



CITY OF DULUTH

Community Planning Division

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File Number	PL 18-158	Contact	Kyle Deming, kdeming@duluthmn.gov	
Type	MU-I Planning Review	Planning Commission Date	January 8, 2019	
Deadline for Action	Application Date	December 4, 2018	60 Days	February 4, 2019
	Date Extension Letter Mailed	December 20, 2018	120 Days	April 3, 2019
Location of Subject	1012 E. Second St. (St. Luke's Building A)			
Applicant	St. Luke's Hospital – Mike Boeselager	Contact	mboeselager@slhduluth.com	
Agent	Erdman Company – Tim Casey	Contact	tcasey@erdman.com	
Legal Description	PID 010-3830-05080			
Site Visit Date	December 26, 2018	Sign Notice Date	December 24, 2018	
Neighbor Letter Date	December 21, 2018	Number of Letters Sent	69	

Proposal

Requested is a Plan Review associated with the MU-I plan for the St. Luke's Campus. The proposal includes:

- Relocation of the Emergency Department to Building A,
- Replacement of the existing parking deck east of Building A,
- Development of a new structure containing an ambulance garage and Emergency Department drop-off/parking accessed from E. 2nd St,
- Creation of a heliport on the roof of the new ambulance garage/parking structure,
- Installation of pavement, storm water treatment, perimeter landscaping, and improved lighting in the parking lot on the north side of E. 2nd St across from Building A.

	Current Zoning	Existing Land Use	Future Land Use Map Designation
Subject	MU-I	Medical	Medical District
North	MU-I/R-2	Medical Parking/Residential	Medical District
South	MU-I	Medical	Medical District
East	MU-I/R-2	Medical Parking/Residential	Medical District
West	MU-I	Medical	Medical District

Summary of Code Requirements

50-15.4 MU-I District - Planning review by the Planning Commission is required for new development and redevelopment in the MU-I district where there is not an approved MU-I District Plan.

50-18.1E Storm Water Management - Addresses water runoff quality and quantity pre- and post-construction.

50-20.5.E Use Specific Standards for Accessory Heliports - All accessory heliports shall have and maintain in effect at all times all required permits and approvals, if any, for the facility and operation required by the FAA, and shall design and maintain the facility and conduct operations in compliance with those permits and approvals;

50-24 Parking and Loading - Addresses required minimum and maximum parking spaces and loading docks, dimensional standards, snow storage and pedestrian circulation.

50-25 Landscaping and Tree Preservation - Landscaping standards such as materials, plant size, location, tree preservation and replacement.

50-26 Screening, Walls, and Fences - Screening of mechanical equipment, loading areas, and commercial containers, plus regulations regarding fences and retaining walls.

50-27 Signs. Wall signs are limited to the square footage of the size of the building being less than or equal to the length of the structure.

50-29 Sustainability standards apply to new developments or buildings.

50-30 Design Standards - Building standards for multi-family, commercial, institutional, and industrial buildings.

50-31 Exterior Lighting - Directs the minimum and maximum illumination values and lighting fixtures for a site.

50-37.11 Planning Review - Planning Commission shall approve the Planning Review or approve it with modifications, if it is determined that the application complies with all applicable provisions of this Chapter.

Comprehensive Plan Governing Principle and/or Policies and Current History (if applicable):

Principle #1 – Reuse previously developed lands.

Principle #3 – Support existing economic base.

Principle #4 – Support economic growth sectors. This includes the medical field.

Principle #5 – Promote reinvestment in neighborhoods.

Principle #7 – Create and maintain connectivity.

Principle #8 – Encourage mix of activities, uses, and densities.

Principle #9 – Support private actions that contribute to the public realm.

Principle #10 – Take actions that enhance the environment, economic, and social well-being of the community.

Principle #13 – Develop a healthy community.

Principle #14 – Integrate fairness into the fabric of the community.

Economic Development Policy #3 – Build on existing economic strengths and competitive advantages, Strategy #2. Coordinate with major institutions, including hospital and university campuses, to plan for their growth, minimize development impacts, and provide for stability and livability for the campuses, their employees, and surrounding neighborhoods.

Future Land Use - Medical District: An area encompassing the medical campuses and adjacent areas that support them, with related commercial, office uses and residential uses in the fringe areas of the district, density increasing from fringe to taller buildings in core, form-based guidelines to transition between core and fringe, preserve viewsheds, pedestrian-oriented design, transit facilities, and parking, Relationship to institutional master plans

St Luke's Hospital has had several projects come before the Planning Commission in previous years:

- FN 10-113 - Oxygen Tanks at NW corner of 10th Ave. E. and E. 2nd St.,
- FN 11-002 - Permanent Parking Lot between E. 1st and E. 2nd St. west of 12th Ave. E.,
- FN 11-011 - Construction of SLH Building A at SE corner of 10th Ave. E. and E. 2nd St.,
- FN 11-049 - SUP for Temporary Gravel Parking Lot and Storage Yard on north side of E. 2nd St. between 10th and 11th Aves. E.,
- PL 12-170 - District Plan for parking, signage, lighting, and traffic calming,
- PL 14-060 - Generator Building at NE corner of 10th Ave. E. and E. 2nd St.,
- PL 16-082 - MRI Building Expansion on E. 2nd St. side of the hospital,
- PL 17-143 - 750 SF Cancer Center addition to SLH Lakeview Building, 1001 E. Superior St., for radiation therapy.

Review and Discussion Items

Staff finds that:

1) Applicant's proposal includes:

- a) relocation of the Emergency Department to Building A from its existing location on 1st Street;
- b) replacement of the existing parking deck east of Building A with a new structure containing an ambulance garage and Emergency Department drop-off/parking accessed from E. 2nd St.;
- c) addition of parking in the lower level of the new ambulance/heliport structure accessed by E. 1st St.;
- d) creation of a heliport on the roof of the new ambulance garage/parking structure;
- e) removal of the parking lane in the 1000 block of E. 2nd St.;
- f) improvements to the existing gravel parking lot on the north side of E. 2nd St. consisting of pavement, storm water treatment, perimeter landscaping, and improved lighting;
- g) addition of an elevator to the south wall of Building A near the point where the skywalk across 10th Ave. E. enters the building.

2) 50-15.4 (MU-I District) - Property is zoned MU-I. St. Luke's Hospital has an approved District Plan (adopted 2012). This structure was not included in that plan, so Planning Review is required. The MU-I zone district is intended for this type of hospital campus. The purpose statement for the MU-I District states that it "is established to provide for the unique development needs and impacts of major medical, educational and research institutional development. The intent is to give institutional landowners the flexibility to plan and develop their facilities while ensuring that surrounding neighborhoods are protected from adverse impacts, such as traffic, overshadowing buildings, noise and unexpected expansion of institutional uses into residential areas." Compliance with specific UDC Development Standards are below.

3) 50-18.1 (Natural Resources Overlay) – The property is not within a floodplain or shoreland area. The project includes erosion control measures during construction, and permanent water quality and rate control will be met using existing systems. Water quality improvements to the existing parking lot on the north side of E. 2nd St. include installation of pavement to reduce erosion, and an engineered swale to filter runoff.

4) 50-20.3 (Use Specific Standards) – Accessory Heliports must maintain required permits with FAA and operate the facility in accordance with those permits.

5) 50-23 (Connectivity) – Paragraph 5 of the applicant's submittal and Sheet D.1 describe pedestrian, vehicular, and transit access to the relocated Emergency Department. Patient drop-off and parking is provided in the new parking deck off of E. 2nd St. Pedestrian and transit access will route from surrounding streets and bus stops; the walkway from E. 2nd St. to the building entrance is covered. Removal of a parking lane on E. 2nd St. reduces the crossing distance for pedestrians accessing the site from the north. For the parking lot on the north side of E. 2nd St., the applicant is required to add pedestrian walkways (striped, at a minimum) at both the east and west ends of the parking lot connecting to adjacent public sidewalks.

6) 50-24 (Parking and Loading) – The proposal relocates the Emergency Department within the St. Luke's campus. There will be a loss of 34 parking stalls from the 2nd St. level with the new parking deck. The City Engineer has confirmed that a traffic circulation study is not required due to the scope of the project. The application includes that the parking lot on the north side of E. 2nd St. will be paved, except for a portion along the alley. Alley portions of the parking lot should be paved concurrently with the primary parking lot.

7) 50-25 (Landscaping and Tree Preservation) – Attachment C.3 is the landscape plan described by paragraph 14 of the applicant's submittal. The proposal provides required street frontage landscaping for the new structure as well as the improved parking lot on the north side of E. 2nd St.

8) 50-26 (Screening, Walls, and Fences) – No mechanical units, trash, or loading areas are planned to be installed at grade level. Existing trash and loading areas will be utilized. A roof-mounted mechanical unit will be added to the roof of Building A and will be screened similarly to the existing units, which comply with the UDC. The height of the proposed structure is within the height limits of the zone district and the proposed structure will utilize colored

precast concrete with brick inlays similar to the existing Building A exterior. The parapet wall at the top of the new structure will partially screen the heliport, provide shielding from the wind of the helicopter, and provide a place for directional signage.

9) 50-31 (Exterior Lighting) – Proposed exterior lighting at building entrances will be designed to comply with UDC requirements. Surface-mounted heliport lighting will be per FAA requirements and walkway lighting on the helipad will be designed to comply with UDC requirements. Existing flood lights on the gravel parking lot north of E. 2nd St. will be replaced with fixtures that comply with the UDC.

10) The proposal includes relocation of the heliport to the roof of the new parking deck. The new location provides improved access to the relocated Emergency Department. However, the relocated site creates other concerns, outlined in paragraph 7 of the applicant's submittal. Noise from arriving and departing helicopters will be approximately 400 feet closer to the residential neighborhoods on the north side of E. 2nd St. Approximately 100 dwelling units will be within 500 feet of the relocated helistop compared to 36 dwelling units within 500 feet of the existing helistop.

Applicant prepared the attached "Noise Screening Analysis" to consider impacts to the surrounding neighborhood. The study found that, while there will be intermittent increases in noise levels in the neighborhood during helicopter operations, there is no exceedance of Occupational Safety and Health Administration (OSHA), Minnesota Pollution Control Agency (MPCA), or Federal Aviation Administration (FAA) noise safety levels. These noise safety standards are set for longer-term exposures (see descriptions of each level in the attached Noise Screening Analysis) and the noise generated by helicopter operations will typically be less than 15 minutes each and approximately 400 times per year given current air ambulance traffic.

Based on review of Grid Point Results (Table 4 of the Analysis) with the Grid Point Locations map (Exhibit 4 of the Analysis), portions of the residential neighborhood will be exposed to noise levels of 100 - 103 dB near the intersection of 12th Ave. E. and E. 2nd St. and 100.8 dB across E. 2nd St. from the helistop. The model predicts noise levels in the 90 dB range as far away as 15th Ave. E. and 2nd St. Examples of things that typically generate 100 dB sounds include lawn mower, motorcycle, or garbage truck.

In addition to noise calculations, the applicant also analyzed the amount of wind generated by helicopter operations (which is called "rotor wash") to see if it would cause negative impacts to E. 2nd St. and adjacent parking lots. Limited data exists for the specific helicopter in use at St. Luke's Hospital, but the applicant finds that there have been no problems with the current heliport, which is mounted over the open parking deck. Additionally, the applicant provided calculations from a US Dept. of Transportation-FAA study of larger helicopters showing the expected rotor wash to be less than the 10-35 miles per hour velocities generated by the larger military-style helicopters in the study. This may be considered a possible nuisance condition to people using E. 2nd St., which may be abated somewhat by the solid parapet wall at the edge of the helistop which could deflect some rotor wash. To reduce the possibility of wind driven debris, the heliport has been designed with heating coils in the surface to eliminate the need for salt and sand in the winter.

11) Tom Johnson, City of Duluth, Storm Water Engineer, commented that storm water improvements are needed for the gravel parking lot and that he is in conversation with the applicant's engineer about this matter. No additional City, public, or agency comments have been received.

12) Per UDC 50-37.1.N, an approved Planning Review will expire if the project or activity authorized is not begun within one year, which can be extended for one additional year at the discretion of the Land Use Supervisor.

13) Summary: When considering approval of this proposal, the Planning Commission should consider how the proposed project complies with *Article IV Development Standards* and the purpose of the MU-I district. The City's Future Land Use Map (attached) indicates that areas north of E. 2nd St. are currently zoned R-2, but should be rezoned MU-I for expansion of the medical campus. Noise and other impacts should be considered.

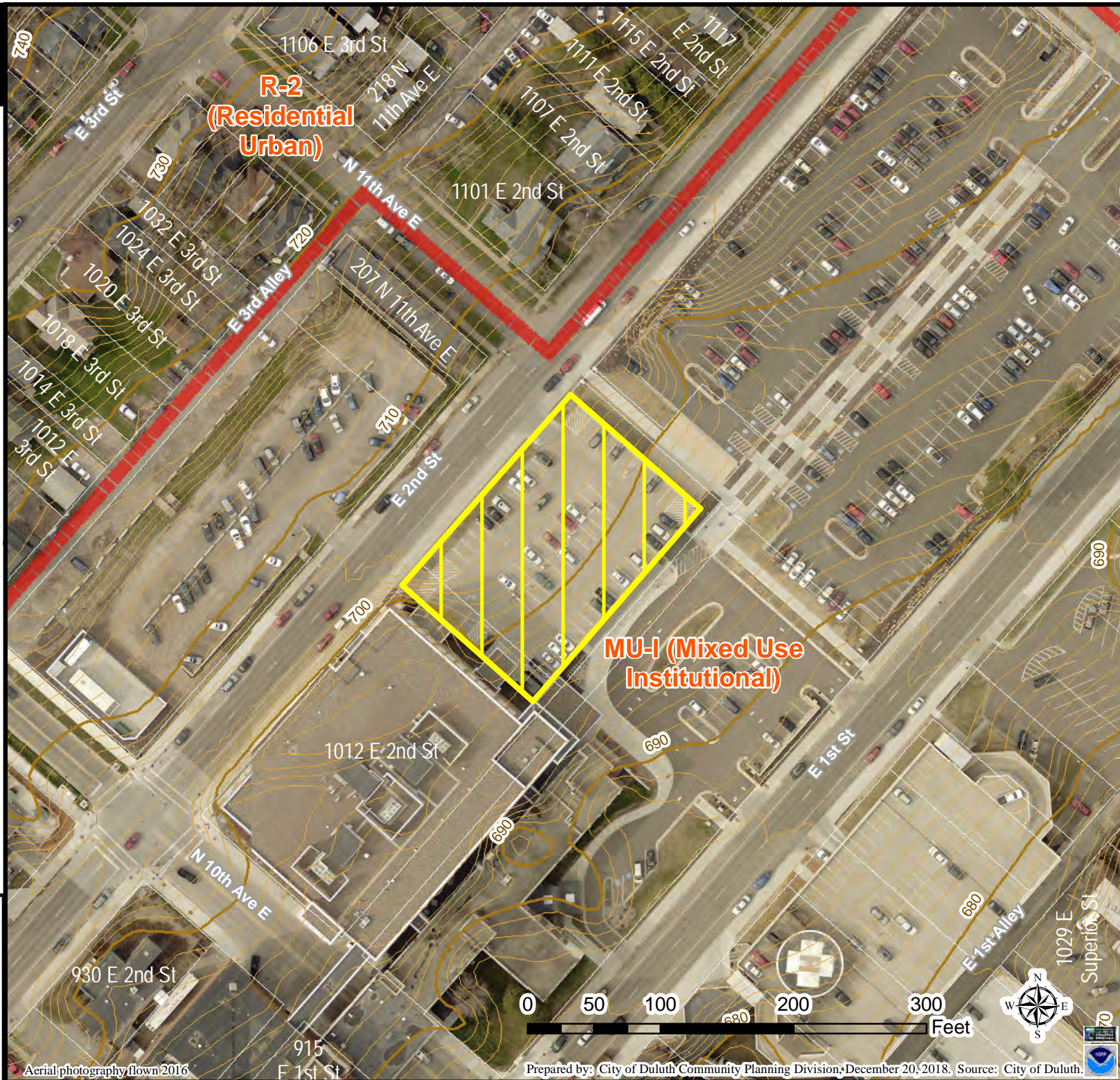
Staff Recommendation

Based on the above findings, staff recommends approval of the Planning Review, subject to the following conditions:

- 1) The project be limited to, constructed, and maintained according to the site plans, landscaping plans, and exterior elevations provided with this application as Attachments A.1, A.2, A.3, B.1, B.2, B.3, B.4, B.5, B.6, C.1, C.2, C.3, D.1, and D.2 dated 12/04/2018;
- 2) The heliport be used exclusively for patient transport;
- 3) The applicant provide to the Land Use Supervisor fixture details for the lighting of the heliport before making application for a building permit and that the proposed lighting comply with UDC Sec. 50-31;
- 4) The applicant provide to the Land Use Supervisor revised landscape and storm water plans (Attachments C.1, C.2, and C.3) before application for a building permit to show additional landscaping (street trees) that meet UDC requirements and storm water improvements to the parking lot on the north side of E. 2nd St. that are approved by the City Engineer;
- 5) The applicant amend the plans for the parking lot on the north side of E. 2nd St. to include paving the portion along the alley;
- 6) Any alterations to the approved plans that do not alter major elements of the plans may be approved by the Land Use Supervisor without further Planning Commission; however, no such administrative approval shall constitute a variance from the provisions of UDC Chapter 50.



St. Luke's Hospital
 1012 E. 2nd St.
 MU-I Plan Review
 Parking and Helistop



Legend

- 1 Ft contour
- 10 Ft contour
- Municipal Boundary
- Zoning Boundaries
- Trout Stream (GPS)
- Other Stream (GPS)

The City of Duluth has tried to ensure that the information contained in this map or electronic document is accurate. The City of Duluth makes no warranty or guarantee concerning the accuracy or reliability. This drawing/data is neither a legally recorded map nor a survey and is not intended to be used as one. The drawing/data is a compilation of records, information and data located in various City, County and State offices and other sources affecting the area shown and is to be used for reference purposes only. The City of Duluth shall not be liable for errors contained within this data provided or for any damages in connection with the use of this information contained within.



St. Luke's Hospital
 1012 E. 2nd St.
 MU-I Plan Review
 Parking and Helistop



Legend

- Municipal Boundary
- Zoning Boundaries
- Trout Stream (GPS)
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Aerial photography flown 2016

Prepared by: City of Duluth Community Planning Division, December 20, 2018. Source: City of Duluth.



St. Luke's Hospital
1012 E. 2nd St.
MU-I Plan Review
Parking and Helistop



Legend

- Municipal Boundary
- Trout Stream (GPS)
- Other Stream (GPS)
- Future Land Use**
- Open Space
- Rural Residential
- Low-density Neighborhood
- Traditional Neighborhood
- Urban Residential
- Neighborhood Commercial
- Neighborhood Mixed Use
- General Mixed Use
- Central Business Secondary
- Central Business Primary
- Auto Oriented Commercial
- Large-scale Commercial
- Business Park
- Tourism/Entertainment District
- Medical District
- Institutional
- Commercial Waterfront
- Industrial Waterfront
- Light Industrial
- General Industrial
- Transportation and Utilities

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Aerial photography flown 2016



December 4, 2018

St. Luke's Hospital
1012 East Second Street
Duluth, MN

Planning Commission Submittal

1. Project Overview

St. Luke's hospital is in the process of planning and designing new medical space in their existing Building "A" facility. The goal of this project is to better serve the City of Duluth and St. Luke's patients. The build-out of the second and third floors will provide state of the art medical space and provide better healthcare to the surrounding community. The project at St. Luke's Hospital is a buildout of Building "A" consisting of the following:

- a) Buildout of the third floor for a new emergency department
- b) Remove existing parking deck and replace the parking deck with a new structure which will serve as a new helipad, ambulance garage, emergency department drop-off and parking on two levels.
- c) Buildout of the second floor with catheter labs and related clinic / hospital functions.
- d) Add a new elevator between Building "A" and the existing facility.
- e) Minor remodeling on the fourth floor.
- f) Site work as required for the new functions including curb line bump-outs on 2nd Street.
- g) Modification of the adjacent gravel parking lot on the opposite side of 2nd Street from Building "A".

2. Schematic Building Plans

Attached (See A.1 - A.3) are schematic plans for the new structure. These include:

- a) Lower level parking
- b) Second level indicating the new ambulance garage and emergency department patient drop-off and parking.
- c) Third level helipad

3. Building Elevations / Renderings

Attached (See B.1 – B6) are conceptual renderings of what the facility will look like once the project is complete. The intent of the design is to match the existing materials of Building "A" so that it blends and complements the existing structure.

4. Site Circulation, Layout and Landscaping

St. Luke's Building "A" can be accessed by First and second street on the east and west sides and 10th Avenue on the south side. Attached (See C.1 - C.3) is a diagram indicating these streets and the direction of travel on them.

5. Emergency Department Access

The emergency department can be accessed by ambulance, personal vehicle drop-off and walking from local surroundings or via being dropped off via mass transit. There are two different levels that a patient may access. The main entry point is from Second Street as the emergency department is located on this level. The secondary access point is from First Street where a patient may park or walk-up to the entry on First Street, enter the building and take an elevator ride up one floor to the emergency department. Attached (See D.1 and D.2) are diagrams indicating the different access points to the emergency department.

6. Number of emergency patients per day

Currently St. Luke's sees approximately 85 -100 patients per day. 15 – 17% of these patients arrive by ambulance. St. Luke's also receives approximately 200 patients per year by helicopter.

7. Helipad Considerations (See attachments E.1 – E.3)

Flight Path: An identified flight path has been selected for the helipad permitting through the Minnesota Department of Transportation (MnDOT) and the federal aviation administration (FAA). These paths are clear of any safety obstructions for the designated slopes though and around the identified flight paths. The identified flight paths are attached to this document.

Noise: As part of the relocation of the helipad closer to 2nd Street, a noise study was completed to identify the impacts the relocation may have on the surrounding neighborhood. The noise study identified existing noise levels as well as proposed noise levels. The result of this study found that there will be an increase in intermittent noise levels in portions of the neighborhood, but there is no exceedance of noise safety levels as identified by Occupational Safety and Health Administration (OSHA), the Minnesota Pollution Control Agency (MCPA), and the FAA. The noise report is attached to this document.

Wind: In addition to the impacts identified above, the wind created by a helicopter (referred to as rotor wash) was considered in this location. The primary areas of concern with regard to the rotor wash are the public spaces adjacent to the property (such as St. Luke's parking lot or 2nd Street). The area immediately adjacent to the helipad will only be operated by St. Luke's staff and will not be open the general public.

Limited data exists with regards to modeling specific rotor wash information. For this reason, a specific wind model was unable to be created and instead the analysis was completed using an empirical approach based on other existing data.

In the current condition, the existing helipad is elevated approximately 10 feet above the Northland ramp parking facility. Parking spots exists on the Northland ramp immediately adjacent to the elevated helicopter landing area. This is comparable to the elevation of the helipad to 2nd street and stands to reason that a comparable condition would exist along 2nd Street. St. Luke's does not have reports of any vehicle damage or pedestrian concerns during operation of their existing facility. It should be noted that this is a somewhat conservative approach to the prediction of the proposed condition due to the existing helipad being an open metal structure whereas the proposed condition will include a concrete roof structure that will further work to deflect wind away from the public space.

In addition to the existing facility being used as a comparison, some existing data exists relative to rotor wash of different helicopter units. This data was created by the US Department of Transportation and the FAA in the 1990's and is generally applicable to larger, military style helicopters. However, it would be expected that the smaller medical helicopters that are to be permitted for use at the St. Luke's facility would create less rotor wash due to less force generation being required to maintain the weight of the helicopter.

Two graphs are attached which indicate rotor wash velocities for various helicopter units. In both graphs, the data indicates that at a distance of 10' above ground level (the approximate elevation above 2nd Street where a helicopter will land) there would be an expectation of 10-30 knots (10-35 mph) on average. This would indicate a possible nuisance condition for the travelling public, but not a safety concern or a concern with potential property damage.

8. Lighting

The new structure will be lit as follows:

- a) The parking areas in the new structure will be lit with energy efficient LED parking fixtures. These fixtures are designed to light the parking surface only and not spill light out of the structure.
- b) The helipad will be lit with surface mounted in slab lights to guide the helicopter. These lights will only be on when a helicopter needs to land. An additional fixture will be added to the face of Building "A" to illuminate the entrance into the building. This light will only be on when required.

9. The existing parking lot will be modified as follows:

- a) Existing flood lighting (secured to wood Minnesota Power poles in the alley) will be removed due to concerns raised from the adjacent property owners about light pollution
- b) New lighting will be installed within the parking area in line with St. Luke's current site lighting including a cutoff fixture to direct light downwards.

10. Signage

Signage will be used to indicate various points of entry for both patients and ambulances. This is indicated on the provided renderings. St. Luke's does have a campus signage plan in place.

11. Parking

As part of the construction of the emergency department and ambulance access, some parking will be reduced at the St. Luke's campus. However, with the available parking elsewhere within the site, there is still enough parking to satisfy UDC parking requirements after the completion of this project. Parking may be considered as a future need with further campus development.

12. HVAC Screening

A new rooftop mechanical unit will be located on the roof of Building "A". It is not anticipated that this new unit will be seen from the street level. However, the new unit will be screened using the same design as what was designed and in place currently on top of Building "A".

13. Deliveries and Trash Removal

All deliveries and trash removal for the new departments will utilize the existing methods that the hospital has in place. There will not be any increased traffic to this portion of the site for deliveries and trash.

14. Landscaping, Traffic, & Streetscape

Landscaping elements are designed within compliance for UDC standards for street side screening. This includes trees and shrubs in planting beds along the street. The view of traffic existing the enclosed structure is considered in the selection of the landscaping materials. Current site plan and landscape plans are attached.

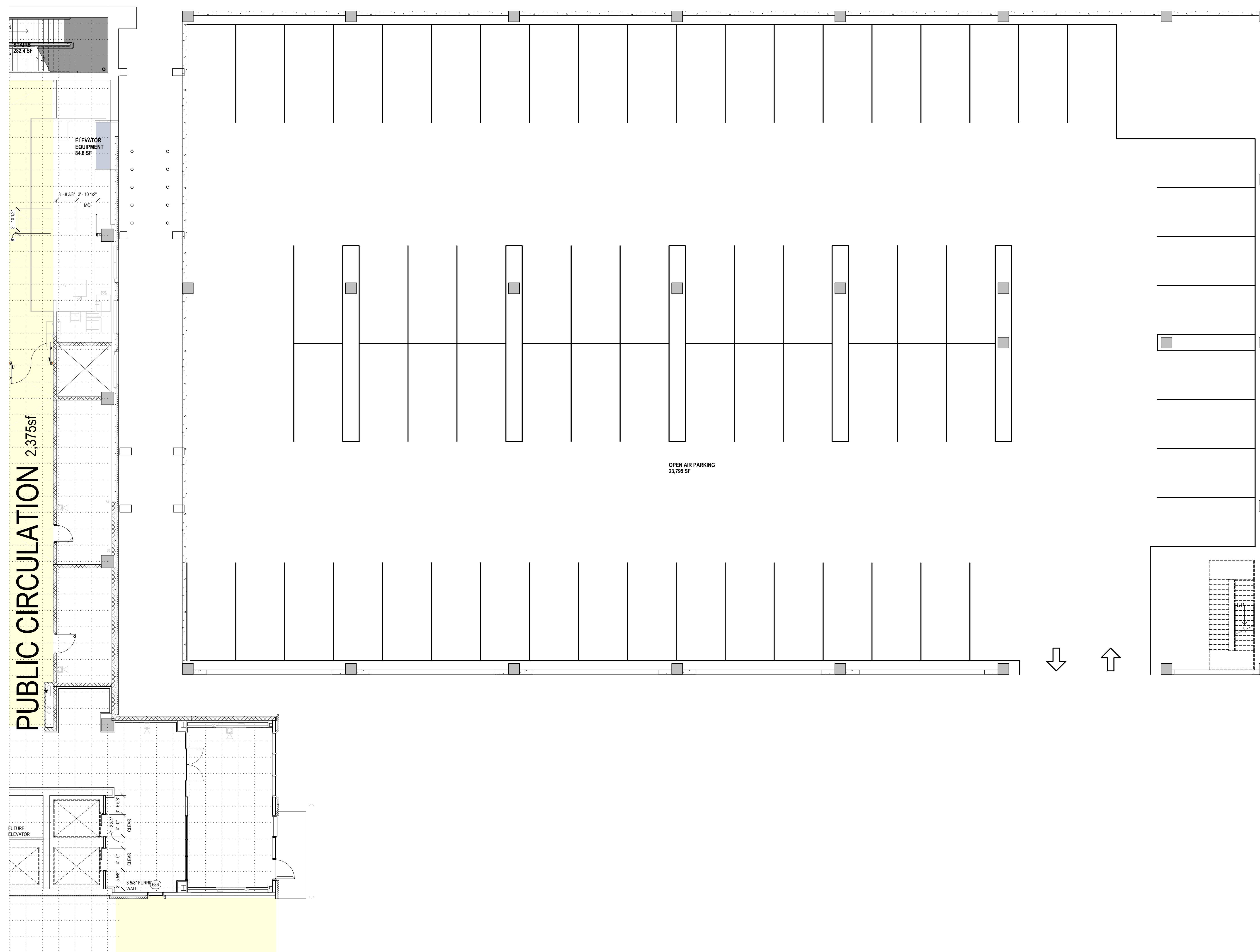
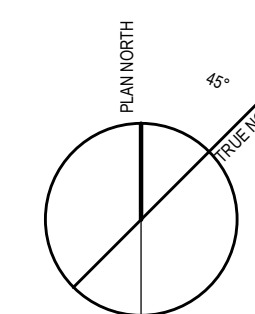
Given the expectation of a future structure across 2nd Street, no internal parking lot landscaping is proposed at this time. Should this area become a more permanent surface parking lot, St. Luke's would undertake the effort to complete grading of the lot at a flatter slope and installing UDC compliant elements (such as shade trees) within the parking area.

Some additional traffic is anticipated on 2nd Street as part of the relocation of the St. Luke's emergency department, but this is well below thresholds that would require a traffic study for the project.

St. Luke's is also proposing bump-outs in 2nd Street for the following reasons:

- a. These bump-outs will provide a safety benefit to ambulance traffic relative to the other traffic on 2nd Street as well as the pedestrian traffic on 2nd Street.
- b. These bump-outs will provide traffic calming for traffic moving along 2nd Street. While the bump-outs will not actually impede the traffic lanes, the break of the street cross section lends itself to providing safer moving traffic patterns in this critical corridor. Given the long one-way travel path on 2nd Street with a uniform cross section, it is anticipated these will be particularly effective.
- c. The bump-outs will better define the medical campus and a clearer definition to the emergency access point for the general public.

It should be noted that these bump-outs are not intended to facilitate a mid-block pedestrian crossing. Rather, the landscaping strategy is designed a manner that the pedestrian crossings are encouraged at 10th Avenue East and 11th Avenue East.



1 SECOND FLOOR PARKING DECK
 SCALE: 1/8" = 1'-0"

Attachment - A.1

4	PLANNING COMMISSION SUBMITTAL	12/04/16
No.	Description	Date
Document Release		

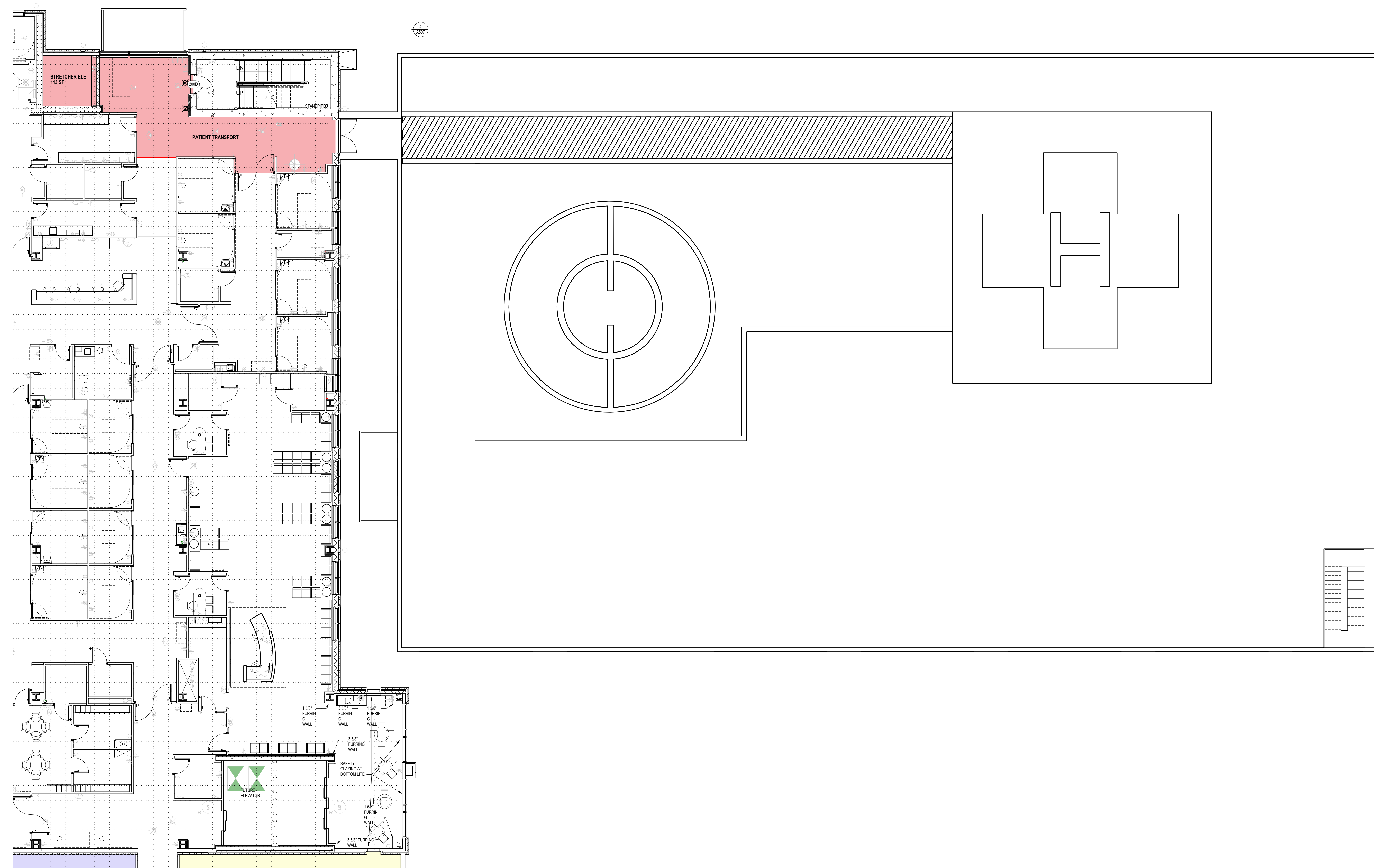
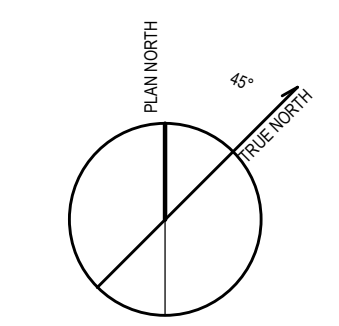
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Sheet Name
SECOND FLOOR PARKING DECK

Scale: 1/8" = 1'-0"
 Sheet Number

A110

DULUTH, MN
 656220



1 FOURTH FLOOR PARKING DECK
 SCALE: 1/8" = 1'-0"

Attachment - A.3

4	PLANNING COMMISSION SUBMITTAL	12/04/16
No.	Description	Date
Document Release		

Dim/Author Chk/Checker

Sheet Name
FOURTH FLOOR PARKING DECK

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 Sheet Number

A112

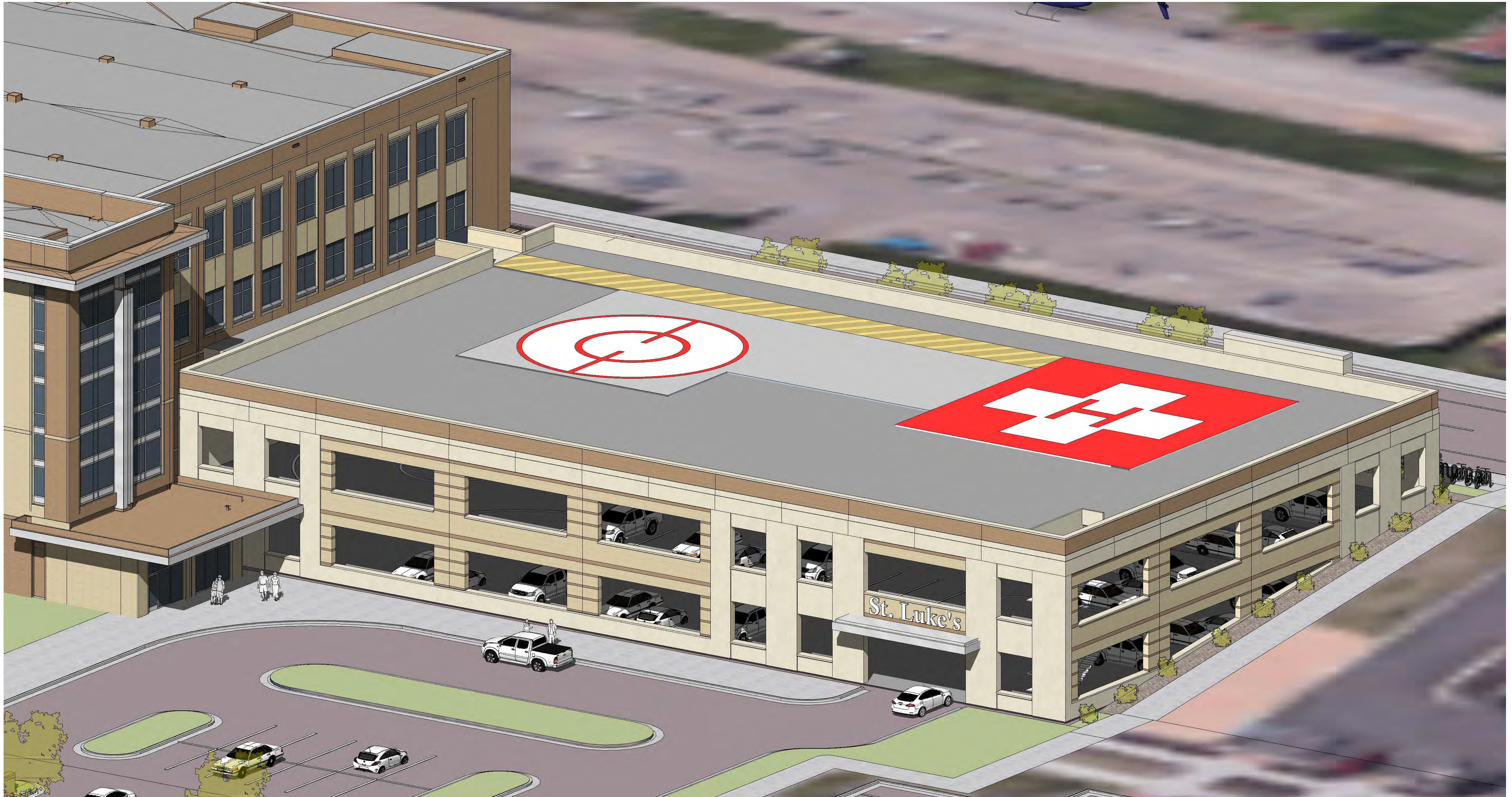
DULUTH, MN
 656220



PARKING DECK ENTRY PERSPECTIVE

ERDMAN

Attachment - B.1



RAMP AXON EAST

ERDMAN

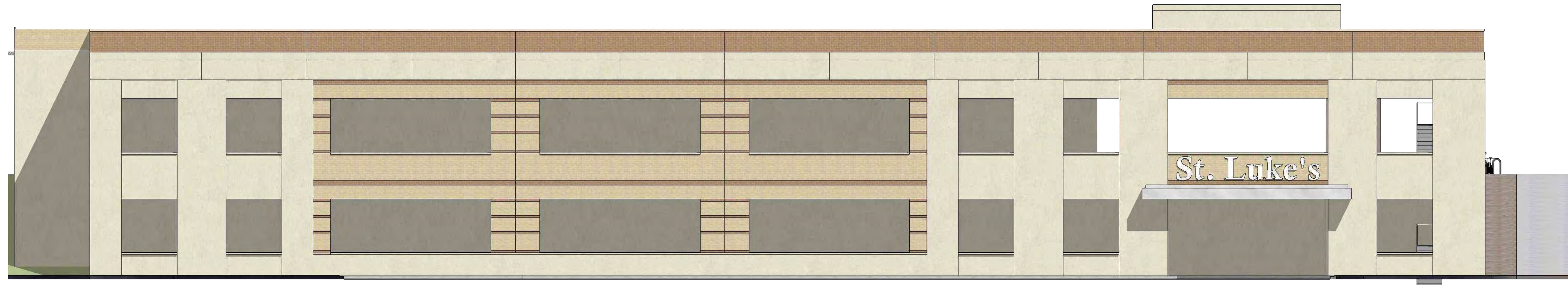
Attachment - B.2



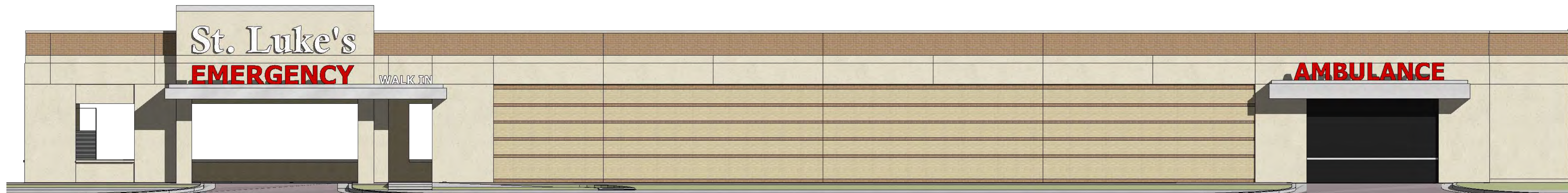
RAMP AXON NORTH

ERDMAN

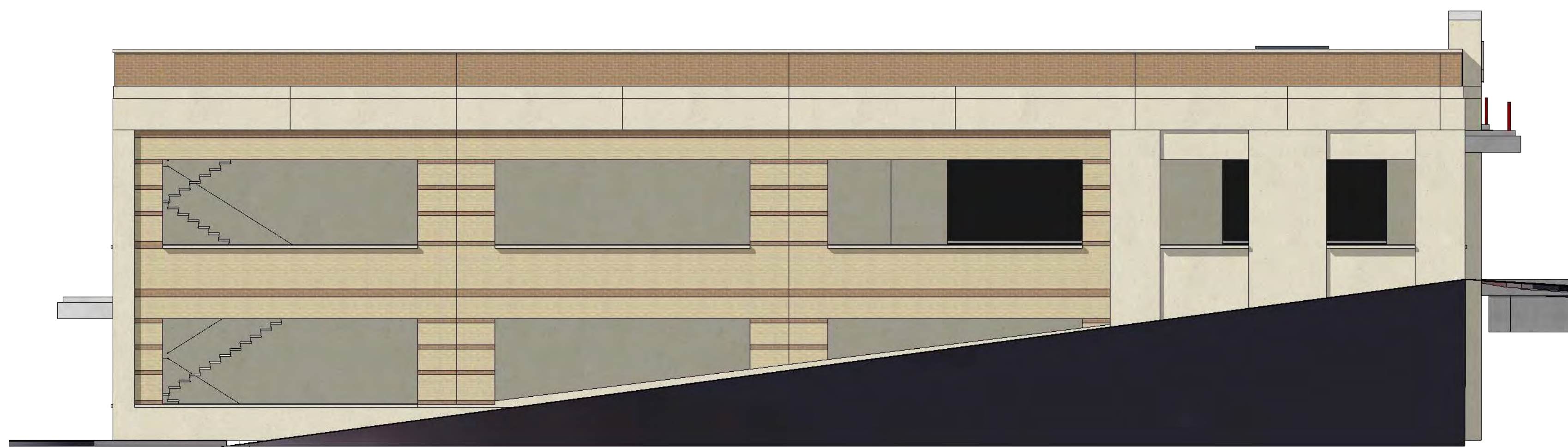
Attachment - B.3



EAST ELEVATION SCALE = 1/8" = 1'



WEST ELEVATION SCALE = 1/8" = 1'



NORTH ELEVATION SCALE = 1/8" = 1'

ERDMAN

Attachment - B.4



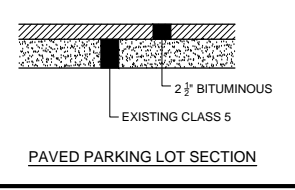
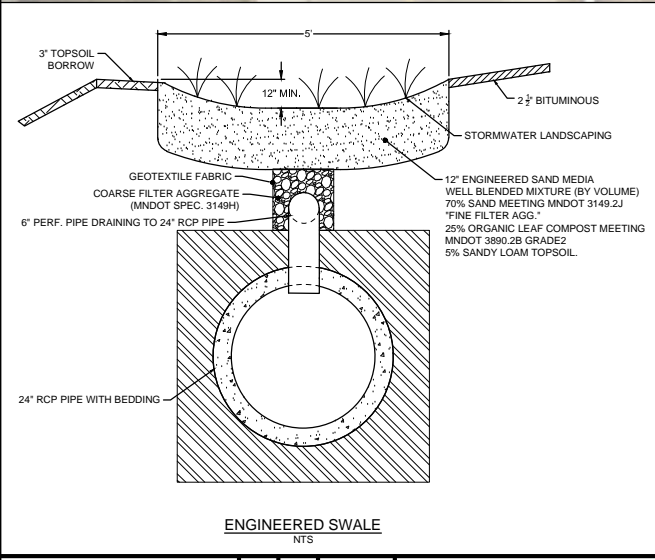
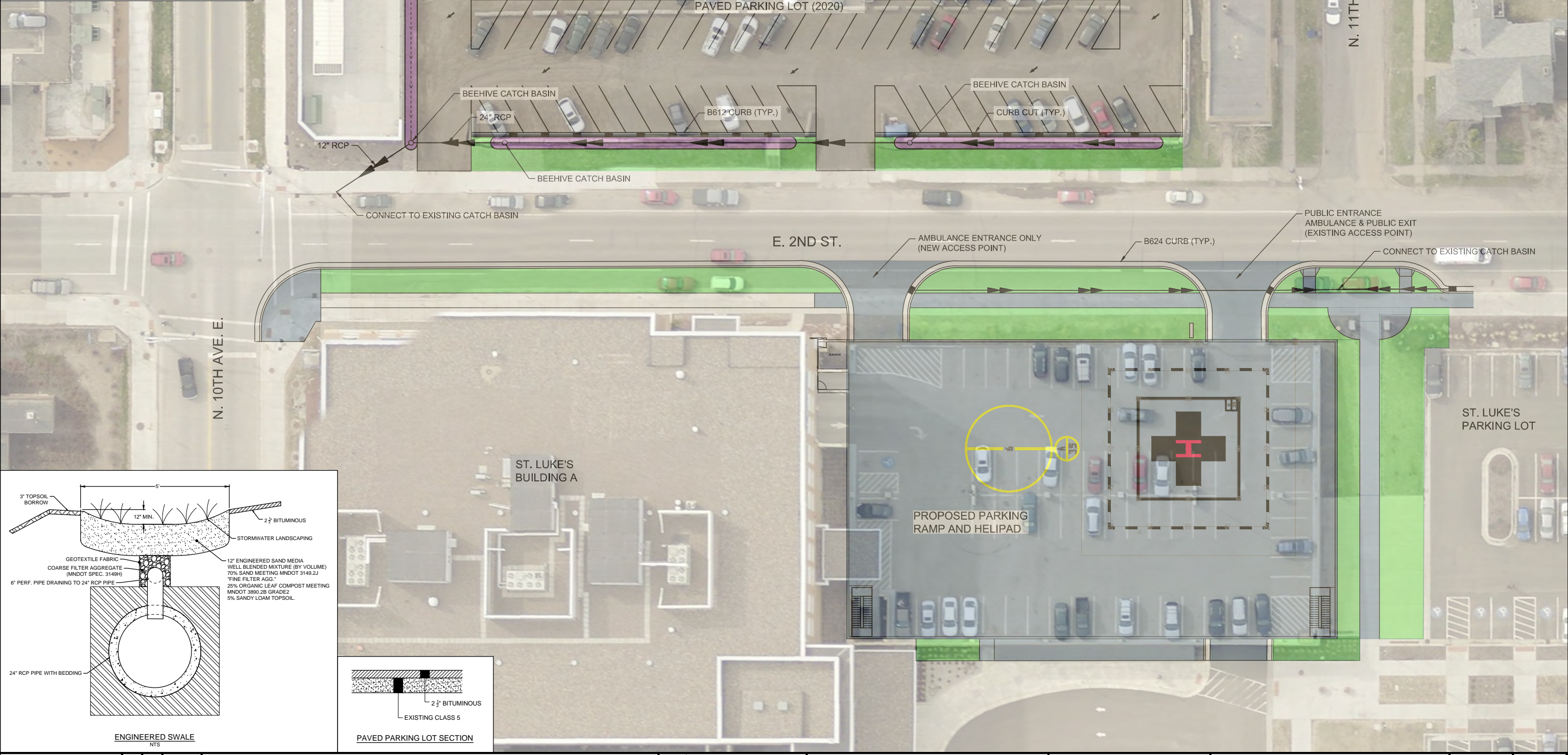
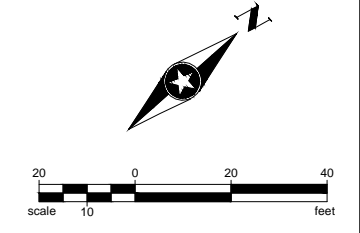
PARKING DECK DETAIL



NEW ELVATOR SHAFT
BRICK TO MATCH EXISTING BUILDING

NEW ELVEATOR SHAFT DETAIL

- EXISTING**
- RIGHT OF WAY
 - SANITARY SEWER AND MANHOLE
 - WATER MAIN, HYDRANT, VALVE AND MANHOLE
 - WATER SERVICE AND CURB STOP BOX
 - STORM SEWER, MANHOLE AND CATCH BASIN
 - GAS MAIN, VALVE, VENT AND METER
 - TRAFFIC SIGNAL
 - STREET NAME SIGN
- PROPOSED**
- STORM SEWER, MANHOLE AND CATCH BASIN
 - CULVERT AND APRON ENDWALL
 - DRAIN TILE
 - BITUMINOUS
 - CONCRETE
 - LANDSCAPING
 - ENGINEERED SWALE (SEE DETAIL)



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DESIGNER: DRH				
CHECKED BY: DRH				
DESIGN TEAM	NO.	BY	DATE	REVISIONS

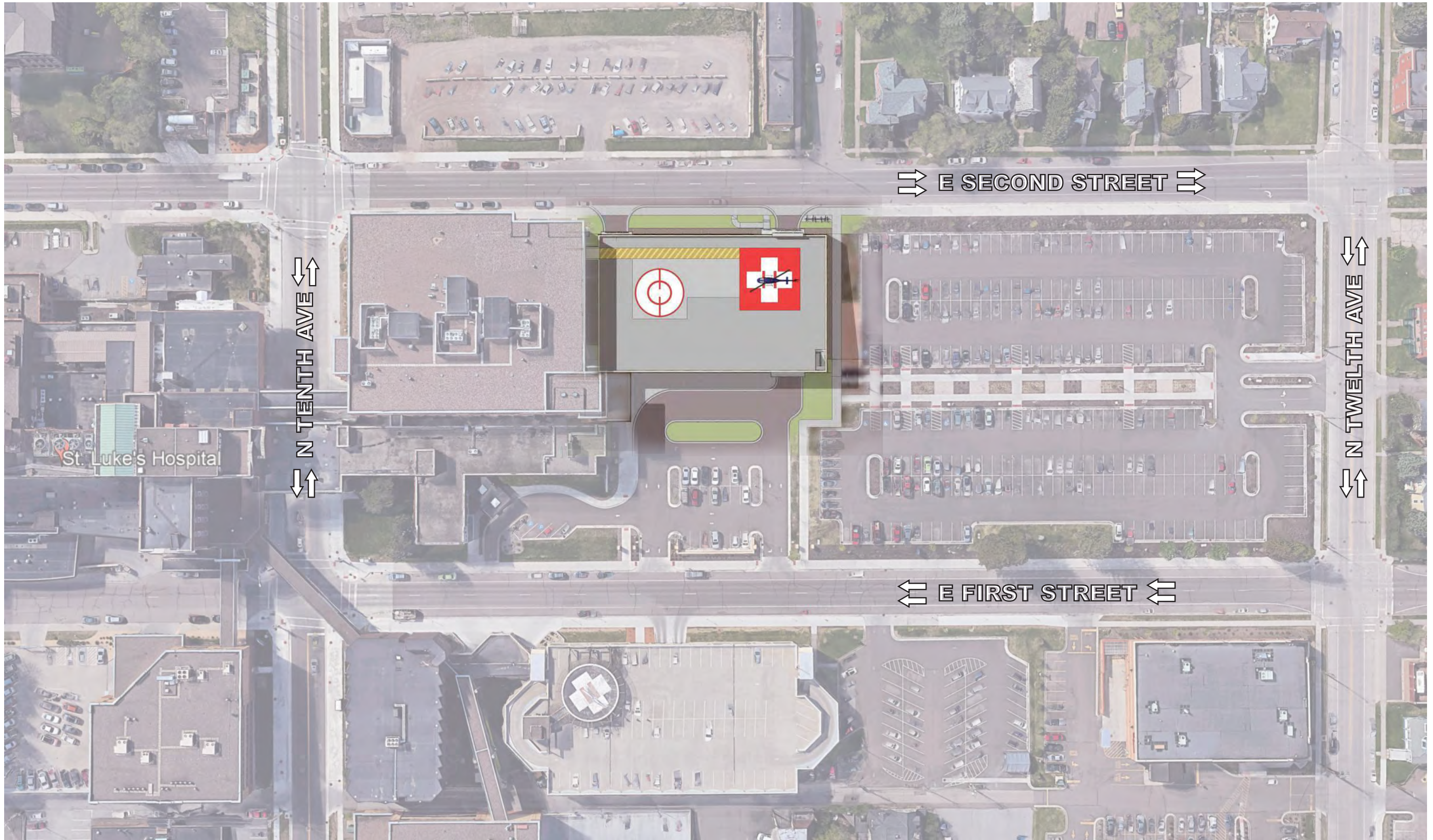
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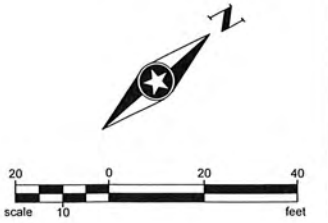
ATTACHMENT C.1

DULUTH,
MINNESOTA

SITE LAYOUT
ST. LUKES HOSPITAL

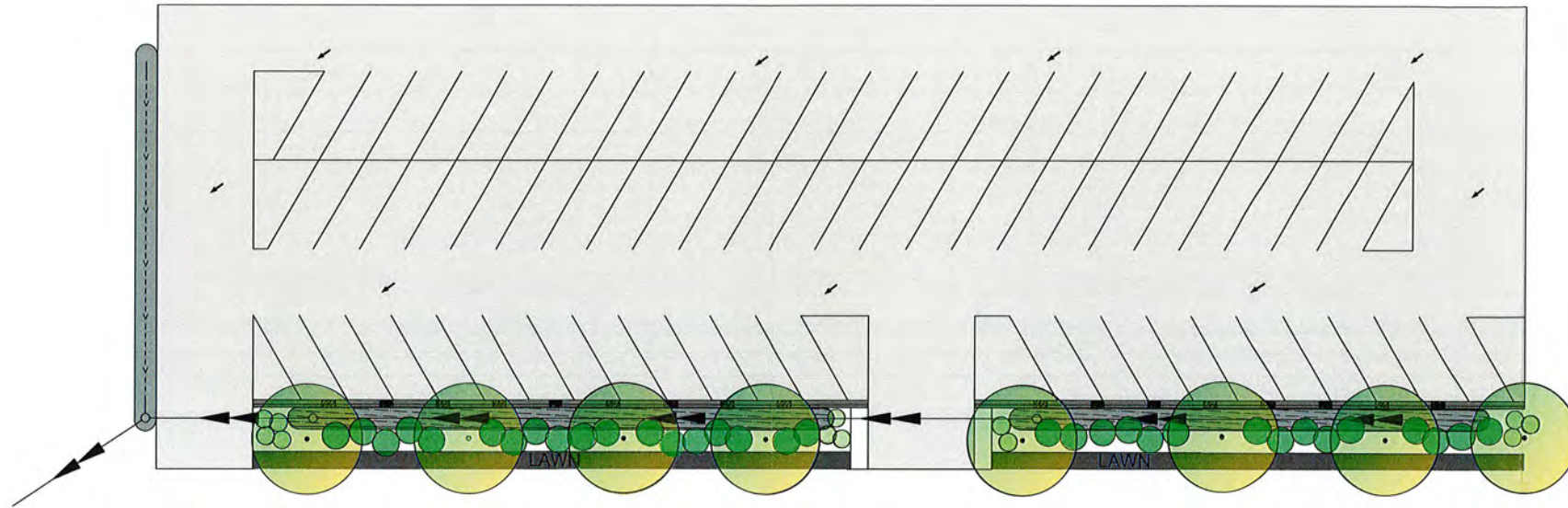
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STLUH 146887










N. 10TH AVE. E.

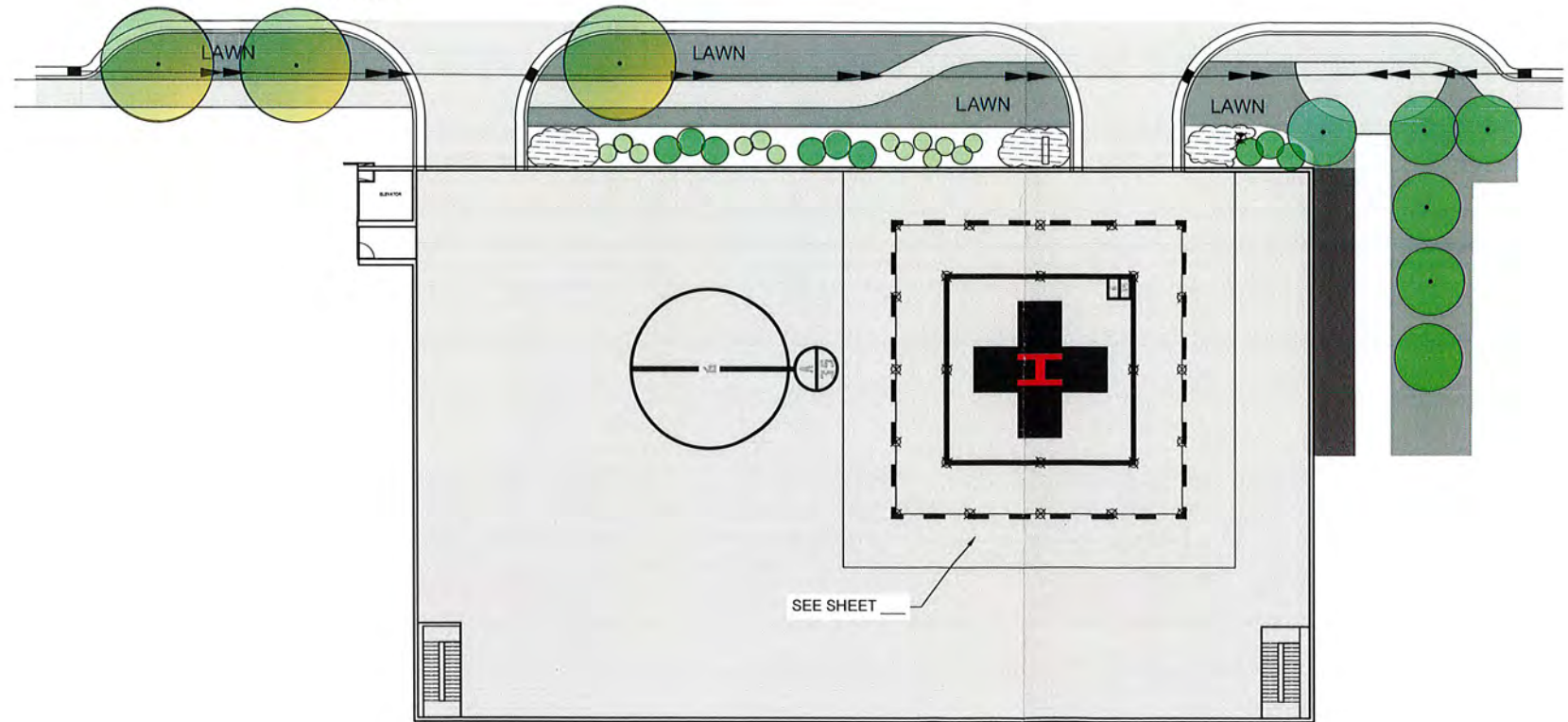
N. 11TH AVE. E.



Schematic Planting Legend:

- 
 Shade Tree (2.5" caliper):
 -American Sentry Linden
 -State Street Maple
- 
 Ornamental Tree (1.5"-2" caliper):
 -Red Jewel Crabapple
 -Autumn Brilliance Serviceberry
- 
 Large Shrub:
 -Redtwig Dogwood
 -Sunrise Forsythia
 -Dwarf Ninebark
- 
 Small Shrub:
 -Goldflame Spirea
 -Carnaval Weigela
 -Gro-low Sumac
- 
 Perennials and groundcovers

E. 2ND ST.



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DESIGNER: DRH				
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DESIGN TEAM	NO.	BY	DATE	REVISIONS

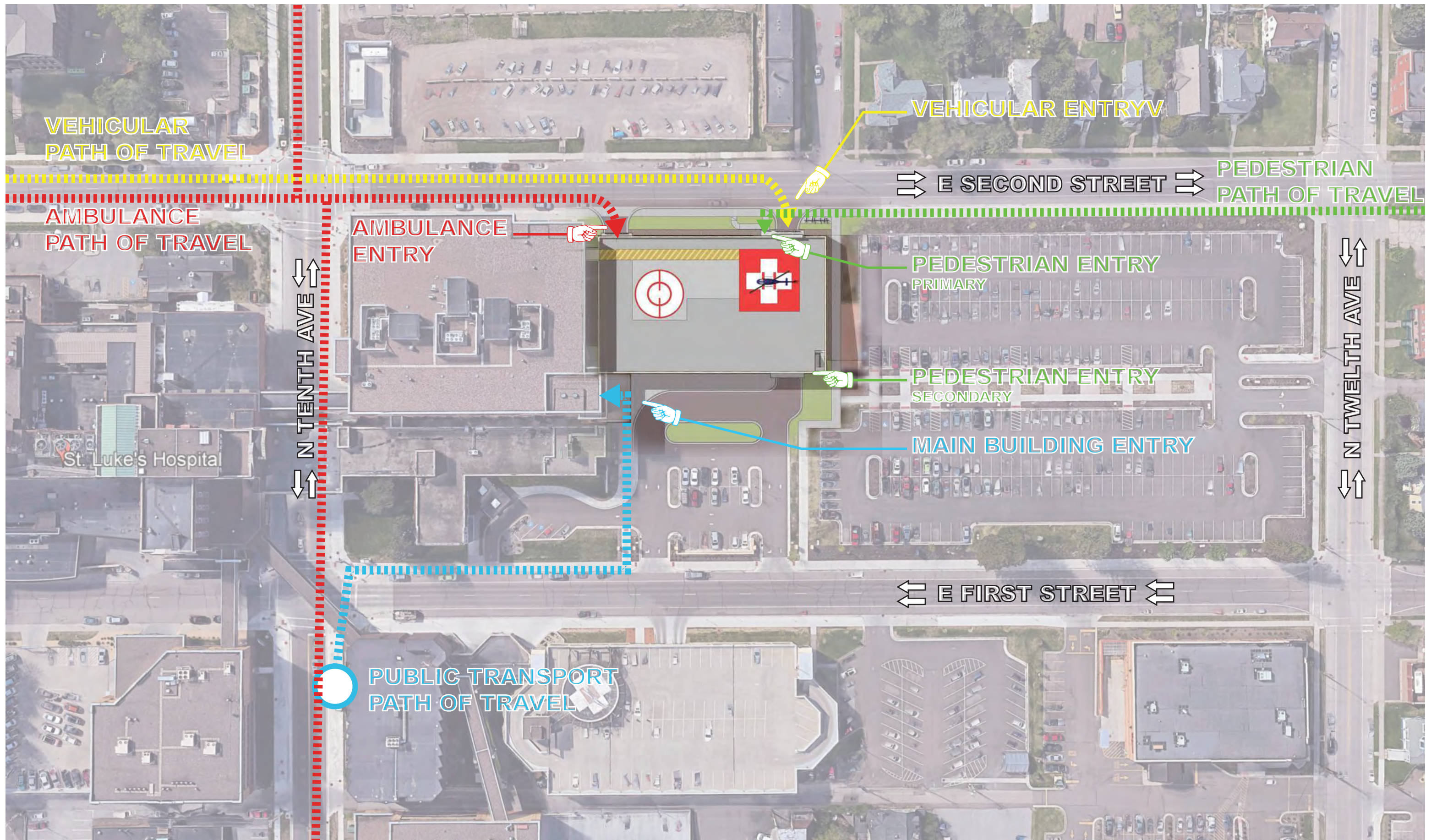


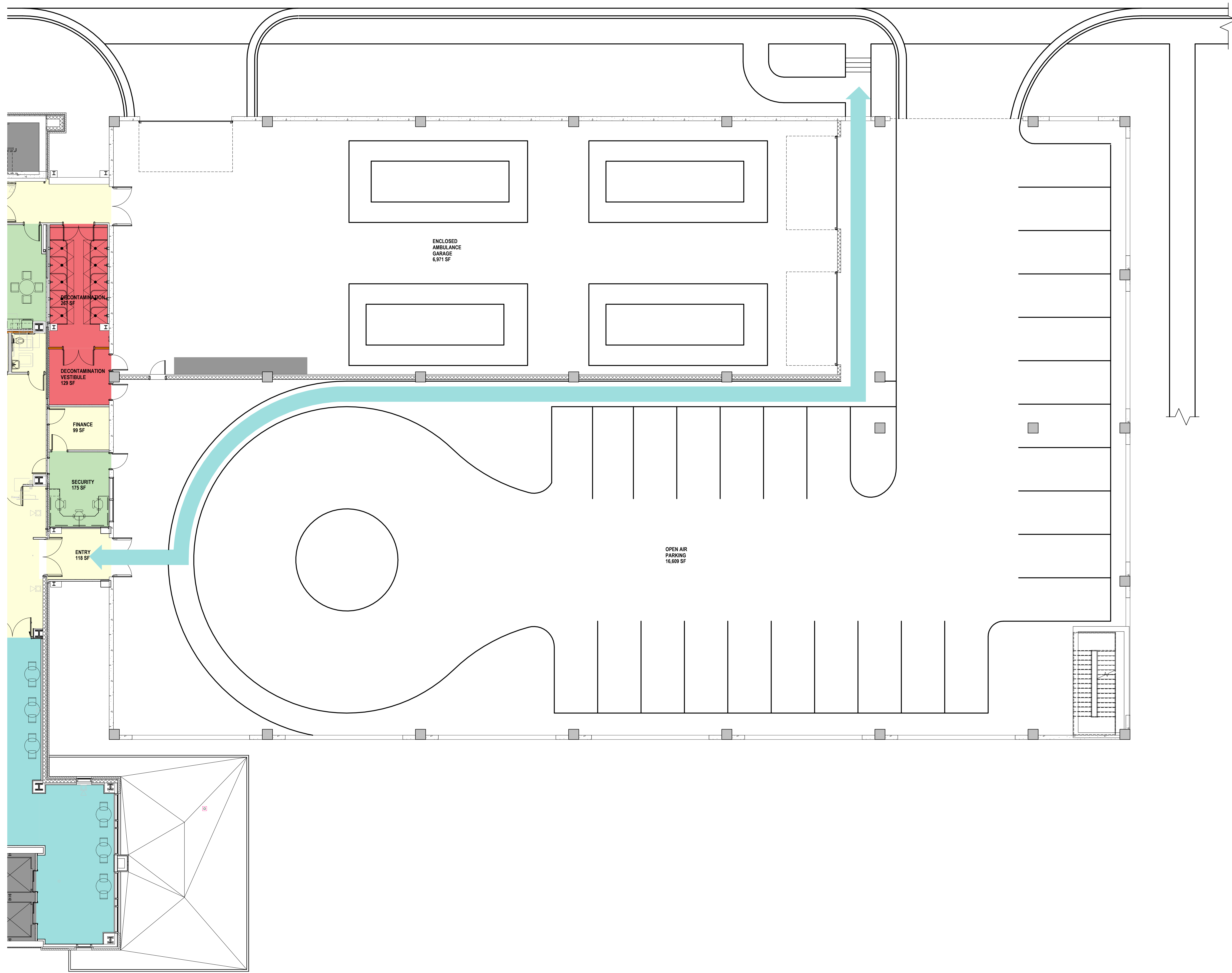
ATTACHMENT C.3

DULUTH,
MINNESOTA

LANDSCAPING PLAN
ST. LUKES HOSPITAL

FILE NO.
STLUH 146887



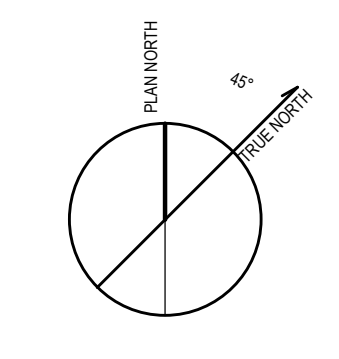


1 THIRD FLOOR PARKING DECK
 SCALE: 1/8" = 1'-0"



ED INFILL

1012 E. SECOND ST.
 DULUTH, MN 53805



4	PLANNING COMMISSION SUBMITTAL	12/04/16
No.	Description	Date
Document Release		

Dim: Author Chk: Checker

Sheet Name
THIRD FLOOR PARKING DECK

Scale: 1/8" = 1'-0"
 Sheet Number

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DULUTH, MN
 656220

Noise Screening Analysis

St. Luke Hospital Helipad Relocation, Duluth, MN

PREPARED FOR

Short Elliott Hendrickson, Inc.

PREPARED BY

Landrum & Brown, Incorporated

November 2018



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1 BACKGROUND

This report summarizes the results of a noise screening analysis for a proposed helipad relocation at St. Luke Hospital in Duluth, MN. The proposed project includes the relocation of an existing helipad as shown in Exhibit 1. Operation of the helipad in the proposed new location would change the noise levels in the area immediately surrounding the site. Therefore, a noise analysis has been requested to document the potential change in noise and identify any conflicts with existing Federal or local regulations regarding noise.

Sound is created by a source, such as a helicopter, that induces vibrations in the air. The vibration produces alternating bands of relatively dense and sparse particles of air, spreading outward from the source like ripples on a pond. Sound waves dissipate with increasing distance from the source. Sound waves can also be reflected, diffracted, refracted, or scattered. When the source stops vibrating, the sound waves disappear almost instantly and the sound ceases. Unwanted sound is commonly referred to as “noise.”

Sound can be defined in terms of three components:

- Level (amplitude)
- Pitch (frequency)
- Duration (time pattern)

Sound is measured on the decibel dB scale. For environmental noise studies, sound is typically weighted to account for the relative loudness perceived by the human ear, as the ear is less sensitive to low audio frequencies. This scale is known as A-weighted and the A-weighted decibel scale is commonly abbreviated dBA, or dBa, or dB(a). For this analysis, all noise levels are reported on the A-weighted scale.

Given the multiple dimensions of sound, a variety of descriptors, or metrics, have been developed for describing sound and noise. Some of the most commonly used metrics are discussed in this section. They include:

- Maximum Level (**L_{max}**)
- Equivalent Sound Level (**L_{eq}**)
- Day-Night Average Sound Level (**DNL**)
- Time Above Level (**TA**)

Maximum sound level or L_{max} is simply the highest sound level recorded during an event or over a given period of time. It provides a simple and understandable way to describe a sound event and compare it with other events.



Legend

- Existing Helipad
- Existing Parking Structure
- Proposed Helipad
- Future Building

0 75 150 Feet

N
↑

Prepared by Landrum & Brown - 11/28/2018. Filename: Y:\SEANEPAVE-L&B Work Product\2-GIS\MXD\DOCUMENT\Ex-1_Proposed Project.mxd



The “time above,” or TA, metric indicates the amount of time that sound at a particular location exceeds a given sound level threshold. TA is often expressed in terms of the total time per day that the threshold is exceeded. For example, if a location exceeded 65 dB (TA65) for 25 minutes the TA65 level would be 25.

The equivalent sound level (Leq) metric may be used to define cumulative noise dosage, or noise exposure, over a period of time. In computing Leq, the total noise energy over a given period of time, during which numerous events may have occurred, is logarithmically averaged over the time period. The Leq represents the steady sound level that is equivalent to the varying sound levels actually occurring during the period of observation. For example, an 8-hour Leq of 67 dB indicates that the amount of sound energy in all the peaks and valleys that occurred in the 8 hour period is equivalent to the energy in a continuous sound level of 67 dB. Leq is typically computed for measurement periods of 1 hour, 8 hours, or 24 hours, although any time period can be specified.

The Day-Night Average Sound Level (DNL) metric is really a variation of the 24-hour Leq metric. Like Leq, the DNL metric describes the total noise exposure during a given period. Unlike Leq, however, DNL, by definition, can only be applied to a 24-hour period. In computing DNL, an extra weight of 10 dB is assigned to any sound levels occurring between the hours of 10:00 p.m. and 6:59 a.m. This is intended to account for the greater annoyance that nighttime noise is presumed to cause for most people. Due to the logarithmic nature of the dB scale, this extra weight treats one nighttime noise event as equivalent to 10 daytime events of the same magnitude.

2 REGULATORY SETTING

This section presents information regarding regulations and other guidelines and best practices with respect to environmental noise.

2.1 OSHA Noise Regulations

The Occupational Safety and Health Administration (OSHA) sets legal limits on noise exposure in the workplace. These limits are based on a worker's time weighted average over an 8 hour day. With noise, OSHA's permissible exposure limit (PEL) is 90 dBA for all workers for an 8 hour day. The OSHA standard for noise exposure per time of day is shown in Table 1.

OSHA does provide a checklist for highlighted hazards in a heliport or helipad, which should be considered when constructing the proposed helipad:

- Is proper ear protection given to all employees working in or around high noise exposure areas?
- Are feasible administrative and engineering controls being implemented whenever employee noise exposures equal or exceed 85 dBA for 8-hours?
- Is a hearing conservation program administered and continued whenever employee noise exposures equal or exceed 85 dBA for 8-hours? Including requirements for monitoring,



audiometric testing, audiogram evaluation, hearing protection, training and education, and recordkeeping.

TABLE 1: OSHA NOISE STANDARDS

Duration (hours per day)	Sound level dBA slow response
8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
1/2	110
1/4	115

Source: Occupational Safety and Health Standards, 1910
Subpart G, Occupational Health and Environmental Control,
Standard Number: 1910.95

2.2 State of Minnesota Noise Regulations

Minnesota’s noise regulations are based on surrounding land use activity. Noise area classifications (NAC) are categorized based on the land use at the location of the person who hears the noise, and have three classifications, organized from most to least restrictive. Medical and other health services fall under NAC 1; however, they may seek a noise variance to fall under NAC 2 or 3. Minnesota’s noise standards are based on daytime (7:00am to 9:59pm) or nighttime (10:00pm to 6:59am) classifications and are measured at either L₁₀ or L₅₀. L₁₀ means the sound level, expressed in dBA, which is exceeded 10% of the time for a one-hour survey. L₅₀ means the sound level, expressed in dBA, which is exceeded 50% of the time for a one-hour survey. The noise standards are in Table 2 below.

TABLE 2: MINNESOTA NOISE STANDARDS

Noise Area Classification (NAC)	Daytime		Nighttime	
	L ₅₀	L ₁₀	L ₅₀	L ₁₀
1	60	65	50	55
2	65	70	65	70
3	75	80	75	80

Source: MAR 7030.0040



2.3 Federal Aviation Administration Guidelines

The Federal Aviation Administration (FAA) provides guidance on aircraft noise compatibility for airport activity in the vicinity of public use airports. While the hospital heliport is not subject to the same regulations as a public use airport, the guidance for land use compatibility with noise is useful to understand the potential for community annoyance. In general, per FAA guidelines, 65 DNL is the noise level at which most noise-sensitive land uses are considered to be incompatible with exterior noise levels unless otherwise treated to reduce interior noise levels.¹ Per FAA guidance, DNL is the only metric that is used to demonstrate land use compatibility; although other metrics, including LMAX and TA, can be used for informational purposes.

¹ FAA Advisory Circular 1050.1F.



3 NOISE MODELING METHODOLOGY

The noise analysis was conducted using the FAA’s Aviation Environmental Design Tool (AEDT) Version 2d. The AEDT software programs is used to model noise levels from aircraft flights (operations) based on aircraft performance, altitude, and other variables. Inputs into the AEDT include the number of operations by aircraft (helicopter) type, time of day (daytime or nighttime), flight tracks, and take-off/landing profiles.

Operations by Aircraft Type and Time of Day

The total number of operations modeled for this analysis was based on data from calendar year 2017 in which 192 total helicopter trips (192 take-offs and 192 landings) occurred using an Agusta A119 aircraft. Due to the penalty applied to the DNL noise metric for operations that occur during the nighttime (10:00pm to 6:59am), the ratio of daytime to nighttime operations is modeled. Actual data regarding the ratio of daytime to nighttime operations is not available. Therefore, a ratio of 85 percent daytime and 15 percent nighttime operations was modeled based on past data from similar hospital medical helicopter operations. Table 3 shows the total number of annual operations modeled for this analysis.

TABLE 3: MODELED AIRCRAFT OPERATIONS

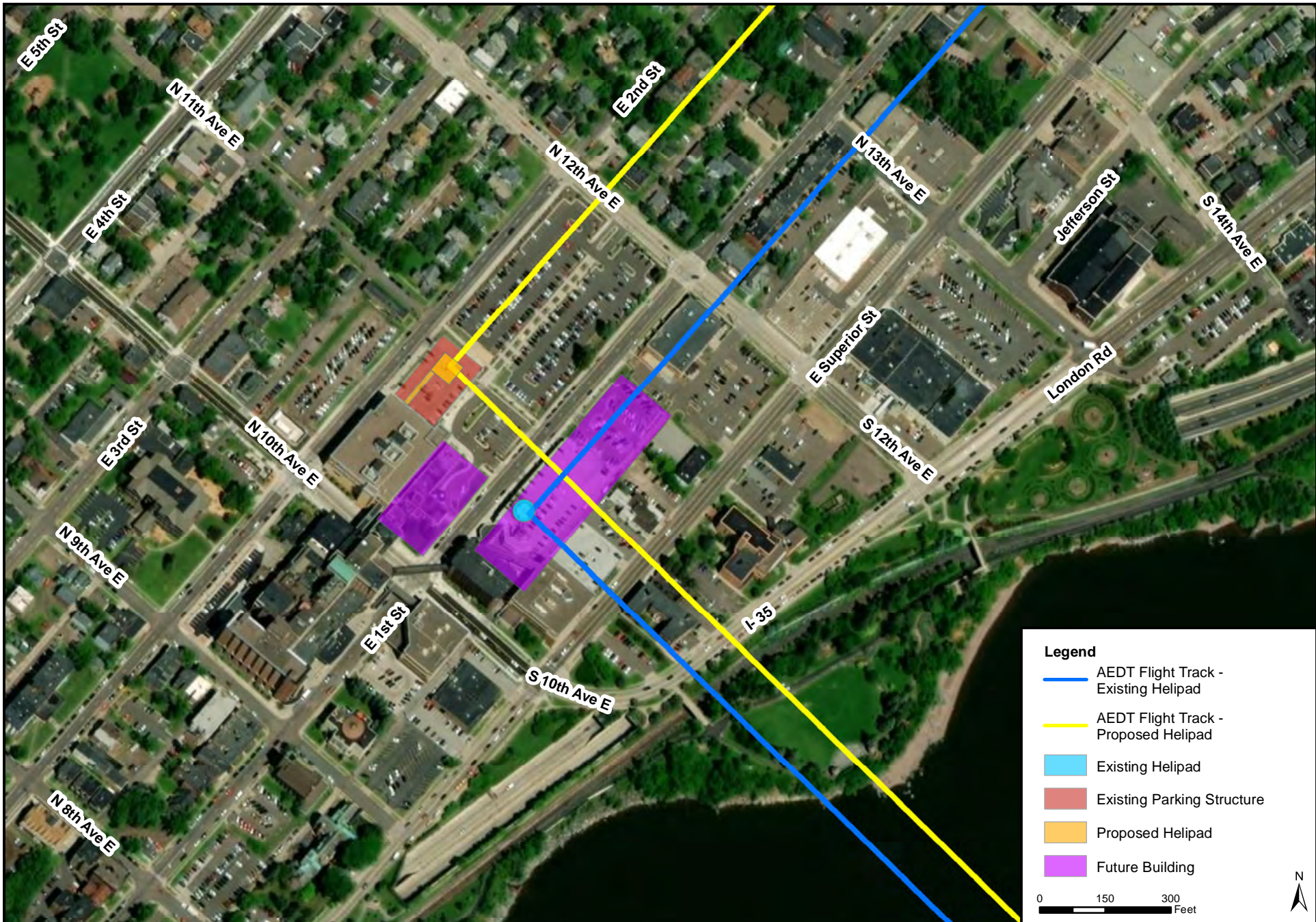
Aircraft ID	Take-offs		Landings	
	Daytime	Nighttime	Daytime	Nighttime
Agusta 119	163.2	28.8	163.2	28.8

Flight Tracks

Flight tracks represent the two-dimensional path of the aircraft over the ground. For this analysis, data was provided that indicated that helicopter operations arrive and depart either to and from the northeast or to and from the southeast as shown in Exhibit 1. For this analysis it was assumed an equal ratio of operations along these two flight paths.

Flight Profiles

Flight profiles include the altitude of flight, speed, and other aircraft operating characteristics along the two-dimensional flight path. The AEDT includes a database of aircraft performance for helicopter take-off and landing profiles. Standard take-off and landing profiles were used with minor adjustment to account for altitude requirements to avoid buildings and other obstacles. For the purpose of this analysis it was assumed that helicopter take-offs would initiate a vertical climb to 30 feet before a departure climb acceleration at a 4.1 (horizontal) to 1.0 (vertical) profile. Landings were modeled to follow a similar 4.1 to 1.0 approach profile.





4 RESULTS

The results of the analysis is presented graphically using noise contours and grid points to demonstrate compliance with FAA and OSHA guidelines. Additionally, a qualitative assessment of percent of time above 50 dB was conducted to demonstrate compliance with State of Minnesota Noise Regulations.

Noise contours are lines of equal noise levels in which all areas within the contour line would be at or above the selected noise level and all areas outside the line would be below the selected noise level. Exhibit 3 shows a comparison of the DNL noise levels for the No Action and the Proposed Project at 65 DNL.

Grid points report the actual (or projected) noise level at a specific location. For this analysis, a set of regularly-spaced grid points created in the AEDT model and the maximum noise level (LMAX) from a single helicopter operation was modeled for each grid point for both the existing helipad (No Action) and the proposed helipad (Proposed Project). Exhibit 4 shows the grid point locations and Table 4 shows the LMAX values at each grid point for the No Action and Proposed Project scenario. Each grid point is given an alpha numeric ID according to the row (designated by letters) and column (designated by numbers) on Exhibit 4.

Compliance with OSHA Regulations

The same occupational noise levels experienced by employees at the helipad would not be expected to change due to the proposed helipad relocation. It is also expected that the same mitigation would be used including hearing protection and limitation on engine idling time to reduce noise exposure for employees on the helipad. The results of the grid point analysis using AEDT show that the maximum noise levels on the helipad during helicopter operation would reach 116.5 dB. The duration of this noise exposure would be limited to the time a helicopter is in operation and is not expected to exceed $\frac{1}{4}$ hour (15 minutes) per day. Noise levels from helicopter flights would not be expected to exceed 85 dB for more than eight hours; therefore, no additional engineering controls or noise monitoring would be required. **Therefore, the proposed helipad would not cause noise levels that would violate OSHA regulations.**

Compliance with State of Minnesota Regulations

As shown on Exhibit 4 and Table 4, the grid point closest to the residential area northwest of East 2nd Street (Grid I-8) is likely to currently experience maximum noise levels (LMAX) of 86.3 dB from a single helicopter flight on the existing helipad. This location would be expected to experience maximum noise levels (LMAX) of 100.8 from a single helicopter flight on the proposed helipad.

Per these regulations, residential land uses should not be exposed to noise at or above 65 dB for more than 50 percent of the time during the daytime (7:00am to 9:59pm); and should not be exposed to noise at or above 50 dB for more than 50 percent of the time during the nighttime (10:00pm to 6:59am). While the maximum noise levels from a single helicopter flight would exceed these levels, the overall duration of time in which the helicopter flights would be audible would not exceed 50 percent of the daytime or nighttime hours. Based on historic flight records, approximately 192 helicopter trips (192

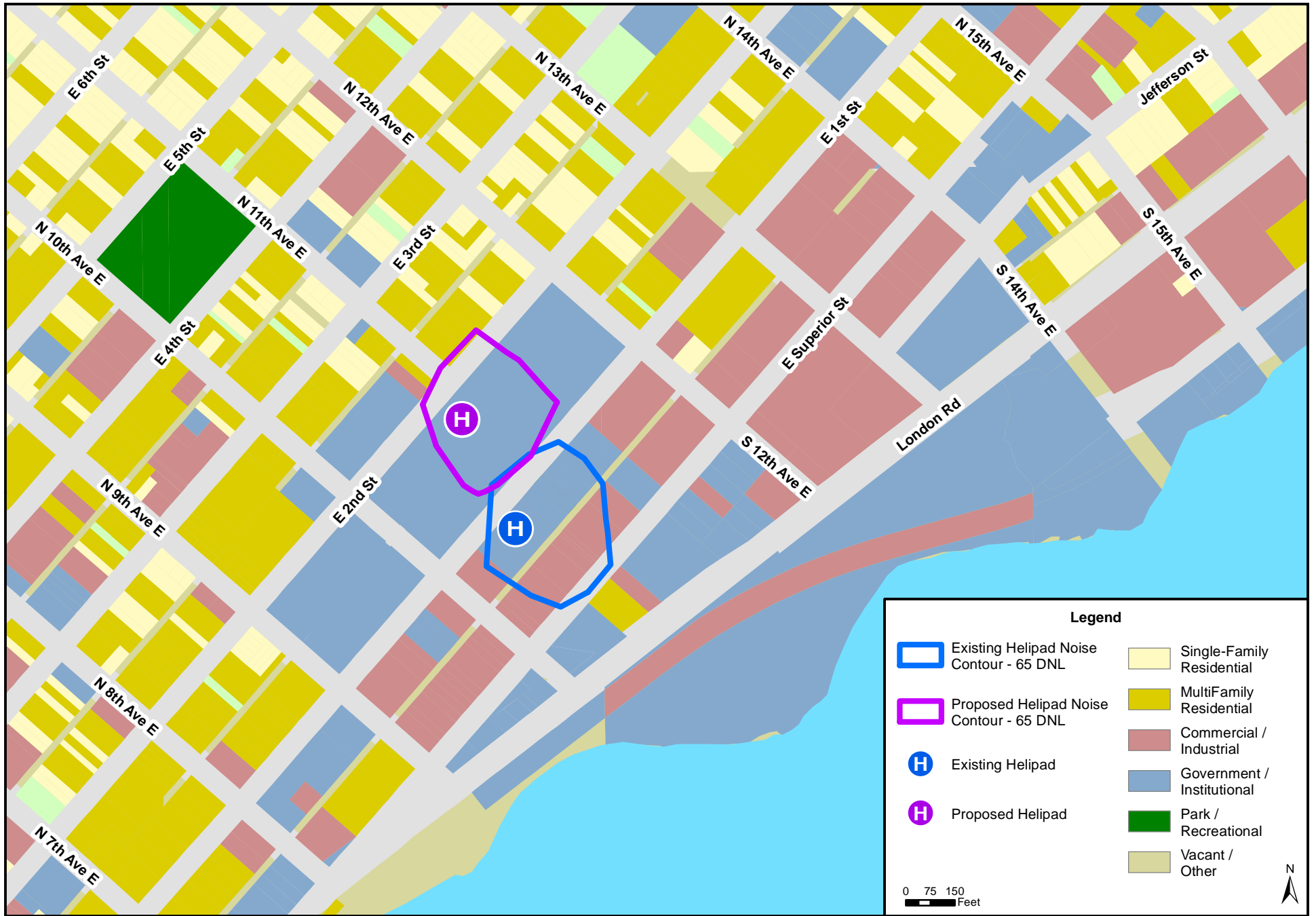


take-offs and 192 landings) occur per year, which equals approximately 1.05 flights per day. Assuming each helicopter flight is audible above 50 dB for less than fifteen minutes (including engine idle time on the helipad) this activity would not exceed 50 percent of the time during the daytime or nighttime.

Therefore, the proposed helipad would not cause noise levels that would violate State of Minnesota noise regulations.

Comparison with FAA Guidelines

Per FAA guidelines, 65 DNL is the noise level at which noise-sensitive land uses, including residential areas, would be considered incompatible with aircraft noise. These guidelines and the comparative analysis is for informational purposes only because FAA requirements don't directly apply to a private helipad. As shown in Exhibit 3, the 65 DNL noise contour would extend to just beyond East 2nd Street; however, no residential structures would be within the 65 DNL noise contour. **Therefore, the proposed helipad would not cause noise levels that would exceed FAA guidelines.**



Helicopter Noise Study
St. Luke Hospital



Noise Contours Showing Day-Night Average Sound Level (DNL)

EXHIBIT:
3





TABLE 4: GRID POINT RESULTS

GRID ID	LMAX - Existing Helipad	LMAX - Proposed Helipad
A-1	73.6	72.3
B-1	74.2	73.1
C-1	74.7	73.8
D-1	75.2	74.4
E-1	75.4	74.9
F-1	75.5	75.3
G-1	75.5	75.5
H-1	75.4	75.6
I-1	75.1	75.5
J-1	74.7	75.2
K-1	74.1	74.7
L-1	73.5	74.2
M-1	72.9	73.5
N-1	72.3	72.8
A-2	74.5	71.2
B-2	75.2	74.0
C-2	75.7	74.7
D-2	76.2	75.4
E-2	76.5	76.0
F-2	76.7	76.5
G-2	76.7	76.9
H-2	76.5	76.9
I-2	76.1	76.8
J-2	75.7	76.4
K-2	75.1	75.8
L-2	74.4	75.1
M-2	73.7	74.4
N-2	73.0	73.6
A-3	75.3	72.1
B-3	76.0	73.0
C-3	76.7	75.6
D-3	77.3	76.5
E-3	77.8	77.3
F-3	78.0	78.0
G-3	78.0	78.4
H-3	77.7	78.5
I-3	77.2	78.3
J-3	76.6	77.7
K-3	75.9	77.0
L-3	75.2	76.1
M-3	74.5	75.3
N-3	73.7	74.5



GRID ID	LMAX - Existing Helipad	LMAX - Proposed Helipad
A-4	74.3	73.0
B-4	76.9	73.8
C-4	77.8	74.8
D-4	78.6	77.6
E-4	79.2	78.7
F-4	79.6	79.6
G-4	79.6	80.3
H-4	79.2	80.5
I-4	78.5	80.1
J-4	77.7	79.3
K-4	76.8	78.3
L-4	76.0	77.2
M-4	75.3	76.2
N-4	74.5	75.4
A-5	75.2	73.8
B-5	76.2	74.8
C-5	78.9	75.9
D-5	80.0	77.2
E-5	81.0	80.1
F-5	81.6	81.7
G-5	81.6	82.9
H-5	80.9	83.2
I-5	79.9	82.5
J-5	78.8	81.1
K-5	77.8	79.6
L-5	76.9	78.4
M-5	76.1	77.3
N-5	75.4	76.3
B-6	77.3	75.8
C-6	78.6	77.1
D-6	81.6	78.6
E-6	83.3	80.4
F-6	84.4	84.0
G-6	84.4	86.7
H-6	83.2	87.6
I-6	81.5	85.8
J-6	80.1	83.3
K-6	78.9	81.3
L-6	77.9	79.7
M-6	77.0	78.5
N-6	76.2	77.4
B-7	78.5	77.0
C-7	80.1	78.5
D-7	82.2	80.3



GRID ID	LMAX - Existing Helipad	LMAX - Proposed Helipad
E-7	86.3	82.6
F-7	89.3	85.9
G-7	89.1	93.8
H-7	86.1	99.0
I-7	83.5	91.0
J-7	81.7	86.2
K-7	80.2	83.4
L-7	79.0	81.4
M-7	78.0	79.8
N-7	77.0	78.6
C-8	82.0	80.1
D-8	84.8	82.3
E-8	89.5	85.5
F-8	100.8	91.5
G-8	100.3	101.8
H-8	90.8	116.5
I-8	86.3	100.8
J-8	83.6	91.3
K-8	81.8	86.4
L-8	80.3	83.5
M-8	79.1	81.5
N-8	78.0	79.9
D-9	88.1	84.7
E-9	98.1	90.0
F-9	115.6	100.6
G-9	118.1	106.1
H-9	100.2	97.3
I-9	90.9	112.1
J-9	86.4	100.2
K-9	83.7	91.3
L-9	81.9	86.4
M-9	80.3	83.6
N-9	79.1	81.6
D-10	96.0	87.7
E-10	104.9	97.1
F-10	98.4	100.7
G-10	97.2	93.8
H-10	107.9	87.8
I-10	99.6	95.4
J-10	90.8	103.4
K-10	86.4	99.4
L-10	83.6	90.0
M-10	81.9	86.4
N-10	80.4	83.7



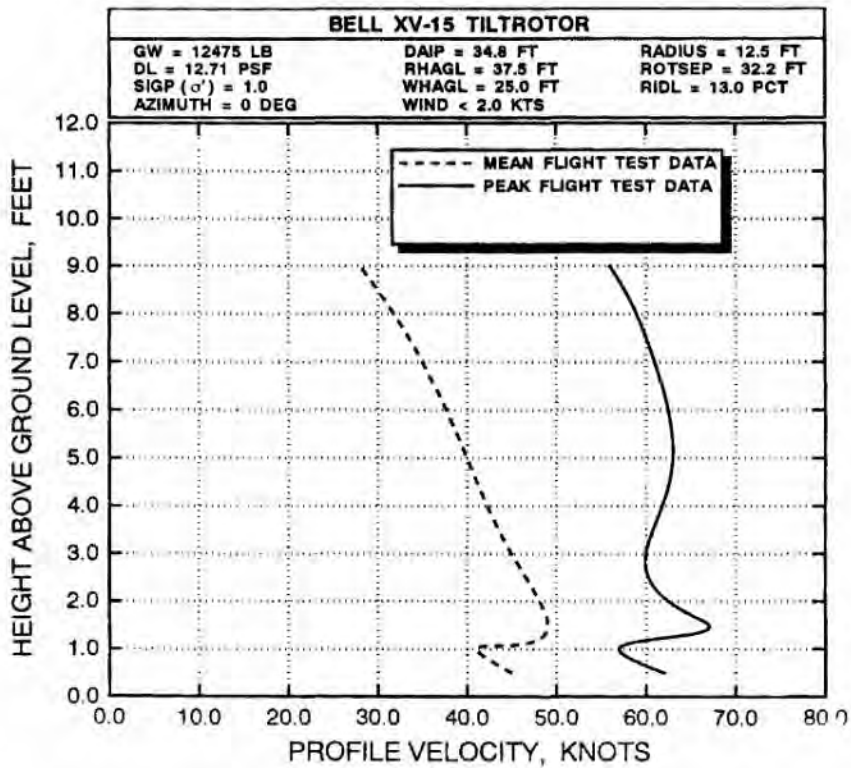
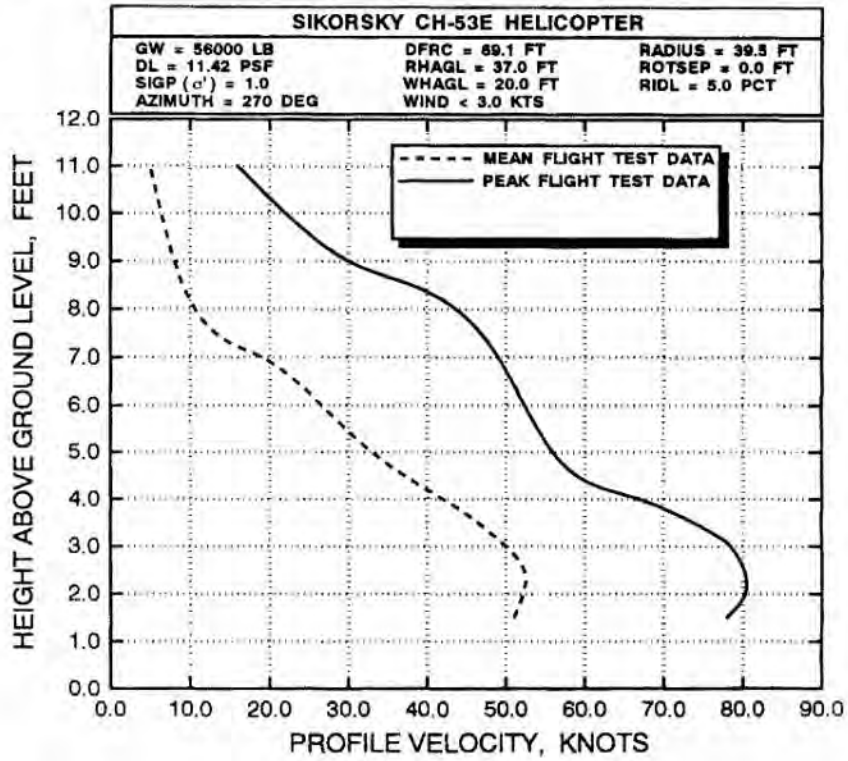
GRID ID	LMAX - Existing Helipad	LMAX - Proposed Helipad
D-11	97.7	92.0
E-11	96.3	95.0
F-11	89.2	91.9
G-11	87.8	87.4
H-11	95.3	84.3
I-11	101.7	86.8
J-11	98.0	92.6
K-11	90.2	98.7
L-11	86.4	96.8
M-11	83.8	90.3
N-11	82.0	86.4
E-12	88.4	89.5
F-12	85.5	86.6
G-12	84.0	84.0
H-12	87.0	82.1
I-12	92.1	83.1
J-12	97.4	85.9
K-12	95.6	90.2
L-12	89.6	95.7
M-12	86.3	95.0
N-12	83.8	89.6
F-13	83.0	83.6
G-13	81.4	81.9
H-13	83.5	80.3
I-13	86.1	80.7
J-13	90.0	82.6
K-13	94.8	85.2
L-13	93.9	88.5
M-13	89.1	93.3
N-13	86.1	93.4
G-14	79.9	80.1
H-14	81.1	78.8
I-14	82.9	78.7
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K-14	88.2	82.2
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N-14	88.6	91.1
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J-15	82.5	78.5
K-15	84.6	80.0
L-15	87.3	81.7



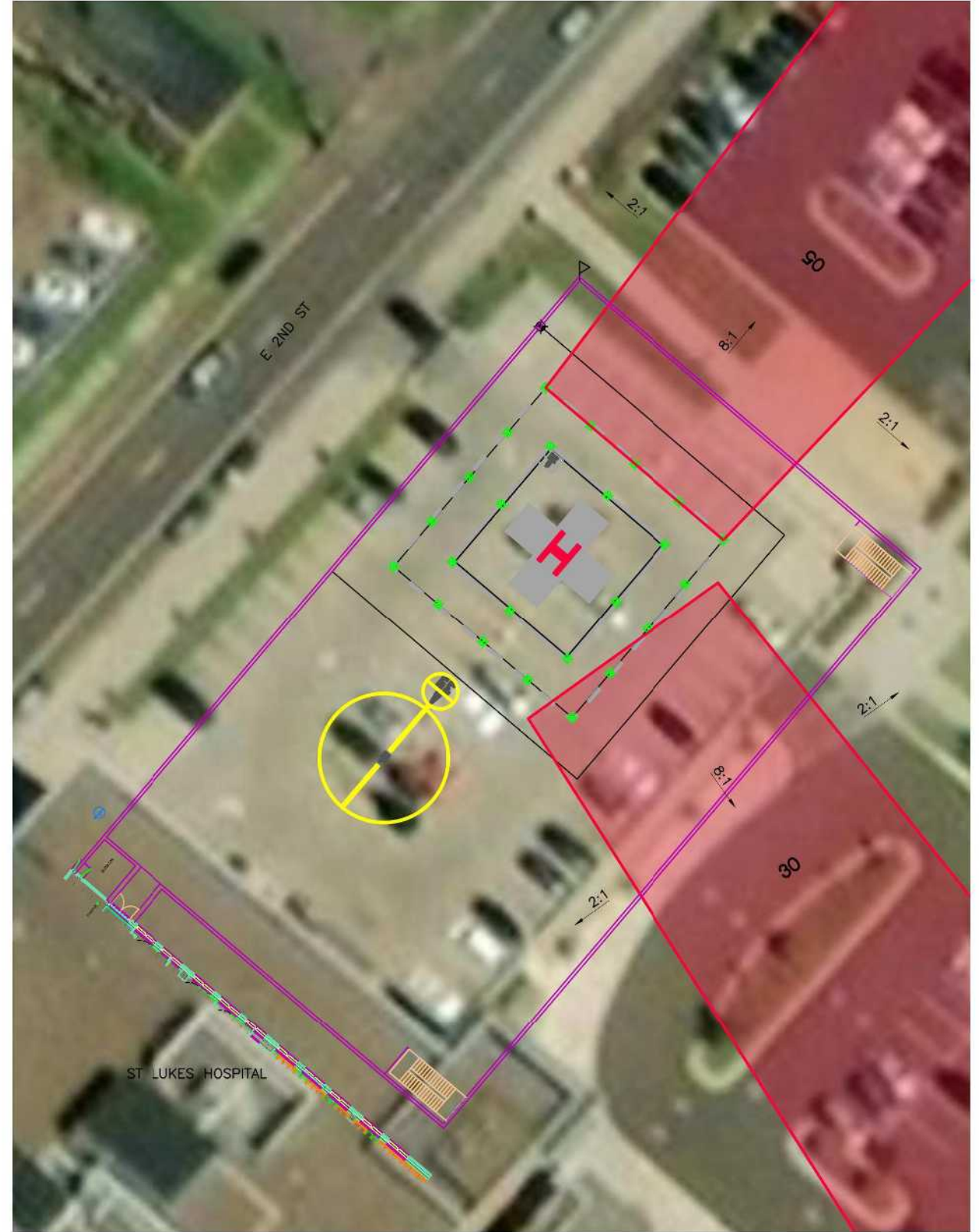
GRID ID	LMAX - Existing Helipad	LMAX - Proposed Helipad
M-15	90.3	83.8
N-15	90.9	86.4
G-16	77.6	77.5
H-16	77.7	76.5
I-16	78.9	75.9
J-16	80.4	77.0
K-16	82.0	78.2
L-16	83.9	79.6
M-16	86.4	81.3
N-16	88.8	83.1
H-17	76.5	75.6
I-17	77.5	74.8
J-17	78.7	75.7
K-17	80.0	76.8
L-17	81.6	77.9
M-17	83.2	79.3
N-17	85.6	80.8
I-18	76.3	74.0
J-18	77.3	74.6
K-18	78.4	75.5
L-18	79.7	76.5
M-18	81.1	77.7
N-18	82.6	79.0
J-19	76.2	73.6
K-19	77.1	74.4
L-19	78.2	75.3
M-19	79.3	76.3
N-19	80.7	77.4
J-20	75.1	72.7
K-20	76.0	73.4
L-20	76.9	74.3
M-20	77.9	75.1
N-20	79.0	76.1


Source: AEDT Version 2.d.

Rotor Wash Graphs for Alternate Helicopter Units



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ST LUKES HOSPITAL 2018 ST LUKES HOSPITAL HELIPAD DULUTH, MN	
SHEET TITLE APPROACH AND DEPARTURE SURFACES	
SEH FILE NO. STLUH_146687 STATE PROJECT NO. ISSUE DATE DESIGNED BY DRAWN BY	DATE REVISIONS DESCRIPTION
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Attachment E.3	
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