

June 6, 2005

Mr. W.F. Somervell  
Kansas City Terminal Railway Company (KCT)  
4501 Kansas Avenue  
Kansas City, Kansas 66106

Re: Repair of Existing Stone Retaining Wall Separating Beardsley Road and KCT  
Tracks – Phase II (Track 81 Stations 25+00 to 25+50 and 26+00 to 32+20)

Mr. Somervell,

The existing stone retaining wall separating Beardsley Road from KCT Track 81 has been evaluated for the purpose of determining a schedule for rehabilitation. The wall was constructed in the late 1800's and is experiencing structural failure in several areas as a result of its intended service life being exceeded and/or adverse effects of improperly channeled stormwater runoff. The wall locations planned for repair are located in Kansas City, Missouri on KCT Line Segment 8921 from Mile Post 9.16 to 9.30 and are referenced to KCT Track 81 centerline stationing beginning with Station 0+00 at the south pier of the BNSF Hannibal Bridge over the Missouri River and proceeding south. These areas are planned for repair after Phase I is complete from Track 81 Station 25+50 to 26+00, as detailed on the Phase I letter dated May 23, 2005.

All areas scheduled for repair in this document are expected to be designed and constructed in a manner similar to that described for Phase I, utilizing rock or soil anchors installed behind a soldier pile fascia wall. The lone exception is the area from Station 31+40 to 32+20, which is expected to require a tangential drilled shaft wall installed prior to wall demolition. The repair locations on the following pages are listed beginning with the most critical and then in descending order.

### Station 25+00 to 25+50

Some locations in this area of the wall have been previously covered by shotcrete without reinforcement in an apparent attempt at temporary stabilization (See Figure 1). The method of repair includes the full demolition of the existing stone wall and rock backfill back to expose the native bedrock face behind. The native bedrock face will be stabilized minimally during the initial 26-hour Track 80/81 demolition outage and fully anchored during 6 subsequent 10-hour outages. Construction of a new soldier pile fascia wall will then be performed as soon as practicable after rock anchoring during 10 periodic 10-hour outages. The repair area is approximately 1100 square feet of retaining wall and the estimated cost is \$242,550.

**Figure 1. Station 25+00 to 25+50**



### Station 31+40 to 32+20

This wall area is between the existing piers of the east-bound I-70 to south-bound I-35 ramp overpass and the north-bound I-35 to west-bound I-70 ramp overpass (See Figure 2). This area has experienced accelerated deterioration through the presence of excessive water running through the wall and retained backfill as a result of a failed KCMO stormwater inlet immediately behind the wall on the south curb line of Beardsley Road. The repair area is approximately 2200 square feet of retaining wall, which covers full height repair. This area is expected to require a tangential drilled shaft wall due to the presence of the active Beardsley Road immediately behind the existing wall. Additionally, based on field observations, it appears that the wall is a stacked stone gravity wall, and at least 10 feet thick at about half height. The combination of this aspect, as well as the presence of fine-grained backfill material and the excessive height of the wall, lends itself to this repair method. Repair of this area is expected to cost \$424,160. Demolition is expected to be minimally performed from the top of the wall, but will likely require a 30-hour outage on Tracks 80 and 81. Construction is expected to require 32 ten-hour outages.

**Figure 2. Station 31+40 to 32+20**



Station 27+50 to 28+30

This area of the wall extends from the pier of east-bound I-70 to south-bound Beardsley road ramp overpass to a step-out in the wall 80 feet to the south. Significant portions along the base of the wall have experienced severe deterioration. The existing wall consists of a full height wall of approximately 30 feet with a shorter 17- to 18-foot wall placed approximately 5 feet in front. The high wall appears to extend to bearing below the top of the shorter wall. For this reason, we anticipate leaving the high wall in place and removing the lower wall. The demolition area is then approximately 1440 square feet and the new wall is planned to be approximately 2000 square feet. Repair of this area is estimated to cost \$366,995.20. Demolition is expected to require a 34-hour outage on Tracks 80 and 81 out. Construction is expected to require 28 ten-hour outages.

**Figure 3. Station 27+50 to 28+30**



#### Station 30+70 to 31+40

This area of the wall extends from the pier of the north-bound I-35 to west-bound I-70 ramp overpass to a point 70 feet to the north. The existence of a high and low wall similar to those described above for Station 27+50 to 28+30 indicates a demolition area of approximately 500 square feet and a new wall are of approximately 1750 square feet. Repair of this area is expected to cost \$295,790. Demolition is estimated to require a 12-hour outage on Tracks 80 and 81 due to the presence of a cast-in-place portion of the well expected to be difficult to remove. Construction is expected to require 25 ten-hour outages.

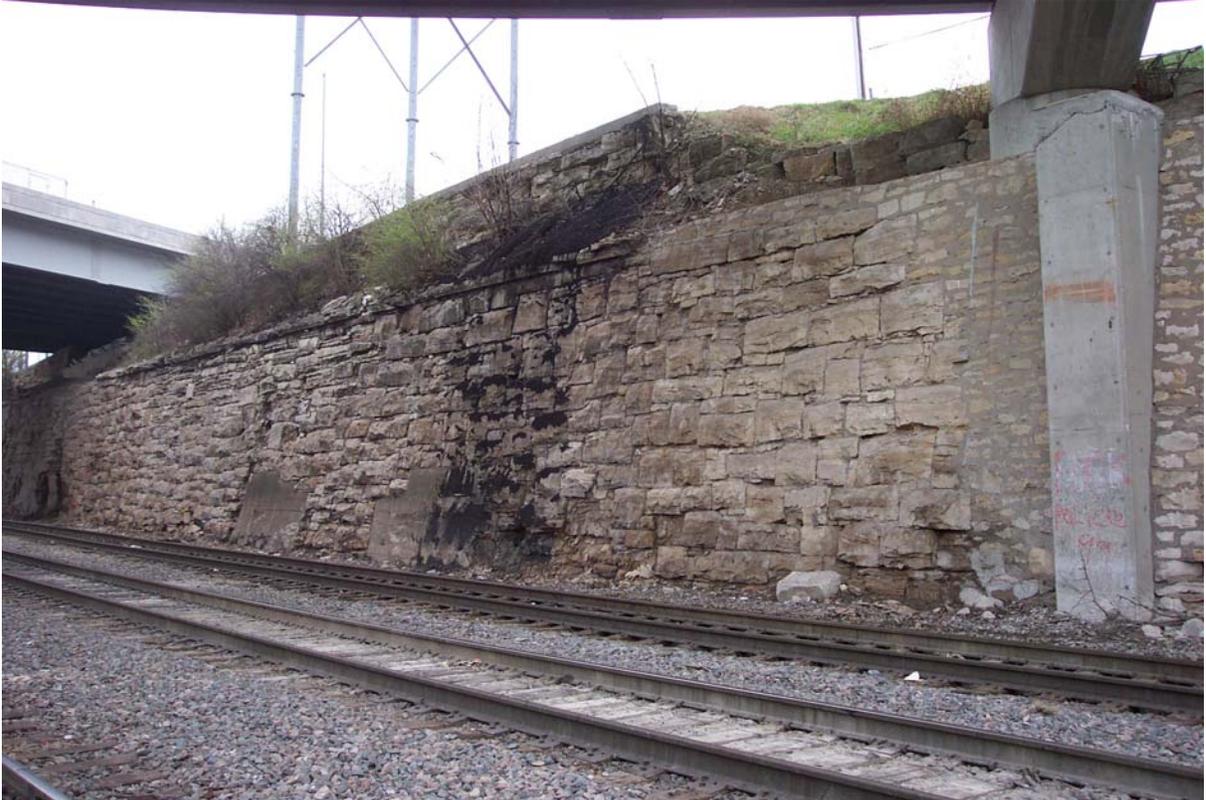
**Figure 4. Station 30+70 to 31+40**



Station 26+00 to 27+50

This area of the wall extends from the south drip line of the I-70 Intercity Viaduct Bridge to the pier of east-bound I-70 to south-bound Beardsley road ramp overpass. Full height repair of the wall is required for 3300 square feet. Repair of this area is expected to cost \$636,339. Demolition is estimated to require a 78-hour outage on Tracks 80 and 81. Construction is expected to require 47 ten-hour outages.

**Figure 5. Station 26+00 to 27+50**



### Station 28+30 to 30+70

This wall section consists of the high and low wall arrangement as described previously. The demolition area is estimated at approximately 4320 square feet and the repair area at approximately 6000 square feet. Repair of this area is expected to cost \$1,100,985.60. Demolition is estimated to require a 102-hour outage on Tracks 80 and 81. Construction is expected to require 85 ten-hour outages.

**Figure 6. Station 28+30 to 30+70**



The sections of wall outside the primary repair areas from 25+00 to 26+00 have not been investigated as exhaustively with respect to estimates and outage timelines. However, for the purpose of this conceptual evaluation, we have assumed similar construction methods and used unit costs of \$145.00 per square foot for wall construction and \$30.30 for wall demolition. These values are significantly higher than routine retaining wall costs due to outage conditions and extreme access issues. These estimated costs do not include flagging or engineering/construction services. We have also estimated the expected outage durations using comparisons to the timelines for the repair areas from 25+00 to 26+00. An inverse relationship is expected to exist between additional “blocks” of track outage time and decreasing costs. Additionally, larger sections of wall being addressed per Contractor mobilization will result in cost savings associated with economy of scale.

## Summary of Repair Estimates and Track Outages

Repair Area	Estimated Subtotal	10% Contingency	Estimated Total	Full Track 80/81 Outage (hrs)	Track 81 Only (10-Hour Outages)
25+00 to 26+50	\$ 220,500.00	\$ 22,050.00	\$ 242,550.00	26	16
31+40 to 32+20	\$ 385,600.00	\$ 38,560.00	\$ 424,160.00	30	32
27+50 to 28+30	\$ 333,632.00	\$ 33,363.20	\$ 366,995.20	34	28
30+70 to 31+40	\$ 268,900.00	\$ 26,890.00	\$ 295,790.00	12	25
26+00 to 27+50	\$ 578,490.00	\$ 57,849.00	\$ 636,339.00	78	47
28+30 to 30+70	\$ 1,000,896.00	\$ 100,089.60	\$ 1,100,985.60	102	85
			<b>Totals</b>	<b>282</b>	<b>233</b>
				(Hours)	(10-Hour Days)

We appreciate the opportunity to perform this evaluation and look forward to working on future aspects of this project. Please feel free to call me at (913) 915-7138 with any questions or comments.

Thank you,  
TranSystems Corporation

Charles E. Mader, P.E.  
Principal/Vice President