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January 7, 2016

VIA IZIS

Chairperson Marnique Heath
D.C. Board of Zoning Adjustment
441 4th Street NW, Suite 210S
Washington, DC 20001

Re: BZA Case No. 19133 – Applicant's Post-Hearing Submission

Dear Chairperson Heath and Members of the Board:

The enclosed materials are those for which the Board left the record open following the public hearing in this case. This case is scheduled for a decision on January 12, 2016.

1. **Revised Site Plan for Widened Alley**

As described at the public hearing, the Applicant agreed to devote some of the south side of the subject property for alley use to effectively widen the alley and mitigate potential alley congestion near the site. The attached site plan in Exhibit A shows six (6) feet of the subject property to the west and three (3) feet of the subject property to the east devoted to alley use.

2. **"Matter-of-Right" Option**

Board Member Hill requested that the Applicant show what matter-of-right options it considered. The Applicant seriously explored only one matter-of-right option, which involved removing building footprint from the rear (south) of the building. Because of the historic and urban design issues with removing footprint from the 18th or Church Street sides of the building, the Applicant never explored these options in any meaningful way.

The diagrams attached in Exhibit B describe in detail the myriad practical difficulties with building design and functioning that would result from removing footprint from the rear of the building. As the diagrams demonstrate, a conforming lot occupancy would impose a substantial burden on the Applicant.

**3. Comprehensive Transportation Review (CTR) Statement**

Although traffic and loading considerations are not germane to the requested lot occupancy variance – as the Board acknowledged at the public hearing – the Applicant agreed to submit it to the record. The Applicant prepared the CTR only as a courtesy to the neighbors and the ANC, who requested it. Despite its lack of relevance, the CTR demonstrates that the project is not expected to adversely impact nearby traffic conditions. The CTR also recommends widening the alley – despite finding that alley traffic is low – to minimize the potential for alley congestion. As described above, the Applicant agreed to widen the alley as well as implement a loading management plan and transportation demand management plan. The CTR is attached in Exhibit C.

**4. Memorandum of Understanding (MOU)**

Although the Applicant and the ANC were unable to agree on an MOU, the Applicant is willing to unilaterally commit to some of the provisions in the proposed MOU. The Applicant seeks to be a good neighbor, so the Applicant will agree to the following conditions:

1. Prior to the issuance of a building permit, the Applicant will engage the services of a professional arborist to conduct an assessment of all existing street trees fronting the property and provide applicable management and preservation measures during construction. If trees are deemed to need replacement by the arborist, the Applicant will consult with the appropriate neighborhood groups including Dupont Circle Historic Main Streets and the Dupont Circle Conservancy for recommended options.

2. Prior to the issuance of a building permit, the Applicant will provide to ANC 2B the Traffic Control and Staging Plan prior to seeking final approval of such plan from DDOT for public comment.

3. Prior to the issuance of a building permit, the Applicant will designate a construction "point person" and will provide their name, email, and cell phone number to ANC 2B to disseminate to the neighbors within 200 feet. This person will be available during work hours and after hours throughout demolition, environmental remediation, and construction to respond to concerns as they relate to the Project.

4. When the parking garage in the Project becomes operational, excess parking may be offered for rent or sale to members of the broader community at the discretion of the Church and the residential building.

**5. Draft Findings of Fact and Conclusions of Law**

The Applicant's draft Findings of Fact and Conclusions of Law is filed as separate exhibit in the record.

Should you or your staff have any questions, please do not hesitate to contact us.

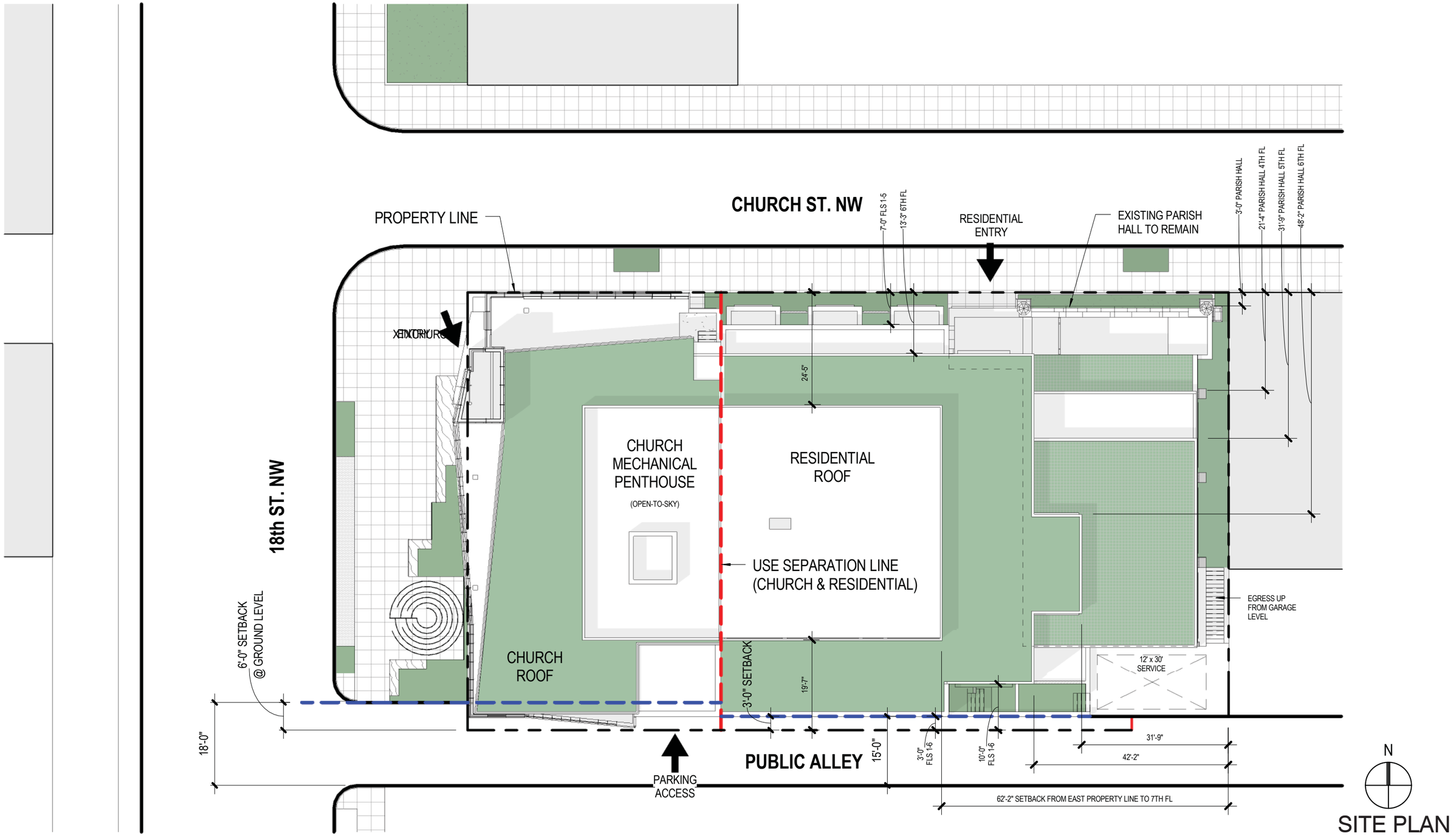
Sincerely,

Allison Prince

Cary Kadlecek

Attachments
gsdocs\8667372.1

# EXHIBIT A




# SITE PLAN

**ST. THOMAS' PARISH EPISCOPAL CHURCH / 1772 CHURCH ST. NW**

*2016-01-07*

ST. THOMAS' PARISH
EPISCOPAL CHURCH • DUPONT CIRCLE

CASRiegler
VALUE | URBAN | CHARACTER

Scale

A1.01

Hickok Cole ARCHITECTS

# EXHIBIT B

# 1772 CHURCH STREET NW

## BOARD OF ZONING ADJUSTMENT - ADDITIONAL EXHIBITS

## JANUARY 07TH, 2016

**PROJECT TEAM:**


**OWNER:** CAS RIEGLER
1010 WISCONSIN AVE. NW
WASHINGTON, DC 20001
(202) 215-6588

ST. THOMAS' PARISH EPISCOPAL CHURCH
1772 CHURCH ST, NW
WASHINGTON, DC 20036
(202) 332-0607

**ARCHITECT:** HICKOK COLE ARCHITECTS
1023 31ST STREET, NW
WASHINGTON, DC 20007
(202) 667-9776

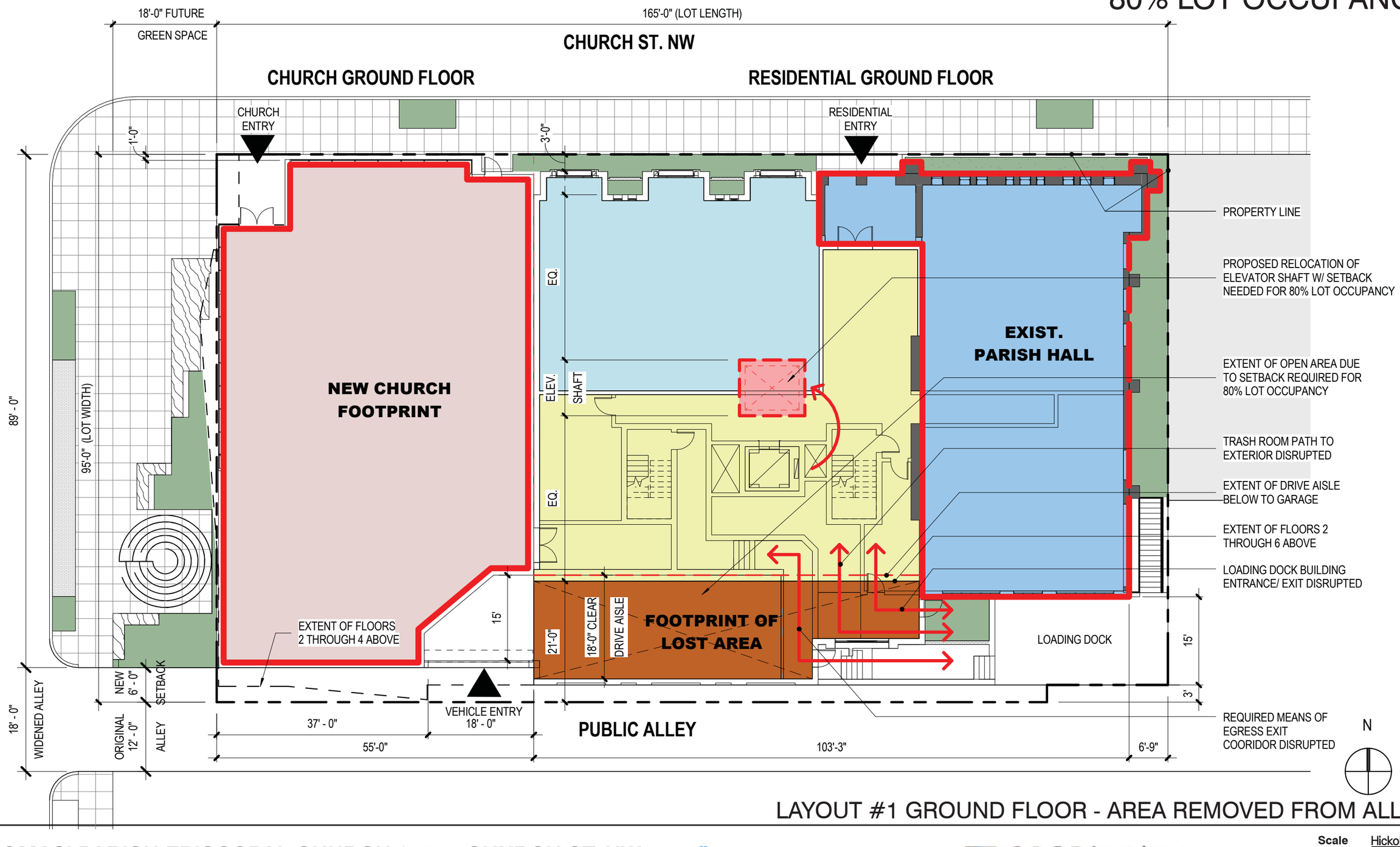


ST. THOMAS' PARISH
EPISCOPAL CHURCH • DUPONT CIRCLE

CASRiegler
VALUE | URBAN | CHARACTER

Hickok Cole
ARCHITECTS

# 80% LOT OCCUPANCY




## LAYOUT #1 GROUND FLOOR - AREA REMOVED FROM ALLEY

**ST. THOMAS' PARISH EPISCOPAL CHURCH / 1772 CHURCH ST. NW**

*2016-01-07*

ST. THOMAS' PARISH
EPISCOPAL CHURCH • DUPONT CIRCLE

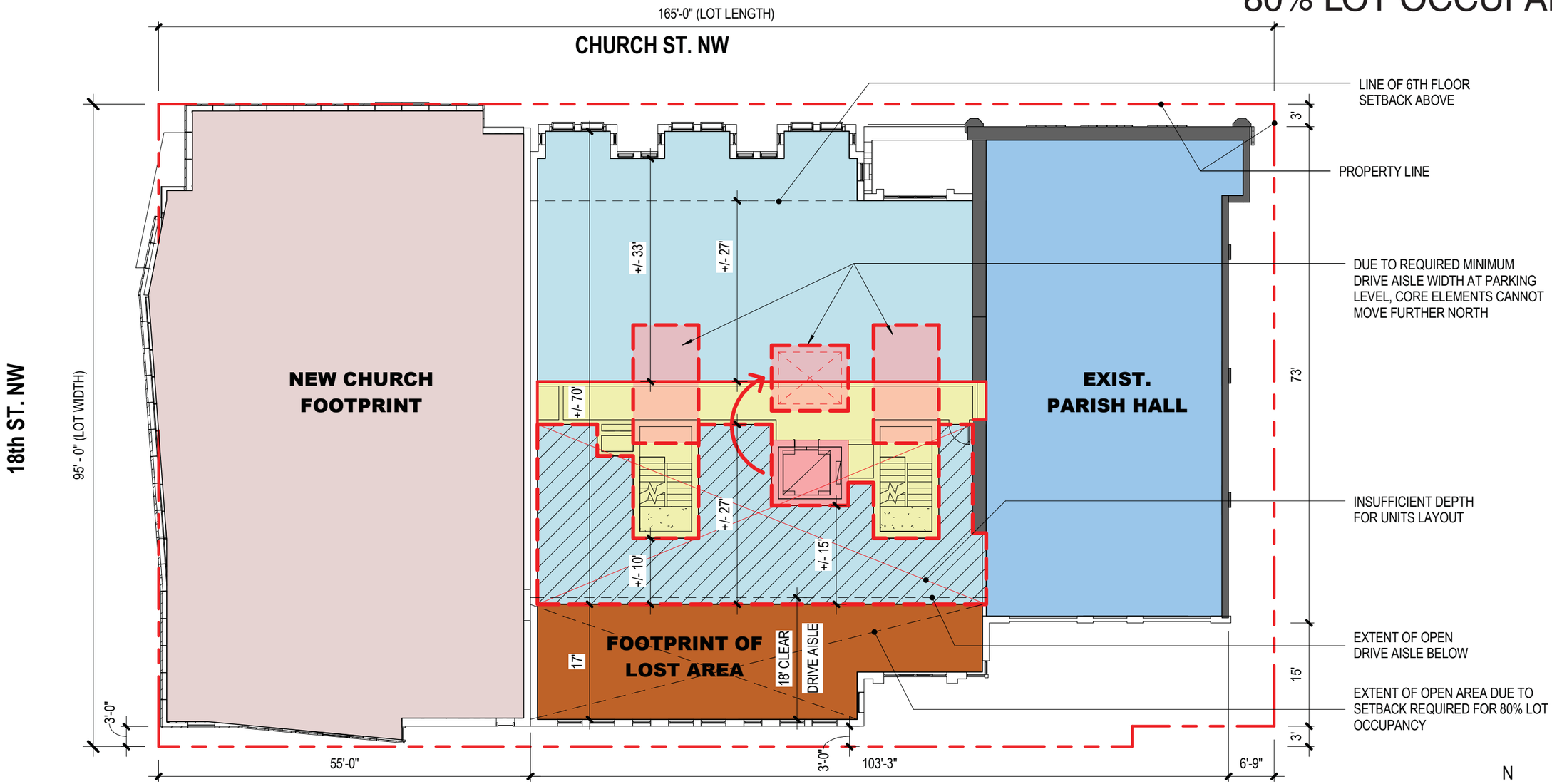
CAS Riegler
VALUE | URBAN | CHARACTER

**Scale**
1/16" = 1'

A1.02

Hickok Cole
ARCHITECTS

# 80% LOT OCCUPANCY




| FLOOR: | HPRB #4 / BZA DESIGN: EFFICIENCY % | 80% LOT OCCUPANCY: EFFICIENCY % | EFF. % LOSS: |
|---|---|---|---|
| G | 56.0% | 51.7% | *4.3%* |
| 2 | 88.6% | 86.9% | *1.7%* |
| 3 | 89.1% | 87.3% | *1.8%* |
| 4 | 88.0% | 86.1% | *1.9%* |
| 5 | 88.0% | 85.9% | *2.1%* |
| 6 | 79.3% | 74.3% | *5.0%* |
| 7 | 87.6% | 87.6% | *0.0%* |
| **TOTAL:** | **81.6%** | **78.7%** | *3.0%* |

## LAYOUT #1 TYPICAL FLOOR - AREA REMOVED FROM ALLEY

**ST. THOMAS' PARISH EPISCOPAL CHURCH / 1772 CHURCH ST. NW**

*2016-01-07*

ST. THOMAS' PARISH
EPISCOPAL CHURCH • DUPONT CIRCLE

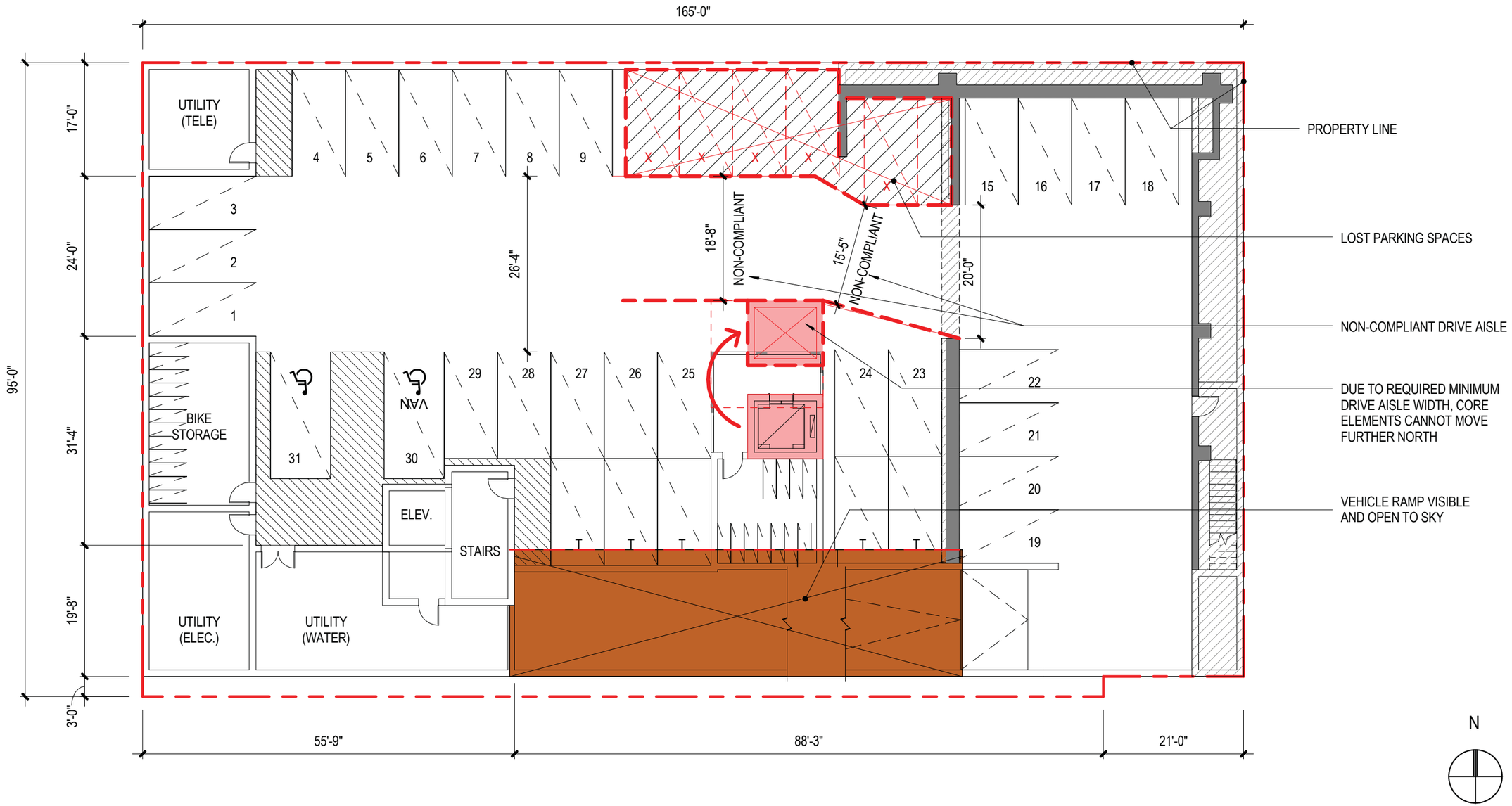
CASRiegler
VALUE | URBAN | CHARACTER

Scale
1/16" = 1'

A1.03

Hickok Cole
ARCHITECTS

# 80% LOT OCCUPANCY




## LAYOUT #1 PARKING PLAN - AREA REMOVED FROM ALLEY

**ST. THOMAS' PARISH EPISCOPAL CHURCH / 1772 CHURCH ST. NW**

*2016-01-07*

ST. THOMAS' PARISH
EPISCOPAL CHURCH • DUPONT CIRCLE

CASRiegler
VALUE | URBAN | CHARACTER

**Scale**
1/16" = 1'

A1.04

Hickok Cole ARCHITECTS

# EXHIBIT C

GOROVE / SLADE

1140 Connecticut Avenue NW
Suite 600
Washington, DC 20036
202.296.8625

# TECHNICAL MEMORANDUM

| | | |
|---|---|---|
| To: | Nick Jessee | CAS Riegler |
| | Robin Bettarel | CAS Riegler |
| From: | Peter D. Kauffmann, PE | |
| | Robert B Schiesel, PE | |
| | Daniel B. VanPelt, PE, PTOE | |
| Date: | December 2, 2015 | |
| Subject: | 1772 Church Street NW – Washington, DC | |
| | Comprehensive Transportation Review (CTR) Statement | |

## OVERVIEW

This memorandum presents the findings of a transportation assessment conducted for 1772 Church Street, NW in the Dupont Circle neighborhood of Washington, DC. This document was prepared in support of the project's Board of Zoning Adjustment (BZA) case, number 19133, which requests a variance from lot occupancy requirements "to allow the construction of an addition for a church and a residential building", and adheres to the standards and guidelines set forth by the District Department of Transportation (DDOT) for comprehensive transportation reviews (CTRs).

The 1772 Church Street project would construct an addition to the St. Thomas' Parish Episcopal Church, located in a vacant portion of the church's property at the corner of 18th and Church Streets, and would also renovate the existing Parish Hall building. The site location is shown in Figure 1, with an annotated site plan included as Figure 2, both below. The completed structure would house 19,515 square feet of worship space for St. Thomas, an expansion over their current confined quarters within the Parish Hall, along with 56 residential dwelling units. Both uses would be considered a part of one building for zoning purposes but would function largely independently, having separate street-level entrances and a shared 36-space below-grade parking garage.

The purpose of this memorandum is to:

- **Provide a summary of the proposed development program**, including existing site conditions, details on the proposed redevelopment plans, and projected future site trip generation.
- **Review the major transportation elements of the site plan**, namely the project's pedestrian and bicycle access locations and supporting infrastructure; parking accommodations, including garage access, curbside management, and **proposed alley access enhancements** to minimize the potential for conflicts and blockages in the public alley to the south of the site; and loading facilities, including a discussion of projected loading demand and truck access routes and maneuvers. This section of the report also discusses **transportation demand management measures** included in the project in addition to presenting the components of a **proposed loading management plan** to minimize impacts of residential and church loading activity.

- **Evaluate the impacts of site-generated vehicle trips on the surrounding roadway network** through a study of vehicle delay, queuing, and intersection safety at four intersections around the site.
- **Present the findings of a study of alley operations** around the future garage access point in the public alley directly south of the site. The alley operation study examines existing activity patterns within the alley to identify operational concerns stemming from issues such as two-way vehicle encounters and loading blockages and identifies strategies and site plan adjustments that could minimize the site's impact on alley traffic.

Major findings of the CTR include:

- The project's projected vehicle trip generation is low, comprising between 1-2% of forecasted future weekday traffic volumes on 17th and 18th Streets, increasing to approximately 6.6% of volumes on Sundays, and will not have an appreciable impact on traffic flow in the surrounding neighborhood. Accounting for the impacts of temporary construction zones near the intersection of 18th and P Streets, all intersection approaches operate at generally favorable levels today and **the proposed development is not projected to increase vehicle delay or queuing to unacceptable levels at any study area intersections**. As a result, **the project will not have a detrimental impact on neighborhood traffic and no intersection mitigation measures are necessary**.
- The project's garage will increase the level of activity in the public alley to the south of the site, particularly between the garage entrance and 18th Street. During the busiest period of combined church and residential garage traffic, namely the Sunday peak hour, the redeveloped site would generate approximately 60 trips, 21 of which would be using the garage. During these times, site garage trips would comprise approximately half of the 40 vehicles using the alley. A study of alley activity conducted in support of this report found that **existing alley traffic is low and the incidence of two-way vehicle encounters and truck blockages is minimal**. While the net increase in trips using the alley is also low, the fact that the site-generated trips will comprise a substantial percentage of future alley traffic does warrant some modifications to the proposed site plan to improve alley conditions for tenants and neighbors in the future. To this end, **this study recommends that the alley be expanded into private space by 3-6' to establish an effective width of 15-18' for the length of the site**, which will allow vehicles to pass each other in the portion of the alley adjacent to the site. **This study also recommends several elements of a loading management plan** that would reduce the impacts of site loading activity on alley operations on neighboring homes.

## DEVELOPMENT PROGRAM SUMMARY

This section provides a review of existing conditions at St. Thomas' Parish Episcopal Church and presents a summary of the redevelopment proposal laid out in the 1772 Church Street NW BZA application. The proposed development program is then used to develop the projected future site trip generation for all travel modes, which serves as the basis for the CTR that follows.

### *Existing Conditions*

The project site is located at the corner of Church and 18th Streets, NW, in the Dupont Circle neighborhood of DC. The site location is shown in Figure 1. The site is currently home to St. Thomas' Parish, an Episcopal church in operation on this site since 1899. The main portion of the church was destroyed by arson in 1970. Since then the church has been operating out of the former Parish Hall on the eastern section of the site, with the remainder of the parcel where the sanctuary formerly stood remaining open.

### *Proposed Redevelopment*

This project would create an addition to the Parish Hall in this open space, consisting of a new sanctuary and associated church space facing 18th Street as well as a separate residential component accessed from Church Street. The existing Parish Hall would be renovated to contain residential units and would function as a portion of the residential side of the finished building. The church and apartment buildings would function largely independently, but the two uses will be connected and will be considered one building for zoning purposes. See Figure 2 for an annotated site plan.

When completed, the building will include:

- 19,515 square feet of church uses in four stories (approximately 61' height), including a sanctuary holding approximately 167 seats, church function rooms and offices, classrooms, and a community meeting and gathering space
- 56 residential units in seven stories (70' height), the configuration of which is to be determined (this study will assume apartments, ITE land use code 220)
- 36 parking spaces on one below-grade level, accessed from the alley on the south side of the parcel. 31 of these would be direct-access spaces as required by zoning, with an additional 5 tandem spaces also provided. Per the Zoning Regulations, 17 spaces would be allocated to church use with the remainder going to the residential component.
- One 30' loading berth accessed from the alley

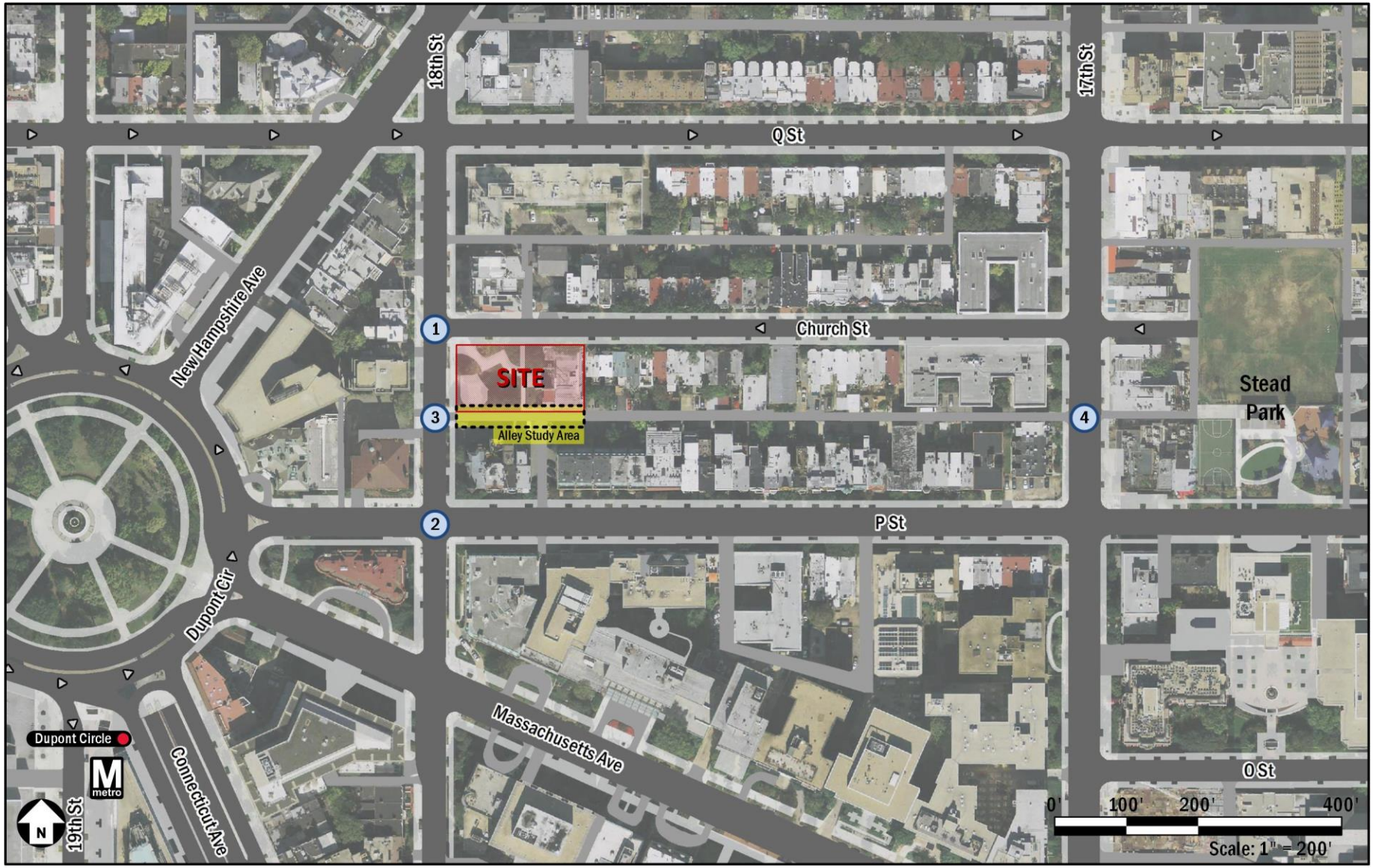



**Figure 1: Site Location, Study Intersections, and Alley Study Area**

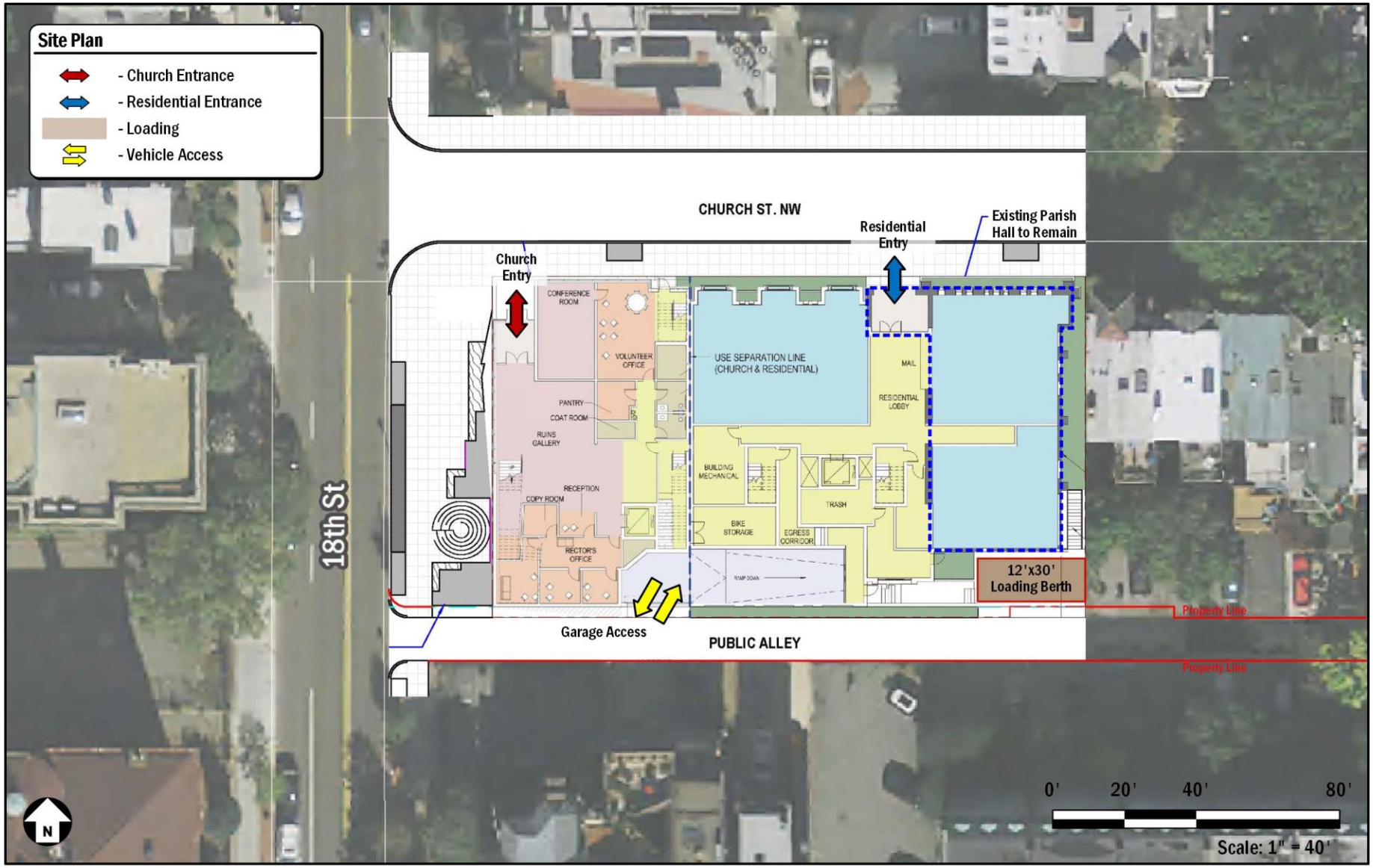



**Figure 2: Annotated Site Plan**

## *Projected Site Trip Generation*

The development program presented in the project's BZA application, presented above, can be used to project the amount of trips that the completed development will generate. DDOT's Comprehensive Transportation Review (CTR) standards require that trip generation for all travel modes must be calculated and specify certain trip generation thresholds that trigger further analysis steps in the CTR.

This section presents a summary of the site's expected mode split and projected multimodal trip generation, with further details and justification included in Technical Attachment A. Per DDOT's CTR standards, the project's development program and trip generation only meet the threshholds for further vehicle analysis and do not require a review of off-site pedestrian, bicycle, or transit infrastructure or services. More detail about CTR triggers is included in Technical Attachment A. The further vehicle analysis steps prescribed in the CTR standards are analyzed in the subsequent "Vehicular Traffic Impacts" section.

### *Mode Split*

Future site trip generation is typically calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) *Trip Generation, 9th Edition*. Since the Dupont Circle neighborhood, and in fact the District as a whole, are characterized by the availability of multiple non-auto travel options, DDOT's CTR standards call for trip generation forecasts to be adjustments to account for the expected travel mode split at the site in question since *Trip Generation* provides data for suburban sites with low transit use.

Expected mode splits are determined using a combination of studies from local organizations like the Washington Metropolitan Area Transit Authority (WMATA) and the Metropolitan Washington Council of Governments (MWCOG) as well as US Census Bureau data. Raw data from these organizations is shown in Technical Attachment A, with the resulting mode split assumptions summarized in Table 1.

**Table 1: Summary of Travel Mode Split by Site Component (excerpt from Technical Attachment A)**

| | Travel Mode | | | |
|---|---|---|---|---|
| **Land Use** | Drive | Transit | Bike | Walk |
| Residential Mode Split | 30% | 30% | 10% | 30% |
| Church Mode Split (Weekday, office uses) | 55% | 30% | 5% | 10% |
| Church Mode Split (Sunday, worship uses) | 50% | 15% | 5% | 30% |

### *Multimodal Trip Generation*

With the expected mode split determined, the projected future site trip generation by mode can be determined. This process, based on ITE and DDOT methodologies, is summarized in Table 2 and shown step-by-step in Technical Attachment A.

Note that this study assumes that the church's existing surface parking lot that is accessed from the alley between 1757 P Street and 1763 P Street remains in place and that the amount of activity at that lot is unchanged, although it should be noted that the surface lot will be redeveloped into residential units as a separate project at a later date. Since the church trip generation projections shown in Table 2 do not discount the number of trips that are currently using the existing lot, this assumption creates a conservatively high estimate of the number of church trips coming to the site since the church's existing trip generation is already included in the existing traffic counts. In actuality, the number of new trips attributable to the church will be lower than what is shown in Table 2, and therefore what is assumed in this study, since the church portion of the garage will only need to accommodate the added trips that are generated by the church's expansion.

**Table 2: Summary of Trip Generation by Site Component and Travel Mode (excerpt from Technical Attachment A)**

| Mode | Land Use | AM Peak Hour | | | PM Peak Hour | | | Sunday Peak Hour | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | In | Out | Total | In | Out | Total | In | Out | Total |
| Auto | Apartments | 2 veh/hr | 8 veh/hr | 10 veh/hr | 10 veh/hr | 4 veh/hr | 14 veh/hr | 5 veh/hr | 3 veh/hr | 8 veh/hr |
| Auto | Church | 4 veh/hr | 2 veh/hr | 6 veh/hr | 4 veh/hr | 3 veh/hr | 7 veh/hr | 26 veh/hr | 26 veh/hr | 52 veh/hr |
| **Auto** | **Total** | **6 veh/hr** | **10 veh/hr** | **16 veh/hr** | **14 veh/hr** | **7 veh/hr** | **21 veh/hr** | **31 veh/hr** | **29 veh/hr** | **60 veh/hr** |
| | | | | | | | | | | |
| Transit | Apartments | 2 ppl/hr | 9 ppl/hr | 11 ppl/hr | 11 ppl/hr | 5 ppl/hr | 16 ppl/hr | 8 ppl/hr | 6 ppl/hr | 14 ppl/hr |
| Transit | Church | 2 ppl/hr | 2 ppl/hr | 4 ppl/hr | 2 ppl/hr | 2 ppl/hr | 4 ppl/hr | 17 ppl/hr | 17 ppl/hr | 34 ppl/hr |
| **Transit** | **Total** | **4 ppl/hr** | **11 ppl/hr** | **15 ppl/hr** | **13 ppl/hr** | **7 ppl/hr** | **20 ppl/hr** | **25 ppl/hr** | **23 ppl/hr** | **48 ppl/hr** |
| | | | | | | | | | | |
| Bike | Apartments | 1 ppl/hr | 3 ppl/hr | 4 ppl/hr | 4 ppl/hr | 1 ppl/hr | 5 ppl/hr | 3 ppl/hr | 2 ppl/hr | 5 ppl/hr |
| Bike | Church | 0 ppl/hr | 1 ppl/hr | 1 ppl/hr | 0 ppl/hr | 1 ppl/hr | 1 ppl/hr | 6 ppl/hr | 5 ppl/hr | 11 ppl/hr |
| **Bike** | **Total** | **1 ppl/hr** | **4 ppl/hr** | **5 ppl/hr** | **4 ppl/hr** | **2 ppl/hr** | **6 ppl/hr** | **9 ppl/hr** | **7 ppl/hr** | **16 ppl/hr** |
| | | | | | | | | | | |
| Walk | Apartments | 2 ppl/hr | 9 ppl/hr | 11 ppl/hr | 11 ppl/hr | 5 ppl/hr | 16 ppl/hr | 8 ppl/hr | 6 ppl/hr | 14 ppl/hr |
| Walk | Church | 1 ppl/hr | 0 ppl/hr | 1 ppl/hr | 1 ppl/hr | 0 ppl/hr | 1 ppl/hr | 34 ppl/hr | 35 ppl/hr | 69 ppl/hr |
| **Walk** | **Total** | **3 ppl/hr** | **9 ppl/hr** | **12 ppl/hr** | **12 ppl/hr** | **5 ppl/hr** | **17 ppl/hr** | **42 ppl/hr** | **41 ppl/hr** | **83 ppl/hr** |

*Note: Sunday Peak Hour of apartments and church are based on ITE rates and may not occur in the same hour*

As discussed above and enumerated in Technical Attachment A, the resulting trip generation does not trip the CTR triggers for further pedestrian, bicycle, or transit network reviews. As a result, this report will only further analyze vehicle traffic impacts, along with the required reviews of loading, parking, and traffic safety called for in the CTR standards. Subsequent sections of this document will present these site plan and further traffic impact analyses.

## SITE PLAN REVIEW

This section presents a review of the site plan's transportation-related elements, including on-site non-auto travel infrastructure, parking accommodations, and loading facilities. This section also discusses the site's transportation demand management (TDM) plan, which is a set of strategies that have been incorporated into the project to reduce the site's travel demand, and also provides the framework for a loading management plan that will minimize the impact of site loading activity on alley and roadway operations. This review finds that the proposed on-site transportation infrastructure meets District standards and is sufficient to handle projected multimodal travel demand.

### *Bicycle and Pedestrian Infrastructure*

From a transportation standpoint, the Dupont Circle neighborhood is characterized by the prevalence of non-auto travel modes. The preponderance of work, retail, and entertainment destinations within walking distance in conjunction to the availability of numerous nearby transit services means that the number of trips made on foot is particularly high, while the neighborhood has one of the highest percentages of bicycle commuters in the District as well.

These characteristics mean that it is particularly important that the proposed redevelopment enable residents, church employees, and church members to use non-auto travel modes in order to leverage the high-quality bicycle and pedestrian networks surrounding it. To that end, the project will implement improvements to on-site bicycle and pedestrian infrastructure.

The site plan calls for the sidewalks around the site to be reconstructed as part of the project. The reconstructed sidewalks will meet DDOT's width and accessibility requirements as set forth in the *Design and Engineering Manual*, *Public Realm Design Manual*, and other relevant planning documents such as those relating to the Dupont Circle Historic District overlay. When completed, the new sidewalks will maintain the existing connection to the Parish Hall entrance on Church Street, which will serve the residential component of the redeveloped building, and create a connection to the new church entrance on 18th Street. These pedestrian access points are shown in Figure 2, above. The site plan also calls for the existing paved labyrinth present on the western portion of the site, in the footprint of the former sanctuary, to be recreated adjacent to the renovated sidewalk along 18th Street.

The project will also include secure bicycle parking in the redeveloped building's below-grade garage. The Zoning Regulations rewrite, which was recently approved as of the writing of this report, calls for one long-term bicycle parking space for every 3 residential dwelling units and for every 7,500 sf of religious institution space. This translates to 19 residential spaces and 3 church spaces based on the submitted BZA application program. The BZA application shows 23 bike racks to be contained in two spaces within the garage, satisfying both the current and future Zoning Regulations.

The project will also include street-level bike racks for use of short-term site visitors. The quantity and location of these racks will be determined at a later date but will satisfy the future Zoning Regulations, which call for 8 church and 3 residential bicycle parking spaces.

### *Parking Accommodations*

At present, St. Thomas' Parish is served by one off-street parking lot, with supplementary parking for Sunday worship services provided on the south side of Church Street, where parking is permitted between 9am-1pm on Sundays only. This project would add an off-street garage to be constructed below grade under the renovated Parish Hall and building addition,

replacing the off-street lot that will be redeveloped into residential units as a separate project at a later date. This project does not propose to change the curbside management on Church Street.

All existing parking areas will remain in place in the near future and are expected to operate as they do today, including maintaining their current levels of vehicle trip generation, for the purposes of this study.

### *Off-Street Parking Garage*

The development program proposed in the project's BZA application requires 31 parking spaces per the Zoning Regulations, of which 17 spaces will be allocated to church uses and 14 spaces to the residences. The site plan proposes creating a 36-space parking garage below grade in the basement level of the renovated Parish Hall and underneath the building addition. 31 of these spaces would be direct access, as required by the Zoning Regulations, with the remaining 5 spaces configured as tandem parking spaces.

This configuration will be sufficient to handle expected church parking demand. This 17-space garage is being created to replace the existing 7-space off-street surface parking lot located off the public alley to the south of the site between 1757 P Street and 1763 P Street, which presently handles day-to-day church parking demand. The surface lot will be redeveloped as a separate project at a later date but will remain available for church use in the near future. The new garage will continue to be supplemented by Sunday-only on-street parking zone along Church Street to accommodate the increased parking demand during Sunday worship services.

The proposed parking supply allocated to the residential component, 19 spaces including tandem spaces, is expected to be sufficient to accommodate the expected residential parking demand. A review of parking demand at comparable residential developments in the surrounding area found a parking utilization ratio ranging between 0.13-0.29 spaces per dwelling unit, which for a 56-unit apartment building corresponds to approximately 7-16 parked vehicles. This finding indicates that the 19 spaces required by the Zoning Regulations should amply accommodate the expected parking demand.

### *Off-Street Parking Access*

The new off-street parking garage will be accessed from the public alley to the south of the site, which provides connections to 17$^{th}$ and 18$^{th}$ Streets. The proposed site plan adheres to the existing site property line, which maintains the 30' sight triangle at the intersection of the public alley and 18$^{th}$ Street that DDOT requires to provide adequate sight distances for drivers. These sight triangles are shown in purple in Figure 3.

The garage itself would be accessed via a ramp descending down from the north side of the public alley. This report recommends that the configuration of this ramp be expanded slightly from the site plans included in the BZA application to allow for independent two-way traffic flow by widening the ramp from 15' to 18' and increasing the garage entrance from 17' to 22' in width. The expanded garage entrance would also improve sight lines at this location, allowing vehicles departing the garage to safely yield to any traffic that may be present in the alley. These recommended changes are reflected in Figure 3, along with the recommended alley access enhancements that will be discussed below.

However, vehicles accessing the garage must traverse the public alley, which has a minimum width of 12' for its entire length. Alleys 12' in width or less are very common in this portion of the District and provide satisfactory operational conditions even when they provide access to off-street parking facilities; however, there is some concern from neighbors along the alley that the 1772 Church Street project could overwhelm the alley and obstruct the flow of traffic for other alley users.

A review of existing alley operations adjacent to the 1772 Church Street site, conducted in support of this study and discussed in more detail in the Alley Operation Study section at the end of this report, found that the alley currently operates satisfactorily with a 12' width. Even during the busiest period of traffic demand, the portion of the alley directly adjacent to the site, marked in yellow as the "Alley Study Area" in Figure 1, sees a total of 14 eastbound and 8 westbound vehicle trips between 8:30 and 9:30 AM, or approximately one vehicle every 160 seconds. This relatively low travel demand does not create many chances for two-way encounters between oncoming vehicles. The alley study also saw only one instance where a loading, trash service, or utility vehicle obstructed the alley study for more than 40 seconds at any point during the 10.5 hours of data collection presented in Technical Attachment F, and that was a trash truck collecting refuse that occupied the alley study area PM and Sunday peak hours for 201 seconds at 7:15 AM when no other vehicles were using the alley. These alley performance metrics are discussed in more detail in Table 12 and Table 13 in the Alley Operation Study section, below.

Based on Table 2, the highest period of trip generation for new garage will occur in both the PM and Sunday peak hours, when approximately 21 vehicles per hour will be traveling either to or from the garage. This increase, of on average one vehicle every 170 seconds, will not cause a noticeable increase in two-way encounters within the alley. However, in order to minimize any potential impacts that the site's garage could have on alley operations, this project proposes to widen the effective width of the alley along the length of the project in order to reduce the likelihood of conflicts or blockages.

### *Proposed Alley Access Enhancements*

The Applicant is proposing to expand the alley into private space in order to reduce the potential for alley blockages and to reduce the degree of conflicts between two-way traffic within the alley. This study recommends that 3' of private property be allocated to increase the effective width of the alley to 15' along the entire length of the site. Between the garage entrance and 18th Street, this study recommends that a further 3' of private property be allocated to increase the total expansion in this area to 6' for an effective alley width of 18'. These recommended modifications are shown in Figure 3.

Vehicle maneuverability analyses were conducted to test this proposed layout using AutoTURN software. The results of this analysis are shown in Technical Attachment B. Most notably, widening the effective width of the alley by 3-6' as recommended above would allow for two-way traffic by normal sized vehicles adjacent to the site (Exhibit B-1 in Technical Attachment B), and would permit auto traffic to pass trash trucks and other large vehicles in the 18' wide section near 18th Street (Exhibit B-2 in Technical Attachment B). Exhibit B-3 in Technical Attachment B further shows how the combination of alley widening and the expansion of the garage ramp discussed above allow for two-way traffic to access the auto garage without issue.

Taken together, these recommended access enhancements further serve to minimize the project's impact on alley conditions and are intended to complement the project's loading management plan and transportation demand management plan that are presented in a following section.

### *On-Street Parking and Curbside Management*

This project does not propose any changes to curbside management around the site. At present, parking is prohibited along the south side of Church Street except from 9am-1pm on Sundays, a period that coincides with St. Thomas' Sunday service at 11am. This policy limits the impact of nearby churches, including St. Thomas, on the neighborhood parking supply by creating additional spaces specifically during the peak period of church parking demand, making church patrons less likely to compete for neighborhood-serving spaces. Meanwhile, the limited parking hours minimizes impacts to neighborhood traffic at all other times.

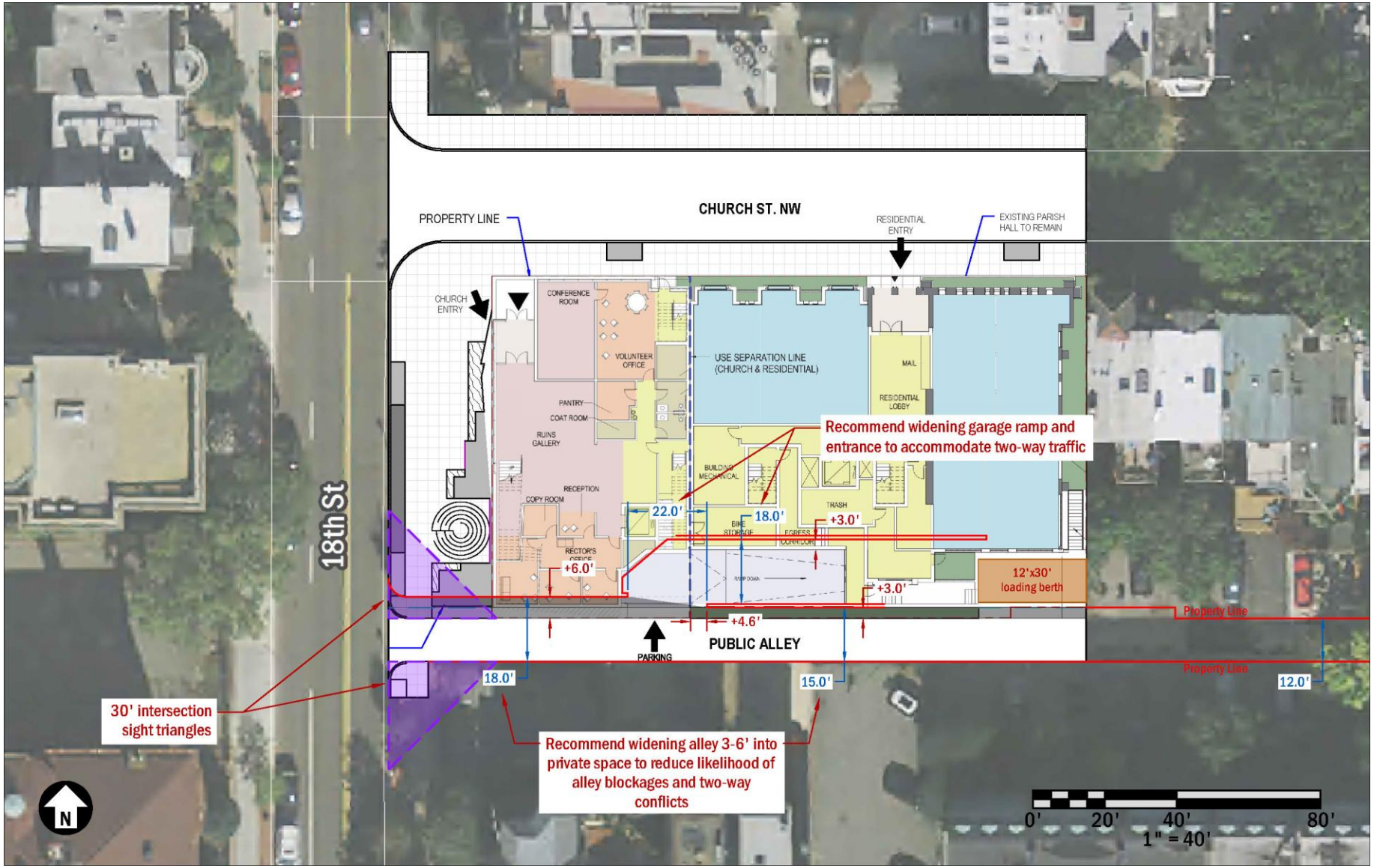



**Figure 3: Annotated Site Plan Showing Recommended Modifications to BZA Plans to Improve Garage Access and Alley Traffic Flow**

## *Loading Facilities*

The Zoning Administrator has determined that on-site loading facilities are not required for this project because of the site's historic structural components and the constraints they impose on site design. However, the redevelopment project has been designed to include a loading berth in order to accommodate expected loading demand while minimizing the impacts of site-generated loading activity. This loading berth will be located in private space directly off the public alley to the south of the site, as shown in Figure 2. This section discusses the sufficiency of this loading facility and presents a proposed loading management plan that is intended to reduce the impacts of loading operations on alley traffic and neighboring homes.

### *Projected Loading Demand*

Based on data collected at comparable developments, a development of this size is projected to process 3.2 truck operations per day within the loading berth. As with the trip generation calculations shown in Table 2, these values represent the total amount of future site loading demand and does not include a discount for loading activity at the existing church. The majority of loading activity at the future site would be large vans performing services like package delivery or maintenance service calls, with the remainder stemming from residents moving in or out of the building. This breakdown is shown in Table 3.

**Table 3: Projected Future Site Loading Demand**

| | Operations per Day by Truck Type | | | |
|---|---|---|---|---|
| **Loading Type** | Cargo Van | Box Truck | 55' Truck | **Total** |
| Resident Moving Activity | 0.00 | 0.20 | 0.00 | **0.20** |
| Deliveries (Residential + Church) | 3.00 | 0.00 | 0.00 | **3.00** |
| **Total** | **3.00** | **0.20** | **0.00** | **3.20** |

Note that trash and recycling collection operations are not included in the above calculations. These services currently perform collections while stopped within the alley, a practice that is expected to continue, and as such are not expected to utilize the loading berth. This project also will not increase the recurrence or frequency of collections, and as such these operations are not included in Table 3.

### *Truck Access*

Trucks can access the berth from 18th Street, a DDOT-designated primary truck route, and depart via 17th Street to Massachusetts Avenue, another primary truck route. This routing pattern is shown in Figure 4. Trucks can also access the berth from east-to-west, although the west-to-east direction shown in Figure 4 is preferred since it allows trucks to unload directly to the loading platform directly west of the dock.

Truck maneuverability analyses verifying that trucks can enter the alley from 18th Street and can enter and exit the loading berth based on the west-to-east routing discussed above, as analyzed using AutoTURN, are included in Exhibit B-4 of Technical Attachment B. These analyses show that the site's loading berth can accommodate trucks up to 24' in length within the constraints of the site's historic structures.

Limiting truck access to the site to those 24' in length or shorter will not impact the types of loading or moving operations expected at the site. In fact, the U-Haul truck rental company estimates that a 24' truck is appropriate for "two bedroom houses [or] larger apartment moves" (http://www.uhaul.com/Trucks/17ft-Moving-Truck-Rental/EL/), the latter of which is comparable to the largest units expected in the proposed development. This truck length constraint has been incorporated into the proposed loading management plan that follows.

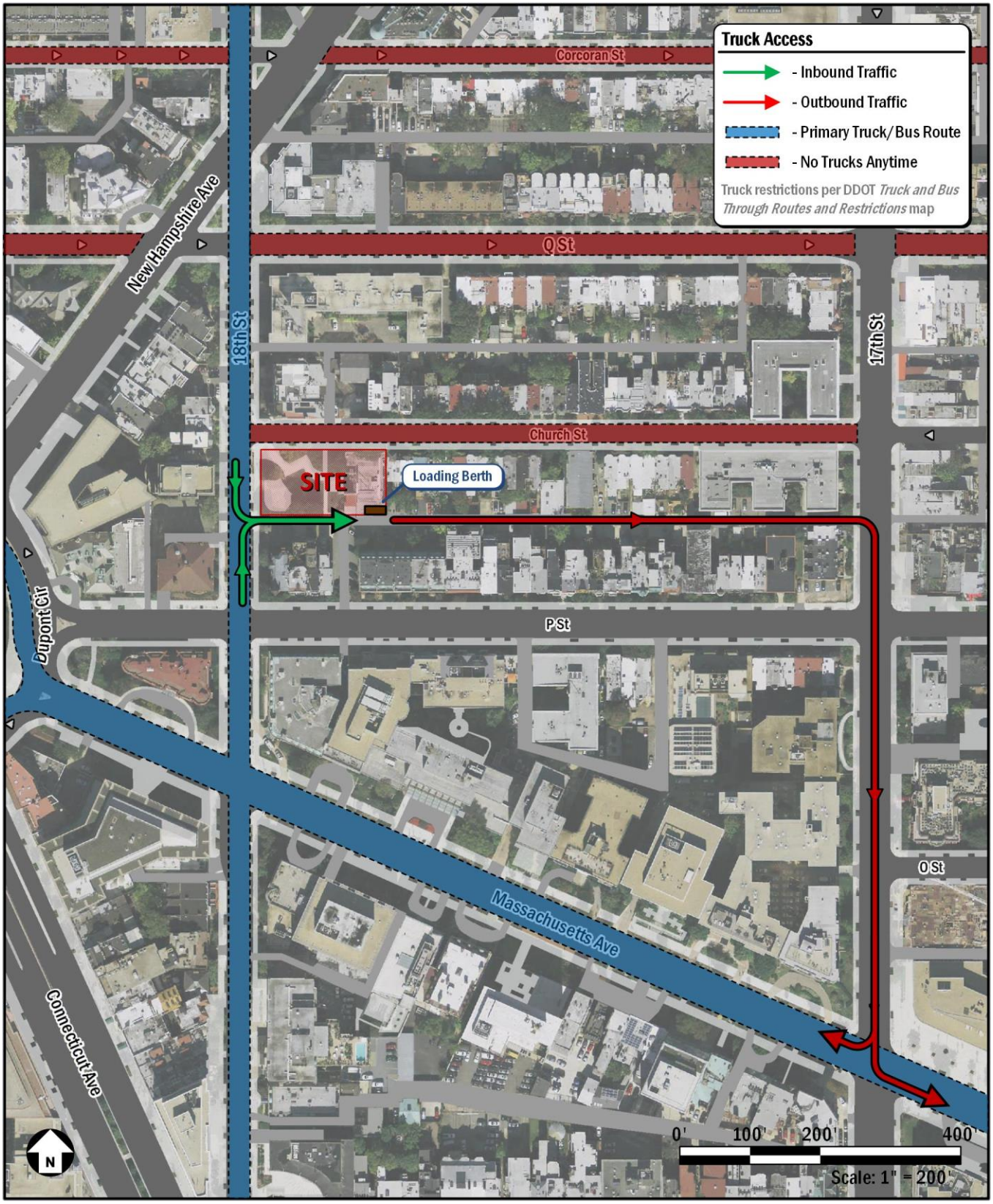



**Figure 4: Truck Access to/from DDOT-Designated Primary Truck Routes**

### *Loading Management Plan*

The goal of this plan is to minimize undesirable impacts to the surrounding streets, neighboring homes, and to building residents, while reducing conflicts between alley traffic and truck traffic using the loading facilities. The components of the plan are intended to ensure smooth operation of the loading facilities through a combination of management and scheduling of loading operations.

The components of the loading management plan are as follows:

1. A loading dock manager will be designated by the building management. The dock manager will coordinate with tenants and church officials to schedule deliveries and residential moves.
2. All loading activity will take place in private space and not in public right-of-way. Residential and church tenants will be made aware of these requirements.
3. Residential and church tenants will be limited to using trucks 24' in length or less within the loading berth located off the public alley to the south of the site. Tenants who wish to use longer trucks must apply for a public space permit from DDOT allowing them to conduct loading operations within public space.
4. All loading, delivery, and trash collection activity will be required to utilize the building's internal corridors to access the loading berth, remaining on private property.
5. Collected trash and recycling must be stored within the building unless there is a scheduled collection time within 24 hours, at which point it may be moved outside for collection but must remain out of the public right-of-way. Trash and recycling must also remain clear of the strip of private space along the north side of the alley that will be paved to widen the alley's effective width adjacent to the site.
6. All residential move ins/move outs will be required to be scheduled in a manner that coordinates with scheduled church deliveries. For the purposes of this plan, deliveries are assumed to include any scheduled activity that uses the loading dock, including but not limited to catering operations.
7. The dock manager will schedule deliveries such that the loading dock capacity are not exceeded. In the event that an unscheduled delivery vehicle arrives while the dock is full, that driver will be directed to return at a later time so as to not impede traffic flow within the alley or on any adjacent street, as prescribed in condition (2), above.
8. Trucks using the loading dock will not be allowed to idle and must follow all District guidelines for heavy vehicle operation including but not limited to DCMR 20 – Chapter 9, Section 900 (Engine Idling), the regulations set forth in DDOT's Freight Management and Commercial Vehicle Operations document, and the primary access routes listed in the DDOT Truck and Bus Route System.
9. The dock manager will be responsible for disseminating DDOT's Freight Management and Commercial Vehicle Operations document to drivers as needed to encourage compliance with District laws and DDOT's truck routes. The dock manager will also post these documents in a prominent location within the service area.
10. A representative of the building management will be on call during scheduled deliveries to address compliance issues.

### *Transportation Demand Management*

The 1772 Church Street NW project has also been designed to incorporate a number of TDM measures to further minimize any impacts of the development might have on the surrounding transportation networks. TDM measures are a set of strategies that have been incorporated into the site plan, development program, and/or building management policies with the intention of reducing the site's travel demand. TDM measures typically work by encouraging the use of alternate modes, minimizing amount of vehicle trips – and particularly single-occupancy vehicle trips – during peak period travel times, or by redistributing these trips to off-peak periods.

The Applicant proposes the following TDM measures for the 1772 Church Street NW project:

- The Applicant will exceed existing zoning requirements to provide bicycle parking/storage facilities at the level of the more stringent Zoning Regulations that will be implemented in the near future. This includes the requirements to provide secure parking located in the garage for residents and church employees.
- The Applicant will unbundle the cost of residential parking from the cost of lease or purchase.
- The Applicant will identify TDM Leaders (for planning, construction, and operations) at the residential and church components. The TDM Leaders will work with residents and church employees to distribute and market various transportation alternatives and options.
- The Applicant will place an electronic message board in the residential lobby that provides real-time information on nearby transit services, carshare vehicles, and Bikeshare stations.
- Building management will provide new residents with an informational package containing details on nearby transit, carshare, and Bikeshare services as well as information on loading dock policies and restrictions, particularly the prohibition on conducting loading operations within public right-of-way without a valid public space permit.

## VEHICULAR TRAFFIC IMPACTS

One of the main purposes of a CTR is to determine what impact, if any, a proposed development will have on the surrounding vehicular transportation network. The level of impact is determined through an intersection capacity analysis and is based on two primary performance metrics at each intersection and approach, namely the average delay that vehicles experience and the length of queues that form. This section presents the information used to assess conditions for existing, future background without development, and total future with development condition analysis scenarios, with a summary of the results given at the end. A review of available traffic safety data is also included, with a focus on recent intersection crash data reports provided by DDOT, including a discussion of any intersections that are identified to have elevated crash rates.

### *Intersection Capacity Analysis*

This intersection capacity analysis was conducted in general accordance with the typical parameters set by the District Department of Transportation (DDOT) for preparing such studies as laid out in the CTR standards. The following intersections, shown in Figure 1, are included in the study area:

1. 18th & Church Streets, NW
2. 18th & P Streets, NW
3. 18th Street NW & Mid-Block Alley (adjacent to Embassy of Malaysia Chancery Annex)
4. 17th Street NW & Mid-Block Alley (adjacent to 1514 17th Street NW)

The analysis contained herein compares three traffic volume scenarios: (1) existing conditions within the study area; (2) background conditions, representing future traffic levels if no development on the site were to occur; and (3) total future conditions, representing background conditions with the addition of the proposed development. The following sections outline the components of each scenario.

### *Study Area Overview (2015 Existing Conditions)*

A field survey was performed to identify the current lane configuration, traffic controls, and signal timings and to observe traffic levels. Figure 5 shows the existing and future lane designations and site garage access point.

Weekday peak hour turning movement counts were performed at the study area intersections on Thursday, November 12, 2015 during the AM and PM rush periods, 6:30 to 9:30 AM and from 4:00 to 7:00 PM, respectively, in accordance with DDOT requirements. This count date represents a “typical” weekday when the DC public school system and the federal government were in session. This “typical” weekday also represents time periods that include normal operation for other major traffic generators in the study area.

Supplementary Sunday turning movement counts were also conducted in order to assess traffic conditions around St. Thomas’ Parish’s Sunday worship services. These counts were performed at the study area intersections on Sunday, November 8, 2015 from 10:00 AM to 2:30 PM, encompassing the church’s Sunday service, which runs from 11:00 AM to 12:30 PM, and continuing through the church’s religious education programs, which conclude around 2:00 PM.

The raw peak hour count volumes are shown on Figure 6. Individual intersection peak hours were used rather than a system-wide peak hour in order to assess the worst-case conditions at each intersection, and as a result volumes do not balance between intersections since the specific hour represented therein may not be the same at adjacent intersections. The detailed traffic volume worksheets are included as Technical Attachment C, and include supplementary count data showing the level of pedestrian and bicycle activity during all count periods.

It should be noted that traffic patterns at the intersection of 18th and P Streets are at present disrupted by two construction zones. Construction at the Patterson Mansion and future American Enterprise Institute headquarters, both of which are included as background developments to this project and discussed in the next section, have closed travel lanes on P Street and 18th Street, respectively. The configuration and effects of these closures are discussed in more detail on Figure 5. Since both projects are expected to be finished prior to the completion of the 1772 Church Street project, this analysis assumes that non-construction conditions are present within the study area.

To that end, the raw peak hour traffic count data, which was summarized in Figure 6, was adjusted to account for the atypical travel patterns that currently exist at the intersection of 18th and P Streets since disruptive construction closures were in effect when the count data was collected in November 2015. After a thorough search for recent CTRs or DDOT studies that may include traffic data for non-construction conditions at this location, Gorove/Slade identified a DDOT-prepared Synchro traffic analysis network dated January 2015 that includes pre-construction PM peak hour count data. With no other pre-construction data readily available, the traffic distributions present in this set of counts has been used to adjust the raw November 2015 peak hour count data to represent conditions when construction activities are not taking place. This process is discussed in more detail in Figure 6, and the resulting adjusted traffic volumes will be used in all intersection capacity analyses in this study.

### *Projected Background Traffic Growth (2017 Background Future Conditions without Development)*

The background traffic volumes were attained by beginning with the existing volumes, with the aforementioned adjustments to account for construction activity, and building upon these volumes to account for projected trips for nearby planned developments as well as the annual growth of traffic on surrounding roadways.

This study identified three potential background developments based on consultation with DDOT and community members:

A. The Washington Club/Patterson Mansion (15 Dupont Circle NW), which is being converted from a private club to micro-apartment units

B. Iraqi Consular Section (1801 P Street NW), which is believed to be closed and undergoing renovations

C. Future American Enterprise Institute Headquarters (1785 Massachusetts Avenue NW), which will be housed in the renovated Andrew Mellon Building

D. Embassy of Malaysia Chancery Annex (1501 18th Street NW), which is undergoing renovations

These background developments, shown in Figure 7, are all located within two blocks of the site. Traffic studies or site plans could not be found for any of these developments, so development programs and projected completion dates were taken from real estate news articles, District records, and orthophotographic area measurements.

As with the site trip generation projections above, trip generation for these background developments was calculated based on the methodology outlined in ITE's *Trip Generation*, 9th Edition, adjusted using expected travel mode splits to account for the urban nature of the site. These trip generation calculations are shown in Technical Attachment D and summarized below.

**Table 4: Summary of Background Development Trip Generation (excerpt from Technical Attachment D)**

| Background Development | AM Peak Hour | | | PM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|---|---|
| | In | Out | Total | In | Out | Total | In | Out | Total |
| A. Patterson Mansion | 3 veh/hr | 11 veh/hr | 14 veh/hr | 13 veh/hr | 7 veh/hr | 20 veh/hr | 7 veh/hr | 7 veh/hr | 14 veh/hr |
| B. Iraqi Consular Section | 8 veh/hr | 1 veh/hr | 9 veh/hr | 1 veh/hr | 7 veh/hr | 8 veh/hr | 0 veh/hr | 0 veh/hr | 0 veh/hr |
| C. American Enterprise Institute HQ | 51 veh/hr | 7 veh/hr | 58 veh/hr | 11 veh/hr | 54 veh/hr | 65 veh/hr | 2 veh/hr | 2 veh/hr | 4 veh/hr |
| D. Embassy of Malaysia Chancery Annex | 2 veh/hr | 1 veh/hr | 3 veh/hr | 0 veh/hr | 2 veh/hr | 2 veh/hr | 0 veh/hr | 0 veh/hr | 0 veh/hr |
| **Total** | **64 veh/hr** | **20 veh/hr** | **84 veh/hr** | **25 veh/hr** | **70 veh/hr** | **95 veh/hr** | **9 veh/hr** | **9 veh/hr** | **18 veh/hr** |

These trips were then distributed and assigned to the network based on regional travel patterns as determined using Census data as implemented in the American Association of State Highway and Transportation Officials' (AASHTO) Census Transportation Planning Products tool. This tool shows the vehicle trip flows between the site's traffic analysis zone (TAZ 00020042) and all other TAZs in the Washington region, based on 2006-2010 Census data from the American Community Survey. The expected distribution of trips in and around the study area as determined based on this data is shown on Figure 8.

In addition to the trips generated by the background developments, general regional traffic along the study area roadways is expected to change due to other developments not in the vicinity of the project site and broader shifts in regional travel patterns. The MWCOG regional transportation model provides estimates of growth along major transportation links throughout the metropolitan Washington region. Projections from the MWCOG model for the years 2015 through 2020, presented in detail in Technical Attachment D, were used to determine background growth rates along all study area roads. A summary of the annual growth rates assumed in this study is shown in Table 5. These growth rates were applied to all study area roadways and intersections, with the exception of turning movements entering and exiting the public alley since that link does not process regional traffic.

**Table 5: Summary of Background Growth Rates (excerpt from Technical Attachment D)**

| Location | Annual Growth |
|---|---|
| North-South Streets (17th & 18th Streets), both directions | 0.0% |
| P Street, eastbound | 2.0% |
| P Street, westbound | 3.5% |
| Other Local-Serving Roads (Church Street & Alley), both directions | 0.0% |

In order to determine the volumes for the future background conditions, the trips generated by the background developments and the inherent growth on the study area roadways were added to the existing traffic volumes. The resulting future background traffic volumes are shown on Figure 9.

## *Site Traffic Impacts (2017 Total Future Conditions with Development)*

Trip generation projections for the proposed development were previously discussed in the "Projected Site Trip Generation" section, above. A summary of the multimodal trip generation results was included in Table 2. Detailed multimodal trip generation calculations can be found in Technical Attachment A.

The CTR standards call for further analysis of vehicular traffic impacts, so Table 6 shows a consolidated summary of the projected peak hour site vehicle trip generation for all three analysis periods. Again, full details on the trip generation forecast, including information about assumptions and calculation methodology, can be found in Technical Attachment A.

**Table 6: Summary of Projected Peak Hour Site Vehicle Trip Generation (adapted from Technical Attachment A)**

| | AM Peak Hour | | | PM Peak Hour | | | Sunday Peak Hour | | |
|---|---|---|---|---|---|---|---|---|---|
| **Development Component** | In | Out | Total | In | Out | Total | In | Out | Total |
| Residential Apartments | 2 | 8 | 10 | 10 | 4 | 14 | 5 | 3 | 8 |
| Church | 4 | 2 | 6 | 4 | 3 | 7 | 26 | 26 | 52 |
| **Total Vehicle Trips** | **6** | **10** | **16** | **14** | **7** | **21** | **31** | **29** | **60** |
| *Trips to/from Garage* | *6* | *10* | *16* | *14* | *7* | *21* | *11* | *10* | *21* |
| *Trips to/from Church Street* | *0* | *0* | *0* | *0* | *0* | *0* | *20* | *19* | *39* |

*Notes:*

- *Sunday Peak Hour of apartments and church are based on ITE rates and may not occur in the same hour*
- *This study assumes that 75% of garage spaces allocated to the church will turn over during the Sunday peak hour. All remaining church-based trips are assumed to use the Sunday-only parking zone along Church Street.*

As discussed in the "Projected Site Trip Generation" section, above, it is important to note that the trip generation noted in Table 2 and Table 6 do not assume any discounts or reductions for trips to and from the existing church. This analysis assumes that the church's existing surface parking lot and the Sunday-only parking zone along Church Street both remain in place and that the amount of trips using these facilities remains unchanged, although it should be noted that the surface lot will be redeveloped into residential units as a separate project at a later date. Since Table 2 and Table 6 both present projected future trip generation for the entire redeveloped site, this assumption effectively double-counts the existing trips generated by St. Thomas' Parish in their current Parish Hall configuration and represents a conservative assumption that has been built into the intersection capacity analyses.

The projected peak hour site vehicle trips were then distributed and assigned to the network based on the distribution discussed the "Background Future Conditions" section, above, and shown in Figure 8. The resulting site-generated vehicle traffic volumes are shown on Figure 10.

It should be noted that even after the mode split reductions the church's forecasted vehicle trip generation during the Sunday peak hour is projected to exceed the 17 spaces provided on site as required by the Zoning Regulations. This situation is typical at urban church locations, since requiring churches to provide spaces to accommodate their entire congregation's parking demand would result in an excessively large parking supply that would sit largely empty outside of worship services. As a result, this study assumes that 75% of the church's spaces within the garage will turn over during the Sunday peak hour, with all remaining church-based trips assumed to use the Sunday-only parking zone along Church Street as discussed in the "On-Street Parking and Curbside Management" section, above. These volumes are still included in the Total Future Conditions traffic analysis, but are routed to Church Street instead of the new garage.

The site-generated trips were then added to the future background volumes in order to determine the total future volumes, as shown on Figure 11.

## *Summary of Capacity Analysis Results*

Intersection capacity analyses were performed for the three scenarios outlined above at the intersections contained within the study area during the morning and afternoon peak hours. Synchro 8, a traffic analysis software package, was used to analyze the study intersections based on industry-standard *Highway Capacity Manual* (HCM) 2010 methodology. This section presents the intersection capacity analysis results in terms of the average vehicle delay, which can also be expressed as a letter grade "level of service", as well as the queue lengths expected to be present at each intersection and approach.

## *Vehicle Delay and Level of Service*

Intersection service quality is typically expressed in terms of level of service (LOS) and delay for each approach. A LOS grade is a letter grade based on the average delay, in seconds per vehicle, 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 highly urbanized areas.

The LOS capacity analyses were based on the peak hour traffic volumes discussed previously, the lane use and traffic controls outlined in Figure 5, and the HCM 2010 methodology, as implemented in the Synchro 8 software package. The HCM 2010 methodology also incorporates pedestrian and bicycle traffic volumes into its calculations; these non-auto traffic volumes were collected as part of the vehicle turning movement counts discussed above and are included in the raw traffic count reports in Technical Attachment C. Synchro was used to calculate the average delay and LOS of each intersection approach throughout the study area, as well as the overall average delay and intersection LOS grade for the signalized intersection of 18th and P Streets.

Table 7 summarizes the LOS and delay results of the capacity analyses for each of the existing, future background, and total future scenarios. Detailed intersection capacity analysis worksheets are included as Technical Attachment E.

As shown in the capacity analysis results, all intersections are currently operate at an acceptable level of service at present and are expected to continue to operate acceptable level of service under future background and total future conditions. Overall, the trips generated by the proposed development show a negligible impact on the surrounding roadway network.

## *Vehicle Queues*

The HCM 2010 methodology also provides projections of expected queues throughout the CTR study area. Table 8 shows projected 95th percentile queue lengths, in feet as calculated using Synchro 8, at each intersection approach. 95th percentile queues represent worst-case conditions and are expected to be exceeded no more than 5% of the time.

Table 8 shows that the only location that sees 95th percentile queues exceeding the available upstream storage length is the northbound approach of the intersection of 18th and P Streets, and only during the PM peak hour. This condition is not impacted significantly by the proposed development, with calculated queues increasing from 233' to 236' (+1.3%) between background future and total future conditions.

However, it is important to note that site observations did not find excessive northbound queues in this location. Rather, this condition is likely a result of boundary conditions at the edge of the CTR study area. The intersection of 18th and P Streets is signalized, as is the intersection of 18th Street and Massachusetts Avenue directly to the south, which is not within the CTR study area determined in conjunction with DDOT during the scoping process. These intersections are separated by approximately 150', which does not leave much storage space for queues at the northbound approach of the intersection of 18th & P Streets. However, these two signals are coordinated in such a way that the northbound green at Massachusetts Avenue coincides with the northbound green phase at P Street, which in practice allows platoons of northbound traffic to pass through the intersection of 18th and P Streets without stopping. Since the intersection of 18th Street and Massachusetts Avenue is not included in the traffic model, Synchro assumes that northbound traffic arrives at P Street at generally uniform intervals rather than in coordinated platoons as it actually does. Therefore, this finding is merely an artifact of the calculation methodology and is not indicative of any adverse conditions.

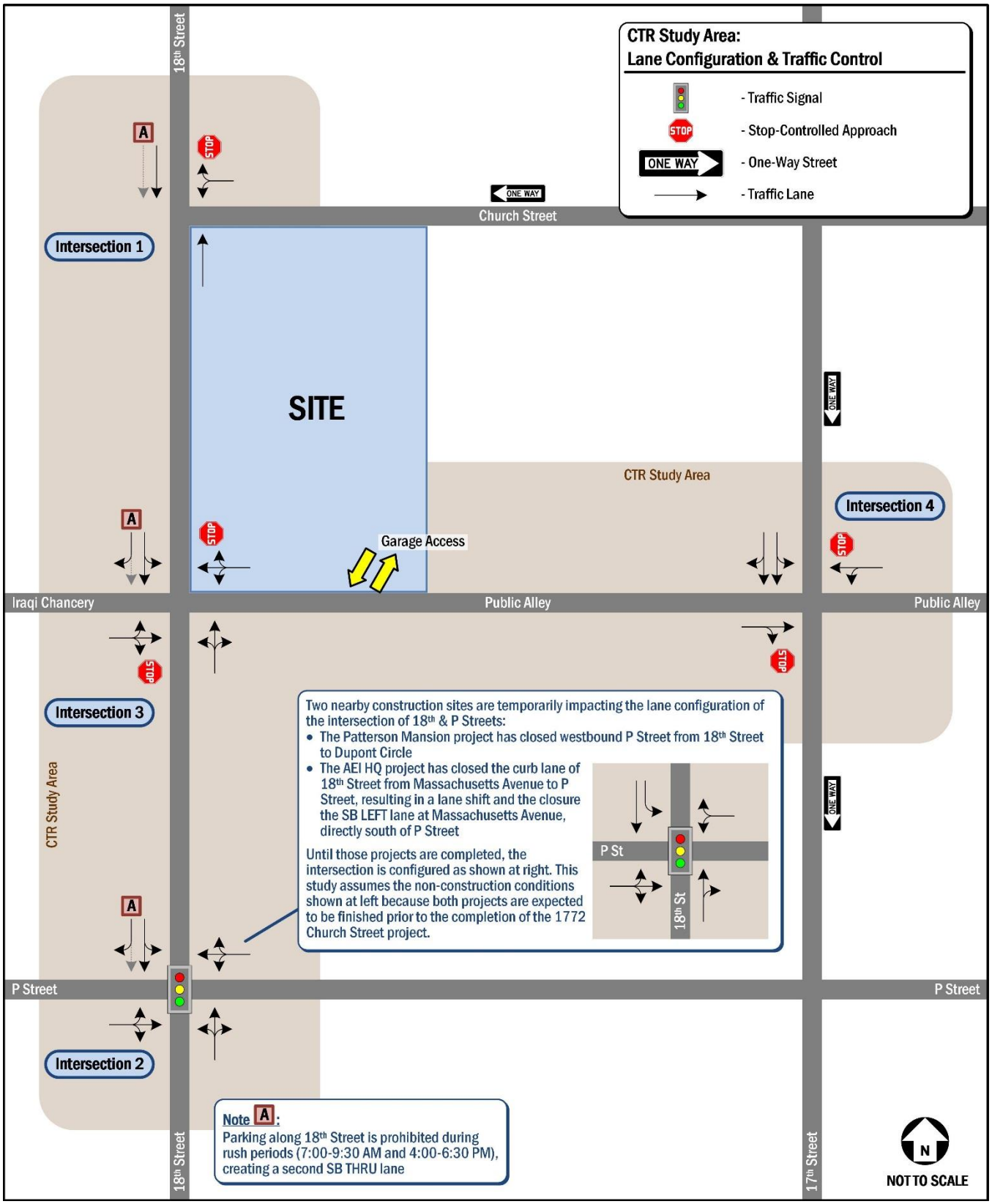



**Figure 5: CTR Study Area Lane Configuration and Traffic Control**

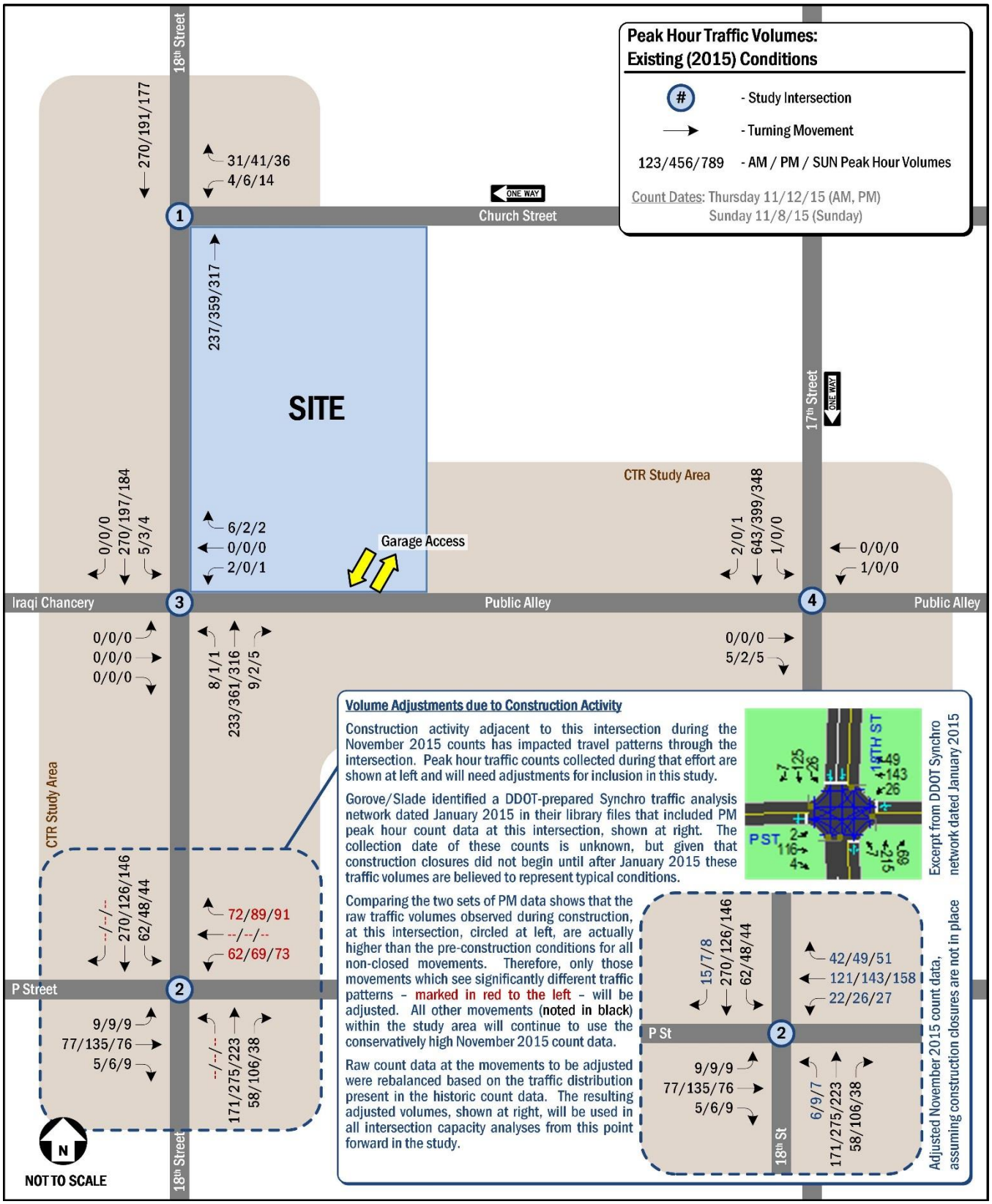



**Figure 6: Peak Hour Traffic Volumes – 2015 Existing Conditions, including adjustments for construction activity**

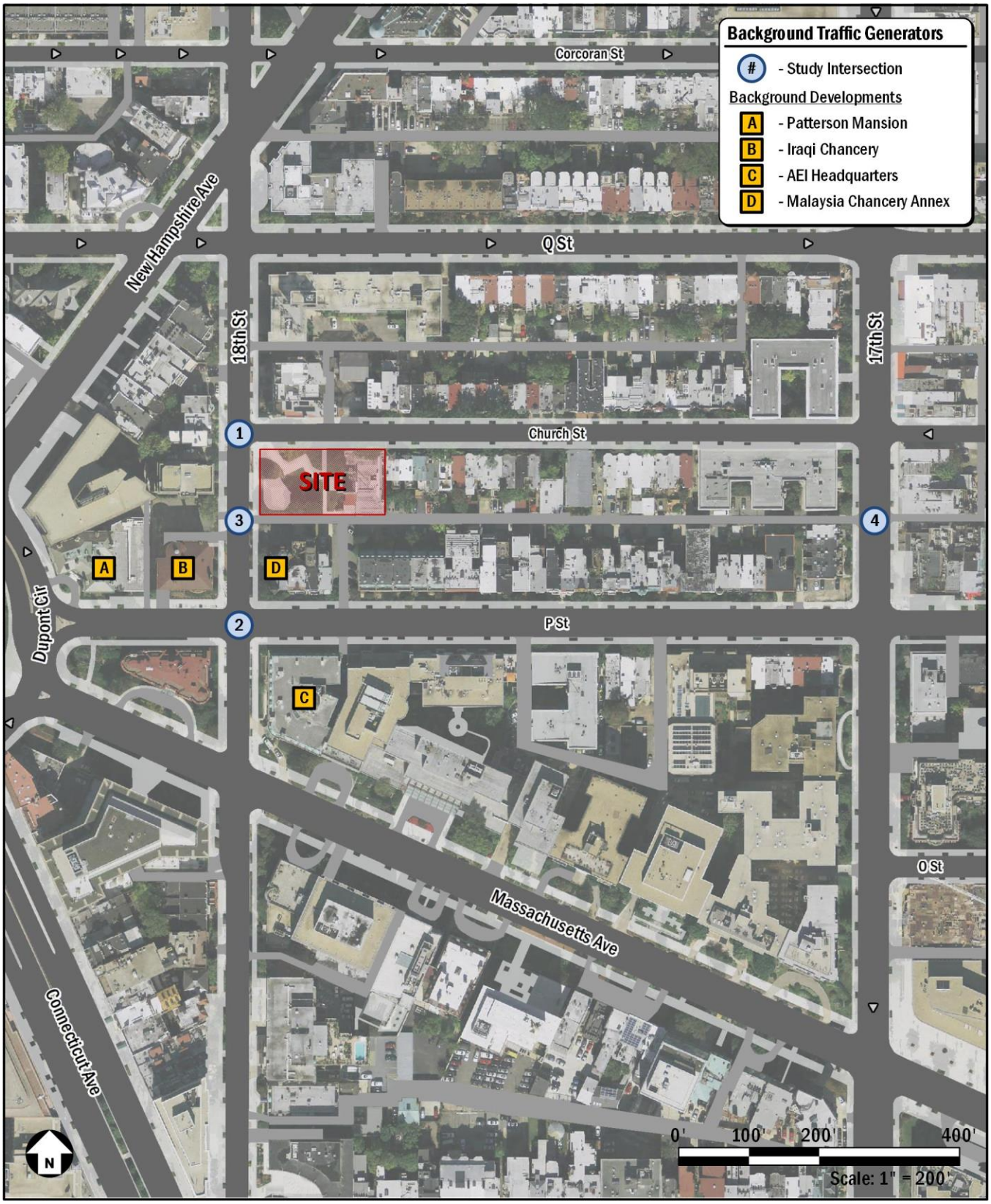



**Figure 7: Background Developments**

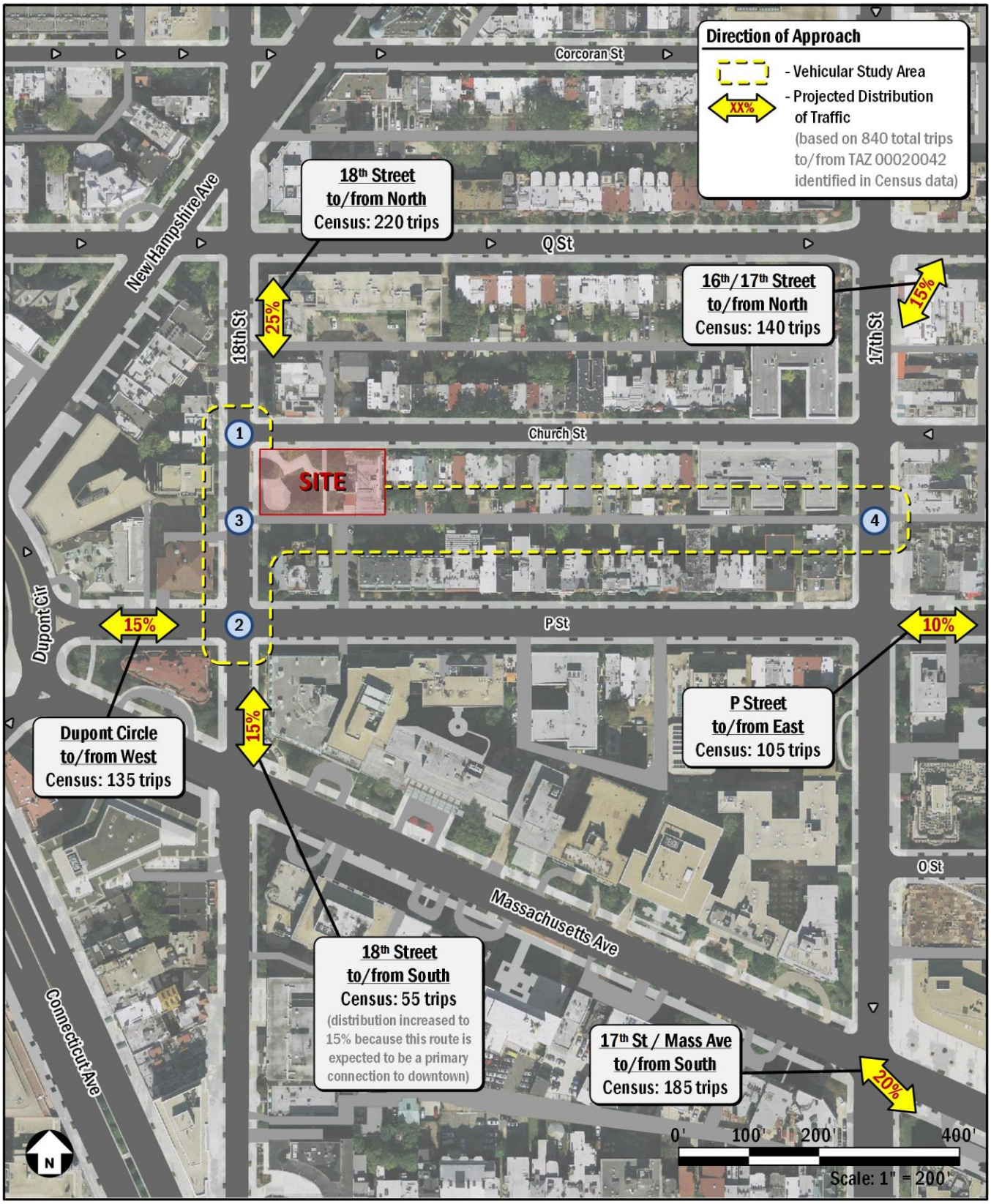



**Figure 8: Projected Trip Distribution, based on Census/CTPP data**

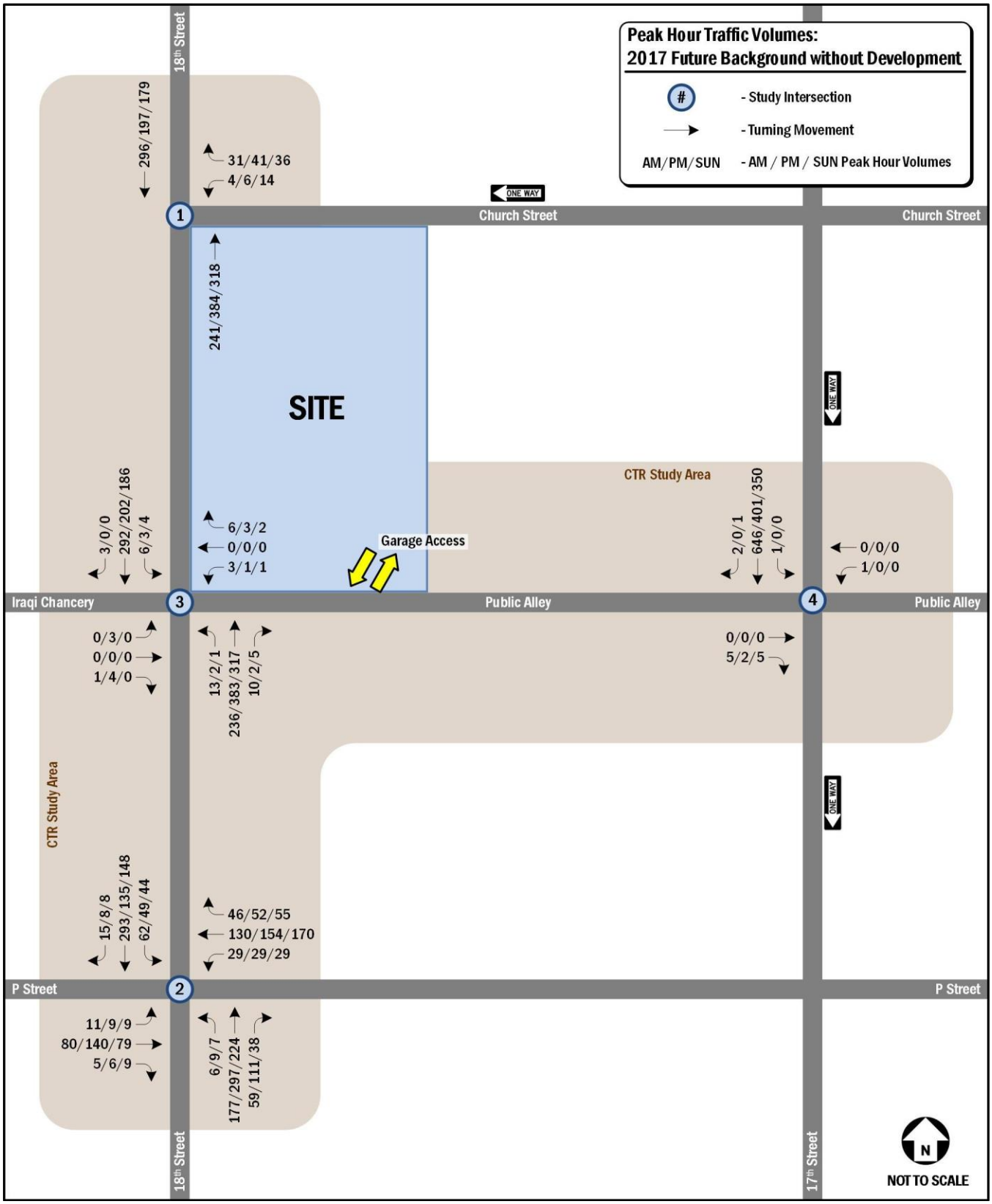



**Figure 9: Peak Hour Traffic Volumes – 2017 Background Future Conditions without Development**

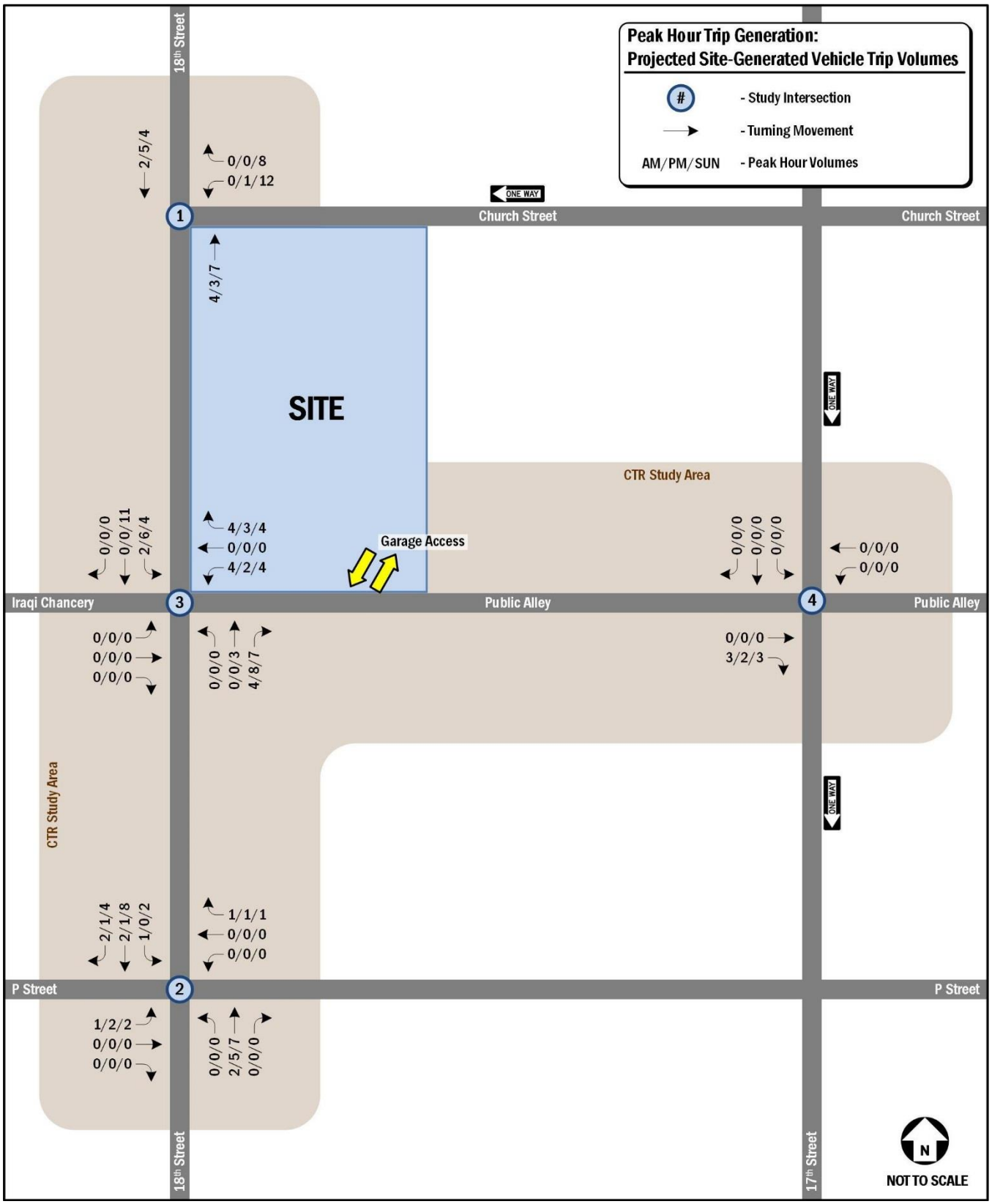



**Figure 10: Peak Hour Traffic Volumes – Projected Site-Generated Vehicle Trips**

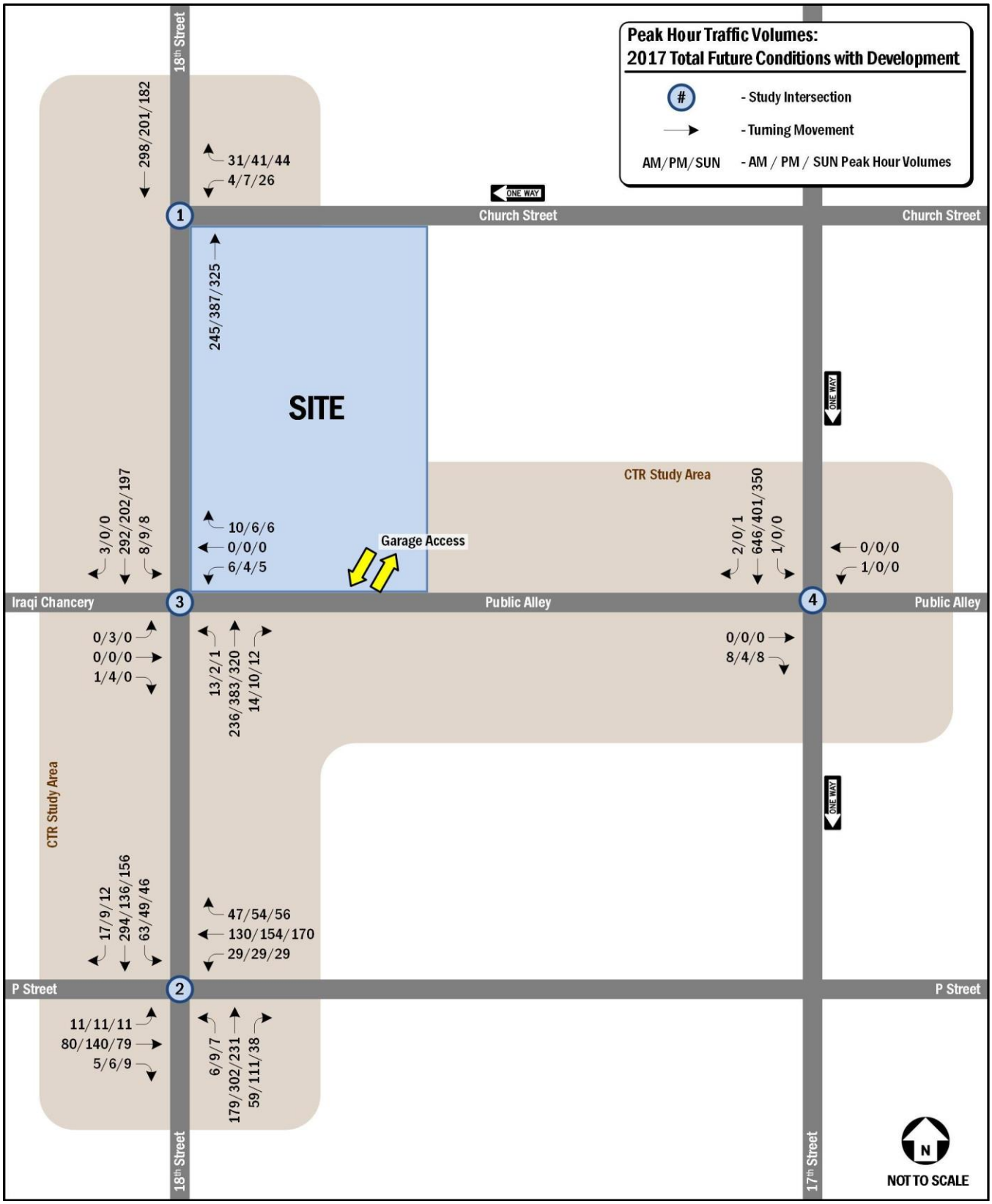



**Figure 11: Peak Hour Traffic Volumes – 2017 Total Future Conditions with Development**

**Table 7: Intersection Capacity Analysis Results – Level of Service (letter grade, A-F) and Average Delay (in seconds)**

| | | 2015 Existing Conditions | | | | | | 2017 Background Future without Development | | | | | | 2017 Total Future with Development | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *AM Peak Hour* | | *PM Peak Hour* | | *SUN Peak Hour* | | *AM Peak Hour* | | *PM Peak Hour* | | *SUN Peak Hour* | | *AM Peak Hour* | | *PM Peak Hour* | | *SUN Peak Hour* | |
| **Intersection** | **Approach** | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| **1. 18th St & Church St** | Westbound | 10.3 | B | 11.4 | B | 11.7 | B | 10.4 | B | 11.6 | B | 11.8 | B | 10.4 | B | 11.7 | B | 12.5 | B |
| **2. 18th St & P Street** | **Overall** | **18.5** | **B** | **21.9** | **C** | **18.3** | **B** | **19.0** | **B** | **22.5** | **C** | **18.8** | **B** | **19.0** | **B** | **22.6** | **C** | **18.8** | **B** |
| | Eastbound | 24.5 | C | 31.4 | C | 25.4 | C | 24.6 | C | 31.6 | C | 25.4 | C | 24.6 | C | 31.6 | C | 25.5 | C |
| | Westbound | 27.5 | C | 38.2 | D | 29.9 | C | 28.6 | C | 39.9 | D | 30.7 | C | 28.6 | C | 40.3 | D | 30.8 | C |
| | Northbound | 14.6 | B | 12.6 | B | 11.6 | B | 14.7 | B | 13.0 | B | 11.6 | B | 14.7 | B | 13.1 | B | 11.7 | B |
| | Southbound | 13.5 | B | 9.6 | A | 10.8 | B | 13.6 | B | 9.7 | A | 10.8 | B | 13.7 | B | 9.7 | A | 11.0 | B |
| **3. 18th St & Public Alley** | Eastbound | 0.0 | A | 0.0 | A | 0.0 | A | 11.4 | B | 14.7 | B | 0.0 | A | 11.4 | B | 15.0 | B | 0.0 | A |
| | Westbound | 12.5 | B | 14.4 | B | 13.2 | B | 12.9 | B | 15.0 | B | 13.2 | B | 13.3 | B | 15.5 | C | 14.0 | B |
| | N'bound Left | 8.4 | A | 8.4 | A | 8.0 | A | 8.5 | A | 8.4 | A | 8.0 | A | 8.5 | A | 8.4 | A | 8.0 | A |
| | S'bound Left | 8.3 | A | 8.9 | A | 8.5 | A | 8.3 | A | 8.9 | A | 8.5 | A | 8.3 | A | 9.0 | A | 8.5 | A |
| **4. 17th St & Public Alley** | Eastbound | 11.0 | B | 9.8 | A | 9.6 | A | 11.0 | B | 9.8 | A | 9.6 | A | 11.0 | B | 9.8 | A | 9.6 | A |
| | Westbound | 0.0 | A | 0.0 | A | 0.0 | A | 0.0 | A | 0.0 | A | 0.0 | A | 0.0 | A | 0.0 | A | 0.0 | A |
| | S'bound Left | 0.0 | A | 0.0 | A | 0.0 | A | 0.0 | A | 0.0 | A | 0.0 | A | 0.0 | A | 0.0 | A | 0.0 | A |

**Table 8: Intersection Capacity Analysis Results – 95th Percentile Queue Lengths (in feet)**

| | | | 2015 Existing Conditions | | | 2017 Background Future without Development | | | 2017 Total Future with Development | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Intersection** | **Movement** | **Storage Length** | AM Peak Hour | PM Peak Hour | SUN Peak Hour | AM Peak Hour | PM Peak Hour | SUN Peak Hour | AM Peak Hour | PM Peak Hour | SUN Peak Hour |
| **1. 18th St & Church St** | Westbound | 825' | 5' | 8' | 8' | 5' | 8' | 8' | 5' | 10' | 13' |
| | Northbound | 100' | 0' | 0' | 0' | 0' | 0' | 0' | 0' | 0' | 0' |
| | Southbound | 200' | 0' | 0' | 0' | 0' | 0' | 0' | 0' | 0' | 0' |
| **2. 18th St & P Street** | Eastbound | 200' | 82' | 145' | 84' | 86' | 150' | 87' | 86' | 151' | 89' |
| | Westbound | 825' | 155' | 205' | 196' | 173' | 221' | 214' | 174' | 223' | 215' |
| | Northbound | 150' | 140' | **214'** | 137' | 145' | **233'** | 138' | 147' | **236'** | 142' |
| | Southbound | 200' | 94' | 44' | 105' | 100' | 47' | 106' | 101' | 47' | 114' |
| **3. 18th St & Public Alley** | Eastbound | 60' | 0' | 0' | 0' | 0' | 3' | 0' | 0' | 3' | 0' |
| | Westbound | 825' | 3' | 0' | 0' | 3' | 0' | 0' | 3' | 3' | 3' |
| | Northbound | 100' | 0' | 0' | 0' | 0' | 0' | 0' | 0' | 0' | 0' |
| | Southbound | 100' | 0' | 0' | 0' | 0' | 0' | 0' | 0' | 0' | 0' |
| **4. 17th St & Public Alley** | Eastbound | 825' | 0' | 0' | 0' | 0' | 0' | 0' | 3' | 0' | 0' |
| | Westbound | 120' | 0' | 0' | 0' | 0' | 0' | 0' | 0' | 0' | 0' |
| | Southbound | 100' | 0' | 0' | 0' | 0' | 0' | 0' | 0' | 0' | 0' |

## *Traffic Safety Analysis*

This section provides a review of traffic safety data and pertinent site design considerations in and around the proposed redevelopment project.

### *Intersection Crash Data*

An analysis of existing crash data through the CTR study area was performed to determine if any intersections experience abnormally high crash rates at present. This analysis is based on data from DDOT's Traffic Accident Reporting and Analysis System (TARAS) and covers the last 3 years for which data is available, ranging from January 2012 to December 2014.

A review of the TARAS database found crash reports at two of the 4 study area intersections. These reports were reviewed and analyzed to determine the crash rate at each location. Crash rates are expressed in terms of the number of incidents per million-entering vehicles (MEV), which in turn is calculated based on peak hour traffic volumes. The resulting crash rates per intersection are shown in Table 9.

**Table 9: Intersection Crash Rates**

| Intersection | Total Crashes | Ped Crashes | Bike Crashes | Rate per MEV* |
|---|---|---|---|---|
| 1. 18th & Church Streets | 2 | 0 | 0 | 0.25 |
| 2. 18th & P Streets | 14 | 0 | 0 | **1.09** |
| 3. 18th Street & Public Alley | *no crash reports found* | | | n/a |
| 4. 17th Street & Public Alley | *no crash reports found* | | | n/a |

** - Million Entering Vehicles; volumes estimated based on turning movement count data*

According ITE's *Transportation Impact Analysis for Site Development*, a crash rate of 1.0 or higher is an indication that further study is required. 1 of the studied intersections meet this threshold, as shown in red in Table 9 with a breakdown of crash types, as indicated in the TARAS database, given in Table 10. and detailed in Table 9).

A rate over 1.0 does not necessarily mean there is a significant problem at an intersection, but rather is a threshold used to identify which intersections may have higher crash rates due to operational, geometric, or other issues. Additionally, it is important to note that the crash records do not provide detailed location information and in some cases the reported crashes may have been located near but not necessarily within the intersection in question.

For the flagged intersection with a crash rate over 1.0 per MEV, the crash type information from TARAS was reviewed to see if there is a high percentage of certain crash types. Generally, the reasons for why an intersection has a high crash rate cannot be derived from crash data, as the exact details of each crash are not represented. However, some summaries of crash data can be analyzed to identify general trends or eliminate some possible causes. Table 10 contains a breakdown of crash types reported for the intersection with a crash rate over 1.0 per MEV.

**Table 10: Crash Type Breakdown**

| Intersection | Rate per MEV | Right Angle | Left Turn | Right Turn | Rear End | Side Swiped | Head On | Parked | Fixed Object | Ran Off Road | Ped. Involved | Backing | Non-Collision | Under/Over Ride | Unspecified | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2. 18th & P Streets | **1.09** | 3 | 1 | 1 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | **14** |
| | | *21%* | *7%* | *7%* | *21%* | *14%* | *7%* | *0%* | *0%* | *0%* | *0%* | *7%* | *0%* | *0%* | *14%* | |

The TARAS data in Table 10 shows that the intersection of 18th and P Streets is only slightly over the threshold of 1.0 crashes per MEV, with a crash rate of approximately 1.09 crashes per MEV. A total of 14 crashes were reported during the 3-year analysis period and included a total of 4 injuries, 2 of which were disabling. There were no reported pedestrian-involved or bicycle-involved crashes.

The crashes at this intersection generally consisted of right angle, rear end, and side swipe collisions. Rear end collisions are particularly common at intersections. Right angle collisions are also common at intersections and generally occur when vehicles do not yield the right of way to perpendicular traffic. Sideswipe crashes can occur when thru vehicles attempt to pass turning vehicles waiting for a gap in oncoming or pedestrian traffic. Overall, the distribution of crash types at 18th & P Streets is typical of conditions at a signalized intersection and does not indicate a likely safety issue at the intersection.

This report does not recommend mitigation measures at this intersection as the proposed development is not projected to make changes to the commuting patterns, operations, or geometry of this intersection that could negatively influence safety.

### *Intersection and Garage Sight Lines*

Another factor that is important to consider when assessing traffic safety, particularly at proposed developments, is to ensure that adequate sight lines are provided at intersections and garage entrances. This report previously discussed sight distances at both of these locations in the "Off-Street Parking Access" section, above.

The redevelopment project maintains adequate sight lines at all study area intersections. The only intersection that is directly adjacent to the reconstructed building is the intersection of the public alley and 18th Street. The "Off-Street Parking Access" section found that the site plan is configured in a way that satisfies DDOT's requirements for 30' sight triangles at this location (shown in purple on Figure 3).

At the garage entrance point, the "Off-Street Parking Access" section presented several recommended modifications to the site plan relative to the plans contained in the BZA application plans to improve maneuverability, and particularly sight lines, for traffic exiting the garage. Most notably, increasing the garage entrance from 17' to 22' would give drivers exiting the garage a wider viewing angle into the alley, thereby reducing the potential for conflicts between exiting vehicles and east-west traffic within the alley. The widened garage entrance would also increase the visibility between inbound and outbound garage traffic. Increasing the garage entrance width, in conjunction with the widening of the parking garage ramp discussed previously, also would allow vehicles to exit the garage and head east to 17th Street, as is shown in Technical Attachment B-3.

## ALLEY OPERATION STUDY

In addition to the typical traffic study elements outlined in DDOT's CTR standards, this transportation statement also includes a study of alley operations. The Applicant has chosen to undertake this effort in order to ensure that the development's garage will function effectively given current traffic conditions in the public alley that the garage empties into, as well as to address concerns expressed by neighbors of the project who use the public alley, particularly to access rear yard parking areas.

### *Data Collection*

The alley operation study collected data relating to alley activity concurrently with the intersection turning movement counts discussed above, covering AM and PM study periods from 6:30-9:30 AM and 4:00-7:00 PM on Thursday, November 12, 2015 and a Sunday study period surrounding church worship services on Sunday, November 8, 2015 between 10:00 AM and 2:30 PM. The study covered the section of the public alley directly south of the site, beginning at 18th Street and stretching approximately 250' east, just past the eastern property line of the St. Thomas' Parish site. The approximate extents of the alley study area are shown in yellow on Figure 1, above.

The data collection process involved collecting video spanning the three study periods, totaling 10.5 hours. This video data was used to determine the level of vehicle activity within the alley study area. Each vehicle entering, maneuvering within, or departing the alley study area was recorded and categorized by vehicle type and direction of travel. The alley study area only covered the public portion of the alley and did not include any private rear yard parking areas, so any vehicles departing from or returning to parking spaces were also counted. Timestamps denoting the start and end times of each maneuver were also recorded, from which the dwell time can be determined, which is defined as the amount of time a vehicle took to traverse the alley study area. Raw tabulated data is included in Technical Attachment F.

### *Alley Traffic Characteristics*

In general, traffic volumes within the alley study area are low. The busiest hour of alley activity occurred during the AM study period and saw a total of 22 vehicles traversing the portion of the alley adjacent to the proposed redevelopment site, or approximately one vehicle every 160 seconds on average.

The incidence of truck traffic during the 10.5 hours of count data was also relatively low. Truck traffic was only observed during the AM study period, comprising of two trash trucks and one utility truck.

**Table 11: Alley Traffic Summary Statistics (adapted from Technical Attachment F)**

| Statistic | AM Study Period<br>Thu Nov 12 2015<br>6:30-9:30 AM | PM Study Period<br>Thu Nov 12 2015<br>4:00-7:00 PM | Sunday Study Period<br>Sun Nov 08 2015<br>10:00 AM - 2:30 PM |
|---|---|---|---|
| **Total Vehicles** | **40** | **33** | **42** |
| *Automobiles* | *37* | *33* | *42* |
| *Trash/Service Trucks* | *3* | *0* | *0* |
| **Peak Hour** | **08:30 AM - 09:30 AM** | **04:45 AM - 05:45 AM** | **01:30 PM - 02:30 PM** |
| *Total Hourly Vehicles* | *22* | *12* | *13* |
| *Eastbound* | *14* | *6* | *9* |
| *Westbound* | *8* | *6* | *4* |

Note that these volumes do not exactly match the intersection turning movement count data presented in Figure 6 and Technical Attachment C because the alley study area only covers the portion of alley adjacent to the redevelopment site,

whereas the turning movement counts were collected at the alley's intersections with 17th and 18th Streets. Figure 1, above, showed the extent of the alley study area, in yellow relative to the intersection turning movement count locations, in blue.

### *Two-Way Vehicle Encounters*

An analysis of the tabulated alley activity data shows that the alley study area is empty most of the time, as shown in Table 12. More than one vehicle was present in the alley for only 2 minutes and 15 seconds out of the 10.5 hours of study (0.36%). In total, there were 9 instances over the 10.5 hours where multiple vehicles were present in the alley, and of those only 3 instances involved vehicles traveling in opposite directions.

The dwell times of these vehicles encountering two-way encounters does not indicate that they were significantly delayed, with only one of these vehicles taking more than 45 seconds to traverse the alley, including departing a parking space.

**Table 12: Summary of Vehicle Encounters in the Alley Study Area (adapted from Technical Attachment F)**

| Number of Vehicles in Study Area | AM Study Period Thu Nov 12 2015 6:30-9:30 AM | PM Study Period Thu Nov 12 2015 4:00-7:00 PM | Sunday Study Period Sun Nov 08 2015 10:00 AM - 2:30 PM |
|---|---|---|---|
| 0 vehicles | 158 min 39 sec *(88.1%)* | 161 min 41 sec *(89.8%)* | 253 min 36 sec *(93.9%)* |
| 1 vehicles | 19 min 42 sec *(7.3%)* | 18 min 12 sec *(6.7%)* | 15 min 58 sec *(5.9%)* |
| 2 vehicles | 1 min 17 sec *(0.5%)* | 0 min 08 sec *(0.0%)* | 0 min 27 sec *(0.2%)* |
| 3 vehicles | 0 min 23 sec *(0.1%)* | 0 min 00 sec *(0.0%)* | 0 min 00 sec *(0.0%)* |
| 4+ vehicles | 0 min 00 sec *(0.0%)* | 0 min 00 sec *(0.0%)* | 0 min 00 sec *(0.0%)* |

### *Alley Blockages*

The incidence of alley blockages observed during the study periods, as identified by vehicles with significantly above-average dwell times and summarized in Table 13, was lower than anticipated. No prolonged loading activity was observed within the alley study area. The longest dwell times observed, and in fact the only dwell times over 100 seconds, occurred early during the AM study period when no other traffic was present in the alley. The first of these was a prolonged parking maneuver that took 148 seconds to complete, while the second instance was a trash truck conducting collection operations that took 201 seconds to traverse the alley study area.

**Table 13: Summary of Blockages in the Alley Study Area (adapted from Technical Attachment F)**

| Dwell Time | AM Study Period Thu Nov 12 2015 6:30-9:30 AM | PM Study Period Thu Nov 12 2015 4:00-7:00 PM | Sunday Study Period Sun Nov 08 2015 10:00 AM - 2:30 PM |
|---|---|---|---|
| 0-45 seconds | 33 vehicles *(82.5%)* | 27 vehicles *(81.8%)* | 40 vehicles *(95.2%)* |
| 45-90 seconds | 5 vehicles *(12.5%)* | 5 vehicles *(15.2%)* | 2 vehicles *(4.8%)* |
| 90+ seconds | 2 vehicles *(5.0%)* | 1 vehicles *(3.0%)* | 0 vehicles *(0.0%)* |
| **Maximum Dwell** | **201 sec** | **98 sec** | **62 sec** |

### *Conclusions*

At present, congestion in the alley is minimal and the number of two-way vehicle encounters that are present is generally limited to the morning rush hour due to a combination of truck activity and the delays caused by drivers backing out of parking spaces. The proposed 1772 Church Street redevelopment project and its associated below-grade garage will add approximately 21 vehicles per hour to the alley during its highest periods of trip generation, namely during the PM and Sunday peak hours. This increase translates to an average of one vehicle every 170 seconds and should not cause a noticeable increase in the incidence of two-way traffic encounters.

Although the volume and frequency of these new site-generated trips will be low and was shown in the "Vehicular Traffic Impacts" section above to have minimal impact on the CTR study intersections, the 21 peak hour trips that will access the garage during the PM and Sunday peak hours represents a measurable increase over existing alley volumes. Those 21 trips represent an increase of 62% over the 33 trips that currently use the alley during the PM peak hour and an increase of 53% over the 40 trips that currently use the alley during the Sunday peak hour.

In light of this fact, and in order to ensure that efficient alley access is maintained for their tenants and neighbors in the future, the Applicant has proposed to widen the effective width of the alley along the length of the site in order to reduce the likelihood of two-way vehicle encounters or alley blockages. This study recommended a series of modifications to the site layout and loading dock management, as presented in the "Proposed Alley Access Enhancements" and "Loading Management Plan" sections above, which included the following recommended elements:

- Expand the alley into private space by 3-6' to establish an effective width of 15-18' for the length of the site;
- Limit the size of trucks that can use the site's loading berth to 24' in length or shorter to allow all site-related loading activities to be accommodated outside of the alley; and
- Implement a loading management plan, the conditions of which were outlined earlier in this document, to further minimize the impacts of site-related loading activities on alley operations and neighboring homes.

Taken together, these recommended modifications and the loading management plan will allow vehicles to pass each other adjacent to the site, eliminating two-way vehicle conflicts in this section and significantly reducing the impact of blockages from trash collection and other alley users who may decide to conduct loading operations within public space.

## TECHNICAL ATTACHMENTS

This report is supplemented by the following technical attachments:

- *Technical Attachment A: Multimodal Trip Generation*
  Assumptions and calculation steps used to determine the site's projected trip generation
- *Technical Attachment B: Alley Accessibility Analyses*
  Vehicle maneuverability analyses conducted using AutoTURN
- *Technical Attachment C: Raw Traffic Count Reports*
  Raw vehicle, truck, pedestrian, and bicycle count data collected at the study area intersections in November 2015
- *Technical Attachment D: Background Traffic*
  Background growth rate source data and assumptions plus background development characteristics and trip generation
- *Technical Attachment E: Synchro Intersection Capacity Reports*
  Synchro report files showing AM, PM, and Sunday analysis results for 2015 Existing Conditions, 2017 Background Future Conditions without Development, and 2017 Total Future Conditions with Development
- *Technical Attachment F: Raw Alley Activity Data*
  Raw data showing timestamps for traffic passing through the alley study area, categorized by vehicle type and direction of travel; collected in November 2015