AIRPORT LIGHTING SYSTEMS

DESCRIPTION

310-1.1 This item shall consist of furnishing and installing airport runway and taxiway edge lighting systems, retroreflective markers, guidance signs, runway centerline and touchdown zone lighting systems, other taxiway lighting systems, and other approach lighting aid systems, in accordance with this specification, the referenced specifications and drawings, and applicable advisory circulars. The system shall be installed at the locations and in accordance with the dimensions, design and details shown on the plans. This work shall include the furnishing of all equipment, materials, services and incidentals necessary to place it in operating condition as a completed unit to the satisfaction of the Engineer.

310-1.2 The Contractor shall maintain current copies of all referenced and applicable standards on the job site. The Contractor is responsible to make known to the Engineer any conflict between plans and specifications that he observes or of which he is made aware.

EQUIPMENT AND MATERIALS

310-2.1 General.

a. Airport lighting equipment and materials shall meet the requirements outlined in Item SS-300 and the applicable Item L Series Specifications.

b. For pre-cast or prefabricated concrete encased light base installations, the Contractor shall submit and coordinate the construction of the proposed pre-cast units with the Engineer onsite to review and approve the construction process. The Contractor shall submit his proposed installation process for review and approval by the Engineer. The Contractor shall provide additional items and work if required and requested by the Engineer for the construction and installation of the pre-cast units at no additional cost to the Owner.

Pre-cast or prefabricated concrete encased light bases may only be assembled at the Contactor's staging area at the airport to allow the Engineer to check and approve all such construction items. Pre-cast bases assembled offsite will not be allowed.

c. For in-pavement fixture installations, the Contractor shall submit his proposed installation method and technique for correct placement and alignment of all lights for review and approval prior to any work.

In-pavement lighting systems will require an experienced electrical supervisor and experienced installation team, including licensed surveyor. This includes the complete installation, layout, and coordination with paving joints and paving work.

310-2.2 Light fixtures. Airfield lights shall be supplied with all features and accessories including isolation transformers, light bases, base covers, safety ground rods, concrete pads and incidentals required for a complete installation as defined in these Specifications and as shown on the plans.

310-2.3 Lamps. Lamps for elevated edge lights shall be LED type as specified.

310-2.4 Spare equipment including fixtures and spare sign replacement components**.** Provide 10 percent (rounded up to the next whole number) spare fixtures of each type installed for the taxiway and runway edge

and runway threshold lights, add other types or new spare lamps as needed, minimum quantity of 2 required. Provide 10 percent (rounded up to the next whole number) spare sign replacement components of each type installed for signs, minimum quantity of 1 required. Spare fixtures and spare sign replacement components shall not be measured for separate payment but shall be considered subsidiary to the respective light fixture or sign pay items.

a. A spare elevated LED fixture unit shall be one complete, ready-to-install fixture, including the coupling, column, head housing assembly, cordset, LED power supply assembly, LED assembly, and lens assembly.
b. A spare elevated quartz fixture unit shall be one complete, ready-to-install fixture, including the coupling, column, head housing assembly, cordset, lamp assembly, and lens assembly.
c. A spare in-pavement LED fixture unit shall be one complete, ready-to-install fixture, including the top cover assembly, bottom pan assembly, cordset, LED power supply assembly, and LED assembly.
d. A spare sign replacement component unit shall include the LED light tube assembly and LED power supply assembly.

Spare fixtures and sign replacement components shall be on-site and available for use by the Contractor prior to the final acceptance testing. Any fixtures or sign components installed new in this project and replaced as part of the final acceptance testing shall be shipped back to the manufacturer for repair or replacement, and then delivered back to the Owner at no additional cost.

The spare fixtures and spare sign replacement components shall be delivered and stored as directed by the Owner, with transmittal receipt signed by Owner's representative. A signed copy shall be forwarded to the Engineer with an additional signed copy placed in the O&M manuals.

310-2.5 Guidance signs. Guidance signs shall be L-858(L), meeting the criteria set forth in AC 150/5345-44, Specification for Taxiway and Runway Signs, and suitable for base mounting. Each unit shall be furnished with the required panels, mounting assemblies, frangible couplings, transformer, intensity control, identification tag, metal tethers, fasteners and safety ground rods.

Style 2 and Style 3 signs shall meet the luminance requirements in AC 150/5345-44 throughout the current ranges of the associated series circuit.

Guidance signs shall have an integral on/off switch for airport maintenance use.

Signs shall be furnished with permanent type nameplates that are both weather and sunlight resistant. Nameplates which are completed with ink markers or similar methods will not be accepted.

Refer to the guidance sign index in the Plans for information on each sign's size, style, class and mode.

The complete sign installation shall be designed to withstand a 200-mph wind load.

310-2.6 Isolation transformers. New isolation transformers shall be Type L-830 and have a wattage rating suitable for the wattage of the fixture and sign lamps. The transformer shall be listed in FAA Circular AC 150/5345-47.

Provide 10 percent spare isolation transformers of each type installed for lights, signs and other equipment. Spare transformers shall not be measured for separate payment but shall be considered subsidiary to the respective light fixture or sign pay items.

CONSTRUCTION METHODS

310-3.1 General. The installation and testing details for the lighting system shall be as specified in the applicable advisory circulars.

The Contractor is responsible for all surveying and measurement which is required to accurately position and aim airfield lighting systems and equipment.

Airfield lighting systems and equipment that are improperly installed shall be removed and re-installed correctly as directed by the Engineer. No payment will be made for the removal and reinstallation of airfield lighting systems and equipment improperly installed. All remedial work shall be to the satisfaction of the Engineer.

310-3.2 Lighting layout plans. The Contractor shall stake the airfield lighting systems, prior to installation of any trench, cable or lighting apparatus. The intent is to stake the installation at the locations indicated, noting any deviation from plan dimensions to the Engineer prior to installation. The Contractor shall obtain the services of an experienced and licensed surveyor to perform this work.

The Engineer shall provide electronic CADD files to the Contractor for this staking work. The Contractor shall stake the items and his surveyor shall provide a CADD file submittal back to the Engineer. Based upon this submittal, the Engineer shall coordinate and provide directions on any adjustments necessary to meet existing field condition requirements and comply with FAA Advisory Circular requirements on the layout and spacing of equipment.

The Contractor and his surveyor shall then make any electronic CADD file spacing adjustments and/or field staking adjustments prior to installation at no additional cost to the Owner.

Refer to General Provisions Section 50 Control of Work for additional construction layout and staking requirements.

310-3.3 Placing the equipment. The equipment shall be mounted on concrete pads as shown in the plans. Secure the equipment and make all final connections.

310-3.4 Mounting, leveling, and aiming. The concrete support to which the equipment is fastened shall be accurately leveled before mounting the equipment. The units shall be properly aimed, as recommended by the manufacturer of the supplied equipment. This adjustment shall be accomplished using factory-approved aiming devices and techniques.

310-3.5 Placing lights. All equipment shall be installed at locations indicated in the plans. Lights shall be laid out by locating the two control points by station as indicated on the plans and measuring the indicated individual separation distances. Light bases shall be located within 1 inch +/- longitudinally and 0.5 inches +/- transversely of the location indicated unless deviation is approved by the Engineer. Excavation for installation of light bases shall be backfilled with at least 4 inches of granular leveling course, as approved by the Engineer. Fixture height shall be as indicated on the Drawings.

For pre-cast or prefabricated concrete encased light base installations, a leveling course of sand shall be placed in the bottom of the excavated hole, sufficient for accurately installing, leveling and placing the lights in accordance with the requirements in this specification and AC 150/5340-30. Concrete encased light bases shall be allowed to cure a minimum of 7 days prior to installation.

Utilize a bubble level device to level all light fixtures in the horizontal light plane during the day, and then

check at night to ensure uniformity in light output.

Provide factory-approved alignment tools and aiming devices to properly level and align fixtures as required by the FAA Advisory Circulars and manufacturer's installation instructions. After all light fixture installations are completed and accepted by the Engineer, these alignment tools and aiming devices shall become property of the Owner and shall be delivered and stored as directed by the Owner.

310-3.6 Placing signs. All signs shall be installed at the approximate location indicated in the plans. The specific requirements for sign location are specified in AC 150/5340-18, Standards for Airport Sign Systems. Specific requirements of this AC are also shown on the Plans. Signs shall be located within 1 inch +/- longitudinally or 0.5 inches +/- transversely of the required location unless deviation is approved by the Engineer. The locations for the signs shall be staked by the Contractor and approved by the Engineer before installation begins.

Provide single module signs with one tether. Provide multiple module signs with a tether at both ends.

310-3.7 Transformer installation. The transformer for base mounted fixtures shall be placed inside the base. The transformer for stake mounted fixtures shall be located uniformly as shown on the plans. The primary cable connections shall be made with L-823 connectors as described in Item L-108 and have 3 feet of slack cable. The secondary leads connected to the lamp leads by means of a disconnecting plug and receptacle provided with the unit, and this joint shall not be taped. The secondary joint shall be fastened with a holding ring provided for this purpose.

310-3.8 Unit assembly. All electrical equipment, including edge lights, guidance signs and other visual aid units shall be assembled in accordance with the manufacturer's installation procedures. Anti-seize compound shall be used on all screws, nuts, and threads, including frangible coupling threads. If coated bolts are used (ceramic metallic/fluoropolymer coating), then do not apply anti-seize compound.

Provide and install all spacers, shims, and gaskets as required, and verify they are in place before installing the light fixture on the base.

Bolts and washers for new and existing bases shall be new. Do not reuse existing hardware.

The minimum thread engagement into top flange of the base shall be 0.5 inches. For in-pavement light fixture assemblies, the bolt protrusion requirement shall be minimum 0.75 inch; maximum 1 inch.

For in-pavement light fixtures, provide Nord-Lock NL 3/8 stainless steel 2-part locking washers or approved equal, as required by the manufacturer.

Coordinate recommended torque values with the light fixture manufacturer, light base can manufacturer, stainless steel bolts and hardware used, and exact anti-seize compound used, to prevent light base thread damage. Utilize a dial-type torque wrench for accuracy and to prevent over-tightening bolts. Never use impact wrenches/drills when removing or installing bolts.

The Contractor shall submit complete installation method shop drawings and calculations to determine the proper torque requirements for review and approval by the Engineer prior to any field removal or installation work for in-pavement light fixtures.

When installing new or existing light fixtures on existing bases, the following work shall be performed for the removal and reinstallation work:

a. Remove all bolts including any that are frozen or broken. If necessary, drill out and tap for new

bolt. If the can threads are galled but usable, clean threads with a tap.

b. Remove the light, base plate, transformer, and any foreign object that may be inside the can.
c. Remove the old cable, mandrel the conduits, and shop-vacuum out the can clean.
d. Install the new cable, connectors, transformer, gasket, bolts, and other required appurtenances per the fixture type and its location in accordance with FAA Advisory Circular requirements and manufacturer's requirements.
e. Never use impact wrenches/drills when removing or installing bolts.

The Contractor shall obtain complete installation manuals for the new airfield lighting equipment and the existing equipment to be reinstalled prior to any removal or installation work. Copies of these manuals shall be maintained in 3-ring binders within the Contractor's onsite field office.

In-pavement light fixtures that are installed too high will require their complete removal and reinstallation at no additional cost to the Owner. In-pavement fixtures shall be provided with all spacers, shims, gaskets and other appurtenances for complete installations that comply with FAA Advisory Circular requirements and manufacturer's installation instructions. All assemblies and work shall be to the satisfaction of the Engineer.

310-3.9 Identification numbers. An identifying number shall be assigned to each light and sign in accordance with the plans or as approved by the Engineer and Owner. This number shall be imprinted with reflective black with 1/2" letters on a non-corrosive metal disc 2" minimum diameter and attached to the pavement side of the fixture with a metal screw.

310-3.10 Temporary airfield lighting. Refer to the Airfield Lighting Phasing Plans and Details for additional requirements. Existing lighting circuits shall remain operational by use of temporary circuits. New lighting circuits shall also be connected and remain operational by use of temporary circuits. This item shall include all work to maintain the existing and new lighting circuits during construction and allow all taxiways and runways in operation to remain lighted, including that portion through the construction area, as indicated in the Phasing Plans and as directed by the Engineer.

The Contractor shall perform initial field work including location and verification of existing circuits and submit plans for the temporary airfield lighting required in each work phase, for review and approval by the Engineer and Owner, prior to starting work of that phase. This work shall include megger testing of circuits and circuit segments before and after installation and connection of jumpers.

The Contractor shall install couplings and other required fittings/appurtenances in conduit systems at last pavement joint within each phase for connecting to conduit systems in the next phase, or for connecting to existing conduit systems to remain.

310-3.11 Testing. The installation shall be tested in operation as a completed unit prior to acceptance. Tests shall include taking megger and voltage readings as outlined in Item SS-300 and Item L-108. Testing equipment shall be furnished by the Contractor. Refer to Item L-108 for additional test requirements.

Tests shall be conducted in the presence of the Engineer and shall be to his/her satisfaction.

All installations shall be fully tested by continuous operation for not less than 24 hours as completed systems prior to acceptance. These tests shall include the functioning of each control not less than 10 times.

Equipment and materials covered by FAA Advisory Circulars are referred to by item numbers and approved equipment is listed within the AC 150/5345-53 Airport Lighting Equipment Certification Program's monthly Addendum, which contains a complete and updated listing of the certified equipment

and manufacturers, and is listed in the FAA Buy American Preference equipment list, which is also updated monthly. The Contractor shall provide and install new certified equipment that works reliably and efficiently with the existing equipment to remain in service. The Contractor shall provide any additional accessories and/or appurtenances required to provide fully functional electrical systems to the satisfaction of the Owner and Engineer, at no additional cost to the Owner.

The Contractor shall ascertain that all lighting system components furnished (including FAA certified and approved equipment) are compatible in all respects with each other and the remainder of the new and existing systems. Any non-compatible components furnished by the Contractor shall be replaced at no additional cost to the Owner with a similar unit that is approved by the Engineer and compatible with the remainder of the airport lighting system.

310-3.12 Photometric testing.

Test all elevated and in-pavement fixtures installed by this contract using the services of a "Mobile Photometric Measurement System" in accordance with AC 150/5340-26 item 4.1.12 and the specific equipment's Advisory Circular photometric performance requirements. This testing work shall be required for both new fixtures and reinstalled existing fixtures. Submit qualifications of the mobile photometric testing company for review and approval by the Engineer prior to the Preconstruction Meeting. The testing company shall have a minimum 5 years' experience in performing these type tests and submit past experience qualifications and points of contact at similar size airports.

A preconstruction meeting for mobile photometric testing will be held with the Airport, FAA, Engineer, Contractor, Electrical Subcontractor, and approved testing company. Attendance may be in person or via conference call as determined by the Engineer. An agenda shall be provided detailing the construction schedule, work completion dates, scheduled test date(s), test equipment and their requirements, weather conditions, airfield conditions, and other information necessary for scheduling the testing with the overall construction schedule, to avoid delays, and to avoid damage to the airfield.

The Contractor shall coordinate with the Airport and Engineer one week prior to the testing to confirm the test date and time. Testing may have to be rescheduled due to adverse weather conditions or airfield conditions. Any equipment, earthwork, or other items damaged during the testing procedures shall be promptly replaced and/or repaired to the satisfaction of the Owner and Engineer at no additional cost to the Owner.

The Contractor shall clean and perform required maintenance on fixtures to be tested immediately prior to the initial test runs. Test runs and their schedules shall be coordinated with the Contractor, Engineer, and Owner so that the Contractor has adequate staff on-site during the testing procedures. The testing agency shall have all test programming complete and ready prior to starting the test runs.

<u>Mobile Photometric Testing Runs:</u>

- Test the centerline lighting systems along Taxiway SA, Taxiway SB, Taxiway SH, Taxiway SJ, Taxiway SK and the segments of Taxiway SC and Taxiway SF.
- Test the edge lighting systems along Taxiway SA, Taxiway SB, Taxiway SH, Taxiway SJ, Taxiway SK and the segments of Taxiway SC and Taxiway SF.

The complete preliminary test results shall be immediately reviewed by Contractor, Engineer, and Owner on the testing agency's computer. Each individual fixture must meet and exceed its FAA AC photometric performance requirements and pass its specific photometric test specific to that fixture's type, class, mode, option, style and age (i.e. new or existing). Fixtures that fail this test shall immediately be repaired and/or replaced as required to the satisfaction of the Owner and Engineer with retesting required to verify

compliance to take place that night or the next night. All retesting work required will be at the Contractor's expense at no additional cost to the Owner.

The intent is to check the light output and orientation of the lighting systems. New fixtures must pass photometric testing for new installations. Testing for new fixtures shall only be by pass or fail results, and any marginal results will be considered a failure. Existing fixtures must pass photometric testing at not less than 70% of the minimum output required when operated at full intensity. Misaligned fixtures shall be corrected to eliminate their alignment error. Existing fixtures, when removed, cleaned and inventoried for storage, shall be photographed to detail any significant lens scratching or damage which can distort or diffuse the light output causing the fixture to fail its photometric testing. As part of the in-pavement fixtures rehabilitation, the fixtures' prisms, lens and gaskets will be replaced with new to eliminate lens distortion and ensure the fixture is properly sealed and ready for reinstallation. ***New light fixtures installed in existing bases shall be checked for proper output and alignment. Any photometric issues arising from the existing light base or surrounding pavement shall be reported to the Airport and the Engineer.***

The submitted test reports shall include, but not be limited to, an executive summary, an overview summary for all light fixtures tested including their performance data and analysis, color bar charts showing pass/marginal/fail results, commissioning level considerations, airport diagram, aerial view plans and/or CAD plans detailing all fixture locations by identifier number and containing annotated comments on failed fixtures, and recommendations concerning the probable cause of all failed fixtures.

These test reports shall be submitted in PDF format to the Engineer for review. Methods requiring the Engineer to review items online, download, or configure their own reports are not acceptable.

The complete final test reports shall be submitted to the Owner and Engineer and installed within the O&M manuals at the end of the project. Final test reports shall clearly indicate that all fixtures have passed and met the FAA requirements for their fixture type and use.

METHOD OF MEASUREMENT

310-4.1 Temporary airfield lighting shall be measured as a lump sum complete item per each respective phase work area, including all work completed in place and ready for operation, and including the installation, protection, and removal of all temporary cables, conduits, lighting, grounding, marking, and associated items and appurtenances, as indicated in the Drawings and as directed by the Engineer.

310-4.2 Mobile photometric testing shall be measured as a lump sum complete item, including all testing work with photometric report assembled and submitted to the Owner and Engineer by an approved testing company, completed in place, for the specific areas and lighting systems as indicated in the Drawings and as directed by the Engineer. This work shall include testing for taxiway in-pavement centerline lighting systems and taxiway edge lighting systems installed in this project.

BASIS OF PAYMENT

310-5.1 Payment will be made at the contract unit price for each complete item, measured as provided above, and accepted by the Engineer. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item to the satisfaction of the Engineer.

310-5.2 Payment will be made at the contract lump sum price for each complete item, measured as provided above, and accepted by the Engineer. This price shall be full compensation for furnishing all

materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item to the satisfaction of the Engineer.

Lump sum payments will be based on successful completion of three major portions of the work to the satisfaction of the Engineer.

- 50% Infrastructure in the ground is completed, including items such as concrete foundations, reinforcing, conduits, wiring, etc.

- 25% System equipment is installed, equipment is mounted and aimed, support structures installed, wires pulled/terminated between equipment items, system energized and tested, system is fully functional, ready for commissioning.

- 25% System is commissioned and determined to be fully functional to users as approved by the Owner.

Payment will be made under:

Item SS-310-5.1 Temporary Airfield Lighting ***(Base Bid)*** -- per Lump Sum

Item SS-310-5.2 Mobile Photometric Testing -- per Lump Sum

Item SS-310-5.3 Temporary Airfield Lighting (Additive Alternate 1) – per Lump Sum

END OF ITEM SS-310

GENERAL INFORMATION

1.0 GENERAL OVERVIEW

The Houston Airport System (HAS)is seeking proposers to provide the services in the rehabilitation of Taxiways SA and SB including the connecting taxiways. Work will include milling and overlay of bituminous pavement, widening of bituminous shoulders and two radii, bituminous crack repairs, PCC panel repairs and replacement, various drainage impovements, grading, airfield electrical lighting and signage, and marking. .

1.1 Sealed proposers shall consist of the following, each to be labeled with the assigned Solicitation Number HJA-TXSASB-2023-022, located on the first page of this CSP:

1.1.1 Two (2) hard copies of the proposers package, including one (1) printed original signed in blue ink on the Official Signature Page by an authorized officer of the Proposer;

1.1.2 Seven (7) USB flash drives containing a scanned electronic copy of your original proposers package (to include the hard copy of the Electronic Proposers Form and all required forms designated in Section 18.0, in a sealed envelope/box; and

1.1.3 Two (2) hard copies OR two (2) USB flash drives containing electronic copies of the requested financial information in a separate sealed envelope/ box labeled with “Financial Information,” along with the assigned Solicitation Number.

All of the information above should be sent to:

Houston Airport System
Attn: Cathy Vander Plaast
Aviation Procurement Officer
Supply Chain Management (SCM)
16930 JFK Blvd
Houston, Texas 77032

1.2 The deadline for the submittal of the proposers to SCM is no later than the date and time indicated on the first page of the CSP document. All proposals will be opened and publicly read in the Venus Conference Room, at 2:15:00 PM on the solicitation due date. Failure to submit the required number of copies may be cause for disqualification from the CSP process.

1.3 Proposers may elect to mail or personally deliver their proposal to Supply Chain Management. Proposer(s) may submit their proposals to Supply Chain Management any time prior to the stated deadline.

1.4 The City shall bear no responsibility for submitting responses on behalf of any Proposer.

1.5 Award shall be made only to a Proposer that is responsive and responsible, as defined in Section 32.0.

1.6 Solicitation Schedule

1.6.1 Below are dates of significance for this Request for Competition Sealed Proposals (CSP).

13.2 An evaluation committee shall evaluate Proposer's submissions in accordance with the evaluation criteria listed in Item 13.1 above. Upon completion of the evaluation, the committee may develop a shortlist of Proposer(s) meeting the technical competence requirements. The shortlisted Proposer(s) may be scheduled for a structured oral presentation, demonstration, and/or interview. Following these City-to-Proposer(s)' meetings, the evaluation committee will summarize their findings and recalculate their scores, if needed. However, the evaluation committee reserves the right to issue a letter(s) of clarification when deemed necessary to any or all Proposer(s). The oral presentations, demonstrations, and/or interviews may be recorded and/or videotaped.

13.3 The City reserves the right to request that Proposer(s) provide a final presentation handout of their Submission at their scheduled meeting. No Proposer may attend presentations of any other Proposer. If necessary, Proposer may be scheduled for more than one presentation, demonstration, or interview.

14.0 SUBMITTAL REQUIREMENTS

To simplify the review process, the Respondent(s) must provide the responses to the items set forth below and include this information as requested in their proposers packet to allow for the evaluation committee to conduct a thorough assessment of the Respondent(s) experience and capabilities. Moreover, Respondent(s) are encouraged to include additional relevant and supporting information to demonstrate their qualifications.

14.1 EXPERIENCE & REPUTATION OF PROPOSER (30 Points)

Organization - Stable & Well Established
Experience with similar type of construction on airports
Expericence with FAA specifications
Experience with nightime construction
Experience in same Size/Summary of Contracts
Pending legal action
Reference Checks

14.2 PRICE (50 Points)

VENDOR'S SUBMITTAL (Attachment C – Pricing for IAH)
Evaluate based on overall price of the offer - Lowest price gets Maximum Points
Formula: Lowest Price/Higher Price = % * Maximum Points = Awarded Points
Failure to price all aspects gets 0 ranking.

14.3 PROPOSER'S ABILITY TO MEET OR BETTER PROJECT MILESTONE (20 Points)

Draft Construction Schedule of this project, rehabilitation of Taxiways SA & SB
Provide options for HAS review to improve Construction Schedule
On-time Completion Rate for recent construction projects
Average Time of Punch List Completion after Substantial Construction Completion for recent construction projects

14.4 FINANCIAL STRENGTH OF CONTRACTOR (Pass/Fail)

VENDOR'S SUBMITTAL
Liquidity Ratio
Debt Ratio
Operational Ratio
Profitability Ratio
Asset Turnover

25.6 Proposer may increase preprinted price on line items stating “Minimum Bid Price” in the description on the Proposal Form by crossing out the minimum and inserting revised price on the line above.

25.7 Proposer may decrease preprinted price on line items stating “Maximum Bid Price” in the description on the Proposal Form by crossing out the maximum and inserting revised price on the line above.

25.8 Proposer shall insert a price no greater than the maximum preprinted range and no less than the minimum preprinted range for line items stating “Fixed Range Unit Price” in the description on the Proposal Form by crossing out prices noted and inserting revised price on the line above.

26.0 PROPOSAL SUBMISSION

26.1 The Houston Airport System’s Aviation Procurement Officer will receive Proposals until 2:00 p.m. CST on August 18, 2023, at:

Houston Airport System Admin Facility
16930 JFK Blvd.
Houston, TX 77032.

26.2 Proposals submitted after the Proposal Submittal Date will be returned to Proposer unopened.

26.3 Proposer shall submit in person or by mail in accordance with Section 26.1.1 Proposal Submission.

26.4 Verbal, facsimile or electronic Proposals are invalid and will not be considered.

26.5 Proposers shall submit one (1) original (marked original) signed in BLUE ink by the authorized person that is binding the proposed Firm, and one (1) copy, and seven (7) electronic copies (USB thumb drives) of its proposal with required Proposal Security, and required Proposal Supplements, in a sealed, opaque envelope. In addition, Proposer shall clearly identify Project, Proposal Date and Proposer’s name on the outside of envelope. If forwarded by mail, the sealed envelope containing the Proposal must be enclosed in another envelope addressed for postal delivery.

26.6 Proposer shall submit Document 00470D – Bidder’s DBE Participation Plan with the proposal. If the DBE goal is not met, the Document 00471 – Pre-Proposal Good Faith Efforts, and Document 00472 Bidder’s DBE Goal Deviation Request form shall also be included in the submission with the CSP.

26.7 The proposer selected for an award will be the Proposer whose Proposal as presented in the response to the CSP, is the most advantageous to the City and offers the best value. The City is not bound to accept the lowest priced Proposal if that Proposal is not in the best interest of the City as determined by the City.

26.8 Submission of a Proposal indicates Proposer’s acceptance of the evaluation technique and Proposer’s recognition that some subjective judgments must be made by the City during the assigning of points.

Section 20

Proposal Requirements and Conditions

20-01 Advertisement (Notice to Bidders). The advertisement is included in Section 00210.

20-02 Qualification of bidders. Each bidder shall submit evidence of competency and evidence of financial responsibility to perform the work to the Owner at the time of bid opening. Evidence of competency, unless otherwise specified, shall consist of statements covering the bidder's past experience on similar work, and a list of equipment and a list of key personnel that would be available for the work.

Each bidder shall furnish the Owner satisfactory evidence of their financial responsibility. Evidence of financial responsibility, unless otherwise specified, shall consist of a confidential statement or report of the bidder's financial resources and liabilities as of the last calendar year or the bidder's last fiscal year. Such statements or reports shall be certified by a public accountant. At the time of submitting such financial statements or reports, the bidder shall further certify whether their financial responsibility is approximately the same as stated or reported by the public accountant. If the bidder's financial responsibility has changed, the bidder shall qualify the public accountant's statement or report to reflect the bidder's true financial condition at the time such qualified statement or report is submitted to the Owner.

~~Unless otherwise specified, a bidder may submit evidence that they are prequalified with the State Highway Division and are on the current "bidder's list" of the state in which the proposed work is located. Evidence of State Highway Division prequalification may be submitted as evidence of financial responsibility in lieu of the certified statements or reports specified above.~~

20-03 Contents of proposal forms. The Owner's proposal forms state the location and description of the proposed construction; the place, date, and time of opening of the proposals; and the estimated quantities of the various items of work to be performed and materials to be furnished for which unit bid prices are asked. The proposal form states the time in which the work must be completed, and the amount of the proposal guaranty that must accompany the proposal. The Owner will accept only those Proposals properly executed on physical forms or electronic forms provided by the Owner. Bidder actions that may cause the Owner to deem a proposal irregular are given in paragraph 20-09 *Irregular proposals*.

A prebid conference is required on this project to discuss as a minimum, the following items: material requirements; submittals; Quality Control/Quality Assurance requirements; the construction safety and phasing plan including airport access and staging areas; and unique airfield paving construction requirements (If applicable). Prebid conference time, date, and place of the meeting is included in Section 00210.

20-04 Issuance of proposal forms. The Owner reserves the right to refuse to issue a proposal form to a prospective bidder if the bidder is in default for any of the following reasons:

a. Failure to comply with any prequalification regulations of the Owner, if such regulations are cited, or otherwise included, in the proposal as a requirement for bidding.

Business Enterprises (DBE), Women Business Enterprises (WBE), Persons with Disabilities Business Enterprises (PDBE) and Small Business Enterprise (SBE) participation goals which are as follows:

3.5.3.1.1.1 the DBE goal is 24 percent,

3.5.3.1.1.2 the WBE goal is N/A percent, and

3.5.3.1.1.3 the PDBE goal is N/A percent.

3.5.3.1.1.4 The bidder may substitute SBE participation of no more than four (4) percent of the MBE goal, the WBE goal, or portions of the MBE Goal and WBE Goal.

3.5.3.1.1.5 The bidder may not use Native-American-owned firms that are certified as MBEs to meet MBE contract goals. Native-Americans firms can only be used as SBEs in fulfillment of the above stated goals.

3.5.3.1.1.6 The bidder may not use MWSBE Suppliers to account for more than 50% of the MWSBE participation plan.

3.5.3.1.2 The MBE, WBE, PDBE, and SBE goals are unique and specific to this Agreement. The Contractor shall make reasonable efforts to achieve these goals.

3.5.3.1.3 Failure by Contractor to comply with the goals for MBE, WBE, SBE, or PDBE is a material breach of the Agreement, which may result in termination of the Agreement, or such other remedy permitted as the City deems appropriate.

ARTICLE 8 - TIME

8.1 *PROGRESS AND COMPLETION: Insert the following Paragraph 8.1.6.1.*

~~8.1.6.1 Contractor shall credit the City by Change Order for inspection services for overtime work or work performed on Sundays or Legal Holidays. The amount Contractor credits the City will be ***actual costs*** per inspector for inspection services~~.

ARTICLE 9 - PAYMENTS AND COMPLETION

9.1 *UNIT PRICE WORK*: *Delete Section 9.1 in its entirety and insert the following Section 9.1.*

9.1 References to Unit Prices in individual Specification sections are not applicable to the Contract. Include payment for portions of the Work required by these sections in the Stipulated Price for the Contract.

9.12 *LIQUIDATED DAMAGES*: *Insert the following Paragraph 9.12.1.1.*

c. To ensure that the DBE Program is narrowly tailored in accordance with applicable law;
d. To ensure that only firms that fully meet 49 CFR Part 26 eligibility standards are permitted to participate as DBEs;
e. To help remove barriers to the participation of DBEs in DOT-assisted contracts;
f. To assist the development of firms that can compete successfully in the market place outside the DBE Program; and
g. To provide appropriate flexibility to recipients of federal financial assistance in establishing and providing opportunities for DBEs.

The Director of the City's Office of Business Opportunity (OBO) is the DBE Liaison Officer. In that capacity, s/he is responsible for implementing all aspects of the DBE program. Implementation of the DBE program is accorded the same priority as compliance with all other legal obligations incurred by City in its financial assistance agreements with the DOT.

DBE Obligation. City will never exclude any person from participation in, deny any person the benefits of, or otherwise discriminate against anyone in connection with the award and performance of any contract covered by 49 CFR Part 26 on the basis of race, color, sex, or national origin.

In administering its DBE program, City will not, directly or through contractual or other arrangements, use criteria or methods of administration that have the effect of defeating or substantially impairing accomplishment of the objectives of the DBE program with respect to individuals of a particular race, color, sex, or national origin.

Contract Goal. All bidders and proposers shall make Good Faith Efforts, as defined in 49 CFR Part 26, to subcontract 24% of the dollar value of the prime contract to Disadvantaged Business Enterprises at least 51% owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation, in which 51% of the stock is owned by one or more such individuals, and whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it. "Socially and economically disadvantaged individual" means a U.S. Citizen (or a lawfully admitted permanent resident of the United States) who is:

a. Any individual who the City finds to be socially and economically disadvantaged on a case-by-case basis.
b. Any individual in the following groups, members of which are rebuttably presumed to be socially and economically disadvantaged:

(1) "Black Americans,"
(2) "Hispanic Americans,"
(3) "Native Americans,"
(4) "Asian-Pacific Americans,"
(5) "Subcontinent Asian-Americans,"
(6) "Women," or