These plans and the accompanying application (including all related documents and exhibits) have been prepared by Applicant to meet the requirements for a conditional use for the proposed residential and commercial development in the Trout Creek Stormwater Overlay District (Code Section 208-162 etal). If a conditional use is granted by the Board of Supervisors, revised plans and application(s) will be prepared and submitted by Applicant to meet applicable conditions imposed by the Board and applicable provisions of the Tredyffrin Township Subdivision and Land Development Ordinance.

Site Address:
Walker Road and Old Eagle School Road
Wayne, PA 19087

Applicant:
Arcadia Tredyffrin, LLC
114 Forrest Avenue, Suite 1
Narberth, PA 19072

Equitable Owner:
Arcadia Tredyffrin, LLC
114 Forrest Avenue, Suite 1
Narberth, PA 19072

Project No. ARLC1201
September 16, 2014
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INTRODUCTION

THE PROBLEM

Tredyffrin Township residents within the Trout Creek Watershed struggle with increasing flooding, property damage, and stream bank erosion problems as a result of upstream historic development with inadequate stormwater management. In addition, portions of the Trout Creek have been listed as impaired by the Pennsylvania Department of Environmental Protection (PA DEP).

Flooding

Urbanization without stormwater controls over the past several decades has led to much of the infrastructure (i.e. storm sewer collection systems, culverts, road crossings, etc.) to be undersized in regards to stormwater collection and conveyance. Along the Trout Creek corridor residents face a challenge of localized flooding at stream crossings and along the stream channel itself, often times within residents backyards. This is a condition noted at Walker Road, Glenhardie Road and Richards Road. Through various hydrologic and hydraulic studies, Pennoni Associates has determined that Walker Road floods in just over the 2-year design storm event, which is generally consistent with observations of local residents and Township officials. Flooding often causes Walker Road to be closed temporarily until flood waters recede as noted in Photo 1.

Photo 1. Flooding at the intersection of Walker Road and Glenhardie Road taken by Laurie Elliot on Saturday March 13, 2010.

Property Damage

Due to localized flooding, both the residents of the Township and the Township itself have faced property damage. Residents face flooded homes, damaged yards and driveways and much more; while, the Township has faced damaged roadways and utilities. This damage has been noted not only lower in the watershed, but also higher in areas such as Contention Road as shown in Photo 2.
Stream Bank and Stream Channel Erosion

Flooding is a natural process where during a rain event the water level within a stream will rise and often times encompass a portion of the overbanks, which provide attenuation during and shortly after the storm event. Stream channel and stream bank erosion itself is a natural process within a watershed. This process allows for the stream to regulate itself to the characteristics of a given watershed. However, often times due to urbanization this process is accelerated, such as noted within the Trout Creek Watershed. Changes within the watershed such as increased

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1 (Thomas 2012)
Impervious cover in conjunction with little or inadequate stormwater management control often lead to this process. The erosion of the stream banks often leads to the break down and disconnection of the stream channel with its overbanks as shown in Photo 4.

Photo 4. Severely eroded stream banks located just upstream of the Walker Road culvert on the Richter Property taken by Pennoni Associates Inc. on Tuesday, March, 20 2012.

Impaired Streams

Portions of the Trout Creek have been listed as impaired by the Pennsylvania Department of Environmental Protection (PA DEP). A stream can be determined to be impaired if one or more
designated use is determined to be impaired by any pollutant. The designated uses include: Aquatic Life, Water Supply, Fish Consumption, and Recreation.

**TREDYFFRIN TOWNSHIP’S RESPONSE TO THE PROBLEM**

As a result of these issues, Tredyffrin Township over a decade has taken great steps to correct the problems seen within the Trout Creek Watershed, including:

- In 2004, Tredyffrin Township commissioned the *Trout Creek Watershed Restoration and Protection Plan*. This document provided the Township an overview status of the watershed itself, as well as suggestions to improve the overall quality of the watershed.
- In 2009, the Stormwater Management Ordinance (Chapter 174) was updated to add more stringent regulations for rate and volume control. This ordinance is seen as one of the most rigorous stormwater management ordinances in Southeastern Pennsylvania, if not the entire state.
- In 2010, Tredyffrin Township commissioned the *Trout Creek Watershed Study and Stormwater Best Management Practice Analysis*. As part of this study, a hydrologic and hydraulic model was developed to analyze the watershed. Ten sites were identified for potential stormwater management retrofits to improve the watershed.
- In 2012, Tredyffrin Township adopted the Trout Creek Overlay which was largely based off of recommendations made by in the *Trout Creek Watershed Study and Stormwater Best Management Practice Analysis*. 
STORMWATER MANAGEMENT 101

RAINFALL AND PROBABILITY

Stormwater management design is based on a design storm (i.e. 2-year storm, 100-year storm, etc), which is a description of the magnitude of the storm. The greater the number the year storm the greater the amount of precipitation one can expect. Each design storm has an annual probability of occurrence. This probability is equal to the inverse of the storm event represented as a percentage. For example, a 100-year storm probability equals 1 divided by 100 or 1%; which is to say that there is a one percent chance of a storm equal to or greater than the 100-year storm occurring.

These hypothetical design storms are based on a precipitation event that occurs over a 24-hour period of time. It is assumed that over that 24-hour time period a given amount of precipitation will fall over the watershed. For example, for the 100-year design storm, the rainfall depth in the Township over a 24-hour period is 7.39-inches.

STORMWATER MANAGEMENT REGULATIONS

Chapter 174 of the Tredyffrin Township Code outlines the requirements for stormwater management design for new developments. The requirements are broken down into two primary categories, runoff rate control and runoff volume control.

Runoff Rate Control

Runoff rate is a measurement of the volume of water running off in a unit of time from a surface, often times measured in cubic feet per second. With a hydrologic model we can calculate and determine the existing runoff rate for the site with no stormwater controls. This is determined based on a number of variables including the site soils, ground cover, known precipitation data and much more. Similarly, we can calculate the rate of runoff for the proposed site, assuming no stormwater controls. The runoff rate of the proposed site with no stormwater controls will be much higher than the existing runoff rate due to an increase in impervious surfaces and change in ground cover. The goal of stormwater management is to ensure that the proposed runoff rate is not greater than the existing runoff rate for a given site.

The runoff rate control requirements of Chapter 174 require the reduction of the peak rate of runoff of the 5-year post-development storm to that of the 1-year pre-development storm. A graphic of the runoff rate reductions is outlined in Table 1 below. The Trout Creek Overlay Ordinance adopted in 2012 allows for zoning bonuses provided that the Public Stormwater Improvements meet the requirements of §208-161.A(3). In the case of the Wayne Glen Development, additional zoning bonuses may be obtained if the requirements of §208-161.A(3) are met and exceed the baseline peak rate control requirements in Chapter 174 by 50% for all design storms, in addition to the requirements of §208-117 for conditional use approval. A graphic of the rate reductions sought by the Wayne Glen Development are summarized in Table 1.
Runoff Volume Control

Runoff volume is a measurement of the actual amount of water running off, expressed in cubic feet. In a similar fashion to the runoff rate, we can calculate the runoff volume for a given area based with and without stormwater controls. Again, this is determined based on a number of variables including the site soils, ground cover, and known precipitation data. The goal of runoff volume control is to ensure that the runoff volume of the proposed site is not greater than the runoff volume of the existing site.

The runoff volume control requirements of Chapter 174 requires stormwater management facilities be designed to promote groundwater recharge through one or more Best Management Practices (BMPs). The regulations require the management of the runoff volume associated with the increase in runoff volume from pre- to post-development for the 2-year frequency storm event.
WAYNE GLEN COMPLIANCE

CURRENT DESIGN AND HOW WE GOT HERE

The Richter Property, was identified within the 2010 Trout Creek Watershed Study and Stormwater Best Management Practice Analysis as one of the few opportunities to provide a sizable stormwater management facility that could mitigate downstream flooding of Trout Creek. In the Trout Creek Watershed Study it was suggested that a regional detention basin could reduce the rate and velocity of runoff downstream of Walker Road. The currently proposed regional basin with floodplain restoration, as proposed by Arcadia Tredyffrin LLC, accomplishes this goal.

Over the past two years, several iterations of the proposed development have been prepared. Many constraining factors have led to the re-design including: protecting and preserving historic features on-site, existing sinkholes, a required 100-foot setback from existing sinkholes, depth to bedrock, the area necessary for the basin, and much more. The most complicating factor to the design has proven to be the required 100-foot setback of stormwater management facilities from known sinkholes as outlined in Appendix B of Chapter 174 of the Tredyffrin Township Code. The current development plan has been designed to locate all stormwater management facilities outside of the 100-foot setback as shown in Figure 1.

The current development plan proposes the construction of a new multi-use development including residential uses and office uses. The residential development will provide 108 new units, comprising of 30 Carriage Homes and 78 Townhomes. On the Professional Parcel, two new office buildings totaling 60,000-sf footprint (240,000-sf gross area), surface parking and a new five story parking garage with a 44,000-sf footprint are proposed.

In order to provide the necessary stormwater management controls to obtain the density and impervious bonuses in accordance with the Tredyffrin Trout Creek Overlay Ordinance, many stormwater BMPs were designed including:

- 18 bio-retention basins
- 6 surface infiltration basins
- 3 sub-surface infiltration basins
- 11,847-sf permeable pavement on residential
- 33,964-sf permeable pavement on professional
- 42,000-sf green roof on professional

In addition to the smaller stormwater management facilities, a regional basin with floodplain restoration will be constructed totaling approximately 37-ac-ft of storage over approximately 5-acres of the Residential Parcel. These various stormwater management systems are highlighted on the Overall Stormwater Plan, Figure 2.
Bio-retention Basins and Subsurface Infiltration Basins

Bio-retention basins are shallow depressed areas planted with native vegetation to treat and capture runoff. These facilities are designed with an engineered soil mixture (~ 2-feet thick) below the surface and, in some cases, a stone trench of varying depth below the engineered soil. An outlet structure is set at a minimum depth of six inches above the basin bottom or the 2-year water surface elevation and provides for controlled outflow of flow during larger storm events. The storage below that elevation provides for capture and infiltration of stormwater runoff. In doing so the runoff volume associated with the 2-year storm is removed and the runoff rate is reduced.

Photo 6. A photo of a bio-retention basin planted with mature vegetation.

Photo 7. A photo of a surface infiltration basin at Applecross Country Club in East Brandywine Township.

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2 (Strand Associates n.d.)
**Subsurface Infiltration Basins**

A subsurface infiltration consists of perforated pipe placed in a stone trench below the ground surface. Storage is provided within the piping as well as in the voids of the stone. An outlet structure is designed to provide storage for the 2-year design storm, as well as overflow for larger storm events. By providing this storage, runoff volume associated with the 2-year storm is removed and the runoff rate is reduced.

![Photo 8. A photo of a subsurface infiltration basin under construction.](image)

**Permeable Pavement**

Permeable pavement consists of a masonry block placed on a stone bed. Gaps are designed between the blocks to allow water to drain into the stone bed. The stone bed provides storage and promotes infiltration of stormwater runoff. The voids in the stone bed below the pavers provides storage for the runoff volume associated with the 2-year storm effectively reducing runoff volume and rate.

![Photo 9. A photo of the pavedrain paver block. The space between blocks allows for runoff to enter the stone trench below the block.](image)

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3 (Pave Drain n.d.)
**Green roof**

A vegetated roof, often times referred to as a green roof, is a veneer of vegetation that is grown on and completely covers an otherwise conventional flat or pitched roof. The vegetation gives the roof a hydrologic characteristic that is closely related to a lawn or meadow. Green roofs provide a reduction in runoff from the building through storage in the soil media and evapotranspiration by the plants themselves. A green roof was installed at the Penn Medicine building located at Chesterbrook Boulevard in 2010.

Photo 10. The green roof installed on the entrance canopy at the Penn Medicine building at Chesterbrook Boulevard. Photo taken by Pennoni Associates in July 2010.

**ON-SITE STORMWATER COMPLIANCE**

**Runoff Rate Control**

In order to obtain the density bonus as outlined in the Tredyffrin Township Trout Creek Overlay Ordinance (TCO) a system of smaller stormwater management facilities including bio-retention areas, permeable paver areas, surface infiltration/detention basins, subsurface infiltration basins, meadow areas, and a green roof system are proposed throughout the site. These various BMPs are highlighted on Figure 2. The combination of these BMPs will provide the necessary rate control for the development, which is equivalent to a 50% reduction in the baseline Stormwater Rate Control Requirements of Tredyffrin Township as outlined in the Stormwater Management Regulations section of this report.

Graph 1 demonstrates a typical reduction in peak runoff rates for the various storm events for a portion of the development. The entire Wayne Glen site has been designed to reduce the runoff rates for each storm event in accordance with the Tredyffrin TCO.
Graph 1. A bar graph representing the peak runoff rate reductions associated with Point of Interest #2 for each design storm event in accordance with the Tredyffrin Township TCO. All storm events are reduced more than the allowable TCO rates.
Runoff Volume Control

Similarly to the rate control, in order to demonstrate compliance with the Tredyffrin Township Trout Creek Overlay Ordinance, the development required a great deal of stormwater management systems. These systems are designed to store and infiltrate the runoff associated with the 2-year post-development design storm. These systems are designed to work in conjunction with one another, a system known as a “treatment train.” In some instances on the site, downstream BMPs have been designed to accept additional runoff from upstream BMPs. At the bottom of the treatment train, the point of interest, there will be no flow leaving the system during the 2-year design storm at each point. An example of a treatment train is highlighted in Figure 3.

Graph 2 summarizes the total runoff volume Wayne Glen site in existing conditions, in proposed conditions with no stormwater controls, in proposed conditions with Chapter 174 controls and in proposed conditions under the current design. In proposed conditions the site will generate 151,439-cf of runoff for the 2-year storm; however, that runoff volume will be stored and infiltrated on-site. Since this runoff volume will be stored and infiltrated on-site there will be zero runoff volume leaving the site during the 2-year storm.

Graph 2. A bar graph representing the runoff volume for the site for various scenarios. The runoff volume for the Wayne Glen site for the 2-year storm will be 0-cf.
OFF-SITE STORMWATER COMPLIANCE

Regional Basin

In order to obtain the density bonus as outlined in the Tredyffrin Township Trout Creek Overlay Ordinance (TCO), a new regional detention basin is proposed to meet the runoff rate requirements of the Trout Creek Overlay. The TCO states that for development sites specifically identified in the 2010 Trout Creek Watershed Study and Stormwater Best Management Practice Analysis, demonstrate compliance with the proposed reductions of a 5% reduction of the peak rate for the 2-year storm and a 20% rate reduction for the 100-year storm.

Two branches known as the Avonwood Drive Branch and Weadley Branch converge just upstream (south) of the Richter Property. At this point these two tributaries combine and bisect a portion of the Richter Property before discharging through an existing culvert under Walker Road. The drainage area contributing flow to this culvert contains approximately 1.18 square miles, with 36-acres (4.8%) being occupied by the Richter Property. The land associated with Richter Property is 4.8% of the 1.18 square mile area contributing flow to Walker Road.

As part of the proposed development, a regional detention basin with floodplain restoration (Figure 2) has been designed within the areas adjacent to the stream transecting the Richter Property. The basin will encompass approximately 5-acres of the site and provide storage for approximately 37-ac-ft of runoff when full. In conjunction with the regional basin construction, the stream bed and banks within the limits of the Richter Property will be restored and stabilized. This regional basin will be landscaped similar to a constructed wetland within the floodplain areas, with native water tolerant vegetation which could include grasses, shrubs and trees as shown in Photo 11. The vegetation will provide a riparian buffer, which will not only help to stabilize the area around the stream but also provide habitat for wildlife and aquatic life.

Photo 11. A photo of a large scale detention facility located in Greenwood Village, Colorado. This facility encompasses 6.63-acres4.

4 (City of Greenwood Village, Colorado n.d.)
Runoff Rate Control Compliance

The basin has been designed to store and slowly release runoff with specific rate reductions consistent with the 2010 Trout Creek Watershed Study. Graph 2 shows the rate reductions for various storm events at Walker Road. As outlined in the 2010 Trout Creek Watershed Study, it was estimated that a basin on this property could provide a 5% peak runoff rate reduction for the 2-year storm and a 20% peak runoff rate reduction for the 100-year storm. Our design meets these reductions.

Graph 3. A graphical representation of the rate reductions provided by the Regional Detention Basin at Walker Road.

In order to achieve these rate reductions the existing overbank areas will be flattened to provide an area for water ponding, while maintaining and restoring the existing stream bed and banks as shown in Figure 4. A berm will be constructed along Walker Road approximately 6-ft high along the Walker Road side and 14.25-ft high on along the upstream side. Cross-sectional representations of the berm at the intersection of Walker Road and Glenhardie Road have been provided as Figure 5. The existing culvert under Walker Road will be replaced with three new culverts of various sizes and at varying elevations (Figure 6). The new culverts will function as the outlet control structure for this basin.
When constructed the basin will function similar to a bathtub with an open drain. Water will fill the basin faster than outlet structure can release water. The basin will fill up and release water at a slower rate. For each storm event a larger portion of the basin will fill, as shown in Figure 7. This water will also be deeper during each larger storm event and there will be an increase in depth as you approach the lowest point of the basin at the Walker Road culvert entrance.

**Reduced Flooding**

Under current conditions, Walker Road overtops in approximately the 2-year design storm as shown in Figure 8. The inundation area increases with storm event and encompasses approximately 212-feet along Walker Road in the 100-year design storm as shown in Figure 11. As previously mentioned, the regional detention basin has been designed to store and slowly release the 100-year design storm. What this means is that Walker road will no longer flood during storm events up to and including the 100-year storm. As shown in the blow up below and in Figure 13 the reduction in the inundation area associated with the 100-year storm. As this figure demonstrates, Walker Road currently floods during the 100-year storm and will no longer flood after construction of the basin.

**Impact on Downstream Watercourse**

The overall drainage area (Figure 14) to Trout Creek is 8.85-square miles and is comprised of six tributaries that feed the main branch of Trout Creek. The drainage area to Walker Road (Figure 14) is 1.18-square miles, which is roughly 1/8th or 13% of the overall Trout Creek Watershed. Due to the contributing size of the area to Walker Road as well as its placement in the watershed,
the benefits of the proposed regional detention basin will largely be realized at Walker Road itself, as well as the immediate downstream corridor.

As mentioned previously, the impacts of the regional detention basin are:

- Reduced flooding frequency and depth at Walker Road.
- No overtopping of Walker Road for storms up to and including the 100-year storm event.
- Reduced flooding frequency and depth at Glenhardie Road
- Reduced peak runoff rate of 5% for the 2-year storm and 20% for the 100-year storm.
- A restored and stabilized stream corridor through the Richter Tract, a section of stream which is currently deemed impaired by DEP due to severely eroded stream banks.

**Above and Beyond**

Throughout the Conditional Use process, Arcadia Tredyffrin LLC has gone above and beyond the requirements of the Tredyffrin Township Trout Creek Overlay Ordinance. Arcadia has always listened to the comments from both the Township as well as the residents and has attempted to accommodate all concerns throughout the design process.

Early in the process, Arcadia committed to providing no overtopping of Walker Road for storms up to the 100-year storm event; a condition that is not part of the Trout Creek Overlay Ordinance. In addition to this, by virtue of the Regional Basin design, the overtopping of Glenhardie Road will be reduced to storms above the 50-year storm event as highlighted in Figure 15.

Residents requested that a “cloudburst” storm or a storm with high intensity over a short time period be modeled as part of the design of the regional detention basin. This model was provided by Pennoni Associates Inc. and reviewed by Princeton-Hydro. The model consisted of a 1-hour duration 100-year storm with 2.82-inches of rainfall for the watershed to Walker Road. The model demonstrated that the basin can accommodate this high intensity event without overtopping Walker Road. This cloudburst storm was also run with the existing conditions and it was determined that Walker Road would overtop during this storm event with a total depth of water of < 10-inches over Walker Road.
Graph 4. A graphical representation of the rate reductions provided by the Regional Detention Basin at Walker Road for the Cloudburst Storm.
CONCLUSIONS

Pennoni Associates Inc. has prepared a Post-Construction Stormwater Management Report, a Post-Construction Stormwater Management Operations & Maintenance Document, a Carbonate Geology Study, and Design Plans that demonstrate compliance with the conditions set forth in the Tredyffrin Township Trout Creek Overlay Ordinance for the proposed development.

The Wayne Glen project will benefit Tredyffrin Township and its residents by:

- Reducing flooding frequency at Walker Road (no overtopping of Walker Road in storms up to and including the 100-year storm).
- Reducing flooding frequency at Glenhardie Road (no overtopping of Glenhardie Road in storms up to and including the 50-year storm).
- Restoring and stabilizing a section of Trout Creek, currently deemed impaired by PA DEP.
- Retaining the runoff volume associated with the 2-year storm for the entire Wayne Glen development.
- Significantly reducing the runoff rate for all storms up to and including the 100-year storm for the entire Wayne Glen development.
- Providing a model stormwater community to showcase within the Township.
References
ALL STORMWATER BMP's LOCATED 100-FT OR MORE FROM KNOWN KARST FEATURES

LEGEND
- BIO-RETENTION BASINS
- SURFACE INFILTRATION BASINS
- REGIONAL DETENTION BASIN
- PERMEABLE PAVEMENT
- SUBSURFACE INFILTRATION BASINS
- 100-FT KARST FEATURE SETBACK

100-FT KARST FEATURE SETBACK

FIGURE 1
TYPICAL TREATMENT TRAIN

FIGURE 3
TYPICAL EXISTING AND PROPOSED BASIN CROSS-SECTION

LEGEND

- EXCAVATED BASIN AREA
FIGURE 7
REGIONAL BASIN INUNDATION MAPPING

LEGEND
- 1-YR STORM
- 2-YR STORM
- 5-YR STORM
- 10-YR STORM
- 25-YR STORM
- 50-YR STORM
- 100-YR STORM

1-YR
2-YR
5-YR
10-YR
25-YR
50-YR
100-YR
EXISTING 2-YR FLOODPLAIN

LEGEND

156 LF OF WALKER ROAD INUNDATED MAX PONDING DEPTH OF LESS THAN 6"
FIGURE 9

2-YR INUNDATION MAP - PROPOSED CONDITIONS

LEGEND

PROPOSED 2-YR FLOODPLAIN

NO OVERTOPPING OF WALKER ROAD

Tributary No. to Trout Creek

Weasley Road Branch

Wenwood Drive Branch

Property Line

One South Church Street, 2nd Floor  West Chester, PA 19382

T 610.429.8907  F 610.429.8918

Pennoni Associates Inc.
Engineers  Surveyors  Planners
Landscape Architects
FIGURE 10

2-YR INUNDATION MAP - PROPOSED AND EXISTING CONDITIONS

PROPOSED 2-YR FLOODPLAIN
EXISTING 2-YR FLOODPLAIN

NO OVERTOPPING OF WALKER ROAD IN PROPOSED CONDITIONS

PROPERTY LINE

WEXLEY ROAD BRANCH
AVONWOOD DRIVE BRANCH
FIGURE 12

100-YR INUNDATION MAP - PROPOSED CONDITIONS

LEGEND

PROPOSED 100-YR FLOODPLAIN

GLENHARLIE ROAD
INUNDATION REDUCED TO 22 LF. LESS THAN 12" PONDING DEPTH IN PROPOSED CONDITIONS

NO OVERTOPPING OF WALKER ROAD IN PROPOSED CONDITIONS

PROPOSED 100-YR FLOODPLAIN

Tributary No. to Trout Creek

Weasley Road Branch

Avonwood Drive Branch

Property Line
FIGURE 13
100-YR INUNDATION MAP - PROPOSED VS EXISTING CONDITIONS

LEGEND
EXISTING 100-YR FLOODPLAIN
PROPOSED 100-YR FLOODPLAIN

GLENHARDIE ROAD INUNDATION REDUCED TO 22 LF. LESS THAN 12" PONCING DEPTH IN PROPOSED CONDITIONS
NO OVERTOPPING OF WALKER ROAD IN PROPOSED CONDITIONS

TRAIBUTARY NO. TO TROUT CREEK
EXISTING 100-YR FLOODPLAIN
PROPOSED 100-YR FLOODPLAIN
WEADLEY ROAD BRANCH
AVONWOOD DRIVE BRANCH
PROPERTY LINE
FIGURE 14

TROUT CREEK WATERSHED MAP

TROUT CREEK WATERSHED (8.85 SQ MI)

DRAINAGE AREA (1.18 SQ MI)

RICHARDS ROAD
WALKER ROAD
RICHTER SITE (36-AC)
FIGURE 15

50-YR INUNDATION MAP - PROPOSED AND EXISTING CONDITIONS

EXISTING 50-YR FLOODPLAIN
PROPOSED 50-YR FLOODPLAIN

NO OVERTOPPING OF GLENHARIE ROAD IN PROPOSED CONDITIONS
NO OVERTOPPING OF WALKER ROAD IN PROPOSED CONDITIONS

Tributary No. to Trout Creek

Weasley Road Branch

Avonwood Drive Branch

FIGURE 15