



PAVEMENT MANAGEMENT PROGRAM:

- **PAVEMENT MAINTENANCE PROGRAM**
- **ALLEY REPLACEMENT PROGRAM**
- **SUBDIVISION STREET MAPS**
- **ALLEY MAPS**

March 2016

Introduction

Road pavements gradually deteriorate due to weather and daily traffic loads. Once the condition of a pavement deteriorates beyond a certain point, reconstruction is the only means of repair. Before the pavement reaches that point, relatively inexpensive preventive maintenance techniques can cut short the cycle of deterioration, improve the pavement condition, and postpone the need for expensive reconstruction.

The goal of our Pavement Maintenance Program (PMP) is to be proactive with regard to pavement repairs, which will stop potholes before they start – thereby reducing regular maintenance costs – and stretch reconstruction dollars by extending the life of the pavement that has not yet deteriorated too severely. Ultimately, the program will not only improve our streets, but help make better use of taxpayer dollars as well.

Pavement Maintenance Program

Our Pavement Maintenance Program establishes a guideline to preserve the structural integrity and extend the service life of the City of Clayton's street network. Funding for the program comes from the City's Revolving Public Improvement Fund.

A pavement maintenance program is a systematic approach to using a series of preventive maintenance treatments over time. One treatment will improve the quality of the pavement surface and extend the pavement life, but the true benefits of pavement maintenance are realized when there is a consistent schedule for performing the preventive maintenance.

The performance of pavements depends upon the type, time of application, and quality of the maintenance it receives. Pavement maintenance can be classified into three types of pavement maintenance operations:

- **Preventive Maintenance** is the planned strategy of cost-effective treatments to an existing roadway system that preserves the system, retards future deterioration and maintains or improves the functional condition of the system without significantly increasing structural capacity. In essence, preventive maintenance activities protect the pavement and decrease the rate of deterioration.
- **Reactive Maintenance** includes activities that must be done in response to events beyond the control of the Public Works Department. Some events require response as soon as possible to avoid serious consequences because a present or imminent danger exists. Reactive maintenance cannot be scheduled because they occur without warning and often must be immediately addressed. Examples of reactive maintenance activities include pothole patching, and removal and replacement of pavement blowups. When pavement failures occur, City crews address them immediately with temporary patches. When available, hot-mix asphalt is used. During the winter, when hot-mix is not available, cold patch asphalt is used. At a later time, when weather and schedules are conducive, crews

remove the temporary patches with a skid-steer mounted mill, install permanent hot-mix asphalt patches, and seal the edges.

- **Routine maintenance** is the day-to-day maintenance activities that are scheduled or whose timing is within the control of our street maintenance personnel. Examples of routine maintenance include filling cracks in pavement as necessary (i.e. during inclement weather), street sweeping, trash collection, and re-painting faded pavement markings.

All types of maintenance are needed in a comprehensive pavement maintenance program. However, emphasizing preventive maintenance may prevent a pavement from requiring reactive maintenance. Although all three types of maintenance are important, we have created this PMP to cost-effectively prolong the pavement service life of our streets.

Delays in preventive maintenance increase the quantity of pavement defects and their severity so that, when corrected, the cost is much greater. The purpose of our PMP is to protect the pavement structure, slow the rate of pavement deterioration and correct pavement surface deficiencies. As an aid to assess the effectiveness of our PMP, we conduct a yearly field review of all City streets.

Pavement Treatments

This PMP utilizes surface treatments as categories of work. These surface treatments are targeted at pavement surface defects primarily caused by the environment and vehicular loads. Preventive maintenance treatments used to protect the pavement structure and slow the rate of pavement deterioration include the following:

- Crack and Joint Sealing
- Microsurfacing
- Novachip
- Surface Milling and Asphalt Overlay

CRACK AND JOINT SEALING

Description: Crack and joint sealing consists of cleaning the non-working crack in the bituminous pavement surface and placing the specified materials into and above the crack to substantially reduce infiltration of water and to reinforce the adjacent pavement. The fill method consists cleaning the crack surface and placing the specified materials into the cavity to prevent the intrusion of water and incompressibles into the crack.

Purpose: The purpose of sealing and filling cracks in the flexible pavement surface is to prevent water and incompressibles from entering the pavement structure.

Existing pavement condition: The existing bituminous surface should be a relatively newly placed surface on a good base. On a flexible (asphalt or rock) base, the bituminous

surface should be two to four years old and on a composite pavement (concrete base with asphalt surface), one to two years old. The visible surface distress may include: fairly straight open longitudinal and transverse cracks with slight secondary cracking and slight raveling at the crack face, and no patching or very few patches in excellent condition.

Existing pavement surface preparation: None, although the surface must be dry, so springtime application is generally preferable. The cracksealing material takes longer to set up in hot temperatures.

Performance: The effectiveness of the seal will greatly depend upon the width of crack being sealed and the movement of the pavement structure at the crack.

Life Extension: This treatment is not a one shot operation. In order to maintain the sealed pavement surface, a routine maintenance crack sealing and filling operation should follow up this treatment, as additional cracks develop. For the purposes of this program, we seal and fill cracks on a biennial basis.

MICROSURFACING

Description: Microsurfacing is a mixture of polymer modified asphalt emulsion, mineral aggregate, mineral filler, water, and other additives, properly proportioned, mixed, and placed on a paved surface.

Purpose: A single course microsurfacing will retard oxidation and improve skid resistance in the pavement surface. A multiple course microsurfacing is used to correct certain pavement surface deficiencies including severe rutting, minor surface profile irregularities, polished aggregate or low skid resistance and light to moderate raveling. Microsurfacing is typically used on flexible or composite pavements and can perform under all traffic volumes.

Existing pavement condition: The existing pavement should exhibit a uniform cross section and a good base. The visible distress may include slight cracking, rutting, minor surface irregularities, flushed or polished surface and/or moderate raveling.

Existing pavement surface preparation: Surface preparation typically includes crack fill, bump removal if necessary, removal of thermoplastic pavement markings and seal patching for large voids and potholes. The existing surface must be dry and clean during installation. Summertime installation is preferred due to dry weather and warmer temperatures, which speed up setting times. Streets are swept using a streetsweeper in order to ensure a clean surface.

Performance: A microsurface performs well on roadways to correct pavement surface conditions described above. Microsurfacing is a “wearing course”, which will deteriorate over time. Microsurfacing should not be placed on concrete pavements or severely deteriorated asphalt pavements.

Life Extension: We expect that microsurfacing applied at warranted conditions will have a life span of approximately 7 years. By that time, most of the microsurfacing material wears off and a new coat can be applied.

Performance Limitations: A standard microsurfacing formulation should not be used on a pavement with moderate to heavy surface cracks. Due to its brittle nature, it is a poor crack sealer. Because micro-surfacing mixes require warm to moderate temperatures for curing, we plan to only perform this work in the middle of the summer. Microsurfacing should only be performed twice before milling and installing a new asphalt surface. Too many layers of microsurfacing has been known to lead to delamination.

NOVACHIP

Description: Novachip is an ultrathin bonded wearing course consisting of a polymer-modified asphalt emulsion and a 3/4" layer of gap-graded hot-mix asphalt.

Purpose: Novachip provides an excellent bond to the concrete surface and provides a new, smooth riding layer without greatly affecting utility structures and curb heights.

Existing Pavement Condition: The existing pavement should exhibit a good base condition. Some cracking is acceptable, as long as movement is not occurring and vertical displacements are less than 3/8".

Existing pavement surface preparation: Any base failures must be repaired, and any cracks greater than 1/4" in width should be sealed. Some minor milling may be required at curb ramps and around utility structures. After milling is completed, the street must be swept to ensure a clean, dry surface prior to installation of the new asphalt. This work is best suited to summertime, due to preferable weather conditions.

Performance: This type of treatment will protect the remaining pavement structure, slow the rate of deterioration and improve the ride quality. However, since only 3/4" of material is being placed, it will not improve ride quality to the extent of a traditional asphalt overlay.

Performance Limitations: This treatment should not be used on an existing pavement that shows evidence of a weak base.

SURFACE MILLING WITH BITUMINOUS OVERLAY

Description: The removal of an existing bituminous surface by the cold milling method and the placement of a dense graded bituminous mixture.

Purpose: The cold milling operation is used to: (1) correct specific existing surface deficiencies, and (2) correct the shape of the existing cross section. The bituminous overlay replaces the bituminous material that is removed.

Existing Pavement Condition: The existing pavement should exhibit a good base condition. The visible surface distress may include: severe surface raveling, multiple longitudinal and transverse cracking with slight raveling, a small amount of block cracking, patching in fair condition, debonding surface and slight to moderate rutting.

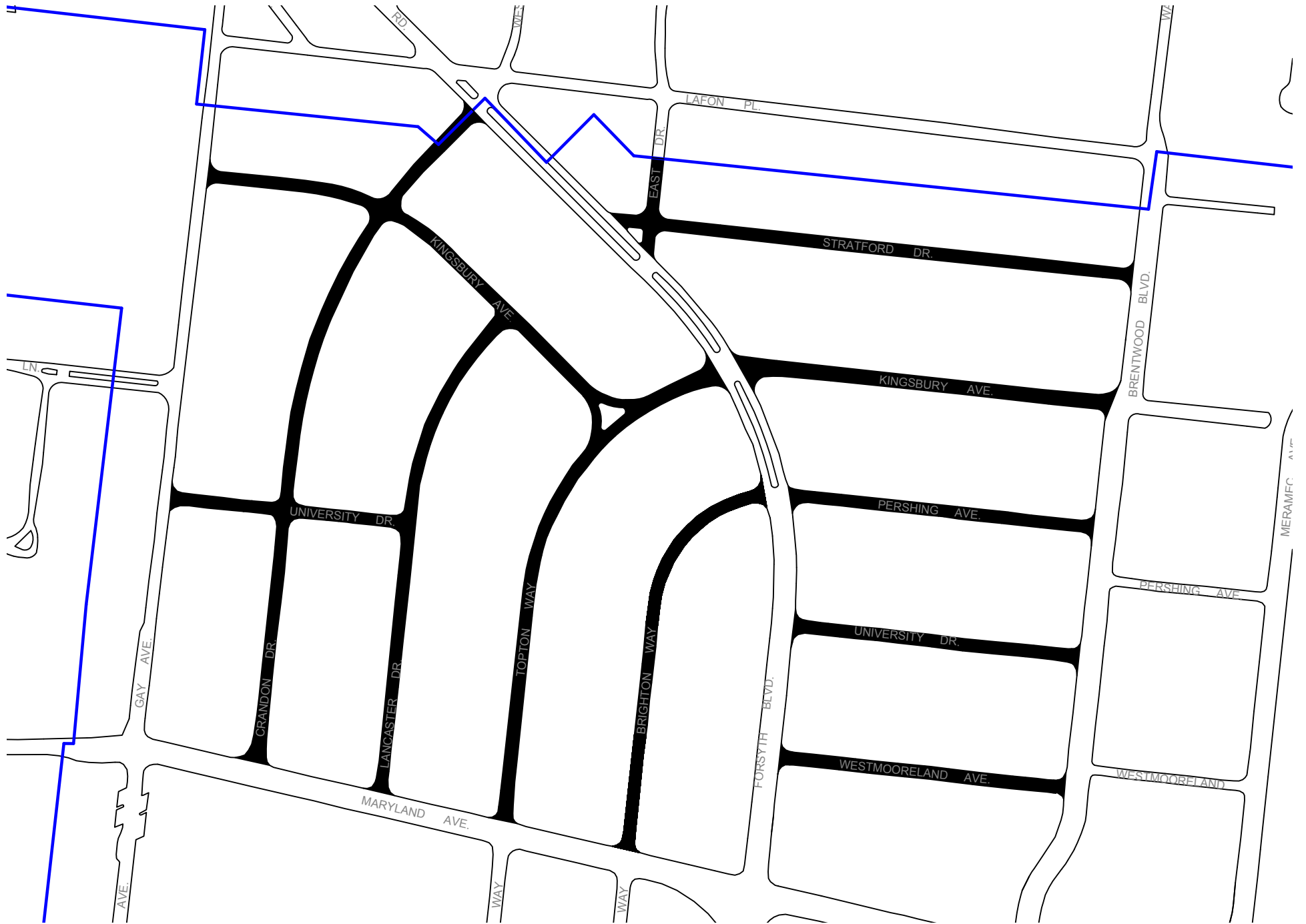
Existing pavement surface preparation: The cold milling operation is used to correct rutting in the existing bituminous surface layer where the rutting is not caused by a weak base and when the condition of the exiting pavement has deteriorated to a point where it is not practical to correct the problem by a more economical treatment. The cold milling operation is also used to remove an existing bituminous course that is debonding and to remove the existing bituminous surface to retain the existing curb face. After cold milling is completed, the street must swept to ensure a clean, dry surface prior to installation of the new asphalt. This work is best suited to summertime, due to preferable weather conditions. While higher temperatures prolong the wait time to allow traffic back onto the streets, they also allow for time to achieve full compaction and the smoothest ride.

Performance: This type of treatment will protect the remaining pavement structure, slow the rate of deterioration and improve the ride quality.

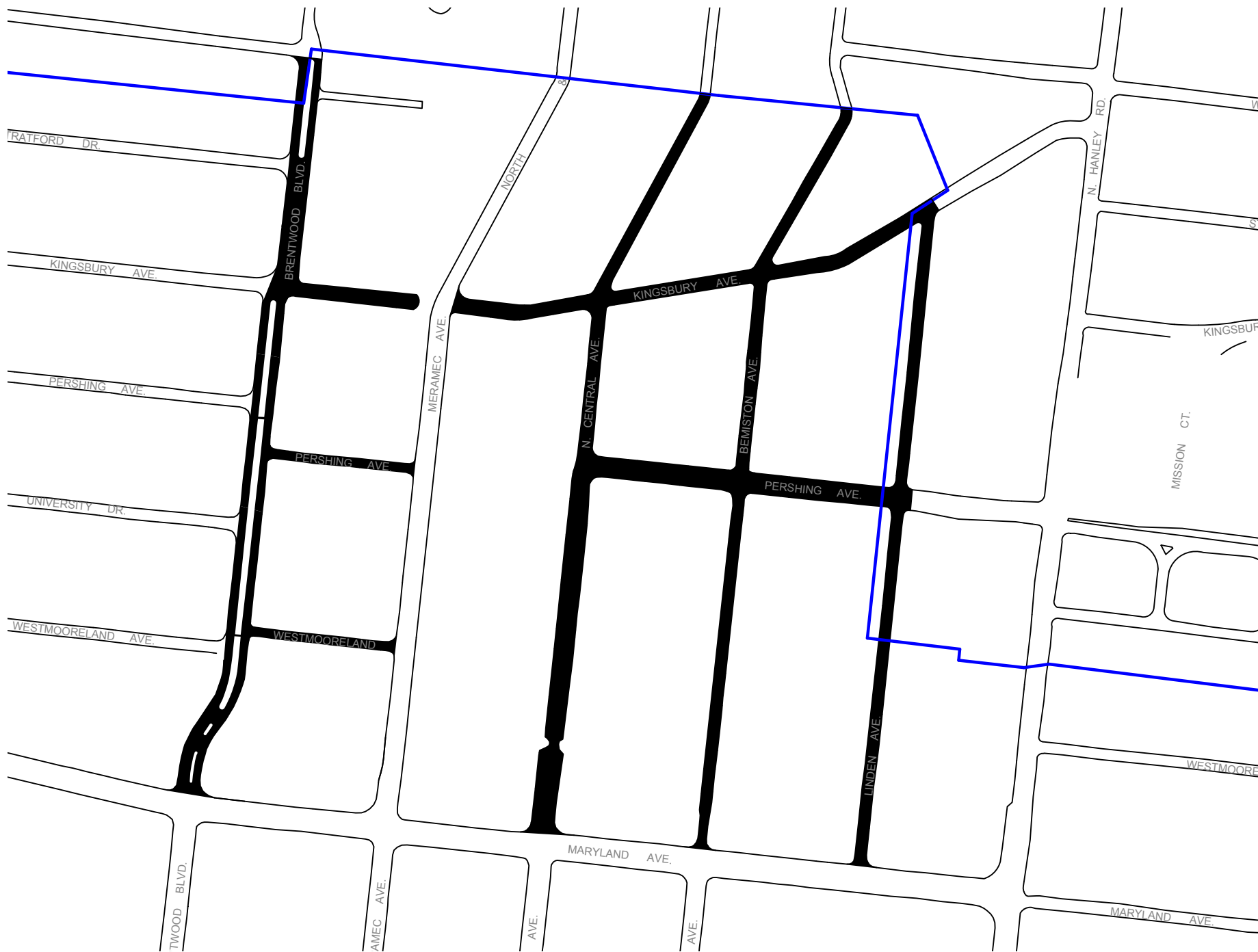
Performance Limitations: This treatment should not be used on an existing pavement that shows evidence of a weak base.

Alley Replacement Program

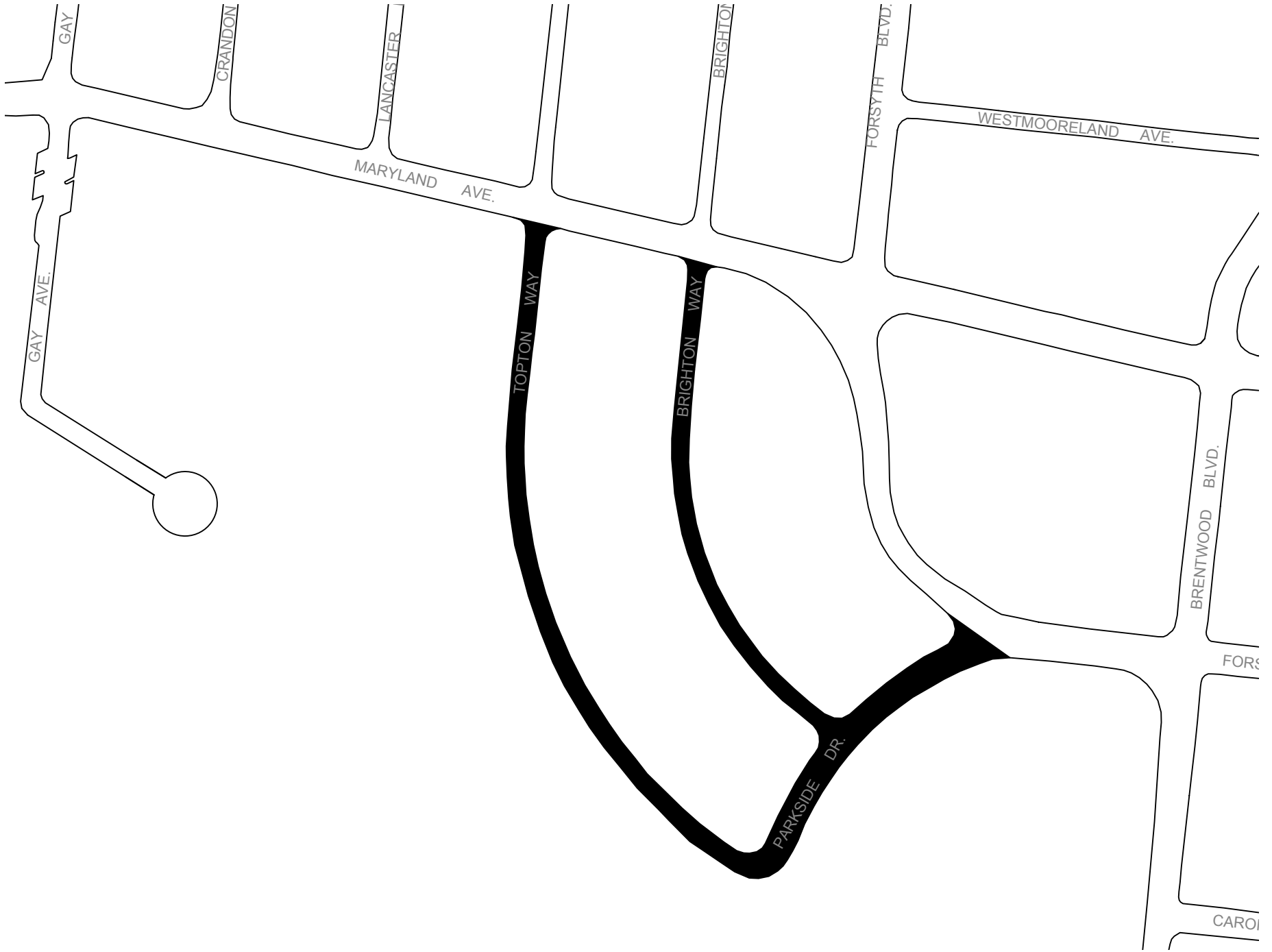
The alleys within the City of Clayton serve varied purposes depending on their location. In some instances, they serve as garage access; in others they provide access for deliveries and garbage collection. Most of the alleys within the city are made of concrete, some consist of a concrete base with an asphalt surface, and a few consist of only asphalt. Because of the heavy loads that alleys experience due to garbage collection and deliveries, concrete is the preferred pavement choice. In addition, concrete has a longer life span, meaning that once a concrete alley has been constructed, replacement should not be necessary for twenty-five years or more. Therefore, the Public Work Department has undertaken the strategy of replacing dilapidated alleys with concrete, regardless of whether they are currently composed of concrete or asphalt. Utilizing an annual assessment, staff will prioritize alley replacement projects. Included in this report are scheduled alley replacements for the next twenty years. This schedule will be modified based upon annual assessments as well as redevelopments which may replace the alleys.



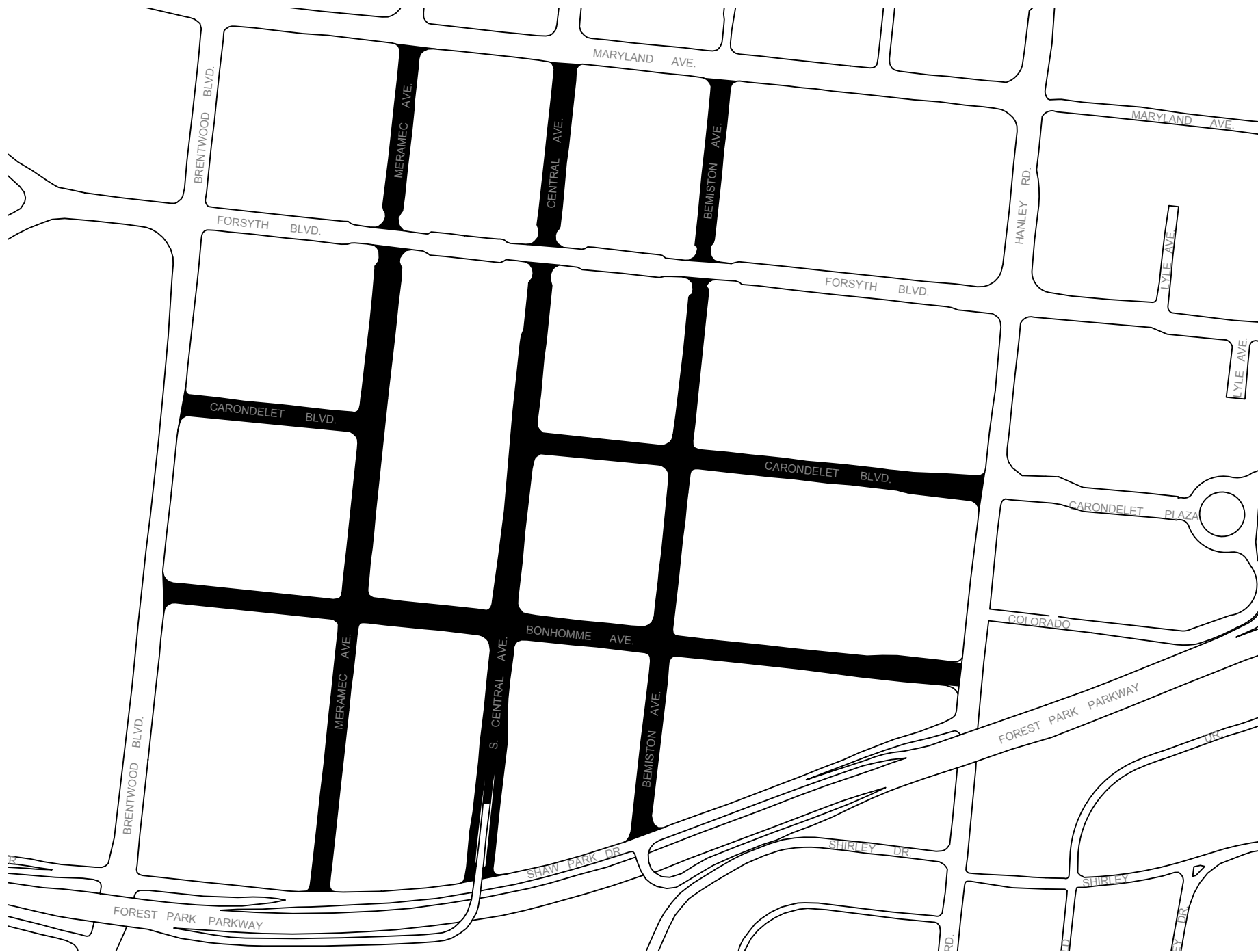
Clayton Gardens Subdivision



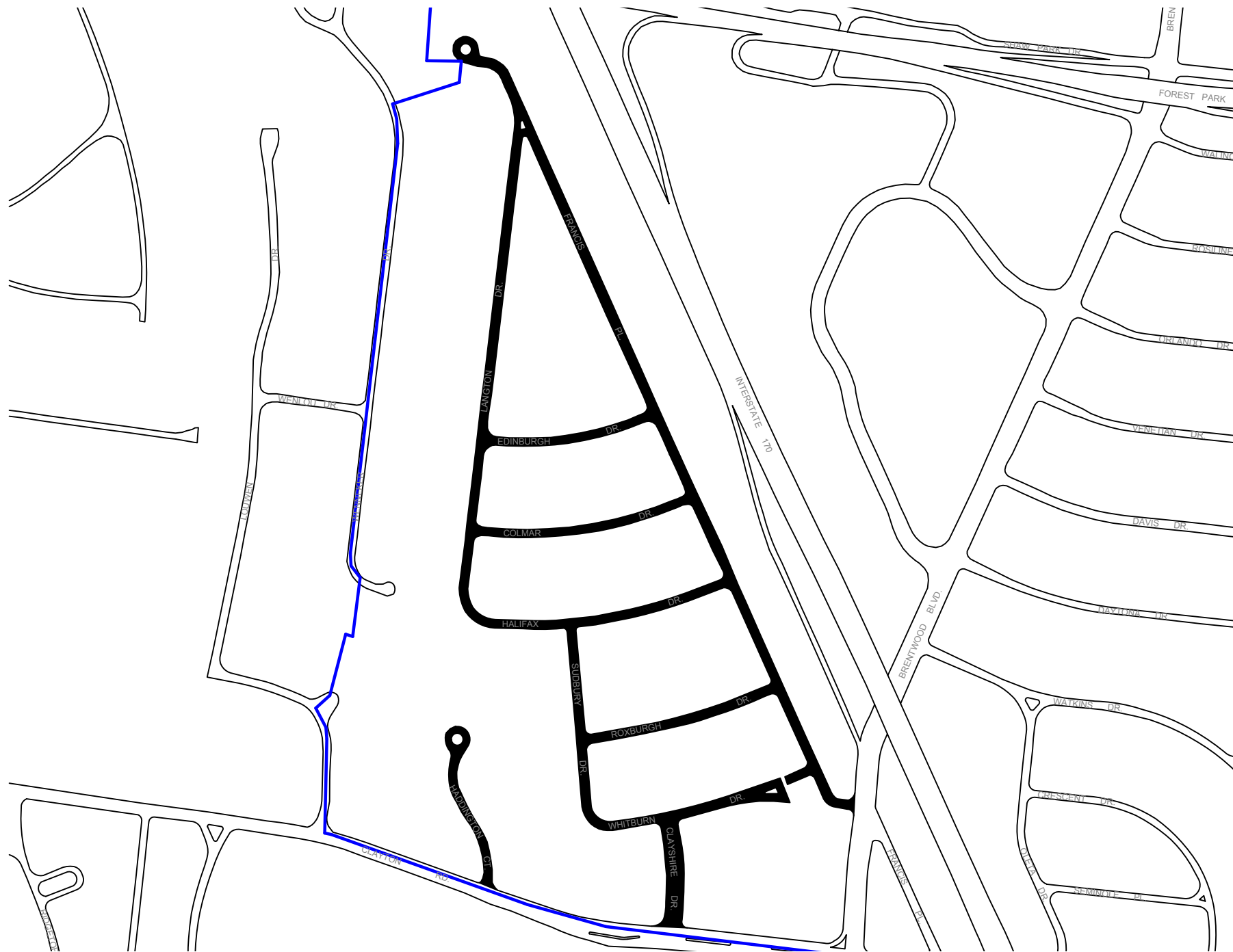
Bemiston Subdivision



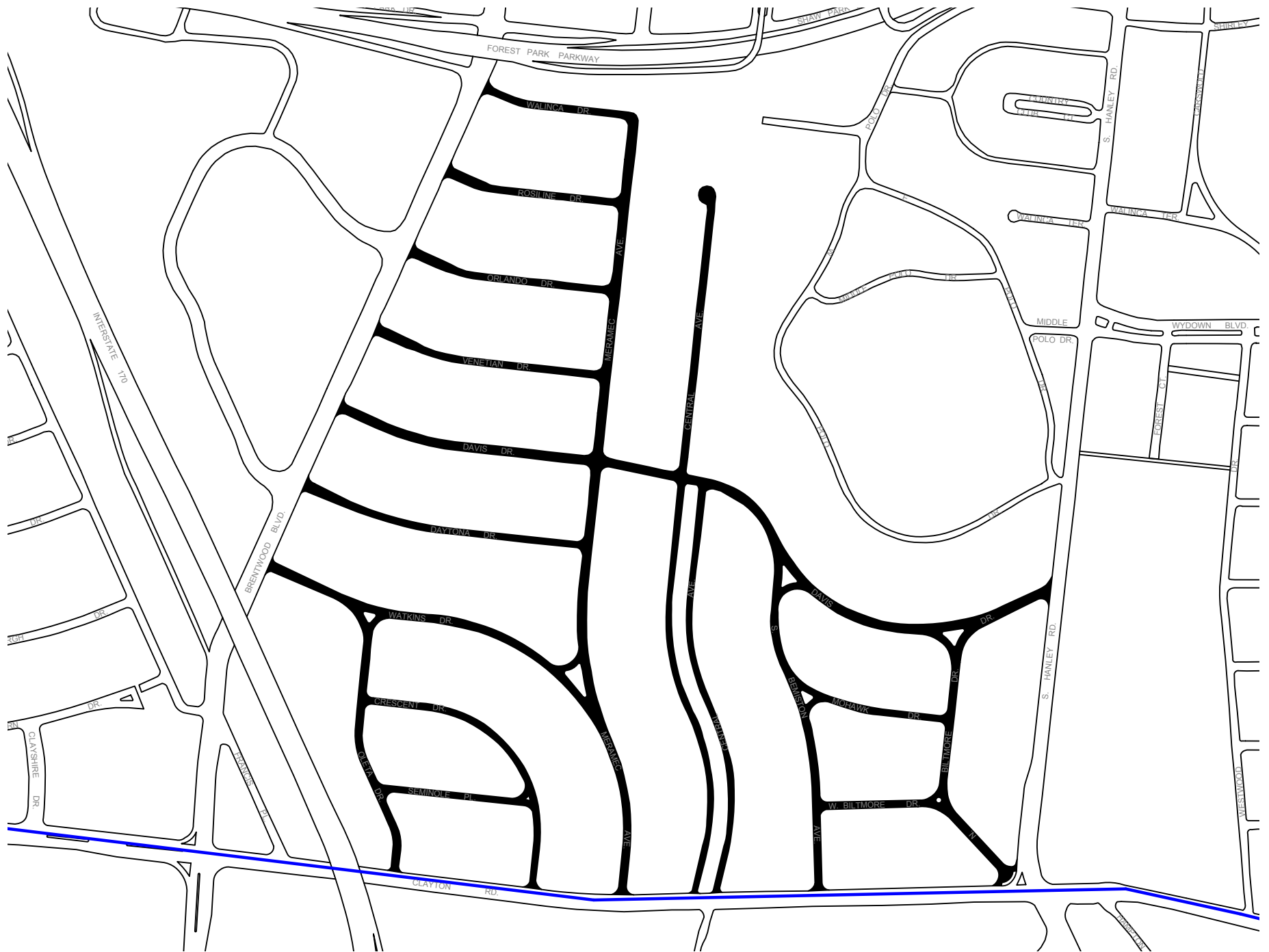
Parkside Subdivision



Central Business District



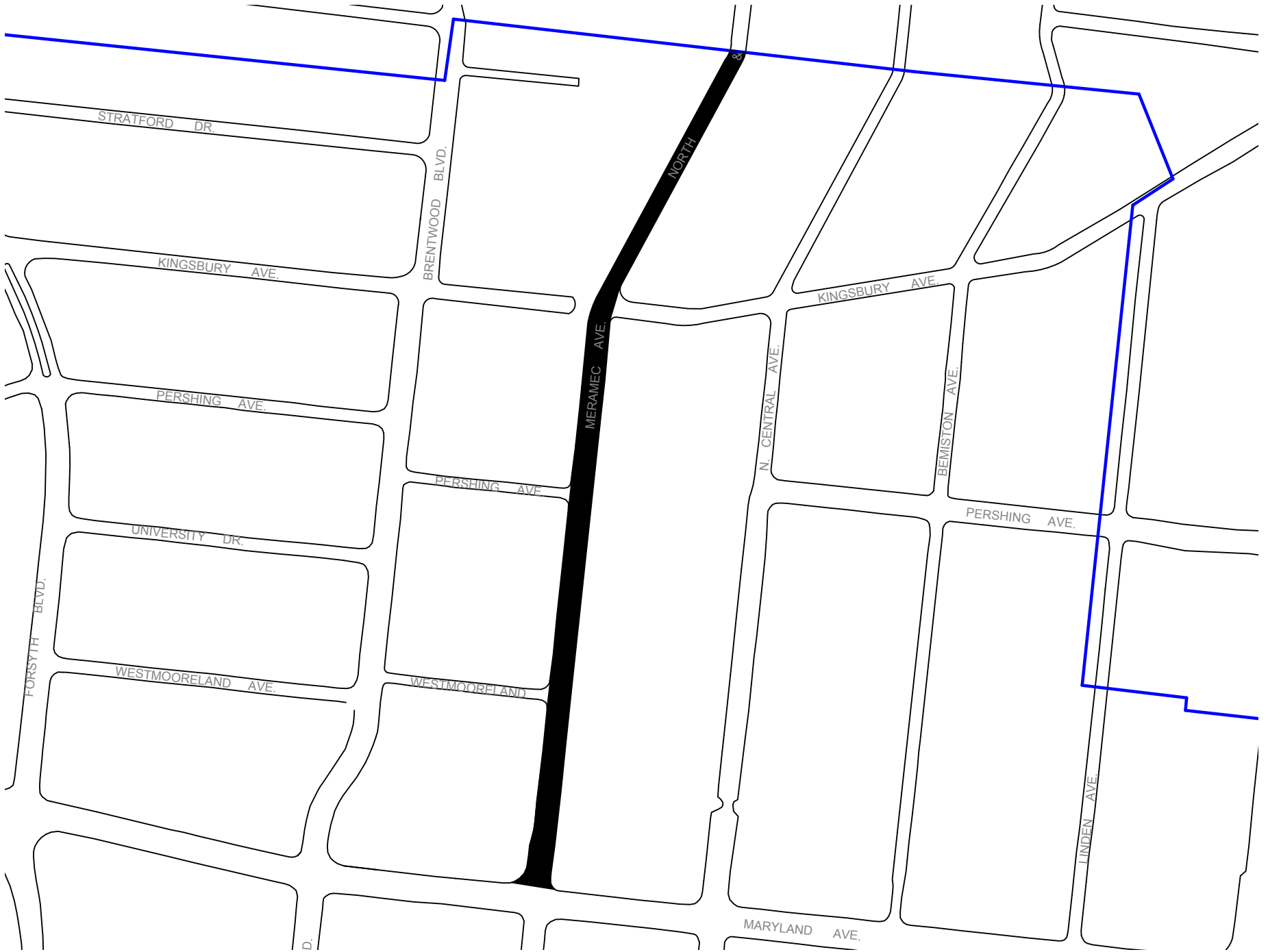
Clayshire Subdivision



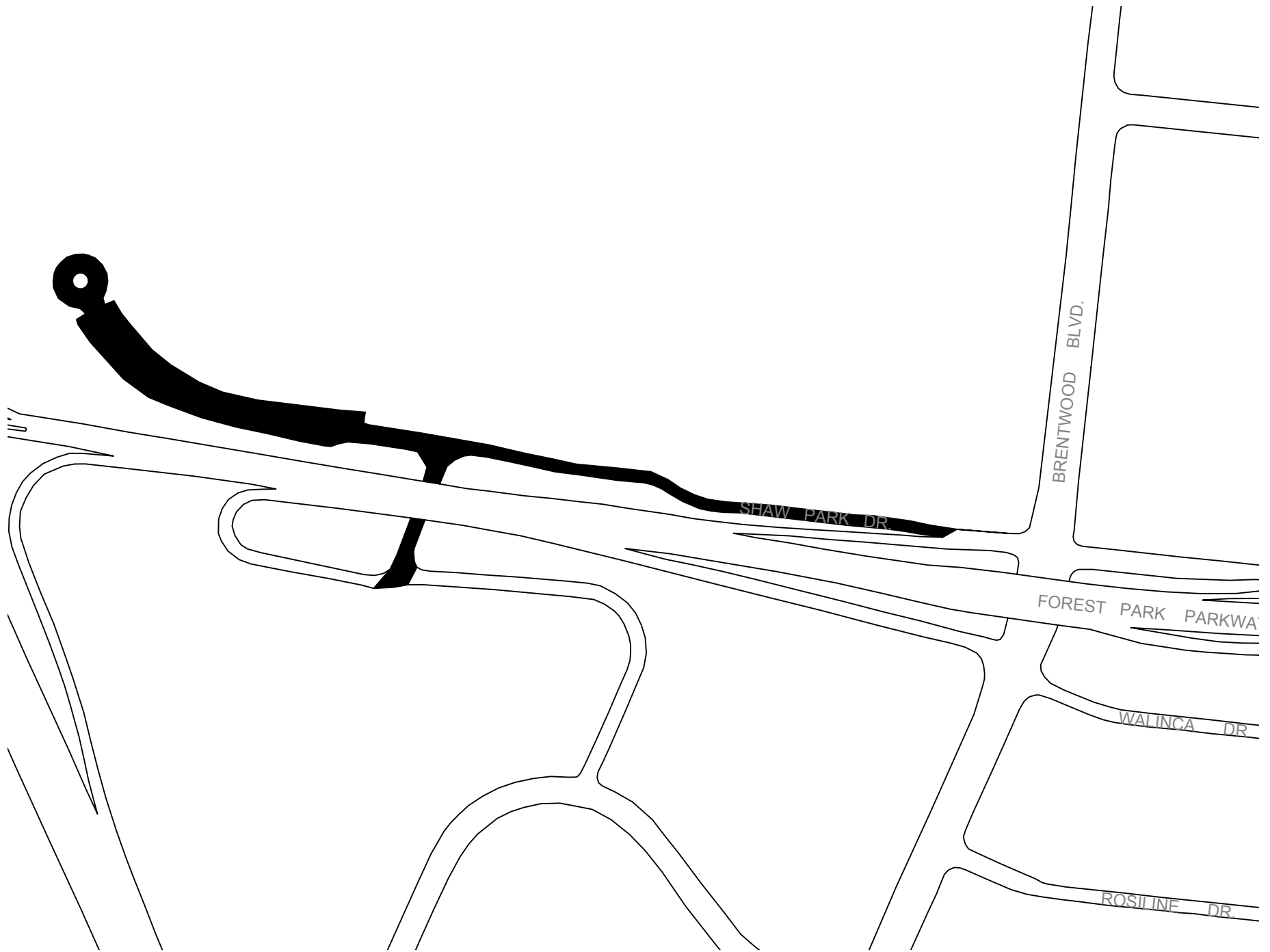
Davis Place Subdivision



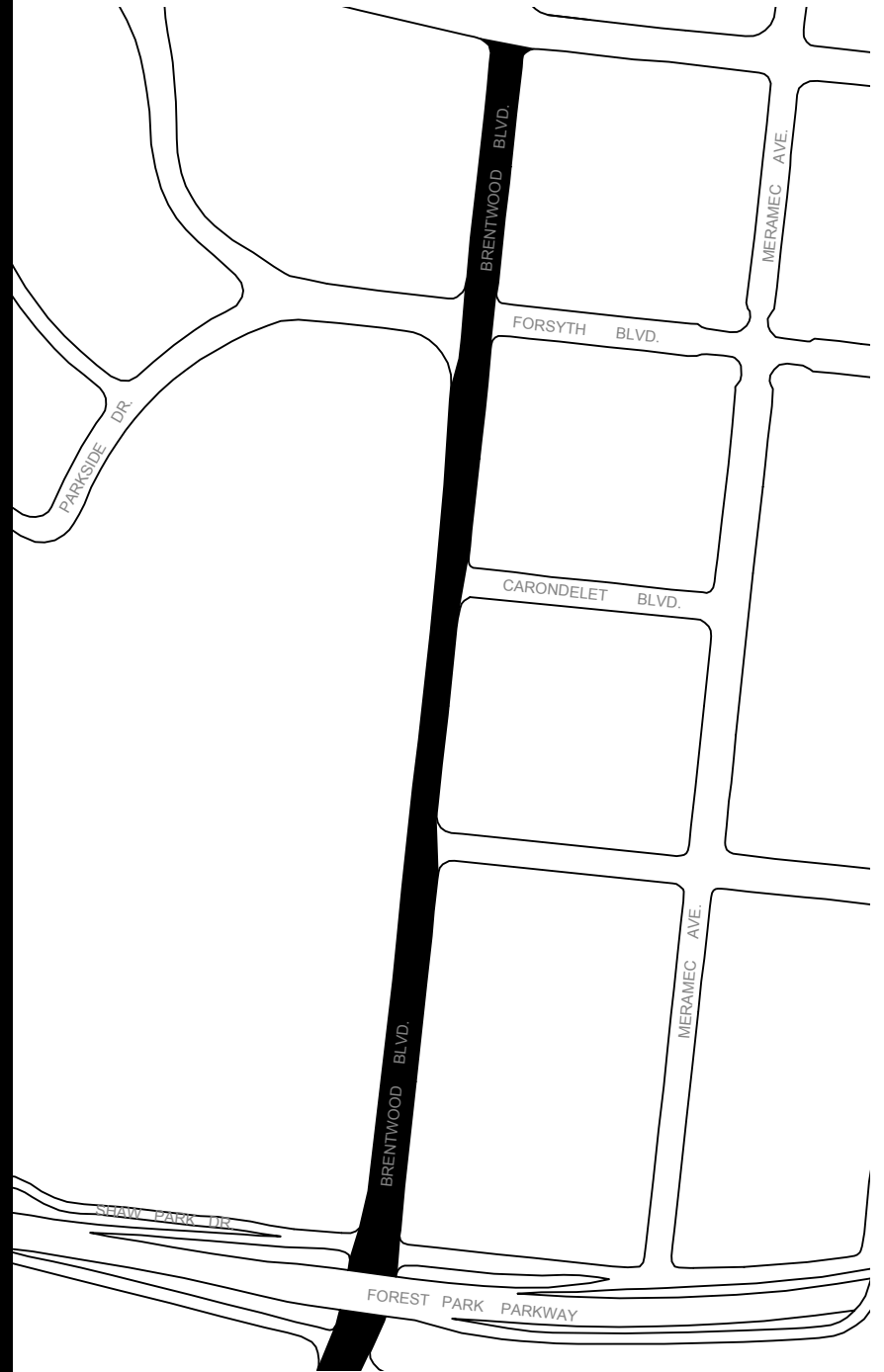
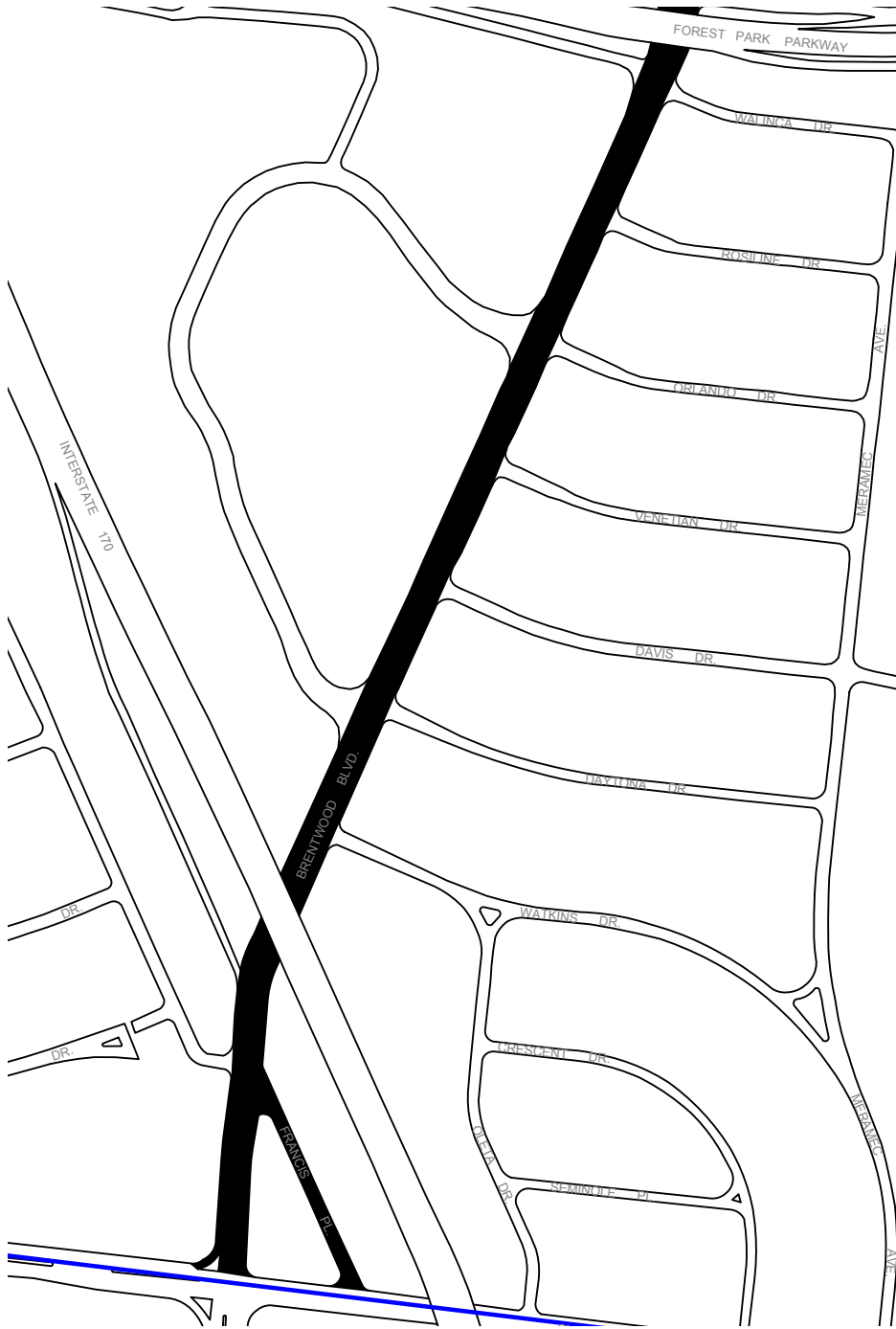
Country Club Estates, Country Club Court,
Walinca Terrace, and Shirley Drive



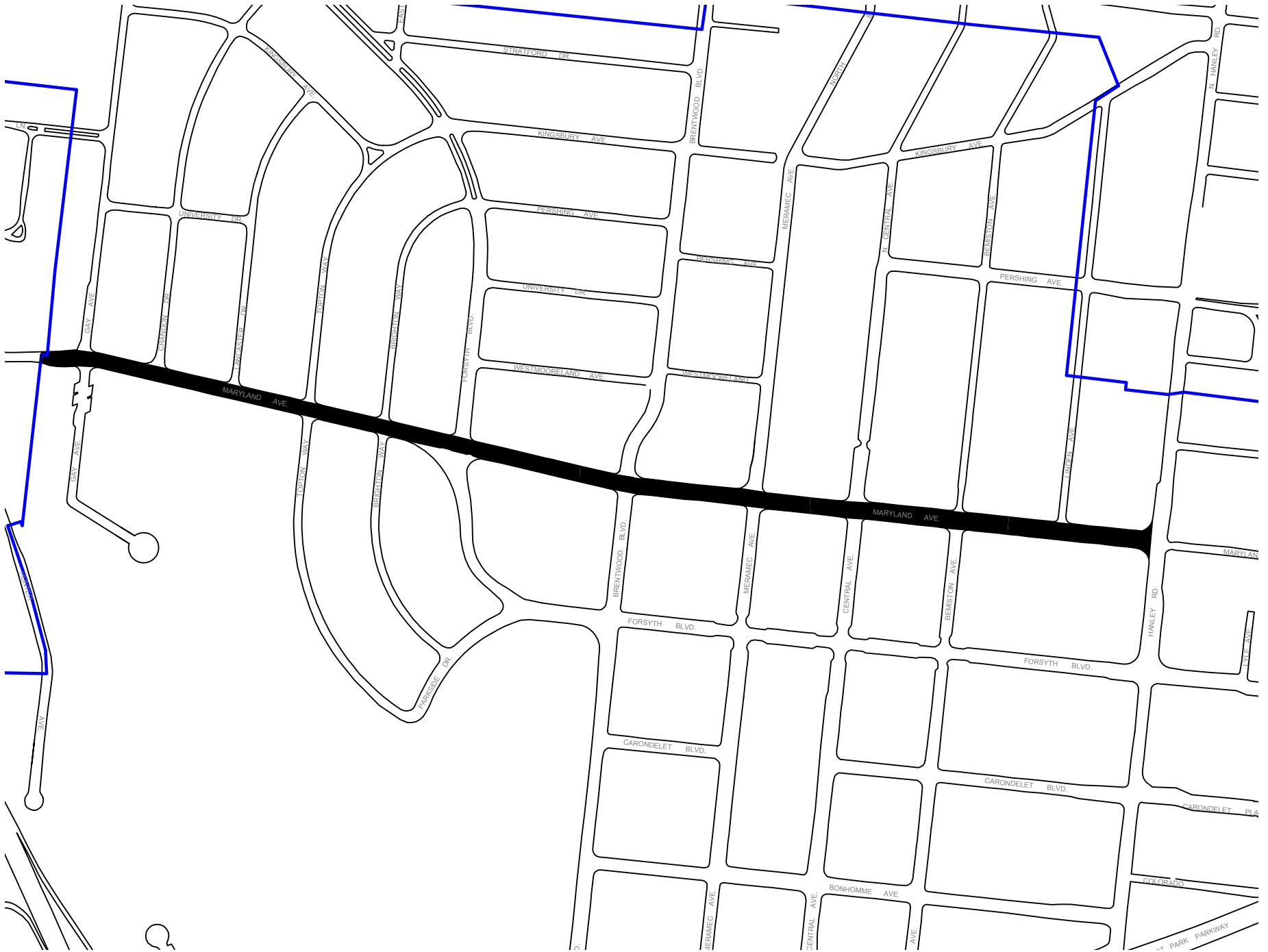
North Meramec Avenue



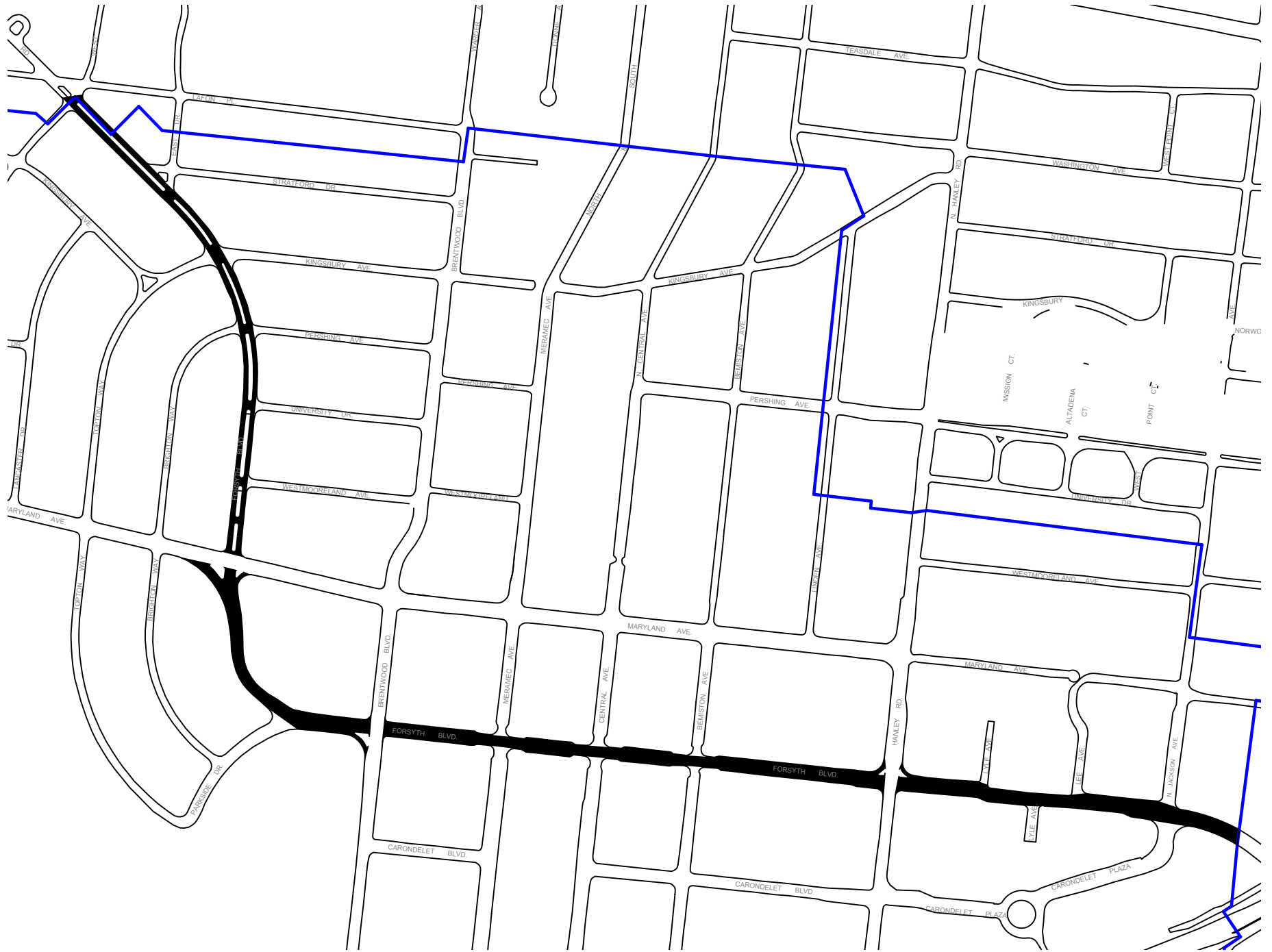
Shaw Park Drive



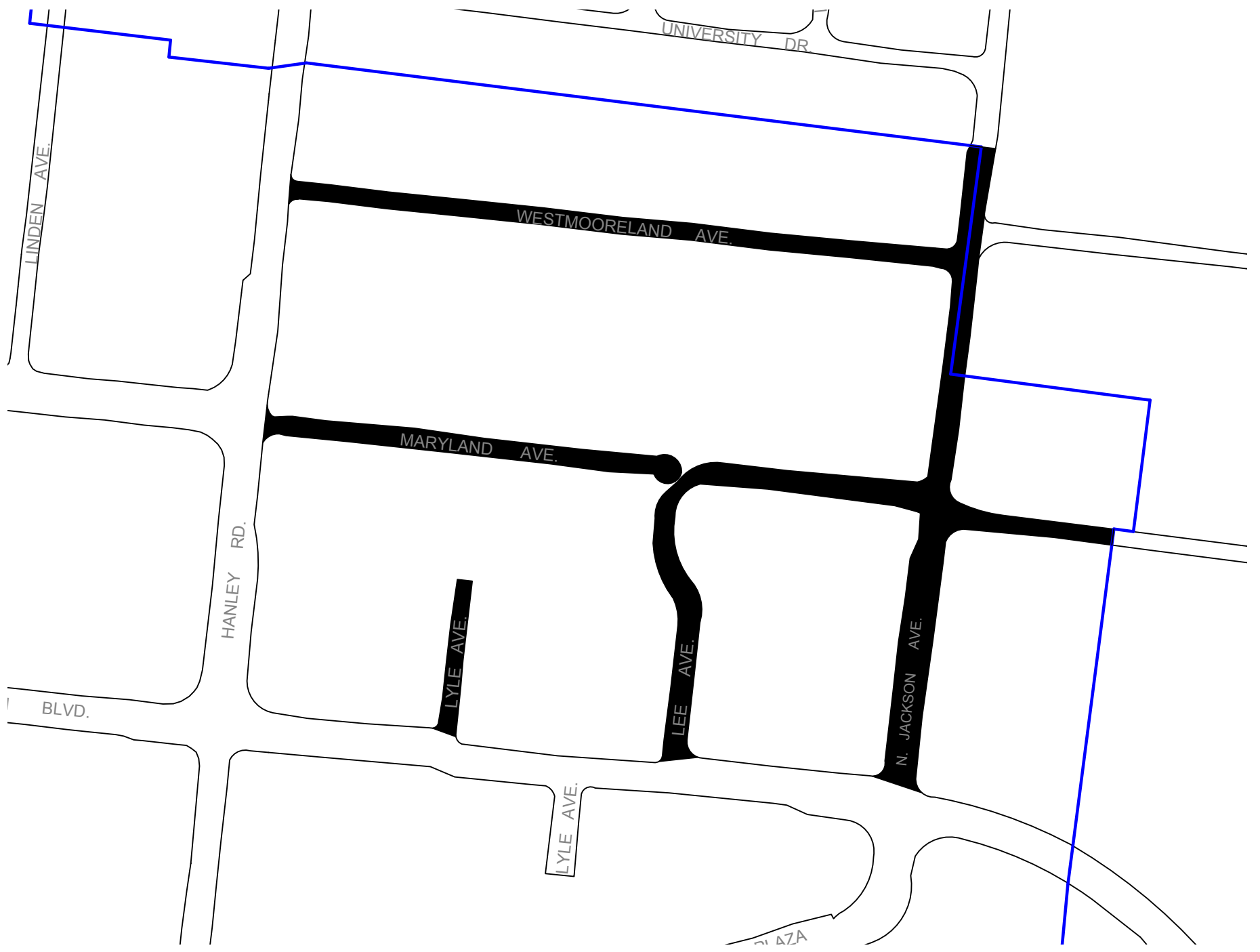
Brentwood Boulevard



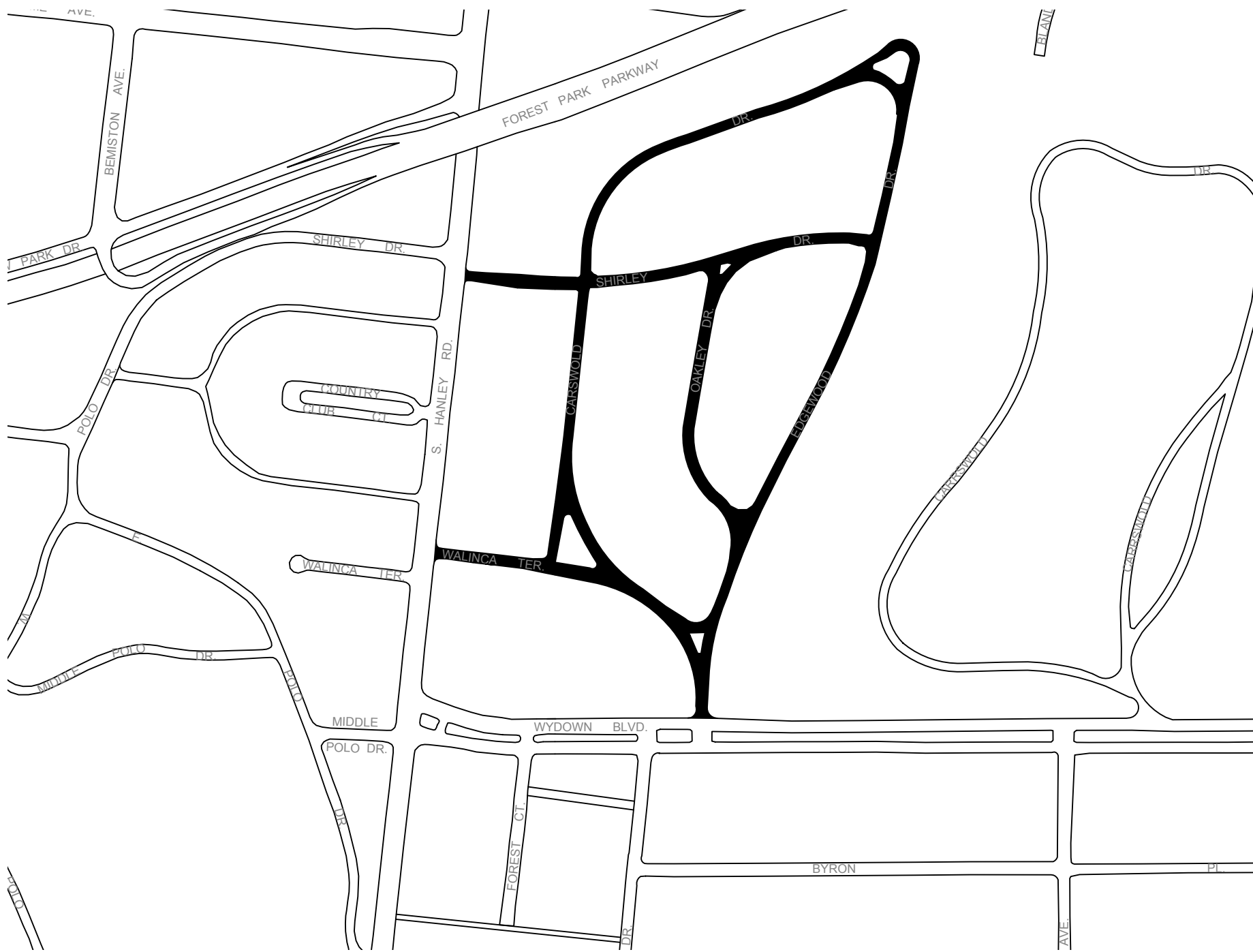
Maryland Avenue



Forsyth Avenue (West)



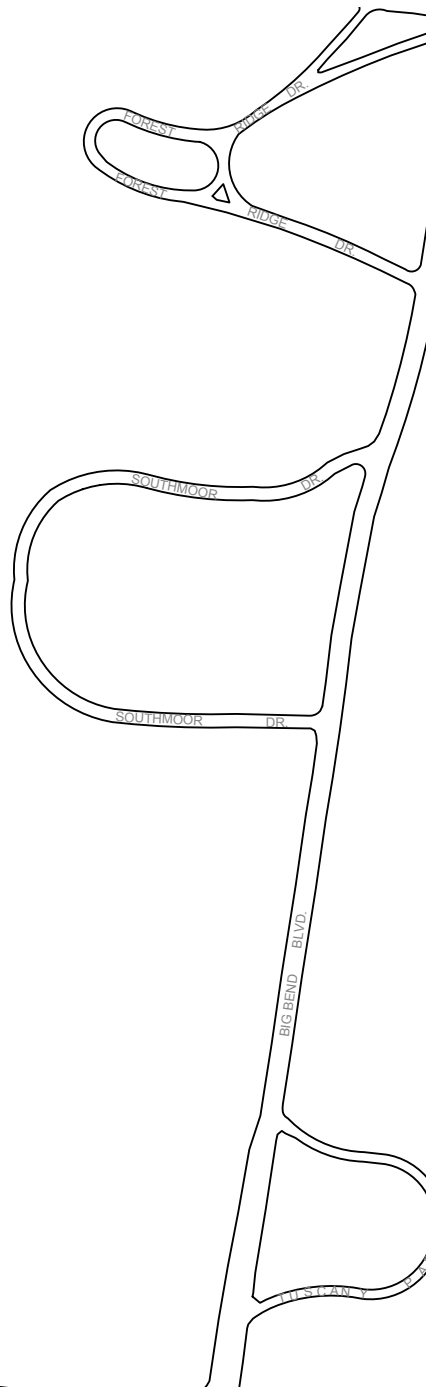
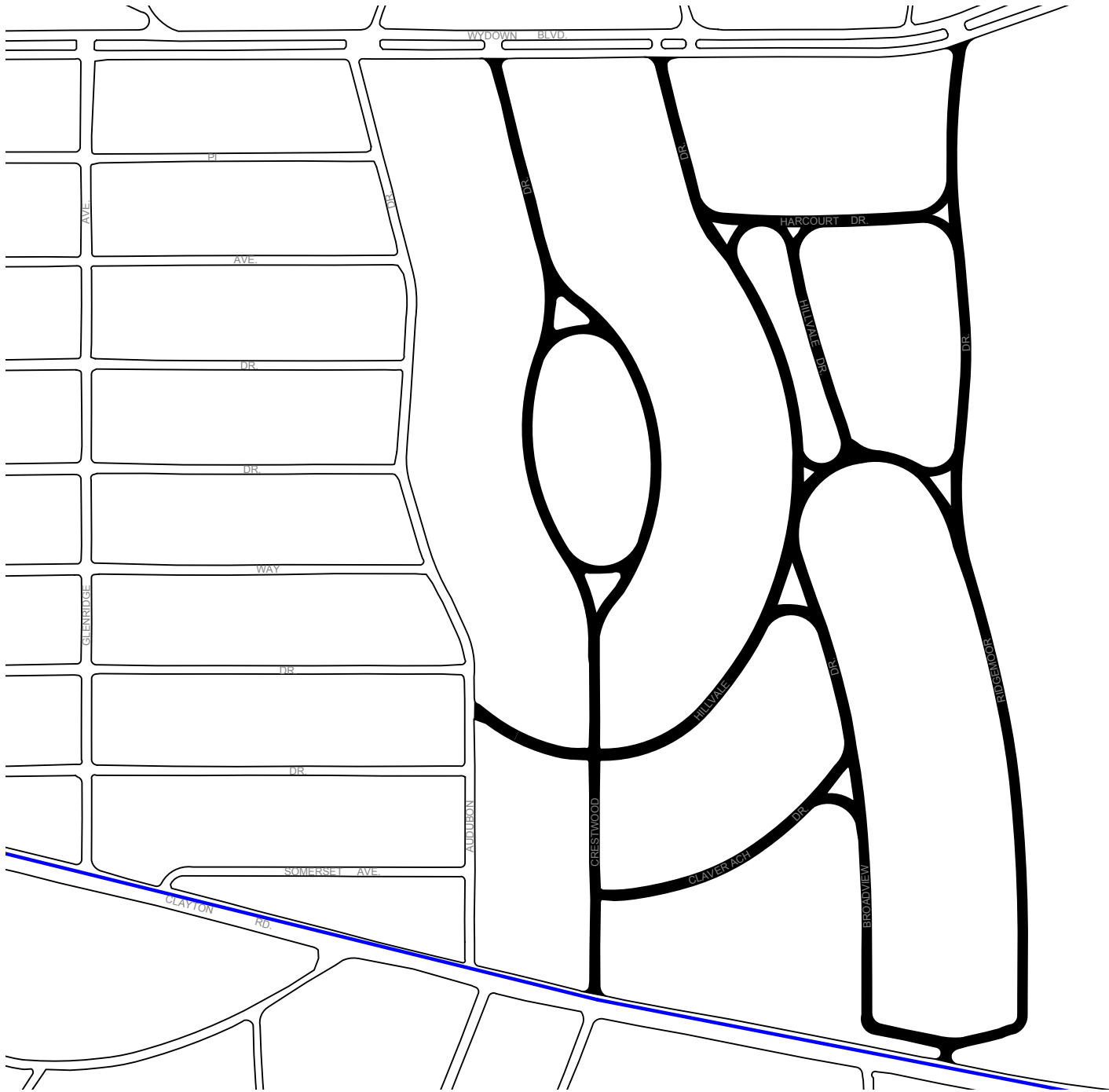
Hanley Place & Maryland Terrace



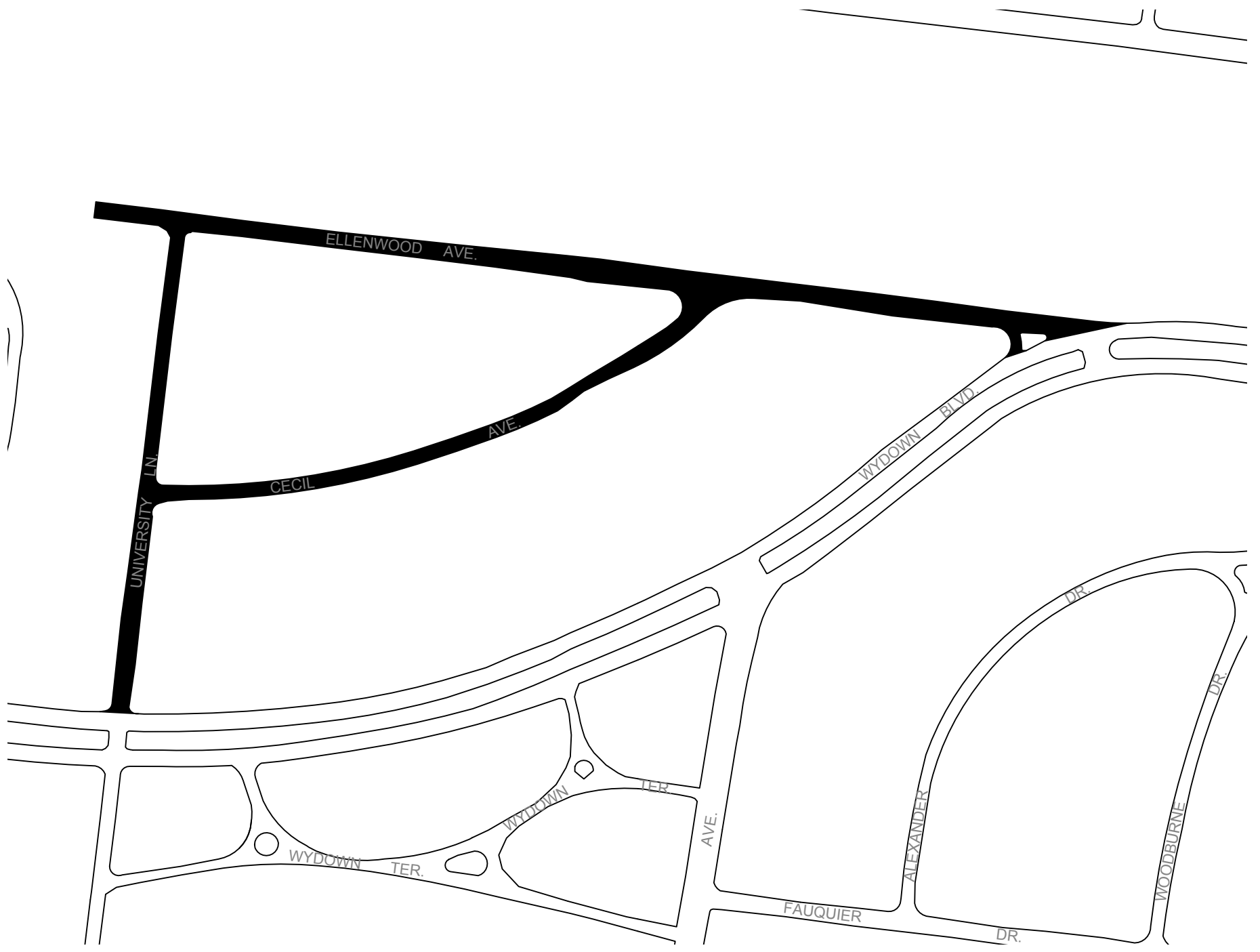
Wydown Forest Subdivision



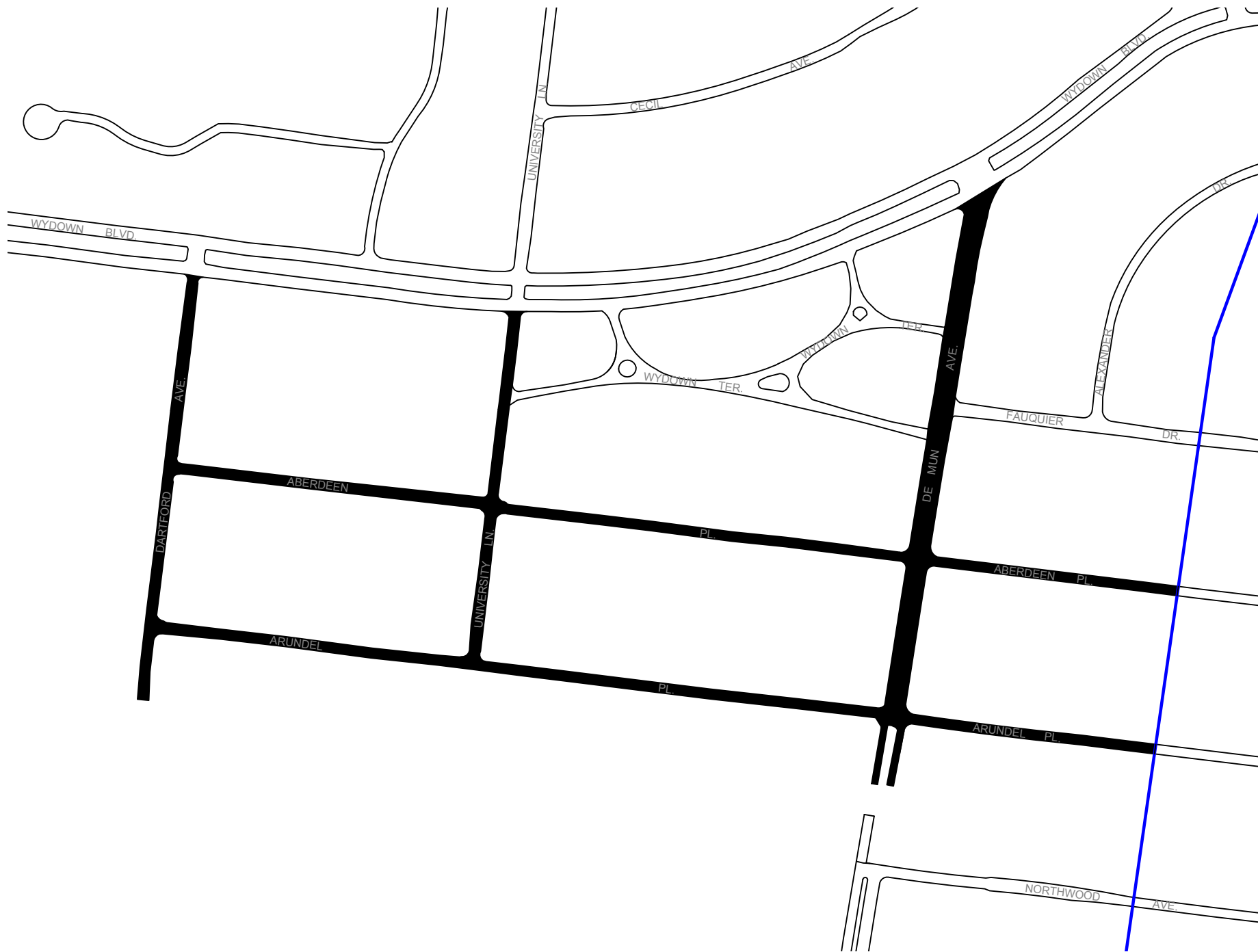
Moorlands Subdivision



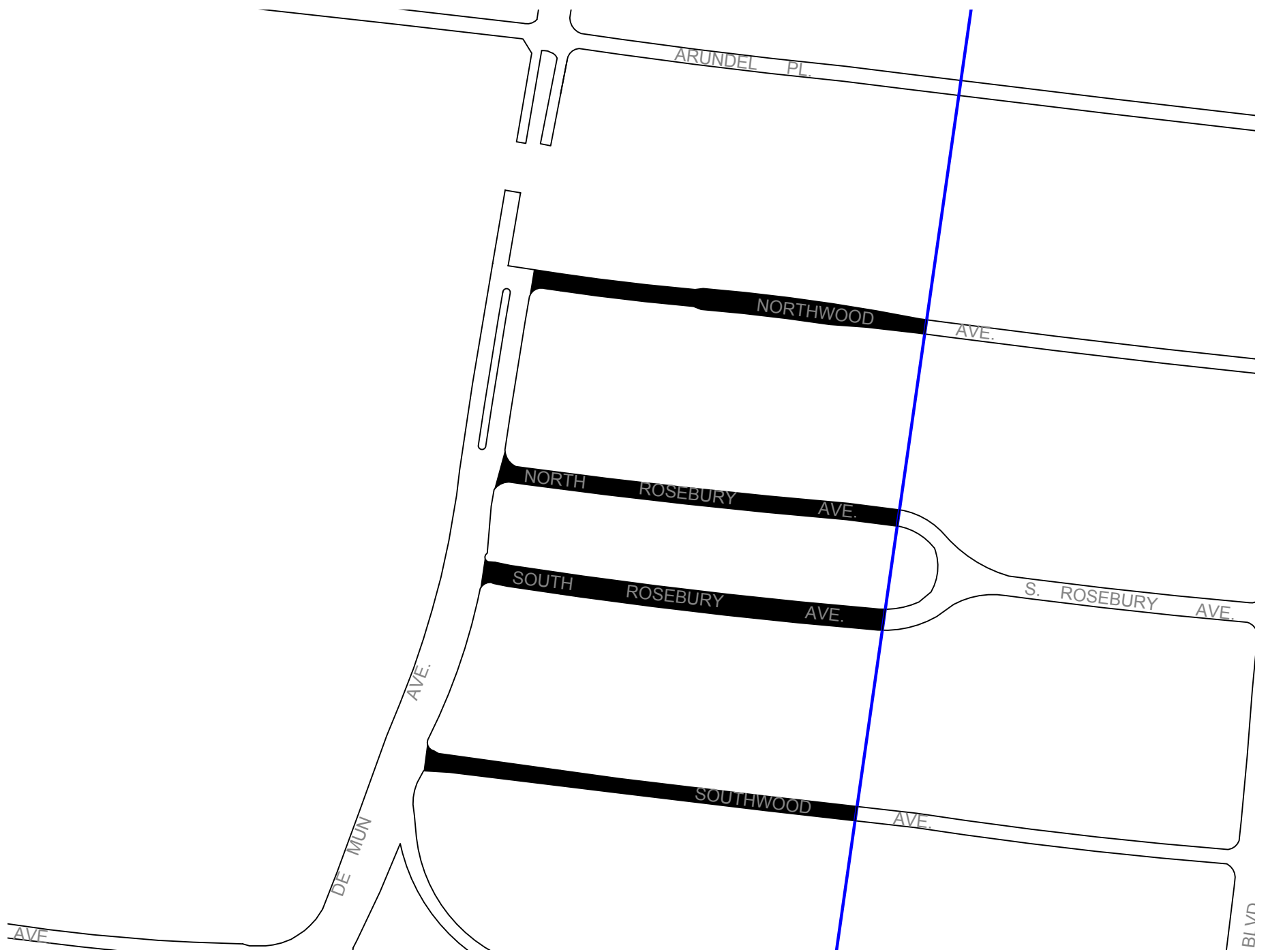
Clavarach Subdivision



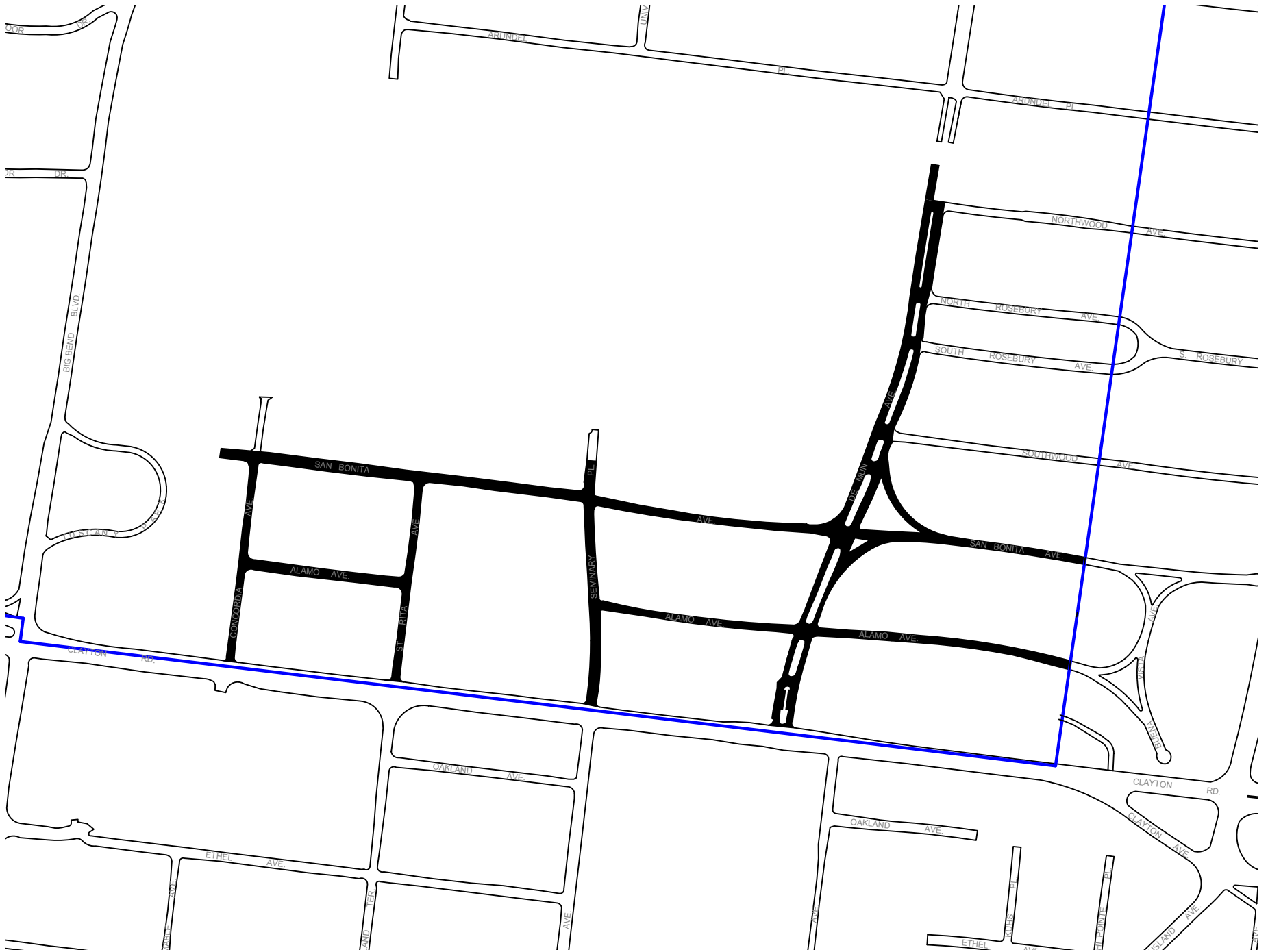
Skinker Heights Subdivision



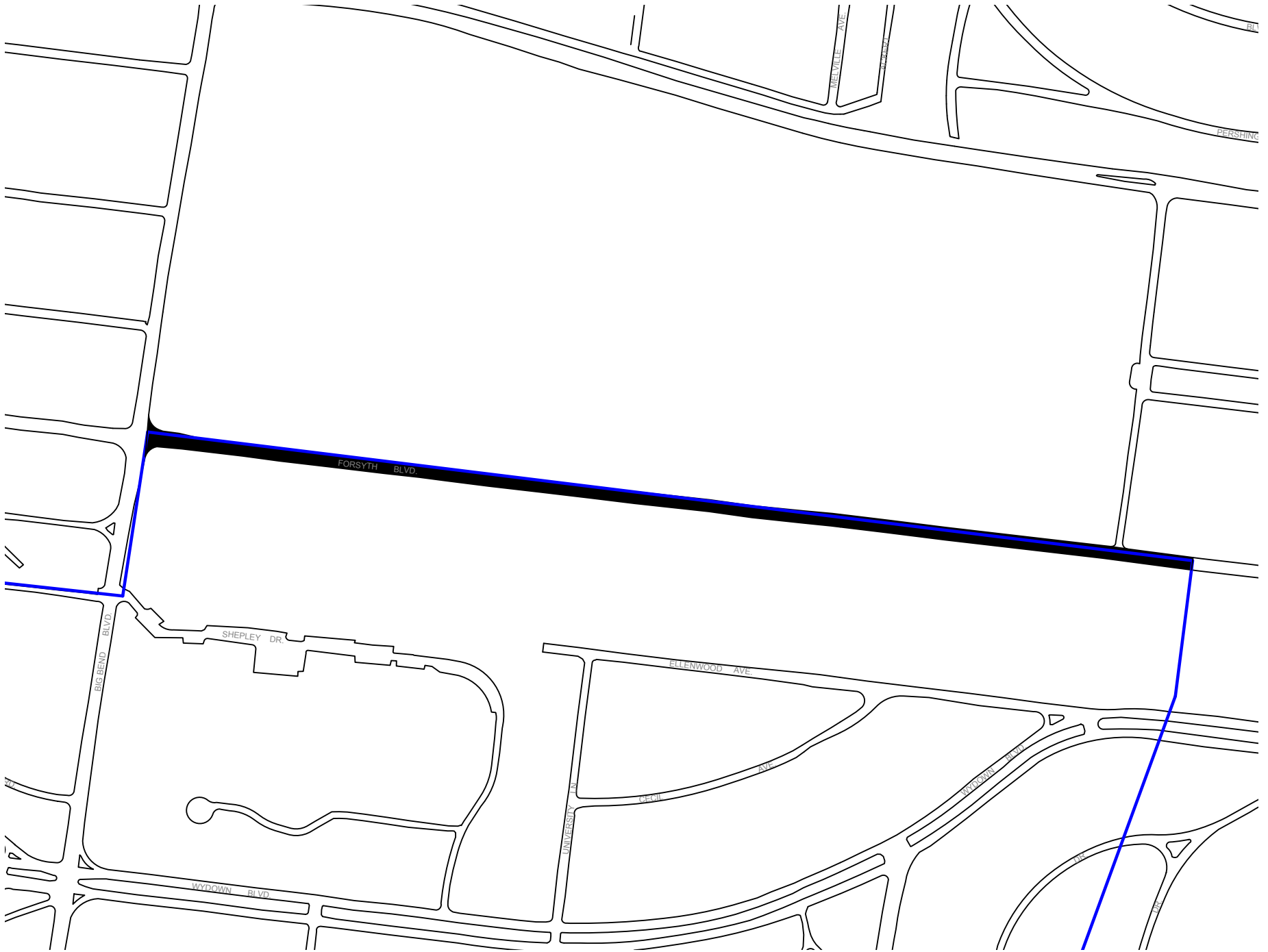
Hillcrest Subdivision



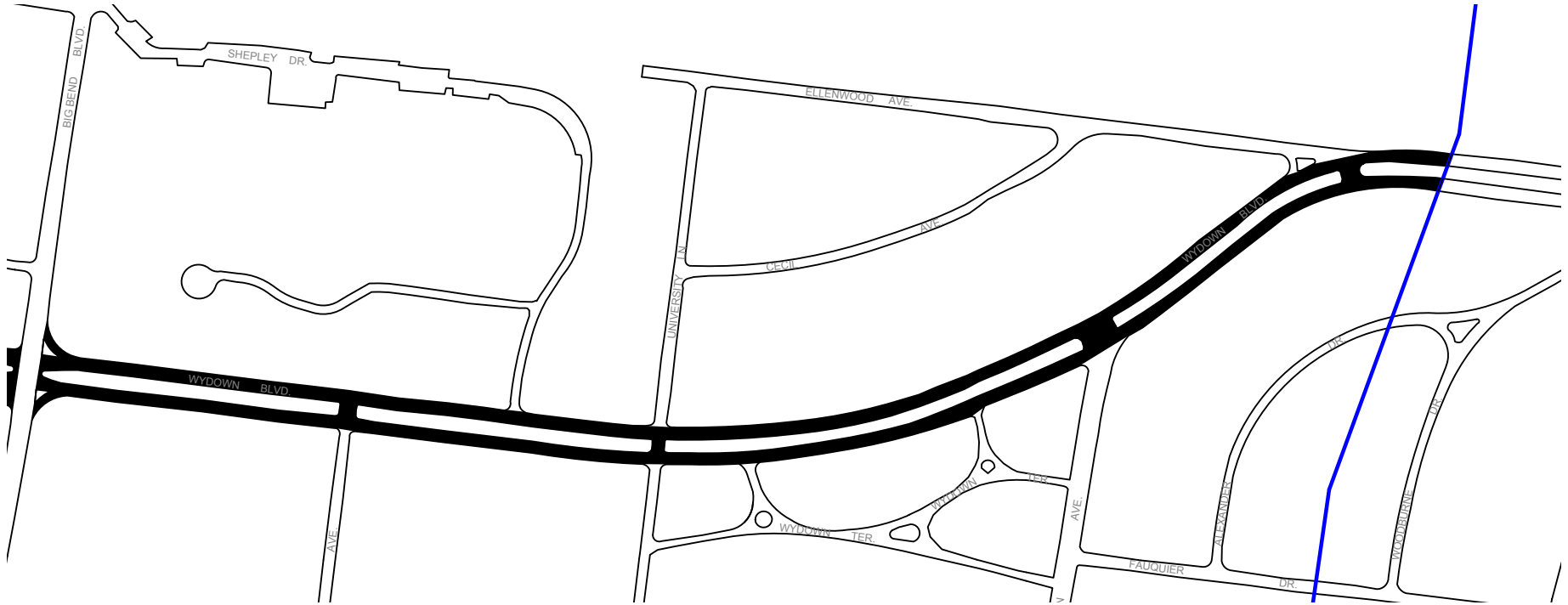
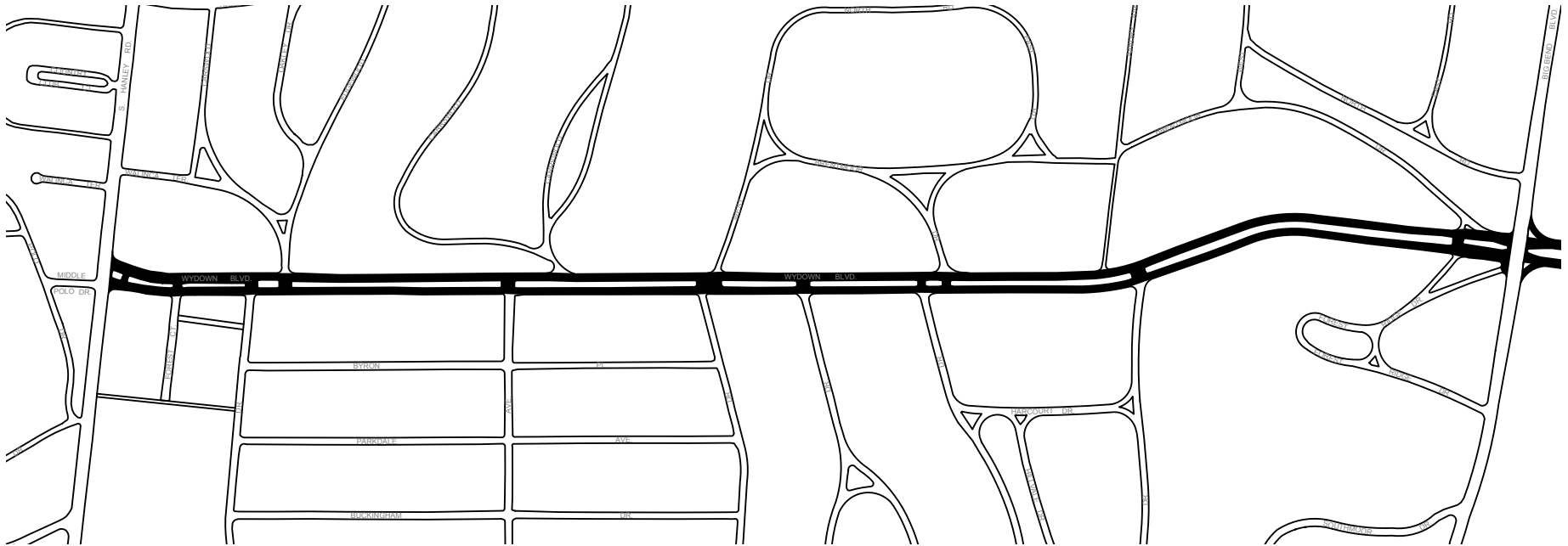
DeMun Park Subdivision



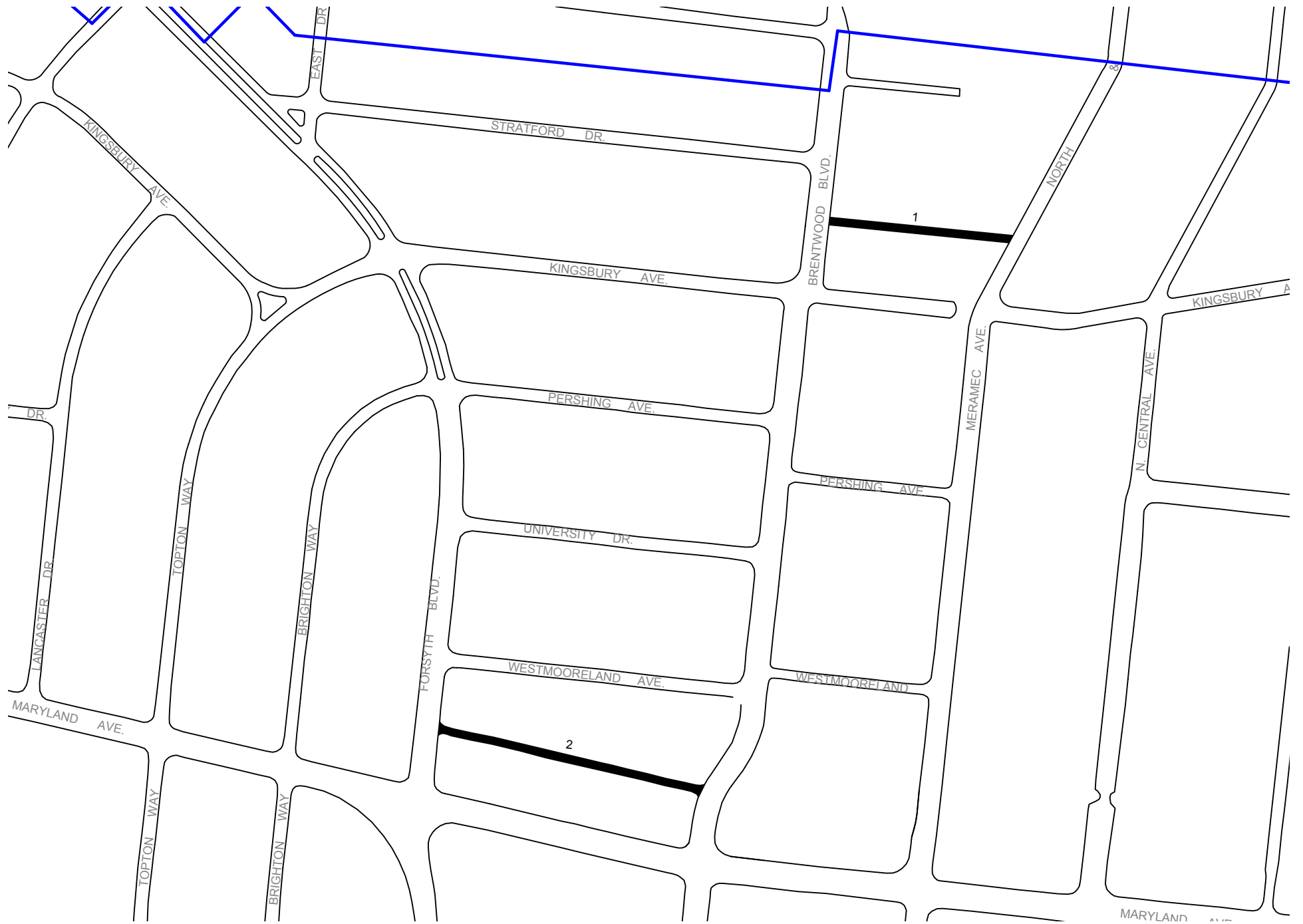
Hi-Pointe Subdivision



Forsyth Boulevard (East)



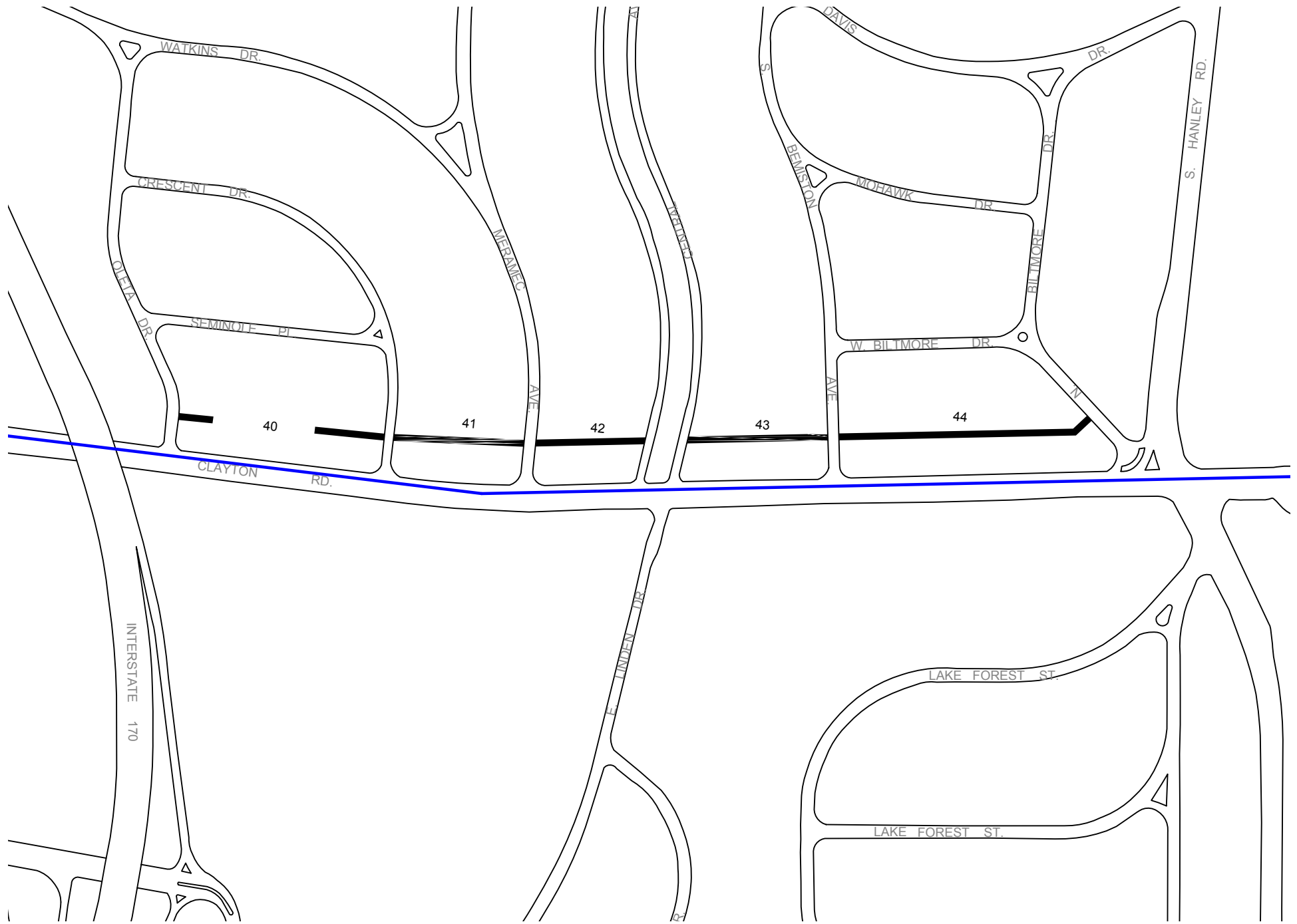
Wydown Boulevard



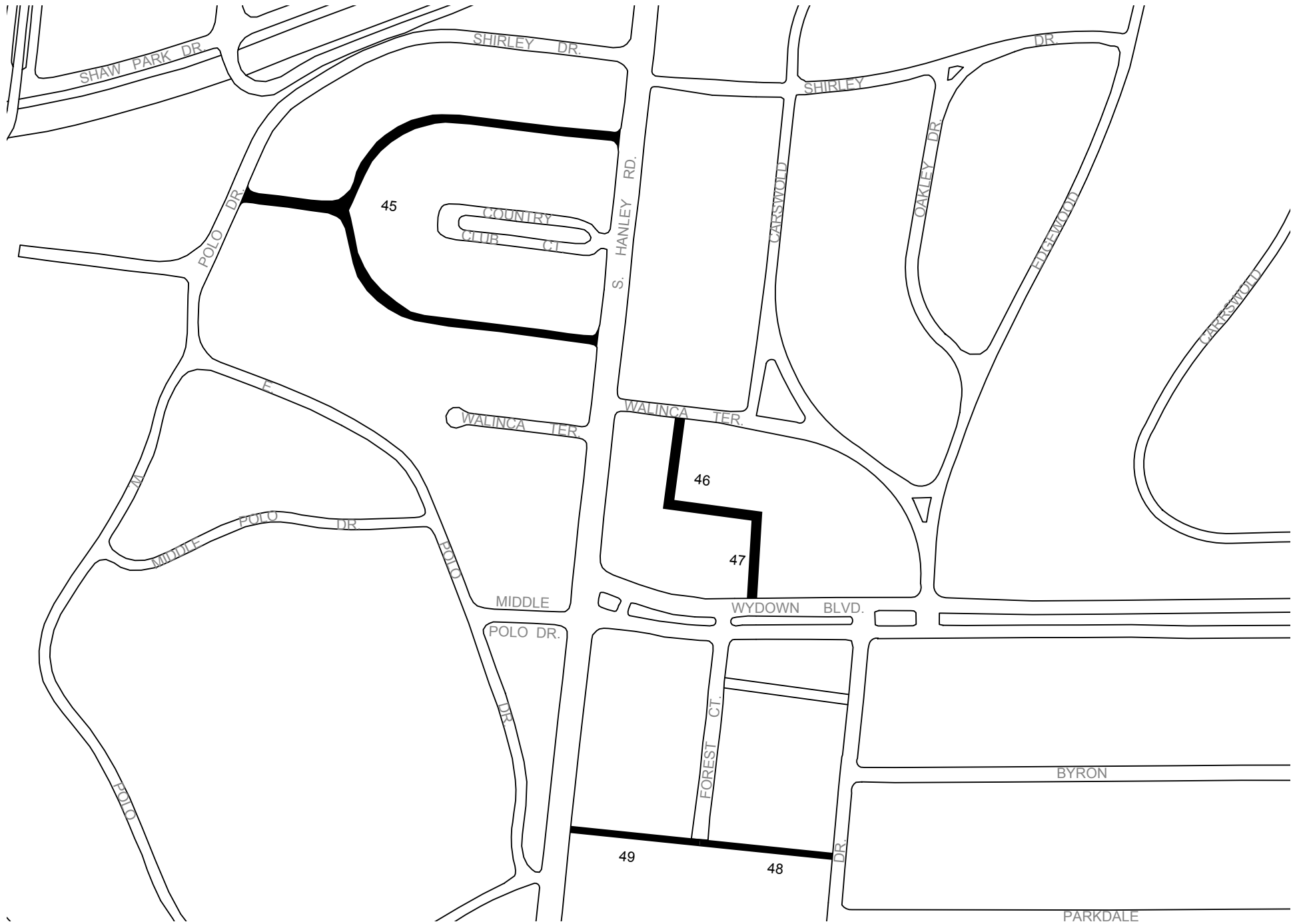
Alleys-Clayton Gardens & Bemiston



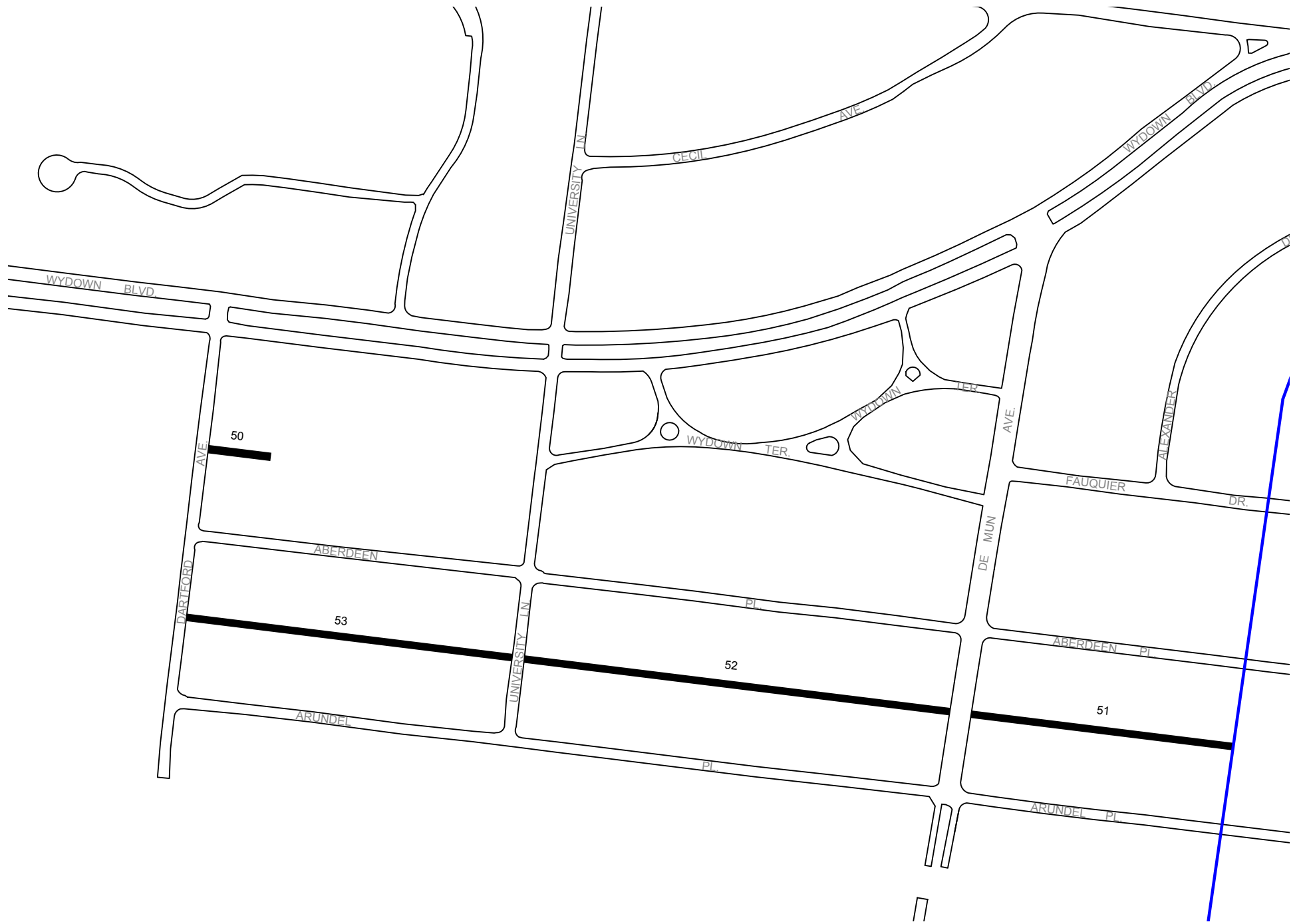
Alleys-Central Business District



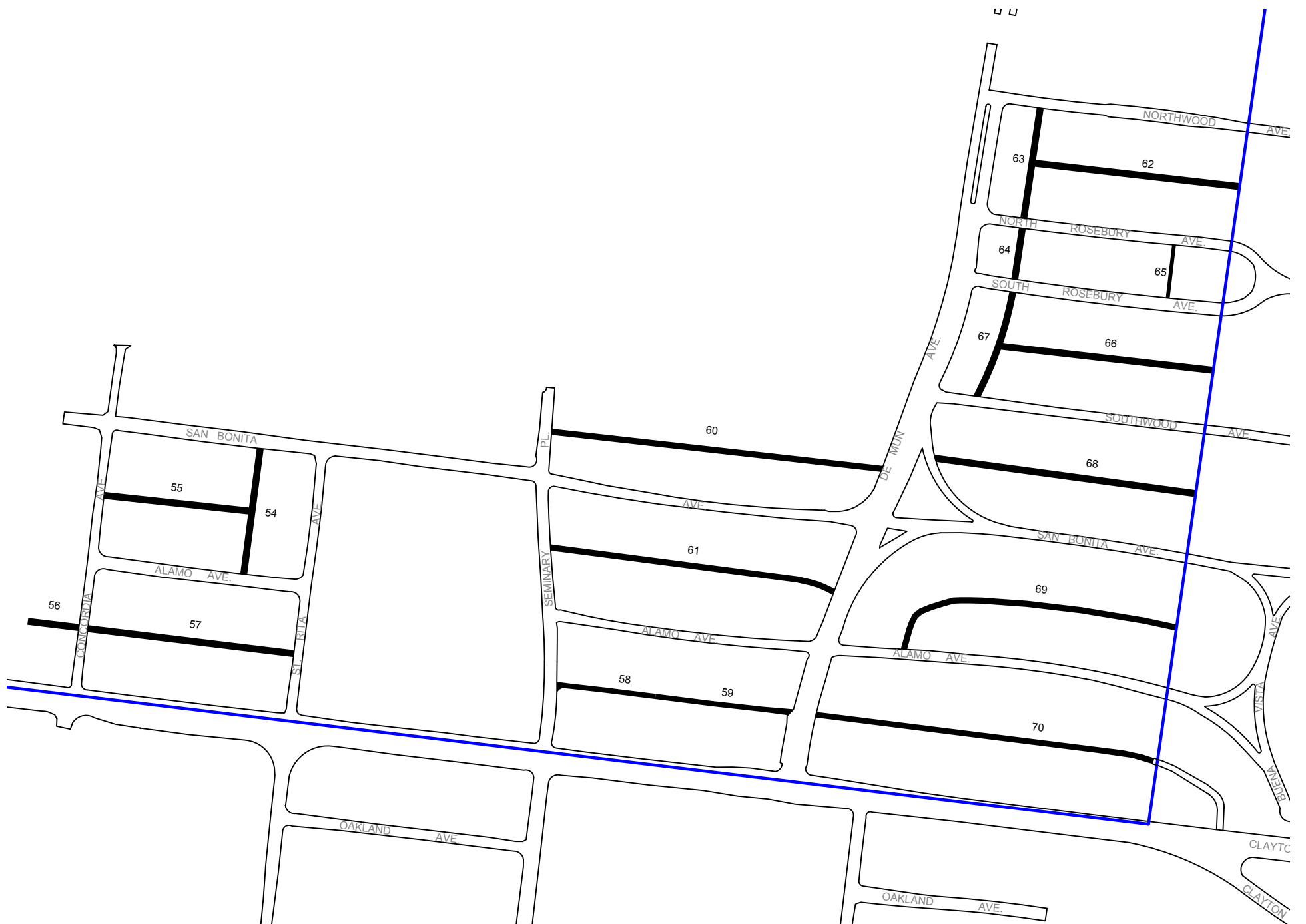
Alleys-Davis Place (South)



Alleys-Country Club, Wydown Forest, Bemis Way



Alleys-Hillcrest



Alleys-Hi Pointe/DeMun