

**ZONING MAP AMENDMENT
BOONE COUNTY PLANNING COMMISSION**

RECEIVED
83090
APR 03 2023
04
BOONE COUNTY
PLANNING COMMISSION

Seven (7) copies of submitted drawings are required

An application consists of all fees paid in full, submitted drawings, and a completed application form

SECTION A: (To be completed by applicant)

1. Name of Project: Clean Energy Truck Hub
2. Location of Project: 5390 Limaburg Road
3. Total Acreage of Project: 17.1 acres total - 0.83 acres RS to I-1
4. Current Zoning of Property: RS and I-1
5. Proposed Zoning of Property (classification being requested): I-1
6. Proposed Use(s) (specify each use):
Truck hub for renewable energy truck fleet fueling facility with compressed natural gas fueling equipment and parking
7. Proposed Building Intensities (specify for each building):

8. Are you applying for any of the following (check all that apply):
 Conditional Use Permit Variance
9. Current Owner: Skas Properties LLC
Address: 961 Whirlaway Drive
Union Kentucky 41091
City State Zip Code
Phone Number: _____ Fax Number: _____
Email: _____
10. Applicant: CT Realty - Cole Moody
Address: 4343 Von Karman Avenue, Suite 200
Newport Beach CA 92660
City State Zip Code
Phone Number: 949-431-6414 Fax Number: _____
Email: cmoody@ctrinvestors.com
11. Are there any existing buildings on the site: Yes No
If yes, indicate how many: 4 - driving range and golf center building and maintenance buildings

12. 1123 415 2006
Deed Book Page Number Group Number

13. Have you had a pre-application meeting with the BCPC staff: Yes No

14. Have you submitted a Concept Development Plan: Yes No

15. Have you met or discussed your proposed development with any of the following organizations/agencies (check all that apply):

- | | |
|---|---|
| <input type="checkbox"/> Boone County Building Department | <input type="checkbox"/> Local Fire District |
| <input type="checkbox"/> Boone County Public Works Department | <input type="checkbox"/> Local School District |
| <input type="checkbox"/> Boone County Water District | <input type="checkbox"/> Northern Kentucky Health Department |
| <input type="checkbox"/> Cincinnati Bell | <input type="checkbox"/> Owen Cooperative Electric, Inc. |
| <input type="checkbox"/> Cincinnati/Northern Kentucky International Airport (Kentucky Airport Zoning Commission for height restrictions near the airport) | <input type="checkbox"/> Sanitation District No. 1 |
| <input type="checkbox"/> Duke Energy | <input type="checkbox"/> USDA NRCS/Boone County Conservation District |
| <input type="checkbox"/> Florence Public Services Department | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Kentucky Division of Water | |
| <input type="checkbox"/> Kentucky Transportation Cabinet | |

16. Concept Development Plan Jurisdiction/Location (check all that apply):
 Unincorporated Boone Florence Walton Union

17. Waiver of 60 Day Time Requirement by Originator for Final Planning Commission Action:

In accordance with the provisions of KRS 100.211, the applicant(s) and property owner(s) or originator(s) hereby waive the 60 day time limit for the Boone County Planning Commission to take final action on my (our) Zoning Map Amendment/Concept Development Plan application. This time limit waiver is considered effective immediately upon receipt by the Boone County Planning Commission and expires on _____

Property Owner's Signature: _____

Applicant's Signature:  _____

12. 1123 415 2026
Deed Book Page Number Group Number

13. Have you had a pre-application meeting with the BCPC staff: Yes No

14. Have you submitted a Concept Development Plan: Yes No

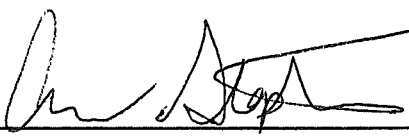
15. Have you met or discussed your proposed development with any of the following organizations/agencies (check all that apply):

- | | |
|---|---|
| <input type="checkbox"/> Boone County Building Department | <input type="checkbox"/> Local Fire District |
| <input type="checkbox"/> Boone County Public Works Department | <input type="checkbox"/> Local School District |
| <input type="checkbox"/> Boone County Water District | <input type="checkbox"/> Northern Kentucky Health Department |
| <input type="checkbox"/> Cincinnati Bell | <input type="checkbox"/> Owen Cooperative Electric, Inc. |
| <input type="checkbox"/> Cincinnati/Northern Kentucky International Airport (Kentucky Airport Zoning Commission for height restrictions near the airport) | <input type="checkbox"/> Sanitation District No. 1 |
| <input type="checkbox"/> Duke Energy | <input type="checkbox"/> USDA NRCS/Boone County Conservation District |
| <input type="checkbox"/> Florence Public Services Department | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Kentucky Division of Water | |
| <input type="checkbox"/> Kentucky Transportation Cabinet | |

16. Concept Development Plan Jurisdiction/Location (check all that apply):
 Unincorporated Boone Florence Walton Union

17. Waiver of 60 Day Time Requirement by Originator for Final Planning Commission Action:

In accordance with the provisions of KRS 100.211, the applicant(s) and property owner(s) or originator(s) hereby waive the 60 day time limit for the Boone County Planning Commission to take final action on my (our) Zoning Map Amendment/Concept Development Plan application. This time limit waiver is considered effective immediately upon receipt by the Boone County Planning Commission and expires on _____

Property Owner's Signature:  3-23-23

Applicant's Signature: _____

SECTION B: (To be completed by Planning Commission staff)

1. Date Received: 4/4/23 Fee Received: \$ 3136 Receipt #: 88090
2. Number of Copies Received: _____
3. Has the following been submitted (check all that apply):
 - Completed Application
 - Concept Development Plan
 - Legal Description
 - Names and Mailing Addresses of Adjacent Property Owners
4. Date the application is Administratively Complete (as defined in KRS 100.211): _____
5. Staff Reviewer: M. Schwartz
6. Committee Chairperson: C. Gulick
7. Scheduled Public Hearing Date: 5/3/2023
8. Boone County Planning Commission Action: _____ Date of Action: 7/5/2023
 - _____ Approved
 - _____ Approved with Conditions
 - Denial / Approval of Conditional Use Permit with 1 condition
 - _____ Other
9. Resolution Number: _____

Boone County Planning Commission
Boone County Administration Building
2950 Washington Street, Room 317
P.O. Box 958
Burlington, Kentucky 41005
Phone: 859-334-2196 Fax: 859-334-2264
plancom@boonecountyky.org
www.boonecountyky.org

EXHIBIT

“A”

STAFF REPORT

#1

Request of **CT Realty, per Cole Moody (applicant)** for **Skas Properties LLC (owner)** for: (1) a Zoning Map Amendment from Rural Suburban (RS) to Industrial One (I-1) for an approximate 0.83 acre area located at 5390 Limaburg Road, Boone County, Kentucky; and (2) a Conditional Use Permit to allow a truck stop on an approximate 17.1 acre area located at 5390 Limaburg Road, Boone County, Kentucky. The request is for the development of a Clean Energy Truck Hub to provide fueling and parking for a compressed natural gas truck fleet on an overall 17.1 acre area located at 5390 Limaburg Road, Boone County, Kentucky.

May 3, 2023

REQUEST

- A. The first part of the submitted request is to rezone an approximate 0.83 acre area of an approximate 17.1 acre lot located at 5390 Limaburg Road from Rural Suburban (RS) to Industrial One (I-1).
- B. The second part of the submitted request is for a Conditional Use Permit to allow a truck stop on an approximate 17.1 acre area located at 5390 Limaburg Road.

SITE HISTORY

- 1990-1992 Based on information contained in the Boone County GIS, the site was developed with the existing building.
- 1992 On February 12, 1992, the Boone Board of Adjustment approved a Conditional Use Permit for a golf driving range and miniature golf course (BCBOA-92-003).
- 1992 On December 16, 1992, the Boone County Planning Commission approved a Conveyance Plat, creating the lot in question.
- 2013 On May 8, 2013, the Boone Board of Adjustment approved a Variance reducing the Buffer Yard D width from eight (80) feet with a forty (40) foot option to twenty-five (25) feet (BCBOA-13-011).
- 2013 On May 16, 2013, the Boone County Planning Commission approved a Minor Site Plan for a storage barn.
- 2015 On May 22, 2015, the Boone County Planning Commission approved a Minor Site Plan for a storage building.
- 2019 On May 7, 2019, the Boone County Planning Commission approved a Tenant Finish Permit to Stephen's Golf Academy.
- 2021 On November 23, 2021, the Boone County Planning Commission approved a Minor Site Plan for a storage building.

APPLICABLE REGULATIONS

- A. Section 205.H of the Boone County Zoning Regulations states that in addition to any

specific requirements for conditionally permitted uses deemed appropriate by the Board of Adjustment, the Board shall review the particular facts and circumstances of each proposed use and determine that the use is in fact a conditional use as established under the provisions of these regulations. The Board may consider whether such use at the proposed location:

1. Will be harmonious with and in accordance with the general objectives, or with any specific objective of the County's comprehensive plan, a specific corridor plan and/or the zoning order.
 2. Will be designed, constructed, operated, and maintained so as to be harmonious and appropriate in appearance with the existing or intended character of the general vicinity and shall not change the essential character of the same area.
 3. Will be hazardous to existing or future neighboring uses.
 4. Will be served adequately by essential public facilities and services such as highways, streets, police and fire protection, drainage structures, refuse disposal, water and sewer, and schools; or that the persons or agencies responsible for the establishment of the proposed use shall be able to provide adequately any such services.
 5. Will create excessive additional requirements at public cost for public facilities and services and will be detrimental to the economic welfare of the community.
 6. Will involve uses, activities, process, materials, equipment and conditions of operation that will be detrimental to any persons, property, or the general welfare by reason of excessive production of traffic, noise, smoke, dust, fumes, glare or odors.
 7. Will have vehicular approaches to the property which shall be so designed as not to create an interference with traffic on surrounding public thoroughfares.
- B. Section 302.A.5 of the Boone County Zoning Regulations states that at the time of filing an application for a zoning map amendment, the property owner may also request a variance or a conditional use permit for the same development. A development that is subject to a zone change or Concept Development Plan approval shall comply with all applicable requirements of these regulations unless a written request for a variance(s), or exception(s) pursuant to ARTICLE 2, as applicable.
- C. Section 308 of the Boone County Zoning Regulations states that before any map amendment is granted, the Planning Commission and legislative body shall use the following criteria:
1. The map amendment is in agreement with the adopted comprehensive plan and any specific study designed to further detail the Boone County Comprehensive Plan for the location in question; or
 2. The existing zoning classification is inappropriate and that the proposed zoning classification is appropriate; or
 3. There have been major changes of an economic, physical, or social nature not anticipated in the adopted comprehensive plan that substantially alter the area's character.
- D. Section 505.4 of the Boone County Zoning Regulations identifies truck stop as a conditional use in the I-1 district.

- E. Section 1102.A of the Boone County Zoning Regulations states that the purpose of the Industrial One district is to allow different types of small to large scale light manufacturing, warehouse, distribution and related service uses, which require direct accessibility to a regional transportation system. Manufacturing operations in this district will generally not utilize unrefined raw materials, whose processing may potentially create undesirable noise, odors, dust, smoke, hazardous materials or waste or be delivered in large bulk transportation forms. Such districts are located in areas which provide employment opportunities for community and regional labor markets. Districts will be located on suitable lands accessible from expressways and/or arterials. In addition, this zoning district allows for integrated office campus and/or industrial/warehouse developments with a business park setting, characterized by landscaped entrances, boulevard streets, large amounts of green space and low building coverage ratio, multi-level buildings, constant architectural and signage theme, parking structures, and integrated pedestrian and recreation facilities. This district is also to provide for appropriate public facilities and/or services to the permitted uses identified in the district. This zoning classification can range from a compact, multi-level office development on several acres to an extensive mixed office/warehouse/distribution development that is located on many acres. This zoning classification often includes some limited commercial wholesale and retail uses intended to serve the district and constructed to blend in visually with the character of the area.
- F. Section 4000 of the Boone County Zoning Regulations includes the following definition:
1. Truck Stop: A facility designed to provide services to the trucking industry including but not limited to dispensing of fuel, restaurants, showers, and associated retail sales. The permitted uses do not include truck repair, washes, or the sale of vehicles unless such activities are expressly listed as a permitted use for the district in question, and a conditional use permit must be obtained for any activity to be conducted at a truck stop that is listed as a conditional use for the district in question.

SITE CHARACTERISTICS

- A. The approximate 0.8 acre area, being a part of the approximate 17.1 acre property, is located along the east side of Limaburg Road, approximately 750 feet south of Timber Lane.
- B. The site has one hundred fifty (150) feet of frontage along Limaburg Road.
- C. The approximate 17.1 acre property is currently occupied by a private golf driving range facility. The site is currently occupied by the driveway to the larger property.
- D. The approximate 17.1 acre property is currently accessed from a single curb cut onto Limaburg Road.
- E. A tree line exists along the north, south, and east property lines of the approximate 17.1 acre property.

- F. The site is within the 55 day/night noise level of the Cincinnati/Northern Kentucky International Airport.
- G. Topographically, the approximate 17.1 acre property slopes downward, west to east, at an average grade of approximately 2%.

ADJACENT LAND USES AND ZONES

- North: Single-family residential dwellings (RS) and an industrial development (I-1)
- South: Single-family residential dwellings (RS) and vacant/undeveloped land (I-1)
- East: Industrial uses (I-1)
- West: Meadowood Golf Course (SR-1/PD)

RELATIONSHIP TO COMPREHENSIVE PLAN

- A. The Our Boone County Plan 2040 Future Land Use Plan designates the site for "Suburban Density Residential" and "Recreational" uses, which are described as follows:
 - 1. Suburban Density Residential: - Low density residential uses of up to one dwelling unit per acre.
 - 2. Recreation: Public and commercial outdoor recreation including golf courses, parks, race tracks, private reserves, wooded areas that serve an established recreation use, etc.
- B. The following Our Boone County Plan 2040 Goals and Objectives apply to this application:
 - 1. Mixing of residential and other land uses shall be encouraged where appropriate (Overall Goal A, Objective 2).
 - 2. Land uses and zoning decisions shall strive to balance the rights of landowners with the rights of neighbors and the community (Overall Goal A, Objective 4).
 - 3. Development policies shall not discriminate against any person (Demographics Goal A, Objective 1).
 - 4. Provide appropriate services, housing, employment, and shopping opportunities in order to meet the needs of the population in all geographic areas of the County (Demographics Goal A, Objective 4).
 - 5. Industries shall be promoted in suitable locations to make the county a vital part of a strong regional economy (Economy Goal A, Objective 2).
 - 6. Boone County shall seek a combination of land uses that balances revenues generated from those uses with the expenditures required to support them (Economy Goal A, Objective 8).
 - 7. Compact, efficient development patterns shall be encouraged for industrial, commercial, and office uses with appropriately sized and well maintained buffer spaces between the business use and other land uses (Economy Goal B, Objective 1).
 - 8. Mixing of commercial and non-commercial uses shall occur in areas where

- consideration has been given to assure compatibility with surrounding land uses and natural systems (Economy Goal B, Objective 2).
9. Commercial uses shall be designed and located to coordinate with the surrounding land uses and shall have safe access and adequate parking (Economy Goal B, Objective 3).
 10. Interstate commercial uses, as well as the freight logistics industry, shall be in close proximity to interstate interchanges for maximum convenience and economy to the traveling public, while minimizing traffic congestion (Economy Goal B, Objective 4).
 11. Industrial development shall be encouraged to locate near railroad lines, highways, the Ohio River, the Airport, and where infrastructure exists or is planned (Economy Goal B, Objective 5).
 12. Effective site placement, architectural design, and landscape design for industrial uses shall enable a favorable relationship with adjoining uses. Smoke, dust, noise, and odor impacts shall be kept at a minimum and site development and enforcement shall be carefully coordinated with regulatory agencies (Economy Goal B, Objective 7).
 13. Priority shall be given towards maintaining, protecting, and improving the capacity and safety of the existing road system across jurisdictions (Transportation Goal A, Objective 1).
 14. Inefficiencies in the transportation network, including road condition, intersection improvements, and signal enhancements shall be identified and addressed (Transportation Goal B, Objective 3).
 15. Roadway capacity shall be preserved by utilizing access management policies and guidelines (Transportation Goal B, Objective 4).
- C. Limaburg Road is a county maintained collector street providing for two way traffic within two driving lanes. There are no sidewalks along the roadway. The posted speed limit is 45 MPH.
- D. The following are excerpts from Our Boone County Plan 2040:
1. Developments in Boone County must recognize the potential impacts upon adjoining land uses and incorporate a transition of land uses, building setbacks, and/or landscaping to minimize these impacts. Potential impacts include visual, noise or vibrations, odors, dust, smoke, and light. Buffering to mitigate these impacts should be an integral part of the design of proposed projects; where appropriate, existing site features should be used in meeting this guideline. Developments should provide buffering along public roadways, to soften the visual impact. Appropriate wooded areas and stream valleys should remain as open space within developments and between developments. Developments proposed adjacent to planned or established open spaces should provide pedestrian access where appropriate. Natural green space benefits the community as well as encourages developers to create innovative development designs through clustering of buildings and impermeable area. Typically, buffering is required and provided between both like and unlike land uses. However, as the development of Boone County fills in previously rural areas, different lot sizes and designs of residential development sometimes impact each other. Where an appropriate gradation of lot size and setbacks cannot be designed into a proposed residential

subdivision development of a significantly higher density than existing adjacent residential uses, deliberate vegetation buffering may need to be incorporated into the design to help protect low density residential areas. Buffer areas should use and supplement existing site features where possible (Land Use, Future Land Use Development Guidelines, Buffering, pages 95-96).

2. Developments in Boone County must include landscaping to accompany the proposed project. Retention of existing healthy vegetation is considered a component of landscaping and is encouraged. This landscaping should be designed to improve the public view of a development, and should be incorporated into parking lots and other vehicle circulation areas, as well as within open spaces and around structures. Landscaping is intended to soften the visual impacts of the development from adjoining properties and roadways. The amount of heat absorbed by impervious cover from sun radiation is decreased by landscaping, which reduces energy costs. Landscaping helps purify the air of harmful pollutants, thus reducing health impacts. It also helps reduce the quantity and improve the quality of storm water runoff, including temperature. The use of bioretention islands (water filtering basins) and grass swales should be used where possible in place of raised islands as described in Northern Kentucky's Storm Water Best Management Practices Manual (2012). Native species are often heartier than nursery stock and should be used wherever possible to minimize pesticides and other high impact forms of maintenance. Developments along major roadways in Boone County must include landscaping between the development and the right-of-way in order to promote the aesthetic appearance from the roads and to facilitate the compatibility of differing land uses (Land Use, Future Land Use Development Guidelines, Landscaping, page 96).

STAFF COMMENTS

- A. The submitted Concept Development Plan indicates the following:

1. Provision for four (4) 'fast-fill' natural gas fuel dispensers, available for any Clean Energy customer.
2. Provision for ninety-two (92) 'fast-fill' natural gas fuel dispensers, available for box trucks for a private Clean Energy customer.
3. Provision for 264 'time-fill' natural gas fuel dispensers, available for truck cabs for a private Clean Energy customer.
4. Provision for 280 passenger vehicle parking spaces.
5. Provision for three (3) office buildings, each having 1,440 square feet of space.
6. Provision for a 4,800 square foot vehicle service building.
7. Provision for perimeter landscaping.
8. Provision for security fencing.
9. Provision for stormwater detention.
10. Provision for one (1) curb cut onto Limaburg Road.

- B. Staff has reviewed the submitted Concept Development Plan against the Boone County Zoning Regulations, and offers the following comments:

1. Section 3151 provides regulations for trash enclosure areas. Insufficient

information has been submitted to determine compliance with this requirement.

2. Section 3314 requires all parking and loading spaces, including driveways, aisles, vehicle storage, outdoor storage, and vehicle circulation areas to be improved with either asphalt concrete or portland cement concrete. Insufficient information has been submitted to determine compliance with this requirement.
 3. Section 3316 provides regulations for lighting. Insufficient information has been submitted to determine compliance with this requirement.
 4. Section 3635 provides regulations for landscaping around utility and mechanical equipment. The submitted concept plan indicates the provision for an equipment compound. Insufficient information has been submitted to determine compliance with this requirement.
- C. The applicant has provided trip generation information indicating that the proposed facility will generate approximately 60 trips during the AM peak hour and approximately 75 trips during the PM peak hour.
- D. The applicant has provided a Project Description and Justification Statement supporting their requested zoning map amendment and conditional use permit.
- E. All areas adjacent to the approximate 17.1 acre property that are currently zoned I-1, are identified for 'Industrial' uses on the 2040 Future Land Use Map of the comprehensive plan.
- F. While the majority of the approximate 17.1 acre property is identified for 'Recreational' uses on the 2040 Future Land Use Map of the comprehensive plan, this designation primarily reflects the existing land use that was anticipated to continue and may not reflect the potential land use of the redevelopment of the property.
- G. Staff sent out an Agency Memo to the Boone County Building Department, Boone County Public Works, and the Hebron Fire District
1. Andy Ifcic, Hebron Fire District, replied that he had no comments.
 2. Mark Martin, Boone County Building Department, replied that he had no comments.

STAFF CONCERNS

- A. Staff had several concerns regarding the proposal. We contacted the applicant regarding these issues and received the following responses:
1. The applicant has stated that no trailers will be stored on the site. However, the applicant should address the noise levels that will occur on the site, specifically addressing whether the trucks will be running during the 'time-fills', whether there will be constant beeping from the trucks being in reverse, and whether there will be noise during the evening hours.

Answer: CNG truck engines are 90% quieter than a diesel truck engine. It takes 10 idling natural gas trucks to equal 1 idling diesel truck. Yes, there is a beep when the truck is in reverse.

2. There is a discrepancy between the number of spaces identified in the applicant's Project Description and Justification Statement and those shown on the submitted concept plan. The applicant should address which numbers are being proposed for the site.

Answer: The site plan information box states 280 driver vehicle parking spaces, 264 truck cab spaces, 92 box truck spaces and 10 "staging" spaces. A staging space provides a location for tow truck to remove trucks that need offsite maintenance or repair and return trucks after repair. The numbers shown on the site plan are the number of spaces proposed.

3. The submitted Concept Plan indicates the provision of a 4,800 square foot vehicle service building. The applicant should address the specific types of services that will be provided/allowed in this building.

Answer: The service area is used for routine light servicing of the trucks. Any major servicing or repair is done offsite at shops that are equipped to do more complicated work. Examples of services performed onsite include inspections, wiper replacements, tire changes, light bulb changes, oil changes, fluid top-off, and engine computer reading. Note that the service area does not have a building. The service area will have portable awnings for weather protection and portable containers for secure storage. These weather protection awnings are shown in the rendering.

4. The applicant should address whether any of the passenger vehicle parking spaces will be provided with the natural gas filling equipment or other EV charging stations.

Answer: There will be no EV charging stations for the passenger vehicle parking.

5. The plan shows three (3) office buildings. The applicant should address the reason why there is not just one (1) office building.

Answer: Multiple portable office units allow the site to flex with the requirements for office space as needed by the trucking operators. As an example, the site might initially be served by one portable office unit that has four interior offices. Later, a second could be deployed when more office space is needed. As operations change, office space can be expanded or reduced by adding or removing the portable office units.

CONCLUSION

The zoning map amendment request needs to be evaluated by the Boone County Planning Commission and the Boone Fiscal Court in terms of Article 3 of the Boone County Zoning

Regulations, the appropriate planning documents noted herein, and the potential impacts on existing and planned uses in the area.

The conditional use permit request needs to be evaluated by the Boone County Planning Commission in terms of Article 2 of the Boone County Zoning Regulations, the appropriate planning documents noted herein, and the potential impacts on existing and planned uses in the area.

Respectfully submitted,



Michael D. Schwartz
Director, Zoning Services

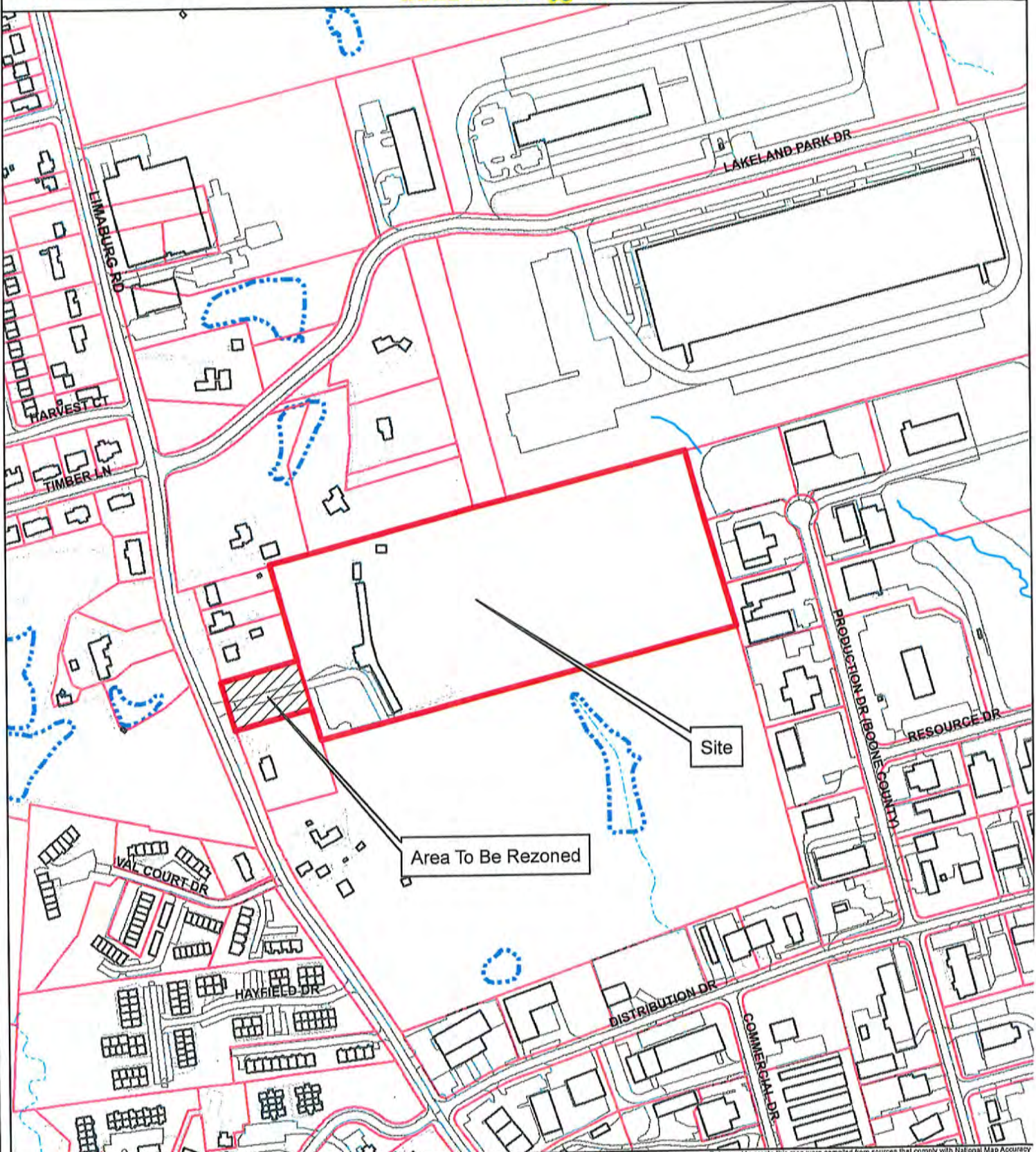
MDS/ss

Attachments:

- *Vicinity Map
- *Aerial Map
- *Topographical Map
- *Zoning Map
- *2040 Future Land Use Map
- *Noise Contour
- *Application
- *Project Description and Justification Statement
- *Concept Development Plan

Vicinity Map

www.boonecountygis.com



Copyright 2022 Boone County GIS. Reproduction by any means without the express permission of the Boone County Planning Commission is prohibited.

Data used to create this map were compiled from sources that comply with National Map Accuracy Standards. Boone County GIS extends no warranty with respect to the accuracy or content of the information provided by this map. This map should be used for general planning purposes only.



Map Created: xx/xx/2022

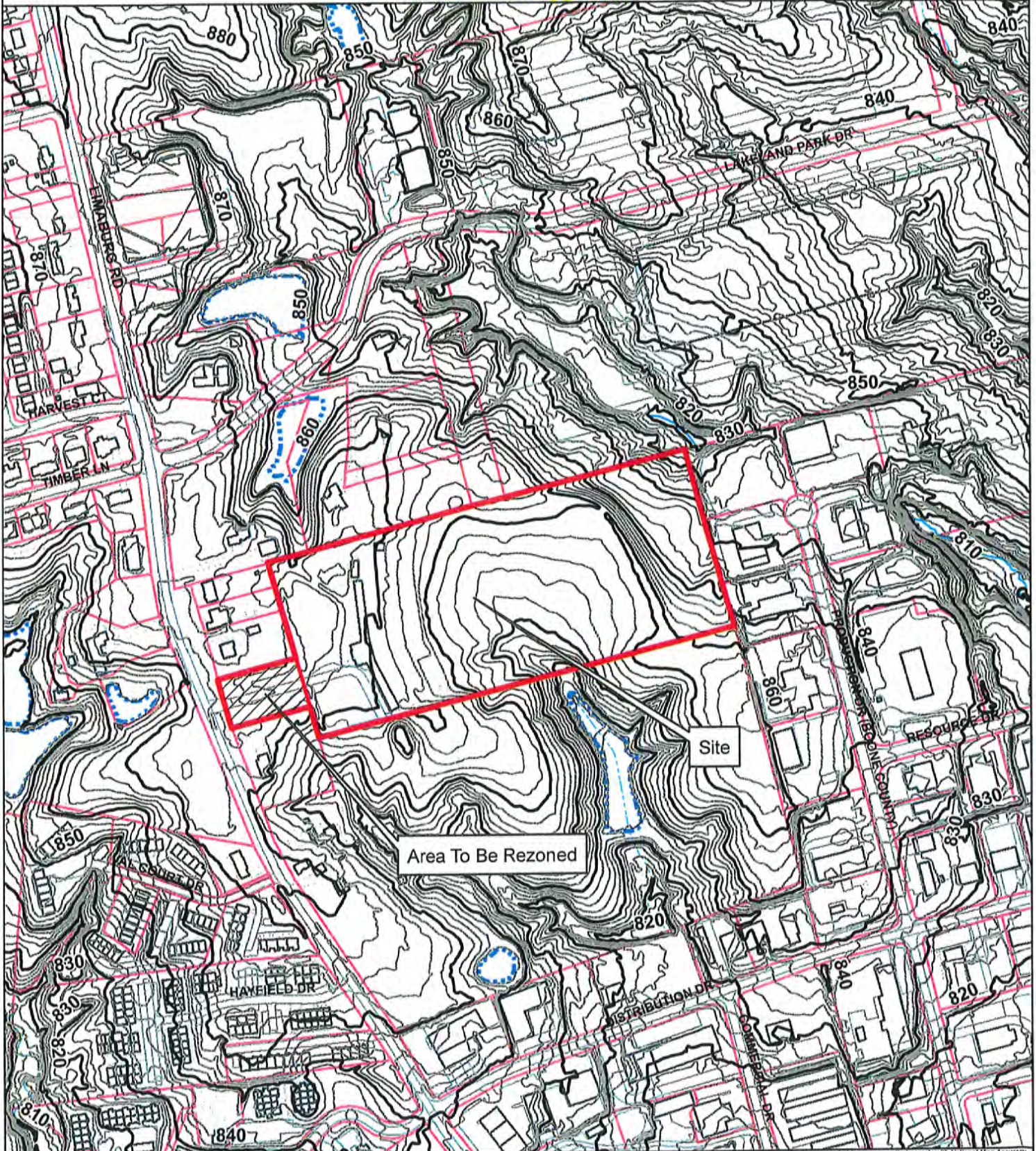
Boone County GIS - Putting Northern Kentucky on the Map



High Resolution PDF 12x18
ArcMap Document: *.mxd

Topographic Map

www.boonecountygis.com



Copyright 2022 Boone County GIS. Reproduction by any means without the express permission of the Boone County Planning Commission is prohibited.

Data used to create this map were compiled from sources that comply with National Map Accuracy Standards. Boone County GIS extends no warranty with respect to the accuracy or content of the information provided by this map. This map should be used for general planning purposes only.

0 205 410 820 1,230 1,640 Feet

1 inch = 400 feet



Boone County GIS - Putting Northern Kentucky on the Map

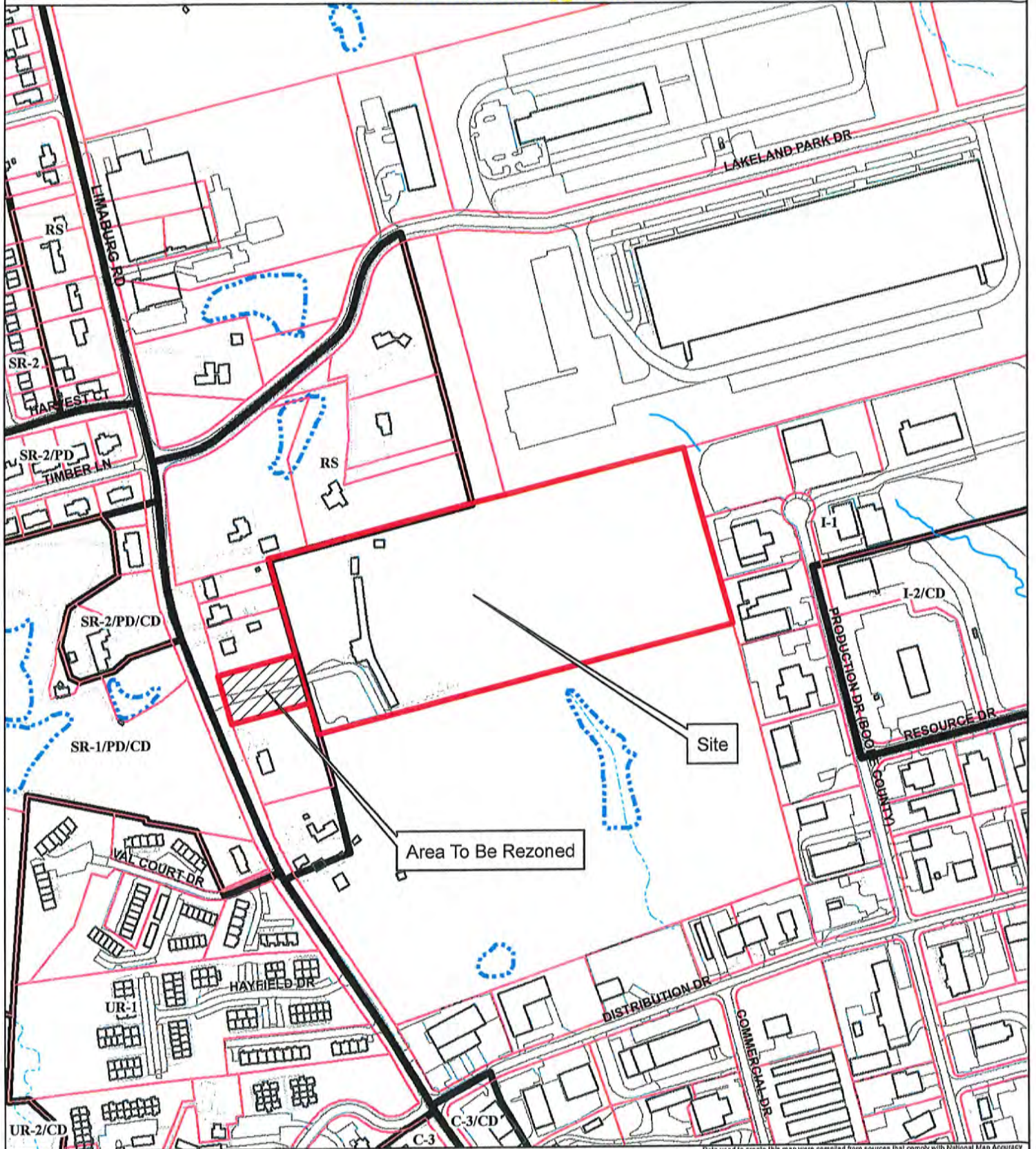


Map Created: xx/xx/2022

Boone County GIS
ArcMap Document (*.mxd)

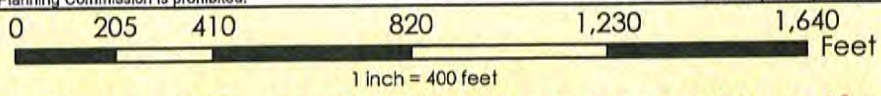
Zoning Map

www.boonecountygis.com



Copyright 2022 Boone County GIS. Reproduction by any means without the express permission of the Boone County Planning Commission is prohibited.

Data used to create this map were compiled from sources that comply with National Map Accuracy Standards. Boone County GIS extends no warranty with respect to the accuracy or content of the information provided by this map. This map should be used for general planning purposes only.



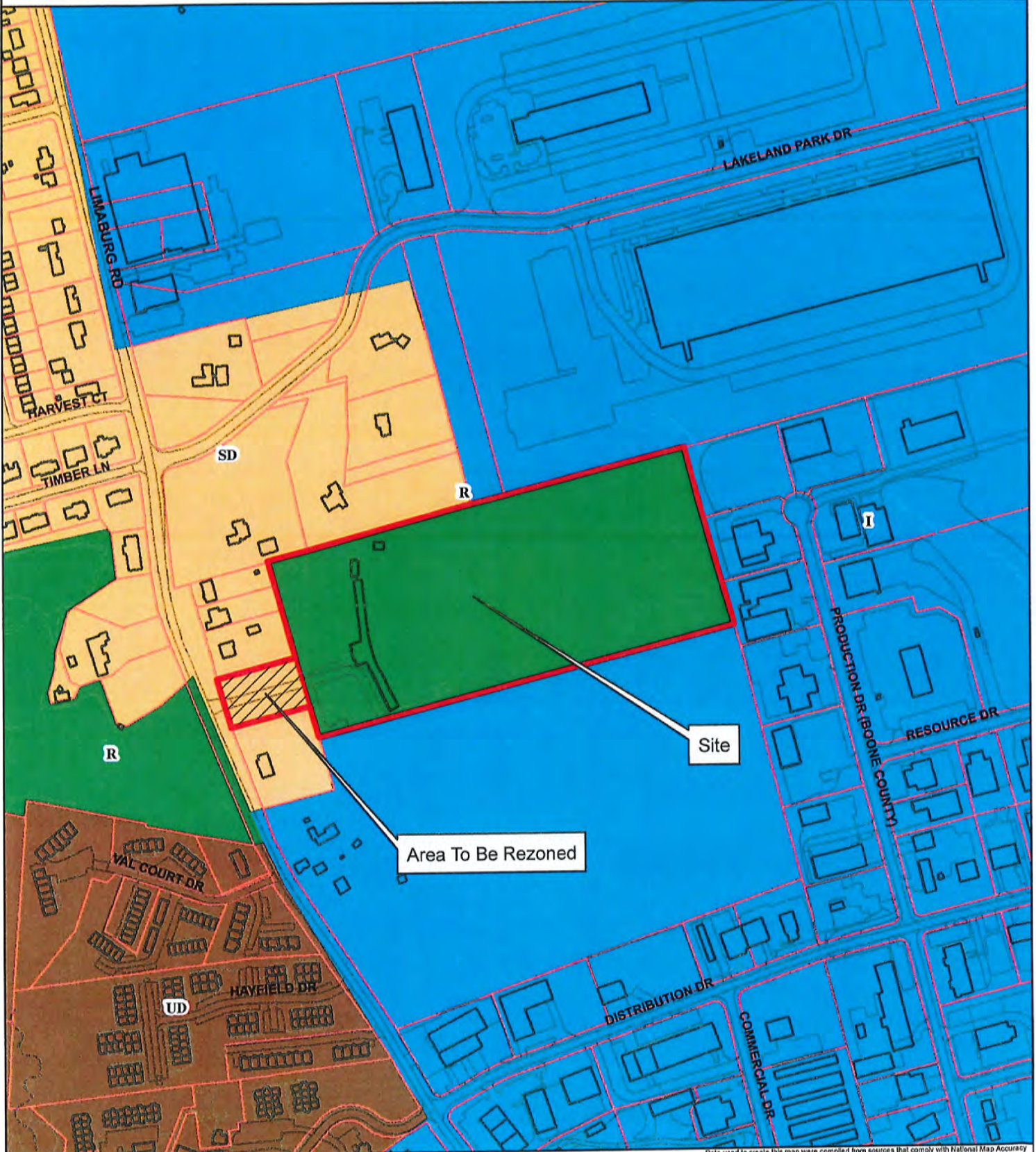
Boone County GIS - Putting Northern Kentucky on the Map

Map Created: xx/xx/2022

Multi-Plan File by 2022 03 01 10:00
ArcMap Document: * mxd

2040 Future Land Use Map

www.boonecountygis.com



Copyright 2022 Boone County GIS. Reproduction by any means without the express permission of the Boone County Planning Commission is prohibited.

Data used to create this map were compiled from sources that comply with National Map Accuracy Standards. Boone County GIS extends no warranty with respect to the accuracy or content of the information provided by this map. This map should be used for general planning purposes only.

0 205 410 820 1,230 1,640 Feet

1 inch = 400 feet



Boone County GIS - Putting Northern Kentucky on the Map

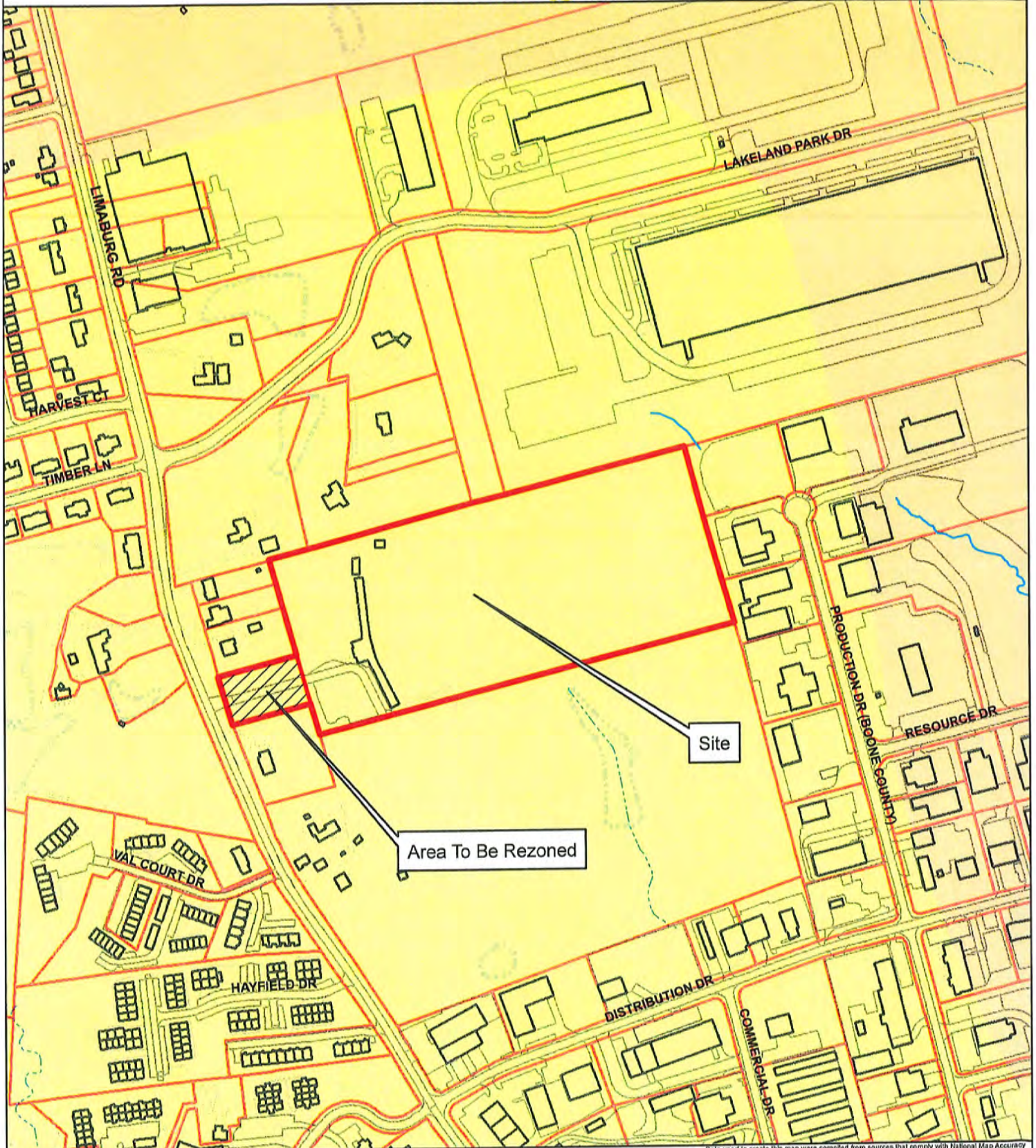


Map File Location: \\boone\GIS\MapDocs\2040_Future_Land_Use_Map.aprx
ArcMap Document: *.mxd

Map Created: xx/xx/2022

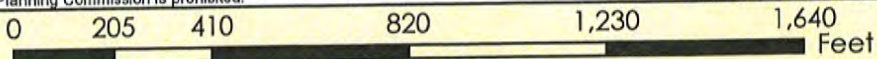
Noise Contour Map

www.boonecountygis.com



Copyright 2022 Boone County GIS. Reproduction by any means without the express permission of the Boone County Planning Commission is prohibited.

Data used to create this map were compiled from sources that comply with National Map Accuracy Standards. Boone County GIS extends no warranty with respect to the accuracy or content of the information provided by this map. This map should be used for general planning purposes only.



1 inch = 400 feet



Boone County GIS - Putting Northern Kentucky on the Map

Map Created: xx/xx/2022

ArchMap Document: *.mxd

12. 1123 415 2026
Deed Book Page Number Group Number

13. Have you had a pre-application meeting with the BCPC staff: Yes No

14. Have you submitted a Concept Development Plan: Yes No

15. Have you met or discussed your proposed development with any of the following organizations/agencies (check all that apply):

- | | |
|---|---|
| <input type="checkbox"/> Boone County Building Department | <input type="checkbox"/> Local Fire District |
| <input type="checkbox"/> Boone County Public Works Department | <input type="checkbox"/> Local School District |
| <input type="checkbox"/> Boone County Water District | <input type="checkbox"/> Northern Kentucky Health Department |
| <input type="checkbox"/> Cincinnati Bell | <input type="checkbox"/> Owen Cooperative Electric, Inc. |
| <input type="checkbox"/> Cincinnati/Northern Kentucky International Airport (Kentucky Airport Zoning Commission for height restrictions near the airport) | <input type="checkbox"/> Sanitation District No. 1 |
| <input type="checkbox"/> Duke Energy | <input type="checkbox"/> USDA NRCS/Boone County Conservation District |
| <input type="checkbox"/> Florence Public Services Department | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Kentucky Division of Water | |
| <input type="checkbox"/> Kentucky Transportation Cabinet | |

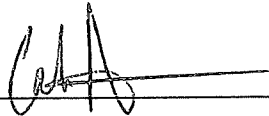
16. Concept Development Plan Jurisdiction/Location (check all that apply):
 Unincorporated Boone Florence Walton Union

17. Waiver of 60 Day Time Requirement by Originator for Final Planning Commission Action:

In accordance with the provisions of KRS 100.211, the applicant(s) and property owner(s) or originator(s) hereby waive the 60 day time limit for the Boone County Planning Commission to take final action on my (our) Zoning Map Amendment/Concept Development Plan application. This time limit waiver is considered effective immediately upon receipt by the Boone County Planning Commission and expires on _____

Property Owner's Signature: _____

Applicant's Signature: _____



12. 1123 415 2026
Deed Book Page Number Group Number

13. Have you had a pre-application meeting with the BCPC staff: Yes No

14. Have you submitted a Concept Development Plan: Yes No

15. Have you met or discussed your proposed development with any of the following organizations/agencies (check all that apply):

- | | |
|---|---|
| <input type="checkbox"/> Boone County Building Department | <input type="checkbox"/> Local Fire District |
| <input type="checkbox"/> Boone County Public Works Department | <input type="checkbox"/> Local School District |
| <input type="checkbox"/> Boone County Water District | <input type="checkbox"/> Northern Kentucky Health Department |
| <input type="checkbox"/> Cincinnati Bell | <input type="checkbox"/> Owen Cooperative Electric, Inc. |
| <input type="checkbox"/> Cincinnati/Northern Kentucky International Airport (Kentucky Airport Zoning Commission for height restrictions near the airport) | <input type="checkbox"/> Sanitation District No. 1 |
| <input type="checkbox"/> Duke Energy | <input type="checkbox"/> USDA NRCS/Boone County Conservation District |
| <input type="checkbox"/> Florence Public Services Department | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Kentucky Division of Water | |
| <input type="checkbox"/> Kentucky Transportation Cabinet | |

16. Concept Development Plan Jurisdiction/Location (check all that apply):
 Unincorporated Boone Florence Walton Union

17. Waiver of 60 Day Time Requirement by Originator for Final Planning Commission Action:

In accordance with the provisions of KRS 100.211, the applicant(s) and property owner(s) or originator(s) hereby waive the 60 day time limit for the Boone County Planning Commission to take final action on my (our) Zoning Map Amendment/Concept Development Plan application. This time limit waiver is considered effective immediately upon receipt by the Boone County Planning Commission and expires on _____

Property Owner's Signature:

 3-23-23

Applicant's Signature: _____

SECTION B: (To be completed by Planning Commission staff)

1. Date Received: 4/4/23 Fee Received: \$ 3136 Receipt #: 88090
2. Number of Copies Received: _____
3. Has the following been submitted (check all that apply):
 - Completed Application
 - Concept Development Plan
 - Legal Description
 - Names and Mailing Addresses of Adjacent Property Owners
4. Date the application is Administratively Complete (as defined in KRS 100.211): _____
5. Staff Reviewer: _____
6. Committee Chairperson: _____
7. Scheduled Public Hearing Date: _____
8. Boone County Planning Commission Action: _____ Date of Action: _____
 - _____ Approved
 - _____ Approved with Conditions
 - _____ Denial
 - _____ Other
9. Resolution Number: _____

Boone County Planning Commission
Boone County Administration Building
2950 Washington Street, Room 317
P.O. Box 958
Burlington, Kentucky 41005
Phone: 859-334-2196 Fax: 859-334-2264
plancom@boonecountyky.org
www.boonecountyky.org

Clean Energy Truck Hub
5390 Limaburg Road, Boone County, KY
Zone Map Amendment and Conditional Use
Project Description and Justification Statement

CT Realty has a contract to purchase 17.1 acres at 5390 Limaburg Road (Parcel ID 049.00-00-013.00), the current Stephens Golf Center, from SKAS Properties, LLC. CT Realty is the preferred national developer for Clean Energy. CT Realty and Clean Energy propose to develop a Clean Energy Truck Hub on the property at 5390 Limaburg Road. The Clean Energy Truck Hub will provide fueling, parking and accessory uses for a major e-commerce provider within the current market. The truck fleet will use renewable natural gas (RNG) fuel that is dispensed as compressed natural gas (CNG) instead of traditional diesel fuel.

The Clean Energy Truck Hub is a new and unique land use. The Boone County Planning Commission Zoning Administrator has determined that using the Boone County Zoning Regulations the proposed use is most closely classified as a "truck stop" because the Truck Hub is a truck fueling operation. The property at 5390 Limaburg Road is primarily designated I-1 Industrial One District, however, a small portion of the site that contains the access driveway is zoned RS Rural Suburban Residential District. The proposed use – Truck Hub/truck stop – is a permitted conditional use in the I-1 District, however, a zone map amendment is needed for the approximately 0.83-acre RS District portion of the site to change to I-1 District. CT Realty is requesting concurrent review and approval of a zone map amendment from RS District to I-1 District and for conditional use approval of the Truck Hub/truck stop.

Clean Energy Truck Hub Background Information

CT Realty is the preferred national developer for Clean Energy, the largest provider and distributor of natural gas as vehicle fuel in North America. Clean Energy has an agreement with a major e-commerce provider within the current market to provide low and negative carbon CNG to their sustainable truck fleet. These CNG trucks will be deployed to directly replace diesel trucks for transporting goods. Diesel trucks have dominated the transportation industry for over 80 years and have a fully developed support infrastructure for truck fueling and parking. Alternative technologies entering the market need similar infrastructure to compete with and eventually replace diesel trucks. The Clean Energy Truck Hub is exactly this: infrastructure for truck fueling and parking that makes it possible to replace diesel trucks.

Clean Energy sells this clean fuel to customers who are purchasing an increasingly large number of CNG-fleet trucks for regional trucking. This is the same product that fuels regional bus systems, airport shuttles, and refuse trucks. The environmental impacts are clear: less expensive for fleets, carbon neutral or carbon negative to the environment (zero environmental emission impact), 90% quieter than diesel engines, and it combines the cleanest fuel with the cleanest engines to cut carbon emissions. Clean Energy has over 565 stations that they own or operate throughout the U.S. and Canada. They have an excellent safety record and have safely operated over their 30-year history. The goal is to ensure that Boone County has the infrastructure in place to readily serve the next generation of logistic vehicles. These green trucks need this facility to stage their operation and compete against diesel.



Limaburg Road Site Design and Operation

The proposed facility at 5390 Limaburg Road will consist of a CNG truck fueling facility, and an adjacent private, fully secure parking lot to refuel and store the e-commerce provider's truck cabs and box trucks. The fueling system connects to the standard natural gas line in Limaburg Road, pulls that gas through above ground compression equipment, and pumps the fuel directly into trucks on demand. The natural gas pipeline is the same pipeline that now supplies gas to heat homes and buildings, to cook food and create hot water in Boone County. There will be no underground storage tanks. The facilities and equipment for the site are shown on the concept plan and site renderings.

The CNG refilling station will be both "Time-Fill" and "Fast-Fill". Time-Fill refers to fueling vehicles over a period of time while the vehicle is parked. For example, a truck cab that is parked between shifts can be gradually filled during that time. Using Time-Fill for CNG is a simple procedure, similar in concept to charging an electric vehicle. The operator of the vehicle connects to the Time-Fill dispensers when they return to the yard, the compressor begins operating and flowing CNG to the connected vehicles, and when the system determines the vehicle is full, the system is complete. Fast-Fill refers to on-demand fuel dispensing similar to how gasoline or diesel fuel is dispensed to fuel a vehicle tank. The vehicle operator performs the fueling operation and attends the vehicle while fueling is completed in a matter of minutes. There will be no storage or parking of trailers. The entire operation is monitored 24/7 by the Clean Energy operations center.

The facility will be unmanned, and the Time-Fill parking and dispensing facility will be fully secured through controlled gate access. The secured lot will be designated for the e-commerce provider and will not be open to the public. From a daily operational standpoint, fleet drivers will arrive in their personal vehicles to start their shift and park their personal vehicles in the secured lot. Drivers will then take their truck cabs out for their shift to do their job delivering product. After running their routes, drivers will return their truck cabs, connect them, and depart in their personal vehicles. Fast-Fill will primarily service the box trucks from the site. The Fast-Fill fueling station will be available to serve Clean Energy customers. There will be 4 dispensing ports for Fast-Fill.

The Clean Energy Truck Hub will have 280 parking spaces for driver personal vehicles, 264 parking spaces for company truck cabs with Time Fuel connections, and 92 parking spaces for box trucks that will use the Fast Fill fuel dispenser islands and canopy. The parking is located on the eastern two-thirds of the site and will be behind an 8-foot-tall security fence. The concept plan illustrates the proposed locations of each type of parking. The truck cab parking spaces will be 12' x 30' and will have Time Fill fuel connections. There will be no truck trailer parking on the site. The box truck parking spaces will be 12' x 40'. The driver personal vehicle spaces will be 9' x 18'. Entrance to the parking area is secure and will have access code entrance controls.

The site will have an equipment compound area that will contain fueling equipment, mechanical equipment, and fuel storage vessels, and will have a 6-foot-tall security fence. Landscape screening is proposed around the equipment compound area. The 4 Fast-Fill fueling dispensers will be located east of the equipment compound with a canopy over the dispensers.

The site will have one driveway on Limaburg Road. The proposed entrance is in the same location as the existing golf center entrance. A landscape buffer is proposed along the site perimeter adjacent to

the properties that are zoned RS District. The proposed buffer will comply with the Boone County Zoning Regulations, will contain a combination of evergreen and deciduous trees and shrubs and a berm or fence. Landscape buffers are proposed on the north and south side of the proposed entrance drive. Three office units are proposed north of the Fast-Fill area, behind the parking area security fence. A vehicle service area is designated for performing routine minor servicing of the trucks. Shelter awnings will be used for weather protection in servicing the trucks.

While the proposed use is classified as a truck stop, the Truck Hub will not have some of the elements typical of a truck stop land use. There will be no retail sales, no general consumer retail fueling, no showers, no laundry services, and no restaurant. The Truck Hub is not open to the public – access is restricted to vehicles for the e-commerce provider or approved fleet customers. The proposed site was chosen because of its proximity to the activities of the e-commerce provider, proximity to other industrial uses, and access to natural gas service. Typically truck stops are located at high traffic volume corner lot locations with easy access and/or visibility from interstates. These are not conditions that apply to this site.

CT Reality and Clean Energy recently obtained trip generation data for a Truck Hub they operate in central Ohio. The trip generation analysis was performed by a traffic engineering consultant. The analysis determined that the Truck Hub generates low levels of AM and PM peak hour trips and low daily trips when compared to other industrial uses. According to the analysis, the Truck Hub use generates 0.22 vehicles trips per Time-Fill parking spaces in the AM peak hour and 0.27 vehicles trips per Time-Fill parking spaces in the PM peak hour. Based on the proposed number of Time Fill spaces – 264 spaces – peak hour trips are estimated to be 59 trips in the AM peak hour and 72 trips in the PM peak hour. The destination for a majority of the trucks leaving the Truck Hub will be to the existing distribution centers located northwest of the airport, at or near the North Bend Road and I-275 interchange. Therefore most exiting vehicles are expected to turn right and go north. There will be trucks that turn left and head south to other locations.

Zone Map Amendment

5390 Limaburg Road is predominantly zoned I-1 Industrial One District. A small portion of the site – approximately 0.83 acres – is zoned RS Rural Suburban District. The RS District portion of the site is currently the driveway for the existing Stephens Golf Center. The driveway for the Truck Hub is proposed in the same location of the existing driveway.

The Boone County Future Land Use Map designates the property as Recreational and Suburban Density Residential. The Recreational designation reflects the current condition/use of the golf center that has been in operation since about 1990/1992. The site is adjacent to planned and existing industrial uses and industrial zoning to the south, to the east and along most of the northern property line boundary. We believe that the Future Land Use Map reflects an existing condition. Long term use for recreation is not specified in the Future Land Use text for Subarea 11 Burlington and this property.

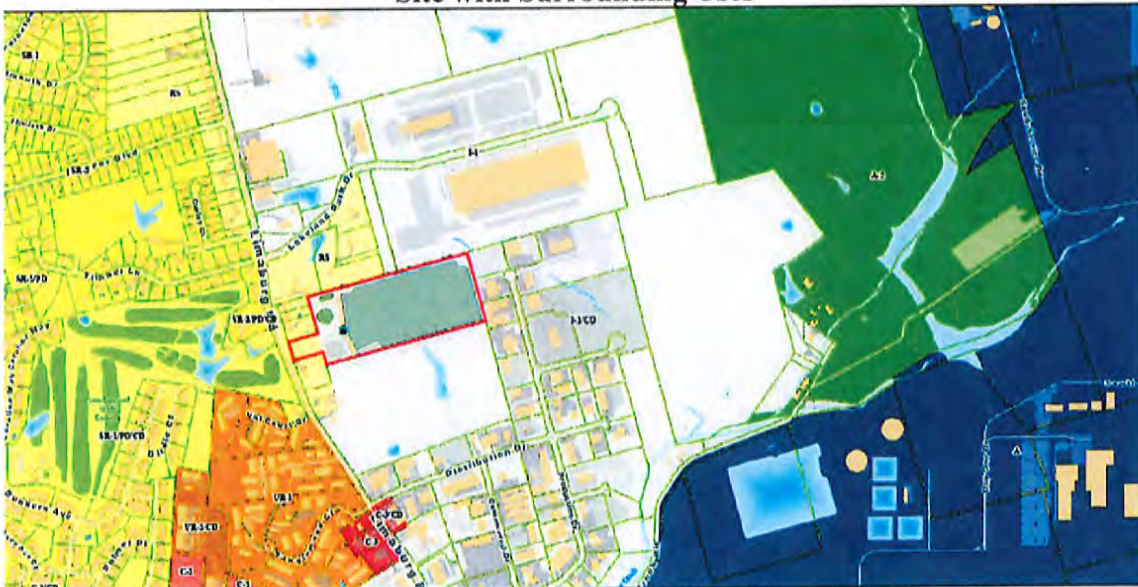
The current I-1 District zoning of the golf center does not permit commercial recreation uses and does not allow residential uses. Any permitted industrial use of the golf center property would need to obtain a zone map amendment for the RS District portion of the site to access the property. We believe the existing RS District is not a functional development option. It is not practical for the RS portion

to develop as zoned – subdividing the 0.83 portion from the overall tract would leave the remaining acreage (and the majority of the property) without frontage.

We believe that the existing industrial development adjacent to the site and in the vicinity represent the predominant and appropriate land use pattern and designation. Conditions have changed as a result of the amount of industrial/warehousing/distribution uses built in the area and because of the significant expansion of airport related activities and uses. The change in character and the amount of industrial development in the area justifies and supports the zone map amendment request.



Site with Surrounding Uses



Site with Surrounding Zoning

Conditional Use Standards

Please consider the following when reviewing this conditional use request as they relate to Section 252, General Standards Applicable to All Conditional Uses:

1. *Will be harmonious with and in accordance with the general objectives or with any specific objective of the County's Comprehensive Plan, a specific corridor plan and/or the zoning order.*

The property is predominantly surrounded by industrial uses. We believe the conditions have changed with the amount of industrial development in the area and that the character has changed. Future Land Use Map designation does not reflect the changed conditions.

2. *Will be designed, constructed, operated, and maintained so as to be harmonious and appropriate in appearance with the existing or intended character of the general vicinity and shall not change the essential character of the same area.*

The concept plan for the Truck Hub includes buffers adjacent to existing residential uses. The use will be a low traffic generator and will not generate high levels of noise. The character of the area is dominated by industrial and warehousing uses and the proposed use is appropriate.

3. *Will be hazardous to existing or future neighboring uses.*

The neighboring properties will not suffer hazardous effects from the proposed use. Clean Energy has a strong safety record and will comply with county and federal rules and regulations. While the proposed use falls under the definition of a truck stop, the facility does not have retail sales, retail fuel, showers, laundry services, or a restaurant. The fueling at the site is not open to the general public. We believe there will be significant environmental benefits achieved by displacing more than 200 diesel trucks from daily use in Boone County.

4. *Will be served adequately by essential public facilities and services such as highways, streets, police and fire protection, drainage structures, refuse disposal, water and sewer, and schools; or that the persons or agencies responsible for the establishment of the proposed use shall be able to provide adequately any such services.*

Public services will adequately serve the property and on-site structures. Plans will be reviewed by the Fire Department, Engineering Department, and Utility Department(s) for confirmation of sufficient availability and capacity. Ample internal circulation is provided to provide access for trucks and commercial vehicles, and therefore fire vehicles and garbage trucks will be able to access and serve the site.

5. *Will not create excessive additional requirements at public cost for public facilities and services and will not be detrimental to the economic welfare of the community.*

The proposed Truck Hub will not strain public facilities/services or the economic welfare of the community. There will be low service demands for this operation.

6. *Will not involve uses, activities, process, materials, equipment, and conditions of operation that will be detrimental to any persons, property, or the general welfare by reason of excessive production of traffic, noise, smoke, fumes, glare, or odors.*

The facility will follow county landscape buffering and light standards in order to avoid nuisance to neighboring properties. CT Realty and Clean Energy will work with Boone

County to mitigate potential concerns posed by the site development. We can provide traffic analysis and studies to Boone County (and KYTC) as part of the site plan review and construction permitting if determined necessary. We believe there will be significant environmental benefits achieved by displacing more than 200 diesel trucks from daily use in Boone County.

7. *Will have vehicular approaches to the property which shall be so designed as not to create an interference with traffic on surrounding public thoroughfares.*

Access to the site is proposed from a single driveway in the same location as the existing golf center driveway. Necessary Encroachment Permits will be applied for, and driveways will be reviewed by KYTC and/or the Boone County Engineering Department. CT Realty and Clean Energy can provide traffic analysis and studies to Boone County (and KYTC) as part of the site plan review and construction permitting if determined necessary.

PROJECT INFORMATION

PROJECT NAME: CNG FUELING STATION
 PROJECT ADDRESS: 5390 LIMBURG RD, BURLINGTON KY
 PROJECT DESCRIPTION: INSTALLATION OF COMPRESSED NATURAL GAS VEHICLE FUELING STATION WITH ASSOCIATED CONTROLS EQUIPMENT PAIS, CONNECTING GAS MAIN, SAFETY SYSTEMS, AND OTHER MINOR SITE WORK AT THE PROJECT SITE LISTED ABOVE.

ZONING INFORMATION

JURISDICTION: BOONE COUNTY, KENTUCKY
 ZONING CLASSIFICATION: EXISTING RS & L1; PROPOSED I-1
 PLANNED LAND USE: CLEAN TRUCK FUELING HUB

SITE DATA:

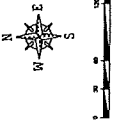
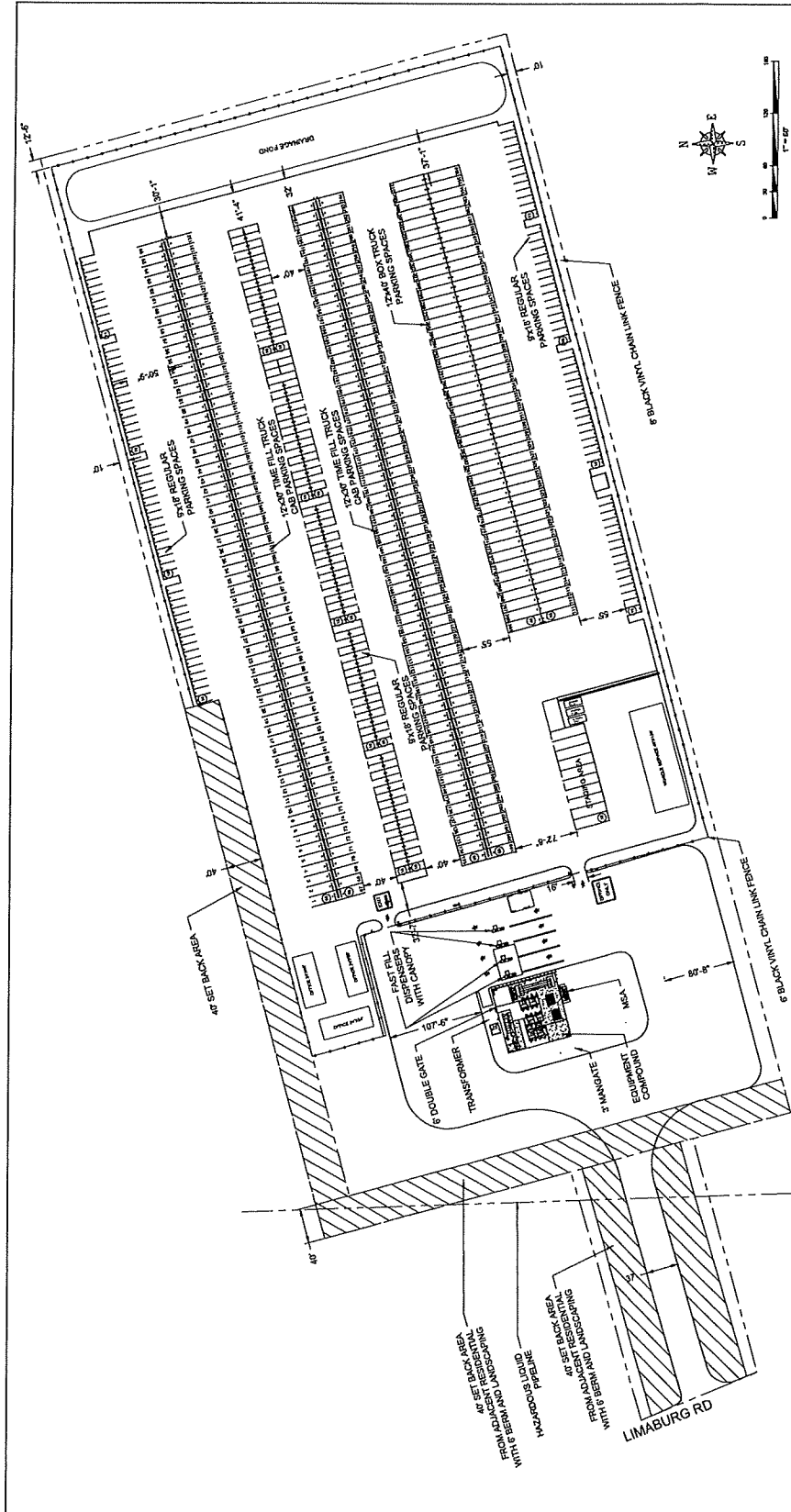
SITE AREA: 17.2 AC
 PROPOSED FAST FILL AND EQUIPMENT COMPOUND AREA: 1.63 AC
 PROPOSED TIME FILL AND REGULAR PARKING AREA: 10.2 AC
 OTHER SPACE (17%):
 REQUIRED: A SF
 PROVIDED: X SF

PARKING AND SITE REQUIREMENTS

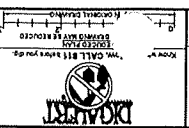
PARKING:
 STANDARD 9X18' REQUIRED: 246 PROVIDED: 280 STAGING: X
 TIME FILL TRUCK CAB 12'X30' 216 X
 BOX TRUCKS 12'X40' 52 264 X
 OCCUPANCY CLASSIFICATION: GROUP M - MERCHANDILE TYPE OF CONSTRUCTION: IIB

COMPRESSOR INFORMATION

X - TRUCKS AT 35 DGE/ TRUCK PER 8 HOUR WINDOW - X SCFM
 X - COMPRESSORS AT XXX SCFM EA

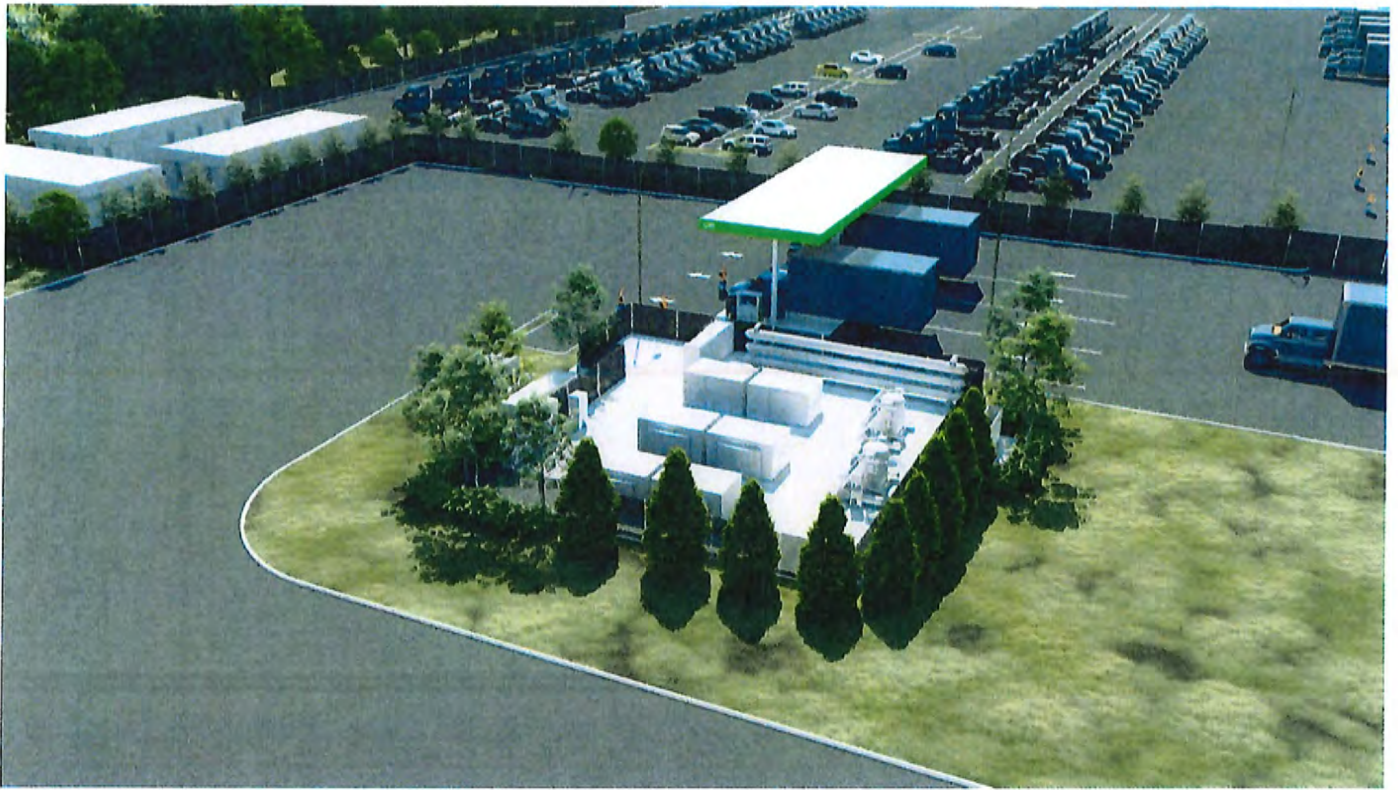


REV	DATE	DESCRIPTION



CP-6
 DATE ISSUED:
 DATE REVISED:
 CNG FUELING STATION
 PROPOSED SITE
 5390 LIMBURG RD
 BURLINGTON, KY
 PRELIMINARY SITE PLAN
 APPROVED BY: [Signature]
 DRAWN BY: [Signature]
 SHEET NO. 1 OF 1





EXHIBIT

“B”

ZONE CHANGE/CONCEPT PLAN COMMITTEE REPORT

TO: Boone County Planning Commission
FROM: Corrin Gulick, Chair
DATE: July 5, 2023
RE: Request of **CT Realty, per Cole Moody (applicant)** for **Skas Properties LLC (owner)** for: (1) a Zoning Map Amendment from Rural Suburban (RS) to Industrial One (I-1) for an approximate 0.83 acre area located at 5390 Limaburg Road, Boone County, Kentucky; and (2) a Conditional Use Permit to allow a truck stop on an approximate 17.1 acre area located at 5390 Limaburg Road, Boone County, Kentucky. The request is for the development of a Clean Energy Truck Hub to provide fueling and parking for a compressed natural gas truck fleet on an overall 17.1 acre area located at 5390 Limaburg Road, Boone County, Kentucky.

APPROVAL

REMARKS:

1. We, the Committee Members were present at the Committee Meeting and voted on the above request or else were absent from voting. Further, based upon the vote, the Committee directs the Staff to draft the finding of fact and conditions, if deemed necessary, to complete the Committee Report.
2. We, the Committee, recommend approval of the above referenced Zoning Map Amendment and Conditional Use Permit based on the following findings of fact:

FINDINGS OF FACT (Zoning Map Amendment):

1. The Committee concluded that the proposed I-1 district, along with the submitted concept development plan, is appropriate and that the existing RS district is inappropriate.

The site in question is part of a larger 17.1 acre property which is currently zoned Industrial One (I-1) and is bound by I-1 zoning to the north, south, and east. The proposed I-1 district for the site in question would bring the entire 17.1 acre property into a single zoning district.

The proposed I-1 district will allow the larger 17.1 acre property to develop in a manner which is consistent with adjacent areas which are currently zoned I-1.

The site in question is the only current access to the larger 17.1 acre property. The existing RS district, for the site in question, significantly limits the development of the larger 17.1 acre property.

2. The Committee concluded the attached conditions are necessary to achieve consistency with the Our Boone County Plan 2040. The Committee also concluded that the attached

conditions are necessary to mitigate any foreseeable community impacts that may be created by the development. The property owner has signed a letter demonstrating agreement with the conditions:

CONDITIONS:

1. Development shall be consistent with the revised Concept Development Plan, received on June 12, 2023. Where there is a discrepancy between the Project Description and Justification Statement and the Concept Development Plan drawings, the Concept Development Plan drawings shall take precedence.
2. Any exterior light pole shall not exceed twenty (20) feet in height and be equipped with down-lit light fixtures.
3. To ensure that traffic along Limaburg Road is not unduly affected by the proposed development, the owner and/or developer, at their cost, shall construct a right-turn deceleration lane and a left-turn storage lane on Limaburg Road at the proposed curb cut to the site, provided that there is sufficient right-of-way to accommodate the turn lanes, subject to the approval by the County Engineer as part of the encroachment permit process.
4. To provide for interconnectivity, access, in the form of an easement and paved driveway, shall be provided from the proposed 'fast fill' area to the southern property line.
5. Any Buffer Yard D shall include a berm, not exceeding a 3:1 slope.
6. Any Buffer Yard D that is not within the front yard shall include a fence with a minimum height of six (6) feet. The fence shall be installed in the center of the buffer yard or along the inner boundary of the buffer yard.

FINDINGS OF FACT (Conditional Use Permit):

1. The proposed truck stop will be harmonious and in accordance with the comprehensive plan.
 - a. The proposed truck stop will not have many of the services found in a typical truck stop (i.e., convenience store, restaurant, shower facilities) making the proposed use more compatible with the existing industrial uses in the area.
 - b. The proposed truck stop will not have any truck trailers making the proposed use more compatible with the adjacent residential uses in the area.
2. The proposed truck stop will be designed, constructed, operated, and maintained so as to be harmonious and appropriate in appearance with the existing or intended character of the general vicinity and shall not change the essential character of the same area.
 - a. The proposed truck stop will have: (1) single story buildings; (2) landscaped buffers; and (3) passenger vehicle parking in the areas that are closest to the existing residential dwellings.

ZONE CHANGE/CONCEPT PLAN COMMITTEE REPORT

Clean Energy Truck Hub

July 5, 2023

Page 3

3. The proposed truck stop will not be hazardous to existing or future neighboring uses.
 - a. The proposed truck stop will be equipped with safety features to mitigate any fuel spillage.
4. The proposed truck stop will be served adequately by essential public facilities and services such as highways, streets, police and fire protection, drainage structures, refuse disposal, water and sewer, and schools; or that the persons or agencies responsible for the establishment of the proposed use shall be able to provide adequately any such services.
 - a. The proposed truck stop is located within an area that is easily served by various public facilities and will be located on a collector street that is less than one (1) mile from a state maintained arterial street.
5. The proposed truck stop will not create excessive additional requirements at public cost for public facilities and services and will not be detrimental to the economic welfare of the community.
 - a. The proposed truck stop will have the same public requirements as any other industrial development in the area.
6. The proposed truck stop will not involve uses, activities, process, materials, equipment and conditions of operation that will be detrimental to any persons, property, or the general welfare by reason of excessive production of traffic, noise, smoke, dust, fumes, glare or odors.
 - a. The proposed truck stop will use compressed natural gas, which is odorless, other than the odor that is injected in the gas by the appropriate utility authority.
 - b. The proposed trucks, which will run on the compressed natural gas, are much quieter than traditional diesel powered truck.
 - c. Since there will be no truck trailers, there will be no additional noise that results from the connection/dropping of the trailers.
7. The proposed truck stop will have vehicular approaches to the property which shall be so designed as not to create an interference with traffic on surrounding public thoroughfares.
 - a. Any required improvements to Limaburg Road will be addressed during the issuance of the encroachment permit by the County.

CONDITION:

1. The Conditional Use Permit for the proposed truck stop shall only be approved if the Boone Fiscal Court takes action to approve the proposed zoning map

ZONE CHANGE/CONCEPT PLAN COMMITTEE REPORT

Clean Energy Tuck Hub

July 5, 2023

Page 4

amendment from RS to I-1.

A copy of the Public Hearing minutes accompanies the findings and recommendation serving as a summary of the evidence and testimony presented by the proponents and opponents of this request. Attached is the signature page for the Zone Change/Concept Development Plan Committee Vote.

ZONE CHANGE/CONCEPT PLAN COMMITTEE VOTE

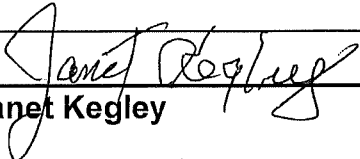
TO: Boone County Planning Commission
FROM: Corrin Gulick, Chairwoman
DATE: June 21, 2023

REMARKS:

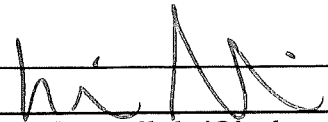
We, the Committee Members were present at the Committee Meeting and voted on the above request or else were absent from voting. Further, based upon the vote, the Committee directs the Staff to draft the findings of fact and conditions if deemed necessary in order to complete the Committee Report.

**ZONING MAP AMENDMENT/CONDITIONAL USE PERMIT, Corrin Gulick, Chairwoman,
Michael Schwartz, Staff**

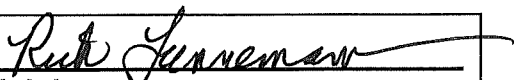
1. Request of **CT Realty, per Cole Moody (applicant)** for **Skas Properties LLC (owner)** for: (1) a Zoning Map Amendment from Rural Suburban (RS) to Industrial One (I-1) for an approximate 0.83 acre area located at 5390 Limaburg Road, Boone County, Kentucky; and (2) a Conditional Use Permit to allow a truck stop on an approximate 17.1 acre area located at 5390 Limaburg Road, Boone County, Kentucky. The request is for the development of a Clean Energy Truck Hub to provide fueling and parking for a compressed natural gas truck fleet on an overall 17.1 acre area located at 5390 Limaburg Road, Boone County, Kentucky.



Janet Kegley
For Project Absent _____
Against Project _____
Abstain _____ Deferred _____

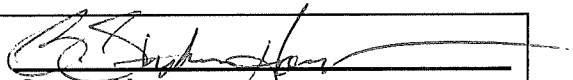


Corrin Gulick (Chairwoman)
For Project _____ Absent _____
Against Project _____
Abstain _____ Deferred _____



Rick Lunnemann
For Project _____ Absent _____
Against Project _____
Abstain _____ Deferred _____

Kathy Clark (Alternate)
For Project _____ Absent _____
Against Project _____
Abstain _____ Deferred _____



Steve Harper
For Project Absent _____
Against Project _____
Abstain _____ Deferred _____

Steve Turner (Alternate)
For Project _____ Absent _____
Against Project _____
Abstain _____ Deferred _____

David Hincks
For Project _____ Absent _____
Against Project _____
Abstain _____ Deferred _____

Jackie Steele (Alternate)
For Project _____ Absent _____
Against Project _____
Abstain _____

TOTAL: _____ DEFERRED 3 FOR PROJECT 1 ABSENT
 1 AGAINST PROJECT _____ ABSTAIN

**BOONE COUNTY PLANNING COMMISSION
BOONE COUNTY ADMINISTRATION BUILDING
BOONE COUNTY FISCAL COURTROOM
PUBLIC HEARINGS
MAY 3, 2023
7:30 P.M.**

Chairman Rolfsen opened the Public Hearing at 7:30 p.m. and welcomed the audience to the Planning Commission's May 3, 2023 Public Hearings.

COMMISSION MEMBERS PRESENT:

Mr. Randy Bessler
Mrs. Kathy Clark
Mrs. Pamela Goetting
Ms. Corrin Gulick, Vice Chairwoman
Mr. Steve Harper, Temporary Presiding Officer
Mr. David Hincks
Mrs. Janet Kegley
Mr. Rick Lunnemann
Mr. Eric Richardson
Mr. Charlie Rolfsen, Chairman
Mr. Bob Schwenke
Mr. Tom Szurlinski
Mr. Steve Turner
Mr. Kenny Vaught

COMMISSION MEMBERS NOT PRESENT:

Mrs. Jackie Steele, Secretary/Treasurer

LEGAL COUNSEL PRESENT:

Mr. Dale Wilson

STAFF MEMBERS PRESENT:

Mr. Kevin P. Costello, AICP, Executive Director
Mr. Michael D. Schwartz, Director, Zoning Services
Mr. Todd K. Morgan, AICP, Senior Planner

Chairman Rolfsen introduced the first item on the Agenda.

ZONING MAP AMENDMENT/CONDITIONAL USE PERMIT, Michael Schwartz, Staff

1. Request of **CT Realty, per Cole Moody (applicant)** for **Skas Properties LLC (owner)** for: (1) a Zoning Map Amendment from Rural Suburban (RS) to Industrial One (I-1) for an approximate 0.83 acre area located at 5390 Limaburg Road, Boone County, Kentucky; and (2) a Conditional Use Permit to allow a truck stop

on an approximate 17.1 acre area located at 5390 Limaburg Road, Boone County, Kentucky. The request is for the development of a Clean Energy Truck Hub to provide fueling and parking for a compressed natural gas truck fleet on an overall 17.1 acre area located at 5390 Limaburg Road, Boone County, Kentucky.

Staff Member, Michael Schwartz, referred to his PowerPoint presentation (See Staff Report). The request involves rezoning a 0.83 acre area from Rural Suburban (RS) to Industrial One (I-1) at 5390 Limaburg Road. The request also includes a Conditional Use Permit application to allow a truck stop as defined in the zoning regulations. The zone change site is part of a larger 17.1 acre development. The site history is found on Page 1 of the Staff Report. The site has 150 feet of road frontage along Limaburg Road. The area already zoned I-1 is occupied by a golf driving range. The subject area is occupied by a driveway leading to the only curb cut along Limaburg Road. A tree line exists along the north, south and east property lines. Mr. Schwartz described the surrounding land uses, which includes single-family homes and industrial development in the area. Pages 1-3 of the Staff Report includes the pertinent sections of the zoning code that pertains to the request. The proposed use is classified as a truck stop since it calls for dispensing fuel for trucks. The topography of the site slopes west to east at a 2% grade. The Future Land Use Map designates the site for Recreation (R) and Suburban Density Residential (SD) uses. Pages 4-6 of the Staff Report includes portions of the Comprehensive Plan. Limaburg Road is a County maintained road and contains no sidewalks. It is located in the 55 DNL Noise Contour. He showed photographs of the site and adjoining properties.

Mr. Schwartz reviewed the submitted Concept Development Plan. It includes 4 fast fill natural gas fuel dispensers for Clean Energy customers, 92 fast fill natural gas fuel dispensers for box trucks for Clean Energy customers, 264 "time fill" natural gas fuel dispensers for truck cabs for Clean Energy customers, 280 passenger vehicle parking spaces, 3 office buildings each having 1,440 square feet of space, a 4,800 square foot vehicle service building, perimeter landscaping, security fencing, stormwater detention and use of the existing curb cut on Limaburg Road. Mr. Schwartz commented that people will drive their personal vehicles, park their car, get in a box truck or truck cab, pick up a trailer or make deliveries and return to the same location for refueling. Staff has reviewed the Concept Development Plan and notes that it has substantially met the requirements of the Zoning Regulations. The applicant has provided trip generation figures that show the facility generates 60 trips during the AM peak hour and approximately 75 trips during the PM peak hour. The applicant has provided a Project Description and Justification Statement. All areas adjacent to the 17.1 acre property that are zoned I-1 and are planned for industrial uses in the future. The Recreation Future Land Use classification for the site largely reflects the use of the property today. The Hebron Fire District and the Boone County Building Department had no comments on the request. The Boone County Public Works Department replied and requested a Traffic Impact Study to be submitted at the Site Plan stage as road improvements may be necessary. Pages 7 & 8 of the Staff Report list a series of questions and Staff concerns. The applicant has submitted a reply to these items as part of the Staff Report. Mr. Schwartz showed some drawings of what the facility will look like if approved. There are 2 parts to the request. The

first is a small Zoning Map Amendment request out front. The recommendation on this request will be forwarded to the Fiscal Court for final action. The second request is for a Conditional Use Permit for the truck stop that is only approved by the Planning Commission.

Chairman Rolfsen asked if the applicant was present and wanted to proceed with their presentation?

Ms. Anne McBride, representing CT Realty, stated that it is a really unique zoning request and use for the subject property. About 4.6% of the site is zoned RS. A vast majority of the site is zoned I-1. The access to the site is zoned RS. One can't go through the RS Zoning to get to the I-1 zoned portion. It has to be zoned the same to have the use in question. The property is zoning landlocked, as it can't be developed completely unless all of it is zoned I-1. The Future Land Use Map for the site reflects the existing zoning at the time. There have been major changes in the area as lifestyles have changed. More people are working from home as a result of Covid. There is a lot of empty office space and e-commerce has changed the retail sector. More distribution centers have been built for storage and delivery business. All of that could not have been anticipated with the current Comprehensive Plan. The 0.83 site can only be used for residential purposes given the current RS zoning. A Conditional Use Permit application is being pursued for a truck stop but it is not one in a truest sense. The facility is not open to the public but involves the private clients that it serves. It does not have diesel fuel, a restaurant, showers, truck washing, or a lounge. It serves truck cabs only and box trucks. There are no trailers. The fuel is renewable compressed natural gas. Ms. McBride described the filling process for vehicles. There are many benefits of this use for the environment. One of their clients wants to meet their carbon neutral goal by 2040. The use is not as noisy as diesel trucks. There is no idling. Ms. McBride distributed a handout to the Board members showing the site and surrounding properties. It shows the neighboring industrial uses already in place. The proposed use is less objectionable. The site is about 1,200 feet from the Airport. The I-1 zoning already in place allows distribution related uses. She indicated that they would comply with all of the requirements of the Boone County Zoning Regulations. It includes trash dumpsters and landscaping to screen the use from the existing residences. Parking will be provided on paved surfaces. A monument sign is being proposed and will meet all of the requirements along with lighting. In regard to the Conditional Use Permit, the use is harmonious with the Comprehensive Plan. The access is the only thing seen from the road due to screening and setback. It is compatible to other uses in the area and it isn't hazardous to the area. There are adequate public facilities in the area. It is a less intense use versus other uses that are permitted in the I-1 district.

Mr. Ralph Anderson, CT Realty, described his company as an industrial developer. They are in all markets nationwide. Their client is Clean Energy Fuels. He has 7 projects underway of 24 that will eventually be constructed. Eight of the projects have been constructed of which 3 are his projects. For every one compressed natural gas truck, one diesel truck will leave the road. The trucks have been purchased and when put into service, a diesel truck will be eliminated by their client. It really is a carbon negative initiative as it captures the gas and returns it to the grid when put into the truck. The operations are local operators or drivers that may own a franchise. It is not

a shifting type of operation. Trucks operate when they are needed. A peak time may be a 3 hour shift.

Mr. Chuck Nelson, Clean Energy Fuels, stated that the goal of the program is to reduce the carbon footprint. The company captures manure and greenhouse gases, cleans it and puts it back into the pipeline to put in vehicles. One diesel truck idling is noisier than 10 Clean Energy gas trucks. Waste haulers usually run their vehicles on natural gas. It is quieter. The natural gas trucks don't idle. There will be other fleets of vehicles that will use the facility but it is not open to the general public. It is for local drivers.

Chairman Rolfsen asked if anyone wanted to speak in favor or against the request?

Mr. Travis Miller, OKI Regional Council of Governments, stated that he is not in favor or against the zoning request but rather supports the use of compressed natural gas. OKI's Metropolitan Transportation Plan supports the use of alternative fuels. It will improve air quality in the region. The I-75 corridor from the State line to Walton is an alternative fuel corridor. It was done to promote compressed natural gas, particularly for freight users. It is also recommended in OKI's Regional Strategic Plan.

Mr. Lee Crume, B-NKY, stated that his organization supports the project as it adds to the region's effort to encourage low carbon emissions and renewable energy. Trucks are part of our community and this project minimizes the impact using compressed natural gas. It is less pollution and noise.

Ms. Tammy McDaniel, 1805 Lakeland Park Drive, stated that she supports a clean environment. She wonders what it is like living next door to the facility? All day long, there are cars driving down Lakeland Park Drive due to the industrial in the area. There is trash and needles. The road is not big enough for this project. Limaburg Road is not big enough for a truck stop. There are sometimes backups on Limaburg Road. More development is coming. She is concerned about lighting and property values. Her house was impacted by the Amazon blasting. She assumes that Mr. Anderson and Mr. Nelson don't live by these types of facilities. Imagine what it would be like to live next to it. They have to live with it constantly. She likes having the driving range next to her.

Mr. Art Crawford, 5320 Limaburg Road, stated that he agreed with Ms. McDaniel as he moved to the area 3 years ago and occasionally he has a golf ball in his yard. He expressed a concern about the project's impact.

Chairman Rolfsen asked if any Commissioners had any questions or comments?

Mr. Hincks inquired about the safety of filling a truck with compressed gas versus diesel fuel? Mr. Nelson replied that natural gas has significant safety standards. This includes pressure monitoring and emergency shutdowns. A diesel leak occurs on the ground and is flammable. Natural gas is

lighter than air and goes up. It vents into the air. Natural gas has to be the perfect mixture of methane and oxygen to have any type of ignition. Clean Energy has many stations across the United States and follows all the national standards. Natural gas has an odor and is the same type of gas for water heaters and stoves. They don't store the gas on-site as it is only in the pipeline to be put into vehicles. There are controls and sensors in place for safety purposes. Mr. Hincks asked how the proposal is not like a truck stop? Ms. McBride replied that a truck stop like Flying J is open to the public. Truck stops use diesel fuel. The proposed facility doesn't sell food or tires or have showers or truck washes. It doesn't have trailers and drivers don't sleep on-site. It has more security because it is private and not open to the public. Mr. Nelson noted that the gas would originate from a gas line already in existence on Limaburg Road.

Chairman Rolfsen asked what happens if there is a gas leak? Mr. Nelson responded that it is monitored by controls from gas detection systems. They also monitor the pressures in the system. The site is monitored 24/7 by a command center. It is designed with an emergency shut down fault system. They would dispatch the local fire department and personnel from their company.

Chairman Rolfsen asked about the lighting? Mr. Nelson replied that there will be lighting in the parking area for safety and security purposes. They usually follow the local requirements. Lighting will be diverted down and inward. He showed that the lighting will be directed from the canopy to the compound area. There will be berms along the drive areas and additional landscaping around the perimeters to better buffer the use from the residential. They are trying to be a good neighbor.

Chairman Rolfsen asked who is the company that will be using the facility? Mr. Nelson replied that it could be CCX, Amazon or FedEx. The company owns the trucks and hires local companies/drivers to use them.

Ms. Gulick expressed a concern about traffic. Is the Traffic Impact Study completed yet since the County Engineer required it? Mr. Anderson responded that it is in process. She felt there are safety concerns about Limaburg Road. What type of improvements to Limaburg Road is the developer offering?

Mr. Nelson replied that any improvements would be based on the recommendations outlined in the Traffic Impact Study. It could include road widening or safety signage. Mr. Anderson noted the box trucks have less of an impact than tractor trailers.

Chairman Rolfsen inquired about the directions of the traffic to and from the facility. It may affect improvements on the road from both directions or in one direction dependent on who uses the facility like Amazon. It is not a signalized intersection.

Ms. Gulick mentioned that it is difficult to control it if there are third party companies using the facility. Mr. Anderson replied that enforcement will occur regardless of who is using the facility. He also explained that at other facilities they have made the necessary road improvements.

Mr. Wilson mentioned that the applicant noted that the facility will be unmanned. How will it be enforced? Mr. Anderson replied it would be law enforcement or code enforcement. Chairman Rolfsen asked who is enforcing the fact that someone may sleep overnight at the facility even though it may not be a truck stop? Mr. Nelson replied that they have security cameras and 24/7 monitoring. Anything done on private property would be under their enforcement whereas on the public road would be the County.

Mr. Lunnemann asked the applicant to address the completion of the Traffic Impact Study, lighting and landscaping. It is essential to know what needs to be done to the road before the Planning Commission acts. Again, what direction will the vehicles come from and leave the site?

Mr. Costello asked if the proposed facility would be better suited to be located on Airport property next to the proposed user(s)? Mr. Nelson replied that their facilities are typically not located next to warehouse hubs or sorting facilities. It is typically day routes and not long haul routes.

Chairman Rolfsen inquired on the location of a similar facility? Mr. Anderson replied it is located in the Columbus market or in Groveport.

Mr. Schwenke commented that it could be one client today but change in the future to 5 or 6 with different traffic patterns. Mr. Costello explained one could limit the use to what is there today and not allow trailers to avoid the heavy traffic and congestion. One could also cap the number of parking spaces.

Ms. McBride stated that the vast majority of the site is already zoned I-1 so it could be a vast distribution facility with trucks and trailers all night. There are other uses than can occur by right as long as they meet the Site Plan Review requirements.

Mrs. Clark asked if the facility was unmanned, had no employees, with a security fence and cameras, and if something happens, would they depend on local law enforcement?

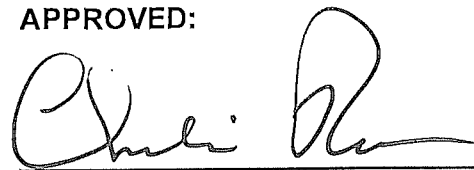
Mr. Anderson replied that they would rely on local law enforcement. On-premise problems would be monitored by Clean Energy electronically via video and by local on-site service folks. The Command Center is in Denver and Newport Beach, California. The drivers also have safety officers and have to follow rules. The individual driver is trained to fill up their own vehicle.

Mr. Szurlinski asked what was the purpose of the buildings on the north side? Mr. Nelson responded the building is used for small meetings with staff and drivers. It could involve the dispatcher or safety officer. There is no public access to the building. The other building is used for light maintenance/service – headlights, wiper blades, fluids, etc. Maintenance workers are usually on-site each day. A truck won't start unless the hose is disconnected from the vehicle. It is not manned like a gas station.

Ms. McDaniel expressed a concern about vapors in the air. Will it be a problem if she has a backyard fire or has fireworks? Where will the private cars be located on the site as it affects lighting the site? What will be the impact on her property?

Seeing no further questions or comments, Chairman Rolfsen announced that the Committee Meeting for this item will be on May 17, 2023 at 5:00 P.M. This item will be on the Agenda for the Business Meeting on June 7, 2023 at 7:00 p.m. in the Fiscal Courtroom. Secretary/Treasurer Steele closed the Public Hearing at 8:48 p.m.

APPROVED:



Charlie Rolfsen
Chairman

Attest:



Kevin P. Costello, AICP
Executive Director

Exhibit A – Email from Rob Franxman
Exhibit B – Surrounding Industrial Properties

Michael Schwartz

From: Robert Franxman
Sent: Thursday, April 27, 2023 9:29 AM
To: Michael Schwartz
Subject: RE: Clean Energy Truck Hub - 5390 Limaburg Road

Michael,

Sorry I'm a day late. Just 1 comment.

Thanks,
Rob

- The submitted information presents data that the traffic numbers are lower than 100 trips per peak hour. 100 trips is the typical threshold that triggers a site specific Traffic Impact Study; I'll accept the applicants conclusion that a TIS isn't required based on the number of trips. However; as they indicate on page 6 (bullet 7) they should be required to provide the already completed traffic analysis during site plan review and the encroachment permit process. In addition, the developer should be aware Limaburg Road is classified as a collector and experiences significant mixed (car / truck / ped / transit) traffic volumes despite relatively narrow lanes and a mostly rural roadway section with no shoulders. When they do submit their already completed traffic analysis, I would ask that they evaluate safety along the general Limaburg corridor that will be impacted by an increase in larger vehicles. This evaluation should include analysis of crash data to identify the potential causes and crash patterns in the corridor and determine if the proposed development will impact the current crash patterns.

From: Michael Schwartz <mschwartz@boonecountyky.org>
Sent: Friday, April 7, 2023 8:43 AM
To: Paul Stephenson <Pstephenson@boonecountyky.org>; Mark Martin <mmartin@boonecountyky.org>; Robert Franxman <rfranxman@boonecountyky.org>; Daniel Menetrey <dmenetrey@boonecountyky.org>; aifcic@hebronfire.org
Subject: Clean Energy Truck Hub - 5390 Limaburg Road

We are in receipt of the above referenced zoning map amendment application.

If you have any comments that you would like to have included in our staff report, please forward them to me no later than **Wednesday, April 26, 2023**.

Michael D. Schwartz
Director, Zoning Services



BOONE COUNTY
PLANNING COMMISSION

2950 Washington Street, Room 317
Burlington, Kentucky 41005
(P) 859-334-2196 (F) 859-334-2264

**BOONE COUNTY PLANNING COMMISSION
ADOPTED FINDINGS OF FACT FOR DENIAL**

Request of **CT Realty, per Cole Moody (applicant)** for **Skas Properties LLC (owner)** for: (1) a Zoning Map Amendment from Rural Suburban (RS) to Industrial One (I-1) for an approximate 0.83 acre area located at 5390 Limaburg Road, Boone County, Kentucky; and (2) a Conditional Use Permit to allow a truck stop on an approximate 17.1 acre area located at 5390 Limaburg Road, Boone County, Kentucky. The request is for the development of a Clean Energy Truck Hub to provide fueling and parking for a compressed natural gas truck fleet on an overall 17.1 acre area located at 5390 Limaburg Road, Boone County, Kentucky.

REMARKS:

1. We, the Boone County Planning Commission, recommend denial of the above referenced Zoning Map Amendment and approval of the Conditional Use Permit based on the following Findings of Fact:

FINDINGS OF FACT (Zoning Map Amendment):

1. The proposed I-1 district is not consistent with The Our Boone County Plan 2040 Future Land Use Plan designates the site for "Suburban Density Residential" uses.
 - a. The proposed I-1 district will allow industrial uses within an area that is recommended for residential development up to four (4) units per acre.
2. The proposed I-1 district is not consistent with the following Our Boone County Plan 2040 Goals and Objectives:
 - a. Mixing of residential and other land uses shall be encouraged where appropriate (Overall Goal A, Objective 2).
 - (1) Using the site in question for industrial uses is not appropriate given the existing residential uses in the area along Limaburg Road.
 - b. Land uses and zoning decisions shall strive to balance the rights of landowners with the rights of neighbors and the community (Overall Goal A, Objective 4).
 - (1) The property owners in the vicinity of the site in question knew, or should have known that the area that is currently zoned I-1 could be developed with industrial uses. Additionally, they knew, or should have known that the site was zoned for residential uses. The larger are of the site, that is currently zoned I-1, can be developed as long as access is from an adjacent property that is also zoned I-1.
 - c. Priority shall be given towards maintaining, protecting, and improving the capacity and safety of the existing road system across jurisdictions (Transportation Goal A, Objective 1).
 - (1) While Limaburg Road is identified as a collector street, it is not designed or constructed to a collector street standard. The provision of additional

truck traffic on Limaburg Road will have a negative impact on the capacity and safety of the roadway.

3. The existing RS district is appropriate and the proposed I-1 district is inappropriate.
 - a. The existing RS district is consistent with the 2040 Future Land Use Map of the comprehensive plan which identifies the site for residential uses, up to four (4) units per acre. The existing RS district permits residential uses up to three (3) units per acre.
 - b. The proposed I-1 district would allow industrial traffic to go through an area that has established single-family residential dwellings.
 - c. The remainder of the property, which is currently zoned I-1, can be appropriately developed, provided access is from adjacent areas that are zoned I-1.
4. There have been no major changes of an economic, physical, or social nature within the area involved which were not anticipated in the adopted comprehensive plan and which have substantially altered the basic character of such area.

FINDINGS OF FACT (Conditional Use Permit):

1. The proposed truck stop will be harmonious and in accordance with the comprehensive plan.
 - a. The proposed truck stop will not have many of the services found in a typical truck stop (i.e., convenience store, restaurant, shower facilities) making the proposed use more compatible with the existing industrial uses in the area.
 - b. The proposed truck stop will not have any truck trailers making the proposed use more compatible with the adjacent residential uses in the area.
2. The proposed truck stop will be designed, constructed, operated, and maintained so as to be harmonious and appropriate in appearance with the existing or intended character of the general vicinity and shall not change the essential character of the same area.
 - a. The proposed truck stop will have: (1) single story buildings; (2) landscaped buffers; and (3) passenger vehicle parking in the areas that are closest to the existing residential dwellings.
3. The proposed truck stop will not be hazardous to existing or future neighboring uses.
 - a. The proposed truck stop will be equipped with safety features to mitigate any fuel spillage.
4. The proposed truck stop will be served adequately by essential public facilities and

services such as highways, streets, police and fire protection, drainage structures, refuse disposal, water and sewer, and schools; or that the persons or agencies responsible for the establishment of the proposed use shall be able to provide adequately any such services.

- a. The proposed truck stop is located within an area that is easily served by various public facilities and will be located on a collector street that is less than one (1) mile from a state maintained arterial street.
5. The proposed truck stop will not create excessive additional requirements at public cost for public facilities and services and will not be detrimental to the economic welfare of the community.
 - a. The proposed truck stop will have the same public requirements as any other industrial development in the area.
 6. The proposed truck stop will not involve uses, activities, process, materials, equipment and conditions of operation that will be detrimental to any persons, property, or the general welfare by reason of excessive production of traffic, noise, smoke, dust, fumes, glare or odors.
 - a. The proposed truck stop will use compressed natural gas, which is odorless, other than the odor that is injected in the gas by the appropriate utility authority.
 - b. The proposed trucks, which will run on the compressed natural gas, are much quieter than traditional diesel powered truck.
 - c. Since there will be no truck trailers, there will be no additional noise that results from the connection/dropping of the trailers.
 7. The proposed truck stop will have vehicular approaches to the property which shall be so designed as not to create an interference with traffic on surrounding public thoroughfares.
 - a. Any required improvements to Limaburg Road will be addressed during the issuance of the encroachment permit by the County.

CONDITION:

1. The Conditional Use Permit for the proposed truck stop shall only be approved if the Boone Fiscal Court takes action to approve the proposed zoning map amendment from RS to I-1.

**BOONE COUNTY PLANNING COMMISSION
BOONE COUNTY ADMINISTRATION BUILDING
BOONE COUNTY FISCAL COURTROOM
PUBLIC HEARINGS
MAY 3, 2023
7:30 P.M.**

Chairman Rolfsen opened the Public Hearing at 7:30 p.m. and welcomed the audience to the Planning Commission's May 3, 2023 Public Hearings.

COMMISSION MEMBERS PRESENT:

Mr. Randy Bessler
Mrs. Kathy Clark
Mrs. Pamela Goetting
Ms. Corrin Gulick, Vice Chairwoman
Mr. Steve Harper, Temporary Presiding Officer
Mr. David Hincks
Mrs. Janet Kegley
Mr. Rick Lunnemann
Mr. Eric Richardson
Mr. Charlie Rolfsen, Chairman
Mr. Bob Schwenke
Mr. Tom Szurlinski
Mr. Steve Turner
Mr. Kenny Vaught

COMMISSION MEMBERS NOT PRESENT:

Mrs. Jackie Steele, Secretary/Treasurer

LEGAL COUNSEL PRESENT:

Mr. Dale Wilson

STAFF MEMBERS PRESENT:

Mr. Kevin P. Costello, AICP, Executive Director
Mr. Michael D. Schwartz, Director, Zoning Services
Mr. Todd K. Morgan, AICP, Senior Planner

Chairman Rolfsen introduced the first item on the Agenda.

ZONING MAP AMENDMENT/CONDITIONAL USE PERMIT, Michael Schwartz, Staff

1. Request of **CT Realty, per Cole Moody (applicant) for Skas Properties LLC (owner)** for: (1) a Zoning Map Amendment from Rural Suburban (RS) to Industrial One (I-1) for an approximate 0.83 acre area located at 5390 Limaburg Road, Boone County, Kentucky; and (2) a Conditional Use Permit to allow a truck stop

on an approximate 17.1 acre area located at 5390 Limaburg Road, Boone County, Kentucky. The request is for the development of a Clean Energy Truck Hub to provide fueling and parking for a compressed natural gas truck fleet on an overall 17.1 acre area located at 5390 Limaburg Road, Boone County, Kentucky.

Staff Member, Michael Schwartz, referred to his PowerPoint presentation (See Staff Report). The request involves rezoning a 0.83 acre area from Rural Suburban (RS) to Industrial One (I-1) at 5390 Limaburg Road. The request also includes a Conditional Use Permit application to allow a truck stop as defined in the zoning regulations. The zone change site is part of a larger 17.1 acre development. The site history is found on Page 1 of the Staff Report. The site has 150 feet of road frontage along Limaburg Road. The area already zoned I-1 is occupied by a golf driving range. The subject area is occupied by a driveway leading to the only curb cut along Limaburg Road. A tree line exists along the north, south and east property lines. Mr. Schwartz described the surrounding land uses, which includes single-family homes and industrial development in the area. Pages 1-3 of the Staff Report includes the pertinent sections of the zoning code that pertains to the request. The proposed use is classified as a truck stop since it calls for dispensing fuel for trucks. The topography of the site slopes west to east at a 2% grade. The Future Land Use Map designates the site for Recreation (R) and Suburban Density Residential (SD) uses. Pages 4-6 of the Staff Report includes portions of the Comprehensive Plan. Limaburg Road is a County maintained road and contains no sidewalks. It is located in the 55 DNL Noise Contour. He showed photographs of the site and adjoining properties.

Mr. Schwartz reviewed the submitted Concept Development Plan. It includes 4 fast fill natural gas fuel dispensers for Clean Energy customers, 92 fast fill natural gas fuel dispensers for box trucks for Clean Energy customers, 264 "time fill" natural gas fuel dispensers for truck cabs for Clean Energy customers, 280 passenger vehicle parking spaces, 3 office buildings each having 1,440 square feet of space, a 4,800 square foot vehicle service building, perimeter landscaping, security fencing, stormwater detention and use of the existing curb cut on Limaburg Road. Mr. Schwartz commented that people will drive their personal vehicles, park their car, get in a box truck or truck cab, pick up a trailer or make deliveries and return to the same location for refueling. Staff has reviewed the Concept Development Plan and notes that it has substantially met the requirements of the Zoning Regulations. The applicant has provided trip generation figures that show the facility generates 60 trips during the AM peak hour and approximately 75 trips during the PM peak hour. The applicant has provided a Project Description and Justification Statement. All areas adjacent to the 17.1 acre property that are zoned I-1 and are planned for industrial uses in the future. The Recreation Future Land Use classification for the site largely reflects the use of the property today. The Hebron Fire District and the Boone County Building Department had no comments on the request. The Boone County Public Works Department replied and requested a Traffic Impact Study to be submitted at the Site Plan stage as road improvements may be necessary. Pages 7 & 8 of the Staff Report list a series of questions and Staff concerns. The applicant has submitted a reply to these items as part of the Staff Report. Mr. Schwartz showed some drawings of what the facility will look like if approved. There are 2 parts to the request. The

first is a small Zoning Map Amendment request out front. The recommendation on this request will be forwarded to the Fiscal Court for final action. The second request is for a Conditional Use Permit for the truck stop that is only approved by the Planning Commission.

Chairman Rolfsen asked if the applicant was present and wanted to proceed with their presentation?

Ms. Anne McBride, representing CT Realty, stated that it is a really unique zoning request and use for the subject property. About 4.6% of the site is zoned RS. A vast majority of the site is zoned I-1. The access to the site is zoned RS. One can't go through the RS Zoning to get to the I-1 zoned portion. It has to be zoned the same to have the use in question. The property is zoning landlocked, as it can't be developed completely unless all of it is zoned I-1. The Future Land Use Map for the site reflects the existing zoning at the time. There have been major changes in the area as lifestyles have changed. More people are working from home as a result of Covid. There is a lot of empty office space and e-commerce has changed the retail sector. More distribution centers have been built for storage and delivery business. All of that could not have been anticipated with the current Comprehensive Plan. The 0.83 site can only be used for residential purposes given the current RS zoning. A Conditional Use Permit application is being pursued for a truck stop but it is not one in a truest sense. The facility is not open to the public but involves the private clients that it serves. It does not have diesel fuel, a restaurant, showers, truck washing, or a lounge. It serves truck cabs only and box trucks. There are no trailers. The fuel is renewable compressed natural gas. Ms. McBride described the filling process for vehicles. There are many benefits of this use for the environment. One of their clients wants to meet their carbon neutral goal by 2040. The use is not as noisy as diesel trucks. There is no idling. Ms. McBride distributed a handout to the Board members showing the site and surrounding properties. It shows the neighboring industrial uses already in place. The proposed use is less objectionable. The site is about 1,200 feet from the Airport. The I-1 zoning already in place allows distribution related uses. She indicated that they would comply with all of the requirements of the Boone County Zoning Regulations. It includes trash dumpsters and landscaping to screen the use from the existing residences. Parking will be provided on paved surfaces. A monument sign is being proposed and will meet all of the requirements along with lighting. In regard to the Conditional Use Permit, the use is harmonious with the Comprehensive Plan. The access is the only thing seen from the road due to screening and setback. It is compatible to other uses in the area and it isn't hazardous to the area. There are adequate public facilities in the area. It is a less intense use versus other uses that are permitted in the I-1 district.

Mr. Ralph Anderson, CT Realty, described his company as an industrial developer. They are in all markets nationwide. Their client is Clean Energy Fuels. He has 7 projects underway of 24 that will eventually be constructed. Eight of the projects have been constructed of which 3 are his projects. For every one compressed natural gas truck, one diesel truck will leave the road. The trucks have been purchased and when put into service, a diesel truck will be eliminated by their client. It really is a carbon negative initiative as it captures the gas and returns it to the grid when put into the truck. The operations are local operators or drivers that may own a franchise. It is not

a shifting type of operation. Trucks operate when they are needed. A peak time may be a 3 hour shift.

Mr. Chuck Nelson, Clean Energy Fuels, stated that the goal of the program is to reduce the carbon footprint. The company captures manure and greenhouse gases, cleans it and puts it back into the pipeline to put in vehicles. One diesel truck idling is noisier than 10 Clean Energy gas trucks. Waste haulers usually run their vehicles on natural gas. It is quieter. The natural gas trucks don't idle. There will be other fleets of vehicles that will use the facility but it is not open to the general public. It is for local drivers.

Chairman Rolfsen asked if anyone wanted to speak in favor or against the request?

Mr. Travis Miller, OKI Regional Council of Governments, stated that he is not in favor or against the zoning request but rather supports the use of compressed natural gas. OKI's Metropolitan Transportation Plan supports the use of alternative fuels. It will improve air quality in the region. The I-75 corridor from the State line to Walton is an alternative fuel corridor. It was done to promote compressed natural gas, particularly for freight users. It is also recommended in OKI's Regional Strategic Plan.

Mr. Lee Crume, B-NKY, stated that his organization supports the project as it adds to the region's effort to encourage low carbon emissions and renewable energy. Trucks are part of our community and this project minimizes the impact using compressed natural gas. It is less pollution and noise.

Ms. Tammy McDaniel, 1805 Lakeland Park Drive, stated that she supports a clean environment. She wonders what it is like living next door to the facility? All day long, there are cars driving down Lakeland Park Drive due to the industrial in the area. There is trash and needles. The road is not big enough for this project. Limaburg Road is not big enough for a truck stop. There are sometimes backups on Limaburg Road. More development is coming. She is concerned about lighting and property values. Her house was impacted by the Amazon blasting. She assumes that Mr. Anderson and Mr. Nelson don't live by these types of facilities. Imagine what it would be like to live next to it. They have to live with it constantly. She likes having the driving range next to her.

Mr. Art Crawford, 5320 Limaburg Road, stated that he agreed with Ms. McDaniel as he moved to the area 3 years ago and occasionally he has a golf ball in his yard. He expressed a concern about the project's impact.

Chairman Rolfsen asked if any Commissioners had any questions or comments?

Mr. Hincks inquired about the safety of filling a truck with compressed gas versus diesel fuel? Mr. Nelson replied that natural gas has significant safety standards. This includes pressure monitoring and emergency shutdowns. A diesel leak occurs on the ground and is flammable. Natural gas is

lighter than air and goes up. It vents into the air. Natural gas has to be the perfect mixture of methane and oxygen to have any type of ignition. Clean Energy has many stations across the United States and follows all the national standards. Natural gas has an odor and is the same type of gas for water heaters and stoves. They don't store the gas on-site as it is only in the pipeline to be put into vehicles. There are controls and sensors in place for safety purposes. Mr. Hincks asked how the proposal is not like a truck stop? Ms. McBride replied that a truck stop like Flying J is open to the public. Truck stops use diesel fuel. The proposed facility doesn't sell food or tires or have showers or truck washes. It doesn't have trailers and drivers don't sleep on-site. It has more security because it is private and not open to the public. Mr. Nelson noted that the gas would originate from a gas line already in existence on Limaburg Road.

Chairman Rolfsen asked what happens if there is a gas leak? Mr. Nelson responded that it is monitored by controls from gas detection systems. They also monitor the pressures in the system. The site is monitored 24/7 by a command center. It is designed with an emergency shut down fault system. They would dispatch the local fire department and personnel from their company.

Chairman Rolfsen asked about the lighting? Mr. Nelson replied that there will be lighting in the parking area for safety and security purposes. They usually follow the local requirements. Lighting will be diverted down and inward. He showed that the lighting will be directed from the canopy to the compound area. There will be berms along the drive areas and additional landscaping around the perimeters to better buffer the use from the residential. They are trying to be a good neighbor.

Chairman Rolfsen asked who is the company that will be using the facility? Mr. Nelson replied that it could be CCX, Amazon or FedEx. The company owns the trucks and hires local companies/drivers to use them.

Ms. Gulick expressed a concern about traffic. Is the Traffic Impact Study completed yet since the County Engineer required it? Mr. Anderson responded that it is in process. She felt there are safety concerns about Limaburg Road. What type of improvements to Limaburg Road is the developer offering?

Mr. Nelson replied that any improvements would be based on the recommendations outlined in the Traffic Impact Study. It could include road widening or safety signage. Mr. Anderson noted the box trucks have less of an impact than tractor trailers.

Chairman Rolfsen inquired about the directions of the traffic to and from the facility. It may affect improvements on the road from both directions or in one direction dependent on who uses the facility like Amazon. It is not a signalized intersection.

Ms. Gulick mentioned that it is difficult to control it if there are third party companies using the facility. Mr. Anderson replied that enforcement will occur regardless of who is using the facility. He also explained that at other facilities they have made the necessary road improvements.

Mr. Wilson mentioned that the applicant noted that the facility will be unmanned. How will it be enforced? Mr. Anderson replied it would be law enforcement or code enforcement. Chairman Rolfsen asked who is enforcing the fact that someone may sleep overnight at the facility even though it may not be a truck stop? Mr. Nelson replied that they have security cameras and 24/7 monitoring. Anything done on private property would be under their enforcement whereas on the public road would be the County.

Mr. Lunnemann asked the applicant to address the completion of the Traffic Impact Study, lighting and landscaping. It is essential to know what needs to be done to the road before the Planning Commission acts. Again, what direction will the vehicles come from and leave the site?

Mr. Costello asked if the proposed facility would be better suited to be located on Airport property next to the proposed user(s)? Mr. Nelson replied that their facilities are typically not located next to warehouse hubs or sorting facilities. It is typically day routes and not long haul routes.

Chairman Rolfsen inquired on the location of a similar facility? Mr. Anderson replied it is located in the Columbus market or in Groveport.

Mr. Schwenke commented that it could be one client today but change in the future to 5 or 6 with different traffic patterns. Mr. Costello explained one could limit the use to what is there today and not allow trailers to avoid the heavy traffic and congestion. One could also cap the number of parking spaces.

Ms. McBride stated that the vast majority of the site is already zoned I-1 so it could be a vast distribution facility with trucks and trailers all night. There are other uses than can occur by right as long as they meet the Site Plan Review requirements.

Mrs. Clark asked if the facility was unmanned, had no employees, with a security fence and cameras, and if something happens, would they depend on local law enforcement?

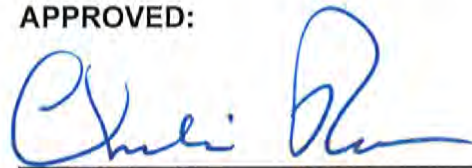
Mr. Anderson replied that they would rely on local law enforcement. On-premise problems would be monitored by Clean Energy electronically via video and by local on-site service folks. The Command Center is in Denver and Newport Beach, California. The drivers also have safety officers and have to follow rules. The individual driver is trained to fill up their own vehicle.

Mr. Szurlinski asked what was the purpose of the buildings on the north side? Mr. Nelson responded the building is used for small meetings with staff and drivers. It could involve the dispatcher or safety officer. There is no public access to the building. The other building is used for light maintenance/service – headlights, wiper blades, fluids, etc. Maintenance workers are usually on-site each day. A truck won't start unless the hose is disconnected from the vehicle. It is not manned like a gas station.

Ms. McDaniel expressed a concern about vapors in the air. Will it be a problem if she has a backyard fire or has fireworks? Where will the private cars be located on the site as it affects lighting the site? What will be the impact on her property?

Seeing no further questions or comments, Chairman Rolfsen announced that the Committee Meeting for this item will be on May 17, 2023 at 5:00 P.M. This item will be on the Agenda for the Business Meeting on June 7, 2023 at 7:00 p.m. in the Fiscal Courtroom. Secretary/Treasurer Steele closed the Public Hearing at 8:48 p.m.

APPROVED:



Charlie Rolfsen
Chairman

Attest:



Kevin P. Costello, AICP
Executive Director

Exhibit A – Email from Rob Franxman
Exhibit B – Surrounding Industrial Properties

Michael Schwartz

From: Robert Franxman
Sent: Thursday, April 27, 2023 9:29 AM
To: Michael Schwartz
Subject: RE: Clean Energy Truck Hub - 5390 Limaburg Road

Michael,

Sorry I'm a day late. Just 1 comment.

Thanks,
Rob

- The submitted information presents data that the traffic numbers are lower than 100 trips per peak hour. 100 trips is the typical threshold that triggers a site specific Traffic Impact Study; I'll accept the applicants conclusion that a TIS isn't required based on the number of trips. However; as they indicate on page 6 (bullet 7) they should be required to provide the already completed traffic analysis during site plan review and the encroachment permit process. In addition, the developer should be aware Limaburg Road is classified as a collector and experiences significant mixed (car / truck / ped / transit) traffic volumes despite relatively narrow lanes and a mostly rural roadway section with no shoulders. When they do submit their already completed traffic analysis, I would ask that they evaluate safety along the general Limaburg corridor that will be impacted by an increase in larger vehicles. This evaluation should include analysis of crash data to identify the potential causes and crash patterns in the corridor and determine if the proposed development will impact the current crash patterns.

From: Michael Schwartz <mschwartz@boonecountyky.org>
Sent: Friday, April 7, 2023 8:43 AM
To: Paul Stephenson <Pstephenson@boonecountyky.org>; Mark Martin <mmartin@boonecountyky.org>; Robert Franxman <rfranxman@boonecountyky.org>; Daniel Menetrey <dmenetrey@boonecountyky.org>; aifcic@hebronfire.org
Subject: Clean Energy Truck Hub - 5390 Limaburg Road

We are in receipt of the above referenced zoning map amendment application.

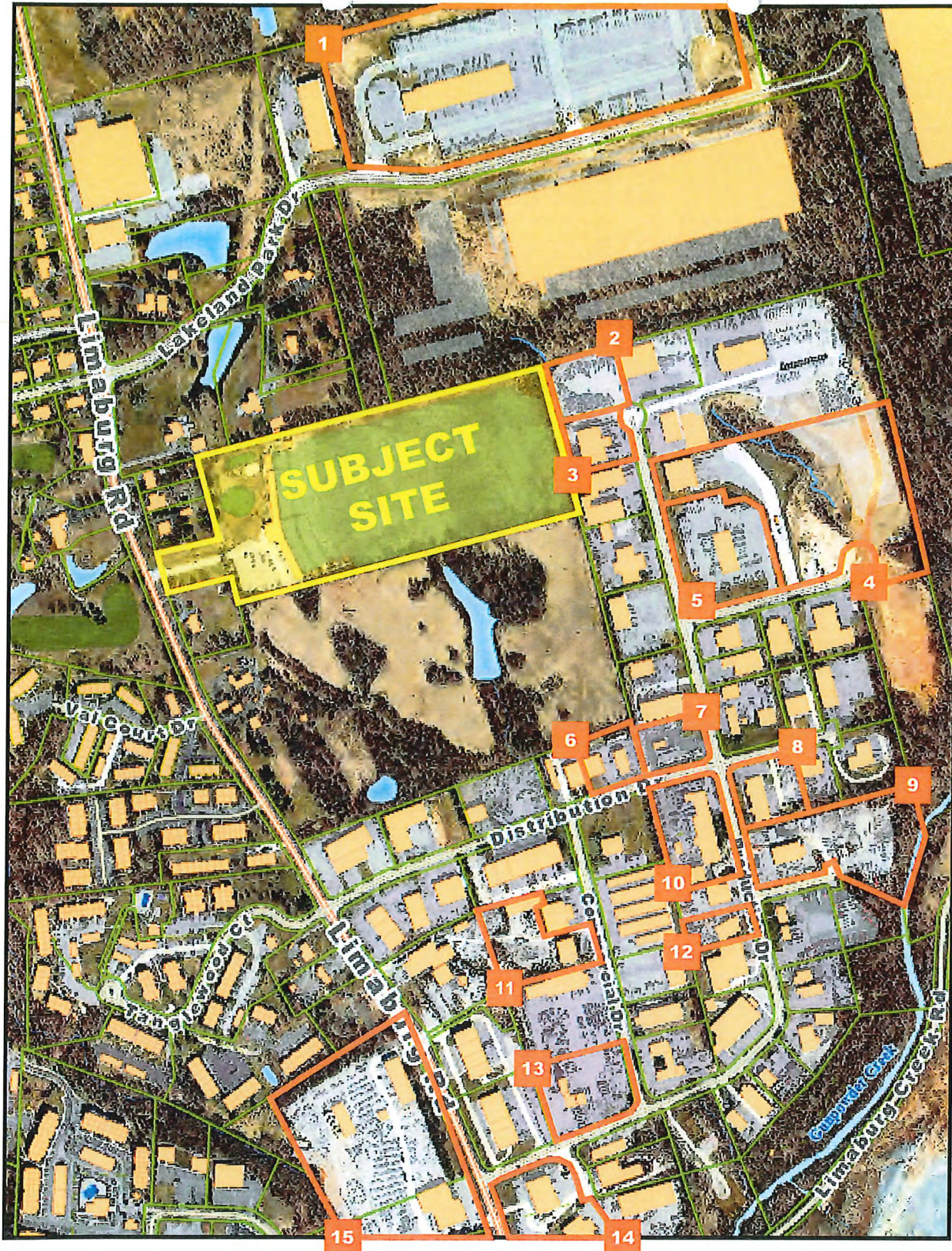
If you have any comments that you would like to have included in our staff report, please forward them to me no later than **Wednesday, April 26, 2023**.

Michael D. Schwartz
Director, Zoning Services

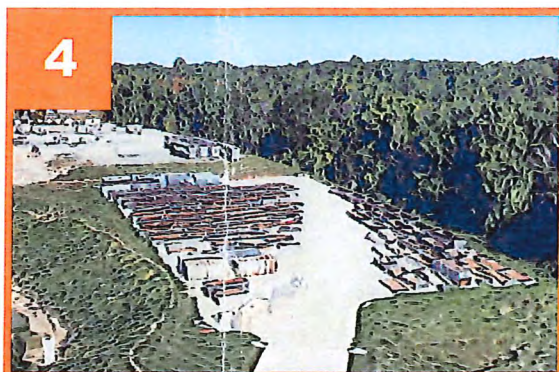
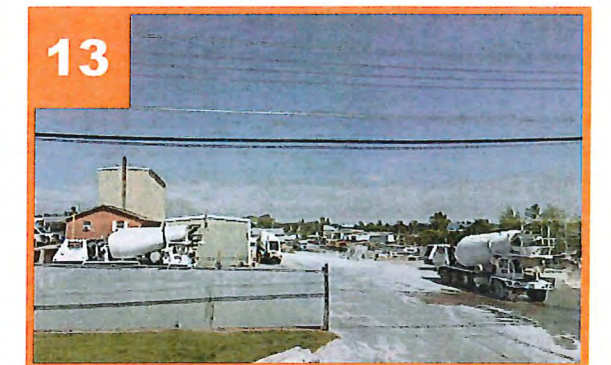


BOONE COUNTY
PLANNING COMMISSION

2950 Washington Street, Room 317
Burlington, Kentucky 41005
(P) 859-334-2196 (F) 859-334-2264



5390 LIMABURG RD
Surrounding Industrial Properties



SUPPORTING INFORMATION

**ZONING DESCRIPTION
SKAS PROPERTIES, LLC
BOONE COUNTY, KENTUCKY
CONTAINING 0.8327 ACRES**

Situate in Boone County, the Commonwealth of Kentucky, and being part of a 17.1053-acre tract of land owned by SKAS Properties, LLC, Inc by Deed 1123, Page 419 (all references to deeds, microfiche, plats, surveys, etc. refer to the records of the Boone County PVA Office, unless noted otherwise) and being more particularly bounded and described as follows:

Beginning at the northwest corner of Lot 5 of Lela Heights Subdivision as recorded in Book 4, Page 48, said point also being the easterly right of way of Limaburg Road;

Thence, along the north line of Lot 5, North 74°00'00" East a distance of 241.83 feet to the northeast corner of said Lot 5


Thence, leaving said northeast corner, along the easterly lines of Lot 5 and Lot 6, South 16°57'00" East a distance of 150.00 feet to the northeast corner of Lot 7 and the southwest corner of Lot 6;

Thence, along the southerly line of Lot 6 and the northerly line of Lot 7, South 74°00'00" West a distance of 241.83 feet to the southwest corner of Lot 6 and the northwest corner of Lot 7 and being the easterly right of way of Limaburg Road;

Thence, along the westerly line of Lot 6 and Lot 5, and the easterly right of way of Limaburg Road, North 16°57'00" West to the point of beginning containing 0.8327 acres of land more or less and subject to all easements of records.

This description was prepared from the deed descriptions and not based on an actual field survey.

Woolpert, Inc.


Michael J. Wilson LS
Kentucky Land Surveyor #4074





BOONE COUNTY PLANNING COMMISSION

www.boonecountyky.org/pc
www.boonecountygis.com

Boone County Administration Building
2950 Washington Street, Room 317
P.O. Box 958
Burlington, KY 41005

Phone (859) 334-2196; Fax (859) 334-2264
plancom@boonecountyky.org

June 22, 2023

SKAS Properties LLC
961 Whirlaway Drive
Union, Kentucky 41091

RE: Request of CT Realty, per Cole Moody (applicant) for Skas Properties LLC (owner) for: (1) a Zoning Map Amendment from Rural Suburban (RS) to Industrial One (I-1) for an approximate 0.83 acre area located at 5390 Limaburg Road, Boone County, Kentucky; and (2) a Conditional Use Permit to allow a truck stop on an approximate 17.1 acre area located at 5390 Limaburg Road, Boone County, Kentucky. The request is for the development of a Clean Energy Truck Hub to provide fuelling and parking for a compressed natural gas truck fleet on an overall 17.1 acre area located at 5390 Limaburg Road, Boone County, Kentucky.

To Whom It May Concern:


The following represents the recommended conditions of approval for the above referenced application as discussed by the Planning Commission at their June 21, 2023 meeting. As you verbally agreed to these conditions at that meeting, please so indicate by signing in the space provided at the end of this letter and return the original letter to the Planning Commission's office no later than June 30, 2023.

CONDITIONS

1. Development shall be consistent with the revised Concept Development Plan, received on June 12, 2023. Where there is a discrepancy between the Project Description and Justification Statement and the Concept Development Plan drawings, the Concept Development Plan drawings shall take precedence.
2. Any exterior light pole shall not exceed twenty (20) feet in height and be equipped with down-lit light fixtures.
3. To ensure that traffic along Limaburg Road is not unduly affected by the proposed development, the owner and/or developer, at their cost, shall construct a right-turn deceleration lane and a left-turn storage lane on Limaburg Road at the proposed curb out to the site, provided that there is sufficient right-of-way to accommodate the turn lanes, subject to the approval by the County Engineer as part of the encroachment permit process.
4. To provide for interconnectivity, access, in the form of an easement and paved driveway, shall be provided from the proposed 'fast fill' area to the southern property line.
5. Any Buffer Yard D shall include a berm, not exceeding a 3:1 slope.
6. Any Buffer Yard D that is not within the front yard shall include a fence with a minimum height of six (6) feet. The fence shall be installed in the center of the buffer yard or along the inner boundary of the buffer yard.

Clean Energy Truck Hub
June 22, 2023
Page 2

Sincerely,



Michael D. Schwartz
Director, Zoning Services

MDS/ss

AGREEMENT

I, the property owner and developer of the approximate 17.1 acre area located at 5390 Limaburg Road, Boone County, Kentucky, agree to the conditions listed herein for the above referenced Zoning Map Amendment.



SKAS Properties LLC (owner)

6-27-23

Date



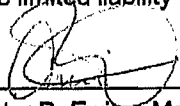
Clean Energy (developer)

06-27-2023

Date

US RE CTR Phase I JV, LLC, a
Delaware limited liability company

By: CTR Clean Energy Developer, LLC, a
Delaware limited liability company,

By: 

Carter B. Ewing, Managing Partner

June 22, 2023

Date

Clean Energy Compressed Natural Gas Development

Traffic Impact Study

Limaburg Road, City of Burlington
Boone County, Kentucky
June 2023

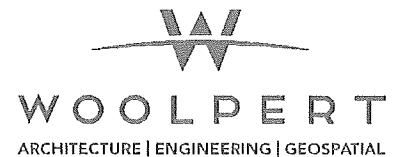




Table of Contents

Section 1 - Executive Summary	1
Section 2 - Introduction	3
Scope of Work	3
References	4
Section 3- Existing Conditions.....	5
Study Area	5
Roadway Network.....	5
Traffic Volumes	5
Section 4 - Proposed Development.....	9
Development Description	9
Trip Generation	9
Directional Distribution	10
Opening Year Traffic Volumes	10
Horizon Year Traffic Volumes	10
Section 5 - Traffic Analyses	14
Signal Warrant Analysis	14
Turn Lane Analysis	14
Capacity Analysis	17
Section 6 - Conclusions.....	20
Recommendations	20
Section 7 - Statement of Certification.....	21

ATTACHMENTS

ATTACHMENT 1: SITE PLAN

ATTACHMENT 2: DATA COLLECTION

ATTACHMENT 3: TRAFFIC VOLUMES CALCULATIONS

ATTACHMENT 4: 2024 NO-BUILD CAPACITY ANALYSIS SHEETS

ATTACHMENT 5: 2024 BUILD CAPACITY ANALYSIS SHEETS

ATTACHMENT 6: 2034 NO-BUILD CAPACITY ANALYSIS SHEETS

ATTACHMENT 7: 2034 BUILD CAPACITY ANALYSIS SHEETS

ATTACHMENT 8: TURN LANE ANALYSIS CALCULATIONS

ATTACHMENT 9: COMPLETED CNG CASE STUDY

SECTION 1 - EXECUTIVE SUMMARY

A Traffic Impact Study (TIS) was required by Boone County to determine the off-site roadway impacts that the proposed Compressed Natural Gas (CNG) development will have on the adjacent roadway network at the existing The Stephens Golf Center location on Limaburg Road in Burlington, Kentucky.

The proposed CNG development consists of a 17.2-acre Clean Energy CNG fueling station and parking facility, as shown in Figure 1. A conceptual site plan is included in Attachment 1. The proposed development area is currently occupied by The Stephens Golf Center, which consists of a small putting green, parking area, and driving range.



Figure 1: Site Area, Source: Google Earth, N.T.S.

The study area consists of three (3) existing intersections and one (1) proposed driveway intersection. Throughout this submittal and the TIS, the intersections are numerally identified as:

1. Limaburg Road and Conrad Lane
2. Limaburg Road and Timber Lane/Lakeland Park Drive
3. Limaburg Road and Site Drive 1
4. Limaburg Road and Burlington Pike (KY 18)

Based on the results of the traffic analyses, included in Section 5, the following roadway improvements are recommended.

2024 Opening Year Clean Energy CNG Build Improvements

Intersection #4 - Limaburg Road and KY 18

1. After reviewing LOS between the No-Build and Build scenarios for approaches at Intersection 4, additional traffic volumes to and from the proposed development do not substantially degrade the intersection LOS from a Level F. LOS for the AM No-Build and Build Horizon Year scenarios are 145.2 and 144.3 seconds per vehicle, respectively. LOS for the PM No-Build and Build Horizon Year scenarios are 171.6 and 178.0 seconds per vehicle, respectively. Based on the minimal impacts anticipated, there are no recommendations to improve the existing conditions at the intersection.

SECTION 2 - INTRODUCTION

This Traffic Impact Study (TIS) was prepared for the proposed Clean Energy CNG at 5390 Limaburg Road in Burlington, Boone County, Kentucky. The Clean Energy CNG study area consists of three (3) existing intersections along Limaburg Road and KY 18.

The study scenarios included within this TIS are the following:

- 2024 Opening Year No-Build (without CNG traffic)
- 2024 Opening Year CNG Build (with CNG traffic)
- 2034 Horizon Year No-Build (without CNG traffic)
- 2034 Horizon Year CNG Build (with CNG traffic)

The purpose of this document is to evaluate the design traffic conditions along the street network based on the anticipated traffic generated from the proposed development. Clean Energy has retained Woolpert, Inc. to prepare this TIS to evaluate the efficiency of the existing roadway network with the addition of the proposed development.

Scope of Work

The scope of work for this study includes:

1. Prepare trip generation for the planned site based on data and trip generation calculations from a previously completed CNG site case study.
2. Assign generated trips to the network based on existing traffic patterns in the area.
3. A linear growth rate will be calculated from historic counts in the KYTC Traffic Count Database. The growth rate will be utilized to grow background traffic to the Opening Year and Horizon Year.
4. Complete capacity analyses using Synchro at up to three (3) existing intersections and one (1) site access for the studied peak periods for No-Build and Build conditions for Opening Year and Horizon Year conditions.
5. Perform turn lane warrants at site driveway intersections to determine if dedicated turn lanes are warranted at those locations.
6. Perform turn lane queuing analysis to determine if projected queues will conflict with proposed access points and/or existing locations. Queueing analysis shall be completed by utilizing the 95th percentile queue length computed by Synchro. SimTraffic is not anticipated.
7. Determine a list of recommended improvements for Opening and Horizon Year peak hour conditions based on the analytical effort described above.
8. Prepare a Traffic Impact Study that documents the methodology and summarizes the recommendations for the planned site.

References

1. Highway Capacity Manual, 7th Edition, Updated 2022, Transportation Research Board.
2. Synchro 11.
3. Highway Design Guidance Manual, 2022, Commonwealth of Kentucky Transportation Cabinet (KYTC).
4. Traffic Access and Impact Studies for Site Development, Institute of Transportation Engineers' (ITE).
5. Traffic Impact Study Requirements (2023 Policy), 2023, Kentucky Transportation Cabinet (KYTC).
6. Traffic Operations Guidance Manual, 2021, Commonwealth of Kentucky Transportation Cabinet (KYTC).
7. Trip Generation Manual, 11th Edition, Institute of Transportation Engineers' (ITE).
8. Most recent concept plan prepared by Woolpert.

SECTION 3- EXISTING CONDITIONS

Study Area

The CNG Development site is located at 5390 Limaburg Road in Burlington, Boone County, Kentucky, which is currently occupied by The Stephens Golf Center. The CNG Development study area includes three (3) existing intersections and one (1) proposed access point along Limaburg Road and KY 18. The land use in the study area consists primarily of industrial/distribution, commercial, and residential development. The existing and proposed intersections are numerically identified throughout this study and shown in Figure 1 as:

1. Limaburg Road and Conrad Lane
2. Limaburg Road and Timber Lane/Lakeland Park Drive
3. Limaburg Road and Site Drive 1
4. Limaburg Road and Burlington Pike (KY 18)

Roadway Network

Within the study area, KY 18 is a 4-lane urban principal arterial with a posted speed limit of 55 mph. Limaburg Road is a 2-lane urban principal arterial with a posted speed limit of 45 mph. Conrad Lane is an urban minor arterial with a posted speed limit of 35 mph. Lakeland Park Drive is a local access roadway with a posted speed limit of 25 mph. Timber Lane is a local residential roadway with a posted speed limit of 20 mph.

Traffic Volumes

Turning movement counts were conducted by Eggeman Engineering & Consulting, LLC on Wednesday, May 10, 2023, from 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM at the intersections listed above. The turning movement count summary sheets are contained in **Attachment 2**. The AM Peak hour and PM Peak hour occurred between 7:00 and 8:00 AM and 4:00 and 5:00 PM, respectively.

Based on the expected trips for the site and existing roadway network, the study is required to be a Level 1 with 10-year design and low risk design traffic. The turning movement counts were grown to the Opening and Design Years using a linear growth rate of 1%, obtained from KYTC's Traffic Count Reporting System. KYTC guidelines for traffic forecasting state that "Growth rates should utilize a linear growth rate analysis for a 15-year historical period. A minimum of 4 data points should be evaluated." However, since traffic counts fluctuated greatly between 2009 and 2023, a conservative linear growth rate of 1% was assumed. The Existing Year volumes are shown in Figure 2 and the projected Opening Year and Horizon Year No-Build (without CNG traffic) traffic volumes are shown in Figures 3 and 4.

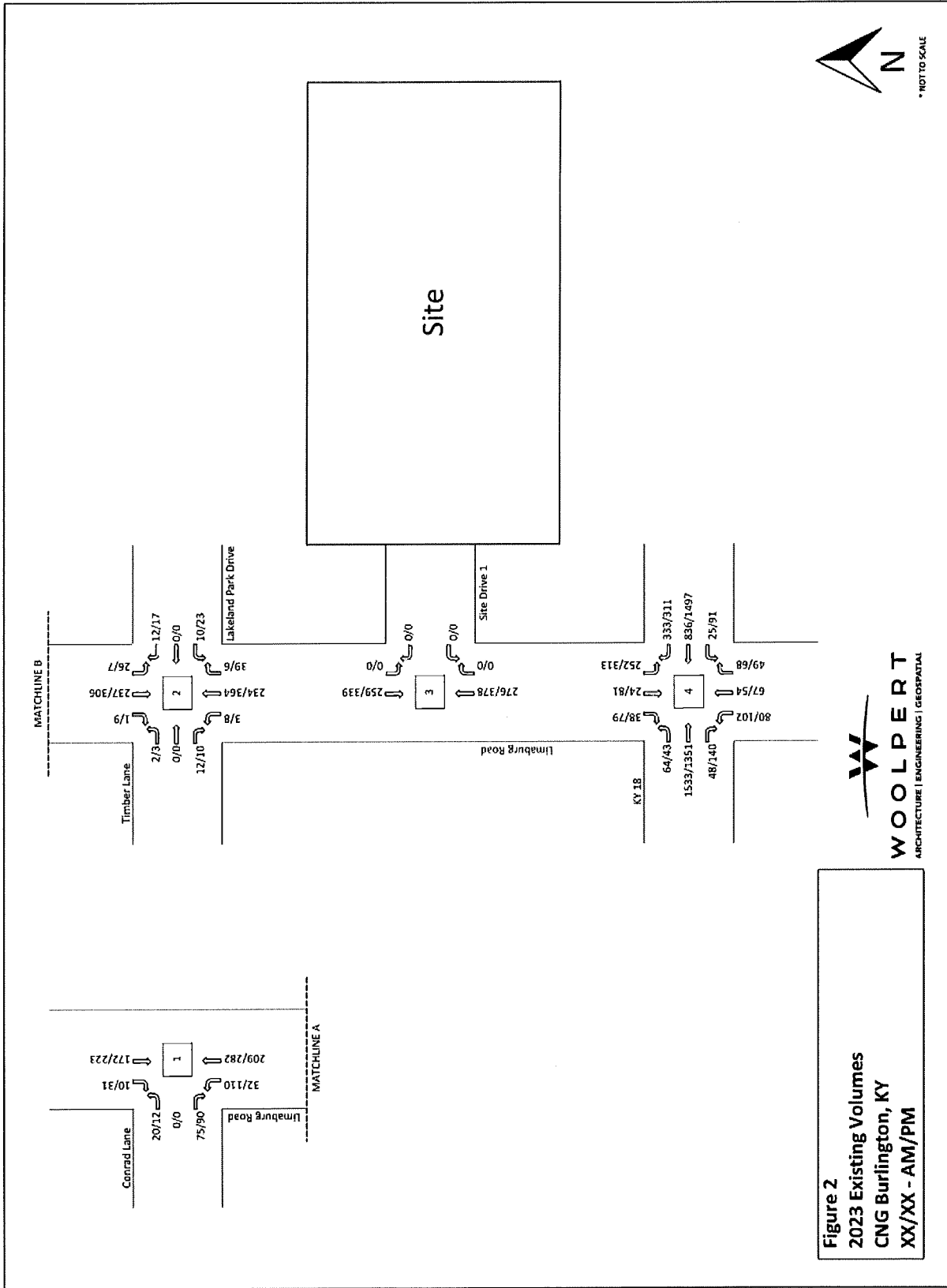
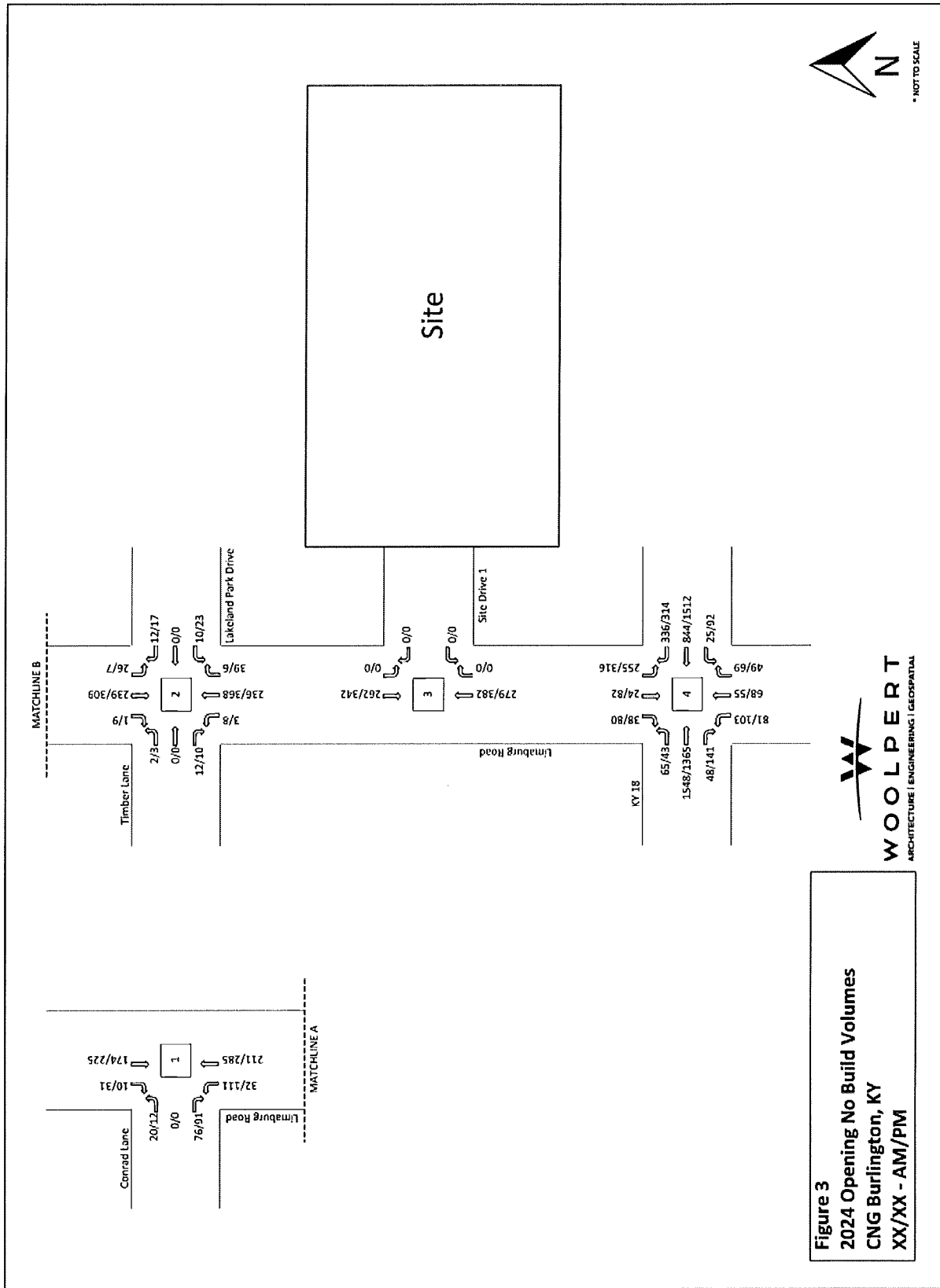
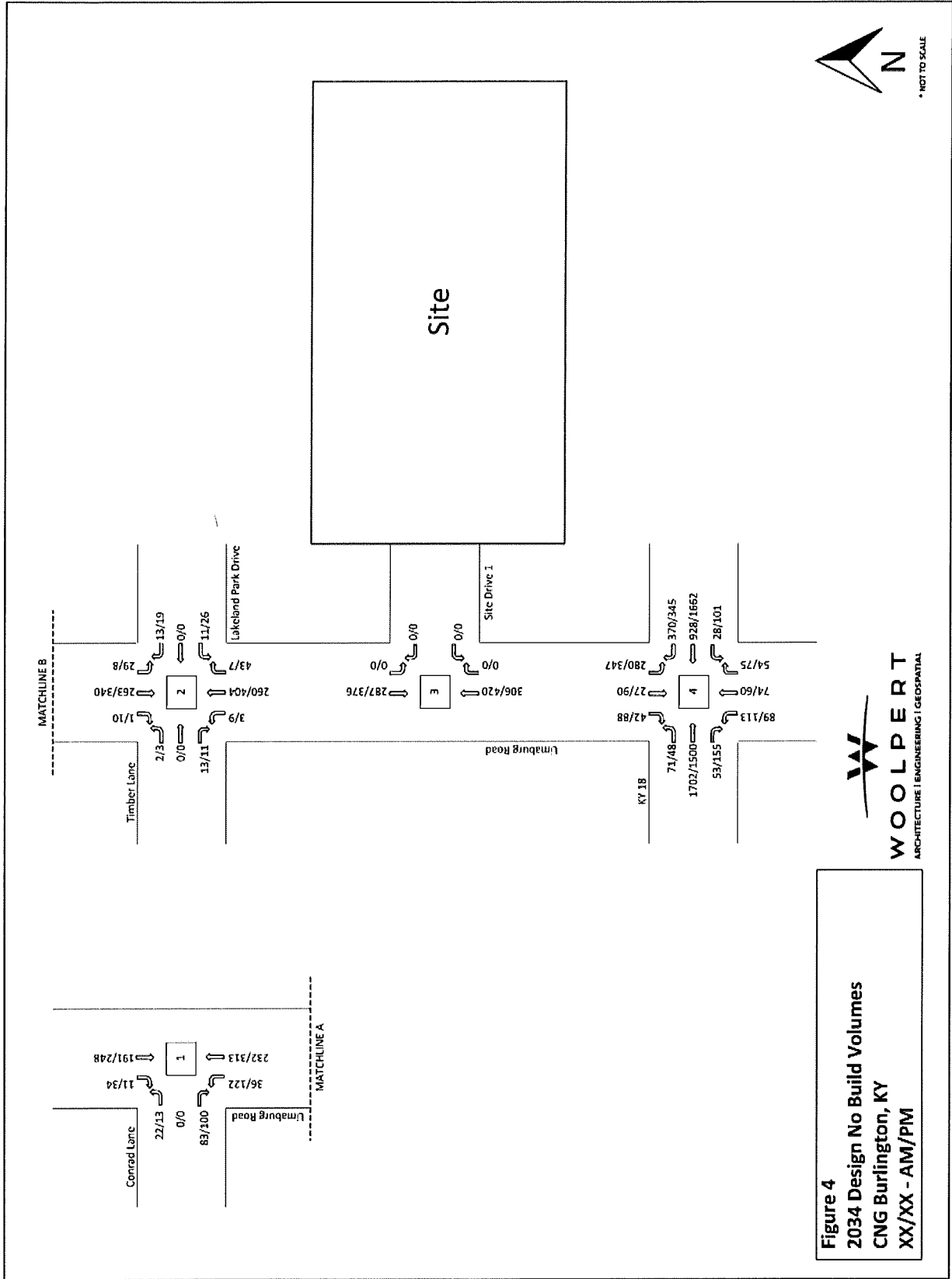


Figure 2
2023 Existing Volumes
CNG Burlington, KY
XX/XX - AM/PM





SECTION 4 - PROPOSED DEVELOPMENT

Development Description

The proposed CNG development consists of a 17.2-acre Clean Energy CNG fueling station and parking facility with 264 timefill and 4 fast-fill stations. The CNG Development study area includes three (3) existing intersections and one (1) proposed access point along Limaburg Road and KY 18. A site plan is included in **Attachment 1** and Figure 5 below.

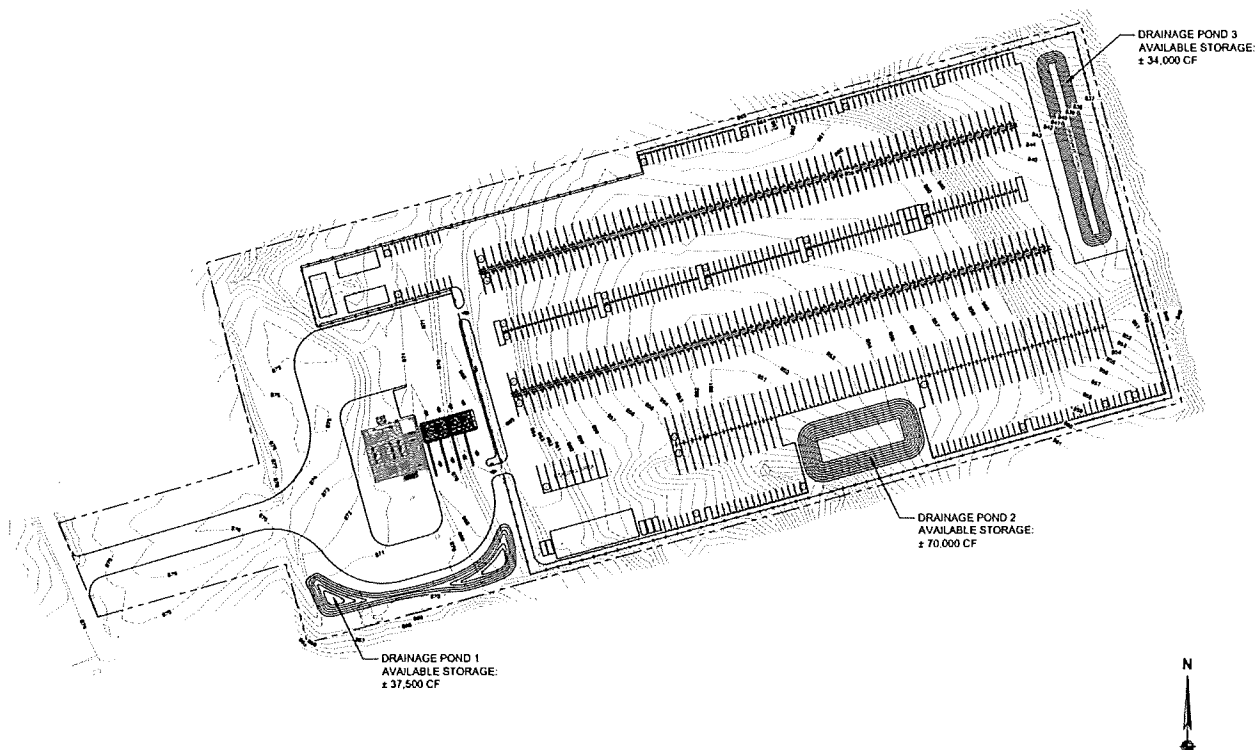


Figure 5. Proposed Preliminary CNG Development Site Plan. N.T.S.

Trip Generation

The ITE Trip Generation Manual, 11th Edition was not used to calculate the anticipated trips generated by the proposed CNG development because the proposed land use was not compatible with any ITE land use code. The trip generation rates for this study were based upon collected trip generation data and calculated rates from a case study with a completed and operational CNG site, which can be found in **Attachment 9**. Time fill and fast-fill fueling stations were combined to create conservative estimates for trip generation rates. The trip generation rates are shown in Table 1, and the trip generation calculations are shown in Table 2.

Table 1. Trip Generation Rates for CNG Sites

Trips per Timefill Space							
Compressed Natural Gas	Daily	AM Peak Hour			PM Peak Hour		
		Total	Entering	Exiting	Total	Entering	Exiting
Passenger Trips	1.50	0.12	0.06	0.06	0.12	0.10	0.02
Truck Cabs Trips	1.63	0.10	0.06	0.04	0.15	0.02	0.13
Total Trips	3.13	0.22	0.12	0.10	0.27	0.12	0.15

Table 2. Trip Generation

Compressed Natural Gas (No Pass-By Reduction)	Size	Unit	AM Peak Hour			PM Peak Hour		
			Total	Entering	Exiting	Total	Entering	Exiting
			Passenger Cars	268	Fueling Stations	32	16	16
Truck Cabs	27	16	11			40	5	35
Total Trips			59	32	27	72	32	40

Directional Distribution

The proposed directional distribution is based on the collected turning movement counts on the existing roadway network and anticipated truck cab movements to warehouses located northwest of the CNG site. Table 3 below shows the distribution of traffic expected to approach and depart from the CNG site.

Table 3. Passenger Car Directional Distribution

Route	Approach/Departure
	Primary Trip Distribution
From/To the NORTH Limaburg Road	10%
From/To the EAST KY 18	50%
From/To the WEST KY 18	40%
Total	100%

Table 4. Truck Cab Directional Distribution

Route	Approach/Departure
	Primary Trip Distribution
From/To the NORTH Limaburg Road	100%

Based on the directional distribution shown in Table 3 and 4, the proposed development’s trip generation shown in Table 2 were distributed to the adjacent roadway network. The proposed development’s generated trips are illustrated in Figure 6.

Opening Year Traffic Volumes

The proposed CNG development’s generated trips shown in Figures 6 were added to the 2024 Opening Year No-Build traffic volumes in Figure 3 to develop the 2024 Opening Year CNG Build traffic volumes shown in Figure 7.

Design Year Traffic Volumes

The proposed CNG development’s generated trips shown in Figures 6 were added to the 2034 Design Year No-Build traffic volumes in Figure 4 to develop the 2034 Design Year CNG Build traffic volumes shown in Figure 8. The traffic volume calculations are included in Attachment 3.

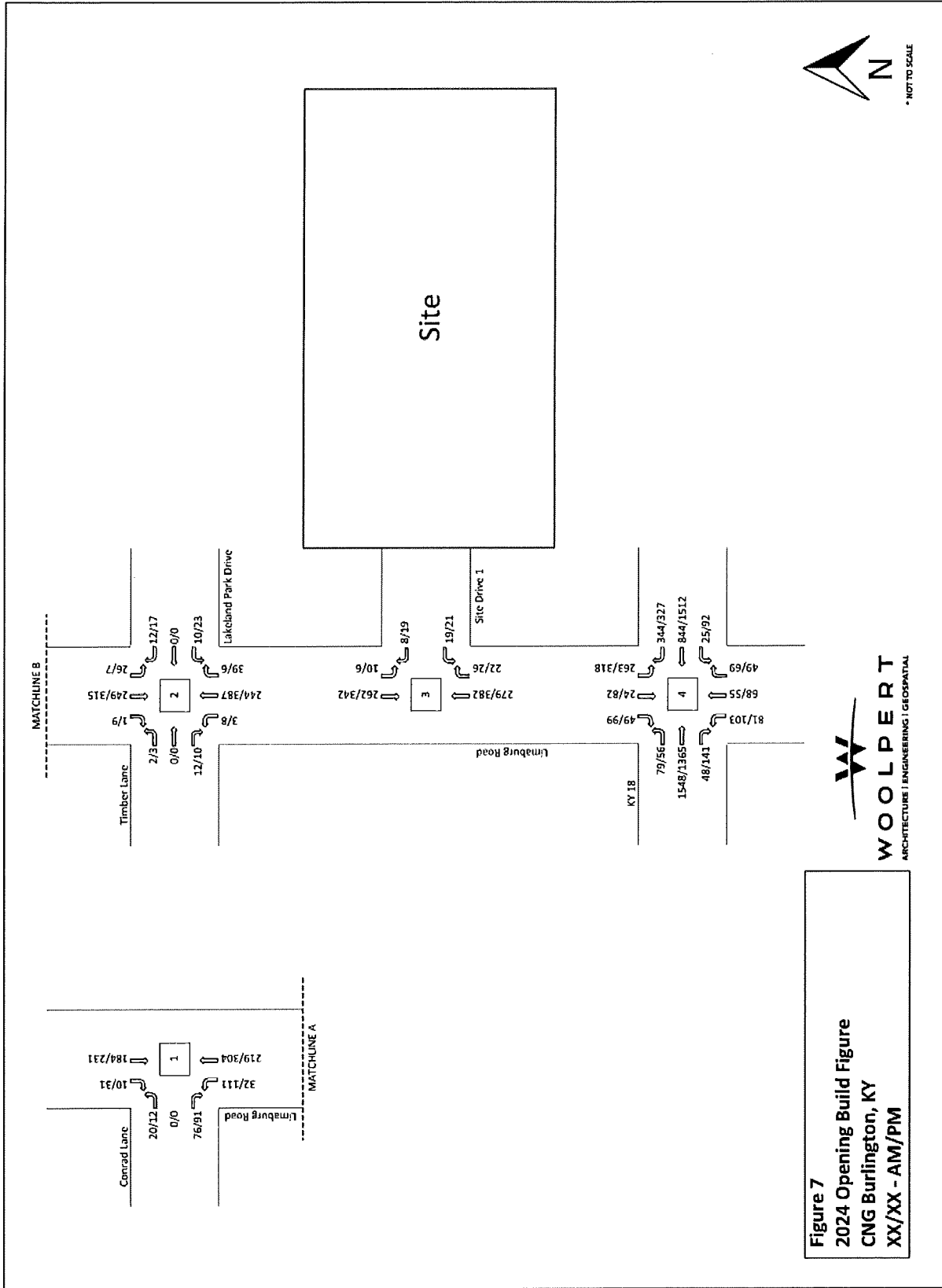
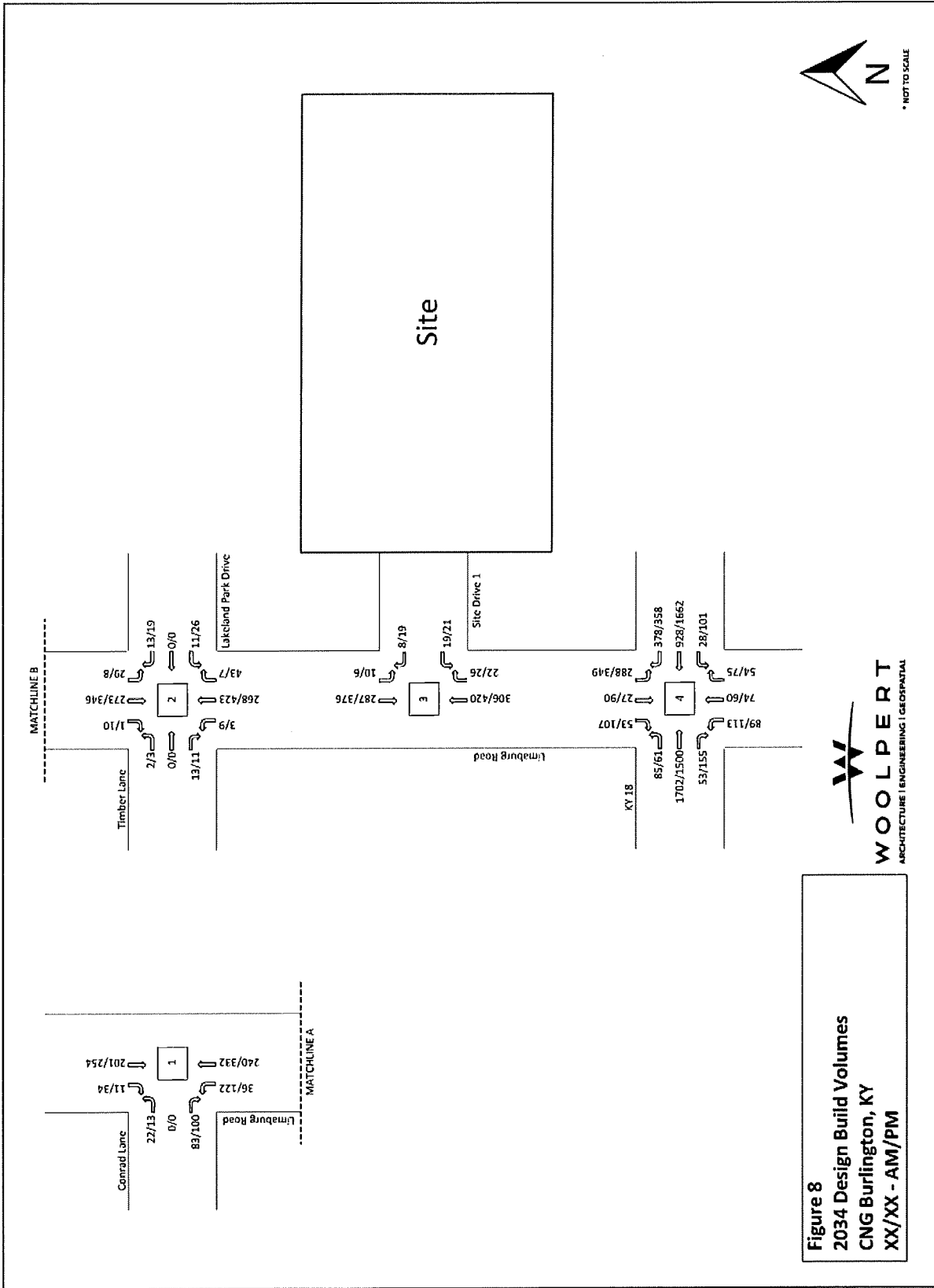


Figure 7
2024 Opening Build Figure
CNG Burlington, KY
XX/XX - AM/PM





SECTION 4 - TRAFFIC ANALYSES

Turn Lane Analysis

Turn lane warrant analysis was completed at the unsignalized site access points according to the KYTC Highway Design Guidance Manual. The results indicate that a southbound left turn lane at Intersection 3 is not warranted. A northbound right turn lane at Intersection 3 is also not warranted.

Turn lane warrants were completed using Horizon Build volumes and are included in **Attachment 8**. Storage turn lane lengths were determined by the Warrant Calcs Tool provided by KYTC, which uses guidance provided in the Auxiliary Turn Lane Policy outlined in the KYTC Highway Design Manual. The 95th percentile queue is the queue length that has only a 5-percent probability of being exceeded during the analysis time period.

Movement	Existing Turn Lane Length (Ft.)	Table 5: AM Peak Hour Turn Lane and Queueing Analysis								
		Opening Year (2024)				Horizon Year (2034)				
		No Build		Build		No Build		Build		Recommended Length (Ft.) NC = No Change
		KYTC Calculated Length (Ft.)	Synchro 95th %tile Queue Length (Ft.)	KYTC Calculated Length (Ft.)	Synchro 95th %tile Queue Length (Ft.)	KYTC Calculated Length (Ft.)	Synchro 95th %tile Queue Length (Ft.)	KYTC Calculated Length (Ft.)	Synchro 95th %tile Queue Length (Ft.)	
1. Limaburg Road and Conrad Lane										
EBLR	-	-	15	-	15	-	18	-	18	-
NBTL	-	-	3	-	3	-	5	-	5	-
SBTR	-	-	-	-	-	-	-	-	-	-
2. Limaburg Road and Timber Lane/Lakeland Park Drive										
EBLTR	-	-	3	-	3	-	3	-	3	-
WBLTR	-	-	10	-	10	-	13	-	13	-
NBL	150	190	0	190	0	190	0	190	0	NC
NBT	-	-	-	-	-	-	-	-	-	-
NBR	190	190	-	190	-	190	-	190	-	NC
SBL	300	190	5	190	5	190	5	190	5	NC
SBTR	-	-	-	-	-	-	-	-	-	-
3. Limaburg Road and Site Drive 1										
WBL	300			125	3			125	5	NC
WBR	300			125	0			125	0	NC
NBTR	-			-	-			-	-	-
SBTL	-			-	0			-	0	-
4. Limaburg Road and KY 18										
EBL	380	320	265	345	220	345	293	345	253	NC
EBT	-	-	1823	-	1790	-	2265	-	2265	-
EBR	375	295	63	295	63	320	68	320	68	NC
WBL	345	295	88	295	90	295	103	295	103	NC
WBT	-	-	533	-	565	-	605	-	653	-
WBR	345	770	440	795	483	845	500	845	558	NC
NBL	120	345	195	345	198	370	213	370	213	NC
NBTL	-	-	200	-	200	-	215	-	215	-
NBR	120	295	123	295	123	320	135	320	135	NC
SBL	175	645	230	670	238	695	250	695	258	NC
SBTL	-	-	0	-	0	-	0	-	0	-
SBR	175	295	63	295	83	295	68	320	88	NC

Movement		Table 6: PM Peak Hour Turn Lane and Queuing Analysis								
		Opening Year (2024)				Horizon Year (2034)				
		No Build		Build		No Build		Build		Recommended Length (Ft.) NC = No Change
		KYTC Calculated Length (Ft.)	Synchro 95th %tile Queue Length (Ft.)	KYTC Calculated Length (Ft.)	Synchro 95th %tile Queue Length (Ft.)	KYTC Calculated Length (Ft.)	Synchro 95th %tile Queue Length (Ft.)	KYTC Calculated Length (Ft.)	Synchro 95th %tile Queue Length (Ft.)	
1. Limaburg Road and Conrad Lane										
EBLR	-	-	23	-	23	-	28	-	28	-
NBTL	-	-	10	-	10	-	10	-	10	-
SBTR	-	-	-	-	-	-	-	-	-	-
2. Limaburg Road and Timber Lane/Lakeland Park Drive										
EBLTR	-	-	5	-	5	-	5	-	5	-
WBLTR	-	-	28	-	28	-	38	-	40	-
NBL	150	190	0	190	0	190	0	190	0	NC
NBT	-	-	-	-	-	-	-	-	-	-
NBR	190	190	-	190	-	190	-	190	-	NC
SBL	300	190	3	190	3	190	3	190	3	NC
SBTR	-	-	-	-	-	-	-	-	-	-
3. Limaburg Road and Site Drive 1										
WBL	300			125	5			125	5	NC
WBR	300			125	3			125	3	NC
NBTR	-			-	-			-	-	-
SBTL	-			-	0			-	0	-
4. Limaburg Road and KY 18										
EBL	380	295	163	320	273	295	235	320	308	NC
EBT	-	-	1278	-	1428	-	1718	-	1795	-
EBR	375	445	170	445	178	470	193	470	195	NC
WBL	345	370	345	370	303	395	393	395	343	NC
WBT	-	-	1783	-	1850	-	2253	-	2283	-
WBR	345	745	473	770	513	795	548	820	583	NC
NBL	120	395	205	395	198	420	215	420	215	NC
NBTL	-	-	228	-	218	-	238	-	238	-
NBR	120	345	220	345	208	345	225	345	225	NC
SBL	175	745	308	745	313	795	340	795	343	NC
SBTL	-	-	373	-	378	-	415	-	415	-
SBR	175	345	138	395	175	370	155	395	190	NC

Capacity

Capacity of an intersection is quantified by the Level of Service (LOS), which is based upon the average amount of delay a vehicle experiences while at a particular intersection. The criterion for both signalized and unsignalized intersections is shown in Tables 7 and 8, respectively, and described within the Highway Capacity Manual (HCM 7).

Table 7. Signalized Intersection LOS Criteria

Level of Service	Control Delay (seconds/vehicle)
<i>A</i>	<i>0-10</i>
<i>B</i>	<i>>10-20</i>
<i>C</i>	<i>>20-35</i>
<i>D</i>	<i>>35-55</i>
<i>E</i>	<i>>55-80</i>
<i>F</i>	<i>>80</i>

Table 8. Unsignalized Intersection LOS Criteria

Level of Service	Control Delay (seconds/vehicle)
<i>A</i>	<i><10</i>
<i>B</i>	<i>>10-15</i>
<i>C</i>	<i>>15-25</i>
<i>D</i>	<i>>25-35</i>
<i>E</i>	<i>>35-50</i>
<i>F</i>	<i>>50</i>

Capacity analyses were performed for the four (4) studied intersections within the study area during the AM and PM peak hours for all studied traffic scenarios utilizing the corresponding traffic volumes from the previous Volume Submittal. The HCS capacity analysis summary sheets are contained in the following attachments: 2024 No-Build Capacity Analysis Sheets (**Attachment 4**), 2024 Build Capacity Analysis Sheets (**Attachment 5**), 2034 No-Build Capacity Analysis Sheets (**Attachment 6**), 2034 Build Capacity Analysis Sheets (**Attachment 7**).

Direction	Approach	Table 9: AM Peak Hour Capacity Analysis			
		Opening Year (2024)		Horizon Year (2034)	
		No Build	Build	No Build	Build
1. Limaburg Road and Conrad Lane					
Conrad Lane	EB	11.1-B	11.2-B	11.5-B	11.7-B
Limaburg Road	NB	1.6-A	1.6-A	1.6-A	1.6-A
	SB	0.0-A	0.0-A	0.0-A	0.0-A
Intersection Total		2.8-A	2.7-A	2.8-A	2.8-A
2. Limaburg Road and Timber Lane/Lakeland Park Drive					
Timber Lane	EB	11.6-B	11.8-B	12.1-B	12.3-B
Lakeland Park Drive	WB	14.6-B	14.9-B	15.9-C	16.2-C
Limaburg Road	NB	0.2-A	0.2-A	0.2-A	0.2-A
	SB	1.3-A	1.2-A	1.3-A	1.3-A
Intersection Total		1.9-A	1.8-A	1.9-A	1.9-A
3. Limaburg Road and Site Drive 1					
Site Drive 1	WB		12.5-C		13.0-C
Limaburg Road	NB		0.0-A		0.0-A
	SB		0.1-A		0.3-A
Intersection Total			0.7-A		0.7-A
4. Limaburg Road and KY 18					
KY 18	EB	191.6-F	176.2-F	247.1-F	239.3-F
	WB	46.5-D	52.1-D	50.1-D	58.9-D
Limaburg Road	NB	72.0-E	73.0-E	74.0-E	74.0-E
	SB	42.9-D	43.8-D	43.7-D	43.8-D
Intersection Total		117.4-F	111.8-F	145.2-F	144.3-F

Direction	Approach	Table 10: PM Peak Hour Capacity Analysis			
		Opening Year (2024)		Horizon Year (2034)	
		No Build	Build	No Build	Build
1. Limaburg Road and Conrad Lane					
Conrad Lane	EB	13.1-B	13.4-B	14.2-B	14.5-B
Limaburg Road	NB	2.3-A	2.2-A	2.4-A	2.3-A
	SB	0.0-A	0.0-A	0.0-A	0.0-A
Intersection Total		3.0-A	2.9-A	3.2-A	3.1-A
2. Limaburg Road and Timber Lane/Lakeland Park Drive					
Timber Lane	EB	13.3-B	13.5-B	14.0-B	14.3-B
Lakeland Park Drive	WB	20.2-C	21.1-C	24.3-C	25.5-C
Limaburg Road	NB	0.3-A	0.3-A	0.3-A	0.3-A
	SB	0.4-A	0.4-A	0.4-A	0.4-B
Intersection Total		2.6-A	2.6-A	3.0-A	3.1-A
3. Limaburg Road and Site Drive 1					
Site Drive 1	WB		13.7-C		14.6-C
Limaburg Road	NB		0.0-A		0.0-A
	SB		0.1-A		0.1-A
Intersection Total			0.7-A		0.7-A
4. Limaburg Road and KY 18					
KY 18	EB	110.2-F	143.1-F	170.1-F	189.3-F
	WB	169.5-F	175.9-F	223.2-F	223.5-F
Limaburg Road	NB	84.6-F	76.2-E	79.2-E	78.9-E
	SB	46.1-D	46.7-D	48.1-D	48.0-D
Intersection Total		126.5-F	140.1-F	171.6-F	178.0-F

SECTION 5 - CONCLUSIONS

Recommendations

2024 Opening Year Clean Energy CNG Build Improvements

Intersection #4 - Limaburg Road and KY 18

1. After reviewing LOS between the No-Build and Build scenarios for approaches at Intersection 4, additional traffic volumes to and from the proposed development do not substantially degrade the intersection LOS from a Level F. LOS for the AM No-Build and Build Horizon Year scenarios are 145.2 and 144.3 seconds per vehicle, respectively. LOS for the PM No-Build and Build Horizon Year scenarios are 171.6 and 178.0 seconds per vehicle, respectively. Based on the minimal impacts anticipated, there are no recommendations to improve the existing conditions at the intersection.

SECTION 6 - STATEMENT OF CERTIFICATION

I certify that this TRAFFIC IMPACT STUDY has been prepared by myself or under my immediate supervision and that I have experience and training in the field of traffic and transportation engineering.

X



Mike Timko, PE
Kentucky PE #26236
Woolpert, Inc.



Attachment 1

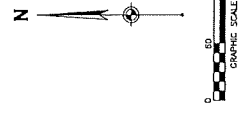
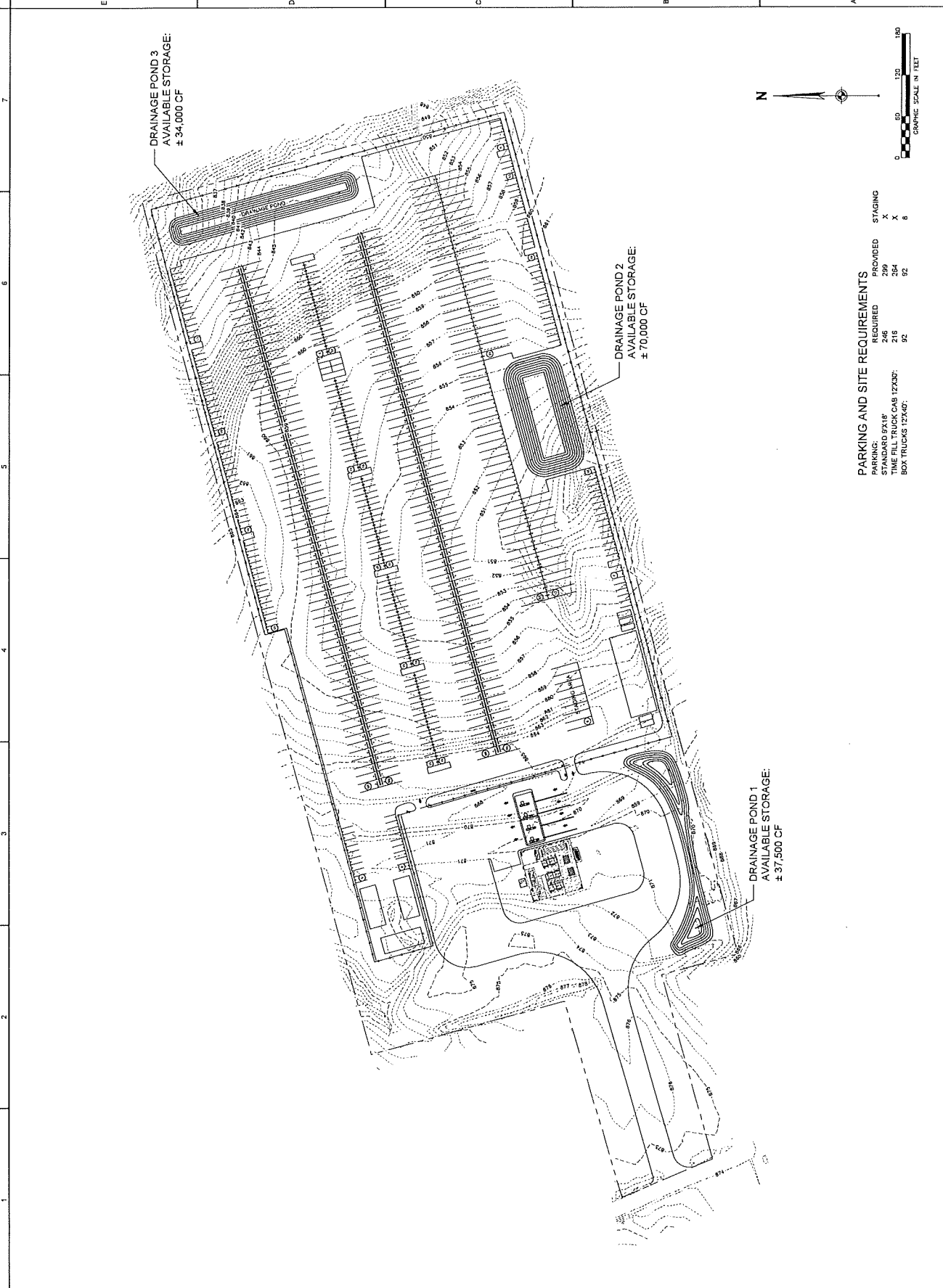
Site Plan

CNG Fueling Station

PROJECT NO: 19015381
 DATE ISSUED: 05/27/2023
 DESIGNED BY: [Signature]
 DRAWN BY: [Signature]
 CHECKED BY: [Signature]

SHEET NAME:
**PRELIMINARY SITE
 PLAN EXHIBIT**

SHEET NO:
C-000



PARKING AND SITE REQUIREMENTS

PARKING:	REQUIRED	PROVIDED	STAGING
STANDARD P&T	246	299	X
TIME HILL TRUCK C&S 12'X30'	218	254	X
BOX TRUCKS 12'X40'	92	92	6

Attachment 2

Data Collection

Study Name Limaburg-Conrad

Start Date 05/10/2023

Start Time 7:00 AM

Site Code 1

Project Woolpert 2023

**Type Road
Classification Lights**

Start Time	Limaburg Rd. Southbound			n/a Westbound			Limaburg Rd. Northbound			Conrad Ln. Eastbound			
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	U-Turn
7:00 AM	1	35	0	0	0	0	39	7	0	14	6	0	0
7:15 AM	2	39	0	0	0	0	49	2	0	22	6	0	0
7:30 AM	2	44	0	0	0	0	43	7	0	15	4	0	0
7:45 AM	0	35	0	0	0	0	46	15	0	22	3	0	0
8:00 AM	0	26	0	0	0	0	40	7	0	10	4	0	0
8:15 AM	3	33	0	0	0	0	35	2	0	10	2	0	0
8:30 AM	1	28	0	0	0	0	37	9	0	8	3	0	0
8:45 AM	4	23	0	0	0	0	24	11	0	11	3	0	0
4:00 PM	10	49	0	0	0	0	81	29	0	17	1	0	0
4:15 PM	4	47	0	0	0	0	58	20	0	27	3	0	0
4:30 PM	6	61	0	0	0	0	57	25	0	24	3	0	0
4:45 PM	8	45	0	0	0	0	70	32	0	18	2	0	0
5:00 PM	2	61	0	0	0	0	50	38	0	16	2	0	0
5:15 PM	7	62	0	0	0	0	54	19	0	12	2	0	0
5:30 PM	6	52	0	0	0	0	56	20	0	21	2	0	0
5:45 PM	2	39	0	0	0	0	64	19	0	24	0	0	0

Study Name Limaburg-Conrad
Start Date 05/10/2023
Start Time 7:00 AM
Site Code 1
Project Woolpert 2023

Type Road Classification Trucks

Start Time	Limaburg Rd. Southbound			n/a Westbound			Limaburg Rd. Northbound			Conrad Ln. Eastbound			
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	U-Turn
7:00 AM	0	2	0	0	0	0	6	0	0	0	0	0	0
7:15 AM	1	10	0	0	0	0	3	0	0	0	0	0	0
7:30 AM	3	4	0	0	0	0	11	1	0	2	1	0	0
7:45 AM	1	3	0	0	0	0	11	0	0	0	0	0	0
8:00 AM	3	1	0	0	0	0	6	1	0	0	0	0	0
8:15 AM	0	4	0	0	0	0	4	1	0	0	1	0	0
8:30 AM	2	4	0	0	0	0	5	0	0	0	2	0	0
8:45 AM	1	5	0	0	0	0	3	0	0	0	0	1	0
4:00 PM	0	4	0	0	0	0	5	0	0	0	1	0	0
4:15 PM	2	2	0	0	0	0	0	2	0	1	0	0	0
4:30 PM	0	12	0	0	0	0	6	1	0	1	1	0	0
4:45 PM	1	3	0	0	0	0	5	0	0	1	1	0	0
5:00 PM	1	2	0	0	0	0	0	1	0	0	0	0	0
5:15 PM	0	4	0	0	0	0	1	0	0	0	0	0	0
5:30 PM	0	4	0	0	0	0	2	0	0	0	0	0	0
5:45 PM	0	4	0	0	0	0	1	1	1	0	1	0	0

Study Name Limaburg-Conrad
Start Date 05/10/2023
Start Time 7:00 AM
Site Code 1
Project Woolpert 2023

**Type Crosswalk
Classification Pedestrians**

Start Time	Limaburg Rd. Southbound			n/a Westbound			Limaburg Rd. Northbound			Conrad Ln. Eastbound		
	Peds CW	CCW	Combin	Peds SB	NB	Combin	Peds CW	CCW	Combin	Peds CW	CCW	Combin
7:00 AM	0	0	0				0	0	0	0	0	0
7:15 AM	0	0	0				0	0	0	0	0	0
7:30 AM	0	0	0				0	0	0	0	0	0
7:45 AM	0	0	0				0	0	0	0	0	0
8:00 AM	0	0	0				0	0	0	0	0	0
8:15 AM	0	0	0				0	0	0	0	0	0
8:30 AM	0	0	0				0	0	0	0	0	0
8:45 AM	0	0	0				0	0	0	0	0	0
4:00 PM	0	0	0				0	0	0	0	0	0
4:15 PM	0	0	0				0	0	0	0	0	0
4:30 PM	0	0	0				0	0	0	0	0	0
4:45 PM	0	0	0				0	0	0	0	0	0
5:00 PM	0	0	0				0	0	0	0	0	0
5:15 PM	0	0	0				0	0	0	0	0	0
5:30 PM	0	0	0				0	0	0	0	0	0
5:45 PM	0	0	0				0	0	0	0	0	0

Study Name Limaburg-Conrad
Start Date 05/10/2023
Start Time 7:00 AM
Site Code 1
Project Woolpert 2023

Type Road Classification Totals

Start Time	Limaburg Rd. Southbound			n/a Westbound			Limaburg Rd. Northbound			Conrad Ln. Eastbound			
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	U-Turn
7:00 AM	1	37	0	0	0	0	45	7	0	14	6	0	0
7:15 AM	3	49	0	0	0	0	52	2	0	22	6	0	0
7:30 AM	5	48	0	0	0	0	54	8	0	17	5	0	0
7:45 AM	1	38	0	0	0	0	58	15	0	22	3	0	0
8:00 AM	3	28	0	0	0	0	48	8	0	10	5	0	0
8:15 AM	3	37	0	0	0	0	40	4	0	10	3	0	0
8:30 AM	3	32	0	0	0	0	42	9	0	8	5	0	0
8:45 AM	5	28	0	0	0	0	27	11	0	11	4	0	0
4:00 PM	10	53	0	0	0	0	86	29	0	18	2	0	0
4:15 PM	6	49	0	0	0	0	58	22	0	28	3	0	0
4:30 PM	6	73	0	0	0	0	63	26	0	25	4	0	0
4:45 PM	9	48	0	0	0	0	75	33	0	19	3	0	0
5:00 PM	3	63	0	0	0	0	50	40	0	16	2	0	0
5:15 PM	7	66	0	0	0	0	55	19	0	12	2	0	0
5:30 PM	6	56	0	0	0	0	58	20	0	21	2	0	0
5:45 PM	2	43	0	0	0	0	65	20	0	25	0	0	0

Study Name Limaburg-Timber

Start Date 05/10/2023

Start Time 7:00 AM

Site Code 2

Project Woolpert 2023

**Type Road
Classification Lights**

Start Time	Limaburg Rd. Southbound			Lakeland Pk Dr. Westbound			Limaburg Rd. Northbound			Timber Ln. Eastbound			
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	U-Turn
7:00 AM	1	47	5	0	0	1	17	48	0	0	3	0	0
7:15 AM	0	58	5	0	1	1	8	46	1	0	3	0	1
7:30 AM	0	70	2	0	1	3	4	55	2	0	2	0	0
7:45 AM	0	50	4	0	4	1	4	61	0	0	3	0	1
8:00 AM	1	32	1	0	2	0	3	45	0	0	2	0	0
8:15 AM	3	50	0	0	0	2	5	38	0	0	0	0	1
8:30 AM	1	39	2	0	1	0	3	41	0	0	0	0	1
8:45 AM	1	35	0	0	0	5	6	34	0	0	2	0	0
4:00 PM	3	76	1	0	2	0	1	102	4	0	2	0	2
4:15 PM	3	67	0	0	3	2	0	76	1	0	5	0	1
4:30 PM	1	78	0	0	7	14	2	78	1	0	1	0	0
4:45 PM	1	67	0	0	1	3	0	99	2	0	1	0	0
5:00 PM	1	76	0	0	3	6	0	84	1	0	2	0	1
5:15 PM	0	75	0	0	0	1	0	72	0	0	0	0	0
5:30 PM	0	67	0	0	1	0	2	81	3	0	1	0	0
5:45 PM	0	61	1	0	1	9	0	86	1	0	1	0	1

Study Name Limaburg-Timber
Start Date 05/10/2023
Start Time 7:00 AM
Site Code 2
Project Woolpert 2023

Type Road Classification Trucks

Start Time	Limaburg Rd. Southbound			Lakeland Pk Dr. Westbound			Limaburg Rd. Northbound			Timber Ln. Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
7:00 AM	0	0	0	0	0	0	2	5	0	0	0	0
7:15 AM	0	4	8	0	1	0	1	5	0	0	0	0
7:30 AM	0	5	1	0	2	0	3	5	0	0	0	0
7:45 AM	0	3	1	0	3	0	0	7	0	0	0	0
8:00 AM	0	0	1	0	1	0	3	5	0	0	0	0
8:15 AM	0	2	0	0	1	0	1	4	0	0	0	0
8:30 AM	0	3	0	0	0	0	4	2	0	0	0	0
8:45 AM	0	3	0	0	0	0	2	5	0	0	0	0
4:00 PM	0	4	2	0	0	1	1	4	0	0	0	0
4:15 PM	0	2	0	0	1	0	0	1	0	0	0	0
4:30 PM	0	6	4	0	1	0	0	3	0	0	0	0
4:45 PM	0	4	0	0	2	0	2	1	0	0	0	0
5:00 PM	0	0	1	0	0	1	0	1	0	0	0	0
5:15 PM	0	2	2	0	0	1	4	1	0	0	0	0
5:30 PM	0	1	2	0	0	0	0	1	0	0	0	0
5:45 PM	0	4	1	0	1	0	0	0	0	0	0	0

Study Name Limaburg-Timber
Start Date 05/10/2023
Start Time 7:00 AM
Site Code 2
Project Woolpert 2023

Type Road Classification Totals

Start Time	Limaburg Rd. Southbound			Lakeland Pk Dr. Westbound			Limaburg Rd. Northbound			Timber Ln. Eastbound							
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	U-Turn				
7:00 AM	1	47	5	0	0	0	1	0	0	19	53	0	0	4	0	0	0
7:15 AM	0	62	13	0	2	0	2	0	9	51	1	0	0	3	0	1	0
7:30 AM	0	75	3	0	3	0	5	0	7	60	2	0	0	2	0	0	0
7:45 AM	0	53	5	0	7	0	2	0	4	70	0	0	0	3	0	1	0
8:00 AM	2	33	2	0	3	0	1	0	6	53	0	0	0	3	0	0	0
8:15 AM	3	52	0	0	1	0	2	0	6	43	0	0	0	0	0	1	0
8:30 AM	1	42	2	0	1	0	0	0	7	43	0	0	0	0	0	1	0
8:45 AM	1	38	0	0	0	0	5	0	8	39	0	0	0	2	0	0	0
4:00 PM	4	82	3	0	2	0	0	0	2	106	4	0	0	3	0	2	0
4:15 PM	3	69	0	0	4	0	3	0	0	77	1	0	0	5	0	1	0
4:30 PM	1	84	4	0	8	0	14	0	2	81	1	0	0	1	0	0	0
4:45 PM	1	71	0	0	3	0	3	0	2	100	2	0	0	1	0	0	0
5:00 PM	1	76	1	0	3	0	7	0	0	86	1	0	0	2	0	1	0
5:15 PM	0	77	2	0	0	0	2	0	4	73	0	0	0	0	0	0	0
5:30 PM	0	68	2	0	1	0	0	0	2	82	3	0	0	1	0	0	0
5:45 PM	0	65	2	0	2	0	9	0	0	86	1	0	0	1	0	1	0

Study Name KY 18-Limaburg

Start Date 05/10/2023

Start Time 7:00 AM

Site Code 3

Project Woolpert 2023

**Type Road
Classification Lights**

Start Time	Limaburg Rd. Southbound			Burlington Pike Westbound			Limaburg Rd. Northbound			Burlington Pike Eastbound						
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	U-Turn			
7:00 AM	7	2	44	0	84	167	3	0	10	23	12	0	9	335	12	0
7:15 AM	6	2	61	0	70	199	2	0	11	12	28	0	12	370	16	0
7:30 AM	9	12	63	0	74	216	8	0	11	14	14	0	8	409	9	0
7:45 AM	6	6	46	0	77	210	11	0	16	16	24	0	13	371	19	0
8:00 AM	15	6	38	0	40	166	4	0	18	14	12	0	10	266	6	0
8:15 AM	9	4	47	0	52	207	4	0	12	4	20	0	6	339	9	0
8:30 AM	12	5	41	0	42	187	10	0	14	8	21	0	12	336	12	0
8:45 AM	12	4	47	0	37	135	10	0	15	5	13	0	8	320	10	0
4:00 PM	25	25	89	0	67	346	23	1	26	10	32	0	34	302	10	0
4:15 PM	20	18	54	0	60	390	21	0	9	11	19	0	33	361	5	0
4:30 PM	19	14	65	0	95	388	27	0	15	15	22	0	37	323	9	1
4:45 PM	12	23	92	0	70	320	19	1	16	17	23	0	33	322	16	0
5:00 PM	23	15	92	0	60	330	16	1	13	13	22	0	22	288	14	0
5:15 PM	22	24	61	0	55	364	24	1	20	9	24	0	28	301	3	0
5:30 PM	16	17	69	0	97	405	26	0	16	15	28	0	23	273	7	1
5:45 PM	21	11	59	0	76	414	27	1	15	16	23	0	32	254	2	0

Study Name KY 18-Limaburg
Start Date 05/10/2023
Start Time 7:00 AM
Site Code 3
Project Woolpert 2023

Type Road
Classification Trucks

Start Time	Limaburg Rd. Southbound			Burlington Pike Westbound			Limaburg Rd. Northbound			Burlington Pike Eastbound				
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	U-Turn	
7:00 AM	1	0	4	7	0	0	0	0	0	0	1	10	4	0
7:15 AM	6	0	12	7	0	0	0	0	0	0	0	5	1	0
7:30 AM	1	1	15	7	0	1	0	0	0	0	0	9	1	0
7:45 AM	1	1	7	5	0	0	1	0	0	0	0	12	2	0
8:00 AM	2	0	6	12	0	0	0	0	0	0	0	11	2	0
8:15 AM	2	0	7	5	0	0	2	1	0	0	1	6	2	0
8:30 AM	0	0	6	3	0	0	0	0	1	0	0	4	2	0
8:45 AM	0	1	10	7	0	0	0	0	0	0	0	7	1	0
4:00 PM	1	0	2	6	0	0	0	0	0	0	0	12	1	0
4:15 PM	0	1	2	5	0	1	0	0	0	0	0	8	0	0
4:30 PM	0	0	6	3	0	0	0	1	0	0	0	9	0	0
4:45 PM	1	0	2	5	0	0	0	0	0	0	0	9	2	0
5:00 PM	0	0	1	6	0	0	0	0	0	0	0	7	1	0
5:15 PM	0	0	1	9	0	0	0	0	0	0	0	4	1	0
5:30 PM	1	0	0	3	0	0	0	0	0	0	0	3	0	0
5:45 PM	0	0	3	4	0	0	0	0	0	0	0	3	1	0

Study Name KY 18-Limaburg
Start Date 05/10/2023
Start Time 7:00 AM
Site Code 3
Project Woolpert 2023

Type Road Classification Totals

Start Time	Limaburg Rd. Southbound			Burlington Pike Westbound			Limaburg Rd. Northbound			Burlington Pike Eastbound			
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	U-Turn
7:00 AM	9	2	48	0	0	3	10	24	12	13	349	16	0
7:15 AM	12	2	73	0	0	2	11	12	28	13	379	17	0
7:30 AM	10	13	78	0	0	9	11	14	15	8	421	10	0
7:45 AM	7	7	53	0	0	11	17	17	25	14	384	21	0
8:00 AM	17	6	45	0	0	4	18	14	12	12	279	9	0
8:15 AM	11	4	54	0	0	4	14	5	23	7	345	11	0
8:30 AM	12	5	47	0	0	10	14	8	23	12	341	14	0
8:45 AM	12	5	57	0	0	10	15	5	13	8	327	11	0
4:00 PM	26	25	92	0	0	23	27	10	35	37	315	11	0
4:15 PM	21	19	56	0	0	22	10	11	21	33	370	5	0
4:30 PM	19	14	71	0	0	27	15	16	23	37	332	9	1
4:45 PM	13	23	94	0	0	19	16	17	23	33	334	18	0
5:00 PM	23	15	93	0	0	16	13	13	22	22	295	15	0
5:15 PM	22	24	62	0	0	24	20	9	24	28	306	4	0
5:30 PM	17	17	69	0	0	26	16	15	28	23	277	7	1
5:45 PM	21	11	62	0	0	27	15	16	23	32	259	3	0

Attachment 3

Traffic Volumes Calculations

CleanEnergy CNG
Burlington, Kentucky

CNG Burlington

Compressed Natural Gas (No Pass-By Reduction)	Size	Unit	AM Peak Hour		PM Peak Hour			
			Total	Entering	Exiting	Total	Entering	Exiting
Passenger Cars	268	Fueling Stations	32	16	16	32	27	5
Trucks			27	16	11	40	5	35
Total Trips			59	32	27	72	32	40

Groveport (maximum values)
 Timefill 52
 Fast-fill (not used) 2

	Daily	AM Peak Hour			PM Peak Hour		
		Total	Entering	Exiting	Total	Entering	Exiting
Passenger Trips	78	6	3	3	6	5	1
Trucks Trips	85	5	3	2	8	1	7
Total Trips	163	11	6	5	14	6	8

	Daily	Trips per Timefill Space					
		AM Peak Hour			PM Peak Hour		
		Total	Entering	Exiting	Total	Entering	Exiting
Passenger Trips	1.50	0.12	0.06	0.06	0.12	0.10	0.02
Trucks Trips	1.63	0.10	0.06	0.04	0.15	0.02	0.13
Total Trips	3.13	0.22	0.12	0.10	0.27	0.12	0.15

Burlington, KY
 Timefill 264
 Fast-fill (used) 4
 Total 268

	Daily	AM Peak Hour			PM Peak Hour		
		Total	Entering	Exiting	Total	Entering	Exiting
Passenger Trips	402	32	16	16	32	27	5
Trucks Trips	437	27	16	11	40	5	35
Total Trips	839	59	32	27	72	32	40

CNG Burlington TRIP ASSIGNMENT ROUTINGS

ORIGIN	DESTINATION	TRIP ROUTINGS O-D PERCENT	ROUTE SPLIT	AFFECTED MOVEMENTS BY TRIPS	AM TRIPS	PM TRIPS
<u>Entering PC Trips</u>						
Limaburg Road (NORTH)	Site Drive 1	10%	100%	1SBT 2SBT 3SBL	2	3
KY 18 (EAST)	Site Drive 1	50%	100%	4WBR 3NBR	8	13
KY 18 (WEST)	Site Drive 1	40%	100%	4EBL 3NBR	6	11
TOTAL ENTERING TRIPS					16	27

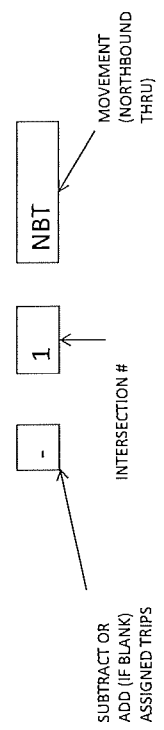
<u>Exiting PC Trips</u>						
Site Drive 1	Limaburg Road (NORTH)	10%	100%	3WBR 2NBT 1NBT	2	1
Site Drive 1	KY 18 (EAST)	50%	100%	3WBL 4SBL	8	2
Site Drive 1	KY 18 (WEST)	40%	100%	3WBL 4SBR	6	2
TOTAL EXITING TRIPS					16	5

<u>Entering Truck Cab Trips</u>						
Limaburg Road (NORTH)	Site Drive 1	100%	50%	1SBT 2SBT 3SBL	8	3
Limaburg Road (NORTH)	Site Drive 1	100%	50%	4EBL 3NBR	8	2
TOTAL ENTERING TRIPS					16	5

<u>Exiting Truck Cab Trips</u>						
Site Drive 1	Limaburg Road (NORTH)	100%	50%	3WBR 2NBT 1NBT	6	18
Site Drive 1	Limaburg Road (NORTH)	100%	50%	3WBL 4SBR	5	17
TOTAL EXITING TRIPS					11	35

Intersection Legend

1. Limaburg Road and Conrad Lane
2. Limaburg Road and Timber Lane/Lakeland Park Drive
3. Limaburg and Site Drive 1
4. Limaburg Road and KY 18



TRAFFIC PROJECTIONS - AM PEAK HOUR
CNG Burlington, KY

Int. #	Movement	2023	2024	Site Trips		2024	2034	2034	Int. #	Movement
		Raw Traffic Counts	No Build Opening Year Volumes	Primary Trips IN	Primary Trips OUT	Build Opening Year Volumes	No Build Design Hour Volumes	Build Design Hour Volumes		
1	EBL	20	20			20	22	22	1	EBL
1	EBT		0			0	0	0	1	EBT
1	EBR	75	76			76	83	83	1	EBR
1	WBL		0			0	0	0	1	WBL
1	WBT		0			0	0	0	1	WBT
1	WBR		0			0	0	0	1	WBR
1	NBL	32	32			32	36	36	1	NBL
1	NBT	209	211		8	219	232	240	1	NBT
1	NBR		0			0	0	0	1	NBR
1	SBL		0			0	0	0	1	SBL
1	SBT	172	174	10		184	191	201	1	SBT
1	SBR	10	10			10	11	11	1	SBR
2	EBL	2	2			2	2	2	2	EBL
2	EBT	0	0			0	0	0	2	EBT
2	EBR	12	12			12	13	13	2	EBR
2	WBL	10	10			10	11	11	2	WBL
2	WBT	0	0			0	0	0	2	WBT
2	WBR	12	12			12	13	13	2	WBR
2	NBL	3	3			3	3	3	2	NBL
2	NBT	234	236		8	244	260	268	2	NBT
2	NBR	39	39			39	43	43	2	NBR
2	SBL	26	26			26	29	29	2	SBL
2	SBT	237	239	10		249	263	273	2	SBT
2	SBR	1	1			1	1	1	2	SBR
3	EBL		0			0	0	0	3	EBL
3	EBT		0			0	0	0	3	EBT
3	EBR		0			0	0	0	3	EBR
3	WBL		0		19	19	0	19	3	WBL
3	WBT		0			0	0	0	3	WBT
3	WBR		0		8	8	0	8	3	WBR
3	NBL		0			0	0	0	3	NBL
3	NBT	276	279			279	306	306	3	NBT
3	NBR		0	22		22	0	22	3	NBR
3	SBL		0	10		10	0	10	3	SBL
3	SBT	259	262			262	287	287	3	SBT
3	SBR		0			0	0	0	3	SBR
4	EBL	64	65	14		79	71	85	4	EBL
4	EBT	1533	1548			1548	1702	1702	4	EBT
4	EBR	48	48			48	53	53	4	EBR
4	WBL	25	25			25	28	28	4	WBL
4	WBT	836	844			844	928	928	4	WBT
4	WBR	333	336	8		344	370	378	4	WBR
4	NBL	80	81			81	89	89	4	NBL
4	NBT	67	68			68	74	74	4	NBT
4	NBR	49	49			49	54	54	4	NBR
4	SBL	252	255		8	263	280	288	4	SBL
4	SBT	24	24			24	27	27	4	SBT
4	SBR	38	38		11	49	42	53	4	SBR

Intersection Legend

1. Limaburg Road and Conrad Lane - Unsignalized
2. Limaburg Road and Timber Lane/Lakeland Park Drive - Unsignalized
3. Limaburg and Site Drive 1 - Unsignalized
4. Limaburg Road and KY 18 - Signalized

Linear Growth Rate

1%

TRAFFIC PROJECTIONS - PM PEAK HOUR
CNG Burlington, KY

Int. #	Movement	2023	2024	Site Trips		2024	2034	2034	Int. #	Movement
		Raw Traffic Counts	No Build Opening Year Volumes	Primary Trips IN	Primary Trips OUT	Build Opening Year Volumes	No Build Design Hour Volumes	Build Design Volumes		
1	EBL	12	12			12	13	13	1	EBL
1	EBT		0			0	0	0	1	EBT
1	EBR	90	91			91	100	100	1	EBR
1	WBL		0			0	0	0	1	WBL
1	WBT		0			0	0	0	1	WBT
1	WBR		0			0	0	0	1	WBR
1	NBL	110	111			111	122	122	1	NBL
1	NBT	282	285		19	304	313	332	1	NBT
1	NBR		0			0	0	0	1	NBR
1	SBL		0			0	0	0	1	SBL
1	SBT	223	225	6		231	248	254	1	SBT
1	SBR	31	31			31	34	34	1	SBR
2	EBL	3	3			3	3	3	2	EBL
2	EBT	0	0			0	0	0	2	EBT
2	EBR	10	10			10	11	11	2	EBR
2	WBL	23	23			23	26	26	2	WBL
2	WBT	0	0			0	0	0	2	WBT
2	WBR	17	17			17	19	19	2	WBR
2	NBL	8	8			8	9	9	2	NBL
2	NBT	364	368		19	387	404	423	2	NBT
2	NBR	6	6			6	7	7	2	NBR
2	SBL	7	7			7	8	8	2	SBL
2	SBT	306	309	6		315	340	346	2	SBT
2	SBR	9	9			9	10	10	2	SBR
3	EBL		0			0	0	0	3	EBL
3	EBT		0			0	0	0	3	EBT
3	EBR		0			0	0	0	3	EBR
3	WBL		0		21	21	0	21	3	WBL
3	WBT		0			0	0	0	3	WBT
3	WBR		0		19	19	0	19	3	WBR
3	NBL		0			0	0	0	3	NBL
3	NBT	378	392			382	420	420	3	NBT
3	NBR		0	26		26	0	26	3	NBR
3	SBL		0	6		6	0	6	3	SBL
3	SBT	339	342			342	376	376	3	SBT
3	SBR		0			0	0	0	3	SBR
4	EBL	43	43	13		56	48	61	4	EBL
4	EBT	1351	1365			1365	1500	1500	4	EBT
4	EBR	140	141			141	155	155	4	EBR
4	WBL	91	92			92	101	101	4	WBL
4	WBT	1497	1512			1512	1662	1662	4	WBT
4	WBR	311	314	13		327	345	358	4	WBR
4	NBL	102	103			103	113	113	4	NBL
4	NBT	54	55			55	60	60	4	NBT
4	NBR	68	69			69	75	75	4	NBR
4	SBL	313	316		2	318	347	349	4	SBL
4	SBT	81	82			82	90	90	4	SBT
4	SBR	79	80		19	99	88	107	4	SBR

Intersection Legend

1. Limaburg Road and Conrad Lane/Private Drive - Unsignalized
2. Limaburg Road and Timber Lane/Lakeland Park Drive - Unsignalized
3. Limaburg and Site Drive 1 - Unsignalized
4. Limaburg Road and KY 18 - Signalized

Linear Growth Rate

1%

Attachment 4

2024 No-Build Capacity Analysis Sheets

HCM 6th TWSC
1: Limaburg Road & Conrad Lane

AM Opening Year No Build

Intersection						
Int Delay, s/veh	2.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑	↑	
Traffic Vol, veh/h	20	76	32	211	174	10
Future Vol, veh/h	20	76	32	211	174	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	85	53	90	88	50
Heavy Vehicles, %	5	3	3	15	11	50
Mvmt Flow	24	89	60	234	198	20

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	562	208	218	0	-
Stage 1	208	-	-	-	-
Stage 2	354	-	-	-	-
Critical Hdwy	6.45	6.23	4.13	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-
Follow-up Hdwy	3.545	3.327	2.227	-	-
Pot Cap-1 Maneuver	483	830	1346	-	-
Stage 1	820	-	-	-	-
Stage 2	704	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	458	830	1346	-	-
Mov Cap-2 Maneuver	458	-	-	-	-
Stage 1	778	-	-	-	-
Stage 2	704	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	1.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1346	-	708	-	-
HCM Lane V/C Ratio	0.045	-	0.16	-	-
HCM Control Delay (s)	7.8	0	11.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	-	-

HCM 6th TWSC

2: Limaburg Road & Timber Lane/Lakeland Park Drive

AM Opening Year No Build

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↑	↑	↑	↑	↑	
Traffic Vol, veh/h	2	0	12	10	0	12	3	236	39	26	239	1
Future Vol, veh/h	2	0	12	10	0	12	3	236	39	26	239	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	190	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	92	75	50	92	43	38	84	51	50	79	25
Heavy Vehicles, %	0	2	8	40	2	50	0	10	15	38	5	0
Mvmt Flow	4	0	16	20	0	28	8	281	76	52	303	4

























Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	758	782	305	714	708	281	307	0	0	357	0	0
Stage 1	409	409	-	297	297	-	-	-	-	-	-	-
Stage 2	349	373	-	417	411	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.28	7.5	6.52	6.7	4.1	-	-	4.48	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.5	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.5	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.372	3.86	4.018	3.75	2.2	-	-	2.542	-	-
Pot Cap-1 Maneuver	326	326	721	302	360	656	1265	-	-	1027	-	-
Stage 1	623	596	-	637	668	-	-	-	-	-	-	-
Stage 2	671	618	-	545	595	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	299	307	721	282	339	656	1265	-	-	1027	-	-
Mov Cap-2 Maneuver	299	307	-	282	339	-	-	-	-	-	-	-
Stage 1	619	566	-	633	664	-	-	-	-	-	-	-
Stage 2	638	614	-	506	565	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.6	14.6	0.2	1.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1265	-	-	562	422	1027	-	-
HCM Lane V/C Ratio	0.006	-	-	0.036	0.114	0.051	-	-
HCM Control Delay (s)	7.9	-	-	11.6	14.6	8.7	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.4	0.2	-	-

HCM 6th Signalized Intersection Summary
 4: Limaburg Road & KY 18

AM Opening Year No Build

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	1548	48	25	844	336	81	68	49	255	24	38
Future Volume (veh/h)	65	1548	48	25	844	336	81	68	49	255	24	38
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1856	1707	1841	1826	1781	1856	1856	1870	1678	1781	1515
Adj Flow Rate, veh/h	86	1701	56	44	917	369	106	109	68	352	0	48
Peak Hour Factor	0.76	0.91	0.86	0.57	0.92	0.91	0.71	0.70	0.72	0.81	0.46	0.79
Percent Heavy Veh, %	13	3	13	4	5	8	3	3	2	15	8	26
Cap, veh/h	73	1297	532	67	1253	545	205	216	184	969	0	389
Arrive On Green	0.05	0.37	0.37	0.04	0.36	0.36	0.12	0.12	0.12	0.30	0.00	0.30
Sat Flow, veh/h	1626	3526	1447	1753	3469	1510	1767	1856	1585	3196	0	1284
Grp Volume(v), veh/h	86	1701	56	44	917	369	106	109	68	352	0	48
Grp Sat Flow(s),veh/h/ln	1626	1763	1447	1753	1735	1510	1767	1856	1585	1598	0	1284
Q Serve(g_s), s	7.0	57.0	3.9	3.8	35.6	32.0	8.7	8.5	6.1	13.4	0.0	4.2
Cycle Q Clear(g_c), s	7.0	57.0	3.9	3.8	35.6	32.0	8.7	8.5	6.1	13.4	0.0	4.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	73	1297	532	67	1253	545	205	216	184	969	0	389
V/C Ratio(X)	1.17	1.31	0.11	0.65	0.73	0.68	0.52	0.51	0.37	0.36	0.00	0.12
Avail Cap(c_a), veh/h	73	1297	532	79	1274	554	205	216	184	969	0	389
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	74.0	49.0	32.2	73.5	43.0	41.9	64.4	64.3	63.2	42.3	0.0	39.1
Incr Delay (d2), s/veh	158.3	145.8	0.1	14.1	2.2	3.2	9.0	8.2	5.6	1.1	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	10.6	72.9	2.5	3.5	21.3	17.6	7.8	8.0	4.9	9.2	0.0	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	232.3	194.8	32.3	87.5	45.2	45.1	73.4	72.5	68.8	43.3	0.0	39.7
LnGrp LOS	F	F	C	F	D	D	E	E	E	D	A	D
Approach Vol, veh/h		1843			1330			283			400	
Approach Delay, s/veh		191.6			46.5			72.0			42.9	
Approach LOS		F			D			E			D	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		25.0	12.4	63.5		54.0	13.5	62.4				
Change Period (Y+Rc), s		* 7	6.5	6.5		7.0	6.5	6.5				
Max Green Setting (Gmax), s		* 18	7.0	57.0		47.0	7.0	56.9				
Max Q Clear Time (g_c+I1), s		10.7	5.8	59.0		15.4	9.0	37.6				
Green Ext Time (p_c), s		0.6	0.0	0.0		1.4	0.0	6.8				

Intersection Summary

HCM 6th Ctrl Delay	117.4
HCM 6th LOS	F

Notes

User approved volume balancing among the lanes for turning movement.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
1: Limaburg Road & Conrad Lane

Baseline
PM Opening Year No Build

Intersection						
Int Delay, s/veh	3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↑		↑	
Traffic Vol, veh/h	12	91	111	285	225	31
Future Vol, veh/h	12	91	111	285	225	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	80	83	82	76	78
Heavy Vehicles, %	25	4	4	6	9	10
Mvmt Flow	16	114	134	348	296	40

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	932	316	336	0	-	0
Stage 1	316	-	-	-	-	-
Stage 2	616	-	-	-	-	-
Critical Hdwy	6.65	6.24	4.14	-	-	-
Critical Hdwy Stg 1	5.65	-	-	-	-	-
Critical Hdwy Stg 2	5.65	-	-	-	-	-
Follow-up Hdwy	3.725	3.336	2.236	-	-	-
Pot Cap-1 Maneuver	269	720	1212	-	-	-
Stage 1	690	-	-	-	-	-
Stage 2	497	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	232	720	1212	-	-	-
Mov Cap-2 Maneuver	232	-	-	-	-	-
Stage 1	595	-	-	-	-	-
Stage 2	497	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.1	2.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1212	-	572	-	-
HCM Lane V/C Ratio	0.11	-	0.227	-	-
HCM Control Delay (s)	8.3	0	13.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.4	-	0.9	-	-

HCM 6th TWSC
2: Limaburg Road & Timber Lane/Lakeland Park Drive

Baseline
PM Opening Year No Build

Intersection												
Int Delay, s/veh	2.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↖	↗	↖	↗	↖
Traffic Vol, veh/h	3	0	10	23	0	17	8	368	6	7	309	9
Future Vol, veh/h	3	0	10	23	0	17	8	368	6	7	309	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	190	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	92	50	41	92	53	50	86	75	44	91	56
Heavy Vehicles, %	0	2	10	9	2	24	0	2	50	86	6	11
Mvmt Flow	8	0	20	56	0	32	16	428	8	16	340	16

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	860	848	348	850	848	428	356	0	0	436	0	0
Stage 1	380	380	-	460	460	-	-	-	-	-	-	-
Stage 2	480	468	-	390	388	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.3	7.19	6.52	6.44	4.1	-	-	4.96	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.19	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.19	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.39	3.581	4.018	3.516	2.2	-	-	2.974	-	-
Pot Cap-1 Maneuver	278	298	677	273	298	583	1214	-	-	791	-	-
Stage 1	646	614	-	568	566	-	-	-	-	-	-	-
Stage 2	571	561	-	620	609	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	256	288	677	258	288	583	1214	-	-	791	-	-
Mov Cap-2 Maneuver	256	288	-	258	288	-	-	-	-	-	-	-
Stage 1	638	602	-	561	559	-	-	-	-	-	-	-
Stage 2	532	554	-	590	597	-	-	-	-	-	-	-

Approach	EB		WB		NB			SB	
HCM Control Delay, s	13.3		20.2		0.3			0.4	
HCM LOS	B		C						

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1214	-	-	462	324	791	-	-
HCM Lane V/C Ratio	0.013	-	-	0.06	0.272	0.02	-	-
HCM Control Delay (s)	8	-	-	13.3	20.2	9.6	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	1.1	0.1	-	-

HCM 6th Signalized Intersection Summary
4: Limaburg Road & KY 18

Baseline
PM Opening Year No Build

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	43	1365	141	92	1512	314	103	55	69	316	82	80
Future Volume (veh/h)	43	1365	141	92	1512	314	103	55	69	316	82	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1856	1870	1885	1841	1811	1811	1870	1856	1841	1885	1841
Adj Flow Rate, veh/h	72	1500	148	110	1680	397	106	120	110	241	297	105
Peak Hour Factor	0.60	0.91	0.95	0.84	0.90	0.79	0.73	0.79	0.63	0.83	0.81	0.76
Percent Heavy Veh, %	7	3	2	1	4	6	6	2	3	4	1	4
Cap, veh/h	89	1324	595	81	1290	566	173	188	158	533	573	474
Arrive On Green	0.05	0.38	0.38	0.05	0.37	0.37	0.10	0.10	0.10	0.30	0.30	0.30
Sat Flow, veh/h	1711	3526	1585	1795	3497	1535	1725	1870	1572	1753	1885	1560
Grp Volume(v), veh/h	72	1500	148	110	1680	397	106	120	110	241	297	105
Grp Sat Flow(s),veh/h/ln	1711	1763	1585	1795	1749	1535	1725	1870	1572	1753	1885	1560
Q Serve(g_s), s	6.4	58.1	9.9	7.0	57.0	34.0	9.1	9.5	10.5	17.1	20.1	7.8
Cycle Q Clear(g_c), s	6.4	58.1	9.9	7.0	57.0	34.0	9.1	9.5	10.5	17.1	20.1	7.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	89	1324	595	81	1290	566	173	188	158	533	573	474
V/C Ratio(X)	0.81	1.13	0.25	1.35	1.30	0.70	0.61	0.64	0.70	0.45	0.52	0.22
Avail Cap(c_a), veh/h	100	1324	595	81	1290	566	173	188	158	533	573	474
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	72.5	48.2	33.2	73.8	48.8	41.5	66.7	66.8	67.3	43.4	44.4	40.1
Incr Delay (d2), s/veh	34.2	69.6	0.2	220.0	141.9	3.9	15.2	15.6	22.6	2.8	3.3	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.5	51.1	6.8	13.8	71.3	18.9	8.2	9.1	8.8	12.3	14.9	5.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	106.7	117.9	33.4	293.8	190.7	45.4	81.8	82.4	89.8	46.1	47.7	41.2
LnGrp LOS	F	F	C	F	F	D	F	F	F	D	D	D
Approach Vol, veh/h		1720			2187			336			643	
Approach Delay, s/veh		110.2			169.5			84.6			46.1	
Approach LOS		F			F			F			D	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		22.5	13.5	64.6		54.0	14.6	63.5				
Change Period (Y+Rc), s		* 7	6.5	6.5		7.0	6.5	6.5				
Max Green Setting (Gmax), s		* 16	7.0	56.9		47.0	9.0	57.0				
Max Q Clear Time (g_c+I1), s		12.5	9.0	60.1		22.1	8.4	59.0				
Green Ext Time (p_c), s		0.4	0.0	0.0		2.6	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			126.5									
HCM 6th LOS			F									
Notes												
User approved volume balancing among the lanes for turning movement.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

Attachment 5

2024 Build Capacity Analysis Sheets

HCM 6th TWSC
1: Limaburg Road & Conrad Lane

AM Opening Year Build

Intersection						
Int Delay, s/veh	2.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	20	76	32	219	184	10
Future Vol, veh/h	20	76	32	219	184	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	85	53	90	88	50
Heavy Vehicles, %	5	3	3	15	11	50
Mvmt Flow	24	89	60	243	209	20
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	582	219	229	0	-	0
Stage 1	219	-	-	-	-	-
Stage 2	363	-	-	-	-	-
Critical Hdwy	6.45	6.23	4.13	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.327	2.227	-	-	-
Pot Cap-1 Maneuver	470	818	1333	-	-	-
Stage 1	810	-	-	-	-	-
Stage 2	697	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	446	818	1333	-	-	-
Mov Cap-2 Maneuver	446	-	-	-	-	-
Stage 1	768	-	-	-	-	-
Stage 2	697	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	11.2	1.6		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1333	-	695	-	-	
HCM Lane V/C Ratio	0.045	-	0.163	-	-	
HCM Control Delay (s)	7.8	0	11.2	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.6	-	-	

HCM 6th TWSC
2: Limaburg Road & Timber Lane/Lakeland Park Drive

AM Opening Year Build

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↗	↖	↗	↖	↗	↖
Traffic Vol, veh/h	2	0	12	10	0	12	3	244	39	26	249	1
Future Vol, veh/h	2	0	12	10	0	12	3	244	39	26	249	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	190	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	92	75	50	92	43	38	84	51	50	79	25
Heavy Vehicles, %	0	2	8	40	2	50	0	10	15	38	5	0
Mvmt Flow	4	0	16	20	0	28	8	290	76	52	315	4
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	779	803	317	735	729	290	319	0	0	366	0	0
Stage 1	421	421	-	306	306	-	-	-	-	-	-	-
Stage 2	358	382	-	429	423	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.28	7.5	6.52	6.7	4.1	-	-	4.48	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.5	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.5	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.372	3.86	4.018	3.75	2.2	-	-	2.542	-	-
Pot Cap-1 Maneuver	316	317	710	292	350	648	1252	-	-	1019	-	-
Stage 1	614	589	-	630	662	-	-	-	-	-	-	-
Stage 2	664	613	-	536	588	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	289	299	710	273	330	648	1252	-	-	1019	-	-
Mov Cap-2 Maneuver	289	299	-	273	330	-	-	-	-	-	-	-
Stage 1	610	559	-	626	658	-	-	-	-	-	-	-
Stage 2	631	609	-	497	558	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	11.8		14.9			0.2			1.2			
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1252	-	-	550	412	1019	-	-				
HCM Lane V/C Ratio	0.006	-	-	0.036	0.116	0.051	-	-				
HCM Control Delay (s)	7.9	-	-	11.8	14.9	8.7	-	-				
HCM Lane LOS	A	-	-	B	B	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0.4	0.2	-	-				

HCM 6th TWSC
3: Limaburg Road & Site Drive 1

AM Opening Year Build

Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	19	8	279	22	10	262
Future Vol, veh/h	19	8	279	22	10	262
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	300	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	9	303	24	11	285
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	622	315	0	0	327	0
Stage 1	315	-	-	-	-	-
Stage 2	307	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	450	725	-	-	1233	-
Stage 1	740	-	-	-	-	-
Stage 2	746	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	445	725	-	-	1233	-
Mov Cap-2 Maneuver	445	-	-	-	-	-
Stage 1	740	-	-	-	-	-
Stage 2	738	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	12.5	0	0.3			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	445	725	1233	-
HCM Lane V/C Ratio	-	-	0.046	0.012	0.009	-
HCM Control Delay (s)	-	-	13.5	10	7.9	0
HCM Lane LOS	-	-	B	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	0	-

HCM 6th Signalized Intersection Summary
 4: Limaburg Road & KY 18

AM Opening Year Build

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	79	1548	48	25	844	344	81	68	49	263	24	49
Future Volume (veh/h)	79	1548	48	25	844	344	81	68	49	263	24	49
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1856	1707	1841	1826	1781	1856	1856	1870	1678	1781	1515
Adj Flow Rate, veh/h	104	1701	56	44	917	378	106	109	68	362	0	62
Peak Hour Factor	0.76	0.91	0.86	0.57	0.92	0.91	0.71	0.70	0.72	0.81	0.46	0.79
Percent Heavy Veh, %	13	3	13	4	5	8	3	3	2	15	8	26
Cap, veh/h	123	1318	541	67	1168	508	203	213	182	960	0	386
Arrive On Green	0.08	0.37	0.37	0.04	0.34	0.34	0.12	0.12	0.12	0.30	0.00	0.30
Sat Flow, veh/h	1626	3526	1447	1753	3469	1510	1767	1856	1585	3196	0	1284
Grp Volume(v), veh/h	104	1701	56	44	917	378	106	109	68	362	0	62
Grp Sat Flow(s),veh/h/ln	1626	1763	1447	1753	1735	1510	1767	1856	1585	1598	0	1284
Q Serve(g_s), s	9.9	58.5	3.9	3.9	37.3	34.7	8.8	8.6	6.2	14.0	0.0	5.6
Cycle Q Clear(g_c), s	9.9	58.5	3.9	3.9	37.3	34.7	8.8	8.6	6.2	14.0	0.0	5.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	123	1318	541	67	1168	508	203	213	182	960	0	386
V/C Ratio(X)	0.85	1.29	0.10	0.66	0.79	0.74	0.52	0.51	0.37	0.38	0.00	0.16
Avail Cap(c_a), veh/h	147	1318	541	78	1168	508	203	213	182	960	0	386
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	71.5	49.0	31.9	74.2	46.8	45.9	65.2	65.1	64.0	43.2	0.0	40.2
Incr Delay (d2), s/veh	30.8	136.5	0.1	14.8	3.6	5.9	9.2	8.5	5.8	1.1	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.8	71.6	2.5	3.6	22.6	19.3	7.9	8.0	4.9	9.5	0.0	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	102.3	185.5	32.0	89.0	50.4	51.8	74.4	73.6	69.8	44.3	0.0	41.1
LnGrp LOS	F	F	C	F	D	D	E	E	E	D	A	D
Approach Vol, veh/h		1861			1339			283			424	
Approach Delay, s/veh		176.2			52.1			73.0			43.8	
Approach LOS		F			D			E			D	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		25.0	12.5	65.0		54.0	18.3	59.2				
Change Period (Y+Rc), s		* 7	6.5	* 6.5		7.0	6.5	6.5				
Max Green Setting (Gmax), s		* 18	7.0	* 59		47.0	14.1	49.9				
Max Q Clear Time (g_c+I1), s		10.8	5.9	60.5		16.0	11.9	39.3				
Green Ext Time (p_c), s		0.6	0.0	0.0		1.5	0.0	5.0				
Intersection Summary												
HCM 6th Ctrl Delay			111.8									
HCM 6th LOS			F									
Notes												
User approved volume balancing among the lanes for turning movement.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

Intersection						
Int Delay, s/veh	2.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W		A		P	
Traffic Vol, veh/h	12	91	111	304	231	31
Future Vol, veh/h	12	91	111	304	231	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	80	83	82	76	78
Heavy Vehicles, %	25	4	4	6	9	10
Mvmt Flow	16	114	134	371	304	40

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	963	324	344	0	-	0
Stage 1	324	-	-	-	-	-
Stage 2	639	-	-	-	-	-
Critical Hdwy	6.65	6.24	4.14	-	-	-
Critical Hdwy Stg 1	5.65	-	-	-	-	-
Critical Hdwy Stg 2	5.65	-	-	-	-	-
Follow-up Hdwy	3.725	3.336	2.236	-	-	-
Pot Cap-1 Maneuver	258	712	1204	-	-	-
Stage 1	684	-	-	-	-	-
Stage 2	485	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	222	712	1204	-	-	-
Mov Cap-2 Maneuver	222	-	-	-	-	-
Stage 1	588	-	-	-	-	-
Stage 2	485	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.4	2.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1204	-	560	-	-
HCM Lane V/C Ratio	0.111	-	0.232	-	-
HCM Control Delay (s)	8.4	0	13.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.4	-	0.9	-	-

Intersection												
Int Delay, s/veh	2.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↑	↑	↕	↕	↕
Traffic Vol, veh/h	3	0	10	23	0	17	8	387	6	7	315	9
Future Vol, veh/h	3	0	10	23	0	17	8	387	6	7	315	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	190	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	92	50	41	92	53	50	86	75	44	91	56
Heavy Vehicles, %	0	2	10	9	2	24	0	2	50	86	6	11
Mvmt Flow	8	0	20	56	0	32	16	450	8	16	346	16

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	888	876	354	878	876	450	362	0	0	458	0	0
Stage 1	386	386	-	482	482	-	-	-	-	-	-	-
Stage 2	502	490	-	396	394	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.3	7.19	6.52	6.44	4.1	-	-	4.96	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.19	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.19	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.39	3.581	4.018	3.516	2.2	-	-	2.974	-	-
Pot Cap-1 Maneuver	267	287	672	261	287	566	1208	-	-	774	-	-
Stage 1	641	610	-	552	553	-	-	-	-	-	-	-
Stage 2	555	549	-	616	605	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	245	277	672	247	277	566	1208	-	-	774	-	-
Mov Cap-2 Maneuver	245	277	-	247	277	-	-	-	-	-	-	-
Stage 1	633	597	-	545	546	-	-	-	-	-	-	-
Stage 2	517	542	-	585	592	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.5	21.1	0.3	0.4
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1208	-	-	450	311	774	-	-
HCM Lane V/C Ratio	0.013	-	-	0.062	0.284	0.021	-	-
HCM Control Delay (s)	8	-	-	13.5	21.1	9.7	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	1.1	0.1	-	-

Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	19	382	26	6	342
Future Vol, veh/h	21	19	382	26	6	342
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	300	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	21	415	28	7	372

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	815	429	0	0	443	0
Stage 1	429	-	-	-	-	-
Stage 2	386	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	347	626	-	-	1117	-
Stage 1	657	-	-	-	-	-
Stage 2	687	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	344	626	-	-	1117	-
Mov Cap-2 Maneuver	344	-	-	-	-	-
Stage 1	657	-	-	-	-	-
Stage 2	682	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.7	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	344	626	1117	-
HCM Lane V/C Ratio	-	-	0.066	0.033	0.006	-
HCM Control Delay (s)	-	-	16.2	10.9	8.2	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0	-

HCM 6th Signalized Intersection Summary
4: Limaburg Road & KY 18

Baseline
PM Opening Year Build

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	1365	141	92	1512	327	103	55	69	318	82	99
Future Volume (veh/h)	56	1365	141	92	1512	327	103	55	69	318	82	99
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1856	1870	1885	1841	1811	1811	1870	1856	1841	1885	1841
Adj Flow Rate, veh/h	93	1500	148	110	1680	414	106	120	110	242	298	130
Peak Hour Factor	0.60	0.91	0.95	0.84	0.90	0.79	0.73	0.79	0.63	0.83	0.81	0.76
Percent Heavy Veh, %	7	3	2	1	4	6	6	2	3	4	1	4
Cap, veh/h	83	1247	561	98	1260	553	200	217	182	530	570	471
Arrive On Green	0.05	0.35	0.35	0.05	0.36	0.36	0.12	0.12	0.12	0.30	0.30	0.30
Sat Flow, veh/h	1711	3526	1585	1795	3497	1535	1725	1870	1572	1753	1885	1560
Grp Volume(v), veh/h	93	1500	148	110	1680	414	106	120	110	242	298	130
Grp Sat Flow(s),veh/h/ln	1711	1763	1585	1795	1749	1535	1725	1870	1572	1753	1885	1560
Q Serve(g_s), s	7.5	55.0	10.4	8.5	56.0	36.8	9.0	9.4	10.3	17.4	20.4	9.9
Cycle Q Clear(g_c), s	7.5	55.0	10.4	8.5	56.0	36.8	9.0	9.4	10.3	17.4	20.4	9.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	83	1247	561	98	1260	553	200	217	182	530	570	471
V/C Ratio(X)	1.13	1.20	0.26	1.12	1.33	0.75	0.53	0.55	0.60	0.46	0.52	0.28
Avail Cap(c_a), veh/h	83	1247	561	98	1260	553	200	217	182	530	570	471
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	74.0	50.2	35.8	73.5	49.8	43.6	64.8	65.0	65.4	43.9	45.0	41.3
Incr Delay (d2), s/veh	137.6	99.2	0.2	127.1	155.7	5.6	9.8	9.9	14.0	2.8	3.4	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	10.9	57.1	7.1	12.1	74.0	20.5	7.9	8.7	8.3	12.5	15.1	7.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	211.6	149.4	36.1	200.6	205.5	49.2	74.5	74.8	79.4	46.7	48.4	42.7
LnGrp LOS	F	F	D	F	F	D	E	E	E	D	D	D
Approach Vol, veh/h		1741			2204			336			670	
Approach Delay, s/veh		143.1			175.9			76.2			46.7	
Approach LOS		F			F			E			D	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		25.0	15.0	61.5		54.0	14.0	62.5				
Change Period (Y+Rc), s		* 7	6.5	6.5		7.0	6.5	6.5				
Max Green Setting (Gmax), s		* 18	8.5	55.0		47.0	7.5	56.0				
Max Q Clear Time (g_c+I1), s		12.3	10.5	57.0		22.4	9.5	58.0				
Green Ext Time (p_c), s		0.6	0.0	0.0		2.7	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			140.1									
HCM 6th LOS			F									
Notes												
User approved volume balancing among the lanes for turning movement.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

Attachment 6

2034 No-Build Capacity Analysis Sheets

HCM 6th TWSC
1: Limaburg Road & Conrad Lane

AM Horizon Year No Build

Intersection						
Int Delay, s/veh	2.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	22	83	36	232	191	11
Future Vol, veh/h	22	83	36	232	191	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	85	53	90	88	50
Heavy Vehicles, %	5	3	3	15	11	50
Mvmt Flow	27	98	68	258	217	22
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	622	228	239	0	-	0
Stage 1	228	-	-	-	-	-
Stage 2	394	-	-	-	-	-
Critical Hdwy	6.45	6.23	4.13	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.327	2.227	-	-	-
Pot Cap-1 Maneuver	446	809	1322	-	-	-
Stage 1	803	-	-	-	-	-
Stage 2	675	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	419	809	1322	-	-	-
Mov Cap-2 Maneuver	419	-	-	-	-	-
Stage 1	755	-	-	-	-	-
Stage 2	675	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	11.5	1.6		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1322	-	675	-	-	
HCM Lane V/C Ratio	0.051	-	0.184	-	-	
HCM Control Delay (s)	7.9	0	11.5	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0.2	-	0.7	-	-	

HCM 6th TWSC
 2: Limaburg Road & Timber Lane/Lakeland Park Drive

AM Horizon Year No Build

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↑	↑	↑	↑	↑	
Traffic Vol, veh/h	2	0	13	11	0	13	3	260	43	29	263	1
Future Vol, veh/h	2	0	13	11	0	13	3	260	43	29	263	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	190	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	92	75	50	92	43	38	84	51	50	79	25
Heavy Vehicles, %	0	2	8	40	2	50	0	10	15	38	5	0
Mvmt Flow	4	0	17	22	0	30	8	310	84	58	333	4

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	834	861	335	786	779	310	337	0	0	394	0	0
Stage 1	451	451	-	326	326	-	-	-	-	-	-	-
Stage 2	383	410	-	460	453	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.28	7.5	6.52	6.7	4.1	-	-	4.48	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.5	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.5	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.372	3.86	4.018	3.75	2.2	-	-	2.542	-	-
Pot Cap-1 Maneuver	290	293	693	268	327	631	1234	-	-	994	-	-
Stage 1	592	571	-	613	648	-	-	-	-	-	-	-
Stage 2	644	595	-	515	570	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	262	274	693	248	306	631	1234	-	-	994	-	-
Mov Cap-2 Maneuver	262	274	-	248	306	-	-	-	-	-	-	-
Stage 1	588	538	-	609	644	-	-	-	-	-	-	-
Stage 2	609	591	-	473	537	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	12.1		15.9		0.2		1.3	
HCM LOS	B		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1234	-	-	530	382	994	-	-
HCM Lane V/C Ratio	0.006	-	-	0.04	0.137	0.058	-	-
HCM Control Delay (s)	7.9	-	-	12.1	15.9	8.8	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.5	0.2	-	-

HCM 6th Signalized Intersection Summary
 4: Limaburg Road & KY 18

AM Horizon Year No Build

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	1702	53	28	928	370	89	74	54	280	27	42
Future Volume (veh/h)	71	1702	53	28	928	370	89	74	54	280	27	42
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No				No				No			
Adj Sat Flow, veh/h/ln	1707	1856	1707	1841	1826	1781	1856	1856	1870	1678	1781	1515
Adj Flow Rate, veh/h	93	1870	62	49	1009	407	116	119	75	388	0	53
Peak Hour Factor	0.76	0.91	0.86	0.57	0.92	0.91	0.71	0.70	0.72	0.81	0.46	0.79
Percent Heavy Veh, %	13	3	13	4	5	8	3	3	2	15	8	26
Cap, veh/h	73	1295	532	70	1256	546	205	215	184	968	0	389
Arrive On Green	0.05	0.37	0.37	0.04	0.36	0.36	0.12	0.12	0.12	0.30	0.00	0.30
Sat Flow, veh/h	1626	3526	1447	1753	3469	1510	1767	1856	1585	3196	0	1284
Grp Volume(v), veh/h	93	1870	62	49	1009	407	116	119	75	388	0	53
Grp Sat Flow(s),veh/h/ln	1626	1763	1447	1753	1735	1510	1767	1856	1585	1598	0	1284
Q Serve(g_s), s	7.0	57.0	4.4	4.3	40.6	36.5	9.6	9.4	6.8	14.9	0.0	4.7
Cycle Q Clear(g_c), s	7.0	57.0	4.4	4.3	40.6	36.5	9.6	9.4	6.8	14.9	0.0	4.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	73	1295	532	70	1256	546	205	215	184	968	0	389
V/C Ratio(X)	1.27	1.44	0.12	0.70	0.80	0.74	0.57	0.55	0.41	0.40	0.00	0.14
Avail Cap(c_a), veh/h	73	1295	532	79	1259	548	205	215	184	968	0	389
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	74.1	49.1	32.4	73.6	44.5	43.2	64.9	64.8	63.6	42.9	0.0	39.3
Incr Delay (d2), s/veh	193.0	204.1	0.1	21.5	3.9	5.5	10.8	9.9	6.6	1.2	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	11.7	90.6	2.7	4.1	24.2	20.0	8.5	8.6	5.4	10.0	0.0	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	267.1	253.2	32.5	95.1	48.4	48.7	75.7	74.6	70.2	44.1	0.0	40.0
LnGrp LOS	F	F	C	F	D	D	E	E	E	D	A	D
Approach Vol, veh/h	2025				1465				310		441	
Approach Delay, s/veh	247.1				50.1				74.0		43.7	
Approach LOS	F				D				E		D	
Timer - Assigned Phs	2		3		4		6		7		8	
Phs Duration (G+Y+Rc), s	25.0		12.7		63.5		54.0		13.5		62.7	
Change Period (Y+Rc), s	* 7		6.5		6.5		7.0		6.5		6.5	
Max Green Setting (Gmax), s	* 18		7.0		57.0		47.0		7.0		56.3	
Max Q Clear Time (g_c+I1), s	11.6		6.3		59.0		16.9		9.0		42.6	
Green Ext Time (p_c), s	0.6		0.0		0.0		1.6		0.0		6.4	
Intersection Summary												
HCM 6th Ctrl Delay			145.2									
HCM 6th LOS			F									
Notes												
User approved volume balancing among the lanes for turning movement.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th TWSC
1: Limaburg Road & Conrad Lane

PM Horizon Year No Build

Intersection						
Int Delay, s/veh	3.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			↑	↑	
Traffic Vol, veh/h	13	100	122	313	248	34
Future Vol, veh/h	13	100	122	313	248	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	80	83	82	76	78
Heavy Vehicles, %	25	4	4	6	9	10
Mvmt Flow	17	125	147	382	326	44

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1024	348	370	0	-	0
Stage 1	348	-	-	-	-	-
Stage 2	676	-	-	-	-	-
Critical Hdwy	6.65	6.24	4.14	-	-	-
Critical Hdwy Stg 1	5.65	-	-	-	-	-
Critical Hdwy Stg 2	5.65	-	-	-	-	-
Follow-up Hdwy	3.725	3.336	2.236	-	-	-
Pot Cap-1 Maneuver	236	691	1178	-	-	-
Stage 1	667	-	-	-	-	-
Stage 2	465	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	199	691	1178	-	-	-
Mov Cap-2 Maneuver	199	-	-	-	-	-
Stage 1	562	-	-	-	-	-
Stage 2	465	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.2	2.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1178	-	531	-	-
HCM Lane V/C Ratio	0.125	-	0.268	-	-
HCM Control Delay (s)	8.5	0	14.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.4	-	1.1	-	-

HCM 6th TWSC
 2: Limaburg Road & Timber Lane/Lakeland Park Drive

PM Horizon Year No Build

Intersection

Int Delay, s/veh 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↖	↗	↖	↖	↗
Traffic Vol, veh/h	3	0	11	26	0	19	9	404	7	8	340	10
Future Vol, veh/h	3	0	11	26	0	19	9	404	7	8	340	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	190	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	92	50	41	92	53	50	86	75	44	91	56
Heavy Vehicles, %	0	2	10	9	2	24	0	2	50	86	6	11
Mvmt Flow	8	0	22	63	0	36	18	470	9	18	374	18

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	948	934	383	936	934	470	392	0	0	479	0	0
Stage 1	419	419	-	506	506	-	-	-	-	-	-	-
Stage 2	529	515	-	430	428	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.3	7.19	6.52	6.44	4.1	-	-	4.96	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.19	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.19	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.39	3.581	4.018	3.516	2.2	-	-	2.974	-	-
Pot Cap-1 Maneuver	243	266	647	238	266	551	1178	-	-	758	-	-
Stage 1	616	590	-	536	540	-	-	-	-	-	-	-
Stage 2	537	535	-	590	585	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	220	256	647	223	256	551	1178	-	-	758	-	-
Mov Cap-2 Maneuver	220	256	-	223	256	-	-	-	-	-	-	-
Stage 1	607	576	-	528	532	-	-	-	-	-	-	-
Stage 2	494	527	-	556	571	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14	24.3	0.3	0.4
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1178	-	-	428	284	758	-	-
HCM Lane V/C Ratio	0.015	-	-	0.07	0.35	0.024	-	-
HCM Control Delay (s)	8.1	-	-	14	24.3	9.9	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	1.5	0.1	-	-

HCM 6th Signalized Intersection Summary
 4: Limaburg Road & KY 18

PM Horizon Year No Build

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	1500	155	101	1662	345	113	60	75	347	90	88
Future Volume (veh/h)	48	1500	155	101	1662	345	113	60	75	347	90	88
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1856	1870	1885	1841	1811	1811	1870	1856	1841	1885	1841
Adj Flow Rate, veh/h	80	1648	163	120	1847	437	116	131	119	264	326	116
Peak Hour Factor	0.60	0.91	0.95	0.84	0.90	0.79	0.73	0.79	0.63	0.83	0.81	0.76
Percent Heavy Veh, %	7	3	2	1	4	6	6	2	3	4	1	4
Cap, veh/h	77	1285	578	81	1275	560	199	216	182	529	569	471
Arrive On Green	0.04	0.36	0.36	0.04	0.36	0.36	0.12	0.12	0.12	0.30	0.30	0.30
Sat Flow, veh/h	1711	3526	1585	1795	3497	1535	1725	1870	1572	1753	1885	1560
Grp Volume(v), veh/h	80	1648	163	120	1847	437	116	131	119	264	326	116
Grp Sat Flow(s),veh/h/ln	1711	1763	1585	1795	1749	1535	1725	1870	1572	1753	1885	1560
Q Serve(g_s), s	7.0	56.8	11.3	7.0	56.8	39.4	9.9	10.4	11.3	19.3	22.7	8.7
Cycle Q Clear(g_c), s	7.0	56.8	11.3	7.0	56.8	39.4	9.9	10.4	11.3	19.3	22.7	8.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	77	1285	578	81	1275	560	199	216	182	529	569	471
V/C Ratio(X)	1.04	1.28	0.28	1.49	1.45	0.78	0.58	0.61	0.66	0.50	0.57	0.25
Avail Cap(c_a), veh/h	77	1285	578	81	1275	560	199	216	182	529	569	471
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	74.4	49.5	35.1	74.4	49.5	44.0	65.3	65.5	65.9	44.7	45.9	41.0
Incr Delay (d2), s/veh	114.3	133.1	0.3	273.9	206.3	7.0	11.8	12.0	17.0	3.3	4.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.4	68.7	7.7	15.7	90.1	21.9	8.6	9.5	9.0	13.6	16.6	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	188.7	182.6	35.3	348.3	255.8	51.0	77.2	77.5	82.9	48.1	50.1	42.3
LnGrp LOS	F	F	D	F	F	D	E	E	F	D	D	D
Approach Vol, veh/h		1891			2404			366			706	
Approach Delay, s/veh		170.1			223.2			79.2			48.1	
Approach LOS		F			F			E			D	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		25.0	13.5	63.3		54.0	13.5	63.3				
Change Period (Y+Rc), s		* 7	6.5	6.5		7.0	6.5	6.5				
Max Green Setting (Gmax), s		* 18	7.0	56.8		47.0	7.0	56.8				
Max Q Clear Time (g_c+I1), s		13.3	9.0	58.8		24.7	9.0	58.8				
Green Ext Time (p_c), s		0.6	0.0	0.0		2.9	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay	171.6
HCM 6th LOS	F

Notes

- User approved volume balancing among the lanes for turning movement.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Attachment 7

2034 Build Capacity Analysis Sheets

HCM 6th TWSC
1: Limaburg Road & Conrad Lane

AM Horizon Year Build

Intersection						
Int Delay, s/veh	2.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑	↑	
Traffic Vol, veh/h	22	83	36	240	201	11
Future Vol, veh/h	22	83	36	240	201	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	85	53	90	88	50
Heavy Vehicles, %	5	3	3	15	11	50
Mvmt Flow	27	98	68	267	228	22

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	642	239	250	0	-	0
Stage 1	239	-	-	-	-	-
Stage 2	403	-	-	-	-	-
Critical Hdwy	6.45	6.23	4.13	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.327	2.227	-	-	-
Pot Cap-1 Maneuver	434	797	1310	-	-	-
Stage 1	794	-	-	-	-	-
Stage 2	668	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	408	797	1310	-	-	-
Mov Cap-2 Maneuver	408	-	-	-	-	-
Stage 1	746	-	-	-	-	-
Stage 2	668	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.7	1.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1310	-	662	-	-
HCM Lane V/C Ratio	0.052	-	0.188	-	-
HCM Control Delay (s)	7.9	0	11.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.7	-	-

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↗	↖	↗	↖	↗	↖
Traffic Vol, veh/h	2	0	13	11	0	13	3	268	43	29	273	1
Future Vol, veh/h	2	0	13	11	0	13	3	268	43	29	273	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	190	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	92	75	50	92	43	38	84	51	50	79	25
Heavy Vehicles, %	0	2	8	40	2	50	0	10	15	38	5	0
Mvmt Flow	4	0	17	22	0	30	8	319	84	58	346	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	856	883	348	808	801	319	350	0	0	403	0	0
Stage 1	464	464	-	335	335	-	-	-	-	-	-	-
Stage 2	392	419	-	473	466	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.28	7.5	6.52	6.7	4.1	-	-	4.48	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.5	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.5	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.372	3.86	4.018	3.75	2.2	-	-	2.542	-	-
Pot Cap-1 Maneuver	280	285	682	259	318	623	1220	-	-	985	-	-
Stage 1	582	564	-	606	643	-	-	-	-	-	-	-
Stage 2	637	590	-	506	562	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	253	266	682	240	297	623	1220	-	-	985	-	-
Mov Cap-2 Maneuver	253	266	-	240	297	-	-	-	-	-	-	-
Stage 1	578	531	-	602	638	-	-	-	-	-	-	-
Stage 2	602	586	-	464	529	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	12.3			16.2			0.2			1.3		
HCM LOS	B			C								

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1220	-	-	517	373	985	-	-
HCM Lane V/C Ratio	0.006	-	-	0.041	0.14	0.059	-	-
HCM Control Delay (s)	8	-	-	12.3	16.2	8.9	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.5	0.2	-	-

HCM 6th TWSC
3: Limaburg Road & Site Drive 1

AM Horizon Year Build

Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔			↔
Traffic Vol, veh/h	19	8	306	22	10	287
Future Vol, veh/h	19	8	306	22	10	287
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	300	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	9	333	24	11	312

























Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	679	345	0	0	357
Stage 1	345	-	-	-	-
Stage 2	334	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	417	698	-	-	1202
Stage 1	717	-	-	-	-
Stage 2	725	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	412	698	-	-	1202
Mov Cap-2 Maneuver	412	-	-	-	-
Stage 1	717	-	-	-	-
Stage 2	717	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	412	698	1202
HCM Lane V/C Ratio	-	-	0.05	0.012	0.009
HCM Control Delay (s)	-	-	14.2	10.2	8
HCM Lane LOS	-	-	B	B	A
HCM 95th %tile Q(veh)	-	-	0.2	0	0

HCM 6th Signalized Intersection Summary
4: Limaburg Road & KY 18

AM Horizon Year Build

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	1702	53	28	928	378	89	74	54	288	27	53
Future Volume (veh/h)	85	1702	53	28	928	378	89	74	54	288	27	53
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1856	1707	1841	1826	1781	1856	1856	1870	1678	1781	1515
Adj Flow Rate, veh/h	112	1870	62	49	1009	415	116	119	75	398	0	67
Peak Hour Factor	0.76	0.91	0.86	0.57	0.92	0.91	0.71	0.70	0.72	0.81	0.46	0.79
Percent Heavy Veh, %	13	3	13	4	5	8	3	3	2	15	8	26
Cap, veh/h	125	1295	532	70	1146	499	205	215	184	968	0	389
Arrive On Green	0.08	0.37	0.37	0.04	0.33	0.33	0.12	0.12	0.12	0.30	0.00	0.30
Sat Flow, veh/h	1626	3526	1447	1753	3469	1510	1767	1856	1585	3196	0	1284
Grp Volume(v), veh/h	112	1870	62	49	1009	415	116	119	75	398	0	67
Grp Sat Flow(s),veh/h/ln	1626	1763	1447	1753	1735	1510	1767	1856	1585	1598	0	1284
Q Serve(g_s), s	10.6	57.0	4.4	4.3	42.6	39.4	9.6	9.4	6.8	15.4	0.0	6.0
Cycle Q Clear(g_c), s	10.6	57.0	4.4	4.3	42.6	39.4	9.6	9.4	6.8	15.4	0.0	6.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	125	1295	532	70	1146	499	205	215	184	968	0	389
V/C Ratio(X)	0.90	1.44	0.12	0.70	0.88	0.83	0.57	0.55	0.41	0.41	0.00	0.17
Avail Cap(c_a), veh/h	125	1295	532	79	1165	507	205	215	184	968	0	389
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	71.0	49.1	32.4	73.6	49.1	48.0	64.9	64.8	63.6	43.1	0.0	39.8
Incr Delay (d2), s/veh	50.7	204.1	0.1	21.5	8.0	11.2	10.8	9.9	6.6	1.3	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	10.1	90.6	2.7	4.1	26.1	22.3	8.5	8.6	5.4	10.3	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	121.8	253.2	32.5	95.1	57.0	59.1	75.7	74.6	70.2	44.3	0.0	40.7
LnGrp LOS	F	F	C	F	E	E	E	E	E	D	A	D
Approach Vol, veh/h		2044			1473			310			465	
Approach Delay, s/veh		239.3			58.9			74.0			43.8	
Approach LOS		F			E			E			D	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		25.0	12.7	63.5		54.0	18.4	57.8				
Change Period (Y+Rc), s		* 7	6.5	6.5		7.0	6.5	6.5				
Max Green Setting (Gmax), s		* 18	7.0	57.0		47.0	11.9	52.1				
Max Q Clear Time (g_c+I1), s		11.6	6.3	59.0		17.4	12.6	44.6				
Green Ext Time (p_c), s		0.6	0.0	0.0		1.6	0.0	4.3				

Intersection Summary

HCM 6th Ctrl Delay	144.3
HCM 6th LOS	F

Notes

- User approved volume balancing among the lanes for turning movement.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
1: Limaburg Road & Conrad Lane

PM Horizon Year Build

Intersection

Int Delay, s/veh 3.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑	↑	
Traffic Vol, veh/h	13	100	122	332	254	34
Future Vol, veh/h	13	100	122	332	254	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	80	83	82	76	78
Heavy Vehicles, %	25	4	4	6	9	10
Mvmt Flow	17	125	147	405	334	44

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1055	356	378	0	-	0
Stage 1	356	-	-	-	-	-
Stage 2	699	-	-	-	-	-
Critical Hdwy	6.65	6.24	4.14	-	-	-
Critical Hdwy Stg 1	5.65	-	-	-	-	-
Critical Hdwy Stg 2	5.65	-	-	-	-	-
Follow-up Hdwy	3.725	3.336	2.236	-	-	-
Pot Cap-1 Maneuver	226	684	1170	-	-	-
Stage 1	661	-	-	-	-	-
Stage 2	453	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	189	684	1170	-	-	-
Mov Cap-2 Maneuver	189	-	-	-	-	-
Stage 1	554	-	-	-	-	-
Stage 2	453	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.5	2.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1170	-	519	-	-
HCM Lane V/C Ratio	0.126	-	0.274	-	-
HCM Control Delay (s)	8.5	0	14.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.4	-	1.1	-	-

HCM 6th TWSC
 2: Limaburg Road & Timber Lane/Lakeland Park Drive

PM Horizon Year Build

Intersection												
Int Delay, s/veh	3.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕	↑	↕	↕	↕	↕
Traffic Vol, veh/h	3	0	11	26	0	19	9	423	7	8	346	10
Future Vol, veh/h	3	0	11	26	0	19	9	423	7	8	346	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	190	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	92	50	41	92	53	50	86	75	44	91	56
Heavy Vehicles, %	0	2	10	9	2	24	0	2	50	86	6	11
Mvmt Flow	8	0	22	63	0	36	18	492	9	18	380	18

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	976	962	389	964	962	492	398	0	0	501	0	0
Stage 1	425	425	-	528	528	-	-	-	-	-	-	-
Stage 2	551	537	-	436	434	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.3	7.19	6.52	6.44	4.1	-	-	4.96	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.19	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.19	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.39	3.581	4.018	3.516	2.2	-	-	2.974	-	-
Pot Cap-1 Maneuver	232	256	642	228	256	535	1172	-	-	741	-	-
Stage 1	611	586	-	521	528	-	-	-	-	-	-	-
Stage 2	522	523	-	585	581	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	210	246	642	214	246	535	1172	-	-	741	-	-
Mov Cap-2 Maneuver	210	246	-	214	246	-	-	-	-	-	-	-
Stage 1	602	572	-	513	520	-	-	-	-	-	-	-
Stage 2	480	515	-	551	567	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	14.3		25.5		0.3		0.4	
HCM LOS	B		D					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1172	-	-	416	273	741	-	-
HCM Lane V/C Ratio	0.015	-	-	0.072	0.364	0.025	-	-
HCM Control Delay (s)	8.1	-	-	14.3	25.5	10	-	-
HCM Lane LOS	A	-	-	B	D	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	1.6	0.1	-	-

HCM 6th TWSC
3: Limaburg Road & Site Drive 1

PM Horizon Year Build

Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↔			↕
Traffic Vol, veh/h	21	19	420	26	6	376
Future Vol, veh/h	21	19	420	26	6	376
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	300	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	21	457	28	7	409

























Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	894	471	0	0	485
Stage 1	471	-	-	-	-
Stage 2	423	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	312	593	-	-	1078
Stage 1	628	-	-	-	-
Stage 2	661	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	310	593	-	-	1078
Mov Cap-2 Maneuver	310	-	-	-	-
Stage 1	628	-	-	-	-
Stage 2	656	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.6	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	310	593	1078	-
HCM Lane V/C Ratio	-	-	0.074	0.035	0.006	-
HCM Control Delay (s)	-	-	17.5	11.3	8.4	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0	-

HCM 6th Signalized Intersection Summary
 4: Limaburg Road & KY 18

PM Horizon Year Build

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	61	1500	155	101	1662	358	113	60	75	349	90	107
Future Volume (veh/h)	61	1500	155	101	1662	358	113	60	75	349	90	107
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1856	1870	1885	1841	1811	1811	1870	1856	1841	1885	1841
Adj Flow Rate, veh/h	102	1648	163	120	1847	453	116	131	119	266	327	141
Peak Hour Factor	0.60	0.91	0.95	0.84	0.90	0.79	0.73	0.79	0.63	0.83	0.81	0.76
Percent Heavy Veh, %	7	3	2	1	4	6	6	2	3	4	1	4
Cap, veh/h	83	1247	561	98	1260	553	200	217	182	530	570	471
Arrive On Green	0.05	0.35	0.35	0.05	0.36	0.36	0.12	0.12	0.12	0.30	0.30	0.30
Sat Flow, veh/h	1711	3526	1585	1795	3497	1535	1725	1870	1572	1753	1885	1560
Grp Volume(v), veh/h	102	1648	163	120	1847	453	116	131	119	266	327	141
Grp Sat Flow(s),veh/h/ln	1711	1763	1585	1795	1749	1535	1725	1870	1572	1753	1885	1560
Q Serve(g_s), s	7.5	55.0	11.5	8.5	56.0	41.7	9.9	10.4	11.3	19.4	22.8	10.8
Cycle Q Clear(g_c), s	7.5	55.0	11.5	8.5	56.0	41.7	9.9	10.4	11.3	19.4	22.8	10.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	83	1247	561	98	1260	553	200	217	182	530	570	471
V/C Ratio(X)	1.24	1.32	0.29	1.22	1.47	0.82	0.58	0.61	0.65	0.50	0.57	0.30
Avail Cap(c_a), veh/h	83	1247	561	98	1260	553	200	217	182	530	570	471
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	74.0	50.2	36.2	73.5	49.8	45.2	65.2	65.4	65.8	44.6	45.8	41.6
Incr Delay (d2), s/veh	175.5	150.4	0.3	162.4	214.3	9.5	11.8	11.9	16.8	3.4	4.2	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	12.3	71.8	7.8	13.7	91.3	23.3	8.6	9.5	9.0	13.7	16.6	7.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	249.5	200.7	36.5	235.9	264.1	54.7	76.9	77.3	82.6	48.0	50.0	43.2
LnGrp LOS	F	F	D	F	F	D	E	E	F	D	D	D
Approach Vol, veh/h		1913			2420			366			734	
Approach Delay, s/veh		189.3			223.5			78.9			48.0	
Approach LOS		F			F			E			D	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		25.0	15.0	61.5		54.0	14.0	62.5				
Change Period (Y+Rc), s		* 7	6.5	6.5		7.0	6.5	6.5				
Max Green Setting (Gmax), s		* 18	8.5	55.0		47.0	7.5	56.0				
Max Q Clear Time (g_c+1), s		13.3	10.5	57.0		24.8	9.5	58.0				
Green Ext Time (p_c), s		0.6	0.0	0.0		3.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			178.0									
HCM 6th LOS			F									
Notes												
User approved volume balancing among the lanes for turning movement.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

Attachment 8

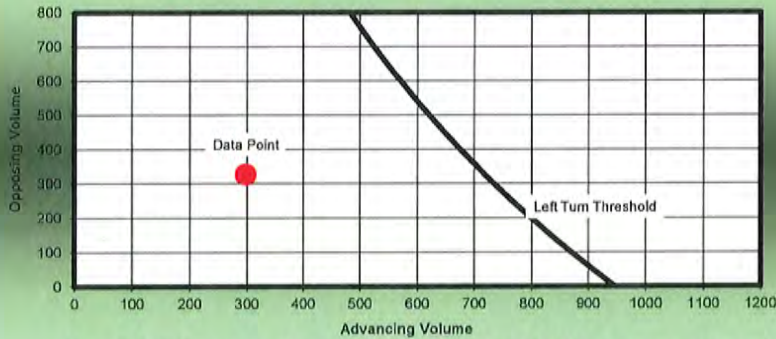
Turn Lane Analysis Sheets

AM Left Turn Lane Warrants

Input Fields

Left Turn Volume (vph)	10	Speed Limit (mph)	45
Advancing Volume (vph)	297	No. of through lanes	2
Opposing Volume (vph)	328	Percent Heavy Vehicles (decimal percent)	0.02

Left Turn Lane Warrants



Left Turn Lane NOT Warranted

Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

AM Right Turn Lane Warrants

Input Fields

Right Turn Volume (vph)	22	Speed Limit (mph)	45
Advancing Volume (vph)	328		



Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

PM Left Turn Lane Warrants

Input Fields

Left Turn Volume (vph)	6	Speed Limit (mph)	45
Advancing Volume (vph)	382	No. of through lanes	2
Opposing Volume (vph)	446	Percent Heavy Vehicles (decimal percent)	0.02



Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

PM Right Turn Lane Warrants

Input Fields

Right Turn Volume (vph) 26

Speed Limit (mph) 45

Advancing Volume (vph) 446



Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

	2NBL	2NBR	2SBL	3WBL	3WBR	4EBL	4EBR	4WBL	4WBR	4NBL	4NBR	4SBL	4SBR
2024 AM No Build													
Turn Queue?	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Turn Volume	3	39	26	0	0	65	48	25	336	81	49	255	38
Speed Limit	45	45	45	25	25	55	55	55	55	55	55	55	55
Cycle Length (0 seconds - Uncontrolled, 60 seconds- Stop Controlled)	0	0	0	60	60	160	160	160	160	160	160	160	160
Approach Percent Grade (G)	3	3	3	3	3	3	3	3	3	3	3	3	3
Rural Arterial	N	N	N	N	N	N	N	N	N	N	N	N	N
Deceleration Method 1 (feet)	220	220	220	125	125	340	340	340	340	340	340	340	340
Deceleration Method 2 (feet)	115	115	115	50	50	220	220	220	220	220	220	220	220
Deceleration Method 3 (feet)	340	340	340	0	0	485	485	485	485	485	485	485	485
Minimum (feet)	75	75	75	75	75	100	75	75	550	125	75	425	75
Method 1 (feet)	220	220	220	125	125	340	340	340	340	340	340	340	340
Method 2 Minimum (feet)	190	190	190	125	125	320	295	295	770	345	295	645	295
Method 3 Minimum (feet)	0	0	0	0	0	0	0	0	0	0	0	0	0
Calculated Minimum Length (feet)	190	190	190			320	295	295	770	345	295	645	295

	2NBL	2NBR	2SBL	3WBL	3WBR	4EBL	4EBR	4WBL	4WBR	4NBL	4NBR	4SBL	4SBR
2024 AM Build													
Turn Queue?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Turn Volume	3	39	26	19	8	79	48	25	344	81	49	263	49
Speed Limit	45	45	45	25	25	55	55	55	55	55	55	55	55
Cycle Length (0 seconds - Uncontrolled, 60 seconds- Stop Controlled)	0	0	0	60	60	160	160	160	160	160	160	160	160
Approach Percent Grade (G)	3	3	3	3	3	3	3	3	3	3	3	3	3
Rural Arterial	N	N	N	N	N	N	N	N	N	N	N	N	N
Deceleration Method 1 (feet)	220	220	220	125	125	340	340	340	340	340	340	340	340
Deceleration Method 2 (feet)	115	115	115	50	50	220	220	220	220	220	220	220	220
Deceleration Method 3 (feet)	340	340	340	0	0	485	485	485	485	485	485	485	485
Minimum (feet)	75	75	75	75	75	125	75	75	575	125	75	450	75
Method 1 (feet)	220	220	220	125	125	340	340	340	340	340	340	340	340
Method 2 Minimum (feet)	190	190	190	125	125	345	295	295	795	345	295	670	295
Method 3 Minimum (feet)	0	0	0	0	0	0	0	0	0	0	0	0	0
Calculated Minimum Length (feet)	190	190	190	125	125	345	295	295	795	345	295	670	295

	2NBL	2NBR	2SBL	3WBL	3WBR	4EBL	4EBR	4WBL	4WBR	4NBL	4NBR	4SBL	4SBR
2034 AM No Build													
Turn Queue?	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Turn Volume	3	43	29	0	0	71	53	28	370	89	54	280	42
Speed Limit	45	45	45	25	25	55	55	55	55	55	55	55	55
Cycle Length (0 seconds - Uncontrolled, 60 seconds- Stop Controlled)	0	0	0	60	60	160	160	160	160	160	160	160	160
Approach Percent Grade (G)	3	3	3	3	3	3	3	3	3	3	3	3	3
Rural Arterial	N	N	N	N	N	N	N	N	N	N	N	N	N
Deceleration Method 1 (feet)	220	220	220	125	125	340	340	340	340	340	340	340	340
Deceleration Method 2 (feet)	115	115	115	50	50	220	220	220	220	220	220	220	220
Deceleration Method 3 (feet)	340	340	340	0	0	485	485	485	485	485	485	485	485
Minimum (feet)	75	75	75	75	75	125	100	75	625	150	100	475	75
Method 1 (feet)	220	220	220	125	125	340	340	340	340	340	340	340	340
Method 2 Minimum (feet)	190	190	190	125	125	345	320	295	845	370	320	695	295
Method 3 Minimum (feet)	0	0	0	0	0	0	0	0	0	0	0	0	0
Calculated Minimum Length (feet)	190	190	190			345	320	295	845	370	320	695	295

	2NBL	2NBR	2SBL	3WBL	3WBR	4EBL	4EBR	4WBL	4WBR	4NBL	4NBR	4SBL	4SBR
2034 AM Build													
Turn Queue?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Turn Volume	3	43	29	19	8	85	53	28	378	89	54	288	53
Speed Limit	45	45	45	25	25	55	55	55	55	55	55	55	55
Cycle Length (0 seconds - Uncontrolled, 60 seconds- Stop Controlled)	0	0	0	60	60	160	160	160	160	160	160	160	160
Approach Percent Grade (G)	3	3	3	3	3	3	3	3	3	3	3	3	3
Rural Arterial	N	N	N	N	N	N	N	N	N	N	N	N	N
Deceleration Method 1 (feet)	220	220	220	125	125	340	340	340	340	340	340	340	340
Deceleration Method 2 (feet)	115	115	115	50	50	220	220	220	220	220	220	220	220
Deceleration Method 3 (feet)	340	340	340	0	0	485	485	485	485	485	485	485	485
Minimum (feet)	75	75	75	75	75	150	100	75	625	150	100	475	100
Method 1 (feet)	220	220	220	125	125	340	340	340	340	340	340	340	340
Method 2 Minimum (feet)	190	190	190	125	125	370	320	295	845	370	320	695	320
Method 3 Minimum (feet)	0	0	0	0	0	0	0	0	0	0	0	0	0
Calculated Minimum Length (feet)	190	190	190	125	125	370	320	295	845	370	320	695	320

	2NBL	2NBR	2SBL	3WBL	3WBR	4EBL	4EBR	4WBL	4WBR	4NBL	4NBR	4SBL	4SBR
2024 PM No Build													
Turn Queue?	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Turn Volume	8	6	7	0	0	43	141	92	314	103	69	316	80
Speed Limit	45	45	45	25	25	55	55	55	55	55	55	55	55
Cycle Length (0 seconds - Uncontrolled, 60 seconds- Stop Controlled)	0	0	0	60	60	160	160	160	160	160	160	160	160
Approach Percent Grade (G)	3	3	3	3	3	3	3	3	3	3	3	3	3
Rural Arterial	N	N	N	N	N	N	N	N	N	N	N	N	N
Deceleration Method 1 (feet)	220	220	220	125	125	340	340	340	340	340	340	340	340
Deceleration Method 2 (feet)	115	115	115	50	50	220	220	220	220	220	220	220	220
Deceleration Method 3 (feet)	340	340	340	0	0	485	485	485	485	485	485	485	485
Minimum (feet)	75	75	75	75	75	75	225	150	525	175	125	525	125
Method 1 (feet)	220	220	220	125	125	340	340	340	340	340	340	340	340
Method 2 Minimum (feet)	190	190	190	125	125	295	445	370	745	395	345	745	345
Method 3 Minimum (feet)	0	0	0	0	0	0	0	0	0	0	0	0	0
Calculated Minimum Length (feet)	190	190	190			295	445	370	745	395	345	745	345

	2NBL	2NBR	2SBL	3WBL	3WBR	4EBL	4EBR	4WBL	4WBR	4NBL	4NBR	4SBL	4SBR
2024 PM Build													
Turn Queue?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Turn Volume	8	6	7	21	19	56	141	92	327	103	69	318	99
Speed Limit	45	45	45	25	25	55	55	55	55	55	55	55	55
Cycle Length (0 seconds - Uncontrolled, 60 seconds- Stop Controlled)	0	0	0	60	60	160	160	160	160	160	160	160	160
Approach Percent Grade (G)	3	3	3	3	3	3	3	3	3	3	3	3	3
Rural Arterial	N	N	N	N	N	N	N	N	N	N	N	N	N
Deceleration Method 1 (feet)	220	220	220	125	125	340	340	340	340	340	340	340	340
Deceleration Method 2 (feet)	115	115	115	50	50	220	220	220	220	220	220	220	220
Deceleration Method 3 (feet)	340	340	340	0	0	485	485	485	485	485	485	485	485
Minimum (feet)	75	75	75	75	75	100	225	150	550	175	125	525	175
Method 1 (feet)	220	220	220	125	125	340	340	340	340	340	340	340	340
Method 2 Minimum (feet)	190	190	190	125	125	320	445	370	770	395	345	745	395
Method 3 Minimum (feet)	0	0	0	0	0	0	0	0	0	0	0	0	0
Calculated Minimum Length (feet)	190	190	190	125	125	320	445	370	770	395	345	745	395

	2NBL	2NBR	2SBL	3WBL	3WBR	4EBL	4EBR	4WBL	4WBR	4NBL	4NBR	4SBL	4SBR
2034 PM No Build													
Turn Queue?	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Turn Volume	9	7	8	0	0	48	155	101	345	113	75	347	88
Speed Limit	45	45	45	25	25	55	55	55	55	55	55	55	55
Cycle Length (0 seconds - Uncontrolled, 60 seconds- Stop Controlled)	0	0	0	60	60	160	160	160	160	160	160	160	160
Approach Percent Grade (G)	3	3	3	3	3	3	3	3	3	3	3	3	3
Rural Arterial	N	N	N	N	N	N	N	N	N	N	N	N	N
Deceleration Method 1 (feet)	220	220	220	125	125	340	340	340	340	340	340	340	340
Deceleration Method 2 (feet)	115	115	115	50	50	220	220	220	220	220	220	220	220
Deceleration Method 3 (feet)	340	340	340	0	0	485	485	485	485	485	485	485	485
Minimum (feet)	75	75	75	75	75	75	250	175	575	200	125	575	150
Method 1 (feet)	220	220	220	125	125	340	340	340	340	340	340	340	340
Method 2 Minimum (feet)	190	190	190	125	125	295	470	395	795	420	345	795	370
Method 3 Minimum (feet)	0	0	0	0	0	0	0	0	0	0	0	0	0
Calculated Minimum Length (feet)	190	190	190			295	470	395	795	420	345	795	370

	2NBL	2NBR	2SBL	3WBL	3WBR	4EBL	4EBR	4WBL	4WBR	4NBL	4NBR	4SBL	4SBR
2034 PM Build													
Turn Queue?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Turn Volume	9	7	8	21	19	61	155	101	358	113	75	349	107
Speed Limit	45	45	45	25	25	55	55	55	55	55	55	55	55
Cycle Length (0 seconds - Uncontrolled, 60 seconds- Stop Controlled)	0	0	0	60	60	160	160	160	160	160	160	160	160
Approach Percent Grade (G)	3	3	3	3	3	3	3	3	3	3	3	3	3
Rural Arterial	N	N	N	N	N	N	N	N	N	N	N	N	N
Deceleration Method 1 (feet)	220	220	220	125	125	340	340	340	340	340	340	340	340
Deceleration Method 2 (feet)	115	115	115	50	50	220	220	220	220	220	220	220	220
Deceleration Method 3 (feet)	340	340	340	0	0	485	485	485	485	485	485	485	485
Minimum (feet)	75	75	75	75	75	100	250	175	600	200	125	575	175
Method 1 (feet)	220	220	220	125	125	340	340	340	340	340	340	340	340
Method 2 Minimum (feet)	190	190	190	125	125	320	470	395	820	420	345	795	395
Method 3 Minimum (feet)	0	0	0	0	0	0	0	0	0	0	0	0	0
Calculated Minimum Length (feet)	190	190	190	125	125	320	470	395	820	420	345	795	395

Attachment 9

Completed CNG Case Study

To:	Kevan McLaughlan 38 Technology Drive, Suite 200 Irvine CA 92618	From:	Cathy Lawrence / Sandhya Perumalla 38 Technology Drive, Suite 200 Irvine CA 92618
File:	2042610819	Date:	November 21, 2022

Reference: CNG Groveport, OH Case Study – Trip Rates Summary

Stantec Consulting Services Inc. (Stantec) has performed an analysis of the driveway trips generated by the compressed natural gas (CNG)/alternative energy fueling station located in Groveport, OH. Preliminary trip generation estimates, based on general assumptions of truck delivery schedules, were prepared in support of the approval process of several proposed CNG fueling stations, including the Groveport site. Since the Groveport site has been completed and is operational, a case study of the driveway trips was undertaken to determine specialized trip generation rates specific to the CNG fueling stations for use with future traffic studies prepared for similar uses.

Site Description

The Groveport CNG site is located on the east side of Green Pointe Drive and consists of 52 timefill spaces and 2 fast-fill dispensing lanes. The site has two driveways: the south driveway is for inbound (eastbound) traffic, and the north driveway is for outbound (westbound) traffic. The project site is shown in Figure 1.

Driveway Data Collection

Inbound and outbound traffic counts were conducted by Quality Counts, LLC at the site driveways for three consecutive weekdays in early November 2022 (Tuesday, November 1 – Thursday, November 3). The counts differentiated between passenger vehicles and large trucks (i.e., buses, two-axle six-wheel trucks, and three or more axle trucks). The observed driveway trip count results for the three-day count are summarized in Table 1 (attached). The count data is also attached.

The driveway counts ranged from 151 daily trips to 163 daily trips during the three-day count, with an average of 159 daily trips. Of the average daily trips, 77 trips were generated by passenger vehicles and 82 trips were generated by trucks. The maximum number of daily trips was 163 trips, of which 78 were generated by passenger vehicles and 85 were generated by trucks.

During the typical AM peak hour (one hour between 7 AM and 9 AM), the total number of driveway trips ranged from 8 trips to 11 trips over the three-day count. The total average was 10 trips, with 5 inbound and 5 outbound trips during the AM peak hour. The maximum AM peak hour total during the three-day count was 11 trips with 6 inbound trips and 5 outbound trips. The number of passenger vehicle trips during the maximum AM peak hour count was 6 trips with 3 inbound trips and 3 outbound trips, and the number of truck trips was 5 trips with 3 inbound trips and 2 outbound trips.

During the typical PM peak hour (one hour between 4 PM and 6 PM), the total number of driveway trips ranged from 13 to 14 trips during the three-day count. The total average was 13 trips during the PM peak hour, with 6 inbound trips and 7 outbound trips. The maximum PM peak hour total was 14 trips with 6 inbound trips and 8 outbound trips. The number of passenger vehicle trips during the maximum count was 6 trips with 5 inbound trips and 1 outbound trip, and the number of truck trips was 8 trips with 1 inbound trip and 7 outbound trips.

Reference: CNG Groveport, OH Case Study – Trip Rates Summary

Trip Generation Rate Evaluation

To be conservative, the maximum observed daily, AM peak hour, and PM peak hour trips during the three-day count were used to calculate trip generation rates (on a per timefill space basis) for CNG fueling stations. Rates for total trips were estimated as well as rates for both passenger vehicles and trucks.

Table 2 summarizes the observed trip rates. As this table shows, the site generates 3.13 daily trips per timefill space, with 1.50 daily passenger trips per timefill space and 1.63 daily truck trips per timefill space. During the AM peak hour, the total trip generation rate is 0.22 trips per timefill space (0.12 inbound, 0.10 outbound), with 0.12 passenger trips per timefill space (0.06 inbound, 0.06 outbound) and 0.10 truck trips per timefill space (0.06 inbound, 0.04 outbound). During the PM peak hour, the total trip rate is 0.27 trips per timefill space (0.12 inbound, 0.15 outbound), with 0.12 passenger trips per timefill space (0.10 inbound, 0.02 outbound) and 0.15 truck trips per timefill space (0.02 inbound, 0.13 outbound).

Conclusions

Based on actual driveway counts at an existing CNG fueling station, the trip generation rates for CNG fueling stations are estimated to be 3.13 daily trips per timefill space, 0.22 AM peak hour trips per timefill space, and 0.27 PM peak hour trips per timefill space. The rates for passenger vehicles are 1.50 daily trips per timefill space, 0.12 AM peak hour trips per timefill space, and 0.12 PM peak hour trips per timefill space. The rates for trucks are 1.63 daily trips per timefill space, 0.10 AM peak hour trips per timefill space, and 0.15 PM peak hour trips per timefill space.

Stantec Consulting Services Inc.



Cathy Lawrence PE
Transportation Engineer

Phone: 949 923 6064
Cathy.Lawrence@stantec.com



Sandhya Perumalla ENV SP
Senior Transportation Planner

Phone: 949 923 6074
Sandhya.Perumalla@stantec.com

Attachment: Figure 1 – Case Study Project Site
Table 1 – Driveway Count Summary
Table 2 – CNG Fueling Station Trip Rates
Count Data

c. Daryl Zerfass, Stantec



Figure 1
Case Study Project Site
Page 3

November 21, 2022

Kevan McLaughlan

Page 4 of 5

Reference: CNG Groveport, OH Case Study – Trip Rates Summary

Table 1 Count Summary – Driveway Trips

Count Date	Daily	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Tuesday, Nov 1, 2022							
Total Vehicle Trips	151	6	5	11	6	8	14
Passenger Vehicle Trips	72	3	3	6	5	1	6
Truck Trips	79	3	2	5	1	7	8
Wednesday, Nov 2, 2022							
Total Vehicle Trips	163	6	5	11	6	7	13
Passenger Vehicle Trips	78	1	4	5	5	0	5
Truck Trips	85	5	1	6	1	7	8
Thursday, Nov 3, 2022							
Total Vehicle Trips	162	4	4	8	7	6	13
Passenger Vehicle Trips	80	1	3	4	6	0	6
Truck Trips	82	3	1	4	1	6	7
Average Total Vehicle Trips	159	5	5	10	6	7	13
Note: 52 timefill spaces Bold = Maximum							

November 21, 2022

Kevan McLaughlan

Page 5 of 5

Reference: CNG Groveport, OH Case Study – Trip Rates Summary

Table 2 CNG/Alternative Energy Fueling Station Trip Rate Summary

Vehicle Type	Trips per Timefill Space						
	Daily	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Total Vehicles	3.13	0.12	0.10	0.22	0.12	0.15	0.27
Passenger Vehicles	1.50	0.06	0.06	0.12	0.10	0.02	0.12
Trucks	1.63	0.06	0.04	0.10	0.02	0.13	0.15
Note: Trip rates based on maximum observed trips during 3 consecutive day counts and 52 timefill spaces							

Type of report: Tube Count - Vehicle Classification Data

LOCATION: 5870 Green Pointe Dr South Dwy
 QC JOB #: 15984001
 DIRECTION: EB
 DATE: Nov 1 2022

SPECIFIC LOCATION:
 CITY/STATE: Groveport, OH

Start Time	FHWA 1-3	FHWA 4-13	Total
12:00 AM	0	1	1
01:00 AM	2	4	6
02:00 AM	0	4	4
03:00 AM	1	0	1
04:00 AM	0	2	2
05:00 AM	0	5	5
06:00 AM	0	1	1
07:00 AM	3	3	6
08:00 AM	1	1	2
09:00 AM	0	1	1
10:00 AM	1	2	3
11:00 AM	0	2	2
12:00 PM	3	0	3
01:00 PM	1	0	1
02:00 PM	2	1	3
03:00 PM	3	3	6
04:00 PM	5	1	6
05:00 PM	3	0	3
06:00 PM	3	0	3
07:00 PM	3	1	4
08:00 PM	3	0	3
09:00 PM	1	1	2
10:00 PM	3	2	5
11:00 PM	0	0	0
Day Total	38	35	73
Percent	52.1%	47.9%	



AM Peak Volume	7:00 AM	5:00 AM	1:00 AM
	3	5	6
PM Peak Volume	4:00 PM	3:00 PM	3:00 PM
	5	3	6

Comments:

Report generated on 11/11/2022 12:54 PM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>)

Type of report: Tube Count - Vehicle Classification Data

LOCATION: 5870 Green Pointe Dr South Dwy

SPECIFIC LOCATION:

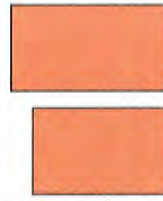
CITY/STATE: Groveport, OH

QC JOB #: 15984001

DIRECTION: EB

DATE: Nov 2 2022

Start Time	FHWA 1-3	FHWA 4-13	Total
12:00 AM	1	2	3
01:00 AM	1	0	1
02:00 AM	0	2	2
03:00 AM	1	3	4
04:00 AM	0	4	4
05:00 AM	2	4	6
06:00 AM	2	4	6
07:00 AM	1	5	6
08:00 AM	0	2	2
09:00 AM	0	4	4
10:00 AM	0	0	0
11:00 AM	2	4	6
12:00 PM	1	0	1
01:00 PM	1	2	3
02:00 PM	4	0	4
03:00 PM	5	1	6
04:00 PM	3	0	3
05:00 PM	1	2	3
06:00 PM	4	1	5
07:00 PM	4	1	5
08:00 PM	1	0	1
09:00 PM	1	1	2
10:00 PM	1	0	1
11:00 PM	2	2	4
Day Total	38	44	82
Percent	46.3%	53.7%	



ADT
82

AM Peak Volume	5:00 AM	7:00 AM	5:00 AM
	2	5	6
PM Peak Volume	3:00 PM	1:00 PM	3:00 PM
	5	2	6

Comments:

Report generated on 11/11/2022 12:54 PM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>)

Type of report: Tube Count - Vehicle Classification Data

LOCATION: 5870 Green Pointe Dr South Dwy

SPECIFIC LOCATION:

CITY/STATE: Groveport, OH

QC JOB #: 15984001

DIRECTION: EB

DATE: Nov 3 2022

Start Time	FHWA 1-3	FHWA 4-13	Total
12:00 AM	1	1	2
01:00 AM	2	1	3
02:00 AM	1	1	2
03:00 AM	0	3	3
04:00 AM	0	8	8
05:00 AM	0	2	2
06:00 AM	1	2	3
07:00 AM	1	1	2
08:00 AM	1	3	4
09:00 AM	3	5	8
10:00 AM	1	2	3
11:00 AM	1	1	2
12:00 PM	2	1	3
01:00 PM	1	1	2
02:00 PM	4	0	4
03:00 PM	6	1	7
04:00 PM	2	3	5
05:00 PM	1	0	1
06:00 PM	2	1	3
07:00 PM	1	0	1
08:00 PM	4	0	4
09:00 PM	2	1	3
10:00 PM	2	2	4
11:00 PM	1	0	1
Day Total	40	40	80
Percent	50%	50%	



AM Peak Volume	9:00 AM - 4:00 AM	4:00 AM	8
PM Peak Volume	3:00 PM - 4:00 PM	3:00 PM	7

Comments:

Report generated on 11/11/2022 12:54 PM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>)

LOCATION: 5870 Green Pointe Dr South Dwy

SPECIFIC LOCATION:

CITY/STATE: Groveport, OH

QC JOB #: 15984001

DIRECTION: EB

DATE: Nov 1 2022 - Nov 3 2022

Start Time	FHWA 1-3	FHWA 4-13	Total
Grand Total	116 49.4%	119 50.6%	235
ADT 78			

Comments:

Report generated on 11/11/2022 12:54 PM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>)



Type of report: Tube Count - Vehicle Classification Data

LOCATION: 5870 Green Pointe Dr North Dwy

SPECIFIC LOCATION:

CITY/STATE: Groveport, OH

QC JOB #: 15984002

DIRECTION: WB

DATE: Nov 1 2022

Start Time	FHWA 1-3	FHWA 4-13	Total
12:00 AM	0	1	1
01:00 AM	3	3	6
02:00 AM	4	1	5
03:00 AM	1	0	1
04:00 AM	2	0	2
05:00 AM	4	0	4
06:00 AM	3	0	3
07:00 AM	1	1	2
08:00 AM	3	2	5
09:00 AM	1	1	2
10:00 AM	0	1	1
11:00 AM	3	1	4
12:00 PM	0	1	1
01:00 PM	2	1	3
02:00 PM	0	4	4
03:00 PM	1	4	5
04:00 PM	1	7	8
05:00 PM	0	3	3
06:00 PM	0	3	3
07:00 PM	1	3	4
08:00 PM	1	3	4
09:00 PM	1	1	2
10:00 PM	1	0	1
11:00 PM	1	3	4
Day Total	34	44	78
Percent	43.6%	56.4%	
ADT 78			
AM Peak Volume	2:00 AM 4	1:00 AM 3	1:00 AM 6
PM Peak Volume	1:00 PM 2	4:00 PM 7	4:00 PM 8

Comments:

Report generated on 11/11/2022 1:00 PM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>)

Type of report: Tube Count - Vehicle Classification Data

LOCATION: 5870 Green Pointe Dr North Dwy
SPECIFIC LOCATION:
CITY/STATE: Groveport, OH

QC JOB #: 15984002
DIRECTION: WB
DATE: Nov 2, 2022

Start Time	FHWA 1-3	FHWA 4-13	Total
12:00 AM	2	1	3
01:00 AM	0	1	1
02:00 AM	2	0	2
03:00 AM	4	0	4
04:00 AM	3	0	3
05:00 AM	5	0	5
06:00 AM	3	1	4
07:00 AM	4	1	5
08:00 AM	3	1	4
09:00 AM	2	3	5
10:00 AM	0	1	1
11:00 AM	2	3	5
12:00 PM	1	0	1
01:00 PM	1	1	2
02:00 PM	1	0	1
03:00 PM	1	6	7
04:00 PM	0	7	7
05:00 PM	0	2	2
06:00 PM	1	2	3
07:00 PM	1	5	6
08:00 PM	1	2	3
09:00 PM	1	0	1
10:00 PM	0	1	1
11:00 PM	2	3	5
Day Total	40	41	81
Percent	49.4%	50.6%	
ADT 81			
AM Peak Volume	5:00 AM 5	9:00 AM 3	5:00 AM 5
PM Peak Volume	11:00 PM 2	4:00 PM 7	3:00 PM 7

Comments:

Report generated on 11/11/2022 1:00 PM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>)

Type of report: Tube Count - Vehicle Classification Data

LOCATION: 5870 Green Pointe Dr North Dwy

SPECIFIC LOCATION:

CITY/STATE: Groveport, OH

QC JOB #: 15984002

DIRECTION: WB

DATE: Nov 3 2022

Start Time	FHWA 1-3	FHWA 4-13	Total
12:00 AM	1	1	2
01:00 AM	1	1	2
02:00 AM	0	2	2
03:00 AM	3	0	3
04:00 AM	8	0	8
05:00 AM	2	0	2
06:00 AM	2	1	3
07:00 AM	2	0	2
08:00 AM	3	1	4
09:00 AM	2	1	3
10:00 AM	3	2	5
11:00 AM	0	1	1
12:00 PM	2	3	5
01:00 PM	1	1	2
02:00 PM	2	1	3
03:00 PM	0	6	6
04:00 PM	0	6	6
05:00 PM	0	3	3
06:00 PM	1	1	2
07:00 PM	0	4	4
08:00 PM	0	4	4
09:00 PM	0	1	1
10:00 PM	3	1	4
11:00 PM	1	1	2
Day Total	37	42	79
Percent	46.8%	53.2%	



Time Period	Volume
4:00 AM - 2:00 AM	8
10:00 PM - 3:00 PM	3
AM Peak Volume	8
PM Peak Volume	3

Comments:

Report generated on 11/11/2022 1:00 PM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>)

SUMMARY - Tube Count - Vehicle Classification Data

Type of report: Tube Count - Vehicle Classification Data

LOCATION: 5870 Green Pointe Dr North Dwy CITY/STATE: Groveport, OH		QC JOB #: 15984002 DIRECTION: WB DATE: Nov 1 2022 - Nov 3 2022	
Start Time	FHWA 1-3	FHWA 4-13	Total
Grand Total	111	127	238
Percent	46.6%	53.4%	
ADT 79			

Comments:

Report generated on 11/11/2022 1:00 PM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>)



Type of report: Tube Count - Vehicle Classification Data

LOCATION: 5870 Green Pointe Dr South Dwy

SPECIFIC LOCATION:

CITY/STATE: Groveport, OH

QC JOB #: 15984001

DIRECTION: WB

DATE: Nov 1 2022

Start Time	FHWA 1-3	FHWA 4-13	Total
12:00 AM	0	0	0
01:00 AM	0	0	0
02:00 AM	0	0	0
03:00 AM	0	0	0
04:00 AM	0	0	0
05:00 AM	0	0	0
06:00 AM	0	0	0
07:00 AM	0	0	0
08:00 AM	0	0	0
09:00 AM	0	0	0
10:00 AM	0	0	0
11:00 AM	0	0	0
12:00 PM	0	0	0
01:00 PM	0	0	0
02:00 PM	0	0	0
03:00 PM	0	0	0
04:00 PM	0	0	0
05:00 PM	0	0	0
06:00 PM	0	0	0
07:00 PM	0	0	0
08:00 PM	0	0	0
09:00 PM	0	0	0
10:00 PM	0	0	0
11:00 PM	0	0	0
Day Total	0	0	0
Percent	0%	0%	0
ADT	0		
AM Peak Volume	12:00 AM	12:00 AM	12:00 AM
PM Peak Volume	12:00 PM	12:00 PM	12:00 PM

Comments:

Report generated on 11/11/2022 12:54 PM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>)

Type of report: Tube Count - Vehicle Classification Data

LOCATION: 5870 Green Pointe Dr South Dwy

SPECIFIC LOCATION:

CITY/STATE: Groveport, OH

QC JOB #: 15984001

DIRECTION: WB

DATE: Nov 2 2022

Start Time	FHWA 1-3	FHWA 4-13	Total
12:00 AM	0	0	0
01:00 AM	0	0	0
02:00 AM	0	0	0
03:00 AM	0	0	0
04:00 AM	0	0	0
05:00 AM	0	0	0
06:00 AM	0	0	0
07:00 AM	0	0	0
08:00 AM	0	0	0
09:00 AM	0	0	0
10:00 AM	0	0	0
11:00 AM	0	0	0
12:00 PM	0	0	0
01:00 PM	0	0	0
02:00 PM	0	0	0
03:00 PM	0	0	0
04:00 PM	0	0	0
05:00 PM	0	0	0
06:00 PM	0	0	0
07:00 PM	0	0	0
08:00 PM	0	0	0
09:00 PM	0	0	0
10:00 PM	0	0	0
11:00 PM	0	0	0
Day Total	0	0	0
Percent	0%	0%	
ADT			
0			
AM Peak Volume	12:00 AM	12:00 AM	12:00 AM
0	0	0	0
PM Peak Volume	12:00 PM	12:00 PM	12:00 PM
0	0	0	0

Comments:

Report generated on 11/11/2022 12:54 PM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>)

Type of report: Tube Count - Vehicle Classification Data

LOCATION: 5870 Green Pointe Dr South Dwy

SPECIFIC LOCATION:

CITY/STATE: Groveport, OH

QC JOB #: 15984001

DIRECTION: WB

DATE: Nov 3 2022

Start Time	FHWA 1-3	FHWA 4-13	Total
12:00 AM	0	0	0
01:00 AM	0	0	0
02:00 AM	0	0	0
03:00 AM	0	0	0
04:00 AM	0	0	0
05:00 AM	0	0	0
06:00 AM	0	0	0
07:00 AM	0	0	0
08:00 AM	0	0	0
09:00 AM	1	0	1
10:00 AM	1	0	1
11:00 AM	0	0	0
12:00 PM	0	0	0
01:00 PM	0	0	0
02:00 PM	0	0	0
03:00 PM	0	0	0
04:00 PM	0	0	0
05:00 PM	0	0	0
06:00 PM	0	0	0
07:00 PM	0	0	0
08:00 PM	0	0	0
09:00 PM	0	0	0
10:00 PM	1	0	1
11:00 PM	0	0	0
Day Total	3	0	3
Percent	100%	0%	



ADT
3

AM Peak Volume	9:00 AM	12:00 AM	12:00 AM
AM Peak Volume	1	0	0
PM Peak Volume	1	0	0

Comments:

Report generated on 11/11/2022 12:54 PM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>)

Type of report: Tube Count - Vehicle Classification Data SUMMARY - Tube Count - Vehicle Classification Data

LOCATION: 5870 Green Pointe Dr South Dwy QC JOB #: 15984001
 SPECIFIC LOCATION: DIRECTION: WB
 CITY/STATE: Groveport, OH DATE: Nov 1 2022 - Nov 3 2022

Start Time	FHWA 1-3	FHWA 4-13	Total
Grand Total	3	0	3
Percent	100%	0%	
ADT			

Comments: _____

Report generated on 11/11/2022 12:54 PM SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>)



**Clean Energy Truck Hub
5390 Limaburg Road, Boone County, KY
Zone Map Amendment and Conditional Use
Project Description and Justification Statement**

CT Realty has a contract to purchase 17.1 acres at 5390 Limaburg Road (Parcel ID 049.00-00-013.00), the current Stephens Golf Center, from SKAS Properties, LLC. CT Realty is the preferred national developer for Clean Energy. CT Realty and Clean Energy propose to develop a Clean Energy Truck Hub on the property at 5390 Limaburg Road. The Clean Energy Truck Hub will provide fueling, parking and accessory uses for a major e-commerce provider within the current market. The truck fleet will use renewable natural gas (RNG) fuel that is dispensed as compressed natural gas (CNG) instead of traditional diesel fuel.

The Clean Energy Truck Hub is a new and unique land use. The Boone County Planning Commission Zoning Administrator has determined that using the Boone County Zoning Regulations the proposed use is most closely classified as a “truck stop” because the Truck Hub is a truck fueling operation. The property at 5390 Limaburg Road is primarily designated I-1 Industrial One District, however, a small portion of the site that contains the access driveway is zoned RS Rural Suburban Residential District. The proposed use – Truck Hub/truck stop – is a permitted conditional use in the I-1 District, however, a zone map amendment is needed for the approximately 0.83-acre RS District portion of the site to change to I-1 District. CT Realty is requesting concurrent review and approval of a zone map amendment from RS District to I-1 District and for conditional use approval of the Truck Hub/truck stop.

Clean Energy Truck Hub Background Information

CT Realty is the preferred national developer for Clean Energy, the largest provider and distributor of natural gas as vehicle fuel in North America. Clean Energy has an agreement with a major e-commerce provider within the current market to provide low and negative carbon CNG to their sustainable truck fleet. These CNG trucks will be deployed to directly replace diesel trucks for transporting goods. Diesel trucks have dominated the transportation industry for over 80 years and have a fully developed support infrastructure for truck fueling and parking. Alternative technologies entering the market need similar infrastructure to compete with and eventually replace diesel trucks. The Clean Energy Truck Hub is exactly this: infrastructure for truck fueling and parking that makes it possible to replace diesel trucks.

Clean Energy sells this clean fuel to customers who are purchasing an increasingly large number of CNG-fleet trucks for regional trucking. This is the same product that fuels regional bus systems, airport shuttles, and refuse trucks. The environmental impacts are clear: less expensive for fleets, carbon neutral or carbon negative to the environment (zero environmental emission impact), 90% quieter than diesel engines, and it combines the cleanest fuel with the cleanest engines to cut carbon emissions. Clean Energy has over 565 stations that they own or operate throughout the U.S. and Canada. They have an excellent safety record and have safely operated over their 30-year history. The goal is to ensure that Boone County has the infrastructure in place to readily serve the next generation of logistic vehicles. These green trucks need this facility to stage their operation and compete against diesel.



the properties that are zoned RS District. The proposed buffer will comply with the Boone County Zoning Regulations, will contain a combination of evergreen and deciduous trees and shrubs and a berm or fence. Landscape buffers are proposed on the north and south side of the proposed entrance drive. Three office units are proposed north of the Fast-Fill area, behind the parking area security fence. A vehicle service area is designated for performing routine minor servicing of the trucks. Shelter awnings will be used for weather protection in servicing the trucks.

While the proposed use is classified as a truck stop, the Truck Hub will not have some of the elements typical of a truck stop land use. There will be no retail sales, no general consumer retail fueling, no showers, no laundry services, and no restaurant. The Truck Hub is not open to the public – access is restricted to vehicles for the e-commerce provider or approved fleet customers. The proposed site was chosen because of its proximity to the activities of the e-commerce provider, proximity to other industrial uses, and access to natural gas service. Typically truck stops are located at high traffic volume corner lot locations with easy access and/or visibility from interstates. These are not conditions that apply to this site.

CT Reality and Clean Energy recently obtained trip generation data for a Truck Hub they operate in central Ohio. The trip generation analysis was performed by a traffic engineering consultant. The analysis determined that the Truck Hub generates low levels of AM and PM peak hour trips and low daily trips when compared to other industrial uses. According to the analysis, the Truck Hub use generates 0.22 vehicles trips per Time-Fill parking spaces in the AM peak hour and 0.27 vehicles trips per Time-Fill parking spaces in the PM peak hour. Based on the proposed number of Time Fill spaces – 264 spaces – peak hour trips are estimated to be 59 trips in the AM peak hour and 72 trips in the PM peak hour. The destination for a majority of the trucks leaving the Truck Hub will be to the existing distribution centers located northwest of the airport, at or near the North Bend Road and I-275 interchange. Therefore most exiting vehicles are expected to turn right and go north. There will be trucks that turn left and head south to other locations.

Zone Map Amendment

5390 Limaburg Road is predominantly zoned I-1 Industrial One District. A small portion of the site – approximately 0.83 acres – is zoned RS Rural Suburban District. The RS District portion of the site is currently the driveway for the existing Stephens Golf Center. The driveway for the Truck Hub Is proposed in the same location of the existing driveway.

The Boone County Future Land Use Map designates the property as Recreational and Suburban Density Residential. The Recreational designation reflects the current condition/use of the golf center that has been in operation since about 1990/1992. The site is adjacent to planned and existing industrial uses and industrial zoning to the south, to the east and along most of the northern property line boundary. We believe that the Future Land Use Map reflects an existing condition. Long term use for recreation is not specified in the Future Land Use text for Subarea 11 Burlington and this property.

The current I-1 District zoning of the golf center does not permit commercial recreation uses and does not allow residential uses. Any permitted industrial use of the golf center property would need to obtain a zone map amendment for the RS District portion of the site to access the property. We believe the existing RS District is not a functional development option. It is not practical for the RS portion

Conditional Use Standards

Please consider the following when reviewing this conditional use request as they relate to Section 252, General Standards Applicable to All Conditional Uses:

1. *Will be harmonious with and in accordance with the general objectives or with any specific objective of the County's Comprehensive Plan, a specific corridor plan and/or the zoning order.*

The property is predominantly surrounded by industrial uses. We believe the conditions have changed with the amount of industrial development in the area and that the character has changed. Future Land Use Map designation does not reflect the changed conditions.

2. *Will be designed, constructed, operated, and maintained so as to be harmonious and appropriate in appearance with the existing or intended character of the general vicinity and shall not change the essential character of the same area.*

The concept plan for the Truck Hub includes buffers adjacent to existing residential uses. The use will be a low traffic generator and will not generate high levels of noise. The character of the area is dominated by industrial and warehousing uses and the proposed use is appropriate.

3. *Will be hazardous to existing or future neighboring uses.*

The neighboring properties will not suffer hazardous effects from the proposed use. Clean Energy has a strong safety record and will comply with county and federal rules and regulations. While the proposed use falls under the definition of a truck stop, the facility does not have retail sales, retail fuel, showers, laundry services, or a restaurant. The fueling at the site is not open to the general public. We believe there will be significant environmental benefits achieved by displacing more than 200 diesel trucks from daily use in Boone County.

4. *Will be served adequately by essential public facilities and services such as highways, streets, police and fire protection, drainage structures, refuse disposal, water and sewer, and schools; or that the persons or agencies responsible for the establishment of the proposed use shall be able to provide adequately any such services.*

Public services will adequately serve the property and on-site structures. Plans will be reviewed by the Fire Department, Engineering Department, and Utility Department(s) for confirmation of sufficient availability and capacity. Ample internal circulation is provided to provide access for trucks and commercial vehicles, and therefore fire vehicles and garbage trucks will be able to access and serve the site.

5. *Will not create excessive additional requirements at public cost for public facilities and services and will not be detrimental to the economic welfare of the community.*

The proposed Truck Hub will not strain public facilities/services or the economic welfare of the community. There will be low service demands for this operation.

6. *Will not involve uses, activities, process, materials, equipment, and conditions of operation that will be detrimental to any persons, property, or the general welfare by reason of excessive production of traffic, noise, smoke, fumes, glare, or odors.*

The facility will follow county landscape buffering and light standards in order to avoid nuisance to neighboring properties. CT Realty and Clean Energy will work with Boone





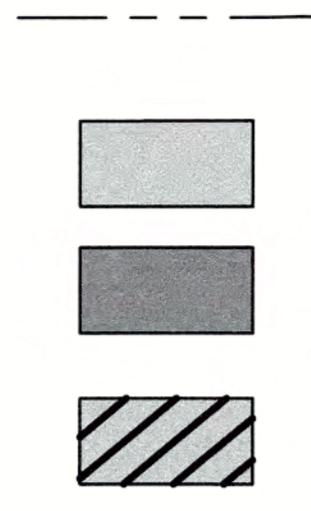
LEGEND

PROPERTY BOUNDARY

RESIDENTIAL SUBURBAN ZONE (RS)

INDUSTRIAL ZONE (I-1)

AREA TO BE REZONED FROM RS TO I-1
0.83 ACRES



PROJECT INFORMATION:

PROJECT NAME: CNG FUELING STATION
 PROJECT ADDRESS: 5390 LIMABURG RD, BURLINGTON KY
 PROJECT DESCRIPTION: INSTALLATION OF COMPRESSED NATURAL GAS VEHICLE FUELING STATION WITH ASSOCIATED CONTROLS EQUIPMENT PADS, CONNECTING PIPING, ELECTRICAL, SAFETY SYSTEMS, AND OTHER MINOR SITE WORK AT THE PROJECT SITE LISTED ABOVE.

ZONING INFORMATION:

JURISDICTION: BOONE COUNTY, KENTUCKY
 ZONING CLASSIFICATION: EXISTING RS & I-1 ; PROPOSED I-1
 I-1: INDUSTRIAL ZONE
 RS: RURAL SUBURBAN
 PLANNED LAND USE: CLEAN TRUCK FUELING HUB

SITE DATA:

SITE AREA: 17.2 AC
 PROPOSED FAST FILL AND EQUIPMENT COMPOUND AREA: 1.63 AC
 PROPOSED TIME FILL AND REGULAR PARKING AREA: 10.2 AC

PARKING AND SITE REQUIREMENTS:

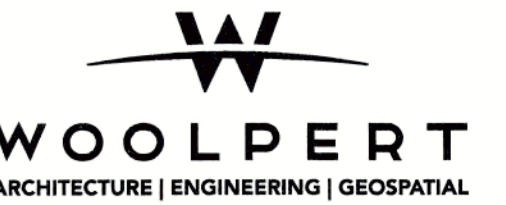
PARKING: REQUIRED
 STAGING:
 STANDARD 9'X18': 246
 TIME FILL TRUCK CAB 12'X30': 216
 BOX TRUCKS 12'X40': 92

OCCUPANCY CLASSIFICATION:

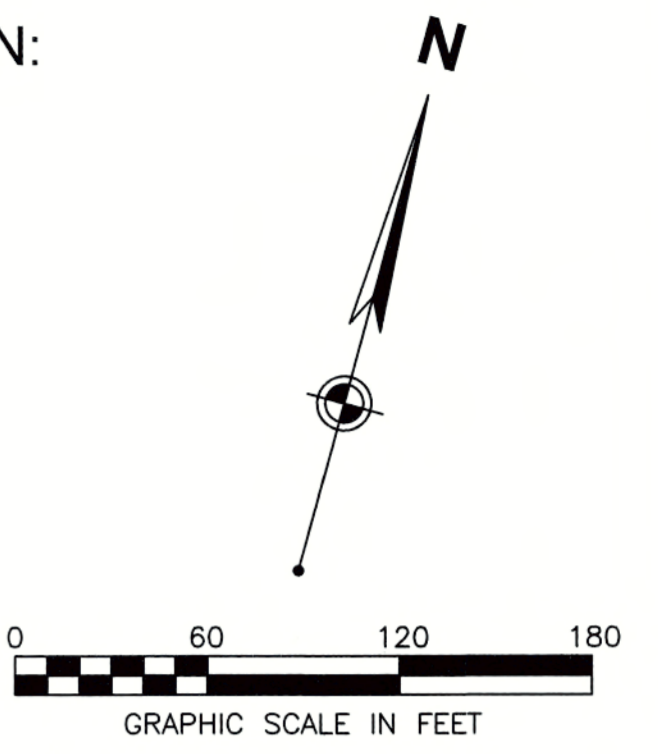
GROUP M - MERCANTILE

TYPE OF CONSTRUCTION:

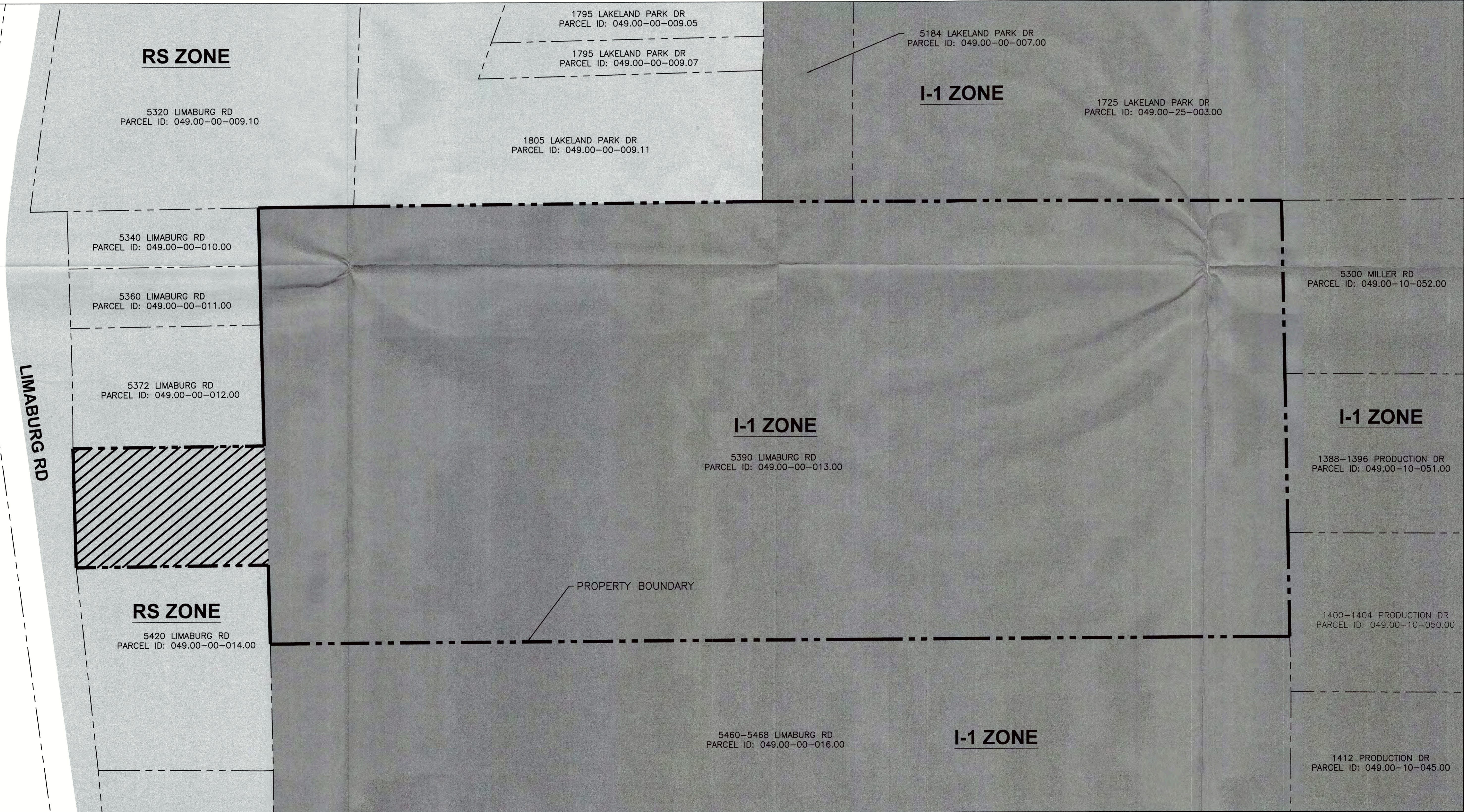
IIB



SELECT BLUE
DOWN ARROW
TO SELECT OFFICE



Layout Tab Name: Layout1
 Last Saved By: Henry, 3/30/2023 3:24:41 PM
 G:\BL\10015381_CNG_Fueling_Station\4.0_Design_Disciplines\4.03_Civil\Cadd\Exhibits\Zoning_Exhibit.dwg Plotted By: Henry, Lily, Plotted: March 31, 2023, 11:07:51 AM



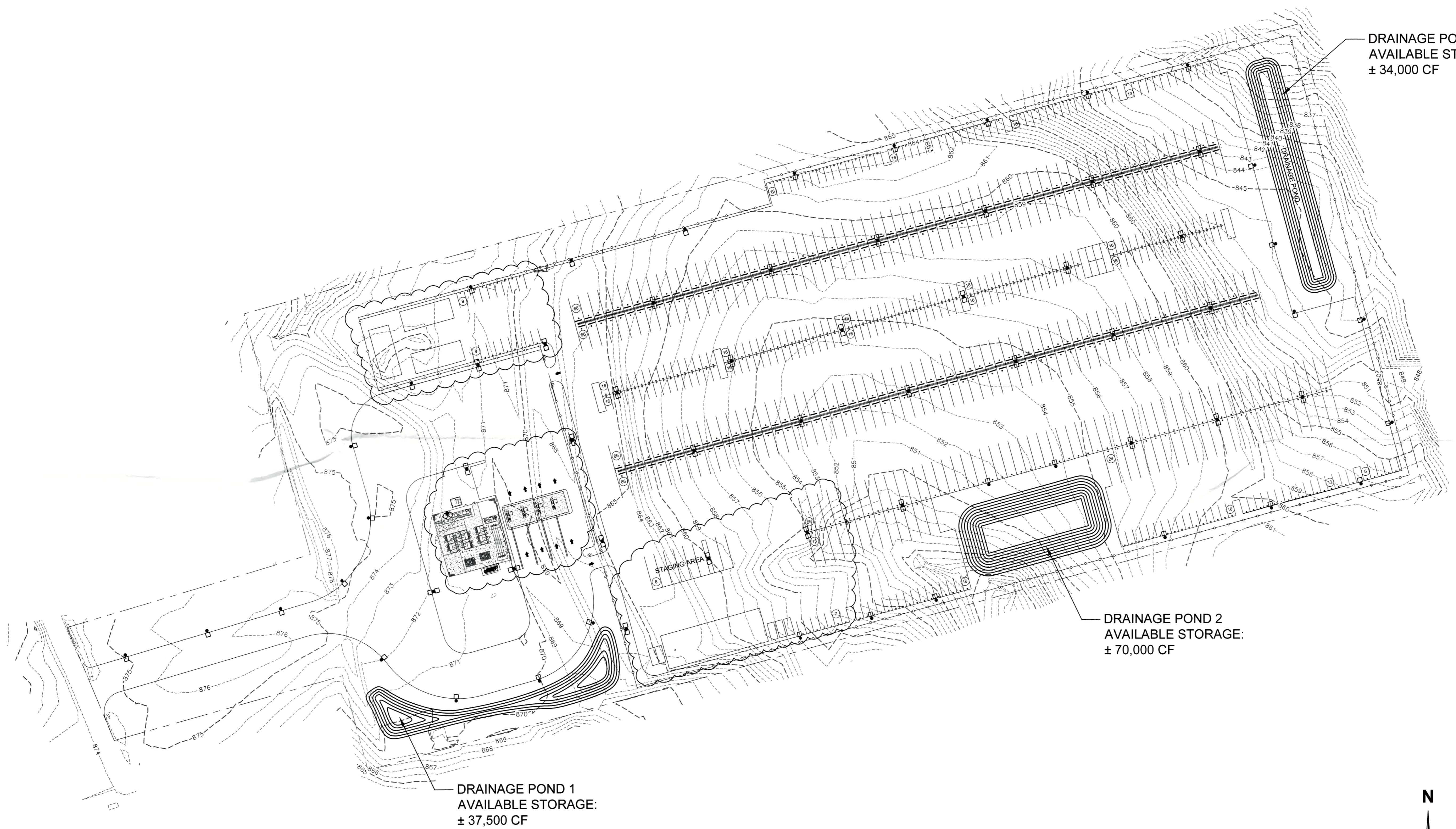
ISSUANCE SCHEDULE

CTR PARTNERS
CNG FUELING STATION

PROJECT NO: 10015381
 DATE ISSUED: 03/31/23
 DESIGNED BY: JW
 DRAWN BY: LMH
 CHECKED BY: SRK

SHEET NAME:
 ZONING EXHIBIT

SHEET NO:
1 OF 1



DRAINAGE POND 1
 AVAILABLE STORAGE:
 ± 37,500 CF

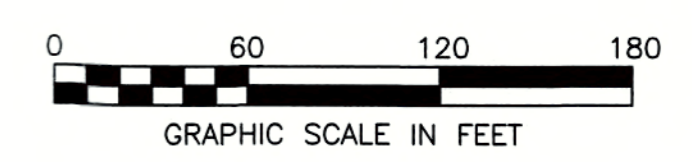
DRAINAGE POND 2
 AVAILABLE STORAGE:
 ± 70,000 CF

DRAINAGE POND 3
 AVAILABLE STORAGE:
 ± 34,000 CF

STAGING AREA

PARKING AND SITE REQUIREMENTS

PARKING:	REQUIRED	PROVIDED	STAGING
STANDARD 9'X18'	246	299	X
TIME FILL TRUCK CAB 12'X30'	216	264	X
BOX TRUCKS 12'X40'	92	92	8



ISSUANCE SCHEDULE	DESCRIPTION
NUMBER	DATE

CNG Fueling Station

PROJECT NO: 10015381
 DATE ISSUED:
 DESIGNED BY:
 DRAWN BY:
 CHECKED BY:

SHEET NAME:
 PRELIMINARY SITE
 PLAN EXHIBIT

SHEET NO:
C-000

Layout Tab Name: Layout1
 Last Saved By: Timko, 6/9/2023 8:34:06 AM
 G:\BL\10015381_CNG_Fueling_Station\4.0 Design Disciplines\4.03 CIVIL\Cadd\Exhibits\10015381-Site Exhibit.dwg Plotted By: Timko, Mike Plotted: June 9, 2023, 8:35:09 AM

PRELIMINARY PLANS

ISSUANCE SCHEDULE
 NUMBER DATE DESCRIPTION

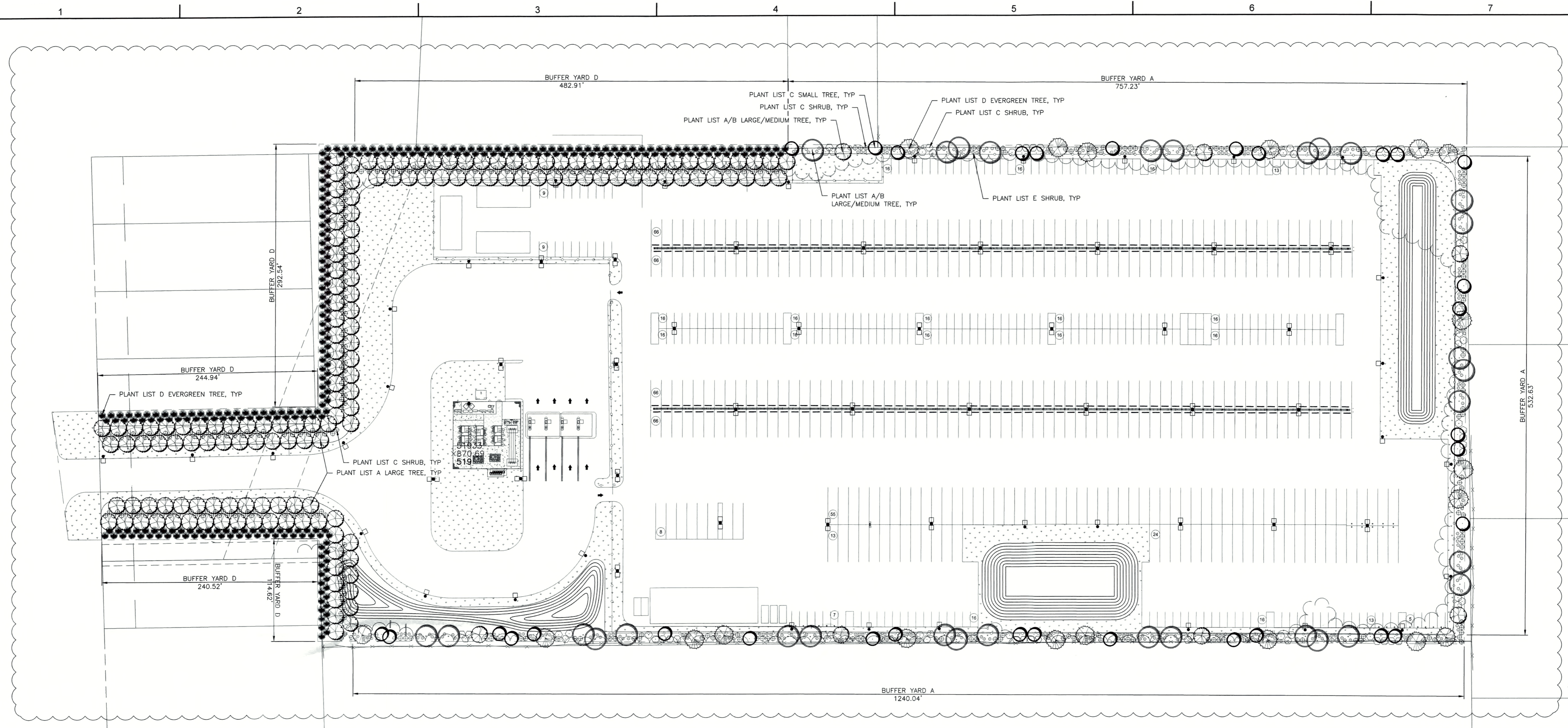
**CLEAN ENERGY FUELS
 CNG FUELING FACILITY**

5390 LIMABURG ROAD
 BURLINGTON, KENTUCKY 41005

PROJECT NO: 10015381
 DATE ISSUED: 6/9/23
 DESIGNED BY: XXX
 DRAWN BY: XXX
 CHECKED BY: XXX

SHEET NAME:
 LANDSCAPE PLAN

SHEET NO:
C-500



LANDSCAPE CODE SUMMARY

SECTION 3625 - INTERIOR LANDSCAPING FOR VEHICULAR USE AREAS (VUA)

VUA IS LOCATED IN INDUSTRIAL DISTRICT OUTSIDE THE FRONT YARD AND CORNER SIDE YARDS. NO TREES ARE REQUIRED.

SECTION 3645 - BUFFER YARDS

BUFFER YARD A - 10' WIDTH
 LENGTH OF PROPERTY ADJOINING ZONING DISTRICT I-1 = 2,530 FEET
 (757.23 + 532.63 + 1,240.04 = 2,529.90)

REQUIRED: 127 SMALL TREES (2,530/100 * 5) OR 76
 LARGE/MEDIUM CANOPY TREES (2,530/100 * 3) OR 76
 EVERGREEN TREES (2,530/100 * 3)

PROVIDED: 32 SMALL TREES, 38 CANOPY LARGE/MEDIUM CANOPY
 TREES, AND 19 EVERGREEN TREES
 (32/5) * 100 = 640 LF
 (38/3) * 100 = 1,267 LF
 (19/3) * 100 = 633 LF
 640 + 1,267 + 633 = 2,540 TOTAL LENGTH
 2,540 > 2,530 = QUANTITIES PROVIDED MEET CODE

REQUIRED: 759 SHRUBS FROM PLANT LIST E (2,530 / 100 *
 30) OR 380 SHRUBS FROM PLANT LIST C (2,530 / 100 * 15)

PROVIDED: 341 SHRUBS FROM PLANT LIST E AND 207 SHRUBS
 FROM PLANT LIST C
 (346/30) * 100 = 1,153 LF
 (207/15) * 100 = 1,380 LF
 1,153 + 1,380 = 2,533 TOTAL LENGTH
 2,533 > 2,530 = QUANTITIES PROVIDED MEET CODE

BUFFER YARD D - 40' WIDTH
 LENGTH OF PROPERTY ADJOINING ZONING DISTRICT RS = 1,376 FEET
 (114.62 + 240.52 + 244.94 + 292.54 + 482.91 = 1,375.53)

REQUIRED: 276 EVERGREEN TREES (1,376 / 100 * 20)
 PROVIDED: 283

REQUIRED 152 LARGE CANOPY TREES (1,376 / 100 * 11)
 PROVIDED: 157

REQUIRED 276 SHRUBS FROM PLANT LIST C (1,376 / 100 *
 20)
 PROVIDED: 284

Layout Tab Name: C-500 LANDSCAPE PLAN
 Last Saved By: Ryan E / 6/19/2023 10:56:18 AM
 W:\Spin\BL\Doyleton\10015381-CNG-Fueling Station\4.0-Design-Disciplines\4.03-CIVIL\Cadd\DWG\10015381-LAN.dwg Plotted By: Ryan, Jonathon Plotted: June 19, 2023, 10:57:25 AM

ISSUANCE SCHEDULE
 NUMBER DATE DESCRIPTION

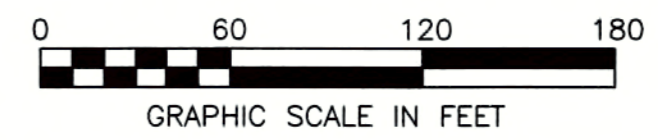
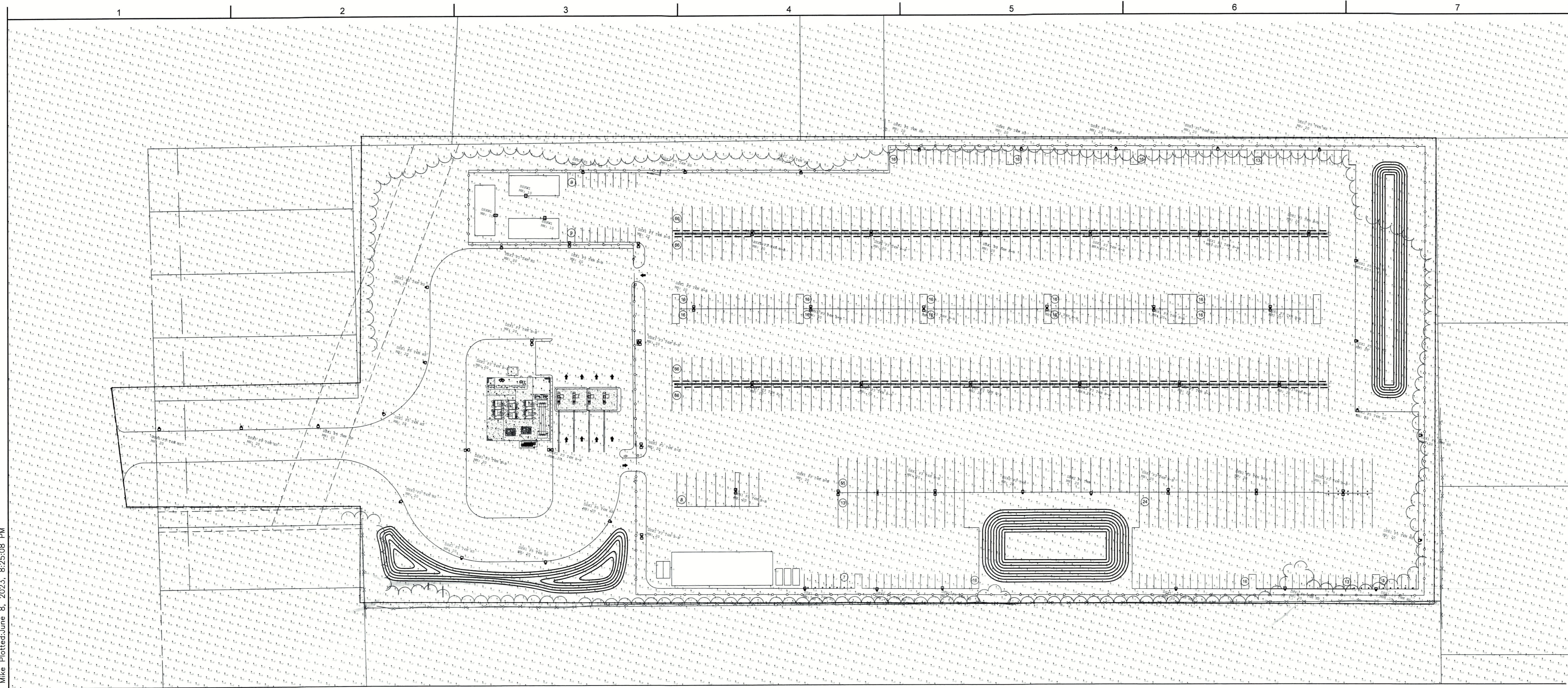
**CLEAN ENERGY FUELS
 CNG FUELING FACILITY**

PROJECT NO: 10015381
 DATE ISSUED: 6/9/23
 DESIGNED BY: DH
 DRAWN BY: DH
 CHECKED BY: RV

SHEET NAME:
 PHOTOMETRIC PLAN

SHEET NO:
C-600

5390 LIMABURG ROAD
 BURLINGTON, KENTUCKY 41005



Label	Avg	Max	Min	Avg/Min	Max/Min
CNG	2.95	7.4	1.2	2.46	6.17
OVERALL	0.74	7.9	0.0	N.A.	N.A.
PROPERTY LINE	0.10	0.9	0.0	N.A.	N.A.
PARKING	1.75	7.8	0.2	8.75	39.00
WEST PAVEMENT	1.83	5.6	0.1	18.30	56.00

Symbol	Qty	Tag	Arrangement	Description	LLF	Luminaire Lumens	Luminaire Watts	Total Watts
	32	DSX1 P3 T4M B-B	Back-Back	DSX1 LED P3 40K T4M MVOLT	0.900	12308	102	6528
	30	DSX1 P5 T4M HS	SINGLE	DSX1 LED P5 40K T4M MVOLT HS	0.900	12025	138	4140
	3	DSXW1	Single	DSXW1 LED 10C 350 40K T4M MVOLT	0.900	1458	13.3	39.9
	2	DSX2 P1 T4M	SINGLE	DSX2 LED P1 40K T4M MVOLT	0.900	18551	140	280
	1	DSX1 P3 T4M B-B	2 @ 90 degrees	DSX1 LED P3 40K T4M MVOLT	0.900	12308	102	204

Layout Tab Name: C-600 PHOTOMETRIC PLAN
 Last Saved By: Timko, 6/8/2023 8:24:41 PM
 C:\BL\10015381_CNG Fueling Station\4.0 Design Disciplines\4.03 CIVIL\Cadd\DWG\10015381-LTG.dwg Plotted By: Timko, Mike Plotted: June 8, 2023, 8:25:08 PM

SSS Square Straight Steel Poles

Lead times will vary depending on options selected. Consult with your sales representative. Example: SSS 20 SC DM19 DDB

Series	Nominal fixture mounting height	Nominal (short) base size/wall thickness	Mounting ¹	Options	Finish ²	
SSS	10'-39" (for 1/2 ft increments, add 6 to the pole height. Ex: 20'-6 equals 20' 6in.)	4C 4" 1 1/4" (11967) 4G 4" 7/8" (17937) 5C 5" 1 1/4" (11967) 5G 5" 7/8" (17937) 6C 6" 1 1/4" (11967) 6G 6" 7/8" (17937)	Tenon mounting PT Open top (includes top cap) T20 2-3/8" O.D. (2" NPS) T25 2-7/8" O.D. (2-1/2" NPS) T30 3-1/2" O.D. (3" NPS) T35 4" O.D. (3-1/2" NPS) KAC, RAD, KSE, KSE, KYR, KYE Drill mounting ³ DM19MT 1 at 90° DM20 2 at 180° DM20PL 2 at 180° with one side plugged DM20 2 at 90° DM20 3 at 90° DM20 4 at 90° CSV, GSK, RSL, AERS, OMERO™ BLA, ALI, DLI, DMI mounting ⁴ DM19AS 1 at 90° DM20AS 2 at 180° DM20AS 2 at 90° DM30AS 3 at 90° DM40AS 4 at 90° BLA, ALI, DLI, DMI mounting ⁴ DM19RAD 1 at 90° DM20RAD 2 at 180° DM20RAD 2 at 90° DM30RAD 3 at 120° DM40RAD 4 at 90° ESX Drill mounting ⁵ DM19ESX 1 at 90° DM20ESX 2 at 180° DM20ESX 2 at 90° DM30ESX 3 at 90° DM40ESX 4 at 90°	AERS™ Suspend drill mounting ⁶ DM19AST 1 at 90° DM20AST 2 at 180° DM20AST 2 at 90° DM30AST 3 at 90° DM40AST 4 at 90° NPL14xy 1/2" threaded nipple ⁷ NPL14xy 3/4" threaded nipple ⁷ NPL14xy 1" threaded nipple ⁷ ERHxy Extra handle ⁸ MAXX Match existing ⁹ USPOM United States point of manufacture ¹⁰ IC Interior coating ¹¹ UL UL listed with label (includes NEC compliant cover) NEC NEC 410.30 compliant gasketed handlehole (see UL Label)	Shipped installed LIAB Less anchor bolts (include when anchor bolts are not needed) VD Vibration damper TP Tamper resistant handlehole cover fasteners Hkxy Horizontal arm bracket (1 fixture) ¹² FLExy Fretless outlet less electrical ¹³ CP12xy 1/2" coupling ¹⁴ CP13xy 3/4" coupling ¹⁴ CP11xy 1" coupling ¹⁴ NPL12xy 1/2" threaded nipple ⁷ NPL14xy 3/4" threaded nipple ⁷ NPL14xy 1" threaded nipple ⁷ ERHxy Extra handle ⁸ MAXX Match existing ⁹ USPOM United States point of manufacture ¹⁰ IC Interior coating ¹¹ UL UL listed with label (includes NEC compliant cover) NEC NEC 410.30 compliant gasketed handlehole (see UL Label)	Standard colors DDBD Dark bronze DWHD White DNDL Black DMMD Medium bronze DNAD Natural aluminum DSS Sandstone DCC Charcoal gray DTG Teal/green DBR Bright red DSB Steel blue Architectural Colors and Special Finishes ¹⁵ Galvanized, Paint over Galvanized, RAL Colors, Custom Colors and Extended Warranty Finishes available.

- NOTES**
- Wall thickness will be signified with a "C" (1 Gauge) or a "G" (2 Gauge) in nomenclature. "C" - 6.196" / "G" - 6.1793"
 - PT open top poles include top cap. When ordering tenon mounting and drill mounting for the same pole, follow this example: DM20T2D.
 - The combination includes a required extra handlehole.
 - Refer to the fixture spec sheet for the correct drilling template pattern and orientation compatibility.
 - Insert "1" or "2" in designator for size: e.g. DM19AS12.
 - Specify location and orientation when ordering option.
 - For "x", specify the height above the base of pole in feet or feet and inches, separate feet and inches with a "."
 - Example: SF = 5 and 20' 3in = 20-3' 0in "x". Specify nomenclature from handlehole (A, B, C, D).
 - Refer to the handlehole orientation diagram below.
 - Example: 1/2" coupling at 7' 8", orientation C = CP12C5-K
 - Horizontal arm is 18" x 2-3/8" O.D. tenon standard, with radius curve providing 12" rise and 2-3/8" O.D. If ordering tenon horizontal arm at the same height, specify with Hkxy. Example: Hk20B.
 - Combination of tenon top and drill mount includes extra handlehole.
 - Must add original order number of receiving party.
 - Use when roof certifications are required.
 - Provides enhanced corrosion resistance.
 - Additional notes available: see www.lithonia.com/technotes or Architectural Colors brochure (Form No. 79A-1). Available by formal quote only, consult factory for details.

LITHONIA LIGHTING
OUTDOOR: One Lithonia Way, Conyers, GA 30012 Phone: 800-705-SERV (7378) www.lithonia.com
©1994-2021 Acuity Brands Lighting, Inc. All rights reserved. Rev. 01/22/21

D-Series Size 1 LED Area Luminaire



Specifications
EPA: 1.01 ft² (0.09 m²)
Length: 33" (83.8 cm)
Width: 13" (33.0 cm)
Height H1: 7-1/2" (19.0 cm)
Height H2: 3-1/2" (8.9 cm)
Weight (max): 27 lbs (12.2 kg)

Introduction
The modern styling of the D-Series is striking yet unobtrusive - making a bold, progressive statement even as it blends seamlessly with its environment. The D-Series distills the benefits of the latest in LED technology into a high performance, high efficacy, long-life luminaire. The outstanding photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. It is ideal for replacing up to 750W metal halide in pedestrian and area lighting applications with typical energy savings of 65% and expected service life of over 100,000 hours.

Ordering Information EXAMPLE: DSX1 LED P7 40K T3M MVOLT SPA NLTAIR2 PIRHN DDBXD

Series	LEDs	Color temperature	Distribution	Voltage	Mounting	
DSX1 LED	Forward optics P1 P4 P7 P9 P2 P5 P8 P3 P6 P9 Rotated optics P10 P12 P11 P13	30K 3000 K 40K 4000 K 50K 5000 K	T1S Type I Short (Automated) T2S Type II Short T2M Type II Medium T3S Type III Short T3M Type III Medium T4M Type IV Medium T7M Forward Throw Medium	TSVS Type V Very Short ¹ TSS Type V Short ¹ TSM Type V Medium ¹ TSW Type V Wide ¹ BLC Backlight control ¹ LCCO Left corner cutoff ¹ RCCO Right corner cutoff ¹	MVOLT ¹ 120V 208V 240V 277V 347V 480V	Shipped included SPA Square pole mounting RPA Round pole mounting ² WBA Wall bracket ³ SPUMBA Square pole universal mounting adaptor ⁴ RPU MBA Round pole universal mounting adaptor ⁴ Shipped separately KMBAS DDBXD 0 Most arm mounting bracket adaptor (specify finish) ⁵

Control options
Shipped installed
NLTAIR2 Single full generation 2 enabled¹⁶
PIRHN Network, high/low motion/ambient sensor¹⁷
PER NEMA twist-lock receptacle only (controls ordered separately)¹⁸
PERS Fine-gin receptacle only (controls ordered separately)¹⁹
PERK Seven-pin receptacle only (controls ordered separately)²⁰
DMG 0-10V dimming wires gasket outside fixture (for use with an external control, ordered separately)²¹
DS Dual switching²²

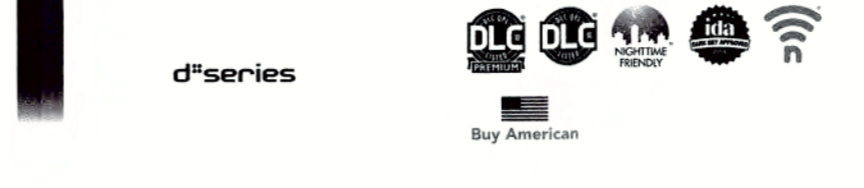
Other options
PIR High-flow, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 56"¹⁷
PIRHN High-flow, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 56"¹⁷
PIRHNFCV High-flow, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 16"¹⁷
PIRHNFCV High-flow, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 16"¹⁷
FAO Field adjustable output²³

Shipped installed
HS Haze-side shield²⁴
SF Single face (120, 277, 347V)¹
DF Double face (208, 240, 480V)¹
L90 Left rotated optics¹
R90 Right rotated optics¹
HA 50°C ambient operations¹
Shipped separately
BS Bird spikes²⁵
EGS External glare shield

Finish
DDBD Dark bronze
DNDL Black
DNAD Natural aluminum
DWHD White
DMDD Textured dark bronze
DRLBD Textured black
DNATD Textured natural aluminum
DWHGD Textured white

LITHONIA LIGHTING
COMMERCIAL OUTDOOR
One Lithonia Way • Conyers, Georgia 30012 • Phone: 1-800-705-SERV (7378) • www.lithonia.com
© 2011-2020 Acuity Brands Lighting, Inc. All rights reserved.
DSX1-LED Rev. 07/30/20 Page 1 of 8

D-Series Size 2 LED Area Luminaire



Specifications
EPA: 1.1 ft² (0.10 m²)
Length: 40" (101.6 cm)
Width: 15" (38.1 cm)
Height H1: 7-1/4" (18.4 cm)
Height H2: 3-5" (8.9 cm)
Weight: 36lbs

Introduction
The modern styling of the D-Series is striking yet unobtrusive - making a bold, progressive statement even as it blends seamlessly with its environment. The D-Series distills the benefits of the latest in LED technology into a high performance, high efficacy, long-life luminaire. The outstanding photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. The Size 2 is ideal for replacing 400-1000W metal halide in area lighting applications with energy savings of up to 80% and expected service life of over 100,000 hours.

Ordering Information EXAMPLE: DSX2 LED P7 40K T3M MVOLT SPA NLTAIR2 PIRHN DDBXD

Series	LEDs	Color temperature	Distribution	Voltage	Mounting	
DSX2 LED	Forward optics P1 P5 P2 P6 P3 P7 P4 P8 Rotated optics P10 P13 P11 P14 P12	30K 3000 K 40K 4000 K 50K 5000 K	T1S Type I Short (Automated) T2S Type II Short T2M Type II Medium T3S Type III Short T3M Type III Medium T4M Type IV Medium T7M Forward Throw Medium	TSVS Type V Very Short ¹ TSS Type V Short ¹ TSM Type V Medium ¹ TSW Type V Wide ¹ BLC Backlight control ¹ LCCO Left corner cutoff ¹ RCCO Right corner cutoff ¹	MVOLT ¹ XXVOLT 127/148/200V ^{1,2} 120V ¹ 208V ¹ 277V ¹ 347V ¹ 480V ¹	Shipped included SPA Square pole mounting RPA Round pole mounting ² WBA Wall bracket ³ SPUMBA Square pole universal mounting adaptor ⁴ RPU MBA Round pole universal mounting adaptor ⁴ Shipped separately KMBAS DDBXD 0 Most arm mounting bracket adaptor (specify finish) ⁵

Control options
Shipped installed
NLTAIR2 Single full generation 2 enabled¹⁶
PIRHN Network, high/low motion/ambient sensor¹⁷
PER NEMA twist-lock receptacle only (no controls)¹⁸
PERS Fine-gin receptacle only (no controls)¹⁹
PERK Seven-pin receptacle only (no controls)²⁰
DMG 0-10V dimming wires gasket outside back of housing for external control (no controls)²¹
DS Dual switching²²

Other options
PIRHN Bi-level, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 56"¹⁷
PIRHNFCV High-flow, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 16"¹⁷
FAO Field Adjustable Output²³

Shipped installed
HS Haze-side shield²⁴
SF Single face (120, 277, 347V)¹
DF Double face (208, 240, 480V)¹
L90 Left rotated optics¹
R90 Right rotated optics¹
HA 50°C ambient operations¹
BAA Buy America/Act Compliant
Shipped separately
BS Bird spikes²⁵
EGS External glare shield

Finish
DDBD Dark bronze
DNDL Black
DNAD Natural aluminum
DWHD White
DMDD Textured dark bronze
DRLBD Textured black
DNATD Textured natural aluminum
DWHGD Textured white

LITHONIA LIGHTING
COMMERCIAL OUTDOOR
One Lithonia Way • Conyers, Georgia 30012 • Phone: 1-800-705-SERV (7378) • www.lithonia.com
© 2011-2021 Acuity Brands Lighting, Inc. All rights reserved.
DSX2-LED Rev. 07/19/21 Page 1 of 8

WOOLPERT
ARCHITECTURE | ENGINEERING | GEOSPATIAL
1203 Walnut Street, 2nd Floor
Cincinnati, OH 45202
513.272.8300

PRELIMINARY PLANS

ISSUANCE SCHEDULE	DESCRIPTION
NUMBER	DATE

CLEAN ENERGY FUELS
CNG FUELING FACILITY
5390 LIMABURG ROAD
BURLINGTON, KENTUCKY 41005

PROJECT NO: 10015381
DATE ISSUED: 6/9/23
DESIGNED BY: XXX
DRAWN BY: XXX
CHECKED BY: XXX

SHEET NAME:
PHOTOMETRIC PLAN

SHEET NO:
C-601

Layout Tab Name: C-601 PHOTOMETRIC PLAN
Last Saved By: Mike, 6/8/2023 8:24:41 PM
C:\BA\10015381_CNG Fueling Station\4.0 Design Disciplines\4.0 CIVIL\Cadd\DWG\10015381-LTG.dwg Plotted: June 8, 2023, 8:25:10 PM



August 2, 2023

Michael Schwartz
Zoning Administrator
Boone County Planning Commission
2950 Washington Street, Room 317
Burlington, Kentucky 41005

Via Email and Overnight Delivery

RE: Zone Map Amendment and Conditional Use Permit – CT Realty Investment Clean Energy Truck Hub 5390 Limaburg Road, Boone County, KY

Mr. Schwartz:

On behalf of CT Realty, Clean Energy and SKAS Properties, LLC, I am transmitting this letter to withdraw the zone map amendment and conditional use permit application for the property at 5390 Limaburg Road (Parcel ID 049.00-00-013.00), the existing Stephens Golf Center.

Please confirm that the application withdrawal is accepted and that no further action will be scheduled with the Planning Commission or Fiscal Court on this application.

Thank you for your time and coordination. Please contact me if needed.

Sincerely,

A handwritten signature in black ink that reads "Jonathan Woche".

Jonathan Woche, AICP, LEED GA
MDC #4714