

June 9, 2021

To: Crystal Lake Township Board

From: Zoning Administrator

Re: Revisions to Article 24 of the Zoning Ordinances

Attachments: Current Article 24 – Crystal Lake Watershed Overlay
Significant Changes – Proposed Article 24 Updates

I have attached the current Article 24 for reference.

I have also attached a list of significant updates to the 1994 Article 24, Crystal Lake Watershed Overlay Ordinance, that are being proposed.

The full text of the proposed updates to Article 24 will be provided to you after the Planning Commission receives public input and final updates are made.

The changes being proposed to the 1994 Overlay Ordinance have been under review by the Planning Commission at their March, April and May meetings. The Planning Commission is planning to hold a public hearing on June 30, 2021, at Grow Benzie to receive public input and comment. After considering and incorporating relevant public comments, the Planning will forward the updated Article 24 to the Board for consideration and approval.

As background, these updates are the largely the product of the Crystal Lake & Watershed Association's Land Use Committee. That Land Use Committee has been reviewing the existing 1994 Crystal Lake Watershed District Overlay for more than two years. They approached the Planning Commission in late summer 2019 to establish an understanding of why these proposed updates are necessary. The CL&WA made presentation to the Planning Commission in Spring of 2020, but further action was interrupted by the pandemic. In those presentations, the CL&WA explained that this project is a result of:

- Conversations with zoning administrators from the three townships that border Crystal Lake (Crystal Lake, Benzonia and Lake). The ZAs pointed out areas of the ordinance that were not clear and could not be acted on. They pointed out loopholes in the ordinance that prevented them from acting on situations where the intent of the ordinance was clear, but its language was not.
- Visual observation. Land Use Committee members have toured the lakeshore and the entire watershed observing building sites, logging sites, tree clearing sites, sites where variances have been requested, and sites where the ordinance has been ignored. They have attended township meetings and listened to the citizens who turned up at those meetings.
- The CL&WA Committee consulted respected advisors and partners in organizations such as EGLE, DNR, Michigan Lake and Stream Association, Michigan Inland Lakes Partnership, Midwest Glacial Lakes Partnership, Benzie Conservation District, MSU extension, and the forestry community. Each of these organizations, through research that supports their sometimes-divergent goals, has concluded that protection of an entire watershed is critical to its water quality.
- Extensive study was conducted of research papers, studies and publications concerning watersheds in Michigan and neighboring states such as Wisconsin, Minnesota and Pennsylvania that have glacial lakes with similar environments. These states provided model ordinances for consideration. This wide body of research supports clarifying and strengthening the current Watershed Overlay provisions.

Please keep in mind that this is an update to an existing ordinance. We are not starting from scratch. The Township's current 1994 ordinance (Article 24), combined with ordinance Article 22 (Environmental

Provisions), covers every category of protections - including vegetative cover, impervious surfaces, setbacks and density, building on slopes, tree clearing, runoff control and stormwater management. These categories of the current ordinances remain relevant. They have been in place and active for 25 years.

I also note that the updates to the Overlay Article 24 necessitate adding and revising certain definitions in Ordinance Section 2.2. Further, some parts of Article 22 and Table 14.21.2.2 (site plan requirements) in Article 14 should be updated for clarity and consistency.

It is anticipated that a full package covering Articles 24, 22, 2.2 and Table 14.21.2.2 will be presented to the Board as early as the July 20 Board Meeting.

ARTICLE 24
CRYSTAL LAKE WATERSHED OVERLAY
CURRENT VERSION
AS PUBLISHED IN CURRENT ORDINANCES
LAST UPDATED 1994

**ARTICLE XXIV
CRYSTAL LAKE WATERSHED OVERLAY DISTRICT**

Sec. 24.1 PURPOSE

The purpose of this Article is to protect the environmental quality of Crystal Lake, the Crystal Lake shoreline, and the Crystal Lake watershed through appropriate land use and design regulations. The protection of the Crystal Lake watershed is deemed a public purpose in order to preserve important environmental, historical, residential, recreational, cultural, scenic, and economic attributes of the region.

More specifically, the purpose of this Article is to protect the public health, safety, and welfare; to prevent and control water pollution; to protect fish spawning grounds, aquatic life, bird, and other wildlife habitat; to protect buildings and lands from accelerated erosion; to protect wetlands; to control building sites, placement of structures, and land uses; to conserve shore cover; to conserve natural beauty and open space; and to anticipate and respond to the impacts of development in shoreland areas.

Sec. 24.2 WATERSHED OVERLAY DISTRICT

All areas that are in the Crystal Lake watershed, according to the Crystal Lake Watershed Overlay Map shall meet all requirements of this Article. The Crystal Lake Watershed Overlay Map shall be on file with the Township Clerk and the Zoning Administrator at all times. Any interpretations of the boundaries of this map shall be the responsibility of the Zoning Administrator, whose decision may be appealed to the Township Board of Appeals.

In cases where a parcel is partially inside and partially outside of the overlay district, only those portions located within the overlay district are required to comply with the regulations of this Article.

Sec. 24.3 USES PERMITTED

All uses permitted by right or by conditional or special land use permit in the underlying zoning district shall be permitted, in the Crystal Lake Watershed Overlay District except for:

- A. Confined Feedlots
- B. Slaughterhouses
- C. Gas Stations
- D. Auto Repair Shops
- E. Auto Washes

- F. Oil-change Establishments
- G. Industrial uses involved in the manufacturing, compounding, processing, or treating of products.

Sec. 24.4 LOT SIZE, WIDTH, AND SETBACK

Minimum lot size, lot width, and setback requirements of the underlying zoning district shall be met unless this Article specifically states otherwise.

Sec. 24.5 APPROVAL PROCESS

A. All of the following uses or buildings (including additions or extensions to such uses or buildings) that are located wholly or partially within the Watershed Overlay District shall be required to obtain site plan approval pursuant to Article XIV.

1. Commercial Establishments.
2. Industrial Establishments.
3. Multifamily Housing Developments.
4. Subdivisions and Condominium Subdivisions.
5. Parking Areas Containing Four or More Parking Spaces.
6. Private Roads or Paved Areas Exceeding Four Thousand (4,000) Square Feet.
7. Planned Residential Developments, Planned Unit Developments.

Sec. 24.6 DESIGN REQUIREMENTS

The purpose of the design requirements of this section are to slow the rate of stormwater runoff, to reduce erosion and sedimentation, to protect water quality, to keep nutrients from entering lakes and streams, to maintain water temperatures at natural levels, to preserve fish and wildlife habitat, and to preserve aesthetic and scenic values of the watershed environment.

All new development, including additions or extensions to existing buildings, shall meet the design requirements of this section.

- A. Setbacks from Crystal Lake:
 1. All principal buildings shall be set back at least thirty-five (35) feet from the ordinary high-water mark of Crystal Lake, subject to Sec. 3.2.
 2. Within thirty-five (35) feet of the ordinary high-water

mark of Crystal Lake, a maximum of 400 square feet of land shall be covered by impervious surfaces, including all structures and paving for each 100 linear feet of lake frontage.

3. No unsightly, offensive, or potentially polluting material, including but not limited to lawn clippings, leaves, garbage, trash, refuse, or toxic materials, may be dumped or stored within thirty-five (35) feet of the ordinary high-water mark of Crystal Lake.

B. Vegetative Buffer: All existing vegetation located within thirty-five (35) feet of the ordinary high-water mark of Crystal Lake shall be maintained as a vegetative buffer in accordance with this Section.

1. Removal of vegetation in the natural vegetative buffer shall be limited to no more than twenty-five (25) percent of the length of this buffer, provided that cutting of this twenty-five (25) percent shall not create a clearcut opening greater than twenty-five (25) feet wide for every one hundred (100) feet of shoreline.
2. Natural shrubbery, trees, or other vegetation shall be preserved as far as practical and, where removed, shall be replaced with other naturally occurring vegetation that is equally effective in retarding runoff, preventing erosion, and preserving natural beauty. A mowed lawn is not a desirable vegetative buffer adjacent to the shoreline.
3. Native plants, shrubbery, and trees are encouraged when new vegetation is planted.
4. Existing soil and organic matter shall not be altered or disturbed within the natural vegetative buffer.
5. These provisions shall not apply to the removal of dead, diseased, or dying trees at the discretion of the landowner.

C. Development on Steep Slopes: Development on slopes of twelve (12) percent or greater shall meet the design requirements of this Section.

1. Density: The permitted density for residential

dwelling shall be based on the existing slope of the site. The permitted number of dwellings shall be based on the procedures outlined in Section 16.19 (e) by applying the maximum density requirements of this Section.

<u>Maximum Density Without Sewer</u>	<u>Maximum Density With Sewers</u>	<u>Existing Slope</u>
1.00 Unit per Acre	2.00 Units per Acre	12 to 17
0.75 Unit per Acre	1.50 Units per Acre	18 to 24
0.50 Unit per Acre	1.00 Unit per Acre	25+ Percent

2. Lot Coverage: The amount of land allowed to be covered by impervious surfaces shall be based on the existing slope of the site. Lot coverage shall be defined as the percentage of the lot (excluding rights-of-way and wetlands) that is covered by impervious surfaces, including structures and paving. In the case of PUDs, PRDs, and Condominiums, each individual lot need not meet the requirements of this section, provided that the total project does meet the requirements of this section.

The maximum lot coverage shall be as follows:

<u>Lot Coverage</u>	<u>Existing Slope</u>
30 Percent	12 to 17 Percent
20 Percent	18 to 24 Percent
10 Percent	25+ Percent

3. Natural Vegetative Cover: As much of the existing vegetation, including bushes, shrubs, natural ground cover, and trees, shall remain on the site as possible. Lawn areas shall not qualify as natural vegetative cover required in this section. The required amount of vegetative area to remain undisturbed shall be based on the existing slope on the site and shall be clearly indicated on the proposed site plan or sketch plan. The natural vegetate areas shall be located along lot lines, natural drainage courses, wetlands, and steep slopes to the extent possible. In the case of PUDs, PRDs, and Condominiums, each individual lot need not meet the requirements of this Section, provided that the total project does meet the requirements of this Section.

<u>Percent of Lot to Remain in Natural Vegetative Cover</u>	<u>Existing Slope</u>
30 Percent	12 to 17 Percent
40 Percent	18 to 24 Percent
50 Percent	25+ Percent

4. Development of Slopes of Twenty-Five (25) Percent or Greater: Development on slopes of twenty-five (25) percent or greater shall be prohibited unless there are no other reasonable or prudent alternatives. If the property owner believes that no reasonable or prudent alternatives exist, he or she must first obtain a Special Land Use Permit as provided for in this Ordinance prior to any development on slopes of twenty-five (25) percent or greater. In reviewing the Special Land Use request, the Zoning Administrator or Planning Commission must find that the following conditions are met:

- (a) That no other reasonable or prudent alternatives exist.
- (b) That the development will not create excessive soil erosion or sedimentation and that it will not impair the quality of water discharged from the site.
- (c) That the peak rate of stormwater runoff after development will not exceed the peak rate of stormwater runoff that has occurred prior to the proposed development.
- (d) That all design requirements of this Section are met.

5. Determination of Slope: The determination of slope shall be made by the Zoning Administrator based on the Slope Map. The Slope Map shall be on file with the Township Clerk and the Zoning Administrator at all times. The Zoning Administrator shall make the best possible determination using the scale of the map and shall record his or her determination on a site plan that is made available by the property owner. In cases where there is more than one slope category on a lot or proposed development, the Zoning Administrator shall indicate these areas on the site plan.

If the property owner disagrees with the slope determination made by the Zoning Administrator, he or she may request a review of the determination by the Planning Commission during the site plan review process. In making its case, the property owner shall present topographic mapping or a survey prepared and sealed by a licensed community planner, a licensed architect, a registered civil engineer, or a licensed surveyor. Based on the evidence presented by the Zoning Administrator and the property owner, the Planning Commission shall make a slope determination and shall record its decision on the proposed site plan.

D. Development on Ridge Lines: A "ridge line" shall be defined as a line at which a critical slope area breaks to a slope of less than eight (8) percent for a distance of at least twenty (20) feet. A "critical slope area" shall be defined as all slopes facing Crystal Lake that have a significant portion of their grade being twelve (12) percent or greater for a distance of at least one hundred (100) feet.

1. All principal buildings shall be set back at least fifty (50) feet from all ridge lines.
2. All principal or accessory buildings or structures located within one hundred (100) feet of a ridge line shall not exceed eighteen (18) feet in height.
3. All accessory structures, such as but not limited to signs, sheds, garages, and satellite dishes, shall be set back at least thirty (30) feet from all ridge lines.
4. A building setback from the ridge line of only twenty (20) feet may be permitted if any of the following conditions exist:
 - (a) There are no other reasonable or prudent alternatives to achieve the required fifty (50)-foot setback.
 - (b) There would be significant environmental consequences if the fifty (50)-foot setback was required.
 - (c) The building is not located within a special or unique viewing area or view shed within the Crystal Lake Overlay District.

5. All existing vegetation located within twenty (20) feet on either side of the ridge line shall be maintained as a vegetative buffer in accordance with this Section.

(a) Removal of vegetation in the natural vegetative buffer shall be limited to no more than twenty-five (25) percent of the length of this buffer, provided that cutting of this twenty-five (25) percent shall not create a clear-cut opening greater than twenty-five (25) feet wide for every one hundred (100) feet of ridge line.

(b) Natural shrubbery, trees, or other vegetation shall be preserved as far as practical and, where removed, shall be replaced with other naturally occurring vegetation that is equally effective in retarding runoff, preventing erosion, and preserving natural beauty. A mowed lawn is not a desirable vegetation buffer adjacent to the ridge line.

(c) Native plants, shrubbery, and trees are encouraged when new vegetation is planted.

(d) Existing soil and organic matter shall not be altered or disturbed within the natural vegetative buffer.

E. Private Roads: All private roads located in the Watershed Overlay District shall meet the requirements of this Section.

1. Private roads shall not be located within thirty (30) feet of Crystal Lake or within ten (10) feet of a wetland or stream.

2. Private roads in hilly terrain shall be encouraged to locate along natural contours of the land in order to minimize cutting, filling, and erosion.

F. General Design Standards: For all developments in the Watershed Overlay District, the following general design standards shall be followed:

1. Natural vegetation shall be maintained wherever possible. If the removal of vegetation is required, reestablishment of a compatible plant material shall be required.

2. Existing mature trees shall be incorporated into the project design where feasible.
3. Natural drainage courses shall be protected from grading activity.
4. Where known, groundwater flow patterns shall not be interrupted.
5. Slopes created by the grading of the site should generally not exceed a slope ratio of one (1) foot of vertical slope to three (3) feet of horizontal distance.
6. Buildings shall be clustered as much as possible to retain open space and surrounding tree cover and to minimize changes in topography.
7. Screening along roadways shall make maximum use of berming and landscaping but shall not interfere with sight distances.

G. Construction Guidelines: For all developments in the Watershed Overlay District, the following construction guidelines shall be followed:

1. Whenever feasible, natural vegetation shall be retained and protected.
2. Where inadequate vegetation exists, temporary or permanent vegetation shall be established.
3. All exposed slopes and graded areas shall be landscaped with ground cover, shrubs, and trees as soon as possible.
4. The smallest practical area of land shall be exposed at any one time during development.
5. When land is exposed during development, the exposure shall be kept to the shortest practical period of time and, if possible, shall be scheduled during seasons of minimum precipitation.
6. The permanent final vegetation and all structures shall be installed as soon as practical.

7. Trees are susceptible to all development in their immediate vicinity; and, unless extreme measures are taken during construction to protect them, their life span will inevitably be shortened. The developer must demonstrate how trees will be protected during construction or how to relocate trees if necessary.

8. For relocating trees, the root ball must be approximately ten (10) to twelve (12) inches in diameter for every inch of the tree's diameter. Adequate drainage and backfill shall be necessary to complete the relocation. Root protection during construction is essential in saving mature trees. Recommended techniques include using a geotextile aeration mat to allow structures to have adequate ventilation, while protecting the roots from excessive compaction and steel-reinforced concrete paving patterned with voids to be filled with gravel or grass that allow drainage, while protecting the tree from root compaction in highly trafficked areas.

SUMMARY OF
PROPOSED UPDATES
TO
ARTICLE 24
CRYSTAL LAKE WATERSHED OVERLAY

**CRYSTAL LAKE WATERSHED OVERLAY DISTRICT
ARTICLE 24 PROPOSED REVISIONS
SIGNIFICANT CHANGES**

SECTION 24.3 - USES EXCLUDED IN WATERSHED OVERLAY DISTRICT

1. Exclusions added include:
 - a. Commercial farming without submitting Generally Accepted Agricultural Management Practices (GAAMPs) and subject to Sections 24.7 and 24.8,
 - b. Clear Cut Lumbering without submitting a forest management plan (see Section 24.7.C)
 - c. Parking Lots (per Article XX [20]) in R-1, R-2 and RP Districts
 - d. Expansion of Existing Parking Lots
 - e. Fertilizer Storage without Secondary Containers
 - f. Salt Storage
 - g. Marinas or Boat Repair Shops
 - h. Airports or Private Landing Fields
 - i. Sand and/or Gravel Pits or Quarries
 - j. Golf Courses or Golf Course Expansions

REVISE SLOPE RANGES IN SECTIONS 24.4, 24.7, AND 24.8

1. Revised slope ranges to agree with the soil analyses provided in the USDA Natural Resources Conservation Service and Forest Service (NRCS) Benzie-Manistee Soil Survey. SECTION 24.4 - SETBACKS AND DENSITY
 1. Principal buildings to be set back from CL 100', up from 35'.
 2. No accessory buildings within 35' of CL OHWM.
 3. Limited building size (150 sq ft, 12 ft height) from 35'to 75' from CL OHWM.
 4. Density is reduced for multi-family developments (see revised Table 24-1).

SECTION 24.5 - APPROVAL PROCESS

1. All uses permitted by right or special land use permit require a site plan.
2. No site alteration (grading, excavation, vegetation removal, etc.), is allowed prior to site plan approval.
3. Any request must include a Septic Evaluation completed by the Benzie Leelanau District Health Department and submitted to the Zoning Administrator.
4. Forestry is defined and requires a Best Practices forest management plan.
5. Prohibition of shoreline retaining walls in Art. 22 repeated. Rip rap requires permit from ZA.
6. Runoff control during and after construction in Article 22 must be detailed on site plan.
7. Direct discharge of runoff via ditch, pipe or culvert into the lake, stream or wetland is prohibited.
8. No expansion of non-conforming structures in Crystal Lake vegetative buffer zone.

SECTION 24.7 - DESIGN STANDARDS - VEGETATIVE COVER

1. Vegetative cover requirements are stricter (see revised Table 24-2).
2. Turf grass (lawn) does not count in vegetative cover calculations.
3. Variable slopes on a site are used when calculating vegetative cover requirements.
4. Vegetative buffers are created for streams and wetlands.
5. Buffers are standardized at 35 feet, eliminated from vegetation requirement calculation.
6. Max clear cut opening in Crystal Lake shoreline vegetative buffer is reduced from 25' to 10.'
7. Added section titled Tree Maintenance & Management.
 - a. Forestry is defined and requires a temporary zoning permit.
 - b. Tree removal during construction defined and must be shown on site plan.
 - c. Tree mgmt. and maint. by property owner defined. May require certified plan.

SECTION 24.8 - DESIGN STANDARDS - IMPERVIOUS SURFACES

1. Maximum lot coverage allowed is reduced (see revised Table 24-3).
2. Lot coverage calculation excludes slopes more than 18% and vegetative buffer zones.
3. Criteria and testing set for surfaces to qualify as permeable.
4. Non-conforming conditions – maintain or repair without increasing footprint or volume.

SECTION 24.9 - DESIGN STANDARDS - DEVELOPMENT ON SLOPES

1. A steep slope is defined as a slope of 18% or greater, down from 25%.
2. Development on a steep slope requires a Special Land Use Permit

INSERT NEW SECTION 24.10 -- SETTING CRITERIA FOR SPECIAL LAND USE PERMITS ON SLOPES 18% or greater.

SECTION 24.11 - DESIGN STANDARDS - DEVELOPMENT ON RIDGELINES

1. New definition of ridgelines and delineation.
2. Increased setback for accessory structures to 50ft.

SECTION 24.12 - DESIGN STANDARDS - PRIVATE ROADS AND DRIVEWAYS

1. A road that must be located within a buffer zone must be constructed of permeable surface.

SECTION 24.13 – GENERAL DESIGN

1. Clarified plants to be compatible native plants or non-invasive plants.
2. Add reference to vegetative cover and buffers.
3. Required to show run-off control on site plan and repeats 24.5 requirements.

SECTION 24.14 – CONSTRUCTION

1. Added requirement to install biodegradable mats to areas exposed by construction
2. Provides direction on protection of trees to remain.
3. Protections during construction of trees and other vegetation, and streams and wetlands, by making these areas off limits to heavy equipment, parked vehicles and trailers, in order to prevent soil compaction and water pollution.

SECTION 24.15 - RESOURCES

1. A new section added to give applicants general information about organizations to contact for guidance.
2. This section may be updated by the Zoning Administrator without formal amendment of these ordinances.

ADD NEW ILLUSTRATIVE FIGURES

- FIGURE 24-1 – WATERSHED BOUNDARY
- FIGURE 24-2 – RAIN GARDENS
- FIGURE 24-3.1 – SLOPE ZONES
- FIGURE 24-3.2 – SLOPE ZONE DETERMINATION & ANALYSIS
- FIGURE 24-4 – SETBACK EXAMPLES
- FIGURE 24-5 – PERMEABLE SUBBASE DESIGNS
- FIGURE 24-8.1 – ROOT ZONE PROTECTION
- FIGURE 24-8.2 – ROOT ZONE PROTECTION
- FIGURE 25-6.1 – PERMEABLE PAVEMENT EXAMPLE
- FIGURE 25-6.2 – PERMEABLE PAVEMENT LAYER DEFINITION
- FIGURE 25-7 – PERMEABLE DESIGN CHECKLIST

5/19/2021

Article XXIV Crystal Lake Watershed Overlay District
Outline/Structure of Document

Current	Proposed
24.1 Purpose	24.1 Purpose
24.2 Watershed Overlay District	24.2 Watershed Overlay District
24.3 Uses Permitted	24.3 Uses Excluded in Watershed Overlay District
24.4 Lot Size, Width and Setback	24.4 Setbacks & Density <ul style="list-style-type: none"> A. Setbacks B. Wetland and Stream Setbacks C. Density <ul style="list-style-type: none"> • Table = Slope -v- Units per Acre
24.5 Approval Process Seven specific uses needing site plan approval	24.5 Approval Process <ul style="list-style-type: none"> A. Site Plans – Required for ALL projects B. Forestry & Forestry Management C. Retaining Walls -- Prohibited D. Runoff Control – During & after construction E. Nonconforming Conditions
24.6 Design Requirements	24.6 Design Standards for Construction and Use of Land
A. Setbacks from Crystal Lake <ul style="list-style-type: none"> 1. 35' from OHWM 2. 400 SF hard surf allowed in 35' 	24.7 Design Standard - Vegetative Cover <ul style="list-style-type: none"> A. General Requirements Vegetative Cover <ul style="list-style-type: none"> • Table = Slope -v-% Cover to Remain B. Vegetative Buffer Zones C. Tree Maintenance & Management (NEW) <ul style="list-style-type: none"> 1. Forestry 2. Tree Removal for Construction 3. Tree Management / Maintenance by Property Owner (non-commercial)
B. Vegetative Buffer <ul style="list-style-type: none"> 1. Clear-cut opening to Lake 2. Preserve natural cover as far as practical 	
C. Development on Steep Slopes <ul style="list-style-type: none"> 1. Density <ul style="list-style-type: none"> • Table = Slope -v- Units per Acre 2. Lot Coverage – Impervious Surf <ul style="list-style-type: none"> • Table = Slope -v- % Lot Coverage 3. Natural Vegetative Cover <ul style="list-style-type: none"> • Table = Slope -v-% Cover to Remain 	24.8 Impervious Surfaces <ul style="list-style-type: none"> A. Lot coverage <ul style="list-style-type: none"> • Table = Slope -v- % Lot Covered B. Existing Impervious Surfaces C. Permeable or Pervious Surfaces
4. Development on Slope 25% or Greater <ul style="list-style-type: none"> • Allowed by Spec Use Permit 	24.9 Development on Slopes <ul style="list-style-type: none"> A. Steep Slopes <ul style="list-style-type: none"> • Slopes Gtr than 18% need Spec Land Use Pmt B. Determination of Slope <ul style="list-style-type: none"> • Use Slope Map in Office
D. Development on Ridgelines <ul style="list-style-type: none"> 1. Define Ridgeline 2. Define Setbacks for Buildings 3. Vegetation Removal 	24.10 Requirements for Special Land Use Permit (NEW)
E. Private Roads	24.11 Development on Ridgelines <ul style="list-style-type: none"> 1. Define Ridgeline 2. Define Setbacks for Buildings 3. Vegetation Removal
F. General Design Standards	24.12 Private Roads and Driveways
G. Construction Guidelines	24.13 General Design Guidelines
	24.14 Construction Requirement
	24.15 Resources (NEW)

DRAFT OF
ARTICLE 24
WITH PROPOSED UPDATES TO
ORDINANCE TEXT

**ARTICLE XXIV
CRYSTAL LAKE WATERSHED OVERLAY DISTRICT**

SECTION 24.1 PURPOSE

The purpose of this Article is to protect the environmental quality of Crystal Lake, the Crystal Lake shoreline, and the Crystal Lake watershed through appropriate land use and design regulations. The protection of the Crystal Lake Watershed is deemed a public purpose in order to preserve important environmental, historical, residential, recreational, cultural, scenic, and economic attributes of the region.

More specifically, the purpose of this Article is:

To protect the public health, safety, and welfare;

To prevent water pollution and warming;

To prevent erosion and degradation and fragmentation of landscapes;

To protect fish spawning grounds, aquatic life, bird and other wildlife habitat;

To protect buildings and lands from accelerated erosion;

To protect streams, wetlands, groundwater resources, and the water quality of Crystal Lake;

To conserve natural beauty, open space, native vegetation, and diversity of plants and animals throughout the watershed;

To ensure that land use and/or development enhances rural character rather than detracts from or ignores the natural topography, resources, amenities, and fragile environment of Crystal Lake and its watershed.

SECTION 24.2 WATERSHED OVERLAY DISTRICT

All areas that are in the Crystal Lake Watershed, according to the Crystal Lake Watershed Overlay Map (Figure 24-1) shall meet all requirements of this Article. All uses allowable in the underlying zoning districts of this Ordinance shall comply with the standards set forth in this Article regulating development and land use in the Crystal Lake Watershed. The requirements of this Article shall be applied in addition to the other applicable regulations or use restrictions for each zoning district and shall be considered as a separate portion of the zoning application.

The Crystal Lake Watershed Overlay Map shall always be on file with the Township Clerk and the Zoning Administrator. Any interpretations of the boundaries of this map shall be the responsibility of the Zoning Administrator, whose decision may be appealed to the Township Board of Appeals.

42 In cases where a parcel is partially inside and partially outside of the overlay
43 district, only those portions located within the overlay district are required to
44 comply with the regulations of this Article.

45
46 Where there is any conflict between the provisions or requirements of this
47 overlay district, and those of any underlying zoning district, the more restrictive
48 provisions apply.

49
50 When the proposed land use is a “use by right” in the underlying zoning district,
51 the Planning Commission and Board of Zoning Appeals will diligently engage in a
52 good faith effort to achieve an acceptable site plan.

53

54 **SECTION 24.3 USES EXCLUDED IN WATERSHED OVERLAY DISTRICT**

55

56 All uses permitted by right or by special land use permit in the underlying zoning
57 district shall be permitted in the Crystal Lake Watershed Overlay District
58 EXCEPT for the following uses which include but are not limited to:

- 59 A. Confined Feedlots
- 60 B. Slaughterhouses
- 61 C. Gas Stations
- 62 D. Auto Repair Shops
- 63 E. Auto Washes
- 64 F. Oil-change Establishments
- 65 G. Industrial Uses involved in the Manufacturing, Compounding, Processing,
66 or Treating of Products.
- 67 H. Commercial Farming without submitting documentation of Generally
68 Accepted Agricultural Management Practices (GAAMPs) planning and
69 without compliance with Sections 24.7 and 24.8.
- 70 I. Clear Cut Lumbering without submitting a Forest Management Plan (see
71 Section 24.7.C)
- 72 J. Parking Lots (per Article XX [20]) in R-1, R-2 and RP Districts
- 73 K. Expansion of Existing Parking Lots
- 74 L. Fertilizer Storage without Secondary Containers
- 75 M. Salt Storage
- 76 N. Marinas or Boat Repair Shops
- 77 O. Airports or Private Landing Fields
- 78 P. Sand and/or Gravel Pits or Quarries
- 79 Q. Golf Courses or Golf Course Expansions

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81 **SECTION 24.4 SETBACKS & DENSITY**

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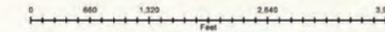
83 Minimum setbacks and density requirements of the underlying zoning district
84 shall be met unless this Article specifically states otherwise. Refer to underlying
85 zoning district for lot dimension requirements. All setbacks are measured along
86 the ground contours.

Crystal Lake Township Zoning Map

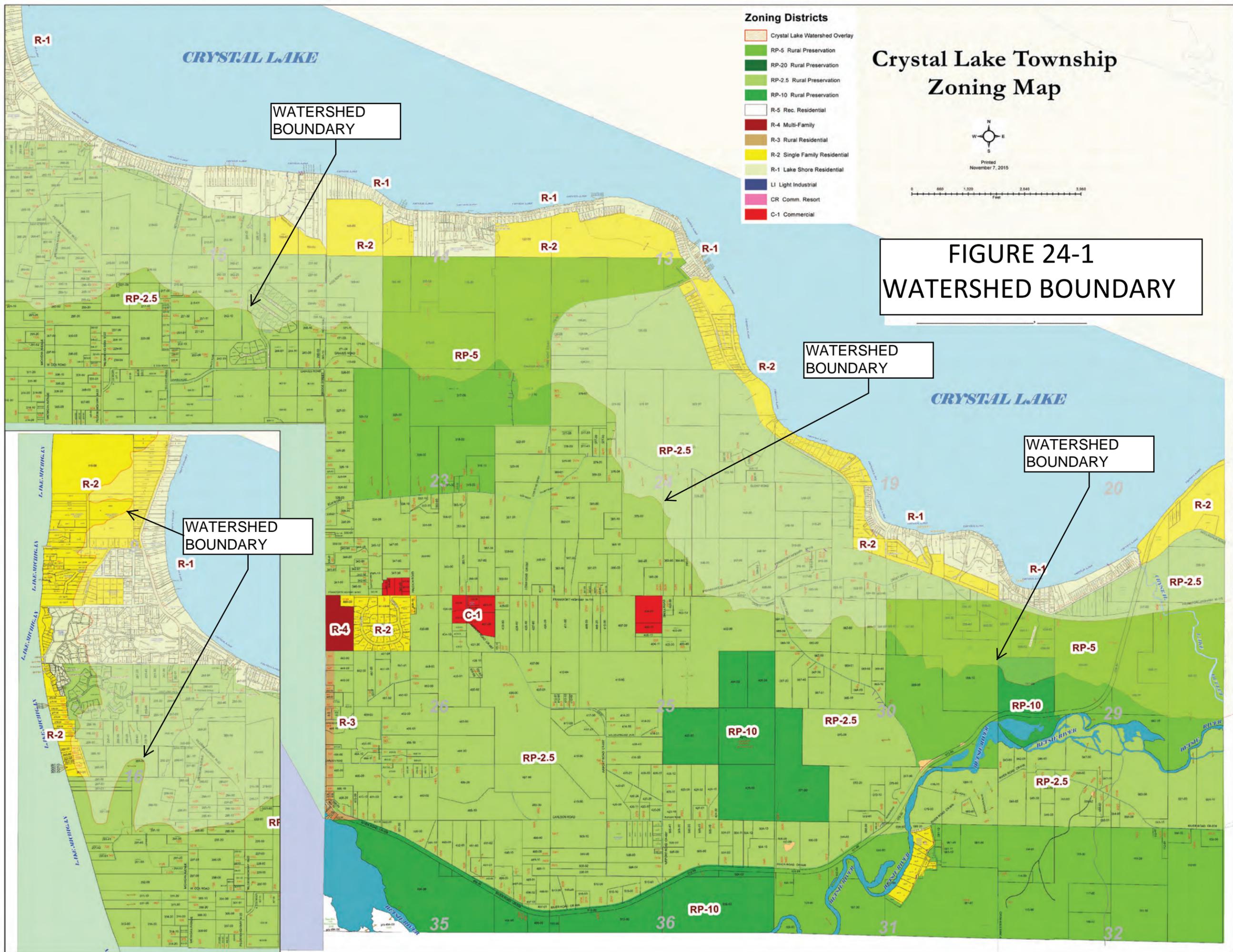
- Zoning Districts**
- Crystal Lake Watershed Overlay
 - RP-5 Rural Preservation
 - RP-20 Rural Preservation
 - RP-2.5 Rural Preservation
 - RP-10 Rural Preservation
 - R-5 Rec. Residential
 - R-4 Multi-Family
 - R-3 Rural Residential
 - R-2 Single Family Residential
 - R-1 Lake Shore Residential
 - LI Light Industrial
 - CR Comm. Resort
 - C-1 Commercial



Printed
November 7, 2015



**FIGURE 24-1
WATERSHED BOUNDARY**



WATERSHED
BOUNDARY

WATERSHED
BOUNDARY

WATERSHED
BOUNDARY

WATERSHED
BOUNDARY

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A. Setbacks

1. All principal buildings and permitted uses shall be set back at least one hundred (100) feet from the ordinary high-water mark (OHWM) of Crystal Lake.
2. All accessory buildings and accessory uses shall be set back at least thirty-five (35) feet from the OHWM of Crystal Lake.
3. Within 35 feet of the OHWM of Crystal Lake, no impervious surfaces shall be permitted. See subsequent Section 24.8.

B. Setbacks from Wetlands and Streams

No impervious surfaces shall be permitted within 35 feet of the OHWM of Wetlands and Streams. See subsequent Section 24.8.

C. Density

The permitted density for residential dwellings shall be one dwelling unit per lot/parcel in R-1, R-2, and RP Districts. In the case of development classified as a PRD (Article 16.19), a PUD (Article 17) or a Condominium or Subdivision (Article 18), the density shall be based on the existing slope of the site, the following table, and all other requirements of this Article.

Existing Slope	Maximum Density
Less than 6%	1.00 unit per acre
6% to less than 12%	0.75 unit per acre
12% to less than 18%	0.50 unit per acre
18% or greater	Special Land Use Permit Required

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SECTION 24.5 APPROVAL PROCESS

A. Site Plans

1. All uses permitted by right or by special land use permit (including additions or extensions to such uses or buildings) that are located wholly or partially within the Watershed Overlay District shall be required to obtain site plan approval pursuant to Article XIV (14).
2. No site alteration, including but not limited to grading, excavation,

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115 tree and other vegetation removal, filling, demolition or construction
116 of any kind, shall be permitted until a site plan has been approved
117 and a permit has been issued by the Zoning Administrator.

118 B. Septic Inspection & Maintenance

119 1. Improperly maintained or installed septic systems are a primary
120 cause of pollution in Michigan's inland lakes. Because these
121 septic systems are near the shoreline, close to the water table, and
122 in very permeable soil, they must all be in perfect working order to
123 protect water quality. Routine inspection and pumping are
124 essential. Vigorous programs of education, leak detection and
125 voluntary remediation are required, and Crystal Lake Township
126 joins with other community groups in supporting these efforts.

127 2. Any request for a zoning (or land use) permit must include a Septic
128 Evaluation completed by the Benzie-Leelanau District Health
129 Department and submitted to the Zoning Administrator. The Zoning
130 Administrator may waive this requirement if the proposed
131 development would have no effect on the septic system. Any
132 recommended maintenance, repairs, corrective action or
133 replacement must be completed on a timetable agreed to by owner,
134 health department and zoning administrator. In addition, all of the
135 requirements of the Benzie-Leelanau District Department Sanitary
136 Code must be met, according to Section 14.7.3.B.

137 C. Forestry & Forest Management

138 Forestry as defined in Section 2.2 under "Forest", "Forestry Use or Forest
139 Operations," "Forest Management," and "Timber Harvesting" located
140 wholly or partially within the Watershed Overlay requires a Temporary
141 Zoning Permit (see Article 14), which will be issued by the Zoning
142 Administrator when:

143 1. the Zoning Administrator has received a plan for the forestry activity
144 that complies with the Michigan Department of Natural Resources
145 Forestry Best Management Practices for Soil and Water Quality,
146 and;

147 2. this plan is written by a Forester as defined in Section 2.2 and
148 recognized as such by the Benzie County Conservation District
149 Forester.

150 3. Pre-approved templates for forestry management plans are
151 available from the Zoning Administrator or on the Township's
152 website. Templates are also available from the American Tree
153 Farm System for Michigan's Family Forest Owners.
154 (www.treefarmssystem.org/michigan)

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D. Retaining Walls

1. Shoreline retaining walls (see Section 2.2) are prohibited.
2. No shoreline retaining wall shall be modified, enlarged, replaced or removed without an approved zoning permit from the Zoning Administrator.
3. Shoreline erosion protection such as “rip-rap” or the like shall not be installed without receiving a permit from the Michigan Department of Energy, Great Lakes and Environment (EGLE), and submitting same to the Zoning Administrator. (See Section 22.) In addition, all relevant provisions of this overlay, including but not limited to Section 24.7 DESIGN STANDARD – VEGETATED COVER; Section 24.9 DEVELOPMENT ON SLOPES; Section 24.12 GENERAL DESIGN GUIDELINES; and 24.13 CONSTRUCTION REQUIREMENTS, shall apply.

E. Runoff Control

Runoff from any and all impervious surfaces shall be controlled in accordance with Section 22.6. The site plan submitted for approval must address existing control of runoff and runoff control both during and after construction through the use of filtering, retention, and Low Impact Development (LID) systems such as rain gardens or constructed wetlands. See Figure 24-2. Direct discharge of runoff above surface or sub-surface via ditch, pipe, or culvert into the lake, stream, or wetland is prohibited at all times including during and after construction.

F. Non-conforming Conditions

Non-conforming situations (see Section 2.2) created by the adoption of amendments or revisions to Article XXIV (24) shall be adjudicated in accordance with Article XXVIII (28) of this Ordinance subject to the following conditions.

1. Where a structure already exists on a parcel and is wholly or partially within 35 feet of the Lake’s OHWM, that structure, regardless of height shall be considered to be a lawful, non-conforming structure, which cannot be expanded in either footprint or volume.
2. If multiple lots of record are combined and the existing non-conforming structures are removed to allow construction of a new structure, then the new structure shall meet all requirements of the current Ordinances.

How to choose the right location

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At least 10' from a building

Never plant a rain garden on top of a septic tank, drain field, wellhead, or utilities.

**FIGURE 24-2
RAIN GARDENS**

Select a site with few or no trees to avoid disturbing their roots.

FOR MORE INFORMATION ON RAIN GARDENS SEE _____

Avoid steep slopes and allow for overflow.

Check your local

Area of rain garden (Sq. Ft.) =

Area to be treated (Sq. Ft.) / Depth of Rain Garden (in.)

EXAMPLE

900 Sq. Ft. / 6 in. =
150 Sq. Ft Rain Garden



General Rain Garden Planting Zones

Select plants according to their water needs.

Bottom: For plants that can tolerate wetter conditions.

Slope: For plants that can tolerate occasional standing water.

Top: For plants that prefer drier conditions.



Overview of a Rain Garden

Cross-section of a Rain Garden

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SECTION 24.6 DESIGN STANDARDS FOR CONSTRUCTION AND USE OF LAND

The purpose of the design standards of this Article are:

- To slow the rate and volume of stormwater runoff;
- To reduce erosion and sedimentation;
- To protect water quality and recharge groundwater;
- To keep excess nutrients, such as nitrogen and phosphorus and other pollutants from entering lakes and streams;
- To maintain water temperatures at natural levels;
- To preserve fish and wildlife habitat, and;
- To preserve aesthetic and scenic values of the watershed environment.

Any development and/or use of land, including but not limited to new structures; additions or extensions to existing structures (regardless of height); or construction in, or changes to, vegetative cover shall meet the design standards of this Article.

The application prepared by the owner and/or owner’s agent shall show, by submitting appropriate calculations and resource inventories, that the proposed development, construction, or land use will preserve predevelopment natural floodwater storage capacity; preserve valuable habitat for Lake and Watershed flora and fauna; preserve water quality and ground water resources; control stormwater runoff velocity and/or volume; and protect any other natural stream, floodplain, and/or wetland function; and is otherwise consistent with the intent of this Article.

In addition, an owner or owner’s agent shall meet all requirements of the Township for grading and filling of their property and for stormwater retention, including the environmental provisions of Article XXII (22).

SECTION 24.7 DESIGN STANDARD – VEGETATIVE COVER

The terms “vegetation,” and “vegetative cover” as used in this Article shall be defined as all the plant life of an area, taken as a whole, including perennial grasses, legumes, forbs, shrubs, and trees.

A. General Requirements for Vegetative Cover

1. The required area of vegetative cover to remain undisturbed shall be in accordance with the following table and based on the proximity to Crystal Lake, streams, and wetlands and the existing slopes on the site. The Minimum Percent to Remain shall be calculated for each portion of the lot having a similar slope (referred to as a ‘slope zone’). Areas having a slope of 18% or greater, rights of way and vegetative buffer zones per Section 24.7.B occurring (wholly or partially) in each slope zone shall be excluded

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from the calculation in that slope zone. Areas of undisturbed vegetative cover shall be clearly shown on the proposed site plan. See Figures 24-3.1 and 24-3.2 for an example of how the requirements of the following table are applied.

2. Turf grass or lawns (see Section 2.2) shall not qualify as native or non-invasive vegetative cover required in this Section and shall not be used in the calculation of percentage of vegetative cover in this Section.

TABLE 24-2	
Existing Slope	Minimum Percent of Lot to Remain in Native and/or Non-Invasive Vegetative Cover
Less than 6%	30%
6% to less than 12%	40%
12% to less than 18%	50%
18%+	Special Land Use Permit Required

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3. Natural vegetative areas shall be located or preserved along lot lines, natural drainage courses, streams, wetlands, and steep slopes.
4. Where existing vegetation is removed in conformance with this Article and such areas are required to be replaced, they shall be replaced with native or non-invasive vegetative cover that is recommended as being effective in infiltrating runoff, preventing erosion, and preserving natural beauty. (Refer to Section 24.14 Resources).
3. In the case of PUDs, PRDs, Condominiums and Subdivision development, each individual lot need not meet the requirements of this Section, provided that the total project does meet the requirements of this Article.

B. Vegetative Buffer Zones

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Vegetative Buffer Zones are defined as areas adjacent to Crystal Lake, to streams and wetlands, and to ridgelines, where vegetation is critical to promoting infiltration, preventing erosion and/or controlling runoff. All distances are measured along the ground contours.

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1. Vegetation shall remain or begin at the ordinary high-water mark (OHWM) of Crystal Lake, stream, or wetland, and at a ridgeline,

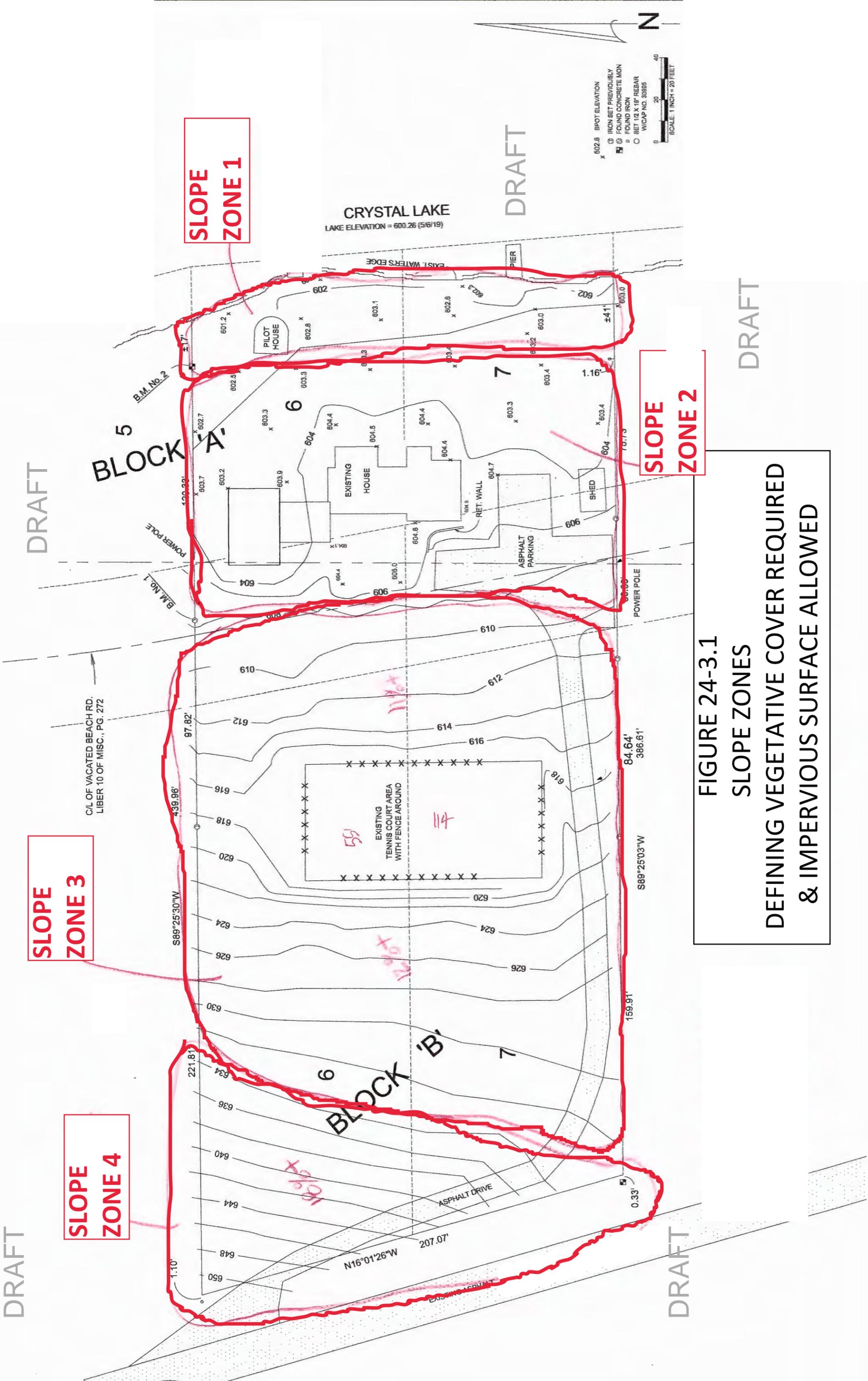
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SLOPE ZONE 3

SLOPE ZONE 4

SLOPE ZONE 1

SLOPE ZONE 2



CRYSTAL LAKE
LAKE ELEVATION = 600.26 (5/6/19)

BLOCK 'A'

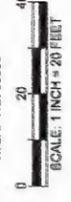
BLOCK 'B'

FIGURE 24-3.1
SLOPE ZONES
DEFINING VEGETATIVE COVER REQUIRED
& IMPERVIOUS SURFACE ALLOWED

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- x 602.8 SPOT ELEVATION
- ⊙ IRON BOLT PREVIOUSLY FOUND
- ⊙ FOUND CONCRETE MON
- ⊙ FOUND IRON
- ⊙ BBT 1/2 X 1/8 REBAR W/CAP NO. 30885



S89°25'30"W

S89°25'03"W

M.916.10.91N

C/L OF VACATED BEACH RD.
LIBER 10 OF MISC., PG. 272

B.M. No. 2

B.M. No. 1

POWER POLE

POWER POLE

ASPHALT DRIVE

ASPHALT PARKING

EXISTING HOUSE

PILOT HOUSE

EAST WATERS EDGE

PIER

CRYSTAL LAKE
LAKE ELEVATION = 600.26 (5/6/19)

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**FIGURE 24-3.2
SLOPE ZONE DETERMINATION & ANALYSIS**

ZONE ON TOPO SURVEY	DETERMINED SLOPE (SEE 24.9) The determination of slope percentages shall be shown on the site plan. There may be different slope percentages in different areas of the lot/parcel, which will determine the amount of vegetative cover removal and/or the area of impervious surface allowed in each of the different areas	VEGETATIVE COVER TO REMAIN (SEE 24.7) The Minimum Percent to Remain shall be calculated for each portion of the lot having a similar slope (referred to as a 'slope zone'). Areas having a slope of 18% or greater, rights of way and vegetative buffer zones per Section 24.7.B occurring (wholly or partially) in each slope zone shall be excluded from the calculation in that slope zone	MAX. ALLOWED IMPERVIOUS SURFACE (SEE 24.8) The area of IMPervious Surface (IMPS) permitted shall be based on distance from the Lake's OHWM and the existing slope zones of the site. Lot coverage shall be defined as the percentage of the lot area (excluding the area of slopes greater than 18%, rights-of-way and vegetative buffer zones per Section 24.7.B) that is uninterrupted by public rights-of-way or slopes greater than 18% and is covered by impervious surface areas, including structures and paving
ZONE 1	This area is within 35' of the OHWM (Ordinary High-Water Mark) of Crystal Lake, which is a defined buffer zone	SEE 24.7.B -- Removal of vegetation in an existing vegetative buffer shall be limited to no more than twenty percent (20%) of the length of shoreline of the buffer, provided that removal of this twenty percent (20%) shall not create a clear-cut opening greater than ten feet (10') wide for every fifty feet (50') of shoreline	SEE 24.8.A -- Within 35 feet of the Crystal Lake OHWM, no IMPervious Surfaces (IMPS), regardless of height, shall be permitted. Permeable surfaces shall be constructed per Section 24.8.C.
ZONE 2	Portion of site where slope is approximately 6% Dimension of Zone 2 = 200'w by 110'd Area of Zone 2 = 22,000 sq ft	SEE TABLE 24-2 -- Slope between 6% and 12% requires 40% vegetative cover (8,800 sf) to remain undisturbed unless a lawful, non-conforming situation exists. That is, up to 13,200 sf can be removed.	SEE TABLE 24-3 – Slope less than 6% allows 30% lot coverage, that is, 6,600 sf of IMPS. Per 24.4 the setback from the Lake's OHWM is 100 feet. However, the area of IMPS (structures, paving, etc.) located between 35 and 75 feet of the lake, shall be limited to a maximum of 150 square feet per 100 linear feet of lake frontage unless a lawful, non-conforming situation exists. SEE FIGURE 24-4. SEE Section 24.5.E for non-conforming situations.
ZONE 3	Portion of site where slope is approximately 12% Dimension of Zone 3 = 200'w by 245'd Area of Zone 3 = 49,000 sq ft	SEE TABLE 24-2 -- Slope between 12% and 18% requires 50% vegetative cover (24,500 sf) to remain undisturbed unless a lawful, non-conforming situation exists. That is, up to 24,500 sf can be removed.	SEE TABLE 24-3 – Slope between 12% and 18% allows 10% lot coverage, that is, 4,900 sf of IMPS (structures, paving, etc.
ZONE 4	Portion of site where slope is greater than 18% . See 24.9 Dimension of Zone 4 = 200'w by 60'd along the 'fall-line.' Area of Zone 4 = ~12,000 sq ft	SEE TABLE 24-2 – Slope greater than 18% requires 50% vegetative cover (24,500 sf) to remain undisturbed and also requires the owner to obtain a Special Land Use Permit that may require more than 50% vegetative cover to remain undisturbed. See Section 24.10	SEE TABLE 24-3 – Slope greater that 18% allows not more than 10% of IMPS and also requires the owner to obtain a Special Land Use Permit that may further reduce the percentage of IMPS. See Section 24.8.C. and 24.10.

- 264 and extend a minimum distance of 35 feet, measured horizontally
265 on a line perpendicular to the shoreline, water course or ridgeline.
- 266 a. Existing soil and organic matter shall not be altered or
267 disturbed within the natural vegetative buffer.
- 268 b. Existing vegetated areas that are located along lot lines,
269 natural drainage courses, streams, wetlands, ridgelines, and
270 slopes shall be maintained.
- 271 c. Turf grass areas are not considered vegetative buffer.
- 272 2. All existing vegetation located within thirty-five (35) feet of the
273 ordinary high-water mark of Crystal Lake, shall be preserved as a
274 vegetative buffer in accordance with this Section.
- 275 a. Removal of vegetation in an existing vegetative buffer shall
276 be limited to no more than twenty percent (20%) of the
277 length of shoreline of the buffer, provided that removal of this
278 twenty percent (20%) shall not create a clear-cut opening
279 greater than ten feet (10') wide for every fifty feet (50') of
280 shoreline.
- 281 b. For lots greater than fifty feet (50') wide, the clear-cut
282 opening so created shall be restricted to ten feet (10') or less
283 for any single opening. Multiple openings shall not be
284 contiguous.
- 285 3. All existing vegetation located within thirty-five (35') feet on either
286 side of any stream, wetland or ridgeline shall be maintained as a
287 vegetative buffer in accordance with this Section.
- 288 a. Removal of vegetation in the natural vegetative buffer shall
289 be limited to no more than twenty-five (25) percent of the
290 length of this buffer, provided that cutting of this twenty-five
291 (25) percent shall not create a clear-cut opening greater than
292 twenty-five (25) feet wide for every one hundred (100) feet of
293 ridgeline. Multiple openings shall not be contiguous.
- 294 C. Tree Maintenance & Management
- 295 Woodlands provide for public safety through the prevention of erosion,
296 siltation, and flooding. They are critical to a healthy watershed, even if not
297 next to a lake, stream, or wetland. Woodlands control stormwater by
298 reducing runoff velocity and quantity, by filtering pollutants before they
299 enter waterways, by absorbing rainfall and snow melt, and by recharging
300 aquifers thereby protecting and improving water quality, which is

301 tremendously important to the health and welfare of the communities near
302 Crystal Lake, Betsie River and Lake Michigan.

303 1. Forestry

304 Any forestry, timber harvesting or land clearing activity in any forest
305 (as defined by Section 2.2) located within the Crystal Lake
306 Watershed Overlay District shall be subject to submitting a Best
307 Practices plan and obtaining a permit as required by Section
308 24.5.C. In addition to the requirements of Section 24.5.C, the
309 cutting and removing of trees in the watershed shall be restricted by
310 Section 22.5 which covers "Removal of Vegetative Cover" in
311 environmentally sensitive areas of Crystal Lake Township.

312 2. Tree Removal for Construction

- 313 a. Removal of trees during construction or expansion of new or
314 existing structures shall be restricted to the building footprint,
315 decks, patios, septic fields, driveways, walkways, etc. shown
316 on the approved site plan. See Section 24.5.
- 317 b. Areas of trees and vegetation removed for temporary
318 parking and/or storage of materials, equipment, etc. shall be
319 shown on the approved site plan and must be included in the
320 calculation for the Percent of Vegetation to Remain on the
321 parcel per the text and table in Section 24.7.A.

322 3. Tree Management / Maintenance by Property Owner (non-commercial)

- 323 a. Tree topping in the Overlay District is prohibited unless the
324 Zoning Administrator has received a plan prepared by a
325 Certified Arborist, Registered Landscape Architect, Forester,
326 or Landscape Design Professional who maintains an active
327 certification from the Michigan Natural Shoreline
328 Professional Training and Certification Program (see Section
329 2.2, Definitions).
- 330 b. A property owner may, without a permit, remove up to five
331 (5) trees whose diameter measures between 6" and 12" at a
332 height of 4.5' above the ground, provided that the trees
333 removed represent no more than 30% of the total number of
334 trees on the property. In addition, any tree removal by
335 property owner is subject to all restrictions in this Overlay,
336 including but not limited to: provisions for removal of
337 vegetation on existing slopes; preservation of existing
338 vegetation in vegetative buffer zones; and lot coverage
339 requirements on existing slopes.
- 340 c. Any tree removal more extensive than described in Section
341 24.7.C.3.b., preceding, requires an Administrative Waiver
342 that will be issued by the Zoning Administrator (see Section
343 14) after the Zoning Administrator has received a plan for the

- 344 additional tree removal prepared by a Certified Arborist,
345 Registered Landscape Architect, Forester, or Landscape
346 Design Professional (see Section 2.2, Definitions) This plan
347 shall conform to the environmental purposes and meet all
348 requirements of this overlay ordinance and the provisions of
349 Section 22.5. Pre-approved templates for such tree removal
350 plans are available from the Zoning Administrator or on the
351 Township's website.
- 352 d. Property owners who encounter insect infestation or trees
353 suspected of being diseased shall contact a Certified
354 Arborist, Registered Landscape Architect, Forester, or
355 Landscape Design Professional (see Section 2.2,
356 Definitions) for proper diagnosis and planning for treatment
357 or removal. The property owner shall supply a copy of this
358 consultant's report to the Zoning Administrator prior to
359 removing any trees.
- 360 e. Exceptions to the requirements in Section 24.7.C.3.b and
361 24.7.C.3.c. are:
- 362 1). Actions made necessary by an emergency, such as a
363 tornado, windstorm, flood, freeze, or other disaster, in
364 order to prevent injury or damage to persons or
365 property or to restore order;
 - 366 2). Repair or maintenance work performed by public
367 utilities necessitating the trimming or cutting of trees;
 - 368 3). Removal of dead trees.

370 **SECTION 24.8 DESIGN STANDARD – IMPERVIOUS SURFACES**

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372 A. Lot Coverage

373 The area of impervious surface permitted shall be based on distance from
374 the Crystal Lake OHWM, streams, and wetlands, and the existing slope
375 zones of the site. Lot coverages are calculated considering only those
376 portions of a lot that are uninterrupted by rights-of-way and/or slopes 18%
377 or greater. For those uninterrupted portions, lot coverage is calculated as
378 the area covered by impervious surfaces (see Section 2.2) compared to
379 the area of the uninterrupted portion of the lot from which the areas of
380 easements, slopes 18% or greater and/or vegetative buffers (see Section
381 24.7.B) have been deducted.

- 382 1. Within 35 feet of the Crystal Lake OHWM, streams, and wetlands,
383 no impervious surfaces, regardless of height, shall be permitted.
384 Impervious surface area of structures, paving, etc. established
385 between 35 and 75 feet of the lake, stream or wetland shall be
386 limited to a maximum of 150 square feet per 100 linear feet of lake

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frontage. Maximum height of structures between 35 and 75 feet of the lake, stream, or wetland shall be 12 feet. See Figure 24-4

2. The maximum lot coverage varies depending on distance from the lake, stream or wetland (see Section 24.7.A.1 and 24.8.A) and the slope of the land on the lot/parcel. Maximum lot coverage shall be in accordance with the following table 24-3:

TABLE 24-3	
Existing Slope	Lot Coverage
Less than 12%	30%
12% to less than 18%	20%
18%+	Special Land Use Permit Required

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See Figures 24-3.1 and 24-3.2 for an example of how the requirements of this table are applied.

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3. In the case of PUDs, PRDs, and Condominiums, each individual lot need not meet the requirements of Sections 24.7 and 24.8, provided that the total project does meet the requirements of Sections 24.7 and 24.8.

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B. Existing Impervious Surfaces

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For impervious surfaces that were lawfully placed when constructed but that do not comply with the impervious surface standards of Section 24.8.A, preceding, the property owner may do either of the following:

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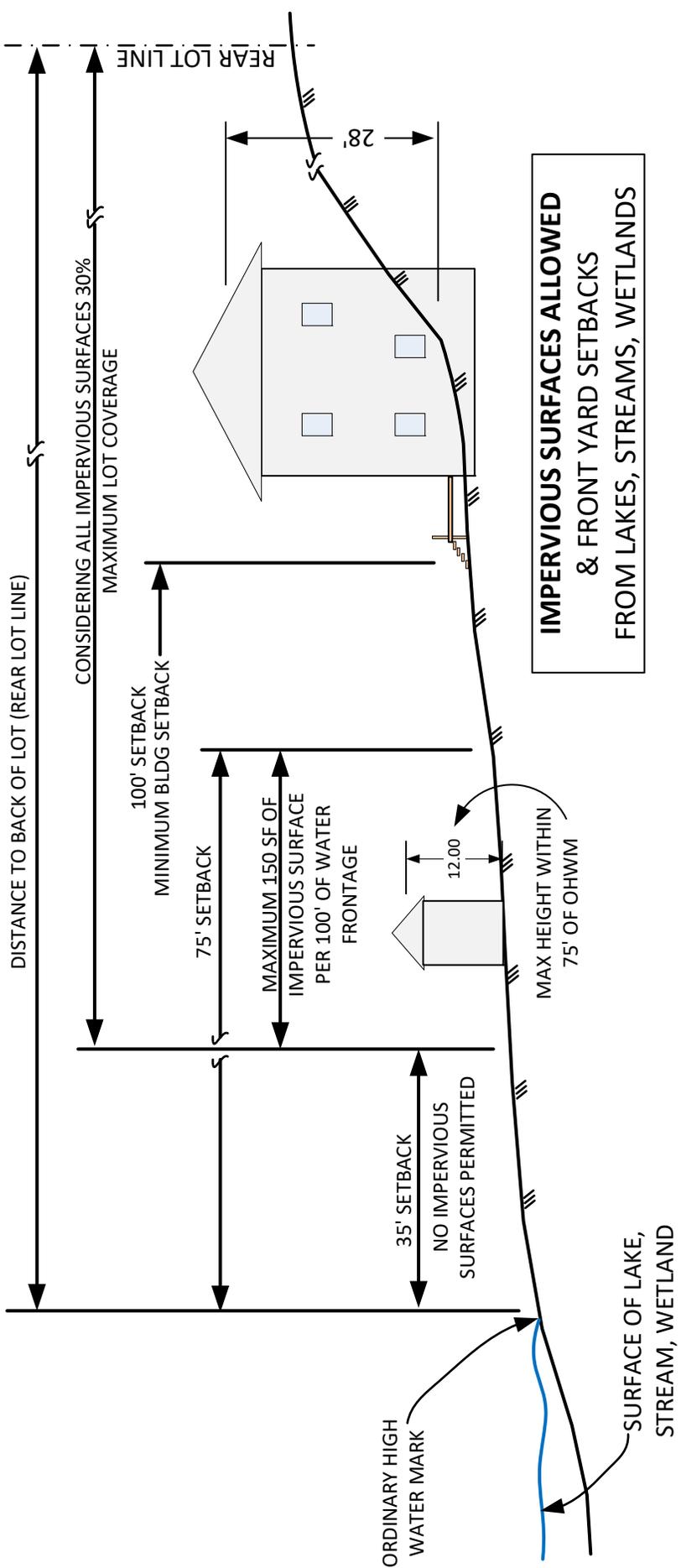
1. Maintain and repair existing impervious surfaces without increasing their area; or
2. Replace existing impervious surfaces with permeable or pervious surfaces that meet applicable setbacks and the standards of Section 24.8. Refer to Section 24.14, Resources, for information on permeable surface designs.

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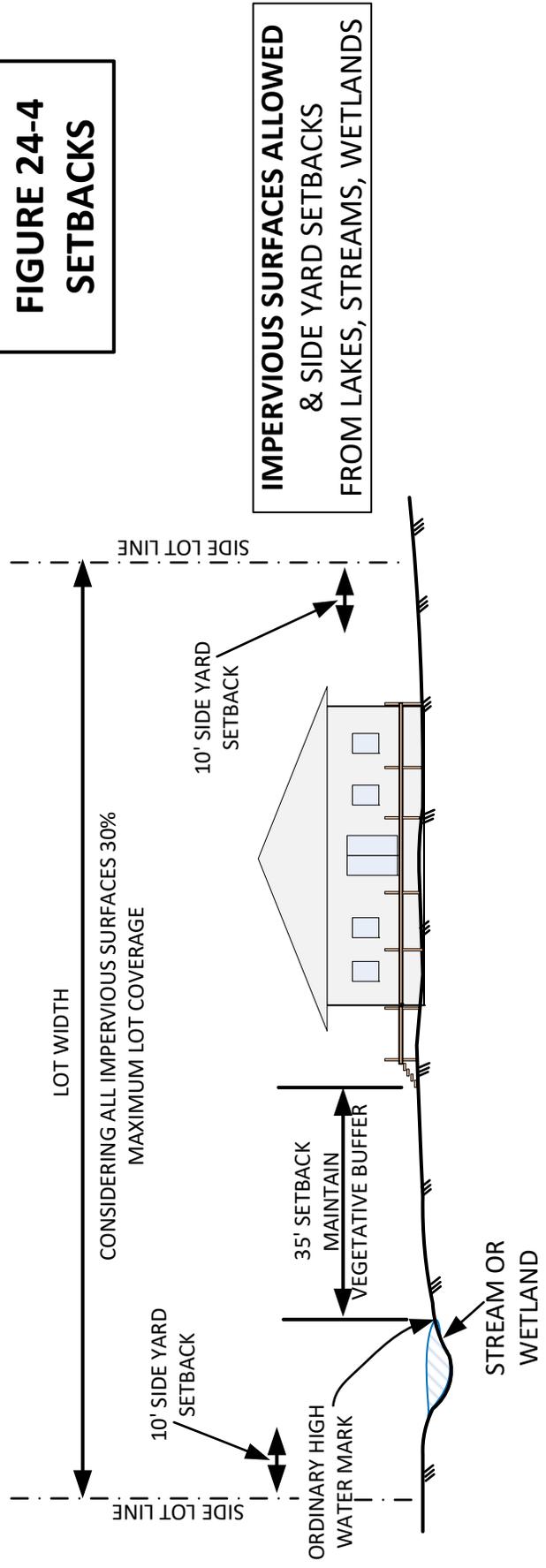
C. Permeable or Pervious Surfaces

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1. To qualify as a permeable or pervious surface, the prepared subbase shall be similar to that shown in Figures 24-5, 24-6.1 and 24-6.2; and,
2. The prepared subbase must undergo a four (4) hour percolation test, observed by the Zoning Administrator or his designee, showing a percolation rate equal to adjacent, undisturbed soils.



**FIGURE 24-4
SETBACKS**



PERMEABLE INSTALLATIONS

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Similar to the non-permeable paver systems structural component, permeable paver installations offer secondary purpose for capturing and detaining rainwater. Common uses can range from sidewalk and plaza areas, to heavy-duty parking lots and roadways and include various base depths as shown in the two details below.

PERMEABLE ON OPEN GRADED AGGREGATE - LIGHT DUTY

This cross-section is an example of a light-duty pedestrian sidewalk application.

. Specific installation details will vary based on site conditions.

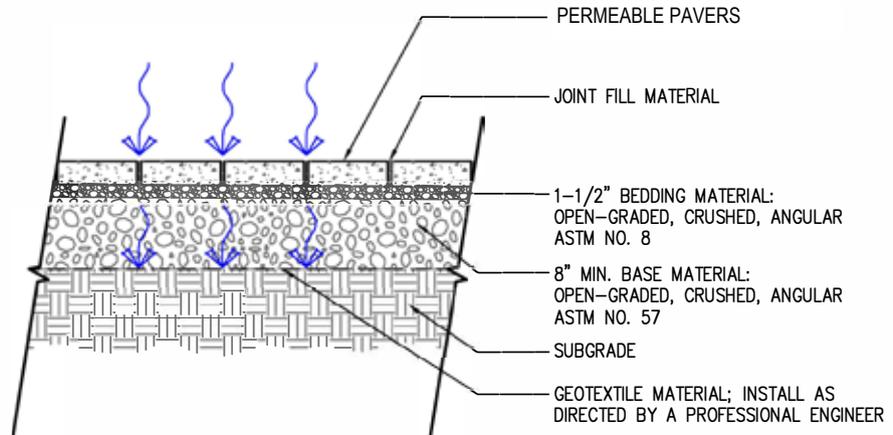


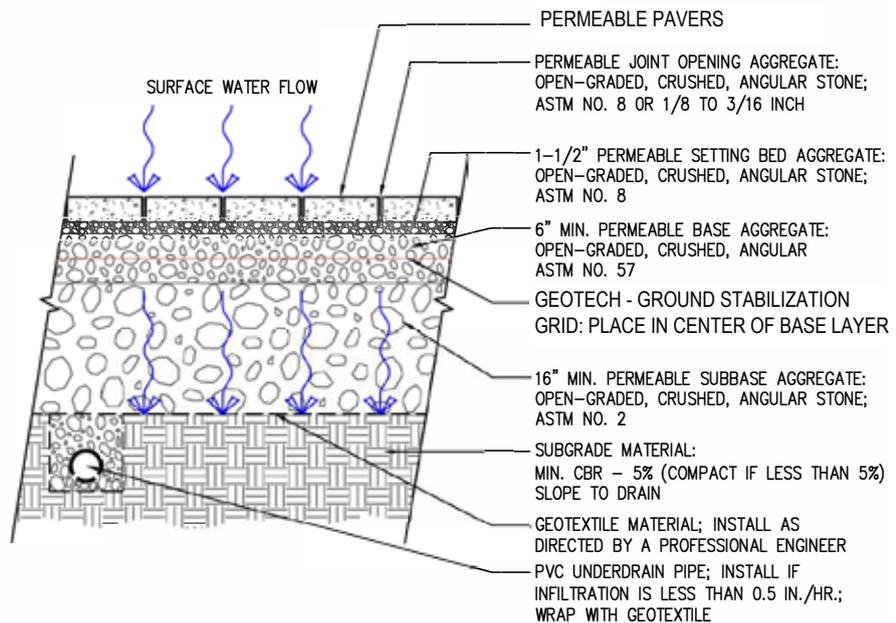
FIGURE 24-5

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PERMEABLE ON OPEN GRADED AGGREGATE - HEAVY-DUTY

Heavy-duty permeable applications require additional base support as illustrated below. This cross section is only an example.

Specific installation details will vary based on site conditions.



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SECTION 24.9 DESIGN STANDARD – DEVELOPMENT ON SLOPES

- A. Steep Slopes
Development on slopes greater than eighteen percent (18%) is prohibited without a Special Land Use Permit.

- B. Determination of Slope
 - 1. The determination of slope percentages shall be shown on the site plan presented for approval by the property owner. The site plan shall include calculations and/or cross-sections showing how slope percentages are calculated. There may be different slope percentages in different areas of the lot/parcel, which will determine the amount of vegetative cover removal and/or the area of impervious surface allowed in each of the different areas. See example illustration in Figures 24-3.1 and 24-3.2.
 - a. In the event slope percentages are not shown on the site plan, the Zoning Administrator shall use the Slope Map to determine percentages of slope for the lot/parcel. The Slope Map shall always be on file with the Township Clerk and the Zoning Administrator.
 - b. The Zoning Administrator shall make the best possible determination using the scale of the map and shall record his or her determination on a site plan that is made available by the property owner. In cases where there is more than one slope category on a lot or proposed development, the Zoning Administrator shall indicate these areas on the site plan.
 - 2.. If the property owner disagrees with the slope determination made by the Zoning Administrator, he or she may request a review of the determination by the Planning Commission during the site plan review process.
 - a. In making its case, the property owner shall present a topographic map, or a survey of the property prepared and sealed by a licensed surveyor or licensed civil engineer or a licensed architect.
 - b. Based on the evidence presented by the Zoning Administrator and the property owner, the Planning Commission shall make a slope determination and shall record its decision on the proposed site plan.

SECTION 24.10 REQUIREMENTS FOR SPECIAL LAND USE PERMIT

There are two reasons for Special Land Use Permits (SLUP) in the Watershed Overlay area: first is because the underlying zoning district specifies that certain

2021-06-14 Changes

459 land uses require a SLUP; and second is because whatever is being developed
460 is on a slope of 18% or greater. Circumstances could be such that both
461 conditions are true.

462 If a Special Land Use Permit is required by other sections of the Ordinance or by
463 Article 24 itself, the SLUP prepared by the owner and/or owner's agent shall
464 show, by submitting appropriate calculations and resource inventories, how the
465 proposed development, construction, or land use will preserve rural character of
466 land; preserve valuable flora and fauna habitat; address water quality and natural
467 floodwater storage capacity; control stormwater runoff velocity and/or volume;
468 and protect any other natural stream, floodplain, and/or wetland function; and is
469 consistent with the intent of this Article.

470 The following criteria shall be used by the Zoning Administrator and/or Planning
471 Commission to determine if a Special Land Use Permit should be granted.

- 472 A. The property owner has demonstrated their attempts to comply with the
473 ordinances and that no other reasonable or prudent alternatives exist.
- 474 B. The property owner has demonstrated that reason for the Special Land
475 Use application is not created by the action of the applicant.
- 476 C. The property owner has provided a site plan that details all the information
477 required by this Article, the underlying zoning district and Article 14, Part
478 4, including the requirements of Table 14.21.2.2.
- 479 1. The Zoning Administrator will prepare a written report addressing the
480 property owner's compliance with each requirement of this Article,
481 Article 14, Part 4, and each item of Table 14.21.2.2.
- 482 2. The site plan shall show slope zones as defined in Section 24.9 of this
483 Article. See Figures 24-3.1 and 24-3.2.
- 484 3. The site plan shall show contouring and landscaping, including
485 protected vegetation zones during construction and final landscaping
486 after construction.
- 487 D. The Section 24.4, Table 24-1 limit allowing no more than 0.50 units per
488 acre in the area where the slope is 18% or greater is maintained or the
489 number of units per acre is further reduced as the slopes become steeper.
- 490 E. The Section 24.7, Table 24-2 limit allowing no more than 50% of existing
491 vegetative cover to be removed in the area where the slope is 18% or
492 greater is maintained or the percentage of vegetative cover allowed to be
493 removed is further reduced as the slopes become steeper.
- 494 F. The property owner has demonstrated how the vegetative cover on
495 'downslope areas' will be preserved or improved.
- 496 1. The 'downslope areas' are the land on the slope descending from the
497 area being developed and/or a ridgeline and/or the crest of a hill.

- 498 2. The Zoning Administrator and/or Planning Commission may require, as
499 a condition of approval, that the property owner provide an affidavit,
500 (filed with the property deed) describing how the 'downslope areas' will
501 be maintained over time.
- 502 G. The owner has provided a Forest Management Plan, if applicable.
- 503 H. The Section 24.8, Table 24-3 limit allowing impervious surfaces to cover
504 no more than 20% of the area where the slope is 18% or greater is
505 maintained or the percentage of impervious surface is further reduced as
506 the slopes become steeper.
- 507 I. Engineered runoff control: the site plan shall show designs and
508 calculations confirming that the peak rate of stormwater runoff after
509 development will not exceed the peak rate of stormwater runoff that has
510 occurred prior to the proposed development stamped by a registered
511 professional engineer.
- 512 1. The owner has employed Low Impact Development Designs for
513 handling runoff and improving water filtration.
- 514 2. The site plan shall show how surface runoff during construction will be
515 controlled and contained on the property.
- 516 3. The site plan shall show how surface runoff will be controlled and
517 contained on the property after construction
- 518 4. That the development will not create excessive soil erosion or
519 sedimentation and that it will not impair the quality of water discharged
520 from the site.
- 521 J. The owner has provided a Shoreline Stewardship Plan for riparian buffers
522 at the Lake, streams, or wetlands.
- 523 K. The property owner has demonstrated that, in granting their application for
524 a Special Land Use Permit, their project will not cause a substantial
525 adverse effect upon property values in the immediate vicinity, or in the
526 district in which the property of the applicant is located.

527
528 **SECTION 24.11 DESIGN STANDARD – DEVELOPMENT ON RIDGELINES**

529
530 Ridgelines shall be defined as visually prominent strips or crests of land.
531 Ridgelines include the highest points of elevation in the watershed and separate
532 one drainage basin from another. (see Section 2.2). Ridgelines shall be as
533 shown on the Slope Map, which shall always be on file with the Township Clerk
534 and the Zoning Administrator.

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- 535 A. The precise delineation of a ridgelines shall be determined by the Zoning
536 Administrator at the time a zoning permit application is received based on
537 any combination of the following criteria.
- 538 1. Ridgelines that are located at the top of slopes 18% or greater facing
539 Crystal Lake.
- 540 2. Ridgelines that are at the top of slopes that create valleys that drain
541 directly into Crystal Lake.
- 542 3. Ridgelines that are part of an area of significant ecological, historical,
543 or cultural importance, such as those that connect park or trail
544 systems.
- 545 4. Ridgelines that have visual dominance as characterized by a
546 silhouetting appearance against the sky.
- 547 5. Ridgelines are a significant natural backdrop feature.
- 548 6. Ridgelines that have a visual dominance due to proximity and view
549 from existing major corridors.
- 550 7. Ridgelines that surround or visually dominate the surrounding valley
551 landscape either through their size in relation to the hillside or terrain of
552 which they are a part.
- 553 B. All principal buildings and accessory structures shall be set back at least
554 fifty feet (50') from ridgelines measured along ground contours.
- 555 C. All principal use structures or accessory buildings or structures located
556 within one hundred (100) feet of a ridgeline (measured along ground
557 contours) shall not exceed eighteen (18) feet in height. See Figure 24.5.
- 558 D. All existing vegetation located within thirty-five (35) feet on either side of
559 the ridgeline (measured along ground contours) shall be maintained as a
560 vegetative buffer in accordance with Section 24.7.B.
- 561 E. A building setback from the ridgeline may be waived by the Zoning
562 Administrator if any of the following conditions exist:
- 563 a. There are no other reasonable or prudent alternatives to achieve
564 the required fifty (50)-foot setback.
- 565 b. There would be significant environmental consequences if the fifty
566 (50)-foot setback were enforced.
- 567 c. The structure in question is not located within a special or unique
568 viewing area or view shed within the Crystal Lake Overlay District.
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SECTION 24.12 DESIGN STANDARD – PRIVATE ROADS & DRIVEWAYS

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All private roads and driveways located in the Watershed Overlay District shall meet the requirements of Section 3.22 and this Section.

- A. Private roads shall not be located within thirty-five (35) feet of Crystal Lake or within ten (10) feet of a wetland, stream, or ridgeline. If a road must be located within thirty-five feet (35') of a wetland, stream or ridgeline, the road surface shall be permeable as required by Section 24.8. Distances are measured along ground contours.
- B. Private roads and driveways in hilly terrain shall be located along natural contours of the land in order to minimize cutting, filling, and erosion and shall be shown on site plans.

SECTION 24.13 GENERAL DESIGN GUIDELINES

For any development, construction, improvement, or alteration of land use, including removal or clearing of vegetative cover in the Watershed Overlay District, the following general design guidelines shall be followed:

- A. Vegetation shall be maintained. If an owner, on his site plan, proposes that the removal of vegetation is necessary, reestablishment of like-type native or non-invasive plant material suitable to the habitat shall be required. The percent of vegetative cover and/or vegetative buffers per Section 24.7.A and 24.8.A must be restored.
- B. Existing mature trees (i.e., six inches or larger diameter at a height of 4.5') that the owner wishes to remain shall be located on the site plan and incorporated into the project design. See Section 24.13.H.
- C. Natural drainage courses shall be protected from grading activity.
- D. Obvious surface water and known groundwater flow patterns shall not be interrupted.
- E. Slopes created by the grading of the site shall not exceed a slope ratio of one (1) foot of vertical slope to three (3) feet of horizontal distance.
- F. Buildings shall be clustered as much as possible to retain open space, surrounding tree cover, other vegetative cover and to minimize changes in topography.
- G. Screening along roadways shall make maximum use of berming and landscaping but shall not interfere with sight distances. (Refer to Article XXII [22]).
- H. The site plan submitted for approval must address control of runoff both during and after construction using filtering, retention, and Low Impact Development (LID) systems such as rain gardens or constructed wetlands. Direct discharge via ditch, pipe, or culvert of runoff into the lake, stream or wetland is prohibited.

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SECTION 24.14 CONSTRUCTION REQUIREMENTS

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For any development, construction, improvement, or alteration of land use, including removal or clearing of vegetative cover in the Watershed Overlay District, the following construction requirements shall be followed:

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A. Owner and/or owner's agent must obtain an Erosion, Sedimentation, and Stormwater Control permit and submit to the Zoning Administrator prior to removing vegetative cover, moving earth or beginning construction.

621

622

B. The smallest practical area of land shall be exposed at any time during development.

623

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C. When land is exposed during development, the exposure shall be kept to the shortest practical period of time and, if possible, shall be scheduled during seasons of minimum precipitation.

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D. Whenever feasible, existing native and non-invasive vegetation shall be retained and protected. Topsoil should be preserved whenever possible.

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1. Any vegetation required to remain on the property must be maintained and protected by a barrier of orange tape and signs that clearly prohibit disturbance.

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a. This barrier must be maintained until construction is complete.

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b. If the owner shows on the site plan that no construction activities will take place within dripline of vegetation that is required to be protected, then the protective barrier will not be required in that location.

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E. The owner and/or owner's agent must show on site plan how trees will be protected during construction and/or how trees will be relocated, if relocations are necessary.

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1. A protective barrier (See Figures 24-8.1 and 24-8.2) is required for all trees that are to remain on the site, and shall, at minimum, be comprised of orange vinyl snow fence not less than 4 feet in height, with stakes no less than 8 feet apart, and placed at the perimeter of the drip line of all trees to be protected from construction activity. The barrier must be maintained until construction is complete. If the owner shows on the site plan that no construction activities will take place within 50 feet of the CRZ (critical root zone) of trees that are to remain on site, then a protective barrier will not be required in that location.

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2. For relocating trees, the root ball must be approximately ten (10) to twelve (12) inches in diameter for every inch of the tree's diameter. Adequate drainage and backfill shall be necessary to complete the relocation. Root protection during construction is essential in saving

- 654 mature trees (i.e., six inches or larger diameter at a height of 4.5'.
655 Recommended techniques include:
- 656 (a) using a geotextile aeration mat to allow structures to have
657 adequate ventilation, while protecting the roots from
658 excessive compaction, and;
 - 659 (b) steel-reinforced concrete paving patterned with voids filled
660 with gravel or grass that allow drainage, while protecting the
661 tree from root compaction in highly trafficked areas.
- 662 F. The following minimum requirements shall be used to prevent or minimize
663 soil compaction that may occur during construction due to excavation,
664 stockpiling materials, equipment traffic, and equipment parking:
- 665 1. Septic system areas shall be protected from soil compaction in
666 accordance with Health Department regulations and
667 recommendations.
 - 668 2. Parking, storing equipment and/or storing construction materials in
669 areas designated for storm water runoff during or after construction
670 is prohibited.
 - 671 3. Parking areas shall be limited to the extent possible and marked
672 with signage during construction. The Zoning Administrator will
673 approve the number of designated parking spots in accordance
674 with the size of the property and the layout of the construction.
 - 675 4. Erosion from topsoil stockpiling and fill material storage areas shall
676 be maintained and controlled by encircling such storage areas with
677 erosion control/silt fencing.
 - 678 5. When topsoil is reapplied to disturbed areas, it should be “bonded”
679 with the subsoil. This can be done by spreading a thin layer of
680 topsoil (2-3 inches), tilling it into the subsoil and then reapplying the
681 remaining topsoil.
- 682 G. When developing a property that includes a wetland and/or stream, owner
683 and/or owner’s agent shall not:
- 684 1. Deposit or permit the placing of fill material in a wetland or stream;
 - 685 2. Dredge, remove or permit the removal of soil or minerals from a
686 wetland or stream;
 - 687 3. Perform construction or maintain any activity or development in a
688 wetland or stream;
 - 689 4. Divert surface waters into a wetland or stream.
- 690 H. Where inadequate vegetation exists, temporary or permanent native or
691 non-invasive vegetation shall be established.
- 692 I. All exposed slopes and graded areas shall be landscaped with
693 biodegradable mats, ground cover, shrubs, and trees as soon as possible.

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- 694 J. The permanent final vegetation and all structures shall be installed as
695 soon as practical.
- 696 K. The Zoning Administrator or designee may inspect the property at any
697 time during construction to determine if any element of the site plan as
698 submitted and approved, or any requirements of this ordinance, are not
699 being adhered to. Failure to comply with approved site plans may result in
700 citations and fines.
- 701 L. If the Zoning Administrator determines that vegetation protections and soil
702 compaction requirements have not been met at any time during
703 construction, he or she may require post construction soil percolation tests
704 to be performed by a qualified testing firm, followed by rehabilitation as
705 necessary to reverse the effects of soil compaction in protected areas.
706

707 **SECTION 24.15 RESOURCES**

708 The following list of suggested resources is current as of the adoption date of this
709 ordinance and is not meant to be a comprehensive list. This list shall be
710 reviewed and may be updated from time-to-time by the Zoning Administrator
711 without formal amendment of these Ordinances. For more or updated resources,
712 contact the Michigan State University Extension for the Benzie County area.

713 A. General Information & Organizations to Contact for Guidance

- 714 1. Benzie Conservation District Programs and Services
715 <https://www.benziecd.org/programs--services.html>
- 716 2. Crystal Lake & Watershed Association
717 <http://crystallakewatershed.org/>
- 718 3. Michigan Natural Shoreline Partnership
719 <http://www.mishorelinepartnership.org/>
- 720 Includes listing of Michigan Certified Natural Shoreline
721 Professionals at:
722 [http://www.mishorelinepartnership.org/find-a-shoreline-
contractor.html](http://www.mishorelinepartnership.org/find-a-shoreline-
723 contractor.html)

724 B. Native Plant Specific Resource
725 Plant It Wild
726 <http://plantitwild.net/>

727 C. Permeable Surface Resources
728 See Figures 24-5, 24-6.1, 24-6.2 and 24-7

Nine components of a highly **Successful** **Permeable Pavement**

FIGURE 24-6.1

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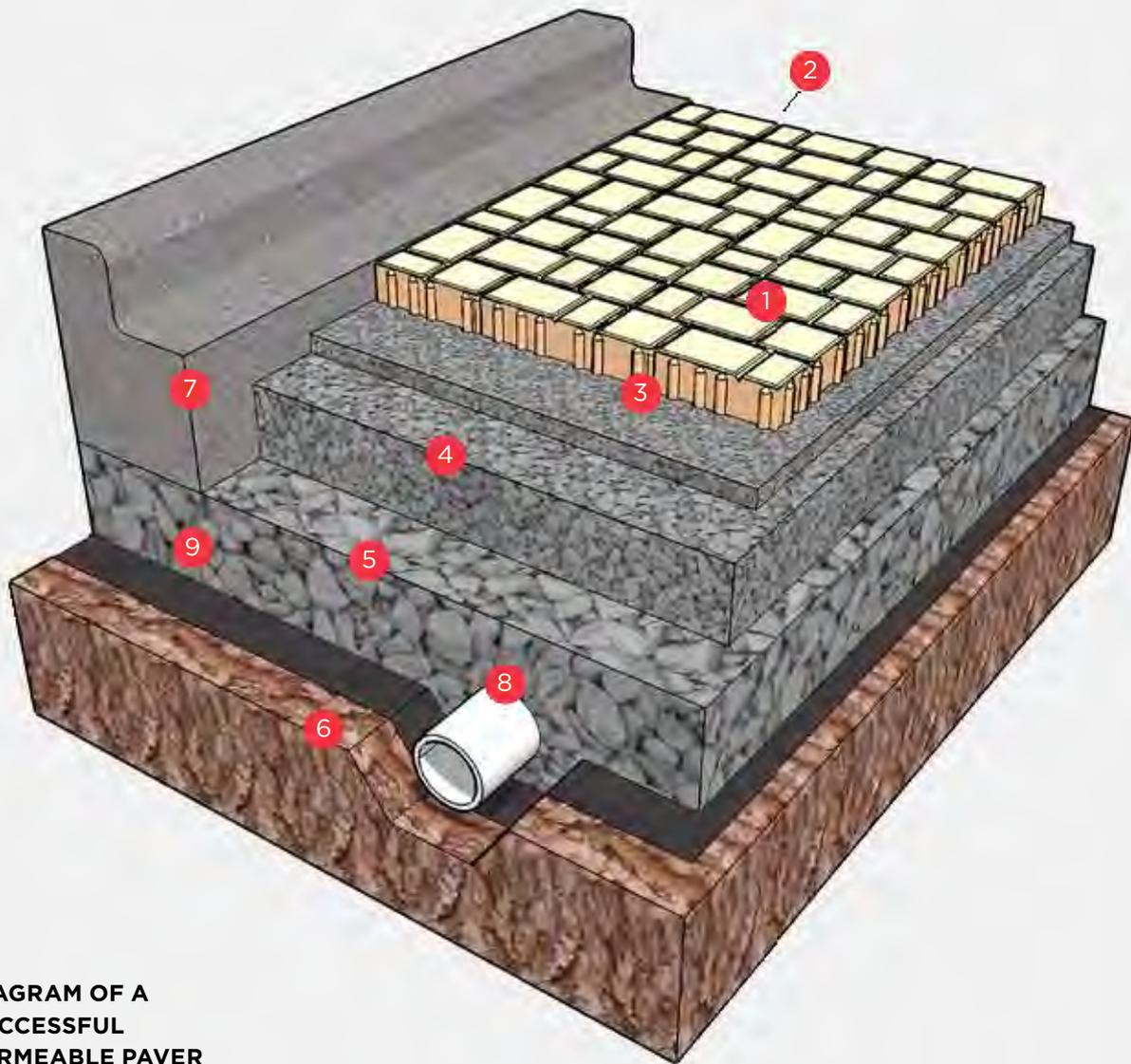


DIAGRAM OF A
SUCCESSFUL
PERMEABLE PAVER
INSTALLATION

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1 | Unilock Permeable Interlocking Concrete Paver

With various aesthetically pleasing colors and textures, creative choices are not compromised by function. Permeable Interlocking Concrete Pavers (PICPs) are the most durable of any porous pavement material. Unilock's minimum 8,500 psi (57 MPa), high-strength, no-slump concrete allows water to infiltrate between paver units instead of through the material. The joint sizes vary between paver options, ranging from 0.25" (6 mm) to 0.5" (13 mm), which meet the Americans with Disabilities Act specifications for permeable pavement, and allows a minimum of 100" (2,540 mm) per hour of surface infiltration.

2 | Joint Aggregate - ASTM No. 8 OR 9

As the initial filtering layer, the 0.25" (6 mm) crushed, angular, chip stone captures approximately 80 percent of debris in the first 1" (25 mm) to 2" (51 mm). The secondary function of the joint aggregate is to increase the positive interlock between the paver units, which is essential to the structural stability of the PICPs. The joint aggregate must always remain filled to the lip of the PICP units to reduce unnecessary clogging.

3 | Setting Bed Aggregate - ASTM No. 8

Using the 0.25" (6 mm) crushed, angular, chip stone, instead of sand, provides a smooth leveling course for placing pavers and additional structural interlocking of the PICPs. Unlike sand, the setting bed aggregate allows for rapid water infiltration with over 500" (12,700 mm) per hour through the 40 percent void-space. Sand must be avoided as a setting bed in a PICP application.

4 | Base Aggregate - ASTM No. 57

When subsoil conditions are conducive to supporting the ASTM No. 57 (12.5-25mm) crushed, angular, open-graded base material without migration, it can be used without ASTM No. 2 (50-63mm) subbase aggregate. Minimum thickness must be designed to sufficiently support anticipated loads, as well as accommodate stormwater detention in the 40 percent void space of the material. The ASTM No. 57 base aggregate, with a minimum thickness of 4" (102 mm), serves as a transition material between the ASTM No. 8 (2-10mm) setting bed and the ASTM No. 2 subbase aggregate. The infiltration rate of the ASTM No. 57 is over 500" (12,700 mm) per hour.

5 | Subbase Aggregate - ASTM No. 2

Subsoil conditions will dictate the necessity of this larger ASTM No. 2 (50-63mm), crushed, angular, open-graded subbase aggregate thickness. Installation of such material will provide increased structural stability on sites with poor soil conditions. A minimum thickness of 8" (203 mm) is required for effective performance. Subbase aggregate thickness must be designed to sufficiently support anticipated loads. As an added feature, the ASTM No. 2 subbase aggregate temporarily detains stormwater runoff in the 40 percent void-space of the material. The ASTM No. 2 also has an infiltration rate of over 500" (12,700 mm) per hour.

6 | Subgrade

Existing soil materials will determine the performance capabilities of the PICP system. Pre-construction soil analysis, including percolation, California Bearing Ratio and penetrometer measurements (blow counts), are mandatory for proper design. Subsoils with less than 0.5" (13 mm) per hour of infiltration may require underdrainage, scarification and potentially amendments. Subsoils with greater than 0.5" (13 mm) per hour are considered highly permeable. Subsoil compaction can cause a detrimental reduction in permeability and can be eliminated.

7 | Edge Restraint

PICP containment is vitally important to the success of interlocking properties. Lack or failure of an edge restraint will negatively impact the integrity of the pavement surface. For all vehicular PICP applications, an edge restraint, such as a concrete curb, is required. For non-vehicular and pedestrian areas, a plastic edging is sufficient when properly anchored into the subbase

8 | Underdrain

In PICP systems, the underdrain pipe is based on several factors, such as the permeability of the subsoil, detention requirements, and stormwater release rate of the site. With highly permeable subsoils over 0.5" (13 mm) per hour, the underdrain pipe could be eliminated. Underdrain pipe size is inconsequential, provided the flow rate is greater than the release rate.

9 | Mechanical Base Stabilization

Subsoil characteristics will determine the need for base stabilization. Specifically designed geogrid style systems, such as DriveGrid™ system, can be placed between the subsoil and ASTM No. 57 (12.5-25mm) base aggregate or ASTM No. 2 (50-63mm) and subbase. DriveGrid is not required between aggregate material layers. The base stabilization must be determined by soil conditions specific to each project. Drivegrid should be considered for any weaker subsoils.

Designer/Reviewer Checklist for Pervious Pavement with Infiltration Bed

Type of pervious pavement(s) proposed: _____

Source of mix design or material source: _____

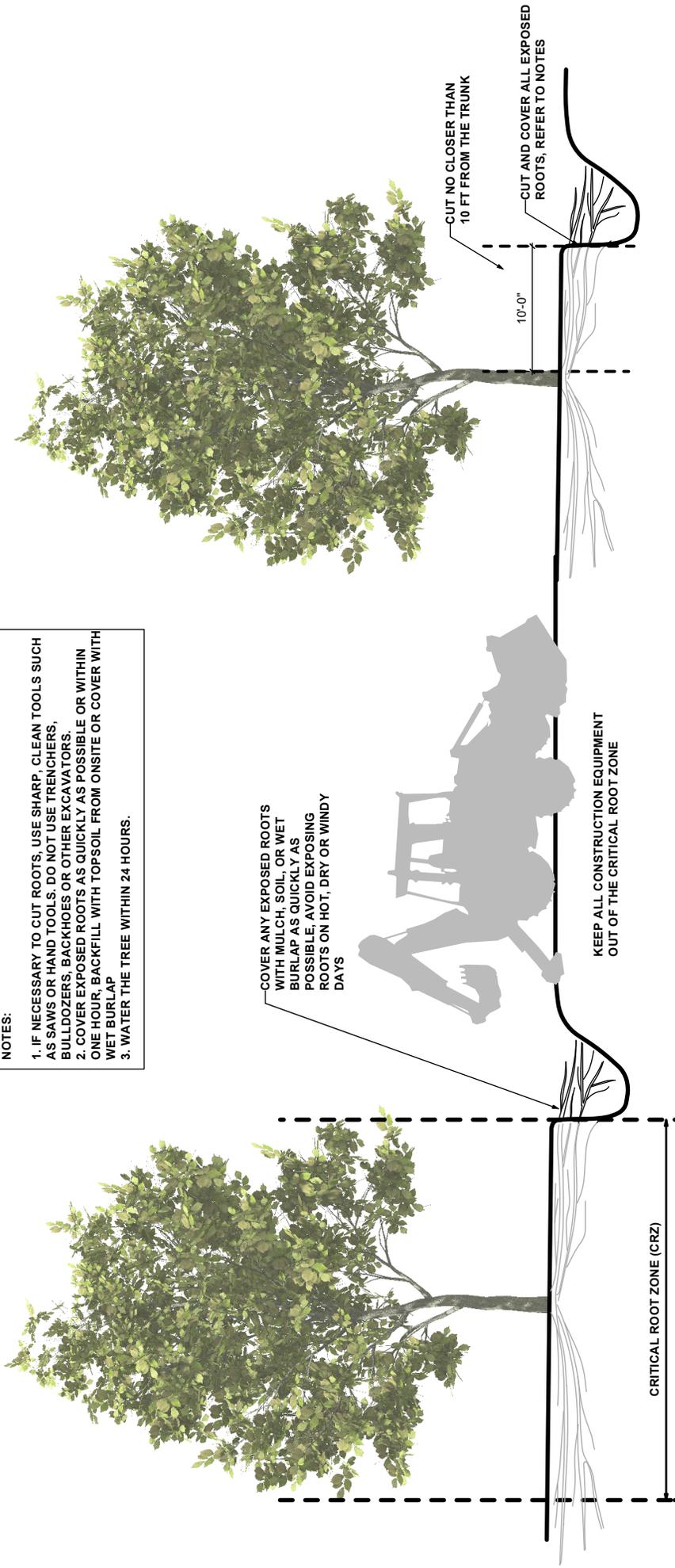
ITEM	YES	NO	N/A	NOTES
Appropriate application of pervious pavement (e.g., use, traffic loading, slopes)?				
Was the Soil Infiltration Testing Protocol followed?				
Appropriate areas of the site evaluated?				
Infiltration rates measured?				
Was the Infiltration BMP followed?				
Two-foot minimum separation between the bed bottom and bedrock/SHWT?				
Soil permeability acceptable?				
If not, appropriate underdrain provided?				
Adequate separations from wells, structures, etc.?				
Natural, uncompacted soils?				DRAFT
Level infiltration area (bed bottom)?				
Excavation in pervious pavement areas minimized?				
Hotspots/pretreatment considered?				
Loading ratio below 5:1?				
Storage depth limited to two feet?				
Drawdown time less than 48 hours?				
Positive overflow from system?				
Erosion and Sedimentation control?				
Feasible construction process and sequence?				
Geotextile specified?				
Clean, washed, open-graded aggregate specified?				
Properly designed/specified pervious pavement surface?				
Maintenance accounted for and plan provided?				
Signage provided?				



**FIGURE 24-8.1
CRITICAL ROOT ZONE AND TREE PROTECTION
FENCE DIAGRAM**

NOTES:

1. IF NECESSARY TO CUT ROOTS, USE SHARP, CLEAN TOOLS SUCH AS SAWS OR HAND TOOLS. DO NOT USE TRENCHERS, BULLDOZERS, BACKHOES OR OTHER EXCAVATORS.
2. COVER EXPOSED ROOTS AS QUICKLY AS POSSIBLE OR WITHIN ONE HOUR, BACKFILL WITH TOPSOIL FROM ONSITE OR COVER WITH WET BURLAP.
3. WATER THE TREE WITHIN 24 HOURS.



**FIGURE 24-8.2
ROOT PROTECTION & CUTTING DIAGRAM**

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ARTICLE 22
ENVIRONMENTAL PROVISIONS
WITH PROPOSED UPDATES TO
ORDINANCE TEXT

CERTAIN UPDATES TO ARTICLE 24 NECESSITATE
CHANGES TO ARTICLE 22 FOR CONSISTENCY AND CLARITY

ARTICLE XXII - DRAFT

Section 22.1 PURPOSE

Current Ordinance:

It is the intent of these regulations to identify and protect those areas of the Township that are considered to be environmentally sensitive to development, due to soil types, drainage, vegetation, wildlife habitats, floodplain, slope erosion or other factors, and that are subject to being seriously endangered, damaged, or destroyed if allowed **to** develop in a manner inconsistent with their conservation and preservation. Since the welfare and well-being of the citizens of the Township are directly linked and related to the natural environment of the area, it is recognized by this Article that in order to maintain sensitive areas in their natural condition for the benefit of mankind, it is necessary to protect such areas from degradation.

Commentary: Section 22.1

In Section 22.1 “development” is a term that could have different meanings to owners wishing to build, expand, improve, alter, etc. a parcel of land. The meaning of “development” is expanded in other areas of Article 22. For example:

Section 22.6 A: The first sentence of this section reads “When any land in the Township is **developed or altered in any way** which affects stormwater runoff onto adjacent properties....which shall result in the maximum amount of stormwater runoff not exceeding that which existed prior to the **development or improvement** of the property...”

Section 22.1 should be revised to include terms already in use in Article 22 so that “development” can be more clearly understood.

Proposed Revision: Section 22.1

It is the intent of these regulations to identify and protect those areas of the Township that are considered to be environmentally sensitive to **development, improvement, or any alteration of land use, including removal of vegetative cover**, due to soil types, drainage, vegetation, wildlife habitats, floodplain, slope erosion or other factors, and that are subject to being seriously endangered, damaged, or destroyed if allowed **to be developed, improved or altered in any way, including removal of vegetative cover**, in a manner inconsistent with their conservation and preservation.

Since the welfare and well-being of the citizens of the Township are directly linked and related to the natural environment of the area, it is recognized by

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this Article that in order to maintain sensitive areas in their natural condition for the benefit of mankind, it is necessary to protect such areas from degradation.

Section 22.2 REGULATION OF ENVIRONMENTALLY SENSITIVE AREAS

Current Ordinance

All uses allowable in zoning districts of this Ordinance shall comply with the standards set forth in this section regulating the development of environmentally sensitive areas. These requirements shall be considered in addition to use restrictions or other applicable regulations for each zoning district, and shall be considered as a separate portion of the zoning application.

Commentary: Section 22.2

Section 22.2 should repeat the changes made to “development” language in Section 22.1, to maintain clarity throughout Article 22. In addition, The language in this section could be more inclusive by referencing overlay districts that have unique use restrictions.

Proposed Revision:

All uses allowable in zoning districts of this Ordinance shall comply with the standards set forth in this section regulating the development, **improvement, or any alteration of land use, including removal of vegetative cover** of environmentally sensitive areas. These requirements shall be considered in addition to use restrictions or other applicable regulations for each zoning district, **including all overlay districts**, and shall be considered as a separate portion of the zoning application.

Section 22.3 ENVIRONMENTALLY SENSITIVE AREAS

Current Ordinance

The protection of areas of environmental concern, such as wetlands, high risk erosion, dunelands, floodplains, or steep slope areas, and lands lying in the Betsie River Natural River District must be considered in conjunction with development and must conform with the following regulations of state, county and township agencies as applicable:

Section 22.3: Commentary

The preamble to this section uses the term “development” with no additional explanation or clarification as to what development is. The term “development” should be

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consistently referenced throughout Article 22 and be in line with its meaning in Section 22.1.

Section 22.3: Proposed Revision

The protection of areas of environmental concern, such as wetlands, high risk erosion, dunelands, floodplains, or steep slope areas, and lands lying in the Betsie River Natural River District must be considered in conjunction with **development, improvement and any alteration of land use, including removal of vegetative cover**, and must conform with the following regulations of state, county and township agencies as applicable:

Section 22.3, A-G

Current Ordinance

- A. Dune Formations and High Risk Erosion Areas are sensitive sandy and clay areas under protection of the Michigan Natural Resources & Environmental Protection Act, PA 451 of 1994, Parts 353 and 323 respectively (formerly, the Sand Dunes Protection Act, PA 222 of 1976, as amended by Public Act 146 and 147 of 1989, and the Shorelands Protection and Management Act, Public Act 245 of 1970, as amended).
- B. Wetlands are defined by degree of soil wetness, generally including those soils classified by the Michigan Natural Resources & Environmental Protection Act, PA 451 of 1994, Part 303, Section 324.30301 et seq (formerly, the Goemere-Anderson Wetlands Act, PA 203 of 1979) as being able to support aquatic vegetation regardless of whether it has standing water or not. No activity shall be permitted on a site with regulated wetlands, unless a wetlands permit has been obtained by the applicant from the Michigan Department of Environmental Quality.
- C. Sensitive Riverine Areas are defined as areas on each side of streams that could be subject to flooding or erosion and alterations of land may require a soil erosion and sedimentation control permit under Part 91, Section 324.9101 et seq of the Michigan Natural Resources & Environmental Protection Act, Public Act 451 of 1994, (formerly, PA 346 of 1972).
- D. Inland Lakes are sensitive areas around the water body, including the watershed, which could be subject to flooding, erosion, or pollution per Part 301, Section 324.30101 et seq of the Michigan Natural Resources & Environmental Protection Act, Public Act 451 of 1994, (formerly, PA 345 of 1966).
- E. Flood Plain Areas are low areas adjacent to inland lakes and streams subject to flooding according to the one hundred (100) year flood hazard boundary map as administered by the Federal Emergency Management Agency (FEMA) or an Intermediate Regional Flood map prepared by the Army Corps of Engineers (see

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Section 22.9). A structure proposed within a floodplain is not permitted to be erected until a permit from the Michigan Dept. of Environmental Quality is obtained pursuant to Part 31 of the Michigan Natural Resource & Environmental Protection Act, Public Act 451 of 1994 and Section 22.9 of this Article.

F. Steep Slopes

When the proposed building site has slopes in excess of fifteen (15) percent, questionable soils stability or evidence of erosion, the Zoning Administrator shall require the applicant to obtain a site analysis and conform with the applicable requirements of Overlay Districts and this Article.

G. Natural River District The rules and regulations adopted under Part 305, Section 324.30501, et seq, of the Michigan Natural Resources & Environmental Protection Act, PA 451 of 1994 (formerly PA 231 of 1970) the State of Michigan shall apply to the strip of land four hundred (400) feet wide on each side of and parallel to the Betsie River, Dair Creek, and the Little Betsie River.

Section 22.3 D: Commentary

This section on Inland Lakes is confusing. Inland lakes **are** the water body. The intent is to protect the watershed of the inland lake. Note that Sections 22.3 C and 22.3 G include specific mention of areas of protection on either side of rivers and streams, so defining an inland lake as including its watershed is consistent within this Section.

Section 22.3 D: Proposed Revision

D. Inland Lake **An inland lake includes a body of water and its entire watershed, consisting of sensitive shorelines, forests, streams and headlands,** which could be subject to flooding, erosion, or pollution per Part 301, Section 324.30101 et seq of the Michigan Natural Resources & Environmental Protection Act, Public Act 451 of 1994, (formerly, PA 345 of 1966).

Section 22.4 RETAINING WALL PERMIT

Current Ordinance

No shoreline retaining wall shall be erected without first having obtained a permit from the Michigan Department of Environmental Quality.

Section 22.4: Commentary

The Crystal Lake Township Zoning Administrator should be a formal part of the process for permitting shoreline retaining walls in the township. In addition, there is no definition of retaining wall in Section 2. Article 22 should be updated to reflect the renaming of MDEQ.

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Section 22.4: Proposed Revision

No shoreline retaining wall shall be erected without first having obtained a permit from **the Crystal Lake Township Zoning Administrator and the Michigan Department of Environment, Great Lakes and Energy (EGLE).**

Add the following definition to Section 2: **A retaining wall is a structure built to retain sand, earth, or other granular or cohesive material at or close to the vertical position at the edge of a lake, stream, wetland, road, walkway, terrace, excavation, or the like. A retaining wall is a vertical or nearly vertical (approximately 90 degrees to 135 degrees) structure that retains (holds back) any material (usually earth) and prevents it from sliding or eroding away. A retaining wall may be comprised of wood, stone, masonry units, concrete, vinyl or metal sheets or a combination thereof.**

Section 22.5 REMOVAL OF VEGETATIVE COVER

Current Ordinance Preamble

Except where land owners are engaged in an active program of forest management pursuant to a written forest management plan prepared by a trained forester, or the land is enrolled in the state commercial forest management program or other state or federal sanctioned tax program for lands in active forest management, or the land is within a more restrictive District such as the Crystal Lake Overlay District, or the Waterbodies Overlay District, or is within those portions of the Betsie River, Dair Creek, and the Little Betsie River designated under the State Natural Rivers Program, the applicant shall provide evidence that the cutting and removing of trees and other native vegetation will be, wherever practical, performed according to the following standards:

Section 22.5 Preamble: Commentary 1

Note that this preamble refers to forestry, including management of sustainable forests, which would not fall under “development” as currently used in Section 22.1. This is an example (discussed in Section 22.1) of why we should clarify “development” language in Section 22.1

In an effort to clarify, and simplify, the meaning of this preamble we consulted the Benzie Conservation District Forester who advised that all three exceptions noted in the original Section: [1) landowners are engaged in an active program of forest management pursuant to a written forest management plan prepared by a trained forester, or 2) the land is enrolled in the state commercial forest management program, or 3) other state or federal sanctioned tax program for lands in active forest management] could be covered more clearly and simply, without compromising the

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intent of the Section. The proposed revision requires that the owner have a written forest management plan, and that the term “forester” is clearly defined.

Section 22.5 Preamble : Proposed Revision 1

Except where landowners are engaged in an active program of forest management pursuant to a forest management plan **prepared by a professional forester, as defined in Section 2.2, and recognized as such by the Benzie County Conservation District Forester...**

Add the following definition to Section 2.2: **Foresters are professionals who, through forestry education and practical experience, have acquired expertise in the practical application of biological, physical, quantitative, managerial, economic, social and policy principles to the regeneration, management, utilization and conservation of forests to meet specified goals and objectives while maintaining the productivity of the forest.**

Section 22.5 Preamble: Commentary 2

The second part of the preamble needs updating. The Betsie Valley Trail Overlay District, Article 27, is not mentioned here, most likely because it was developed after Article 22 was written. It should be included.

The word “Watershed” is omitted from the section, and this word is critical to the intent of the Section.

The words “wherever practical” should be eliminated. The applicant may provide evidence on the permit application why a particular provision is not practical, and review this with the Zoning Administrator.

Other proposed language clarifies that regardless of who the “applicant” is, the owner or their agent is responsible, and must secure a permit for removal of vegetation..

Section 22.5 Preamble: Proposed Revision 2

...or the land is within a more restrictive District such as the Crystal Lake **Watershed** Overlay District, or the Waterbodies Overlay District, or is within those portions of the Betsie River, Dair Creek, and the Little Betsie River designated under the State Natural Rivers Program, **or is within the Betsie Valley Trail Overlay District, the owner or owner’s agent** shall provide evidence **in their zoning application** that the cutting and removing of trees and other native vegetation will be performed according to the following standards:

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Section 22.5 A-F

Current Ordinance

- A. The removal of more than forty (40) percent of trees that are six (6) inches or more in diameter (measured at 1 foot above ground level) shall not be permitted.
- B. Cutting shall be done in such a manner as to avoid erosion, to preserve rare species of trees or greenery, to preserve scenic qualities, and to preserve desirable screening.
- C. All trees intended to remain standing and undamaged shall be clearly marked on the proposed site plan.
- D. In order to protect the trees and the roots of the trees, wherever practical, all structures and roads shall be set back at least 10 (ten) feet from the trees identified on the site plan to be left standing or undamaged.
- E. Wherever feasible, groups or clumps of trees shall be preserved to encourage survival of the root zone.
- F. Exceptions to the requirements of this subsection are as follows:
1. Tree removal or transplanting occurring during use of land for agriculture or the operation of a commercial nursery or tree farm.
 2. Actions made necessary by an emergency, such as a tornado, windstorm, flood, freeze, dangerous and infectious insect infestation or disease, or other disaster, in order to prevent injury or damage to persons or property or to restore order.
 3. Tree trimming, removal, or transplanting performed by or on behalf of any governmental agencies.
 4. Repair or maintenance work performed by public utilities necessitating the trimming or cutting of trees.
 5. Removal or trimming of dead, diseased, or damaged trees where the damage resulted from an accident or nonhuman cause.

Section 22.5 A-F: Commentary

The suggestions for revision in this Section are recommended after consultation with the Benzie District Conservation Officer:

- A.** Removal of more than 40% of trees greater than 6 inches in diameter is best done, in consultation with a professional forester (see Section 2). Issues of remaining forest health and sustainability must be evaluated with a harvest this extensive. In addition the language “(measured at 1 foot above ground level)” is not a

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measurement currently used by foresters. The appropriate measure is 4.5 feet (Diameter at Breast Height).

- B. Additional language is recommended to align with goals of prepared forest management plans.
- C. Edit language to reflect current usage in forest management plans.
- D. No Change
- E. No change
- F. No change to F.1 and F.2. F3 should be eliminated as we do not know what situation it is meant to cover. No change to F.4 and F.5.

Section 22.5 A-F: Proposed Revisions

22.5 A The removal of more than **30%** of trees that are six (6) inches or more in diameter **measured at a height of 4.5 feet (DBH)** shall not be permitted.

22.5 B Cutting shall be done in such a manner as to avoid erosion, to preserve rare species of trees **and native vegetation, to maintain biodiversity**, to preserve scenic qualities and to preserve desirable screening,

22.5 C **All residual trees (trees remaining) shall be clearly marked on the proposed plan to protect them from damage.**

22.5 F 3 **Delete this exception.**

Section 22.6 GRADING AND FILLING OF PROPERTY AND STORMWATER DETENTION

Current Ordinance

A. When any land in the Township is developed or altered in any way which affects stormwater runoff, the owner shall detain such stormwater from runoff onto adjacent properties, including roads and other rights-of-way, in such a manner which shall result in the maximum amount of stormwater runoff not exceeding that which existed prior to the development or improvement of the property, and in accord with the requirements of the Michigan Natural Resources & Environmental Protection Act, PA 451 of 1994, Part 91, Section 324.9101 et.seq. formerly the Soil Erosion/Sedimentation Control Act, PA 347 of 1972, as amended. In addition, all development shall conform to the Crystal Lake Township Soil Erosion, Sedimentation and Stormwater Control Ordinance and any general rules or administrative guidelines.

B. Special attention shall be given to proper site drainage so that runoff of stormwater will not adversely affect neighboring properties or the water quality of the township's lakes and streams. Stormwater control mechanisms, such as retention/detention basins, vegetative buffers, swales, and infiltration trenches, shall be required

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to ensure that the peak rate of stormwater runoff after development does not exceed the rate prior to development. (For a storm with a twenty-five (25) year frequency of three (3) and one-half (1/2) inches and twenty-four (24) hour duration).

C. The final grade surface of ground areas remaining after the construction of a building or structure, and any earth changes made in connection with use of land shall be designed and landscaped such that surface water flows away from the building or structure and is collected or managed in a manner which avoids any increase in surface water discharge onto adjacent properties or public roads, the erosion of or filling of any road ditch, the blockage of any natural or public watercourse, the creation of standing water over a private sewage disposal drainage field, and any unnecessary impoundment of surface water. The provisions of this section shall be administered and enforced pursuant to the site plan review provisions of Article XIV, when applicable. In all other cases, the Zoning Administrator shall determine after consultation with the Soil Erosion, Sedimentation, and Stormwater Control administrator whether the provisions of this section are met. When it is determined that inadequate surface water control exists, no Certificate of Zoning Compliance shall be issued until the situation is corrected and approved by the Zoning Administrator.

Section 22.6: Commentary

Section 22.6 A The first sentence of this section (“When any land in the Township is **developed or altered in any way** which affects stormwater runoff onto adjacent properties...which shall result in the maximum amount of stormwater runoff not exceeding that which existed prior to **the development or improvement** of the property...”) supports the expanded understanding of “development” that we recommend in a revision for Section 22.1. Language should be consistent throughout Article 22.

The Soil Erosion, Sedimentation and Stormwater Control Ordinance is at Benzie County, not the township.

Section 22.6 B This section should include reference to bioengineered systems such as rain gardens or constructed wetlands as examples of stormwater control mechanisms. This inclusion would add dimension to the examples of stormwater control mechanisms.

Section 22.6: Proposed Revisions

A. When any land in the Township is **developed, improved, or altered in any way, including removal of vegetative cover, and this action affects stormwater runoff**, the owner shall detain such stormwater from runoff onto adjacent properties, including roads and other rights-of-way, in such a manner which shall result in the maximum amount of stormwater runoff not exceeding that which existed prior to the **development improvement or alteration** of the property.....**In addition, all development, improvement or alteration of the property shall conform to the Benzie County Soil**

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Erosion, Sedimentation and Stormwater Control Ordinance and any general rules or administrative guidelines.

B. Special attention shall be given to proper site drainage so that runoff of stormwater will not adversely affect neighboring properties or the water quality of the township's lakes, **streams, and wetlands**. Stormwater control mechanisms, such as retention/detention basins, vegetative buffers, swales, **infiltration trenches, rain gardens or constructed wetlands** shall be required to ensure that the peak rate of stormwater runoff after development does not exceed the rate prior to development. (For a storm with a twenty-five (25) year frequency of three (3) and one-half (1/2) inches and twenty-four (24) hour duration).

NOTE: TOM IS CONSULTING ENGINEER ABOUT THE PEAK RATE OF STORMWATER RUNOFF

4/10/2020 CSB

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ARTICLE 14 – TABLE 14.21.2.2
SITE PLAN DRAWING REQUIREMENTS
WITH PROPOSED UPDATES TO
TABLE TEXT

CERTAIN UPDATES TO ARTICLE 24 NECESSITATE
CHANGES TO TABLE 14.21.2.2 OF ARTICLE 14
FOR CONSISTENCY AND CLARITY

NO OTHER CHANGES ARE BEING MADE TO ARTICLE 14

Table 14.21.2.2

Site Plan Submittal Requirements and Elements that May be Waived by Zoning Administrator

Requirements for Site Plan Completeness	Portion of Site Plan Eligible for Waiver by Zoning Administrator			
Type of Site Plan	Major Site Plans	Minor Site Plans & SLUPs	PRDs & Conservation PUDs	Watershed Overlay
A. A scale drawing at no smaller than 1" =50' (1" = 20' for land under five (5) acres) with the scale proportional to the size of the project showing maximum detail on one (1) or more sheets of paper measuring not more than twenty-four (24) by thirty-six (36) inches may be submitted.	None	Scale may be changed	None	None
B.M. A location map at a smaller scale indicated the relationship of the site to the surround land use.	All None	All	All None	All
C.N. North arrow, scale, descriptive legend, name and address of applicant, name and address of the licensed professional surveyor, engineer, landscape architect or architect involved in development of the site plan, the professional seal of the preparer, and date prepared or last amended. The property owners and applicants' name, addresses and phone numbers shall also be indicated.	None	See Table Note 1 at end of Table	None	None
D.S. Property dimensions, total acreage of the site, legal description of the property, plat name, lot numbers, property lines including angles, dimensions, and reference to a section corner, quarter corner, or point on a recorded plat, as well as existing or proposed deed restrictions or previous zoning approval limiting the property and in the case of a condominium development, the proposed master deed.	None	None See Table Note 2 at end of Table	None	See Table Note 2 at end of Table
E.P. The zoning of the site and of all adjacent property and the location of any building or structure with a base area larger than ten (10) square feet on adjacent property within two hundred (200) feet of the parcel boundary.	None	See Table Note 23 at end of Table	None	See Table Note 3 at end of Table
F.S. Any variances to be requested.	None	None	None	None

Requirements for Site Plan Completeness	Portion of Site Plan Eligible for Waiver by Zoning Administrator			
Type of Site Plan	Major Site Plans	Minor Site Plans & SLUPs	PRDs & Conservation PUDs	Watershed Overlay
<p>GF. Location, width and name of existing abutting streets, and proposed streets public rights-of-way, private roads, drives, sidewalks, and easements serving the development, and the location of all roads and driveways within 200 feet of the parcel. Location, width and name of proposed streets, public rights-of-way, private roads, drives, sidewalks, and easements serving the development.</p>	None	None All	None	All
<p>D. Existing and proposed public rights-of-way and/or private easements.</p>	None	None	None	
<p>HC. All existing natural features including vegetation, streams, lakes, ponds, etc. on site and within five hundred (500) feet. Show vegetative buffers at shoreline, streams, wetlands and ridgelines. Show the location of stands of trees and individual trees, apart from the stands of trees having a caliper of twelve (12) inches or greater, four feet above existing grade, with an indication as to which will be retained, and which will be removed or altered by earth changes. Also, all other significant vegetation to be retained and the location of all proposed landscaping, buffer strips, greenbelts, berms, fences or walls shall be shown. Show shoreline erosion protection. Submit evidence of EGLE review of shoreline protection proposed, if applicable.</p>	None	All May reduce 500 ft to 100 ft.	None	<p>None Must comply with Ord. Sections: 24.7.A. 24.7.C.2. 24.13.B 24.13.H 24.14.D and E May reduce 500 ft to 100 ft</p>
<p>IF. All areas within the 100-year flood plain, regulated wetlands, sand dunes, or high-risk erosion areas on to the site.</p>	None	None	None	None
<p>JE. Location, shape and ground footprint of existing and proposed buildings and intended uses thereof, as well as building and roof dimensions, floor area, finished floor elevation, building height and percentage of lot area covered by buildings.</p>	None	Finished floor elevation	None	<p>None. Must calculate impervious surface per 24.8.A</p>
<p>KE. Distance of proposed structures from rear, side, and front lot lines.</p>	None	None	None	None
<p>LR. Dimensions and number of proposed lots or condominium units.</p>	None	None	None	None
<p>MH. Location, and dimensions of worker parking and materials storage area during construction. Location, dimensions and design of off-street parking areas after construction, including type of surface materials, maneuvering lanes, service lanes, off-street loading spaces and other</p>	None	All	None	None

Requirements for Site Plan Completeness	Portion of Site Plan Eligible for Waiver by Zoning Administrator			
Type of Site Plan	Major Site Plans	Minor Site Plans & SLUPs	PRDs & Conservation PUDs	Watershed Overlay
service areas within the development.				
N _L . Proposed location of accessory buildings and use, including free-standing signs and on-site lighting	Free standing signs	Free standing signs	Free standing signs	Free standing signs
O _E . The location of all proposed outside storage and the manner in which it is to be screened and accessed	None	None	None	None Comply with Section 24.7.C.2
P _L . Location of water supply and the location and design of wastewater systems and solid waste disposal facilities (including trash receptacles and dumpsters). All utility lines must be indicated along with the location and specifications of any proposed above or below ground storage facilities for any chemicals, salts, flammable materials, or hazardous materials, as well as any containment structures or clear zones required by government authorities	None	None	None	None
Q _K . Proposed location of proposed uses of common open spaces and recreational facilities, including all pedestrian or bicycle trails, if applicable.	None	NoneAll	None	None
R. Slope Zones and Buffer Zones. Show topographic contour lines at 2-foot intervals and outline Slope Zones for slopes 0 to 6%, 6 to 12%, 12 to 18% and 18% and greater as applicable. For each slope zone, show the calculated area of the zone, the area of vegetative cover to remain, and the area of impervious surface. Show Buffer Zones at shoreline, streams, wetlands and ridgelines.	All	All	All	None. Must comply with Sections 24.9, Tables 24-1, 24-2, 24-3
S _Z . Stormwater drainage plans addressing a 100-year storm design base including: flows onto the site from adjacent sites and roads, storm water impact on the site (soils, impervious surfaces, potential impervious surface, retention ponds, detention ponds, and related temporary as well as permanent management facilities as appropriate), and the storm water outfall, or flow control into adjacent drainage courses, ditches and the like. On sites having limited area as is existing built-up community areas with small lots, the Zoning Commission may permit controlled exception to the 100-year storm	AllNone	All	AllNone	None

Requirements for Site Plan Completeness	Portion of Site Plan Eligible for Waiver by Zoning Administrator			
Type of Site Plan	Major Site Plans	Minor Site Plans & SLUPs	PRDs & Conservation PUDs	Watershed Overlay
base for good and sufficient reasons.				
T↓. Proposed grades of any site retention and detention facilities, and site drainage pattern at a minimum of two (2) foot intervals. Show benchmark location and location of site retained water with calculations. Written documentation prepared by a registered civil engineer indicating that the peak rate of stormwater runoff after development will not exceed the peak rate of stormwater runoff occurring before development (for a storm with a twenty-five (25) year frequency and twenty-four (24) hour duration.	None	Site drainage pattern at a minimum of two (2) foot intervals	None	None Comply with Section 22.6
U↓. Calculations for the percentage of the lot or parcel covered by all impervious surfaces (existing and proposed) including, but not limited to, building roof areas, driveways, patios, decks, walkways, sheds, etc. Water courses and water bodies including surface drainage ways.	NoneAll	NoneAll	NoneAll	None Comply with Section 24.8
V↓. Research this -- All site plans shall comply with the terms of the Soil Erosion and Sedimentation Control Act MCL 324.9109 et seq	AllNone	All	AllNone	None
W. "As-built-plans" or construction drawings shall be filed with the Zoning Commission immediately after construction is completed that demonstrates compliance with this Ordinance.	None	NoneAll	None	All
X↓. A completed Environmental Permits Checklist Affidavit of Compliance per Ordinance Article 14.7.3.	None	NoneAll	None	None
Y↓. For projects requiring a Traffic Impact Assessment pursuant to Section 22.10.C, a completed Traffic Impact Assessment shall accompany the Site Plan.	None	None	None	None
Z↓. Any other information required by the Zoning Administrator to establish compliance with the Ordinance.	None	None	None	None

Table 14.21.2.2 Notes:

1. Can waive name and address of surveyor, engineer, landscape architect or professional planner involved in development of this site plan, the professional seal of the preparer, only if no professional was involved in the development of the site plan.
2. Can waive reference to a section corner, quarter corner, or point on a recorded plat.

3. Can waive the location of any building or structure with a base area larger than ten (10) square feet on adjacent property within two hundred (200) of the parcel boundaries and the zoning of adjacent properties.

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ARTICLE 02
SECTION 2.2 -- DEFINITIONS
WITH PROPOSED UPDATES TO
ORDINANCE TEXT

UPDATES TO ARTICLE 24 NECESSITATE
ADDITIONS & REVISIONS TO CERTAIN ARTICLE 02 DEFINITIONS
FOR CONSISTENCY AND CLARITY

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Certified Arborist (new)

International Society of Arboriculture (ISA) Certified Arborists have met a minimum practical experience level, have been tested and certified to know science-based practices in the field of arboriculture, and maintain certification through continuing education. ISA Certified Arborist credentials apply to individuals, not businesses. A code of ethics for ISA Certified Arborists® strengthens the credibility and reliability of the tree care work force.

International Society of Arboriculture (ISA) - <https://www.isa-arbor.com/>
Arboriculture Society of Michigan (ASM) - <https://www.asm-isa.org/>

Clear Cut Lumbering (new)

Clear cut lumbering, clearing, clear cutting is the removal of all trees from an area of forested land or woodland for any purpose, including but not limited to: harvesting and replanting trees; in preparation for land conversion for development or other land use; or conversion to open land.

Forest (revised)

A parcel of land consisting of an ecosystem or assemblage of ecosystems dominated by trees supporting other woody vegetation and species of plants and animals that require a forest habitat. Trees in a forest are typically higher than 5 meters and have a canopy cover of more than 10%, or trees able to reach these thresholds in situ. A forest is not defined by its size. For example, a forest may include woodlands, woodlots, windbreaks, and shelter belt, and the like; or a forest could be a very narrow strip of planted trees along a property line; or a small patch of hardwoods, or a wet area, left after construction of homes.

Forester (new)

Foresters are professionals who, through forestry education and practical experience, have acquired expertise in the practical application of biological, physical, quantitative, managerial, economic, social, and policy principles to the regeneration, management, utilization and conservation of forests to meet specified goals and objectives while maintaining the productivity of the forest.

A professional forester qualified to submit a written plan for forest operations, forest management, timber harvesting or other tree removal in the Crystal Lake Watershed Overlay District shall subscribe to the Michigan Stewardship Ethic of the Forest Stewardship Program of the Michigan DNR and shall meet at least one of the following certifications:

“Registered Foresters” are recognized by the State of Michigan – <http://www.Michigan.gov/Forestry>

“Certified Foresters” are certified by the Society of American Foresters - <http://www.safnet.org>

“ACF Foresters” are members of the Association of Consulting Foresters - <http://www.acf-foresters.org>

“Forest Stewardship Plan Writers” write Forest Stewardship Plans
https://www.michigan.gov/dnr/0,4570,7-350-79136_79237_80945_81361---,00.htm

“Technical Service Providers” write plans for the Environmental Quality Incentives Program
<https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/technical/tsp/>

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“Qualified Foresters”, certified by MDARD ,write plans for the Qualified Forest Program –
www.Michigan.gov/qfp

Michigan’s Stewardship Ethic:

“Stewardship is an ethic recognizing that the land and its natural inhabitants have an inherent worth. We acknowledge that we have a responsibility to consider the current and far distant future value of the land as we manage, protect, and enjoy the forest. Stewardship guides us to conduct our activities to the utmost of our abilities and to insure the future health, productivity, diversity, and well-being of the land, its natural communities and native species. Stewardship today provides opportunities to future generations to use and enjoy the land and its resources.”

Landowner Application Forest Stewardship Program
Michigan Department of Natural Resources – Forest Resources Division

Forest Management (revised)

The practical application of biological, physical, quantitative, managerial, economic, social, and policy principles to the regeneration, management, utilization, and conservation of forests to meet specified goals and objectives while maintaining the productivity of the forest.

Impervious surface (revised)

An area that releases as runoff all or the majority of precipitation that falls on it, including but not limited to, structures, rooftops, sidewalks, driveways, parking lots, patios, fire pit areas, swimming pools and streets unless specifically designed, constructed, and maintained to be permeable. Exterior decks are considered if they allow water to pass through rather than run off and the area below is permeable.

Invasive Species (new)

A species that is not native to the ecosystem under consideration (*or, for this ordinance, “native to the Crystal Lake watershed”*) and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

Landscape Architect (new)

A Landscape Architect is a person who holds a license or is registered to practice landscape architecture in the State of Michigan. Landscape Architects have a bachelor's and/or master's degree in landscape architecture from a university accredited by the American Society of Landscape Architects (ASLA) and are licensed by the state in order to analyze, plan, design, manage, and nurture the built and natural environments; design and work on landscape projects. To search for registered Landscape Architects by location in the State of Michigan:

<https://www.lara.michigan.gov/colaLicVerify/ICityCounty.jsp>

Landscape Design Professional (new)

Landscape Design Professionals who maintain an active certification from the Michigan Natural Shoreline Professional Training and Certification Program demonstrate knowledge of the profession in the use of “green” landscaping technologies and bioengineered erosion control for the protection of Michigan inland lakes. MCNSP is approved by the Michigan Natural Shoreline Partnership and recognized by the Michigan Department of Environment Great Lakes and Energy (EGLE) and the Michigan Department of Natural Resources.

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Certified Landscape Design Professionals can be found on the EGLE and Michigan Natural Shoreline Partnership websites.

https://www.michigan.gov/egle/0,9429,7-135-3313_3681_28734-161113--,00.html
<https://www.mishorelinepartnership.org/find-a-shoreline-contractor.html>

Lot Coverage (revised)

The amount of impervious surface on a lot, stated in terms of percentage, that is covered by all buildings, and/or structures located thereon. This shall be deemed to include all buildings, roofed porches, arbors, breezeways, patio roofs, whether open box types and/or lathe roofs, or fully roofed, as well as sidewalks, driveways, patios, firepit areas, garage aprons and parking areas, but shall not be deemed to include fences, walls, or hedges used as fences, unroofed decks (twelve (12) inches or more above the finished grade) or swimming pools. Lot coverage shall be measured from the drip line of the roof or from the wall or foundation if there is no projecting portion of the roof. *Lot coverage for the Crystal Lake Watershed Overlay District is further defined in Article 24.*

Low-impact development (new)

Stormwater management practices that promote the infiltration of rainwater and recharge of groundwater (as opposed to the conveyance of stormwater off site) . The purpose of LID is to mimic a site's pre-development hydrology by using design techniques to retain runoff close to its source. LID may include any of the following: bio-retention basins such as rain gardens, infiltration trenches, porous pavement, grassed swales, perforated pipe, dry wells, rain barrels, and cisterns or other technologies or practices that reduce runoff.

Native Vegetation (new)

Plants that have occurred in a particular region, ecosystem, or habitat without human introduction.

Overlay District (revised)

A zoning district that encompasses one or more underlying zones and that imposes additional requirements above that required by the underlying zone.

Removal of Vegetation (revised)

Includes but is not limited to the cutting, pruning, pulling, digging out, chemical treatment, or by similar means, to the extent that a sufficient amount of the plant, both above and below ground, is removed and/or destroyed such that the plant will not live.

Retaining Wall (new)

A retaining wall is a structure built to retain sand, earth, or other granular or cohesive material at or close to the vertical position at the edge of a lake, stream, wetland, road, walkway, terrace, excavation, or the like. A retaining wall is a vertical or nearly vertical (approximately 90° to 135°) structure that retains (holds back) any material (usually earth) and prevents it from sliding or eroding away. A retaining wall may be comprised of wood, stone, masonry units, concrete, vinyl or metal sheets or a combination thereof.

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Ridgelines (new)

Ridgelines shall be defined as visually prominent strips or crests of land. Ridgelines include the highest points of elevation in the watershed and separate one drainage basin from another. Ridgelines shall be as shown on the Slope Map, which shall always be on file with the Township Clerk and the Zoning Administrator.

- A. The precise delineation of a ridgeline shall be determined by the Zoning Administrator at the time a zoning permit application is received based on any combination of the following criteria.
1. Ridgelines that are located at the top of slopes 18% or greater facing Crystal Lake.
 2. Ridgelines that are at the top of slopes that create valleys that drain directly into Crystal Lake.
 3. Ridgelines that are part of an area of significant ecological, historical, or cultural importance, such as those that connect park or trail systems.
 4. Ridgelines that have visual dominance as characterized by a silhouetting appearance against the sky.
 5. Ridgelines are a significant natural backdrop feature.
 6. Ridgelines that have a visual dominance due to proximity and view from existing major corridors.
 6. Ridgelines that surround or visually dominate the surrounding valley landscape either through their size in relation to the hillside or terrain of which they are a part.

Rip Rap (new)

Rip rap, also known as rip rock, shot rock, rock armor, or rubble, is man-placed rock or other material used to protect shorelines, streambeds, bridge abutments, pilings and other shoreline structures against scour and water, wave, or ice erosion. Rip rap is installed in Crystal Lake Township with a permit from the Michigan Department of Energy, Great Lakes and Environment (EGLE) and in the Crystal Lake Watershed Overlay District, the permit must be submitted to the Zoning Administrator prior to beginning a project. Rip rap specifications for Michigan are detailed in the Soil Erosion and Sedimentation Control Guidebook (July 2019) that is used in administering the Soil Erosion and Sedimentation Control (SESC) Program.

https://www.michigan.gov/documents/dtmb/SESC_Guidebook_2019_660638_7.pdf

Steep Slope (revised)

A slope that has a topographic grade of eighteen percent (18%) or greater.

Timber Harvesting (new)

Includes felling, forwarding, sorting, loading and hauling of timber products. Harvest operations require haul roads, log landings and skid trails to be developed and maintained. Timber harvesting, and other silvicultural treatments such as tree planting, soil scarification, and herbicide application, are vital and integral parts of management of forest resources. The treatments contribute to a healthy and vigorous forest. These practices perpetuate the land use which has the greatest potential for protecting surface water quality.

Turf grass (new)

A species of warm or cool season grasses that form a dense thick mat of short roots. Mowing creates a dense even surface and increases the need for water regardless of season. Turf or turfgrass or lawn does

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not include artificial turf.

Tree Topping (new)

Tree topping is the indiscriminate cutting of tree branches to stubs or to lateral branches that are not large enough to assume the terminal role (sustain the remaining branch). Other names for topping include “heading,” “tipping,” “hat-racking,” and “rounding over.”

Topping is often used to reduce the size of a tree. An owner may feel that a tree has become too large for his or her property, or that tall trees may pose an unacceptable risk. Topping is not a viable method of height reduction and increases risk by reducing the tree's energy supply which comes from its canopy; creating large wounded areas prone to decay and infection that a tree cannot biologically heal; and exposing remaining leaves suddenly to high levels of light and heat which compromises the tissues beneath the bark.

Alternatives to tree topping are branch reduction by trained professionals. These methods preserve the natural form and processes of the tree. In some cases, replacement is the best option. Further information is available through the International Society of Arboriculture, www.isa-arbor.com.

Vegetation and Vegetative Cover (new)

All plant life of an area, taken as a whole, including perennial grasses, legumes, forbs, shrubs, and trees .

Vegetative Buffer Zone (new)

Vegetation buffers are strips of land with permanent vegetation designed to intercept stormwater runoff and minimize soil erosion. Buffers can reduce the amount of sediment and pollutants carried by runoff to nearby lakes, wet- lands, or streams.