



December 2, 2015

Ms. Margaret White
Project Manager
Town of Winchester
71 Mount Vernon Street
Winchester, MA 01890

Re: 416 Cambridge Street 40B Development Peer Review

Dear Ms. White:

Below please find our response to a comment letter from Weston & Sampson, dated October 30, 2015. For clarity, the comments are in italics while our responses are directly below in normal font.

Sewer System Evaluation

Comment: The sewer system for Winchester North will connect to the Town's wastewater collection system on Wainwright Road at sewer manhole SB-195. Wastewater discharged from the development flows by gravity on Wainwright Road to Cambridge Street and then to Everett Avenue and Edgewater Place before it enters the MWRA collection system.

The proposed development will produce a Title V flow of 17,270 gpd (157 bedrooms x 110 gpd/bedroom) and a peak flow of 69,080 gpd (17,270 gpd x 4 peaking factor).

Weston & Sampson evaluated the existing sewer infrastructure between Wainwright Road and the MWRA connection at Edgewater Place. As part of the evaluation, Weston & Sampson performed a hydraulic capacity analysis (Appendix A) of the sewers downstream of the proposed development and reviewed 2015 sewer manhole and sewer pipe inspection data of the area (Figure 1).

Response: The applicant acknowledges Weston & Sampson's recommendations for the sewer system rehabilitations associated with the downstream sewer lines. As such, the applicant has agreed to fund a \$2,400 per unit I&I fee, per the request of the Town's Engineering Department, which is greater than the estimated cost associated with the identified deficiencies.

Utility Plan Review

Comment: Weston & Sampson reviewed the Utility Plan (Sheet 6 of 14), produced by Bohler Engineering. The proposed 8-inch PVC service connection has a 5.0% slope. However, based on the invert elevations indicated on the plans and proposed pipe length of 88 lf, the slope is actually 5.93% $[(111.42 - 106.2) / 88 \text{ lf}]$. The Utility Plan should be revised to indicate the correct incoming invert elevation at the sewer manhole on Wainwright Road (107.42).



Response: The utility plan Sheet 6 has been modified to clarify the slope of the pipe at 2.0%.

Comment: *Weston & Sampson identified a potential conflict between the 8-inch PVC sewer service and 15-inch HDPE drain, 46 lf downstream of manhole SMH-1. The proposed sewer invert at this location is 109.12 and the proposed drain invert is 107.9. The elevation at the top of the 15-inch HDPE drain is 109.15. The layout of the sewer and drain infrastructure should be evaluated to determine if the sewer line could be laid under the drain. At a minimum, the slope of the sewer and/or drain should be revised to provide a minimum 12-inch separation.*

Response: The pipe crossing has been reevaluated and the requested separation distance is provided. This information is shown on the utility plan on Sheet C-6.

Comment: *All sewer pipes shall be SDR35 PVC pipe and all manholes shall be precast. The sewer system shall comply with all ASCE Manual on Engineering Practice – NO. 60, DEP, and Town of Winchester Requirements.*

Response: As requested, the sewer pipes have been modified to SDR 35 PVC pipes and all manholes precast. This is shown with a note on the bottom of Utility Plan C-6, as well as note #24 on the Grading & Utility Notes on Sheet 2.

Drain System Evaluation

Comment 1: *Document Adequate Drainage at Low Points and Impervious Areas – Show inlet capacity calculations comparing inlet capacity to proposed inflow.*

Response 1: Inlet capacities have been provided within the updated Drainage Report. Please refer to the “Hydraulic Capacity of Grate Inlet in Sump” chart included in Appendix F of the revised Drainage Report, showing that the proposed catch basins and yard drains will have adequate capacity to capture and pass the 100-year design storm flow with a maximum water depth of 3” or less at the grate.

Comment 2: *Preserve the existing hydrologic regime through the use of Low Impact Development (LID).*

Response 2: Based on the density of the project, many low impact development features are not feasible. However, the project does reduce Post-development drainage patterns to below the pre-development patterns, does minimize the amount of impervious area by putting the majority of parking in a parking garage within the building footprint, and directs runoff to multiple infiltration basins.

Comment 3: *Precipitation data was not NRCC Publication RR 93-5 as required. Drainage calculations shall be updated to reflect the required precipitation data, including pre and post construction flow rates and volumes.*



Response 3: Pre and Post construction flow rates and volumes (although analyzing volume is not a requirement of the State regulations) have been provided in the updated Drainage Report. It is notable that the project designs to the State standards of TP40 and not the Cornell Method as requested under the local ordinance. It is our understanding that the Cornell Method would only apply if the project drained to a Town storm sewer system. The drainage design has been revised so that the site does not drain to the Town storm sewer in Wainwright Road with the exception of a negligible overland flow from the proposed driveway aprons within the Wainwright Road right-of-way.

Comment 4: The 25-year design storm intensity for collection system design in the Hydraflow Storm Sewer results table should be confirmed and used consistently in the calculations. The results table uses varying intensities and is not consistent.

Response 4: The Hydraflow storm sewer results table in Appendix F of the Drainage report has been modified to be consistent within the calculations.

Comment 5: Analysis of the closed drainage system for the 100-year event velocity check and routing of overflows was not completed.

Response 5: Basin #1 discharges through a 12" diameter pipe at an outlet elevation of 114.79. The bottom elevation of the crushed stone envelope for basin #1 is 115.25 ft and the top of the stone is 120.75 ft. The HydroCAD calculations included in the drainage report show that the 100-year water surface elevation within basin #1 is 119.78 feet, which is within the crushed stone envelope of basin #1 and below any upstream catch basin grate elevations.

Basin #2 discharges through a 12" diameter pipe at an outlet elevation of 95.10. The bottom elevation of the crushed stone envelope for basin #2 is 94.40 ft and the top of the stone is 97.90 ft. The HydroCAD calculations included in the drainage report show that the 100-year water surface elevation within basin #1 is 96.98 feet, which is within the crushed stone envelope of basin #2 and below any upstream catch basin grate elevations.

The sizing of the riprap outlet pads for both basins is included in Appendix F of the revised drainage report.

Additionally, we have added a 100-year storm event analysis of the pipe network to illustrate that the system does not surcharge out of the grates in the 100-year storm event (see appendix F). Furthermore we provided catch basin inlet analysis to illustrate that the CB's will not back up beyond 3" during the 100-year storm event which is consistent with the freeboard provided on the plans so that all designed drainage patterns are consistent with assumptions presented in the report (see appendix F).

Comment 6: The proposed project includes a new connection from Infiltration Basin 2 to Town owned drainage system on Wainwright Road. Analysis of the Wainwright Road drainage system and downstream drainage is required for the 25, and 100 year storm events to confirm available capacity exists for the new flor.



- Response 6: The previously proposed connection from Infiltration Basin #2 to the Town owned drainage system in Wainwright Road has been eliminated. As such, additional analysis of the Wainwright road drainage system is not needed.
- Comment 7: Post construction volume calculations show an increase in runoff volume compared to existing conditions.*
- Response 7: So noted. Volumes draining to the wetland system to the rear of the site are greater than existing condition volumes. However, the design complies with State standards. It is notable that volumes flowing to the MADOT system within Cambridge Street do reduce volumes to below pre-existing conditions. This information is provided within the Drainage Report.
- Comment 8: Provide a profile drawing of utility crossings to avoid potential conflicts. There are several utility crossings along the route of the proposed drainage structures.*
- Response 8: Callouts have been provided on all utility crossings to show that conflicts do not exist. Please refer to Utility Sheet 6.
- Comment 9: Provide confirmation of maintenance inspection port installation. Inspection ports are not optional as show on the construction details sheet 14.*
- Response 9: Inspection ports have been provided on the drainage basins and are shown on the detail sheets. Please refer to plan Sheets 13 and 14.
- Comment 10: Is there adequate protection/collection for any runoff from the west slope?*
- Response 10: The west slope will be drained by a series of yard drains. Please refer to the pipe sizing and inlet capacity calculations in Appendix F of the Drainage Report showing adequate capacities. Yard drain grates are set at elevation 138.2 while the finished floor is 140.8.
- Comment 11: The outlet from Infiltration Basin 1 creates a new outlet at the Town line with Woburn. Based on the contours it appears that the new discharge location may direct runoff in a different direction. Additional information is required in this area. New overland flow to Woburn is not permitted.*
- Response 11: The Drainage Report has provided additional information showing the drainage patterns from Infiltration Basin #1. It is notable that all drainage areas exiting the site to the north flow to a single pond with associated wetlands north of the site.



Massachusetts Stormwater Management Standards Review

Standard 1

Comment 1: No New Untreated Discharges – No new stormwater conveyances (e.g., outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

Upon review of the Stormwater Drainage Report and Site Plan we have determined that the information presented is incomplete. Confirmation that all impervious area is tributary to the Stormceptor systems is required and explanation on why the outfall from Infiltration Basin 1 is not considered a new outfall.

Response 1: See above responses for additional information.

Standard 2

Comment 1: Peak Rate Attenuation – Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

Upon review of the Stormwater Drainage Report and Site Plan we have determined that the information as presented may be inaccurate. Additional runoff design points appear to be required which will affect the results.

Response 1: See above responses for additional information. The Proposed Drainage Tributary Map in Appendix C has been revised to provide additional labels for further clarification. A MassGIS map is provided in Appendix C of the Drainage Report showing how the area drains to the pond.

Standard 3

Comment 1: Recharge to Groundwater – Loss of annual recharge to ground water shall be eliminated or minimized through the use of infiltration measures.

Upon review of the Stormwater Management Report, Site Plan and hydrologic modeling computations we have determined that the attenuation calculations (Standard 2) and recharge calculations (Standard 3) require further update and modification. Upon receipt of updated calculations a determination of compliance with Standard 2 and Standard 3 can be verified.

Response 1: See above responses for additional information. The recharge calculations have been revised in Appendix E of the Drainage Report to reflect minor changes to the basin size, as a result of comments 4-8 under the “Standards 2 and 3 Comments” below.



Standards 2 and 3 Comments:

- Comment 1: It appears that the selection of two (2) stormwater design points is insufficient and will affect the pre and post construction peak flow rate comparison. The total area of 1.88 Acres for E-1 is not tributary to DP1. Overland flow to the property line that does not reach DP1 requires additional design points. Please provide an existing contour plan similar to sheet 5 Grading Plan with existing contours and additional design points only. Recalculate existing and proposed runoff rates with new design points.*
- Response 1: Please see the above discussion in response 11 relative to how the north side of the site drains to a single pond and associated wetlands, and therefore additional design points are not warranted.
- Comment 2: The inclusion of P-1 in the flow calculations at DP1 may show a false reduction of flow rate from the existing to proposed condition.*
- Response 2: Please see the above response.
- Comment 3: Design Point DP2 should be represented as two points in the proposed analysis. Existing runoff travels overland to Cambridge Street and to downstream drainage on Cambridge Street. Proposed runoff travels overland to Cambridge Street and piped from Infiltration Basin 1 to a drain on Wainwright Road.*
- Response 3: Design point P-2 has been broken into two separate areas as requested. Under existing and proposed conditions, the majority of the site drains directly to Cambridge Street, bypassing the existing catch basin on Wainwright Road. Please refer to the drainage area maps in Appendix C of the Drainage Report.
- Area P-2A was added to represent the 0.026 acres of mostly impervious area that is not captured by the proposed site drainage system, but flows into Wainwright Road and the existing catch basin and drainage system. This additional flow is unavoidable, as it is generated by area within the Wainwright Road right-of-way. However, the outflow from this area during the 25-year design storm is 0.10 cfs, which can be considered negligible with no adverse impact on the downstream drainage system.
- Comment 4: Provide backup data for ADS StormTech system to document volumes per depth of storage. (Storage vs Elevation Curve)*
- Response: 4: Back-up calculations based on Stormtech specifications demonstrating that the Stormtech volumes listed in the HydroCAD calculations are correct are provided in Appendix E of the revised drainage report. The HydroCAD calculations, the back-up sizing volume calculations, plans, and details are all based on the actual Stormtech unit dimensions. The surrounding stone envelope is based on the Stormtech unit layout dimensions plus one foot of stone on the both sides of the units plus three feet of stone on either end of the basin. To be conservative, the volumes of the manifolds are not included in the calculations.



Comment 5: Provide detailed HYDROCAD Data for runoff volumes per design point to compare with the summary sheets provided.

Response 5: A summary output of runoff volumes per design point is included at the beginning of Appendix D in the revised Drainage Report.

Comment 6: The dimensions provided for the field storage appear inaccurate as they do not account for a reduction for manifold and pipe connections. Is storage volume for the ADS StormTech system end caps included in the volume provided?

Comment 7: Confirm Prismatic dimensions on HYDROCAD Storage input

Comment 8: Document ADS StormTech effective area used in HYDROCAD.

Response: 6-8: Back-up calculations based on Stormtech specifications demonstrating that the Stormtech volumes listed in the HydroCAD calculations are correct are provided in Appendix E of the revised drainage report. The HydroCAD calculations, the back-up sizing volume calculations, plans, and details are all based on the actual Stormtech unit dimensions. The surrounding stone envelope is based on the Stormtech unit layout dimensions plus one foot of stone on the both sides of the units plus three feet of stone on either end of the basin. To be conservative, the volumes of the manifolds are not included in the calculations.

Comment 9: Provide a table summarizing pre and post primary outlet flow to each design point that correlates with the HYDROCAD output.

Response 9: The various nodes within HydroCAD have differing times of concentrations, and as such the time of peak flows are not the same for each node. Therefore, it is not possible to add the individual outlet discharges for each node and have them add up to the total design point discharge.

Standard 4

Comment 1: Standard 4 - Water Quality – Stormwater management systems must be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS).

Upon review of the Stormwater Management Report, Site Plan, hydrologic modeling computations, BMP sizing data, and TSS calculation worksheet the data is incomplete.

TSS calculation sheets need to be developed for each outlet train with all BMP's included. Deep Sump Catch Basin are not included and only one TSS worksheet was submitted. Confirm location of stormceptors and their ability to collect all impervious areas.



Response 1: An additional TSS removal worksheet was added for the deep sump catch basins draining to water quality units and then to the infiltration basin. The overall site TSS removal rate increased to 86.1% as documented in Appendix E of the revised Drainage Report.

Standard 5

Comment 1: Land Uses With Higher Potential Pollutant (LUHPPL)

Upon review of the Stormwater Management Report, Site Plan, and hydrologic modeling computations it appears that the project is not a LUHPPL with a high intensity parking lot and does not generate higher concern.

Response 1: No additional information is required.

Standard 6

Comment 1: Area of Critical Environmental Concern (ACEC)

Upon review of the Stormwater Management Report and Site Plan, the project does not appear to be in a ACEC.

Response 1: No additional information is required.

Standard 7

Comment 1: Project Classification – New Development or Redevelopment

Upon review of the Stormwater Management Report and Site Plan, the project appears to be in compliance as a new development project pending review of updated calculations.

Response 1: No additional information is required.

Standard 8

Comment 1: Construction Period Pollution Prevention – Erosion and Sedimentation Controls

Upon review of the Stormwater Management Report, the project appears to be incomplete. Please provide an itemized list of Construction Pollution Prevention measures. Potentially missing items include:

- *Stabilized Construction Exits – for offsite sediment protection*
- *Pavement Sweeping – for sediment removal*
- *Temporary Sedimentation Basins and Diversion Basins - as necessary for fine-grained*



- *sediment protection*
- *Dewatering Protocol – for sediment removal*

Response 1: The requested information will be included in the Stormwater Pollution Prevention Plan when it is prepared with the construction documents.

Standard 9

Comment 1: Operation and Maintenance Plan

*Upon review of the Stormwater Management Report the project appears to be incomplete. Please provide an itemized list of Operation and Maintenance Plan items. Potentially missing items include:
Long-Term Operation and Maintenance Plan components:*

- *Maintenance of Pavement Systems*
- *Maintenance of Vegetative areas*
- *Management of Snow and Ice*

Response 1: The Long Term Operation and Maintenance Plan in Appendix G of the Drainage Report has been revised to include the requested components.

Standard 10

Comment 1: Prohibition of Illicit Discharges

Upon review of the Stormwater Management Report and Site Plan, the project appears to be in compliance.

Response 10: No response necessary.

Water System Evaluation

Comment 1: Weston & Sampson completed an evaluation of the water system for the proposed 96 unit Winchester North apartment building located at 416 Cambridge Street in Winchester. The proposed building's water service will be obtained from the 10-inch water main in Wainwright Road. By changing the location of the normally closed division gate valve on Wainwright Road to the intersection with Cambridge Street, this 10-inch main will be included in the town's West High Service system. The purpose of this evaluation was to determine if the proposed apartment building would receive adequate water service (pressure and flows), and if it would have an adverse impact on town of Winchester's water distribution system. A computer based hydraulic model was used to evaluate the capabilities of the water distribution system in the area of the proposed apartment building.



Response 1: As noted in WSE 10/30/15 letter, the municipal water service to the site will be adequate. We have revised the utility plan to show the requested water service layout as shown on Utility Sheet 6.

Comment 2: The developer's site plans show the apartment building being served by an 8-inch water main off the town's 10-inch main in Wainwright Road. We recommend installing a 10-inch water main to serve the apartment building. The 10-inch water main should branch off into a three way manifold with a properly sized domestic water line, properly sized fire sprinkler service line, and a minimum of 8-inch line to serve the hydrants on the property. Each of the three lines should have a gate valve near the street/property line so that the three lines can be isolated separately. This is beneficial so that if one line were compromised, the gate valve could be closed and the remaining lines would still maintain service and pressure. Also, the maximum length of 6-inch hydrant lateral should be kept below 40 feet.

Response 2: Weston & Sampson provided a sketch of a possible water system extension into the site. Suggested lines sizes, valving, and branches were incorporated into the design documents. Additionally, hydrant locations were adjusted to improve separation from the main building.

Site/Civil Design Evaluation

Comment 1: Fire truck access is only provided to a portion of the front and a portion of the back of the building. It should also be noted that the vehicle access to the back of the building must travel under the building, which is a safety concern during a fire situation.

Response 1: This has been reviewed by the Winchester Fire Prevention Office and no response is needed.

Comment 2: The site plan, including the height of the building "pass-through", has been reviewed with the Winchester Fire Prevention Office and compliance with State Fire Prevention Codes has been confirmed.

Response 2: The size of the truck used in the Exhibit has been confirmed by the Winchester Fire Prevention Officer. Furthermore, the Exhibit (attached) has been modified to show improved access to the rear of the site after curb radii were enlarged in the rear parking lot.

Comment 3: The "Driveway Location Exhibit" indicates there is 106 feet of separation between turning movements. The distance between driveway openings is approximately half of this distance and is shorter than desirable. The developer should demonstrate that stacking of vehicles will not create a problem. The developer should demonstrate that site distance is adequate for all turning movements including vegetation and snow piles.

Response 3: This has been reviewed by the Towns peer review traffic engineer and all related comments have been addressed.



Comment 4: The "Snow Storage Exhibit" indicates designated areas but does not provide quantity. The northwest storage area is located behind a fire hydrant. This area is capable of

holding approximately 13,000 cubic feet if piled to 10-feet. This area would reach capacity after only 28-inches of snow assuming plowing of pavement only and 50% compaction. Additional storage locations will likely be required or excess snow will need to be moved off site.

Response 4: We have provided a snow storage location plan (see attached) where we believe the locations identified provide an adequate snow storage area. We would anticipate a condition in the Comprehensive Permit that would specify the owner's snow storage obligations and if after a certain quantity of snow is stored, the incremental additional snow would need to be removed from the property.

Comment 5: The "Loading Exhibit" indicates a truck parked without blocking any other parking spots, however there is a dumpster shown in the same location on the Site plan.

Response 5: The dumpsters will be stored inside the building and will not impact the loading area.

Comment 6: The developer should provide a sidewalk to Wainwright Road to accommodate future connection to pedestrian accessible sidewalks.

Response 6: A sidewalk connection is provided to Wainwright Road. Refer to Site Plan Sheet.

Comment 7: Retaining wall details were not provided. Drains should be provided behind retaining walls and the discharge points identified on the plans. The retaining wall west of the existing home is 11.5 feet tall and is very close to the existing building.

Response 7: A formal wall design will be provided with the Building Permit application. However, callouts for the wall drains have been added to Grading & Drainage Plan Sheet 5.

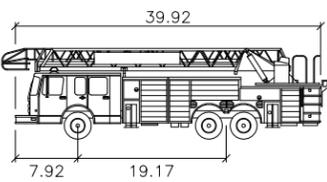
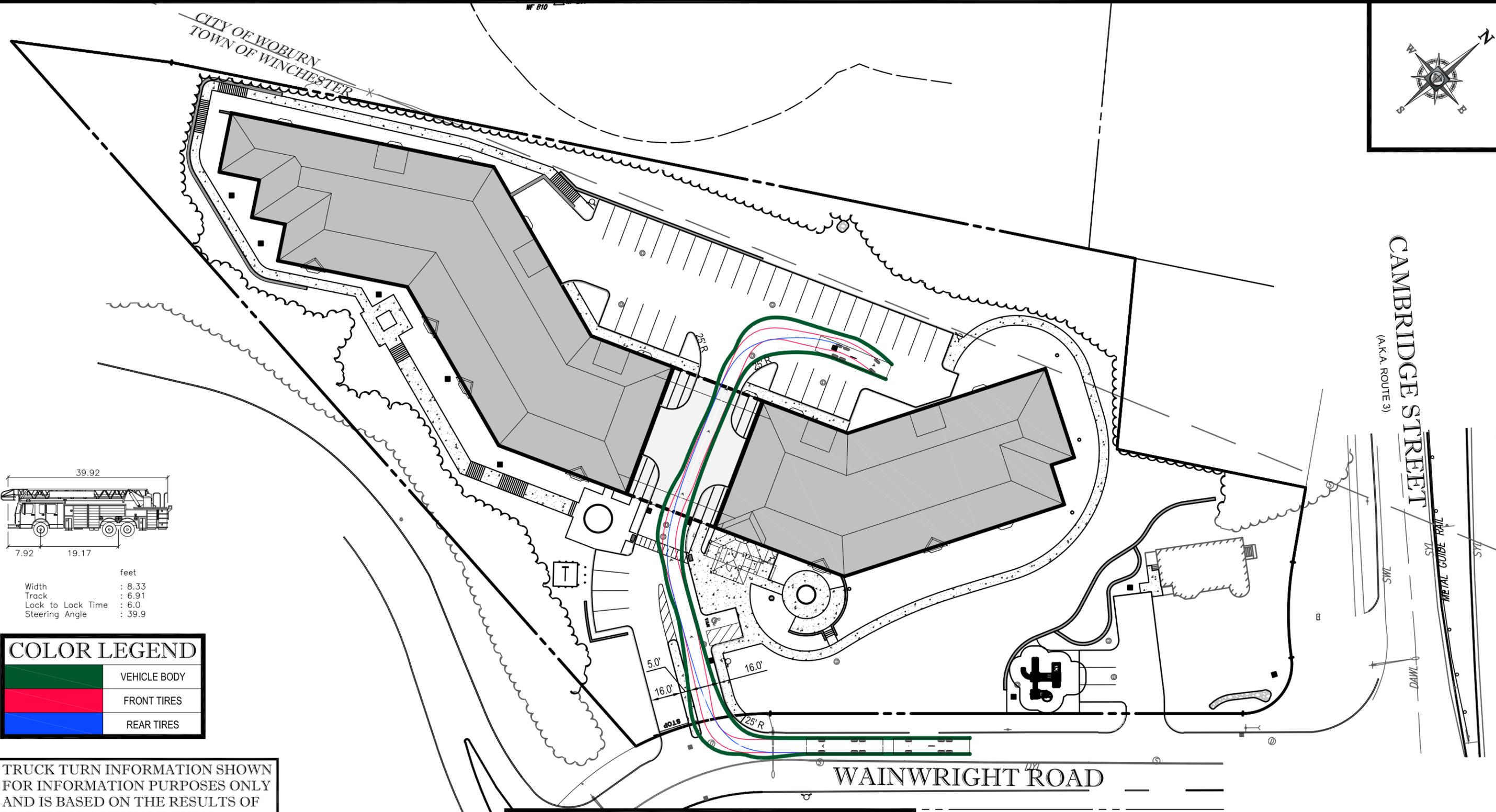
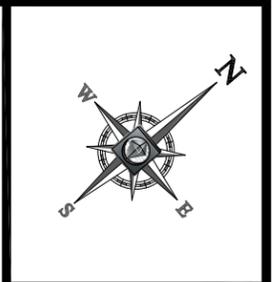
We trust the above and attached are sufficient for your needs at this time. Should you have any questions or require additional information, please do not hesitate to contact either of us at (508) 480-9900.

Sincerely,

BOHLER ENGINEERING

Jesse M. Johnson, P.E.

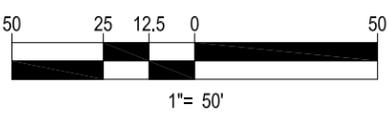
John A. Kucich, P.E.



feet
Width : 8.33
Track : 6.91
Lock to Lock Time : 6.0
Steering Angle : 39.9

COLOR LEGEND	
	VEHICLE BODY
	FRONT TIRES
	REAR TIRES

TRUCK TURN INFORMATION SHOWN FOR INFORMATION PURPOSES ONLY AND IS BASED ON THE RESULTS OF MODELING A VEHICLE TURN SIMULATION IN AUTOTURN VEHICLE SIMULATION SOFTWARE



FIRE TRUCK EXHIBIT
416 CAMBRIDGE STREET
WINCHESTER, MASSACHUSETTS
SCALE: 1"=50'
DATE: 12/02/15

PREPARED BY
 **BOHLER**
ENGINEERING

CAMBRIDGE STREET
(AKA. ROUTE 3)

WAINWRIGHT ROAD

CITY OF WOBURN
TOWN OF WINCHESTER

METAL GUIDE RAIL

DRAWN

7/15

7/15

7/15

7/15

7/15

7/15

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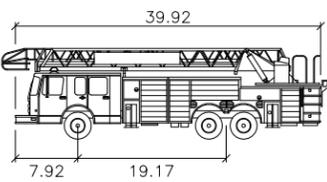
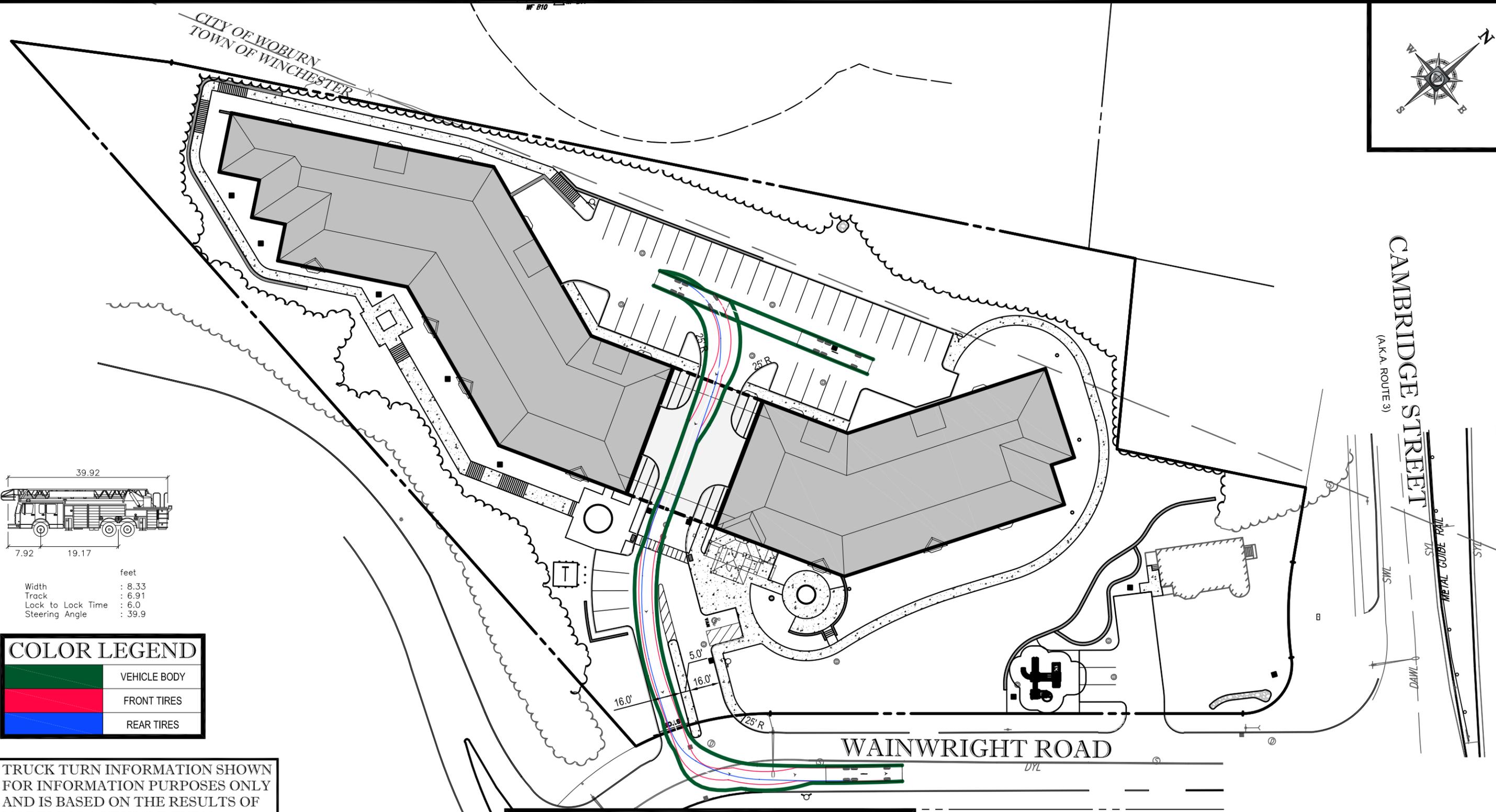
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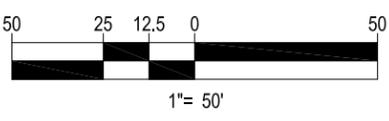
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	feet
Width	: 8.33
Track	: 6.91
Lock to Lock Time	: 6.0
Steering Angle	: 39.9

COLOR LEGEND	
	VEHICLE BODY
	FRONT TIRES
	REAR TIRES

TRUCK TURN INFORMATION SHOWN FOR INFORMATION PURPOSES ONLY AND IS BASED ON THE RESULTS OF MODELING A VEHICLE TURN SIMULATION IN AUTOTURN VEHICLE SIMULATION SOFTWARE



FIRE TRUCK EXHIBIT "B"
416 CAMBRIDGE STREET
WINCHESTER, MASSACHUSETTS
SCALE: 1"=50'
DATE: 12/02/15

PREPARED BY
 **BOHLER**
ENGINEERING



CAMBRIDGE STREET
(A.K.A. ROUTE 3)

SY
7/5

METAL GUIDE RAIL

SY
7/5

DAWN

WAINWRIGHT ROAD

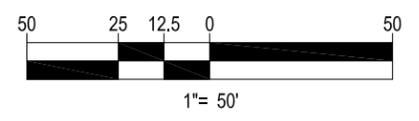
PROP. SNOW STORAGE AREA (TYP.)

NOTE: THE APPLICANT WILL ACCEPT AS A CONDITION OF ANY APPROVALS GRANTED FOR THE PROJECT A REQUIREMENT THAT SNOW WINDROWS ALONG THE PROJECT SITE FRONTAGE ON WAINWRIGHT ROAD WITHIN THE SIGHT TRIANGLE AREAS OF THE PROJECT SITE DRIVEWAY BE PROMPTLY REMOVED WHERE SUCH ACCUMULATIONS WOULD EXCEED 3-FEET IN HEIGHT.

SNOW STORAGE EXHIBIT

416 CAMBRIDGE STREET
WINCHESTER, MASSACHUSETTS

SCALE: 1"=50'
DATE: 12/02/15



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