

h:\projects\6399\HI-MULLAY\OUTFEASIBILITY STUDY\Enhanced\6399\_figure30.dgn



Another enhancement on the West Bank that is not specifically tied to the Enhanced Northern Alignment modification is the addition of a “bus only” Washington Avenue median crossing lane. This enhancement allows both eastbound and westbound bus routes to utilize a single stop location adjacent to the West Bank CCLRT Station. This eliminates the need for a bus stop on the north side of Washington Avenue and reduces the number of Washington Avenue pedestrian traffic crossings. In addition, the potential redevelopment opportunities in the West Bank area would likely increase in the proximity of the station area as well as at the U of M Ball Field site. Illustrative drawings showing potential development and redevelopment in the West Bank area are provided in Appendix C.

### **8.2.2 East Bank Enhancements**

The enhanced modifications to the Northern Alignment on the East Bank occur along the Burlington Northern Sante Fe (BNSF) railroad corridor east of the Dinkytown trench between 17th Avenue and 21st Avenue. In this section of track, which is approximately 1,750 feet long, the Enhanced Northern Alignment would be shifted nine feet to the south from its location in the Base Northern Alignment. The Enhanced Northern Alignment (shown as a blue line in Figure 31) connects to the Base Northern Alignment (shown as a red line in Figure 31) on either end via large radii. Although the nine-foot shift in alignment is slight over a 1,750 foot section, it would result in the elimination of a crash wall between the existing BNSF heavy rail track and proposed CCLRT track. Design guidelines require maintaining at least a 25-foot centerline-to-centerline horizontal clearance distance between heavy and light rail tracks.

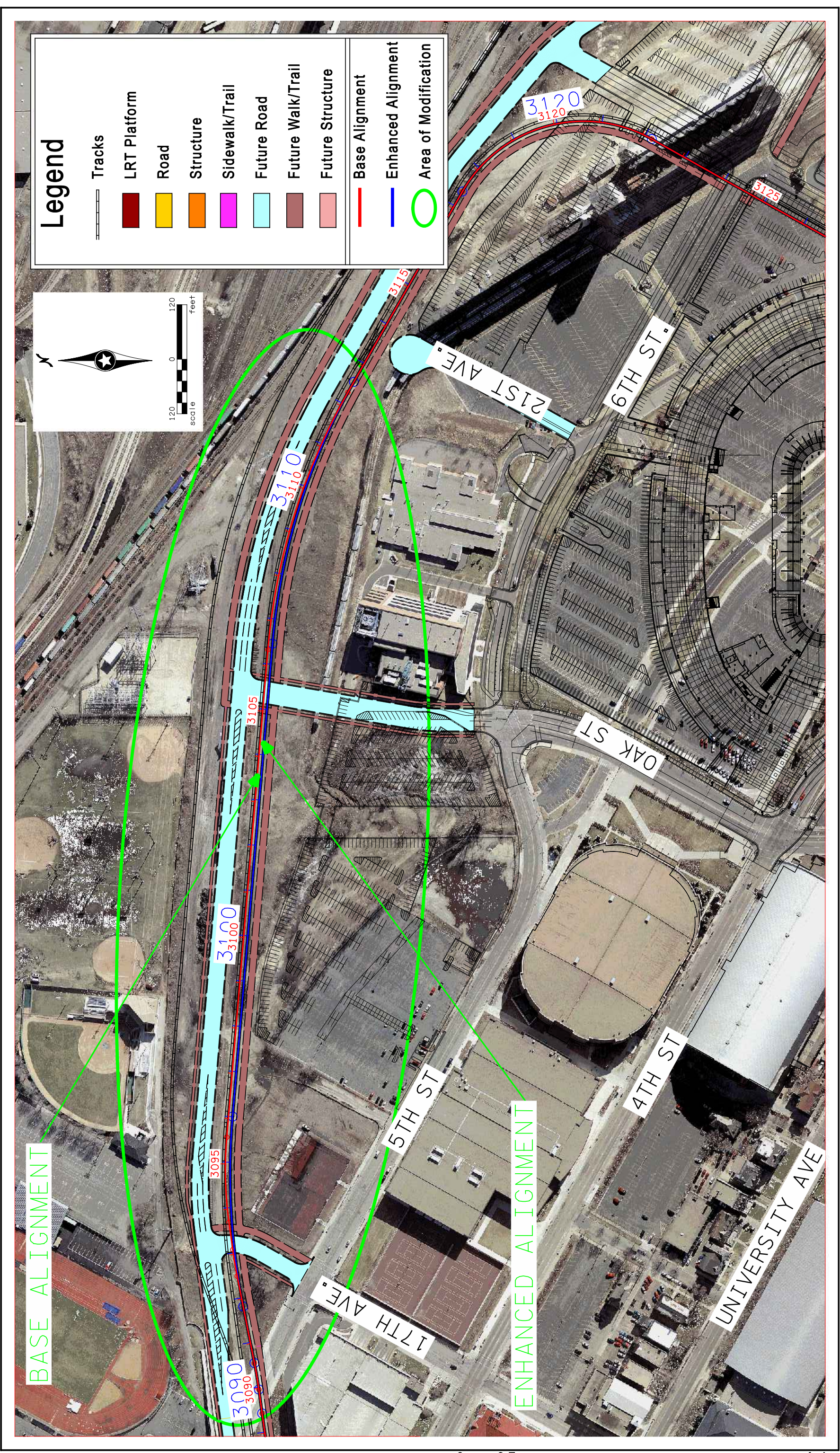
This nine foot shift to the south would result in the following benefits for the Enhanced Northern Alignment:

- Reduces the corridor impact by eliminating the need to acquire approximately 15,000 square feet of BNSF right- of-way.
- Elimination for the need of a crash wall as described above
- Reduction of approximately 4 lineal feet of track length for this segment.

Significant capital cost savings due to the reduction in the amount of right-of-way acquisition as well as the elimination of the crash wall.

By realigning this section of track, the following benefits would be realized:

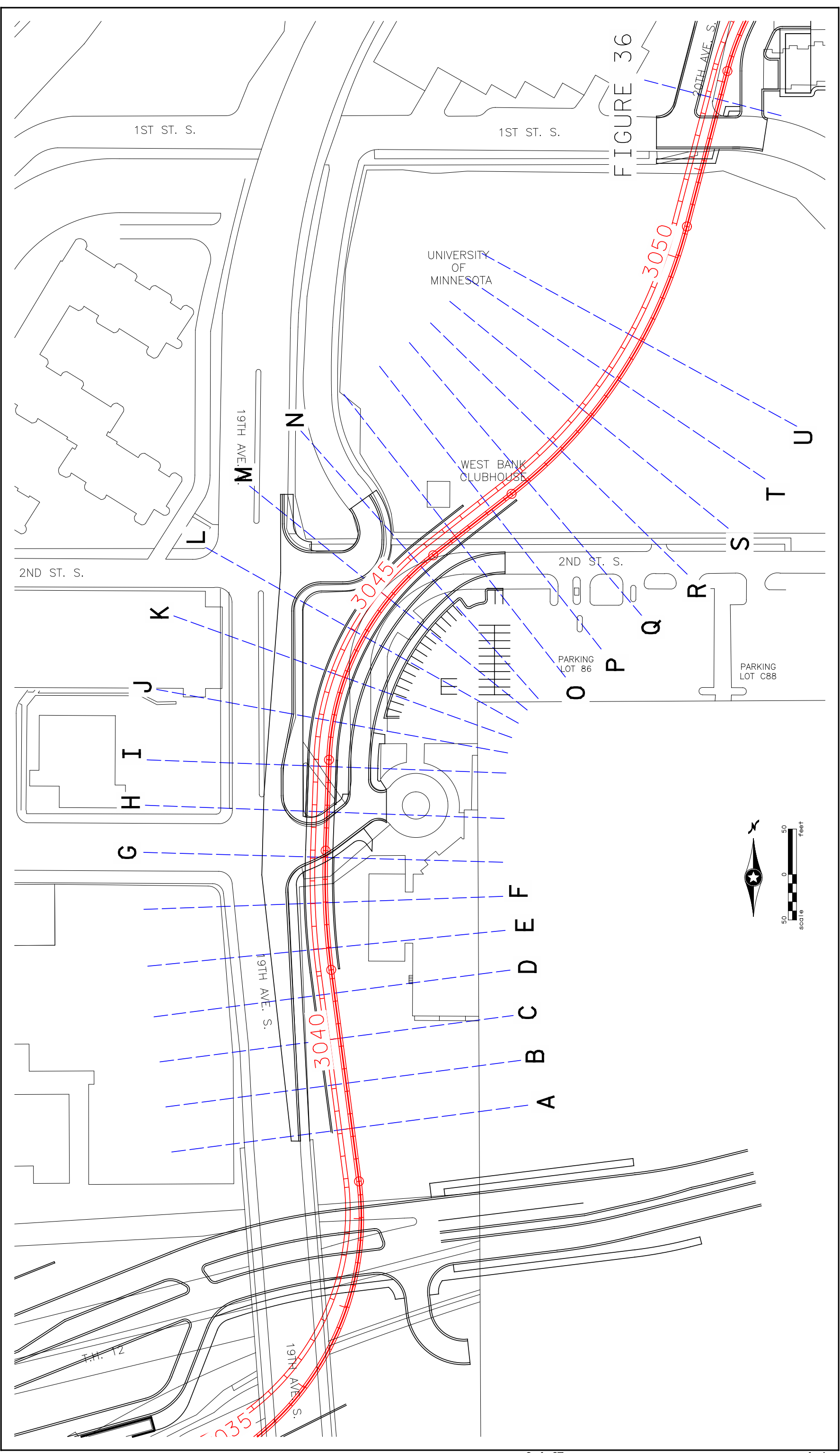
- Second Street would continue to function as-is, in its current location. This eliminates the need to construct a new 2nd Street Bridge over the Northern Alignment trench to maintain access to 22nd Avenue.
- Nineteenth Avenue would continue to function as-is in its current location. This eliminates the need to construct a new 20th Avenue across the University Ball Fields.



h:\projects\6399\HI-MULVAL\AYOUT\FEASIBILITY STUDY\Enhanced\6399\_figure31.dgn

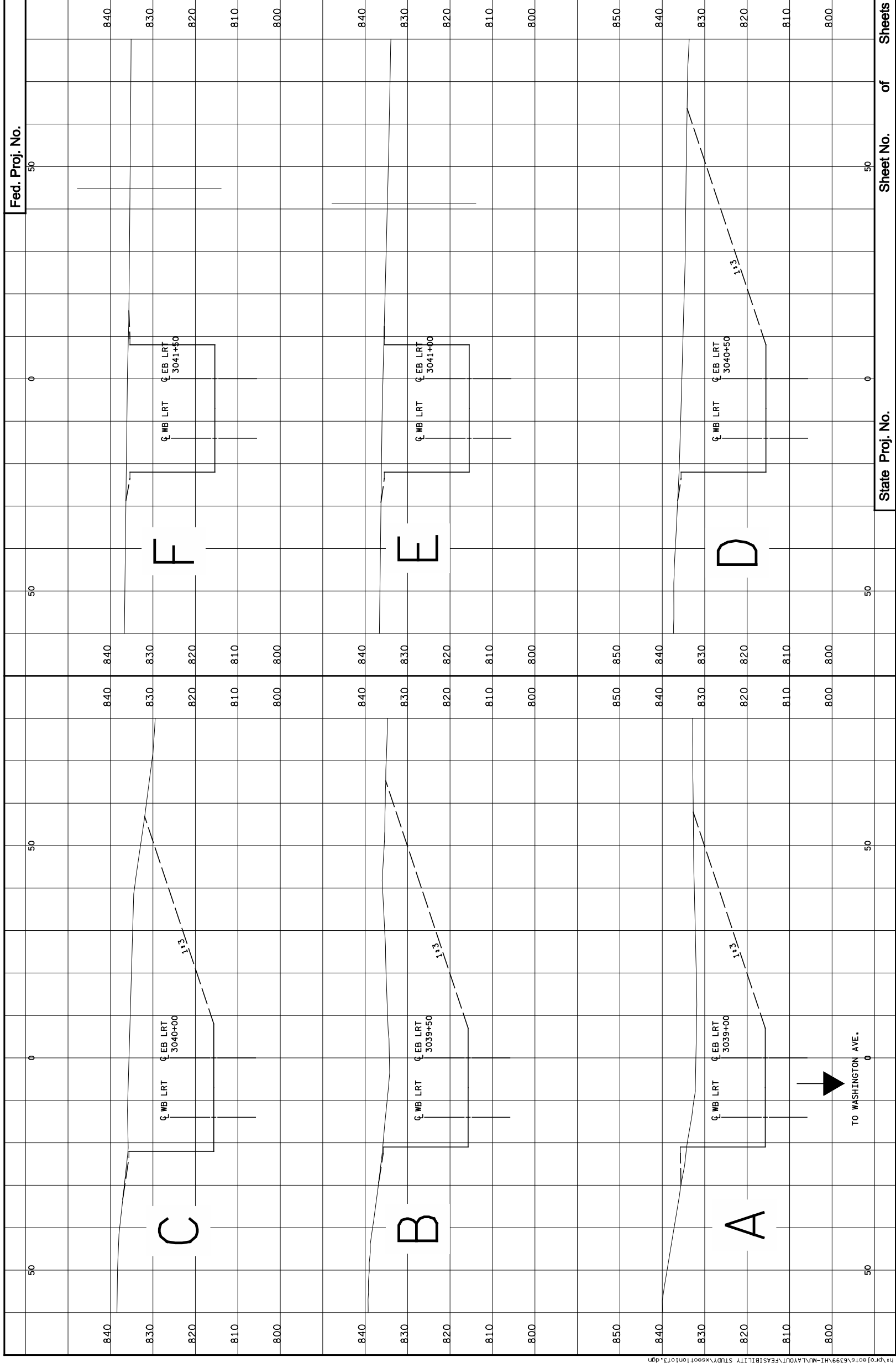


- Bypasses the contaminated site in the University Ball Fields, thus eliminating the need to disturb or remove the contaminated soils (see Figure 29).
- Reduced need for approximately 234 lineal feet of Mechanically Stabilized Earth (MSE) wall from east side of the trench between the Law School Building and Washington Avenue. The section of wall would be replaced with 1:3 slope, resulting in reduced capital costs and increased access to the track bed for maintenance and emergency access. Additionally, this enhancement facilitates snow removal and opens one side of the trench to lessen the tunnel effect. The approximate location of the cross sections can be found in Figure 32. Figure 33 provides cross sections through this area and shows the 1:3 slopes.
- Eliminates need for an additional wall north of 2nd Street, thereby again reducing the capital costs and lessen the tunnel effect. Figures 34 and 35 show cross sections through this area. The approximate location of the cross sections can be found in Figure 32.
- Reduces the length of the retaining wall on both sides of the trench from 900 lineal feet in the Base Northern Alignment to approximately 500 lineal feet in the Enhanced Northern Alignment.
- Provides better intersection configuration at 1st Street and 20th Avenue as well as maintains the existing 20th Avenue as a 26-foot wide roadway west of the CCLRT.
- Reduces the track length by approximately three feet.
- Reduces the impacts to the Riverbluff subsidized townhouses by increasing the horizontal separation from the CCLRT to the adjacent housing units. An ornamental fence would be installed to provide a positive barrier between the CCLRT tracks and the townhouses. Figure 36 is a cross section at 20th Avenue and shows the horizontal spacing between the CCLRT and adjacent housing units. Further analysis is needed to ascertain options for relocation and/or replacement of these subsidized housing units on-site or at another location.

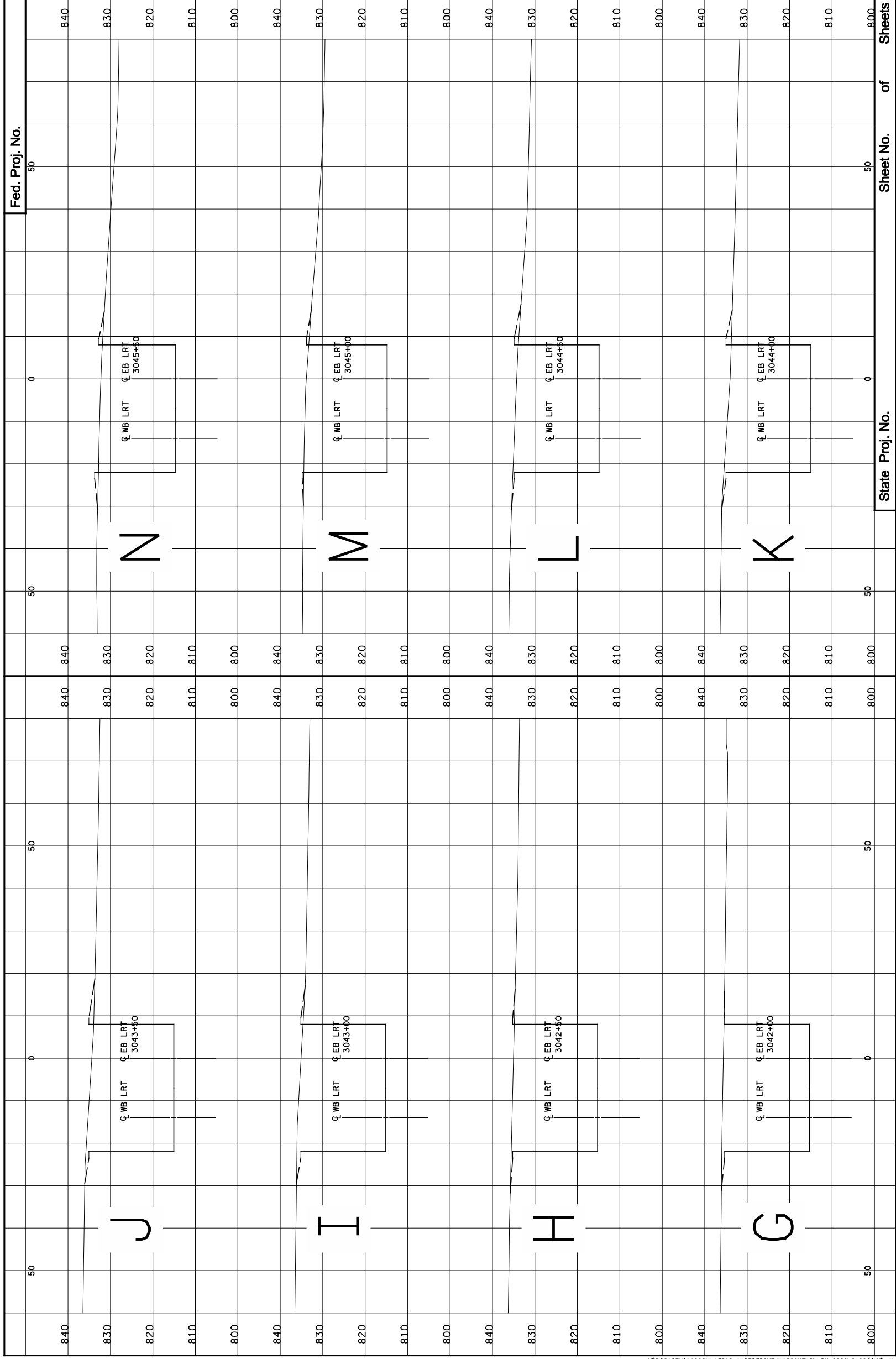


h:\projects\6399\HI-MU\LAYOUT\FEASIBILITY STUDY\6399\_gr1.dgn





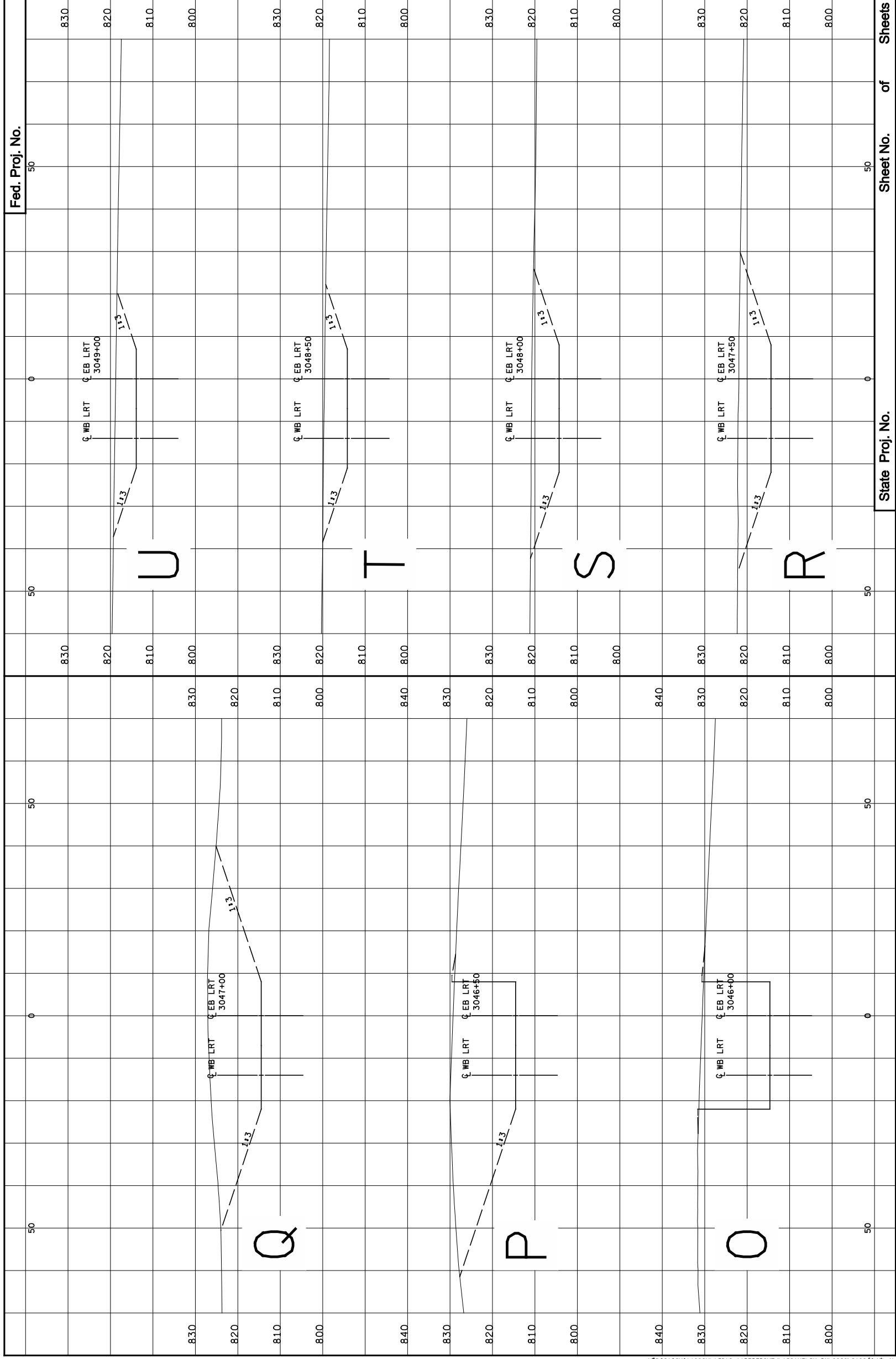
Fed. Proj. No.		State Proj. No.		Sheet No. of		Sheets	
50	0	50	0	50	0	50	0



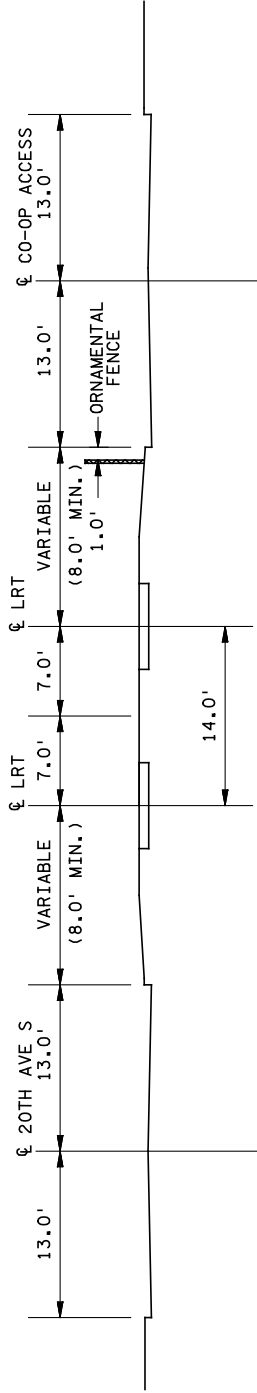
Fed. Proj. No.		State Proj. No.		Sheet No. of		Sheets	
50	50	50	50	50	50	50	800







Fed. Proj. No.		State Proj. No.		Sheets	
50	0	50	0	50	of



**Typical Cross Section - Tracks Adjacent to 20th Ave S**  
Central Corridor LRT Northern Alignment Alternative  
University of Minnesota



**Figure 36**

## 9 Findings

Base upon the four feasibility criteria outlined in Chapter 1, the Northern Alignment is determined to be feasible with respect to engineering, safety, accessibility, light rail operations, roadway network operation, environmental impacts and compatibility with land uses in proximity to the corridor. While the fully-loaded capital cost for the Northern Alignment is \$14.3 to \$19.9 million less than the Washington Avenue Alignment, its CEI has not been finalized. Thus, a feasibility determination for the cost effectiveness of the Northern Alignment can not be made at this time.

The following summarizes in more detail these findings by feasibility criteria. Overall, the Northern Alignment supports the CCLRT project goals for: 1) Economic Opportunity and Investment, 2) Communities and Environment, and 3) Transportation and Mobility.

### 9.1 Engineering, Safety, and Accessibility

*Is the Northern Alignment feasible from an engineering basis? Does it meet FTA standards for light rail systems? Does the Northern Alignment accommodate existing and planned roadways and trails?*

The engineering analysis, described in further detail in Chapters 2 and 3, evaluated geometric design, right-of-way, utility relocations, structures, constructability and compatibility with existing and future roadways and trails. This analysis revealed that the Northern Alignment is technically feasible and meets FTA design standards. Furthermore, the proposed Northern Alignment requires some right-of-way mitigation, minimal utility relocations, and does not preclude the integration of future roadways and trails. With regard to construction phasing, the Northern Alignment utilizes the existing pedestrian Bridge 9 alignment to traverse the Mississippi River, which would not impact vehicular traffic circulation in the West or East Bank neighborhoods.

*Does the Northern Alignment ensure safe, inter-modal interactions by minimizing the number of potential LRT conflict points with public roads, private driveways and pedestrian crossings?*

With the majority of the Northern Alignment below grade, the number of potential LRT conflict points with public roads, private driveways, and pedestrian crossings are minimized. The proposed Alignment is planned to have a total of four at-grade crossings with public streets, four pedestrian crossings, and no private-access conflicts, excluding the track crossings at the station location to reach the appropriate station platform and crossing associated with the future Granary Road. The relatively small number of track crossings and potential LRT conflict points with pedestrians, autos, buses, and emergency vehicles make the Northern Alignment a feasible alternative.

***Are the three Northern Alignment stations accessible to pedestrians, bicyclists, and people with disabilities?***

Appropriate accommodations, as described in Chapter 3, have been designed to ensure a high level of accessibility for pedestrians, bicyclists, and people with disabilities at the three Northern Alignment CCLRT stations. Accessibility features such as elevators, switchback ramps, stairs, and low-floor vehicles have been designed to meet or exceed Americans with Disability Act (ADA) requirements.

## **9.2 CCLRT and Roadway Traffic Network Operations**

***Does the Northern Alignment enhance or adversely impact the overall operations of the CCLRT with regard to ridership, travel time, and equipment requirements?***

Operating the CCLRT on the Northern Alignment was determined to be feasible based on station location and design, track geometry, and rail crossing. The overall estimated travel time on the Northern Alignment is less than for the Washington Avenue Alignment<sup>15</sup>.

***Does the Northern Alignment provide reasonable and appropriate roadway circulation in and around the vicinity of the U of M that does not result in failing intersections?***

With a considerable portion of the Northern Alignment below grade, there will be no significant impacts to the roadway network in and around the vicinity of the U of M. Thus, no failing conditions at intersections, particularly in the East Bank and Stadium Village areas, will result from the Northern Alignment. Impacts to mission critical U of M services as well as traffic flow and circulation in and around the U of M campus are minimal with the Northern Alignment.

## **9.3 Environmental and Land Use Impacts**

***Do reasonable mitigation measures exist to address potential environmental impacts to make the Northern Alignment feasible?***

The environmental impacts are described in detail in Chapter 5 of this study. Based on this environmental analysis, there are various anticipated impacts to cultural resources, park areas, contaminated sites, and HUD subsidized affordable housing units that will need to be considered. None of these impacts are anticipated to be fatal flaws, but may require mitigation. In addition, the aesthetics impacts to the historic U of M Mall are minimized.

---

<sup>15</sup> Travel times estimates for the Northern Alignment are preliminary. Additional refinements to the travel times estimates would likely reduce the travel time for the Northern Alignment.

***Do compatible land uses currently exist and is their potential for future development along the Northern Alignment?***

The Dinkytown neighborhood, which has mostly commercial land uses mixed with some residential and University of Minnesota-related land uses, has higher density development that is compatible with the CCLRT line. The area around the Dinkytown Station exhibits strong redevelopment potential. Many privately-owned parcels within walking distance of this station present redevelopment opportunities. Adding a major transit stop in Dinkytown may reduce the demand for surface parking lots in the area, thus creating redevelopment opportunities on underutilized parcels. Furthermore, there are opportunities for more high-density housing and/or mixed-use projects in the proximity of the Dinkytown Station.

## **9.4 Cost Effectiveness**

***Is the fully-loaded capital cost for the Northern Alignment reasonable?***

The fully-loaded capital cost for the Northern Alignment ranges from \$154.075 million to \$159.675 million<sup>16</sup>. With a fully-loaded capital cost that is \$14.3 to \$19.9 million less than the Washington Avenue Alignment, the Northern Alignment's capital cost is considered reasonable and feasible within the current CCLRT scope and budget.

***Does the proposed Northern Alignment have a Cost Effectiveness Index (CEI) that qualifies for federal funding?***

Conformity and concurrence on the Cost Effective Index (CEI) for the Northern Alignment was not reached between the U of M and the Central Corridor Project Office (CCPO) prior to publication of this feasibility report. A supplemental technical memorandum detailing the Northern Alignment's CEI and its assumptions will be issued once conformance and concurrence between the U of M and the CCPO is reached.

---

<sup>16</sup> The upper bound estimate of \$159.675 million was presented to the CCLRT Corridor Management Committee on April 30, 2008, and does not include enhancements (see Chapter 8) to the Northern Alignment that resulted in the \$154.075 million estimate, a net decrease in cost of \$5.6 million.