Central Corridor LRT: Review of Washington and Northern Alignments
Introduction

"Central Corridor" is the designation for an east-west connection between the cities of Saint Paul and Minneapolis, Minnesota. The corridor has been an integral component of the growth of both cities since their origins and has changed over the past 150 or so years as the cities themselves have changed. The corridor is roughly eleven miles long and encompasses five major centers of economic activity — the two downtowns, the Midway district, the state Capitol area and the University of Minnesota. In addition, several relatively high-density neighborhoods with nearly 120,000 residents, large and small businesses as well as industrial operations surround the corridor (Metropolitan Council, 2006). About 29% of Minnesota's employment is in the central cities; the central corridor area contains about 280,000 of those jobs (Metropolitan Council, n.d.a). Current transportation planning focuses on a light-rail transit (LRT) line proposed to connect the downtowns largely along University and Washington Avenues. Revenue service is scheduled to begin in 2014 with major construction beginning mid-2010. When complete, it will be one of the most-extensive transportation projects undertaken in state history. An overview of the steps that have brought the project to its current status follow (Metropolitan Council, n.d.b).

On June 5, 2001 the Ramsey County Regional Rail Authority declared its intent to conduct Alternatives Analysis and prepare an Environmental Impact Statement for the corridor. Nearly five years later, in April 2006, a Draft Environmental Impact Statement was released. The Alternatives Analysis compared the baseline — maximum enhancements to existing local and limited-stop bus service in the corridor — with LRT and Bus Rapid Transit (BRT), and included varied alignments for LRT and BRT service.

The goals established for transportation enhancements in the corridor were:
1) Economic opportunity and investment
2) Communities and environment
3) Transportation and mobility

The following table serves to introduce and summarize some key comparative measures from the DEIS (Metropolitan Council, 2006).

<table>
<thead>
<tr>
<th>DEIS Objectives</th>
<th>Baseline <em>(best case)</em></th>
<th>LRT</th>
<th>BRT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic opportunity &amp; investment</td>
<td>Does Not Support</td>
<td>Strongly Supports</td>
<td>Supports</td>
</tr>
<tr>
<td>Communities and environment</td>
<td>Does Not Support</td>
<td>Strongly Supports</td>
<td>Supports</td>
</tr>
<tr>
<td>Transportation and mobility</td>
<td>Does Not Support</td>
<td>Strongly Supports</td>
<td>Supports</td>
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</tbody>
</table>

**Key Comparative Measures**

<table>
<thead>
<tr>
<th></th>
<th>Baseline <em>(best case)</em></th>
<th>LRT</th>
<th>BRT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily ridership forecast (2020)</td>
<td>33,700</td>
<td>38,100</td>
<td>31,200</td>
</tr>
<tr>
<td>Peak hour travel time</td>
<td>73 minutes</td>
<td>35 minutes</td>
<td>42 minutes</td>
</tr>
<tr>
<td>Capital costs (2008 build)</td>
<td>N/A</td>
<td>$840 million</td>
<td>$241 million</td>
</tr>
<tr>
<td>Annual operating cost (2020)</td>
<td>$90.8 million</td>
<td>$97.2 million</td>
<td>$94 million</td>
</tr>
</tbody>
</table>

The baseline was rated as inadequate on each of these objectives. BRT was rated as “supporting” each goal and LRT was rated as “strongly supporting” each goal. In June 2006, the Metropolitan Council selected and proposed LRT as the locally preferred alternative to the Federal Transit Administration (including the ~$600 million cost difference). Supporting this proposal — among other factors — were LRT travel times 20% better than BRT and 109% better than the baseline, ridership an estimated 22% higher than BRT and 13% higher than the baseline, and all objectives more strongly supported than BRT and supported much more strongly than the baseline. The proposed alignment in the Draft Environmental Impact Statement included a dedicated tunnel that would run beneath Washington Ave. from Stadium Village to the Washington Ave. bridge through the heart of the University of Minnesota campus — an
option strongly supported by the University. In early 2008, in response to FTA requirements and new cost estimates, the Central Corridor Management Committee (including the University of Minnesota, which voted "yes, with reservations") and the Metropolitan Council voted to remove the tunnel from the project scope along with other alterations and pursue an at-grade line. This was done as a cost-cutting measure to position the project to score adequately on the FTA's Cost Effectiveness Index (CEI) for a federal funding match. In March 2008, the University hired SRF, a Minneapolis-based engineering firm, to revisit and study the viability of the "Northern Alignment". In May 2008, the Metropolitan Council voted to discontinue work on the Northern Alignment. In August 2009, the FTA approved the Final Environmental Impact Statement with the at-grade Washington Ave. alignment.

The Metropolitan Council has said it expects FTA to grant approval to begin final engineering in 2009, however, on September 22, 2009 the University of Minnesota filed a lawsuit seeking protection "from the adverse effects of the Central Corridor light rail line". These alleged effects are many, but primarily the University is concerned about magnetic interference and vibrations from the train operation impacting millions of dollars in sensitive equipment in laboratories along Washington Avenue. The University has not been satisfied with the level of detail the Central Corridor Project Office has proposed for mitigation measures. The Council counters that the level of detail requested by the University is properly assessed in the Final Engineering stage of a project and that it is too early to provide the level of review the University demands.

As of the time of this writing, the University and the Metropolitan Council report progress on the negotiation of mitigation measures.
Stakeholders

There are a range of stakeholders involved in the two alignments described below in a power versus interest grid. Following the grid is a brief description of the most significant stakeholders by category, their role and their interests in the alignment decision.

<table>
<thead>
<tr>
<th>Subjects (High Interest/Low Power)</th>
<th>Players (High Interest/High Power)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DISTRICT COUNCILS COLLABORATIVE of Saint Paul - Minneapolis</td>
<td>UNIVERSITY OF MINNESOTA</td>
</tr>
<tr>
<td>TRANSIT for Livable Communities</td>
<td>Metropolitan Council</td>
</tr>
<tr>
<td>STADIUM VILLAGE</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>The Crowd (Low Interest/Low Power)</th>
<th>Context Setters (Low Interest/High Power)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>U.S. Department of Transportation Federal Transit Administration</td>
</tr>
</tbody>
</table>

Players

There are many "players" (high interest and high power), making the decision about the alignments very complex.
The University of Minnesota is the key "player" in this case study and has a special legal status, constitutional autonomy, which makes the University a separate department of government, not merely an agency of the executive or legislative branch (Minnesota House of Representatives House Research, n.d.). This has made it challenging for the other "players" to have influence over the University.

The University plays a significant role in the Central Corridor project since the Washington at-grade alignment travels through the campus and because one third of the projected riders on the line are projected to be generated by the University of Minnesota. Four guiding principles have influenced the University's planning efforts since 2005 (University of Minnesota Board of Regents, 2008):

- The optimal operation of the Central Corridor LRT line is vital to a strong, regional, multi-modal transportation system.
- Safety is fundamental to the success of the operation of the line.
- The Central Corridor should realize development opportunities while reducing impact to the urban environment.
- The functionality and aesthetics of the University campus must be enhanced.

The bottom line interests for the University are that the at-grade alignment not interfere with the access to and from campus and the University hospital and clinics and that the integrity of the University community be preserved, especially "mission-critical research."

Another of the key "players" is the State of Minnesota whose role is to provide some of the local funding commitment required by the New Starts program. This was accomplished through a supplementary bonding package in May 2008 after Governor Pawlenty vetoed that Central Corridor project in the April 2008 bonding bill. Governor Pawlenty said "he vetoed funding for the Central Corridor light rail line in part because of concerns expressed by the University of Minnesota" (MPR News Q, 2008).
Since the project entered Preliminary Engineering, the Metropolitan Council has been the lead agency. The Metropolitan Council created a Central Corridor Management Committee to provide advice to the council. The University also has a seat on the 13 member committee. A Central Corridor Project Office was established in 2007 to manage the project. The interest of the Metropolitan Council is that the project remain on schedule and that negotiations with the University of Minnesota about mitigation for vibration and electromagnetic field impacts on University research facilities be resolved.

The Counties Transit Improvement Board (CTIB) was formed when the 2008 Transportation Bill was passed by the legislature, authorizing metropolitan counties to impose a 1/4 cent sales tax and $20 motor vehicle excise tax to fund major transit improvements. In its first year of operation, CTIB made a commitment to fund 30% of the capital costs (up to $300 million) of the Central Corridor line, and awarded almost 10% of that commitment in its first grant round. The overall interest of the CTIB is to provide transit investments that will help commuters, residents and businesses move more quickly and efficiently throughout the metropolitan region (Counties Transit Improvement Board, 2009).

**Context Setters**

The key "context setter" (high power, low interest) is the Federal Transit Administration (FTA). FTA operates the discretionary New Starts program which is "the federal government's primary finance resource for supporting locally-planned, implemented and operated transit "guideway" capital investments." FTA's role is to "evaluate and rate New Starts projects as an input to federal funding decisions and at specific milestones throughout each project's planning and development." (Federal Transit Administration, n.d.). The interest of FTA is to ensure that projects are justifiable given a broad range of benefits and impacts. The criteria include mobility improvements, environmental benefits, cost effectiveness, transit supportive land use and future
patterns, other factors and local financial commitment. The final step taken by FTA is to recommend a full funding grant agreement (FFGA) which is not made until projects demonstrate that they are ready, i.e., the scope, costs, benefits, and impacts are considered firm and final. The lack of agreement between the Metropolitan Council and the University of Minnesota on mitigation threatens the schedule for achieving this step.

**Subjects**

Business and community groups are the key "subjects" (high interest, low power) and have been most vocal about issues regarding station placement, parking, transit operations, business preservation and street reconstruction. Specific to the Washington at-grade alignment, the District Councils Collaborative (representing 10 St. Paul and 5 Minneapolis neighborhood organizations) expressed concerns about the 25,000 average daily vehicle trips that will be diverted off Washington Avenue to accommodate the transit mall. They specifically requested that an area wide traffic analysis of traffic impacts be performed and that a realistic mitigation program be developed (Metropolitan Council, 2008).

One business group that would have benefitted from the Northern Alignment is the Dinkytown Business Association. Skott Johnson, president of the association, recently noted that "Dinkytown has changed as it has needed to change," morphing from a residential/commercial district serving the surrounding neighborhood to an entertainment destination that draws people from greater distances (M, 2007). The Northern Alignment would have provided an opportunity to continue to revitalize the Dinkytown area.
The Crowd

Current transit riders (low power, low interest) traveling to the University of Minnesota campus have many options, including local service and express routes and free shuttle services operated by the University of Minnesota. Their interest will be to have their service maintained or enhanced.

For most current transit users traveling to the University of Minnesota, the Washington Avenue alignment will be more convenient. On the other hand, the Northern Alignment would provide enhanced access for current riders in Dinkytown and for Marcy-Holmes neighborhood.

The 2008 Metro Transit light rail and bus rider satisfaction survey provides some insights into future riders of the Central Corridor line (Metro Transit, 2009). 91% of bus customers (3.17 mean score on a 1-5 scale) were satisfied and 95% of rail customers (3.32 mean score) were satisfied with overall service, suggesting a higher level of rider satisfaction with light rail that could apply to future riders of the Central Corridor line. Also, light rail riders felt slightly more safe, 77% vs. 75% at night, and 98% vs. 94% during the day. Again, this could apply to future riders of the Central Corridor line. It is not possible to differentiate the findings by the two alignments.

Washington Avenue Alignment

The at-grade Washington Avenue LRT alignment has several key advantages compared to a BRT operation and other LRT alignments. Comparing LRT with BRT, the five-year-old Hiawatha light rail line has proven successful and has established light-rail as an accepted (if not embraced) travel mode in the Twin Cities. This is evidenced by 10.2 million rides in 2008 — a number more than 20% higher than projections for 2020. Additionally, data suggests that LRT can serve as a "gateway mode" to greater transit use. In an October 2008 survey of Hiawatha
Light Rail customers, 61% indicated that the introduction of light-rail service influenced their decision to use regional bus service (Metro Transit, 2008). There are currently no BRT lines in the Twin Cities and this corridor would not permit using BRT in a way that would maximize its operational advantages because of the many intersection crossings it would contend with which would slow travel time considerably. In *Urban Transportation Systems*, Sigurd Grava writes about LRT:

The ideal situation for LRT development would be a corridor, at least some 10 km long that has not only strong destination points and trip attractions at both ends (CBD, shopping center, large medical complex, university campus, research of office park, airport, sports and recreation facilities, or similar cluster), but also comparable, if less intensive, activities along the way. The corridor should encompass within walking distance to the service line…residential areas with at least moderately high density (preferably 40 dwelling units per acre…). Beyond the central spine, residential districts of medium density… could connect via convenient feeder services. (Grava, 473)

Applying Grava’s ideal to a real-world situation, it’s difficult to imagine a situation better suited for LRT than the Central Corridor. With a CBD at each end, mid-size shopping centers near a number of stations, hospitals near two stations, a university campus in the middle of the line, two stations proximate research and office complexes, three major sports stadiums (and additional arenas), and medium-density residential neighborhoods along the way as well as excellent bus and rail connections, this alignment appears tailor-made for LRT.
It is important to note that Central Corridor is not a "blank slate" — much of its development through history is due to a thriving streetcar system which provided excellent access for millions of riders. For decades, the "University Line" was a heavily-used central connector which followed a nearly identical alignment to the proposed Washington Ave. alignment. Today, Metro Transit bus routes 16 and 50 serve the corridor. From November 1, 2008 to October 31, 2009 those routes accounted for nearly 6.4 million rides - nearly 10% of all bus rides in the Metro Transit system. Of those rides, nearly 1.07 million were paid by U-Pass and 380,000 by Metropass fare types suggesting significant service for students and employees along this route. Stops near the proposed East Bank station location are very popular destinations with current riders.
Access

The primary distinction with the Northern Alignment is East Bank station as a central access point to the heart of the University campus. This station would be located in the center of Washington Avenue between Weaver-Densford Hall on the south and the Parking and Transportation Services building to the north. It would be enclosed by a "transit mall" from Oak Street to Washington Bridge which would permit transit buses, emergency vehicles and bicycles only in a nearly 16-foot lane measured from the edge of the outer rail to the curb face. The locations of the East Bank and the West Bank station (which is also somewhat closer to campus than in the Northern Alignment plan) permit access to all major campus buildings with a walk of 1/2-mile or less of one of the three "University" stations.

Other Strengths

- Ridership in this corridor is historically sound and projections show more than 6,000 additional rides per day compared with the Northern Alignment (see table p.19).
- End-to-end travel time on the Washington Alignment is about 3% faster than the Northern Alignment. This is partially due to a shorter overall track length.
- All of the right-of-way requirements are secure. With the Northern Alignment, agreements with the BNSF railway would need to be negotiated.
- Visibility. Because the train is arguably its own best advertisement, it has the potential to attract more riders where more citizens can view it in operation day after day.

Access and the other strengths of the Washington Avenue alignment ultimately are reflected in a Cost Effectiveness Index value of $23.80 which falls in the "Medium" range (the higher the score, the more competitive the project is). This is within FTA guidelines and is more likely to
continue to be competitive compared with other projects nationally as it proceeds towards the Final Engineering stage.

**Weaknesses**

The primary weaknesses of the Washington Alignment are:

- The possibility of vibration and electromagnetic conflicts at the 80 labs in 17 buildings along Washington Avenue. If not mitigated properly, this could render millions of dollars in equipment and research ineffective or less effective.

- More conflicts with existing public streets and more disruptive construction.

- Little redevelopment potential.

Concerns about vibration and electromagnetic conflicts are serious, however, the concerns would also need to be addressed to some degree in the Northern Alignment because of its proximity within a few hundred feet of the new "Biomedical Discovery District" (including the Center for Magnetic Resonance Research) which is being developed north of TCF Bank Stadium.

**Northern Alignment**

The Northern Alignment is the alternative that was proposed by the University of Minnesota for the segment of the Central Corridor Light Rail Transit (CCLRT) alignment that runs from I-35W to the U of M Transitway when the tunnel alternative was eliminated (see below).
Physical Description and Stations

The "Northern" Alignment would have joined the Hiawatha Line at the same location as the CCLRT and then crossed over I-35W to the south side of Washington Avenue to a station located under Cedar Avenue. The West Bank station would have been at Cedar Avenue and 3rd Street and would have required some redesign of roads. The station would have been located further west and would have required U of M students to walk a little farther but would have been closer to the commercial areas of Cedar Riverside and Seven Corners and the high density housing in the area. After leaving the West Bank station, the Northern Alignment would have crossed over ball fields near the U of M Law School and displaced four of the Riverbluff HUD subsidized townhomes.

The line would then have turned to the northeast to use Bridge 9 over the Mississippi River, a fracture critical bridge and would have needed to be fully replaced to support LRT. In
1999, the bridge was converted to a bicycle and pedestrian trail. The bikeway would have been accommodated on the new bridge.

The line would then have connected to an existing below grade railroad right-of-way and used that corridor until 23rd Avenue. There have been longstanding plans to construct a new road, Granary Road, to connect 11th Avenue SE and 25th Avenue SE, in this same corridor. This has been a high-priority project for the City of Minneapolis to divert traffic from University Avenue SE and 4th Street SE and to open up underused industrial land for development. All of the uses, Granary Road, trails, sidewalks and freight rail, would have been accommodated.

A split platform station would have been located below grade at 14th Avenue SE and University Avenue as the alternative to the East Bank station on the Washington Avenue alignment. The split platform would have been designed to provide vertical circulation at three locations, providing access to the street and pedestrian system above. This would have been very different from the East Bank station in design and would have served a different population.

On the Northern alignment, several University buildings south of Washington Avenue and west of Harvard Street SE fall outside the 1/2 mile radius (Metropolitan Council, 2008). However, in the feasibility analysis that was performed, the home colleges of U-Pass holders were identified and 80% of U-Pass holders had their destinations within the 1/2 mile radius of the Dinkytown.
station (Metropolitan Council, 2008). Additionally, the Dinkytown station would have served the immediate commercial area and the residents of the adjacent Marcy-Holmes neighborhood which consists of student rental properties and owner occupied single family homes.

Three current local Metro Transit routes that would have intersected with the new Dinkytown station: Routes 2, 3 and 6. Unlike the Washington Avenue alignment, which will create efficiencies in bus service, these routes would have needed to be continued.

![Dinkytown station trench (Source: J. Lysen)](image1)

![Loring Pasta Bar in Dinkytown (Source: J. Lysen)](image2)

After running through the railroad trench, the line would have turned south at 23rd Avenue SE and paralleled that street to the Transitway. Here, the Northern Alignment would have passed the Biosciences Corridor which would have encountered the same concerns about vibration and electromagnetic field impacts. The Stadium Village station on the "Northern" alignment would have been oriented differently than the Washington Avenue alignment.

The Northern Alignment would have crossed fewer public streets, 4 versus 9 for the Washington Avenue alignment, due to its use of the railroad right-of-way. It was also expected to have less construction impacts on existing roads and less utility disruption.
CEI considerations

The Cost Effectiveness Index is the result of the incremental annualized capital cost + the incremental operating/maintenance cost divided by user benefits (annual hours). From the standpoint of fully loaded capital costs, the initial feasibility analysis showed that the Northern Alignment was less costly: $159.7 million vs. $174 million for the Washington Avenue alignment. However, the Northern Alignment did not have the user benefits, ridership and travel time, to create a competitive CEI. Two levels of ridership were forecast: 35,240 and 35,560 "enhanced access" weekday ridership. FTA would have had to concur with the "enhanced access" adjustments. The Northern Alignment would have been longer than the Washington Avenue alignment by about a half mile but was expected to be faster since it would have been grade-separated for much of its distance. The Central Corridor Project Office (CCPO) disputed that finding and the travel time was later determined to be longer.

The CEI was calculated as ranging from $24.58 to $28.25. The lower CEI was a result of using "enhanced access" ridership estimates as well as an annualization factor of 331 instead of 319. SRF argued that the higher annualization factor was appropriate because it reflected strong weekend service and ridership as they claimed is currently found on the Central Corridor. Even the lower CEI, however, did not meet the threshold for FTA recommendations for funding.

Strengths and weaknesses

The strengths of the Northern Alignment were its lesser conflict with University research facilities and access to the University hospital and clinics. Construction would also be less disruptive because much of the line would be in the railroad right-of-way and the Bridge 9 replacement would only affect trail users instead of the disruption that will be caused by construction on Washington Avenue. Because there are fewer intersections with public roads, it
was also viewed as having fewer pedestrian, auto, bus and emergency vehicle conflicts. Because it wasn't wholly contained within the University, the Northern Alignment also had redevelopment potential missing from the Washington Avenue alignment. Dinkytown housing and commercial development opportunities would have been increased over the long term.

The weaknesses were that the replacement of Bridge 9 would have required many approvals to move ahead due to its historic nature, railroad right-of-way would have had to be obtained, affordable housing would have been lost on the West Bank, and the line would have been less accessible to U of M students and employees. Lastly, the CEI made the project not competitive, placing the project in a "Medium-low" range for the CEI compared to a “Medium” assessment for the Washington Avenue alignment. At that time, the FTA recommended that only projects with a CEI of $23.99 or lower be considered for funding (Medium, Medium-High, or High).

Conclusion

Determining the "best" alignment depends on whether success is being measured from an overall transportation system perspective or from the perspective of the individual corridor's impacts. The Washington Avenue alignment represents the best solution from an overall transportation system perspective. The University of Minnesota is a critical destination for higher education, research and medical care. Linking all of the University of Minnesota to the rest of the region on a central spine of an emerging system of LRT corridors makes the most sense for the economic competitiveness of the Twin Cities metro region. Both alignments have significant impacts which either require extensive mitigation, such as the diversion of traffic and the impact on the research laboratories for the Washington Avenue alignment, or lost opportunities, such as the Northern Alignment's effect on the revitalization of Dinkytown.
<table>
<thead>
<tr>
<th></th>
<th>Washington Avenue Alignment</th>
<th>Northern Alignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical description</td>
<td>From West Bank crosses Washington bridge, at-grade on Washington Ave. until 23rd Ave., north to stadium and t-way.</td>
<td>From West Bank, NE to Bridge 9, connect to railroad ROW to 23rd Avenue, turn south to Transitway.</td>
</tr>
</tbody>
</table>
| Stations                    | • East Bank station on Washington Ave. between Weaver-Densford, Parking & Transportation building.  
                                 • West Bank station closer to UMN.  
                                 • Stadium Village on 23rd Ave. closer to University Ave. | • Dinkytown station in railroad trench at 14th Ave SE and University Ave SE.  
                                 • West Bank station farther from U of M but closer to commercial and residential area.  
                                 • Stadium Village station oriented differently. |
| Bus, pedestrian and bike connections | • Excellent bus connections.  
                                 • Transit mall w/ excellent bike/ped connections to East Bank station. | • Good bus connections but may not have created as many efficiencies.  
                                 • Adequate pedestrian and bike connections. |
| Projected ridership         | 41,790                                                           | 35,240 (approved) or 35,560 ("enhanced access"). |
| Travel time                 | 39.13 minutes                                                    | 40.26 minutes.                                                                   |
| Cost effectiveness index    | $23.80                                                           | $24.58 (not approved) to $28.44 (Med-Low range).                                 |
| Advocates                   | • Metropolitan Council.  
                                 • Hennepin and Ramsey Counties.  
                                 • Cities of Minneapolis and St. Paul.  
                                 • Transportation advocacy groups. | • University of Minnesota.  
                                 • Neighborhoods affected by traffic diverted from Washington Avenue.  
                                 • Dinkytown business community. |
| Opponents                   | • University of Minnesota.                                       | • Metropolitan Council.                                                           |
| Strengths                   | • Ridership.  
                                 • Competitive CEI.  
                                 • All campus within 1/2-mile of a station.  
                                 • No unknown ROW needs.  
                                 • Historically sound travel way. | • Less conflict with research facilities and U hospital and clinics.  
                                 • Construction less disruptive.  
                                 • Fewer intersections with public roads.  
                                 • Redevelopment potential for Dinkytown. |
| Weaknesses                  | • Construction more disruptive.                                  | • Replacement of historic Bridge 9.                                              
                                 • More mitigation required for labs.  
                                 • Crosses more intersections.  
                                 • Little development opportunity. | • ROW needed to be acquired from railroad.  
                                 • Loss of affordable housing.  
                                 • CEI not competitive. |
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Reference List


