

COMPREHENSIVE TRANSPORTATION REVIEW

5000 14TH STREET NW BZA

WASHINGTON, DC

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EXECUTIVE SUMMARY

The following report is a Comprehensive Transportation Review (CTR) of the school transition at 5000 14th Street NW. The report reviews the transportation aspects of the project's Board of Zoning Adjustment (BZA) application (BZA Case Number 19851).

The purpose of this study is to evaluate whether the project will generate a detrimental impact to the surrounding transportation network. This evaluation is based on a technical comparison of the existing conditions, background conditions, and future conditions. This report concludes that **the project will not have a detrimental impact** to the surrounding transportation network assuming that all planned site design elements and mitigation measures are implemented.

Proposed Project

The 5000 14th Street NW site is generally bounded by Gallatin Street to the north, a public alley to the south, 14th Street to the east, and Piney Branch Road to the west. The site is currently occupied by the Kingsbury Center, which is a private school that serves students with learning differences. Currently, Kingsbury has a student enrollment of 108, ranging from kindergarten to 12th grade, and 71 staff members. The proposed plan for the site is to transition the site to the Latin American Bilingual Public Charter School (LAMB). LAMB is expected to start operating out of the 5000 14th Street site in autumn of 2018, and for an interim period, both LAMB and Kingsbury will occupy the space. During the interim period, the maximum number of students that will occupy the building for both Kingsbury and LAMB will be 485 and the maximum number of faculty staff for both schools will be 116 (175 students/80 faculty at Kingsbury; 310 students/36 faculty at LAMB). After Kingsbury has fully vacated the property, LAMB proposes to accommodate 600 students and 110 faculty/staff members.

Under existing conditions, vehicular access to the 5000 14th Street site is from four curb cuts: two (2) along 14th Street (the Northeast and Southeast Driveways) and two (2) along Piney Branch Road (the Northwest and Southwest Driveways). The Northeast and Southwest Driveways currently operate as inbound only while the Southeast and Northwest Driveways operate as outbound only. Additionally, the Southeast

Driveway operates as right out only due to the proximity of the adjacent intersection and the skewed geometry.

These curb cuts provide access to approximately 107 parking spaces and separate pick-up/drop-off areas for private vehicles and school buses. As part of the interim conditions and ultimate conditions, the locations and operations of vehicular access points and number of parking spaces is not expected to change; however, the internal circulation as it relates to pick-up/drop-off areas and the allocation of parking spaces will change.

As part of the interim plan, the primary Kingsbury entrance will be relocated to the northern portion of the building. As such, all Kingsbury-related pick-up/drop-off activity will take place along the northern side of the site. Given the size of the student population and the amount of students that take the school bus, this amount of space is expected to adequately accommodate the pick-up/drop-off needs of Kingsbury.

Under interim and ultimate conditions, LAMB's primary entrance will be along the east side of the building, adjacent to the dual parking/circulation lanes. The overall pick-up/drop-off operations of LAMB will differ from those of Kingsbury in that school buses will not be used. Additionally, PK3-2nd Grade students are expected to be escorted into and out of the school by their parent or guardian. As such, pick-up/drop-off operations require both a pick-up/drop-off queuing area and designated parking spaces.

Under interim and ultimate conditions, vehicular pick-up/drop-off will take place along the upper circulation lane. Under interim conditions, it is expected that only 50 feet of queuing space will be needed as the majority of students will be in PK3-2nd Grade. Under ultimate conditions, it is expected that 320 feet of queuing space will be needed as the student population will increase and be more evenly distributed.

Designated pick-up/drop-off parking will be located along the lower circulation lane and along the southern side of the building. These areas are located nearest to the entrance without impeding, or being impeded by pick-up/drop-off queues.

Under the interim conditions, it is expected that LAMB will have a faculty/staff parking demand of 21 spaces and the LAMB pick-up/drop-off operations is expected to have a demand of 29 spaces. In addition to LAMB, Kingsbury faculty/staff



members will require parking during the interim conditions. Kingsbury will have a faculty/staff parking demand of approximately 56 parking spaces. Overall, this amounts to an overall parking demand of 106 spaces, with the pick-up/drop-off spaces doubling as visitor parking during the school day.

Under the ultimate conditions, it is expected that LAMB will have a faculty/staff parking demand of 64 spaces. The LAMB pick-up/drop-off operations is expected to have a demand of 40 spaces. Overall, this amounts to an overall parking demand of 104 paces, with pick-up/drop-off spaces doubling as visitor parking during the school day.

Multi-Modal Impacts and Recommendations

Transit

5000 14th Street NW is served by regional and local transit services via Metrobus and Metrorail. The site is located 1.1 miles from the Georgia Avenue-Petworth Metrorail. There are also seven (7) Metrobus routes that service the site along major corridors.

Although the project will be generating new transit trips, existing facilities have enough capacity to handle the new trips.

Pedestrian

The 5000 14th Street NW site is surrounded by a generally well-connected pedestrian network. Most roadways within a quarter-mile radius provide sidewalks and acceptable crosswalks and curb ramps, particularly along the primary walking routes. However, there are residential streets to the north and west of the site which lack sidewalks, curb ramps, or crosswalks that meet DDOT and ADA standards.

Since the existing pedestrian infrastructure at pedestrian access points surrounding the site provide an adequate walking environment and there are sidewalks along all primary routes to pedestrian destinations, with the exception of Piney Branch Road and portion of Gallatin Street north and west of the site, there are no proposed pedestrian infrastructure improvements as a result of the school transition.

Bicycle

The 5000 14th Street NW site has adequate connectivity to existing on- and off-street bicycle facilities. The site is adjacent to bicycle lanes along 14th Street and one block from a signed bicycle route on 13th Street. The Rock Creek Park Trail is also approximately 1.5 miles to the west of the site.

Vehicular

The 5000 14th Street site is well-connected to several principal and minor arterials such as Military Road, Missouri Avenue, Georgia Avenue, Arkansas Avenue, 16th Street, 14th Street and 13th Street and an existing network of collector and local roadways.

In order to determine impacts that the proposed developments will have on the transportation network, this report projects future conditions with and without the development of the site and performs analyses of intersection delays and queues. Two future scenarios were considered: a 2020 interim future condition scenario where both LAMB and Kingsbury will occupy the space and a total future condition scenario where Kingsbury has fully vacated the property. These results were compared to the acceptable levels of delay set by DDOT standards as well as existing queues to determine if the site will negatively impact the study area. The analysis concluded that two intersections trigger mitigations for the 2020 Interim Condition scenario, and the same two intersections trigger mitigations for the 2025 Ultimate Condition scenario.

The following conclusions are reached within this chapter:

- Under existing conditions the study area intersections generally operate under acceptable conditions with the exception of four intersections along 14th Street and 16th Street.
- Under background conditions, Emerson Street is converted from two-way operations to one-way westbound operations between 14th Street and 13th Street and one-way eastbound operations between 14th Street and 16th Street as a result of the 16th Street Heights Neighborhood Traffic Safety Study. This results in a significant increase in delay along Gallatin Street, which serves as the main primary east-west connection in replace of Emerson Street.
- As a result of 2020 Interim Future scenario, two intersections trigger the need to explore mitigations:
 - 16th Street & Gallatin Street, NW
 - 14th Street & Gallatin Street, NW
- As a result of 2025 Total Future scenario, two intersections trigger the need to explore mitigations:
 - 16th Street & Gallatin Street, NW
 - 14th Street & Gallatin Street, NW
- Mitigation measures were analyzed with the following mitigation measures being proffered for the both the 2020



Interim and 2025 Total Future scenarios of the development:

- It was determined that the 14th Street & Gallatin Street intersection can be improved by traffic signal timing modifications by giving additional green time to the Gallatin Street approaches. This improves delay along Gallatin Street without detrimental impact to 14th Street operations.
- Capacity concerns at the 16th Street & Gallatin Street intersection can be primarily attributed to the re-routing of east-west trips due to the change in traffic operations along Emerson Street to the south. Mitigation measures were explored at this intersection; however, this report ultimately proposes that DDOT continue to evaluate the operations of Gallatin Street as part of subsequent phases of the 16th Street Heights Neighborhood Traffic Safety Study.

Transportation Demand Management (TDM)

This report has outlined the following TDM measures for both the interim and ultimate school occupancy conditions:

- Student TDM Elements
 - The School will encourage carpooling and publically recognize at Peace Ceremonies any parent who regularly drives 3 or more students to school.
 - The School will offer DC One Cards to all students to encourage the use of public transportation
 - Require all drop-off and pick-up activities to be within areas specifically designated on campus.
 - The School will offer a parent listserv which will allow parents to find carpool matches.
 - The school will coordinate bike safety/education courses for students.
- Faculty/Staff TDM Elements
 - The School will offer a transit benefit program to faculty and staff to encourage the use of public transportation.
 - All faculty and staff who drive to school will be instructed to park on campus.
 - The School will encourage carpooling and publically recognize any faculty or staff who regular drives 2 additional faculty or staff members to school.
 - All faculty/staff will be complete training on TDM procedures

School-Wide TDM Elements

- The School will continue to work with the neighborhood through periodic public meetings to ensure any traffic concerns can be addressed in a timely manner.
- The School will assign a staff member to serve as Transportation Management Coordinator (TMC) who will be responsible for oversight of the TDM plan, adherence to driving and parking regulations, and encourage and facilitate car-pooling.
- The School will implement policies for deliveries to the campus to minimize the impact of this traffic on the neighborhood.
- The School will install outdoor bicycle parking racks to promote additional bicycle activity on-campus.
- The school will participate in the Safe Routes to School Program

Summary and Recommendations

Overall, the project contains many positive transportation features, including:

- The site is within close proximity to Metrobus stops of routes along major corridors.
- All queuing for drop-off/pick up is accommodated internally.
- All parking demand is accommodated internally.
- A robust Transportation Demand Management (TDM) plan to reduce the demand of single-occupancy vehicles, private vehicles during peak period travel times or shifts single-occupancy vehicular demand to off-peak periods.
- The development is proposing to mitigate vehicular capacity concerns at the intersection of 14th Street and Gallatin Street NW.

Based on these features and the technical analysis contain within, this report concludes that **the proposed project will not have a detrimental impact** to the surrounding transportation network assuming that all planned site design elements and mitigation measures are implemented.



INTRODUCTION

This report is a Comprehensive Transportation Review (CTR) for 5000 14th Street NW. The report reviews the transportation aspects of the project's Board of Zoning Adjustment (BZA) application (Case Number 19851).

5000 14th Street NW, as shown in Figure 1 and Figure 2, is located in the 16th Street Heights neighborhood in Northwest DC. This CTR is submitted into the Board of Zoning Adjustment record for this case, as an evaluation of the transportation impacts of the application.

PURPOSE OF STUDY

The purpose of this report is to:

1. Review the transportation elements of the development site plan and demonstrate that the site conforms to DDOT's general policies of promoting non-automobile modes of travel and sustainability.
2. Provide information to DDOT and other agencies on how the development of the site will influence the local transportation network. This report accomplishes this by identifying the potential trips generated by the site on all major modes of travel and where these trips will be distributed on the network.
3. Determine if the project will lead to adverse impacts on the local transportation network. This report accomplishes this by projecting future conditions with and without development of the site and performing analyses of vehicular delays. These delays are compared to the acceptable levels of delay set by DDOT standards to determine if the site will negatively impact the study area. The report discusses what improvements to the transportation network are needed to mitigate adverse impacts.

PROJECT SUMMARY

The site is currently occupied by the Kingsbury Center, which is a private school that serves students with learning differences. Kingsbury currently has a population of 108 students and 71 faculty members. The proposed plan is to transition the site to the Latin American Bilingual Public Charter School (LAMB). LAMB is expected to start operating out of the 5000 14th Street site in autumn of 2018, and for an interim period, both LAMB and Kingsbury will occupy the space. Under the interim

conditions Kingsbury and LAMB will have a combined student population of 485 students and 116 faculty members. Under ultimate conditions LAMB will have a population of 600 students and 110 faculty members.

CONTENTS OF STUDY

This report contains nine sections as follows:

- *Study Area Overview*
This section reviews the area near and adjacent to the proposed projects and includes an overview of the site location.
- *Project Design*
This section reviews the transportation components of the projects, including the site plan and access. This chapter also contains the proposed Transportation Demand Management (TDM) plan for the site.
- *Trip Generation*
This section outlines the travel demand of the proposed projects. It summarizes the proposed trip generation of the project.
- *Traffic Operations*
This section provides a summary of the existing roadway facilities and an analysis of the existing and future roadway capacity in the study area. This section highlights the vehicular impacts of the project, including presenting mitigation measures for minimizing impacts as needed.
- *Transit*
This section summarizes the existing and future transit service adjacent to the site, reviews how the project's transit demand will be accommodated, outlines impacts, and presents recommendations as needed.
- *Pedestrian Facilities*
This section summarizes existing and future pedestrian access to the sites, reviews walking routes to and from the project sites, outlines impacts, and presents recommendations as needed.
- *Bicycle Facilities*
This section summarizes existing and future bicycle access to the site, reviews the quality of cycling routes to and from the project sites, outlines impacts, and presents recommendations as needed.



- Safety/Crash Analysis

This section reviews the potential safety impacts of the projects. This includes a review of crash data at intersections in the study area and a qualitative discussion on how the development will influence safety.

- Summary and Conclusions

This section presents a summary of the recommended mitigation measures by mode and presents overall report findings and conclusions.

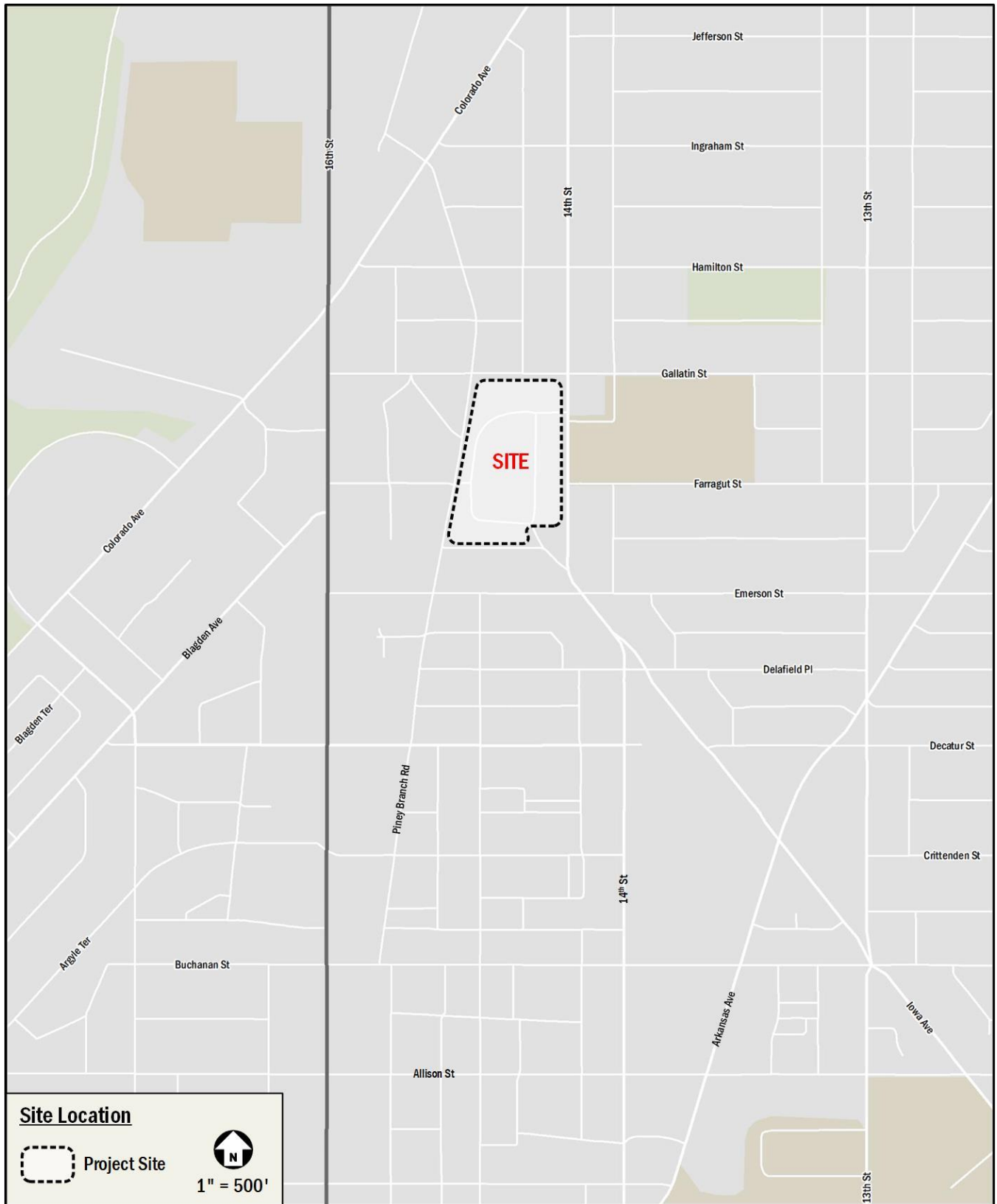


Figure 1: Site Location

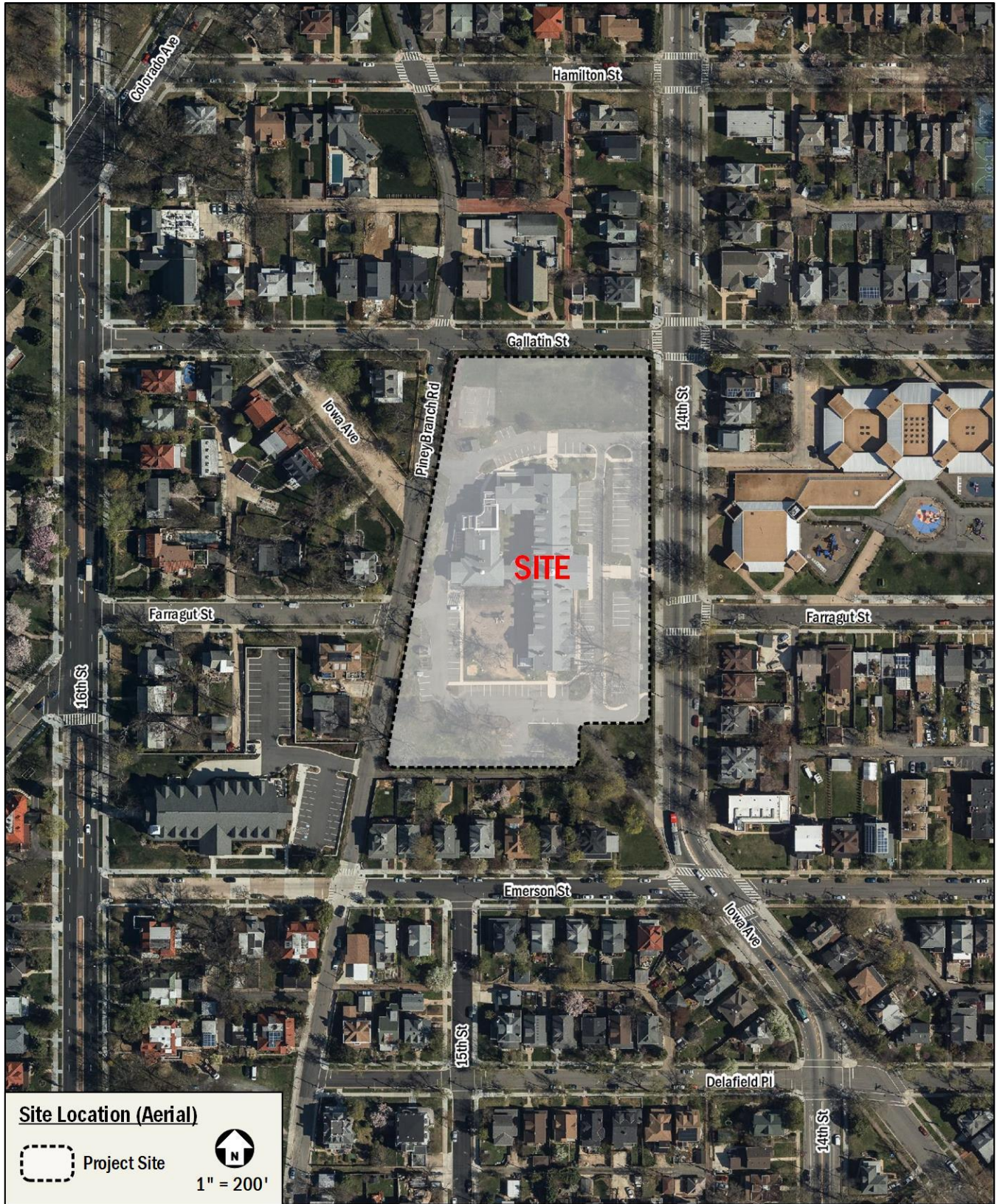


Figure 2: Site Location (Aerial)



STUDY AREA OVERVIEW

This section reviews the study area and includes an overview of the site location, including a summary of the major transportation characteristics of the area and of future regional projects.

The following conclusions are reached within this chapter:

- The 5000 14th Street NW site is surrounded by an extensive regional and local transportation system that will connect the students and staff of the proposed school to the rest of the District and surrounding areas.
- The 5000 14th Street NW site is primarily served by Metrobus along prominent corridors such as 16th Street and 14th Street.
- There is bicycle infrastructure in the vicinity of the site, with connectivity to the Rock Creek Park Trail.
- Pedestrian conditions are generally good, particularly along anticipated major walking routes, however there are gaps in the pedestrian network, such as missing sidewalks, crosswalks and curb ramps.

MAJOR TRANSPORTATION FEATURES

Overview of Regional Access

The 5000 14th Street NW site has ample access to regional vehicular- and transit-based transportation options, as shown in Figure 3, that connect the site to destinations within the District, Virginia, and Maryland.

The site is accessible from several principal arterials such as Military Road, Missouri Avenue, and Georgia Avenue. These roadways create connectivity to the Capital Beltway (I-495) that surrounds Washington, DC and its inner suburbs, as well as providing connectivity to the District core.

The site is located 1.1 miles from the Georgia Avenue-Petworth Metrorail station, which is served by the Green and Yellow Lines and connects Prince George's County, Maryland and Fairfax County, Virginia, while providing access to the District core. The site is also located 1.8 miles from the Fort Totten Metrorail Station, which is served by the Green, Yellow and Red Lines. The Red Line connects Montgomery County, MD to the District core. In addition, the Green, Yellow, and Red Lines

provide connections to all additional Metrorail lines allowing for access to much of the DC Metropolitan area.

Overall, the 5000 14th Street NW site has access to several regional roadways and transit options, making it convenient to travel between the site and destinations in the District, Virginia, and Maryland.

Overview of Local Access

There are a variety of local transportation options near the site that serve vehicular, transit, walking, and cycling trips, as shown on Figure 4. The site is served by a local vehicular network that includes several minor arterials and collector roads such as Arkansas Avenue, 16th Street, 14th Street, 13th Street, Colorado Avenue, Blagden Avenue, and Iowa Avenue. In addition, there is an existing network of connector and local roadways, such as Gallatin Street, Emerson Street, and Piney Branch Road, which provide access to the site.

The Metrobus system provides local transit service in the vicinity of the site, including connections to several neighborhoods within the District and additional Metrorail stations. As shown in Figure 4, there are seven (7) bus routes that service the site. In the vicinity of the site, there are bus stops along 16th Street and 14th Street. These bus routes connect the site to many areas of the District. A detailed review of transit stops within a quarter-mile walk of the site is provided in a later section of this report.

There are several existing bike facilities near the site that connect to areas within the District. Residential low volume streets surrounding the site provide connectivity to the bicycle lanes on 14th Street, the signed bicycle route on 13th Street, and the Rock Creek Park Trail. A detailed review of existing and proposed bicycle facilities and connectivity is provided in a later section of the report.

Anticipated pedestrian routes, such as those to public transportation stops, retail zones, and community amenities, provide adequate pedestrian facilities; however, there are some sidewalks and curb ramps that are missing or do not meet DDOT standards. A detailed review of existing and proposed pedestrian access and infrastructure is provided in a later section of this report.

Overall, the 5000 14th Street NW site is surrounded by a good local transportation network that allows for efficient



transportation options via transit, bicycle, walking, or vehicular modes.

Carsharing

Three carsharing companies provide service in the District: Zipcar, Maven, and Car2Go. All three services are private companies that provide registered users access to a variety of automobiles. Of these, Zipcar and Maven have designated spaces for their vehicles. While there are no car-share locations within a quarter-mile of the site, there are three car-share locations located approximately within a mile of the site. The closest car-share location to the site is located at Upshur Street and Kansas Avenue NW.

Carsharing is also provided by Car2Go, which provides point-to-point car-sharing. Car2Go currently has a fleet of vehicles located throughout the District and Arlington. Car2Go vehicles may park in any non-restricted metered curbside parking space or Residential Parking Permit (RPP) location in any zone throughout the defined “Home Area”. Members do not have to pay the meters or pay stations. Car2Go does not have permanent designated spaces for their vehicles; however, availability is tracked through their website and mobile phone application, which provides an additional option for car-sharing patrons.

FUTURE PROJECTS

There are a few District initiatives located in the vicinity of the site. These planned and proposed projects are summarized below.

Local Initiatives

MoveDC: Multimodal Long-Range Transportation Plan

MoveDC is a long-range plan that provides a vision for the future of DC’s transportation system. As the District grows, so must the transportation system, specifically in a way that expands transportation choices while improving the reliability of all transportation modes.

The MoveDC report outlines recommendations by mode with the goal of having them completed by 2040. The plan hopes to achieve a transportation system for the District that includes:

- 70 miles of high-capacity transit (streetcar or bus)
- 200 miles of on-street bicycle facilities or trails
- Sidewalks on at least one side of every street
- New street connections

- Road management/pricing in key corridors and the Central Employment Area
- A new downtown Metrorail loop
- Expanded commuter rail
- Water taxis

In direct relation to the proposed development, the MoveDC plan outlines recommended pedestrian and bicycle improvements such as new sidewalks, and new bicycle trails and bicycle lanes. These recommendations would create additional multi-modal capacity and connectivity to the proposed development and are discussed further down in the report.

SustainableDC: Sustainable DC Plan

SustainableDC is a planning effort initiated by the Department of Energy & Environment and the Office of Planning that provides the District with a framework of leading Washington DC to become the most sustainable city in the nation. The 2012 report proposes a 20-year timeframe to answer challenges in areas of: (1) Jobs & the economy; (2) Health & Wellness; (3) Equity & Diversity; (4) Climate & Environment; (5) Built Environment; (5) Energy; (6) Food; (7) Nature; (8) Transportation; (9) Waste; and (10) Water. With respect to transportation, the sustainability goals targeted in 20 years include:

- Improving connectivity and accessibility through efficient, integrated, and affordable transit systems
- Expanding provision of safe, secure infrastructure for cyclists and pedestrians
- Reducing traffic congestion to improve mobility
- Improving air quality along major transportation routes

A combination of increasing public transit and decreasing vehicular mode shares has been suggested to meet the transportation targets.

16th Street Heights Neighborhood Traffic Safety Study

This traffic safety study was initiated by DDOT in July 2016 to provide a comprehensive analysis of traffic calming in the 16th Street Heights neighborhood. The study area is generally bounded by Emerson Street NW to the north, Allison Street NW to the south, 16th Street NW to the west, and Arkansas Avenue NW to the east. The study was split into two phases in order to initially address the traffic calming petitions submitted to DDOT by residents for Emerson Street NW, as well as to



evaluate travel speeds and traffic volumes on other study area roadways. Phase 1 of the study focused on the existing conditions in the study area and was presented to residents in December 2016. Phase 2 consisted of recommendations to address various study area concerns, including additional data collection outside of the study area to further evaluate the volume concerns on Emerson Street NW.

As a part of the study, in July 2017, DDOT converted the 1300, 1400, and 1500 blocks of Emerson Street NW to one-way, diverging from 14th Street NW. DDOT intends to evaluate the one-way operation of the roadway for a six (6) week period after implementation.

Background Developments

Following national and DDOT methodologies, a background development must meet the following criteria to be incorporated into the analysis:

- Be located in the study area, defined as having an origin or destination point within the cluster of study area intersections;
- Have entitlements; and
- Have a construction completion date prior or close to the proposed development.

Based on this criteria, no background developments were identified.

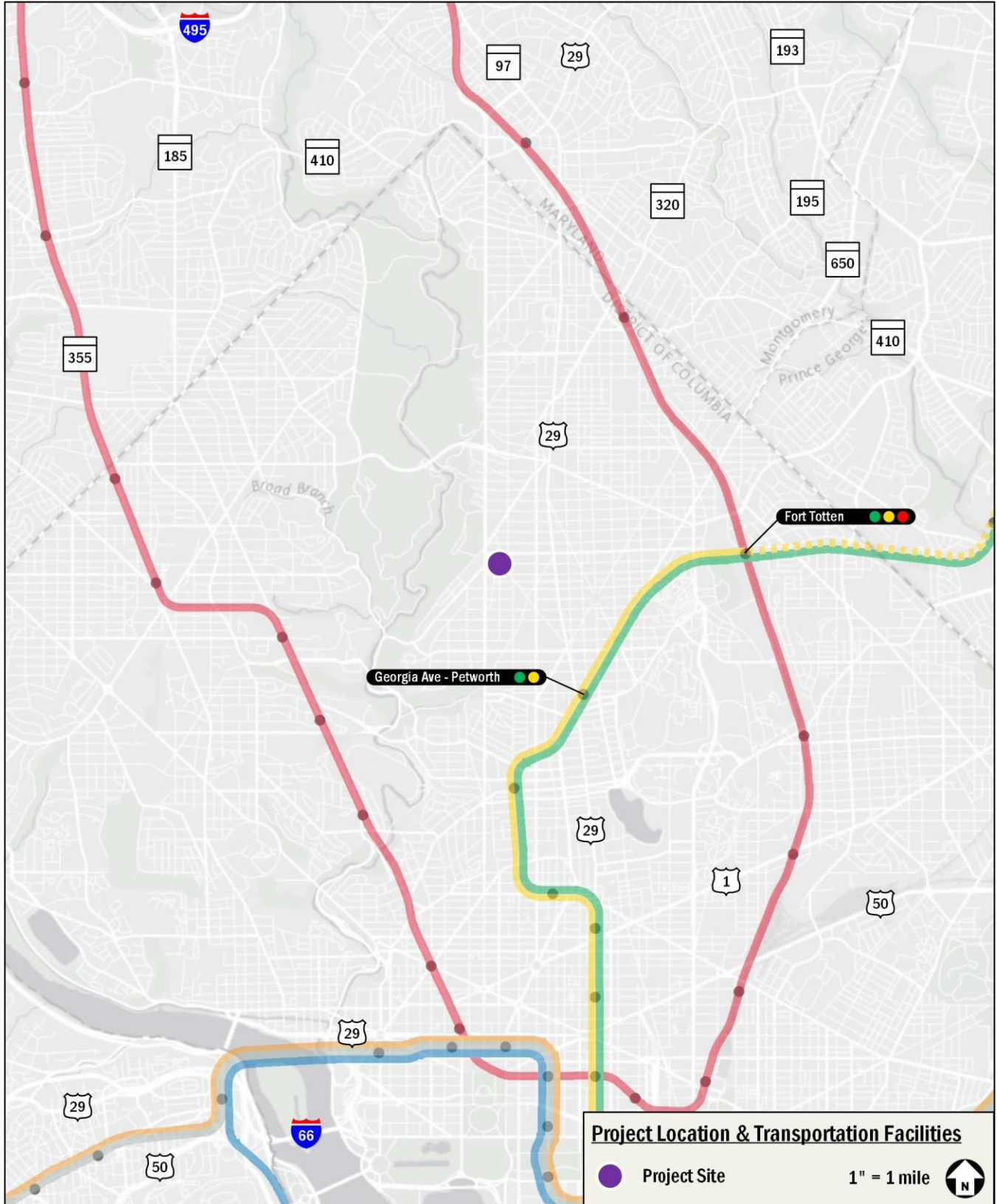


Figure 3: Major Regional Transportation Facilities



Figure 4: Major Local Transportation Facilities



PROJECT DESIGN

This section reviews the transportation components of the 5000 14th Street NW project, including the proposed site plan and access points. It includes descriptions of the vehicular access for the site, loading, parking, bicycle and pedestrian facilities, and Transportation Demand Management (TDM) plan.

PROJECT SUMMARY

The 5000 14th Street NW site is generally bounded by Gallatin Street to the north, a public alley to the south, 14th Street to the east, and Piney Branch Road to the west.

The site is currently occupied by the Kingsbury Center, which is a private school that serves students with learning differences. Currently, Kingsbury has a student enrollment of 108, ranging from kindergarten to 12th grade, and 71 staff members. The proposed plan is to transition the site to the Latin American Bilingual Public Charter School (LAMB). LAMB is expected to start operating out of the 5000 14th Street site in autumn of 2018, and for an interim period, both LAMB and Kingsbury will occupy the space. During the interim period, the maximum number of students that will occupy the building for both Kingsbury and LAMB will be 485 and the maximum number of faculty staff for both schools will be 116 (175 students/80 faculty at Kingsbury; 310 students/36 faculty at LAMB). After Kingsbury has fully vacated the property, LAMB proposes to accommodate 600 students and 110 faculty/staff members. Figure 5 shows the proposed site plan, outlining the primary vehicular and pedestrian access locations.

Under existing conditions, the Kingsbury school day runs from 8:30 AM to 3:05 PM for the lower school, 8:15 AM to 3:15 PM for the middle school, and 8:05 AM to 3:05 PM for the upper school. Additionally, all students may arrive early for breakfast services and stay late if enrolled in after care. The LAMB school day will run from 8:30 AM to 3:00 PM for primary students and 8:15 to 3:15 for elementary students, with before and after care provided.

SITE ACCESS AND CIRCULATION

Vehicular Access

Under existing conditions, vehicular access to the 5000 14th Street site is from four curb cuts: two (2) along 14th Street (the Northeast and Southeast Driveways) and two (2) along Piney

Branch Road (the Northwest and Southwest Driveways). The Northeast and Southwest Driveways currently operate as inbound only while the Southeast and Northwest Driveways operate as outbound only. Additionally, the Southeast Driveway operates as right out only due to the proximity of the adjacent intersection and the skewed geometry.

These curb cuts provide access to approximately 107 parking spaces and separate pick-up/drop-off areas for private vehicles and school buses. As part of the interim conditions and ultimate conditions, the locations and operations of vehicular access points and number of parking spaces is not expected to change; however, the internal circulation as it relates to pick-up/drop-off areas and the allocation of parking spaces will change. Vehicular access for the existing conditions, interim conditions, and ultimate conditions are shown in Figure 6, Figure 7, and Figure 8, respectively. Detailed parking and pick-up/drop-off operations are included later in this section.

Pedestrian Access and Circulation

Under the proposed interim conditions, the primary Kingsbury pedestrian access point is proposed to be from an existing entrance on the north side of the building. Under the proposed interim and ultimate conditions, the primary LAMB pedestrian access point is proposed to be from an existing entrance on the east side of the building. Proposed pedestrian access locations are shown on Figure 5. Drop-off/pick up locations correspond to the respective school access point.

Bicycle Access

Bicycle access to the 5000 14th Street site is from four existing curb cuts: two (2) along 14th Street and two (2) along Piney Branch Road. Short-term bicycle parking will be located along the perimeter of the building.

PICK-UP/DROP-OFF PROCEDURES

Currently at Kingsbury, school bus pick-up/drop-off operations occur in the upper circulation lane and vehicle pick-up/drop-off occurs in the lower circulation lane. As part of the interim plan, the primary Kingsbury entrance will be relocated to the northern portion of the building. As such, all Kingsbury-related pick-up/drop-off activity will take place along the northern side of the site as shown on Figure 6. Given the size of the student population and the amount of students that take the school bus, this amount of space is expected to adequately accommodate the pick-up/drop-off needs of Kingsbury.



Under interim and ultimate conditions, LAMB's primary entrance will be along the east side of the building, adjacent to the dual parking/circulation lanes. The overall pick-up/drop-off operations of LAMB differ from those of Kingsbury in that school buses are not used. Additionally, PK3-2nd Grade students are expected to be escorted into and out of the school by their parent or guardian. As such, pick-up/drop-off operations require both a pick-up/drop-off queuing area and designated parking spaces.

As shown in Figure 7 and Figure 8, under interim and ultimate conditions, vehicular pick-up/drop-off will take place along the upper circulation lane. Under interim conditions, it is expected that only 50 feet of queuing space will be needed as the majority of students will be in PK3-2nd Grade. Under ultimate conditions, it is expected that 320 feet of queuing space will be needed as the student population will increase and be more evenly distributed. The queuing demand estimates are based on an assumption of two linear feet of queuing space per student driven, which is comparable to other schools in the District.

Designated pick-up/drop-off parking will be located along the lower circulation lane and along the southern side of the building. These areas are located nearest to the entrance without impeding, or being impeded by pick-up/drop-off queues. The amount of designated pick-up/drop-off parking for the interim and ultimate conditions is outlined in the following section.

PARKING

Currently on the site, there are approximately 107 parking spaces. This amount of parking is expected to adequately serve the site under existing and interim conditions.

As discussed above, parking is necessary not just for faculty and staff parking, but also for LAMB pick-up/drop-off operations. Under the interim conditions, it is expected that LAMB will have a faculty/staff parking demand of 21 spaces based on the amount of faculty/staff members expected to drive and park to work, and the expected amount of carpooling. The LAMB pick-up/drop-off operations is expected to have a demand of 29 spaces based on the amount of PK3-2nd Grade students expected to be driven to work and the amount of time parents are expected to park. Parents typically park for approximately 10 minutes on average while picking up or dropping off their children. In addition to LAMB, Kingsbury faculty/staff members

will require parking during the interim conditions. Based on the amount of faculty/staff members expected to drive and the utilization of carpooling, Kingsbury will have a faculty/staff parking demand of approximately 56 parking spaces. Overall, this amounts to an overall parking demand of 106 spaces, with the pick-up/drop-off spaces doubling as visitor parking during the school day.

Under the ultimate conditions, it is expected that LAMB will have a faculty/staff parking demand of 64 spaces. The LAMB pick-up/drop-off operations is expected to have a demand of 40 spaces. Overall, this amounts to an overall parking demand of 104 spaces, with pick-up/drop-off spaces doubling as visitor parking during the school day.

LOADING

Truck routing to and from the site will be focused on designated primary truck routes such as 16th Street, 14th Street, and Georgia Avenue. Loading access will be from the northeast driveway along 14th Street NW; no backing maneuvers occur in public space.

The current loading operations at the site are proposed to remain as existing with the school transition. As such, the development will supply one (1) 30' loading berth and one (1) 20' service/delivery space. This amount of loading space is expected to be sufficient for the site as schools are generally expected to generate 2 to 3 loading activities per day, including activities such as trash removal and food delivery.

TRANSPORTATION DEMAND MANAGEMENT (TDM)

TDM is the application of policies and strategies used to reduce travel demand or to redistribute demand to other times or spaces. TDM typically focuses on reducing the demand of single-occupancy, private vehicles during peak period travel times or on shifting single-occupancy vehicular demand to off-peak periods.

The Applicant proposes the following TDM measures for both the interim and ultimate conditions:

- Student TDM Elements
 - The School will encourage carpooling and publically recognize at Peace Ceremonies any parent who regularly drives 3 or more students to school.
 - The School will offer DC One Cards to all students to encourage the use of public transportation



- Require all drop-off and pick-up activities to be within areas specifically designated on campus.
- The School will offer a parent listserv which will allow parents to find carpool matches.
- The school will coordinate bike safety/education courses for students.

- Faculty/Staff TDM Elements
 - The School will offer a transit benefit program to faculty and staff to encourage the use of public transportation.
 - All faculty and staff who drive to school will be instructed to park on campus.
 - The School will encourage carpooling and publically recognize any faculty or staff who regular drives 2 additional faculty or staff members to school.
 - All faculty/staff will be complete training on TDM procedures

- School-Wide TDM Elements
 - The School will continue to work with the neighborhood through periodic public meetings to ensure any traffic concerns can be addressed in a timely manner.
 - The School will assign a staff member to serve as Transportation Management Coordinator (TMC) who will be responsible for oversight of the TDM plan, adherence to driving and parking regulations, and encourage and facilitate car-pooling.
 - The School will implement policies for deliveries to the campus to minimize the impact of this traffic on the neighborhood.
 - The School will install outdoor bicycle parking racks to promote additional bicycle activity on-campus.
 - The school will participate in the Safe Routes to School Program

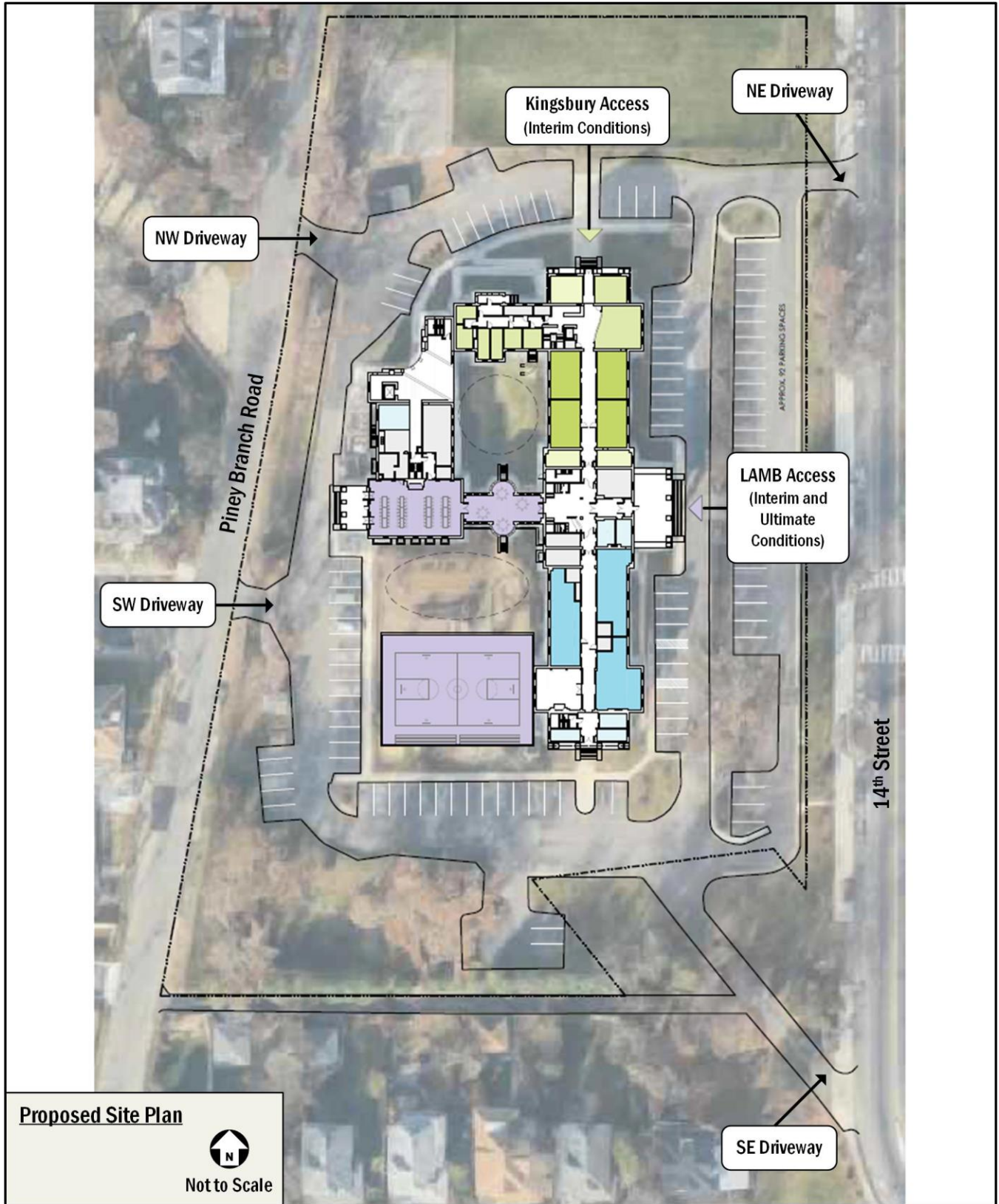


Figure 5: Proposed Site Plan



Figure 6: Existing (2017) Kingsbury Access and Vehicular Circulation



Figure 7: Interim Conditions Access and Vehicular Circulation



Figure 8: Ultimate Conditions Access and Vehicular Circulation



TRIP GENERATION

This section outlines the transportation demand of the 5000 14th Street NW project. It summarizes the projected trip generation of the site by mode and land use, which forms the basis for the chapters that follow.

We propose to analyze two trip generation conditions for: (1) the interim condition when the two schools are cohabitating the building; and (2) the ultimate condition when only LAMB occupies the building. As such, trip generation was projected for each condition.

Trip generation for the Kingsbury Center was calculated based on data collection at the site driveways on Tuesday, June 6, 2017. Because the school intends to grow as part of the interim condition, the existing driveway counts were factored upwards for both the student and employees. For the purposes of

factoring the existing counts, it was assumed that all pick-up/drop-off activity would account for one inbound trip and one outbound trip. As such, additional inbound trips in the morning and additional outbound trips in the afternoon were assumed to be employee trips. Based on these assumptions, the existing and projected trip generation for the Kingsbury Center is shown on Table 1 for the AM peak hour, the PM school peak hour, and the PM commuter peak hour.

Trip generation for LAMB was based on information provided by the school in regard to projected student/employee mode split and start/end times, as well as comparable data from other DC area schools. Existing counts were not collected for LAMB as some pick-up/drop-off activity occurs on-street and it would be difficult to determine an accurate existing trip generation. The mode splits assumed for students and employees is shown in Table 2. Trip generation for LAMB under interim and ultimate conditions is shown in Table 3 and Table 4, respectively.

Table 1: Existing and Future Kingsbury-Only Trip Generation

| Scenario | | Kingsbury Vehicular Trip Generation | | | | | | | | | |
|-----------------------|---------------|-------------------------------------|-----------|-----------|---------------------------------------|-----------|-----------|---|----------|----------|-----------|
| | | AM Peak Hour 7:45 - 8:45 AM | | | PM School Peak Hour 2:45 - 3:45 PM | | | PM Commuter Peak Hour 5:15 - 6:15 PM | | | |
| | | IB | OB | Total | IB | OB | Total | IB | OB | Total | |
| Existing | Students (x) | 108 | 25 | 25 | 50 | 17 | 17 | 34 | 3 | 3 | 6 |
| | | | =0.23x | =0.23x | =0.46x | =0.16x | =0.16x | =0.31x | =0.03x | =0.03x | =0.06x |
| | Employees (y) | 71 | 23 | 0 | 23 | 0 | 25 | 25 | 0 | 3 | 3 |
| | | | =0.32y | =0.00y | =0.32y | =0.00y | =0.35y | =0.35y | =0.00y | =0.04y | =0.04y |
| | Total | | 48 | 25 | 73 | 17 | 42 | 59 | 3 | 6 | 9 |
| Proposed (Interim) | Students (x) | 175 | 41 | 41 | 81 | 28 | 28 | 55 | 5 | 5 | 10 |
| | | | =0.23x | =0.23x | =0.46x | =0.16x | =0.16x | =0.31x | =0.03x | =0.03x | =0.06x |
| | Employees (y) | 80 | 26 | 0 | 26 | 0 | 28 | 28 | 0 | 3 | 3 |
| | | | =0.32y | =0.00y | =0.32y | =0.00y | =0.35y | =0.35y | =0.00y | =0.04y | =0.04y |
| | Total | | 66 | 41 | 107 | 28 | 56 | 83 | 5 | 8 | 13 |
| Net | Students (x) | 67 | 16 | 16 | 31 | 11 | 11 | 21 | 2 | 2 | 4 |
| | Employees (y) | 9 | 3 | 0 | 3 | 0 | 3 | 3 | 0 | 0 | 0 |
| | Total | | 18 | 16 | 34 | 11 | 14 | 24 | 2 | 2 | 4 |

Table 2: LAMB Mode Split Assumptions

| Mode Split | Vehicle | Passenger in car that parks* | Transit | Walk | Bike |
|---|---------|---------------------------------|---------|------|------|
| Student (PK3-2 nd Grade) | 81% | 4% | 8% | 4% | 3% |
| Student (3 rd – 5 th Grade) | 71% | 4% | 15% | 6% | 4% |
| Employee | 70% | -- | 20% | 5% | 5% |

*Represents students that have faculty member parents who drive



Table 3: Interim LAMB-Only Trip Generation

| Mode/User Group | | Interim Trip Generation | | | | | | | | |
|-----------------|--------------|-------------------------|-----------------|-----------------|---------------------|----------------|-----------------|-----------------------|----------------|----------------|
| | | AM Peak Hour | | | PM School Peak Hour | | | PM Commuter Peak Hour | | |
| | | IB | OB | Total | IB | OB | Total | IB | OB | Total |
| Auto | Students | 130 v/hr | 132 v/hr | 263 v/hr | 86 v/hr | 84 v/hr | 170 v/hr | 37 v/hr | 37 v/hr | 74 v/hr |
| | Employees | 17 v/hr | 0 v/hr | 17 v/hr | 0 v/hr | 0 v/hr | 0 v/hr | 0 v/hr | 13 v/hr | 13 v/hr |
| | Total | 148 v/hr | 132 v/hr | 280 v/hr | 86 v/hr | 84 v/hr | 170 v/hr | 37 v/hr | 50 v/hr | 87 v/hr |
| Transit | Students | 14 p/hr | 0 p/hr | 14 p/hr | 0 p/hr | 9 p/hr | 9 p/hr | 0 p/hr | 5 p/hr | 5 p/hr |
| | Employees | 3 p/hr | 0 p/hr | 3 p/hr | 0 p/hr | 0 p/hr | 0 p/hr | 0 p/hr | 2 p/hr | 2 p/hr |
| | Total | 18 p/hr | 0 p/hr | 18 p/hr | 0 p/hr | 9 p/hr | 9 p/hr | 0 p/hr | 7 p/hr | 7 p/hr |
| Walk | Students | 7 p/hr | 0 p/hr | 7 p/hr | 0 p/hr | 4 p/hr | 4 p/hr | 0 p/hr | 2 p/hr | 2 p/hr |
| | Employees | 1 p/hr | 0 p/hr | 1 p/hr | 0 p/hr | 0 p/hr | 0 p/hr | 0 p/hr | 1 p/hr | 1 p/hr |
| | Total | 8 p/hr | 0 p/hr | 8 p/hr | 0 p/hr | 4 p/hr | 4 p/hr | 0 p/hr | 3 p/hr | 3 p/hr |
| Bike | Students | 5 p/hr | 0 p/hr | 5 p/hr | 0 p/hr | 3 p/hr | 3 p/hr | 0 p/hr | 2 p/hr | 2 p/hr |
| | Employees | 1 p/hr | 0 p/hr | 1 p/hr | 0 p/hr | 0 p/hr | 0 p/hr | 0 p/hr | 1 p/hr | 1 p/hr |
| | Total | 6 p/hr | 0 p/hr | 6 p/hr | 0 p/hr | 3 p/hr | 3 p/hr | 0 p/hr | 2 p/hr | 2 p/hr |

Table 4: Ultimate LAMB-Only Trip Generation

| Mode/User Group | | Ultimate Trip Generation | | | | | | | | |
|-----------------|--------------|--------------------------|-----------------|-----------------|---------------------|-----------------|-----------------|-----------------------|-----------------|-----------------|
| | | AM Peak Hour | | | PM School Peak Hour | | | PM Commuter Peak Hour | | |
| | | IB | OB | Total | IB | OB | Total | IB | OB | Total |
| Auto | Students | 242 v/hr | 252 v/hr | 495 v/hr | 163 v/hr | 156 v/hr | 319 v/hr | 67 v/hr | 67 v/hr | 134 v/hr |
| | Employees | 53 v/hr | 0 v/hr | 53 v/hr | 0 v/hr | 1 v/hr | 1 v/hr | 0 v/hr | 39 v/hr | 39 v/hr |
| | Total | 295 v/hr | 252 v/hr | 548 v/hr | 163 v/hr | 157 v/hr | 320 v/hr | 67 v/hr | 106 v/hr | 173 v/hr |
| Transit | Students | 41 p/hr | 0 p/hr | 41 p/hr | 0 p/hr | 26 p/hr | 26 p/hr | 0 p/hr | 13 p/hr | 13 p/hr |
| | Employees | 12 p/hr | 0 p/hr | 12 p/hr | 0 p/hr | 0 p/hr | 0 p/hr | 0 p/hr | 9 p/hr | 9 p/hr |
| | Total | 53 p/hr | 0 p/hr | 53 p/hr | 0 p/hr | 26 p/hr | 26 p/hr | 0 p/hr | 22 p/hr | 22 p/hr |
| Walk | Students | 18 p/hr | 0 p/hr | 18 p/hr | 0 p/hr | 11 p/hr | 11 p/hr | 0 p/hr | 6 p/hr | 6 p/hr |
| | Employees | 3 p/hr | 0 p/hr | 3 p/hr | 0 p/hr | 0 p/hr | 0 p/hr | 0 p/hr | 2 p/hr | 2 p/hr |
| | Total | 21 p/hr | 0 p/hr | 21 p/hr | 0 p/hr | 12 p/hr | 12 p/hr | 0 p/hr | 8 p/hr | 8 p/hr |
| Bike | Students | 12 p/hr | 0 p/hr | 12 p/hr | 0 p/hr | 8 p/hr | 8 p/hr | 0 p/hr | 4 p/hr | 4 p/hr |
| | Employees | 3 p/hr | 0 p/hr | 3 p/hr | 0 p/hr | 0 p/hr | 0 p/hr | 0 p/hr | 2 p/hr | 2 p/hr |
| | Total | 15 p/hr | 0 p/hr | 15 p/hr | 0 p/hr | 8 p/hr | 8 p/hr | 0 p/hr | 6 p/hr | 6 p/hr |



Based on these calculations, the interim vehicular trip generation will include the interim LAMB trip generation plus the net new Kingsbury trips. The trip generation, which will be applied in the interim condition, is shown on Table 5.

Table 5: Combined Interim Vehicular Trip Generation (excludes existing site trips; only net increase to be distributed to network)

| User Group | Net Interim Trip Generation | | | | | | | | |
|------------------------|-----------------------------|-----------------|-----------------|---------------------|----------------|-----------------|-----------------------|----------------|----------------|
| | AM Peak Hour | | | PM School Peak Hour | | | PM Commuter Peak Hour | | |
| | IB | OB | Total | IB | OB | Total | IB | OB | Total |
| LAMB Students | 130 v/hr | 132 v/hr | 263 v/hr | 86 v/hr | 84 v/hr | 170 v/hr | 37 v/hr | 37 v/hr | 74 v/hr |
| LAMB Employees | 17 v/hr | 0 v/hr | 17 v/hr | 0 v/hr | 0 v/hr | 0 v/hr | 0 v/hr | 13 v/hr | 13 v/hr |
| Total | 148 v/hr | 132 v/hr | 280 v/hr | 86 v/hr | 84 v/hr | 170 v/hr | 37 v/hr | 50 v/hr | 87 v/hr |
| Kingsbury Students | 16 v/hr | 16 v/hr | 31 v/hr | 11 v/hr | 11 v/hr | 21 v/hr | 2 v/hr | 2 v/hr | 4 v/hr |
| Kingsbury Employees | 3 v/hr | 0 v/hr | 3 v/hr | 0 v/hr | 3 v/hr | 3 v/hr | 0 v/hr | 0 v/hr | 0 v/hr |
| Total (Net New) | 19 v/hr | 16 v/hr | 34 v/hr | 11 v/hr | 14 v/hr | 24 v/hr | 2 v/hr | 2 v/hr | 4 v/hr |
| Total Students | 146 v/hr | 148 v/hr | 294 v/hr | 97 v/hr | 95 v/hr | 191 v/hr | 39 v/hr | 39 v/hr | 78 v/hr |
| Total Employees | 20 v/hr | 0 v/hr | 20 v/hr | 0 v/hr | 3 v/hr | 3 v/hr | 0 v/hr | 13 v/hr | 13 v/hr |
| Total | 166 v/hr | 148 v/hr | 314 v/hr | 97 v/hr | 98 v/hr | 194 v/hr | 39 v/hr | 52 v/hr | 91 v/hr |

The ultimate condition will include the ultimate LAMB trip generation minus the existing Kingsbury trips. The trip generation, which will be applied in the total future condition, is shown on Table 6.

Table 6: Combined Ultimate Vehicular Trip Generation

| User Group | Net Ultimate Trip Generation | | | | | | | | |
|---------------------|------------------------------|-----------------|-----------------|---------------------|-----------------|-----------------|-----------------------|-----------------|-----------------|
| | AM Peak Hour | | | PM School Peak Hour | | | PM Commuter Peak Hour | | |
| | IB | OB | Total | IB | OB | Total | IB | OB | Total |
| LAMB Students | 242 v/hr | 252 v/hr | 495 v/hr | 163 v/hr | 156 v/hr | 319 v/hr | 67 v/hr | 67 v/hr | 134 v/hr |
| LAMB Employees | 53 v/hr | 0 v/hr | 53 v/hr | 0 v/hr | 1 v/hr | 1 v/hr | 0 v/hr | 39 v/hr | 39 v/hr |
| Total | 295 v/hr | 252 v/hr | 548 v/hr | 163 v/hr | 157 v/hr | 320 v/hr | 67 v/hr | 106 v/hr | 173 v/hr |
| Kingsbury Students | -25 v/hr | -25 v/hr | -50 v/hr | -17 v/hr | -17 v/hr | -34 v/hr | -3 v/hr | -3 v/hr | -6 v/hr |
| Kingsbury Employees | -23 v/hr | 0 v/hr | -23 v/hr | 0 v/hr | -25 v/hr | -25 v/hr | 0 v/hr | -3 v/hr | -3 v/hr |
| Total | -48 v/hr | -25 v/hr | -73 v/hr | -17 v/hr | -42 v/hr | -59 v/hr | -3 v/hr | -6 v/hr | -9 v/hr |
| Total Students | 217 v/hr | 227 v/hr | 445 v/hr | 146 v/hr | 139 v/hr | 285 v/hr | 64 v/hr | 64 v/hr | 128 v/hr |
| Total Employees | 30 v/hr | 0 v/hr | 30 v/hr | 0 v/hr | -24 v/hr | -24 v/hr | 0 v/hr | 36 v/hr | 36 v/hr |
| Total | 247 v/hr | 227 v/hr | 475 v/hr | 146 v/hr | 115 v/hr | 261 v/hr | 64 v/hr | 100 v/hr | 164 v/hr |



TRAFFIC OPERATIONS

This section provides a summary of an analysis of the existing and future roadway capacity surrounding the sites. Included is an analysis of potential vehicular impacts of the 5000 14th Street NW development and a discussion of potential mitigations.

The purpose of the capacity analysis is to:

- Determine the existing capacity of the study area roadways;
- Determine the overall impact of the proposed development on the study area roadways; and
- Discuss potential improvements and mitigation measures to accommodate the additional vehicular trips.

This analysis was accomplished by determining the traffic volumes and roadway capacity for existing conditions, background conditions, and future conditions.

The capacity analysis focuses on the weekday morning commuter peak hour, afternoon school peak hour, and afternoon commuter peak hour, as determined by the existing traffic volumes in the study area and the proposed land uses of the development.

The following conclusions are reached within this chapter:

- Under existing conditions the study area intersections generally operate under acceptable conditions with the exception of four intersections along 14th Street and 16th Street.
- Under background conditions, Emerson Street is converted from two-way operations to one-way westbound operations between 14th Street and 13th Street and one-way eastbound operations between 14th Street and 16th Street as a result of the 16th Street Heights Neighborhood Traffic Safety Study. This results in a significant increase in delay along Gallatin Street, which serves as the main primary east-west connection in replace of Emerson Street.
- As a result of 2020 Interim Future scenario, two intersections trigger the need to explore mitigations:
 - 16th Street & Gallatin Street, NW
 - 14th Street & Gallatin Street, NW

- As a result of 2025 Total Future scenario, two intersections trigger the need to explore mitigations:
 - 16th Street & Gallatin Street, NW
 - 14th Street & Gallatin Street, NW
- Mitigation measures were analyzed with the following mitigation measures being proffered for the both the 2020 Interim and 2025 Total Future scenarios of the development:
 - It was determined that the 14th Street & Gallatin Street intersection can be improved by traffic signal timing modifications by giving additional green time to the Gallatin Street approaches. This improves delay along Gallatin Street without detrimental impact to 14th Street operations.
 - Capacity concerns at the 16th Street & Gallatin Street intersection can be primarily attributed to the re-routing of east-west trips due to the change in traffic operations along Emerson Street to the south. Mitigation measures were explored at this intersection; however, this report ultimately proposes that DDOT continue to evaluate the operations of Gallatin Street as part of subsequent phases of the 16th Street Heights Neighborhood Traffic Safety Study.

STUDY AREA, SCOPE, & METHODOLOGY

This section outlines the vehicular trips generated in the study area along the vehicular access routes and defines the analysis assumptions.

The scope of the analysis contained within this report was coordinated with DDOT. The general methodology of the analysis follows national and DDOT guidelines on the preparation of transportation impact evaluations of site development.

Capacity Analysis Scenarios

The vehicular capacity analyses are performed to determine if the proposed development will lead to adverse impacts on traffic operations. (A review of impacts to each of the other modes is outlined later in this report.) This is accomplished by comparing future scenarios: (1) without the proposed development (referred to as the Background condition) and (2) with the development approved and constructed (referred to as the Future condition). Since there will be a period in which Kingsbury and LAMB will cohabitate the site, two background and two future analyses were performed in order to determine



appropriate mitigations for the interim and ultimate future scenarios.

Specifically, the roadway capacity analysis examined the following scenarios:

1. 2017 Existing Conditions
2. 2020 Future Conditions without the development (2020 Background Conditions)
3. 2020 Future Conditions with the Interim Conditions (2020 Interim Future Conditions)
4. 2025 Future Conditions with the Interim Conditions (2025 Background Conditions)
5. 2025 Future Conditions with the development (2025 Total Future Conditions)

As stated previously, the 2020 interim future condition represents the scenario in which both LAMB and Kingsbury occupy the space and the ultimate condition represents the scenario in which Kingsbury has fully vacated the property and LAMB operates at full capacity. This analysis will discuss the potential differences in mitigations, if any, for these two scenarios given the differing mode splits and vehicular trip generation.

Study Area

The study area of the analysis is a set of intersections where detailed capacity analyses were performed for the scenarios listed above. The set of intersections decided upon during the study scoping process with DDOT are those intersections most likely to have potential impacts or require changes to traffic operations to accommodate the proposed development. Although it is possible that impacts will occur outside of the study area, those impacts are not significant enough to be considered a detrimental impact nor worthy of mitigation measures.

Based on the projected future trip generation and the location of the site access points, the following intersections were chosen and agreed upon by DDOT for analysis:

1. 16th Street & Gallatin St, NW
2. Piney Branch Road & Gallatin St, NW
3. 14th Street & Gallatin St, NW
4. 16th Street & Farragut St, NW
5. Piney Branch Rd & Farragut St / SW School Dwy, NW
6. 14th Street & Farragut Street, NW

7. 16th Street & Emerson St, NW
8. Piney Branch Road & Emerson St, NW
9. 14th Street & Emerson St, NW
10. Piney Branch Road & NW School Driveway, NW
11. 14th Street & NE School Driveway, NW
12. 14th Street & SE School Driveway, NW

Figure 9 shows a map of the study area intersections.

Of note, based on scoping comments from DDOT, a supplementary analysis will be provided prior to the BZA hearing that includes the analysis of the four additional intersections. These intersections were unable to be included in this analysis as turning movement counts were not collected prior to the end of the school year.

- 16th Street & Decatur Street, NW
- 14th Street & Decatur Street, NW
- 16th Street & Colorado Street, NW
- 16th Street & Blagden Street, NW

Geometry and Operations Assumptions

The following section reviews the roadway geometry and operations assumptions made and the methodologies used in the roadway capacity analyses.

Existing Geometry and Operations Assumptions

The geometry and operations assumed in the existing conditions scenario are those present when the main data collection occurred. Gorove/Slade made observations and confirmed the existing lane configurations and traffic controls at the intersections within the study area. Existing signal timings and offsets were obtained from DDOT and confirmed during field reconnaissance.

The lane configurations and traffic controls for the Existing Conditions are shown on Figure 14.

2020 Background Geometry and Operations Assumptions

Following national and DDOT methodologies, a background improvement must meet the following criteria to be incorporated into the analysis:

- Be funded; and
- Have a construction completion date prior or close to the proposed development.

Based on these criteria, one background improvement was included in the 2020 Background conditions. The 16th Street



Table 7: Applied Annual and Total Growth Rates

| Road & Direction of Travel | Annual Growth: | | Total Growth: |
|-----------------------------|----------------|--------------|---------------|
| | 2017 to 2025 | 2017 to 2020 | 2017 to 2025 |
| 16th Street NW – Northbound | 0.50% | 1.51% | 4.07% |
| 16th Street NW – Southbound | 0.50% | 1.51% | 4.07% |

Heights Neighborhood Traffic Safety Study proposed operational changes along Emerson Street. As part of the study Emerson Street was converted to one-way westbound operations between 14th Street and 16th Street and one-way eastbound operations between 14th Street and 13th Street. Traffic data for this report was collected prior to the operational changes along Emerson Street. The lane configurations and traffic controls for the 2020 Background conditions are shown on Figure 15.

2020 Interim Future, 2025 Background, and 2025 Total Future Geometry and Operations Assumptions

The configurations and traffic controls for the 2020 Interim Future conditions, 2025 Background conditions, and 2025 Total Future conditions are based on those for the 2020 Background conditions.

The lane configurations and traffic controls for the 2020 Interim Future Conditions, 2025 Background, and 2025 Total Future Conditions are shown on Figure 15.

Traffic Volume Assumptions

The following section reviews the traffic volume assumptions and methodologies used in the roadway capacity analyses.

Existing Traffic Volumes

The existing traffic volumes are comprised of turning movement count data, which was collected on Tuesday, June 6, 2017 between the hours of 6:30 and 9:30 in the morning and 2:00 and 7:00 in the afternoon/evening (in order to obtain the afternoon school peak and the afternoon commuter peak periods). The results of the traffic counts are included in the Technical Attachments. The existing peak hour traffic volumes are shown Figure 10. For all intersections, the individual morning, afternoon school and afternoon commuter peak hours were used.

2020 Background Traffic Volumes without the project (2020 Background)

The traffic projections for the 2020 Background conditions consist of the existing volumes with two additions:

- Traffic generated by developments expected to be completed prior to 2020 (known as background developments); and
- Inherent growth on the roadway (representing regional traffic growth).

Following national and DDOT methodologies, a background development must meet the following criteria to be incorporated into the analysis:

- Be located in the study area, defined as having an origin or destination point within the cluster of study area intersections;
- Have entitlements; and
- Have a construction completion date prior or close to the proposed development.

Based on these criteria, and as discussed previously, no developments were included in the 2020 Background scenario.

While the background developments represent local traffic changes, regional traffic growth is typically accounted for using growth rates. The growth rates used in this analysis are derived using the Metropolitan Washington Council of Government’s (MWCOG) currently adopted regional transportation model, comparing the difference between the year 2017 and 2025 model scenarios. The growth rates observed in this model served as a basis for analysis assumptions, and where negative growth was observed, a conservative 0.25 percent annual growth rate was applied to the roadway. A 0.5 percent annual growth rate was applied along 16th Street for both travel directions. The applied growth rates are shown in Table 7. Additionally, a 0.25 percent per year growth rate was applied to through traffic along all other study area roadways that were not included in the MWCOG regional transportation model.

The traffic volumes generated by the inherent growth along the network were added to the existing traffic volumes in order to establish the 2020 Background traffic volumes. The traffic volumes for the 2020 Background conditions are shown on Figure 11.



*2020 Interim Future Traffic Volumes with the project
(2020 Interim Future)*

The 2020 Interim Future traffic volumes consist of the 2020 Background volumes with the addition of the traffic volumes generated by the cohabitation of the site by the Kingsbury and LAMB schools during an interim period (Interim Condition site-generated trips). Thus, the 2020 Future traffic volumes include traffic generated by: the existing volumes, the inherent growth on the study area roadways, and Interim Condition site-generated trips of the proposed project.

Trip distribution for the interim site-generated trips for students and employees was determined based on zip code/address data provided by the schools. It was found that the overall distribution of students across the region was very similar for both the Kingsbury and LAMB schools, therefore we are proposing to use the same trip distribution for both Kingsbury and LAMB students. Zip code data for employees was only available for LAMB, therefore the employee trip distribution was based on the data supplied and assumed to be similar for Kingsbury employees. Inbound and outbound trip distribution is shown on Figure 12 and Figure 13, respectively.

The traffic volumes for the 2020 Interim Future conditions were calculated by adding the Interim Condition site-generated traffic volumes for the project to the 2020 Background traffic volumes. Thus, the Interim Future condition with the proposed development scenario includes traffic generated by: existing volumes, inherent growth on the network, and the interim scenario of the proposed development. The interim site-generated traffic volumes are shown on Figure 16 and the 2020 Interim Future traffic volumes are shown on Figure 17.

*2025 Background Traffic Volumes with Interim Conditions
(2025 Background)*

The traffic projections for the 2025 Background conditions consist of the existing volumes with three additions:

- Traffic generated by developments expected to be completed prior to 2025 (known as background developments);
- Traffic generated by the co-occupancy of the site by the Kingsbury and LAMB schools; and
- Inherent growth on the roadway (representing regional traffic growth).

Consistent with the 2020 Background conditions, no developments were included in the 2025 Background scenario and the same background growth rates were used.

The traffic volumes generated by interim site-generated traffic volumes, and the inherent growth along the network were added to the existing traffic volumes in order to establish the 2025 Background traffic volumes. The traffic volumes for the 2025 Background conditions are shown on Figure 18.

*2025 Total Future Traffic Volumes with development
(2025 Total Future)*

The 2025 Total Future traffic volumes consist of the 2025 Background volumes and ultimate condition site-generated volumes after Kingsbury has fully vacated the property and the building is fully occupied by LAMB. Thus, the 2025 Future traffic volumes include traffic generated by: the existing volumes, the inherent growth on the study area roadways, and site-generated volumes after Kingsbury has fully vacated the property and the building is fully occupied by LAMB.

Trip distribution for the total future site-generated trips for students and employees was determined based on zip code/address data provided by the schools. It was found that the overall distribution of students across the region was very similar for both the Kingsbury and LAMB schools, therefore we are proposing to use the same trip distribution for both Kingsbury and LAMB students. Zip code data for employees was only available for LAMB, therefore the employee trip distribution was based on the data supplied and assumed to be similar for Kingsbury employees.

The traffic volumes for the 2025 Total Future conditions were calculated by adding the Ultimate Condition site-generated traffic volumes for the project to the 2025 Background traffic volumes. Thus, the Total Future condition with the proposed development scenario includes traffic generated by: existing volumes, background developments through the year 2025, inherent growth on the network, and the ultimate scenario of the proposed development. The ultimate site-generated traffic volumes are shown on Figure 19 and the 2025 Total Future traffic volumes are shown on Figure 20.

VEHICULAR ANALYSIS RESULTS

Intersection Capacity Analysis

Intersection capacity analyses were performed for the four scenarios outlined previously at the intersections contained



within the study area during the morning commuter, afternoon school peak, and afternoon commuter peak hours. Synchro version 9.1 was used to analyze the study intersections based on the *Highway Capacity Manual* (HCM) 2000 methodology.

The results of the capacity analyses are expressed in level of service (LOS) and delay (seconds per vehicle) for each approach. A LOS grade is a letter grade based on the average delay (in seconds) experienced by motorists traveling through an intersection. LOS results range from “A” being the best to “F” being the worst. LOS D is typically used as the acceptable LOS threshold in the District; although LOS E or F is sometimes accepted in urbanized areas if vehicular improvements would be a detriment to safety or non-auto modes of transportation.

The LOS capacity analyses were based on: (1) the peak hour traffic volumes; (2) the lane use and traffic controls; and (3) the Highway Capacity Manual (HCM) methodologies (using *Synchro* software). The average delay of each approach and LOS is shown for the signalized intersections in addition to the overall average delay and intersection LOS grade. The HCM does not give guidelines for calculating the average delay for a two-way stop-controlled intersection, as the approaches without stop signs would technically have no delay. Detailed LOS descriptions and the analysis worksheets are contained in the Technical Attachments.

Table 8 shows the results of the capacity analyses, including LOS and average delay per vehicle (in seconds) for the five study scenarios. The capacity analysis results are shown on Figure 21 for the morning peak hour, Figure 22 for the afternoon school peak hour, and Figure 23 for the afternoon commuter peak hour.

The study intersections generally operate at acceptable conditions during the morning, afternoon school and afternoon commuter peak hours for the all study scenarios. However, three intersections have at least one approach operate under unacceptable conditions during at least one study scenario and during at least one of the peak hours:

- 16th Street & Gallatin Street NW
During the morning, afternoon school, and afternoon commuter peak periods, the westbound approach of Gallatin Street operates at unacceptable levels during all study scenarios. This can be attributed to due to the re-routing of east-west trips due to the change in traffic operations along Emerson Street to the south. At the

intersection, the Gallatin Street approach is stop-controlled while 16th Street is free-flowing along both approaches. The delay is increased with the addition of school-related site-generated traffic.

- 14th Street & Gallatin Street NW
During the morning and afternoon school peak periods, the eastbound and westbound approach of Gallatin Street operates at unacceptable levels during all study scenarios. During the afternoon commuter peak period, the eastbound approach of Gallatin Street operates at unacceptable levels during the 2020 Interim, 2025 Background, and 2025 Ultimate Future scenarios. This can be attributed to the re-routing of east-west trips due to the change in traffic operations along Emerson Street to the south. This intersection is controlled by a traffic signal and the delay is increased with the addition of school-related site-generated traffic as through traffic and turning vehicles share a single lane on both approaches.
- 16th Street & Emerson Street NW
During the afternoon commuter peak period, the westbound approach of Emerson Street operates at unacceptable levels during all study scenarios. This can primarily be attributed to the stop-controlled operation of this intersection in which 16th Street traffic is free-flowing. Delay is minimally increased as a result of background growth and school-related traffic.

Queuing Analysis

In addition to the capacity analyses presented above, a queuing analysis was performed at the study intersections. The queuing analysis was performed using Synchro software. The 50th percentile and 95th percentile queue lengths are shown for each lane group at the study area signalized intersections. The 50th percentile queue is the maximum back of queue on a median cycle. The 95th percentile queue is the maximum back of queue that is exceeded 5% of the time. For unsignalized intersection, only the 95th percentile queue is reported for each lane group (including free-flowing left turns and stop-controlled movements) based on the HCM 2000 calculations. HCM 2000 does not calculate queuing for all-way stops.

Table 9 shows the queuing results for the study area intersections. Several of the study intersections have one or more lanes group that exceed the given storage length during



at least one peak hour in all of the study scenarios. These intersections are as follows:

- 16th Street & Gallatin Street NW
- 14th Street & Gallatin Street NW

MITIGATIONS AND IMPROVEMENTS

Based on DDOT standards, the proposed development is considered to have an impact at an intersection within the study area if any of the following conditions are met:

- The capacity analyses show a LOS E or F at an intersection or along an approach where one does not exist in the existing or background conditions;
- There is an increase in delay at any approach or overall intersection operating under LOS E or F of greater than 5 seconds when compared to the background scenario; or
- There is an increase in the 95th percentile queues by more than 150 feet at an intersection or along an approach in the future conditions with the proposed development where one does not exist in the background scenario.

Following these guidelines, there are impacts to two intersections as a result of 2020 Interim Future scenario. The same two intersections are considered to have impacts as a result of the 2025 Total Future (Ultimate) scenario. Mitigation measures were tested at these intersections, with results shown on Table 10, queuing results for the mitigation measures shown on Table 11, and detailed Synchro reports included in the Appendix. The following conclusions were made:

- 16th Street & Gallatin Street NW
The westbound approach of Gallatin Street is shown to operate under LOS E or F during the morning peak period for all study scenarios. The delay observed under the 2020 Interim scenario and 2025 Ultimate scenario increases by more than 5 seconds when compared to the 2020 and 2025 Background scenarios, respectively. Therefore, mitigation measures were evaluated.

Under existing conditions, Gallatin Street is stop-controlled and 16th Street is free-flowing. The primary factor for LOS F along the minor approach of Gallatin Street is the re-routing of east-west traffic along this roadway due to the change in the traffic operations along Emerson Street to the south. As a part of the 16th Street Heights Neighborhood Traffic Safety Study, Emerson Street NW

was converted to one-way operations, directed away from 14th Street NW. Gallatin Street parallels Emerson Street between 16th Street and New Hampshire Avenue to the north, providing an alternate continuous east-west route. While the significant increase in delay along Gallatin Street can be attributed to the conversion of Emerson Street to one-way operations, site-generated traffic increases the delay along Gallatin Street by more than 5 seconds when compared to the Background scenario.

Multiple mitigation measures were evaluated to determine if simple improvements could be made to the intersection. Given the existing lane configurations and narrow roadway width of Gallatin Street, changes to the geometry and re-marking of the roadway to separate left and right turning vehicles is not feasible. Changes to 16th Street would also have little impact as the vast majority of traffic is traveling northbound and southbound through the intersection.

Signal warrants were also performed based on the projected intersection volumes, but the warrant was not met despite the increase in the projected volume along Gallatin Street.

Finally, as stated previously, the primary issue at this intersection is the re-routing of east-west traffic to Gallatin Street due to the operational changes along Emerson Street. As such, this report proposes that DDOT continue to evaluate the operations of Gallatin Street in conjunction with the one-way conversion of Emerson Street in subsequent phases of the 16th Street Heights Neighborhood Traffic Safety Study. Although this analysis rerouted existing Emerson Street trips in a logical manner, it is possible that the operational change along Emerson Street diverted traffic to a greater extent than this analysis projected.

- 14th Street & Gallatin Street NW
The westbound approach of Gallatin Street is shown to operate under LOS E or F during the morning peak period for all study scenarios. The delay observed under the 2020 Interim scenario and 2025 Ultimate scenario increases by more than 5 seconds when compared to the 2020 and 2025 Background scenarios, respectively. Therefore, mitigation measures were evaluated.

Under existing conditions, the 14th Street and Gallatin Street intersection is controlled by a traffic signal. Similar



to the delay along the westbound approach of Gallatin Street at 16th Street, the primary factor for LOS F along the minor approach of Gallatin Street at 14th Street is the re-routing of east-west traffic along this roadway. This is due to the change in the traffic operations along Emerson Street to the south.

While the significant increase in delay along Gallatin Street can be attributed to the conversion of Emerson Street to one-way operations, site-generated traffic increases the delay along Gallatin Street by more than 5 seconds when compared to the Background scenario.

It was determined that this intersection can be improved by traffic signal timing modifications by giving additional

green time to the Gallatin Street approaches. This mitigation measure would decrease the delay to near which was observed under Existing Conditions.

This report recommends that DDOT review and comment on this change. If DDOT were to explore this idea further, this report recommends that the Applicant support their efforts and coordinate on a possible implementation.

The proposed signal timing plans for this intersection can be found in the Technical Attachments.

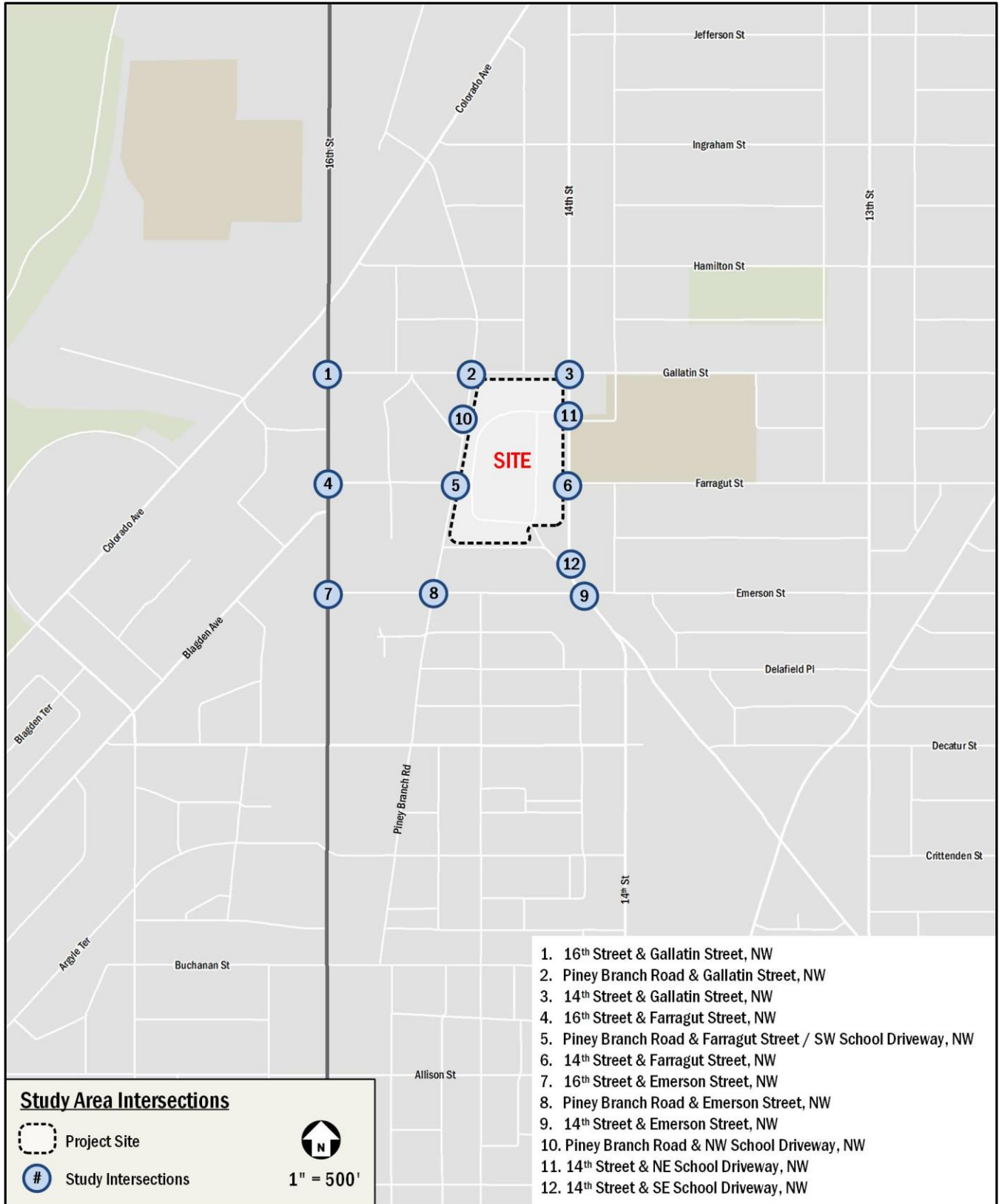


Figure 9: Study Area Intersections

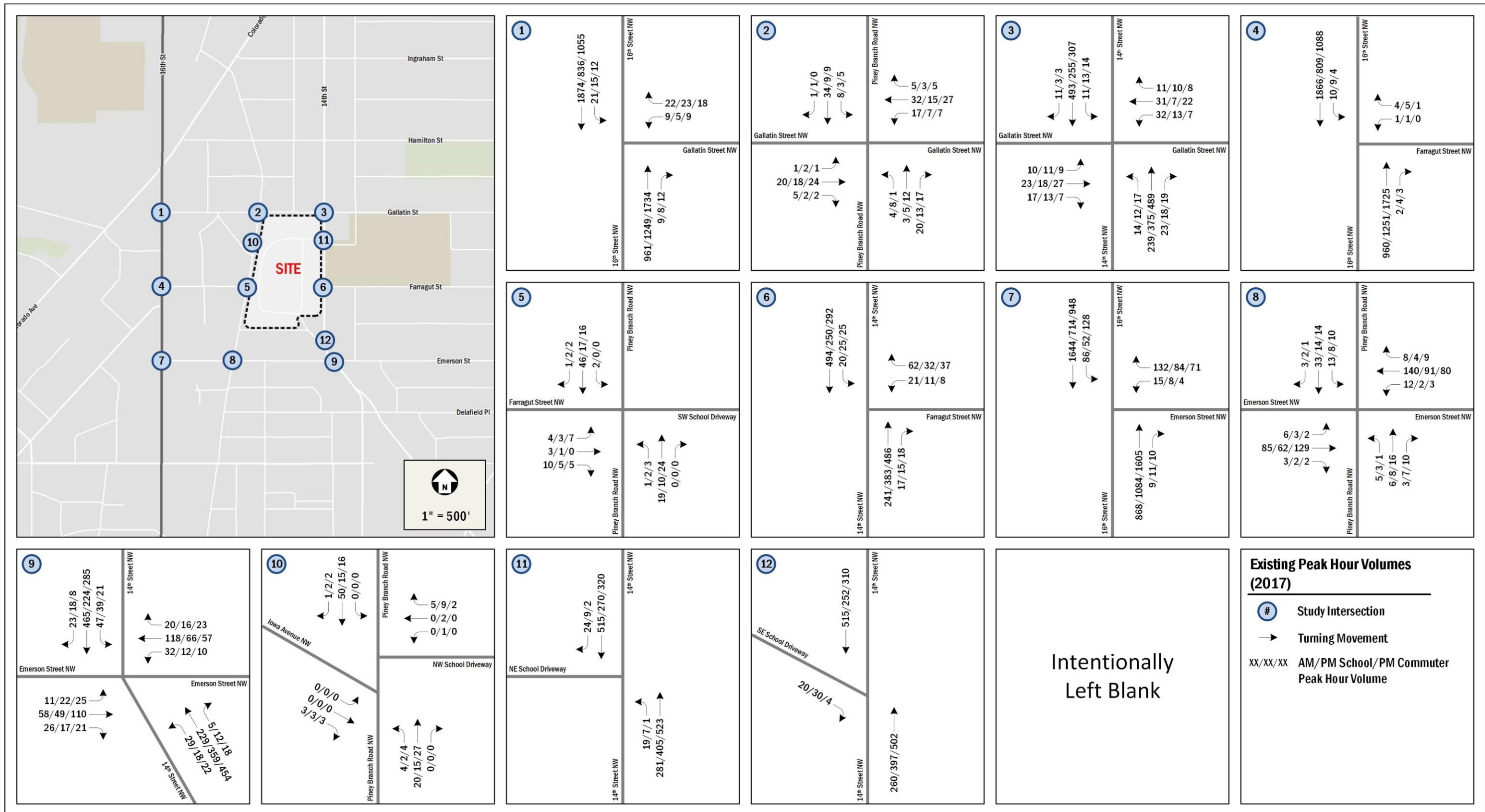


Figure 10: Existing Peak Hour Traffic Volumes (2017)

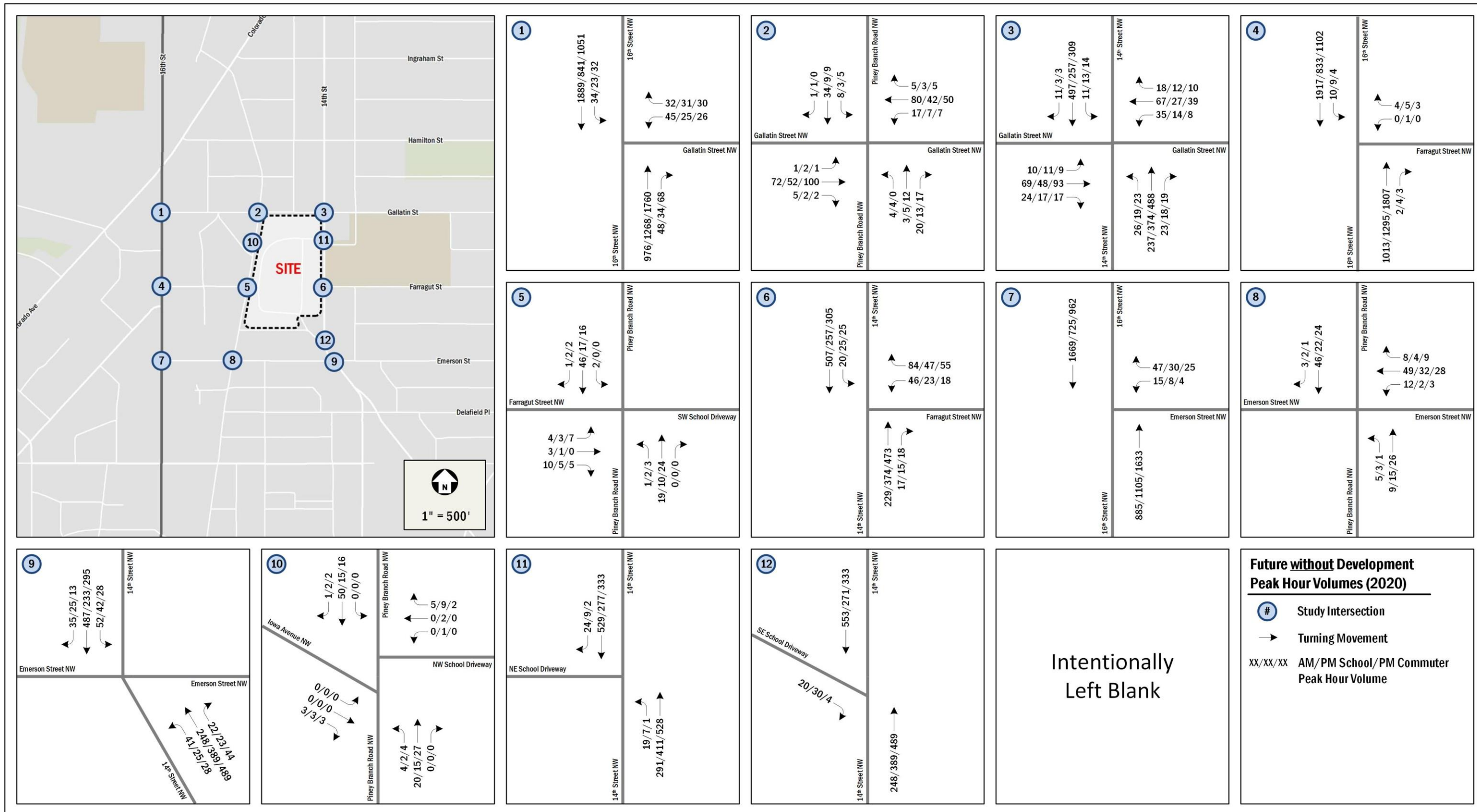


Figure 11: Background Peak Hour Traffic Volumes (2020)