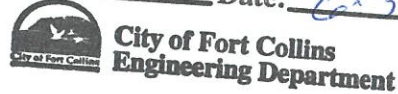


May 29, 2008

Bank of Choice
 3780 West 10th Street
 Greeley, Colorado 80634

APPROVED
 By: RCR Date: 6-3-08

**City of Fort Collins
 Engineering Department**

Attention: Mr. Darrell McAllister

Subject: Alternative Pavement Sections
 Turn Lanes on Boardwalk Drive
 Bank of Choice
 Northwest Corner of Harmony Road and Boardwalk Drive
 Fort Collins, Colorado
 Project No.: FC04254-135

CTL | Thompson, Inc. performed a subgrade investigation and provided pavement recommendations report (Project No. FC04254-135; dated May 16, 2008) for the new turn lane on the east side of Boardwalk Drive adjacent to the Bank of Choice property in Fort Collins, Colorado. Samples of clayey sand tested for swell potential during our initial investigation swelled between 2.8 percent and 3.0 percent. Based on the results of laboratory testing and City of Fort Collins requirements, the subgrade soils have a medium expansion classification and swell mitigation will be required for the subgrade soils in the turn lane. We recommended treating the existing subgrade with a minimum of 12% fly ash in the upper one foot for expansive soil mitigation purposes. We understand the project team has identified comparatively shallow utility service lines in the proposed zone of fly ash treatment. The project team has requested that we provide alternatives for expansive soil mitigation.

We believe an acceptable alternative for expansive soil mitigation is over-excavation and replacement of the subgrade soils with non-expansive recycled concrete. Our recommended alternative pavement sections for the turn lane on Boardwalk Drive are presented in Table I below.

TABLE I
 PAVEMENT THICKNESS ALTERNATIVES

| Road | Hot Mix Asphalt (HMA) + Aggregate Base Course (ABC)* + Recycled Concrete (RCC) | Portland Cement Concrete (PCC) + Recycled Concrete (RCC) |
|--|--|--|
| East Turn Lane at Boardwalk between Harmony Road and Whalers Way | 6.0" HMA + 6" ABC + 24" RCC | 7.0" + 24" RCC |

Note: Recycled concrete (RCC) can be used as an alternative to ABC provided it meets Class 5 or Class 6 specifications.



We used DARWin software to develop our alternative pavement thickness calculations with input values provided by Larimer County Urban Area Street Standards. We estimated an R-value of 50 after completion of over-excavation and replacement below the turn lanes. We converted the estimated R-value to a resilient modulus of 13,168 psi. The other input values remained the same as presented in our subgrade investigation and pavement recommendation report. We have attached computer-generated printouts of the DARWin calculations to this letter.

The subgrade soils underlying the composite pavement section should be over-excavated to a depth of at least 24 inches below the bottom of the composite section. The soils in the bottom of the over-excavation should be scarified to a depth of 8 inches; moisture conditioned to between optimum and 3 percent above optimum moisture content and compacted to at least 95 percent of standard Proctor maximum dry density (ASTM D 698). Recycled concrete should be placed in thin lifts not to exceed 8 inches, moisture treated to near optimum moisture content, and compacted to at least 95 percent of modified Proctor maximum dry density (ASTM D 1557).

Material properties and construction criteria are presented in our subgrade investigation and pavement recommendations report (FC04254-135, dated May 16, 2008) and should be considered in conjunction with this letter. If you have any questions or concerns regarding the content of this letter, please contact the undersigned at your convenience.

Very truly yours,
CTL|THOMPSON, INC.

Eric D. Bernhardt, PE
Manager of Field Services



Attachments: DARWin calculations

cc: bredden@rocheconstructors.com

cc: nswift@rocheconstructors.com

4 cc: City of Fort Collins
Engineering Department
281 North College Avenue
P.O. Box 580
Fort Collins, Colorado 80524
Attention: Mr. Rick Richter

1993 AASHTO Pavement Design

DARWin Pavement Design and Analysis System

A Proprietary AASHTOWare
Computer Software Product

Flexible Structural Design Module

EAST TURN LANE AT BOARDWALK DRIVE BETWEEN HARMONY ROAD AND WHALERS WAY

Flexible Structural Design

| | |
|--|------------|
| 18-kip ESALs Over Initial Performance Period | 1,277,500 |
| Initial Serviceability | 4.5 |
| Terminal Serviceability | 2.5 |
| Reliability Level | 90 % |
| Overall Standard Deviation | 0.44 |
| Roadbed Soil Resilient Modulus | 13,168 psi |
| Stage Construction | 1 |
| Calculated Design Structural Number | 2.85 in |

Specified Layer Design

| <u>Layer</u> | <u>Material Description</u> | Struct Coef. <u>(Ai)</u> | Drain Coef. <u>(Mi)</u> | Thickness <u>(Di)(in)</u> | Width <u>(ft)</u> | Calculated <u>SN (in)</u> |
|--------------|-----------------------------|--------------------------------|-------------------------------|------------------------------|----------------------|------------------------------|
| 1 | HMA | 0.44 | 1 | 6 | 24 | 2.64 |
| 2 | ABC | 0.11 | 1.05 | 6 | 24 | 0.69 |
| Total | - | - | - | 12.00 | - | 3.33 |