Response to Staff Review Comments #1 dated January 30, 2018

FIRE/RESCUE DEPARTMENT

1. A Fire Department Connection (FDC) has been added to each building
2. The entry has been modified to only include a boulevard at the entrance. The remainder of the roadway meets the 20 foot passable width requirement.
3. We have added a fire hydrant on the south end of the storage buildings
4. We have roughly 170 feet of dead end which exceeds the 150 foot maximum per Appendix D. There is no room to add a turn-around. We can shorten the roadway and eliminate some parking and garage space. But this will have a negligible impact on the fire access to the proposed buildings. We request a waiver from the fire chief who we believe has the authority to do so.
5. We do not believe the code requires a full access around the garage between buildings E and D. Furthermore, this would reduce buffer space and increase impervious pavement area.

PUBLIC SERVICES DEPARTMENT

6. Electronic color utility plans were included in the original submittal in a folder titled color site drawings. Please let us know if a paper version is required.
7. The water connection to the Timberview property has been relocated to the east side of building E and a fire hydrant has been added.
8. We have updated the size of the water services to 1-1/2 inch but may update that further during final design.
9. Buildings C and D are up tight against the 30-foot setback to the east property line. The sanitary easement is 10 feet away from this line. We do not believe there are any issues with this placement.
10. The proposed sanitary sewer easement has been revised to 40 feet. Note that there may be other easements that overlap portions of this easement.
11. The size of the main sanitary trunk has been identified as 8-inch although final sizing will be determined during final design and permitting.

COMMUNITY DEVELOPMENT

12. The project summary has been updated with more specific information
13. We have clarified that the commercial outlots are not part of the PUD.
14. The residential density bonus has been corrected.
15. The parking data count has been corrected.
16. We have added a landscape plan for the 2 typical buildings. This eliminates a significant portion of the noise and detail of the plan.

17. Architectural plans have been updated to coordinate with the civil site plan. Renderings have been updated to reflect the proposed buildings.
18. We are not proposing easements to future adjacent developments.
19. A table of land areas is shown on the site layout. Dwelling Unit summaries are located on the Architectural Floor Plans
20. Legal descriptions of the overall property and the PUD project parcels have been added
21. A list of departures has been added to the project summary. Those departures are as follows:
    a. Reduced buffer to adjacent residential districts
    b. Increased drive aisle and maneuvering width
    c. Reduced dwelling unit size
    d. Building materials for storage buildings
22. A statement regarding soil excavation has been added to the grading plan.
23. The stormwater management infrastructure has been designed in accordance with Ottawa County Standards and Specification for Drain Commissioner's Approval dated September 9, 2005. We are not aware of a published groundwater protection strategy of the Township.
24. A note has been added to the utility plan stating that all new utilities will be underground.
25. Street lighting exceeds the minimum of the Township's Subdivision Control Ordinance. We feel that, as an apartment community, the increased density justifies increased lighting to provide a safe environment for the welfare of the tenants and public. No changes have been made.
26. The storage buildings are adjacent to an electric sub-station, a cell tower, and the rear of a grocery store delivery dock. We feel the proposed materials fit with this area and we are asking for a departure for this item.
27. Apartment building elevations have been revised to demonstrate a combination of architectural features
28. Landscaping around the apartment buildings has been revised.
29. Landscaping has been added to the east side of storage building 3
30. Additional building material information has been provided.
31. A detail of the decorative fence has been provided.
32. At our pre-application meeting, Derek mentioned that the proposed driveway from the commercial outlot would not be a problem. We intend to permit that as such and add an access from the outlot onto the main entrance driveway.
33. We have added the decreased residential transition area to our list of departures.
34. The parallel plan has been updated. The site layout now refers to the appropriate density figure of 123 units.
35. Driveways and structures across Robbins Road have been added.
36. The RR / C-1 parcel line east of the property has been added.
37. The Robbins Road Right-of-Way width has been added.
38. The building setback for the power pole easement is shown on the plans.

39. There are now 9 additional spaces beyond that required for dwelling units. These 9 spaces are allocated to the clubhouse use. This use is accessory to the apartments and not intended for any significant off site visitor use. The intended use would be for tenants who could walk to the clubhouse. With an estimated 3 employees staffing the office area, this allows for 6 visitors.

40. Regarding drive aisle widths, all dimension are to back of curb. Dimension of 24.5' or 25' represent a face or curb dimension of 24 feet plus the width of a concrete curb. We are proposing larger drive aisles or maybe more appropriately garage apron approaches in front of garages. In the interest of public safety, we feel it is necessary to provide additional room for turning movements into garages. A 24-foot face to face dimension is very difficult for larger vehicles to accomplish when including the structure of a garage and garage door. Furthermore, our desire to provide a barrier free access should include such additional spaces for larger vehicles. We also note that the 11,000 square feet of additional impervious pavement represents roughly 4% of the impervious material on site. We are requesting a departure from the ordinance for this requirement.

41. Landscape buffer has been added south of the southerly garage and east of the refuse area at Building D.

42. We feel that the commercial look of the proposed Robbins Road sign is in line with the sign ordinance and is in line with what is appropriate along Robbins Road.

43. As mentioned earlier, we feel the lighting, including bollard lights are necessary to provide a safe community.

44. Light fixture P8222 has been revised.

45. The landscape plan has been updated to reflect the stated greenbelt and other landscape deficiencies.

46. We are not proposing any changes to the landscape island locations. Those locations are chosen based on a number of factors including barrier free grading requirements, common vehicle turning capabilities, snow management, and stormwater drainage. The longest stretch of parking spaces is 15 spaces which is a very reasonable length of unbroken spaces.

DEVELOPMENT COVENANT

THIS DEVELOPMENT COVENANT ("Covenant") is made this ____ day of _____ 2017, by ENTITY TO BE FORMED, LLC, LLC, a Michigan limited liability company, with offices at 18000 Cove Street # 201, Spring Lake, MI 49456 ("Developer"), with reference to the following:

RECITALS

A. Developer proposes to develop an apartment community ("Development") on that real property legally described on Exhibit A (the "Property"), which Property is located within the Charter Township of Grand Haven ("Township").

R. As a condition to the Township's approval of the Development, the Township Zoning Ordinance requires that the Developer designate certain Open Space on the Property and that the Developer enter into this Covenant with respect to the preservation, management, and maintenance of the Open Space. The Open Space is legally described and depicted on the Site Plan ("Site Plan") attached as Exhibit B.

COVENANTS

NOW, THEREFORE, the Developer covenants as follows:

1. Preservation and Use of Open Space.
   a. The open space is protected from all forms of development except as shown on the approved site plan;
   b. The open space shall note be changed to another use without the consent of the Township;
   c. The proposed allowable use of the designated open space;
   d. The designated open space is maintained by the parties who have an ownership interest in the open space;
   e. The scheduled maintenance of the open space;
   f. The maintenance of the open space may be undertaken by the township in the event that the open space is inadequately maintained or becomes an nuisance. Further that, any costs incurred by the Township for such maintenance shall b eassessed against the property owners.

3. Recording. This Covenant may be recorded in the Office of the Ottawa County Register of Deeds.

4. Enforceability. This Covenant shall be enforceable only by the Developer and the Township and no other person shall have the right to enforce any provision contained herein.

5. Governing Law. This Covenant shall be governed by, and construed and interpreted in accordance with, the laws of the State of Michigan.

6. Run with the Land. This Covenant shall run with the land and be binding on all successors, assigns, and transferees of Developer.

IN WITNESS WHEREOF, the Developer has caused this Covenant to be executed and delivered as of the day and year first above written.

ENTITY TO BE FORMED, A LIMITED LIABILITY COMPANY, LLC, a Michigan limited liability company.

By: _____

Title: Authorized Agent

{Notary on next page}

STATE OF MICHIGAN

COUNTY OF OTTAWA

On ___, 2018, before me, a Notary Public, in and for said County, personally appeared _____ Authorized Agent, who acknowledged the execution of the foregoing instrument as her free act and deed.

_____
Notary Public
_____County, Michigan
My commission expires:_____

EXHIBIT B

Depiction and Legal Description of the Open Space

GRAND HAVEN CHARTER TOWNSHIP

Community Development Memo

DATE: January 30, 2018

TO: Chad Bush; Ben Robbins; Terry Nash

CC: Brian Sinnott; Mark Oppenhuizen

FROM: Stacey Fedewa, Community Development Director

RE: Apartments at Robbins Rd – PUD – Staff Review Comments No. 1

As required by the Grand Haven Charter Township Zoning Ordinance (Section 23.05), prior to the submission of the site plan to the Planning Commission the plans shall be reviewed by the Community Development Department, Fire/Rescue Department, and Public Services Department to determine whether the site plan complies with the requirements of all applicable state and federal laws and regulations, and with the requirements of all applicable Township Ordinances, resolutions, regulations and policies.

FIRE/RESCUE DEPARTMENT

Fire/Rescue does not approve the plans dated 1/16/2018, and offer the following comments:

- Plans shall identify compliance with IFC 2012 and NFPA 101 2012
- Suppression plans shall be submitted with construction plans. Fire/ Rescue will require a 5" stortz fitting for fire department connection at each building
- a careful review of IFC chapter 5 should be done specifically section 503 and 507
- the boulevard road width doesn't meet IFC requirements (chapter 5 section 503 identifies the requirements for fire department access roads)
- number of fire hydrants provided doesn't meet IFC requirements (A hydrant must be provided near the proposed self-storage units)
- the dead end between building C & A doesn't meet IFC requirements (Appendix D in the IFC provides examples of acceptable turnarounds)
- It is also recommended the dead end between building E & D be connected for a continuous radius around the garage.

PUBLIC SERVICES DEPARTMENT

Public Services does not approve the plans dated 1/16/2018, and offer the following comments:

GENERAL

- Please colorize the utility/civil plan for the next submission using the following key:
    - Water Blue
    - Sanitary Sewer Orange
    - Storm Sewer Green
    - Gas Yellow
    - Electric Red
    - Cable/Phone Purple

WATER

- The loop proposed to go to the Timberview property should be place on the east side of Building "E". A hydrant is required on the south end of the stub.
- Given the number of units in each building, a 1-inch will not be sufficient. Based on fixture calculations, propose a properly sized water service.

SEWER

- Buildings "C" and "D" are shown tight against the sanitary easement. In the event of a failure of the sewer, the building foundation will likely be impacted. Consider moving the buildings to the west, away from the sanitary easement.
- The size of the public right-of-way for the sanitary sewer must be 40-feet and cannot be combined with other easements.
- Note the size of the mainline trunk sewer on the plans.

COMMUNITY DEVELOPMENT

Community Development does not approve the plans dated 1/16/2018, and offer the following comments:

GENERAL COMMENTS

- Corrections needed:
    - Project Summary – please use firm numbers, especially for known figures such as the number of apartment buildings and garage units. Using the term approximately indicates these figures are subject to change and changing these numbers would result in a major PUD amendment.
    - It appears the intent of calling out A-1 and A-2 is to provide information on the future intent of these properties. However, unless they are to be considered as part of the PUD the land area should not be included in the Proposed Land Use Summary table (*i.e., the total site area for the PUD is 11.46-acres and not 13.62*).
    - Residential PUD Density – first, see notes regarding parallel plan in 17.07.3; and

        - Total density bonus = 13% not 28%
        - 123 units x 1.13 = 139 units and not 157.
    - Parking Data – allocating 264 spaces to apartments and 7 spaces to clubhouse, which totals 271; however, it is calling for a total of 273 spaces. See 24.03 for additional details.

- The landscape plan has far too much detail and reference points. It appears each building is proposed to have about the same landscaping. Please remove all reference points to the building landscaping and then include a separate sheet for the "typical landscaping" for each building. Next, rather than having arrows drawn to each plant cluster please convert that information into a table that includes type, quantity, minimum size, and then a code or symbol for that plant that is referenced back to the landscape plan.
- Architectural plans are outdated. Information is shown with four 24-unit buildings and only one 30-unit building. Please correct, and ensure the references are the same. Civil plans name buildings A-E, architectural plans are 1-5.
- Architectural plans and renderings are not the same, and when looked at closely are drastically different in design, layout, and materials (*they're identical to the renderings provided as an example of your Sauk Trail development*). Both of these documents must match what will be constructed.
    - The clubhouse appears to be consistent, but not the apartment buildings.
- There need to be easements provided for future connections to adjacent properties to allow for internal cross-connections.

<u>PLANNED UNIT DEVELOPMENT (CHAPTER 17)</u>

- 17.03.3.B.1 – include a schedule of total land areas devoted to each type of use, number and types of units, and building ground coverage.
    - An additional table needs to be included with this information. For example, how many different floorplans with square footage; the total number and size of the storage units; a compilation of all ground coverage that shows a total rather than having to individually add it up from each building.
- 17.03.3.C – legal description illustrating the location and acreage of the subject property.
    - Another description is needed for the PUD, which would include Parcels B & C (*i.e., the 11.64-acres that will be rezoned PUD*).
- 17.03.3.D – provide a list of departures from the zoning ordinance.
    - Include a departure from Section 21.02 for a smaller apartment size (*minimum is 884 sqft and 730 sqft is proposed*) along with an explanation of why the minimum standards cannot be, or should not be, met.
- 17.03.3.F – on sheet C-121 include a statement indicating the approximate amount of soil that will be brought in, or removed, from the site.
- 17.05.1.A – the design of stormwater management systems and drainage facilities shall be consistent with the groundwater protection strategies of the Township.

- Overall stormwater systems shall be designed to use "best management practices: and create the appearance of a natural pond of feature including gentle (5:1) or varying side slopes, irregular shapes, water tolerant grasses and seed mixes at the bottom of the pond/basin; appropriate flowers, shrubs and grasses along the banks based on environment (wet, dry, sedimentation basin v. pond) to improve views, filter runoff and enhance wildlife habitat.
- Here is an example of the plantings:

STORMWATER MIX

Grasses, Sedges & Rushes		**PLS oz/acre**
Carex bebbii	Bebb's oval sedge	1.75
Carex vulpinoidea	Fox Sedge	2.00
Eleocharis palustris	Great Spike Rush	1.00
Elymus virginicus	Virginia Wild Rye	16.00
Juncus effusus	Soft Rush	0.50
Juncus tenuis	Path Rush	0.50
Juncus torrey	Torrey's Rush	0.25
Panicum virgatum	Switchgrass	8.00
Scirpus pungens	Three square Rush	1.00
Scirpus validus	Soft-stem Bulrush	1.00
Sorghastrum nutans	Indian Grass	8.00
		40.00
Forbs		**PLS oz/acre**
Alisma subcordatum	Common Water Plaintain	1.00
Asclepias incarnata	Swamp Milkweed	1.50
Aster novae-angliae	New England Aster	0.50
Aster umbellatus	Flat-topped Aster	0.50
Bidens cernua	Nodding Bur Marigold	1.00
Echinacea purpurea	Purple Coneflower	2.50
Helenium autumnale	Sneezeweed	1.00
Liatris spicata	Marsh Blazingstar	1.00
Lycopus americanus	Water Horehound	0.50
Mimulus ringens	Monkey Flower	0.25
Monarda fistulosa	Wild Bergamot	0.60
Oenothera biennis	Common Evening Primrose	2.20
Penthorum sedoides	Ditch Stonecrop	0.40
Physostegia virginiana	Obedient Plant	0.50
Polygonum pennsylvanicum	Pennsylvania Smartweed	1.25
Rudbeckia hirta	Black-eyed Susan	2.50
Verbena hastata	Blue Vervain	2.80
Zizia aurea	Golden Alexander	4.00
		24.00
Total Seeding Rate: 40 lbs per acre 2.5 lbs grasses • 1.5 lbs forbs • 36 lbs cover crop 101 native seeds per sq ft		

- 17.05.1.C – add a note to C-111 indicating all new utilities will be buried underground.
- 17.05.1.G – street lighting shall be installed in the same manner as required under the Township's Subdivision Control Ordinance.
  - 5.4.11 – decorative street lights shall be installed at all intersections, curves, cul-de-sacs, dead-end streets and at such other locations as the Township Board in its discretion reasonably requires.
    - Based on staff review it appears only 11 pole mounted figures are required, but 17 are proposed. See image for required locations on last page.
- 17.05.2.A – the proposed buildings within the PUD, including consideration for bulk, placement, architecture, and type of materials shall be compatible with like buildings within the PUD as well as generally compatible with buildings in the general vicinity.
  - The proposed storage units are not compatible. Please make the appropriate improvements.
- 17.05.2.A.3 – buildings with exterior walls greater than 50 feet in horizontal length shall be constructed using a combination of architectural features and a variety of building materials and landscaping near the walls.
  - Unable to determine compliance because site plan, architectural plans, and renderings are inconsistent. Please correct.
- 17.05.2.A.4 – walls that cannot be viewed from public streets (*i.e., all buildings related to the apartments and clubhouse*) shall be designed using architectural features, such as recesses, projections, wall insets, arcades, window display areas, awnings, balconies, window projections, landscape structures or other features that complement the design intent of the structure and landscaping abutting the walls for at least 30% of the wall length.
  - Generally unable to determine compliance as it relates to the architecture.
  - As it relates to landscaping the sides of almost all the apartment buildings do not contain any landscaping that abuts the walls.
  - This also applies to the storage units, and most importantly the 325' area along the east wall of "Self Storage Building 3"

- 17.05.2.A.5 – on-site landscaping shall abut the walls so that the vegetation combined with the architectural features significantly reduce the visual impact of the building mass.
- 17.05.2.A.6 – the predominant building materials should be those characteristic of Grand Haven Township such as brick, wood, native stone and tinted/textured concrete masonry units and/or glass products. Other materials such as smooth-faced concrete block, undecorated tilt-up concrete panels, or pre-fabricated steel panels should only be used as accents and not dominate the building exterior of the structure. Metal roofs may be allowed if compatible with the overall architectural design of the building.
    - 17.05.2.A.7 – exterior colors shall be of low reflectance, subtle, neutral or earth tone colors. High intensity colors such as black, neon, metallic or fluorescent for the façade and/or roof of the building are prohibited except as approved for building trim.
    - No information was provided for the storage units, but it appears the whole structure is made of pre-fabricated steel panels, which cannot dominate the appearance of the building.
        - During the pre-application meeting it was indicated the storage buildings would be of high quality with neutral colors, which would include decorative stone pillars on the ends facing Robbins Road.
            - A "decorative fence with masonry columns" is noted on C-103, but no other details are provided. Please note, this fencing cannot substitute the requirements for the buildings.
    - When the site plan, architectural plans, and renderings are consistent please ensure the various materials and color selections are noted to determine compliance with this requirement.
- 17.05.4.A – a maximum of 1 driveway per existing public street frontage shall be permitted for the PUD. Additional driveways may be permitted provided that such drive is constructed and permitted to share access with other uses within the PUD, or an adjoining principal use or existing lot.
    - This comment is not a requirement, but rather food for thought. Although A-1 and A-2 are being excluded from the PUD, when the two lots are developed you'll want to consider how their access interacts with the apartments. It is unlikely the City will allow an additional driveway for A-2 on Robbins Road, and it's possible they will require the "existing" driveway to be removed. Access to these two business would then be gained via the PUD development. If the decorative fence is to remain in that location the only option for an entrance is between the first two boulevards. Staff believes that is an ideal situation. It is placed appropriately and will allow tenants (both from the apartments and storage units) to easily patron the businesses. Without having an internal connection a tenant would have to make a left-turn out of the development and another left-turn into the businesses, which is in direct contradiction to the Robbins Road Corridor Plan that emphasizes internal connections and removal of driveways. You are urged to consider how these parcels will interact with the site in the future, and make adjustments accordingly. For example, there may not be enough room between the first two boulevards to allow for cross-traffic, so you may need to consider widening that space to accommodate a driveway in the future. Or, if the decorative fence was relocated the access to the businesses could be gained via the driveway to the storage units, which would allow the existing intersection to function for all 3 uses.

- 17.05.5 – open space conveyance draft has been forwarded to the attorney for review.
- 17.05.6 – when a PUD abuts a single family residential district a transition area may be required. Options include:
    - Row of similar housing type
    - Woodlands or landscaped greenbelt to provide an obscuring effect
    - Open or recreation space sufficient in depth to provide adequate separation
    - Significant changes in topography which provide an effective buffer
    - Per Section 20.11.5 – if the use is setback at least 200 feet from the adjacent residentially zoned parcel, then the screening requirements may be waived as a condition of the site plan review, and such waiver will end whenever the 200' setback is reduced by placement of other structures or uses therein.
        - In the list of departures you request, please indicate you are requesting the transitional screening waiver based on the separation between uses and existing woodland.
- 17.07.3 – base density for residential uses – parallel plan. See staff comments below regarding corrections to the parallel plan. Thankfully, the base density is still sufficient for the project, but we'll need a corrected parallel plan for our permanent records.
    - The underlying requirement of only 1 dwelling unit per 3,000 sqft sets the maximum number of units possible. Because the A-1 and A-2 land area needs to be excluded from the PUD, and only part of the proposed PUD is as multi-family, the calculation becomes: 8.49 acres x 43,560 sqft = 369,824 sqft / 3,000 sqft per dwelling unit = 123 dwelling units.
    - The next requirement of the parallel plan is to determine if you're physically able to achieve 123-units by incorporating setbacks; 2 parking spaces for each unit; ensuring that each unit can meet the 884 sqft minimum floor area; including the stormwater requirements; roadways; utilities; etc.
    - After accounting for the extraneous items that have the potential of reducing the number of dwelling units—that will establish the base density.
    - Sheet C-103 includes the correct figure of 123, but still contains a reference to the 306 units. It is unclear how the figure of 306 was identified, and is incorrect.

<u>SITE PLAN REVIEW (CHAPTER 23)</u>

- 23.06.1.C – location of all existing and proposed structures on the subject property, and of all existing structures on land immediately adjacent to the site within 100 feet of the boundary lines.
    - The driveways and structures across Robbins Road are not shown, and the 100' should include their driveways and front wall of homes. Additionally, there is an office building east of 17034 Robbins Rd that needs to be included.
    - Please add a parcel line demarcation between the RR and C-1 properties abutting the east boundary line.
- 23.06.1.D – location of all existing and proposed drives and parking areas (*see above comment*).
- 23.06.1.E – location and right-of-way widths of all existing and proposed abutting streets and alleys.

- The Robbins Road right-of-way needs to be identified.

- 23.06.2 – as a reminder you'll need to provide me with updates on other agencies reviewing and approving the plans.
    - In addition, please provide documentation specifying the setback requirement for structures as it relates to the consumers energy easement for the overhead utility lines running across the property. If I recall, the research was already performed and you confirmed the building locations were ok, but this office needs to include that documentation in our permanent records.

PARKING, LOADING SPACES, AND SIGNS (CHAPTER 24)

- 24.03 – the schedule of number of off-street parking spaces allows 2 spaces for each dwelling unit, which equates to 264. On Sheet C-103 the following statement is included, "clubhouse pool is accessory to apartments, 7 spaces are allocated to clubhouse area." Please explain how you calculated the 7 spaces? There is not clear guidance in this Section for a clubhouse parking schedule.
    - Most likely use options are:
        - Private Club at 1 space/3 persons allowed for maximum occupancy (≈*75 spaces*).
        - Business or professional offices excluding medical at 1 space/200 sf GFA (≈*17 spaces*).
    - I'd like us to find a consensus about what standard of measurement we're comfortable using for the clubhouse.
- 24.04.2 – plans for the layout of off-street parking facilities 24.04.2 – plans for the layout of off-street parking facilities ***shall*** be in accord with the following table:

Parking Pattern	Maneuvering Lane Width	Parking Space Width	Parking Space Length	Total Width of One (1) Tier of Spaces and Maneuvering Lane	Total Width of Two (2) Tiers of Spaces and Maneuvering Lane
75-90 deg.	24 feet	9 feet	18 feet	42 feet	60 feet

    - Section 2.01.3 – the word "shall" is always mandatory and not discretionary.
    - The plan proposes several locations with a 24.5', 35' or 35.5' maneuvering lane width, which would result in more than 11,000 sqft of additional impervious surface.
        - Staff compared the width with Timberview and Piper Lake garages and both have complied with the 24' width.
    - This additional width needs to be removed, or a departure requested.
        - Please be aware, staff will not support the departure request, but the decision would be up to the Planning Commission, and ultimately the Township Board.
- 24.04.7 – where the off-street parking lot is adjacent to any premises used for residential purpose in a district of R-4 or higher classification, the screening requirements of Section 20.11 shall be met. The following areas will be required to meet the screening standards. Specific information is listed below under General Provisions.
    - The 180' area behind "Garage (14 spaces)"
    - The 110' area between "Building D" and the refuse/recycling station

- 24.06 – signage
    - The proposed apartment entry sign is fantastic, and is precisely what the Township is looking for as it relates to signage.
    - Please revise the styles of the project sign and directional sign to more of a monument standard. This is a high-quality development and these two signs do not reflect that quality.
        - Also, it is recommended you use matching ad copy/font for the signs, especially the apartments. Currently, they have no similarities.

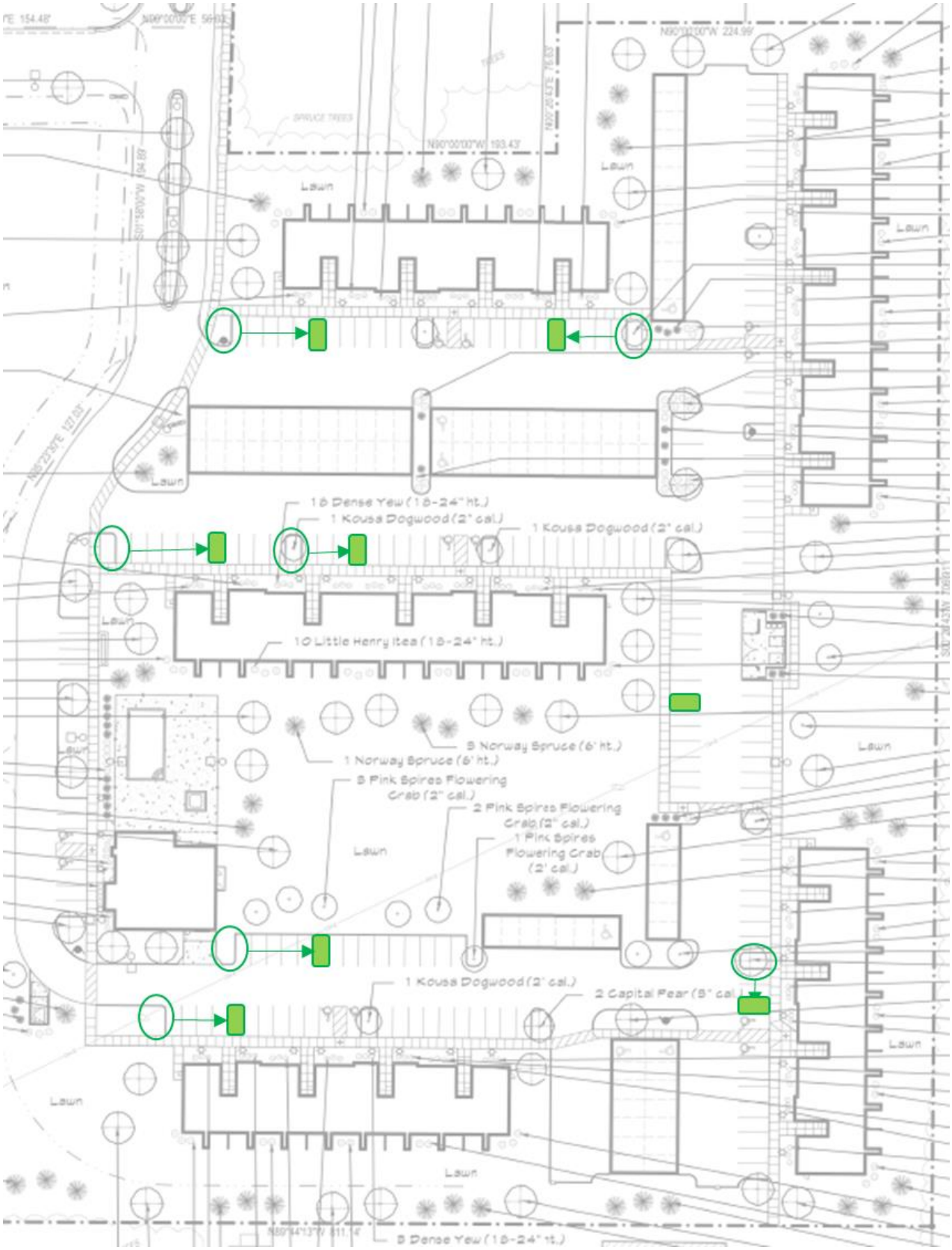
OUTDOOR LIGHTING REQUIREMENTS (CHAPTER 20A)

- It appears the number of bollard and canopy lights could be cut in half. Please reduce the number of fixtures.
- 20A.7.5-6 – all canopy lighting must be fully recessed so the lamp does not extend below the lower plane of the canopy surface.
    - The P8222 fixtures appear to dip below the surface to which they're affixed, and they must be fully recessed.

GENERAL PROVISIONS (CHAPTER 20)

- 20.11.1 – screening requirements may be satisfied by any one of the following, or combination of the following:
    - Greenbelt
    - 6' wall
    - Earth berm
- 20.12 – details on the proposed fence are required.
- 20.13 – landscaping
    - The Township's desire is to use as many native species as possible, and also to avoid planting any invasive species (*if any are present*).
    - The minimum caliper size for a canopy tree = 3½"
        - Currently shown at 3"
    - The minimum caliper size for an ornamental tree = 3"
        - Several currently shown at 2"
    - The minimum height for an evergreen = 6'
        - Spartan Juniper shown at 5'
    - At least 1 deciduous tree is required for every 150 sqft of interior landscaped area = 42 trees
        - Only 26 trees are proposed
    - There are two evergreen shrubs in the landscape island between the two 24-unit garage buildings that do not appear to be identified in the plan.

- Below, please see a drawing of where the landscape islands should be located within the parking lot—they're just slight adjustments that should not affect your parking, but will improve the goal of breaking up the expanse of the asphalt.


Lawn
1 Dense Yew (18-24" ht.)
1 Kousa Dogwood (2" cal.)
1 Kousa Dogwood (2" cal.)
10 Little Henry Itea (18-24" ht.)
3 Norway Spruce (6' ht.)
1 Norway Spruce (6' ht.)
3 Pink Spires Flowering Crab (2" cal.)
2 Pink Spires Flowering Crab (2" cal.)
1 Pink Spires Flowering Crab (2" cal.)
1 Kousa Dogwood (2" cal.)
2 Capital Pear (3" cal.)
3 Dense Yew (18-24" ht.)

Main Street Capital Group

18000 Cove Street, Suite 201
Spring Lake, Michigan 49456
(231) 780-2541
(231) 780-3891 fax

PROJECT SUMMARY:

Our vision for the Apartments at Robbins Road is to create a walkable community that is affordable and accessible to everyone. There is a fine line between designing a standard apartment and incorporating the features that really make it accessible to people with varying degrees of impaired mobility. We plan on integrating low profile thresholds, pocket doors and roll-in showers on all the ground floor units to improve accessibility. Wider drive aisles around the garages will accommodate ADA compliant wheelchair vans and create a generally more accessible community.

The Apartments at Robbins Road is in Grand Haven Township right on the edge of the city of Grand Haven. It's within walking distance of grocery stores, restaurants, schools, churches and a movie theater. The proposed development will consist of 132 apartment units with 88 garages. As part of a mixed-use PUD it will also contain 22,600 sf of self-storage space to accommodate the growing storage demands of this part of town.

The project will consist of 3 – 24-unit buildings and 2 - 30-unit buildings. The community will have 93 2-bed, 2-bath units and 39 1-bed, 1-bath units. Each apartment home will range from 730sf plus an additional 135sf of patio and mechanical space up to 1,070sf. Each unit will have a private exterior entrance, private porch, luxury vinyl tile, carpet, dishwasher, microwave, and a washer & dryer in the unit.

The community will have a clubhouse with pool and exercise room along with plenty of open space to allow residents to play and enjoy the outdoors. Interior sidewalks will directly connect to public sidewalks and Grand Haven Township's bike path network which allows for miles of trails to explore.

We anticipate starting construction in the spring of 2018 and completing buildings within approximately 9 months after we break ground. We expect to complete construction on each building about every 45 days after that to wrap up construction in the summer of 2019.

LIST OF PUD DEPARTURES:

REDUCED BUFFER TO ADJACENT RESIDENTIAL DISTRICTS

We are seeking approval for departure from Section 20.11.5 which requires a transitional screening for the rural residential property east of the development. In this case, the existing distance to the nearest use and the existing woodland provide this transition.

INCREASED DRIVE AISLE AND MANEUVERING LANES

We are seeking approval for a departure from Section 24.04.1. Section 24.04.1 states that off street parking lots shall be laid out in accord with the following table:

Parking Pattern	Maneuvering Lane Width	Parking Space Width	Parking Space Length	Total Width of One (1) Tier of Spaces and Maneuvering Lane	Total Width of Two (2) Tiers of Spaces and Maneuvering Lane
0 deg. (parallel)	12 feet	9 feet	23 feet	20 feet	28 feet
35-50 deg.	15 feet	9 feet	18 feet	33 feet	55 feet
54-74 deg.	15 feet	9 feet	18 feet	33 feet	58 feet
75-90 deg.	24 feet	9 feet	18 feet	42 feet	60 feet
Boat Launching Areas					
30-53 deg.	25 feet	10 feet	45 feet	70 feet	115 feet
54-90 deg.	45 feet	10 feet	45 feet	90 feet	136 feet

We understand that the Township's interpretation of the ordinance is that the listed dimensions are mandated dimensions. We disagree with this enforcement of mandated dimensions at least as they relate to garage approaches and we offer the following support:

1. This is a very common table found in a similar form in many zoning ordinances. The predominant interpretation and use of these tables of parking space dimensions is as a minimum standard. This interpretation as a minimum standard allows for adaptation to site characteristics and specific uses such as grocery stores where shopping carts make wider spaces desirable.
2. The wording "shall be in accord" is unique in that it is different than "shall be in accordance" which is used predominantly throughout the ordinance when identifying exact parameters. The "accord" wording is found in only one other instance, Section 24.02.9. This usage of the "accord" verbiage references uses not specifically mentioned and provides the zoning administrator some discretion in determining a similar type of use. This language allows for some latitude in interpretation and enforcement. In an effort to be consistent, we would suggest this same latitude be provided when the "accord" language is used in Section 24.04.1.
3. The table includes dimensions for boat launch parking. It would appear to be unreasonable to not allow a marina parking area to exceed the 10 foot parking stall width for boat trailer parking stalls. The same could be said for parking areas for other large vehicles such as limousines, busses or trucks. This mandated dimensional standard would not allow for such parking spaces.
4. Section 24.04 addresses parking lot layout but does not mention access to garages. We suggest that the necessary and safe access to a garage is dimensionally different than

access to a parking space. Painted parking spaces do not include walls or door openings. There is no forgiveness at the garage boundary as there is with a painted parking space.

5. We understand the intent and desire to limit the amount of impervious pavement. However, this is best accomplished by providing the correct number of parking spaces without excess. We are proposing the ordinance requirement of 2 spaces per dwelling unit and adding only 9 additional spaces allocated to the clubhouse use. We note that the 11,000 square feet of additional pavement represented by these enlarged garage approaches amounts to 4% of the total impervious area of the site.

REDUCED DWELLING UNIT SIZE

Section 21.02 provides for a minimum apartment size of 884 sf. The proposed plan includes 1-bedroom 1-bath units that contain 730 sf of living area and an additional 135 sf of patio & mechanical area. Two of our primary goals of this project are affordability and accessibility. We've constructed a very similar design before and it has proven to be functional, affordable, and accessible and provides a living option that's financially within reach of many people. There are other new 1-bedroom apartments in the township that are considerably smaller, and we think our design provides a good and spacious value proposition for residents.

STORAGE UNIT BUILDING MATERIALS AND ARCHITECTURE

Section 15.05.2 provides for architectural continuity within the PUD and general vicinity. We are proposing an industry standard storage architecture that primarily includes metal siding and a raised seam metal roof. To enhance the look of this portion of the project we are installing a decorative black metal fence with cultured stone pillars on the north end. On the north end of the outside buildings, we are installing decorative brick veneer as an architectural detail. The long walls on the east and west will be extensively landscaped to help screen the storage buildings and the neighbors to the west.

Currently, there is a brown metal building on the site without any fencing or screening and it's roughly twice as tall as the proposed storage buildings. The proposed storage will be an aesthetic improvement and provide a well-designed buffer between the apartments and the property to the west.

There are 2 neighboring buildings to the west that have asphalt from the property line up to the building without any landscaping buffers. Both buildings have semi-truck loading docks, large dumpsters, including a full-sized compactor, and they use the space as general trash storage including product display racks, wood pallets, propane tanks, and old furniture.

The neighbor to the south is a cell tower and an electric transmission substation that is surrounded by a barbed wire/chain link fence, without a landscaping buffer.
Based on these factors, our proposed storage buildings will be superior to the south and west neighbors and appropriately designed for the east and north neighbors.

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Memo

VIA EMAIL

To:	**Mr. Ben Robbins** **Main Street Capital Group**
From:	**Michael J. Labadie, PE** **Brandon Hayes, PE, P.Eng.** **Fleis & VandenBrink**
Date:	**October 12, 2017**
Re:	**Proposed Robbins Road PUD** **Grand Haven Township, Michigan** **Traffic Impact Study**

Introduction

This memorandum presents the results of the Traffic Impact Study (TIS) for the proposed PUD located on a 13.62-acre parcel that currently includes a trucking/landscaping/snow removal/storage company (Bill Tysman Companies) in Grand Haven Township, Michigan. The site comprises two distinct parcels included in the PUD: a 129-unit residential apartment development, and a 26,454 square foot (SF) self-storage development. These uses will share access to Robbins Road via a proposed new site access drive.

Robbins Road is under the jurisdiction of the City of Grand Haven. The subject property is located along the northern boundary of Grand Haven Township. This TIS has been completed to identify the impacts (if any) of the proposed development on the following study intersections:

- Robbins Road & 172nd Avenue,
- Robbins Road & S. Griffin Street, and
- The proposed site access points.

The scope of the study was developed based on Fleis & VandenBrink's (F&V) knowledge of the study area, understanding of the development program, accepted traffic engineering practice, and methodologies published by the Institute of Transportation Engineers (ITE). Additionally, F&V solicited input regarding the scope of work from the City of Grand Haven and Grand Haven Township.

Data Collection

The existing weekday turning movement traffic volume data were collected for vehicles, cyclists, and pedestrians by F&V subconsultant Traffic Data Collection, Inc. (TDC) on Tuesday, September 19, 2017. Intersection turning movement counts were collected during the weekday AM (7:00 AM to 9:00 AM) and PM (2:00 PM to 6:00 PM) peak periods at all study intersections. This data was used as a baseline to establish existing traffic conditions without the proposed development. The peak hour volumes for each intersection were utilized for this study and the volumes were balanced upward through the study network. At locations where access is provided between study intersections, "dummy" intersections were used to account for sink and source volumes, and through volumes were carried along the main study roadways. Additionally, F&V collected an inventory of existing lane use and traffic controls and obtained existing traffic signal timing

27725 Stansbury Boulevard, Suite 195
Farmington Hills, MI 48334
P: 248.536.0080
F: 248.536.0079
www.fveng.com

information from the Grand Haven Board of Light & Power. The applicable data referenced in this memorandum are attached.

Existing Conditions

Existing peak hour vehicle delays and Levels of Service (LOS) were calculated at the study intersections using Synchro (Version 10) traffic analysis software. This analysis was based on the existing lane use and traffic control shown on the attached Figure 1, the existing peak hour traffic volumes shown on the attached Figure 2, and the methodologies presented in the *Highway Capacity Manual, 6th Edition* (HCM6). Typically, LOS D is considered acceptable, with LOS A representing minimal delay, and LOS F indicating failing conditions. Additionally, SimTraffic network simulations were reviewed to evaluate network operations and vehicle queues. The existing conditions results are attached and summarized in Table 1.

Table 1: Existing Intersection Operations

			AM Peak		PM Peak	
Intersection	Control	Approach	Delay (s/veh)	LOS	Delay (s/veh)	LOS
1. Robbins Road & 172nd Avenue	Signalized	EB	19.8	B	32.2	C
		WB	17.9	B	0.7	A
		NB	25.6	C	0.7	A
		SB	31.2	C	5.8	A
		Overall	**22.8**	**C**	**9.7**	**A**
2. Robbins Road & S. Griffin Street	STOP (Minor)	EB LT	9.5	A	12.6	B
		WB	Free		Free	
		SB	14.7	B	12.6	B

The results of the existing conditions analysis show that all approaches and movements currently operate at a LOS C or better during both peak periods. A review of network simulations showed good traffic operations at all study area intersection approaches and movements during both the AM and PM peak hours. Long vehicle queues were not observed during either peak hour.

Background Conditions

In order to determine the applicable growth rate for the existing traffic volumes to the project build-out year of 2018, historical traffic volume data was reviewed. The historical growth rates on Robbins Road to the east of the study area indicate that between 2013 and 2016, the average annual growth rate was negative (decreasing traffic volumes) on all sections of Robbins Road where data is available. Therefore, no growth rate was applied to the existing 2017 traffic volumes to forecast the 2019 background traffic volumes ***without the proposed development.***

In addition to background growth, it is important to account for traffic that is expected to be generated by approved developments within the vicinity of the study area that have yet to be constructed or are currently under construction. No background developments were identified near the study area that are expected to be completed prior to the site buildout of the proposed development.

The development is proposed to be completed by 2019. Since there is no anticipated traffic growth for the study area, and no approved developments have been identified through the 2019 build-out year, future background conditions (without the proposed development) are assumed equal to existing conditions.

Site Trip Generation Analysis

The number of AM and PM peak hour vehicle trips that would be generated by the proposed development was forecast based on data published by ITE in the *Trip Generation Manual, 10th Edition.* The site trip generation forecast for the proposed development is summarized in Table 2.

Table 2: Site Trip Generation

Land Use	ITE Code	Amount	Units	Average Daily Traffic	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total
Multifamily Housing (Mid-Rise)	221	129	D.U.	701	11	33	44	35	22	57
Mini-Warehouse	151	26,454	S.F.	40	2	1	3	2	2	4
New Trips				741	13	34	47	37	24	61

The vehicle trips that would be generated by the proposed development were assigned to the study road network based on existing peak hour traffic patterns, the proposed site plan, and the methodologies published by ITE. This methodology indicates that new trips will return to their direction of origin. The site trip distributions used in the analysis are summarized in Table 3.

Table 3: Site Trip Distribution

To / From	New Trips Via	AM	PM
North	172nd Avenue	10%	18%
	S. Griffin Street	27%	7%
South	172nd Avenue	17%	25%
East	Robbins Road	17%	23%
West	Robbins Road	29%	27%
		100%	100%

The site-generated vehicle trips were assigned to the study road network based on these trip distribution patterns and are shown on the attached Figure 4. The site-generated trips were added to the existing traffic volumes to calculate the future peak hour traffic volumes shown on the attached Figure 6.

Future Conditions

Future peak hour vehicle delays and LOS ***with the proposed development*** were calculated based on the existing lane use and traffic control, the future traffic volumes, the proposed site access plan, and the methodologies presented in the HCM. Additionally, SimTraffic simulations were reviewed to evaluate network operations and vehicle queues. The results of the future conditions analysis are attached and are summarized in Table 4.

Table 4: Future Intersection Operations

Intersection	Control	Approach	AM Peak Delay (s/veh)	AM Peak LOS	PM Peak Delay (s/veh)	PM Peak LOS
1. Robbins Road & 172nd Avenue	Signalized	EB	20.2	C	27.6	C
		WB	18.1	B	21.5	C
		NB	25.5	C	32.6	C
		SB	31.1	C	35.0	C
		Overall	**22.9**	**C**	**28.9**	**C**
2. Robbins Road & S. Griffin Street	STOP (Minor)	EB LT	9.6	A	8.9	A
		WB	Free		Free	
		SB	15.0	C	16.3	C
3. Robbins Road & Site Driveway	STOP (Minor)	EB	Free		Free	
		WB LT	7.9	A	8.7	A
		NB	11.5	B	14.2	B

The results show that all study intersection approaches and movements are expected to continue to operate in a manner similar to existing conditions during both the AM and PM peak hours. Vehicle delays and LOS as shown in Table 4 are expected to be similar to existing conditions and minor increases will generally not be discernable. In addition, all approaches and movements at the unsignalized site driveway intersection operate at a LOS B or better during both peak periods.

A review of network simulations showed good traffic operations at all study area intersection approaches and movements during both the AM and PM peak hours. Long vehicle queues were not observed during either peak hour. Overall, future traffic conditions will be similar to existing traffic conditions and the development is not expected to have a significant impact on the study intersections.

Auxiliary Lane Analysis

In order to determine the configurations of the proposed site access location on Robbins Road, warrants for right turn lanes were evaluated. The City of Grand Haven does not maintain right-turn lane and taper warrants. Therefore, the Ottawa County Road Commission (OCRC) requirements were reviewed. The OCRC requirements state the following:

> *Additional lanes, passing flares, or other improvements on adjacent public roadways may be required to provide access to a proposed development. Improvements may be identified in a traffic impact study or warranted based on traffic volumes and turning movements as follows:*
>
> *a) Left turns of 150 ADT from a public roadway into proposed development.*
>
> *b) Adjacent public roadway volume exceeds 3000 ADT and development has 15 or more lots/living units.*

Since the daily volume on Robbins Road exceeds 3000 ADT and development has 15 or more lots/living units, improvements at the site driveway should be considered. OCRC does not maintain right-turn lane and taper warrant, so MDOT traffic volumes guidelines for right-turn lanes and tapers were reviewed. Based upon the peak hour traffic volumes on Robbins Road at the site driveway, a right turn deceleration taper is required at the Site Drive. This taper should be designed in accordance with City of Grand Haven requirements.

Access Management

The City of Grand Haven standards for access management were reviewed with respect to the proposed site driveway on Robbins Road. The evaluation was based upon the requirements for a 35 mph roadway. The results of the driveway spacing analysis showed that the proposed Site Access driveway should be located 150 feet from adjacent commercial driveways per the City's standards.

The Robbins Road PUD at 17114 Robbins Road has proposed one access for all site users. The site driveway will be designed as a boulevard access, with ingress and egress lanes separated by a median. This will increase ease-of-access for emergency vehicles by providing additional access lanes via the site egress in the event of a driveway blockage at the site ingress.

Conclusions

The conclusions of this Traffic Impact Study are as follows:

1. The results of the existing conditions analysis showed that all approaches and movements currently operate at a LOS C or better during both peak periods.
2. The analysis of future conditions ***with the proposed development*** showed that all study intersection approaches and movements are expected to continue to operate in a manner similar to existing conditions during both the AM and PM peak hours. Vehicle delays and LOS are expected to be similar to existing conditions and minor increases in delay will not be discernable.
3. The proposed site driveway intersection approaches and movements operate at a LOS B or better during both peak periods.
4. The results of the auxiliary lane warrant analysis are summarized below:
    - A right-turn deceleration taper is required at the Site Drive.
5. The driveway spacing analysis showed that the proposed Site Drive should be located 150 feet from adjacent commercial driveways.
6. The proposed site driveways should be designed in accordance with City of Grand Haven requirements.

Attached: Figures 1-4
Traffic Volume Data
Synchro / SimTraffic Results
Auxiliary Lane Warrants

BMH:mjl

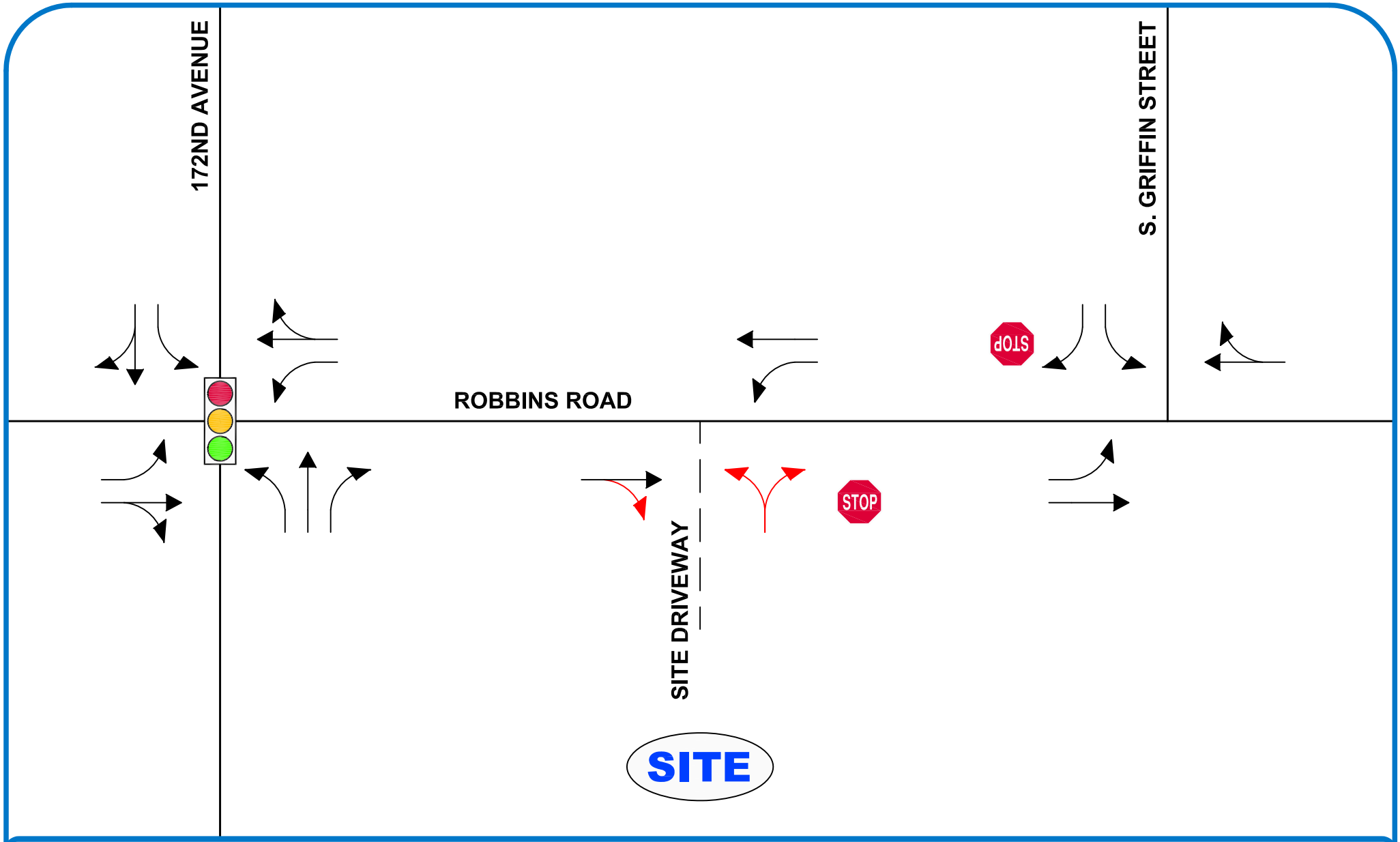


FIGURE 1
LANE USE AND TRAFFIC CONTROL

PROPOSED ROBBINS ROAD PUD - GRAND HAVEN TWP, MI

LEGEND

- SIGNALIZED INTERSECTION
- UNSIGNALIZED INTERSECTION
- ROADS
- EXISTING LANE USE
- PROPOSED LANE USE

NORTH

SCALE: NOT TO SCALE

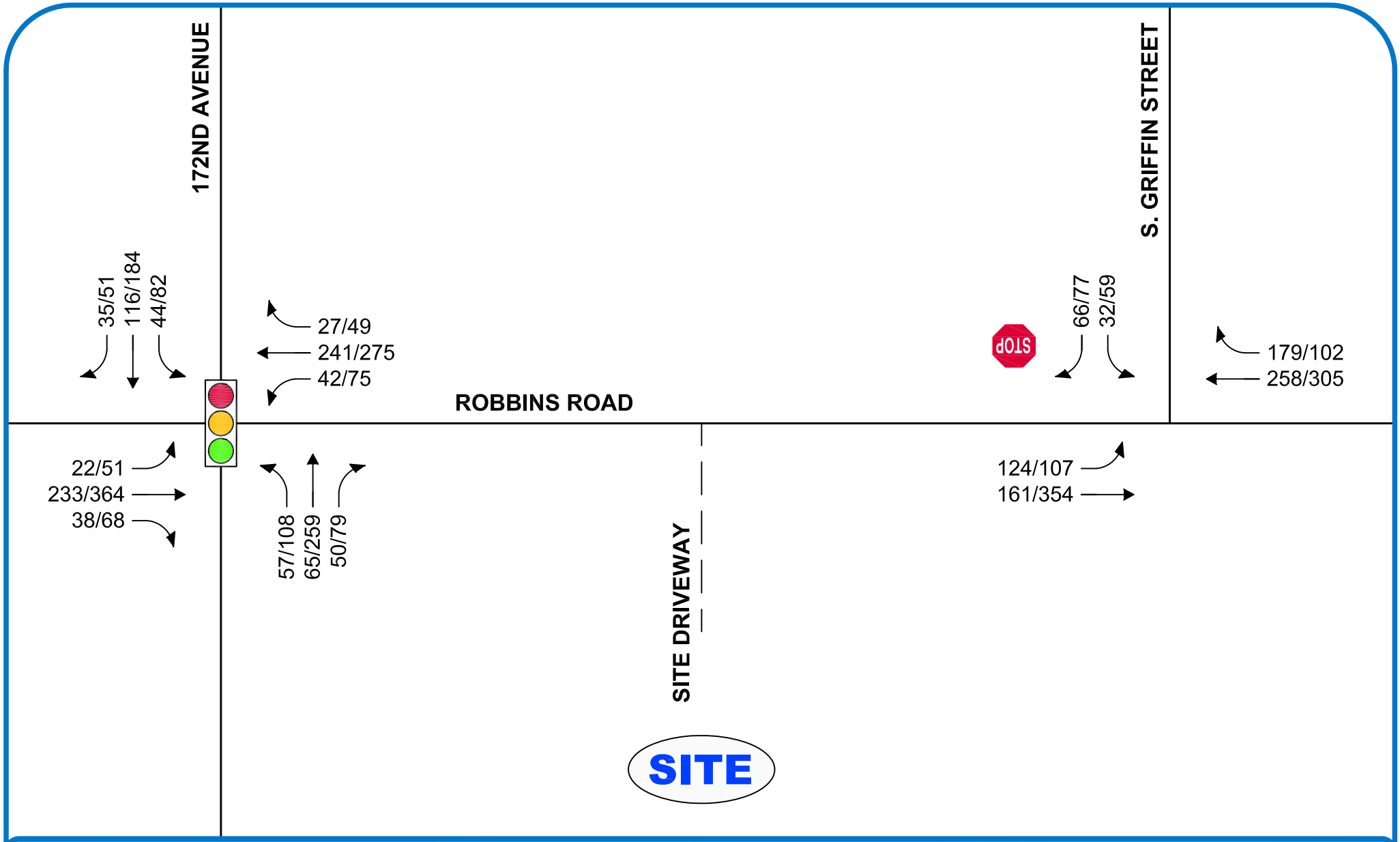


FIGURE 2
EXISTING TRAFFIC VOLUMES

PROPOSED ROBBINS ROAD PUD - GRAND HAVEN TWP, MI

LEGEND

- SIGNALIZED INTERSECTION
- UNSIGNALIZED INTERSECTION
- TRAFFIC VOLUMES (AM/PM)
- ROADS

NORTH

SCALE: NOT TO SCALE

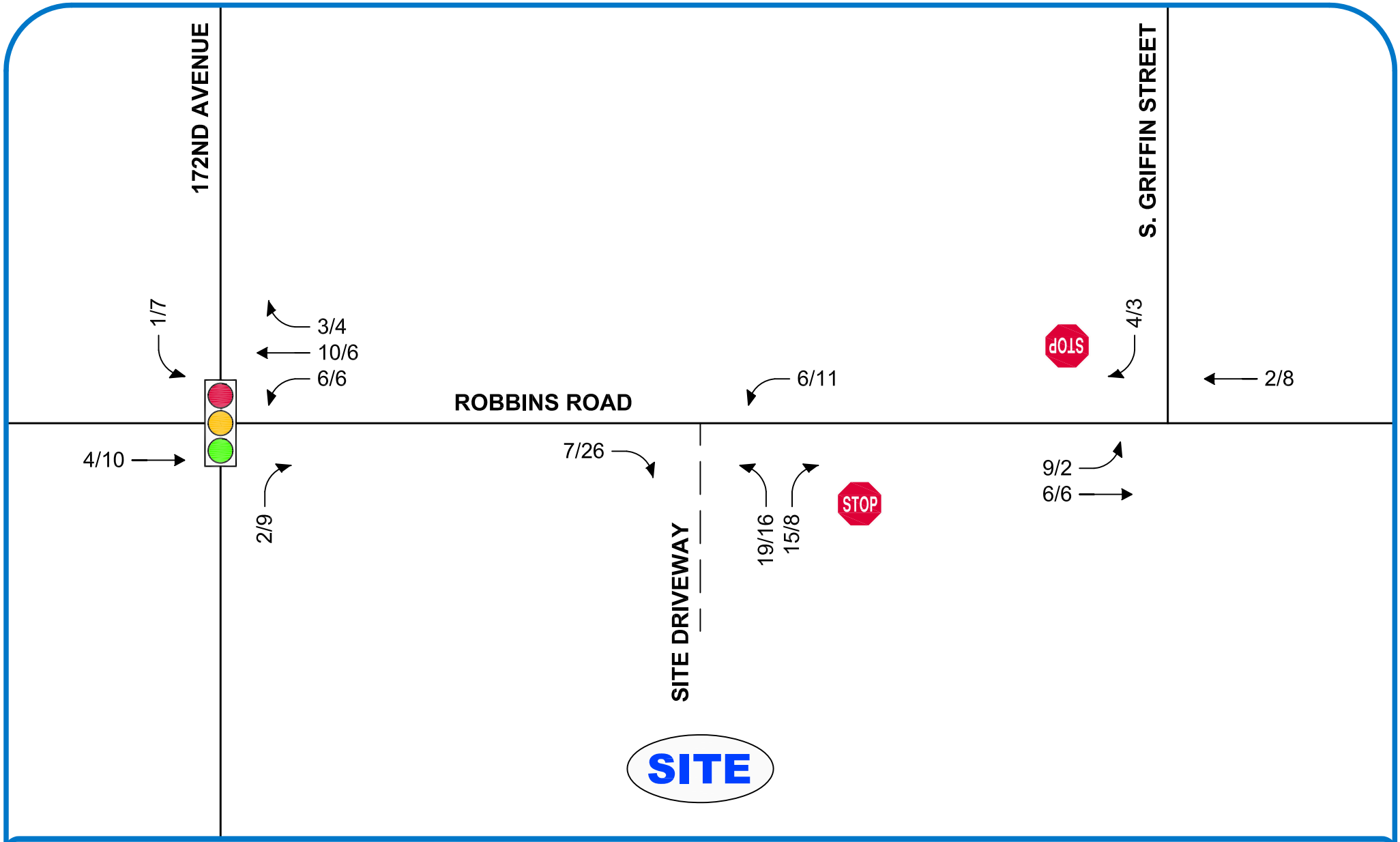


FIGURE 3
SITE-GENERATED TRAFFIC VOLUMES

PROPOSED ROBBINS ROAD PUD - GRAND HAVEN TWP, MI

LEGEND

- SIGNALIZED INTERSECTION
- UNSIGNALIZED INTERSECTION
- TRAFFIC VOLUMES (AM/PM)
- ROADS

NORTH

SCALE: NOT TO SCALE

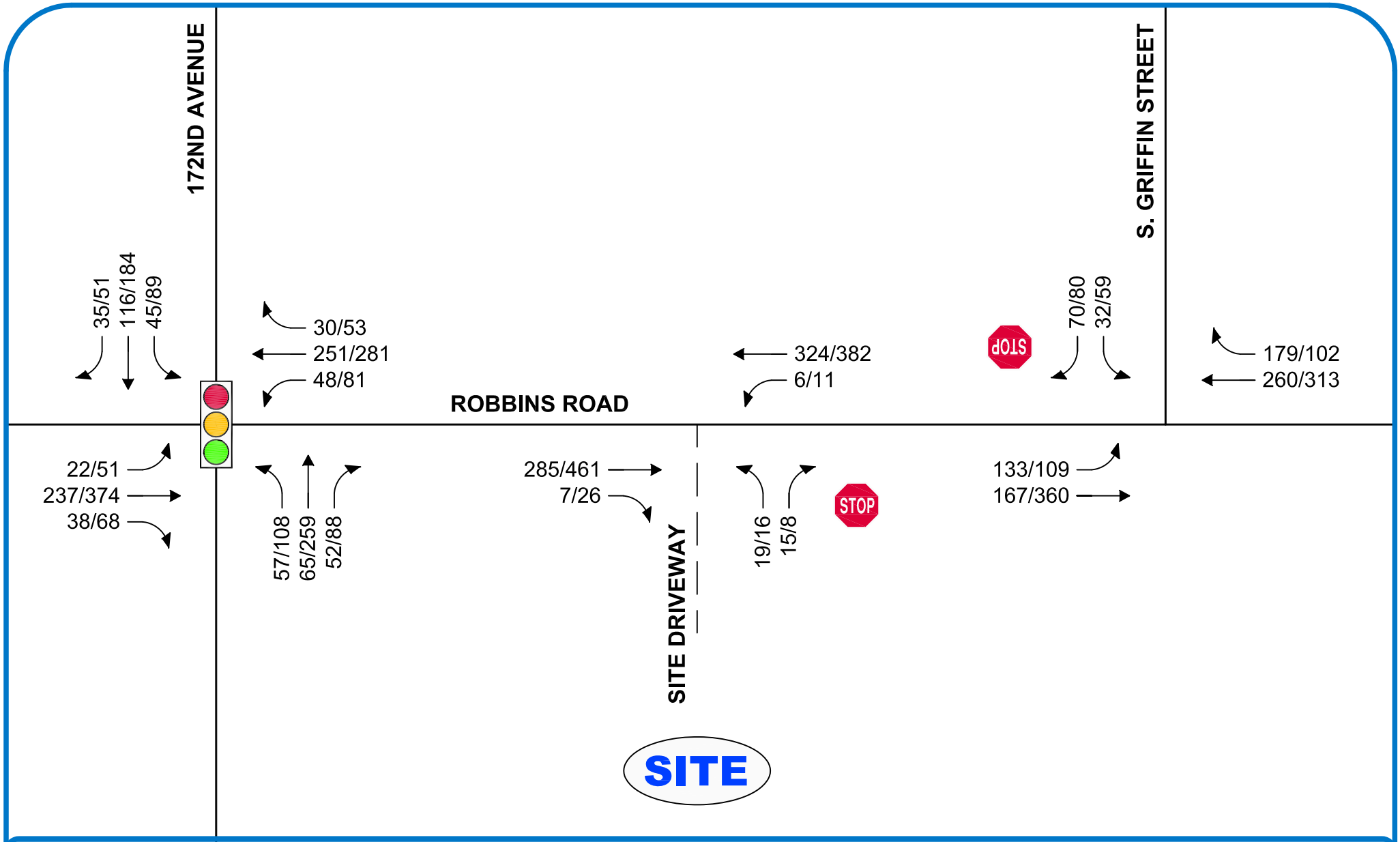


FIGURE 4
FUTURE TRAFFIC VOLUMES

PROPOSED ROBBINS ROAD PUD - GRAND HAVEN TWP, MI

LEGEND

- SIGNALIZED INTERSECTION
- UNSIGNALIZED INTERSECTION
- TRAFFIC VOLUMES (AM/PM)
- ROADS

NORTH

SCALE: NOT TO SCALE

Traffic Data Collection, LLC

tdccounts.com

Phone: (586) 786-5407

Traffic Study Peformed For:

Fleis & VandenBrink

Project:Grand Haven Traffic Impact Study
Type: 4 Hr. Video Turning Movement Count
Weather:Sunny/Cldy, Dry Deg. 70's
Count By: Miovision Video SCU 3DQ SE

File Name : TMC_1 Robbins & 172nd_9-19-17
Site Code : TMC_1
Start Date : 9/19/2017
Page No : 1

Groups Printed- Pass Cars - Buses - Single Units - Heavy Trucks - Peds. - Bikes

	172nd Ave. Southbound					Robbins Road Westbound					172nd Ave. Northbound					Robbins Road Eastbound					
Start Time	Rgt	Thru	Left	Peds	App. Total	Rgt	Thru	Left	Peds	App. Total	Rgt	Thru	Left	Peds	App. Total	Rgt	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	3	12	7	1	23	5	51	9	0	65	4	9	8	1	22	6	36	3	1	46	156
07:15 AM	8	16	5	0	29	3	61	3	0	67	6	19	21	0	46	3	34	5	1	43	185
07:30 AM	4	25	5	2	36	9	56	5	1	71	9	25	15	0	49	8	43	10	2	63	219
07:45 AM	5	29	6	0	40	9	46	7	0	62	13	15	23	0	51	10	50	6	0	66	219
Total	20	82	23	3	128	26	214	24	1	265	32	68	67	1	168	27	163	24	4	218	779
08:00 AM	6	23	8	3	40	7	55	14	1	77	15	17	10	0	42	5	46	2	0	53	212
08:15 AM	17	34	11	3	65	9	61	9	1	80	21	17	16	1	55	13	68	5	2	88	288
08:30 AM	8	32	16	1	57	7	61	11	0	79	5	22	19	0	46	12	52	9	1	74	256
08:45 AM	4	27	9	1	41	4	64	8	0	76	9	9	12	0	30	8	67	6	2	83	230
Total	35	116	44	8	203	27	241	42	2	312	50	65	57	1	173	38	233	22	5	298	986
**** BREAK ****																					
02:00 PM	4	39	18	0	61	9	75	12	0	96	13	47	26	0	86	12	57	13	0	82	325
02:15 PM	10	50	19	1	80	12	69	15	1	97	13	54	30	0	97	13	49	12	1	75	349
02:30 PM	8	45	10	1	64	16	79	13	0	108	15	86	38	0	139	20	63	11	2	96	407
02:45 PM	13	37	17	0	67	14	55	19	0	88	17	48	29	0	94	7	79	10	1	97	346
Total	35	171	64	2	272	51	278	59	1	389	58	235	123	0	416	52	248	46	4	350	1427
03:00 PM	5	47	13	1	66	10	63	12	0	85	19	67	27	0	113	24	66	21	1	112	376
03:15 PM	7	43	14	2	66	11	66	14	0	91	24	57	23	0	104	12	68	18	0	98	359
03:30 PM	14	58	18	1	91	13	78	17	0	108	18	80	28	0	126	18	93	6	2	119	444
03:45 PM	11	46	26	1	84	17	66	13	2	98	20	65	26	0	111	15	90	16	2	123	416
Total	37	194	71	5	307	51	273	56	2	382	81	269	104	0	454	69	317	61	5	452	1595
04:00 PM	14	44	17	4	79	13	68	23	3	107	23	60	29	0	112	20	101	16	0	137	435
04:15 PM	12	36	21	5	74	6	63	22	3	94	18	54	25	0	97	15	80	13	0	108	373
04:30 PM	11	46	19	1	77	12	88	12	1	113	23	46	33	0	102	29	77	13	1	120	412
04:45 PM	18	40	16	0	74	16	78	15	1	110	22	56	33	0	111	22	63	12	0	97	392
Total	55	166	73	10	304	47	297	72	8	424	86	216	120	0	422	86	321	54	1	462	1612
05:00 PM	15	39	7	1	62	20	75	16	0	111	13	65	26	0	104	25	79	14	0	118	395
05:15 PM	6	46	16	4	72	12	65	9	3	89	15	48	22	1	86	21	64	9	1	95	342
05:30 PM	4	42	9	2	57	9	54	13	1	77	9	45	21	1	76	11	59	9	1	80	290
05:45 PM	6	26	10	0	42	23	71	6	0	100	16	37	23	3	79	16	69	7	5	97	318
Total	31	153	42	7	233	64	265	44	4	377	53	195	92	5	345	73	271	39	7	390	1345
Grand Total	213	882	317	35	1447	266	1568	297	18	2149	360	1048	563	7	1978	345	1553	246	26	2170	7744
Apprch %	14.7	61	21.9	2.4		12.4	73	13.8	0.8		18.2	53	28.5	0.4		15.9	71.6	11.3	1.2		
Total %	2.8	11.4	4.1	0.5	18.7	3.4	20.2	3.8	0.2	27.8	4.6	13.5	7.3	0.1	25.5	4.5	20.1	3.2	0.3	28	
Pass Cars	207	848	306	0	1361	256	1535	282	0	2073	342	1024	544	0	1910	342	1517	239	0	2098	7442
% Pass Cars	97.2	96.1	96.5	0	94.1	96.2	97.9	94.9	0	96.5	95	97.7	96.6	0	96.6	99.1	97.7	97.2	0	96.7	96.1
Buses	5	26	10	0	41	8	20	9	0	37	14	21	6	0	41	0	20	7	0	27	146
% Buses	2.3	2.9	3.2	0	2.8	3	1.3	3	0	1.7	3.9	2	1.1	0	2.1	0	1.3	2.8	0	1.2	1.9
Single Units	1	7	1	0	9	2	11	3	0	16	4	3	11	0	18	3	11	0	0	14	57
% Single Units	0.5	0.8	0.3	0	0.6	0.8	0.7	1	0	0.7	1.1	0.3	2	0	0.9	0.9	0.7	0	0	0.6	0.7
Heavy Trucks	0	1	0	0	1	0	2	3	0	5	0	0	2	0	2	0	5	0	0	5	13
% Heavy Trucks	0	0.1	0	0	0.1	0	0.1	1	0	0.2	0	0	0.4	0	0.1	0	0.3	0	0	0.2	0.2
Peds.	0	0	0	31	31	0	0	0	18	18	0	0	0	7	7	0	0	0	21	21	77
% Peds.	0	0	0	88.6	2.1	0	0	0	100	0.8	0	0	0	100	0.4	0	0	0	80.8	1	1
Bikes	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	9
% Bikes	0	0	0	11.4	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	19.2	0.2	0.1

Comments: 4 hour traffic study conducted during typical weekday (Tuesday) from 7:00-9:00 AM morning & 2:00-6:00 PM afternoon peak hours while school was in session. Signalized intersection, with ped. signals for all quadrants. Push buttons exist for east & west legs. Video SCU camera was located within SE intersection quadrant.

Traffic Data Collection, LLC

tdccounts.com

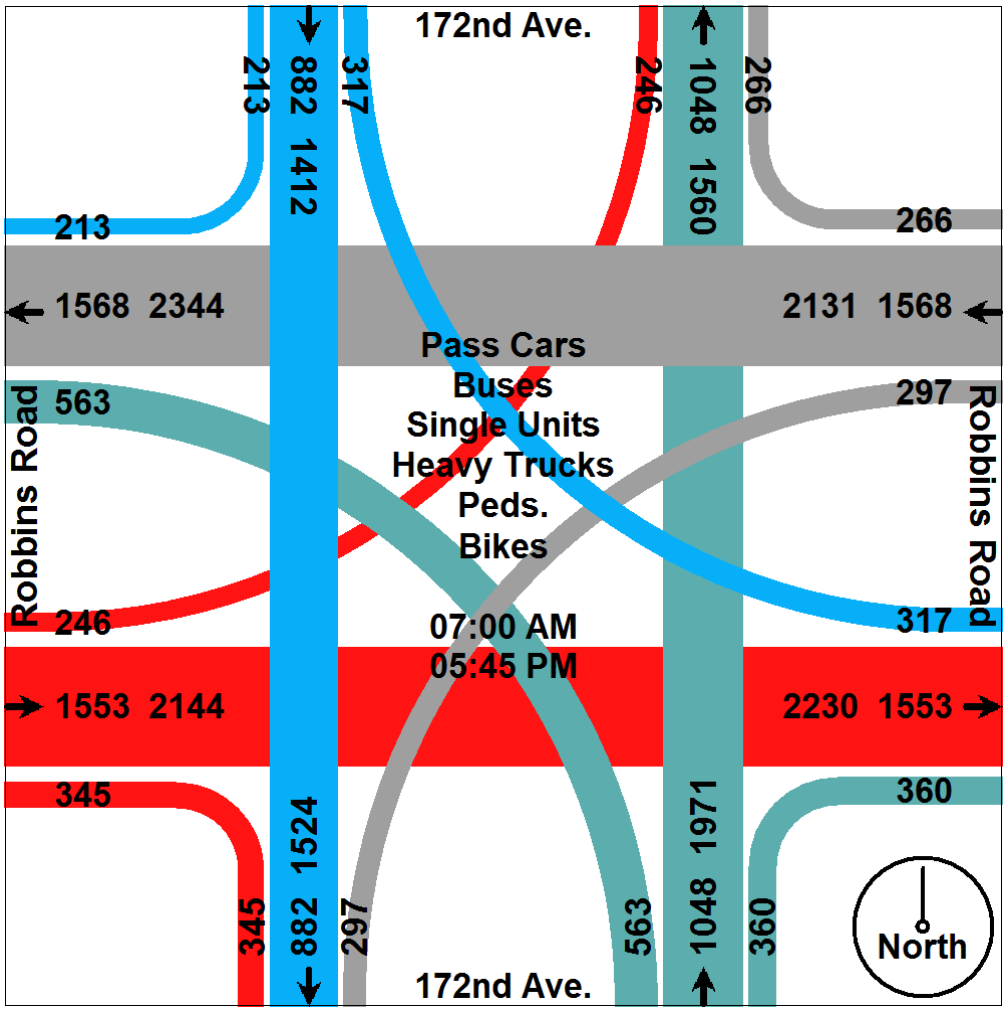
Phone: (586) 786-5407

Traffic Study Peformed For:

Fleis & VandenBrink

Project:Grand Haven Traffic Impact Study
Type: 4 Hr. Video Turning Movement Count
Weather:Sunny/Cldy, Dry Deg. 70's
Count By: Miovision Video SCU 3DQ SE

File Name : TMC_1 Robbins & 172nd_9-19-17
Site Code : TMC_1
Start Date : 9/19/2017
Page No : 2



Traffic Data Collection, LLC

tdccounts.com

Phone: (586) 786-5407

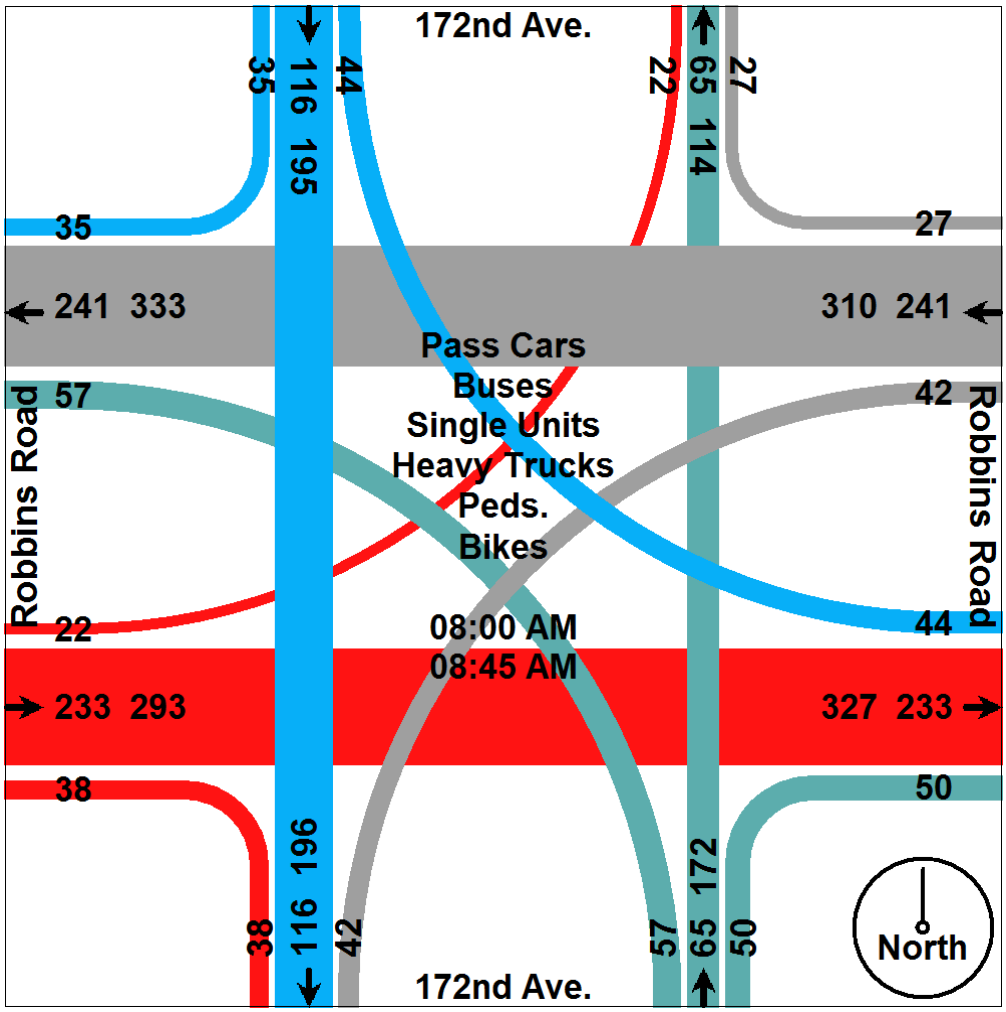
Traffic Study Peformed For:

Fleis & VandenBrink

Project:Grand Haven Traffic Impact Study
Type: 4 Hr. Video Turning Movement Count
Weather:Sunny/Cldy, Dry Deg. 70's
Count By: Miovision Video SCU 3DQ SE

File Name : TMC_1 Robbins & 172nd_9-19-17
Site Code : TMC_1
Start Date : 9/19/2017
Page No : 3

	172nd Ave. Southbound				Robbins Road Westbound				172nd Ave. Northbound				Robbins Road Eastbound				
Start Time	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	6	23	8	37	7	55	**14**	76	15	17	10	42	5	46	2	53	208
08:15 AM	**17**	**34**	11	**62**	**9**	61	9	**79**	**21**	17	16	**54**	**13**	**68**	5	**86**	**281**
08:30 AM	8	32	**16**	56	7	61	11	79	5	**22**	**19**	46	12	52	**9**	73	254
08:45 AM	4	27	9	40	4	**64**	8	76	9	9	12	30	8	67	6	81	227
Total Volume	35	116	44	195	27	241	42	310	50	65	57	172	38	233	22	293	970
% App. Total	17.9	59.5	22.6		8.7	77.7	13.5		29.1	37.8	33.1		13	79.5	7.5		
PHF	.515	.853	.688	.786	.750	.941	.750	.981	.595	.739	.750	.796	.731	.857	.611	.852	.863
Pass Cars	34	112	42	188	25	235	38	298	45	62	54	161	38	227	22	287	934
% Pass Cars	97.1	96.6	95.5	96.4	92.6	97.5	90.5	96.1	90.0	95.4	94.7	93.6	100	97.4	100	98.0	96.3
Buses	1	3	1	5	2	5	3	10	5	2	0	7	0	4	0	4	26
% Buses	2.9	2.6	2.3	2.6	7.4	2.1	7.1	3.2	10.0	3.1	0	4.1	0	1.7	0	1.4	2.7
Single Units	0	1	1	2	0	1	1	2	0	1	3	4	0	2	0	2	10
% Single Units	0	0.9	2.3	1.0	0	0.4	2.4	0.6	0	1.5	5.3	2.3	0	0.9	0	0.7	1.0
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peds.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Peds.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Traffic Data Collection, LLC

tdccounts.com

Phone: (586) 786-5407

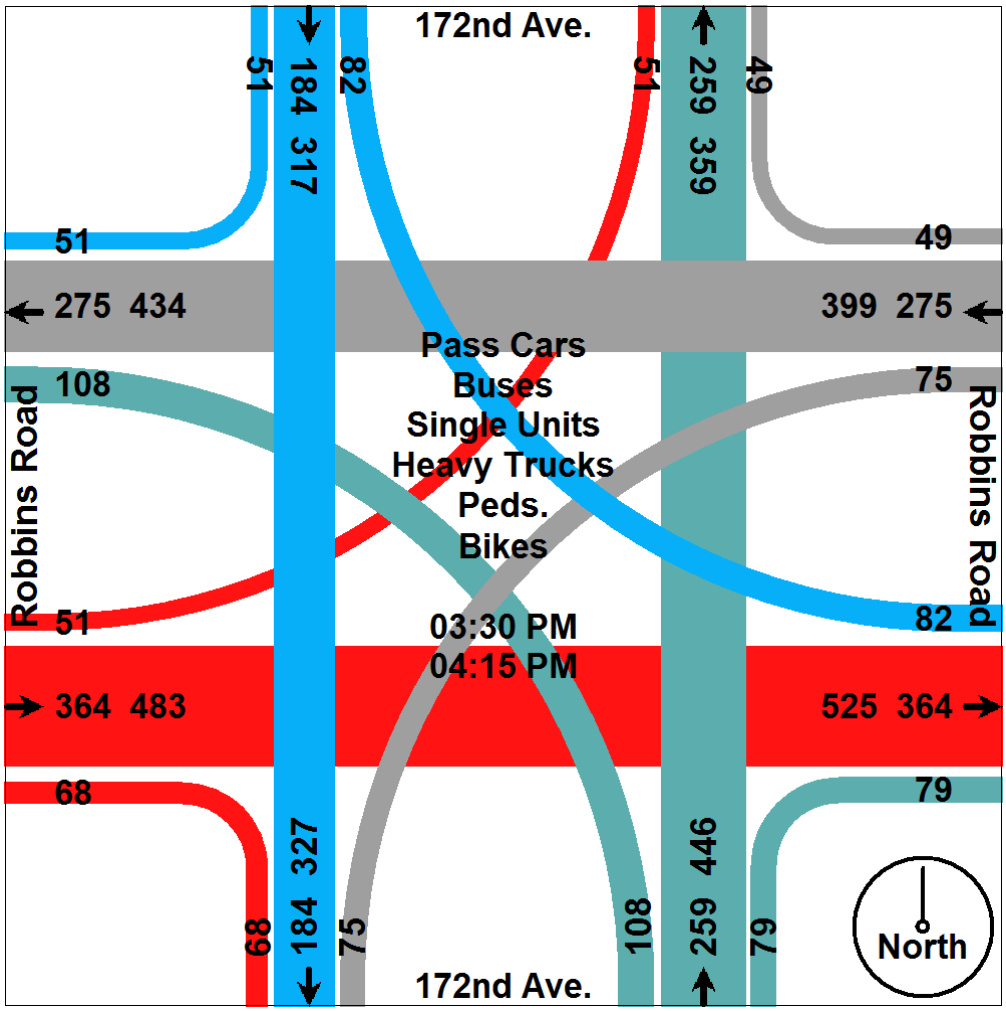
Traffic Study Peformed For:

Fleis & VandenBrink

Project:Grand Haven Traffic Impact Study
Type: 4 Hr. Video Turning Movement Count
Weather:Sunny/Cldy, Dry Deg. 70's
Count By: Miovision Video SCU 3DQ SE

File Name : TMC_1 Robbins & 172nd_9-19-17
Site Code : TMC_1
Start Date : 9/19/2017
Page No : 4

	172nd Ave. Southbound				Robbins Road Westbound				172nd Ave. Northbound				Robbins Road Eastbound				
Start Time	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:30 PM																	
03:30 PM	**14**	**58**	18	**90**	13	**78**	17	**108**	18	**80**	28	**126**	18	93	6	117	**441**
03:45 PM	11	46	**26**	83	**17**	66	13	96	20	65	26	111	15	90	**16**	121	411
04:00 PM	14	44	17	75	13	68	**23**	104	**23**	60	**29**	112	**20**	**101**	16	**137**	428
04:15 PM	12	36	21	69	6	63	22	91	18	54	25	97	15	80	13	108	365
Total Volume	51	184	82	317	49	275	75	399	79	259	108	446	68	364	51	483	1645
% App. Total	16.1	58	25.9		12.3	68.9	18.8		17.7	58.1	24.2		14.1	75.4	10.6		
PHF	.911	.793	.788	.881	.721	.881	.815	.924	.859	.809	.931	.885	.850	.901	.797	.881	.933
Pass Cars	49	178	77	304	49	270	74	393	75	256	107	438	67	355	50	472	1607
% Pass Cars	96.1	96.7	93.9	95.9	100	98.2	98.7	98.5	94.9	98.8	99.1	98.2	98.5	97.5	98.0	97.7	97.7
Buses	2	3	5	10	0	2	0	2	1	3	0	4	0	5	1	6	22
% Buses	3.9	1.6	6.1	3.2	0	0.7	0	0.5	1.3	1.2	0	0.9	0	1.4	2.0	1.2	1.3
Single Units	0	3	0	3	0	3	0	3	3	0	1	4	1	2	0	3	13
% Single Units	0	1.6	0	0.9	0	1.1	0	0.8	3.8	0	0.9	0.9	1.5	0.5	0	0.6	0.8
Heavy Trucks	0	0	0	0	0	0	1	1	0	0	0	0	0	2	0	2	3
% Heavy Trucks	0	0	0	0	0	0	1.3	0.3	0	0	0	0	0	0.5	0	0.4	0.2
Peds.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Peds.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Traffic Data Collection, LLC

tdccounts.com

Phone: (586) 786-5407

Traffic Study Peformed For:

Fleis & VandenBrink

Project:Grand Haven Traffic Impact Study
Type: 4 Hr. Video Turning Movement Count
Weather:Sunny/Cldy, Dry Deg. 70's
Count By: Miovision Video SCU 34N

File Name : TMC_2 Robbins & Griffin_9-19-17
Site Code : TMC_1
Start Date : 9/19/2017
Page No : 1

Groups Printed- Pass Cars - Buses - Single Units - Heavy Trucks - Peds. - Bikes

	S. Griffin Street Southbound					Robbins Road Westbound					Office Bldg. West Dw. Northbound					Robbins Road Eastbound					
Start Time	Rgt	Thru	Left	Peds	App. Total	Rgt	Thru	Left	Peds	App. Total	Rgt	Thru	Left	Peds	App. Total	Rgt	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	12	0	2	4	18	11	67	0	0	78	0	0	0	0	0	0	35	9	0	44	140
07:15 AM	8	0	4	0	12	20	60	0	0	80	0	0	0	0	0	0	24	21	0	45	137
07:30 AM	10	0	4	1	15	10	64	0	0	74	0	0	0	0	0	0	32	7	1	40	129
07:45 AM	9	0	11	1	21	11	59	0	0	70	0	0	0	0	0	0	47	11	0	58	149
Total	39	0	21	6	66	52	250	0	0	302	0	0	0	0	0	0	138	48	1	187	555
08:00 AM	20	0	4	4	28	36	61	0	1	98	0	0	0	0	0	0	37	30	2	69	195
08:15 AM	16	0	7	3	26	87	65	0	1	153	0	0	0	0	0	0	34	51	0	85	264
08:30 AM	23	0	15	2	40	38	66	0	2	106	0	0	0	2	2	0	34	32	0	66	214
08:45 AM	7	0	6	1	14	18	66	0	0	84	0	0	0	0	0	0	56	11	1	68	166
Total	66	0	32	10	108	179	258	0	4	441	0	0	0	2	2	0	161	124	3	288	839
**** BREAK ****																					
02:00 PM	3	0	6	0	9	11	77	0	0	88	0	0	0	0	0	0	67	3	0	70	167
02:15 PM	3	0	5	2	10	5	84	0	1	90	0	0	0	0	0	0	63	7	0	70	170
02:30 PM	7	0	3	0	10	4	79	0	0	83	0	0	0	0	0	0	67	4	0	71	164
02:45 PM	5	0	6	1	12	16	73	0	0	89	0	0	0	0	0	0	84	11	0	95	196
Total	18	0	20	3	41	36	313	0	1	350	0	0	0	0	0	0	281	25	0	306	697
03:00 PM	8	0	6	3	17	17	60	0	0	77	0	0	0	0	0	0	86	11	0	97	191
03:15 PM	5	0	3	2	10	30	85	0	2	117	0	0	0	0	0	0	70	31	1	102	229
03:30 PM	14	0	14	1	29	34	90	0	0	124	0	0	0	0	0	0	87	28	0	115	268
03:45 PM	36	0	14	1	51	24	55	0	2	81	0	0	0	0	0	0	98	29	0	127	259
Total	63	0	37	7	107	105	290	0	4	399	0	0	0	0	0	0	341	99	1	441	947
04:00 PM	22	0	28	0	50	14	75	0	0	89	0	0	0	0	0	0	99	19	0	118	257
04:15 PM	19	0	5	0	24	8	62	0	1	71	0	0	0	0	0	0	87	16	2	105	200
04:30 PM	15	0	16	0	31	8	92	0	0	100	0	0	0	0	0	0	99	13	1	113	244
04:45 PM	9	0	1	3	13	12	94	0	0	106	0	0	0	0	0	0	83	14	0	97	216
Total	65	0	50	3	118	42	323	0	1	366	0	0	0	0	0	0	368	62	3	433	917
05:00 PM	20	0	17	1	38	18	85	0	0	103	0	0	0	0	0	0	102	13	0	115	256
05:15 PM	10	0	18	1	29	3	65	0	0	68	0	0	0	0	0	0	81	14	0	95	192
05:30 PM	14	0	5	0	19	5	69	0	0	74	0	0	0	0	0	0	82	12	1	95	188
05:45 PM	7	0	2	0	9	4	85	0	0	89	0	0	0	0	0	0	75	18	0	93	191
Total	51	0	42	2	95	30	304	0	0	334	0	0	0	0	0	0	340	57	1	398	827
Grand Total	302	0	202	31	535	444	1738	0	10	2192	0	0	0	2	2	0	1629	415	9	2053	4782
Apprch %	56.4	0	37.8	5.8		20.3	79.3	0	0.5		0	0	0	100		0	79.3	20.2	0.4		
Total %	6.3	0	4.2	0.6	11.2	9.3	36.3	0	0.2	45.8	0	0	0	0	0	0	34.1	8.7	0.2	42.9	
Pass Cars	292	0	190	0	482	392	1696	0	0	2088	0	0	0	0	0	0	1589	394	0	1983	4553
% Pass Cars	96.7	0	94.1	0	90.1	88.3	97.6	0	0	95.3	0	0	0	0	0	0	97.5	94.9	0	96.6	95.2
Buses	9	0	12	0	21	50	29	0	0	79	0	0	0	0	0	0	26	21	0	47	147
% Buses	3	0	5.9	0	3.9	11.3	1.7	0	0	3.6	0	0	0	0	0	0	1.6	5.1	0	2.3	3.1
Single Units	1	0	0	0	1	2	11	0	0	13	0	0	0	0	0	0	10	0	0	10	24
% Single Units	0.3	0	0	0	0.2	0.5	0.6	0	0	0.6	0	0	0	0	0	0	0.6	0	0	0.5	0.5
Heavy Trucks	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	4	0	0	4	6
% Heavy Trucks	0	0	0	0	0	0	0.1	0	0	0.1	0	0	0	0	0	0	0.2	0	0	0.2	0.1
Peds.	0	0	0	31	31	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	34
% Peds.	0	0	0	100	5.8	0	0	0	30	0.1	0	0	0	0	0	0	0	0	0	0	0.7
Bikes	0	0	0	0	0	0	0	0	7	7	0	0	0	2	2	0	0	0	9	9	18
% Bikes	0	0	0	0	0	0	0	0	70	0.3	0	0	0	100	100	0	0	0	100	0.4	0.4

Comments: 4 hour traffic study conducted during typical weekday (Tuesday) from 7:00-9:00 AM morning & 2:00-6:00 PM afternoon peak hours while school was in session. Non-signalized intersection. Griffin Elementary School located within NE intersection quadrant. Video SCU camera was located within NW intersection quadrant.

Traffic Data Collection, LLC

tdccounts.com

Phone: (586) 786-5407

Traffic Study Peformed For:

Fleis & VandenBrink

Project:Grand Haven Traffic Impact Study
Type: 4 Hr. Video Turning Movement Count
Weather:Sunny/Cldy, Dry Deg. 70's
Count By: Miovision Video SCU 34N

File Name : TMC_2 Robbins & Griffin_9-19-17
Site Code : TMC_1
Start Date : 9/19/2017
Page No : 2

Traffic Data Collection, LLC

tdccounts.com

Phone: (586) 786-5407

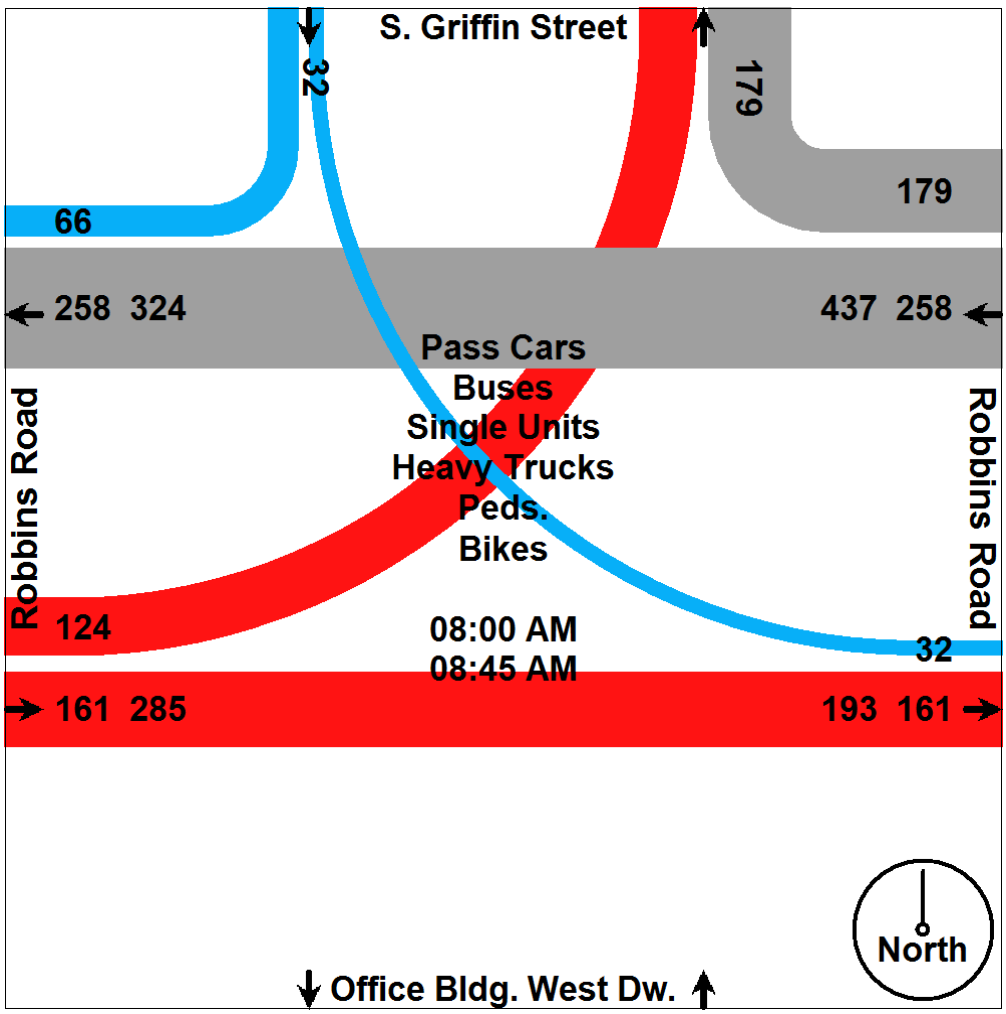
Traffic Study Peformed For:

Fleis & VandenBrink

Project:Grand Haven Traffic Impact Study
Type: 4 Hr. Video Turning Movement Count
Weather:Sunny/Cldy, Dry Deg. 70's
Count By: Miovision Video SCU 34N

File Name : TMC_2 Robbins & Griffin_9-19-17
Site Code : TMC_1
Start Date : 9/19/2017
Page No : 3

	S. Griffin Street Southbound				Robbins Road Westbound				Office Bldg. West Dw. Northbound				Robbins Road Eastbound				
Start Time	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	20	0	4	24	36	61	0	97	0	0	0	0	0	37	30	67	188
08:15 AM	16	0	7	23	**87**	65	0	**152**	0	0	0	0	0	34	**51**	**85**	**260**
08:30 AM	**23**	0	**15**	**38**	38	**66**	0	104	0	0	0	0	0	34	32	66	208
08:45 AM	7	0	6	13	18	66	0	84	0	0	0	0	0	**56**	11	67	164
Total Volume	66	0	32	98	179	258	0	437	0	0	0	0	0	161	124	285	820
% App. Total	67.3	0	32.7		41	59	0		0	0	0		0	56.5	43.5		
PHF	.717	.000	.533	.645	.514	.977	.000	.719	.000	.000	.000	.000	.000	.719	.608	.838	.788
Pass Cars	64	0	30	94	157	248	0	405	0	0	0	0	0	156	115	271	770
% Pass Cars	97.0	0	93.8	95.9	87.7	96.1	0	92.7	0	0	0	0	0	96.9	92.7	95.1	93.9
Buses	2	0	2	4	21	8	0	29	0	0	0	0	0	3	9	12	45
% Buses	3.0	0	6.3	4.1	11.7	3.1	0	6.6	0	0	0	0	0	1.9	7.3	4.2	5.5
Single Units	0	0	0	0	1	2	0	3	0	0	0	0	0	2	0	2	5
% Single Units	0	0	0	0	0.6	0.8	0	0.7	0	0	0	0	0	1.2	0	0.7	0.6
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peds.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Peds.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Traffic Data Collection, LLC

tdccounts.com

Phone: (586) 786-5407

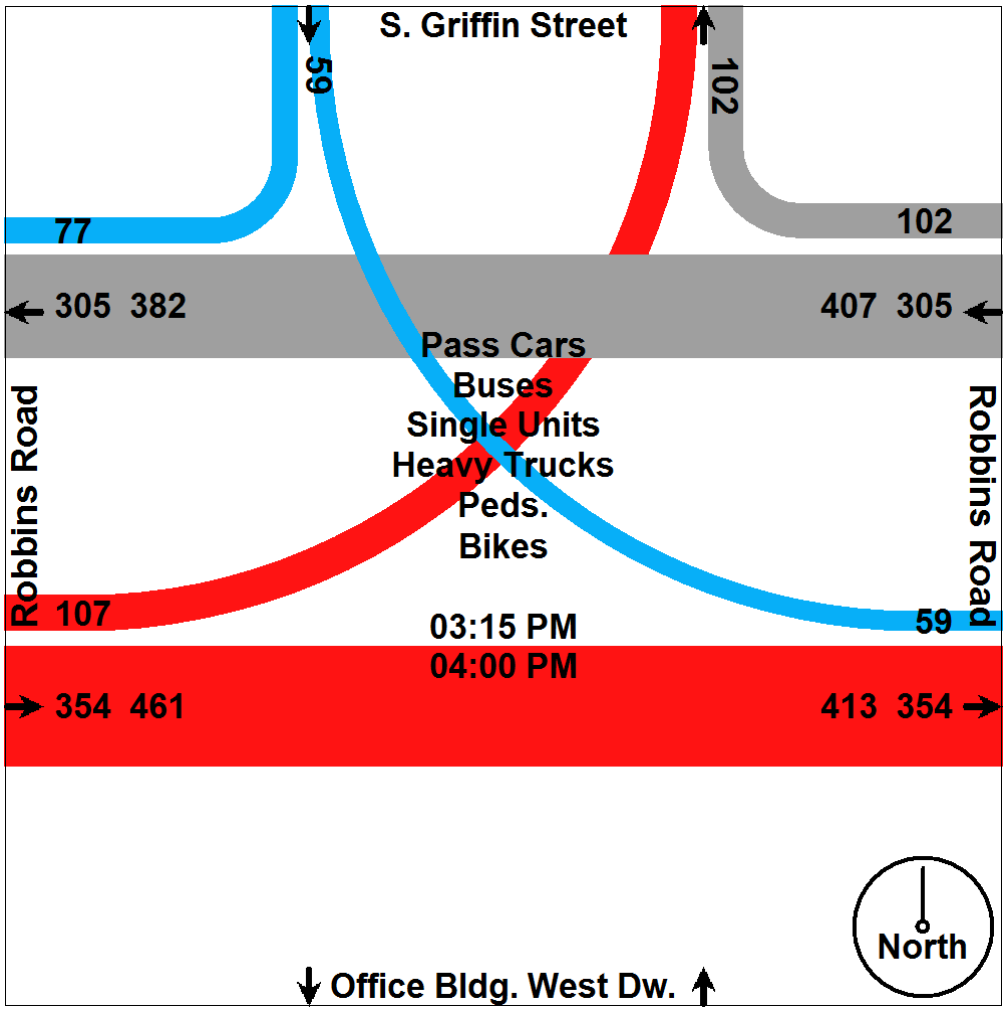
Traffic Study Peformed For:

Fleis & VandenBrink

Project:Grand Haven Traffic Impact Study
Type: 4 Hr. Video Turning Movement Count
Weather:Sunny/Cldy, Dry Deg. 70's
Count By: Miovision Video SCU 34N

File Name : TMC_2 Robbins & Griffin_9-19-17
Site Code : TMC_1
Start Date : 9/19/2017
Page No : 4

	S. Griffin Street Southbound				Robbins Road Westbound				Office Bldg. West Dw. Northbound				Robbins Road Eastbound				
Start Time	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Rgt	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:15 PM																	
03:15 PM	5	0	3	8	30	85	0	115	0	0	0	0	0	70	**31**	101	224
03:30 PM	14	0	14	28	**34**	**90**	0	**124**	0	0	0	0	0	87	28	115	**267**
03:45 PM	**36**	0	14	**50**	24	55	0	79	0	0	0	0	0	98	29	**127**	256
04:00 PM	22	0	**28**	50	14	75	0	89	0	0	0	0	0	**99**	19	118	257
Total Volume	77	0	59	136	102	305	0	407	0	0	0	0	0	354	107	461	1004
% App. Total	56.6	0	43.4		25.1	74.9	0		0	0	0		0	76.8	23.2		
PHF	.535	.000	.527	.680	.750	.847	.000	.821	.000	.000	.000	.000	.000	.894	.863	.907	.940
Pass Cars	77	0	53	130	78	301	0	379	0	0	0	0	0	344	101	445	954
% Pass Cars	100	0	89.8	95.6	76.5	98.7	0	93.1	0	0	0	0	0	97.2	94.4	96.5	95.0
Buses	0	0	6	6	24	2	0	26	0	0	0	0	0	7	6	13	45
% Buses	0	0	10.2	4.4	23.5	0.7	0	6.4	0	0	0	0	0	2.0	5.6	2.8	4.5
Single Units	0	0	0	0	0	2	0	2	0	0	0	0	0	2	0	2	4
% Single Units	0	0	0	0	0	0.7	0	0.5	0	0	0	0	0	0.6	0	0.4	0.4
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
% Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	0.2	0.1
Peds.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Peds.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Level of Service Criteria for Stop Sign Controlled Intersections

The level of service criteria are given in Table 17-2. As used here, control delay is defined as the total elapsed time from the time a vehicle stops at the end of the queue until the vehicle departs from the stop line; this time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position, including deceleration of vehicles from free-flow speed to the speed of vehicles in queue.

The average total delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation. . . .

Exhibit 17-2. Level of Service Criteria for TWSC Intersections

LEVEL OF SERVICE	AVERAGE CONTROL DELAY (sec/veh)
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

Average total delay less than 10 sec/veh is defined as Level of Service (LOS) A. Follow-up times of less than 5 sec have been measured when there is no conflicting traffic for a minor street movement, so control delays of less than 10 sec/veh are appropriate for low flow conditions. To remain consistent with the AWSC intersection analysis procedure described later in this chapter, a total delay of 50 sec/veh is assumed as the break point between LOS E and F.

The proposed level of service criteria for TWSC intersections are somewhat different from the criteria used in Chapter 16 for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Additionally, several driver behavior considerations combine to make delays at signalized intersections less onerous than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, where drivers on the minor approaches to unsignalized intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized than signalized intersections. For these reasons, it is considered that the total delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection. . . .

LOS F exists when there are insufficient gaps of suitable size to allow a side street demand to cross safely through a major street traffic stream. This level of service is generally evident from extremely long total delays experienced by side street traffic and by queueing on the minor approaches. The method, however, is based on a constant critical gap size - that is, the critical gap remains constant, no matter how long the side street motorist waits. LOS F may also appear in the form of side street vehicles' selecting smaller-than-usual gaps. In such cases, safety may be a problem and some disruption to the major traffic stream may result. It is important to note that LOS F may not always result in long queues but may result in adjustments to normal gap acceptance behavior. The latter is more difficult to observe on the field than queueing, which is more obvious.

Source: Highway Capacity Manual, 2010. Transportation Research Board, National Research Council

Level of Service for Signalized Intersections

Level of service for signalized intersections is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. Specifically, level-of-service (LOS) criteria are stated in terms of the average stopped delay per vehicle for a 15-min analysis period. The criteria are given in Exhibit 16-2. Delay may be measured in the field or estimated using procedures presented later in this chapter. Delay is a complex measure and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the *v/c* ratio for the lane group in question.

LOS A describes operations with very low delay, up to 10 sec per vehicle. This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

LOS B describes operations with delay greater than 10 and up to 20 sec per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of average delay.

Exhibit 16-2. Level-of-Service Criteria for Signalized Intersections

LEVEL OF SERVICE	STOPPED DELAY PER VEHICLE (SEC)
A	≤10.0
B	> 10.0 and ≤20.0
C	> 20.0 and ≤ 35.0
D	> 35.0 and ≤ 55.0
E	> 55.0 and ≤ 80.0
F	>80.0

LOS C describes operations with delay greater than 20 and up to 35 sec per vehicle. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

LOS D describes operations with delay greater than 35 and up to 55 sec per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high *v/c* ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

LOS E describes operations with delay greater than 55 and up to 80 sec per vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high *v/c* ratios. Individual cycle failures are frequent occurrences.

LOS F describes operations with delay in excess of 80 sec per vehicle. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection. It may also occur at high *v/c* ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Source: Highway Capacity Manual, 2010. Transportation Research Board, National Research Council

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	233	38	42	241	27	57	65	50	44	116	35
Future Volume (veh/h)	22	233	38	42	241	27	57	65	50	44	116	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		0.99	0.99		0.99	0.99		0.99
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	1870	1870	1870	1841	1841	1841	1811	1811	1811	1841	1841	1841
Adj Flow Rate, veh/h	26	274	45	44	254	28	71	81	62	56	147	44
Peak Hour Factor	0.85	0.85	0.85	0.95	0.95	0.95	0.80	0.80	0.80	0.79	0.79	0.79
Percent Heavy Veh, %	2	2	2	4	4	4	6	6	6	4	4	4
Cap, veh/h	503	652	107	475	702	77	352	433	443	430	317	95
Arrive On Green	0.04	0.42	0.42	0.05	0.43	0.43	0.06	0.24	0.24	0.06	0.23	0.23
Sat Flow, veh/h	1781	1564	257	1753	1627	179	1725	1811	1519	1753	1356	406
Grp Volume(v), veh/h	26	0	319	44	0	282	71	81	62	56	0	191
Grp Sat Flow(s),veh/h/ln	1781	0	1821	1753	0	1806	1725	1811	1519	1753	0	1762
Q Serve(g_s), s	0.7	0.0	11.1	1.2	0.0	9.5	2.7	3.2	2.7	2.1	0.0	8.4
Cycle Q Clear(g_c), s	0.7	0.0	11.1	1.2	0.0	9.5	2.7	3.2	2.7	2.1	0.0	8.4
Prop In Lane	1.00		0.14	1.00		0.10	1.00		1.00	1.00		0.23
Lane Grp Cap(c), veh/h	503	0	759	475	0	780	352	433	443	430	0	411
V/C Ratio(X)	0.05	0.00	0.42	0.09	0.00	0.36	0.20	0.19	0.14	0.13	0.00	0.46
Avail Cap(c_a), veh/h	575	0	759	521	0	780	375	433	443	464	0	411
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.0	0.0	18.6	13.7	0.0	17.2	23.5	27.3	23.6	23.3	0.0	29.7
Incr Delay (d2), s/veh	0.0	0.0	1.7	0.1	0.0	1.3	0.3	1.0	0.7	0.1	0.0	3.7
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(50%),veh/ln	0.3	0.0	4.8	0.5	0.0	4.0	1.0	1.4	1.0	0.9	0.0	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.0	0.0	20.3	13.8	0.0	18.5	23.8	28.2	24.2	23.5	0.0	33.4
LnGrp LOS	B	A	C	B	A	B	C	C	C	C	A	C
Approach Vol, veh/h		345			326			214			247	
Approach Delay, s/veh		19.8			17.9			25.6			31.2	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.2	43.5	10.3	27.0	7.8	44.8	9.8	27.5
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0
Max Green Setting (Gmax), s	7.0	34.0	7.0	21.0	7.0	34.0	7.0	21.0
Max Q Clear Time (g_c+I1), s	3.2	13.1	4.7	10.4	2.7	11.5	4.1	5.2
Green Ext Time (p_c), s	0.0	1.8	0.0	0.8	0.0	1.6	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	22.8
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	124	161	258	179	32	66
Future Vol, veh/h	124	161	258	179	32	66
Conflicting Peds, #/hr	10	0	0	10	10	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	150	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	72	72	65	65
Heavy Vehicles, %	5	5	7	7	4	4
Mvmt Flow	148	192	358	249	49	102

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	617	0	-	0	991	503
Stage 1	-	-	-	-	493	-
Stage 2	-	-	-	-	498	-
Critical Hdwy	4.15	-	-	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.245	-	-	-	3.536	3.336
Pot Cap-1 Maneuver	949	-	-	-	271	565
Stage 1	-	-	-	-	610	-
Stage 2	-	-	-	-	607	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	940	-	-	-	224	554
Mov Cap-2 Maneuver	-	-	-	-	320	-
Stage 1	-	-	-	-	509	-
Stage 2	-	-	-	-	601	-

Approach	EB	WB	SB
HCM Control Delay, s	4.2	0	14.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	940	-	-	-	320	554
HCM Lane V/C Ratio	0.157	-	-	-	0.154	0.183
HCM Control Delay (s)	9.5	-	-	-	18.3	13
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.6	-	-	-	0.5	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	364	68	75	275	49	108	259	79	82	184	51
Future Volume (veh/h)	51	364	68	75	275	49	108	259	79	82	184	51
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		0.99	0.99		0.98	0.99		0.98
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	1870	1870	1870	1885	1885	1885	1870	1870	1870	1841	1841	1841
Adj Flow Rate, veh/h	58	414	77	82	299	53	121	291	89	93	209	58
Peak Hour Factor	0.88	0.88	0.88	0.92	0.92	0.92	0.89	0.89	0.89	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	1	1	1	2	2	2	4	4	4
Cap, veh/h	449	599	111	353	622	110	319	444	477	298	322	89
Arrive On Green	0.06	0.39	0.39	0.07	0.40	0.40	0.07	0.24	0.24	0.07	0.23	0.23
Sat Flow, veh/h	1781	1530	285	1795	1555	276	1781	1870	1558	1753	1381	383
Grp Volume(v), veh/h	58	0	491	82	0	352	121	291	89	93	0	267
Grp Sat Flow(s),veh/h/ln	1781	0	1814	1795	0	1831	1781	1870	1558	1753	0	1764
Q Serve(g_s), s	1.7	0.0	20.3	2.3	0.0	12.9	4.5	12.6	3.8	3.5	0.0	12.3
Cycle Q Clear(g_c), s	1.7	0.0	20.3	2.3	0.0	12.9	4.5	12.6	3.8	3.5	0.0	12.3
Prop In Lane	1.00		0.16	1.00		0.15	1.00		1.00	1.00		0.22
Lane Grp Cap(c), veh/h	449	0	710	353	0	732	319	444	477	298	0	412
V/C Ratio(X)	0.13	0.00	0.69	0.23	0.00	0.48	0.38	0.66	0.19	0.31	0.00	0.65
Avail Cap(c_a), veh/h	481	0	710	371	0	732	325	444	477	311	0	412
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.9	0.0	22.8	16.3	0.0	20.1	24.1	31.0	23.1	24.0	0.0	31.2
Incr Delay (d2), s/veh	0.1	0.0	5.5	0.3	0.0	2.3	0.7	7.4	0.9	0.6	0.0	7.7
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(50%),veh/ln	0.6	0.0	9.2	0.9	0.0	5.7	1.8	6.2	1.4	1.5	0.0	6.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.0	0.0	28.3	16.6	0.0	22.3	24.9	38.4	23.9	24.6	0.0	38.9
LnGrp LOS	B	A	C	B	A	C	C	D	C	C	A	D
Approach Vol, veh/h		549			434			501			360	
Approach Delay, s/veh		26.9			21.3			32.6			35.2	
Approach LOS		C			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.6	41.2	11.2	27.0	9.9	42.0	10.8	27.3
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0
Max Green Setting (Gmax), s	7.0	34.0	7.0	21.0	7.0	34.0	7.0	21.0
Max Q Clear Time (g_c+I1), s	4.3	22.3	6.5	14.3	3.7	14.9	5.5	14.6
Green Ext Time (p_c), s	0.0	2.4	0.0	0.8	0.0	2.0	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	28.7
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	107	354	305	102	59	77
Future Vol, veh/h	107	354	305	102	59	77
Conflicting Peds, #/hr	4	0	0	4	4	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	150	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	82	82	68	68
Heavy Vehicles, %	3	3	7	7	4	4
Mvmt Flow	118	389	372	124	87	113

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	500	0	-	0	1067	439
Stage 1	-	-	-	-	438	-
Stage 2	-	-	-	-	629	-
Critical Hdwy	4.13	-	-	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.227	-	-	-	3.536	3.336
Pot Cap-1 Maneuver	1059	-	-	-	244	614
Stage 1	-	-	-	-	646	-
Stage 2	-	-	-	-	528	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1055	-	-	-	215	611
Mov Cap-2 Maneuver	-	-	-	-	311	-
Stage 1	-	-	-	-	571	-
Stage 2	-	-	-	-	526	-

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	16
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1055	-	-	-	311	611
HCM Lane V/C Ratio	0.111	-	-	-	0.279	0.185
HCM Control Delay (s)	8.8	-	-	-	21	12.2
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.4	-	-	-	1.1	0.7

Intersection: 1: 172nd Avenue & Robbins Road

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	TR
Maximum Queue (ft)	78	187	53	175	109	124	60	119	190
Average Queue (ft)	16	89	19	77	39	43	23	31	81
95th Queue (ft)	53	161	45	146	80	92	49	79	146
Link Distance (ft)		570		360		429			599
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	100		100		165		165	65	
Storage Blk Time (%)		7		4		0		1	15
Queuing Penalty (veh)		2		2		0		2	7

Intersection: 2: Robbins Road & S. Griffin Street

Movement	EB	EB	WB	SB	SB
Directions Served	L	T	TR	L	R
Maximum Queue (ft)	111	28	64	63	67
Average Queue (ft)	38	1	7	19	31
95th Queue (ft)	83	13	35	49	61
Link Distance (ft)		886	746		555
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	100			150	
Storage Blk Time (%)	0				
Queuing Penalty (veh)	0				

Zone Summary

Zone wide Queuing Penalty: 13

Intersection: 1: 172nd Avenue & Robbins Road

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	TR
Maximum Queue (ft)	174	307	107	230	164	279	192	120	260
Average Queue (ft)	33	152	35	105	61	125	38	59	128
95th Queue (ft)	90	260	76	184	120	226	103	116	228
Link Distance (ft)		570		360		429			599
Upstream Blk Time (%)						0			
Queuing Penalty (veh)						0			
Storage Bay Dist (ft)	100		100		165		165	65	
Storage Blk Time (%)		19	0	8		4		5	27
Queuing Penalty (veh)		10	1	6		8		12	22

Intersection: 2: Robbins Road & S. Griffin Street

Movement	EB	EB	WB	SB	SB
Directions Served	L	T	TR	L	R
Maximum Queue (ft)	80	21	39	82	70
Average Queue (ft)	32	1	2	33	33
95th Queue (ft)	65	11	19	68	57
Link Distance (ft)		886	746		555
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	100			150	
Storage Blk Time (%)	0				
Queuing Penalty (veh)	0				

Zone Summary

Zone wide Queuing Penalty: 60

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	237	38	48	251	30	57	65	52	45	116	35
Future Volume (veh/h)	22	237	38	48	251	30	57	65	52	45	116	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		0.99	0.99		0.99	0.99		0.99
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	1870	1870	1870	1841	1841	1841	1811	1811	1811	1841	1841	1841
Adj Flow Rate, veh/h	26	279	45	51	264	32	71	81	65	57	147	44
Peak Hour Factor	0.85	0.85	0.85	0.95	0.95	0.95	0.80	0.80	0.80	0.79	0.79	0.79
Percent Heavy Veh, %	2	2	2	4	4	4	6	6	6	4	4	4
Cap, veh/h	491	647	104	474	694	84	352	433	449	430	317	95
Arrive On Green	0.04	0.41	0.41	0.06	0.43	0.43	0.06	0.24	0.24	0.06	0.23	0.23
Sat Flow, veh/h	1781	1569	253	1753	1609	195	1725	1811	1519	1753	1356	406
Grp Volume(v), veh/h	26	0	324	51	0	296	71	81	65	57	0	191
Grp Sat Flow(s),veh/h/ln	1781	0	1822	1753	0	1803	1725	1811	1519	1753	0	1762
Q Serve(g_s), s	0.7	0.0	11.4	1.4	0.0	10.0	2.7	3.2	2.8	2.1	0.0	8.4
Cycle Q Clear(g_c), s	0.7	0.0	11.4	1.4	0.0	10.0	2.7	3.2	2.8	2.1	0.0	8.4
Prop In Lane	1.00		0.14	1.00		0.11	1.00		1.00	1.00		0.23
Lane Grp Cap(c), veh/h	491	0	752	474	0	778	352	433	449	430	0	411
V/C Ratio(X)	0.05	0.00	0.43	0.11	0.00	0.38	0.20	0.19	0.14	0.13	0.00	0.46
Avail Cap(c_a), veh/h	563	0	752	512	0	778	375	433	449	463	0	411
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.2	0.0	18.9	13.8	0.0	17.4	23.5	27.3	23.4	23.3	0.0	29.7
Incr Delay (d2), s/veh	0.0	0.0	1.8	0.1	0.0	1.4	0.3	1.0	0.7	0.1	0.0	3.7
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(50%),veh/ln	0.3	0.0	4.9	0.5	0.0	4.2	1.0	1.4	1.0	0.9	0.0	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.3	0.0	20.7	13.9	0.0	18.8	23.8	28.2	24.1	23.5	0.0	33.4
LnGrp LOS	B	A	C	B	A	B	C	C	C	C	A	C
Approach Vol, veh/h		350			347			217			248	
Approach Delay, s/veh		20.2			18.1			25.5			31.1	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.5	43.1	10.3	27.0	7.8	44.8	9.8	27.5
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0
Max Green Setting (Gmax), s	7.0	34.0	7.0	21.0	7.0	34.0	7.0	21.0
Max Q Clear Time (g_c+I1), s	3.4	13.4	4.7	10.4	2.7	12.0	4.1	5.2
Green Ext Time (p_c), s	0.0	1.8	0.0	0.8	0.0	1.7	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	22.9
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	133	167	260	179	32	70
Future Vol, veh/h	133	167	260	179	32	70
Conflicting Peds, #/hr	10	0	0	10	10	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	150	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	72	72	65	65
Heavy Vehicles, %	5	5	7	7	4	4
Mvmt Flow	158	199	361	249	49	108

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	620	0	-	0	1021	506
Stage 1	-	-	-	-	496	-
Stage 2	-	-	-	-	525	-
Critical Hdwy	4.15	-	-	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.245	-	-	-	3.536	3.336
Pot Cap-1 Maneuver	946	-	-	-	260	562
Stage 1	-	-	-	-	608	-
Stage 2	-	-	-	-	589	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	937	-	-	-	212	551
Mov Cap-2 Maneuver	-	-	-	-	305	-
Stage 1	-	-	-	-	500	-
Stage 2	-	-	-	-	583	-

Approach	EB	WB	SB
HCM Control Delay, s	4.3	0	15
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	937	-	-	-	305	551
HCM Lane V/C Ratio	0.169	-	-	-	0.161	0.195
HCM Control Delay (s)	9.6	-	-	-	19.1	13.1
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.6	-	-	-	0.6	0.7

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	285	7	6	324	19	15
Future Vol, veh/h	285	7	6	324	19	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
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	310	8	7	352	21	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	318	0	680	314
Stage 1	-	-	-	-	314	-
Stage 2	-	-	-	-	366	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1242	-	417	726
Stage 1	-	-	-	-	741	-
Stage 2	-	-	-	-	702	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1242	-	414	726
Mov Cap-2 Maneuver	-	-	-	-	515	-
Stage 1	-	-	-	-	737	-
Stage 2	-	-	-	-	702	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	11.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	591	-	-	1242	-
HCM Lane V/C Ratio	0.063	-	-	0.005	-
HCM Control Delay (s)	11.5	-	-	7.9	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	374	68	81	281	53	108	259	88	89	184	51
Future Volume (veh/h)	51	374	68	81	281	53	108	259	88	89	184	51
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		0.99	0.99		0.98	1.00		0.98
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	1870	1870	1870	1885	1885	1885	1870	1870	1870	1841	1841	1841
Adj Flow Rate, veh/h	58	425	77	88	305	58	121	291	99	101	209	58
Peak Hour Factor	0.88	0.88	0.88	0.92	0.92	0.92	0.89	0.89	0.89	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	1	1	1	2	2	2	4	4	4
Cap, veh/h	440	600	109	346	614	117	319	441	477	298	322	89
Arrive On Green	0.06	0.39	0.39	0.07	0.40	0.40	0.07	0.24	0.24	0.07	0.23	0.23
Sat Flow, veh/h	1781	1537	278	1795	1536	292	1781	1870	1558	1753	1381	383
Grp Volume(v), veh/h	58	0	502	88	0	363	121	291	99	101	0	267
Grp Sat Flow(s),veh/h/ln	1781	0	1816	1795	0	1828	1781	1870	1558	1753	0	1764
Q Serve(g_s), s	1.7	0.0	21.0	2.5	0.0	13.4	4.5	12.7	4.2	3.8	0.0	12.3
Cycle Q Clear(g_c), s	1.7	0.0	21.0	2.5	0.0	13.4	4.5	12.7	4.2	3.8	0.0	12.3
Prop In Lane	1.00		0.15	1.00		0.16	1.00		1.00	1.00		0.22
Lane Grp Cap(c), veh/h	440	0	708	346	0	731	319	441	477	298	0	412
V/C Ratio(X)	0.13	0.00	0.71	0.25	0.00	0.50	0.38	0.66	0.21	0.34	0.00	0.65
Avail Cap(c_a), veh/h	473	0	708	361	0	731	325	441	477	309	0	412
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.0	0.0	23.1	16.5	0.0	20.2	24.1	31.1	23.2	24.0	0.0	31.2
Incr Delay (d2), s/veh	0.1	0.0	5.9	0.4	0.0	2.4	0.7	7.5	1.0	0.7	0.0	7.7
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(50%),veh/ln	0.7	0.0	9.6	1.0	0.0	5.9	1.8	6.2	1.6	1.6	0.0	6.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.1	0.0	29.0	16.9	0.0	22.6	24.9	38.7	24.2	24.7	0.0	38.9
LnGrp LOS	B	A	C	B	A	C	C	D	C	C	A	D
Approach Vol, veh/h		560			451			511			368	
Approach Delay, s/veh		27.6			21.5			32.6			35.0	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.7	41.1	11.2	27.0	9.9	42.0	10.9	27.2
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0
Max Green Setting (Gmax), s	7.0	34.0	7.0	21.0	7.0	34.0	7.0	21.0
Max Q Clear Time (g_c+I1), s	4.5	23.0	6.5	14.3	3.7	15.4	5.8	14.7
Green Ext Time (p_c), s	0.0	2.4	0.0	0.8	0.0	2.0	0.0	1.0

Intersection Summary	
HCM 6th Ctrl Delay	28.9
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	109	360	313	102	59	80
Future Vol, veh/h	109	360	313	102	59	80
Conflicting Peds, #/hr	4	0	0	4	4	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	150	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	82	82	68	68
Heavy Vehicles, %	3	3	7	7	4	4
Mvmt Flow	120	396	382	124	87	118

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	510	0	-	0	1088	449
Stage 1	-	-	-	-	448	-
Stage 2	-	-	-	-	640	-
Critical Hdwy	4.13	-	-	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.227	-	-	-	3.536	3.336
Pot Cap-1 Maneuver	1050	-	-	-	237	606
Stage 1	-	-	-	-	639	-
Stage 2	-	-	-	-	521	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1046	-	-	-	208	603
Mov Cap-2 Maneuver	-	-	-	-	303	-
Stage 1	-	-	-	-	563	-
Stage 2	-	-	-	-	519	-

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	16.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1046	-	-	-	303	603
HCM Lane V/C Ratio	0.115	-	-	-	0.286	0.195
HCM Control Delay (s)	8.9	-	-	-	21.6	12.4
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.4	-	-	-	1.2	0.7

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	461	26	11	382	16	8
Future Vol, veh/h	461	26	11	382	16	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	83	83	83	88
Heavy Vehicles, %	4	4	7	7	7	4
Mvmt Flow	524	30	13	460	19	9

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	554	0	1025	539
Stage 1	-	-	-	-	539	-
Stage 2	-	-	-	-	486	-
Critical Hdwy	-	-	4.17	-	6.47	6.24
Critical Hdwy Stg 1	-	-	-	-	5.47	-
Critical Hdwy Stg 2	-	-	-	-	5.47	-
Follow-up Hdwy	-	-	2.263	-	3.563	3.336
Pot Cap-1 Maneuver	-	-	992	-	255	539
Stage 1	-	-	-	-	575	-
Stage 2	-	-	-	-	608	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	992	-	252	539
Mov Cap-2 Maneuver	-	-	-	-	380	-
Stage 1	-	-	-	-	568	-
Stage 2	-	-	-	-	608	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	14.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	420	-	-	992	-
HCM Lane V/C Ratio	0.068	-	-	0.013	-
HCM Control Delay (s)	14.2	-	-	8.7	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection: 1: 172nd Avenue & Robbins Road

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	TR
Maximum Queue (ft)	48	206	69	172	100	100	70	104	182
Average Queue (ft)	13	89	23	74	38	41	24	32	79
95th Queue (ft)	39	161	53	143	81	93	58	76	151
Link Distance (ft)		570		360		429			599
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	100		100		165		165	65	
Storage Blk Time (%)		8	0	4				1	15
Queuing Penalty (veh)		2	0	2				2	7

Intersection: 2: Robbins Road & S. Griffin Street

Movement	EB	EB	WB	SB	SB
Directions Served	L	T	TR	L	R
Maximum Queue (ft)	109	12	84	66	70
Average Queue (ft)	43	1	11	21	31
95th Queue (ft)	88	9	47	52	58
Link Distance (ft)		405	746		555
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	100			150	
Storage Blk Time (%)	1				
Queuing Penalty (veh)	1				

Intersection: 3: Site Drive & Robbins Road

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	18	54
Average Queue (ft)	1	21
95th Queue (ft)	10	48
Link Distance (ft)		498
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 14

Intersection: 1: 172nd Avenue & Robbins Road

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	TR
Maximum Queue (ft)	199	325	134	227	135	296	228	120	265
Average Queue (ft)	37	163	38	108	56	130	39	63	139
95th Queue (ft)	113	276	89	193	111	228	113	124	242
Link Distance (ft)		570		360		429			599
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	100		100		165		165	65	
Storage Blk Time (%)		22	0	10		5		6	32
Queuing Penalty (veh)		12	1	8		9		14	29

Intersection: 2: Robbins Road & S. Griffin Street

Movement	EB	EB	WB	SB	SB
Directions Served	L	T	TR	L	R
Maximum Queue (ft)	78	21	49	91	73
Average Queue (ft)	32	1	4	34	35
95th Queue (ft)	64	13	24	69	63
Link Distance (ft)		395	746		555
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	100			150	
Storage Blk Time (%)	0			0	
Queuing Penalty (veh)	0			0	

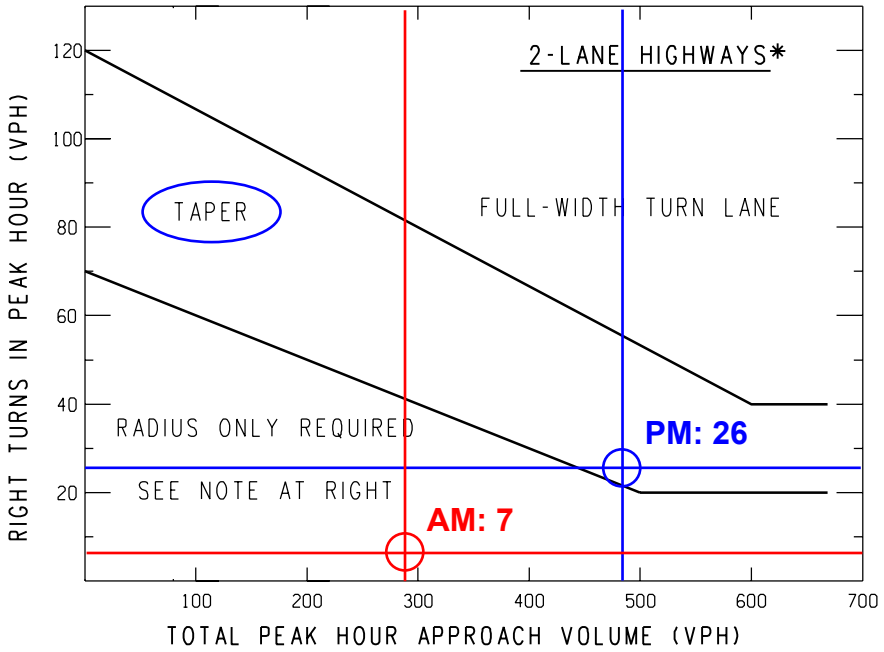
Intersection: 3: Site Drive & Robbins Road

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	34	60
Average Queue (ft)	2	20
95th Queue (ft)	17	50
Link Distance (ft)		485
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 73

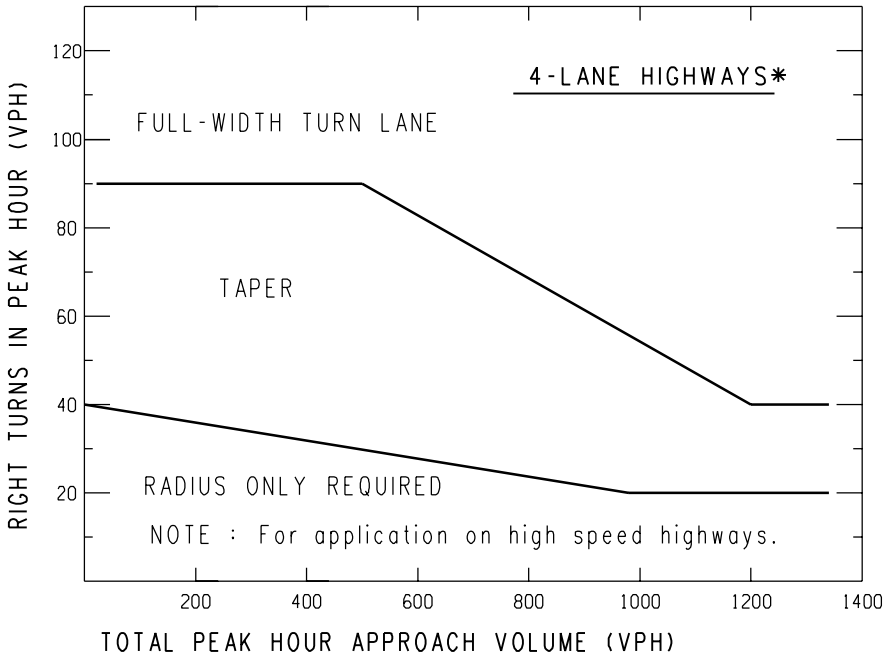
ROBBINS ROAD & SITE DRIVE RT LANE WARRANT



NOTE:
For posted speeds at or under 45 mph, peak hour right turns greater than 40 vph, and total peak hour approach less than 300 vph, adjust right turn volumes.

Adjust peak hour right turns = Peak hour right turns - 20

AM: 292
PM: 487



*If a center left-turn lane exists(i.e. 3 or 5 lane highway), subtract the number of left turns in approach volume from the total approach volume to get an adjusted total approach volume.

Sample Problem:
The Design Speed is 55 mph. The Peak Hour Approach Volume is 300 vph. The Number of Right Turns in the Peak Hour is 100 vph. Determine if a right turn lane is recommended.

Solution:
Figure indicates that the intersection of 300 vph and 100 vph is located above the upper trend line; thus,a right-turn lane may be recommended.

MDOT Michigan Department of Transportation TRAFFIC AND SAFETY NOTE	TRAFFIC VOLUME GUIDELINES FOR RIGHT-TURN LANES AND TAPERS		
DRAWN BY: MTS CHECKED BY: JAT	08/05/2004 PLAN DATE:	604A	SHEET 2 OF 2
FILE: K:/DGN/ts notes/Note604A tsn.dgn		REV. 08/05/2004	

Clear Form

Print

GRAND HAVEN CHARTER TOWNSHIP

PLANNED UNIT DEVELOPMENT (PUD) APPLICATION

Application Type	Fee	Escrow*
Overlay Zone	$310	$2,500
Non-Overlay Zone	$300	$1,500

Sewer Escrow**	
Main Extension	$5,000
Lift Station	$2,000

Applicant Information

Name: Chad Bush

Phone: 616.607.6073 Fax:

Address: 18000 Cove Street, Spring Lake, MI 49417

Email Address: CBush@askpsp.com

Owner Information *(If different from applicant)*

Name:

Phone: Fax:

Address:

Property Information

Address/Location: 17114 Robbins Rd

Parcel Number: 70 - 03 - 33 - 200 - 035 Size *(acres)*: 13.6

Current Zoning: C1 & I1 +007,056,077,070 Zoning Requested: PUD - Mixed Use

Adjacent Zoning: *North*: SP *South*: PUD Res *East*: C-1&RR *West*: City of GH

Master-Planned Zoning: Robbins Sub Area Consistent with Master Plan? Yes

Other Information

Does Property Abut Township Border? Yes

Present Use of the Subject Property? Industrial

Number & Type of Existing Structures? Office, warehouse, salt storage, cell tower

Subject Property Located on a Paved Road? Yes

Municipal Water within 2,700 Feet of Subject Property? Yes

Municipal Sewer within 2,700 Feet of Subject Property? Yes

NOTE: The architect, engineer, planner, or designer shall be responsible for utilizing the Township Ordinance Books and following the procedures and requirements as specified in Chapters 17 and 23 (*and Chapter 15A if located in the Overlay Zone*), and any other applicable ordinances. Initially, submit five copies of the required information for staff review. Once staff has granted tentative approval, additional copies will be required as requested by staff.

I hereby attest the information on this application is, to the best of my knowledge, true and accurate.

Signature of applicant *Date* 1-15-18

Last Revised 2/8/2016

** To cover cost of legal and consulting fees, may be increased as necessary*

*** If approval of this application requires/includes the extension of a municipal sanitary sewer main, an additional $5,000.00 escrow fee shall be required, and an additional $2,000.00 escrow fee shall be required for the installation of a lift station.*

NOTICE

IF I PLAN TO SPLIT THE PARCEL(S) AFTER THE ZONING APPROVALS ARE GRANTED, I REALIZE THAT I MUST APPLY FOR A LAND DIVISION WITH THE ASSESSING DEPARTMENT. ALL LAND DIVISION REQUIREMENTS MUST BE CONFORMED TO BEFORE PROCEEDING WITH FURTHER DEVELOPMENT.

_____ 1-15-18

Signature of applicant *Date*

For Office Use Only

Date Received _____ Fee Paid? _____

Materials Received: Site Plans _____ Location Map _____

Survey _____ Legal Description _____

Dated copy of approved minutes sent to applicant? _____ Date Sent _____

PLANNING COMMISSION USE ONLY

Approval _____

Tabled _____

Denied _____

Conditional Approval _____

The following conditions shall be met for approval:

_____

_____

_____

_____

_____

_____

_____ _____

Signature of Planning Commission Chair *Date*

Main Street Capital Group

18000 Cove Street, Suite 201
Spring Lake, Michigan 49456
(231) 780-2541
(231) 780-3891 fax

Storage Building Specifications:

Roof Pitch: 3":12" gable

Widths: 20' & 30'

Bay Widths: 5' & 10' with evergreen roll up doors

Eave Heights: 8'4"

Exterior Framed Openings: 18-gauge prefinished G-90 galvanized steel

Exterior Wall Panels: 26-gauge A-panel – 40-year paint warranty - Light Stone

Horizontal Interior Partition Panels: 29-gauge R-panel galvalume

Roof Panels: 26-gauge Evergreen colored standing seam – 25-year warranty

Rake and Eave Trim: 26-gauge Evergreen

Foundations: 16' monopour floating slab with welded wire & vapor barrier

Fencing: 6' tall decorative black metal fencing with stone pillars

Brick Facing: Novabrik or comparable mortarless concrete brick siding

Picture of proposed 6' Black decorative fence with stone pillars.:

Main Street Capital Group

Proposed Brick Facing – Harvest Blend – Moisson Nuance:

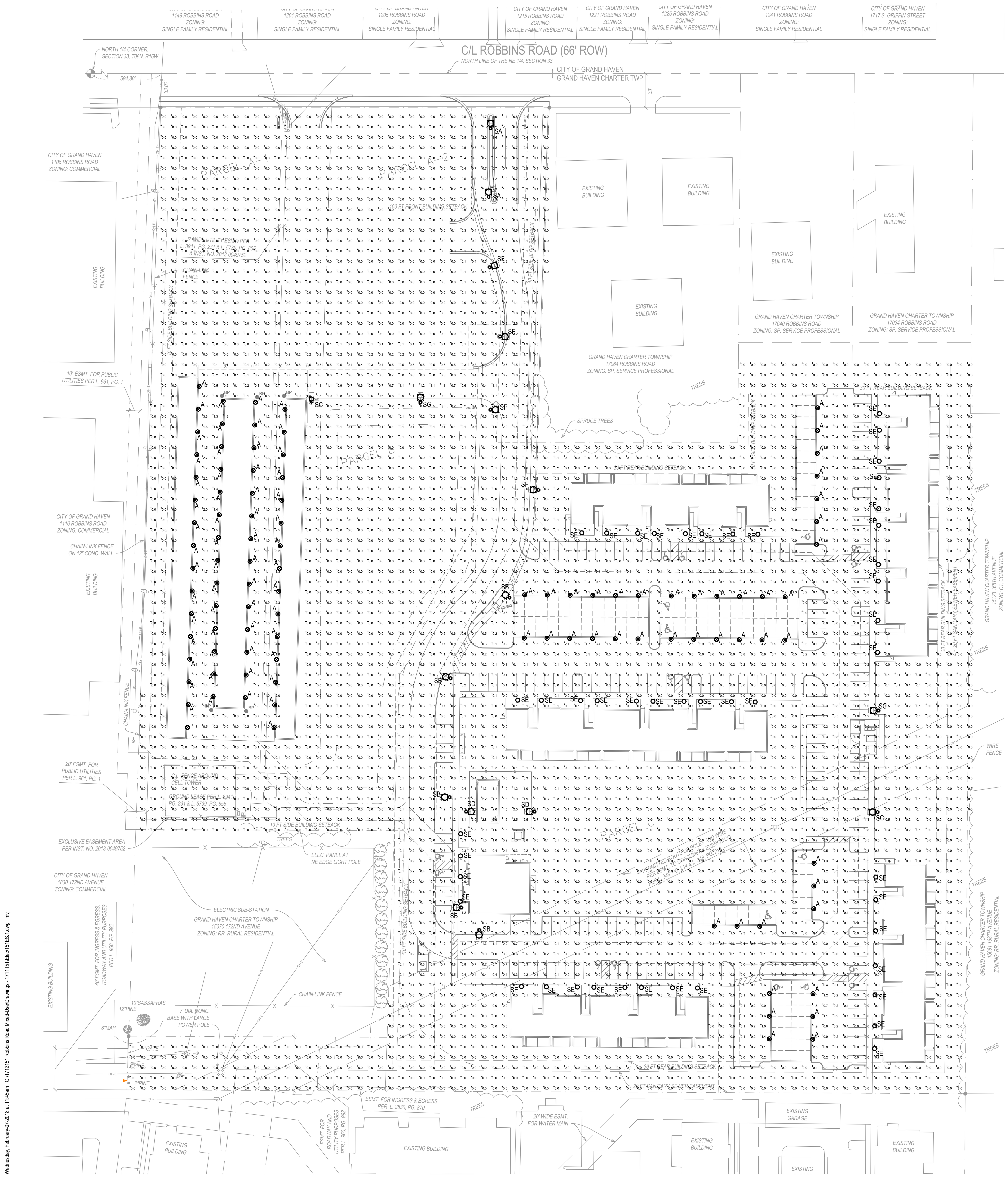
Current Storage Site:

Property to the West:

Property to the West:

Property to the South:

Property to the South:



LUMIÈRE

Catalog #		Type
Project		
Comments		Date
Prepared by		

DESCRIPTION

Tahoe mini-bollards are petite, yet rugged low voltage beacons in three distinct styles. They utilize a 20-watt MR16 lamp source and are ideal for a variety of commercial and residential applications. Each model is available in three sizes and includes a cast zinc ground spike for fast, easy installation. Lumière's exclusive Siphon Protection System (S.P.S.) prevents water from siphoning into the fixture through its own lead wires.

SPECIFICATION FEATURES

A ... Material
Housing is precision-machined from corrosion-resistant 6061-T6 aluminum extrusion.

B ... Finish
Fixture is double protected by a chromate conversion undercoating and polyester powdercoat paint finish, surpassing the rigorous demands of the outdoor environment. Fixture housing is available in a variety of standard colors.

C ... Gasket
Housing and mounting spike adaptor stem are sealed with a high temperature silicone o-ring gasket to prevent water intrusion.

D ... Lens
Lens is machined from solid U.V. stabilized clear acrylic.

E ... Mounting Spike
6-3/4" corrosion-resistant cast zinc ground spike with 1/2" female threaded opening provided as standard (model GS01). It is sealed around the lead wires for rigidity and a watertight seal.

F ... Hardware
Stainless steel hardware is standard to provide maximum corrosion-resistance.

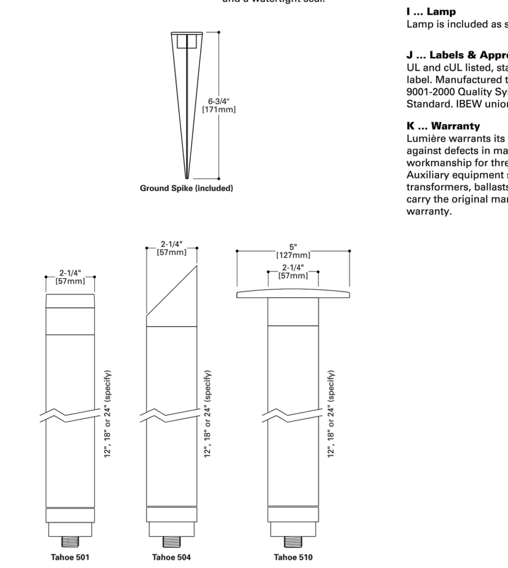
G ... Socket
Ceramic socket with 250° C Teflon® coated lead wires and GU5.3 bi-pin base.

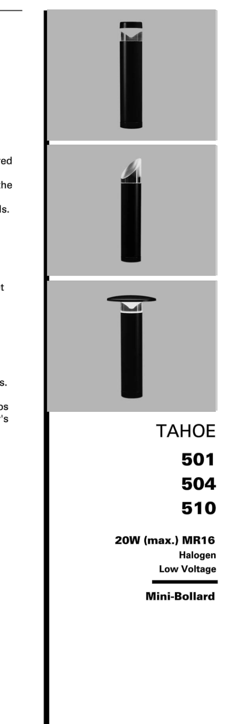
H ... Electrical
Remote 12V transformer required (not included). Available from Lumière as an accessory - see the Accessories & Technical Data section of this catalog for details.

I ... Lamp
Lamp is included as standard.

J ... Labels & Approvals
UL and cUL listed, standard wet label. Manufactured to ISO 9001-2000 Quality Systems Standard. IBEW union made.

K ... Warranty
Lumière warrants its fixtures against defects in materials & workmanship for three (3) years. Auxiliary equipment such as transformers, ballasts and lamps carry the original manufacturer's warranty.





TAHOE
501
504
510

20W (max.) MR16
Halogen
Low Voltage

Mini-Bollard

COOPER Lighting
www.cooperlighting.com

Specifications and Dimensions subject to change without notice.
Consult your representative for additional options and finishes.

ADL032484

D-Series Size 0
LED Area Luminaire

Catalog Number
Notes
Type

A+ Capable Luminaire

This item is an A+ capable luminaire, which has been designed and tested to provide consistent color appearance and system-level interoperability.

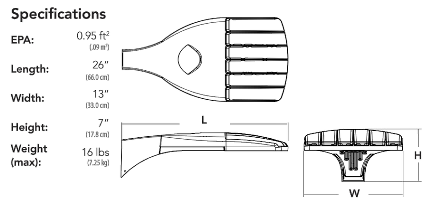
- All configurations of this luminaire meet the Acuity Brands' specification for chromatic consistency
- This luminaire is A+ Certified when ordered with DTL® controls marked by a shaded background. DTL DLL equipped luminaires meet the A+ specification for luminaire to photocontrol interoperability1
- This luminaire is part of an A+ Certified solution for ROAM® or XPoint™ Wireless control networks, providing out-of-the-box control compatibility with simple commissioning, when ordered with drivers and control options marked by a shaded background1

To learn more about A+, visit www.acuitybrands.com/aplus.

1. See ordering tree for details.
2. A+ Certified Solutions for ROAM require the order of one ROAM node per luminaire. Sold Separately: Link to Roam; Link to DTL DLL

Specifications

EPA:	0.95 ft² (.09 m²)
Length:	26" (66.0 cm)
Width:	13" (33.0 cm)
Height:	7" (17.8 cm)
Weight (max):	16 lbs (7.25 kg)



A+ Capable options indicated by this color background.

Ordering Information — EXAMPLE: DSX0 LED P6 40K T3M MVOLT SPA DDBXD

DSX0 LED

Series	LEDs	Color temperature	Distribution	Voltage	Mounting
DSX0 LED	Forward optics P1 P2 P3 P4 P5 P6 P7; Rotated optics P10 P11 P12 P13	30K 3000 K; 40K 4000 K; 50K 5000 K; AMBPC Amber phosphor converted	T1S Type I short; T2S Type II short; T2M Type II medium; T3S Type III short; T3M Type III medium; T4M Type IV medium; TFTM Forward throw medium; T5VS Type V very short; T5S Type V short; T5M Type V medium; T5W Type V wide; BLC Backlight control; LCCO Left corner cutoff; RCCO Right corner cutoff	MVOLT; 120; 208; 240; 277; 347; 480	Shipped included: SPA Square pole mounting; RPA Round pole mounting; WBA Wall bracket; SPUMBA Square pole universal mounting adaptor; RPUMBA Round pole universal mounting adaptor. Shipped separately: KMA8 DDBXD U Mast arm mounting bracket adaptor (specify finish)

Control options		Other options	Finish (required)
Shipped installed: PER NEMA twist-lock receptacle only (control ordered separate); PER5 Five-wire receptacle only (control ordered separate); PER7 Seven-wire receptacle only (control ordered separate); DMG 0-10V dimming extend out back of housing for external control (control ordered separate); PIR Bi-level, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 5fc; PIRH Bi-level, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 5fc; PIR1FC3V Bi-level, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 1fc	PIRH1FC3V Bi-level, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 1fc; BL30 Bi-level switched dimming, 30%; BL50 Bi-level switched dimming, 50%; PNMTDD3 Part night, dim till dawn; PNMT5D3 Part night, dim 5 hrs; PNMT6D3 Part night, dim 6 hrs; PNMT7D3 Part night, dim 7 hrs; FAO Field adjustable output	Shipped installed: HS House-side shield; SF Single fuse (120, 277, 347V); DF Double fuse (208, 240, 480V); L90 Left rotated optics; R90 Right rotated optics; DDL Diffused drop lens. Order separately: BS Bird spikes; EGS External glare shield	DDBXD Dark bronze; DBLXD Black; DNAXD Natural aluminum; DWHXD White; DDBTXD Textured dark bronze; DBLBXD Textured black; DNATXD Textured natural aluminum; DWHGXD Textured white

LITHONIA LIGHTING — One Lithonia Way • Conyers, Georgia 30012 • Phone: 800.279.8041 • www.lithonia.com
© 2011-2017 Acuity Brands Lighting, Inc. All rights reserved.
DSX0-LED Rev. 10/25/17 Page 1 of 7

PROGRESS LIGHTING

Project:
Fixture Type:
Location:
Contact:

P8222 Series
7.25 inch LED Flush Mount • Wet Location

Specifications: P8222-28-30K

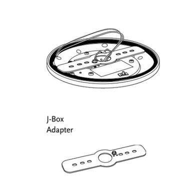
Description:
The P8222 delivers a solution for flush mount, for both residential and commercial markets. In addition, the P8222 is wet located, Title 24 - JA8 - 2016 and is a cost effective solution for fire rated application. The P8222 luminaire unites performance, cost and safety benefits.

Construction:
- Diffused polycarbonate lens controls direct glare from the LEDs
- Simple snap in installation for J-Box
- Die-cast aluminum construction with a powder coat paint finish
- Can be installed in a 4" J-Box
- Lumen output and distribution comparable to a 100W incandescent lamp
- Suitable for use in IC or NON-IC Applications with 25°C (77°F) continuous room side ambient temperature.
- Meets California Title 24 - JA8 - 2016

Images:

Dimensions:
Diameter: 7.25"
Height: 1.27"

Included Mounting Options:
J-Box Mount



Performance:

Input Power	17.3W
Input Voltage	120V
Input Frequency	60Hz
Lumens/LPW	1170/67.6 (LM-79)
CCT	3000K
CRI	90
Life	50,000 (L70/TM-21)
EMI/RFI	FCC Title 47, Part 15, Class B
Min. Start Temp	-30 °C
Max. Operating Temp	30 °C
Warranty	5 yrs.
Labels	cCSAus classified for wet locations ENERGY STAR® qualified California Title 24 - JA8-2016

Catalog number:

Base	Finish	Color Temp	CRI
P8222	28 - White	30K - 3000K	BLANK - 90 CRI

For more information visit our website: www.progresslighting.com — Progress Lighting • 701 Millennium Boulevard • Greenville, SC 29607

Schedule

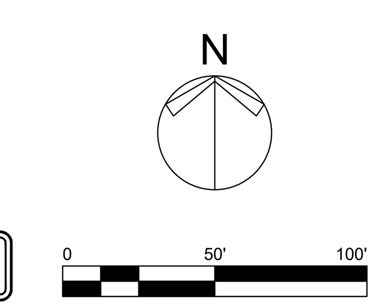
Label	Manufacturer	Catalog Number	Lamp	Number Lamps	Wattage
A	PROGRESS	P8222-2830K LED DOWNLIGHT	40-Nichia 3000K LED's	1	17.3
SA	Lithonia Lighting	DSX0 LED P1 30K T5M MVOLT MOUNTED ON STRAIGHT STEEL POLE AT 12' ABOVE FINISHED GRADE.	LED	1	38
SB	Lithonia Lighting	DSX0 LED P1 30K T3M MVOLT MOUNTED ON STRAIGHT STEEL POLE AT 20' ABOVE FINISHED GRADE.	LED	1	38
SC	Lithonia Lighting	DSX0 LED P1 30K TFTM MVOLTMOUNTED ON STRAIGHT STEEL POLE AT 20' ABOVE FINISHED GRADE.	LED	1	38
SD	Lithonia Lighting	DSX0 LED P1 30K TFTM MVOLTMOUNTED ON STRAIGHT STEEL POLE AT 12' ABOVE FINISHED GRADE.	LED	1	38
SE	EATON - LUMIERE (FORMER COOPER LIGHTING)	510-24-10LED3041-12-CS	10W 3000K, 41 Degree Wide, GU5.3 Base	1	10
SF	Lithonia Lighting	DSX0 LED P1 30K T3M MVOLT MOUNTED ON STRAIGHT STEEL POLE AT 12' ABOVE FINISHED GRADE.	LED	1	38

Statistics

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
SITE	+	0.3 fc	4.5 fc	0.0 fc	N/A	N/A

NOTE: ALL UTILITIES SHOWN ARE APPROXIMATE LOCATIONS FROM FIELD DATA AND AVAILABLE INFORMATION. THEY SHOULD NOT BE INTERPRETED AS EXACT LOCATIONS NOR SHOULD THEY BE ASSUMED TO BE THE ONLY UTILITIES IN THE AREA.

NOT FOR CONSTRUCTION



ARCHITECTS • ENGINEERS
paradigm design
GRAND RAPIDS — 550 3 MILE N.W. SUITE B, GRAND RAPIDS, MI 49544, (616) 785 - 5656
TRAVERSE CITY — 333 E. STATE STREET, TRAVERSE CITY, MI 49684, (231) 346 - 3030
WEB — PARADIGMAE.COM

NOTE: THIS DOCUMENT IS PRELIMINARY IN NATURE AND IS NOT A FINAL, SIGNED AND SEALED DOCUMENT.

PROJECT
17114 ROBBINS MIXED USE PUD
17114 ROBBINS ROAD
GRAND HAVEN, MI 49417

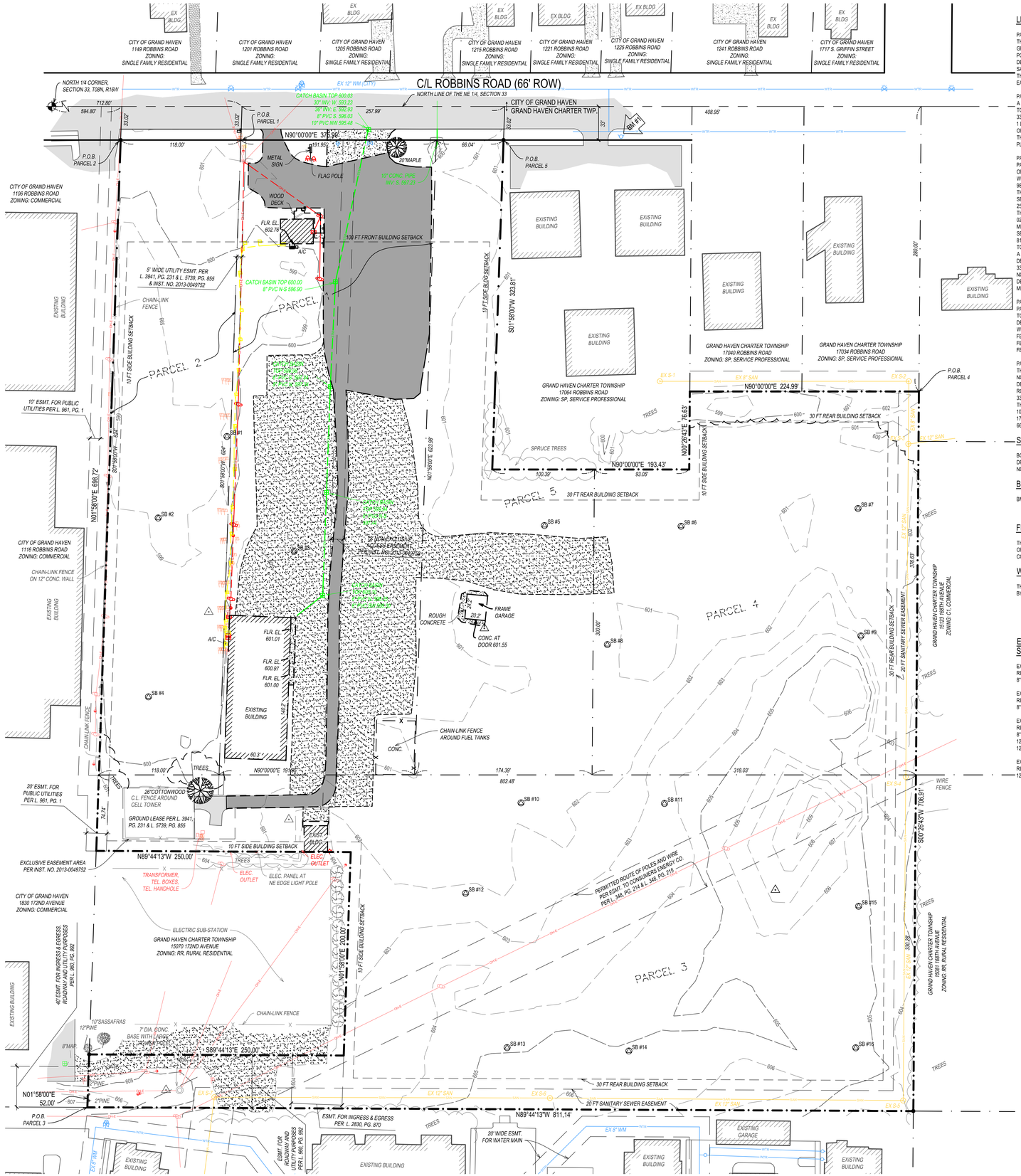
DEVELOPER
MAIN STREET CAPITAL GROUP
18000 COVE STREET, STE 201
SPRING LAKE, MI 49456

RELEASE DATE

△	DATE	DESCRIPTION
	01-16-18	PUD APPLICATION
	02-07-18	PUD APPLICATION

PROJECT
1712151

SHEET
ELECTRICAL SITE LIGHTING CALCULATIONS
ES.1



LEGAL DESCRIPTION:

PARCEL 1:
THAT PART OF THE NORTHEAST 1/4 OF SECTION 33, TOWN 8 NORTH, RANGE 16 WEST, GRAND HAVEN TOWNSHIP, OTTAWA COUNTY, MICHIGAN, DESCRIBED AS COMMENCING AT A POINT DUE EAST ALONG THE NORTH LINE OF SAID SECTION 33, 712.8 FEET AND SOUTH 01 DEGREES 58 MINUTES 00 SECONDS WEST 33.00 FEET FROM THE NORTH 1/4 CORNER OF SAID SECTION 33, THENCE SOUTH 01 DEGREES 58 MINUTES 00 SECONDS WEST 624.0 FEET; THENCE DUE EAST 191.95 FEET, THENCE NORTH 01 DEGREES 58 MINUTES 00 SECONDS EAST 624.00 FEET, THENCE DUE WEST 191.95 FEET TO THE POINT OF BEGINNING.

PARCEL 2:
A PARCEL OF LAND IN SECTION 33, TOWN 8 NORTH, RANGE 16 WEST, GRAND HAVEN TOWNSHIP, OTTAWA COUNTY, MICHIGAN, DESCRIBED AS: BEGINNING 594.8 FEET EAST AND 33 FEET SOUTH OF THE NORTH 1/4 CORNER OF SAID SECTION 33; RUNNING THENCE SOUTH 1 DEGREES 58 MINUTES WEST 624 FEET; THENCE EAST AND PARALLEL TO THE NORTH LINE OF SAID SECTION 33, 118 FEET; THENCE NORTH 1 DEGREES 58 MINUTES EAST 624 FEET; THENCE WEST AND PARALLEL TO THE NORTH LINE OF SAID SECTION 33, 118 FEET TO THE PLACE OF BEGINNING.

PARCEL 3:
PART OF THE NORTH THEE-QUARTERS (N 3/4) OF THE NORTHWEST ONE-QUARTER (NW 1/4) OF THE NORTHEAST ONE-QUARTER (NE 1/4) OF SECTION 33, TOWN 8 NORTH, RANGE 16 WEST, GRAND HAVEN TOWNSHIP, OTTAWA COUNTY, MICHIGAN: COMMENCING SOUTH 980.61 FEET AND SOUTH 89 DEGREES 28 MINUTES 46 SECONDS EAST 556.54 FEET FROM THE NORTH ONE-QUARTER (N 1/4) CORNER; THENCE NORTH 02 DEGREES 13 MINUTES 27 SECONDS EAST 52.00 FEET; THENCE SOUTH 89 DEGREES 28 MINUTES 46 SECONDS EAST 250.00 FEET; THENCE NORTH 02 DEGREES 13 MINUTES 27 SECONDS EAST 00.00 FEET; THENCE NORTH 89 DEGREES 28 MINUTES 46 SECONDS WEST 250.00 FEET; THENCE NORTH 02 DEGREES 13 MINUTES 27 SECONDS EAST 74.74 FEET; THENCE SOUTH 89 DEGREES 44 MINUTES 33 SECONDS EAST 802.48 FEET; THENCE SOUTH 00 DEGREES 42 MINUTES 10 SECONDS WEST 330.28 FEET; THENCE NORTH 89 DEGREES 28 MINUTES 46 SECONDS WEST 811.14 FEET TO BEGINNING.
TOGETHER WITH AN EASEMENT FOR INGRESS AND EGRESS DESCRIBED AS: BEGINNING AT A POINT ON THE NORTH AND SOUTH 1/4 LINE OF SAID SECTION 33 WHICH IS SOUTH 00 DEGREES 00 MINUTES WEST 980.61 FEET FROM THE NORTH 1/4 CORNER OF SAID SECTION 33; THENCE SOUTH 89 DEGREES 28 MINUTES 46 SECONDS EAST 556.54 FEET; THENCE NORTH 02 DEGREES 13 MINUTES 27 SECONDS EAST 40.00 FEET; THENCE NORTH 89 DEGREES 28 MINUTES 46 SECONDS WEST 558.09 FEET; THENCE SOUTH 00 DEGREES 00 MINUTES 00 SECONDS WEST 40.00 FEET TO POINT OF BEGINNING.

PARCEL 4:
PART OF THE NORTH 3/4 OF THE NORTHWEST 1/4 OF THE NORTHEAST 1/4 OF SECTION 33, TOWN 8 NORTH, RANGE 16 WEST, GRAND HAVEN TOWNSHIP, OTTAWA COUNTY, MICHIGAN, DESCRIBED AS: COMMENCING SOUTH 89°44'33" EAST 1379.74 FEET AND SOUTH 00°42'10" WEST 280.00 FEET FROM THE NORTH 1/4 CORNER; THENCE NORTH 89°44'33" WEST 224.99 FEET; THENCE SOUTH 00°42'10" WEST 76.63 FEET; THENCE NORTH 89°44'33" WEST 93.05 FEET; THENCE SOUTH 00°42'10" WEST 300.00 FEET; THENCE SOUTH 89°44'33" EAST 318.04 FEET; THENCE NORTH 00°42'10" EAST 376.63 FEET TO BEGINNING.

PARCEL 5:
THAT PART OF THE NORTHWEST 1/4 OF THE NORTHEAST 1/4 OF SECTION 33, TOWN 8 NORTH, RANGE 16 WEST, GRAND HAVEN TOWNSHIP, OTTAWA COUNTY, MICHIGAN, DESCRIBED AS: COMMENCING AT A POINT ON THE SOUTHERLY RIGHT OF WAY LINE OF ROBBINS ROAD WHICH IS SOUTH 89°44'33" EAST ALONG THE NORTH LINE OF SAID SECTION 33, 970.79 FEET AND SOUTH 02°13'27" WEST 33.02 FEET FROM THE NORTHWEST CORNER THEREOF; THENCE SOUTH 02°13'27" WEST 323.81 FEET; THENCE SOUTH 89°44'33" EAST 100.39 FEET; THENCE SOUTH 00°42'10" WEST 300.00 FEET; THENCE NORTH 89°44'33" WEST 174.39 FEET; THENCE NORTH 02°13'27" EAST 623.98 FEET; THENCE SOUTH 89°44'33" EAST 66.04 FEET TO THE POINT OF BEGINNING.

SURVEY PROVIDED BY:

BOUNDARY & TOPOGRAPHIC SURVEY PROVIDED BY EXXEL ENGINEERING, INC ON A DRAWING TITLED WATER / SEWER PRELIMINARY MIXED USE PUD LAYOUT, DATED NOVEMBER 14, 2017.

BENCHMARKS:

BM #1: TOP OF SW FLANGE BOLT ON HYDRANT, LOCATED 8 FEET SOUTH OF EDGE OF BIT FOR ROBBINS ROAD AND 298 FEET WEST OF THE CENTERLINE OF S GRIFFIN STREET - 2.6 FEET ABOVE GROUND LEVEL. ELEVATION: 603.48 (NAVD 88 DATUM).

FLOODPLAIN DATA:

THE ENTIRE SITE IS DESIGNATED ZONE "X", "AREA DETERMINED TO BE OUTSIDE OF 0.2" ANNUAL CHANCE FLOODPLAIN" ACCORDING TO FEMA FLOOD INSURANCE RATE MAP COMMUNITY-PANEL NUMBER 26139C0087E , EFFECTIVE DATE: DECEMBER 16, 2011.

WETLAND DATA:

THERE ARE NO WETLANDS ON THE SUBJECT PROPERTY BASED ON MAPPING PUBLISHED BY THE U.S. FISH & WILDLIFE SERVICE NATIONAL WETLANDS INVENTORY MAPS.

EXISTING SANITARY STRUCTURES:

EX S-1
RIM: 600.5
8" (E) INV: 593.82

EX S-2
RIM: 602.6
8" (W) & (S) INV: 592.84

EX S-3
RIM: 601.0
8" (N) INV: 592.58
12" (E) INV: 592.25
12" (S) INV: 592.15

EX S-4
RIM: 603.8
12" (N) & (S) INV: 591.43

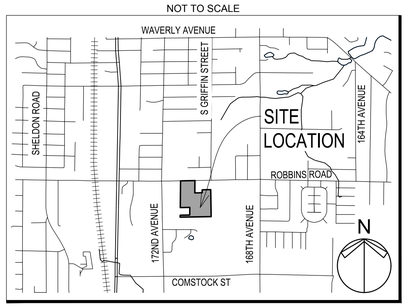
EX S-5
TOP 604.13
12" CHANNEL
(N) INV: 590.73
(W) INV: 590.63

EX S-6
TOP 605.96
12" CHANNEL (E-W) 589.96

EX S-7
TOP 604.63
12" CHANNEL (E & S) 589.13

SITE LOCATION MAP

NOT TO SCALE



17114 ROBBINS ROAD
GRAND HAVEN TOWNSHIP
OTTAWA COUNTY, MICHIGAN

SECTION 33, TOWN 08 N, RANGE 16 W
42°02'41" N, 86°12'41" W
PARCEL #: 70-03-33-200-035
70-03-33-200-056
70-03-33-200-077

EXISTING LEGEND

BENCHMARK	CONTROL POINT	DECIDUOUS TREE
PROPERTY IRON	SECTION CORNER	CONIFEROUS TREE
MAILBOX	SOIL BORING	SIGN
WATER	**ELECTRICAL**	**NATURAL GAS**
VALVE	UTILITY POLE	METER
HYDRANT	GUY WIRE	"MISS DIG" FLAG - GAS
CURB STOP	LIGHT POLE	**TELEPHONE**
STORM SEWER	GROUND LIGHT	PEDESTAL
SQUARE CATCH BASIN	METER	PIT
CURB CATCH BASIN	"MISS DIG" FLAG - ELECTRIC	"MISS DIG" FLAG - TELEPHONE
PIPE INVERT	**SANITARY SEWER**	**FIBER OPTIC**
	MANHOLE	"MISS DIG" FLAG - FIBER OPTIC

CONCRETE PAVEMENT
ASPHALT
GRAVEL SURFACE
CURB & GUTTER
LANDSCAPE CURB
PROPERTY LINE
600 — 601 CONTOUR LINE
X — X FENCE
TREE LINE
WTR — WTR WATER MAIN
SAN — SAN SANITARY SEWER
STM — STM STORM SEWER
G — G NATURAL GAS
OH-E — OH-E OVERHEAD ELECTRIC

Know what's below. Call before you dig.

NOT FOR CONSTRUCTION

NOTE: ALL UTILITIES SHOWN ARE APPROXIMATE LOCATIONS FROM FIELD DATA AND AVAILABLE INFORMATION. THEY SHOULD NOT BE INTERPRETED AS EXACT LOCATIONS NOR SHOULD THEY BE ASSUMED TO BE THE ONLY UTILITIES IN THE AREA.

N

0 50' 100'

ARCHITECTS • ENGINEERS
paradigm design
GRAND RAPIDS: 550 3 MILE N.W. SUITE B, GRAND RAPIDS, MI 49544, (616) 785 - 5656
TRAVERSE CITY: 333 E. STATE STREET, TRAVERSE CITY, MI 49684, (231) 346 - 3030
WEB: ParadigmAE.com

NOTE: THIS DOCUMENT IS PRELIMINARY IN NATURE AND IS NOT A FINAL SIGNED AND SEALED DOCUMENT

BRIAN T. SINNOTT
MI REGISTRATION #6201052169
EXP. DATE 10/31/2019

PROJECT

17114 ROBBINS MIXED USE PUD

17114 ROBBINS ROAD
GRAND HAVEN, MI 49417

DEVELOPER

MAIN STREET CAPITAL GROUP

18000 COVE STREET, STE 201
SPRING LAKE, MI 49456

RELEASE DATE

	DATE	DESCRIPTION
	01-16-18	PUD APPLICATION
	02-07-18	PUD APPLICATION

PROJECT

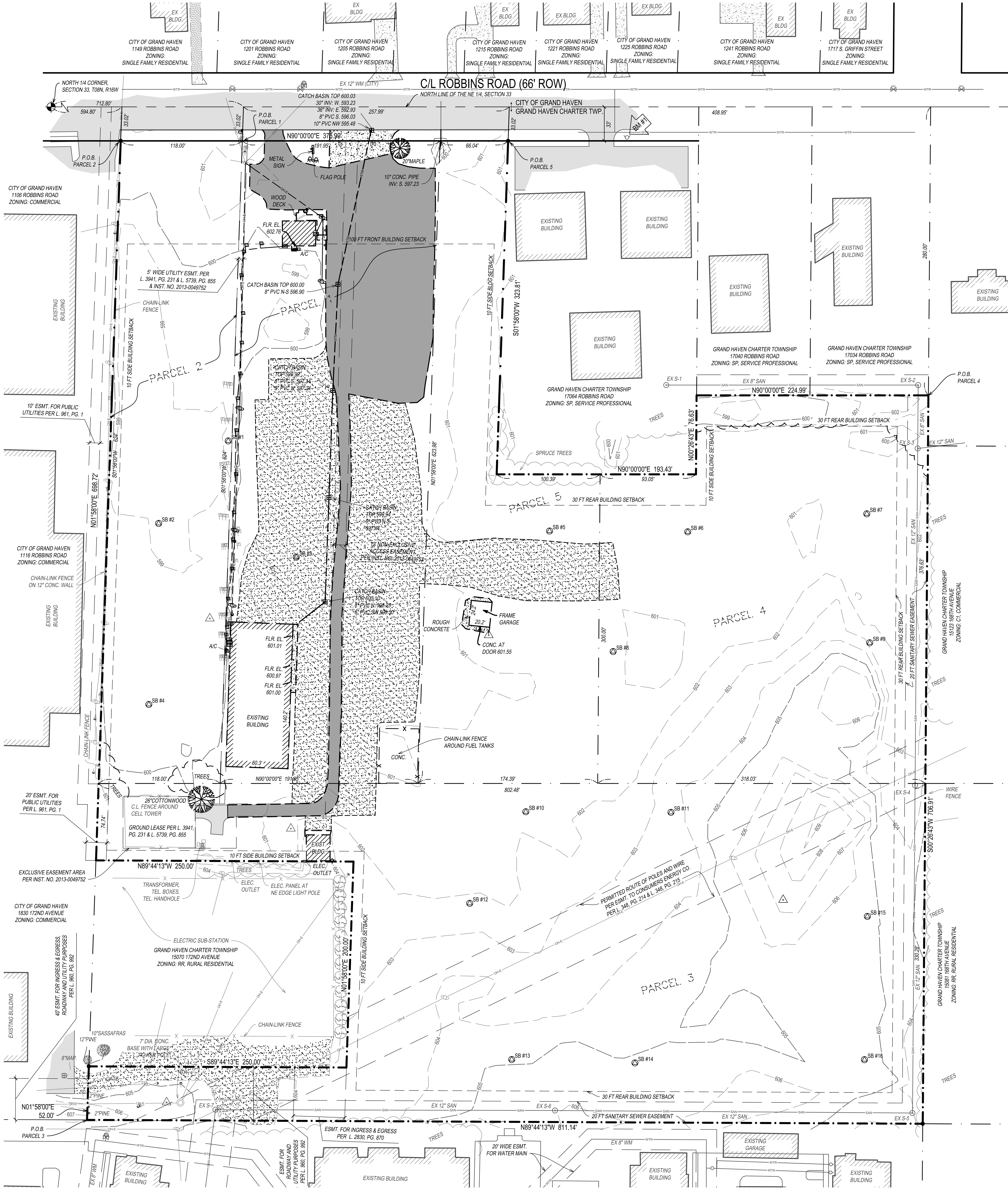
1712151

SHEET

CIVIL EXISTING CONDITIONS

C-101

Wednesday, February-07-2018 at 2:23pm \\PD-FILE1\Jobs$\1712151 Robbins Road Mixed-Use\Drawings - 1711151\Civil\151C-101.dwg bkv



LEGAL DESCRIPTION:

PARCEL 1:
THAT PART OF THE NORTHEAST 1/4 OF SECTION 33, TOWN 8 NORTH, RANGE 16 WEST, GRAND HAVEN TOWNSHIP, OTTAWA COUNTY, MICHIGAN, DESCRIBED AS COMMENCING AT A POINT DUE EAST ALONG THE NORTH LINE OF SAID SECTION 33, 712.8 FEET AND SOUTH 01 DEGREES 58 MINUTES 00 SECONDS WEST 33.00 FEET FROM THE NORTH 1/4 CORNER OF SAID SECTION 33, THENCE SOUTH 01 DEGREES 58 MINUTES 00 SECONDS WEST 624.0 FEET; THENCE DUE EAST 191.95 FEET, THENCE NORTH 01 DEGREES 58 MINUTES 00 SECONDS EAST 624.00 FEET, THENCE DUE WEST 191.95 FEET TO THE POINT OF BEGINNING.

PARCEL 2:
A PARCEL OF LAND IN SECTION 33, TOWN 8 NORTH, RANGE 16 WEST, GRAND HAVEN TOWNSHIP, OTTAWA COUNTY, MICHIGAN, DESCRIBED AS: BEGINNING 594.8 FEET EAST AND 33 FEET SOUTH OF THE NORTH 1/4 CORNER OF SAID SECTION 33; RUNNING THENCE SOUTH 1 DEGREES 58 MINUTES WEST 624 FEET; THENCE EAST AND PARALLEL TO THE NORTH LINE OF SAID SECTION 33, 118 FEET; THENCE NORTH 1 DEGREES 58 MINUTES EAST 624 FEET; THENCE WEST AND PARALLEL TO THE NORTH LINE OF SAID SECTION 33, 118 FEET TO THE PLACE OF BEGINNING.

PARCEL 3:
PART OF THE NORTH THEE-QUARTERS (N 3/4) OF THE NORTHWEST ONE-QUARTER (NW 1/4) OF THE NORTHEAST ONE-QUARTER (NE 1/4) OF SECTION 33, TOWN 8 NORTH, RANGE 16 WEST, GRAND HAVEN TOWNSHIP, OTTAWA COUNTY, MICHIGAN; COMMENCING SOUTH 980.61 FEET AND SOUTH 89 DEGREES 28 MINUTES 46 SECONDS EAST 556.54 FEET FROM THE NORTH ONE-QUARTER (N 1/4) CORNER; THENCE NORTH 02 DEGREES 13 MINUTES 27 SECONDS EAST 52.00 FEET; THENCE SOUTH 89 DEGREES 28 MINUTES 46 SECONDS EAST 250.00 FEET; THENCE NORTH 02 DEGREES 13 MINUTES 27 SECONDS EAST 00.00 FEET; THENCE NORTH 89 DEGREES 28 MINUTES 46 SECONDS WEST 250.00 FEET; THENCE NORTH 02 DEGREES 13 MINUTES 27 SECONDS EAST 74.74 FEET; THENCE SOUTH 89 DEGREES 44 MINUTES 33 SECONDS EAST 802.48 FEET; THENCE SOUTH 00 DEGREES 42 MINUTES 10 SECONDS WEST 330.28 FEET; THENCE NORTH 89 DEGREES 28 MINUTES 46 SECONDS WEST 811.14 FEET TO BEGINNING.
TOGETHER WITH AN EASEMENT FOR INGRESS AND EGRESS DESCRIBED AS: BEGINNING AT A POINT ON THE NORTH AND SOUTH 1/4 LINE OF SAID SECTION 33 WHICH IS SOUTH 00 DEGREES 00 MINUTES WEST 980.61 FEET FROM THE NORTH 1/4 CORNER OF SAID SECTION 33; THENCE SOUTH 89 DEGREES 28 MINUTES 46 SECONDS EAST 556.54 FEET; THENCE NORTH 02 DEGREES 13 MINUTES 27 SECONDS EAST 40.00 FEET; THENCE NORTH 89 DEGREES 28 MINUTES 46 SECONDS WEST 558.09 FEET; THENCE SOUTH 00 DEGREES 00 MINUTES 00 SECONDS WEST 40.00 FEET TO POINT OF BEGINNING.

PARCEL 4:
PART OF THE NORTH 3/4 OF THE NORTHWEST 1/4 OF THE NORTHEAST 1/4 OF SECTION 33, TOWN 8 NORTH, RANGE 16 WEST, GRAND HAVEN TOWNSHIP, OTTAWA COUNTY, MICHIGAN, DESCRIBED AS: COMMENCING SOUTH 89°44'33" EAST 1379.74 FEET AND SOUTH 00°42'10" WEST 280.00 FEET FROM THE NORTH 1/4 CORNER; THENCE NORTH 89°44'33" WEST 224.99 FEET; THENCE SOUTH 00°42'10" WEST 76.63 FEET; THENCE NORTH 89°44'33" WEST 93.05 FEET; THENCE SOUTH 00°42'10" WEST 300.00 FEET; THENCE SOUTH 89°44'33" EAST 318.04 FEET; THENCE NORTH 00°42'10" EAST 376.63 FEET TO BEGINNING.

PARCEL 5:
THAT PART OF THE NORTHWEST 1/4 OF THE NORTHEAST 1/4 OF SECTION 33, TOWN 8 NORTH, RANGE 16 WEST, GRAND HAVEN TOWNSHIP, OTTAWA COUNTY, MICHIGAN, DESCRIBED AS: COMMENCING AT A POINT ON THE SOUTHERLY RIGHT OF WAY LINE OF ROBBINS ROAD WHICH IS SOUTH 89°44'33" EAST ALONG THE NORTH LINE OF SAID SECTION 33, 970.79 FEET AND SOUTH 02°13'27" WEST 33.02 FEET FROM THE NORTHWEST CORNER THEREOF; THENCE SOUTH 02°13'27" WEST 323.81 FEET; THENCE SOUTH 89°44'33" EAST 100.39 FEET; THENCE SOUTH 00°42'10" WEST 300.00 FEET; THENCE NORTH 89°44'33" WEST 174.39 FEET; THENCE NORTH 02°13'27" EAST 623.98 FEET; THENCE SOUTH 89°44'33" EAST 66.04 FEET TO THE POINT OF BEGINNING.

SURVEY PROVIDED BY:

BOUNDARY & TOPOGRAPHIC SURVEY PROVIDED BY EXXEL ENGINEERING, INC ON A DRAWING TITLED WATER / SEWER PRELIMINARY MIXED USE PUD LAYOUT, DATED NOVEMBER 14, 2017.

BENCHMARKS:

BM #1: TOP OF SW FLANGE BOLT ON HYDRANT, LOCATED 8 FEET SOUTH OF EDGE OF BIT FOR ROBBINS ROAD AND 298 FEET WEST OF THE CENTERLINE OF S GRIFFIN STREET - 2.6 FEET ABOVE GROUND LEVEL. ELEVATION: 603.48 (NAVD 88 DATUM).

FLOODPLAIN DATA:

THE ENTIRE SITE IS DESIGNATED ZONE "X", "AREA DETERMINED TO BE OUTSIDE OF 0.2" ANNUAL CHANCE FLOODPLAIN" ACCORDING TO FEMA FLOOD INSURANCE RATE MAP COMMUNITY-PANEL NUMBER 26139C0087E , EFFECTIVE DATE: DECEMBER 16, 2011.

WETLAND DATA:

THERE ARE NO WETLANDS ON THE SUBJECT PROPERTY BASED ON MAPPING PUBLISHED BY THE U.S. FISH & WILDLIFE SERVICE NATIONAL WETLANDS INVENTORY MAPS.

EXISTING SANITARY STRUCTURES:

EX S-1
RIM: 600.5
8" (E) INV: 593.82

EX S-2
RIM: 602.6
8" (W) & (S) INV: 592.84

EX S-3
RIM: 601.0
8" (N) INV: 592.58
12" (E) INV: 592.25
12" (S) INV: 592.15

EX S-4
RIM: 603.8
12" (N) & (S) INV: 591.43

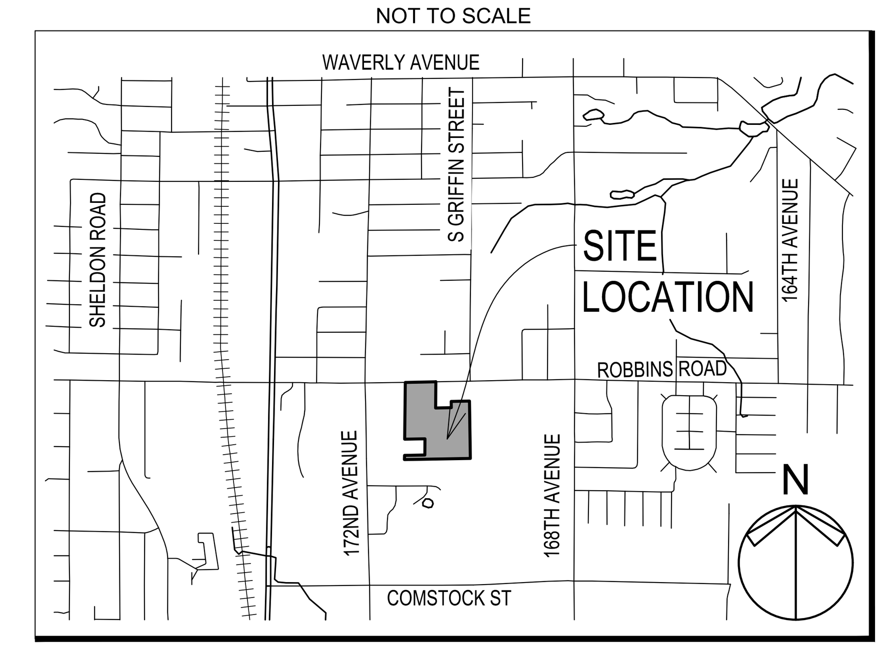
EX S-5
TOP 604.13
12" CHANNEL
(N) INV: 590.73
(W) INV: 590.63

EX S-6
TOP 605.96
12" CHANNEL (E-W) 589.96

EX S-7
TOP 604.63
12" CHANNEL (E & S) 589.13

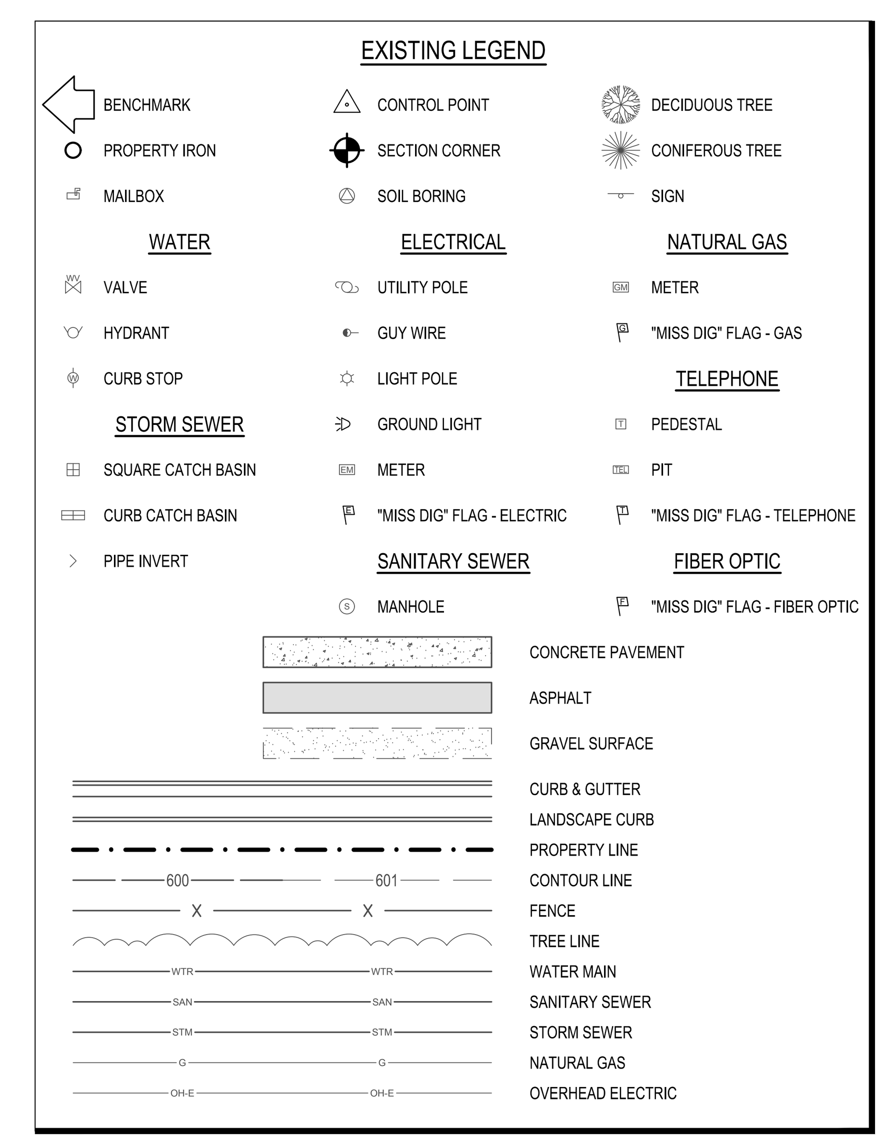
SITE LOCATION MAP

NOT TO SCALE



17114 ROBBINS ROAD
GRAND HAVEN TOWNSHIP
OTTAWA COUNTY, MICHIGAN

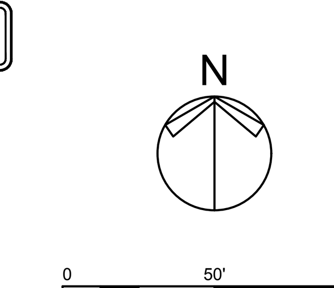
SECTION 33, TOWN 08 N, RANGE 16 W
42°02'41" N, 86°12'41" W
PARCEL #: 70-03-33-200-035
70-03-33-200-056
70-03-33-200-077



Know what's below. Call before you dig.

NOT FOR CONSTRUCTION

NOTE: ALL UTILITIES SHOWN ARE APPROXIMATE LOCATIONS FROM FIELD DATA AND AVAILABLE INFORMATION. THEY SHOULD NOT BE INTERPRETED AS EXACT LOCATIONS NOR SHOULD THEY BE ASSUMED TO BE THE ONLY UTILITIES IN THE AREA.



ARCHITECTS • ENGINEERS
paradigm design
GRAND RAPIDS 550 3 MILE N.W. SUITE B
GRAND RAPIDS, MI 49544
(616) 785 - 5656
TRAVERSE CITY 333 E. STATE STREET
TRAVERSE CITY, MI 49684
(231) 346 - 3030
WEB PARADIGMAE.COM

NOTE: THIS DOCUMENT IS PRELIMINARY IN NATURE AND IS NOT A FINAL, SIGNED AND SEALED DOCUMENT.

BRIAN T. SINNOTT
MI REGISTRATION #6201052169
EXP. DATE 10/31/2019

PROJECT

17114 ROBBINS MIXED USE PUD

17114 ROBBINS ROAD
GRAND HAVEN, MI 49417

DEVELOPER

MAIN STREET CAPITAL GROUP

18000 COVE STREET, STE 201
SPRING LAKE, MI 49456

RELEASE DATE

△	DATE	DESCRIPTION
	01-16-18	PUD APPLICATION
	02-07-18	PUD APPLICATION

PROJECT

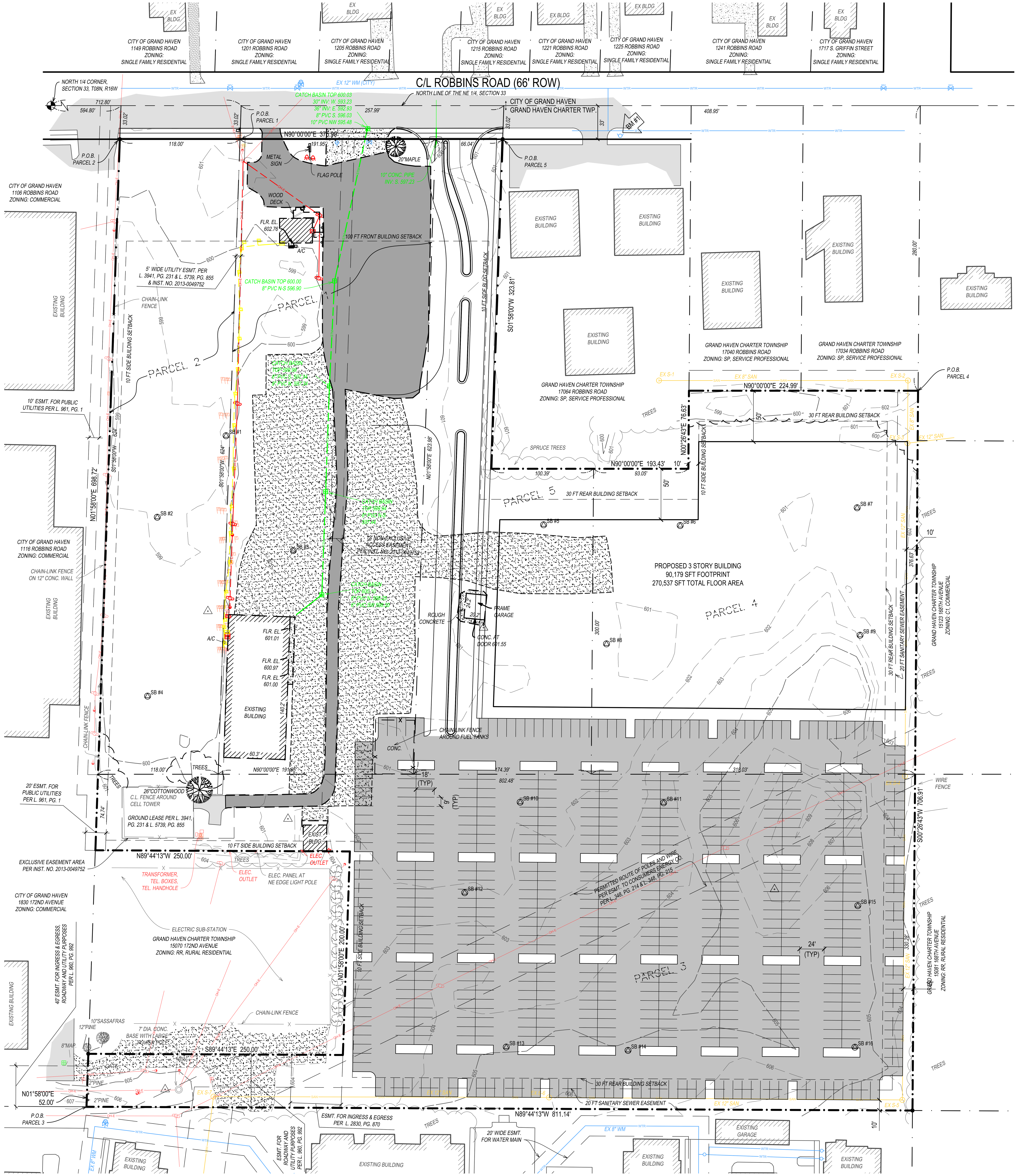
1712151

SHEET

CIVIL EXISTING CONDITIONS

C-101

Wednesday, February-07-2018 at 2:21pm \\PD-FILE1\Jobs$\1712151 Robbins Road Mixed-Use\Drawings - 1711151\Civil\151C-101.dwg bkv



Wednesday, February-07-2018 at 2:23pm \\PD-FILE1\Jobs$\1712151 Robbins Road Mixed-Use\Drawings - 1711151\Civil\151C-102.dwg bkv

SITE DATA:
SITE: 11.47 ACRES
ZONED: R-4 MULTI FAMILY RESIDENTIAL

MINIMUM LOT AREA:	3,000 SFT
MINIMUM LOT WIDTH:	100'
MAXIMUM BUILDING HEIGHT:	35' OR 3 STORIES
MINIMUM FLOOR AREA PER UNIT:	884 SFT
FRONT BUILDING SETBACK:	100'
SIDE BUILDING SETBACK:	10'
REAR BUILDING SETBACK:	30'
BUILDING FOOTPRINT:	90,179 SFT
BUILDING HEIGHT:	3 STORIES
TOTAL BUILDING FLOOR AREA:	270,537 SFT
TOTAL NUMBER OF UNITS:	306 @ 884 SFT EACH
TOTAL PARKING AREA:	185,466 SFT
PARKING SPACES REQUIRED:	612 @ 2 PER UNIT
PARKING SPACES PROVIDED:	612

NOT FOR CONSTRUCTION

NOTE: ALL UTILITIES SHOWN ARE APPROXIMATE LOCATIONS FROM FIELD DATA AND AVAILABLE INFORMATION. THEY SHOULD NOT BE INTERPRETED AS EXACT LOCATIONS NOR SHOULD THEY BE ASSUMED TO BE THE ONLY UTILITIES IN THE AREA.

N

0 50' 100'

ARCHITECTS • ENGINEERS
paradigm design
GRAND RAPIDS 550 3 MILE N.W. SUITE B GRAND RAPIDS, MI 49544 (616) 785 - 5656
TRAVERSE CITY 333 E. STATE STREET TRAVERSE CITY, MI 49684 (231) 346 - 3030
WEB ParadigmAE.com

NOTE: THIS DOCUMENT IS PRELIMINARY IN NATURE AND IS NOT A FINAL, SIGNED AND SEALED DOCUMENT.

BRIAN T. SINNOTT
MI REGISTRATION #6201052169
EXP. DATE 10/31/2019

PROJECT

17114 ROBBINS MIXED USE PUD

17114 ROBBINS ROAD
GRAND HAVEN, MI 49417

DEVELOPER

MAIN STREET CAPITAL GROUP

18000 COVE STREET, STE 201
SPRING LAKE, MI 49456

RELEASE DATE

△	DATE	DESCRIPTION
	01-16-18	PUD APPLICATION
	02-07-18	PUD APPLICATION

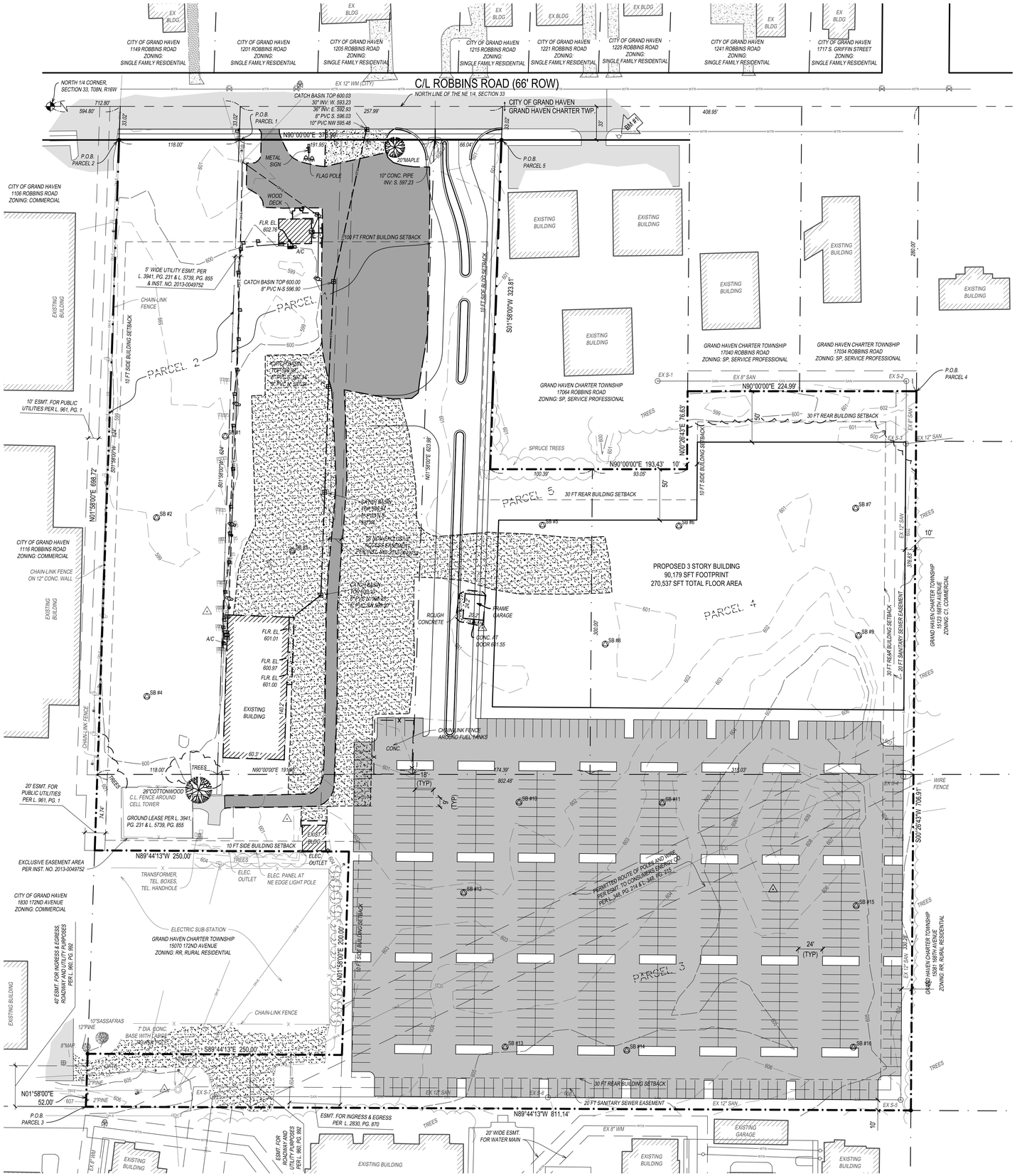
PROJECT

1712151

SHEET

CIVIL PARALLEL PLAN

C-102



SITE DATA:
SITE: 11.47 ACRES
ZONED: R-4 MULTI FAMILY RESIDENTIAL

MINIMUM LOT AREA:	3,000 SFT
MINIMUM LOT WIDTH:	100'
MAXIMUM BUILDING HEIGHT:	35' OR 3 STORIES
MINIMUM FLOOR AREA PER UNIT:	884 SFT
FRONT BUILDING SETBACK:	100'
SIDE BUILDING SETBACK:	10'
REAR BUILDING SETBACK:	30'
BUILDING FOOTPRINT:	90,179 SFT
BUILDING HEIGHT:	3 STORIES
TOTAL BUILDING FLOOR AREA:	270,537 SFT
TOTAL NUMBER OF UNITS:	306 @ 884 SFT EACH
TOTAL PARKING AREA:	185,466 SFT
PARKING SPACES REQUIRED:	612 @ 2 PER UNIT
PARKING SPACES PROVIDED:	612

NOTE: ALL UTILITIES SHOWN ARE APPROXIMATE LOCATIONS FROM FIELD DATA AND AVAILABLE INFORMATION. THEY SHOULD NOT BE INTERPRETED AS EXACT LOCATIONS NOR SHOULD THEY BE ASSUMED TO BE THE ONLY UTILITIES IN THE AREA.

ARCHITECTS • ENGINEERS

paradigm design

GRAND RAPIDS: 550 3 MILE N.W. SUITE B, GRAND RAPIDS, MI 49544, (616) 785 - 5656

TRAVERSE CITY: 333 E. STATE STREET, TRAVERSE CITY, MI 49684, (231) 346 - 3030

WEB: PARADIGMAE.COM

NOTE: THIS DOCUMENT IS PRELIMINARY IN NATURE AND IS NOT A FINAL SIGNED AND SEALED DOCUMENT.

BRIAN T. SINNOTT
MI REGISTRATION #6201052169
EXP. DATE 10/31/2019

PROJECT

17114
ROBBINS
MIXED USE PUD

17114 ROBBINS ROAD
GRAND HAVEN, MI 49417

DEVELOPER

MAIN STREET
CAPITAL GROUP

18000 COVE STREET, STE 201
SPRING LAKE, MI 49456

RELEASE DATE

	DATE	DESCRIPTION
	01-16-18	PUD APPLICATION
	02-07-18	PUD APPLICATION

PROJECT

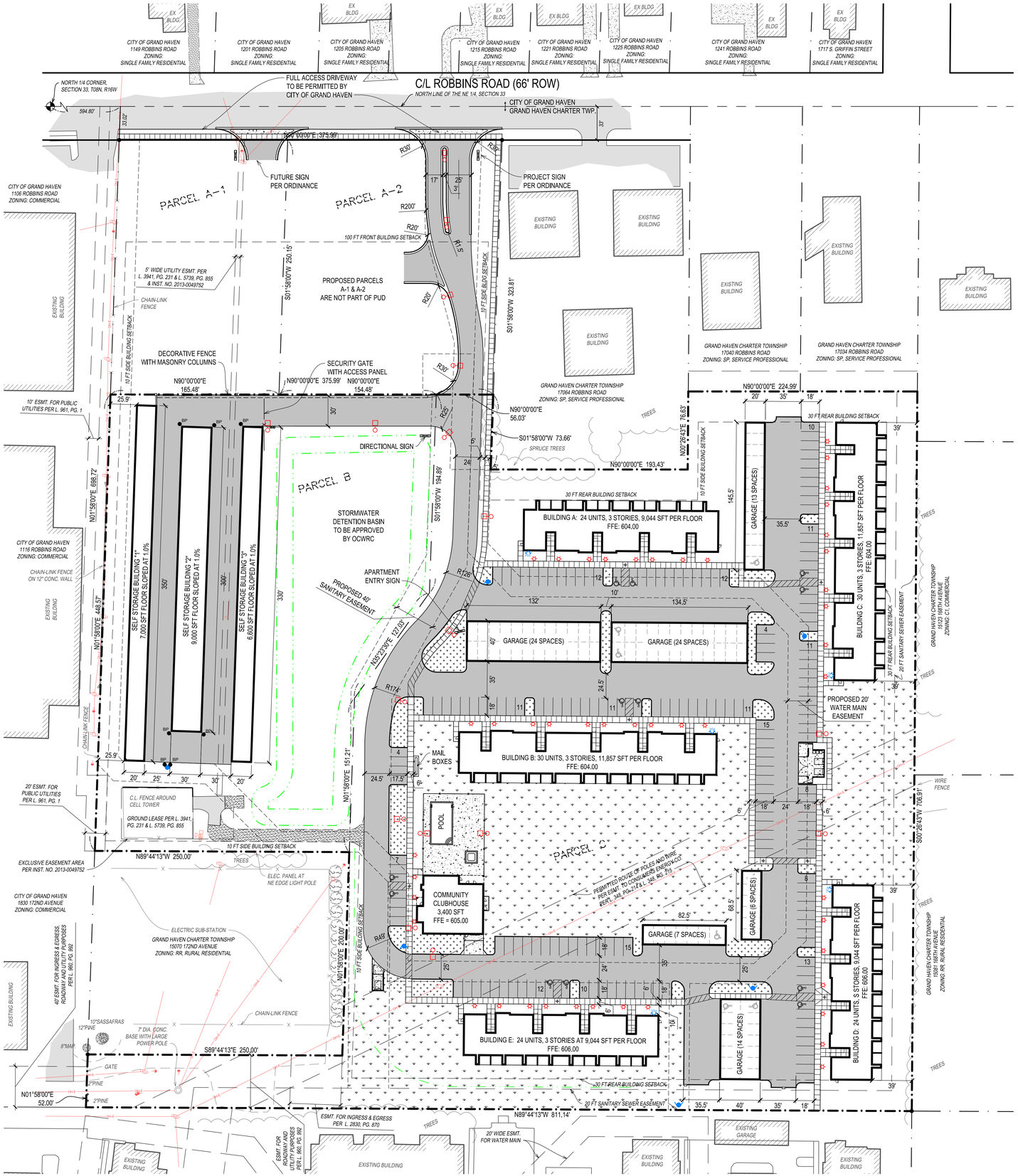
1712151

SHEET

CIVIL PARALLEL PLAN

C-102

Wednesday, February-07-2018 at 2:21pm \\PD-FILE1\Jobs\5171215\Robbins Road Mixed-Use\Drawings - 1711151Civil151C-102.dwg bkv



GENERAL NOTES:

REFER TO ARCHITECTURAL PLANS FOR DETAILS OF CONCRETE SIDEWALK AROUND BUILDING, AND CONCRETE DUMPSTER PAD.

REFER TO ARCHITECTURAL FOUNDATION PLAN FOR DETAILING OF BUILDING AND EXACT BUILDING DIMENSIONS.

REFER TO LANDSCAPE PLAN FOR FOR RESTORATION OF ALL NON PAVED SURFACES.

OWNER HAS SUBMITTED FOR AND OBTAINED THE FOLLOWING SITE RELATED PERMITS:

AGENCY	PERMIT #

OWNER HAS SUBMITTED FOR AND IS IN THE PROCESS OF OBTAINING THE FOLLOWING SITE RELATED PERMITS:

AGENCY	PERMIT
GRAND HAVEN TOWNSHIP	PLANNED UNIT DEVELOPMENT / SPA
OTTAWA COUNTY WATER RESOURCES COMMISSIONER	STORMWATER / DRAIN USE APPROVAL
CITY OF GRAND HAVEN	ROBBINS ROAD DRIVEWAYS

UPON AWARD OF CONTRACT, CONTRACTOR WILL BE RESPONSIBLE TO CHECK WITH ENGINEER AND JURISDICTION ON STATUS OF THE PERMIT(S) LISTED ABOVE.

CONTRACTOR IS RESPONSIBLE TO OBTAIN ALL SITE RELATED PERMITS NOT BEING OBTAINED BY THE OWNER. CONTRACTOR IS REQUIRED TO COMPLETE THE APPLICATION, AND SUBMIT NECESSARY DRAWINGS, FEES, ETC. TO THE APPROPRIATE JURISDICTION. CONTRACTOR SHALL PAY ALL FEES RELATED TO PERMIT(S) AND SECURE PERMIT(S) IN HIS NAME.

CONTRACTOR IS RESPONSIBLE TO COORDINATE ALL SITE UTILITY CONNECTIONS AND INSPECTIONS WITH THE PROPER JURISDICTION AND PAY ALL ASSOCIATED FEES.

THE CONTRACTOR SHALL FIELD VERIFY LOCATION AND ELEVATION OF EXISTING WATER, SANITARY SEWER, AND STORM SEWER CROSSINGS AND CONNECTION POINTS PRIOR TO CONSTRUCTION. CONTACT ENGINEER WITH ANY DISCREPANCIES.

ALL DIMENSIONS SHOWN TO CONCRETE CURB AND GUTTER ARE TO BACK OF CURB UNLESS OTHERWISE NOTED.

CONCRETE GUTTER PAN TO TIP IN THE DIRECTION OF THE ADJACENT PAVEMENT.

ALL PAVEMENT MARKINGS SHALL BE 4" WIDE. STANDARD PARKING SPACES SHALL BE MARKED IN YELLOW AND BARRIER FREE SPACES IN BLUE. EACH BARRIER FREE SPACE SHALL BE PROVIDED WITH A PAINTED PAVEMENT SYMBOL, A PRECAST CONCRETE BUMPER BLOCK, AND A SIGN PER THE MANUAL OF UNIFORM TRAFFIC CONTROLS.

REFERENCE SOILS REPORT FOR BORING LOGS AND PREPARATION AND CONSTRUCTION PROCEDURES FOR SUBBASE AND DESIGN SECTION OF ALL PAVED AREAS.

ALL MDOT REFERENCES ARE TO THE 2012 EDITION.

GENERAL NOTES:

DESCRIPTION OF PUD PARCEL (PARCELS B & C):
PART OF THE NE 1/4 OF SECTION 33, T8N, R16W, GRAND HAVEN TOWNSHIP, OTTAWA COUNTY, MICHIGAN, DESCRIBED AS: COMMENCING AT THE NORTH 1/4 CORNER OF SAID SECTION 33; THENCE N90°00'E 594.80 FEET ALONG THE NORTH LINE OF SAID NE 1/4; THENCE S01°58'00"W 283.17 FEET TO THE PLACE OF BEGINNING OF THIS DESCRIPTION; THENCE N90°00'E 375.99 FEET; THENCE S01°58'00"W 73.66 FEET; THENCE N90°00'E 193.44 FEET; THENCE N00°26'43"E 76.63 FEET; THENCE N90°00'E 224.99 FEET; THENCE S00°26'43"W 706.91 FEET; THENCE N89°44'13"W 811.14 FEET; THENCE N01°58'00"E 52.00 FEET; THENCE S89°44'13"E 250.00 FEET; THENCE N01°58'00"E 200.00 FEET; THENCE N89°44'13"W 250.00 FEET; THENCE N01°58'00"E 448.57 FEET TO THE PLACE OF BEGINNING.
THIS PARCEL CONTAINS 11.47 ACRES.

DESCRIPTION OF OVERALL PARCEL (A-1, A-2, B & C):
PART OF THE NE 1/4 OF SECTION 33, T8N, R16W, GRAND HAVEN TOWNSHIP, OTTAWA COUNTY, MICHIGAN, DESCRIBED AS: COMMENCING AT THE NORTH 1/4 CORNER OF SAID SECTION 33; THENCE N90°00'E 594.80 FEET ALONG THE NORTH LINE OF SAID NE 1/4; THENCE S01°58'00"W 33.02 FEET TO THE SOUTHERLY LINE OF ROBBINS ROAD AND THE PLACE OF BEGINNING OF THIS DESCRIPTION; THENCE N90°00'E 375.99 FEET ALONG SAID SOUTHERLY LINE; THENCE S01°58'00"W 323.81 FEET; THENCE N90°00'E 193.44 FEET; THENCE N00°26'43"E 76.63 FEET; THENCE N90°00'E 224.99 FEET; THENCE S00°26'43"W 706.91 FEET; THENCE N89°44'13"W 811.14 FEET; THENCE N01°58'00"E 52.00 FEET; THENCE S89°44'13"E 250.00 FEET; THENCE N01°58'00"E 200.00 FEET; THENCE N89°44'13"W 250.00 FEET; THENCE N01°58'00"E 698.72 FEET TO THE PLACE OF BEGINNING.
THIS PARCEL CONTAINS 13.62 ACRES.

PROPOSED LAND USE SUMMARY:

PARCEL B	= 2.97 ACRES
CURRENT ZONING	= C-1 AND I-1
PROPOSED USE	= SELF STORAGE
PARCEL C	= 8.49 ACRES
CURRENT ZONING	= C-1 AND I-1
PROPOSED USE	= MULTIFAMILY (APARTMENTS)
TOTAL SITE AREA	= 11.47 ACRES

LANDSCAPING AND OPEN SPACE:

PARCEL C - PARKING LOT INTERIOR LANDSCAPING:
PARKING LOT AREA = 95,142 SFT (2.18 AC)
REQUIRED = 6,343 SFT (1 SFT PER 15 SFT)
PROVIDED = 11,466 SFT

PARCEL C - OPEN SPACE:
PARCEL C AREA = 369,967 SFT (8.49 AC)

REQUIRED OPEN SPACE	= 73,994 SFT (20%)
PROVIDED OPEN SPACE	= 83,957 SFT (23%)

RESIDENTIAL PUD DENSITY:

UNITS PROPOSED IN PARALLEL PLAN = 306 UNITS

BASE R-4 DENSITY ALLOWED PER ORDINANCE
1 DWELLING UNIT PER 3,000 SFT
369,967 SFT / 3000 SFT = 123 DWELLING UNITS

PUD DENSITY BONUS
20% OPEN SPACE = 8% DENSITY BONUS
COMMUNITY CLUBHOUSE = 5% DENSITY BONUS
TOTAL DENSITY BONUS = 13%
123 UNITS X 1.13 = 139 DWELLING UNITS

ALL UNITS ARE EITHER 1 OR 2 BEDROOM RANGING FROM 730 SFT TO 1,070 SFT

PARKING DATA:

APARTMENTS REQUIRE 2 SPACES PER DWELLING UNIT
132 DWELLING UNITS X 2 = 264 SPACES

CLUBHOUSE POOL IS ACCESSORY TO APARTMENTS
9 SPACES ARE ALLOCATED TO CLUBHOUSE AREA

PROPOSED PARKING:
185 SURFACE PARKING SPACES
88 GARAGE SPACES
TOTAL 273 TOTAL SPACES

THE PROPOSED PARKING ABOVE INCLUDES BARRIER FREE SPACES AS FOLLOWS:

12 BARRIER FREE SURFACE SPACES
7 BARRIER FREE GARAGE SPACES

PARKING SPACE: 9' x 18'
DRIVE AISLE: 24' MINIMUM

PROPOSED LEGEND

SIGN
HYDRANT
BP BUMP POST
BOLLARD LIGHT (SEE ELECTRICAL DRAWINGS)
LANDING AREA
LIGHT POLE (SEE ELECTRICAL DRAWINGS)
CONCRETE SIDEWALK
SIDEWALK RAMP
CONCRETE PAVEMENT
STANDARD DUTY ASPHALT
GRAVEL DRIVE
PUD OPEN SPACE
INTERIOR LANDSCAPING
STANDARD CURB & GUTTER
INVERTED CURB & GUTTER
LANDSCAPE CURB
FENCE

NOT FOR CONSTRUCTION

NOTE: ALL UTILITIES SHOWN ARE APPROXIMATE LOCATIONS FROM FIELD DATA AND AVAILABLE INFORMATION. THEY SHOULD NOT BE INTERPRETED AS EXACT LOCATIONS NOR SHOULD THEY BE ASSUMED TO BE THE ONLY UTILITIES IN THE AREA.

N

0 50' 100'

ARCHITECTS • ENGINEERS
paradigm design
GRAND RAPIDS: 550 3 MILE N.W. SUITE B, GRAND RAPIDS, MI 49544, (616) 785 - 5656
TRAVERSE CITY: 333 E. STATE STREET, TRAVERSE CITY, MI 49684, (231) 346 - 3030
WEB: ParadigmAE.com

NOTE: THIS DOCUMENT IS PRELIMINARY IN NATURE AND IS NOT A FINAL SIGNED AND SEALED DOCUMENT

BRIAN T. SINNOTT
REGISTRATION #6201052169
EXP. DATE 10/31/2019

PROJECT

17114 ROBBINS MIXED USE PUD

17114 ROBBINS ROAD
GRAND HAVEN, MI 49417

DEVELOPER

MAIN STREET CAPITAL GROUP

18000 COVE STREET, STE 201
SPRING LAKE, MI 49456

RELEASE DATE

	DATE	DESCRIPTION
	01-16-18	PUD APPLICATION
	02-07-18	PUD APPLICATION

PROJECT

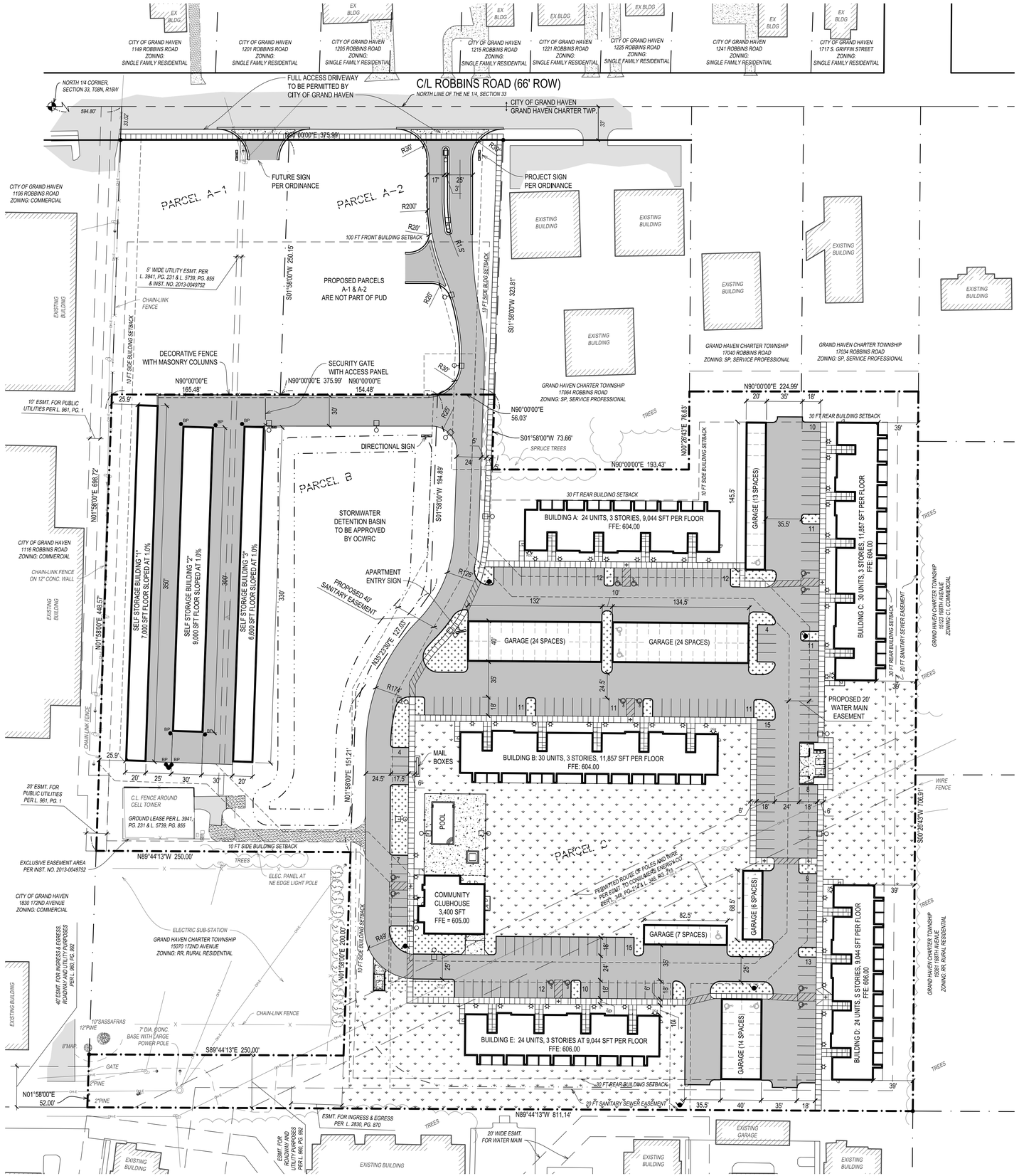
1712151

SHEET

CIVIL LAYOUT PLAN

C-103

Wednesday, February-07-2018 at 2:23pm \\PD-FILE\Jobs\$1712151 Robbins Road Mixed-Use\Drawings - 1711151\Civil\151C-103.dwg bkv



GENERAL NOTES:

REFER TO ARCHITECTURAL PLANS FOR DETAILS OF CONCRETE SIDEWALK AROUND BUILDING, AND CONCRETE DUMPSTER PAD.

REFER TO ARCHITECTURAL FOUNDATION PLAN FOR DETAILING OF BUILDING AND EXACT BUILDING DIMENSIONS.

REFER TO LANDSCAPE PLAN FOR FOR RESTORATION OF ALL NON PAVED SURFACES.

OWNER HAS SUBMITTED FOR AND OBTAINED THE FOLLOWING SITE RELATED PERMITS:

AGENCY	PERMIT #

OWNER HAS SUBMITTED FOR AND IS IN THE PROCESS OF OBTAINING THE FOLLOWING SITE RELATED PERMITS:

AGENCY	PERMIT
GRAND HAVEN TOWNSHIP	PLANNED UNIT DEVELOPMENT / SPA
OTTAWA COUNTY WATER RESOURCES COMMISSIONER	STORMWATER / DRAIN USE APPROVAL
CITY OF GRAND HAVEN	ROBBINS ROAD DRIVEWAYS

UPON AWARD OF CONTRACT, CONTRACTOR WILL BE RESPONSIBLE TO CHECK WITH ENGINEER AND JURISDICTION ON STATUS OF THE PERMIT(S) LISTED ABOVE.

CONTRACTOR IS RESPONSIBLE TO OBTAIN ALL SITE RELATED PERMITS NOT BEING OBTAINED BY THE OWNER. CONTRACTOR IS REQUIRED TO COMPLETE THE APPLICATION, AND SUBMIT NECESSARY DRAWINGS, FEES, ETC. TO THE APPROPRIATE JURISDICTION. CONTRACTOR SHALL PAY ALL FEES RELATED TO PERMIT(S) AND SECURE PERMIT(S) IN HIS NAME.

CONTRACTOR IS RESPONSIBLE TO COORDINATE ALL SITE UTILITY CONNECTIONS AND INSPECTIONS WITH THE PROPER JURISDICTION AND PAY ALL ASSOCIATED FEES.

THE CONTRACTOR SHALL FIELD VERIFY LOCATION AND ELEVATION OF EXISTING WATER, SANITARY SEWER, AND STORM SEWER CROSSINGS AND CONNECTION POINTS PRIOR TO CONSTRUCTION. CONTACT ENGINEER WITH ANY DISCREPANCIES.

ALL DIMENSIONS SHOWN TO CONCRETE CURB AND GUTTER ARE TO BACK OF CURB UNLESS OTHERWISE NOTED.

CONCRETE GUTTER PAN TO TIP IN THE DIRECTION OF THE ADJACENT PAVEMENT.

ALL PAVEMENT MARKINGS SHALL BE 4" WIDE. STANDARD PARKING SPACES SHALL BE MARKED IN YELLOW AND BARRIER FREE SPACES IN BLUE. EACH BARRIER FREE SPACE SHALL BE PROVIDED WITH A PAINTED PAVEMENT SYMBOL, A PRECAST CONCRETE BUMPER BLOCK, AND A SIGN PER THE MANUAL OF UNIFORM TRAFFIC CONTROLS.

REFERENCE SOILS REPORT FOR BORING LOGS AND PREPARATION AND CONSTRUCTION PROCEDURES FOR SUBBASE AND DESIGN SECTION OF ALL PAVED AREAS.

ALL MDOT REFERENCES ARE TO THE 2012 EDITION.

GENERAL NOTES:

DESCRIPTION OF PUD PARCEL (PARCELS B & C):
PART OF THE NE 1/4 OF SECTION 33, T8N, R16W, GRAND HAVEN TOWNSHIP, OTTAWA COUNTY, MICHIGAN, DESCRIBED AS: COMMENCING AT THE NORTH 1/4 CORNER OF SAID SECTION 33; THENCE N90°00'E 594.80 FEET ALONG THE NORTH LINE OF SAID NE 1/4; THENCE S01°58'00"W 283.17 FEET TO THE PLACE OF BEGINNING OF THIS DESCRIPTION; THENCE N90°00'E 375.99 FEET; THENCE S01°58'00"W 73.66 FEET; THENCE N90°00'E 193.44 FEET; THENCE N00°26'43"E 76.63 FEET; THENCE N90°00'E 224.99 FEET; THENCE S00°26'43"W 706.91 FEET; THENCE N89°44'13"W 811.14 FEET; THENCE N01°58'00"E 52.00 FEET; THENCE S89°44'13"E 250.00 FEET; THENCE N01°58'00"E 200.00 FEET; THENCE N89°44'13"W 250.00 FEET; THENCE N01°58'00"E 448.57 FEET TO THE PLACE OF BEGINNING.
THIS PARCEL CONTAINS 11.47 ACRES.

DESCRIPTION OF OVERALL PARCEL (A-1, A-2, B & C):
PART OF THE NE 1/4 OF SECTION 33, T8N, R16W, GRAND HAVEN TOWNSHIP, OTTAWA COUNTY, MICHIGAN, DESCRIBED AS: COMMENCING AT THE NORTH 1/4 CORNER OF SAID SECTION 33; THENCE N90°00'E 594.80 FEET ALONG THE NORTH LINE OF SAID NE 1/4; THENCE S01°58'00"W 33.02 FEET TO THE SOUTHERLY LINE OF ROBBINS ROAD AND THE PLACE OF BEGINNING OF THIS DESCRIPTION; THENCE N90°00'E 375.99 FEET ALONG SAID SOUTHERLY LINE; THENCE S01°58'00"W 323.81 FEET; THENCE N90°00'E 193.44 FEET; THENCE N00°26'43"E 76.63 FEET; THENCE N90°00'E 224.99 FEET; THENCE S00°26'43"W 706.91 FEET; THENCE N89°44'13"W 811.14 FEET; THENCE N01°58'00"E 52.00 FEET; THENCE S89°44'13"E 250.00 FEET; THENCE N01°58'00"E 200.00 FEET; THENCE N89°44'13"W 250.00 FEET; THENCE N01°58'00"E 668.72 FEET TO THE PLACE OF BEGINNING.
THIS PARCEL CONTAINS 13.62 ACRES.

PROPOSED LAND USE SUMMARY:

PARCEL B	= 2.97 ACRES
CURRENT ZONING	= C-1 AND I-1
PROPOSED USE	= SELF STORAGE
PARCEL C	= 8.49 ACRES
CURRENT ZONING	= C-1 AND I-1
PROPOSED USE	= MULTIFAMILY (APARTMENTS)
TOTAL SITE AREA	= 11.47 ACRES

LANDSCAPING AND OPEN SPACE:

PARCEL C - PARKING LOT INTERIOR LANDSCAPING:
PARKING LOT AREA = 95,142 SFT (2.18 AC)
REQUIRED = 6,343 SFT (1 SFT PER 15 SFT)
PROVIDED = 11,466 SFT

PARCEL C - OPEN SPACE:
PARCEL C AREA = 369,967 SFT (8.49 AC)

REQUIRED OPEN SPACE	= 73,994 SFT (20%)
PROVIDED OPEN SPACE	= 83,957 SFT (23%)

RESIDENTIAL PUD DENSITY:

UNITS PROPOSED IN PARALLEL PLAN = 306 UNITS

BASE R-4 DENSITY ALLOWED PER ORDINANCE
1 DWELLING UNIT PER 3,000 SFT
369,967 SFT / 3000 SFT = 123 DWELLING UNITS

PUD DENSITY BONUS
20% OPEN SPACE = 8% DENSITY BONUS
COMMUNITY CLUBHOUSE = 5% DENSITY BONUS
TOTAL DENSITY BONUS = 13%
123 UNITS X 1.13 = 139 DWELLING UNITS

ALL UNITS ARE EITHER 1 OR 2 BEDROOM RANGING FROM 730 SFT TO 1,070 SFT

PARKING DATA:

APARTMENTS REQUIRE 2 SPACES PER DWELLING UNIT
132 DWELLING UNITS X 2 = 264 SPACES

CLUBHOUSE POOL IS ACCESSORY TO APARTMENTS
9 SPACES ARE ALLOCATED TO CLUBHOUSE AREA

PROPOSED PARKING:
185 SURFACE PARKING SPACES
88 GARAGE SPACES
TOTAL 273 TOTAL SPACES

THE PROPOSED PARKING ABOVE INCLUDES BARRIER FREE SPACES AS FOLLOWS:

12 BARRIER FREE SURFACE SPACES
7 BARRIER FREE GARAGE SPACES

PARKING SPACE: 9' x 18'
DRIVE AISLE: 24' MINIMUM

PROPOSED LEGEND

SIGN
HYDRANT
BP BUMP POST
BOLLARD LIGHT (SEE ELECTRICAL DRAWINGS)
LANDING AREA
LIGHT POLE (SEE ELECTRICAL DRAWINGS)
CONCRETE SIDEWALK
SIDEWALK RAMP
CONCRETE PAVEMENT
STANDARD DUTY ASPHALT
GRAVEL DRIVE
PUD OPEN SPACE
INTERIOR LANDSCAPING
STANDARD CURB & GUTTER
INVERTED CURB & GUTTER
LANDSCAPE CURB
FENCE

NOT FOR CONSTRUCTION

NOTE: ALL UTILITIES SHOWN ARE APPROXIMATE LOCATIONS FROM FIELD DATA AND AVAILABLE INFORMATION. THEY SHOULD NOT BE INTERPRETED AS EXACT LOCATIONS NOR SHOULD THEY BE ASSUMED TO BE THE ONLY UTILITIES IN THE AREA.

N

0 50' 100'

ARCHITECTS • ENGINEERS
paradigm design
GRAND RAPIDS: 550 3 MILE N.W. SUITE B, GRAND RAPIDS, MI 49544, (616) 785 - 5656
TRAVERSE CITY: 333 E. STATE STREET, TRAVERSE CITY, MI 49684, (231) 346 - 3030
WEB: ParadigmAE.com

NOTE: THIS DOCUMENT IS PRELIMINARY IN NATURE AND IS NOT A FINAL SIGNED AND SEALED DOCUMENT

BRIAN T. SINNOTT
REGISTRATION #6201052169
EXP. DATE 10/31/2019

PROJECT

17114
ROBBINS
MIXED USE PUD

17114 ROBBINS ROAD
GRAND HAVEN, MI 49417

DEVELOPER

MAIN STREET
CAPITAL GROUP

18000 COVE STREET, STE 201
SPRING LAKE, MI 49456

RELEASE DATE

	DATE	DESCRIPTION
	01-16-18	PUD APPLICATION
	02-07-18	PUD APPLICATION

PROJECT

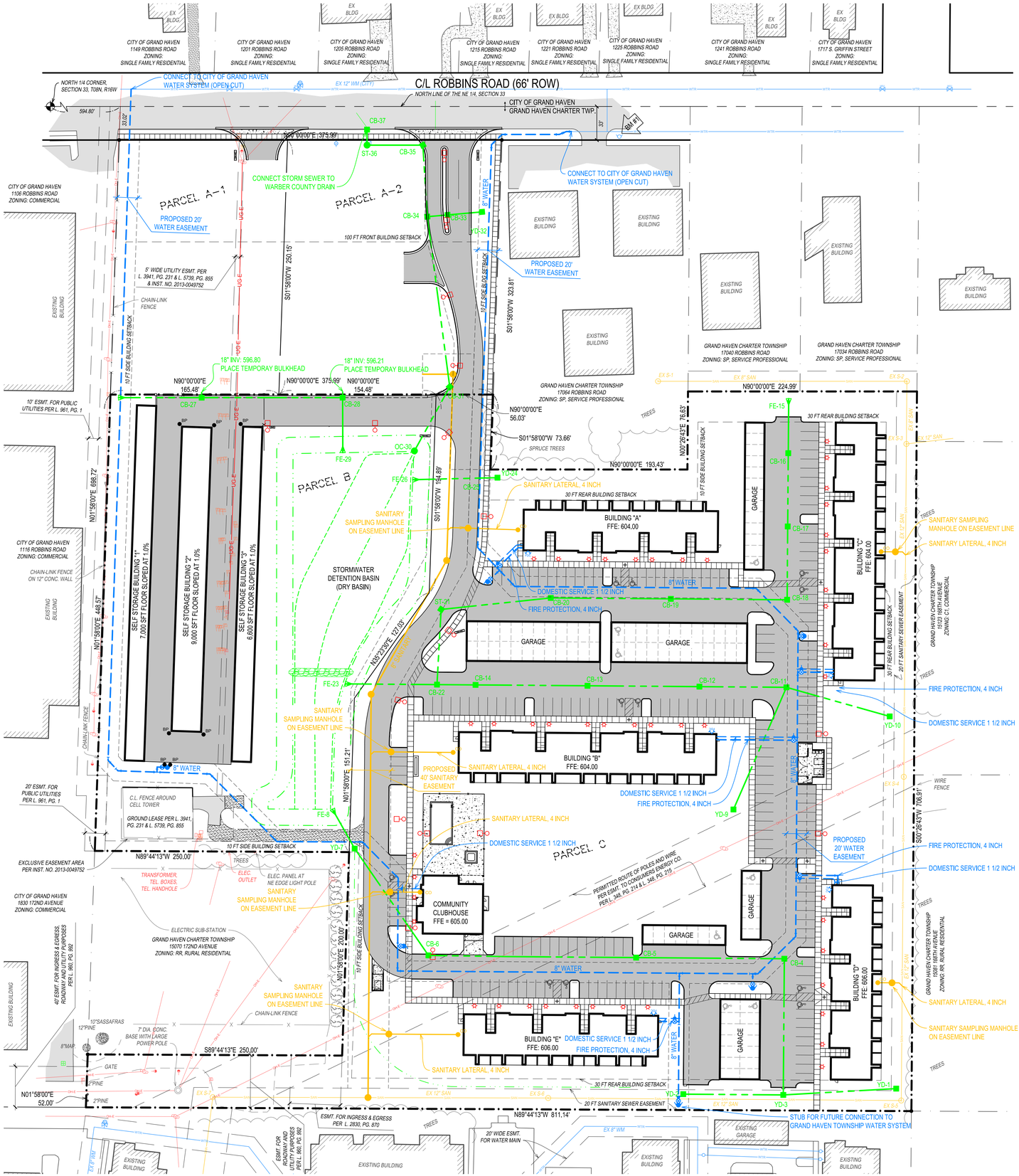
1712151

SHEET

CIVIL LAYOUT PLAN

C-103

Wednesday, February-07-2018 at 2:21pm \\PD-FILE\Jobs\$\1712151\Civil\151C-103.dwg bkv



PROPOSED STORM SEWER STRUCTURE TABLE

STRUCTURE NUMBER	STRUCTURE TYPE & SIZE	RIM ELEV. CASTING TYPE	INVERT
1	YD 2' Ø STANDARD	RIM = 601.93 EJ 1040-N	12" (W) = 599.69
2	YD 2' Ø STANDARD	RIM = 603.02 EJ 1040-N	12" (E) = 599.64
3	YD 4' Ø STANDARD	RIM = 604.70 EJ 1040-N	12" (E) = 599.33 12" (W) = 599.33 12" (N) = 599.33
4	CB 4' Ø STANDARD	RIM = 604.54 EJ 1040-M1	12" (S) = 598.90 12" (W) = 598.90
5	CB 4' Ø STANDARD	RIM = 604.31 EJ 7045-M1-T1	12" (E) = 597.81 15" (W) = 597.81
6	CB 4' Ø STANDARD	RIM = 604.21 EJ 7045-M1-T1	15" (E) = 596.99 15" (NW) = 596.99
7	YD 4' Ø STANDARD	RIM = 601.77 EJ 1040-N	15" (SE) = 596.34 15" (NW) = 596.34
8	FE 4' Ø STANDARD	RIM = 597.91 STANDARD	18" (SE) = 596.20
9	YD 2' Ø STANDARD	RIM = 603.00 EJ 1040-N	12" (NE) = 598.47
10	YD 2' Ø STANDARD	RIM = 601.00 EJ 1040-N	12" (W) = 598.39
11	CB 4' Ø STANDARD	RIM = 602.34 EJ 1040-M1	12" (SW) = 598.05 12" (E) = 598.05 15" (W) = 598.05
12	CB 4' Ø STANDARD	RIM = 602.19 EJ 1040-M1	15" (E) = 597.67 15" (W) = 597.67
13	CB 4' Ø STANDARD	RIM = 602.19 EJ 1040-M1	15" (E) = 596.96 18" (W) = 596.96
14	CB 4' Ø STANDARD	RIM = 602.19 EJ 1040-M1	18" (E) = 596.58 18" (W) = 596.58
15	FE 4' Ø STANDARD	RIM = 600.07 STANDARD	12" (S) = 598.90
16	CB 4' Ø STANDARD	RIM = 602.43 EJ 1040-M1	12" (N) = 598.44 12" (S) = 598.44
17	CB 4' Ø STANDARD	RIM = 602.43 EJ 1040-M1	12" (N) = 598.21 12" (S) = 598.21
18	CB 4' Ø STANDARD	RIM = 602.34 EJ 1040-M1	12" (N) = 597.98 12" (W) = 597.98
19	CB 4' Ø STANDARD	RIM = 602.14 EJ 1040-M1	12" (E) = 597.61 12" (W) = 597.61
20	CB 4' Ø STANDARD	RIM = 602.14 EJ 1040-M1	12" (E) = 596.75 18" (W) = 596.75
21	ST 4' Ø STANDARD	RIM = 602.19 EJ 1040-B	18" (E) = 596.55 18" (S) = 596.55
22	CB 5' Ø STANDARD	RIM = 602.67 EJ 1040-M1	18" (E) = 596.42 18" (N) = 596.42 24" (W) = 596.42
23	FE 4' Ø STANDARD	RIM = 598.45 STANDARD	24" (E) = 596.20
24	YD 4' Ø STANDARD	RIM = 600.04 EJ 1040-N	12" (W) = 596.47
25	CB 4' Ø STANDARD	RIM = 600.29 EJ 7045-M1-T1	12" (E) = 596.36 12" (W) = 596.36
26	FE 4' Ø STANDARD	RIM = 597.37 STANDARD	12" (E) = 596.20
27	CB 5' Ø STANDARD	RIM = 601.36 EJ 7045-M1-T3	18" (N) = 596.79 12" (W) = 597.29 24" (E) = 596.79
28	CB 5' Ø STANDARD	RIM = 601.20 EJ 7045-M1-T3	24" (W) = 596.62 18" (N) = 596.20 24" (S) = 596.62
29	FE 4' Ø STANDARD	RIM = 598.75 STANDARD	24" (N) = 596.50
30	OC 4' Ø STANDARD	RIM = 598.33 STANDARD	36" (N) = 595.00
31	CB 5' Ø STANDARD	RIM = 599.58 EJ 7045-M1-T1	36" (S) = 594.69 36" (N) = 594.69
32	YD 2' Ø STANDARD	RIM = 599.75 EJ 1040-N	12" (W) = 595.59
33	CB 4' Ø STANDARD	RIM = 600.49 EJ 7045-M1-T1	12" (E) = 595.23 12" (W) = 595.13
34	CB 5' Ø STANDARD	RIM = 599.99 EJ 7045-M1-T1	36" (S) = 593.93 12" (E) = 594.93 36" (N) = 593.93
35	CB 6' Ø STANDARD	RIM = 600.46 EJ 7045-M1-T1	36" (S) = 593.57 36" (W) = 593.57
36	ST 6' Ø STANDARD	RIM = 600.08 EJ 1040-B	36" (E) = 593.32 36" (N) = 593.32
37	CB 6' Ø STANDARD	RIM = 600.03 EJ 7045-M1-T1	36" (S) = 593.25 36" (E) = 592.93 30" (W) = 593.23
38	FE 4' Ø STANDARD	RIM = 600.37 STANDARD	12" (E) = 599.20

PROPOSED STORM SEWER PIPE TABLE

UP STREAM STRUCTURE	DOWN STREAM STRUCTURE	SIZE	LENGTH	SLOPE
1	3	12"	111 FT	0.32%
2	3	12"	98 FT	0.32%
3	4	12"	134 FT	0.32%
4	5	12"	146 FT	0.75%
5	6	15"	204 FT	0.40%
6	7	15"	128 FT	0.51%
9	11	12"	131 FT	0.32%
10	11	12"	105 FT	0.32%
11	12	15"	85 FT	0.45%
12	13	15"	110 FT	0.65%
13	14	18"	110 FT	0.34%
14	22	18"	38 FT	0.42%
15	16	12"	54 FT	0.86%
16	17	12"	72 FT	0.32%
17	18	12"	72 FT	0.32%
18	19	12"	114 FT	0.32%

PROPOSED STORM SEWER PIPE TABLE

UP STREAM STRUCTURE	DOWN STREAM STRUCTURE	SIZE	LENGTH	SLOPE
19	20	12"	118 FT	0.73%
20	21	18"	111 FT	0.18%
24	25	12"	34 FT	0.32%
25	26	12"	50 FT	0.32%
27	28	24"	139 FT	0.12%
28	29	24"	54 FT	0.23%
30	31	36"	65 FT	0.47%
31	34	36"	163 FT	0.47%
32	33	12"	35 FT	1.00%
33	34	12"	20 FT	1.00%
34	35	36"	75 FT	0.47%
35	36	36"	55 FT	0.47%
36	37	36"	15 FT	0.47%

NOTE: ALL UTILITIES SHOWN ARE APPROXIMATE LOCATIONS FROM FIELD DATA AND AVAILABLE INFORMATION. THEY SHOULD NOT BE INTERPRETED AS EXACT LOCATIONS NOR SHOULD THEY BE ASSUMED TO BE THE ONLY UTILITIES IN THE AREA.

GENERAL PRIVATE UTILITY NOTES:

PROPOSED PRIVATE UTILITY SERVICE AS SHOWN ARE SCHEMATIC ONLY. ACTUAL LOCATION TO BE COORDINATED WITH INDIVIDUAL UTILITY COMPANY AND APPROVED BY OWNER.

ALL PROPOSED UTILITIES WILL BE INSTALLED UNDERGROUND.

CONTRACTOR SHALL COORDINATE LOCATION OF ALL PRIVATE UTILITIES (GAS, ELECTRIC, PHONE, CABLE, ETC.) WITH THE LOCAL UTILITY COMPANIES AND THE MECHANICAL DRAWINGS. COORDINATE ALL PRIVATE UTILITY LOCATIONS WITH ALL SUB-SURFACE SITE UTILITIES SHOWN ON THIS PLAN.

GENERAL SANITARY SERVICE NOTES:

SITE CONTRACTOR TO END SANITARY LATERAL WITH A CLEAN-OUT AND TEMPORARY CAP AT 5' FROM BUILDING. COORDINATE CONNECTION WITH BUILDING PLUMBING CONTRACTOR.

SANITARY SEWER SERVICE LATERAL AND FITTINGS SHALL BE PVC PER ASTM D3034, SDR 26. JOINTS TO BE ELASTOMERIC SEALS IN ACCORDANCE WITH ASTM F477.

MATERIALS, INSTALLATION, AND TESTING OF SANITARY SEWER SERVICES SHALL CONFORM TO GRAND HAVEN CHARTER TOWNSHIP PUBLIC SERVICES DEPARTMENT WASTEWATER CONNECTION SPECIFICATIONS.

GENERAL STORM SEWER NOTES:

SITE CONTRACTOR TO END STORM CONNECTION 5' FROM BUILDING WITH A TEMPORARY CAP. COORDINATE CONNECTION WITH BUILDING PLUMBING CONTRACTOR.

STORM SEWER UNDERDRAIN (SPU) (12" - 60") SHALL BE SMOOTH INTERIOR CORRUGATED POLYETHYLENE PIPE PER AASHTO M294 TYPE SP, AND SHALL BE PERFORATED AND PRE-WRAPPED WITH A 3.5 OZ/SY GEOTEXTILE FILTER SOCK. JOINTS SHALL BE SOIL TIGHT. PAVEMENT SUBGRADE TO BE GRADED TO SLOPE TOWARDS THE PROPOSED SPU TRENCHES THROUGHOUT SITE.

UNDERDRAIN (4" - 10") SHALL BE SMOOTH INTERIOR CORRUGATED POLYETHYLENE PIPE TYPE S, PER AASHTO M252 AND PRE-WRAPPED WITH A GEOTEXTILE FILTER SOCK. PAVEMENT SUBGRADE TO BE GRADED TO SLOPE TOWARDS THE PROPOSED SPU TRENCHES THROUGHOUT SITE.

STORM SEWER PIPE FOR ROOF DRAIN CONNECTIONS OR WHERE INDICATED TO BE PVC SHALL MEET THE REQUIREMENTS OF ASTM D3034, SDR 26. JOINTS TO BE ELASTOMERIC SEALS IN ACCORDANCE WITH ASTM F477.

MATERIALS, INSTALLATION, AND TESTING OF THE STORM SEWER SYSTEM SHALL CONFORM TO GRAND HAVEN CHARTER TOWNSHIP PUBLIC SERVICES DEPARTMENT WASTEWATER CONNECTION SPECIFICATIONS STANDARDS.

GENERAL WATER SERVICE NOTES:

SITE CONTRACTOR TO END WATER SERVICE(S) AT 5' FROM BUILDING WITH TEMPORARY CAP(S). COORDINATE CONNECTION WITH BUILDING PLUMBING CONTRACTOR.

IRRIGATION WATER SERVICE TO BE TAPPED OFF WATER SERVICE INSIDE BUILDING UTILITY ROOM. COORDINATE WITH LANDSCAPER AND BUILDING PLUMBER.

FIRE PROTECTION LINE AND COMBINED SERVICE LINE SHALL BE DUCTILE IRON PER ANSI/AWWA C151/A21.51, THICKNESS CLASS PER ANSI/AWWA C110/A21.50. FITTINGS SHALL BE DUCTILE IRON PER ANSI/AWWA C110/A21.10, PRESSURE CLASS 350.

DOMESTIC SERVICE SHALL BE COPPER, TYPE K, ANNEALED AND SOFT TEMPER PER ASTM B-88. FITTINGS SHALL CONFORM TO ASTM B-88.

MINIMUM DEPTH OF BURY SHALL BE 60".

FIRE HYDRANT SHALL CONFORM TO ANSI / AWWA C-502 STANDARDS.

MATERIALS, INSTALLATION, AND TESTING OF WATER SERVICE LINES SHALL CONFORM TO GRAND HAVEN CHARTER TOWNSHIP PUBLIC SERVICES DEPARTMENT WASTEWATER CONNECTION SPECIFICATIONS AND THE STATE PLUMBING CODE.

PROPOSED LEGEND

- SIGN
- MANHOLE
- HYDRANT
- FLARED END SECTION
- BOLLARD LIGHT (SEE ELECTRICAL DRAWINGS)
- LIGHT POLE (SEE ELECTRICAL DRAWINGS)
- BUMP POST
- CATCH BASIN
- WATER VALVE
- 45° BEND
- 90° BEND
- FIRE DEPARTMENT CONNECTION
- LANDING AREA
- CLEAN OUT
- CURB STOP
- PIPE PLUG
- TEE
- CONCRETE SIDEWALK
- SIDEWALK RAMP
- CONCRETE PAVEMENT
- STANDARD DUTY ASPHALT
- GRAVEL DRIVE
- STANDARD CURB & GUTTER
- INVERTED CURB & GUTTER
- LANDSCAPE CURB
- FENCE
- WATER MAIN
- SANITARY SEWER
- STORM SEWER
- UNDERDRAIN

NOT FOR CONSTRUCTION

N

0 50' 100'

ARCHITECTS • ENGINEERS

paradigm design

GRAND RAPIDS: 550 3 MILE N.W. SUITE B, GRAND RAPIDS, MI 49544, (616) 785 - 5656

TRAVERSE CITY: 333 E. STATE STREET, TRAVERSE CITY, MI 49684, (231) 346 - 3030

WEB: ParadigmAE.com

NOTE: THIS DOCUMENT IS PRELIMINARY IN NATURE AND IS NOT A FINAL SIGNED AND SEALED DOCUMENT

BRIAN T. SINNOTT
MI REGISTRATION #6201052169
EXP. DATE 10/31/2019

PROJECT

17114 ROBBINS MIXED USE PUD

17114 ROBBINS ROAD
GRAND HAVEN, MI 49417

DEVELOPER

MAIN STREET CAPITAL GROUP

18000 COVE STREET, STE 201
SPRING LAKE, MI 49456

RELEASE DATE

	DATE	DESCRIPTION
	01-16-18	PUD APPLICATION
	02-07-18	PUD APPLICATION

PROJECT

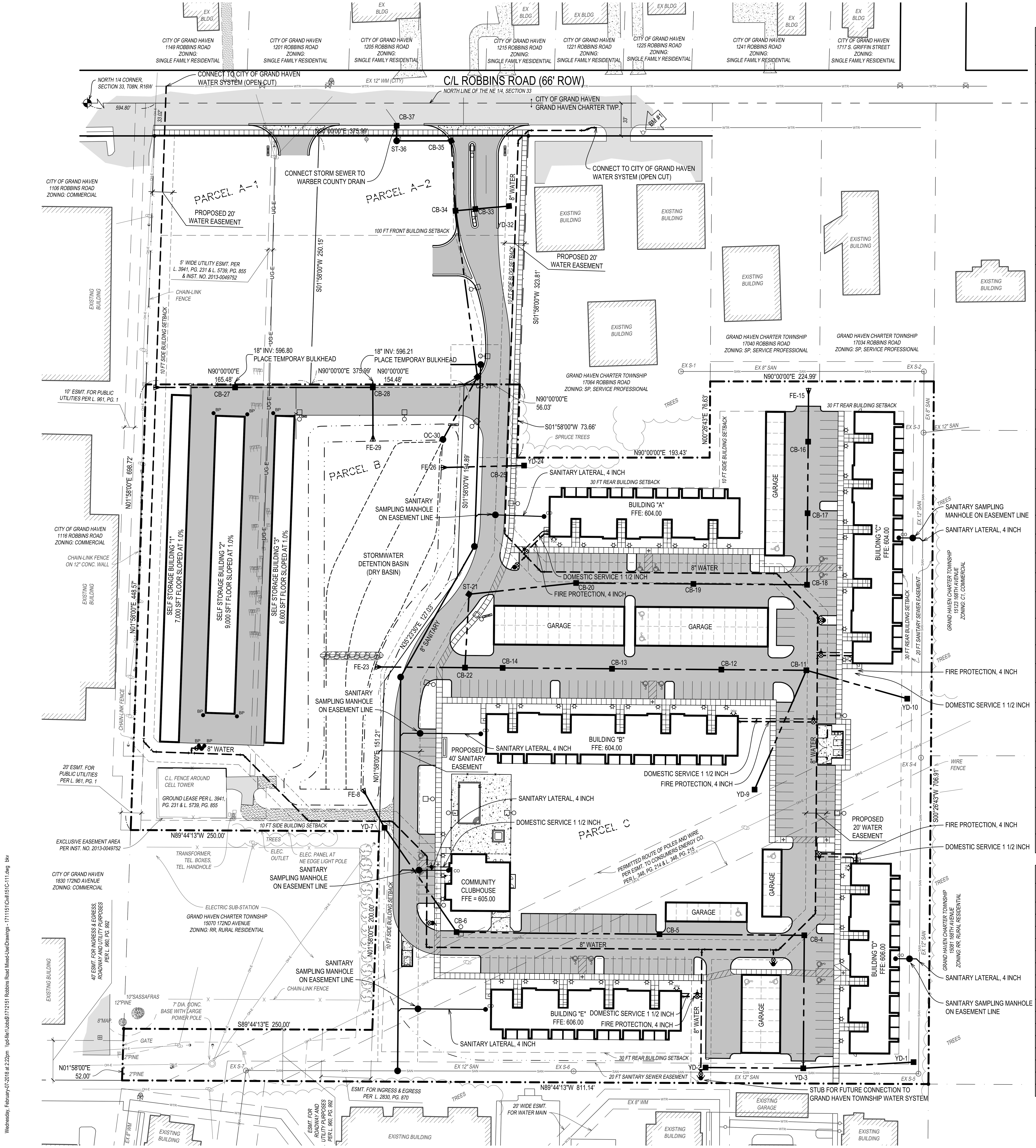
1712151

SHEET

CIVIL OVERALL UTILITY PLAN

C-111

Wednesday, February-07-2018 at 2:23pm \\pd-file1\Jobs$\1712151 Robbins Road Mixed-Use\Drawings - 1711151CIVR15C-111.dwg bkv



PROPOSED STORM SEWER STRUCTURE TABLE			
STRUCTURE NUMBER	STRUCTURE TYPE & SIZE	RIM ELEV. CASTING TYPE	INVERT
1	YD 2' Ø STANDARD	RIM = 601.93 EJ 1040-N	12" (W) = 599.69
2	YD 2' Ø STANDARD	RIM = 603.02 EJ 1040-N	12" (E) = 599.64
3	YD 4' Ø STANDARD	RIM = 604.70 EJ 1040-N	12" (E) = 599.33 12" (W) = 599.33 12" (N) = 599.33
4	CB 4' Ø STANDARD	RIM = 604.54 EJ 1040-M1	12" (S) = 598.90 12" (W) = 598.90
5	CB 4' Ø STANDARD	RIM = 604.31 EJ 7045-M1-T1	12" (E) = 597.81 15" (W) = 597.81
6	CB 4' Ø STANDARD	RIM = 604.21 EJ 7045-M1-T1	15" (E) = 596.99 15" (NW) = 596.99
7	YD 4' Ø STANDARD	RIM = 601.77 EJ 1040-N	15" (SE) = 596.34 18" (NW) = 596.34
8	FE 4' Ø STANDARD	RIM = 597.91 STANDARD	18" (SE) = 596.20
9	YD 2' Ø STANDARD	RIM = 603.00 EJ 1040-N	12" (NE) = 598.47
10	YD 2' Ø STANDARD	RIM = 601.00 EJ 1040-N	12" (W) = 598.39
11	CB 4' Ø STANDARD	RIM = 602.34 EJ 1040-M1	12" (SW) = 598.05 12" (E) = 598.05 15" (W) = 598.05
12	CB 4' Ø STANDARD	RIM = 602.19 EJ 1040-M1	15" (E) = 597.67 15" (W) = 597.67
13	CB 4' Ø STANDARD	RIM = 602.19 EJ 1040-M1	15" (E) = 596.96 18" (W) = 596.96
14	CB 4' Ø STANDARD	RIM = 602.19 EJ 1040-M1	18" (E) = 596.58 18" (W) = 596.58
15	FE 4' Ø STANDARD	RIM = 600.07 STANDARD	12" (S) = 598.90
16	CB 4' Ø STANDARD	RIM = 602.43 EJ 1040-M1	12" (N) = 598.44 12" (S) = 598.44
17	CB 4' Ø STANDARD	RIM = 602.43 EJ 1040-M1	12" (N) = 598.21 12" (S) = 598.21
18	CB 4' Ø STANDARD	RIM = 602.34 EJ 1040-M1	12" (N) = 597.98 12" (W) = 597.98
19	CB 4' Ø STANDARD	RIM = 602.14 EJ 1040-M1	12" (E) = 597.61 12" (W) = 597.61
20	CB 4' Ø STANDARD	RIM = 602.14 EJ 1040-M1	12" (E) = 596.75 18" (W) = 596.75
21	ST 4' Ø STANDARD	RIM = 602.19 EJ 1040-B	18" (E) = 596.55 18" (S) = 596.55
22	CB 5' Ø STANDARD	RIM = 602.67 EJ 1040-M1	18" (E) = 596.42 18" (N) = 596.42 24" (W) = 596.42
23	FE 4' Ø STANDARD	RIM = 598.45 STANDARD	24" (E) = 596.20
24	YD 4' Ø STANDARD	RIM = 600.04 EJ 1040-N	12" (W) = 596.47
25	CB 4' Ø STANDARD	RIM = 600.29 EJ 7045-M1-T1	12" (E) = 596.36 12" (W) = 596.36
26	FE 4' Ø STANDARD	RIM = 597.37 STANDARD	12" (E) = 596.20
27	CB 5' Ø STANDARD	RIM = 601.36 EJ 7045-M1-T3	18" (N) = 596.79 12" (W) = 597.29 24" (E) = 596.79
28	CB 5' Ø STANDARD	RIM = 601.20 EJ 7045-M1-T3	24" (W) = 596.62 18" (N) = 596.20 24" (S) = 596.62
29	FE 4' Ø STANDARD	RIM = 598.75 STANDARD	24" (N) = 596.50
30	OC 4' Ø STANDARD	RIM = 598.33 STANDARD	36" (N) = 595.00
31	CB 5' Ø STANDARD	RIM = 599.58 EJ 7045-M1-T1	36" (S) = 594.69 36" (N) = 594.69
32	YD 2' Ø STANDARD	RIM = 599.75 EJ 1040-N	12" (W) = 595.59
33	CB 4' Ø STANDARD	RIM = 600.49 EJ 7045-M1-T1	12" (E) = 595.23 12" (W) = 595.13
34	CB 5' Ø STANDARD	RIM = 599.99 EJ 7045-M1-T1	36" (S) = 593.93 12" (E) = 594.93 36" (N) = 593.93
35	CB 6' Ø STANDARD	RIM = 600.46 EJ 7045-M1-T1	36" (S) = 593.57 36" (W) = 593.57
36	ST 6' Ø STANDARD	RIM = 600.08 EJ 1040-B	36" (E) = 593.32 36" (N) = 593.32
37	CB 6' Ø STANDARD	RIM = 600.03 EJ 7045-M1-T1	36" (S) = 593.25 36" (E) = 592.93 30" (W) = 593.23
38	FE 4' Ø STANDARD	RIM = 600.37 STANDARD	12" (E) = 599.20

PROPOSED STORM SEWER PIPE TABLE				
UP STREAM STRUCTURE	DOWN STREAM STRUCTURE	SIZE	LENGTH	SLOPE
1	3	12"	111 FT	0.32%
2	3	12"	98 FT	0.32%
3	4	12"	134 FT	0.32%
4	5	12"	146 FT	0.75%
5	6	15"	204 FT	0.40%
6	7	15"	128 FT	0.51%
9	11	12"	131 FT	0.32%
10	11	12"	105 FT	0.32%
11	12	15"	85 FT	0.45%
12	13	15"	110 FT	0.65%
13	14	18"	110 FT	0.34%
14	22	18"	38 FT	0.42%
15	16	12"	54 FT	0.86%
16	17	12"	72 FT	0.32%
17	18	12"	72 FT	0.32%
18	19	12"	114 FT	0.32%

PROPOSED STORM SEWER PIPE TABLE				
UP STREAM STRUCTURE	DOWN STREAM STRUCTURE	SIZE	LENGTH	SLOPE
19	20	12"	118 FT	0.73%
20	21	18"	111 FT	0.18%
24	25	12"	34 FT	0.32%
25	26	12"	50 FT	0.32%
27	28	24"	139 FT	0.12%
28	29	24"	54 FT	0.23%
30	31	36"	65 FT	0.47%
31	34	36"	163 FT	0.47%
32	33	12"	35 FT	1.00%
33	34	12"	20 FT	1.00%
34	35	36"	75 FT	0.47%
35	36	36"	55 FT	0.47%
36	37	36"	15 FT	0.47%

GENERAL PRIVATE UTILITY NOTES:

PROPOSED PRIVATE UTILITY SERVICE AS SHOWN ARE SCHEMATIC ONLY. ACTUAL LOCATION TO BE COORDINATED WITH INDIVIDUAL UTILITY COMPANY AND APPROVED BY OWNER.

ALL PROPOSED UTILITIES WILL BE INSTALLED UNDERGROUND.

CONTRACTOR SHALL COORDINATE LOCATION OF ALL PRIVATE UTILITIES (GAS, ELECTRIC, PHONE, CABLE, ETC.) WITH THE LOCAL UTILITY COMPANIES AND THE MECHANICAL DRAWINGS. COORDINATE ALL PRIVATE UTILITY LOCATIONS WITH ALL SUB-SURFACE SITE UTILITIES SHOWN ON THIS PLAN.

GENERAL SANITARY SERVICE NOTES:

SITE CONTRACTOR TO END SANITARY LATERAL WITH A CLEAN-OUT AND TEMPORARY CAP AT 5' FROM BUILDING. COORDINATE CONNECTION WITH BUILDING PLUMBING CONTRACTOR.

SANITARY SEWER SERVICE LATERAL AND FITTINGS SHALL BE PVC PER ASTM D3034, SDR 26. JOINTS TO BE ELASTOMERIC SEALS IN ACCORDANCE WITH ASTM F477.

MATERIALS, INSTALLATION, AND TESTING OF SANITARY SEWER SERVICES SHALL CONFORM TO GRAND HAVEN CHARTER TOWNSHIP PUBLIC SERVICES DEPARTMENT WASTEWATER CONNECTION SPECIFICATIONS.

GENERAL STORM SEWER NOTES:

SITE CONTRACTOR TO END STORM CONNECTION 5' FROM BUILDING WITH A TEMPORARY CAP. COORDINATE CONNECTION WITH BUILDING PLUMBING CONTRACTOR.

STORM SEWER UNDERDRAIN (SPU) (12" - 60") SHALL BE SMOOTH INTERIOR CORRUGATED POLYETHYLENE PIPE PER AASHTO M294 TYPE SP, AND SHALL BE PERFORATED AND PRE-WRAPPED WITH A 3.5 OZ/SY GEOTEXTILE FILTER SOCK. JOINTS SHALL BE SOIL TIGHT. PAVEMENT SUBGRADE TO BE GRADED TO SLOPE TOWARDS THE PROPOSED SPU TRENCHES THROUGHOUT SITE.

UNDERDRAIN (4" - 10") SHALL BE SMOOTH INTERIOR CORRUGATED POLYETHYLENE PIPE TYPE S, PER AASHTO M252 AND PRE-WRAPPED WITH A GEOTEXTILE FILTER SOCK. PAVEMENT SUBGRADE TO BE GRADED TO SLOPE TOWARDS THE PROPOSED SPU TRENCHES THROUGHOUT SITE.

STORM SEWER PIPE FOR ROOF DRAIN CONNECTIONS OR WHERE INDICATED TO BE PVC SHALL MEET THE REQUIREMENTS OF ASTM D3034, SDR 26. JOINTS TO BE ELASTOMERIC SEALS IN ACCORDANCE WITH ASTM F477.

MATERIALS, INSTALLATION, AND TESTING OF THE STORM SEWER SYSTEM SHALL CONFORM TO GRAND HAVEN CHARTER TOWNSHIP PUBLIC SERVICES DEPARTMENT WASTEWATER CONNECTION SPECIFICATIONS STANDARDS.

GENERAL WATER SERVICE NOTES:

SITE CONTRACTOR TO END WATER SERVICE(S) AT 5' FROM BUILDING WITH TEMPORARY CAP(S). COORDINATE CONNECTION WITH BUILDING PLUMBING CONTRACTOR.

IRRIGATION WATER SERVICE TO BE TAPPED OFF WATER SERVICE INSIDE BUILDING UTILITY ROOM. COORDINATE WITH LANDSCAPER AND BUILDING PLUMBER.

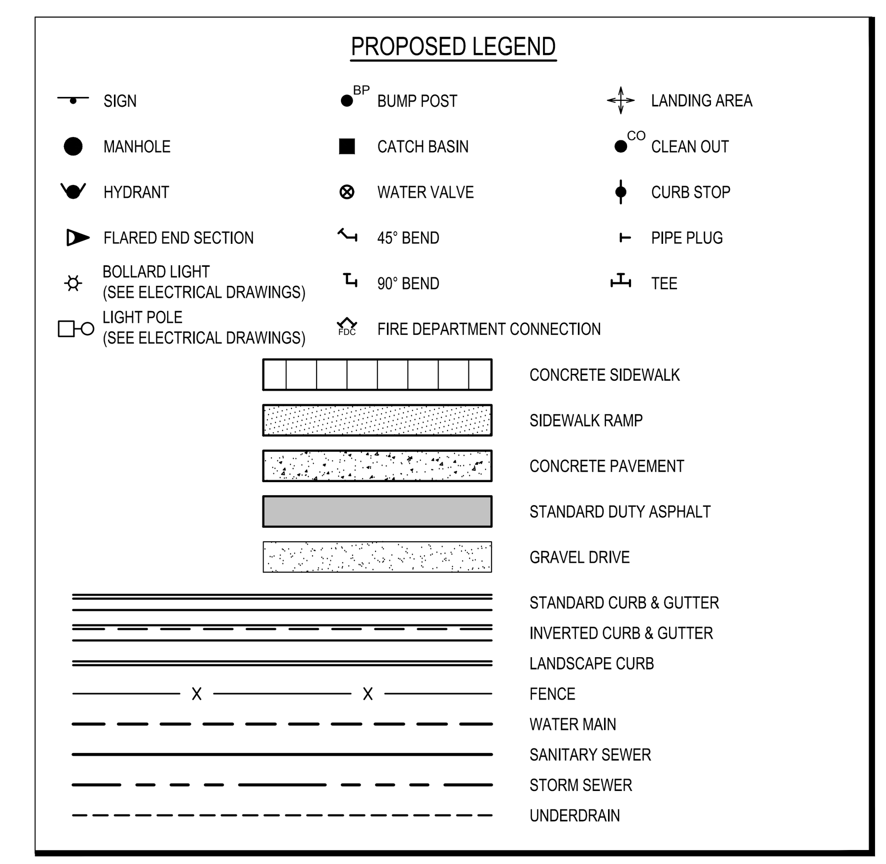
FIRE PROTECTION LINE AND COMBINED SERVICE LINE SHALL BE DUCTILE IRON PER ANSI/AWWA C151/A21.51, THICKNESS CLASS PER ANSI/AWWA C110/A21.50. FITTINGS SHALL BE DUCTILE IRON PER ANSI/AWWA C110/A21.10, PRESSURE CLASS 350.

DOMESTIC SERVICE SHALL BE COPPER, TYPE K, ANNEALED AND SOFT TEMPER PER ASTM B-88. FITTINGS SHALL CONFORM TO ASTM B-88.

MINIMUM DEPTH OF BURY SHALL BE 60".

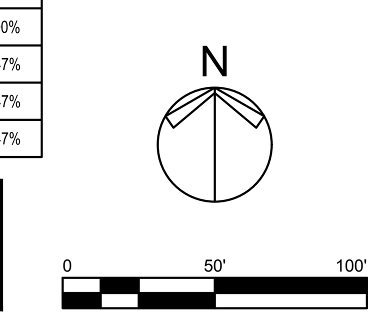
FIRE HYDRANT SHALL CONFORM TO ANSI / AWWA C-502 STANDARDS.

MATERIALS, INSTALLATION, AND TESTING OF WATER SERVICE LINES SHALL CONFORM TO GRAND HAVEN CHARTER TOWNSHIP PUBLIC SERVICES DEPARTMENT WASTEWATER CONNECTION SPECIFICATIONS AND THE STATE PLUMBING CODE.



NOTE: ALL UTILITIES SHOWN ARE APPROXIMATE LOCATIONS FROM FIELD DATA AND AVAILABLE INFORMATION. THEY SHOULD NOT BE INTERPRETED AS EXACT LOCATIONS NOR SHOULD THEY BE ASSUMED TO BE THE ONLY UTILITIES IN THE AREA.

NOT FOR CONSTRUCTION



ARCHITECTS • ENGINEERS
paradigm design
GRAND RAPIDS 550 3 MILE N.W. SUITE B GRAND RAPIDS, MI 49544 (616) 785 - 5656
TRAVERSE CITY 333 E. STATE STREET TRAVERSE CITY, MI 49684 (231) 346 - 3030
WEB ParadigmAE.com

NOTE: THIS DOCUMENT IS PRELIMINARY IN NATURE AND IS NOT A FINAL, SIGNED AND SEALED DOCUMENT.
BRIAN T. SINNOTT
MI REGISTRATION #6201052169
EXP. DATE 10/31/2019

PROJECT

17114 ROBBINS MIXED USE PUD

17114 ROBBINS ROAD
GRAND HAVEN, MI 49417

DEVELOPER

MAIN STREET CAPITAL GROUP

18000 COVE STREET, STE 201
SPRING LAKE, MI 49456

RELEASE DATE

△	DATE	DESCRIPTION
	01-16-18	PUD APPLICATION
	02-07-18	PUD APPLICATION

PROJECT

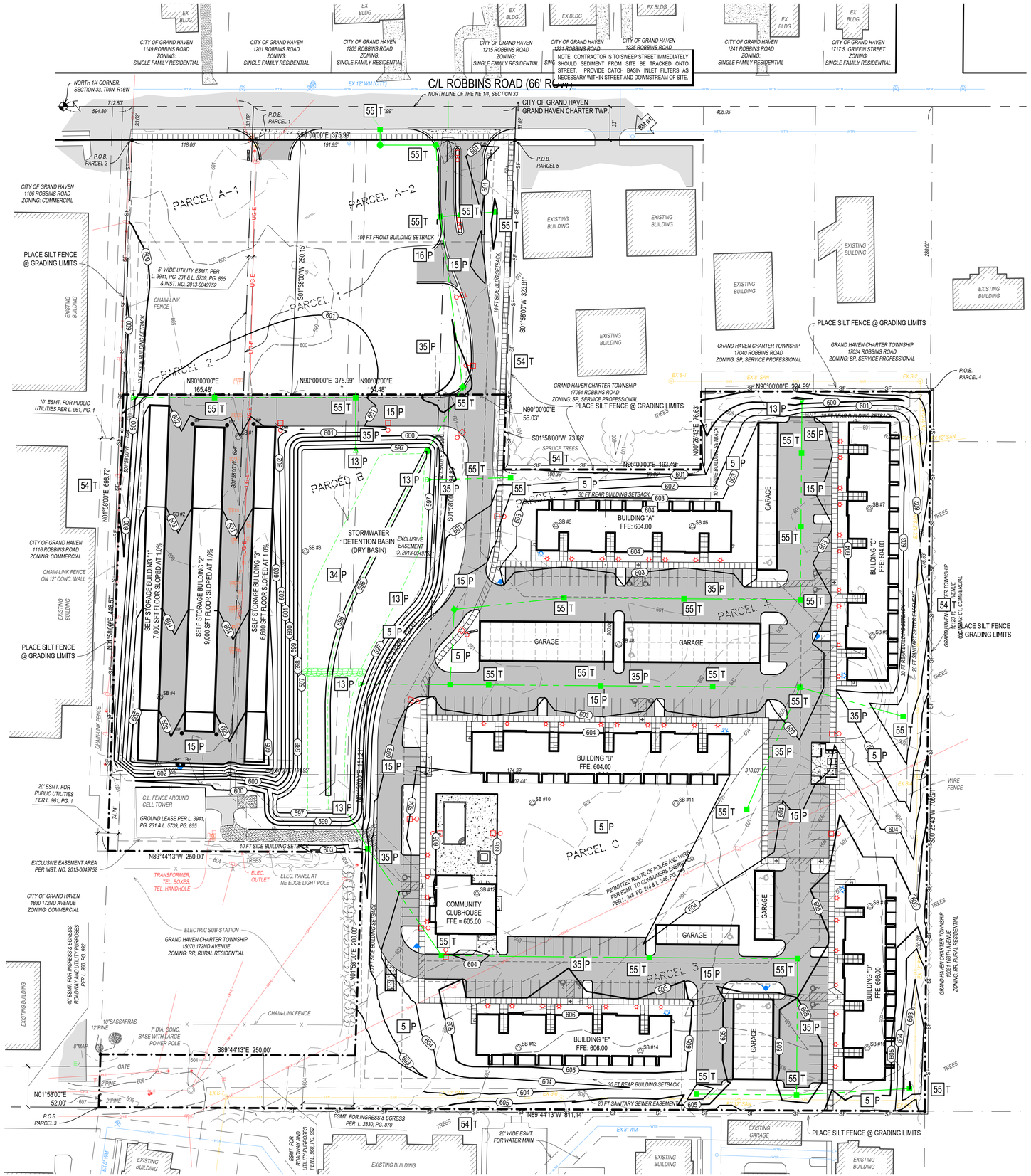
1712151

SHEET

CIVIL OVERALL UTILITY PLAN

C-111

Wednesday, February-07-2018 at 2:22pm \\pd-file1\Jobs$\1712151 Robbins Road Mixed-Use\Drawings - 1711151\Civil\151C-111.dwg bkv



GENERAL SOIL EROSION AND SEDIMENTATION CONTROL NOTES:

IT IS THE OWNER'S RESPONSIBILITY TO OBTAIN THE SOIL EROSION PERMIT FROM THE PROPER GOVERNING AUTHORITY.

A CONTRACTOR / INSPECTOR SHALL INSPECT THE SOIL EROSION/SEDIMENT CONTROL DEVICES ONCE EACH WEEK AND/OR WITHIN 24 HOURS OF A PRECIPITATION EVENT WHICH RESULTS IN A STORM DISCHARGE FROM THE SITE.

ALL DISTURBED NON-PAVEMENT AREAS MUST BE RESTORED WITH TOPSOIL, SEED, FERTILIZER, AND MULCH UNLESS SODDED. (SEE LANDSCAPING PLAN)

ALL SLOPES STEEPER THAN 1V:3H SHALL USE AN EROSION CONTROL BLANKET ([NORTH AMERICAN GREEN S150BN] OR EQUAL). ALL SLOPES BETWEEN 1V:4H AND 1V:3H SHALL USE AN EROSION CONTROL BLANKET ([NORTH AMERICAN GREEN DS75] OR EQUAL), UNLESS INDICATED OTHERWISE ON PLANS.

SEEDING SHOULD BE PREPARED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. THE CONTRACTOR / INSPECTOR SHALL INSPECT THE AREA AFTER SEEDING IS COMPLETED. AREAS THAT ARE BARE OR NOT MULCHED PROPERLY WILL NEED TO BE SPOT SEEDED AND/OR RE-MULCHED.

SILT FENCE SHOULD BE TRENCHED IN, BACKFILLED, AND STAPLED OR STAKED ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS. MAINTENANCE INCLUDES THE REMOVING OF BUILT-UP SEDIMENT WHEN THE SEDIMENT ACCUMULATES TO 1/3 TO 1/2 THE HEIGHT OF THE FENCE. CONTRACTOR WILL HAVE TO REMOVE, REPLACE, RETRENCH, OR REBACKFILL THE FENCE IF IT FAILS. IT WOULD ALSO BE NECESSARY TO REINSTALL IF ANY PORTION OF THE FENCING WAS DAMAGED BY CONSTRUCTION MACHINERY.

INLET FILTERS SHALL BE SILT SACKS, DANDY BAGS, OR APPROVED EQUAL. INLET FILTERS SHOULD BE INSPECTED FOR BUILDUP OF SILT AND OTHER DEBRIS. THIS IS EVIDENT IF STRUCTURE IS CAUSING FLOODING. MAINTENANCE WOULD CONSIST OF REMOVING OF SEDIMENTS OR REPLACING FILTER AS NECESSARY.

SOIL EROSION CONTROL METHODS SHOWN ARE A GUIDELINE AND DO NOT RELIEVE THE CONTRACTOR FROM ADDITIONAL METHODS THAT MAY BE REQUIRED BY THE SOIL EROSION CONTROL PERMIT.

DETENTION BASIN(S) SHALL BE ONE OF THE FIRST ITEMS CONSTRUCTED AND SHALL BE USED AS A TEMPORARY SEDIMENTATION BASIN UNTIL THE SITE IS STABILIZED. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL ACCUMULATED SEDIMENT AND RESTORATION OF THE BASIN PRIOR TO ACCEPTANCE BY THE [OWNER] [REGULATORY AGENCY].

THE CONTRACTOR WILL ENGAGE A CERTIFIED STORM WATER OPERATOR IN ACCORDANCE WITH EPA PHASE II RULES TO MEET REQUIREMENTS OF THE PERMIT. THIS OPERATOR WILL INSPECT THE JOB SITE AS REQUIRED BY RULE. NOTIFY JOB SITE SUPERINTENDENT OF ANY DEFICIENCIES, AND ENTER FINDINGS IN THE JOB SITE INSPECTION JOB BOOK.

TOTAL DISTURBED AREA = 13.12 ACRES. APPROXIMATELY 19,000 CUBIC YARDS OF FILL WILL BE REQUIRED TO ACHIEVE PROPOSED GRADERS, NOT INCLUDING PAVEMENT SECTION MATERIALS.

UNIFIED KEYING SYSTEM
SOIL EROSION AND SEDIMENTATION CONTROL MEASURES

5	SEEDING	34	SEDIMENT BASIN
13	RIP-RAP, RUBBLE, GABIONS	35	STORM SEWER CB CB
15	PAVING	54	GEOTEXTILE SILT FENCE
16	CURB & GUTTER	55	GEOTEXTILE INLET FILTER

CONSTRUCTION SEQUENCE	YEAR: 2018											
	JAN.	FEB.	MARC.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
STRIPPING & STOCKPILING TOPSOIL												
ROUGH GRADING SEDIMENT CONTROL												
TEMPORARY CONTROL MEASURES												
STORM UTILITIES												
TEMPORARY CONSTRUCTION ROADS												
PERMANENT CONTROL MEASURES												
FOUNDATION / BUILDING CONSTRUCTION												
SITE CONSTRUCTION												
FINISH GRADING												
LANDSCAPING												

GENERAL CONTRACTOR SHALL COMPLETE CONSTRUCTION SEQUENCE SCHEDULE WHEN MAKING APPLICATION FOR SOIL EROSION CONTROL PERMIT.

PROPOSED LEGEND

SIGN
BMP BUMP POST
LANDING AREA
MANHOLE
CATCH BASIN
CO CLEAN OUT
HYDRANT
FIRE DEPARTMENT CONNECTION
WATER VALVE
FLARED END SECTION
LIGHT POLE (SEE ELECTRICAL DRAWINGS)
BOLLARD LIGHT (SEE ELECTRICAL DRAWINGS)
CONCRETE SIDEWALK
SIDEWALK RAMP
CONCRETE PAVEMENT
STANDARD DUTY ASPHALT
GRAVEL DRIVE
STANDARD CURB & GUTTER
INVERTED CURB & GUTTER
LANDSCAPE CURB
605 CONTOUR LINE
X X FENCE
WATER MAIN
SANITARY SEWER
STORM SEWER
UNDERDRAIN
SF SF SF SILT FENCE
X T TEMPORARY SOIL EROSION & SEDIMENTATION CONTROL MEASURE
X P PERMANENT SOIL EROSION & SEDIMENTATION CONTROL MEASURE

NOT FOR CONSTRUCTION

NOTE: ALL UTILITIES SHOWN ARE APPROXIMATE LOCATIONS FROM FIELD DATA AND AVAILABLE INFORMATION. THEY SHOULD NOT BE INTERPRETED AS EXACT LOCATIONS NOR SHOULD THEY BE ASSUMED TO BE THE ONLY UTILITIES IN THE AREA.

N

0 50' 100'

ARCHITECTS • ENGINEERS
paradigm design
GRAND RAPIDS 550 3 MILE N.W. SUITE B GRAND RAPIDS, MI 49544 (616) 785 - 5656
TRAVERSE CITY 333 E. STATE STREET TRAVERSE CITY, MI 49684 (231) 346 - 3030
WEB ParadigmAE.com

NOTE: THIS DOCUMENT IS PRELIMINARY IN NATURE AND IS NOT A FINAL SIGNED AND SEALED DOCUMENT

BRIAN T. SINNOTT
REGISTRATION #6201052169
EXP. DATE 10/31/2019

PROJECT

17114
ROBBINS
MIXED USE PUD

17114 ROBBINS ROAD
GRAND HAVEN, MI 49417

DEVELOPER

MAIN STREET
CAPITAL GROUP

18000 COVE STREET, STE 201
SPRING LAKE, MI 49456

RELEASE DATE

	DATE	DESCRIPTION
	01-16-18	PUD APPLICATION
	02-07-18	PUD APPLICATION

PROJECT

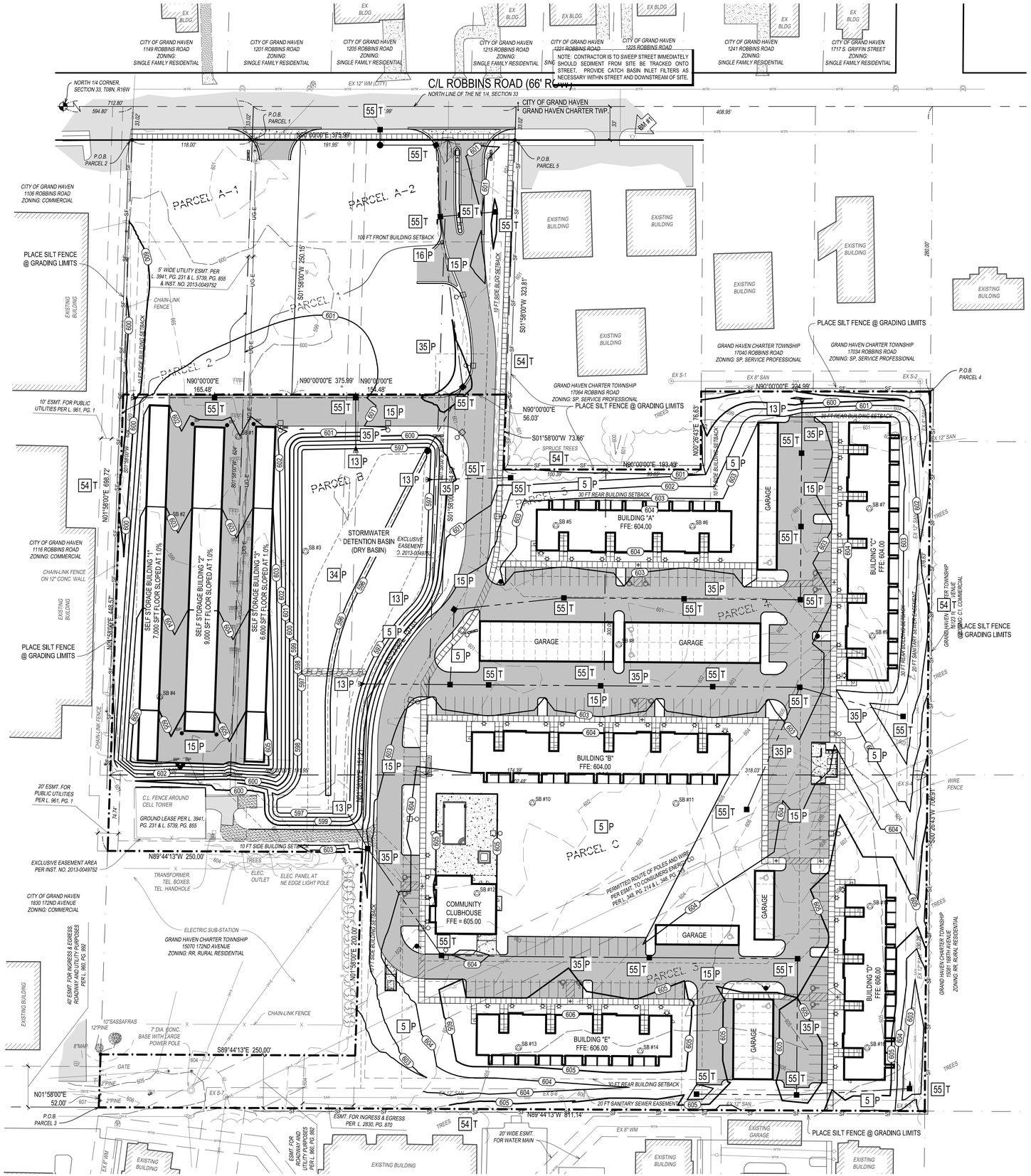
1712151

SHEET

CIVIL OVERALL
GRADING & SESC
PLAN

C-121

Wednesday, February-07-2018 at 2:26pm tpc4fer1/cds5/1712151 Robbins Road Mixed-Use/Drawings - 1711151/Civil/15C-121.dwg bkv



GENERAL SOIL EROSION AND SEDIMENTATION CONTROL NOTES:

IT IS THE OWNER'S RESPONSIBILITY TO OBTAIN THE SOIL EROSION PERMIT FROM THE PROPER GOVERNING AUTHORITY.

A CONTRACTOR / INSPECTOR SHALL INSPECT THE SOIL EROSION/SEDIMENT CONTROL DEVICES ONCE EACH WEEK AND/OR WITHIN 24 HOURS OF A PRECIPITATION EVENT WHICH RESULTS IN A STORM DISCHARGE FROM THE SITE.

ALL DISTURBED NON-PAVEMENT AREAS MUST BE RESTORED WITH TOPSOIL, SEED, FERTILIZER, AND MULCH UNLESS SODDED. (SEE LANDSCAPING PLAN)

ALL SLOPES STEEPER THAN 1V:3H SHALL USE AN EROSION CONTROL BLANKET ([NORTH AMERICAN GREEN S150BN] OR EQUAL). ALL SLOPES BETWEEN 1V:4H AND 1V:3H SHALL USE AN EROSION CONTROL BLANKET ([NORTH AMERICAN GREEN DS75] OR EQUAL), UNLESS INDICATED OTHERWISE ON PLANS.

SEEDING SHOULD BE PREPARED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. THE CONTRACTOR / INSPECTOR SHALL INSPECT THE AREA AFTER SEEDING IS COMPLETED. AREAS THAT ARE BARE OR NOT MULCHED PROPERLY WILL NEED TO BE SPOT SEEDED AND/OR RE-MULCHED.

SILT FENCE SHOULD BE TRENCHED IN, BACKFILLED, AND STAPLED OR STAKED ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS. MAINTENANCE INCLUDES THE REMOVING OF BUILT-UP SEDIMENT WHEN THE SEDIMENT ACCUMULATES TO 1/3 TO 1/2 THE HEIGHT OF THE FENCE. CONTRACTOR WILL HAVE TO REMOVE, REPLACE, RETRENCH, OR REBACKFILL THE FENCE IF IT FAILS. IT WOULD ALSO BE NECESSARY TO REINSTALL IF ANY PORTION OF THE FENCING WAS DAMAGED BY CONSTRUCTION MACHINERY.

INLET FILTERS SHALL BE SILT SACKS, DANDY BAGS, OR APPROVED EQUAL. INLET FILTERS SHOULD BE INSPECTED FOR BUILDUP OF SILT AND OTHER DEBRIS. THIS IS EVIDENT IF STRUCTURE IS CAUSING FLOODING. MAINTENANCE WOULD CONSIST OF REMOVING OF SEDIMENTS OR REPLACING FILTER AS NECESSARY.

SOIL EROSION CONTROL METHODS SHOWN ARE A GUIDELINE AND DO NOT RELIEVE THE CONTRACTOR FROM ADDITIONAL METHODS THAT MAY BE REQUIRED BY THE SOIL EROSION CONTROL PERMIT.

DETENTION BASIN(S) SHALL BE ONE OF THE FIRST ITEMS CONSTRUCTED AND SHALL BE USED AS A TEMPORARY SEDIMENTATION BASIN UNTIL THE SITE IS STABILIZED. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL ACCUMULATED SEDIMENT AND RESTORATION OF THE BASIN PRIOR TO ACCEPTANCE BY THE [OWNER] [REGULATORY AGENCY].

THE CONTRACTOR WILL ENGAGE A CERTIFIED STORM WATER OPERATOR IN ACCORDANCE WITH EPA PHASE II RULES TO MEET REQUIREMENTS OF THE PERMIT. THIS OPERATOR WILL INSPECT THE JOB SITE AS REQUIRED BY RULE. NOTIFY JOB SITE SUPERINTENDENT OF ANY DEFICIENCIES, AND ENTER FINDINGS IN THE JOB SITE INSPECTION JOB BOOK.

TOTAL DISTURBED AREA = 13.12 ACRES. APPROXIMATELY 19,000 CUBIC YARDS OF FILL WILL BE REQUIRED TO ACHIEVE PROPOSED GRADERS, NOT INCLUDING PAVEMENT SECTION MATERIALS.

UNIFIED KEYING SYSTEM
SOIL EROSION AND SEDIMENTATION CONTROL MEASURES

5	SEEDING	34	SEDIMENT BASIN
13	RIP-RAP, RUBBLE, GABIONS	35	STORM SEWER CB CB
15	PAVING	54	GEOTEXTILE SILT FENCE
16	CURB & GUTTER	55	GEOTEXTILE INLET FILTER

CONSTRUCTION SEQUENCE	YEAR: 2018											
	JAN.	FEB.	MARL	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
STRIPPING & STOCKPILING TOPSOIL												
ROUGH GRADING SEDIMENT CONTROL												
TEMPORARY CONTROL MEASURES												
STORM UTILITIES												
TEMPORARY CONSTRUCTION ROADS												
PERMANENT CONTROL MEASURES												
FOUNDATION / BUILDING CONSTRUCTION												
SITE CONSTRUCTION												
FINISH GRADING												
LANDSCAPING												

GENERAL CONTRACTOR SHALL COMPLETE CONSTRUCTION SEQUENCE SCHEDULE WHEN MAKING APPLICATION FOR SOIL EROSION CONTROL PERMIT.

PROPOSED LEGEND

SIGN
BMP BUMP POST
LANDING AREA
MANHOLE
CATCH BASIN
CO CLEAN OUT
HYDRANT
FIRE DEPARTMENT CONNECTION
WATER VALVE
FLARED END SECTION
LIGHT POLE (SEE ELECTRICAL DRAWINGS)
BOLLARD LIGHT (SEE ELECTRICAL DRAWINGS)

CONCRETE SIDEWALK
SIDEWALK RAMP
CONCRETE PAVEMENT
STANDARD DUTY ASPHALT
GRAVEL DRIVE
STANDARD CURB & GUTTER
INVERTED CURB & GUTTER
LANDSCAPE CURB
605 CONTOUR LINE
X X FENCE
WATER MAIN
SANITARY SEWER
STORM SEWER
UNDERDRAIN
SF SF SF SILT FENCE
X T TEMPORARY SOIL EROSION & SEDIMENTATION CONTROL MEASURE
X P PERMANENT SOIL EROSION & SEDIMENTATION CONTROL MEASURE

NOT FOR CONSTRUCTION

NOTE: ALL UTILITIES SHOWN ARE APPROXIMATE LOCATIONS FROM FIELD DATA AND AVAILABLE INFORMATION. THEY SHOULD NOT BE INTERPRETED AS EXACT LOCATIONS NOR SHOULD THEY BE ASSUMED TO BE THE ONLY UTILITIES IN THE AREA.

N

0 50' 100'

ARCHITECTS • ENGINEERS
paradigm design
GRAND RAPIDS 550 3 MILE N.W. SUITE B GRAND RAPIDS, MI 49544 (616) 785 - 5656
TRAVERSE CITY 333 E. STATE STREET TRAVERSE CITY, MI 49684 (231) 346 - 3030
WEB ParadigmAE.com

NOTE: THIS DOCUMENT IS PRELIMINARY IN NATURE AND IS NOT A FINAL SIGNED AND SEALED DOCUMENT

BRIAN T. SINNOTT
REGISTRATION #6201052169
EXP. DATE 10/31/2019

PROJECT

17114
ROBBINS
MIXED USE PUD

17114 ROBBINS ROAD
GRAND HAVEN, MI 49417

DEVELOPER

MAIN STREET
CAPITAL GROUP

18000 COVE STREET, STE 201
SPRING LAKE, MI 49456

RELEASE DATE

	DATE	DESCRIPTION
	01-16-18	PUD APPLICATION
	02-07-18	PUD APPLICATION

PROJECT

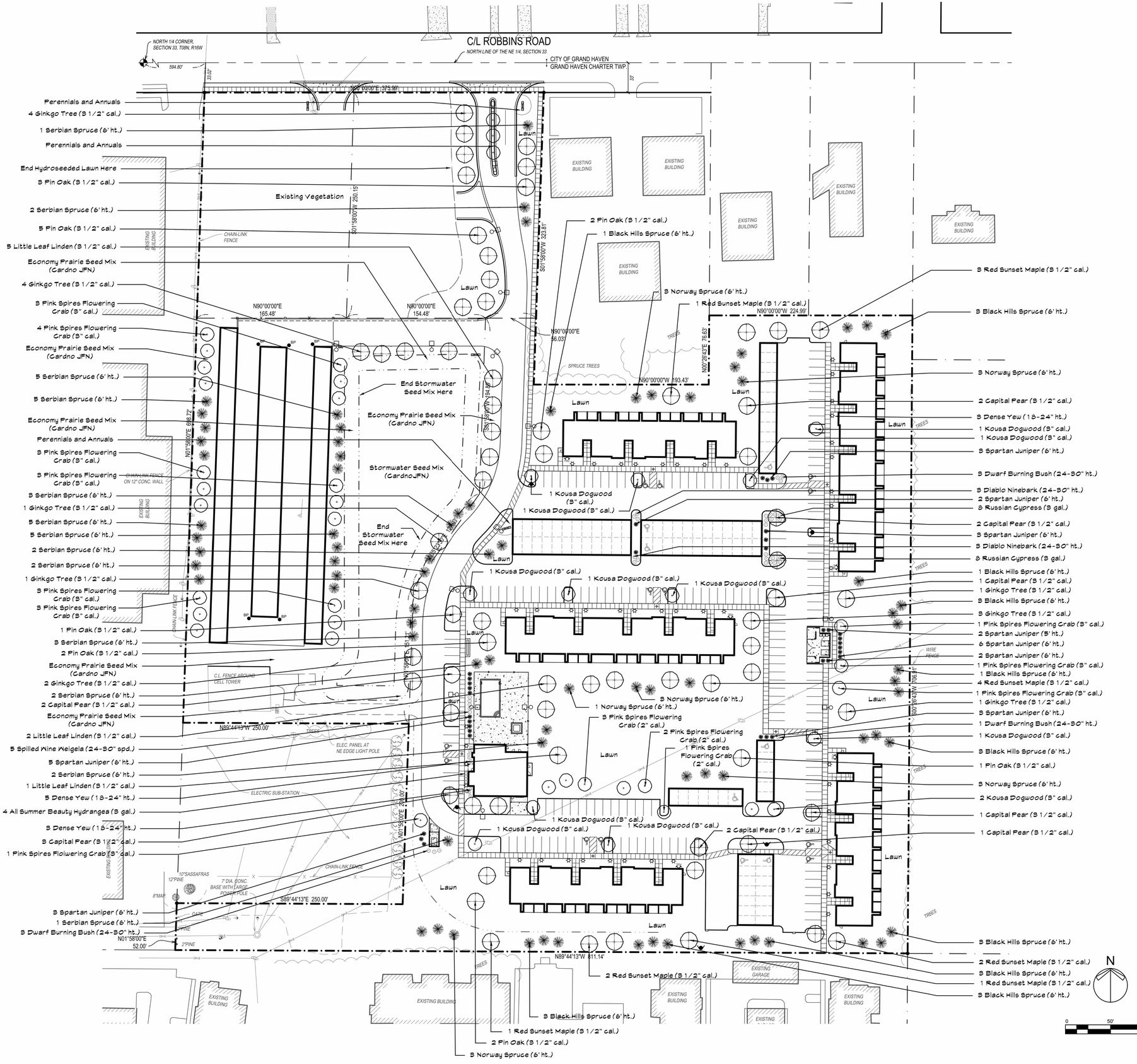
1712151

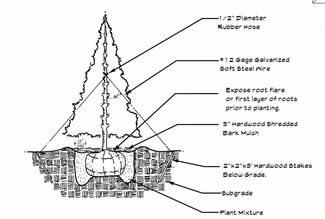
SHEET

CIVIL OVERALL
GRADING & SESC
PLAN

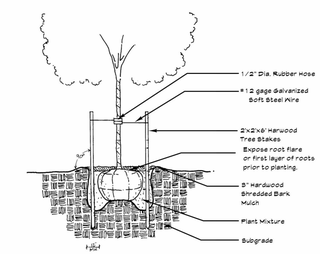
C-121

Wednesday, February-07-2018 at 2:22pm tpc4fer1\Jobs\1712151 Robbins Road Mixed-Use\Drawings - 1711151\Civil\15\C-121.dwg bkv

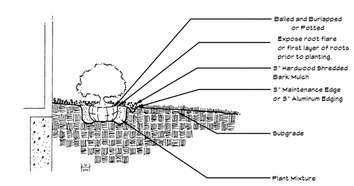




Evergreen Planting Detail-5' and Taller



Deciduous Trees 3" Caliper and Smaller



Shrub Planting Detail

Notes:

1. All landscaping shall be installed by a qualified Landscape Contractor to the size specified on the landscape plan. Smaller sizes will be rejected.
2. All plantings shall be mulched with 3" shredded premium hardwood bark mulch. Trees in lawn areas shall receive a 6' diameter bark ring 3" deep..
3. The landscape contractor shall remove any twine that is wrapped around the trunk of a tree or shrub as well as the top third of any burlap. Remove excess soil on the top of the root ball to expose the root flare or first layer of roots prior to planting. Use a wire cutter to make 3–5 cuts in the wire basket to allow roots to grow through.
4. Planting areas shall be edged with a mechanical bed edger at a depth of 4" to define border for shredded bark mulch.
5. Parking Islands shall be back filled with at least 24" of topsoil. Amend the topsoil with composted manure and mix into the topsoil at a depth of 6–12". Any aggregate or stone from the construction of the parking lot shall be removed prior to backfill.
6. Lawn areas shall recieve at least 4" of topsoil and hydroseeded. Check with specifications for topsoil availability or contact project manager. Topsoil for lawns shall be appropriate for growing and sustaining a healthy lawn. All lawns including the detention ponds shall be hydroseeded with a seed blend consisting of 30% Kentucky Bluegrass, 20% Perennial Ryegrass, 10% Hard Fescue, 20% Creeping Red Fescue and 20% Chewings Fescue.
7. All lawn and shrub bed areas shall be watered by an automatic irrigation system. The irrigation system shall be designed and installed by the Landscape Contractor.
8. Maintenance of the landscape shall be provided for by the owner and include fertilizing of lawn and plant material, yearly pruning, top dressing of mulch areas every other year and provide 1" of water per week during the growing season.
9. Plant materials shall be chosen and installed in accordance with standards recommended by the County Cooperative Extension Service or American Nursery Association.

NOTE: ALL UTILITIES SHOWN ARE APPROXIMATE LOCATIONS FROM FIELD DATA AND AVAILABLE INFORMATION. THEY SHOULD NOT BE INTERPRETED AS EXACT LOCATIONS NOR SHOULD THEY BE ASSUMED TO BE THE ONLY UTILITIES IN THE AREA.

ARCHITECTS • ENGINEERS

paradigm design

GRAND RAPIDS: 550 3 MILE N.W. SUITE B, GRAND RAPIDS, MI 49544, (616) 785 - 5656

TRAVERSE CITY: 333 E. STATE STREET, TRAVERSE CITY, MI 49684, (231) 346 - 3030

WEB: ParadigmAE.com

STATE OF MICHIGAN — JOYCE E. WEISE — LANDSCAPE ARCHITECT — No. 1202 — LICENSED LANDSCAPE ARCHITECT

Landscape Plan Drawn By: Joyce E. Weise PLA, ASLA

PROJECT

17114
ROBBINS
MIXED USE PUD

17114 ROBBINS ROAD
GRAND HAVEN, MI 49417

DEVELOPER

MAIN STREET
CAPITAL GROUP

18000 COVE STREET, STE 201
SPRING LAKE, MI 49456

RELEASE DATE

	DATE	DESCRIPTION
	01-16-18	PUD APPLICATION
	02-07-18	PUD APPLICATION

PROJECT

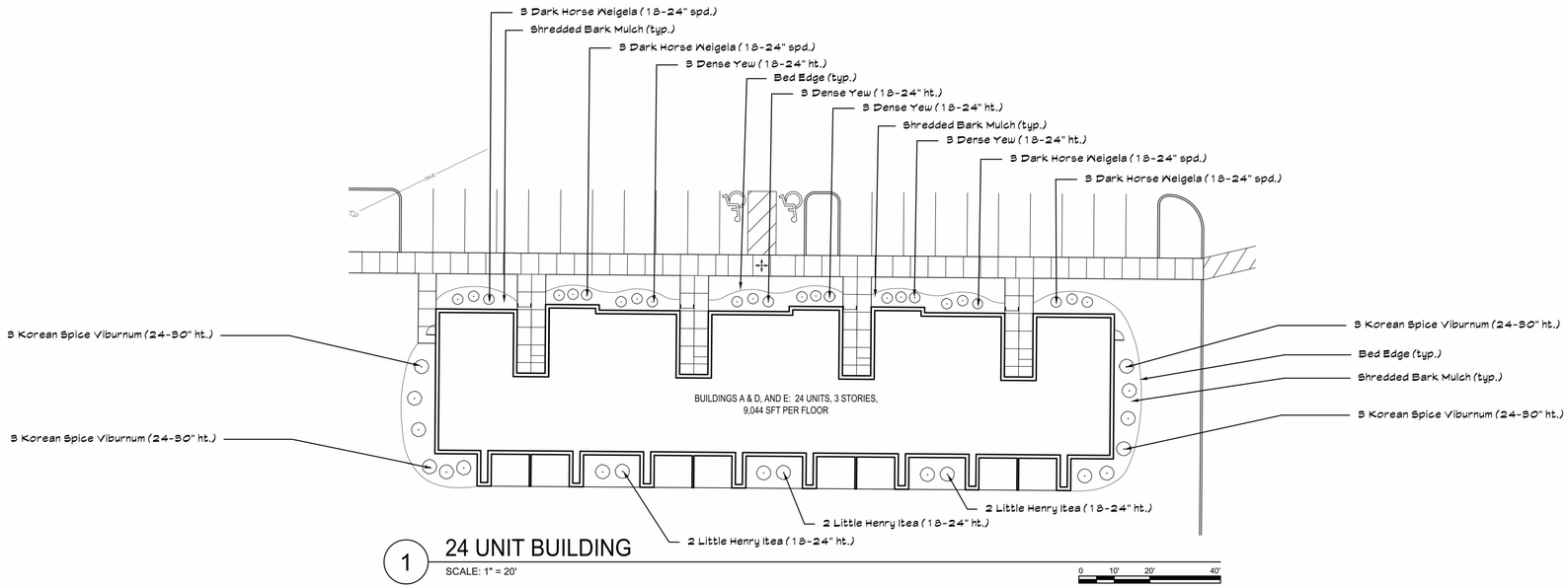
1712151

SHEET

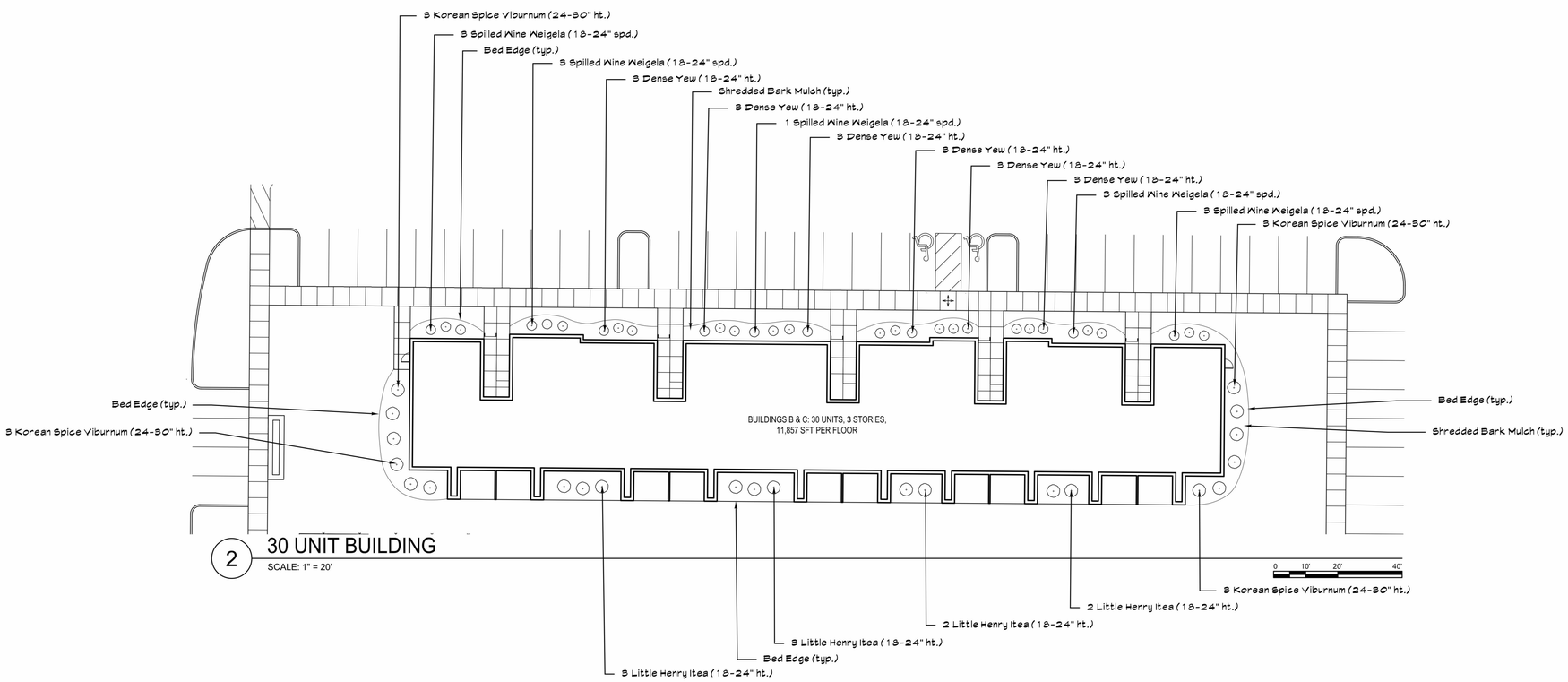
LANDSCAPE PLAN

L-101

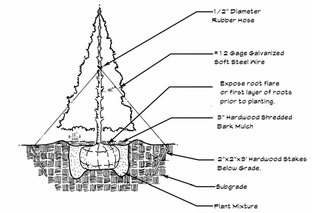
Wednesday, February07-2018 at 2:22pm \\pc-file1\Jobs$\1712151\Cad\151L-101.dwg bkv



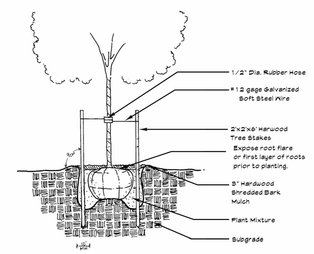
1 24 UNIT BUILDING
SCALE: 1" = 20'



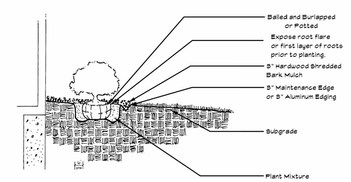
2 30 UNIT BUILDING
SCALE: 1" = 20'



Evergreen Planting Detail-8' and Taller



Deciduous Trees 3" Caliper and Smaller



Shrub Planting Detail

Notes:

1. All landscaping shall be installed by a qualified Landscape Contractor to the size specified on the landscape plan. Smaller sizes will be rejected.
2. All plantings shall be mulched with 3" shredded premium hardwood bark mulch. Trees in lawn areas shall receive a 6' diameter bark ring 3" deep.
3. The landscape contractor shall remove any twine that is wrapped around the trunk of a tree or shrub as well as the top third of any burlap. Remove excess soil on the top of the root ball to expose the root flare or first layer of roots prior to planting. Use a wire cutter to make 3–5 cuts in the wire basket to allow roots to grow through.
4. Planting areas shall be edged with a mechanical bed edger at a depth of 4" to define border for shredded bark mulch.
5. Parking Islands shall be back filled with at least 24" of topsoil. Amend the topsoil with composted manure and mix into the topsoil at a depth of 6–12". Any aggregate or stone from the construction of the parking lot shall be removed prior to backfill.
6. Lawn areas shall recieve at least 4" of topsoil and hydroseeded. Check with specifications for topsoil availability or contact project manager. Topsoil for lawns shall be appropriate for growing and sustaining a healthy lawn. All lawns including the detention ponds shall be hydroseeded with a seed blend consisting of 30% Kentucky Bluegrass, 20% Perennial Ryegrass, 10% Hard Fescue, 20% Creeping Red Fescue and 20% Chewings Fescue.
7. All lawn and shrub bed areas shall be watered by an automatic irrigation system. The irrigation system shall be designed and installed by the Landscape Contractor.
8. Maintenance of the landscape shall be provided for by the owner and include fertilizing of lawn and plant material, yearly pruning, top dressing of mulch areas every other year and provide 1" of water per week during the growing season.
9. Plant materials shall be chosen and installed in accordance with standards recommended by the County Cooperative Extension Service or American Nursery Association.

ARCHITECTS • ENGINEERS
paradigm design
GRAND RAPIDS: 550 3 MILE N.W. SUITE B, GRAND RAPIDS, MI 49544, (616) 785 - 5656
TRAVERSE CITY: 333 E. STATE STREET, TRAVERSE CITY, MI 49684, (231) 346 - 3030
WEB: PARADIGMAE.COM

STATE OF MICHIGAN
JOYCE E. WEISE
LANDSCAPE ARCHITECT
No. 1202
LICENSED LANDSCAPE ARCHITECT

Landscape Plan Drawn By:
Joyce E. Weise PLA, ASLA

PROJECT

17114
ROBBINS
MIXED USE PUD

17114 ROBBINS ROAD
GRAND HAVEN, MI 49417

DEVELOPER

MAIN STREET
CAPITAL GROUP

18000 COVE STREET, STE 201
SPRING LAKE, MI 49456

RELEASE DATE

	DATE	DESCRIPTION
	01-16-18	PUD APPLICATION
	02-07-18	PUD APPLICATION

PROJECT

1712151

SHEET

LANDSCAPE PLAN

L-102

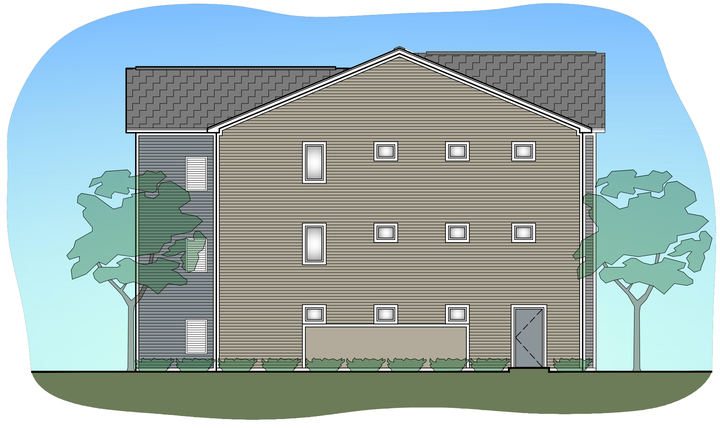
Wednesday, February-07-2018 at 2:22pm IPD-FILE:F:\Jobs$\1712151 Robbins Road Mixed-Use\Drawings - 1711151\Cad\1511L-101.dwg bkv

FRONT ELEVATION – BUILDINGS A, D & E

SCALE: 1/8"=1'-0" 24 UNIT

REAR ELEVATION – BUILDINGS A, D & E

SCALE: 1/8"=1'-0" 24 UNIT



LEFT SIDE ELEVATION – BUILDINGS A, D & E

SCALE: 1/8"=1'-0" 24 UNIT

NOTE: RIGHT SIDE SIMILAR – OPPOSITE HAND

Robbins Road Apartments - 24 Unit (Buildings A, D and E)

17114 Robbins Road
Grand Haven Township, Michigan

2-1-18 . . . . . date

3017 . . . . . commission

A2.0 . . . . sheet

This drawing is the sole property of Oppenhuizen *Architects* and is not to be used or reproduced without their written consent. ©

333 Jackson St.
Grand Haven
Michigan
49417

ph. 616 846 8990
fax 616 846 8898

OppenhuizenArchitects

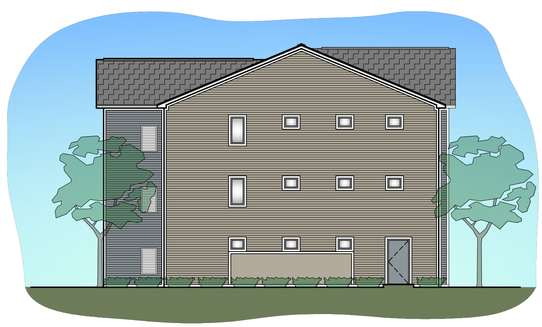
Mark A. Oppenhuizen AIA

FRONT ELEVATION – BUILDINGS B & C

SCALE: 3/32"=1'-0" 30 UNIT

REAR ELEVATION – BUILDINGS B & C

SCALE: 3/32"=1'-0" 30 UNIT



LEFT SIDE ELEVATION – BUILDINGS B & C

SCALE: 3/32"=1'-0" 30 UNIT

NOTE: RIGHT SIDE SIMILAR – OPPOSITE HAND

Robbins Road Apartments - 30 Unit (Buildings B and C)

17114 Robbins Road
Grand Haven Township, Michigan

2-1-18 . . . . . date

3017 . . . . . commission

A2.0 . . . . sheet

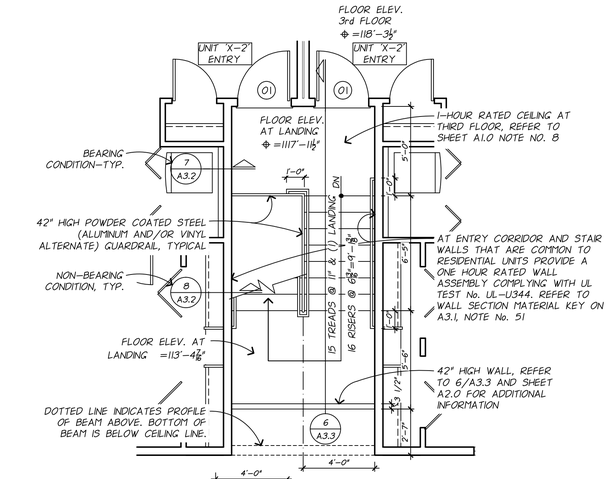
This drawing is the sole property of Oppenhuizen *Architects* and is not to be used or reproduced without their written consent. ©

333 Jackson St.
Grand Haven
Michigan
49417

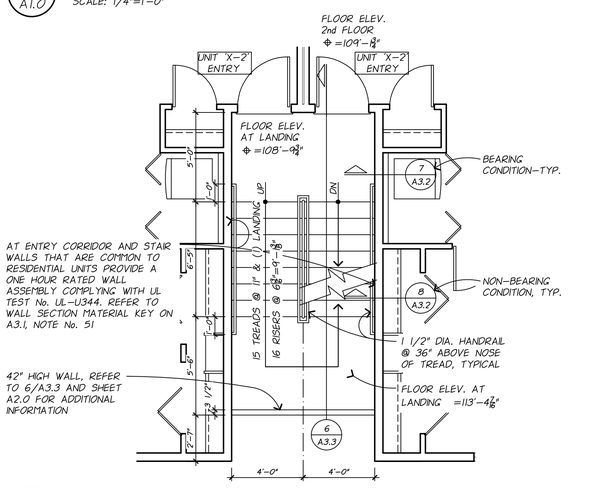
ph. 616 846 8990
fax 616 846 8898

OppenhuizenArchitects

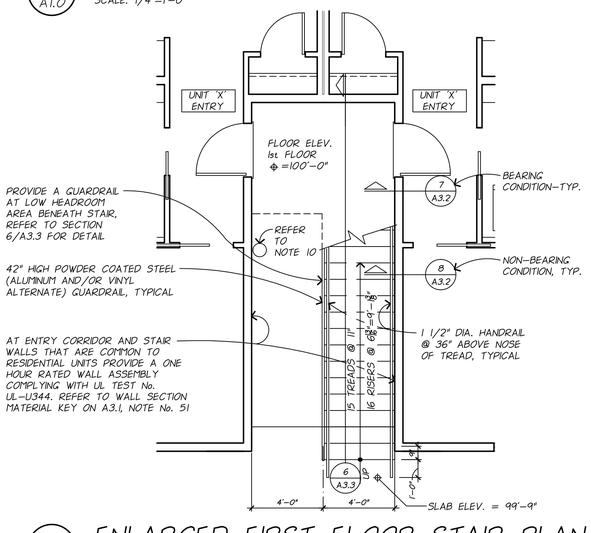
Mark A. Oppenhuizen AIA



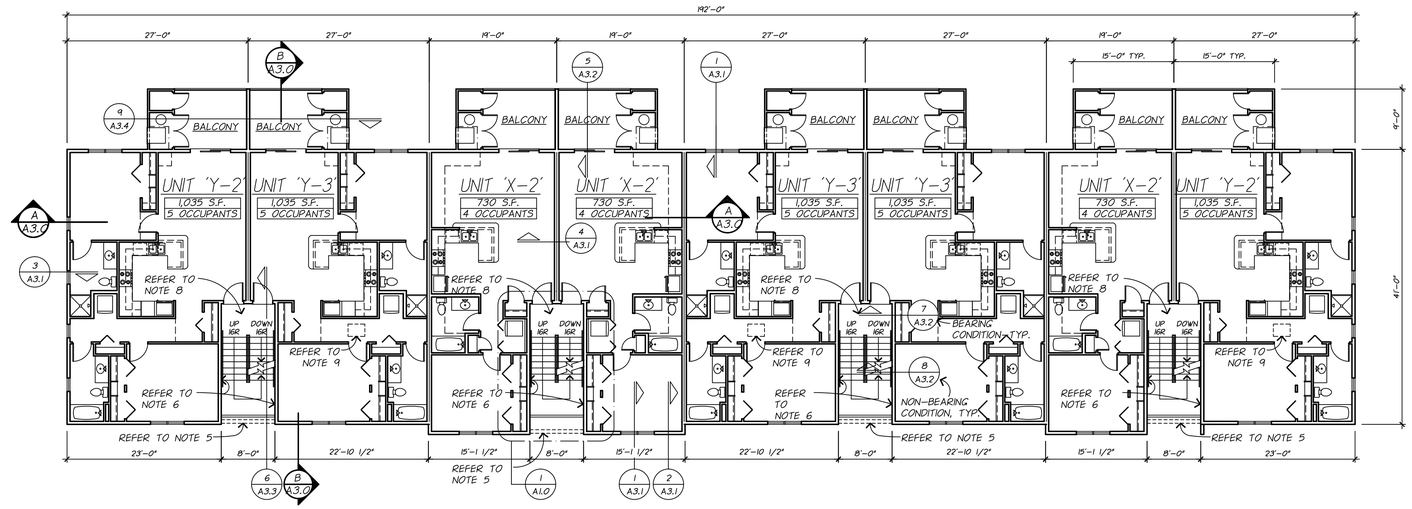
1 / A1.0 ENLARGED THIRD FLOOR STAIR PLAN
SCALE: 1/4"=1'-0"



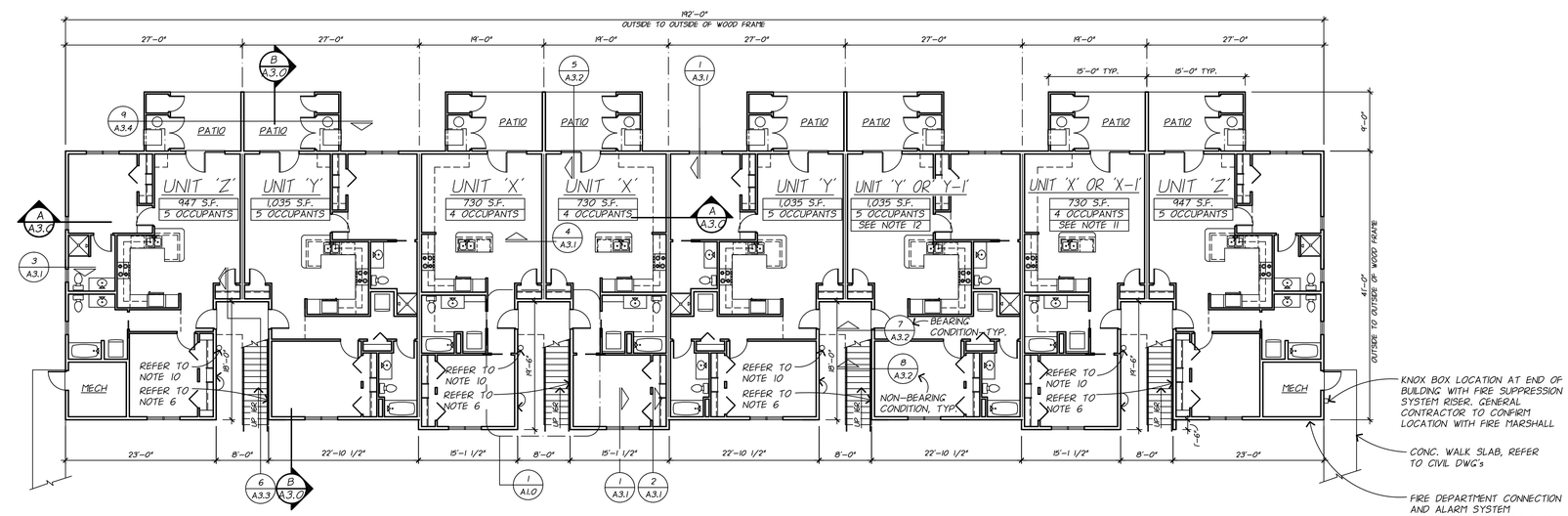
1 / A1.0 ENLARGED SECOND FLOOR STAIR PLAN
SCALE: 1/4"=1'-0"



1 / A1.0 ENLARGED FIRST FLOOR STAIR PLAN
SCALE: 1/4"=1'-0"



SECOND AND THIRD FLOOR OVERALL PLAN – BUILDINGS A, D & E
SCALE: 3/32"=1'-0"
24 UNIT



FIRST FLOOR OVERALL PLAN – BUILDINGS A, D & E
SCALE: 3/32"=1'-0"
24 UNIT

OVERALL FLOOR PLAN GENERAL NOTES:

1.) REFER TO ENLARGED UNIT PLANS ON DRAWINGS A1.1 – A1.4 FOR UNIT DETAIL.

2.) BUILDING AREA PER FLOOR:
- TOTAL DWELLING UNIT AREA = 7,189 S.F.
- TOTAL PATIO/BALCONY AREA = 1,080 S.F.
- TOTAL STAIRWELL AREA = 588 S.F.

TOTAL BUILDING AREA 8,857 S.F.

3.) THE PERIMETER WOOD FRAME STUD WALLS AT ALL FLOORS ARE 2x6's AT 16"O.C. WITH A DOUBLE TOP PLATE.

4.) REFER TO INDIVIDUAL UNIT PLANS ON DRAWINGS A1.1 THRU A1.4 FOR WINDOW TYPE AND LOCATIONS.

5.) DOTTED LINE INDICATES PROFILE OF BEAM ABOVE. BOTTOM OF BEAM IS BELOW CEILING LINE.

6.) AT ENTRY CORRIDOR AND STAIR WALLS THAT ARE COMMON TO RESIDENTIAL UNITS PROVIDE A ONE HOUR RATED WALL ASSEMBLY COMPLYING WITH UL TEST No. UL-U344. REFER TO WALL SECTION MATERIAL KEY ON A3.1, NOTE No. 51

7.) WALLS THAT ARE CONTIGUOUS TO STAIRS SHALL BE CONSTRUCTED AS FIRE BARRIERS AS DEPICTED ON WALL SECTIONS: 7/A3.2 AND 8/A3.2.

8.) PROVIDE 1 HR. RATED CEILING PER DETAIL 1/A3.0 AT STAIR AND PORCH CEILINGS AT THIRD FLOOR.

9.) AT THIRD FLOOR UNIT PROVIDE A 22"x30" MILCOR-UFR, 1 HR. RATED STEEL ACCESS PANEL IN CEILING. UNIT TO HAVE INTEGRAL FRAME AND POSITIVE LATCHING SECURING MECHANISM.

10.) PROVIDE A 10# ABC FIRE EXTINGUISHER IN A SURFACE MOUNTED METAL BOX WITH A CLEAR VISION WINDOW.

11.) UNIT X-1 OCCURS AT THIS LOCATION IN BUILDINGS A AND D.

12.) UNIT Y-2 OCCURS AT THIS LOCATION IN BUILDING A.

PROJECT UNIT MIX			
BLDG.	2BR/2BA	1BR/1BA	TOTAL
A	15	9	24
B	24	6	30
C	24	6	30
D	15	9	24
E	15	9	24
TOTAL	93	39	132
%	70	30	100

Robbins Road Apartments - 24 Unit (Buildings A, D and E)

17114 Robbins Road
Grand Haven Township, Michigan

Bd + Permit
1-22-18 . . . . . date

3017 . . . . . commission

A1.0 . . . . . sheet

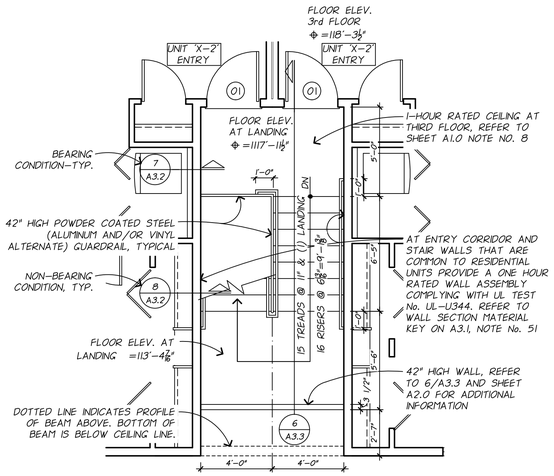
This drawing is the sole property of Oppenhuizen Architects and is not to be used or reproduced without their written consent. ©

333 Jackson St.
Grand Haven
Michigan
49417

ph. 616 846 8990
fax 616 846 8898

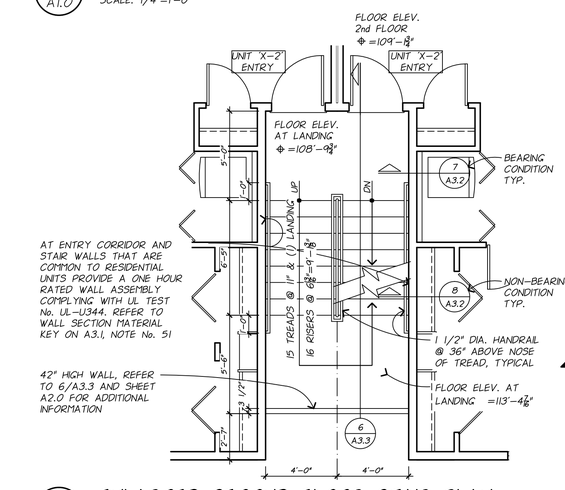
OppenhuizenArchitects

Mark A. Oppenhuizen AIA



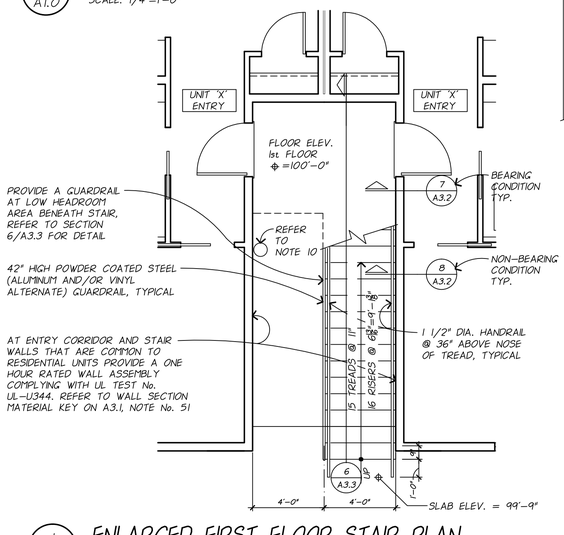
1 / A1.0 ENLARGED THIRD FLOOR STAIR PLAN

SCALE: 1/4"=1'-0"



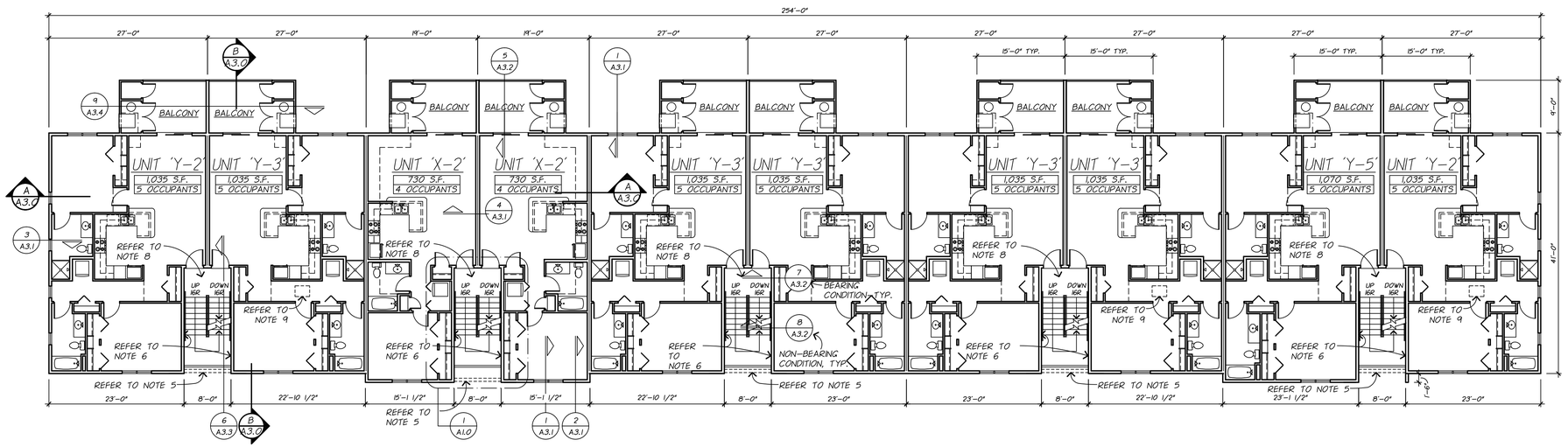
1 / A1.0 ENLARGED SECOND FLOOR STAIR PLAN

SCALE: 1/4"=1'-0"



1 / A1.0 ENLARGED FIRST FLOOR STAIR PLAN

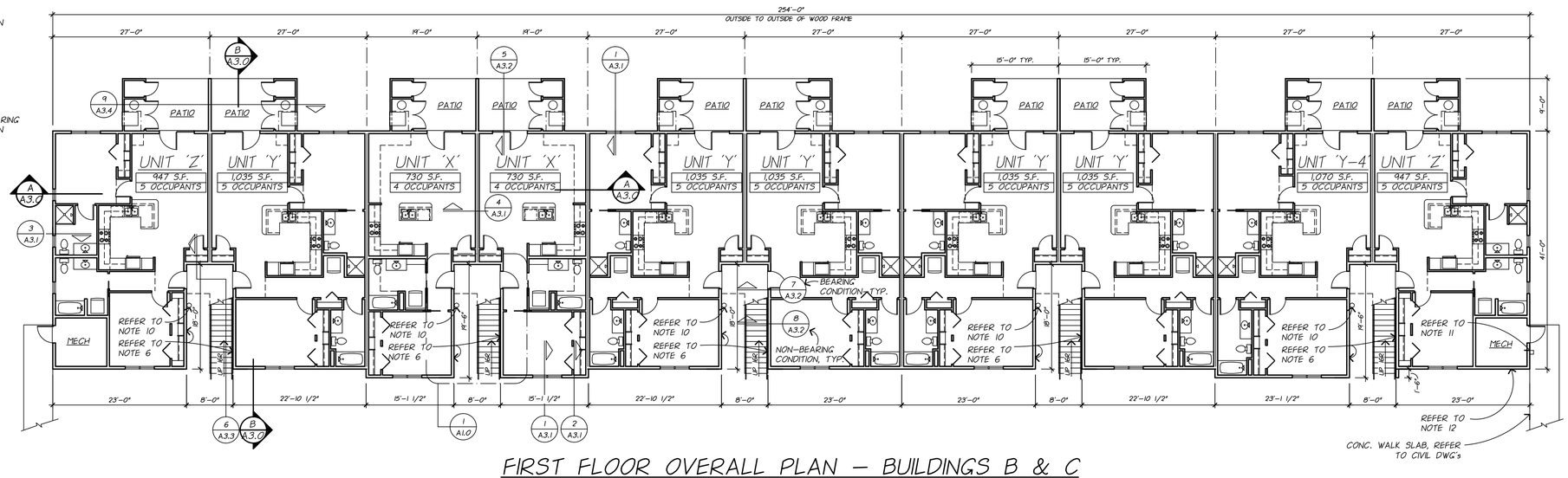
SCALE: 1/4"=1'-0"



SECOND AND THIRD FLOOR OVERALL PLAN – BUILDINGS B & C

SCALE: 3/32"=1'-0"

30 UNIT



FIRST FLOOR OVERALL PLAN – BUILDINGS B & C

SCALE: 3/32"=1'-0"

30 UNIT

OVERALL FLOOR PLAN GENERAL NOTES:

1.) REFER TO ENLARGED UNIT PLANS ON DRAWINGS A1.1 – A1.4 FOR UNIT DETAIL.

2.) BUILDING AREA PER FLOOR:
- TOTAL DWELLING UNIT AREA = 9,599 S.F.
- TOTAL PATIO/BALCONY AREA = 1,350 S.F.
- TOTAL STAIRWELL AREA = 732 S.F.

TOTAL BUILDING AREA 11,681 S.F.

3.) THE PERIMETER WOOD FRAME STUD WALLS AT ALL FLOORS ARE 2x6's AT 16"O.C. WITH A DOUBLE TOP PLATE.

4.) REFER TO INDIVIDUAL UNIT PLANS ON DRAWINGS A1.1 THRU A1.4 FOR WINDOW TYPE AND LOCATIONS.

5.) DOTTED LINE INDICATES PROFILE OF BEAM ABOVE. BOTTOM OF BEAM IS BELOW CEILING LINE.

6.) AT ENTRY CORRIDOR AND STAIR WALLS THAT ARE COMMON TO RESIDENTIAL UNITS PROVIDE A ONE HOUR RATED WALL ASSEMBLY COMPLYING WITH UL TEST No. UL-U344. REFER TO WALL SECTION MATERIAL KEY ON A3.1, NOTE No. 51

7.) WALLS THAT ARE CONTIGUOUS TO STAIRS SHALL BE CONSTRUCTED AS FIRE BARRIERS AS DEPICTED ON WALL SECTIONS: 7/A3.2 AND 8/A3.2.

8.) PROVIDE 1 HR. RATED CEILING PER DETAIL 1/A3.0 AT STAIR AND PORCH CEILINGS AT THIRD FLOOR.

9.) AT THIRD FLOOR UNIT PROVIDE A 22"x30" MILCOR-UFR, 1 HR. RATED STEEL ACCESS PANEL IN CEILING. UNIT TO HAVE INTEGRAL FRAME AND POSITIVE LATCHING SECURING MECHANISM.

10.) PROVIDE A 10# ABC FIRE EXTINGUISHER IN A SURFACE MOUNTED METAL BOX WITH A CLEAR VISION WINDOW.

11.) KNOX BOX LOCATION AT END OF BUILDING WITH FIRE SUPPRESSION SYSTEM RISER. GENERAL CONTRACTOR TO CONFIRM LOCATION WITH FIRE MARSHALL

12.) FIRE DEPARTMENT CONNECTION AND ALARM SYSTEM HORN/STROBE ON FRONT OF BUILDING, FACING THE PARKING AREA. LOCATE AT END OF BUILDING WITH FIRE SUPPRESSION SYSTEM.

PROJECT UNIT MIX			
BLDG.	2BR/2BA	1BR/1BA	TOTAL
A	15	9	24
B	24	6	30
C	24	6	30
D	15	9	24
E	15	9	24
TOTAL	93	39	132
%	70	30	100

Robbins Road Apartments - 30 Unit (Buildings B and C)

17114 Robbins Road
Grand Haven Township, Michigan

Bd + Permit
1-22-18 . . . . . date

3017 . . . . . commission

A1.0 . . . . . sheet

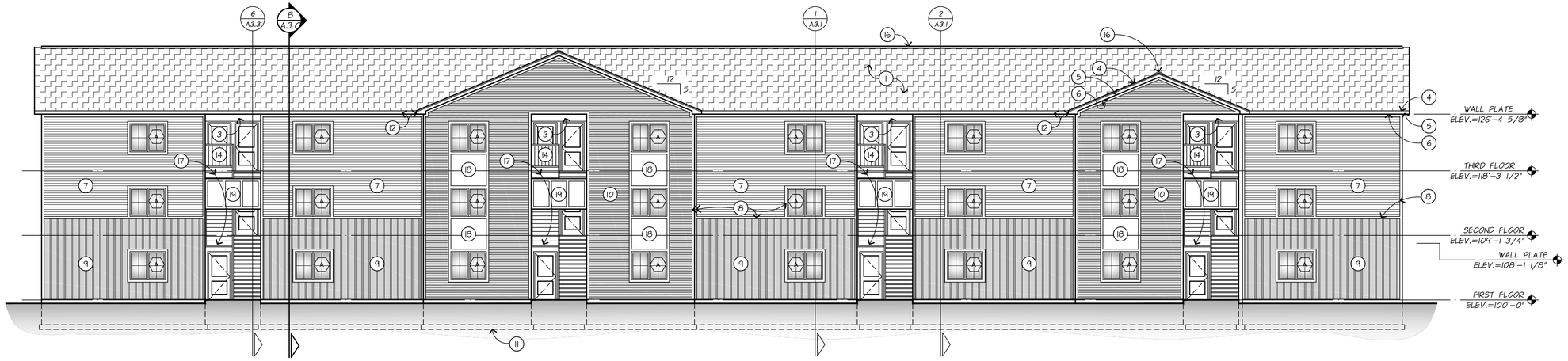
This drawing is the sole property of Oppenhuizen Architects and is not to be used or reproduced without their written consent. ©

333 Jackson St.
Grand Haven
Michigan
49417

ph. 616 846 8990
fax 616 846 8898

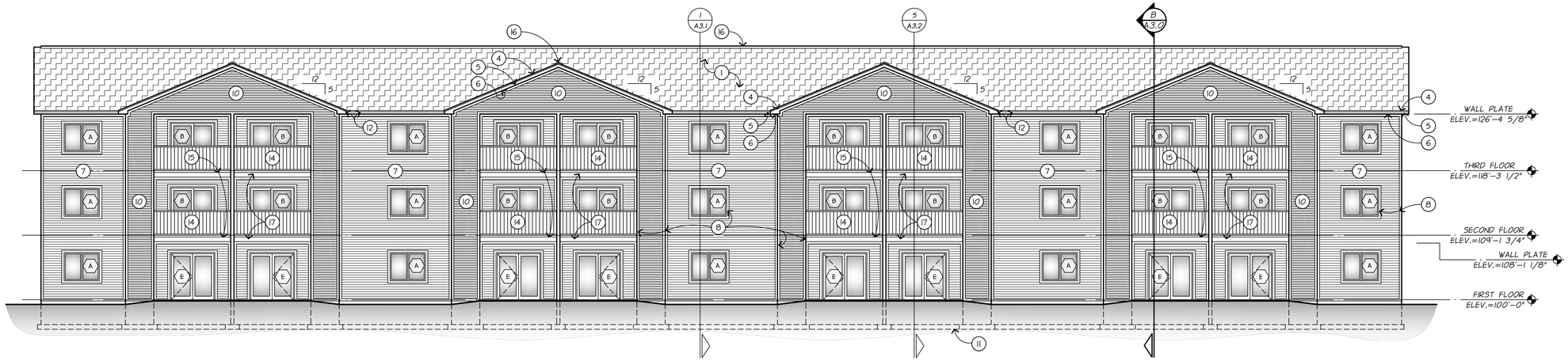
OppenhuizenArchitects

Mark A. Oppenhuizen AIA



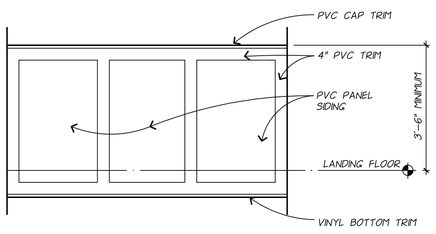
FRONT ELEVATION – BUILDINGS A, D & E

SCALE: 1/8"=1'-0" 24 UNIT



REAR ELEVATION – BUILDINGS A, D & E

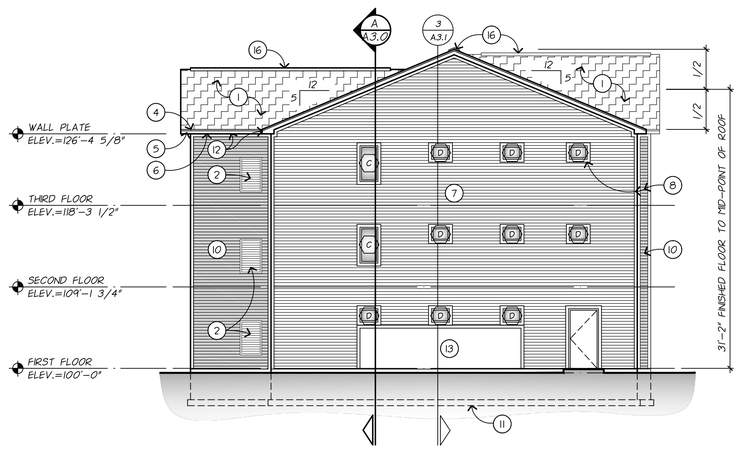
SCALE: 1/8"=1'-0" 24 UNIT



LANDING WALL DETAIL

SCALE: 1/2"=1'-0"

NOTE:
ALL VINYL MATERIAL SELECTIONS BY ARCHITECT



LEFT SIDE ELEVATION – BUILDINGS A, D & E

SCALE: 1/8"=1'-0" 24 UNIT

NOTE: RIGHT SIDE SIMILAR – OPPOSITE HAND

ELEVATION MATERIAL KEY

1. ASPHALT SHINGLES, CERTAINTEED LANDMARK OR EQUAL, COLOR SELECTION BY ARCHITECT.
2. HVAC UNIT GRILLE.
3. PVC TRIM ON GLU-LAM BEAM.
4. PRE-FINISHED METAL DRIP EDGE.
5. ALUMINUM FASCIA, COLOR SELECTION BY ARCHITECT.
6. RIBBED, PERFORATED (FOR VENTING) ALUMINUM SOFFIT.
7. 4" EXPOSURE, BEVELED VINYL SIDING, COLOR #1, SELECTION BY ARCHITECT.
8. 4" VINYL TRIM, COLOR SELECTION BY ARCHITECT.
9. VINYL BOARD + BATTEN SIDING. COLOR #2, SELECTION BY ARCHITECT. FULL HEIGHT MATERIAL W/OUT A HORIZONTAL SEAM.
10. 4" EXPOSURE, BEVELED VINYL SIDING, COLOR #2, SELECTION BY ARCHITECT.
11. FOUNDATION, SEE FOUNDATION PLAN.
12. SEAMLESS VINYL GUTTER AND DOWNSPOUT WITH SPLASH BLOCK AT OUTLET. CONTRACTOR TO CALCULATE AND PROVIDE THE CORRECT # OF DOWNSPOUTS.
13. PVC PANEL W/ 4" PVC TRIM OVERALL SURROUND AS FLAT SURFACE AT METER LOCATIONS
14. POWDER COAT STEEL RAILING SYSTEM, PRICE ALUMINUM AND VINYL RAILING SYSTEM AS ALTERNATE.
15. 5/4"x6" PRESSURE TREATED WOOD DECKING.
16. "SHINGLE OVER" RIDGE VENT.
17. PVC TRIM OVER DECK JOIST FRAMING.
18. PVC PANEL + 4" PVC TRIM SIDING
19. LANDING WALL DETAIL, SEE DETAIL NO. 1/A2.0.

WINDOW KEY:

- (A) 5'-0"x4'-0" SLIDING WINDOW UNIT
- (B) 6'-0"x6'-8" SLIDING GLASS DOOR
- (C) 2'-0"x4'-0" CASEMENT WINDOW UNIT
- (D) 2'-0"x1'-6" FIXED WINDOW UNIT
- (E) 3'-0"x6'-8" FRENCH DOOR W/ TEMPERED GLASS AND 'ADA' LOW-PROFILE SILL w/ 3'-0"x6'-8" TEMPERED GLASS SIDELITE.

NOTES:

1. ALL ROOF OVERHANGS ARE 1'-0" UNLESS NOTED OTHERWISE.
2. GUARD RAIL HEIGHTS AT BALCONIES AND ENTRY BALCONIES ARE 3'-6" OFF FINISHED DECK. GUARDRAIL TO RESIST LOADS IDENTIFIED IN 2015 M.B.C., SECTION 1607.8
3. WINDOWS ON THE FRONT ELEVATION TO HAVE GRILLES BETWEEN THE GLASS.
4. WINDOW AND DOOR HEIGHT IS 6'-8" A.F.F., UNLESS NOTED OTHERWISE.
5. PROVIDE A $1,000.00 ALLOWANCE FOR IDENTIFICATION SIGNAGE ON EACH BUILDING.
6. WINDOW TYPES (A) AND (C) ON THE SECOND AND THIRD FLOORS TO HAVE GUARDS COMPLYING WITH 2015 MBC, SECTION 1015.8.

Robbins Road Apartments - 24 Unit (Buildings A, D and E)

17714 Robbins Road
Grand Haven Township, Michigan

Bd + Permit
1-22-18 . . . . . date

3017 . . . . . commission

A2.0 . . . . sheet

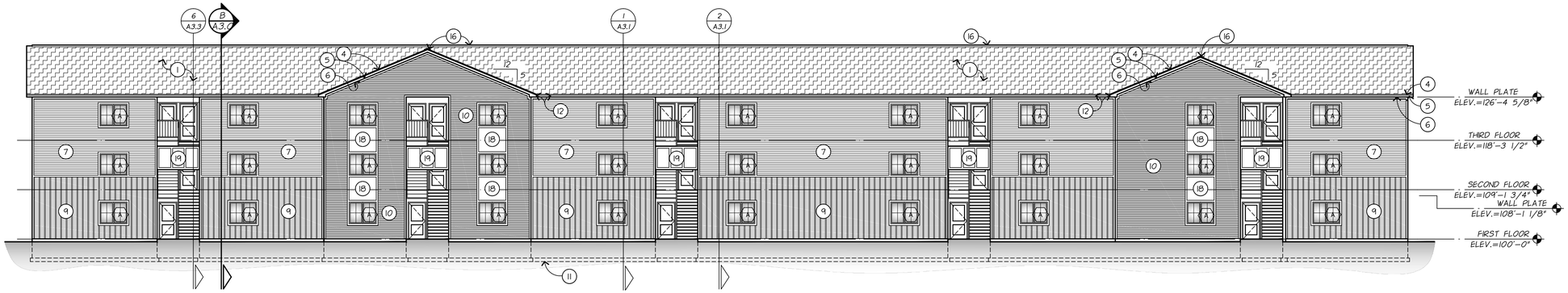
This drawing is the sole property of Oppenhuizen Architects and is not to be used or reproduced without their written consent. ©

333 Jackson St.
Grand Haven
Michigan
49417

ph. 616 846 8990
fax 616 846 8898

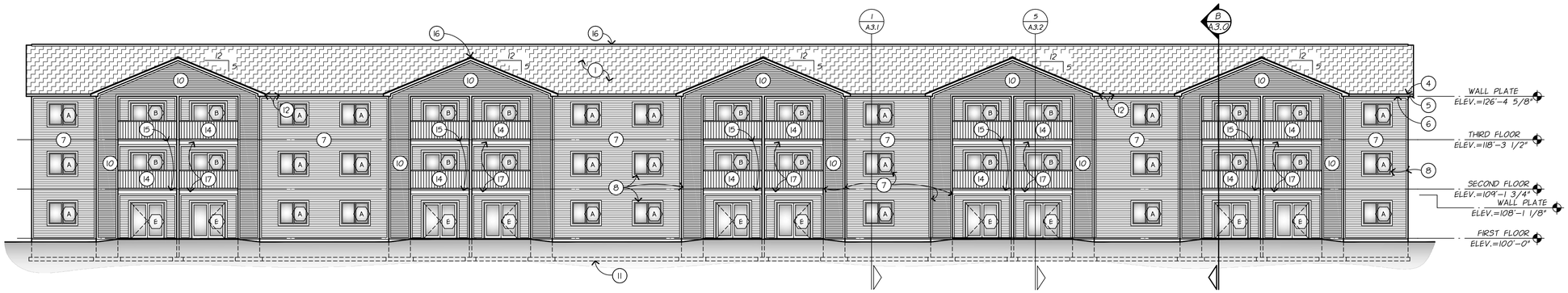
OppenhuizenArchitects

Mark A. Oppenhuizen AIA



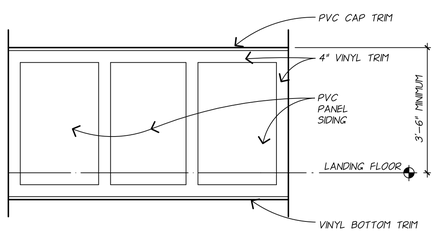
FRONT ELEVATION – BUILDINGS B & C

SCALE: 3/32"=1'-0" 30 UNIT



REAR ELEVATION – BUILDINGS B & C

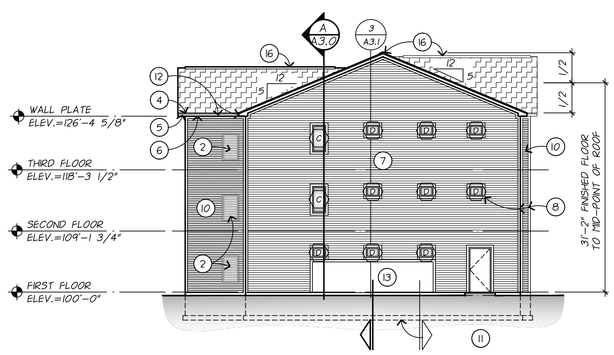
SCALE: 3/32"=1'-0" 30 UNIT



LANDING WALL DETAIL

SCALE: 1/2"=1'-0"

NOTE:
ALL VINYL MATERIAL SELECTIONS BY ARCHITECT



LEFT SIDE ELEVATION – BUILDINGS B & C

SCALE: 3/32"=1'-0" 30 UNIT

NOTE: RIGHT SIDE SIMILAR – OPPOSITE HAND

ELEVATION MATERIAL KEY

1. ASPHALT SHINGLES, CERTAINTEED LANDMARK OR EQUAL, COLOR SELECTION BY ARCHITECT.
2. HVAC UNIT GRILLE.
3. PVC TRIM ON GLU-LAM BEAM.
4. PRE-FINISHED METAL DRIP EDGE.
5. ALUMINUM FASCIA, COLOR SELECTION BY ARCHITECT.
6. RIBBED, PERFORATED (FOR VENTING) ALUMINUM SOFFIT.
7. 4" EXPOSURE, BEVELED VINYL SIDING, COLOR #1, SELECTION BY ARCHITECT.
8. 4" VINYL TRIM, COLOR SELECTION BY ARCHITECT.
9. VINYL BOARD + BATTEN SIDING. COLOR #2, SELECTION BY ARCHITECT. FULL HEIGHT MATERIAL W/OUT A HORIZONTAL SEAM.
10. 4" EXPOSURE, BEVELED VINYL SIDING, COLOR #2, SELECTION BY ARCHITECT.
11. FOUNDATION, SEE FOUNDATION PLAN.
12. SEAMLESS VINYL GUTTER AND DOWNSPOUT WITH SPLASH BLOCK AT OUTLET. CONTRACTOR TO CALCULATE AND PROVIDE THE CORRECT # OF DOWNSPOUTS.
13. PVC PANEL W/ 4" PVC TRIM OVERALL SURROUND AS FLAT SURFACE AT METER LOCATIONS
14. POWDER COAT STEEL RAILING SYSTEM, PRICE ALUMINUM AND VINYL RAILING SYSTEM AS ALTERNATE.
15. 5/4"x6" PRESSURE TREATED WOOD DECKING.
16. "SHINGLE OVER" RIDGE VENT.
17. PVC TRIM OVER DECK JOIST FRAMING.
18. PVC PANEL + 4" PVC TRIM SIDING
19. LANDING WALL DETAIL, SEE DETAIL NO. 1/A2.0.

WINDOW KEY:

- (A) 5'-0"x4'-0" SLIDING WINDOW UNIT
- (B) 6'-0"x6'-8" SLIDING GLASS DOOR
- (C) 2'-0"x4'-0" CASEMENT WINDOW UNIT
- (D) 2'-0"x1'-6" FIXED WINDOW UNIT
- (E) 3'-0"x6'-8" FRENCH DOOR W/ TEMPERED GLASS AND 'ADA' LOW-PROFILE SILL w/ 3'-0"x6'-8" TEMPERED GLASS SIDELITE.

NOTES:

1. ALL ROOF OVERHANGS ARE 1'-0" UNLESS NOTED OTHERWISE.
2. GUARD RAIL HEIGHTS AT BALCONIES AND ENTRY BALCONIES ARE 3'-6" OFF FINISHED DECK. GUARDRAIL TO RESIST LOADS IDENTIFIED IN 2015 M.B.C., SECTION 1607.8
3. WINDOWS ON THE FRONT ELEVATION TO HAVE GRILLES BETWEEN THE GLASS.
4. WINDOW AND DOOR HEIGHT IS 6'-8" A.F.F., UNLESS NOTED OTHERWISE.
5. PROVIDE A $1,000.00 ALLOWANCE FOR IDENTIFICATION SIGNAGE ON EACH BUILDING.
6. WINDOW TYPES (A) AND (C) ON THE SECOND AND THIRD FLOORS TO HAVE GUARDS COMPLYING WITH 2015 MBC, SECTION 1015.8.

Robbins Road Apartments - 30 Unit (Buildings B and C)

17114 Robbins Road
Grand Haven Township, Michigan

Bd + Permit
1-22-18 . . . . . date

3017 . . . . . commission

A2.0 . . . . . sheet

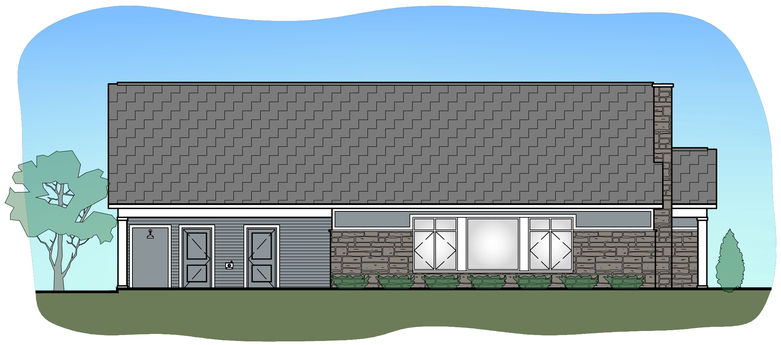
This drawing is the sole property of Oppenhuizen **Architects** and is not to be used or reproduced without their written consent. ©

333 Jackson St.
Grand Haven
Michigan
49417

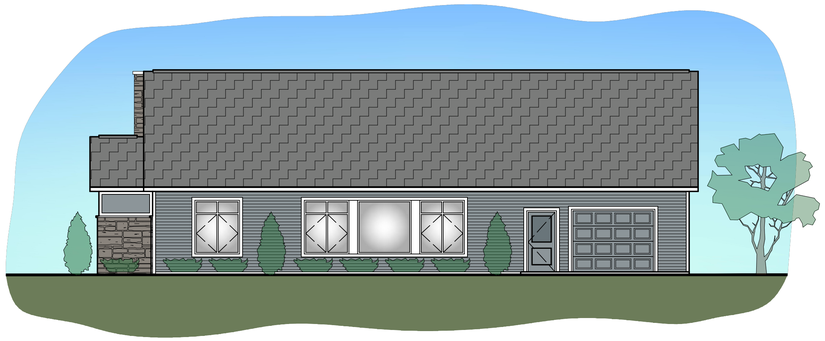
ph. 616 846 8990
fax 616 846 8898

OppenhuizenArchitects

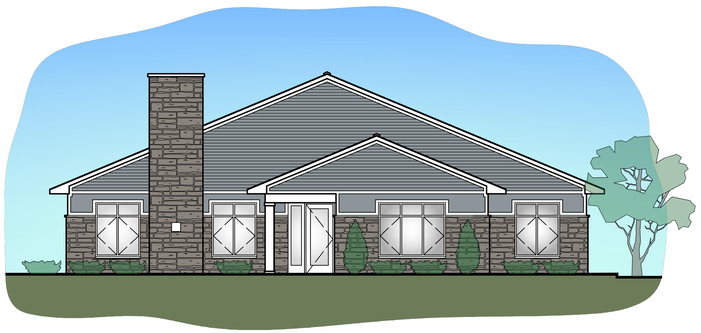
Mark A. Oppenhuizen AIA



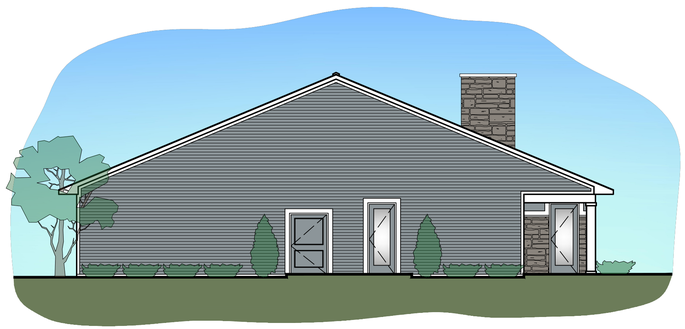
NORTH ELEVATION – COMMUNITY CENTER
SCALE: 1/8"=1'-0"



SOUTH ELEVATION – COMMUNITY CENTER
SCALE: 1/8"=1'-0"



WEST ELEVATION – COMMUNITY CENTER
SCALE: 1/8"=1'-0"



EAST ELEVATION – COMMUNITY CENTER
SCALE: 1/8"=1'-0"

Community Center for:
Robbins Road Apartments
17114 Robbins Road
Grand Haven Township, Michigan

2-1-18 . . . . . date

3017 . . . . . commission

A2,0 . . . . . sheet

This drawing is the sole property of Oppenhuizen *Architects* and is not to be used or reproduced without their written consent. ©

333 Jackson St.
Grand Haven
Michigan
49417

ph. 616 846 8990
fax 616 846 8898

OppenhuizenArchitects

Mark A. Oppenhuizen AIA

GENERAL NOTES:

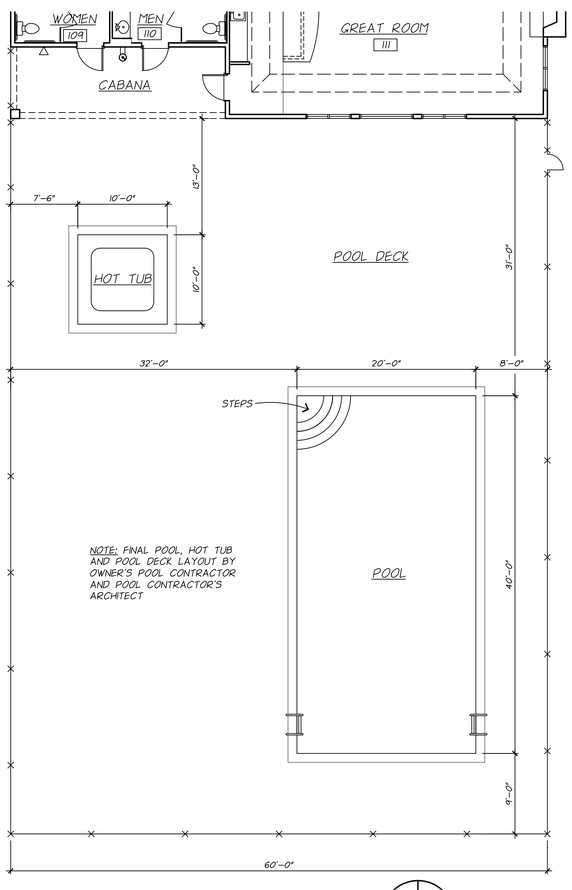
1. EXTERIOR WALL THICKNESS IS 5 1/2" AND INTERIOR WALL THICKNESS IS 3 1/2" UNLESS NOTED OTHERWISE.
2. ALL DIMENSIONS ARE ROUGH FRAMING DIMENSION. FACE TO FACE OF WOOD STUDS, UNLESS NOTED OTHERWISE.
3. PROVIDE A #10 ABC FIRE EXTINGUISHER IN A SEMI-RECESSED CABINET WITH A CLEAR GLASS, BUBBLE STYLE DOOR AT THE LOCATION INDICATED ON THE PLAN.
4. PROVIDE SOLID 2x WOOD BLOCKING AT ALL GRAB BAR AND BATHROOM ACCESSORY LOCATIONS AND AT DOOR KNOB INTERSECTION WITH WALL LOCATIONS.
5. PROVIDE A WATER TYPE FIRE EXTINGUISHER AT THIS LOCATION
6. (A) INDICATES WINDOW TYPE, REFER TO DRAWING A2.0 FOR EXTERIOR WINDOW AND A6.0 FOR INTERIOR WINDOW INFORMATION.
7. FREEZELESS WALL HYDRANT LOCATION, REFER TO DRAWING P1.1 FOR ADDITIONAL INFORMATION.
8. * INDICATES LOCATION OF 22"x30" MILCOR-UFR, 1 HOUR RATED PLYWOOD ACCESS PANEL IN CEILING. UNIT TO HAVE AN INTEGRAL FRAME AND POSITIVE LATCHING/SECURING MECHANISM.
10. REFER TO SHEET A6.0 FOR DOOR LOCATIONS WITH PANIC HARDWARE AND CLOSERS.
11. REFER TO SHEET E1.1 LIGHTING PLAN FOR EXIT LIGHT LOCATIONS.
12. REFER TO POOL AND POOL DECK PLAN BY OTHERS FOR POOL, SPA AND POOL DECK DETAILS.
13. OCCUPANT LOAD DETERMINATION PER TABLE 1004.1.2

GREAT ROOM	818 SF / 15 SF	=	55 OCCUPANTS
CABANA	192 SF / 15 SF	=	13 OCCUPANTS
OFFICES	460 SF / 100 SF	=	5 OCCUPANTS
FITNESS CENTER	630 SF / 50 SF	=	13 OCCUPANTS
MAINTENANCE	423 SF / 300 SF	=	2 OCCUPANTS
MECHANICAL	93 SF / 300 SF	=	1 OCCUPANT
POOL EQUIPMENT	125 SF / 300 SF	=	1 OCCUPANT
TOTAL BUILDING OCCUPANCY		=	90 OCCUPANTS
POOL DECK	3900 SF / 30 SF	=	130 OCCUPANTS
TOTAL OCCUPANCY		=	220 OCCUPANTS

NOTE: TWO EXITS ARE REQUIRED AND PROVIDED FROM THE GREAT ROOM

14. PLUMBING FIXTURE DETERMINATION PER TABLE 403.1 OF THE 2015 MPC
    - TOTAL OCCUPANT LOAD IS (220) OCCUPANTS.
    - TOTAL MALE OCCUPANTS IS (110).
    - TOTAL FEMALE OCCUPANTS IS (110).

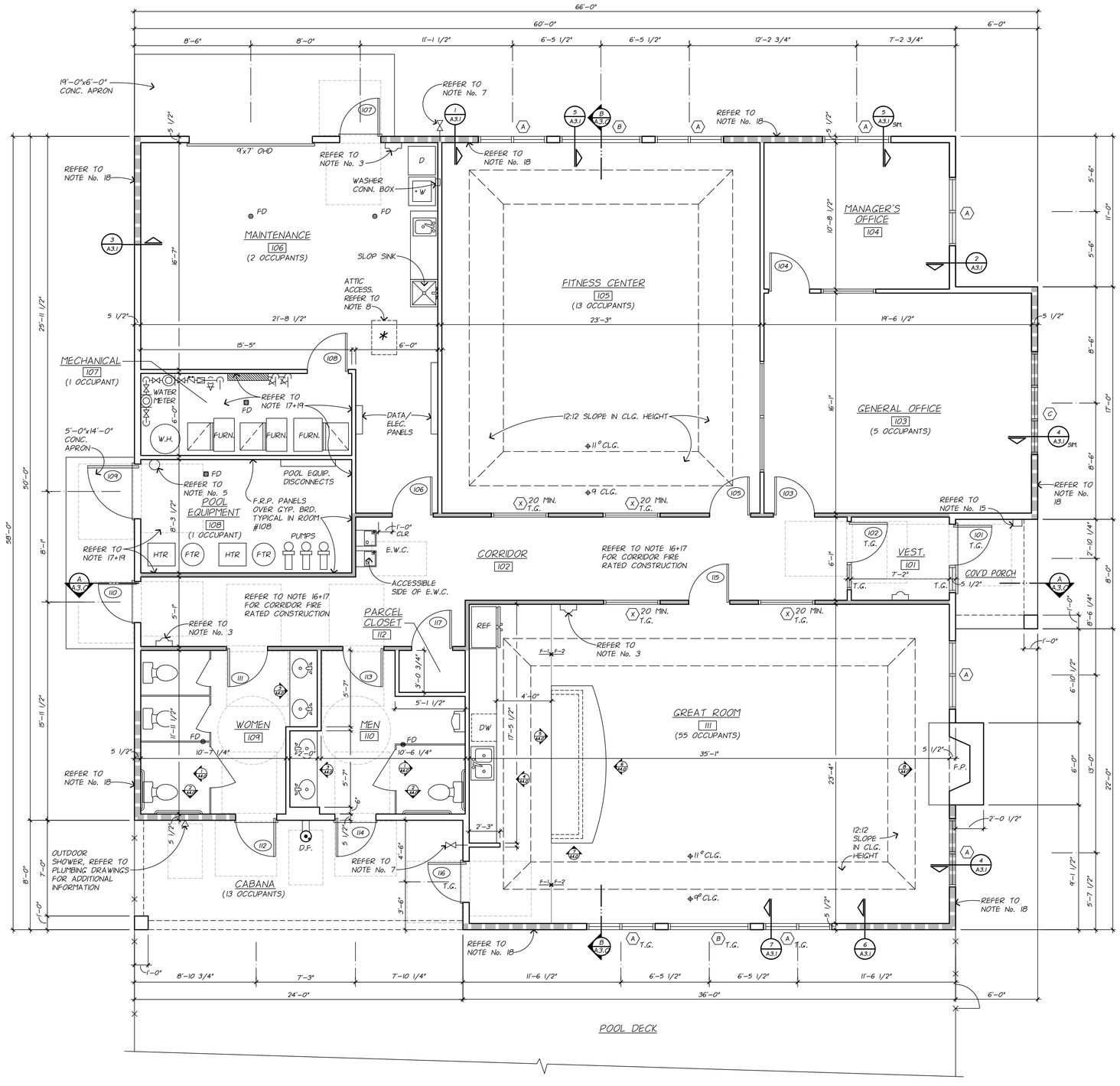
    BASED UPON MOST RESTRICTIVE A-3 OCCUPANCY REQUIREMENTS.
    - MALE, WATER CLOSETS: 1/125 OCCUPANTS. (1) REQUIRED, (3) PROVIDED.
    - FEMALE, WATER CLOSETS: 1/65 OCCUPANTS. (2) REQUIRED, (3) PROVIDED.
    - MALE, LAVATORIES: 1/200 OCCUPANTS, (1) REQUIRED, (2) PROVIDED.
    - FEMALE, LAVATORIES: 1/200 OCCUPANTS, (1) REQUIRED, (2) PROVIDED.
    - DRINKING FOUNTAINS: 1/500 OCCUPANTS. (1) REQUIRED, (1) PROVIDED.
    - SERVICE SINK: (1) REQUIRED, (1) PROVIDED.
15. KNOX BOX, COORDINATE REQUIREMENTS WITH GRAND HAVEN TOWNSHIP, MI FIRE MARSHALL.
16. INDICATES LOCATION OF 3 1/2" 18 GA. STEEL STUD AT CORRIDOR RATED WALL. CONSTRUCT PER UL TEST No. U531.
17. CONSTRUCT THE CEILING AS A ONE HOUR WOOD TRUSS CEILING PER GA. FILE No. 2602.
18. INDICATES SHEAR WALL LOCATION – REFER TO DETAIL #1/ST1.1, FOR INFORMATION.
19. ONE HOUR WALL CONSTRUCTED PER UL TEST No. U305.



POOL DECK PLAN

SCALE: 1/8"=1'-0"

N



FLOOR PLAN – COMMUNITY & FITNESS CENTER

SCALE: 1/4"=1'-0"

BUILDING AREA 3,390 SQ. FT.
POOL DECK AREA 4,992 SQ. FT.
(INCL. POOL AND CABANA AREA)

N

Community Center for:
Robbins Road Apartments
17714 Robbins Road
Grand Haven Township, Michigan

Bid + Permit
1-22-18 . . . . . date

3017 . . . . . commission

A1.0 . . . . . sheet

This drawing is the sole property of Oppenhuizen *Architects* and is not to be used or reproduced without their written consent. ©

333 Jackson St.
Grand Haven
Michigan
49417

ph. 616 846 8990
fax 616 846 8898

OppenhuizenArchitects

Mark A. Oppenhuizen AIA

ELEVATION MATERIAL KEY:

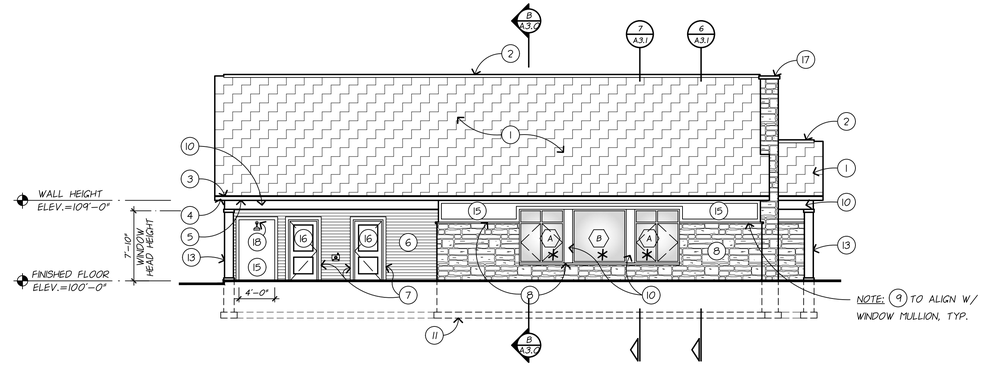
1. ASPHALT SHINGLES
2. SHINGLE OVER RIDGE VENT
3. PRE-FINISHED METAL DRIP EDGE
4. ALUMINUM FASCIA, COLOR SELECTION BY ARCHITECT
5. RIBBED, PERFORATED (FOR VENTING) ALUMINUM SOFFIT
6. 4" EXPOSURE MASTIC CARVED WOOD 44, BEVELED VINYL SIDING, COLOR SELECTION BY ARCHITECT FROM PREMIUM COLOR PALETTE
7. 4" VINYL TRIM
8. VERSETTA STONE, TIGHT CUT PATTERN, COLOR SELECTION BY ARCHITECT
9. VERSETTA STONE, WAINSCOAT CAP, COLOR SELECTION BY ARCHITECT
10. 12" AZEK TRIM
11. FOUNDATION, SEE FOUNDATION PLAN
12. CLAD WD. FRAME WINDOW W/ INSULATED GLASS
13. 12" DIAMETER "TUCSAN STYLE" HB&G FIBERGLASS COLUMN
14. 4" AZEK TRIM
15. AZEK FLUSH FLAT SHEET WITH 4" AZEK TRIM TO CREATE 'PANEL PATTERN' SHOWN
16. EXTERIOR DOOR, REFER TO DOOR SCHEDULE ON DRAWING SHEET A6.0
17. ONE PIECE PRE-FINISHED BLACK METAL CHIMNEY CAP OVER ICE + WATER UNDERLAYMENT, REFER TO ST1.1 ROOF PLAN FOR ADDITIONAL INFORMATION
18. OUTDOOR SHOWER
19. BLACK METAL GAS FIREPLACE EXHAUST HOUSING
20. EMBOSSED PANEL STEEL CLAD INSULTED CORE OVERHEAD DOOR

WINDOW KEY:

- (A) (2) 2'-6"x1'-6" FIXED OVER (2) 2'-6"x4'-6" CASEMENTS
- (B) 6'-0"x6'-0" FIXED
- (C) (3) 2'-6"x1'-6" FIXED OVER (3) 2'-6"x4'-6" CASEMENTS (FIXED CENTER UNIT)

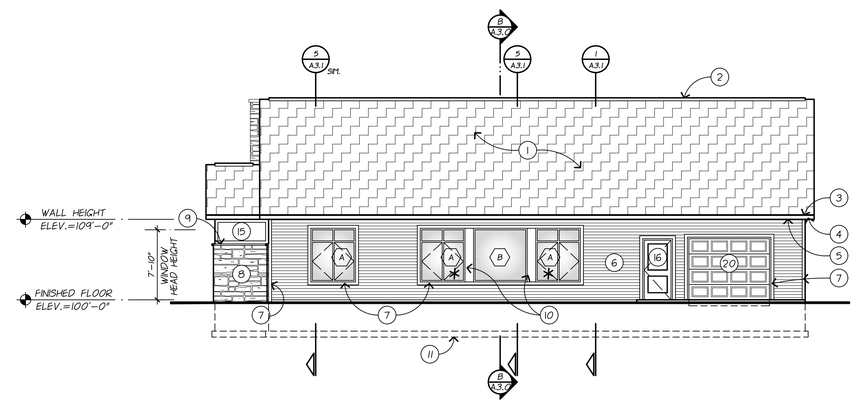
WINDOW KEY NOTES:

1.) ✱ DENOTES TEMPERED GLASS



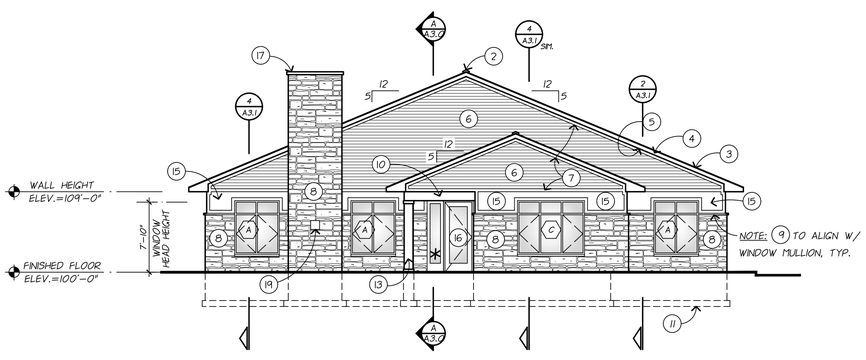
NORTH ELEVATION – COMMUNITY CENTER

SCALE: 1/8"=1'-0"



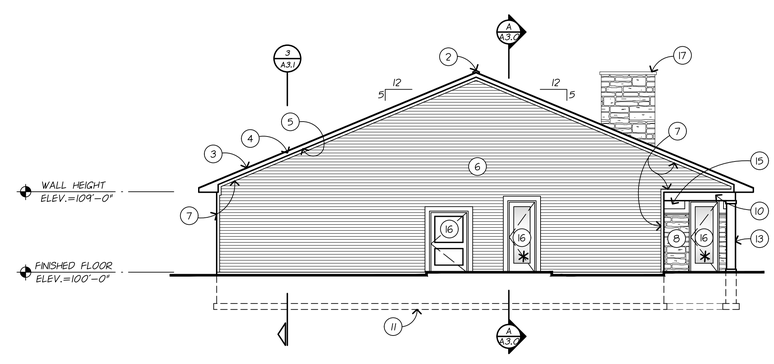
SOUTH ELEVATION – COMMUNITY CENTER

SCALE: 1/8"=1'-0"



WEST ELEVATION – COMMUNITY CENTER

SCALE: 1/8"=1'-0"



EAST ELEVATION – COMMUNITY CENTER

SCALE: 1/8"=1'-0"

Community Center for: Robbins Road Apartments

17114 Robbins Road
Grand Haven Township, Michigan

Bid + Permit
1-22-18 . . . . . date

3017 . . . . . commission

A2.0 . . . . . sheet

This drawing is the sole property of Oppenhuizen **Architects** and is not to be used or reproduced without their written consent. ©

333 Jackson St.
Grand Haven
Michigan
49417

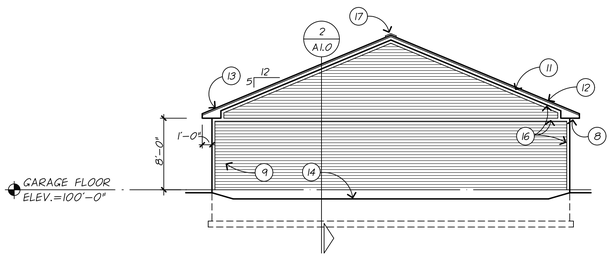
ph. 616 846 8990
fax 616 846 8898

OppenhuizenArchitects

Mark A. Oppenhuizen AIA

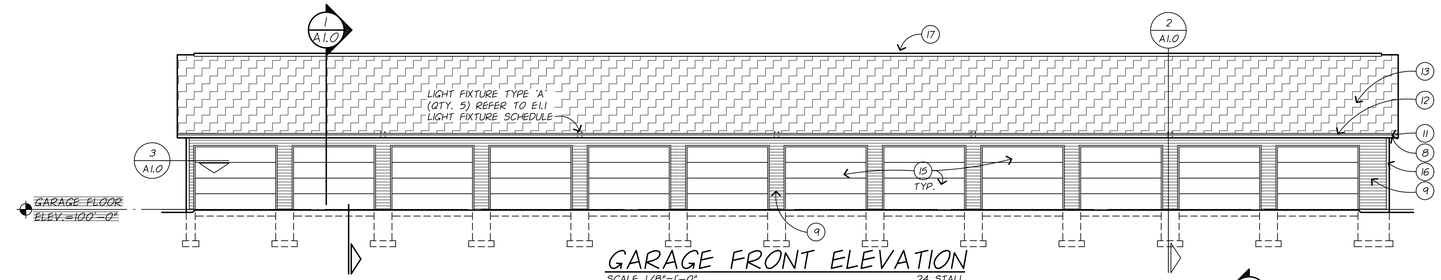
Robbins Road Apartments - Garages

17114 Robbins Road
Grand Haven Township, Michigan



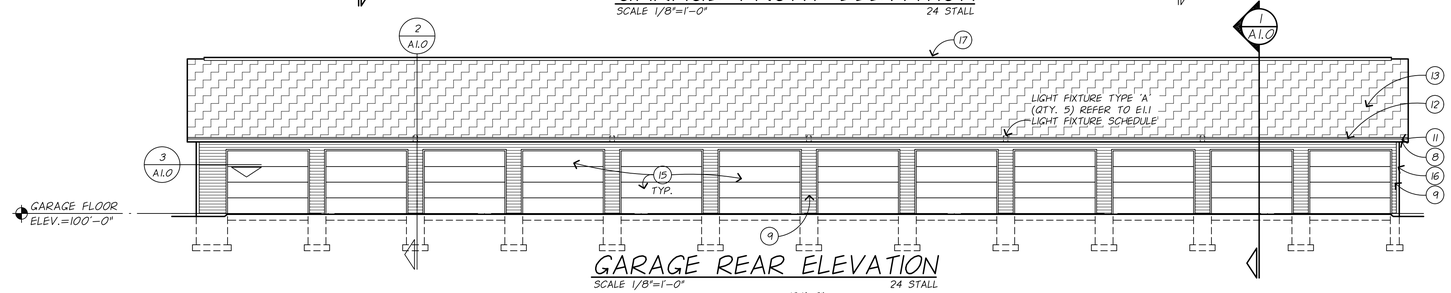
GARAGE SIDE ELEVATION

SCALE 1/8"=1'-0" 24 STALL



GARAGE FRONT ELEVATION

SCALE 1/8"=1'-0" 24 STALL

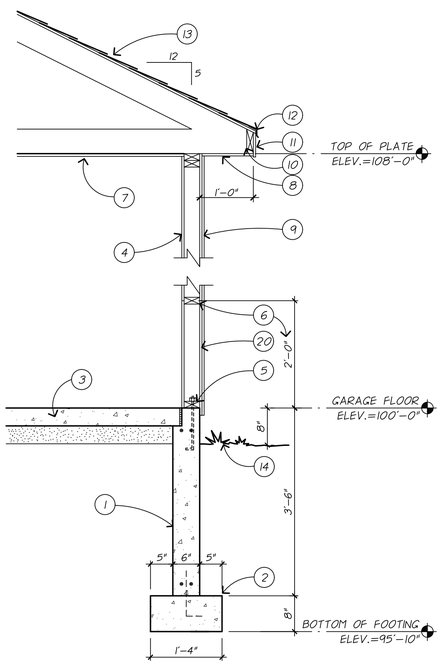


GARAGE REAR ELEVATION

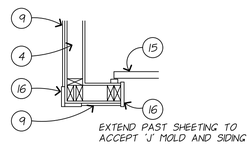
SCALE 1/8"=1'-0" 24 STALL

GARAGE KEYED NOTES:

1. 6" 4,500p.s.i. CONCRETE FOUNDATION WALL W/ (2) No.5 BARS CONTINUOUS
2. 16"x8" 4,500psi CONCRETE FOOTING
3. 4" CONCRETE SLAB (4,000p.s.i. CONCRETE) ON MINIMUM 4" COMPACTED SAND BASE (95% DENSITY PER ASTM 1557)
4. 7/16" OSB SHEETING BOTH SIDES OF 2x4 STUDS AT 24"O.C.
5. P.T. 2x4 SILL PLATE WITH 1/2"DIA. x 12" ANCHOR BOLTS MAX. 4'-0" O.C. AND 1'-0" FROM CORNERS
6. 2x4 HORIZONTAL WOOD BLOCKING AT SHEATHING PANEL JOINT
7. 7/16" O.S.B.
8. PERFORATED (VENTING) ALUMINUM SOFFIT, COLOR SELECTION BY ARCHITECT.
9. 4" EXPOSURE, BEVELED VINYL SIDING, COLOR #1, SELECTION BY ARCHITECT.
10. 2x4 SUBFASCIA
11. PRE-FINISHED ALUMINUM FASCIA - COLOR SELECTION BY ARCHITECT.
12. PREFINISHED METAL DRIP EDGE
13. ASPHALT SHINGLES OVER 15# ROOF FELTS ON 1/2" OSB ROOF DECK ON PRE-ENGINEERED WOOD TRUSSES
14. GRADE LINE
15. 9'-0"x7'-0" EMBOSSED PANEL STEEL OVERHEAD DOOR
16. 4" VINYL TRIM, COLOR SELECTION BY ARCHITECT.
17. SHINGLE OVER RIDGE VENT
18. 3 1/2"x9 1/2" 2.0E LVL HEADER
19. TURN DOWN SLAB 8" AT OVERHEAD DOOR LOCATIONS
20. PROVIDE 1/2" P.T. PLYWOOD SHEATHING ON THE EXTERIOR FACE OF WALL AT THIS LOCATION. (NOT REQUIRED AT END WALLS)

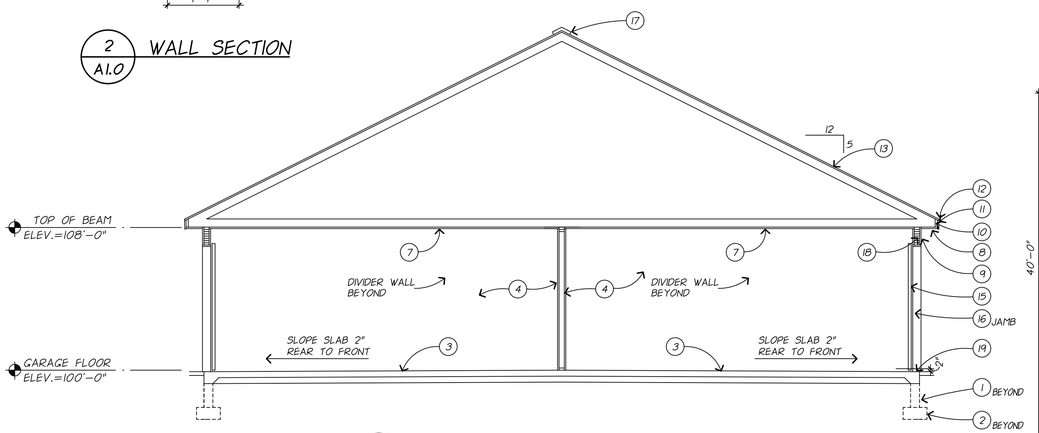


2/A1.0 WALL SECTION



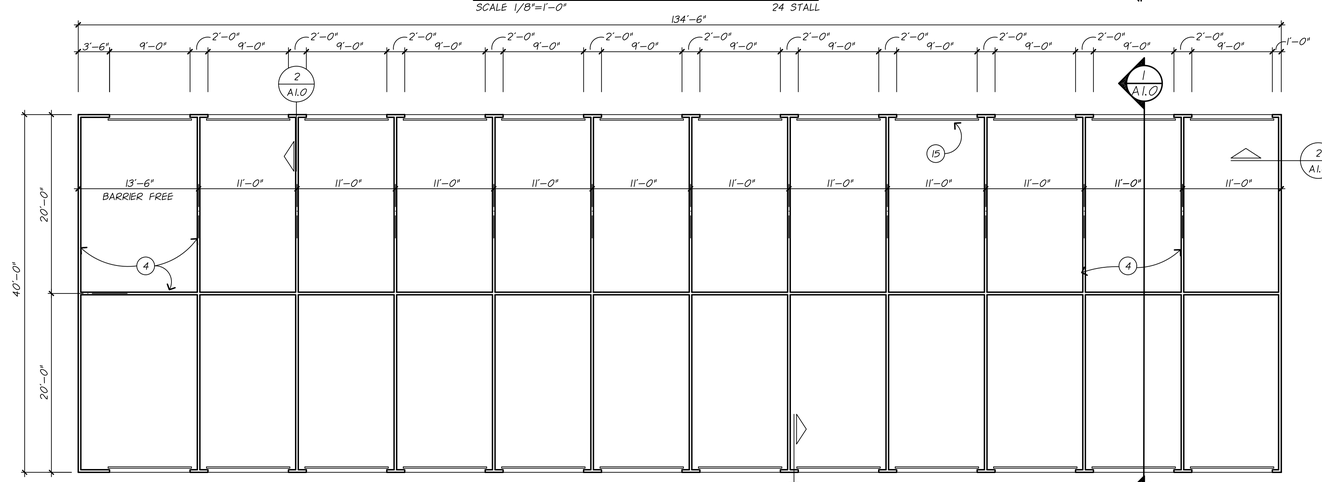
3/A1.0 CORNER DETAIL

SCALE: 3/4"=1'-0"



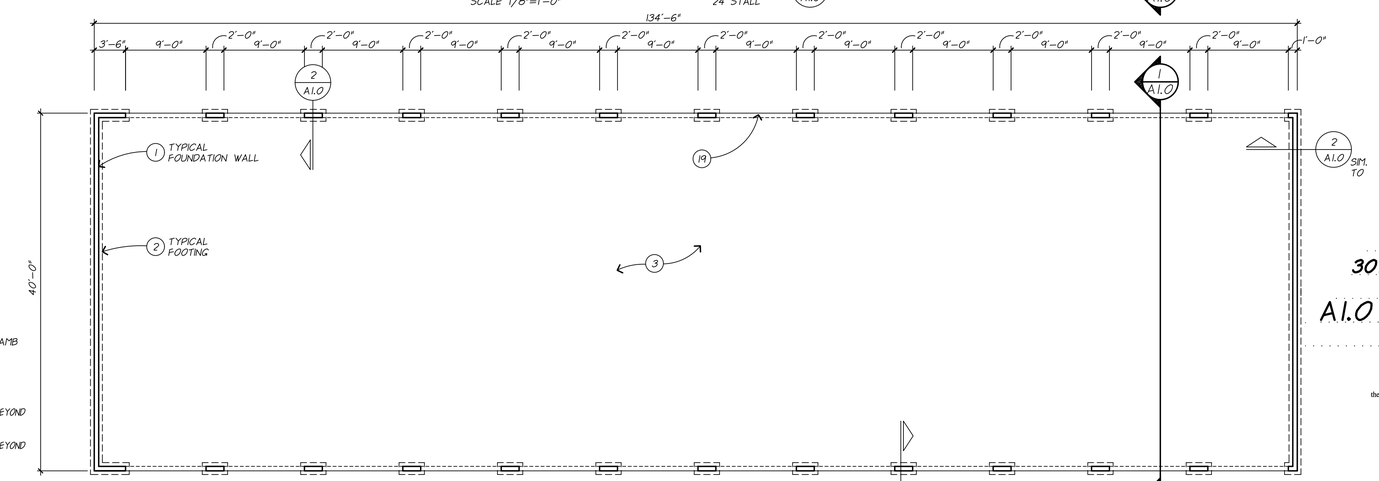
1/A1.0 GARAGE BUILDING SECTION

SCALE 1/4"=1'-0"



GARAGE FLOOR PLAN

SCALE 1/8"=1'-0" 24 STALL



GARAGE FOUNDATION PLAN

SCALE 1/8"=1'-0" 24 STALL

Bid + Permit
1-22-18 . . . . . date

3017 . . . . . commission

A1.0 . . . . . sheet

This drawing is the sole property of Oppenhuizen Architects and is not to be used or reproduced without their written consent. ©

333 Jackson St.
Grand Haven
Michigan
49417

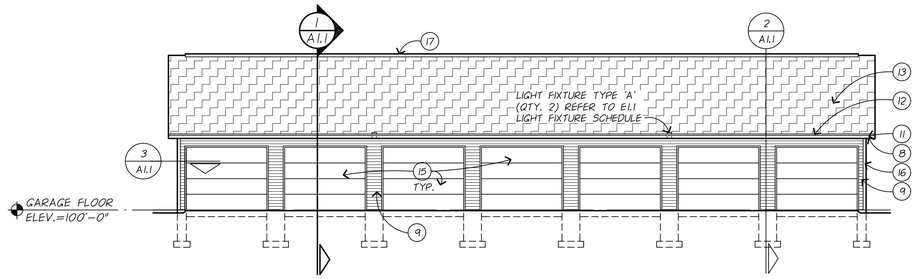
ph. 616 846 8990
fax 616 846 8898

OppenhuizenArchitects

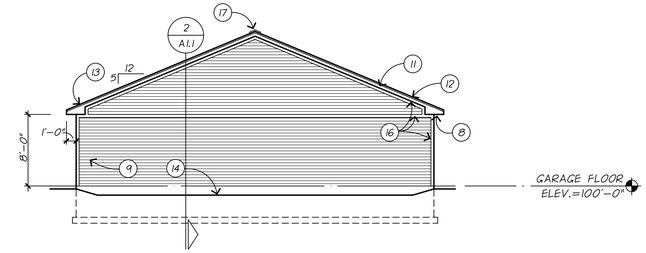
Mark A. Oppenhuizen AIA

GARAGE KEYED NOTES:

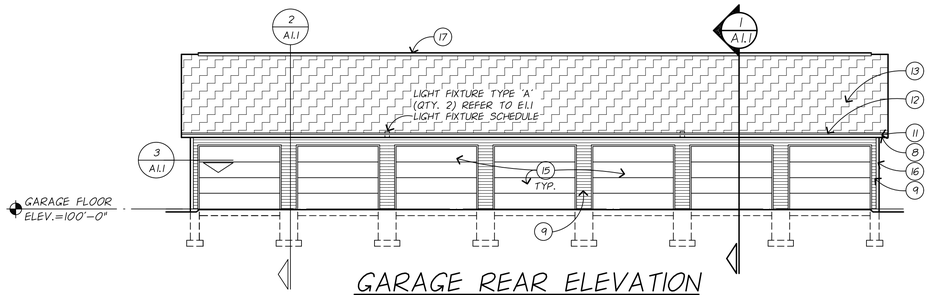
1. 6" 4,500p.s.i. CONCRETE FOUNDATION WALL W/ (2) No.5 BARS CONTINUOUS
2. 16"x8" 4,500psi CONCRETE FOOTING
3. 4" CONCRETE SLAB (4,000p.s.i. CONCRETE) ON MINIMUM 4" COMPACTED SAND BASE (95% DENSITY PER ASTM 1557)
4. 7/16" OSB SHEETING BOTH SIDES OF 2x4 STUDS AT 24"O.C.
5. P.T. 2x4 SILL PLATE WITH 1/2"DIA. x 12" ANCHOR BOLTS MAX. 4'-0" O.C. AND 1'-0" FROM CORNERS
6. 2x4 HORIZONTAL WOOD BLOCKING AT SHEATHING PANEL JOINT
7. 7/16" O.S.B.
8. PERFORATED (VENTING) ALUMINUM SOFFIT, COLOR SELECTION BY ARCHITECT.
9. 4" EXPOSURE, BEVELED VINYL SIDING, COLOR #1, SELECTION BY ARCHITECT.
10. 2x4 SUBFASCIA
11. PRE-FINISHED ALUMINUM FASCIA - COLOR SELECTION BY ARCHITECT.
12. PREFINISHED METAL DRIP EDGE
13. ASPHALT SHINGLES OVER 15# ROOF FELTS ON 1/2" OSB ROOF DECK ON PRE-ENGINEERED WOOD TRUSSES
14. GRADE LINE
15. 9'-0"x7'-0" EMBOSSED PANEL STEEL OVERHEAD DOOR
16. 4" VINYL TRIM, COLOR SELECTION BY ARCHITECT.
17. SHINGLE OVER RIDGE VENT
18. 3 1/2"x9 1/2" 2.0E LVL HEADER
19. TURN DOWN SLAB 8" AT OVERHEAD DOOR LOCATIONS
20. PROVIDE 1/2" P.T. PLYWOOD SHEATHING ON THE EXTERIOR FACE OF WALL AT THIS LOCATION. (NOT REQUIRED AT END WALLS)



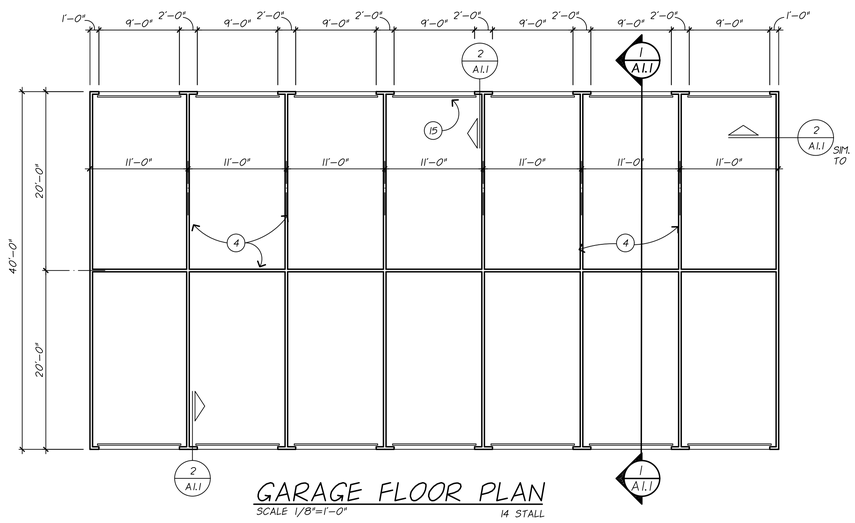
GARAGE FRONT ELEVATION
SCALE 1/8"=1'-0"
14 STALL



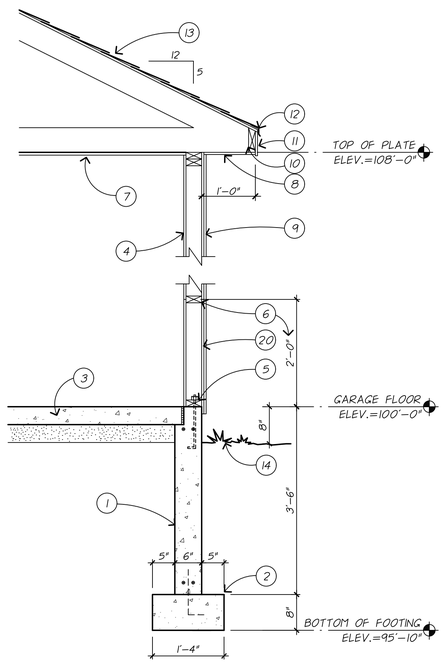
GARAGE SIDE ELEVATION
SCALE 1/8"=1'-0"
14 STALL



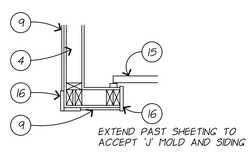
GARAGE REAR ELEVATION
SCALE 1/8"=1'-0"
14 STALL



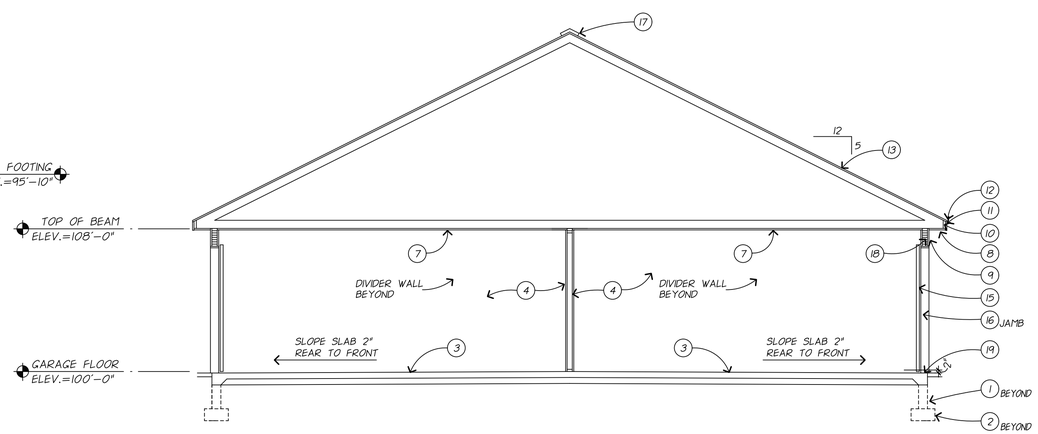
GARAGE FLOOR PLAN
SCALE 1/8"=1'-0"
14 STALL



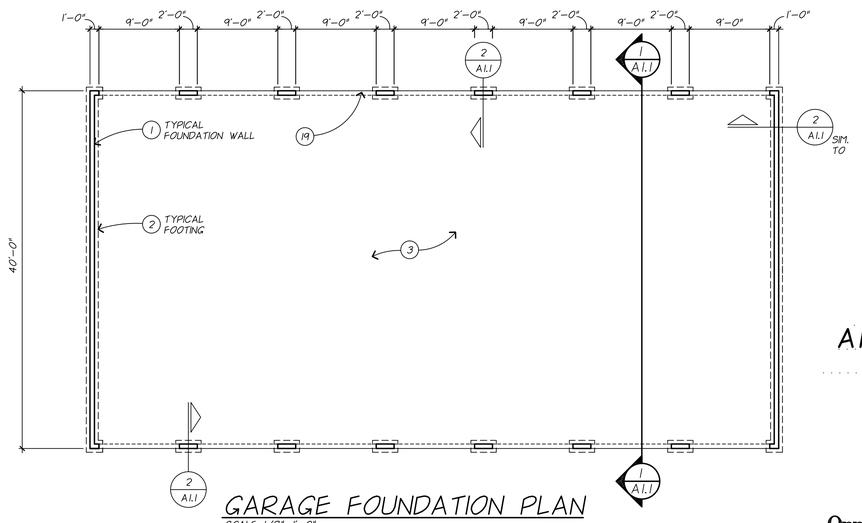
2 / A1.1 WALL SECTION
SCALE: 3/4"=1'-0"



3 / A1.1 CORNER DETAIL
SCALE: 3/4"=1'-0"



1 / A1.1 GARAGE BUILDING SECTION
SCALE 1/4"=1'-0"



GARAGE FOUNDATION PLAN
SCALE 1/8"=1'-0"
14 STALL

Robbins Road Apartments - Garages

17114 Robbins Road
Grand Haven Township, Michigan

Bid + Permit
1-22-18 . . . . . date

3017 . . . . . commission

A1.1 . . . . . sheet

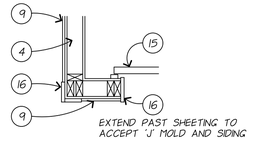
This drawing is the sole property of Oppenhuizen Architects and is not to be used or reproduced without their written consent. ©

333 Jackson St.
Grand Haven
Michigan
49417

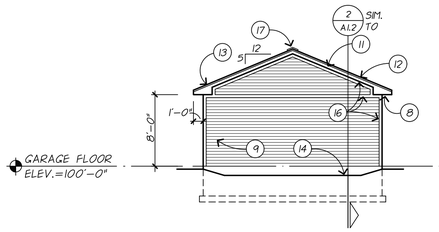
ph. 616 846 8990
fax 616 846 8998

OppenhuizenArchitects

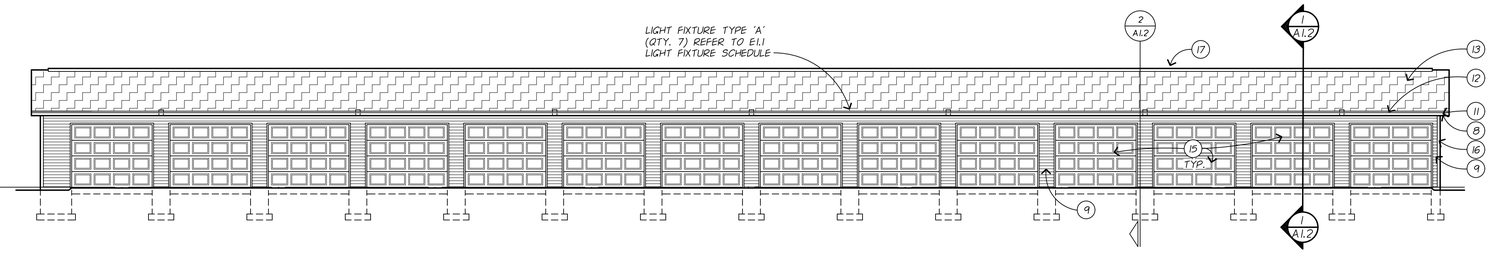
Mark A. Oppenhuizen AIA



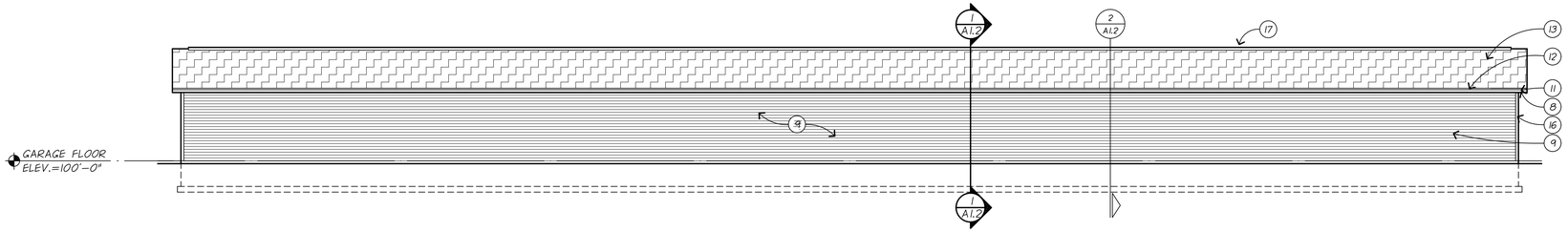
3 / A1.2 CORNER DETAIL
SCALE: 3/4"=1'-0"



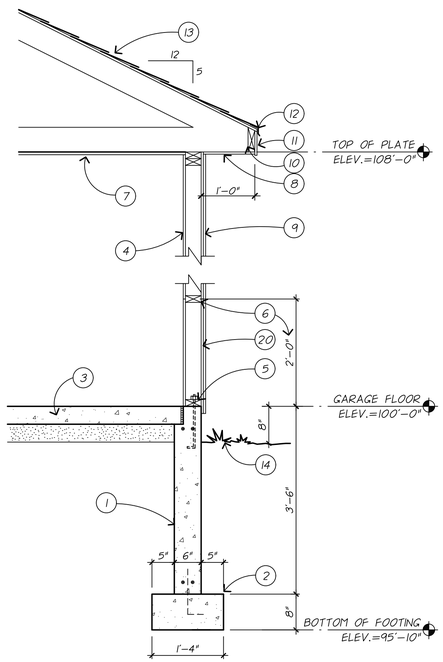
GARAGE SIDE ELEVATION
SCALE 1/8"=1'-0" 14 STALL



GARAGE FRONT ELEVATION
SCALE 1/8"=1'-0" 14 STALL



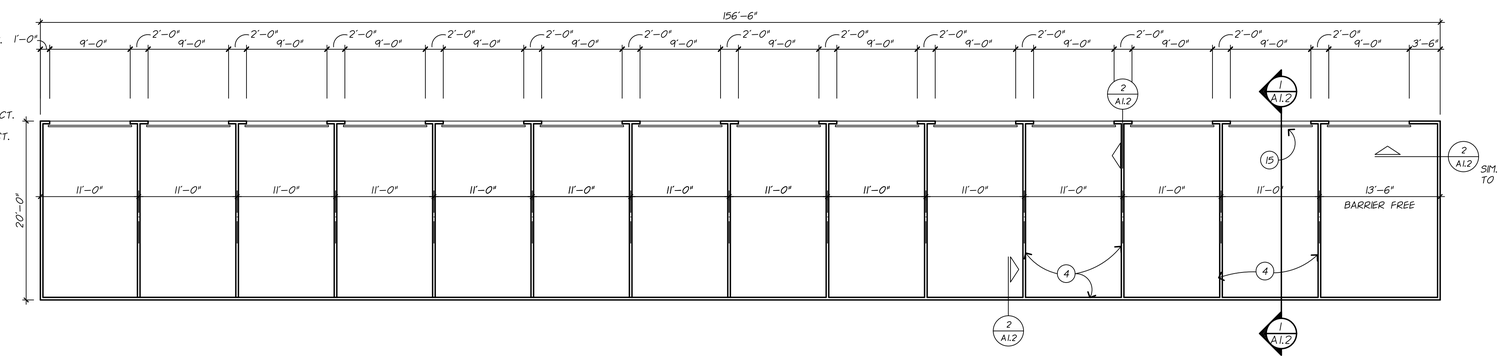
GARAGE REAR ELEVATION
SCALE 1/8"=1'-0" 14 STALL



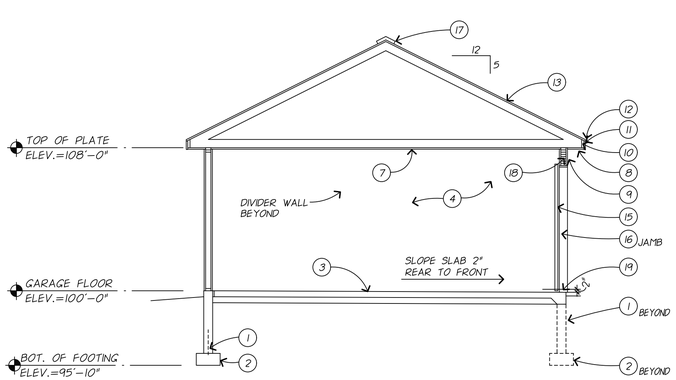
2 / A1.2 WALL SECTION
SCALE: 3/4"=1'-0"

GARAGE KEYED NOTES:

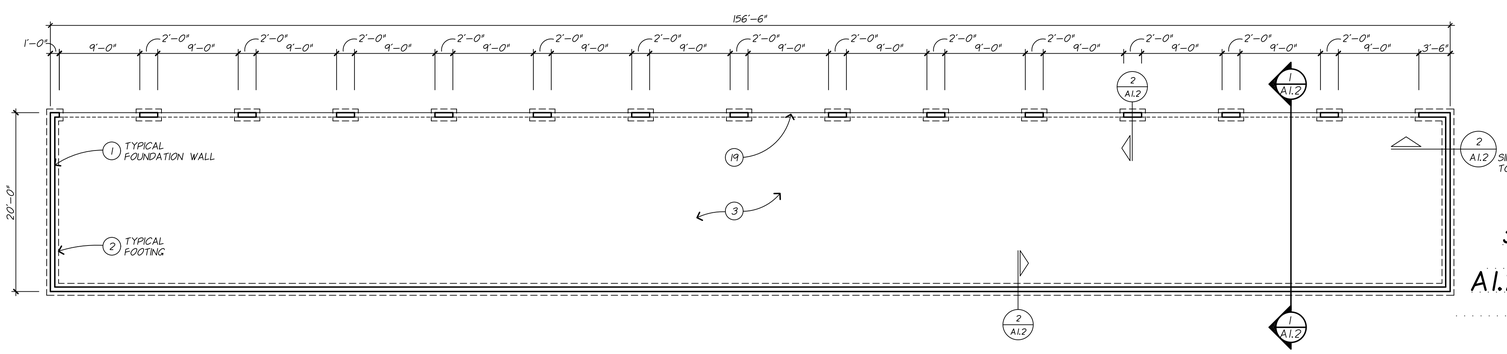
1. 6" 4,500p.s.i. CONCRETE FOUNDATION WALL W/ (2) No.5 BARS CONTINUOUS
2. 16"x8" 4,500psi CONCRETE FOOTING
3. 4" CONCRETE SLAB (4,000p.s.i. CONCRETE) ON MINIMUM 4" COMPACTED SAND BASE (95% DENSITY PER ASTM 1557)
4. 7/16" OSB SHEETING BOTH SIDES OF 2x4 STUDS AT 24"O.C.
5. P.T. 2x4 SILL PLATE WITH 1/2"DIA. x 12" ANCHOR BOLTS MAX. 4'-0" O.C. AND 1'-0" FROM CORNERS
6. 2x4 HORIZONTAL WOOD BLOCKING AT SHEATHING PANEL JOINT
7. 7/16" O.S.B.
8. PERFORATED (VENTING) ALUMINUM SOFFIT, COLOR SELECTION BY ARCHITECT.
9. 4" EXPOSURE, BEVELED VINYL SIDING, COLOR #1, SELECTION BY ARCHITECT.
10. 2x4 SUBFASCIA
11. PRE-FINISHED ALUMINUM FASCIA - COLOR SELECTION BY ARCHITECT.
12. PREFINISHED METAL DRIP EDGE
13. ASPHALT SHINGLES OVER 15# ROOF FELTS ON 1/2" OSB ROOF DECK ON PRE-ENGINEERED WOOD TRUSSES
14. GRADE LINE
15. 9'-0"x7'-0" EMBOSSED PANEL STEEL OVERHEAD DOOR
16. 4" VINYL TRIM, COLOR SELECTION BY ARCHITECT.
17. SHINGLE OVER RIDGE VENT
18. 3 1/2"x9 1/2" 2.0E LVL HEADER
19. TURN DOWN SLAB 8" AT OVERHEAD DOOR LOCATIONS
20. PROVIDE 1/2" P.T. PLYWOOD SHEATHING ON THE EXTERIOR FACE OF WALL AT THIS LOCATION. (NOT REQUIRED AT END WALLS)



GARAGE FLOOR PLAN
SCALE 1/8"=1'-0" 14 STALL



GARAGE BUILDING SECTION
SCALE 1/4"=1'-0"



GARAGE FOUNDATION PLAN
SCALE 1/8"=1'-0" 14 STALL

Robbins Road Apartments - Garages

17114 Robbins Road
Grand Haven Township, Michigan

Bd + Permit
1-22-18 . . . . . date

3017 . . . . . commission

A1.2 . . . . . sheet

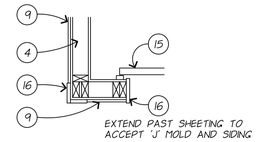
This drawing is the sole property of Oppenhuizen Architects and is not to be used or reproduced without their written consent. ©

333 Jackson St.
Grand Haven
Michigan
49417

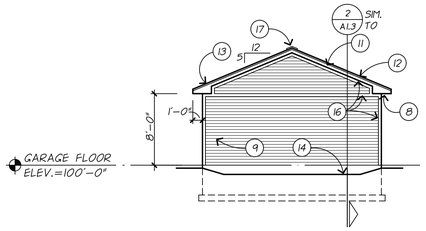
ph. 616 846 8990
fax 616 846 8898

OppenhuizenArchitects

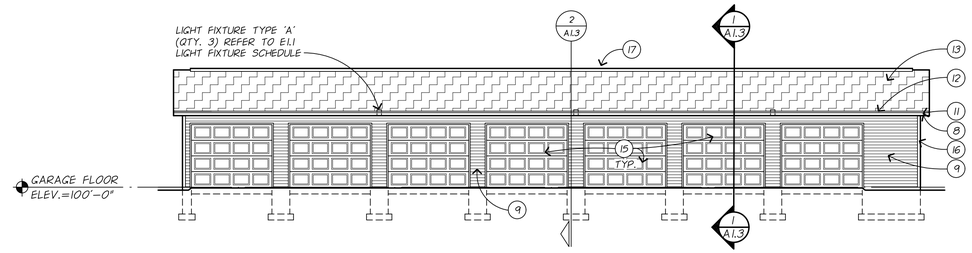
Mark A. Oppenhuizen AIA



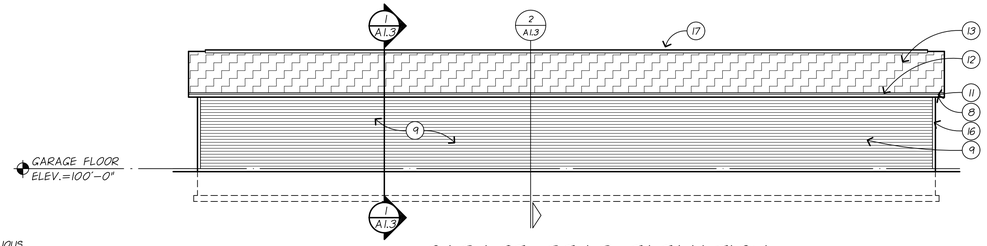
3 / A1.3 CORNER DETAIL
SCALE: 3/4"=1'-0"



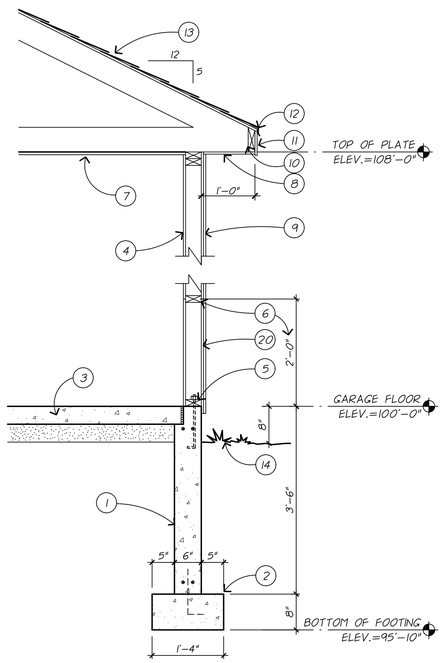
GARAGE SIDE ELEVATION
SCALE 1/8"=1'-0" 7 STALL



GARAGE FRONT ELEVATION
SCALE 1/8"=1'-0" 7 STALL



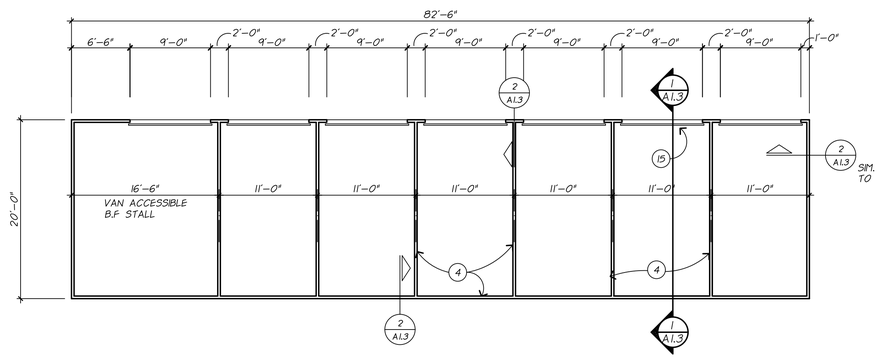
GARAGE REAR ELEVATION
SCALE 1/8"=1'-0" 7 STALL



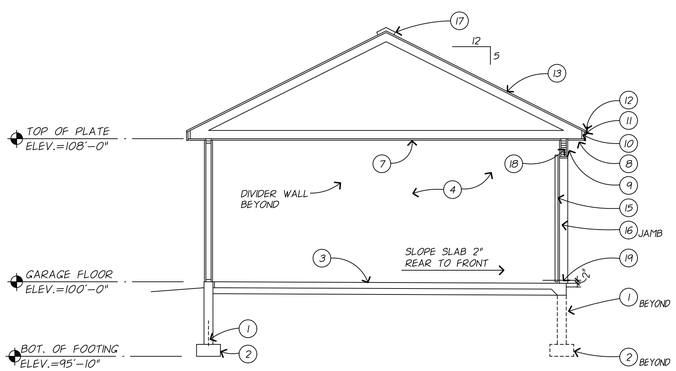
2 / A1.3 WALL SECTION
SCALE: 3/4"=1'-0"

GARAGE KEYED NOTES:

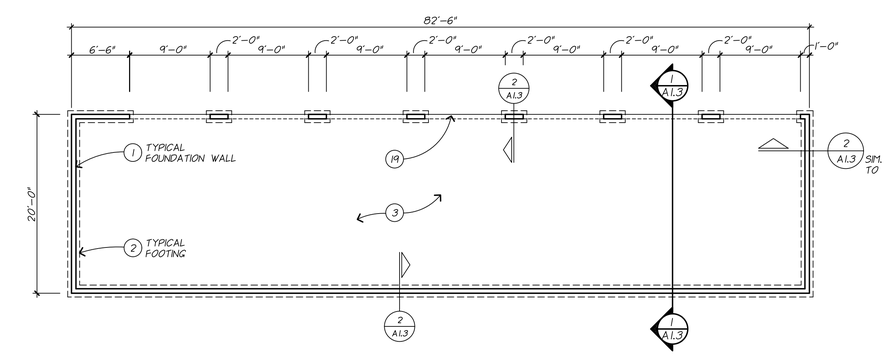
1. 6" 4,500p.s.i. CONCRETE FOUNDATION WALL W/ (2) No.5 BARS CONTINUOUS
2. 16"x8" 4,500psi CONCRETE FOOTING
3. 4" CONCRETE SLAB (4,000p.s.i. CONCRETE) ON MINIMUM 4" COMPACTED SAND BASE (95% DENSITY PER ASTM 1557)
4. 7/16" OSB SHEETING BOTH SIDES OF 2x4 STUDS AT 24"O.C.
5. P.T. 2x4 SILL PLATE WITH 1/2"DIA. x 12" ANCHOR BOLTS MAX. 4'-0" O.C. AND 1'-0" FROM CORNERS
6. 2x4 HORIZONTAL WOOD BLOCKING AT SHEATHING PANEL JOINT
7. 7/16" O.S.B.
8. PERFORATED (VENTING) ALUMINUM SOFFIT, COLOR SELECTION BY ARCHITECT.
9. 4" EXPOSURE, BEVELED VINYL SIDING, COLOR #1, SELECTION BY ARCHITECT.
10. 2x4 SUBFASCIA
11. PRE-FINISHED ALUMINUM FASCIA - COLOR SELECTION BY ARCHITECT.
12. PREFINISHED METAL DRIP EDGE
13. ASPHALT SHINGLES OVER 15# ROOF FELTS ON 1/2" OSB ROOF DECK ON PRE-ENGINEERED WOOD TRUSSES
14. GRADE LINE
15. 9'-0"x7'-0" EMBOSSED PANEL STEEL OVERHEAD DOOR
16. 4" VINYL TRIM, COLOR SELECTION BY ARCHITECT.
17. SHINGLE OVER RIDGE VENT
18. 3 1/2"x9 1/2" 2.0E LVL HEADER
19. TURN DOWN SLAB 8" AT OVERHEAD DOOR LOCATIONS
20. PROVIDE 1/2" P.T. PLYWOOD SHEATHING ON THE EXTERIOR FACE OF WALL AT THIS LOCATION. (NOT REQUIRED AT END WALLS)



GARAGE FLOOR PLAN
SCALE 1/8"=1'-0" 7 STALL



GARAGE BUILDING SECTION
SCALE 1/4"=1'-0"



GARAGE FOUNDATION PLAN
SCALE 1/8"=1'-0" 7 STALL

Robbins Road Apartments - Garages

17114 Robbins Road
Grand Haven Township, Michigan

Bid + Permit
1-22-18 . . . . . date

3017 . . . . . commission

A1.3 . . . . . sheet

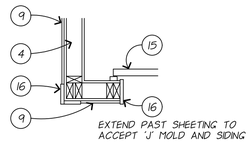
This drawing is the sole property of Oppenhuizen Architects and is not to be used or reproduced without their written consent. ©

333 Jackson St.
Grand Haven
Michigan
49417

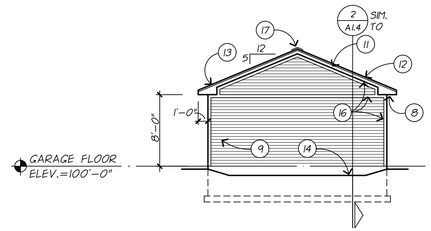
ph. 616 846 8990
fax 616 846 8898

OppenhuizenArchitects

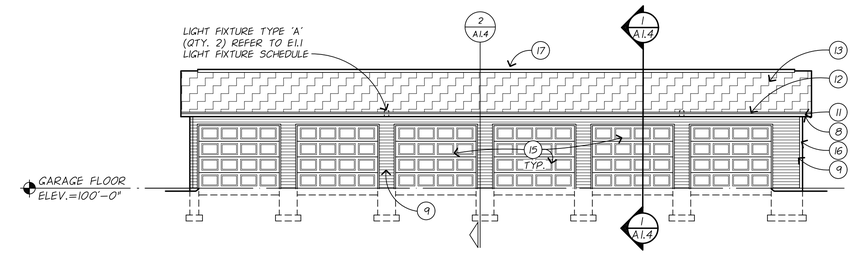
Mark A. Oppenhuizen AIA



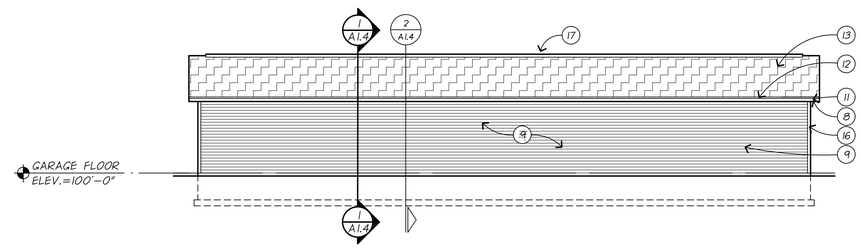
3 / A1.4 CORNER DETAIL
SCALE: 3/4"=1'-0"



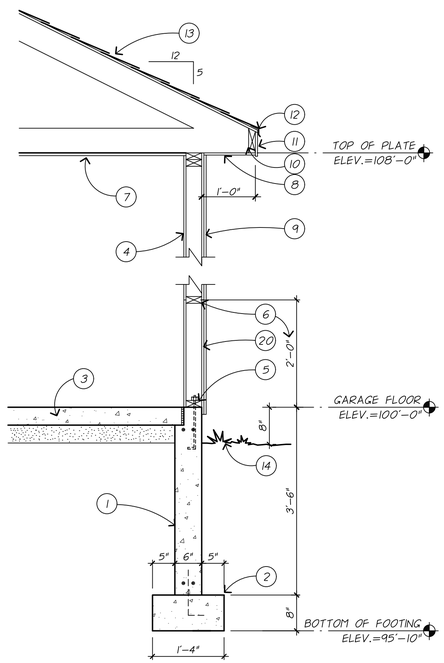
GARAGE SIDE ELEVATION
SCALE 1/8"=1'-0" 6 STALL



GARAGE FRONT ELEVATION
SCALE 1/8"=1'-0" 6 STALL



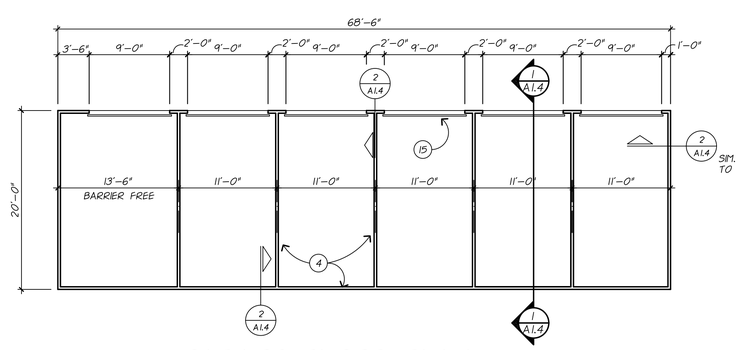
GARAGE REAR ELEVATION
SCALE 1/8"=1'-0" 6 STALL



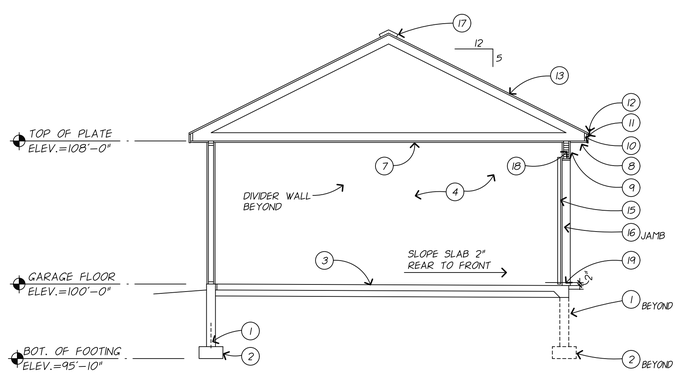
2 / A1.4 WALL SECTION
SCALE: 3/4"=1'-0"

GARAGE KEYED NOTES:

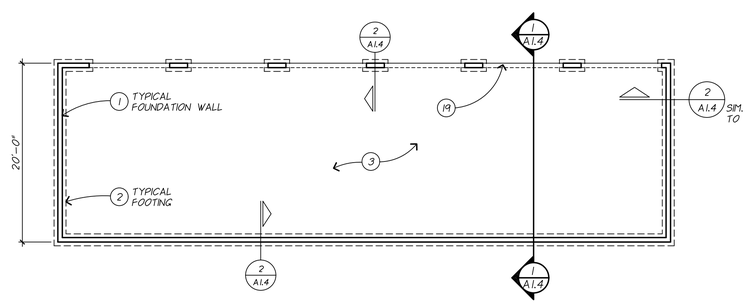
1. 6" 4,500p.s.i. CONCRETE FOUNDATION WALL W/ (2) No.5 BARS CONTINUOUS
2. 16"x8" 4,500psi CONCRETE FOOTING
3. 4" CONCRETE SLAB (4,000p.s.i. CONCRETE) ON MINIMUM 4" COMPACTED SAND BASE (95% DENSITY PER ASTM 1557)
4. 7/16" OSB SHEETING BOTH SIDES OF 2x4 STUDS AT 24"O.C.
5. P.T. 2x4 SILL PLATE WITH 1/2"DIA. x 12" ANCHOR BOLTS MAX. 4'-0" O.C. AND 1'-0" FROM CORNERS
6. 2x4 HORIZONTAL WOOD BLOCKING AT SHEATHING PANEL JOINT
7. 7/16" O.S.B.
8. PERFORATED (VENTING) ALUMINUM SOFFIT, COLOR SELECTION BY ARCHITECT.
9. 4" EXPOSURE, BEVELED VINYL SIDING, COLOR #1, SELECTION BY ARCHITECT.
10. 2x4 SUBFASCIA
11. PRE-FINISHED ALUMINUM FASCIA - COLOR SELECTION BY ARCHITECT.
12. PREFINISHED METAL DRIP EDGE
13. ASPHALT SHINGLES OVER 15# ROOF FELTS ON 1/2" OSB ROOF DECK ON PRE-ENGINEERED WOOD TRUSSES
14. GRADE LINE
15. 9'-0"x7'-0" EMBOSSED PANEL STEEL OVERHEAD DOOR
16. 4" VINYL TRIM, COLOR SELECTION BY ARCHITECT.
17. SHINGLE OVER RIDGE VENT
18. 3 1/2"x9 1/2" 2.0E LVL HEADER
19. TURN DOWN SLAB 8" AT OVERHEAD DOOR LOCATIONS
20. PROVIDE 1/2" P.T. PLYWOOD SHEATHING ON THE EXTERIOR FACE OF WALL AT THIS LOCATION. (NOT REQUIRED AT END WALLS)



GARAGE FLOOR PLAN
SCALE 1/8"=1'-0" 6 STALL



GARAGE BUILDING SECTION
SCALE 1/4"=1'-0"



GARAGE FOUNDATION PLAN
SCALE 1/8"=1'-0" 6 STALL

Robbins Road Apartments - Garages

17114 Robbins Road
Grand Haven Township, Michigan

Bid + Permit
1-22-18 . . . . . date

3017 . . . . . commission

A1.4 . . . . . sheet

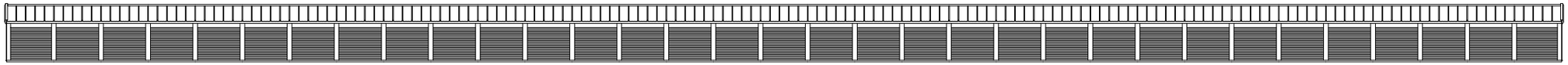
This drawing is the sole property of Oppenhuizen Architects and is not to be used or reproduced without their written consent. ©

333 Jackson St.
Grand Haven
Michigan
49417

ph. 616 846 8990
fax 616 846 8898

OppenhuizenArchitects

Mark A. Oppenhuizen AIA

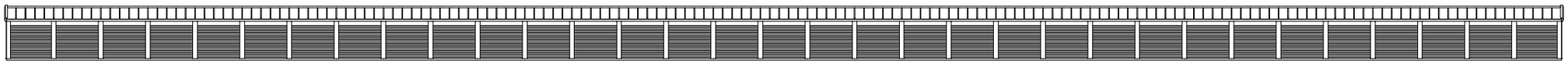


SIDE WALL ELEVATION 1/8"=1'-0"

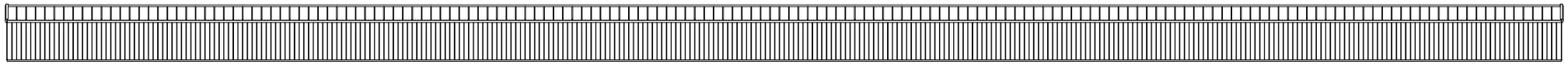
END WALL ELEVATION

2 – 30'-0" x 300'-0" x 8'-4" 3:12 PITCH GABLE BUILDING SYSTEM

END WALL ELEVATION



SIDE WALL ELEVATION 1/8"=1'-0"



SIDE WALL ELEVATION 1/8"=1'-0"

END WALL ELEVATION

1 – 20'-0" x 350'-0" x 8'-4" 3:12 PITCH GABLE BUILDING SYSTEM

END WALL ELEVATION

"NOTICE"

NO FABRICATION CAN BE SCHEDULED OR BEGUN UNTIL "APPROVED" OR "APPROVED AS NOTED" DOCUMENTS ARE RECEIVED BY TRACHTE BUILDING SYSTEMS. COMPLETE THE FOLLOWING:

____ APPROVED – RELEASE FOR FABRICATION

____ APPROVED AS NOTED – RELEASE FOR FABRICATION

____ NOT APPROVED – REVISE AND RESUBMIT

SIGNATURE _____

COMPANY _____

DATE ____/____/____

TRACHTE BUILDING SYSTEMS, Inc.

This drawing and all parts thereof is the exclusive property of Trachte Building Systems, Inc. 314 Wilburn Road, Sun Prairie, Wisconsin (800/356-5824) (Local 608/837-7899) and may not be reproduced in whole or part without written permission.

Revisions:	By:
.	.

Name: Rick | Scale: 1 = 30' | Date: 1/12/18

Job Description:

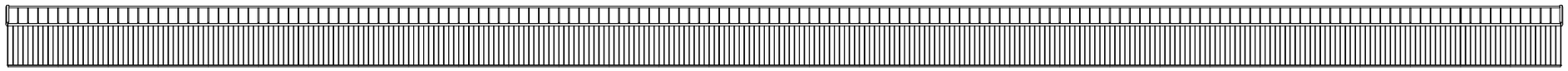
PROPOSED STORAGE SYSTEM FOR: Ben Robbins

Grand Haven, MI 49417

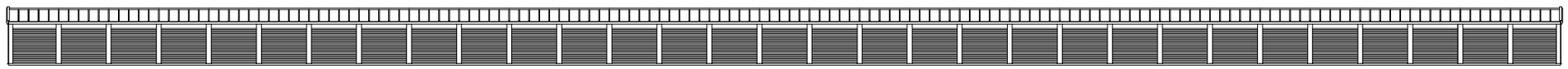
Sheet Title: ELEVATION

Plan #: 49925

SALES ONLY



SIDE WALL ELEVATION 1/8"=1'-0"



SIDE WALL ELEVATION 1/8"=1'-0"

END WALL ELEVATION

3 – 20'-0" x 330'-0" x 8'-4" 3:12 PITCH GABLE BUILDING SYSTEM

END WALL ELEVATION

"NOTICE"

NO FABRICATION CAN BE SCHEDULED OR BEGUN UNTIL "APPROVED" OR "APPROVED AS NOTED" DOCUMENTS ARE RECEIVED BY TRACHTE BUILDING SYSTEMS. COMPLETE THE FOLLOWING:

____ APPROVED – RELEASE FOR FABRICATION

____ APPROVED AS NOTED – RELEASE FOR FABRICATION

____ NOT APPROVED – REVISE AND RESUBMIT

SIGNATURE _____

COMPANY _____

DATE ____/____/____

TRACHTE BUILDING SYSTEMS, Inc.

This drawing and all parts thereof is the exclusive property of Trachte Building Systems, Inc. 314 Wilburn Road, Sun Prairie, Wisconsin (800/356–5824) (Local 608/837–7899) and may not be reproduced in whole or part without written permission.

Revisions:	By:
.	.

Name: Rick | Scale: 1 = 30' | Date: 1/12/18

Job Description:

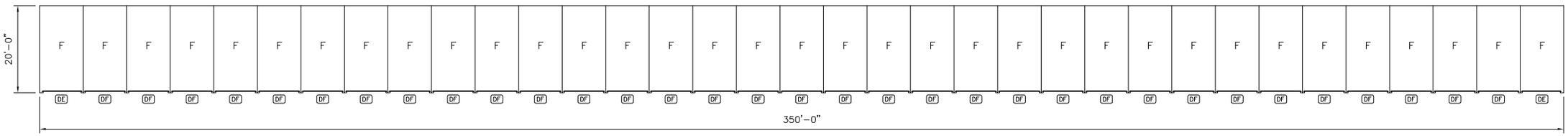
PROPOSED STORAGE SYSTEM FOR: Ben Robbins

Grand Haven, MI 49417

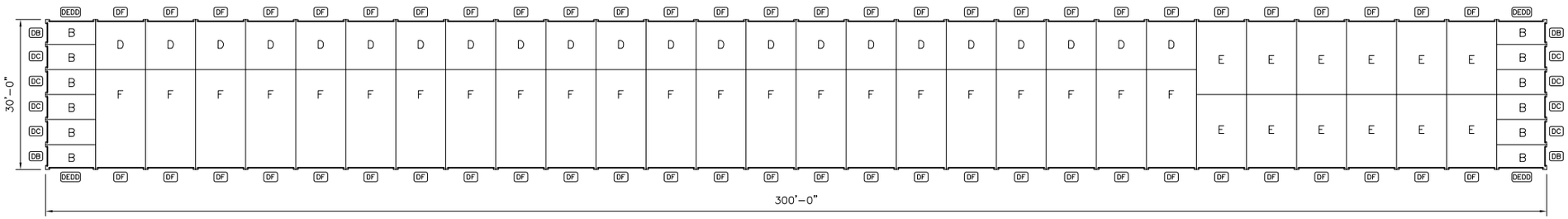
Sheet Title: ELEVATION

Plan #: 49925

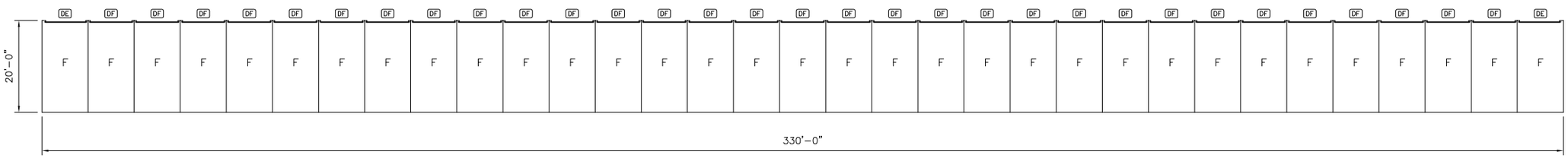
SALES ONLY



1 – 20'-0" x 350'-0" x 8'-4" 3:12 PITCH GABLE BUILDING SYSTEM



2 – 30'-0" x 300'-0" x 8'-4" 3:12 PITCH GABLE BUILDING SYSTEM



3 – 20'-0" x 330'-0" x 8'-4" 3:12 PITCH GABLE BUILDING SYSTEM

"NOTICE"

NO FABRICATION CAN BE SCHEDULED OR BEGUN UNTIL "APPROVED" OR "APPROVED AS NOTED" DOCUMENTS ARE RECEIVED BY TRACHTE BUILDING SYSTEMS. COMPLETE THE FOLLOWING:

____ APPROVED – RELEASE FOR FABRICATION

____ APPROVED AS NOTED – RELEASE FOR FABRICATION

____ NOT APPROVED – REVISE AND RESUBMIT

SIGNATURE _____

COMPANY _____

DATE ____/____/____

TRACHTE BUILDING SYSTEMS, Inc.

This drawing and all parts thereof is the exclusive property of Trachte Building Systems, Inc. 314 Wilburn Road, Sun Prairie, Wisconsin (800/356–5824) (Local 608/837–7899) and may not be reproduced in whole or part without written permission.

Revisions:	By:
.	.

Name: Rick | Scale: 1 = 30' | Date: 1/12/18

Job Description:

PROPOSED STORAGE SYSTEM FOR: Ben Robbins

Grand Haven, MI 49417

PAGE

Sheet Title: FLOOR PLAN

Plan #: 49925

SALES ONLY

PROPOSED SITE DEVELOPMENT PLAN
APARTMENTS at ROBBINS ROAD
17114 ROBBINS ROAD, GRAND HAVEN, MI

DATE 2/5/18
DESIGNED BY ATR

Main Street Capital Group

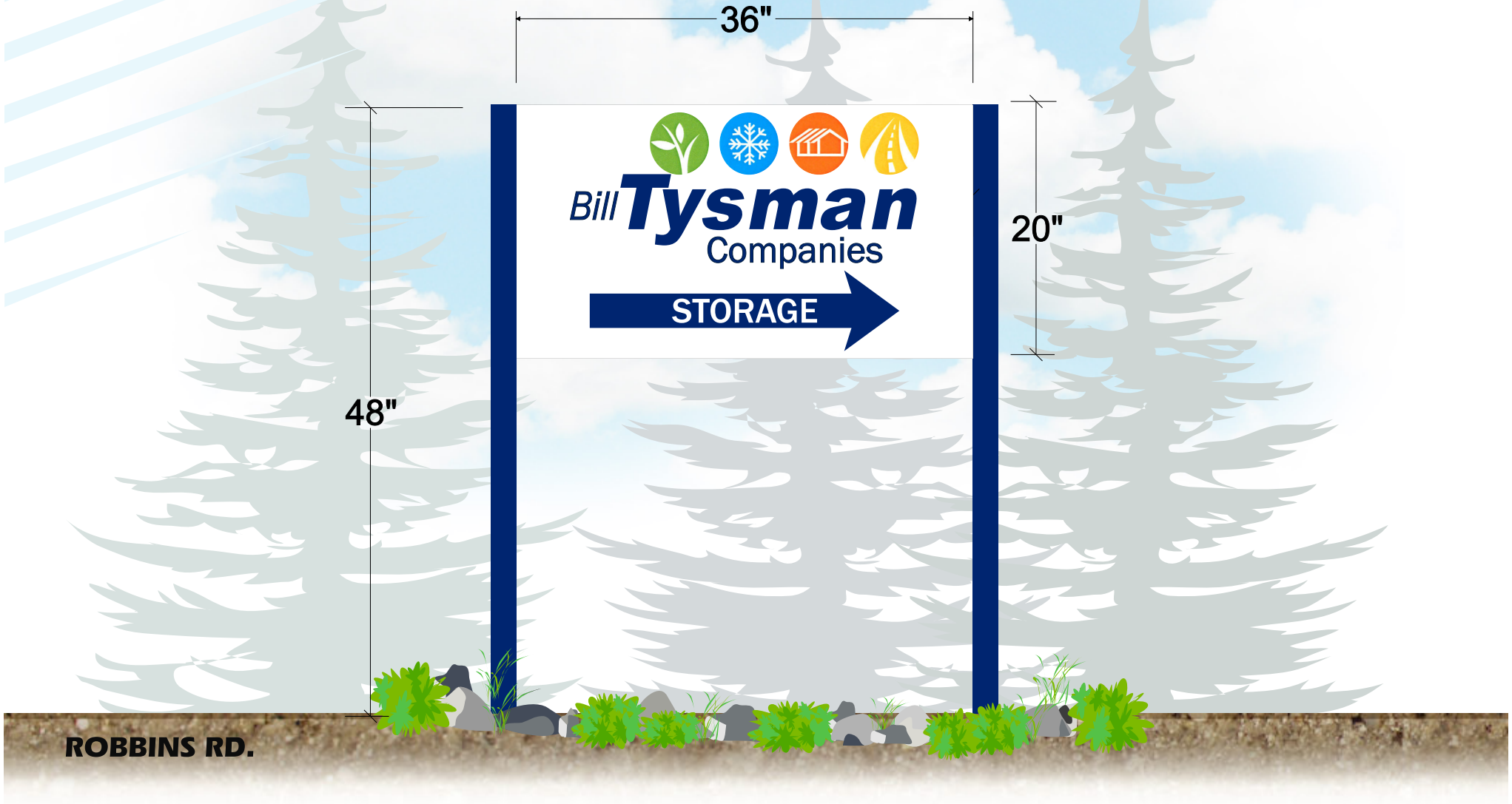
PSG POSTEMA

7475 South Division Avenue, Grand Rapids, MI 49548 Phone (616) 455-0260 Fax (616) 455-0272 www.postemasign.com

STRUCTURE
- Single sided sign
- Custom fabricated of aluminum
- Direct buried in concrete
- Paint to be Matthews Acrylic Polyurethane

GRAPHICS
- Surface applied 3M vinyl graphics

watchfire Time-O-Matic AUTHORIZED DEALER



Sales Consultant: Jim VanTol email: jim@postemasign.com

All designs and specifications are sole property of Postema Signs and Graphics. Any unauthorized use or distribution is prohibited.

7475 South Division Avenue, Grand Rapids, MI 49548 Phone (616) 455-0260 Fax (616) 455-0272 www.postemasign.com

STRUCTURE
- Double sided sign
- SignComp widebody aluminum extrusion
- 2 1/4" aluminum retainers - hingeable for service
- Base fabricated of aluminum
- 3"x5" Steel ground pole - direct buried in concrete
- Paint to be Matthews Acrylic Polyurethane

ELECTRICAL
- High output fluorescent lamps
- Cold start electronic ballasts
- Integrated disconnect
- Photocell to be included
- UL listed and labeled

FACES
- 3/16" White Polycarbonate
- Surface applied 3M translucent vinyl graphics

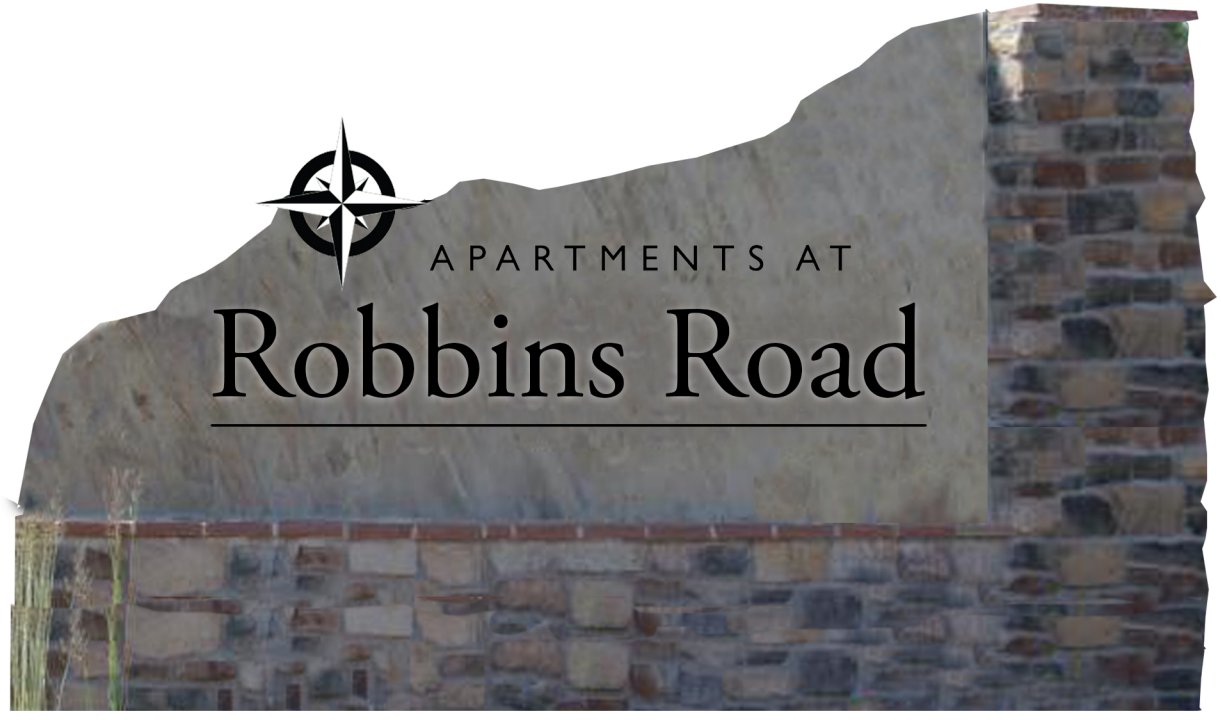
watchfire AUTHORIZED DEALER

ROBBINS RD.

48.7 SQ. FT.

Sales Consultant: Jim VanTol email: jim@postemasign.com

All designs and specifications are sole property of Postema Signs and Graphics. Any unauthorized use or distribution is prohibited.


APARTMENTS AT
Robbins Road