NOTICE OF MEETING
The City of Lake Elmo
Planning Commission will conduct a meeting on
Monday June 24, 2019
at 7:00 p.m.

AGENDA

1. Pledge of Allegiance

2. Approve Agenda

3. Approve Minutes
   a. May 29, 2019
   b. June 10, 2019

4. Public Hearings
   a. Conditional Use Permit - Carmelite Hermitage Chapel (8249 Demontreville Trail)

5. Business Items
   a. Screening Requirements and Off-Street Parking Regulations in Rural Residential Zoning Districts – Draft Ordinance Amendment

6. Communications/Updates
   a. City Council Update – June 18, 2019
   b. Staff Updates
      1. Upcoming Meetings:
         • July 8, 2019
         • July 22, 2019

7. Adjourn

***Note: Every effort will be made to accommodate person or persons that need special considerations to attend this meeting due to a health condition or disability. Please contact the Lake Elmo City Clerk if you are in need of special accommodations.
Commissioner Weeks called to order the meeting of the Lake Elmo Planning Commission at 7:00 p.m.

COMMISSIONERS PRESENT: Cadenhead, Hartley, Holtz, Risner and Weeks
COMMISSIONERS ABSENT: Johnson and Steil
STAFF PRESENT: Planning Director Roberts

Approve Agenda:
M/S/P: Hartley/Risner move to approve the agenda as presented, Vote: 6-0, motion carried unanimously.

Approve Minutes:
M/S/P: Cadenhead/Hartley, move to approve the April 8, 2019 minutes as presented, Vote: 6-0, motion carried unanimously.

M/S/P: Hartley/Risner, move to approve the April 22, 2019 minutes as presented, Vote: 6-0, motion carried unanimously.

Public Hearing – None

Business Item – Screening Requirements and Off-Street Parking Regulations in Rural Residential Zoning Districts

Roberts presented there is some confusion and inconsistency between sections 150.001 and 154.407 of the zoning code. The proposed changes to the ordinance are for lots of an acre or more and take into consideration the comments from the previous meeting.

Holtz asked about if page 2 is replacing page 1, he also asked where 25 ft. size limit came from since it does limit some property owners. Roberts explained that they are taking the language of the two existing sections and combining them into one section so there will be no confusion. Roberts explained the size is commonly used size in other codes.
Holtz asked what “good” condition meant and said “operable” would be a better word. He also asked about “neatly stacked” and suggested that “for safety” is added to provide clarity.

Weeks mentioned she felt it was to provide direction to staff. She drove through the rural areas and did not see issues from the street, she did see properties in technical violation due to boat trailers in the front yard around the lakes.

Cadenhead would like to see a height limit of stacked firewood included. Suggested that durable parking areas be better defined to include not subject to rutting or erosion.

Risner asked about why the rear property line was removed when a side property line was added. Roberts suggested that adding to all property lines would work.

Holtz asked if it was purposeful for a recreational trailer to be excluded from the list of trailers allowed. Roberts suggested that it was not intentionally excluded.

Roberts stated that he will schedule the public hearing for the ordinance change for July 8 to include the changes mentioned today.

**City Council Updates – June 4, 2019**
1. There was one item on the Consent Agenda – the City of Grant Comprehensive Plan. The City had “not comment” to the plan.
2. They City awarded the road reconstruction and signal lights contract for Keats Avenue and Hudson Boulevard.

**Star Tribune Article – June 1, 2019**
Article provided for information only

**Staff Updates**
1. Upcoming Meeting
   a. July 8, 2019 – A Concept Plan for another senior housing development along 39th next to Arbor Glen. It will be affiliated with Arbor Glen and aiming for residents 62 and older.

Meeting adjourned at 8:07 pm

Respectfully submitted,

Tanya Nuss
Permit Technician
TO: Planning Commission  
FROM: Ken Roberts, Planning Director  
AGENDA ITEM: Conditional Use Permit – Carmelite Hermitage of the Blessed Virgin Mary  
REVIEWED BY: Ben Prchal, City Planner

BACKGROUND:

The City has received an application for a conditional use permit (CUP) to allow the construction of a place of worship (chapel) on the property of the Carmelite Hermitage at 8249 Demontreville Trail. This site within a Public and Quasi-Public Open Space zoning district. Places of worship (such as churches and chapels) are conditional uses in the Public and Quasi-Public Open Space zoning district.

ISSUE BEFORE PLANNING COMMISSION:

The Planning Commission is being asked to consider the request for the conditional use permit, conduct a public hearing and make a recommendation to the City Council about the CUP for the proposed chapel at the Carmelite Hermitage at 8249 Demontreville Trail.

PROPOSAL DETAILS/ANALYSIS:

Applicants: Carmelite Hermitage of the Blessed Virgin Mary, 8249 Demontreville Trail, Lake Elmo, MN 55042

Property Owners: Discalced Carmelite Nuns of St. Paul, 8251 Demontreville Trail, Lake Elmo, MN 55042

Location: ALL OF GOVERNMENT LOT 4, IN SECTION 9, TOWNSHIP 29 NORTH, RANGE 21 WEST, ACCORDING TO THE GOVERNMENT SURVEY CONTAINING 59.4 ACRES OF LAND. ALSO, THE SOUTH 30.6 ACRES OF GOVERNMENT LOT 4 IN SECTION 4, AND THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION 4, ALL IN TOWNSHIP 029 RANGE 021, ACCORDING THE GOVERNMENT
SURVEY, BEING THE SOUTH 688 FEET THEREOF. PID# 09.029.21.12.0002

Request: Conditional Use Permit for a place of worship and religious institution

Existing Land Use: Hermitage – A retreat for monks with a community building and garage, cloistered living area with courtyards

Existing Zoning: PF – Public and Quasi-Public Open Space

Surrounding Land Use / Zoning:
- North – Properties owned by Discalced Carmelite Nuns (8251 Demontreville Trail) and Jesuit Retreat House (8243 Demontreville Trail);
- South – Single-family homes (Rural Residential);
- East – Single-family homes (Rural Residential);
- West – Lake Demontreville

Comprehensive Plan Guidance:
- 2030 – Public/Park
- 2040 – Institutional. As noted the in the 2040 Comprehensive Plan, this land use category identifies land that is used for schools, religious institutions, City Hall, municipal buildings, libraries and other institutional uses.

History:
In December 1991, the City approved a variance (regarding code requirement for having frontage on a public road) and a master plan for the Carmelite Hermitage of the Blessed Virgin Mary. This master plan included a phasing plan showing four parts or phases and included a court, guest house/library, chapel, cloister, hermitage, community building and workshop. The variance noted that the applicant has a private recorded easement that allows access to the north from their site to Demontreville Trail North (across the adjoining properties).

In October 2007, the City approved an amendment to the approved master plan to allow an additional accessory building (1,512 square feet) on their site.

Deadline(s) for Action:
- Application Complete – 5-24-2019
- 60 Day Deadline – 7-23-2019
- Extension Letter Mailed – No
- 120 Day Deadline – N/A

Applicable Regulations:
- §154.210 – Off-Street Parking
- Article XIV: Public and Semi-Public Districts

**Request.** A place of worship in Lake Elmo is a conditional use in the Public and Quasi-Public Open Space district. The City approved the Master Plan for the Carmelite Hermitage in 1991 as previously mentioned in this report, but a conditional use permit was never obtained, as the use was considered permitted at that time. The City adopted the Public and Quasi-Public Open Space ordinance in September of 2000, and this ordinance required conditional use permits for places of worship and set forth certain standards for such a use as well as other district requirements that are in place today.
Because the property does not have a conditional use permit as is required by the Zoning Code, the existing use is considered legal non-conforming. The City’s ordinance states that the lawful use of a building or structure may continue, but that the continuation of the non-conforming use does not include expansion. Since the applicant is requesting expansion of the non-conforming use (by adding a chapel), the City must approve a conditional use permit for the entire property in order for the applicant to add the chapel and to bring the property into compliance with current zoning requirements. (Note: Conditional use permits run with or are applicable to a specific property, not with a particular owner or person).

**Use on Proposed Site.** The proposed chapel would be to the west of the existing buildings and south of the existing driveway into the site. As shown on the plans, the chapel would be about 8,520 square feet in area with a height of 41 feet, four inches. The applicant noted in their project description that the chapel would be used for liturgical services and for personal prayer and would have seating for 42 guests in addition to the seating for the 12 members of their community.

They also state that since their community members live in a Hermitage and since their way of life is relatively secluded, they do not generate a significant amount of vehicle traffic. They are anticipating an average of 10-15 visitors a day to their site. They have two part-time employees to help maintain the grounds and buildings. The Hermitage is open to the public between 7:30 AM and 4:30 PM. They are not planning to hold regular church or public worship services in the chapel.

**Setback and Impervious Surface Requirements.** The following table outlines how the proposed use adheres to the setback and impervious surface requirements of the Public and Quasi-Public Open Space District.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Required</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Parcel Area</td>
<td>20 acres</td>
<td>90 acres</td>
</tr>
<tr>
<td>Lot Width – Minimum (at ROW)</td>
<td>100 feet</td>
<td>Approximately 1793 feet</td>
</tr>
<tr>
<td>Lot Depth – Minimum</td>
<td>150 feet</td>
<td>Approximately 2015 feet</td>
</tr>
<tr>
<td>Maximum Height</td>
<td>50 feet</td>
<td>Approximately 41 feet</td>
</tr>
<tr>
<td>Maximum Impervious Coverage</td>
<td>15%</td>
<td>1.2%</td>
</tr>
<tr>
<td>Front Yard Setback – Building</td>
<td>100 feet</td>
<td>Approximately 1000 feet</td>
</tr>
<tr>
<td>Interior Side Yard Setback – Building</td>
<td>100 feet</td>
<td>Approximately 900 feet</td>
</tr>
<tr>
<td>Rear Yard Setback - Building</td>
<td>100 feet</td>
<td>Approximately 1000 feet</td>
</tr>
<tr>
<td>Parking Lot Setback</td>
<td>100 foot</td>
<td>Approximately 200 feet</td>
</tr>
</tbody>
</table>

**Standards for Places of Worship within the Public and Quasi-Public Zoning District.** The following outlines standards for places of worship as outlined in the Public and Quasi-Public zoning district.

a. Direct access is provided to a public street classified by the Comprehensive Plan as major collector or arterial;
   - *Staff Comment.* The City approved a variance for the access to this site in 1991. There is an existing driveway that connects the property to Demontreville Trail that is in an access easement that has been in place since 1904.

b. No use may exceed 235 gallons wastewater generation per day per net acre of land;
• *Staff Comment.* It is unknown how much wastewater is generated, but it is assumed there is no more than 235 gallons being generated per net acre on a 90 acre site.
c. No on-site sewer system shall be designed to handle more than 5,000 gallons per day;
• *Staff Comment.* The proposed drainfield is 15,000 square feet in area and according to the SSTS design report dated May 8, 2019 is designed to handle 350 gallons of waste a day.
d. Exterior athletic fields shall not include spectator seating, public address facilities or lighting;
• *Staff Comment.* There are no exterior athletic fields.
e. No freestanding broadcast or telecast antennas are permitted. No broadcast dish or antenna shall extend more than 6 feet above or beyond the principal structure.
• *Staff Comment.* There are no broadcast or telecast antennas, existing or proposed.

Parking Lot Requirements.

The project plans show a new 18-vehicle parking lot to the west of the entrance driveway and to the northwest of the proposed chapel.

- **Maneuvering Area.** There is sufficient space in and around the parking lot so vehicles do not need to back in to the public street.

- **Surfacing and Drainage.** The majority of the parking lot would have curbing and would be paved with a durable surface. Stormwater drainage would be directed to the northeast to a new infiltration basin on the site.

- **Marking of Parking Spaces.** The Code requires parking areas with five or more spaces to be marked with painted lines at least four inches wide. The plans for the parking lot show striping to meet this requirement.

- **Curbing.** Open off-street parking areas designed to have head-in parking along the property line shall provide a bumper curb or barrier of normal height. The proposed parking lot meets this requirement.

- **Accessible Parking.** The proposed number of parking spaces is 18 and of these, one would be handicap–accessible, which meets the Americans with Disabilities Act (ADA) requirements.

- **Number of Parking Spaces.** The City’s parking requirements requires one space per six seats. There are 54 seats within the chapel so the Code would only require 9 parking spaces for the chapel. The applicant has proposed 18 parking spaces thus meeting this requirement.

Parking Lot Landscaping and Screening Standards

- **Perimeter Parking Lot Landscaping.** The proposed parking lot is located in the center of the property – well away from the street right-of-way and from any property lines. The existing trees on the site provide adequate screening and landscaping around the proposed parking lot.

**Landscape Plans.** The applicant has submitted surveys and project plans showing the existing landscaping and wooded areas on the property. Since the site has extensive areas of trees and the since the proposed chapel would not be removing any existing trees, staff does not recommend that the City review or require additional landscaping on the property.
Septic Drainfield. The existing drainfield is to the south of the existing building and the proposed chapel will not affect the existing drainfield. The project plans show a new drainfield to the south of the proposed chapel. This new drainfield will require a permit from the Washington County Public Health and Environment Department before installation.

Architectural Standards within the Public and Quasi-Public Open Space. The exterior design of the chapel is subject to the Performance Standards set forth in Section 154.600(F) of the Zoning Code. The proposed chapel would be constructed with a mix of brick, limestone, marble and have a green shingled roof. These materials meet the requirements for exterior materials as listed in the zoning code and the overall design meets or exceeds all the design standards set in Section 156.600 of the Zoning Code.

Fire Chief Review. I have attached the Fire Chief’s review comments (dated June 5, 2019) for your consideration. Staff is recommending that the applicant meet all the requirements of the Fire Chief before the City issues a building permit for the chapel.

City Engineer Review. The City Engineer’s review memo (dated June 17, 2019) is attached to this report. His comments are primarily about stormwater management for the project. He noted:

- The project will require a Valley Branch Watershed District (VBWD).
- The storm water facilities for this development should remain privately owned and maintained.
- The storm water facility 100-year HWL must be fully contained within the subject property and easement must be provided to protect the 100-year HWL flood area.
- The applicant shall provide drainage and utility easement over storm water BMP including the 100-year HWL and pond maintenance access road and access bench.

Recommendation Findings. Staff recommends the following findings:

1. The proposed use will not be detrimental to or endanger the public health, safety, comfort, convenience or general welfare of the neighborhood or the city. The use of the property for religious facilities, including the proposed chapel, will not be detrimental or in any way endanger the public health, safety, comfort, convenience or welfare of the neighborhood or the City.

2. The use or development conforms to the City of Lake Elmo Comprehensive Plan. The property is guided for Public/Park in the 2030 Comprehensive Plan and Institutional in the proposed 2040 Comprehensive Plan. A place of worship is a conditional use in these land use designations.

3. The use or development is compatible with the existing neighborhood. The use is compatible with the existing neighborhood. The religious facilities in this area were established in the 1950’s and Hermitage has been on this site since the 1980’s.

4. The proposed use meets all specific development standards for such use listed in Article 7 of this Chapter. The existing and proposed uses meet all specific development standards for such use as listed in Section 154.600 Public and Quasi-Public Open Space.

5. If the proposed use is in a flood plain management or shoreland area, the proposed use meets all the specific standards for such use listed in Chapter 150, §150.250 through 150.257 (Shoreland Regulations) and Chapter 152 (Flood Plain Management). The existing structures and the proposed chapel would be located outside the 0.2% annual chance floodplain and meets shoreland setback requirements.
The proposed use will be designed, constructed, operated and maintained so as to be compatible in appearance with the existing or intended character of the general vicinity and will not change the essential character of that area. The proposed chapel is compatible in appearance with the existing and intended character of the general vicinity and will not change the essential character of the area.

The proposed use will not be hazardous or create a nuisance as defined under this Chapter to existing or future neighboring structures. The existing religious facilities and the proposed chapel are not nor will they be hazardous or create a nuisance.

The proposed use will be served adequately by essential public facilities and services, including streets, police and fire protection, drainage structures, refuse disposal, water and sewer systems and schools or will be served adequately by such facilities and services provided by the persons or agencies responsible for the establishment of the proposed use. The existing facilities and the proposed chapel are and will be adequately served by essential public facilities and services, including streets, police and fire protection, drainage structures, refuse disposal, water and sewer systems and schools.

The proposed use will not create excessive additional requirements at public cost for public facilities and services and will not be detrimental to the economic welfare of the community. The existing facilities and the proposed chapel do not and will not create excessive additional requirements at public cost nor will the existing or proposed facilities on the property be detrimental to the economic welfare of the community.

The proposed use will not involve uses, activities, processes, materials, equipment and conditions of operation that will be detrimental to any persons, property or the general welfare because of excessive production of traffic, noise, smoke, fumes, glare or odors. The existing and proposed uses will not excessively produce traffic, noise, smoke, fumes, glare or odors.

Vehicular approaches to the property, where present, will not create traffic congestion or interfere with traffic on surrounding public thoroughfares. Vehicular approaches to the property do not and will not create and have not created traffic congestion or interfere with traffic. The number of additional vehicles expected on the property because of the new chapel is minimal and will be limited to certain times and days of the weeks.

The proposed use will not result in the destruction, loss or damage of a natural or scenic feature of major importance. N/A

Recommended Conditions of Approval. If the Planning Commission wishes to recommend approval, staff recommends the following conditions:

1) The applicant must obtain all other necessary City, State, and other governing body permits and approvals before the commencement of any construction activity on the site. These include, but not limited to, a Valley Branch Watershed District permit, approval of revised plans by the City Engineer, a building permit and an on-site wastewater (septic) permit.

2) All items and changes outlined by the City Engineer in the memorandum addressing the Carmelite Chapel Conditional Use Permit and Site Improvements dated June 17, 2019 shall be incorporated into the project plans.
3) All items outlined by the Fire Chief in his memo dated June 5, 2019, shall be incorporated into
the project plans and before the City issues a building permit for the project.

4) The applicant must provide written documentation demonstrating adequate wastewater
management facilities exist or are proposed to serve the proposed chapel. This should include either
a Washington County inspection compliance report for the existing on-site wastewater system or a
wastewater management plan and permit approved by Washington County to serve the proposed
chapel.

5) The applicant or owner receive a building permit from the City for chapel within 12 months of City
Council approval of the conditional use permit.

6) If the applicant or owner has not taken action toward starting the chapel or if substantial
construction of the chapel has not taken place within 12 months of the City’s approval of
conditional use permit, the CUP approval shall become void. The applicant or owner may request
City Council approval of a time extension to start or implement the conditional use permit.

FISCAL IMPACT:

None

OPTIONS:
The Planning Commission may:

- Recommend approval of the Conditional Use Permit with recommended findings and conditions
  of approval.
- Recommend approval of the Conditional Use Permit with amended findings and conditions of
  approval.
- Recommend denial of the Conditional Use Permit, citing findings for denial.

RECOMMENDATION:

Staff is recommending approval of the Conditional Use Permit for the Carmelite Hermitage of the Blessed
Virgin Mary including the proposed chapel for the property located 8249 Demontreville Road:

“Move to recommend approval of the conditional use permit for the Carmelite Hermitage including
the proposed chapel for the property located at 8249 Demontreville Road with recommended findings
and conditions of approval as drafted by Staff.”

ATTACHMENTS:

- Application Narrative dated May 24, 2019
- 4 City Maps
- Site Survey
- Certificate of Survey
- Engineering Project Plans (2 sheets)
- Architectural Plans (5 sheets)
- May 8, 2019 SSTS Design Report
- City Engineer Review Memo dated June 17, 2019
- Fire Chief Review memo dated June 5, 2019
- Neighbor comments (Falzone) dated June 16, 2019
Land Use Application – 5-24- 2019

Property Location
All of Government Lot 4 in Section 9, Township 29 north, Range 21 west, City of Lake Elmo, Washington County, Minnesota, according to government survey containing 59.4 acres of land. Also the south 30.6 acres of Government Lot 4 in Section 4, and of the southwest quarter of the southeast quarter of said Section 4, all in Township 29 north, Range 21 west, according to government survey, being the south 688 feet thereof.

Detailed Reason for the Request
In December of 1991, the City of Lake Elmo approved the master plan of the Carmelite Hermitage of the Blessed Virgin Mary (aka Carmel of the Blessed Virgin Mary). The master plan included a phasing plan of four parts. Phase 1, consisting of a community building and garage was constructed in 1991/92. Phase 2, consisting of a central court yard with covered walkways (cloister) was constructed in 2001/2002. Phase 3 consists of a chapel and is the building we would now like to construct. Phase 4 will consist of a guest building and library. We hope to commence Phase 4 around 2022. We request City approval of a conditional use permit to construct our chapel because it is an essential building of every monastery and will provide needed worship space for the members of the Hermitage and their guests.

Variance Requests
No variances requested.

2a. Contact Information

Owner of Record
Discaled Carmelite Nuns of Saint Paul
8251 Demontreville Trail
Lake Elmo, MN 55042
651-777-3882

Authorized Agent
Rev. John Burns
Carmelite Hermitage of the Blessed Virgin Mary
8249 Demontreville Trail
Lake Elmo, MN 55042
651-779-7351
carmelbvm@gmail.com

Architect
Duncan Stroik
218 West Washington Avenue
Suite 1200
South Bend, IN 46601
574-232-1783
stroik@stroik.com

Civil Engineer
Paul Cherne, P.E.
Pioneer Engineering
2b. Property Information

Addresses
Discalced Carmelite Nuns of St. Paul
8251 Demontreville Trail
Lake Elmo, MN 55042

Carmelite Hermitage of the Blessed Virgin Mary
8249 DeMontreville Trail
Lake Elmo, MN 55042

Current Zoning
Public Facility (PF)

Parcel Size
90.109 acres
3,924,760 square feet

PID
0902921120002

Current Legal Description
All of Government Lot 4 in Section 9, Township 29 north, Range 21 west, City of Lake Elmo, Washington County, Minnesota, according to government survey containing 59.4 acres of land. Also the south 30.6 acres of Government Lot 4 in Section 4, and of the southwest quarter of the southeast quarter of said section 4, all in Township 29 north, Range 21 west, according to government survey, being the south 688 feet thereof.
2c. History of the Property

The property under consideration was homesteaded in the 1800s and remained farm land until 1954. At one time William Jennings was owner of all of Lot 4, Section 9, Township 29, Range 21, and all of Lots 3 and 4 and the West one-half of the Southeast Quarter of Section 4, Township 29, Range 21, West in Washington County, Minnesota.

On 25 August 1904, William Jennings and his wife conveyed to Christian Figge by warranty deed dated that day, Government Lot 4, Section 9, Township 29, Range 21, and also the South 30.6 acres of Lot 4 in Section 4 and of the Southwest Quarter of the Southeast Quarter of Section 4, Township 29, Range 21. As part of said conveyance, William Jennings also granted to Christian Figge a right of way (easement) to Figge’s property over Government Lots 3 and 4 in Section 4 as described in a deed recorded in Book 72 of the Book of Deeds, page 80, Washington County, Minnesota. This is the easement from Demontreville Trail across property now owned by the Jesuit Retreat House and to the property under consideration that has existed since 1904.

In 1954, the Discalced Carmelite Nuns of Saint Paul, a non-profit corporation under the laws of the State of Minnesota, were looking for property upon which to build a permanent monastery. They were advised of the property which they now own and entered into negotiations with the current owners.

On 2 February 1954, Phillip C. Mackey and his wife Bernadine R. Mackey conveyed their property, along with its easement, to the Discalced Carmelite Nuns of Saint Paul by warranty deed, dated that day, and filed for record in Washington County, Minnesota, on 4 February 1954. At the time of purchase, said property had been on the market for five years. The Carmelite Nuns built their monastery upon their newly acquired property in 1954/55. They moved into the new monastery in 1955 and have resided there since that time.

In 1983, Rev. John Burns, a Carmelite priest, became chaplain for the Carmelite Nuns in Lake Elmo. After several years, the Carmelite Nuns and Fr. Burns mutually agreed that it would be beneficial to the Carmelite nuns if the Carmelite Fathers and Brothers established their own monastery on the property. This would assure the nuns of future chaplains and allowed the Carmelite Fathers to have a presence in the Twin Cities. In 1987 Carmel of the Blessed Virgin Mary (aka Carmelite Hermitage, Carmelite Hermitage of the Blessed Virgin Mary) was incorporated in the State of Minnesota. Other priests and brothers joined the community over the years.

The Order of Carmelites was founded on Mount Carmel (present State of Israel) sometime before 1200 AD. From there it has spread to six continents. Currently there are about 900 monasteries of nuns with a total membership of 10,000, and 1,000 houses of Carmelite priests and brothers with about a total membership of 6,000. We are part of the Roman Catholic Church.

Our way of life consists of prayer, study, and labor to support ourselves. We also welcome visitors who wish to find a quiet place to refresh their minds and hearts, to reflect and pray, either by themselves or with us, and who may desire to seek guidance for their lives by talking with one of the members of our community. The chapel is the heart of our monastery buildings. Our day is punctuated by liturgical services and times of personal prayer. We live a simple way of life and support ourselves through arts and crafts, organic gardening, maple syrup production, woodworking and self-maintenance of our property and buildings.

2d, i.

The 90 acre tract upon which the new chapel will be built is approximately 60% woodland and 40% prairie and is situated on the east bank of Lake Demontreville. Wildlife is abundant in all areas of the property. We have a personal commitment to live in harmony with our natural surroundings and to employ horticultural practices which do not pollute but rather benefit the environment. We have spent many hours removing buckthorn and diseased trees from our property and planting species of trees and shrubs which are beneficial to wildlife.
The new chapel will be situated just west of the existing buildings of the Hermitage. The land there is almost flat, and construction of the chapel will not require any significant changes to the topography. The hermitage is situated in an open field surrounded by woodlands. The area in the immediate vicinity of the hermitage is planted with lawn, trees, shrubs, and flower beds. Access to the hermitage is provided by a private road from Demontreville Trail. The distance between the hermitage and Demontreville Trail is approximately ½ mile.

Since we live at the Hermitage, and since our way of life is relatively secluded, we leave the Hermitage infrequently, and therefore we do not generate a significant amount of traffic. Visitors to our Hermitage now average 1-2 per day. Additionally, we have regular mail delivery and occasional deliveries by UPS or FedEx. Our new chapel will be open to the public during the day and may generate an increased number of visitors. Because of the remoteness of our property and the fact that we do not advertise, we do not anticipate an increase of visitors beyond an average of 10-15 per day. We do not operate any programs for the public, although we may have a special celebration a few times per year to which guests are invited. We do not anticipate any adverse effects upon the natural areas of our property during or after the construction of the chapel.

2d, ii.

We currently have seven members in our community, and we may eventually grow to a maximum of twelve members. We have two part-time employees who help to maintain our grounds and buildings. The Hermitage opens to the public at 7:30 AM and closes at 4:30 PM. We have a gate which prevents access to the hermitage after-hours.

Our community building provides living and work spaces for the members of the community, including a kitchen, dining room, laundry, shower room, library, infirmary, and mechanical room. To the west of the community building and attached to it lies the cloister. This consists of a quadrangle surrounded by covered walkways which allow passage from one building to another under a roof. The open interior of the cloister is landscaped with flowerbeds and a pool. Off the north and south sides of the cloister are found the bedrooms of the members of the community. The new chapel will be situated just west of the cloister. The chapel will be used for liturgical services and for personal prayer. It has a planned seating capacity of 42 guests, in addition to the members of our community (12 maximum).

2e, i.

Since the parcel of land upon which the chapel will be built is very large and since the chapel will be located in the middle of the parcel, we do not foresee that the chapel will cause any inconvenience or disturbance to the neighborhood or to the City. Our community greatly values silence as an appropriate atmosphere for prayer and personal reflection. None of the activities carried on in the new chapel will create noise. The chapel will be built of durable and noble materials which will enhance the beauty of the neighborhood. The safety of our grounds and buildings is important to us. No toxins or harmful waste products are produced as a result of activities at our monastery, and we are committed to recycling and energy conservation.

2e, ii.

Our parcel of land has always been and continues to be zoned as Public Facility. No change in land use is envisioned in our plans. Since our parcel of land is heavily wooded and borders Lake Demontreville on its west side, we in no way interfere with the development plans of the City of Lake Elmo. The comprehensive plan is for public/park. The rural character of the area will not be changed by the addition of the new chapel building.
Our property is bordered on the south and east by low density private housing, on the north by the Jesuit Retreat House, and on the west by Lake Demontreville. Woodland separates our buildings from the single-family neighborhoods which border our property to the east and to the south. Woodlands also separate us from the Jesuit Retreat House. There is no direct view of our buildings from any neighboring property. There is no incompatibility between our hermitage and the existing neighborhood. We have excellent relations with our neighbors. Many have told us that they are very grateful to live next to our hermitage both because of the prayerful and religious nature of our life and also because of our extensive woodlands.

The Jesuit Retreat House shares the same prayerful and religious activities as we do. Far from being incompatible, our institutions belong to the same church and share a common way of life. The one priest who is resident at the Jesuit Retreat House opposes our new chapel because of a fear that it will increase traffic on the roadway which passes through Jesuit property to reach our hermitage. We have told him that we will work with him to minimize any disturbance to the retreats which take place from Thursday evening through Sunday evening most weeks. Since we do not advertise in any way nor offer programs for the public, we do not anticipate large crowds coming to our hermitage. Visitors will be intermittent and will usually arrive in a single car. By contrast, there may be fifty or more cars which come to and leave from the Jesuit Retreat House at the beginning or end of the weekly retreat. Trucks make food deliveries during the week and a laundry truck comes each week to replace sheets and towels. The Retreat House employs far more people than our Hermitage, and this also adds to the traffic in the area.

Our project conforms to Article 7 of the Zoning Code, including general requirements for parking as regards dimensions and number of parking spaces.

The project is not in a flood plain. The project is in a shoreland district. The project meets the setback and lot area requirements of the ordinance. Demontreville Lake is a recreational development lake. The project is a permitted use in the shoreland district

<table>
<thead>
<tr>
<th>Setback County Road</th>
<th>Ordinance</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setback Public Street</td>
<td>20</td>
<td>1025’</td>
</tr>
<tr>
<td>Setback OHW</td>
<td>200</td>
<td>980’</td>
</tr>
<tr>
<td>Setback top of bluff</td>
<td>30</td>
<td>220’</td>
</tr>
<tr>
<td>Setback OHW- Septic</td>
<td>75</td>
<td>810’</td>
</tr>
<tr>
<td>Maximum impervious coverage</td>
<td>15%</td>
<td>1.2%</td>
</tr>
</tbody>
</table>
2e, vi.
The new chapel will be constructed of the same materials as the existing buildings of the hermitage (brick and stone). The monastery of the Carmelite nuns is also a brick structure. The main building complex of the Jesuit Retreat House is a limestone structure. No change in the character of the area will result from the construction of our chapel. The nearest land uses are also religious.

2e, vii.
The chapel will be isolated from neighbors and will not create a hazard or nuisance to existing or future neighboring structures.

2e, viii.
The project will be served adequately by existing public services and will not create any additional demand for public services. The site utilizes an onsite well and onsite septic system. In 1991 officials from the Lake Elmo Fire Department visited our Hermitage to determine whether our site presented any difficulties of access for the fire department. Fire Chief Dick Sachs stated in writing that our site did not pose any problems to his department. (See attached letter.)

2e, xi.
The project will not create a need for additional public services or facilities. No detriment to the economic welfare of the community will result from the construction of our chapel.

2e, x.
The chapel will be used for religious purposes by the residents of the Hermitage. Guests and visitors will have access to the chapel at suitable hours of the day. The chapel has a planned seating of 42 persons, but we do not anticipate having nearly this many people at our services on a daily basis. At the present time, we have no more than 0 to 10 visitors a day. Most days the number is 0 to 2. The new chapel will not produce noise, smoke, fumes, glare, or odors, and the increase of traffic on account of the chapel will be minimal.

2e, xi.
The site is accessed via a collector street (Demontreville Trail) and a private drive. The additional traffic generated by the chapel is estimated to be 8 average daily trips on most days of the year and 30 average daily trips on a few occasions in a calendar year. Most trips will occur during non-peak hours.
The new chapel will be built in an open field and will result in very minimal tree removal (8-10 evergreens which we ourselves had planted). No wetlands will be impacted. The chapel will be located 980’ feet from Lake Demontreville. The final phase of our monastery building program will consist of a building for visitors and guests as well as some rooms for community workshops and library.

**Landscaping Plan**

Because the area around the chapel will be further developed with a guest building, workshops and a small library, we do not plan extensive landscaping around the chapel. Lawn grasses, some foundations shrubs, and a few flower beds will be planted and mulched with wood chips. Mr. Ken Roberts thought that, under these circumstances, it would not be necessary to submit a separate landscaping plan.
CARMELITE HERMITAGE
OF THE BLESSED VIRGIN MARY
8249 DE MONTREUIL TRAIL
LAKE ELMO, MINNESOTA 55042-9545
SSTS Design Summary Report

On April 19th, 2019, a site evaluation was conducted at 8249 Demontreville Trail N, MN 55082 in Washington County. The PID number is 09.029.21.12.0002

Scope of Report
The purpose of the design report is to create a plan for a new sub-surface treatment system to treat wastewater from the new chapel to be built at the address above. This design details the plan for the required tanks and soil treatment dispersal areas per Washington County Development Code, Chapter Four Subsurface Sewage Treatment System Regulations, Ordinance 206. The system is designed for an Assembly Hall w/ no kitchen plus two (2) full-time employees which will be at the Chapel during day. The system components will be a Type I designed Mound and a total of three Septic & Pump Tanks (1,000-gal; 1,000-gal & 1,000-gal). See Site Plan.

Preliminary & Field Evaluation Work
The Washington County Maps GIS data (https://maps.co.washington.mn.us/WCGIS/) was used to determine all property lines, utility Right of Ways, roads and other necessary features required by Ordinance 206, Section 9, Subparts 9.2 thru 9.3 prior to and during site evaluation. See Site Plan for details.

The information available at MN Well Index (https://mnwellindex.web.health.state.mn.us/) does not indicate the location of any wells within 100 feet of the proposed area. Section MN Well Index – Research.

The Web Soil Survey data (https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx), which is provided by the USDA, was gathered to determine the soil characteristics of the area prior to a field evaluation. See Section Web Soil Survey – Research for more details.

The field evaluation included staking a 50’ x 26’ soil absorption area, measurements from all setbacks and property line, elevations for absorption area, tanks and soil observations and a minimum of four (4) soil observations within or on the edge of the proposed absorption area for the Soil Treatment Area (STA) and an additional four (4) soil observations were conducted in second Soil Treatment Area identified for future use located to the South of the new Mound.

Soil Observations
The soil borings and pits were conducted, classified and recorded to meet the Washington County Ordinance 206, Section 9, 9.5 thru 9.7. Redox was observed in all Borings & Soil Pits. The limiting layer was observed at 14” at SB1. See attached Soil Observation Logs.
Wastewater Sources & Flows
The new Chapel is expected to have a seat capacity for 80 guests with 2 employees on staff full-time. The estimated Peak Flow rate is 350 gallons per day (gpd) was calculated using values provided by Chapter 7081.0130, Table I: Estimate design sewage flow from other establishments. A safety factor of 20% was applied to calculate the final Design Peak Flow of 400 gpd.

The Organic Load was calculated using the Estimate of Waste Strengths from Other Establishments chart provided with the University of Minnesota – SSTS Design Forms Worksheet (see U of MN Design Forms). The total Organic Loading Rate for 400 gpd for 80 guests (.01 #s / seat) & 2 full-time employees (.05 #s /employee) is **.90 pounds of BOD per day** which will need to be treated each day. This equals **269 mg/L of BOD per day**. If the system was used to max capacity each day, this level of effluent would be considered At-Risk Effluent and might need to be sampled regularly to ensure treatment level C prior to dispersal to the Mound. However, the Septic Tanks, the Dose Tank & Soil Treatment Area have been designed to handle the worst-case scenario flow-rate & waste-strength from this building.

The septic tanks & dose tank are sized to provide a retention time of 5 days (typical is 3-days retention) & a **storage capacity of 2 x Peak Flow** in the event of unexpected pump failure.

The total size of the **Soil Absorption Area was increased 25%** to account for a potential of At-Risk Organic Loading rates of BOD & TSS. The Peak Design Flow rate of 400 gpd for a typical Type I system receiving Residential Strength Waste (170 mg/L BOD) would require 1,040 sqft of absorption in Silt Loam soil. The increased size was calculated using the University of Minnesota Chart (Table 5.1; Manual for Septic System Professionals in Minnesota) for determining Organic Loading Rate. The equivalent loading rate for Silt Loam is 0.0007 #/sqft. The required absorption for .90 #s/day BOD @ 400 gpd with an Organic Loading rate of .0007 #/sqft is **1,280 sqft**.

**Type I Mound**
The total area for the STA will impact 3,837 sqft (45.3’ x 84.7’) located to the South of the new Chapel. The newly constructed mound will have an **Absorption Area of 1,300 sqft (26’ x 50’)**. The observations found redoximorphic soil conditions at 14 inches from the surface and will require **22” of washed-mound sand** to achieve the necessary vertical separation from the most limiting layer.

The required materials for the sewer line, distribution network, pumps, piping, sand, rock, fill and cover are detailed in the design worksheets included with this design. Please note, all calculations for materials and pumps are estimates. Actual values may change slightly and will need to field verified for correctness. See U of MN Worksheets for more details.

The pump used for dosing the pressure bed must deliver a minimum of **22 gallons per minute** and overcome a total dynamic head pressure of **16 feet**. All supply pipes and laterals shall be built to specifications and drain-out completely after each dose to prevent freezing.

**A second 1,300 sqft area** was identified and staked-off for **future use**. No structures or vehicle traffic can occur over this area. Precautions should be taken in the years to come to avoid damaging, compacting or disturbing this area.

**Special Conditions**
1. Due to the large flat area, drainage should be maintained throughout the area to avoid ponding around the tanks or at the edges of the Mound.
2. No final sewer elevation was provided by the builder. Elevation and locations are subject to change. No tank can be buried deeper than 4’ below grade.
3. Drainback for Supply Line & Freezing - The slope from the Pressure Bed Supply Line must drain back to the dose tank. Additional depth or insulation may be necessary to keep line from freezing if the supply line is buried too shallow.

4. Setbacks to Easements & Property Lines – There was no survey performed prior to site evaluation, so all measures are estimates. The owner and Installer will need to make sure all construction is within required setbacks.

**Other Considerations**

**6.1 Building Permit requirements.**
No construction shall be allowed by any local unit of government until the permit required for the subsurface sewage treatment system has been issued.

**9.11 Site Protection**
Prior to and during construction or lot improvements, the proposed initial and replacement soil treatment and dispersal areas shall be protected from disturbance, compaction, or other damage by use of stakes and silt fence or snow fence.

**As-Built Drawing**
The Licensed Installer must provide an As-built of the final location of all components. The attached Site Plan is only for reference and should not be considered as final survey.

---

**End of Report**

**Disclaimer**

As property owner, I agree to use the system within the parameters described above and in the design worksheets. I also agree hold Steinbrecher Companies, Inc and the named designer harmless for any future issues regarding this system.

<table>
<thead>
<tr>
<th>Owner Signature</th>
<th>Date</th>
</tr>
</thead>
</table>

Note – This design is not recommended to be permitted until the following areas, included with this design, are signed by property owner.

- Design Summary Report, Preliminary Evaluation Worksheet (section 2) and Homeowner Maintenance Log
Materials & Specifications

8249 DeMontreville Trail N, Lake Elmo

Tanks – Minnesota Precast
- 1,000-gallon Septic Tank
- 1,000-gallon Septic Tank
- 1,000-gallon Dose Tank

Effluent Filter & Alarm
- Polylok 525 w/ Reed Switch for Alarm
- Dual-Alarm Box located in or near house (or Installer equivalent)
- Electrical wire & Junction Box (~100’ from building)
- Dedicated 120V circuit for alarm (10 Amp min.)

Sewer Line
- 4” Sch 40 dia. pipe @ ~ 20’
- Fittings, as necessary

Pump – Gould PE41 (or similar model)
- 23 GPM
- 16 TDH
- Mechanical (120V rated) Float for Pump On/Off
- Electrical wire & Junction Box, as necessary (~100’)
- Dedicated 20 amp, 120V circuit from building to pump

Supply Line to Pressure Laterals
- 2” sch 40 pipe @ ~ 100’
- Fittings, as necessary

Pressure Laterals
- 3 – 50’ long w/ 1 ½” sch 40 pipe
- 3’ spacing (orifices)
- 3/16” diameter orifices (drilled holes)
- Clean-outs at end of each lateral
- 1 ½” Bends, couplings, sweeps and fittings, as necessary

Inspection pipes
- 4” Sch 40 pipe built to spec in Mound design

Mound Sand
- Min. Height – 22”
- Absorption Area – 26’ x 50’

Rock Bed
- Dispersal Area – 10’ x 50’
- Rock depth – 6” + min 3.5” to cover pipe

Back Fill & Black Dirt for cover
- See calculations on Mound Materials Worksheet

*Note: All materials quantities for pipe, sand, rock, etc. are only estimates.
**Tonnage calculations for materials may differ from actual volume used onsite.
Disclaimer: Map and parcel data are believed to be accurate, but accuracy is not guaranteed. This is not a legal document and should not be substituted for a title search, appraisal, survey, or for zoning verification.
## Preliminary Evaluation Worksheet

### 1. Contact Information

- **Property Owner/Client:** Carmelite Monastery  
  **Date Completed:** 4/20/2019
- **Site Address:** 8249 Demontreville Trail N, Lake Elmo  
  **Project ID:**
- **Email:**
- **Mailing Address:** 8249 Demontreville Trail N, Lake Elmo, MN 55402  
  **Legal Description:**
- **Parcel ID:** 09.029.21.12.0002  
  **TWP:**  
  **SEC:**  
  **RNG:**

### 2. Flow and General System Information

#### A. Client-Provided Information

- **Project Type:** ✅ New Construction  
  - Replacement
  - Expansion
  - Repair
- **Project Use:**  
  - Residential
  - ✅ Other Establishment: Assembly hall
- **Residential use:**  
  - # Bedrooms: 
  - Dwelling Sq.ft.: 
  - Unfinished Sq. Ft.: 
  - # Adults: 
  - # Children: 
  - # Teenagers: 
- **In-home business (Y/N):** 
  - If yes, describe:
- **Water-using devices:** (check all that apply)  
  - Garbage Disposal/Grinder
  - Sewage pump in basement
  - Large Bathtub >40 gallons
  - Clothes Washing Machine
  - Dishwasher
  - Water Softener*
  - Iron Filter*
  - High Eff. Furnace*
  - Self-Cleaning Humidifier*
  - Sump Pump*
  - Other:
- **Additional current or future uses:**
- **Anticipated non-domestic waste:** Only domestic waste anticipated.

### The above is complete & accurate:

#### Client signature & date

#### B. Designer-determined flow Information

- **Design Flow:** 400 GPD  
- **Anticipated Waste Type:** Other Est. - At-Risk
- **BOD:** 269 mg/L  
- **TSS:** 70 mg/L  
- **Oil & Grease:** 20 mg/L

### Additional Well Information:

Well is located at NE corner of existing building.

<table>
<thead>
<tr>
<th>#</th>
<th>Description</th>
<th>Mn. ID#</th>
<th>Well Depth (ft.)</th>
<th>Casing Depth (ft.)</th>
<th>Confining Layer</th>
<th>STA Setback</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Monastery Well</td>
<td>Unknown</td>
<td></td>
<td></td>
<td></td>
<td>50</td>
<td>MN Well Index</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Clear water source - should not go into system

---

[Image 29x721 to 141x763] [Image 436x722 to 583x763] [Image 169x509 to 252x524] [Image 285x510 to 347x525] [Image 148x491 to 201x507] [Image 217x490 to 316x508] [Image 223x385 to 341x417] [Image 223x355 to 341x384] [Image 449x355 to 558x401] [Image 346x386 to 426x416] [Image 347x355 to 398x384] [Image 475x509 to 533x526] [Image 385x509 to 441x526]
Preliminary Evaluation Worksheet

<table>
<thead>
<tr>
<th>Site within 200' of noncommunity transient well (Y/N)</th>
<th>No</th>
<th>Yes, source:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site within a drinking water supply management area (Y/N)</td>
<td>No</td>
<td>Yes, source:</td>
</tr>
<tr>
<td>Site in a Well Head Protection inner wellhead management zone (Y/N)</td>
<td>No</td>
<td>Yes, source:</td>
</tr>
<tr>
<td>Buried water supply pipes within 50 ft of proposed system (Y/N)</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

B. Site located in a shoreland district/area?

| Elevation of ordinary high water level: | ft | Source: |
| Classification: | Tank Setback: | STA Setbk: | ft. |

C. Site located in a floodplain?

| Floodplain designation/elevation (10 Year): | ft | Source: |
| Floodplain designation/elevation (100 Year): | ft | Source: |

D. Property Line Id / Source:

| Owner | Survey | County GIS | Plat Map | Other: |

E. ID distance of relevant setbacks on map:

| Water | Easements | Well(s) | Building(s) | Property Lines | OHWL | Other: |

4. Preliminary Soil Profile Information From Web Soil Survey (attach map & description)

| Map Units: | 49–Antigo silt loam | Slope Range: | 0-2 | % |
| List landforms: | Flats, terraces |
| Landform position(s): | Plain |
| Parent materials: | Loess and/or silty glaciofluvial deposits |
| Depth to Bedrock/Restrictive Feature: | 80 | in |
| Depth to Watertable: | 80 | in |

Map Unit Ratings

- Septic Tank Absorption Field- At-grade: Very Limited
- Septic Tank Absorption Field- Mound: Not Limited
- Septic Tank Absorption Field- Trench: Very Limited

5. Local Government Unit Information

| Name of LGU: | Washington County |
|LGU Contact: | |
|LGU-specific setbacks: | N/A for this site |
|LGU-specific design requirements: | Contour Late rate for Mound is <= 10 |
|LGU-specific installation requirements: | |
|Notes: | |
1. Project Information

Property Owner/Client: Carmelite Monastery
Site Address: 8249 Demontreville Trail N, Lake Elmo
Date Completed: 4/19/2019

2. Utility and Structure Information

Utility Locations Identified: Gopher State One Call #
Locate and Verify (see Site Evaluation map)

3. Site Information

Vegetation type(s): Grass
Landscape position: Plain
Percent slope: 2%
Slope shape: Convex, Linear
Slope direction: north

Describe the flooding or run-on potential of site:

Describe the need for Type III or Type IV system:

Note:

Elevations and Benchmarks identified on map? (Y/N): Yes If yes, describe:
BM = Bottom of Apron

Proposed soil treatment area protected? (Y/N): Yes If yes, describe:
See Site Plan

4. General Soils Information

Filled, Compacted, Disturbed areas (Y/N): No

If yes, describe:

Soil observations were conducted in the proposed system location (Y/N): Yes

A soil observation in the most limiting area of the proposed system (Y/N): Yes

Number of soil observations: 8

Soil observation logs attached (Y/N): Yes

Percolation tests performed & attached (Y/N): No

5. Phase I. Reporting Information

Periodically saturated soil: 14 in 100.2 ft Soil Texture: silt loam
Standing water: in ft Percolation Rate: min/inch
Bedrock: in ft Soil Hyd Loading Rate: gpd/ft
Benchmark: 100 ft

Benchmarck Location: Bottom of Apron @ SW Corner of Existing building. - See Map

Differences between soil survey and field evaluation:

Site evaluation issues / comments:
Access for construction from NW corner of site.

Anticipated construction issues:
**Soil Observation Log**

**Client:** Carmelite Monastery

**Location / Address:** 8249 Demontreville Trail N, Lake Elmo

**Observation #/Location:** SB1 - Mound - See Map

**Observation Type:** Auger

<table>
<thead>
<tr>
<th>Depth (in)</th>
<th>Texture</th>
<th>Rock Frag. %</th>
<th>Matrix Color(s)</th>
<th>Mottle Color(s)</th>
<th>Redox Kind(s)</th>
<th>Indicator(s)</th>
<th>Shape</th>
<th>Grade</th>
<th>Consistence</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-9</td>
<td>Silt Loam</td>
<td>&lt;35%</td>
<td>10YR 3/4</td>
<td></td>
<td></td>
<td>Blocky</td>
<td>Weak</td>
<td>Firm</td>
<td>Friable</td>
</tr>
<tr>
<td>9-14</td>
<td>Silt Loam</td>
<td>&lt;35%</td>
<td>10YR 6/6</td>
<td></td>
<td></td>
<td>Blocky</td>
<td>Strong</td>
<td>Firm</td>
<td></td>
</tr>
<tr>
<td>14-20</td>
<td>Clay Loam</td>
<td>&lt;35%</td>
<td>10YR 6/8</td>
<td>10YR 6/2</td>
<td>Depletions</td>
<td>Blocky</td>
<td>Strong</td>
<td>Firm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10YR 5/8</td>
<td>Concentrations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comments:**
LL = 14" - 100.2'

I hereby certify that I have completed this work in accordance with all applicable ordinances, rules and laws.

**Jesse Kloeppner**

(Designer/Inspector)  
(Signature)  
(L4043)  
(4/19/2019)
## Additional Soil Observation Logs

**Client:** Carmelite Monastery  
**Location / Address:** 8249 Demontreville Trail N, Lake Elmo

<table>
<thead>
<tr>
<th>Soil parent material(s): (Check all that apply)</th>
<th>Outwash</th>
<th>Lacustrine</th>
<th>Loess</th>
<th>Till</th>
<th>Alluvium</th>
<th>Bedrock</th>
<th>Organic Matter</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Landscape Position: (check one)</th>
<th>Summit</th>
<th>Shoulder</th>
<th>Back/Side Slope</th>
<th>Foot Slope</th>
<th>Toe Slope</th>
<th>Slope shape</th>
<th>Convex, Linear</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Vegetation:</th>
<th>Grass</th>
<th>Soil survey map units:</th>
<th>49</th>
<th>Slope %:</th>
<th>2.0</th>
<th>Elevation:</th>
<th>101.4</th>
</tr>
</thead>
</table>

**Weather Conditions/Time of Day:** Sunny / 2:45 pm  
**Date:** 04/19/19

<table>
<thead>
<tr>
<th>Observation #/Location:</th>
<th>SB2 - Mound - See Map</th>
<th>Observation Type:</th>
<th>Auger</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Depth (in)</th>
<th>Texture</th>
<th>Rock Frag. %</th>
<th>Matrix Color(s)</th>
<th>Mottle Color(s)</th>
<th>Redox Kind(s)</th>
<th>Indicator(s)</th>
<th>Shape</th>
<th>Grade</th>
<th>Consistence</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-8</td>
<td>Silt Loam</td>
<td>&lt;35%</td>
<td>10YR 3/3</td>
<td></td>
<td></td>
<td>Blocky</td>
<td>Weak</td>
<td>Friable</td>
<td></td>
</tr>
<tr>
<td>8-15</td>
<td>Silt Loam</td>
<td>&lt;35%</td>
<td>10YR 5/6</td>
<td>10YR 4/6</td>
<td></td>
<td>Blocky</td>
<td>Strong</td>
<td>Firm</td>
<td></td>
</tr>
<tr>
<td>15-20</td>
<td>Sandy Clay Loam</td>
<td>&lt;35%</td>
<td>10YR 4/6</td>
<td>10YR 6/4</td>
<td>Depletions</td>
<td>S1</td>
<td>Blocky</td>
<td>Strong</td>
<td>Firm</td>
</tr>
</tbody>
</table>

| | | | | 10YR 5/8 | Concentrations | S1 |

| | | | | | | |

| | | | | | | |

**Comments:** LL = 15" - 100.15'
### Soil Observation Log

**Client:** Carmelite Monastery  
**Location / Address:** 8249 Demontreville Trail N, Lake Elmo

**Soil parent material(s):** (Check all that apply)  
- [ ] Outwash  
- [ ] Lacustrine  
- [ ] Loess  
- [ ] Till  
- [ ] Alluvium  
- [ ] Bedrock  
- [ ] Organic Matter

**Landscape Position:** (check one)  
- [ ] Summit  
- [ ] Shoulder  
- [ ] Back/Side Slope  
- [ ] Foot Slope  
- [ ] Toe Slope  
**Slope shape:** Convex, Linear

**Vegetation:** Grass  
**Elevation (ft):** 101.5  
**Date:** 04/19/19

**Weather Conditions/Time of Day:** Sunny / 1:00 pm  
**Observation #/Location:** SP1 - Mound - See Map  
**Observation Type:** Soil Pit

<table>
<thead>
<tr>
<th>Depth (in)</th>
<th>Texture</th>
<th>Rock Frag. %</th>
<th>Matrix Color(s)</th>
<th>Mottle Color(s)</th>
<th>Redox Kind(s)</th>
<th>Indicator(s)</th>
<th>I-------- Structure--------I</th>
<th>Shape</th>
<th>Grade</th>
<th>Consistence</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Silt Loam</td>
<td>&lt;35%</td>
<td>10YR 3/4</td>
<td></td>
<td></td>
<td>Granular</td>
<td>Weak</td>
<td>Friable</td>
<td></td>
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<tr>
<td>8-15</td>
<td>Silt Loam</td>
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<td></td>
<td>Blocky</td>
<td>Strong</td>
<td>Firm</td>
<td></td>
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<tr>
<td>15-20</td>
<td>Clay Loam</td>
<td>&lt;35%</td>
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<td>Depletions</td>
<td>S1</td>
<td>Blocky</td>
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<td>Concentrations</td>
<td>S1</td>
<td>Blocky</td>
<td>Strong</td>
<td>Extremely Firm</td>
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<tr>
<td>20-25</td>
<td>Clay Loam</td>
<td>&lt;35%</td>
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<td>Extremely Firm</td>
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<td>25-27</td>
<td>Sandy Clay</td>
<td>~45%</td>
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</table>

**Comments:** LL = 15” - 99.75'
### Additional Soil Observation Logs

**Client:** Carmelite Monastery  
**Location / Address:** 8249 Demontreville Trail N, Lake Elmo

**Soil parent material(s):** (Check all that apply)
- Outwash
- Lacustrine
- Loess
- Till
- Alluvium
- Bedrock
- Organic Matter

**Landscape Position:** (check one)
- Summit
- Shoulder
- Back/Side Slope
- Foot Slope
- Toe Slope
- Convex, Linear

**Vegetation:** Grass

**Soil survey map units:** 49  
**Slope %:** 1.0  
**Elevation (ft):** 101.2

**Weather Conditions/Time of Day:** Sunny / 2:55 pm  
**Date:** 04/19/19

### Observation #/Location:

<table>
<thead>
<tr>
<th>Observation Type: Soil Pit</th>
<th>Observation #/Location: SP2 - Mound - See Map</th>
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<th>Rock Frag. %</th>
<th>Matrix Color(s)</th>
<th>Mottle Color(s)</th>
<th>Redox Kind(s)</th>
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</thead>
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<td>10-15</td>
<td>Silt Loam</td>
<td>&lt;35%</td>
<td>10YR 3/6</td>
<td></td>
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<td>Blocky</td>
<td>Strong</td>
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<tr>
<td>15-21</td>
<td>Clay Loam</td>
<td>&lt;35%</td>
<td>10YR 6/8</td>
<td>10YR 7/2</td>
<td>Depletions</td>
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<tr>
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<td></td>
<td></td>
<td>10YR 5/8</td>
<td>Concentrations</td>
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<td>10YR 6/8</td>
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<td>Strong</td>
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**Comments:** LL = 15" - 100.0'
## Soil Observation Log

**Client:** Carmelite Monastery  
**Location / Address:** 8249 Demontreville Trail N, Lake Elmo  
**Date:** 04/19/19

### Soil parent material(s): (Check all that apply)
- [ ] Outwash
- [ ] Lacustrine
- [x] Loess
- [ ] Till
- [ ] Alluvium
- [ ] Bedrock
- [ ] Organic Matter

### Landscape Position: (check one)
- [ ] Summit
- [ ] Shoulder
- [ ] Back/Side Slope
- [ ] Foot Slope
- [ ] Toe Slope

### Vegetation:
- Grass

### Soil survey map units:
- 49

### Slope %:
- 2.0

### Elevation (ft):
- 101.2

### Weather Conditions/Time of Day:
- Sunny / 2:30 pm

### Observation #/Location:
- SP3 - Secondary - See Map

### Observation Type:
- Soil Pit

<table>
<thead>
<tr>
<th>Depth (in)</th>
<th>Texture</th>
<th>Rock Frag. %</th>
<th>Matrix Color(s)</th>
<th>Mottle Color(s)</th>
<th>Redox Kind(s)</th>
<th>Indicator(s)</th>
<th>Shape</th>
<th>Grade</th>
<th>Consistence</th>
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</thead>
<tbody>
<tr>
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<tr>
<td>8-15</td>
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<td>15-20</td>
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<td>Blocky</td>
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<td>Extremely Firm</td>
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<tr>
<td></td>
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<td>7.5YR 5/8</td>
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### Comments
- LL = 16" - 99.9"
## Additional Soil Observation Logs

**Client:** Carmelite Monastery  
**Location / Address:** 8249 Demontreville Trail N, Lake Elmo

**Soil parent material(s):** (Check all that apply)  
- Outwash  
- Lacustrine  
- Loess  
- Till  
- Alluvium  
- Bedrock  
- Organic Matter

**Landscape Position:** (check one)  
- Summit  
- Shoulder  
- Back/Side Slope  
- Foot Slope  
- Toe Slope  
- **Slope shape**  
- Convex, Linear

**Vegetation:** Grass  
**Slope %:** 2.0  
**Elevation (ft):** 101.3

**Weather Conditions/Time of Day:** Sunny / 1:45 pm  
**Date:** 04/19/19

**Observation #/Location:** SB3 - Secondary - See Map  
**Observation Type:** Auger

<table>
<thead>
<tr>
<th>Depth (in)</th>
<th>Texture</th>
<th>Rock Frag. %</th>
<th>Matrix Color(s)</th>
<th>Mottle Color(s)</th>
<th>Redox Kind(s)</th>
<th>Indicator(s)</th>
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<td>Friable</td>
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<td>6-12</td>
<td>Silt Loam</td>
<td>&lt;35%</td>
<td>10YR 4/4</td>
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<td>12-15</td>
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<td>10YR 7/8</td>
<td>Concentrations</td>
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<td>Firm</td>
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<td>Extremely Firm</td>
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**Additional Soil Observation Logs**

**Location / Address:** 8249 Demontreville Trail N, Lake Elmo

**Indicator(s)**

**Structure**

<table>
<thead>
<tr>
<th>Shape</th>
<th>Grade</th>
<th>Consistence</th>
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</table>

**Comments:** LL = 12" - 100.3'
### Soil Observation Log

**Project ID:**

**Carmelite Monastery**

**Location / Address:** 8249 Demontreville Trail N, Lake Elmo

**Soil parent material(s):** (Check all that apply)
- Outwash
- Lacustrine
- Loess
- Till
- Alluvium
- Bedrock
- Organic Matter

**Landscape Position:** (Check one)
- Summit
- Shoulder
- Back/Side Slope
- Foot Slope
- Toe Slope
- Slope shape
- Convex, Linear

**Vegetation:** Grass

**Soil survey map units:** 49

**Slope %:** 2.0

**Elevation (ft):** 100.3

**Date:** 04/19/19

**Weather Conditions/Time of Day:** Sunny / 3:00 pm

**Observation #/Location:** SB4 - Secondary - See Map

**Observation Type:** Auger

<table>
<thead>
<tr>
<th>Depth (in)</th>
<th>Texture</th>
<th>Rock Frag. %</th>
<th>Matrix Color(s)</th>
<th>Mottle Color(s)</th>
<th>Redox Kind(s)</th>
<th>Indicator(s)</th>
<th>Shape</th>
<th>Grade</th>
<th>Consistence</th>
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<tbody>
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<td>0-5</td>
<td>Silt Loam</td>
<td>&lt;35%</td>
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<td>Blocky</td>
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<td>Friable</td>
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<td>5-11</td>
<td>Silt Loam</td>
<td>&lt;35%</td>
<td>10YR 6/6</td>
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<tr>
<td>11-15</td>
<td>Clay Loam</td>
<td>&lt;35%</td>
<td>10YR 5/6</td>
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<td>Strong</td>
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<td>15-20</td>
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<td>Friable</td>
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<td>Concentrations</td>
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</table>

**Comments:** LL = 15” - 99.0’
# Additional Soil Observation Logs

**Client:** Carmelite Monastery  
**Location / Address:** 8249 Demontreville Trail N, Lake Elmo

### Soil parent material(s): (Check all that apply)
- Outwash
- Lacustrine
- Loess
- Till
- Alluvium
- Bedrock
- Organic Matter

### Landscape Position: (check one)
- Summit
- Shoulder
- Back/Side Slope
- Foot Slope
- Toe Slope

### Slope shape
- Convex, Linear

### Vegetation:
- Grass

### Soil survey map units:
- 49

### Date:
- 04/19/19

### Weather Conditions/Time of Day:
- Sunny / 3:15 pm

### Observation #/Location:
- SB5 - Secondary - See Map

### Observation Type:
- Auger

<table>
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<th>Depth (in)</th>
<th>Texture</th>
<th>Rock Frag. %</th>
<th>Matrix Color(s)</th>
<th>Mottle Color(s)</th>
<th>Redox Kind(s)</th>
<th>Indicator(s)</th>
<th>Shape</th>
<th>Grade</th>
<th>Consistence</th>
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</thead>
<tbody>
<tr>
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<td>8-11</td>
<td>Silt Loam</td>
<td>&lt;35%</td>
<td>10YR 6/6</td>
<td>10YR 5/4</td>
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<td>Blocky</td>
<td>Moderate</td>
<td>Firm</td>
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<tr>
<td>11-14</td>
<td>Sandy Clay</td>
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<td>Strong</td>
<td>Extremely Firm</td>
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<td>14-20</td>
<td>Sandy Clay</td>
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<td>7.5YR 5/8</td>
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<td>Concentrations 51</td>
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### Comments
- LL = 14" - 99.8'
# Design Summary Page

1. **PROJECT INFORMATION**

<table>
<thead>
<tr>
<th>Property Owner/Client:</th>
<th>Carmelite Monastery</th>
<th>Project ID:</th>
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<tbody>
<tr>
<td>Site Address:</td>
<td>8249 Demontreville Trail N, Lake Elmo</td>
<td>Date: 04/23/19</td>
</tr>
<tr>
<td>Email Address:</td>
<td></td>
<td>Phone:</td>
</tr>
</tbody>
</table>

2. **DESIGN FLOW & WASTE STRENGTH**

<table>
<thead>
<tr>
<th>Design Flow: 400 GPD</th>
<th>Anticipated Waste Type: Other Est. - At-Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOD: 269 mg/L</td>
<td>TSS: 70 mg/L</td>
</tr>
<tr>
<td>Treatment Level: C</td>
<td>Select Treatment Level C for residential septic tank effluent</td>
</tr>
</tbody>
</table>

3. **HOLDING TANK SIZING**

Minimum Capacity: Residential = 400 gal/bedroom, Other Establishment = Design Flow x 5.0, Minimum size 1000 gallons

<table>
<thead>
<tr>
<th>Code Minimum Holding Tank Capacity:</th>
<th>Gallons in Tanks or Compartments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended Holding Tank Capacity:</td>
<td>Gallons in Tanks or Compartments</td>
</tr>
</tbody>
</table>

Type of High Level Alarm: (Set @ 75% tank capacity)

4. **SEPTIC TANK SIZING**

### A. Residential dwellings:

<table>
<thead>
<tr>
<th>Number of Bedrooms (Residential):</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Code Minimum Septic Tank Capacity:</td>
<td>Gallons in Tanks or Compartments</td>
</tr>
<tr>
<td>Recommended Septic Tank Capacity:</td>
<td>Gallons in Tanks or Compartments</td>
</tr>
<tr>
<td>Effluent Screen &amp; Alarm (Y/N):</td>
<td>Model/Type:</td>
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</table>

### B. Other Establishments:

<table>
<thead>
<tr>
<th>Waste received by:</th>
<th>Gravity</th>
<th>400 GPD x 3 Days Hyd. Retention Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code Minimum Septic Tank Capacity:</td>
<td>1200 Gallons in 2 Tanks or Compartments</td>
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</tr>
<tr>
<td>Recommended Septic Tank Capacity:</td>
<td>2000 Gallons in 2 Tanks or Compartments</td>
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<tr>
<td>Effluent Screen &amp; Alarm (Y/N):</td>
<td>Yes</td>
<td>Model/Type: Polylok 525</td>
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</tbody>
</table>

5. **PUMP TANK SIZING**

<table>
<thead>
<tr>
<th>Pump Tank 1 Capacity (Minimum):</th>
<th>500 Gal</th>
<th>Pump Tank 2 Capacity (Minimum):</th>
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<tbody>
<tr>
<td>Pump Tank 1 Capacity (Recommended):</td>
<td>1000 Gal</td>
<td>Pump Tank 2 Capacity (Recommended):</td>
</tr>
<tr>
<td>Pump 1 GPM</td>
<td>Total Head: 15.6 ft</td>
<td>Pump 2 GPM</td>
</tr>
<tr>
<td>Supply Pipe Dia. 2.00 in</td>
<td>Dose Vol: 80.0 gal</td>
<td>Supply Pipe Dia.</td>
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</table>
6. **SYSTEM AND DISTRIBUTION TYPE**

- **Soil Treatment Type:** Mound
- **Distribution Type:** Pressure Distribution-Level
- **Elevation Benchmark:** 100 ft
- **MPCA System Type:**
- **Type III/IV Details:**
- **Distribution Media:** Rock

7. **SITE EVALUATION SUMMARY:**

**Describe Limiting Condition:** Redoximorphic Features/Saturated Soils

**Layers with >35% Rock Fragments? (yes/no):** No

**Note:**

<table>
<thead>
<tr>
<th>Depth Limiting Condition</th>
<th>Depth</th>
<th>Elevation</th>
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<td>14 inches</td>
<td>1.2 ft</td>
<td>100.2 ft</td>
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</tbody>
</table>

**Minimum Req'd Separation:** 36 inches 3.0 ft

**Code Max System Depth:** Mound -1.8 ft 102.0 ft

- **Critical for system compliance**

**Soil Texture:** Silt Loam

- **Soil Hyd. Loading Rate:** 0.50 GPD/ft²
- **Percolation Rate:** MPI
- **Contour Loading Rate:** 10
- **Measured Land Slope:** 2.0 %
- **Comments:**

8. **SOIL TREATMENT AREA DESIGN SUMMARY**

<table>
<thead>
<tr>
<th>Trench:</th>
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<td>Dispersal Area</td>
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<td>Sidewall Depth</td>
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<td>Trench Width</td>
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<tr>
<td>Total Lineal Feet</td>
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<tr>
<td>No. of Trenches</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Code Max. Trench Depth</td>
<td></td>
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</tr>
<tr>
<td>Contour Loading Rate</td>
<td></td>
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<tr>
<td>Min. Length</td>
<td></td>
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<tr>
<td>Designed Trench Depth</td>
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<table>
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<tr>
<th>Bed:</th>
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<tbody>
<tr>
<td>Dispersal Area</td>
<td></td>
<td></td>
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<tr>
<td>Sidewall Depth</td>
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<tr>
<td>Maximum Bed Depth</td>
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<tr>
<td>Bed Width</td>
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<td>Bed Length</td>
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<tr>
<td>Designed Bed Depth</td>
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<tr>
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<tr>
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<tr>
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<tr>
<td>Absorption Width</td>
<td>26.0 ft</td>
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<tr>
<td>Clean Sand Lift</td>
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<tr>
<td>Berm Width (0-1%)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Upslope Berm Width</td>
<td>15.3 ft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Downslope Berm</td>
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<td></td>
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<tr>
<td>Endslope Berm Width</td>
<td>17.3 ft</td>
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<tr>
<td>Total System Length</td>
<td>84.7 ft</td>
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<td>System Width</td>
<td>45.3 ft</td>
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<tr>
<td>Contour Loading Rate</td>
<td>10.0 gal/ft</td>
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### Design Summary Page

#### At-Grade:

<table>
<thead>
<tr>
<th>Bed Width</th>
<th>Bed Length</th>
<th>Finished Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>ft</td>
<td>ft</td>
<td>ft</td>
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</table>

<table>
<thead>
<tr>
<th>Contour Loading Rate</th>
<th>Upslope Berm</th>
<th>Downslope Berm</th>
</tr>
</thead>
<tbody>
<tr>
<td>gal/ft</td>
<td>ft</td>
<td>ft</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Endslope Berm</th>
<th>System Length</th>
<th>System Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>ft</td>
<td>ft</td>
<td>ft</td>
</tr>
</tbody>
</table>

#### Level & Equal Pressure Distribution

- **No. of Laterals**: 3
- **Perforation Spacing**: 3 ft
- **Perforation Diameter**: 3/16 in
- **Lateral Diameter**: 1.50 in
- **Min Dose Volume**: 63 gal
- **Max Dose Volume**: 100 gal

#### Non-Level and Unequal Pressure Distribution

<table>
<thead>
<tr>
<th>Lateral</th>
<th>Elevation (ft)</th>
<th>Pipe Size (in)</th>
<th>Pipe Volume (gal/ft)</th>
<th>Pipe Length (ft)</th>
<th>Perf Size (in)</th>
<th>Spacing (ft)</th>
<th>Spacing (in)</th>
<th>Minimum Dose Volume</th>
<th>Maximum Dose Volume</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

#### 9. Additional Info for At-Risk, HSW or Type IV Design

**A.** Starting BOD Concentration = Design Flow \( \times \) Starting BOD (mg/L) \( \times \) 8.35 \( \div \) 1,000,000

\[
\begin{align*}
400 \text{ gpd} & \times 269 \text{ mg/L} \times 8.35 \div 1,000,000 = 0.90 \text{ lbs. BOD/day} \\
400 \text{ gpd} & \times 269 \text{ mg/L} \times 8.35 \div 1,000,000 = 0.90 \text{ lbs. BOD/day} \\
\end{align*}
\]

**B.** Target BOD Concentration = Design Flow \( \times \) Target BOD (mg/L) \( \times \) 8.35 \( \div \) 1,000,000

\[
\begin{align*}
Lbs. \text{ BOD To Be Removed:} & = 0.00 \\
\text{PreTreatment Technology:} & = \text{*Must Meet or Exceed Target} \\
\text{Disinfection Technology:} & = \text{*Required for Levels A & B} \\
\end{align*}
\]

**C.** Organic Loading to Soil Treatment Area:

\[
\begin{align*}
269 \text{ mg/L} & \times 400 \text{ gpd} \times 8.35 \div 1,000,000 \div 1300 \text{ ft}^2 = 0.00069 \text{ lbs./day}/\text{ft}^2 \\
\end{align*}
\]

#### 10. Comments/Special Design Considerations:

The Soil Treatment Area is designed to handle potential At-risk Organic Loading Rate of BOD (269 mg/L).
- 0.90 [#/day] \( \times \)0.0007 [BOD Organic Loading #/sqft for Silt Loam] = 1,286 sqft required.
- Mound Absorption Area = 50’ \( \times \) 26’ = 1,300 sqft

All Mound Materials Calculations are only estimates. Actual material amounts & weights may vary.

I hereby certify that I have completed this work in accordance with all applicable ordinances, rules and laws.

---

**Jesse Kloeppner**  
(Designer)  
(Signature)  
(L4043)  
(4/23/2019)
1. **SYSTEM SIZING:**

   A. **Design Flow:** 400 GPD
   
   B. **Soil Loading Rate:** 0.50 GPD/ft²
   
   C. **Depth to Limiting Condition:** 1.2 ft
   
   D. **Percent Land Slope:** 2.0 %
   
   E. **Design Media Loading Rate:** 1.0 GPD/ft²
   
   F. **Mound Absorption Ratio:** 2.60

2. **DISPERSAL MEDIA SIZING**

   A. **Calculate Dispersal Bed Area:** Design Flow ÷ Design Media Loading Rate = ft²
   
   
   If a larger dispersal media area is desired, enter size: 500 ft²
   
   B. **Enter Dispersal Bed Width:** 10.0 ft  
      *Can not exceed 10 feet*
   
   C. **Calculate Contour Loading Rate:** Bed Width × Design Media Loading Rate
   
   D. **Calculate Minimum Dispersal Bed Length:** Dispersal Bed Area ÷ Bed Width = Bed Length

3. **ABSORPTION AREA SIZING**

   A. **Calculate Absorption Width:** Bed Width × Mound Absorption Ratio = Absorption Width
   
   B. For slopes >1%, the Absorption Width is measured downhill from the upslope edge of the Bed.

   **Calculate Downslope Absorption Width:** Absorption Width - Bed Width

4. **DISTRIBUTION MEDIA: ROCK**

   A. **Rock Depth Below Distribution Pipe**
5. DISTRIBUTION MEDIA: REGISTERED TREATMENT PRODUCTS: CHAMBERS AND EZFLOW

A. Enter Dispersal Media: 

B. Enter the Component: Length: __________ ft Width: __________ ft Depth: __________ ft

C. Number of Components per Row = Bed Length divided by Component Length (Round up)

\[ \text{Bed Length} \div \text{Component Length} = \text{components/row} \]

D. Actual Bed Length = Number of Components/row X Component Length:

\[ \text{components} \times \text{ft} = \text{ft} \]

E. Number of Rows = Bed Width divided by Component Width (Round up)

\[ \text{Bed Width} \div \text{Component Width} = \text{rows} \]

F. Total Number of Components = Number of Components per Row X Number of Rows

\[ \text{components} \times \text{rows} = \text{components} \]

6. MOUND SIZING

A. Calculate Minimum Clean Sand Lift: 3 feet minus Depth to Limiting Condition = Clean Sand Lift

\[ 3.0 \text{ ft} - 1.2 \text{ ft} = 1.8 \text{ ft} \]

B. Upslope Height: Clean Sand Lift + Depth of Media + Depth of Cover cover (1 ft.)

\[ 1.8 \text{ ft} + 0.8 \text{ ft} + 1.5 \text{ ft} = 4.1 \text{ ft} \]

C. Select Upslope Berm Multiplier (based on land slope):

D. Calculate Upslope Berm Width: Multiplier \( \times \) Upslope Mound Height = Upslope Berm Width

\[ 3.70 \text{ ft} \times 4.1 \text{ ft} = 15.3 \text{ ft} \]

E. Calculate Drop in Elevation Under Bed: Bed Width X Land Slope ÷ 100 = Drop (ft)

\[ 10.0 \text{ ft} \times 2.0 \% \div 100 = 0.20 \text{ ft} \]

F. Calculate Downslope Mound Height: Upslope Height + Drop in Elevation = Downslope Height

\[ 4.1 \text{ ft} + 0.20 \text{ ft} = 4.3 \text{ ft} \]

G. Select Downslope Berm Multiplier (based on land slope):

H. Calculate Downslope Berm Width: Multiplier \( \times \) Downslope Height = Downslope Berm Width

\[ 4.35 \text{ ft} \times 4.3 \text{ ft} = 18.9 \text{ ft} \]

I. Calculate Minimum Berm to Cover Absorption Area: Downslope Absorption Width + 4 feet

\[ 16.0 \text{ ft} + 4 \text{ ft} = 20.0 \text{ ft} \]

J. Design Downslope Berm = greater of 4H and 4I:

\[ 20.0 \text{ ft} \]

K. Select Endslope Berm Multiplier:

\[ 4.00 \text{ (usually 3.0 or 4.0)} \]

L. Calculate Endslope Berm \( \times \) Downslope Mound Height = Endslope Berm Width

\[ 4.00 \text{ ft} \times 4.3 \text{ ft} = 17.3 \text{ ft} \]

M. Calculate Mound Width: Upslope Berm Width + Bed Width + Downslope Berm Width

\[ 15.3 \text{ ft} + 10.0 \text{ ft} + 20.0 \text{ ft} = 45.3 \text{ ft} \]

N. Calculate Mound Length: Endslope Berm Width + Bed Length + Endslope Berm Width

\[ 17.3 \text{ ft} + 50.0 \text{ ft} + 17.3 \text{ ft} = 84.7 \text{ ft} \]
Note:
For 0 to 1% slopes, Absorption Width is measured from the Bed equally in both directions.
For slopes >1%, Absorption Width is measured downhill from the upslope edge of the Bed.

Comments:
All berms calculated at 4:1 ratio. Additional material may be needed on downslope to properly grade with hillside.
# Mound Materials Worksheet

<table>
<thead>
<tr>
<th>Project ID:</th>
<th>v 04.02.2019</th>
</tr>
</thead>
</table>

## A. Rock Volume

\[
\text{Rock Volume} = (\text{Rock Below Pipe} + \text{Rock to cover pipe (pipe outside dia + 2 inch)}) \times \text{Bed Length} \times \text{Bed Width} = \text{Volume}
\]

\[
(6 \text{ in} + 3.5) \div 12 \times 50.0 \text{ ft} \times 10.0 \text{ ft} = 395.8 \text{ ft}^3
\]

Divide ft\(^3\) by 27 ft\(^3\)/yd\(^3\) to calculate cubic yards:

\[
395.8 \text{ ft}^3 \div 27 = 14.7 \text{ yd}^3
\]

Add 30% for constructability:

\[
14.7 \text{ yd}^3 \times 1.3 = 19.1 \text{ yd}^3
\]

## B. Calculate Clean Sand Volume

**Volume Under Rock bed**: Average Sand Depth \(x\) Media Width \(x\) Media Length = cubic feet

\[
2.2 \text{ ft} \times 10.0 \text{ ft} \times 50.0 \text{ ft} = 1116.7 \text{ ft}^3
\]

**For a Mound on a slope from 0-1%**

Volume from Length = ((Upslope Mound Height - 1) \(x\) Absorption Width Beyond Bed \(x\) Media Bed Length)

\[
\text{ft} - 1) \times \text{ft} \times \text{ft} = \text{ft}^3
\]

Volume from Width = ((Upslope Mound Height - 1) \(x\) Absorption Width Beyond Bed \(x\) Media Bed Width)

\[
\text{ft} - 1) \times \text{ft} \times \text{ft} = \text{ft}^3
\]

Total Clean Sand Volume: Volume from Length + Volume from Width + Volume Under Media

\[
\text{ft}^3 + \text{ft}^3 + \text{ft}^3 = \text{ft}^3
\]

**For a Mound on a slope greater than 1%**

**Upslope Volume**: ((Upslope Mound Height - 1) \(x\) 3 \(x\) Bed Length) \(\div\) 2 = cubic feet

\[
(4.1 \text{ ft} - 1) \times 3.0 \text{ ft} \times 50.0 \text{ ft} \div 2 = 235.0 \text{ ft}^3
\]

**Downslope Volume**: ((Downslope Height - 1) \(x\) Downslope Absorption Width \(x\) Media Length) \(\div\) 2 = cubic feet

\[
(4.3 \text{ ft} - 1) \times 16.0 \text{ ft} \times 50.0 \text{ ft} \div 2 = 1333.3 \text{ ft}^3
\]

**Endslope Volume**: (Downslope Mound Height - 1) \(x\) 3 \(x\) Media Width = cubic feet

\[
4.3 \text{ ft} \times 3.0 \text{ ft} = 100.0 \text{ ft}^3
\]

Total Clean Sand Volume: Upslope Volume + Downslope Volume + Endslope Volume + Volume Under Media

\[
235.0 \text{ ft}^3 + 1333.3 \text{ ft}^3 + 100.0 \text{ ft}^3 + 1116.7 \text{ ft}^3 = 2785.0 \text{ ft}^3
\]

Divide ft\(^3\) by 27 ft\(^3\)/yd\(^3\) to calculate cubic yards:

\[
2785.0 \text{ ft}^3 \div 27 = 103.1 \text{ yd}^3
\]

Add 30% for constructability:

\[
103.1 \text{ yd}^3 \times 1.3 = 134.1 \text{ yd}^3
\]

## C. Calculate Sandy Berm Volume

Total Berm Volume (approx): (Avg. Mound Height - 0.5 ft topsoil) \(x\) Mound Width \(x\) Mound Length) \(\div\) 2

\[
(4.2 - 0.5) \text{ ft} \times 45.3 \text{ ft} \times 84.7 \text{ ft} \div 2 = 7158.4 \text{ ft}^3
\]

Total Mound Volume - Clean Sand volume - Rock Volume = cubic feet

\[
7158.4 \text{ ft}^3 - 2785.0 \text{ ft}^3 - 395.8 \text{ ft}^3 = 3977.5 \text{ ft}^3
\]

Divide ft\(^3\) by 27 ft\(^3\)/yd\(^3\) to calculate cubic yards:

\[
3977.5 \text{ ft}^3 \div 27 = 147.3 \text{ yd}^3
\]

Add 30% for constructability:

\[
147.3 \text{ yd}^3 \times 1.3 = 191.5 \text{ yd}^3
\]

## D. Calculate Topsoil Material Volume

Total Mound Width \(x\) Total Mound Length \(x\) .5 ft

\[
45.3 \text{ ft} \times 84.7 \text{ ft} \times 0.5 \text{ ft} = 1917.4 \text{ ft}^3
\]

Divide ft\(^3\) by 27 ft\(^3\)/yd\(^3\) to calculate cubic yards:

\[
1917.4 \text{ ft}^3 \div 27 = 71.0 \text{ yd}^3
\]

Add 30% for constructability:

\[
71.0 \text{ yd}^3 \times 1.3 = 54.6 \text{ yd}^3
\]
Pressure Distribution
Design Worksheet

<table>
<thead>
<tr>
<th>1. Project ID:</th>
<th>v 04.02.2019</th>
</tr>
</thead>
</table>

1. **Media Bed Width:**

2. **Minimum Number of Laterals in system/zone:**
   \[ \text{Rounded up number of } \left( \frac{\text{Media Bed Width} - 4}{3} \right) + 1 \]

   \[ \left( \frac{10 - 4}{3} \right) + 1 = 3 \text{ laterals} \]

   *Does not apply to at-grades*

3. **Designer Selected Number of Laterals:**

   *Cannot be less than line 2 (Except in at-grades)*

4. **Select Perforation Spacing:**

5. **Select Perforation Diameter Size:**

6. **Length of Laterals:**
   \[ \text{Media Bed Length} - 2 \text{ Feet} \]

   \[ \frac{50.0}{2} = 48.0 \text{ ft} \]

   *Perforation can not be closer then 1 foot from edge.*

7. **Determine the Number of Perforation Spaces:**
   \[ \frac{48.0}{3.0} = 16 \text{ Spaces} \]

8. **Number of Perforations per Lateral** is equal to 1.0 plus the Number of Perforation Spaces. Check table below to verify the number of perforations per lateral guarantees less than a 10% discharge variation. The value is double with a center manifold.

\[ \text{Perforations Per Lateral} = 16 \text{ Spaces} + 1 = 17 \text{ Perfs. Per Lateral} \]

<table>
<thead>
<tr>
<th>Maximum Number of Perforations Per Lateral to Guarantee &lt;10% Discharge Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1/4 Inch Perforations</strong></td>
</tr>
<tr>
<td>Perforation Spacing (Feet)</td>
</tr>
<tr>
<td>---------------------------</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>2½</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>3/16</td>
</tr>
<tr>
<td>1/8</td>
</tr>
</tbody>
</table>

9. **Total Number of Perforations** equals the **Number of Perforations per Lateral** multiplied by the **Number of Perforated Laterals**.

   \[ 17 \text{ Perf. Per Lat.} \times 3 \text{ Number of Perf. Lat.} = 51 \text{ Total Number of Perf.} \]

10. **Spacing of laterals:** Must be greater than 1 foot and no more than 3 feet:

    \[ 3.0 \text{ ft} \]

11. **Select Type of Manifold Connection** (End or Center):

    End

12. **Select Lateral Diameter (See Table):**

    1.50 in
Pressure Distribution
Design Worksheet

12. Calculate the Square Feet per Perforation. Recommended value is 4-11 ft\(^2\) per perforation.

\textit{Does not apply to At-Grades}

a. \textit{Bed Area} = Bed Width (ft) \times \text{Bed Length (ft)}

\begin{align*}
10 \text{ ft} & \times 50 \text{ ft} = 500 \text{ ft}^2
\end{align*}

b. \textit{Square Foot per Perforation} = \text{Bed Area} \div \text{Total Number of Perforations}

\begin{align*}
500 \text{ ft}^2 & \div 51 \text{ perforations} = 9.8 \text{ ft}^2/\text{perforations}
\end{align*}

13. Select \textit{Minimum Average Head}: 1.0 ft

14. Select \textit{Perforation Discharge} (GPM) based on Table: 0.41 GPM per Perforation

15. Determine required \textit{Flow Rate} by multiplying the \textit{Total Number of Perfs.} by the \textit{Perforation Discharge}.

\begin{align*}
51 \text{ Perfs} & \times 0.41 \text{ GPM per Perforation} = 22 \text{ GPM}
\end{align*}

16. \textit{Volume of Liquid Per Foot of Distribution Piping (Table II)}: 0.110 Gallons/ft

17. \textit{Volume of Distribution Piping} = \[ \text{Number of Perforated Laterals} \times \text{Length of Laterals} \times \text{Volume of Liquid Per Foot of Distribution Piping} \]

\begin{align*}
3 \times 48 \text{ ft} & \times 0.110 \text{ gal/ft} = 15.8 \text{ Gallons}
\end{align*}

18. \textit{Minimum Delivered Volume} = \textit{Volume of Distribution Piping} \times 4

\begin{align*}
15.8 \text{ gals} & \times 4 = 63.4 \text{ Gallons}
\end{align*}

\begin{tabular}{|c|c|}
\hline
\textbf{Pipe Diameter (inches)} & \textbf{Liquid Per Foot (Gallons)} \\
\hline
1 & 0.045 \\
1.25 & 0.078 \\
1.5 & 0.110 \\
2 & 0.170 \\
3 & 0.380 \\
4 & 0.661 \\
\hline
\end{tabular}

Comments/Special Design Considerations:
1. **PUMP CAPACITY**

   Pumping to Gravity or Pressure Distribution:
   - **Pressure**

   1. If pumping to gravity enter the gallon per minute of the pump: **22.0** GPM (10 - 45 gpm)
   2. If pumping to a pressurized distribution system:
   3. Enter pump description: **Demand Dosing**

2. **HEAD REQUIREMENTS**

   A. Elevation Difference: **9** ft
      between pump and point of discharge:
   B. Distribution Head Loss: **5** ft
   C. Additional Head Loss: **0.0** ft (due to special equipment, etc.)

<table>
<thead>
<tr>
<th>Minimum Average Head</th>
<th>Distribution Head Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1ft</td>
<td>5ft</td>
</tr>
<tr>
<td>2ft</td>
<td>6ft</td>
</tr>
<tr>
<td>5ft</td>
<td>10ft</td>
</tr>
</tbody>
</table>

D. 1. Supply Pipe Diameter: **2.0** in
2. Supply Pipe Length: **95** ft

E. Friction Loss in Plastic Pipe per 100ft from Table I:

   Friction Loss = **1.34** ft per 100ft of pipe

F. Determine **Equivalent Pipe Length** from pump discharge to soil dispersal area discharge point. Estimate by adding 25% to supply pipe length for fitting loss. **Supply Pipe Length (D.2) X 1.25 = Equivalent Pipe Length**

   **95** ft X 1.25 = **118.8** ft

G. Calculate **Supply Friction Loss** by multiplying Friction Loss Per 100ft (Line E) by the **Equivalent Pipe Length** (Line F) and divide by 100.

   Supply Friction Loss = **1.34** ft per 100ft X **118.8** ft + 100 = **1.6** ft

H. **Total Head** requirement is the sum of the **Elevation Difference** (Line A), the Distribution Head Loss (Line B), Additional Head Loss (Line C), and the Supply Friction Loss (Line G)

   **9.0** ft + **5.0** ft + **0.0** ft + **1.6** ft = **15.6** ft

3. **PUMP SELECTION**

   A pump must be selected to deliver at least **22.0** GPM (Line 1 or Line 2) with at least **15.6** feet of total head.

Comments:
## Pump Tank Design Worksheet (Demand Dose)

### DETERMINE TANK CAPACITY AND DIMENSIONS

**Project ID:**

1. **Design Flow (Design Sum. 1A):**
   - GPD
   - 400

2. **Tank Manufacturer:**
   - Minnesota Precast

3. **Tank Use:**
   - Dosing

4. **Min. required pump tank capacity:**
   - Gal
   - 500

5. **Recommended pump tank capacity:**
   - Gal
   - 1000

### DETERMINE DOSING VOLUME

6. **Calculate Volume to Cover Pump**
   - (Pump and block height + 2 inches) X Gallons Per Inch (2C or 3E)
   - 10 in + 2 inches X 25.0 Gallons Per Inch = 300 Gallons

7. **Calculate Minimum Delivered Volume**
   - 4 X Volume of Distribution Piping:
   - 63 Gallons (Minimum dose)
   - 2.5 inches/dose

8. **Calculate Maximum Pumpout Volume**
   - 25% of Design Flow
   - 400 GPD X 0.25 = 100 Gallons (Maximum dose)
   - 4.0 inches/dose

9. **Select a pumpout volume that meets both Minimum and Maximum:**
   - 80 Gallons

10. **Calculate Doses Per Day**
    - Design Flow ÷ Delivered Volume
    - 400 gpd ÷ 80 gal = 5.00 Doses

11. **Calculate Drainback:**
    - A. Diameter of Supply Pipe =
    - Diameter 2 inches
    - B. Length of Supply Pipe =
    - Length 95 feet
    - C. Volume of Liquid Per Lineal Foot of Pipe =
    - Volume 0.170 Gallons/ft
    - D. Drainback = Length of Supply Pipe X Volume of Liquid Per Lineal Foot of Pipe
    - Drainback 16.2 Gallons

12. **Calculate Total Dosing Volume**
    - Delivered Volume + Drainback
    - 80 gal + 16.2 gal = 96 Gallons

13. **Minimum Alarm Volume**
    - Depth of alarm (2 or 3 inches) X gallons per inch of tank
    - 3 in X 25.0 gal/in = 75.0 Gallons

### DEPENDENT DOSE FLOAT SETTINGS

14. **Calculate Float Separation Distance**
    - Using Dosing Volume
    - Total Dosing Volume / Gallons Per Inch
    - 96 gal ÷ 25.0 gal/in = 3.8 inches

15. **Measuring from bottom of tank:**
    - A. Distance to set Pump Off Float = Pump + block height + 2 inches
    - Distance to set Pump Off Float 12 inches
    - B. Distance to set Pump On Float = Float Separation Distance + Pump On
    - Distance to set Pump On Float 15.8 inches
    - C. Distance to set Alarm Float = Distance to set Pump-On Float + Alarm Depth (2-3 inches)
    - Distance to set Alarm Float 19 inches

Note: Design calculations are based on this specific tank. Substituting a different tank model will change the pump float or timer settings. Contact designer if changes are necessary.
## Flow Estimation: Other Establishments

### Establishment: 7081 Specified Type of Establishment

<table>
<thead>
<tr>
<th>Establishment</th>
<th>Unit</th>
<th># of Units</th>
<th>Design Flow per Unit (See Table I)</th>
<th>Total Avg Daily Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Assembly hall seat</td>
<td>80</td>
<td>4.00</td>
<td>320</td>
</tr>
<tr>
<td>1</td>
<td>Assembly hall employee</td>
<td>2</td>
<td>15.00</td>
<td>30</td>
</tr>
</tbody>
</table>

**Total Flow 7081 Establishments (gpd)**: 350

**Safety Factor (gpd)**: 50.00

**Total Flow 7081 Establishments (gpd)**: 400.00

### Establishment: 7081 Specified Type of Establishment - BOD

<table>
<thead>
<tr>
<th>Establishment</th>
<th>Unit</th>
<th># of Units</th>
<th>Design Pounds / Day</th>
<th>Total Avg Daily Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Assembly hall seat</td>
<td>80</td>
<td>0.01</td>
<td>0.8</td>
</tr>
<tr>
<td>1</td>
<td>Assembly hall employee</td>
<td>2</td>
<td>0.05</td>
<td>0.1</td>
</tr>
</tbody>
</table>

**Total Organic Load 7081 Establishments BOD (lbs/unit/day)**: 0.90

**Total Organic Load 7081 Establishments BOD (mg/L/day)**: 269
## Estimate of Waste Strengths from Other Establishments

<table>
<thead>
<tr>
<th>Type of Facility</th>
<th>BOD$_5$ (mg/L)</th>
<th>BOD$_5$ (lbs/unit/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Airports</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per passenger</td>
<td>400 - 500</td>
<td>0.02</td>
</tr>
<tr>
<td>Per employee</td>
<td>400 - 500</td>
<td>0.05</td>
</tr>
<tr>
<td><strong>Apartment houses</strong></td>
<td>240 - 400</td>
<td>0.175/multiple family</td>
</tr>
<tr>
<td><strong>Assembly hall (no kitchen)</strong></td>
<td>240 - 400</td>
<td>0.01/seat</td>
</tr>
<tr>
<td><strong>Boarding school</strong></td>
<td>240 - 400</td>
<td></td>
</tr>
<tr>
<td><strong>Bowling alley (no kitchen)</strong></td>
<td>240 - 400</td>
<td>0.15/seat</td>
</tr>
<tr>
<td><strong>Camps</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction (Semi-permanent)</td>
<td>400 - 500</td>
<td>0.140</td>
</tr>
<tr>
<td>Country club (member)</td>
<td>400 - 500</td>
<td>0.052/member</td>
</tr>
<tr>
<td>Country club (resident)</td>
<td>240 - 400</td>
<td>0.208/resident</td>
</tr>
<tr>
<td>Day (no meals)</td>
<td>400 - 500</td>
<td>0.031</td>
</tr>
<tr>
<td>Luxury</td>
<td>400 - 500</td>
<td>0.208</td>
</tr>
<tr>
<td><strong>Church (no kitchen)</strong></td>
<td>240 - 400</td>
<td>0.02/seat</td>
</tr>
<tr>
<td>Country club</td>
<td>400 - 800</td>
<td>0.208/member</td>
</tr>
<tr>
<td>Personnel addition</td>
<td>240 - 400</td>
<td>0.04/employee</td>
</tr>
<tr>
<td>Day school</td>
<td>240 - 400</td>
<td>0.031/student</td>
</tr>
<tr>
<td>Add for showers</td>
<td>240 - 400</td>
<td>0.011/student</td>
</tr>
<tr>
<td>Add for cafeteria</td>
<td>500 - 700</td>
<td>0.031/meal</td>
</tr>
<tr>
<td><strong>Factory</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No showers</td>
<td>240 - 400</td>
<td>0.073/employee</td>
</tr>
<tr>
<td>With showers</td>
<td>240 - 400</td>
<td>0.083/employee</td>
</tr>
<tr>
<td><strong>Food service</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ordinary restaurant</td>
<td>600 - 1500</td>
<td>0.35/seat</td>
</tr>
<tr>
<td>24-Hour restaurant</td>
<td>600 - 1500</td>
<td>0.50/seat</td>
</tr>
<tr>
<td>Freeway restaurant</td>
<td>600 - 1500</td>
<td>0.70/seat</td>
</tr>
<tr>
<td>Tavern (limited food)</td>
<td>400 - 800</td>
<td>0.10/seat</td>
</tr>
<tr>
<td>Carry-out (single service)</td>
<td>600 - 800</td>
<td>0.70/100 sqft</td>
</tr>
<tr>
<td>Carry-out</td>
<td>200 - 600</td>
<td>0.04/employee</td>
</tr>
<tr>
<td>Fast food chain</td>
<td>1000 - 2000</td>
<td>0.80/seat</td>
</tr>
<tr>
<td>Kitchen Waste</td>
<td>600 - 1500</td>
<td>0.015/meal</td>
</tr>
<tr>
<td>Toilet and Kitchen Waste</td>
<td>600 - 1500</td>
<td>0.021/customer</td>
</tr>
<tr>
<td>Additional for bars &amp; cocktail lounges</td>
<td>600 - 1500</td>
<td>0.01/customer</td>
</tr>
<tr>
<td>Hospital (not including personnel)</td>
<td>400 - 600</td>
<td>0.518/bed</td>
</tr>
<tr>
<td>Laundry</td>
<td>600 - 800</td>
<td>2.0/machine</td>
</tr>
<tr>
<td>Mobile home park</td>
<td>240 - 400</td>
<td>0.40/space</td>
</tr>
<tr>
<td>Mobile home park</td>
<td>240 - 400</td>
<td>0.140/person</td>
</tr>
<tr>
<td>Motel, Hotel</td>
<td>240 - 400</td>
<td>0.083/bed</td>
</tr>
<tr>
<td>Motel, Hotel</td>
<td>240 - 400</td>
<td>0.14/person</td>
</tr>
<tr>
<td>Nursing home (not including kitchen or laundry)</td>
<td>400 - 600</td>
<td>0.26/bed</td>
</tr>
<tr>
<td>Office building (per 8 hour shift)</td>
<td>240 - 400</td>
<td>0.05/employee</td>
</tr>
<tr>
<td>Park, toilets only</td>
<td>400 - 600</td>
<td>0.01/person</td>
</tr>
<tr>
<td>Park, bathhouse and flush toilets</td>
<td>240 - 400</td>
<td>0.021/person</td>
</tr>
<tr>
<td>Resort hotel, cottage</td>
<td>240 - 400</td>
<td>0.15/room</td>
</tr>
<tr>
<td>Add for self-service laundry</td>
<td>600 - 800</td>
<td>2.0/machine</td>
</tr>
<tr>
<td>Service station</td>
<td>240 - 400</td>
<td>0.50/toilet or urinal</td>
</tr>
<tr>
<td>Service station</td>
<td>240 - 400</td>
<td>0.02/vehicle served</td>
</tr>
<tr>
<td>Shopping center (no food service or laundry)</td>
<td>400 - 600</td>
<td>0.30/1000 sqft</td>
</tr>
<tr>
<td>Shopping center (no food service or laundry)</td>
<td>400 - 600</td>
<td>0.050/employee</td>
</tr>
<tr>
<td>Sports Stadium</td>
<td>400 - 600</td>
<td>0.20/person</td>
</tr>
<tr>
<td>Swimming pool</td>
<td>300 - 500</td>
<td>0.021/person</td>
</tr>
<tr>
<td>Theaters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drive-in</td>
<td>400 - 500</td>
<td>0.010/car space</td>
</tr>
<tr>
<td>Indoor</td>
<td>240 - 400</td>
<td>0.010/seat</td>
</tr>
<tr>
<td>Travel trailer or RV park</td>
<td>400 - 800</td>
<td>0.25/space</td>
</tr>
<tr>
<td>No water/sewer hook up</td>
<td>400 - 800</td>
<td>0.35/space</td>
</tr>
<tr>
<td>With water and sewer</td>
<td>400 - 800</td>
<td>0.35/space</td>
</tr>
</tbody>
</table>
The goal of a septic system is to protect human health and the environment by properly treating wastewater before returning it to the environment. Your septic system is designed to kill harmful organisms and remove pollutants before the water is recycled back into our lakes, streams and groundwater.

This management plan will identify the operation and maintenance activities necessary to ensure long-term performance of your septic system. Some of these activities must be performed by you, the homeowner. Other tasks must be performed by a licensed septic maintainer or service provider. However, it is YOUR responsibility to make sure all tasks get accomplished in a timely manner.

The University of Minnesota’s Septic System Owner’s Guide contains additional tips and recommendations designed to extend the effective life of your system and save you money over time.

Proper septic system design, installation, operation and maintenance means safe and clean water!

<table>
<thead>
<tr>
<th>Property Owner</th>
<th>Carmelite Monestary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property Address</td>
<td>8249 DeMontreville Trail N, Lake Elmo, MN 55402</td>
</tr>
<tr>
<td>System Designer</td>
<td>Jesse Kloeppner</td>
</tr>
<tr>
<td>System Installer</td>
<td>Capra's Utilities</td>
</tr>
<tr>
<td>Service Provider/Maintainer</td>
<td>Contact Info 763-843-4114</td>
</tr>
<tr>
<td>Permitting Authority</td>
<td>Washington County</td>
</tr>
<tr>
<td>Permit #</td>
<td>Date Inspected</td>
</tr>
</tbody>
</table>

Keep this Management Plan with your Septic System Owner’s Guide. The Septic System Owner’s Guide includes a folder to hold maintenance records including pumping, inspection and evaluation reports. Ask your septic professional to also:

- Attach permit information, designer drawings and as-built of your system, if they are available.
- Keep copies of all pumping records and other maintenance and repair invoices with this document.
- Review this document with your maintenance professional at each visit; discuss any changes in product use, activities, or water-use appliances.

For a copy of the Septic System Owner’s Guide, visit www.bookstores.umn.edu and search for the word “septic” or call 800-322-8642.

For more information see http://septic.umn.edu

Version: August 2015
Your Septic System

Septic System Specifics

System Type: [ ] I [ ] II [ ] III [ ] IV* [ ] V*
(Based on MN Rules Chapter 7080.2200 – 2400)
*Additional Management Plan required

- System is subject to operating permit*
- System uses UV disinfection unit*
- Type of advanced treatment unit ____________

Dwelling Type

Number of bedrooms: ______________________
System capacity/ design flow (gpd):   __________
Anticipated average daily flow (gpd): __________
Comments________________________________
Business? : [ ] Y [ ] N  What type? _______________

Well Construction

Well depth (ft):
- Cased well  Casing depth: __________
- Other (specify): ______________________
Distance from septic (ft): > 50
Is the well on the design drawing? [ ] Y [ ] N

Septic Tank

- First tank  Tank volume: 1000 gallons
  Does tank have two compartments? [ ] Y [ ] N
- Second tank  Tank volume: 1000 gallons
- Tank is constructed of ______________
- Effluent screen: [ ] Y [ ] N  Alarm [ ] Y [ ] N

- Pump Tank 1000 gallons
- Effluent Pump make/model: Installer Choice
  Pump capacity 22 GPM
  TDH 16 Feet of head
- Alarm location TBD

Soil Treatment Area (STA)

- Mound/At-Grade area (width x length): 45.3 ft x 84.7 ft
- Rock bed size (width x length): 10 ft x 50 ft
- Location of additional STA: South of New Mound
- Type of distribution media: Rock

- Inspection ports
- Cleanouts
- Surface water diversions
- Additional STA not available
Homeowner Management Tasks

These operation and maintenance activities are your responsibility. Chart on page 6 can help track your activities.

Your toilet is not a garbage can. Do not flush anything besides human waste and toilet paper. No wet wipes, cigarette butts, disposal diapers, used medicine, feminine products or other trash!

The system and septic tanks needs to be checked every 36 months

Your service provider or pumper/maintainer should evaluate if your tank needs to be pumped more or less often.

Seasonally or several times per year

- **Leaks.** Check (listen, look) for leaks in toilets and dripping faucets. Repair leaks promptly.
- **Soil treatment area.** Regularly check for wet or spongy soil around your soil treatment area. If surfaced sewage or strong odors are not corrected by pumping the tank or fixing broken caps and leaks, call your service professional. Untreated sewage may make humans and animals sick. Keep bikes, snowmobiles and other traffic off and control borrowing animals.
- **Alarms.** Alarms signal when there is a problem; contact your service professional any time the alarm signals.
- **Lint filter.** If you have a lint filter, check for lint buildup and clean when necessary. If you do not have one, consider adding one after washing machine.
- **Effluent screen.** If you do not have one, consider having one installed the next time the tank is cleaned along with an alarm.

Annually

- **Water usage rate.** A water meter or another device can be used to monitor your average daily water use. Compare your water usage rate to the design flow of your system (listed on the next page). Contact your septic professional if your average daily flow over the course of a month exceeds 70% of the design flow for your system.
- **Caps.** Make sure that all caps and lids are intact and in place. Inspect for damaged caps at least every fall. Fix or replace damaged caps before winter to help prevent freezing issues.
- **Water conditioning devices.** See Page 5 for a list of devices. When possible, program the recharge frequency based on water demand (gallons) rather than time (days). Recharging too frequently may negatively impact your septic system. Consider updating to demand operation if your system currently uses time,
- **Review your water usage rate.** Review the Water Use Appliance chart on Page 5. Discuss any major changes with your service provider or pumper/maintainer.

During each visit by a service provider or pumper/maintainer

- Make sure that your service professional services the tank through the manhole. (NOT though a 4” or 6” diameter inspection port.)
- Ask how full your tank was with sludge and scum to determine if your service interval is appropriate.
- Ask your pumper/maintainer to accomplish the tasks listed on the Professional Tasks on Page 4.
Professional Management Tasks

These are the operation and maintenance activities that a pumper/maintainer performs to help ensure long-term performance of your system. At each visit a written report/record must be provided to homeowner.

Plumbing/Source of Wastewater
- Review the Water Use Appliance Chart on Page 5 with homeowner.
  Discuss any changes in water use and the impact those changes may have on the septic system.
- Review water usage rates (if available) with homeowner.

Septic Tank/Pump Tanks
- **Manhole lid.** A riser is recommended if the lid is not accessible from the ground surface. Insulate the riser cover for frost protection.
- **Liquid level.** Check to make sure the tank is not leaking. The liquid level should be level with the bottom of the outlet pipe. (If the water level is below the bottom of the outlet pipe, the tank may not be watertight. If the water level is higher than the bottom of the outlet pipe of the tank, the effluent screen may need cleaning, or there may be ponding in the soil treatment area.)
- **Inspection pipes.** Replace damaged or missing pipes and caps.
- **Baffles.** Check to make sure they are in place and attached, and that inlet/outlet baffles are clear of buildup or obstructions.
- **Effluent screen.** Check to make sure it is in place; clean per manufacturer recommendation. Recommend retrofitted installation if one is not present.
- **Alarm.** Verify that the alarm works.
- **Scum and sludge.** Measure scum and sludge in each compartment of each septic and pump tank, pump if needed.

Pump
- **Pump and controls.** Check to make sure the pump and controls are operating correctly.
- **Pump vault.** Check to make sure it is in place; clean per manufacturer recommendations.
- **Alarm.** Verify that the alarm works.
- **Drainback.** Check to make sure it is draining properly.
- **Event counter or elapsed time meter.** Check to see if there is an event counter or elapsed time meter for the pump. If there is one or both, calculate the water usage rate and compare to the anticipated use listed on Design and Page 2. Dose Volume: __________ gallons; Pump run time: __________ Minutes

Soil Treatment Area
- **Inspection pipes.** Check to make sure they are properly capped. Replace caps and pipes that are damaged.
- **Surfacing of effluent.** Check for surfacing effluent or other signs of problems.
- **Lateral flushing.** Check lateral distribution; if cleanouts exist, flush and clean at recommended frequency.
- **Vegetation.** Check to see that a good growth of vegetation is covering the system.

All other components – evaluate as listed here:
# Water-Use Appliances and Equipment in the Home

<table>
<thead>
<tr>
<th>Appliance</th>
<th>Impacts on System</th>
<th>Management Tips</th>
</tr>
</thead>
</table>
| Garbage disposal           | • Uses additional water.  
• Adds solids to the tank.  
• Finely-ground solids may not settle. Unsettled solids can exit the tank and enter the soil treatment area. | • Use of a garbage disposal is not recommended.  
• Minimize garbage disposal use. Compost instead.  
• To prevent solids from exiting the tank, have your tank pumped more frequently.  
• Add an effluent screen to your tank. |
| Washing machine            | • Washing several loads on one day uses a lot of water and may overload your system.  
• Overloading your system may prevent solids from settling out in the tank. Unsettled solids can exit the tank and enter the soil treatment area. | • Choose a front-loader or water-saving top-loader, these units use less water than older models.  
• Limit the addition of extra solids to your tank by using liquid or easily biodegradable detergents. Limit use of bleach-based detergents and fabric softeners.  
• Install a lint filter after the washer and an effluent screen to your tank  
• Wash only full loads and think even – spread your laundry loads throughout the week. |
| Dishwasher                 | • Powdered and/or high-phosphorus detergents can negatively impact the performance of your tank and soil treatment area.  
• New models promote “no scraping”. They have a garbage disposal inside. | • Use gel detergents. Powdered detergents may add solids to the tank.  
• Use detergents that are low or no-phosphorus.  
• Wash only full loads.  
• Scrape your dishes anyways to keep undigested solids out of your septic system. |
| Grinder pump (in home)     | • Finely-ground solids may not settle. Unsettled solids can exit the tank and enter the soil treatment area.                                             | • Expand septic tank capacity by a factor of 1.5.  
• Include pump monitoring in your maintenance schedule to ensure that it is working properly.  
• Add an effluent screen.                                     |
| Large bathtub (whirlpool)  | • Large volume of water may overload your system.  
• Heavy use of bath oils and soaps can impact biological activity in your tank and soil treatment area. | • Avoid using other water-use appliances at the same time. For example, don’t wash clothes and take a bath at the same time.  
• Use oils, soaps, and cleaners in the bath or shower sparingly. |
| Clean Water Uses           |                                                                                                                                                     |                                                                                                                                                   |
| High-efficiency furnace    | • Drip may result in frozen pipes during cold weather.                                                                                               | • Re-route water directly out of the house. Do not route furnace discharge to your septic system.                                              |
| Water softener             |                                                                                                                                                     |                                                                                                                                                   |
| Iron filter                | • Salt in recharge water may affect system performance.                                                                                              | • These sources produce water that is not sewage and should not go into your septic system.                                                     |
| Reverse osmosis            | • Recharge water may hydraulically overload the system.                                                                                               | • Reroute water from these sources to another outlet, such as a dry well, drain tile or old drainfield.                                          |
| Surface drainage           | • Water from these sources will overload the system and is prohibited from entering septic system.                                                   | • When replacing, consider using a demand-based recharge vs. a time-based recharge.                                                              |
| Footing drains             |                                                                                                                                                     | • Check valves to ensure proper operation; have unit serviced per manufacturer directions                                                          |
# Septic System Management Plan for Above Grade Systems

## Homeowner Maintenance Log

Track maintenance activities here for easy reference. See list of management tasks on pages 3 and 4.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Date accomplished</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Check frequently:</strong></td>
<td></td>
</tr>
<tr>
<td>Leaks: check for plumbing leaks*</td>
<td></td>
</tr>
<tr>
<td>Soil treatment area check for surfacing**</td>
<td></td>
</tr>
<tr>
<td>Lint filter: check, clean if needed*</td>
<td></td>
</tr>
<tr>
<td>Effluent screen (if owner-maintained)***</td>
<td></td>
</tr>
<tr>
<td>Alarm**</td>
<td></td>
</tr>
<tr>
<td><strong>Check annually:</strong></td>
<td></td>
</tr>
<tr>
<td>Water usage rate (maximum gpd ____ )</td>
<td></td>
</tr>
<tr>
<td>Caps: inspect, replace if needed</td>
<td></td>
</tr>
<tr>
<td>Water use appliances – review use</td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
</tr>
</tbody>
</table>

*Monthly  
**Quarterly  
***Bi-Annually

Notes:

“As the owner of this SSTS, I understand it is my responsibility to properly operate and maintain the sewage treatment system on this property, utilizing the Management Plan. If requirements in this Management Plan are not met, I will promptly notify the permitting authority and take necessary corrective actions. If I have a new system, I agree to adequately protect the reserve area for future use as a soil treatment system.”

<table>
<thead>
<tr>
<th>Property Owner Signature:</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Plan Prepared By:</td>
<td>Jesse Kloeppner</td>
</tr>
<tr>
<td>Certification #:</td>
<td>C8188</td>
</tr>
<tr>
<td>Permitting Authority:</td>
<td>Washington County</td>
</tr>
</tbody>
</table>

©2015 Regents of the University of Minnesota. All rights reserved. The University of Minnesota is an equal opportunity educator and employer. This material is available in alternative formats upon request. Contact the Water Resources Center, 612-624-9282. The Onsite Sewage Treatment Program is delivered by the University of Minnesota Extension Service and the University of Minnesota Water Resources Center.
The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: [Web Soil Survey](https://soils.usda.gov/)
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

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### Map Unit Legend

<table>
<thead>
<tr>
<th>Map Unit Symbol</th>
<th>Map Unit Name</th>
<th>Acres in AOI</th>
<th>Percent of AOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>49</td>
<td>Antigo silt loam, 0 to 2 percent slopes</td>
<td>2.5</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>Totals for Area of Interest</strong></td>
<td></td>
<td><strong>2.5</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>
Washington County, Minnesota

49—Antigo silt loam, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: 2tnz7
Elevation: 690 to 1,900 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Antigo and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Antigo
Setting
Landform: Flats, terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Loess and/or silty glaciofluvial deposits over loamy glaciofluvial deposits over stratified sandy and gravelly outwash

Typical profile
Ap - 0 to 9 inches: silt loam
E - 9 to 12 inches: silt loam
B/E - 12 to 19 inches: silt loam
Bt1 - 19 to 28 inches: silt loam
2Bt2 - 28 to 31 inches: loam
2Bt3 - 31 to 33 inches: very gravelly sandy loam
3C - 33 to 79 inches: stratified sand to very gravelly coarse sand

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
   Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.8 inches)
Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Forage suitability group: Mod AWC, adequately drained
(G090BY005WI)
Other vegetative classification: Acer saccharum/Hydrophyllum
(AH), Acer saccharum/Viola-Osmorhiza (AViO)
Hydric soil rating: No

Minor Components

Billyboy
Percent of map unit: 8 percent
Landform: Flats, terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Acer saccharum/Caulophyllum-
Circaea (ACaCi), Acer saccharum/Hydrophyllum (AH), Acer
saccharum-Tsuga/Maianthemum (ATM), Acer saccharum/Viola-
Osmorhiza (AViO)
Hydric soil rating: No

Sconsin
Percent of map unit: 5 percent
Landform: Flats, terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Acer saccharum/Caulophyllum-
Circaea (ACaCi), Acer saccharum/Hydrophyllum (AH), Acer
saccharum-Tsuga/Maianthemum (ATM), Acer saccharum/Viola-
Osmorhiza (AViO)
Hydric soil rating: No

Rosholt
Percent of map unit: 3 percent
Landform: Flats, terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Other vegetative classification: Acer saccharum/Vaccinium-
Desmodium (AVDe), Acer saccharum/Athyrium (AAt), Acer
saccharum/Caulophyllum-Circaea (ACaCi), Acer saccharum-
Quercus/Viburnum=(Vaccinium) (AQVb-V)
Hydric soil rating: No

Brill
Percent of map unit: 2 percent
Landform: Flats, terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Acer saccharum/Athyrium (AAt),
Acer saccharum/Caulophyllum-Circaea (ACaCi)
Hydric soil rating: No

Ossmer
Percent of map unit: 2 percent
Landform: Flats, terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, concave
Across-slope shape: Linear
Other vegetative classification: Acer saccharum/Hydrophyllum (AH),
Acer saccharum-Tsuga/Maianthemum (ATM), Acer saccharum/Viola-Osmorhiza (AViO),
Tsuga/Maianthemum-Coptis (TMC)
Hydric soil rating: No

Data Source Information

Soil Survey Area: Washington County, Minnesota
Survey Area Data: Version 14, Oct 9, 2018
Soil Map may not be valid at this scale.
The soil surveys that comprise your AOI were mapped at 1:15,800.

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Please rely on the bar scale on each map sheet for map measurements.

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# Septic Tank Absorption Fields — At-Grade (MN)

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<th>Component name (percent)</th>
<th>Rating reasons (numeric values)</th>
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<td>Antigo silt loam, 0 to 2 percent slopes</td>
<td>Very limited</td>
<td>Antigo (80%)</td>
<td>&gt;= 35% Rock Frags (0.90)</td>
<td>2.2</td>
<td>100.0%</td>
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**Totals for Area of Interest**

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**Rating Options**

*Aggregation Method: Dominant Condition*

*Component Percent Cutoff: None Specified*

*Tie-break Rule: Higher*
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### Septic Tank Absorption Fields — Mound (MN)

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<tr>
<td></td>
<td></td>
<td></td>
<td>Billyboy (8%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rosholt (3%)</td>
<td></td>
<td></td>
<td></td>
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### Rating Options

*Aggregation Method: Dominant Condition*

*Component Percent Cutoff: None Specified*

*Tie-break Rule: Higher*
Septic Tank Absorption Fields -- Trench (MN)—Washington County, Minnesota

MAP LEGEND

Area of Interest (AOI)

Transportation

Soils

Soil Rating Polygons

- Extremely limited
- Very limited
- Moderately limited
- Slightly limited
- Not limited
- Not rated or not available

Soil Rating Lines

- Extremely limited
- Very limited
- Moderately limited
- Slightly limited
- Not limited
- Not rated or not available

Soil Rating Points

- Extremely limited
- Very limited
- Moderately limited
- Slightly limited
- Not limited
- Not rated or not available

Water Features

- Streams and Canals

MAP INFORMATION

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### Rating Options

*Aggregation Method: Dominant Condition*

*Component Percent Cutoff: None Specified*

*Tie-break Rule: Higher*
<table>
<thead>
<tr>
<th>Unique Number</th>
<th>Well Name</th>
<th>Address</th>
<th>City</th>
<th>County</th>
<th>Township</th>
<th>Range</th>
<th>Section</th>
<th>Depth(ft)</th>
<th>Elevation(ft)</th>
<th>Casing Depth(ft)</th>
<th>Casing Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>489214</td>
<td>CARMELITE MONASTERY</td>
<td>8251 DEMONTREVILLE TR N LAKE ELMO</td>
<td>Washington</td>
<td>29</td>
<td>21</td>
<td>9</td>
<td>261</td>
<td>1008</td>
<td>201</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

Minneapolis Department of Health

Minnesota Well Index

Selected Wells
- Public Wells
- Domestic Wells
- Irrigation Wells
- Monitor Wells
- Other Wells
- Sealed Wells
- Unverified Wells
- Township
- Range
- Section

DWSMA: The area managed by a public water supplier to protect their source water

SWBCA: Special Well and Boring Construction Area layer

Zoom to see wells, TRS, DWSMA and SWBCA

Unique Number
- Highlighted are Field Verified Wells. Click Unique Well ID to see detailed well information

Version 2.0.56, 07/13/18 11:48AM

Well List selected
MEMORANDUM

Date: June 17, 2019

To: Ken Roberts, Planning Director
Re: Carmelite Site Improvements

Cc: Chad Isakson, Assistant City Engineer

From: Jack Griffin, P.E., City Engineer

A Site Plan engineering review has been completed for the Carmelite Hermitage Chapel Conditional Use Construction Plan set. The site is located at 8249 DeMontreville Trail North in Lake Elmo. The submittal consisted of the following documentation received on May 28, 2019:

- Site Plans prepared by Pioneer Engineering, dated April 26, 2019.

Engineering review comments are as follows:

STORMWATER MANAGEMENT

- A Valley Branch Watershed District (VBWD) permit will be required. The site plan is subject to a storm water management plan (SWMP) meeting State, VBWD and City rules and regulations.

- The SWMP executive summary must be revised and resubmitted to clarify the required standards for this project (City and VBWD) and to demonstrate compliance with those applicable standards.
  - The total new and recreated impervious surface area must be identified in detail.
  - The applicable standards must reference the VBWD rules and Stormwater Rules for the City of Lake Elmo.
  - The report must state the soil types determined by the soil borings. Assumed infiltration rates must be identified in the report and the report must demonstrate drawdown in 48 hrs.
  - A soil boring location map must be provided and verified that sufficient borings have been taken in accordance with the City Engineering Design Standards Manual.

- Stormwater facilities proposed for meeting State and VBWD permitting requirements must be designed and constructed in accordance with the City Engineering Design Standards Manual available on the City website, dated March 2017.

- Ownership. The stormwater facilities constructed for this development should remain privately owned and maintained.

- Stormwater Maintenance and Easement Agreement. The applicant will be required to execute and record a Stormwater Maintenance and Easement Agreement in the City’s standard form of agreement.

- Maintenance Access. Even as privately owned and maintained facilities, maintenance access roads meeting the City engineering design standards must be provided for all stormwater facilities.

- Easements. The stormwater facility 100-year HWL must be fully contained within the subject property and easements must be provided to protect the 100-year HWL flood area.
• Sheet 4.10. The sanitary sewer and water services must be identified as to size and material. A plan note should be added to indicate the sanitary sewer and water service lines per state plumbing code requirements.

• Sheet 5.10. Revise grading plan to revise storm water BMP site to meet City of Lake Elmo and MN Storm Water Manual standards and as follows:
  ➢ Provide 10:1 aquatic bench and 10:1 maintenance bench around retention BMP.
  ➢ Provide 3:1 length to width ratio for retention basin.
  ➢ Provide defined rip rap overflow location between retention basin and infiltration basin and define overflow spot elevation.
  ➢ Provide retention basin NWL and ensure minimum 3-feet depth. Show NWL level contour on the plan sheet.
  ➢ Provide 100-year HWL contour for the 996.9 HWL. The 100-year HWL of 996.9 is not shown consistent between Sheets 5.10 and 5.30. Revise plans and use spot elevations has required to demonstrate extent of 100-year HWL.

• Sheet 5.10 Provide drainage and utility easement over storm water BMP including the 100-year HWL and pond maintenance access road and access bench. Access road grade must be less than or equal to 10% to the maintenance bench.

• Sheet 5.10. Remove plan note that states “Remove Trees as required within grading limits”. All trees to be removed must be surveyed and shown on the plans. Tree removal may be subject to replacement per City ordinances.

• Sheet 5.20. The rock construction entrance must be positioned for all grading activity on site; not just for basin 100P.

• The site plans must be updated to show the proposed on-site SSTs design. The Septic System Plan prepared by Steinbrecher Companies is not consistent with the site improvements plans.

• The plans must call out detailed site protection from construction activities for the proposed on-site wastewater treatment system and for the proposed storm water infiltration basin.

• No construction may begin until the applicant has received City Engineer approval for the Final Construction Plans; the applicant has obtained and submitted to the City all applicable permits, easements and permissions needed for the project; and a preconstruction meeting has been held by the City’s engineering department.
June 5, 2019

Review of plans for a Conditional Use Permit for construction of the Carmelite Chapel. There was an initial review done in February of 2019, by our then Building Official Mike Bent with regard to the requirement of sprinklers. It was determined that none were required. If the building as presented then is consistent with the current proposal, that determination still stands.

The following items need to be addressed:

- Must meet all applicable codes in the 2015 MN State Fire Code. These requirements also include Appendix D, FIRE APPARATUS ACCESS ROADS.
- With this building not requiring sprinklers, special attention to the following:
  - 503.1.1 “……shall extend to within 150 feet of all portions of the facility…”
  - Appendix D, Section D105 must be addressed regarding the height of the building (couldn’t determine on my plans) and if this section is applicable.
- Will there be any fire hydrants brought into the site?
- Location of Lockbox approved by Fire Chief
- Location of alarm annunciator panel approved by Fire Chief.
- Provide basic overhead view foot print plan of the building, non-architectural, showing rooms, access, utility locations, etc.

Greg Malmquist, Fire Chief

“Proudly Serving Neighbors & Friends”
To the Planning Commission of the City of Lake Elmo:

Regarding the proposed “Chapel” at the Carmelite Hermitage of the Blessed Virgin Mary, I speak on behalf of my family at 5124 Isle Avenue North, Lake Elmo, to say that we absolutely support the construction of a new chapel. However, a few years ago, it was mentioned that this new building would require adding a roadway through our street for new access to the Chapel. I am writing to share that we vehemently oppose the construction of a roadway through Isle Avenue.

We have shared a property line with the Carmelites for just over 20 years, and they have been phenomenal neighbors. My family supports their devoted and faith-filled lifestyle, so we are completely in favor of building the Chapel. We want them to do that! However, we feel they should maintain access where it has always been — along DeMontreville Trail. Adding a roadway through Isle Avenue would disrupt the quiet, residential neighborhood that drew us here originally.

When adding a roadway through Isle Avenue was discussed a few years ago, I was informed by sources affiliated with the city that Isle Avenue was not constructed to withstand consistent vehicular traffic — its weight capacity simply is not enough. Even though the Chapel will not draw many visitors, its weight rating would still need to be adequate, and our street just was not built that way.

We love the city of Lake Elmo. It is where our kids grew up, it’s where most of our family lives, and it’s where we are blessed to call home. Our street has been the place where all of the neighborhood kids grew up playing with each other, where we have gone for countless family bike rides and walks, and where we can take a deep breath from the fast-paced reality of our professional lives.

Isle Avenue is a sanctuary for many of us — not just for my family. It is a safe place. It is a quiet place. It is a lightly-traveled dead end. Because of what this neighborhood means to us, we sincerely ask that you consider maintaining the existing access for the new Chapel.

That said, we wish the Carmelites all the best in the construction of their Chapel. It will be a great addition for their lives, and we are excited for them!

Thank you for considering!

Craig Falzone and family
5124 Isle Avenue North
Lake Elmo, MN 55042

Sent from my T-Mobile 4G LTE Device
BACKGROUND:
City Staff is continuing the amendment process for addressing trailer/recreational vehicle storage on residential properties, firewood, and other items required for screening as directed by the Planning Commission work plan. Staff has been dealing with code enforcement regarding boat/trailer storage on a regular basis. Throughout the enforcement process, of course, many of the residents feel that it is not unreasonable to keep their boat or lawn/landscaping trailer in the front driveway. On June 10th, 2019 the Planning Commission reviewed the proposed code changes and offered several suggestions for Staff to make to the proposed code.

REVIEW AND ANALYSIS:
With previous reports focusing in on vehicle storage and firewood, this report will incorporate the final drafted language of the entire section (154.407). If the discussed section is amended, Staff will be recommending the removal of Section 150.001 because each residential district has its own section to address screening and leaving it in place will continue to cause conflicts.

Lake Elmo:
Each residential district, Rural, Urban and Village Mixed use has their own screening requirement section. Those sections are 154.407, 154.456, and 154.507. Realizing that each district might have different expectations Staff has chosen to specifically focus in on the rural district (154.407). Below are the two sections of Code that would have influence over the rural district for screening requirements in the City. Staff has merged the two existing sections and combined aspects of other communities to create new language for the City (see recommendation section of the report).

§ 154.407 ACCESSORY USES.
A. Exterior Storage in Residential Districts. All materials and equipment shall be stored within a building or be fully screened so as not to be visible from adjoining properties, except for the following:
   1. Laundry drying
   2. Construction and landscaping materials and equipment currently being used on the premises. Materials kept on the premises for a period exceeding six (6) months shall be screened or stored out of view of the primary street on which the house fronts.
   3. Agricultural equipment and materials, if they are used or intended for use on the premises.
   4. Off-street parking and storage of vehicles and accessory equipment, as regulated in Article 5, Section 154.102. (This reference should be 210)
   5. Storage of firewood shall be kept at least ten (10) feet from any habitable structure and screened from view from adjacent properties.
   6. Outdoor parking

§ 150.001 PROHIBITED WITHOUT SCREENING.
(A) Storage of property in Agricultural and Residential districts. All personal property shall be stored within a building or fully screened so as not to be visible from adjoining properties and public streets, except for the following:
   (1) Laundry, drying;
   (2) Recreational equipment commonly used in residential yards;
   (3) Construction and landscaping materials, and equipment currently (within a period of 6 months) being used on the premises;
(4) Off-street parking of licensed operable passenger automobiles and pick-up trucks;
(5) Boats and trailers less than 25 feet in length, if stored in the rear yard more than 10 feet distant from any property line;
(6) Merchandise being displayed for sale in accordance with the provisions of the zoning code;
(7) Farm implements in the AG Zoning District; and/or
(8) Firewood storage for personal use.

FISCAL IMPACT:
Staff does not directly foresee a fiscal impact. However, amending the code may decrease the number of complaints received which would reduce Staff time dedicated to code enforcement.

COMMENTS AND RECOMMENDATION
Staff is looking for final comments on the following proposed language. A public hearing will be scheduled for the July 8th Planning Commission meeting for formal action on the Code changes. As proposed, items would be allowed without screening in the rural zoning districts (A, RR, RT, RS, and RE). The proposed amendments are in red. No parking of commercial trailers is covered in Section 154.210 H.
1. Laundry drying
2. Construction and landscaping materials and equipment currently being used on the premises. Materials kept on the premises for a period exceeding six (6) months shall be screened or stored out of view of the primary street on which the house fronts.
3. Agricultural equipment and materials, if they are used or intended for use on the property.
4. Off-street parking and storage of trailers 25ft in length or less as regulated in Article 7, Section 154.210, are licensed (when applicable) and kept in good and operable condition.
   a. Trailers shall be licensed to a resident of the property.
   b. Residential properties are allowed to store one trailer (boat trailer, snowmobile trailer, utility trailer, recreational vehicle, etc.) within the front yard. All other trailers must be stored either in the side or rear yard, and must be at least 5 ft. from all property lines.
   c. All trailers must be stored on a durable surface with suitable drainage that is not subject to rutting and/or erosion.
   d. Trailers must not be used as temporary or permanent storage of items as described in Chapter 96 of the City Code.
5. Agricultural equipment and materials, if they are used or intended for use on the premises.
6. Firewood storage, for personal use only.
   a. Firewood must be stacked in a stable manner, cannot exceed 5 feet in height, and stored only in the side or rear yards. In the case of properties with multiple frontages, wood shall not be stored on a side that abuts a public street.