ASSESSING ACCESSIBILITY:
Potential transportation impacts of relocating Champaign Central High School
Table of Contents

Abstract 3
Introduction 3
School Siting: A Review of the Literature 3
Scenarios 5
Accessibility 6
Population Distribution 6
Travel Distances 7
Transportation Zones 7
Multimodal Impacts 9
Cost 9
Total Daily Vehicle Miles Traveled 10
Mode Share 10
Mode Share and VMT 12
Athletic Participation 12
Other Extracurricular Activities 12
Cost Estimate 13
Emissions 14
Conclusion 15
Acknowledgments 15
Appendix A: Scenario Summaries 16
Appendix B: Summary of Athletic Participation Assumptions 18

Disclaimer

Information about transportation impacts for each scenario was generated using current data and estimates. Due to unknown changes, such as fluctuations in gas prices, changes to the high school districts, or changes in population, the results of modeling could vary significantly. The models are intended to identify potential tradeoffs for the decision-making process, not to predict actual costs.
Abstract

The Champaign Unit 4 School District is currently considering options for the future of the two high schools, Central and Centennial. The district will likely remodel or rebuild one or both of the high schools. Many sites throughout the Champaign area have been suggested for a new school to replace Central.

Depending on the future locations of the schools, parental and district responsibilities and expenses for transportation may shift. According to Illinois law, the Unit 4 School District does not have to provide transportation to those students living within 1.5 miles of a school. Outside that distance, it must provide transportation. In Champaign, Unit 4 provides the majority of transportation for high school students by paying for MTD (Champaign-Urbana Mass Transit District) passes and additional routes. Students in only a few of the most distant areas are picked up by a yellow school bus.

Assessing Accessibility: Potential Transportation Impacts of Relocating Champaign Central High School uses four hypothetical scenarios, intended to be representative of any of the options currently under consideration, while also comparing current transportation conditions at both high schools. Estimates of the total daily vehicle miles traveled and the modes of transportation that students and staff use to arrive at school were used to develop information about current and future accessibility to the schools, costs of transportation, and levels of pollution generated by school transportation. Results of the study were shared with the Unit 4 School Board and the public to aid in the decision-making process.

Introduction

The Champaign Unit 4 School District is currently considering options for the future of its two high schools, Central and Centennial. Central High School is an older facility and the local school board has suggested several sites on the periphery of the community on which to build a new school. The Champaign Planning Department has identified other sites within the city where a school could replace an existing or vacant land use.

The decision of where to locate a new high school or how to renovate the old one will impact not only the 3,000 high school students in Champaign and their families, but also the future development of the city as a whole. The location and configuration of the local high schools will influence the function of the transportation network. This study aims to assess some of the transportation impacts of high school locations, including accessibility, costs, and emissions.¹

School Siting: A Review of the Literature

In terms of transportation impacts, school siting can be examined in three major ways. From the traffic optimization perspective, a fringe location next to a major roadway is preferable, with ample parking available. With an emphasis on mobility, the best location is on a major urban street with parking, frequent public transit, and bicycle access. The optimal location from an accessibility perspective is within a residential neighborhood to maximize the number of people who can walk to school.² All three perspectives can be used to justify various location choices and have associated costs.

Few studies on the subject of school transportation or school siting exist. A 2011 Environmental Protection Agency (EPA) publication citing data from the US Department of Transportation (USDOT) notes that the number of children walking or biking to school declined significantly from 1969 to 2001, from a rate of 41 percent to only 13 percent, while the rate of students being bussed to school remained relatively

---

¹ Congestion of the road network and safety of various modes of transportation are also important considerations but are not examined here due to limited data availability and the complication of modeling such impacts.
stable. Due to the increase in parents driving kids to school, overall traffic congestion and emissions have increased, which has implications for the health and safety of children. The decrease in use of active transportation modes may be contributing to a nearly threefold increase in childhood obesity rates over the past thirty years. While some of these changes are related to lifestyle differences, some may be related to changes in school siting.

When people make travel choices, the built environment may affect their decisions. In a meta-analysis of transportation studies, Ewing and Cervero found that vehicle miles traveled (VMT) were influenced most by accessibility to destinations and street design variables. Land use diversity, intersection density, and accessibility of destinations improve the walkability of a neighborhood. Transit network and street network design are the primary contributors to the success of a transit network, with land use diversity having a secondary impact. Transportation decisions are complex but studying the built environment can provide some clues for how to plan for the future.

Land use and urban design characteristics may also have an influence on school-related travel behavior. Based on a study of travel diary surveys in Gainesville, Florida, the EPA found that school location and the quality of the built environment impact how children get to school. By locating schools closer to children, more children will be able to use active modes and emissions will decrease. Improving the built environment also reduces driving as children (and their parents) feel more comfortable walking. Another study of schools in the Atlanta, Georgia area found that neighborhood design factors have less influence for children’s travel than for adults because children may be influenced by their parents’ perceptions of crime, traffic safety, or school quality (the initial decision of where to send a child to school). Travel to school seems to be influenced by a slightly different set of factors than general adult travel patterns.

The trend in school siting in the recent past has been like that of retail, favoring the “big box” design and locating schools in areas with ample land and primarily automobile access. Along with this trend, and coupled with consolidation of school districts, the distance that students must travel to get to school has increased. For the state of Illinois, these changes have contributed to an increase in school district costs for student busing. State appropriations for school transportation have risen from approximately $235 million in 1994 to $723 million in 2009, which may be contributing to the State’s budget deficit. Along with governmental costs, individual costs may also be rising.

Today however, the trend may be moving in the other direction as “citizens, school administrators, and parents are recognizing that schools do more than house children for the day. They affect home-buying decisions and traffic patterns. They present opportunities to create neighborhood centers for education and civic life.” Communities are recognizing that school siting decisions are complex and have an influence on the broader urban fabric.

4. Ibid. US EPA 2011
5. Ibid. US EPA 2011
10. Ibid. US EPA 2003
Scenarios

The Champaign Unit 4 School District and City of Champaign Planning Department have identified a multitude of location options if a new high school is built. For the purposes of the transportation impact study, research is limited to five scenarios that might be representative of any of the options considered in the future (see Figure 1). Although attendance boundary redistricting is likely to occur if Central moves, available information is insufficient to make any assumptions about the outcome of that process, thus all scenarios will assume current attendance boundaries and the continuation of Centennial High School as it currently operates.

1. Status Quo

The first scenario considers current transportation conditions at both Central and Centennial high schools. Data provided by the district regarding current transportation modes form the basis for comparison with other scenarios.

2. Country Fair (Springfield Avenue and Mattis Avenue)

The second scenario represents the option for redevelopment of a commercial area located within the heart of the community. The proximity of this particular location to Centennial High School presents some options for continuing to share facilities, as well as optimizing transportation. Other commercial redevelopment areas within the city may exist.

3. Olympian (Olympian Drive and Market Street)

The third scenario exemplifies a greenfield development option where nearly all athletic facilities could be located on site. The site would be at least 60 acres in size, allowing ample space for parking and green space. A greenfield site could be located anywhere on the periphery of Champaign but given the size of the city, would likely be at least three miles from the city’s core.
4. Franklin (Harris Avenue and Sherwood Terrace)

The fourth scenario demonstrates the possibility of swapping facilities with another district school (Franklin Middle School), while also capitalizing on nearby land that will soon be vacant (Judah Christian School) and Spalding Park. Other options for trading school locations within the district might exist, or other local governmental bodies (such as the Park District) might be willing to provide land.

5. Dodds Park

The fifth option is a unique opportunity with the potential for a higher education partnership with Parkland Community College. The school building could be built on a portion of Park District land adjacent to the college and upper level students might have the opportunity to take classes there. Other similar opportunities might exist near the University of Illinois campus.

Accessibility

Accessibility is a measure of the ease with which people can arrive at a particular location. This study will use transportation zones to demonstrate varying degrees of accessibility at each potential school site. If more people are able to get to a site easily, it has a higher level of accessibility.

The three major transportation zones in the Unit 4 School District are self-transport, mass transit, and yellow bus. According to Illinois law, the Unit 4 School District does not have to provide transportation to those students living within 1.5 miles of a school. Outside that distance, it must provide transportation. In Champaign, Unit 4 provides the majority of transportation for high school students by paying for MTD (Champaign-Urbana Mass Transit District) passes and additional routes. Students in only a few of the most distant areas are picked up by a yellow school bus.

Population Distribution

In order to estimate the number of high school students in the Unit 4 School District, 2010 census data by age at the block group level was used. For the purposes of this research, the cluster of persons aged 15 to 17 was selected. Approximately 52 percent of the persons in this age group are assumed to attend Unit 4 high schools, based on current attendance information and the population within the district boundaries (1300 students at Central and 1400 students at Centennial).

Block group populations were attributed to the proper TAZs. Next, the TAZs near the periphery of the Unit 4 District were clipped to match the boundaries of the district. Populations within those TAZs were adjusted with respect to area of the new shapes versus the original TAZ areas (Figure 2 shows the high school districts and Figure 3 shows high school population distribution by TAZ). The population of high school students is generally concentrated in central and western sections of the district.
Travel Distances

To determine approximate travel distances for high school students, all students were assumed to be located at the centroid of their respective TAZs. Network distances from these centroids were calculated using ESRI ArcGIS (see Figure 4).

Transportation Zones

The area of responsibility for the district will change with the high school’s location (see Table 1 and Figure 5). This particular measure of accessibility did not work well for the Country Fair and Dodds Park scenarios as the locations of those schools are outside of the current Central attendance boundaries. The self-transport zones were smaller for those two scenarios because adjacent TAZs were not included in the “Central” district. If a high school was located at Country Fair or Dodds, significant redistricting would be necessary, but the politics of that decision are complicated and the author is not prepared to make assumptions on future districting.

The Olympian and Franklin scenarios can be successfully compared with the current transportation situation at Central High School because the attendance boundaries in those scenarios would likely change only minimally. The District’s zones of responsibility would change drastically with the Olympian scenario; effectively no students reside within the 1.5 mile self-transport zone,\textsuperscript{11} thus the district would be legally responsible for offering transportation to all students (see Figure 5). Franklin’s zones of responsibility would be similar to the status quo scenario.

The accessibility zone model assumes that the school district would be able to negotiate continued busing for high school students regardless of location. The MTD may increase the cost of the busing service if it has to provide many additional routes or additional frequency to locations it would not normally service.

\textsuperscript{11} A few students actually do live within 1.5 miles of the Olympian location, however, for the purposes of modeling, the centroid to which they are assigned is farther than 1.5 miles from the school.
Figure 5: High School Location Scenarios and Transportation Responsibility Zones

Map created by Holly Nelson, UIUC Department of Urban and Regional Planning, January 2012.

Data provided by CUUATS, Champaign Unit 4 Schools, and City of Champaign Planning Department.
A further measure of accessibility is access to multiple modes of transportation. While a detailed analysis of all modes is not possible, a few simple observations can indicate relative accessibility of various modes. Walkscore.com generates an estimate of the “walkability” of an address based on amenities located nearby, and design factors such as intersection density and block lengths. Although this does not indicate the quality of pedestrian facilities, it does provide some indication of the level of connectivity and urban fabric of the neighborhood. Central, Franklin, and Centennial all scored approximately 60 percent on Walkscore, and Country Fair had the highest score at 74 percent. The Olympian and Dodds scenarios had significantly lower scores at 12 and 43 percent, respectively.

Bicycle access to the sites also varies, although local bicycle facilities are rapidly improving (thus new facilities may be added soon). Central, Country Fair, and Centennial all have at least one bicycle route coming from each of four directions. Franklin and Dodds Park have routes coming from two directions. There are no recommended bicycle routes near the Olympian site.

CUMTD provides varying levels of bus access to the sites. There are four daytime routes that pass within a half mile of Central, Country Fair, and Franklin. Centennial has three nearby routes. Dodds Park has two and Olympian currently has no bus access. Additional routes would likely be added near a new school, at cost to the District.

An additional consideration for staff and students who drive themselves to school is the availability of parking. The Central and Franklin sites have on-street parking nearby. The Country Fair, Dodds Park, Centennial, and Olympian sites have the necessary acreages to provide parking on site.

### Cost

The cost of transporting students to and from school and extracurricular activities should be a consideration in the school siting decision. Many have cited the current school’s lack of nearby athletic facilities as a major problem. This study will examine the costs of transportation for athletic participation in addition to basic transportation costs, for both families and the District, including shifts in responsibility between the two.
Total Daily Vehicle Miles Traveled

Approximate total daily vehicle miles traveled (VMT) for each scenario were calculated with trip generation factors from the Institute of Transportation Engineers Trip Generation Handbook. For a school with approximately 1400 students, the average daily trip generation factor is 2.04 one-way trips per day, per student.\(^\text{13}\) This figure accounts not only for student travel, but also other travel associated with the school, including staff and parent trips.\(^\text{14}\)

Based on the numbers of students in each TAZ and network distances to the centroids, total daily VMT was generated (see Figure 6). Central has the lowest daily VMT of 5,840 and Olympian has the highest at 11,590. For comparison, Centennial’s total daily VMT is approximately 5,150.

Mode Share

For local school transportation, modes include driving alone, getting a ride from another family member, public transit, yellow school bus, and walking or bicycling. An additional segment of the population (siblings or members of the same household) does not generate trips because they can ride along or use the same bus stop as another member of the household.

Within each transportation zone, the number of students using each mode was divided based on distances (see Tables 2 and 3). The actual number of non-trip generating students remained constant for each scenario (197 students at Central and 331 students at Centennial).\(^\text{15}\)

The model assumes that all students living within ¼ mile of a school will walk, with the number decreasing with increased distance to the edge of the self-transport zone.\(^\text{16}\) The number of students taking yellow buses does not change and was derived from student locations and district busing information. The number

---

**Figure 6: Total Daily VMT**

<table>
<thead>
<tr>
<th>Mode</th>
<th>Central</th>
<th>Percent</th>
<th>Centennial</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow Bus</td>
<td>91</td>
<td>7.0</td>
<td>107</td>
<td>7.6</td>
</tr>
<tr>
<td>MTD</td>
<td>478*</td>
<td>36.9</td>
<td>631*</td>
<td>45.1</td>
</tr>
<tr>
<td>Self-Transport</td>
<td>528</td>
<td>40.8</td>
<td>331</td>
<td>23.6</td>
</tr>
<tr>
<td>Carpool**</td>
<td>197</td>
<td>15.2</td>
<td>331</td>
<td>23.6</td>
</tr>
<tr>
<td>Total</td>
<td>1294</td>
<td></td>
<td>1400</td>
<td></td>
</tr>
</tbody>
</table>

*This is the number of students eligible for MTD passes which may or may not represent the number who use them on a daily basis. CUMTD estimates that 500-700 students total use MTD buses on a daily basis.

**These students were unaccounted for in the District’s computer model. They are likely members of the same household as another student that would not generate an additional bus stop and could reasonably be expected to carpool.

---


14. Unit 4 allows Juniors and Seniors to leave campus for lunch. Lunchtime travel was not included in this study.

15. Data provided by Steven Rousey, Unit 4 Transportation Director

16. Based on National Household Transportation Survey data, Ibid. US EPA 2011
of students driving, getting a ride, or taking an MTD bus was based on data from an EPA study of Atlanta schools.\textsuperscript{17} MTD also provided an estimate of the total number of high school students taking a bus (an average of 500-700 students), which matches the mode share model fairly well.\textsuperscript{18} The number of students driving themselves was validated by information on student parking permits at Centennial (typically 300-350 permits issued, as compared to 292 student drivers in the model).\textsuperscript{19} Mode share may vary between TAZs of similar distances based on socioeconomic factors, but for simplification purposes, this study assumes uniform mode share based on distance (see Appendix A for more details).

In all scenarios, the number of students driving themselves is relatively constant, ranging from 24 (Olympian and Dodds) to 30 (Franklin) percent. The number of students getting a ride follows a similar trend, with approximately 20 to 25 percent of students arriving in this manner. Students taking a yellow bus are constant at about 8 percent for each scenario. The number of students likely to walk varies significantly, with 0 at Olympian and 11 percent at Central and Franklin. Assuming a similar contract could be negotiated with MTD regardless of location, the number of MTD riders also fluctuates considerably, with 25 percent at Franklin and 47 percent at Dodds Park (see Figure 7).

While the mode share estimate is not necessarily an accurate depiction of family and student behavior, it does allow a comparison of how conditions might be different in various locations. For example, given the current location of Central, some students living nearby might be expected to walk or bike to school. If the school was located at Olympian, almost no students could be expected to walk.

\begin{table}[h]
\centering
\caption{Percent of Mode Share Assumptions}
\begin{tabular}{|c|c|c|c|c|c|c|c|}
\hline
\textbf{Mode} & \textbf{Self-Transport Zone Distance (mi)} & \multicolumn{4}{|c|}{\textbf{MTD Distance (mi)}} & \textbf{Yellow} \\
 & 0-0.25 & 0.26-0.5 & 0.5-1.0 & 1-1.5 & 1.5-4 & \textbf{Bus Zone} \\
\hline
Drive self & 0 & 27 & 40.5 & 45 & 22 & 32 & 9.5 \\
Get ride & 0 & 23 & 34.5 & 39 & 18 & 28 & 8 \\
Walk & 100 & 50 & 25 & 16 & 0 & 0 & 0 \\
YB & 0 & 0 & 0 & 0 & 0 & 0 & 82.5 \\
MTD & 0 & 0 & 0 & 0 & 60 & 40 & 0 \\
\hline
\end{tabular}
\end{table}


\textsuperscript{17} Ibid. Lawrence Frank and Company, 2008
\textsuperscript{18} Estimate provided by Robert Patton, Director of Operations, CUMTD
\textsuperscript{19} Estimate provided by Brian Easter, Athletic and Facilities Director, Centennial High School

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure7}
\caption{Student Mode Share Estimate}
\end{figure}

Source: Estimates based on 2010 US Census Bureau block group population (ages 15-17 from SF-1 P12) attributed to TAZs within the Unit 4 School District, and distances from hypothetical school locations.
**Mode Share and VMT**

In order to include the impacts of urban form on school location, an alternate estimate of VMT was generated using mode share estimates (see Figure 8). These estimates used the ITE trip generation factor (2.04) for students driving themselves and double that factor (4.08) for students getting rides from parents. MTD and yellow bus routes are very complicated. The model assumes that one bus per centroid travels to and from the school location each day. While the model may underestimate bus mileage, daily bus mileages would still be minimal compared to car mileages even if increased by an order of magnitude.

**Athletic Participation**

A major argument in the school siting debate is the difficulty of transporting students for athletic participation. Most athletic facilities are available on site for Centennial, as a significant quantity of land around the building was purchased when the school was developed. Central was initially built as a junior high school in a time period when athletic participation was less extensive than today, thus the school’s site is barely bigger than the building’s footprint. Many of Central’s current athletic facilities are shared with Centennial or are located at other sites around the community. Athletes and their parents frequently complain about the difficulties of getting to and from various sites for practices and games.

Using data from both athletic directors on numbers of students participating, days of practice offsite, and distances of practice locations, annual VMTs for athletic participation were calculated (see Table B1, Appendix B). The mode share assumptions for athletic calculations were slightly different than general assumptions because due to participation in athletics, athletes are more likely to drive to school if they must travel to another site for practice (see Table 4). Cost assumptions remained the same (see Cost Estimate section below).

**Other Extracurricular Activities**

Although not often discussed in the school siting debate, other extracurricular activities such as music, theater, dance, or clubs can be expected to generate additional travel. Currently, these activities take place onsite at both Central and Centennial and could be expected to remain onsite regardless of location. For this reason, other extracurricular activities would likely show very similar patterns of VMT, as well as accessibility, cost, and emissions to the basic travel patterns discussed above.
**Cost Estimate**

Given the VMT estimates from mode share assumptions above, costs for families and the District may vary significantly (see Figure 9). Individual vehicle operational costs are approximately 55.5 cents per mile.\(^{20}\) The Unit 4 annual contract with MTD is currently approximately $305,020.\(^{21}\) In order to estimate differences in the cost of the MTD contract, the current cost (including both Central and Centennial) was divided by the estimate of MTD VMT from the mode share VMT estimate. Yellow bus costs were more difficult to determine. A report by the Maine Department of Education in 2005 lists a cost of $2.87 per mile as the national average for yellow school bus costs.\(^{22}\) To account for inflation and increasing fuel costs, this study uses a rate of $3 per yellow bus mile traveled.

**Figure 9: Estimated Annual Transportation Costs**

![Graph showing estimated annual transportation costs]

Source: Based on author’s estimates of mode share and student distances from school locations. Costs assume $0.55 per mile for families (2011 IRS reimbursement rate), current MTD contract of $305,020 scaled to estimation of MTD VMT for each scenario (CUMTD), and $3 per mile for yellow bus operations (based on State of Maine School Bus Transportation Statistics, FY2005).

<table>
<thead>
<tr>
<th>School Location</th>
<th>Number of Sports Offsite</th>
<th>Annual Family VMT</th>
<th>Annual Family Cost</th>
<th>Annual District VMT</th>
<th>Annual District Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central</td>
<td>18</td>
<td>86342.0</td>
<td>$47,488.09</td>
<td>487.8</td>
<td>$1,463.41</td>
</tr>
<tr>
<td>Country Fair</td>
<td>12</td>
<td>29521.5</td>
<td>$16,236.81</td>
<td>217.1</td>
<td>$651.28</td>
</tr>
<tr>
<td>Olympian</td>
<td>2</td>
<td>13902.3</td>
<td>$7,646.28</td>
<td>0.0</td>
<td>-</td>
</tr>
<tr>
<td>Franklin</td>
<td>12</td>
<td>80408.0</td>
<td>$44,224.42</td>
<td>668.0</td>
<td>$2,004.03</td>
</tr>
<tr>
<td>Dodds Park</td>
<td>8</td>
<td>34449.8</td>
<td>$18,947.37</td>
<td>144.8</td>
<td>$434.44</td>
</tr>
<tr>
<td>Centennial</td>
<td>8</td>
<td>16844.9</td>
<td>$9,264.67</td>
<td>165.1</td>
<td>$495.33</td>
</tr>
</tbody>
</table>

Source: Data on athletic participation provided by Unit 4 athletic directors.

Annual costs for athletic transportation were calculated for the scenarios based on the VMT calculations from the "Athletic Participation" section above (see Table 5). The current Central and the Franklin scenario have significantly higher costs for athletic participation than the two scenarios where most facilities could be located onsite (Olympian and Centennial). To put these costs in perspective, however, the differences in athletic costs are very low in comparison with basic transportation costs (see Figures 10 and 11).


\(^{21}\) Data provided by Cynthia Hoyle, Transportation Planning Consultant for the Champaign-Urbana MTD.

Emissions

In the twenty-first century, people are increasingly concerned about emissions of pollutants and their impacts on climate change. Motor vehicles contribute greatly to emissions of carbon dioxide and other hazardous pollutants. Based on the quantity of vehicle miles traveled, the approximate total annual emissions levels can be compared. Data on emissions of local vehicles were provided by the Champaign County Regional Planning Commission (see Table 6).

Passenger cars and trucks have the highest level of emissions in all scenarios. Currently, the approximate total annual emissions of carbon dioxide equivalent are 480 tons for Central and 333 tons for Centennial. Emissions levels would be similar for the Country Fair and Franklin scenarios. Emissions would be slightly higher in the Dodds scenario with 634 tons, and significantly higher in the Olympian scenario with 926 tons (see Figure 12). If sustainability is a priority for the local community in the future, emissions for school transportation are an important consideration in the decision-making process.

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>CO₂e g/mi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger Car</td>
<td>434</td>
</tr>
<tr>
<td>Passenger Truck</td>
<td>643</td>
</tr>
<tr>
<td>Transit Bus</td>
<td>1,306</td>
</tr>
<tr>
<td>School Bus</td>
<td>1,020</td>
</tr>
</tbody>
</table>

Table 6: Emissions of local vehicles in grams of carbon dioxide equivalent

Source: Data provided by the Champaign-Urbana Urbanized Area Transportation Study of the Champaign County Regional Planning Commission.
Conclusion

School location impacts transportation in terms of accessibility, mode choice, costs, and emissions. These factors should be considered in school siting debates. Each scenario will have positive and negative transportation impacts.

The status quo transportation scenario is fairly efficient in terms of limiting VMT, costs, and emissions but parking at Central is difficult and athletic facilities are scattered. The Country Fair scenario would likely also generate limited VMT, costs, and emissions (dependent on redistricting) and may provide opportunities for more efficient busing and athletic facility sharing. Parking and athletic participation would be much more convenient in the Olympian scenario, but VMT, costs, and emissions would be high and few students could walk or bicycle to school. Franklin is efficient in terms of VMT, costs, and emissions but no parking is available and most athletic facilities would still be located offsite. The Dodds Park site would be somewhat centralized (dependent on redistricting), limit VMT, costs, and emissions, and would provide parking, but some athletic facilities would likely have to remain offsite.

As the discussion among the school board, parents, school staff, and the wider community continues, these pros and cons of accessibility, mode share, transportation costs, and emissions will be discussed. A greenfield site has advantages for ease of construction, provision of parking, and centralization of athletic facilities. Remodeling the current schools or building a new school on an infill site may have higher initial development costs but would save time and money and limit emissions for both families and the district over the school’s lifetime.

Transportation is an essential consideration for school district facilities planning, both in Champaign and elsewhere. Using transportation modeling can help a school district evaluate some of the long term costs of school sites, as well as accessibility and emissions impacts. While models could be improved with survey data from local schools, a more rudimentary model can still provide valuable conceptual information.

Acknowledgments

Many thanks to the local officials and professors who provided data, information, and advice towards the completion of this project. Brian Easter, Centennial Athletic Director; Eric Hansen, Champaign County Regional Planning Commission; Cynthia Hoyle, Transportation Planning Consultant to the CU Mass Transit District; Bruce Knight, City of Champaign Planning Department; Rob Kowalski, City of Champaign Planning Department; Bumsoo Lee, Professor of Urban Planning; Gabriel Lewis, Champaign County Regional Planning Commission; Robert Malito, Interim Superintendent, Unit 4 School District; Robert Patton, CU Mass Transit District; Barbara Ramsay, Champaign Unit 4 Schools; Steve Rousey, Champaign Unit 4 Director of Transportation; Daniel Schneider, Professor of Urban Planning; Mohammed Ullah, Champaign County Regional Planning Commission; Bill Volk, CU Mass Transit District; and John Woods, Central Athletic Director.
Appendix A: Scenario Summaries

**Status Quo**
The Status Quo scenario considers current transportation conditions at both Central and Centennial high schools. Data provided by the district regarding current transportation modes form the basis for comparison with other scenarios. Centennial has space for most athletic facilities and student parking is available. Most of Central’s athletic facilities are not located on site and students are limited to street parking.

Both schools are located fairly close to the center of population of Champaign, and as a result, students traveling to school generate a fairly low number of vehicle miles. Accordingly, there is a balance between the number of students who can walk or bicycle to school, drive or get a ride, and take a transit or school bus. District yearly transportation costs are about $249,000 at Central and $113,000 at Centennial. Families spend a total of about $449,000 at Central and $322,000 at Centennial. Average costs are about $537 per student at Central and $311 at Centennial each year.

**Country Fair**
The Country Fair scenario represents the option for redevelopment of a commercial area located within the heart of the community. The proximity of this particular location to Centennial High School presents some options for continuing to share facilities, as well as optimizing transportation. Other commercial redevelopment areas within the city may exist. Some athletic facilities and student parking could be located on site at a large commercial redevelopment site.

Country Fair (or another similar location) is within the heart of the community, thus transportation would likely continue to be fairly efficient. Families would continue to have access to multiple modes of transportation. District yearly costs for transportation might be about $453,000 and costs for families might be about $416,000, or $669 per student. Emissions levels would be slightly lower than the current amount at Central (475 tons of carbon dioxide).

**Olympian**
The Olympian scenario exemplifies a greenfield development (undeveloped land) option where nearly all athletic facilities could be located on site. The site would be at least 60 acres in size, allowing for ample space for parking, green space, and state-of-the-art athletic facilities. A greenfield site could be located anywhere on the periphery of Champaign but given the size of the city, would likely be at least three miles from the city's core.

Due to its peripheral location, students going to Olympian or another greenfield site would travel significantly higher distances on a daily basis. Almost no students would be able to bicycle or walk to school because few students live within a mile-and-a-half of the school. District yearly costs for transportation would be approximately $806,000 and family costs would be approximately $811,000, which amounts to about $1,281 per student. Carbon dioxide produced by school transportation would also increase, to about 926 tons each year.
**Franklin**

The Franklin scenario demonstrates the possibility of swapping facilities with another district school (Franklin Middle School), while also capitalizing on nearby land that will soon be vacant (Judah Christian School) and Spalding Park. Other options for trading school locations within the district might exist, or other local governmental bodies (such as the Park District) might be willing to provide land. A student parking lot would likely be unavailable due to lack of land and many athletic facilities would remain offsite.

Franklin is also located within the core of the community, so students and their families could continue to use a variety of transportation modes to arrive at school. District costs for transportation might be about $308,000 and family costs might be about $480,000 each year, which is about $607 per student. Emissions of carbon dioxide pollution would be slightly higher than at Central, or about 518 tons per year.

**Dodds Park**

The Dodds Park option is a unique opportunity with the potential for a higher education partnership with Parkland Community College. The school building could be built on a portion of Park District land adjacent to the college and upper level students might have the opportunity to take classes there. Other similar opportunities might exist near the University of Illinois campus.

Dodds park is not quite centrally located (towards the north and west), but is still within developed areas of town. Although the distances that students would have to travel to the Dodds site are higher than current distances, opportunities for various modes of transportation still exist. The cost to transport students would be about $934 per student, or $663,000 for the District and $550,000 for families each year. Daily school travel would produce approximately 634 tons of carbon each year.
Currently, 18 of the 22 athletic programs at Central (including marching band) practice offsite at least once a week. In contrast, 14 athletic programs practice onsite at Centennial. Assumptions on the type of athletic facilities necessary for estimation of costs of athletic transportation (see Table B1). Current data on practice locations and participation was provided by the athletic directors.

### Table C1: Champaign Unit 4 School District athletic participation assumptions

<table>
<thead>
<tr>
<th>Sport</th>
<th>No. Particip.</th>
<th>Weeks of Practice</th>
<th>Dist.of Practice</th>
<th>Central Location</th>
<th>Country Fair Location</th>
<th>Olympian Location</th>
<th>Franklin Location</th>
<th>Dodds Park Location</th>
<th>Centennial Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cheerleading</td>
<td>45</td>
<td>34</td>
<td>D/I</td>
<td></td>
<td>Garden Hills</td>
<td>0 N/A</td>
<td>0 N/A</td>
<td>4 N/A</td>
<td>0 N/A</td>
</tr>
<tr>
<td>Dance</td>
<td>16</td>
<td>34</td>
<td>N/A</td>
<td>0</td>
<td>0 N/A</td>
<td>0 N/A</td>
<td>0 N/A</td>
<td>0 N/A</td>
<td>0 N/A</td>
</tr>
<tr>
<td>Boy's Cross Country</td>
<td>17</td>
<td>13</td>
<td>D/I</td>
<td></td>
<td>2 Varies*</td>
<td>2 Varies*</td>
<td>2 Varies*</td>
<td>6 U of I Course</td>
<td>6 U of I Course</td>
</tr>
<tr>
<td>Boy's Golf</td>
<td>18</td>
<td>10</td>
<td>I</td>
<td></td>
<td>6 U of I Course</td>
<td>6 U of I Course</td>
<td>6 U of I Course</td>
<td>6 U of I Course</td>
<td>6 U of I Course</td>
</tr>
<tr>
<td>Boy's Soccer</td>
<td>38</td>
<td>13</td>
<td>I</td>
<td></td>
<td>6 Franklin</td>
<td>0 N/A</td>
<td>0 N/A</td>
<td>0 N/A</td>
<td>0 N/A</td>
</tr>
<tr>
<td>Football</td>
<td>100</td>
<td>16</td>
<td>D</td>
<td></td>
<td>6 McKinley Field</td>
<td>0 N/A</td>
<td>0 N/A</td>
<td>6 McKinley Field</td>
<td>6 McKinley Field</td>
</tr>
<tr>
<td>Girl's Cross Country</td>
<td>15</td>
<td>13</td>
<td>D/I</td>
<td></td>
<td>2 Varies*</td>
<td>2 Varies*</td>
<td>2 Varies*</td>
<td>6 U of I Course</td>
<td>6 U of I Course</td>
</tr>
<tr>
<td>Girl's Golf</td>
<td>8</td>
<td>10</td>
<td>I</td>
<td></td>
<td>6 U of I Course</td>
<td>6 U of I Course</td>
<td>6 U of I Course</td>
<td>6 U of I Course</td>
<td>6 U of I Course</td>
</tr>
<tr>
<td>Girl's Tennis</td>
<td>25</td>
<td>12</td>
<td>I</td>
<td></td>
<td>6 Lindsay Courts</td>
<td>6 Lindsay Courts</td>
<td>6 Lindsay Courts</td>
<td>0 N/A</td>
<td>0 N/A</td>
</tr>
<tr>
<td>Girl's Swimming/Diving</td>
<td>25</td>
<td>15</td>
<td>I</td>
<td></td>
<td>6 Centennial</td>
<td>6 Centennial</td>
<td>6 Centennial</td>
<td>6 Centennial</td>
<td>6 Centennial</td>
</tr>
<tr>
<td>Girl's Volleyball</td>
<td>45</td>
<td>14</td>
<td>N/A</td>
<td>0</td>
<td>0 N/A</td>
<td>0 N/A</td>
<td>0 N/A</td>
<td>0 N/A</td>
<td>0 N/A</td>
</tr>
<tr>
<td>Boy's Basketball</td>
<td>45</td>
<td>19</td>
<td>N/A</td>
<td>0</td>
<td>0 N/A</td>
<td>0 N/A</td>
<td>0 N/A</td>
<td>0 N/A</td>
<td>0 N/A</td>
</tr>
<tr>
<td>Wrestling</td>
<td>40</td>
<td>16</td>
<td>I</td>
<td></td>
<td>6 YMCA</td>
<td>0 N/A</td>
<td>0 N/A</td>
<td>6 N/A</td>
<td>6 N/A</td>
</tr>
<tr>
<td>Boy's Swimming and Diving</td>
<td>25</td>
<td>14</td>
<td>I</td>
<td></td>
<td>6 Centennial</td>
<td>6 Centennial</td>
<td>6 Centennial</td>
<td>6 Centennial</td>
<td>6 Centennial</td>
</tr>
<tr>
<td>Girl's Basketball</td>
<td>40</td>
<td>20</td>
<td>N/A</td>
<td>0</td>
<td>0 N/A</td>
<td>0 N/A</td>
<td>0 N/A</td>
<td>0 N/A</td>
<td>0 N/A</td>
</tr>
<tr>
<td>Boy's Baseball</td>
<td>50</td>
<td>15</td>
<td>I</td>
<td></td>
<td>6 McKinley Field</td>
<td>0 N/A</td>
<td>0 N/A</td>
<td>6 McKinley Field</td>
<td>6 McKinley Field</td>
</tr>
<tr>
<td>Boy's Tennis</td>
<td>40</td>
<td>13</td>
<td>I</td>
<td></td>
<td>6 Lindsay Courts</td>
<td>6 Lindsay Courts</td>
<td>6 Lindsay Courts</td>
<td>6 Lindsay Courts</td>
<td>6 Lindsay Courts</td>
</tr>
<tr>
<td>Boy's Track &amp; Field</td>
<td>40</td>
<td>19</td>
<td>I</td>
<td></td>
<td>6 Centennial</td>
<td>6 Centennial</td>
<td>6 Centennial</td>
<td>6 Centennial</td>
<td>6 Centennial</td>
</tr>
<tr>
<td>Girl's Softball</td>
<td>25</td>
<td>15</td>
<td>I</td>
<td></td>
<td>6 Carrie Busey</td>
<td>6 Carrie Busey</td>
<td>6 Carrie Busey</td>
<td>6 Carrie Busey</td>
<td>6 Carrie Busey</td>
</tr>
<tr>
<td>Girl's Soccer</td>
<td>45</td>
<td>14</td>
<td>I</td>
<td></td>
<td>6 Franklin</td>
<td>0 N/A</td>
<td>0 N/A</td>
<td>6 N/A</td>
<td>6 N/A</td>
</tr>
<tr>
<td>Girl's Track &amp; Field</td>
<td>25</td>
<td>19</td>
<td>I</td>
<td>9</td>
<td>6 Centennial</td>
<td>6 Centennial</td>
<td>6 Centennial</td>
<td>6 Centennial</td>
<td>6 Centennial</td>
</tr>
<tr>
<td>Marching Band</td>
<td>135</td>
<td>9</td>
<td>D/I</td>
<td></td>
<td>4.5 Centennial</td>
<td>4.5 Centennial</td>
<td>4.5 Centennial</td>
<td>4.5 Centennial</td>
<td>4.5 Centennial</td>
</tr>
</tbody>
</table>

Source: Estimates on participation, days of practice, and location provided by John Woods (Central Athletic Director) and Brian Easter (Centennial Athletic Director).

*Cross country teams practice in various locations. Two common sites are Orchard Downs and Parkland College. The mean of the distance to each of these sites was used in the VMT estimation.