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May 10, 2011

Mr. Kevin Smith  
General Manager  
Truckee-Tahoe Airport  
10356 Truckee Airport Road  
Truckee, California 96161

Subject: Truckee-Tahoe Airport  
Maintenance Projects

Dear Mr. Smith:

Following our discussions in Truckee on Thursday, May 5, I have reviewed the maintenance projects that are proposed at the Truckee Tahoe Airport and have the following comments and questions.

First, you indicated that you would like me to attend your Board Meeting on May 26 at 10:00 a.m. to present some information regarding the runway project and the maintenance projects. I will be pleased to do this. If you need me to come at a different time other than 10:00, please notify me. If you have any special items you want me to address, please let me know.

**Truckee Tahoe Airport Maintenance Projects**

Project 1 – Fog Seal Runway 1-19, Taxiway G and Cross Taxiways – I understand that this runway was rehabilitated in 1994. New pavement was placed and a joint system was installed to control cracking of the asphalt. The spacing of the joints is 20 to 25 foot on centers both directions. These joints and pavement are performing well. The joints have opened up to a width of ½ to 1 inch. There is minimum cracking between the joints.

We developed the original process of sawing and sealing a joint pattern in asphalt pavements placed at high altitude fields in the Sierra-Nevada Mountains some 40 years ago and have followed the performance since that time. We originally spaced our joints at 25-foot on centers but found that after several years we experienced cracking between the joints. To alleviate this cracking it was found that the spacing of the joints needed to be 12 to 15 foot each direction. To minimize the risk of cracking between the joints, the Airport should consider installing supplemental joints, which would provide a 10 to 15 foot spacing.

→ The pavement surface is in good condition, but there is modest weathering of this surface. A fog seal using SS1h asphalt material is an appropriate maintenance operation at this time.

A fog seal does not adhere well to painted surfaces. If you fog seal a painted surface and then paint on top there is some risk of the fog seal and paint coming off. To eliminate this risk the existing paint can be removed prior to placing the fog seal. On this runway the paint



is badly worn and a significant amount of asphalt is apparent within the painted area. It is not considered cost effective to remove the existing marking prior to placing the fog seal, but the Airport should recognize that some areas may experience the paint and fog seal coming off the runway. This would require minor touch up of the paint. We will require the contractor to thoroughly broom all existing painted surfaces with a stiff bristle broom or wire broom prior to placing the fog seal in order to remove any paint that is loose.

Project 2 – Fog Seal West Hangar Area and Warehouse Parking – It has been reported that the West Hangar Area and Warehouse Parking was constructed in 2004. The asphalt pavement in this area was sawed and sealed to protect against cracking due to thermal stresses. The joints are spaced at 20 to 30 feet and there is no indication of cracking between the joints. The joints on this pavement have opened up significantly and were measured at 1 to 2 inches wide. Even with the wide spacing of the joints, the size of this opening is unusual, and it is indicated that it is caused not only by changes due to temperature variations but to shrinkage within the asphalt materials themselves. A visual examination of the surface of the pavement indicates that the pavement is a fine mix, which would require a fairly high asphalt content. This could be a contributing factor to the shrinkage.

The existing joints are wide and it is reported that they increase in width each year. It would be wise to install a supplemental jointing system between the existing joints to provide a spacing between joints of 10 to 15 feet. The addition of these joints would not completely stop the widening of the existing joints, but would significantly decrease it and would decrease the potential for cracking between the joints.

The surface of the pavement is in good condition, with only slight weathering. It is considered that it would be more beneficial to the Airport to add the supplemental jointing pattern at this time and, if funds are not available for fog sealing, the fog sealing could be delayed for 2 to 3 years without seriously affecting the performance of the pavement.

Project 3 – Resurface Pavement at the North End of the East Hangars – The pavement at the north end of the East Hangars, particularly Hangars C, D, G, and H, has deteriorated to a point that it is recommended it be reconstructed. The area to the north of Hangars G and H, extending to the east of Hangar H to mid taxiway and to the west of Hangar G to the west edge of the drainage swale and extending from the north face of the hangar out to the slot drain and 17 feet beyond the slot drain will be reconstructed. In the section beyond Hangars C and D the pavement north of the slot drain for a distance of 17 feet has deteriorated from the west edge of Hangar C to the west edge of Hangar D.

The reconstruction of these areas will consist of grinding and removing the existing asphalt and base if required to provide adequate thickness. The existing base will be scarified and recompacted, a new prime coat will be placed, and 3 inches of new asphaltic concrete pavement will be placed. The new pavement will be placed to match existing grades.

You had proposed that all of this maintenance work be accomplished under a separate contract from the Runway 10-28 work. We would recommend that this portion of the work, which requires new asphaltic concrete pavement, be incorporated as part of the Runway 10-



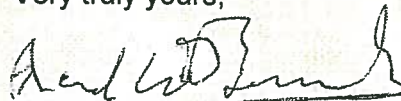
28 project since we will be requiring a coarse grade high stability mix for the pavement on the runway and it would be wise to use the same mix and contractor on this repair work to minimize shrinkage and cracking. We will also be using polymer-modified liquid asphalt in the mix, which has demonstrated the ability to withstand thermal stresses without cracking, or at least to delay the onset of cracking.

Using this high-stability mix with polymer-modified asphalt, we recommend that the sawing of joints be eliminated from the project but that the pavement be monitored closely on an annual basis. If cracks start to form, then a joint pattern should be installed using the cracks as one of the joints. Research has indicated that you can expect at least 8 to 10 years before the first cracks start, if not longer. Since once you install a joint seal you have to maintain it annually, you will have saved 10 years of maintenance by delaying the jointing of the pavement. There are only 10 to 13 years of performance records with this product, but in all areas where it has been properly constructed in the Sierra Nevada Mountains it has proven to be successful and no cracking has occurred. If cracking does occur, it will start with transverse cracks 400 to 500 feet apart and then proceed to closer spacing. If when the first cracks show up the jointing system is installed, then it will relieve the stresses and the cracking will occur along the joints, which can be controlled.

Project 4 – Crack Seal Runway 1-19 Blast Pads – The asphalt pavements in the blast pads beyond the thresholds of Runway 1 and Runway 19 are badly cracked. These cracks can no longer be maintained by filling with joint seal. An inspection has also shown that there is some serious transverse cracking occurring on Taxiway A that needs to be treated. It is proposed in these areas to grind out a section of pavement 12 to 18 inches wide centered on the crack, to recompact the exposed base, and then place a bituminous prime coat and new asphaltic concrete pavement as a 1 to 1½ foot wide patch. Several patches of cracked sections have been placed in various areas on the airport. In all cases cracks have shown up on at least one side of the repair and in many areas on both sides of the repair. To control this cracking it is recommended that a joint be sawed and sealed on one edge of the new pavement repair section on the Runway 1-19 blast pads and Taxiway A.

It is important that the asphaltic pavement placed in these cracks be a high-quality coarse mix made with polymer-modified asphalt to minimize volume change with changes in temperature and distress due to shrinkage. Since this will be a special mix and significant quantities will be developed for the Runway 10-28 rehabilitation project, it is recommended that this phase of the work be added to the runway rehabilitation project.

Very truly yours,



Reinard W. Brandley

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