Waterford

Photo by Laura L. Shaw

"Bury the Wires and Tame the Traffic"

Waterford, Virginia

Preliminary Engineering Study and Concept Plans

FINAL REPORT

Prepared for:
Loudoun County, Virginia

Prepared by:

Kimley-Horn and Associates, Inc.

with:

B2E Consulting Engineers, P.C.
William H. Gordon Associates, Inc.
Williamsburg Environmental Group, Inc.
The Louis Berger Group, Inc.
Walkable Communities, Inc.

in coordination with
Waterford Foundation, Inc.
Waterford Citizens Association
Waterford Elementary School Parent Teacher Organization

OCTOBER 2003

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PREFACE

When a pioneer named Amos Janney founded the Village of Waterford in 1733, Virginia's Blue Ridge foothills formed the frontier of a colonial America that had yet to push past the Appalachian Mountains. In the early 1800s, Waterford grew with the new nation into a bustling commercial center for the surrounding farmland. Following the Civil War, the Industrial Revolution passed the village by. Business gradually closed and moved, but the community remained.

During the 1930's, Waterford began attracting special notice from preservationists for its character as an unspoiled, 19th-century rural village. Local citizens, recognizing their treasure of historic landscape and regional vernacular architecture, founded the Waterford Foundation in 1943 to ensure the protection of this rich heritage. Through the vision of these citizens and other preservationists, Waterford was granted National Historic Landmark status in 1970.

Today, this vision continues. Through a study to establish concept plans to "bury the wires and tame the traffic," the citizens of Waterford and Loudoun County are seeking to preserve the historic character of the Village of Waterford.

Funded by a Federal Transportation Equity Act (TEA-21) grant, this study has been accomplished in close coordination with a number of citizen groups and government agencies.

This report is a consensus-based set of findings and recommendations envisioned to be a planning tool. It is intended to help implement a program of traffic calming, utility relocation, and overall infrastructure improvements for the Village of Waterford.

Acknowledgements

This study is the culmination of years of effort by many citizens, neighbors, and friends of the Village of Waterford, represented by several organizations, including:

- Waterford Foundation, Inc., Eric Breitkreutz, Executive Director
- Waterford Citizens Association, Ed Lehmann, President
- Waterford Elementary School Parent Teacher Organization, Ann Goode, Project Representative

In addition, Loudoun County Department of General Services and the Virginia Department of Transportation were critical in securing the TEA-21 grant and guiding this study.

The consultant team for this study was comprised of the following firms, serving a variety of roles:

- Kimley-Horn and Associates, Inc. – lead consultant, transportation planning, traffic and roadway engineering
- B2E Consulting Engineers, P.C. – electrical engineering
- William H. Gordon Associates, Inc. – civil engineering
- Williamsburg Environmental Group, Inc. – environmental studies and review
- The Louis Berger Group, Inc. – historic and cultural resources studies and review
- Walkable Communities, Inc. – public participation

The team of Kimley-Horn and its subconsultants has appreciated the opportunity to assist Loudoun County and the Village of Waterford in developing concepts for burying the wires, taming the traffic, and preserving the heritage of this National Historic Landmark. It is hoped that this report will serve the citizens of Waterford and Loudoun County as a foundation for the next steps in planning and implementing future projects.

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EXECUTIVE SUMMARY

Walking through the village is a wonderful experience. Removing the intrusions of speeding traffic and wires will provide a sense of place and time unique in America today.
- George Siekkinen, Senior Architect, National Trust for Historic Preservation

Established in 1733, the Village of Waterford, located in Loudoun County, Virginia, is a National Historic Landmark District that is currently experiencing the challenges associated with aging overhead wires and utility poles, traffic growth in the County, and traffic speeds through the village. Waterford citizens and historic preservationists requested a study be performed to "bury the wires and tame the traffic" in the village. In response to these requests, Loudoun County has assisted the Village of Waterford by executing a preliminary engineering study funded through a federal Transportation Equity Act (TEA-21) grant award and Loudoun County matching funds, and administered through Loudoun County and the Virginia Department of Transportation (VDOT).

In 2003, a consultant team led by Kimley-Horn and Associates, Inc. worked closely with County staff and village representatives to perform this study, develop concept plans to improve traffic and pedestrian safety, and to place overhead utility lines underground, while restoring the historic character of the village. This final report of consensus-based findings and recommendations is envisioned to be a planning tool for the village and the County to take to the next step—implementing a logical program of traffic calming, utility relocations, and overall infrastructure improvements that will preserve the heritage of Village of Waterford and protect its National Historic Landmark status.

BACKGROUND

In an August 2002 Memorandum of Agreement, Loudoun County, the Waterford Foundation, the Waterford Citizens Association, and the Waterford Elementary School Parent Teacher Organization recommended a study to explore alternatives and to "arrive at a realistic design scheme and overall preliminary cost estimates" to bury the wires and tame the traffic. This agreement grew out of the efforts from the 1970's to the late 1990's by many of Waterford's citizens to preserve the character of the village. The stated challenge was to balance traffic calming measures, utility relocations, stormwater management, and roadway modifications with the historic nature of the village.

To meet this challenge, this study has taken a holistic approach that integrates solutions throughout the entire village. Creating these solutions required the involvement of Loudoun County staff, Waterford representatives and citizens, and the Kimley-Horn team. This consultant team has included planners and engineers from Kimley-Horn and Associates, supported by specialists from Walkable Communities, B2E Consulting Engineers, William H. Gordon Associates, Williamsburg Environmental Group, and The Louis Berger Group.

STUDY PROCESS

The study area included the Waterford National Historic Landmark District that encompasses the Village of Waterford. The village is an unincorporated area of Loudoun County, approximately five miles northwest of Leesburg. The scope of this study included the collection of data from the field, coordination with appropriate government agencies and utility companies, and the engineering analysis of alternatives with respect to traffic calming, utility relocation, stormwater drainage, and roadway alignment. Environmental requirements were carefully considered, including wetlands, health of trees, and archaeological and historic resources. Preliminary design alternatives were developed and reviewed with representatives from Waterford, as well as Loudoun County staff members. A final set of recommended measures to bury the wires, light the village, tame the traffic, and fix the drainage was developed, including con-cept plans and preliminary estimates of project costs.

In addition, three public meetings with the citizens and neighbors of Waterford were held in conjunction with this preliminary engineering study. The first meeting was held on March 6, 2003. The purpose of this meeting was to gather input from the citizens and neighbors to help guide the study. The second meeting was held on July 17, 2003, and its purpose was to present to the citizens the findings and recommendations of the study and to seek their feedback. The third meeting was held on September 4, 2003 to present the final report, including the concept plans for burying the wires and taming the traffic.

AGENCY COORDINATION

The study team, together with Loudoun County and Waterford representatives, contacted numerous agencies and utility companies as part of this study. Of note were meetings with the VDOT Leesburg Residency and Northern Virginia District offices, Loudoun County Sanitation Authority, Dominion Virginia Power, Verizon Telephone, the Virginia Department of Historic Resources, the Virginia Department of Environmental Quality, and the National Trust for Historic Preservation, as well as correspondence with the Federal Highway Administration and the U.S. Army Corps of Engineers.

INITIAL FINDINGS

The study team developed a set of initial findings based on a review of documentation gathered, input from the citizens of Waterford, and the work of the environmental and historic resources specialists. These findings guided the engineering analyses and the development of concept plans.

Waterford Heritage

In the America of the early 21st century, Waterford's significance is evident. Established in the 18th century, the village grew to pre-Civil War prominence. Today, three quarters of the buildings erected before 1834 are still standing. The visual demarcation is evident between the 19th-century village and the surrounding countryside of fields and farmsteads. The settlement pattern is visible in millworks, houses, roads, hedgerows, fences, and agricultural lands. Waterford's architecturally distinctive buildings were derived from Virginia and Pennsylvania vernacular traditions.

Community Vision

During the 1930's, Waterford began attracting notice from preservationists for its character as an unspoiled rural village. Local citizens founded the Waterford Foundation in 1943. In 1970, Waterford was granted National Historic Landmark (NHL) status, the nation's highest designation of historic properties, officially recognized because it possesses exceptional value in illustrating and interpreting the heritage of the U.S. Waterford is currently one of less than 2,500 such landmarks, and it is one of only a handful in which the entire village is a NHL District.

Endangered Landmark

The legacy of Waterford and its NHL status is threatened today by growing vehicular traffic and an infrastructure in need of repair. Vehicle speeds jeopardize the safety of pedestrians. Storms flood inadequate gutters, pipes, and sidewalks. Aging networks of wires and utility poles diminish viewsheds. Through the efforts of many people from the 1980's to the late 1990's, the citizens of Waterford arrived at a consensus for improving traffic safety and restoring the historic character of the village. In a Village-wide meeting with VDOT and Loudoun County in June 1999, the citizens agreed to the following:

> *The Village of Waterford is supportive of burying the wires and taming the traffic. We want the village to look much like it does today. We'd like to keep our sidewalks as they exist today; we'd like our trees to exist as they do today; and we'd like the drainage problems to be corrected. We'd like to see historically correct street lights in the village, and we'd like to see traffic tamed. Our motto: "Less is more."*

Implementing enhancements that reflect the village's historical significance will help ensure Waterford is unique in the national context.

Citizen Input

This preliminary engineering study grew out of the consensus from the citizens of Waterford. To confirm this consensus, and to get specific input, the study team facilitated a meeting on March 6, 2003 with the citizens and neighbors of Waterford. From this meeting, the study team received a priority list of issues to address, a list of core values held by the citizens about their village, and a list of statements on residents' 20-year visions for the village. This input became the benchmark against which to measure the feasibility of various alternatives for taming traffic, burying wires, fixing drainage, lighting the village, and repairing roads and sidewalks.

Environmental and Historic Resources Findings

In addition to the citizen input, initial findings were obtained from the team's environmental and historic resources specialists. A survey was conducted of 288 trees along the roads and areas of potential construction. The majority of trees were in good health. A total of 137 acres of wetlands was surveyed, and the delineation of those wetlands was approved by the Corps of Engineers. Minor impacts to these wetlands may occur in implementing proposed

solutions. In addition, it was determined that of 133 land parcels investigated, 42 historic preservation easements currently exist within the study area, and several areas within the village have archaeological potential.

ENGINEERING STUDIES AND DESIGN ALTERNATIVES

Traffic Calming

Based on the traffic and speed data collected, as well as observations made in the field, it was evident that traffic calming measures are necessary and that a wide range of solutions is possible. Daily volumes on the streets of Waterford are relatively low, ranging from 200 vehicles per day (vpd) to just over 1,500 vpd. These low volumes allow low speed measures typical of neighborhood streets.

Speeds measured indicated that a majority of drivers exceed the 20 and 25 mph speed limits in the village. The 85th percentile speeds were generally less than 10 mph over the speed limit, but it was the "rogue" speeders that caused concern. Reducing the speed of these drivers is a priority of traffic calming. From field observations, pedestrians frequently use the sidewalks and streets for access to and from buildings and for leisurely walks. Making the streets safer for citizens and visitors is also a priority.

Traffic calming alternatives considered included:

- Minor modifications to the roadways: edge and centerline pavers, corner radius reduction, narrow lanes, signs, pavement markings, etc.
- More major geometric projects: road lowering, speed tables, speed bumps, dips, curbs, gutters, traffic circles, roundabouts, etc.

Roads, Pavements, and Sidewalks

Through the study's research, it was evident that the general geometry of the roads and sidewalks today exists as it did more than 60 years ago. From field measurements, current pavement widths range from 14 to 20 feet on the 2-lane roads in the village. These widths, as well as the horizontal and vertical curves (with poor sight distance in some instances), are not within today's standards for neighborhood streets. The pattern of development over 250 years is not only evident in the structures, it is also evident in the roads themselves.

It was determined that the asphalt pavement along the roads in Waterford is not unusually thick, but that the original crown of the road was generally followed. As successive layers have been placed, and when the gravel ditch was paved, curbs and gutters have lost some effectiveness, drainage problems were exacerbated, and pedestrian access and parking became more difficult in some locations. When discussing sidewalks, the citizens generally stated that the variety of the sidewalk pavement (concrete, stone, brick, gravel, etc.) is what they want to see continued.

In support of traffic calming measures, roadway alignment, pavement, and sidewalk alternatives considered included:

- Minor horizontal realigning of roads away from historic structures, such as the Mill
- Vertical realignment, including lowering the surface of Main Street between Second and the Mill, and lowering the surface of the Corner Store intersection
- Repair of roadways, curbs, gutters, and sidewalks
- Extension of existing sidewalks to provide better pedestrian access throughout the village

Stormwater Management

From field observations and an engineering analysis, it was found that the current stormwater system in Waterford does not adequately handle significant storm events. The existing drainage system in the Village of Waterford consists of seven outfalls that all drain toward the South Fork of Catoctin Creek. On the streets of Waterford, a number of problem areas with the storm drainage were observed; multiple roadside ditches have been eliminated to allow for additional parking; and a majority of culverts along the roads have been damaged or are clogged with silt and debris. Existing roadside ditches and/or storm sewers are not adequately sized to handle the storm runoff based upon current VDOT standards.

Regarding water quality, there are currently no best management practice (BMP) facilities evident within Waterford. The stormwater runoff typically flows directly into South Fork Catoctin Creek without any practical BMP measures.

In support of traffic calming measures throughout the village, stormwater management alternatives included:

- Upgrades and additions to the existing storm drainage system, where practical, to conform with current County and VDOT standards
- BMP measures consistent with the character of the village and meeting environmental and historic resources requirements.

Power and Telephone Wires

Based on research of existing records and information gathered during meetings with Dominion Virginia Power (DVP), Verizon Communications, and Loudoun County electrical inspectors, it was determined that burying the wires is feasible, especially if performed in conjunction with construction of traffic calming and roadway and drainage improvements.

Electrification in Waterford began in the early 1920's. Except for power to the Waterford Elementary School on Loyalty Street, all power in Waterford is single phase, which limits options with respect to transformers and service connections at existing structures. Telephone service existed in Waterford as early as 1895, but there is currently no cable TV service or high-speed Internet access in Waterford.

The alternative of burying the transformers was investigated, and it was determined that DVP does not have a single-phase transformer for underground application. If an underground type transformer did exist, constructing large vaults with grates or other covering would not be consistent with the character of the village, and it would significantly increase the cost of burying the wires. Therefore, approximately 30 above-ground transformers would be needed to distribute power to existing homes and other structures. Service connections to existing structures are feasible, but will need to be investigated on a case-by-case basis during the design phase of this effort.

Thus, the analysis of alternatives for burying the wires resulted in a straightforward recommendation of relocating overhead wires to underground ducts along the streets (under or adjacent to the pavement), removing poles, installing above-ground transformers, and connecting to existing homes and other structures.

Lighting

Currently, minimal street lighting exists throughout the village. Approximately 20 mercury vapor street lamps mounted to utility poles provide some lighting, but the fixtures are well beyond their useful life. Footcandle readings taken during lighting surveys of the village at 4 AM indicated low levels of lighting.

Numerous options for public area street lighting within the village were explored, including lighting each major street or lighting selected areas with higher roadway lighting (30+ feet), pedestrian level lighting (8 to 12 feet), or low level lighting (3 to 5 feet). Another option explored was lighting the facades of selected buildings along Main Street. In accordance with the consensus of the citizens, any lighting fixture would need to be "historically correct."

It was concluded that DVP has several types of poles and fixtures that could approximate period lighting. Other fixtures and poles are available in the marketplace that better replicate historic lighting (such as coach-lantern type fixtures), however, such fixtures would need to be maintained by an entity other than DVP.

Environmental and Historic Resources Review

During the engineering studies, environmental and historic resources experts were consulted as to the potential impacts to wetlands, trees, historic properties, and the overall National Historic Landmark status of the village. At a team meeting on April 30, 2003, it was concluded that the alternatives for traffic calming, drainage improvements, utility relocations, and lighting would likely have "no adverse impact" on the NHL status. The alternatives proposed were found to be relatively benign, and in fact, would enhance the characteristics of the village that qualifies it for NHL status.

Concept Plan Workshop

The various alternatives developed from the engineering analyses were presented at the Concept Plan Workshop on May 27, 2003. In attendance were representatives from Loudoun County Department of General Services, Loudoun County Planning Department, VDOT, the Waterford Citizens Association, the Waterford Foundation, and the Waterford Parent Teachers Organization.

The consultant team facilitated discussions on the alternative concepts for each facet of the study to bury the wires and tame the traffic. The day-long workshop resulted in a set of preferred concepts for taming the traffic, realigning the roadways, fixing the drainage, burying the wires, and lighting the village.

Concepts that emerged as preferred by the Waterford representatives were those that were most consistent with the character of this rural historic village. The intrusiveness of traffic circles or roundabouts was eliminated. The use of native materials (stone, pavers, brick, gravel, etc.) was encouraged. The inclusion of above-ground transformers was accepted.

Also, the group decided on a period lighting fixture for use in pedestrian level lighting applications (8 to 12 feet from the

roadway or sidewalk), eliminating the DVP fixture options and the roadway, low-level, and building facade lighting options.

RECOMMENDATIONS

Following the Concept Plan Workshop, the consultant team compiled the set of consensus-based recommendations for this preliminary engineering study.

Tame the Traffic

To tame the traffic in the Village of Waterford, recommendations include modifications and enhancements to the roads, street corners, sidewalks, drainage systems, and roadside trees and landscaping. The following types of traffic calming measures are recommended for various locations throughout the village:

- Pavers (stone, brick, and/or concrete resembling stone or cobbles), one foot wide, consistent with native materials and flush with the roadway surface, used to define edges of pavement at specific locations and/or narrow the travel lanes
- Pavers, one to four feet wide, flush with the roadway surface, used to define the roadway centerline at specific locations to horizontally displace traffic and narrow travel lanes
- Valley gutters at the edges of roadways to define the travel lanes and improve drainage
- Reduced radius at corners of intersections to slow traffic and/or discourage rolling stops
- "Bulb-outs" along the roadway and at intersections, with stone or concrete curbing, to add trees and landscaping, define parking areas, and add sidewalk area at corners
- Series of alternative "bulb-outs" with trees to provide a "chicane" effect on traffic
- "Speed tables" or raised sections of roadway to vertically displace traffic and allow easier pedestrian access
- Pavers and/or stamped concrete used at intersections to provide a variation in pavement surface, highlighting the intersection and presence of pedestrians, flush with approaching roadways, or as part of a speed table
- "Hump back bridge" in place of the wooden bridge over Tannery Creek to vertically displace traffic
- Lowering of roadway segments in some locations to allow for bulb-outs, speed tables, and hump back bridges (as well as safer pedestrian access and improved drainage)
- Addition and extension of sidewalks and walking paths along the roadway, separated by landscaping and/or pavers to narrow and/or define the edge of the travel lane
- Addition/modification of trees and landscaping along the roadways and at intersections (often in concert with other measures)
- Minimum signage at specific locations in the village to meet safety and regulatory requirements and to enhance traffic calming throughout the village

These traffic calming measures should result in a slight reduction in the average speed of vehicles within the village and a significant reduction in the speed of "rogue" drivers who grossly exceed reasonable speeds. Pedestrians and pets in the village will benefit. In addition, the measures are "traffic neutral," that is, concepts do not result in increased capacity in response to growing traffic volumes in the region. The capacity of the streets in Waterford will remain constant. Motorists will be able to progress through town at slow but reasonable speeds.

Fix the Drainage

To support the recommended traffic calming measures, improvements to stormwater drainage should also be implemented. The specific concepts recommended will correct the drainage problems along Second Street and Main Street, from the Tin Shop to the existing wooden bridge. In general, the recommended drainage improvements include:

- Repairing curbs and inlets
- Regrading ditches
- Replacing and adding pipe culverts
- Cleaning out pipes and outfalls
- Rerouting drainage from historic structures

In addition, the drainage improvements should include the installation of best management practice (BMP) measures to address stormwater quality flowing from Waterford to Catoctin Creek including BMP landscaping, infiltration practices, bio-retention measures, grass swales, and manufactured BMP systems.

Bury the Wires

The recommended area for burying the wires extends from just west of the First Street bridge over Catoctin Creek, just north of First Street on Clover Hill Road, north of the Loyalty Road/Brown's Lane intersection, and approximately 1/4 mile south of the Clarks Gap Road/Factory Street/High Street intersection. Recommendations for relocating overhead wires to underground services include:

- Underground electric service generally following the streets in Waterford, either under the pavement or adjacent to the road
- Underground telephone service following the same general path as the underground electric service.
- Conduits for power and telephone as a duct bank in a single trench, with conduits separated by an appropriate distance to be determined during design
- Spare conduits in this same duct bank for additional electric service, additional telephone services, and possible future cable and Internet services
- Above-ground transformers in appropriate locations, screened or otherwise hidden from view of pedestrians and motorists, through strategic placement, addition of shrubs, construction of screen walls (consistent with the character of the village), etc.

Light the Village

Based on feedback from Waterford representatives, historically correct lighting is recommended consisting of the following:

- A fixture similar to an existing coach-lantern type with a decorative pole, consistent with the character of the village, conforming to "dark sky" standards, and minimizing light trespass onto private properties
- Pedestrian level lighting at 8 to 12 feet above roadway or sidewalk elevations
- Placement of lights in appropriate locations to address safety concerns of pedestrians and motorists

Preserve the Heritage

The measures recommended were reviewed by the Kimley-Horn team members specializing in environmental regulations, archaeology, and historic preservation. It is anticipated that none of the measures will have an adverse impact on the village's NHL status. In fact, FHWA confirmed on July 28, 2003 that National Environmental Policy Act (NEPA) requirements for the improvements will include a Categorical Exclusion, with Section 106 documentation and potentially a programmatic Section 4(f) document, in accordance with NEPA and National Historic Preservation Act (NHPA).

Concept Plan and Final Report Presentations

The recommended concepts from this preliminary engineering study were presented to the citizens of Waterford on July 17, 2003 in a public meeting. The consultant team facilitated a discussion with the group, and feedback was positive. Comments suggested minor alterations to the measures, but overall, the recommendations were accepted as consistent with the character of the village and as potential improvements that will meet the goals of the village to bury the wires and tame the traffic. On September 4, 2003, the final report of this study was presented to the citizens of Waterford, and the findings, recommendations, and concept plans were well-received.

IMPLEMENTATION

It is intended that this final report of findings, recommendations, and concept plans will serve as a planning tool for future implementation of traffic safety and infrastructure improvements and of historic preservation efforts for the Village of Waterford.

The next steps in the planning process involve obtaining funding for the improvements and completing the environmental documentation. Following these steps, an appropriate public entity or public-private partnership could execute the design and construction of a program of projects to make the concept plans a reality.

Preliminary Estimates of Project Costs

Based on the concept plans developed in this study, preliminary project budget estimates were prepared to assist in implementing the next steps in the planning process. These preliminary estimates of project costs include construction, engineering design and construction administration, mobilization, maintenance of traffic, easements, permits, and contingencies. A breakdown of these estimates per type of project is shown on the following page. It should be noted that the preliminary estimates for each project item are dependent upon the other items being constructed in a coordinated program of improvements.

Design and Construction Considerations

During the development of concept plans, the study team consistently verified the feasibility of the solutions with respect to the ability to design and construct such improvements in the future, within the constraints of the physical layout of the village and the nature of the historic properties. Given this initial analysis by the study team, future planners should consider the following:

- Detailed design of traffic calming, pavement, sidewalk, stormwater, utility, and lighting improvements needs to remain consistent with the character of Waterford
- Native and historically correct materials should be used
- Traffic calming measures should be subtle, but effective
- Pedestrian access should be a priority
- Above-ground transformers should be placed strategically to minimize the intrusion on the historic viewsheds
- The community's motto of "less is more" should be followed

In addition, designs should be analyzed with respect to constructability. Temporary parking along Main Street will be required to lower the pavement and construct the new roadway, given the concept plan for this area of the village. Traffic will need to be managed along Main Street and other construction areas. Temporary traffic signals may be necessary to safely construct the projects.

Noise and vibration from construction equipment will also need to be managed, given the age and construction methods used to build the historic structures and the close vicinity of the residences. In general, construction phasing will need to be planned in a logical sequence that minimizes disruption to the citizens of Waterford.

Closing

The team of Kimley-Horn and its subconsultants has appreciated the opportunity to assist Loudoun County and the Village of Waterford in developing concepts for burying the wires, taming the traffic, and preserving the heritage of this National Historic Landmark. It is hoped that this report will serve the citizens of Waterford and Loudoun County well as they plan for the future.

"Bury the Wires and Tame the Traffic"
Waterford, Virginia
Preliminary Estimates of Project Costs

Project Item	Preliminary Costs
Traffic calming measures (2.4 miles of roadway, 12 intersections)	$ 2,800,000
Drainage improvements associated with traffic calming	600,000
Pedestrian-level lighting consistent with village character	700,000
Electric service relocation from overhead lines to underground ducts	5,700,000
Telephone service relocation from overhead lines to underground ducts	2,900,000
Utility service connections to existing structures	800,000
Total in 2003 Dollars:	**$ 13,500,000**

1- Introduction

Waterford

"Bury the Wires and Tame the Traffic"

1. INTRODUCTION

The shady streets and modest buildings of Waterford speak eloquently of the simple lives of the men and women who settled in this quiet corner of Loudoun County and helped build the nation - and of the determination of preservationists who have worked hard to keep this fragile piece of our heritage intact and alive.
-Richard Moe, The National Trust for Historic Preservation

Pink House, 2002

Through the vision and leadership of Waterford citizens, Loudoun County officials, and historic preservationists, the early American rural Village of Waterford is indeed intact and alive today. Established in 1733, the Village of Waterford was designated a National Historic Landmark (NHL) District in 1970 by the U.S. Department of Interior. The village is also a Virginia Landmark Historic District and a Loudoun County Historic District. However, the village is currently experiencing the challenges associated with aging overhead wires and utility poles, traffic growth in the County, and traffic speeds through the village.

In 2002, Waterford citizens and historic preservationists requested a study be performed to "tame the traffic" in the village. In addition, they asked that concept plans be developed to relocate overhead utility wires, fix the roads and sidewalks, and improve the storm drainage.

In response to these requests, Loudoun County has assisted the Village of Waterford by executing this preliminary engineering study, which has been funded through a federal Transportation Equity Act (TEA-21) grant award and Loudoun County matching funds, and administered through Loudoun County and the Virginia Department of Transportation (VDOT).

A consultant team led by Kimley-Horn and Associates, Inc. has worked closely with County staff and village representatives to perform this study, develop concept plans to improve traffic and pedestrian safety, and to place overhead utility lines underground, while restoring the historic character of the village. This final report of consensus-based findings and recommendations is envisioned to be a planning tool for the village and the County to take to the next step—obtaining funding and implementing design and construction. This report represents a master plan of traffic calming, utility relocations, and overall infrastructure improvements that will preserve the heritage of Village of Waterford and protect its NHL status.

Corner Store, circa 1915

1.1 Background

The legacy of Waterford and its NHL status is threatened by growing vehicular traffic and an infrastructure in need of repair. Vehicle speeds jeopardize the safety of pedestrians. Storms flood inadequate gutters, pipes, and sidewalks. Aging networks of wires and utility poles diminish viewsheds.

Over 60 years ago, local citizens and national preservationists recognized the significance of Waterford as an extraordinarily intact rural village of an earlier era. In 1937, the Historic American Buildings Survey carried out a program of photo documentation of Waterford's architectural treasures. In 1943, the citizens formed the Waterford Foundation. Following the recognition of the village as a NHL district in 1970, local citizens, county and state officials, and friends of Waterford from across the nation have continued the preservation efforts.

Through the endeavors of many people from the 1980's to the late 1990's, the Waterford citizens arrived at a consensus for improving traffic safety and restoring the historic character of the village. In a Village-wide meeting with VDOT and Loudoun County in June 1999, the citizens agreed to the following statement:

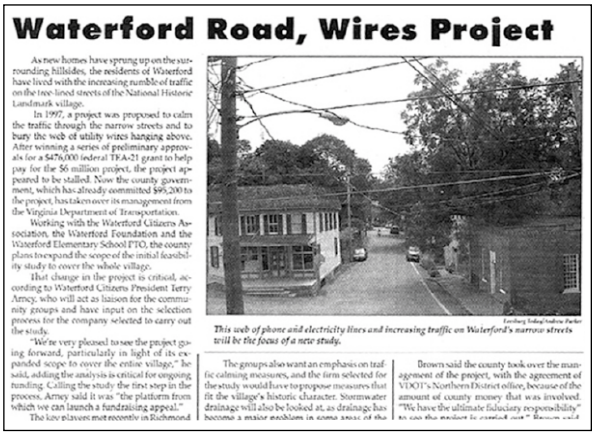
Waterford

Bury the Wires and Tame the Traffic

The Village of Waterford is supportive of burying the wires and taming the traffic. We want the village to look much like it does today. We'd like to keep our sidewalks as they exist today; we'd like our trees to exist as they do today; and we'd like the drainage problems to be corrected. We'd like to see historically correct street lights in the village, and we'd like to see traffic tamed. Our motto: "Less is more."

Implementing enhancements that reflect the village's historical significance will help ensure Waterford is unique in the national context. To begin the implementation, the Waterford Foundation led the application process in 1998-1999 and again in 2000-2001 for a TEA-21 grant to "bury the wires and tame the traffic." Local citizens and school children participated in the process. The result was a grant for this study in the amount of $380,800. Combined with matching funds of 25%, or $95,200, approved by the Loudoun County Board of Supervisors, the total amount available for the project was $476,000. After several discussions between VDOT and Loudoun County, it was agreed that the Loudoun County Department of General Services would administer the study.

With the TEA-21 Grant approved, in an August 2002 Memorandum of Agreement, Loudoun County, the Waterford Foundation, the Waterford Citizens Association, and the Waterford Elementary School Parent Teacher Organization recommended a study to explore alternatives and to "arrive at a realistic design scheme and overall preliminary cost estimates" to bury the wires and tame the traffic. This agreement grew out of the efforts from the 1970's to the late 1990's by many of Waterford's citizens to preserve the character of the village. The agreement also led to the solicitation for professional consulting services in September 2002 and the subsequent award of a contract to the Kimley-Horn team in January 2003.



Waterford Road, Wires Project

As new homes have sprung up on the surrounding hillsides, the residents of Waterford have lived with the increasing rumble of traffic on the tree lined streets of the National Historic Landmark village.

In 1997, a project was proposed to calm the traffic through the narrow streets and to bury the web of utility wires hanging above. After winning a series of preliminary approvals for a $476,000 federal TEA-21 grant to help pay for the $6 million project, the project appeared to be stalled. Now the county government, which has already committed $95,200 to the project, has taken over its management from the Virginia Department of Transportation.

Working with the Waterford Citizens Association, the Waterford Foundation and the Waterford Elementary School PTO, the county plans to expand the scope of the initial feasibility study to cover the whole village.

That change in the project is critical, according to Waterford Citizens President Terry Arney, who will act as liaison for the community groups and have input on the selection process for the company selected to carry out the study.

"We're very pleased to see the project going forward, particularly in light of its expanded scope to cover the entire village," he said, adding the analysis is critical for ongoing funding. Calling the study the first step in the process, Arney said it was "the platform from which we can launch a fundraising appeal."

The key players met recently in Richmond

This web of phone and electricity lines and increasing traffic on Waterford's narrow streets will be the focus of a new study.

The groups also want an emphasis on traffic calming measures, and the firm selected for the study would have to propose measures that fit the village's historic character. Stormwater drainage will also be looked at, as drainage has become a major problem in some areas of the

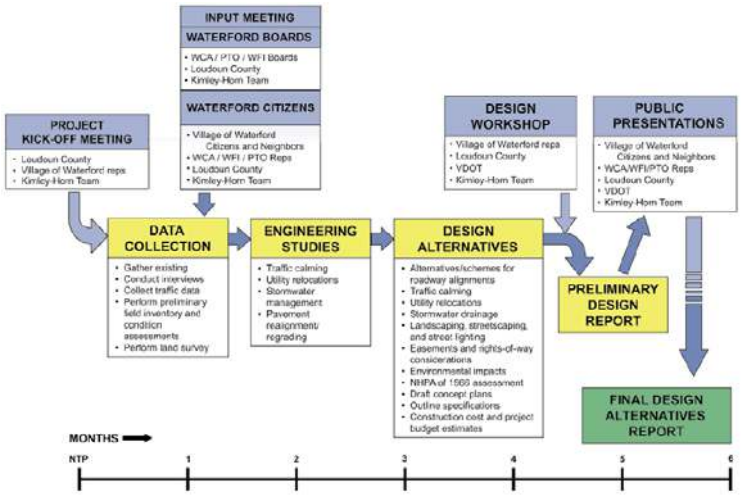
Brown said the county took over the management of the project, with the agreement of VDOT's Northern District office, because of the amount of county money that was involved. "We have the ultimate fiduciary responsibility"

Leesburg Today Article, September 13, 2002

The stated challenge of the "bury the wires and tame the traffic" study was to balance traffic calming measures, utility relocations, stormwater management, and roadway alignments with the historic nature of the village. To meet this challenge, the consultant team took a holistic approach that integrated solutions throughout the entire village. Creating these solutions required the involvement of Loudoun County staff, Waterford representatives and citizens, and the Kimley-Horn team. This team included the following firms, which provided a full range of planning and engineering disciplines:

- Kimley-Horn and Associates – Lead consultant, transportation planning, traffic and roadway engineering
- B2E Consulting Engineers – Electrical engineering
- William H. Gordon Associates – Civil engineering
- Williamsburg Environmental Group – Environmental studies
- The Louis Berger Group – Historical and cultural resources studies
- Walkable Communities – Community participation

TEA-21 Grant Application



Study Scope and Schedule

1.2 Study Scope

As shown in the diagram above, the scope of this study included the following tasks performed over approximately six months:

- Kick-off meeting with Loudoun County and Waterford representatives (February 4, 2003)
- Collection and review of existing documentation and extensive data from the field
- Community input meeting with Waterford citizens (March 6, 2003)
- Coordination with appropriate government agencies and utility companies
- Engineering studies of alternatives with respect to traffic calming, roadway alignment, stormwater drainage, power and telephone utility relocations, and lighting
- Development of design alternatives
- Concept Plan Workshop with Waterford representatives (May 27, 2003)
- Concept Plan Presentation to Waterford citizens (July 17, 2003)
- Development of a final report with findings, recommendations, concept plans, and preliminary cost estimates
- Final Report Presentation to Waterford citizens (September 4, 2003)

During the study process, environmental aspects were carefully considered, including the delineation of wetlands, the health of trees, and potential impacts to archaeological and historic resources. Also, preliminary and final concepts were developed and reviewed with representatives from Waterford, as well as Loudoun County staff members.

Waterford citizens also participated directly in the process through the three public meetings listed above. The purpose of the March 6 meeting was to gather input from the citizens and neighbors to help guide the study. The meeting on July 17 was held to present to the citizens the findings and recommendations of the study and to seek feedback. The meeting on September 4 presented the final report, including the concept plans for burying the wires and taming the traffic. All three meetings were held at the Old School on Fairfax and High Streets in the Village of Waterford.

1.3 Study Area

As shown in **Figure 1-1,** on the following page, the study area included the National Historic Landmark District that encompasses the Village of Waterford, an unincorporated area of Loudoun County, approximately five miles northwest of Leesburg. This area included the roadways within the village shown in Figure 1-1.

1.4 Data Collection

1.4.1 Documentation:

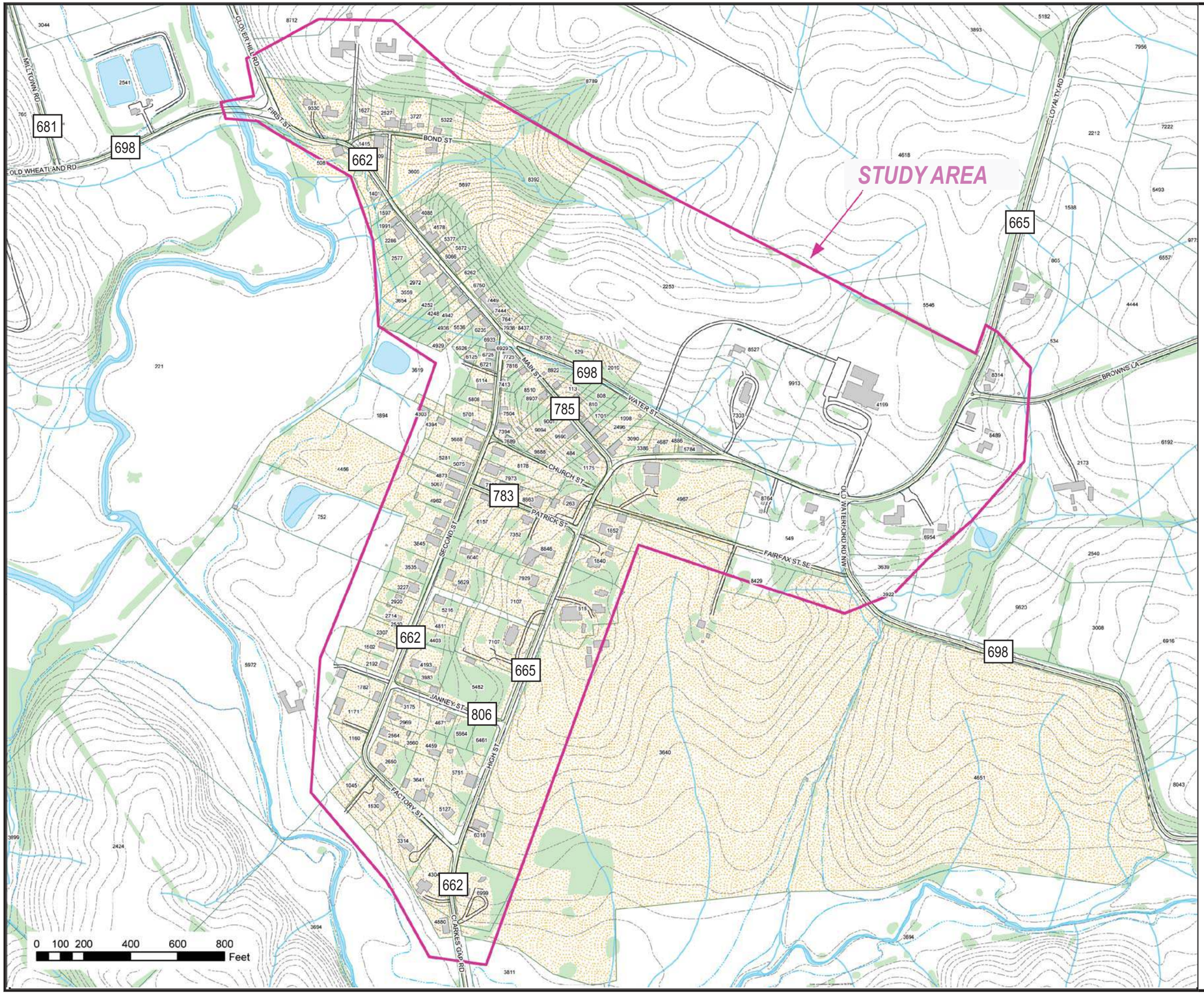
The study team gathered and reviewed an extensive amount of documentation, including previous planning reports, agency information, historic records, and numerous publications on the history of Waterford. A list of the key documents is included in *Appendix A*. In addition, the Waterford Foundation, with the help of several citizens, provided dozens of historic photos in digital format for use in the engineering analyses, as well as in the presentations and the final report.

1.4.2 Base Mapping

The base mapping used during this study was developed through aerial photography taken in March 2003 by Air Survey Corporation and converted to an AutoCAD file compiled from horizontal and vertical field survey control established by William H. Gordon Associates, which also supplemented the mapping with roadway cross-sections. Property boundaries on the base map were approximated from Loudoun County mapping information. The locations of the sanitary sewer lines were approximated from as-built plans provided by the Loudoun County Sanitation Authority. For any subsequent detail design, additional field survey and deed research would be needed. The base mapping obtained for this study was used for the development of feasible design alternatives and concept plans.

Village of Waterford

STUDY AREA
Figure 1-1



LEGEND

- Study Area
- Historic District
- Pavement
- Surfacewater Drains
- Parcels
- Buildings
- Floodplain
- Water
- Topography

N

Kimley-Horn and Associates, Inc.

1.4.3 GIS

A geographic information system (GIS) was developed and populated with environmental, historic, archaeological, and existing conditions information that was collected by the various team members. This information is further discussed in Chapter 2 of this report.

Village of Waterford, 2003

1.4.4 Field Data

The consultant team members collected a large volume of existing conditions information. This data included daily and peak hour traffic volumes, traffic speeds, existing signs, and roadway geometry, as well as crash data. As-built drawings of the sanitary sewer were obtained, and cores of the asphalt pavement on

Main and Second Streets were obtained to determine thickness of existing pavement. The existing storm drainage system was documented. Other data collection efforts included determining health of existing trees in the village, conducting a wetlands survey, documenting parcels of property that contributed to the NHL status, and determining archaeological potential of areas within the village. The configuration of the existing power and telephone utilities was documented, and a survey of the lighting levels was performed. The findings from this existing conditions data is discussed in Chapter 3 of this report.

It should be noted that during this study, hundreds of digital pictures were taken throughout the village (see examples throughout this report). These photos were instrumental in developing and presenting design alternatives. The entire photo library was provided to the County and Waterford representatives for future use.

1.5 Agency Coordination

As the study began in February 2003, Loudoun County Department of General Services sent a letter to the many government agencies and utility companies that had involvement in the grant application process and that would have potential involvement in the study. A copy of this letter and the distribution list is included in *Appendix B.*

Subsequently, the study team, together with Loudoun County and Waterford representatives, met with numerous agencies and utility companies on behalf of this study. Of note were discussions and/or meetings with the following organizations:

- Loudoun County Department of General Services
- Other Loudoun County Departments: Mapping, Geographic Information, Planning, and Health
- Loudoun County Sheriff's Department and Emergency Services
- Loudoun County Sanitation Authority (LCSA)
- Virginia Department of Transportation
  - Northern Virginia District Office
  - Leesburg Residency
  - Central Office Organizations
- Virginia Department of Historical Resources
- Virginia Department of Environmental Quality
- The National Trust for Historic Preservation
- Federal Highway Administration
- U.S. Army Corps of Engineers
- National Park Service
- Dominion Virginia Power
- Verizon (Telephone)
- Adelphia (Cable)
- Waterford Citizens Association (WCA)
- Waterford Foundation, Inc. (WFI)
- Waterford Elementary School Parent Teachers Organization (PTO)

Meetings with these organizations provided the study with information not otherwise available through our review of existing documentation and data. In addition, these meetings established communication links and allowed design concepts to be coordinated with several of these agencies to confirm their viability.

2 - Initial Findings

Waterford

"Bury the Wires and Tame the Traffic"

2. INITIAL FINDINGS

What most distinguishes Waterford isn't its connection to major events. Nor is this a grand place, like Mount Vernon or Monticello. Rather, the modest village homes, and their rural surrounds, preserve the templates of ordinary 18th century American lives.
-Tony Horwitz, National Best-selling Author and Waterford Resident

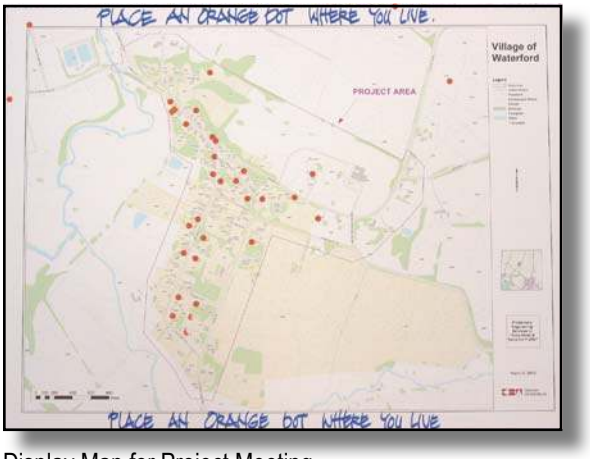
The study team developed a set of initial findings based on input from the citizens of Waterford, a review of documentation gathered, and the work of specialists in environmental and cultural resources. These findings guided the engineering analyses and development of concept plans.

2.1 Citizen Input

This preliminary engineering study to "bury the wires and tame the traffic" was the result of the efforts of many citizens to obtain consensus on the needs of the village. This consensus is documented in the summary of the meeting on June 10, 1999, between citizens, Loudoun County, and VDOT. A copy of this summary is included in *Appendix C*.

To confirm this consensus, and to obtain specific input, the study team facilitated a meeting on March 6, 2003 with citizens and neighbors of Waterford. The combined efforts of the Waterford Citizens Association, the Waterford Foundation, and the Waterford Elementary School Parent Teacher Organization were instrumental in garnering the participation of more than 50 citizens at this meeting.

Project Meeting for Waterford Citizens - March 6, 2003



Display Map for Project Meeting

At the meeting, the consultant team introduced the study and presented "success stories" from similar efforts around the U.S. The citizens participated in three break-out groups in which they marked up maps of the village with their issues and ideas. The citizens also provided input on what they value most about Waterford, as well as their vision for Waterford in 20 years and the issues that this study should address.

One final exercise was voting on those issues to help the study team better understand the citizens' priorities. The results of these discussions are shown in the following tables and figures. The meeting agenda and complete lists of citizen input are included in *Appendix D*. It should be noted that some of the issues raised by the citizens, such as the desire for a bypass around Waterford and for water service in the village, were outside the scope of this study.

The input from the citizens at this meeting became the benchmark against which to measure the feasibility of various alternatives for taming traffic, burying wires, fixing drainage, lighting the village, and repairing roads and sidewalks.

Waterford

Bury the Wires and Tame the Traffic

Input from Break-Out Groups

20-Year Visions for the Village of Waterford from its Citizens

- A town where a dog can sleep on Main St. in front of the post office.
- Protected, tranquil, green, family-filled, lots of outdoor life and activity, fresh air and water, well maintained, visually pleasing.
- SAME-less traffic/better behaved traffic and parking. Healthy trees, well preserved buildings.
- U.S. model of a well-preserved rural historic village.
- A community that has maintained the relationship of the land surrounding the town to the townscape with traffic alleviated to a degree.
- The flavor/character much the same but subtly enhanced to allow better strolling through all of town, more respectful traffic (cars more aware of pedestrians/bicyclists) and improved historic feel.
- The streets will return to slow car traffic where the drivers would feel comfortable stopping and chatting with passersby or looking at the historic names. A place where children are safe to play, bike and walk along the streets. NO power or phone lines visible.
- A place where all Americans can come and see a pre-industrial village and its surrounding rural environment, and where they can participate in a living community to recreate a sense of their past.
- My grandchildren will be able to come to Waterford and see what it was like in the 1800's in a village in Virginia.
- Essentially the same; safer streets; safer for the historic structures; safer for residents and visitors; history preserved.
- Remain as it is now with its current historical look. That visitors will still feel that they are transferred back in time when here.

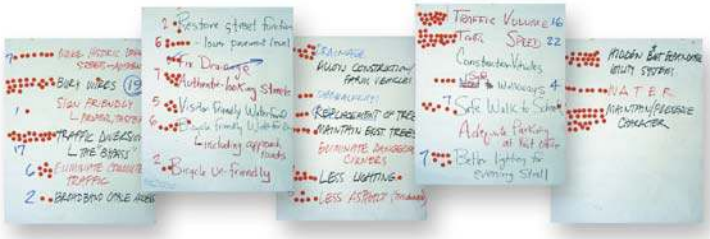
Waterford's "Core Values"

Historic	Bucolic
Beautiful old buildings	Quiet
Preservation	Peaceful
Respect for history and heritage	Rural character
Historic ambiance	Rural village setting
Integrity of architecture	Charm
Spirit of community	Quaint
Neighbors	Original
Family	Green
Safety and security	Healthy trees
Pedestrian friendly	Peaceful
Consideration	Clean
Tolerance	Welcoming
Intrinsic beauty	Friendly
Tranquil	Home

Top Ten Issues to Address

1. Tree canopy (30)
2. Maintain/preserve character (28)
3. Traffic speed (22)
4. Bury wires (19)
5. Hidden and expandable utility system (18)
6. Traffic diversion (the "bypass") (17)*
7. Traffic volume (16)
8. Safe walkways / Safe walk to school (14)
9. Drainage (12)
10. Water (9)*

(x) number of "votes" by participants
* issue outside of study scope



Issues and Concerns from Citizens

2.2 Waterford Heritage & Preservation Efforts

In the America of the early 21st century, Waterford's significance is evident. Established in the 18th century, the village grew to pre-Civil War prominence. Today, three quarters of the buildings erected before 1834 are still standing. The visual demarcation is evident between 19th-century rural village and the surrounding countryside of fields and farmsteads. The topographic features of the landscape influenced the settlement pattern, which is visible in millworks, houses, roads, hedgerows, fences, and agricultural lands. Waterford's architecturally distinctive buildings were derived from Virginia and Pennsylvania vernacular traditions.

During the 1930's, Waterford began attracting notice from preservationists for its character as an unspoiled rural village. The newly formed Historic American Building Survey (HABS) conducted a photo inventory of the village buildings. Local citizens founded the Waterford Foundation in 1943. In 1970, Waterford was granted National Historic Landmark (NHL) status, the nation's highest designation of historic properties, and officially recognized because it possesses exceptional value in illustrating and interpreting the heritage of the U.S. Waterford is currently one of less than 2,500 such landmarks, and it is one of only a handful in which the entire village is an NHL District.

The integrity of the village is embodied in the preservation of historic settlement patterns, the absence of visually modern structures (especially on the periphery), and the use of traditional building materials, for old and new structures, roadways, and sidewalks. In short, Waterford's past is Waterford's present.

1937

2003

Upper Main Street, 1895

Main Street, 1930

Main Street, 1930

Second Street, 1950's

Waterford

Bury the Wires and Tame the Traffic

WATERFORD'S PAST IS WATERFORD'S PRESENT

Pink House, circa 1950

2003

Second Street, circa 1905

2003

The Tin Shop, 1919

2003

The citizens of Waterford have maintained the integrity of the village through years of preservation efforts, which can be summarized with the following milestones:

1937	Historic American Building Survey
1943	Waterford Foundation established
1970	National Historic Landmark status
1987	Waterford Area Management Plan
1988	National Trust List of 11 Most Endangered Historic Places
1992	Landscape Conservation Strategy
1999	Consensus statement
2001	TEA-21 Grant application (follow-up from 1999)
2003	"Bury the Wires and Tame the Traffic" Preliminary Engineering Study and Concept Plans

Today, the national cultural legacy that is the Village of Waterford and its NHL status is threatened by growing vehicular traffic and an infrastructure in need of repair. This study builds on the work of many people in Waterford, Loudoun County, and the Commonwealth of Virginia to recommend concepts that can be taken to the next steps in implementing projects that will help ensure Waterford remains unique in the national context.

During this study, several written histories of Waterford were reviewed, and an essay on the heritage and significance of Waterford was written by the study team's architectural historian. This essay is included in *Appendix E*. In addition, two other pieces written by Waterford citizens are included in Appendix E for reference.

A major factor in Waterford's character is the unspoiled open rolling landscape which surrounds the village and enhances its integrity.

- 1969 nomination of Waterford as a National Historic Landmark

2.3 Environmental and Cultural Resources

In addition to the citizen input and research into Waterford's heritage, findings were obtained from the team's environmental and historic resources specialists.

South Fork of Catoctin Creek

2.3.1 Wetlands Survey

The Williamsburg Environmental Group (WEG) conducted a detailed wetland and water resources investigation in the Village of Waterford for areas subject to jurisdiction by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act. The approximate 137-acre site encompasses the entire historic Village of Waterford and is located within the South Fork of the Catoctin Creek drainage basin in Loudoun County, Virginia. The site is situated approximately 5 miles northwest of Leesburg and can be accessed primarily by Main Street, Water Street, High Street, and Second Street.

Background Evaluation: Prior to conducting fieldwork, WEG consulted the USGS 7.5-minute Topographical Quadrangle Map for Waterford, Virginia (1984 revision), the National Wetlands Inventory (NWI) Interactive Mapper, administered by the U.S. Fish and Wildlife Service, and the 2000 on-line Loudoun County Mapping System, Loudoun County, Virginia. The USGS quad map indicates the village has moderately sloping terrain, along with cleared and forested land. A tributary of South Fork Catoctin Creek is located adjacent to the eastern and southern village limits, while the South Fork of Catoctin Creek is located just within the northwestern village limits. The NWI map depicts no wetland features within the project boundaries. The soil survey indicates the site is underlain primarily by Purcellville and Middleburg series. None of the soils mapped within the village limits are classified by the Natural Resources Conservation Service as hydric and do not indicate the presence of wetland conditions.

Onsite Evaluation: Fieldwork was conducted during February and March 2003 using the Routine Determination Method as outlined in the 1987 *Corps of Engineers Wetland Delineation Manual*. Wetland flags were placed in the field by WEG and sequentially numbered to provide an onsite record of the location of wetlands and other water features. The data sheets used in this investigation were included in the Corps delineation report, along with the delineation map showing the approximate limits of wetlands and other water features, as well as data point locations.

Corps of Engineers Confirmation: The delineation of the wetlands was sent to the Corps of Engineers and a field-verification meeting was held in Waterford on May 23, 2003. The jurisdictional determination was made on May 30, 2003 and is valid for five years. Copies of the letter to the Corps of Engineers requesting confirmation and the letter confirming the delineation are included in *Appendix F.*

Delineation Results: The very small amount of wetlands identified by WEG within the project limits may be classified as emergent. Wetland vegetation on this site is typified by species of sedge (*Carex* spp.) and soft rush (*Juncus effuses*). The transition from wetlands to uplands was generally identified by a vegetation community change. **Figure 2-1** indicates the location of all of the water resources within the study area. Of note:

- The South Fork of Catoctin Creek is located at the northwestern village limits and is the only perennial stream within the village.
- Intermittent streams that may seasonally become dry also exist within the village with the most prominent being the swale that begins at the top of Water Street, flows down the roadside drainage ditch, through a pipe under Water Street, through a viaduct, and under the building (the Corner Store) on the corner of Main Street and Second Street. Exiting via an old culvert, the intermittent stream flows under Second Street, beneath a building (the Tin Shop), and emerges at the rear of the building, flowing through a yard and animal lot before it enters a farm pond and leaves the area of study.

Figure 2-1 TREE AND WETLANDS SURVEY

- A second intermittent stream (Tannery Creek) begins between Main Street and the new school complex, approximately halfway up the hill toward the school, and flows under Main Street and into Catoctin Creek.

- The channel that historically served as the sluice for the Old Mill exists from the location of the waterwheel to Catoctin Creek. It contains water that is primarily backwash from Catoctin Creek and can be considered an intermittent channel.

While water resources are protected by laws and regulations, there are no critical environmental elements present that would hamper the application for or acquisition of a permit to cross or, in a minor way, impact the resources. The replacement of bridges, culverts, or pipes can be addressed through the Corps of Engineers and the Department of Environmental Quality's permitting process.

2.3.2 Tree Survey

WEG also conducted a survey of 288 trees along the roads and areas of potential construction. Trees were inspected for new growth. Leaves were checked for discoloration, abnormal size (small), and abnormal shape (deformed). Buds were checked for abnormally low numbers and sizes. Twigs were checked for any reduction in the extension of shoots. All of these parameters were used to determine if there was a reduction in the tree's typical growth pattern, as compared to the normal patterns for each species of tree (not the past history of the particular specimen).

In addition, the size and shape of the crowns of the trees were checked non-uniformity, poor past pruning, broken branches (past or present). Any decline in the crown, such as die back, deformed growth, loose bark, or conks (mushrooms) was also noted. The health of other parts of the trees were also observed and documented, including the bole (trunk), major limbs, and the base and exposed roots. Other factors such as invasive plants or insects were also noted. It should be noted that with all living things, trees are not 100% predictable and sometimes start to decline or die without giving previous signs of impending problems. Any health evaluation is an educated opinion and comes with no guarantees.

The WEG team members found that the majority of trees were in good health. **Figure 2-1** also shows the results of the tree survey. A listing of the trees surveyed is included in *Appendix G*.

Trees along Second Street

2.3.3 Contributing Parcels & Archaeological Potential

During this study, The Louis Berger Group, Inc. (LBG) provided consultation, including coordination with the consultant team, as well as with federal and state agencies, to verify that concepts could meet the requirements of the National Historic Preservation Act of 1966, as amended; the Archaeological and Historic Preservation Act of 1974; Executive Order 11593, and Title 36 of the Code of Federal Regulations, Parts 660-66 and 800 (as revised, 1999); and other applicable federal cultural resource laws and regulations.

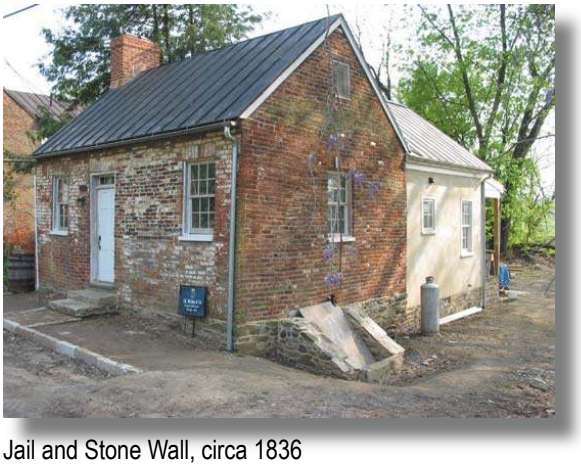
Because the history of the Village of Waterford has already been extensively documented, LBG conducted background research to assess the potential for archaeological resources and historic architectural resources that could be affected by utility burial or traffic calming measures. Relevant repositories of records for research were accessed, including records with the Virginia Division of Historic Resources, the Waterford Foundation, the Library of Virginia, the Virginia Historical Society, Loudoun County libraries and historical societies, and other governmental records.

To conduct a field review of data, LBG met with Kimley-Horn and other team members in Waterford to perform a visual inspection of the architectural and historical resources and to discuss design development based on cultural and natural features of the landscape. These discussions were instrumental in developing traffic calming, street lighting, and utility relocation schemes that are consistent with the character of the village.

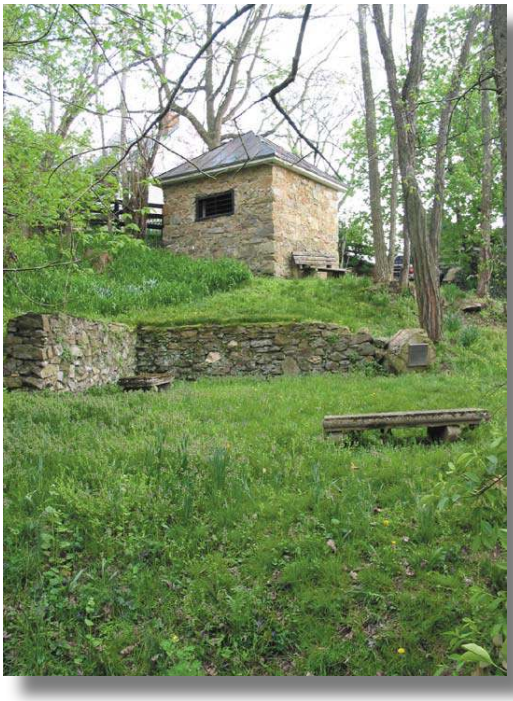
As a specific task, LBG researched the parcels of property within the study area to determine which parcels contribute to the NHL status of the village and which parcels (or portions of parcels) have the potential for intact archaeological deposits. From LBG's research, it was determined that of 133 land parcels investigated, 42 historic preservation easements currently exist.

The contributing parcels are shown in **Figure 2-2**. In addition, many areas within the village have a medium to high archaeological potential, as shown in **Figure 2-3**. A list of the parcels investigated is included in *Appendix H*. This list indicates whether a parcel is contributing or non-contributing and the extent of archaeological potential on the parcel.

The Mill, circa 1829

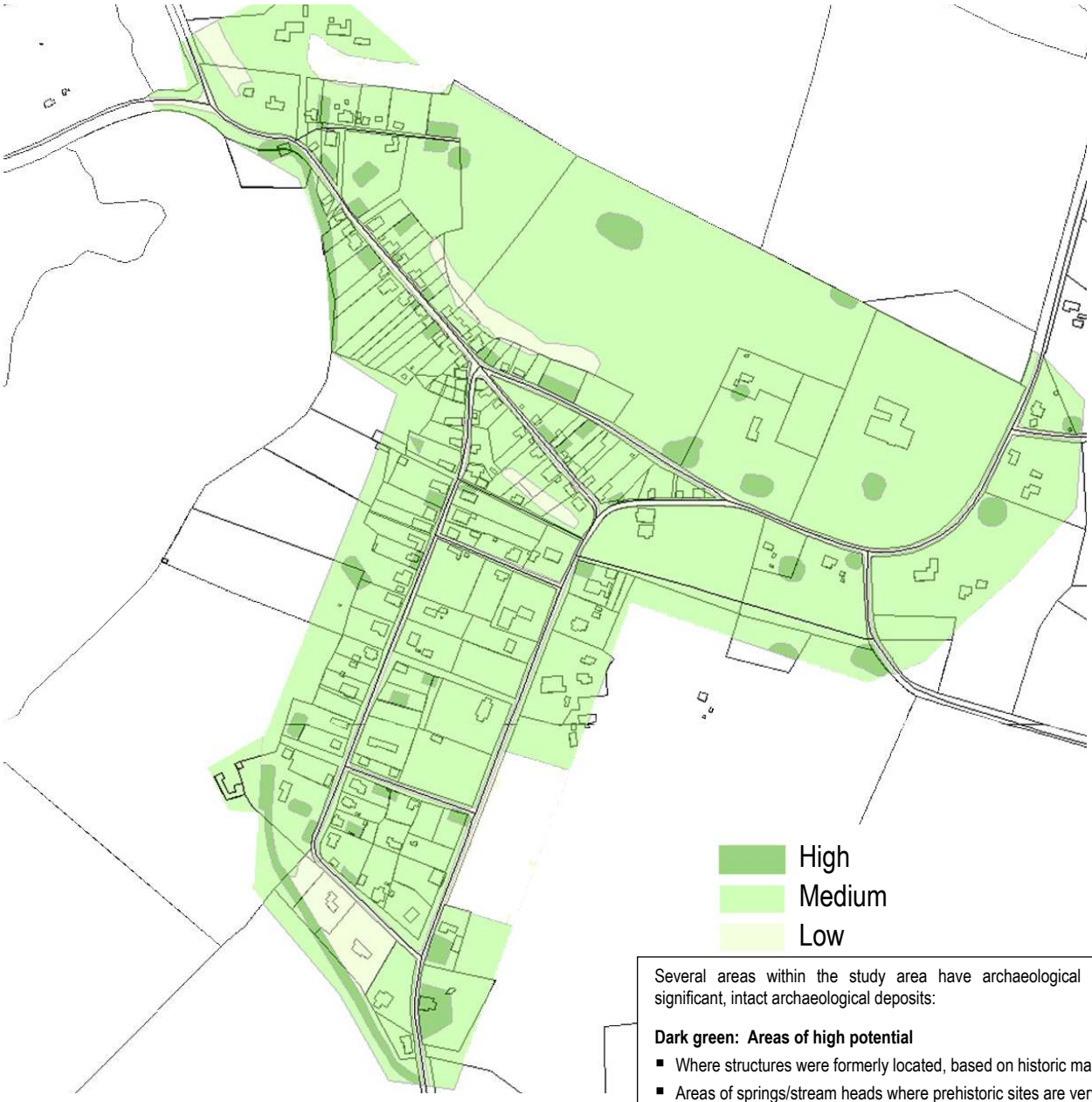


Jail and Stone Wall, circa 1836



Wisteria Cottage,
Main Street, Early 1800's

Figure 2-2 ARCHEOLOGICAL POTENTIAL



Several areas within the study area have archaeological potential for significant, intact archaeological deposits:

Dark green: Areas of high potential

- Where structures were formerly located, based on historic maps
- Areas of springs/stream heads where prehistoric sites are very likely

Light green: Areas of medium potential

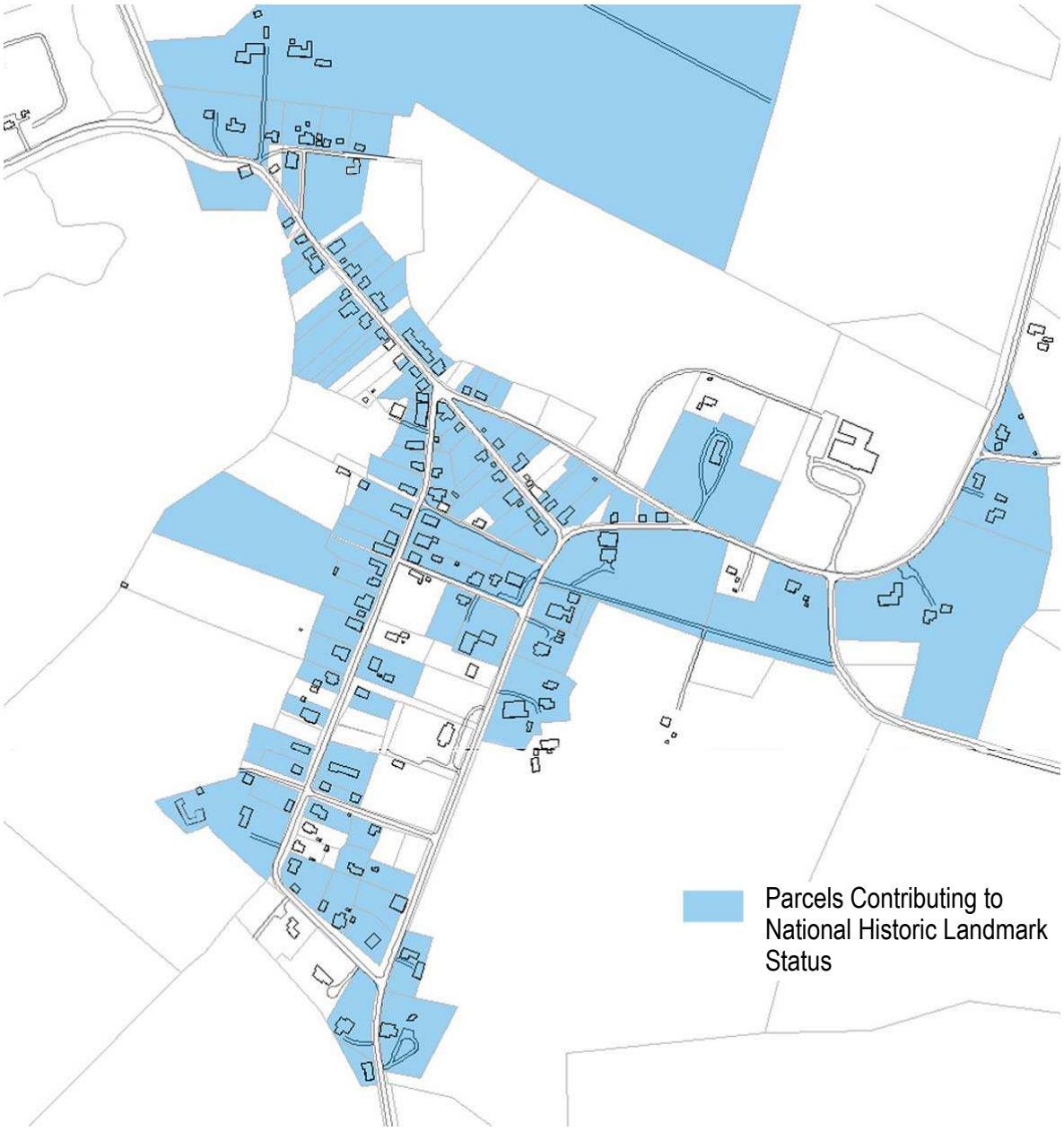
- Archaeological material (foundations of out buildings, privies, wells, trash deposits) related to historic occupations likely to be found
- No evidence from historic maps pinpoints the locations
- General possibility of prehistoric sites

Yellow: Areas of low potential

- Slope, lack of space
- Unlikely location for outbuildings

Note: Areas directly impacted by construction/renovation of structures and roadways in the latter half of the 20th century can be considered to have low potential.

Figure 2-3 CONTRIBUTING PARCELS



3 - Engineering Studies & Design Alternatives

Waterford

"Bury the Wires and Tame the Traffic"

3. ENGINEERING STUDIES AND DESIGN ALTERNATIVES

With input from Waterford citizens, research into Waterford's history, and environmental and cultural resources findings, the consultant team conducted and coordinated five parallel engineering studies, addressing the following aspects of the solutions to bury the wires and tame the traffic in Waterford:

- Traffic calming
- Roads, sidewalks, and pavements
- Stormwater management
- Power and telephone wires
- Lighting

Kimley-Horn, William H. Gordon Associates (WHGA), and B2E Consulting Engineers (B2E) examined the data collected, drew conclusions, and developed design alternatives, coordinating amongst each other and with Williamsburg Environmental Group (WEG) and The Louis Berger Group (LBG). The alternatives developed through these studies were also reviewed consistently by Loudoun County and Waterford representatives, including a presentation of the design alternatives at the Concept Plan Workshop. Specific recommendations for the overall study are thus consensus based.

3.1 Traffic Calming

The study of traffic calming alternatives included a review of existing documentation, an examination of the current land use and transportation network, development of findings from the traffic data collected, and a comparison of literally dozens of possible measures to those that would be acceptable for the Village of Waterford.

3.1.1 Land Use and Transportation Network

According to the Loudoun County Comprehensive Plan, the Village of Waterford is identified as a Rural Village. Located in the Rural Policy Area of the county, the village is comprised of farming and rural residential land uses. The Rural Policy Area contains large and small farms, as well as numerous villages, and is located predominately in the western part of Loudoun County. Accelerating urban sprawl and new residential subdivision development has the potential to diminish the rural character and historical relevance of the area. Predictions of a 98% population growth over the next 20 years within the Rural Policy Area have been the cause for developing the guidelines and growth restrictions identified in the Comprehensive Plan.

Traffic generated by this population growth has also been a concern of the citizens of Waterford. Many of the roadways in and around Waterford are of historical importance and match the rural character of the village. These roads are shown in **Figure 3-1** (base map with road names). The Comprehensive Plan has established transportation and roadway polices to ensure that these roads keep their historical relevance. In addition, in 1987, Loudoun County adopted the Waterford Area Management Plan to help manage growth and change in the Waterford area and conserve the historic and architectural character of the NHL District. The recommendations made in this final report are consistent with both the current Loudoun County Comprehensive Plan and the Waterford Area Management Plan.

With development in areas of the county north and west of Waterford, such as residential development along Old Wheatland Road, Milltown Road, and near Lovettesville, the amount of traffic passing through Waterford to destinations east of Waterford has grown. Commuters regularly travel the rural village streets on their way to and from employment centers in Leesburg, the Dulles area, and the Washington, DC metropolitan region. Due to the historic nature of the village and the limited right-of-way, capacity improvements in the village are not practical.

However, measures to slow the traffic are viable. Such measures will allow a steady progression of traffic through the village at reasonable speeds. Taken as a whole, the traffic calming measures recommended for the village are "traffic neutral," that is, despite growth in traffic volumes in the county, the streets in the Village of Waterford have a fixed capacity and will remain in their current configuration. Implementing capacity improvements for the county, such as a bypass around Waterford, were not considered in the scope of this study.

Figure 3-1 EXISTING ROADS WITHIN THE VILLAGE OF WATERFORD

3.1.2 Existing Traffic Conditions

Kimley-Horn obtained and reviewed existing data and documentation relative to the study of traffic volumes, speeds, and safety. In addition to gathering existing traffic-related information, Kimley-Horn conducted supplemental traffic counts and turning movement counts and gathered other travel-related information, including identifying user characteristics (pedestrians, bicyclists, motorists) and existing and potential parking areas. General traffic operations and conditions were observed, e.g., vehicle speeds and delays and overall operational safety.

Daily traffic volumes on the streets of Waterford are relatively low, ranging from 200 vehicles per day (vpd) to just over 1,500 vpd. These low volumes will allow low speed traffic calming measures typical of neighborhood streets. Two sources of daily volumes produced these findings. Historical 24-hour average annual daily traffic (AADT) counts were obtained from VDOT sources and are documented in **Figure 3-2**. In March and April 2003, Kimley-Horn conducted 24-hour tube counts and collected speed data over a 7-day period. These daily volumes are shown in **Figure 3-3.**

Kimley-Horn also collected AM and PM peak hour traffic volumes in February 2003. The results from these counts are summarized in **Figures 3-4 and 3-5**. Based on these turning movement counts, there is a directional split of traffic in the AM and PM peak hours. The peak direction during the AM peak hour is south, towards Route 9. The reverse is true in the PM peak hour.

Another existing traffic pattern observed is the large number of vehicles traveling through the village from the northwest via Route 681 to the south via Route 662. These vehicle trips do not have origins or destinations within the Village of Waterford. Route 662 is used as a north-south connection through the village to the more major east-west roadway of Route 9.

The results of the speed data collected are shown in **Tables 3-1 and 3-2**. Speed data was collected at the following locations:

- Clarkes Gap Road (Route 662), south of Factory Street
- Second Street, between Janney Street and Patrick Street
- High Street, between Church Street and Main Street Hill
- Water Street, between Loyalty Road and Main Street
- First Street, between Clover Hill Road (Route 662) and the Mill
- Loyalty Road, east of Water Street

While the speed limit through the Village of Waterford ranges from 20 to 25 mph (reduced at some locations to cautionary 10 and 15 mph speed limits where roadways curve), speeds measured indicated that a majority of drivers exceed the 20 and 25 mph speed limits in the village.

Data indicated that in addition to motorists speeding while entering and leaving the village, there are also a number of vehicles exceeding the speed limit within the town limits: 63% and 75% of vehicles were recorded as traveling over 25 mph on Water Street and High Street, respectively, as shown in **Table 3-2**. One location where most drivers tend to obey the set speed limit is on Second Street between Janney and Patrick Streets—only 38% of vehicles exceeded 25 mph.

Two measures of vehicle speed are the 85th percentile speed, which is the speed which 85% of drivers are traveling, and the pace speed, which is the 10 mph range in which most of the vehicles are traveling. These values for the speed data collected as a part of this study are given in **Table 3-3**. Vehicle speed data collected in the field shows that the 85th percentile speed at all collection locations exceeded 25 mph. Clarke's Gap Road was shown to have the highest speeds, with a 10 mph pace speed of 36 to 45 mph. Only 3% of vehicles on Clarke's Gap Road were recorded as observing the posted speed limit.

It should be noted that the large amount of traffic data collected during this study was forwarded to Loudoun County and subsequently to the Waterford Citizens Association for their use.

3.1.3 Traffic Operations and Control Measures

During this study, Kimley-Horn also conducted a sign inventory for the village. The results of this inventory are included in *Appendix I*. All of the intersections within the

Figure 3-2 AVERAGE ANNUAL DAILY TRAFFIC FROM 2001 VDOT COUNTS

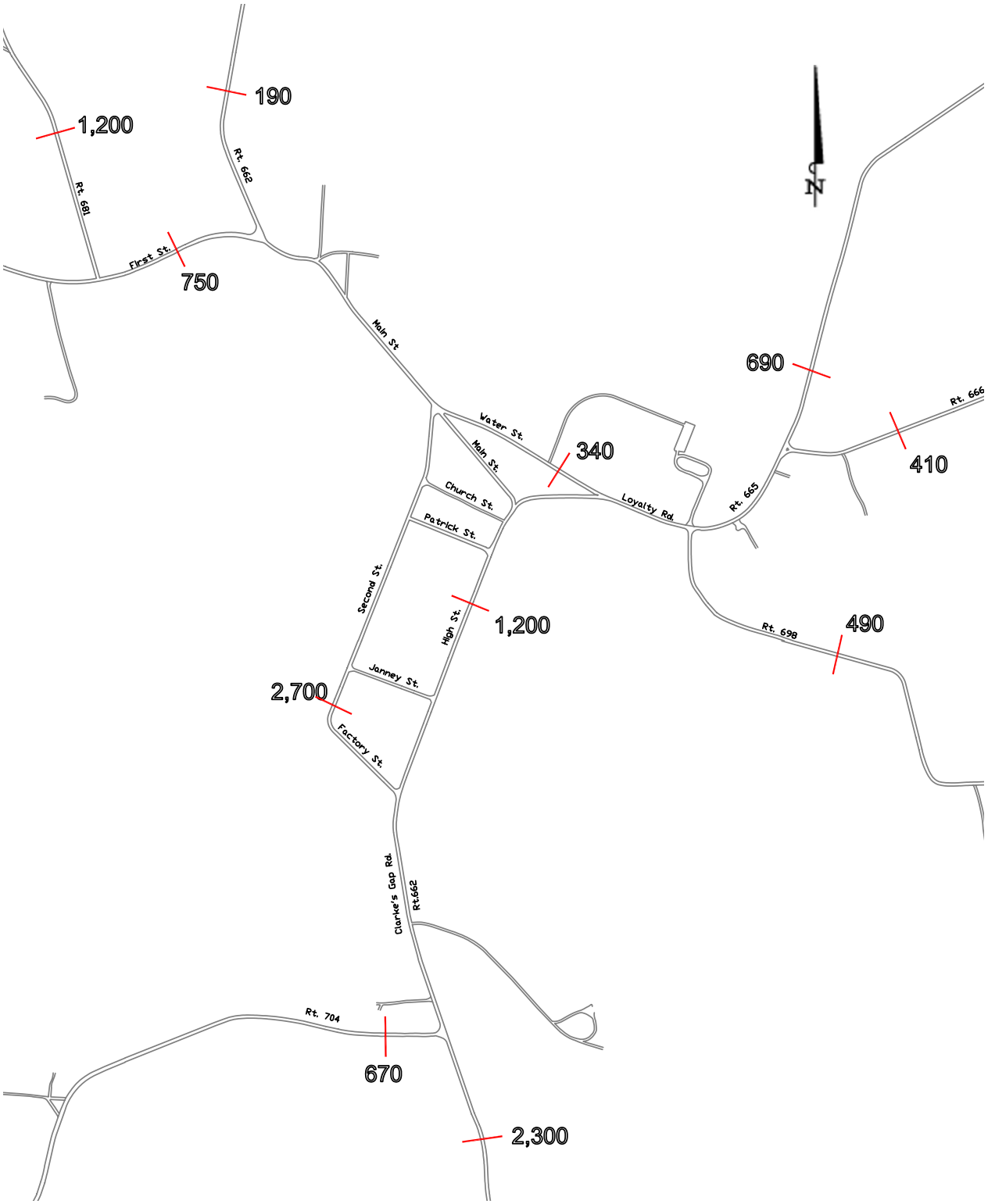


Figure 3-3 24-HOUR AVERAGE DAILY TRAFFIC VOLUMES (FROM DATA COLLECTED 3/31/03 TO 4/7/03)

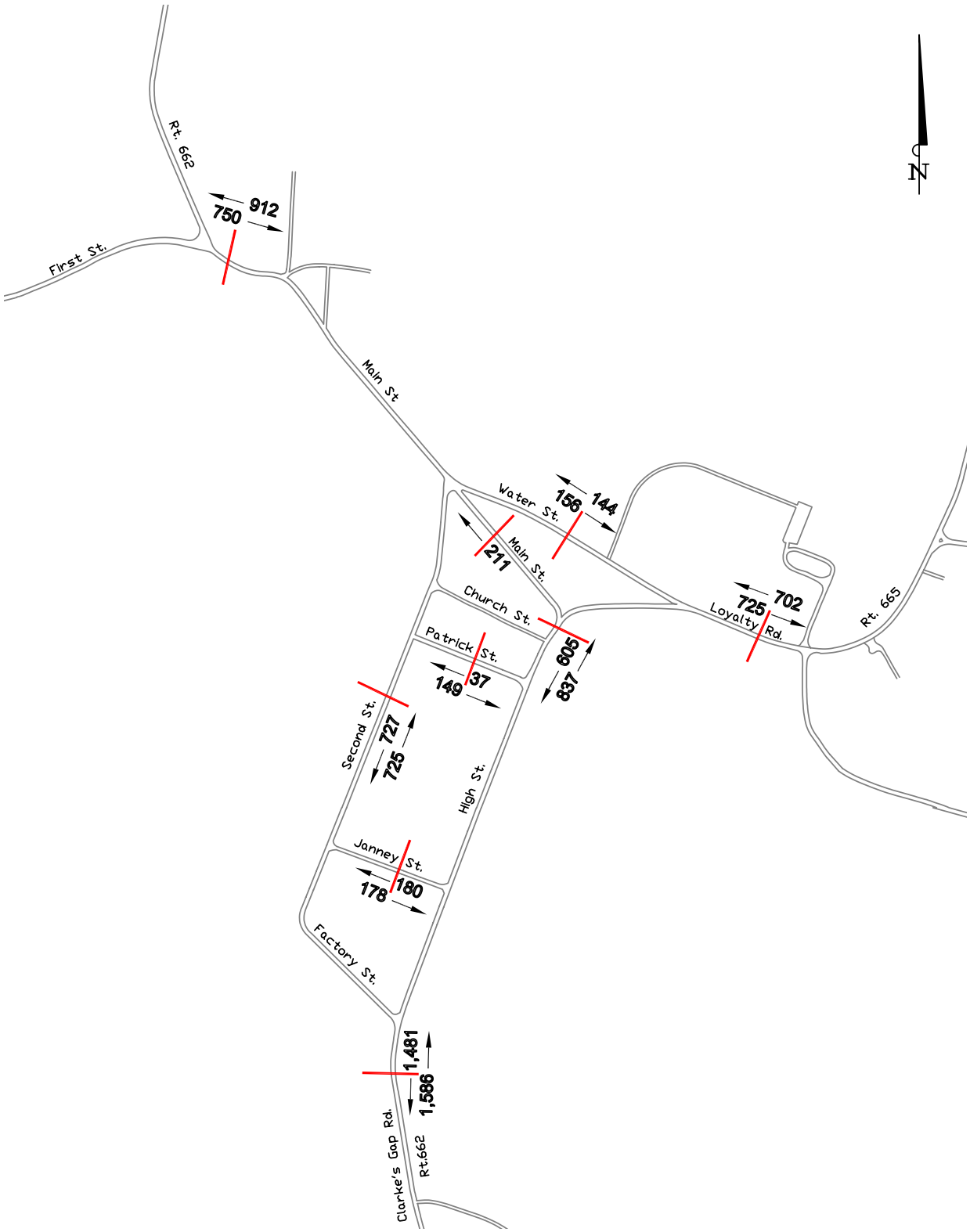


Figure 3-4 AM PEAK HOUR TURNING MOVEMENT COUNTS (FEBRUARY 2003, 6:30 AM TO 7:30 AM)

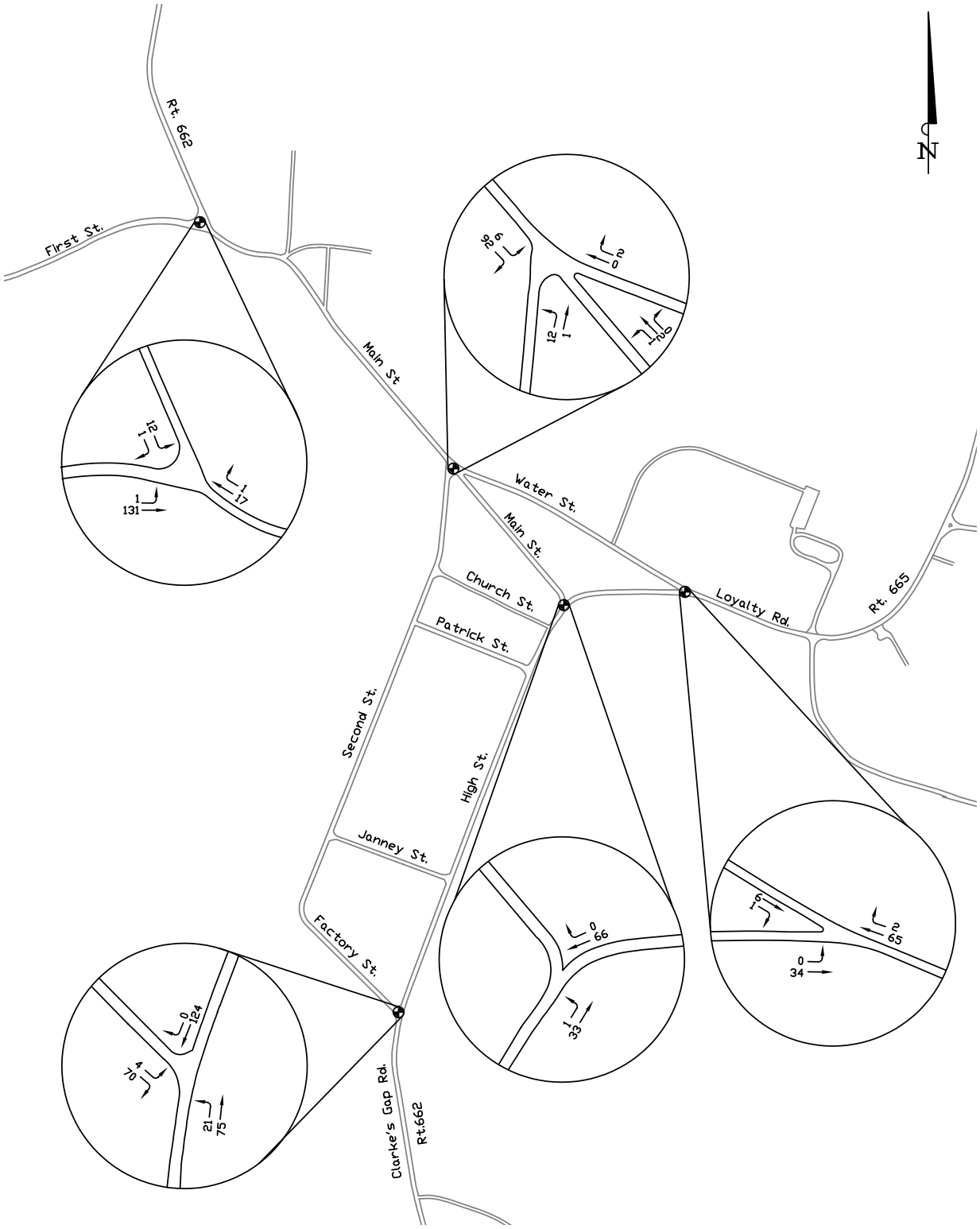


Figure 3-5 PM PEAK HOUR TURNING MOVEMENT COUNTS (FEBRUARY 2003, 5:30 PM TO 6:30 PM)

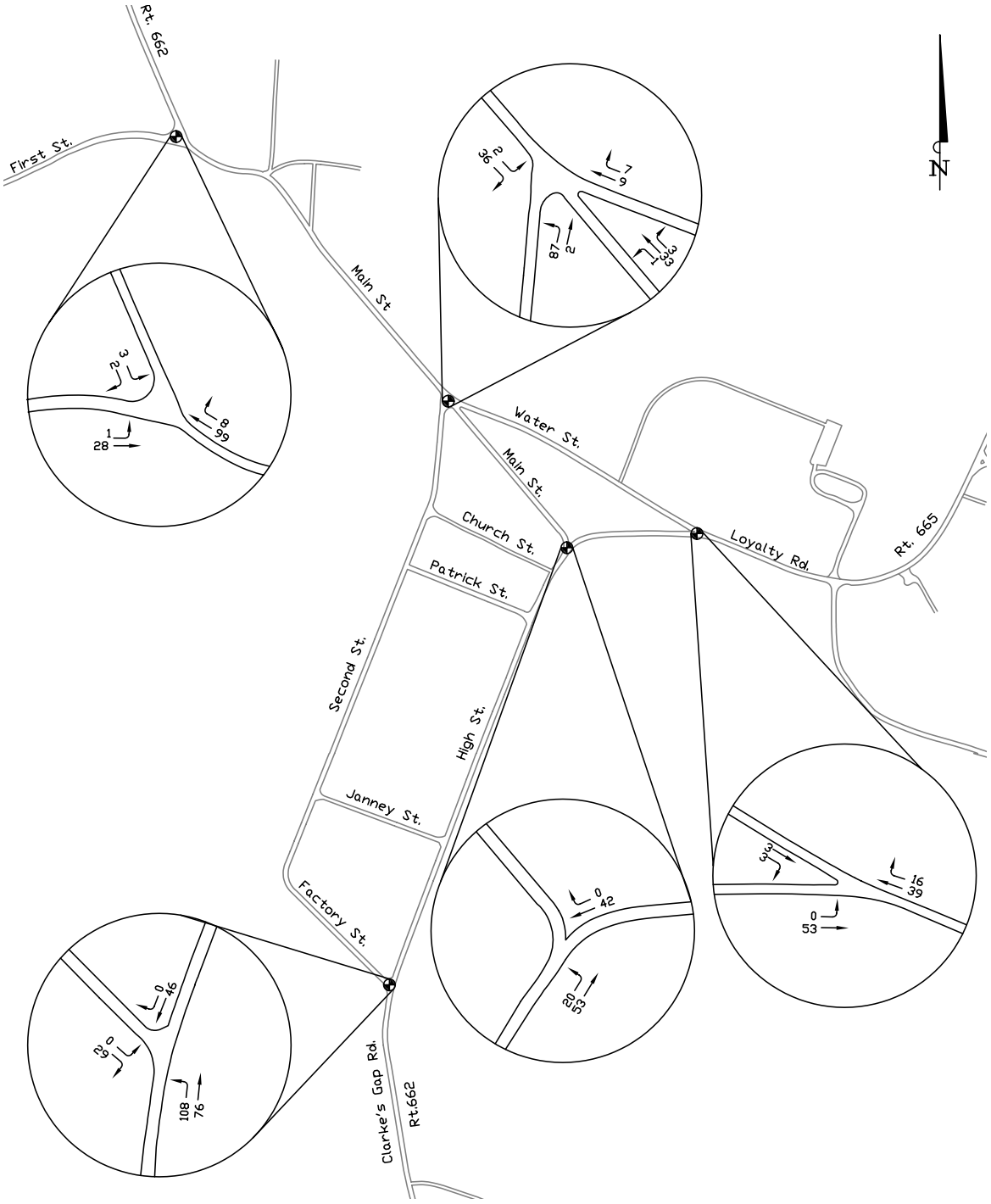


Table 3-1 Speed Study: March 31, 2003 to April 7, 2003 - Total Vehicles

STREET	LOCATION	TOTAL NUMBER OF VEHICLES									
		0-15 MPH	16-20 MPH	21-25 MPH	26-30 MPH	31-35 MPH	36-40 MPH	41-50 MPH	51-60 MPH	61-70 MPH	76+ MPH
Water Street	Between Loyalty Road and Main Street	65	186	485	703	505	120	28	3	1	0
High Street	Between Church Street and Main Street Hill	147	388	1,961	4,769	2,494	302	26	5	1	0
2nd Street	Between Patrick Street and Janney Street	451	1,594	4,211	3,078	701	99	23	2	1	0
Clarke's Gap	South of Factory Street	146	138	287	1,240	4,203	7,790	7,384	275	5	5
Loyalty Road	East of Water Street/High Street intersection	165	549	2,075	3,927	2,575	592	92	8	4	0
Main Street	Between Route 662 (Clover Hill) and the Mill	466	834	2,860	5,195	2,053	225	60	11	3	2

Table 3-2 Speed Study : March 31, 2003 to April 7, 2003 - Percentage of Traffic

STREET	LOCATION	PERCENTAGE OF TOTAL TRAFFIC								Percentage Exceeding 25 MPH
		0-15 MPH	16-20 MPH	21-25 MPH	26-30 MPH	31-35 MPH	36-40 MPH	41-50 MPH	Over 51MPH	
Water Street	Between Loyalty Road and Main Street	3%	9%	23%	34%	24%	6%	1%	< 1%	**63%**
High Street	Between Church Street and Main Street Hill	1%	4%	19%	47%	25%	3%	< 1%	< 1%	**75%**
2nd Street	Between Patrick Street and Janney Street	4%	16%	41%	30%	7%	1%	< 1%	< 1%	**38%**
Clarke's Gap	South of Factory Street	1%	1%	1%	6%	20%	36%	34%	1%	**97%**
Loyalty Road	East of Water Street/High Street intersection	2%	5%	21%	39%	26%	6%	1%	< 1%	**72%**
Main Street	Between Route 662 (Clover Hill) and the Mill	4%	7%	24%	44%	18%	2%	1%	< 1%	**64%**

Table 3-3 Speed Study : March 31, 2003 to April 7, 2003 - Percentile Speeds

STREET	LOCATION	50TH PERCENTILE (MEDIAN) SPEED [MPH]	85TH PERCENTILE SPEED [MPH]	10 MPH PACE SPEED [MPH]	PERCENTAGE OF VEHICLES IN PACE
Water Street	Between Loyalty Road and Main Street	27	33	26 - 35	58%
High Street	Between Church Street and Main Street Hill	27	32	26 - 35	72%
2nd Street	Between Patrick Street and Janney Street	23	28	21 - 30	72%
Clarke's Gap	South of Factory Street	37	43	36 - 45	65%
Loyalty Road	East of Water Street/High Street intersection	27	33	26 - 35	65%
Main Street	Between Route 662 (Clover Hill) and the Mill	26	31	21 - 30	69%

village are stop-controlled. The speed limit within the village varies between 20 and 25 mph. A school zone exists near the Waterford Elementary School, reducing speed limit to 20 mph along Loyalty Road during AM and PM periods on school days. Since 1999, the regulatory speed limit signs have been equipped with additional placards warning speeding vehicles of a $200 fine. Also, in 1999 Route 662 (Clarkes Gap Road) was closed to through trucks.

Information regarding vehicle crashes and speeding citations within the village for the year 2002 was obtained from the Loudoun County Sheriff's Department. There were two crashes reported in the village during this period, one at the intersection of Clarkes Gap Road and Factory Street and one on Loyalty Road just east of the Water Street/Butchers Row intersection. Both of these incidents involved a collision between a vehicle and a deer. In 2002, the Sheriff's Department issued 29 speeding citations along High Street and Loyalty Road within the village. The data does not include any crashes that may have been investigated by the Virginia State Police or crashes that did not require an accident report to be filed.

3.1.4 Conclusions on Traffic Calming

Based on field observations, data collected, and the number of citations given, speeding is a concern on Route 662 and Route 665 through the village. During field visits, numerous vehicles were observed traveling 5 to 10 mph over the speed limit. These observations are corroborated by the speed study conducted in the village. It should also be noted that speeding was not just limited to daylight hours; vehicles were also observed speeding at night and making incomplete stops. At Factory Street and High Street, which is stop controlled, eastbound right-turning vehicles were observed making a "rolling stop" as they attempted to exit the Village.

The data, however, does not indicate an overwhelming amount of traffic. Traffic counts collected as a part of this study indicate that the highest AADT volumes occurred along State Routes 662 and 665. Widths of roadways tend to be narrow, but traffic volumes such as those recorded in this study can be accommodated by widths of 20 to 22 feet, per AASHTO's *A Policy on Geometric Design of Highways and Streets* (2001), Exhibit 5-5. Considering the historic significance of Waterford's structures and the limited right-of-way, the current roadway widths are generally satisfactory for the level of traffic they serve.

Based on the traffic and speed data collected, as well as observations made in the field, it was evident that traffic calming measures are necessary in the village and that a wide range of solutions is possible. Speeds measured indicated that a majority of drivers exceed the 20 and 25 mph speed limits in the village. While the 85th percentile speeds were generally less than 10 mph over the speed limit, it was the "rogue" speeders that caused concern. Reducing the speed of these drivers is a priority of traffic calming.

From field observations, pedestrians frequently use the sidewalks and streets for access to and from buildings and for leisurely walks. Making the streets safer for citizens and visitors is also a priority.

3.1.5 Traffic Calming Measures Considered

Traffic calming measures in towns and cities throughout the U.S. today range from very subtle measures, such as narrower travel lanes and roadside landscaping, to more intrusive measures such as roundabouts and major roadway modifications. A full range of measures was considered for Waterford with respect to the existing traffic and physical conditions of the roadways, intersections, and sidewalks in the village. The measures were reviewed and discussed within the consultant team and with Loudoun County and Waterford representatives to determine the types of changes that would be considered acceptable, given the desire of the citizens to preserve the character of the village, and the requirement for no adverse impact to the National Historic Landmark (NHL) status.

Traffic calming alternatives considered included:

- Minor modifications to the roadways: edge and centerline pavers, corner radius reduction, narrow lanes, signs, pavement markings, etc.
- More major geometric projects: road lowering, speed tables, speed bumps, dips, curbs, gutters, traffic circles, roundabouts, etc.

3.1.6 Materials

It is important to note that any materials used for traffic calming measures should resemble native materials, consistent with the historic character of the village. For example, pavers to define the road edges or centers could be stone or brick, or concrete resembling those materials. A hump back bridge over Tannery Creek could be finished with a veneer of stone. Examples abound of durable materials that can be used in this application and meet the historic character criteria for Waterford. The photos below show some examples.

3.2 Roads, Sidewalks, and Pavements

The study of the roads, sidewalks, and pavements in the Village of Waterford included a review of available mapping, roadway plans, and historic photos; field visits to take measurements and make observations; obtaining cores of the asphalt pavement to determine existing thicknesses; investigating right-of-way issues; and developing findings and drawing conclusions as to alternatives to enhance traffic calming measures.

Second Street

3.2.1 Existing Roadway Conditions

The roads in and around Waterford are paved (with asphalt) and unpaved two-lane undivided facilities. Residents access these roadways via driveways or on-street parking. From field measurements, current pavement widths range from 14 to 20 feet on the 2-lane roads in the village. These widths, as well as the horizontal and vertical curves (with poor sight distance in some instances), are not within today's standards for neighborhood streets.

Referring to **Figure 3-1**, Clarkes Gap Road (Route 662) is a two-lane undivided, paved roadway that runs generally north-south and has narrow shoulders. It serves as access to and from the south, where it connects to Virginia Route 9, a major two-lane undivided roadway, which provides access to Route 7, a major four-lane divided facility that runs east-west.

Within the Village of Waterford, Route 662 has multiple names in addition to Clarkes Gap Road, including Factory Street, Second Street, Main Street, and First Street, which are all paved. Route 662 continues to the north beyond the village as Clover Hill Road, which is unpaved. Factory Street is a narrow road with a roadside ditch and sidewalk along the south side, and parallel parking along the north side of the roadway to serve local residents. Parallel parking was observed along each side of Second Street, which is a narrow, tree-lined residential street with roadside ditches along much of both sides.

Main Street

Main Street allows parking along both sides of the roadway. When parked cars are present, capacity of the roadway is reduced to little more than one lane and requires opposing traffic to pull over in order to pass one another—a traffic calming measure in itself. Curbs and sidewalks exist on either side of Main Street in various states of repair. The distance between the curbs is consistently 30 feet , and the pavement is generally centered between the curbs. Trees and utility poles encroach toward the pavement. The paved ditch on the south side of this road gets wider and steeper as it progresses toward Tannery Creek, creating a safety concern for pedestrians and vehicles.

First Street is a two-lane undivided roadway, intersecting with Main Street at the historic Mill. Also at this location, John Brown's Lane and Bond Street provide access to historic homes and the John Wesley Church. First Street intersects with Clover Hill Road and Route 698 (Old Wheatland Road), which along with Route 681 (Milltown Road) west of Catoctin Creek provides access to the village from the northwest.

Route 665 is a two-lane, undivided, paved roadway serving as the primary north-south route through the village. Route 665 extends from the Clarkes Gap Road/Factory Street intersection at High Street, changing to Butchers Row between the Main Street and Water Street intersections, and changing to Loyalty Road east of Water Street, where it proceeds to the northeast.

Janney Street is a narrow road connecting Second and High Streets and is unpaved for the majority of its length. Patrick Street also connects Second and High Streets as a narrow, paved road. Church Street is an unpaved roadway between Second and High Streets; its east end is largely obscured by vegetation.

The upper part of Main Street (the Big Hill) is a steeply-graded, one-lane, one-way paved roadway which runs westbound from High Street to the intersection of Second

Street, Water Street, and (lower) Main Street. Parallel parking is permitted along both sides of the roadway. Water Street, a narrow, paved, 2-way road, completes the roadway network, connecting the intersections of Butchers Row/Loyalty Road and Second Street/Main Street.

With the exception of the north end of Second Street and the length of Main Street between Second Street and the wooden bridge, the roads throughout the village do not have curb and gutter. Most roads have little or no shoulder. The roadways within the village are narrow, with an average width of 18 feet, which is 6 feet less than the VDOT standard. These roads were once unpaved roadways, intended for horse-drawn carriage traffic, and have not undergone any geometric improvements to their original alignments. Roads within the village are free of pavement markings, which is consistent with its rural historic character. Without centerline stripes, vehicles tend to travel in the center of the roadway.

First Street at Mill

Roads throughout the village are very close to existing buildings, utility poles, and trees, which has been a cause for safety concerns. Specific examples of these safety concerns are:

- The eastbound approach on Main Street comes within inches of the Mill, creating a potential for crashes and damage to the historic structure.
- At the intersection of Factory Street and Clarkes Gap Road, northbound traffic traverses a horizontal curve combined with an upward slope. This geometry, combined with excessive speeds, creates a location for potential crashes.
- Similarly, sight distance issues abound along the east side of the village, from the Loyalty Road/Butchers Row/Water Street intersection, and along the length of Butchers Row and High Street. Excessive vehicle speeds observed along this route reinforce the need for taming the traffic.

3.2.2 Pedestrian Facilities

The existing sidewalks in the Village of Waterford are primarily located along Second Street and Main Street. The sidewalk locations relative to the roadways are generally inconsistent. In some places the sidewalks are lower than the roadway and the transition between roadway and sidewalk is steep. Throughout the village there are discontinuities in the sidewalks, and the portions of sidewalks in need of repair encourage pedestrians to travel in the street.

Most of the pedestrians observed in the village were walking or jogging along Main Street and Second Street, but during any visit to the village, pedestrians can be observed along all of the streets. Main Street appears to be the hub of activity in the village, with the post office generating the majority of pedestrian (and vehicle) trips. The post office and Corner Store, located at the intersection of Main Street and Second Street, were observed to operate as school bus stops. Children were observed walking in the street to reach the bus stops.

When discussing sidewalks, the citizens generally stated that the variety of the sidewalk pavement (concrete, stone, brick, gravel, etc.) is what they want to see continued. They have expressed that they relish the inconsistency of the sidewalks, the variety of widths and materials, and their "clumsy" look. However, the citizens have also expressed a desire to connect existing sidewalks together and to add walking paths or sidewalks that connect to the Waterford Elementary School off of Loyalty Road.

3.2.3 Pavements

Through the study's research, including discussions with VDOT and LCSA and a review of historic photos, it was evident that the general geometry of the roads and sidewalks today exists as it did more than 60 years ago. Prior to the 1930's, roads in Waterford were unpaved. When Waterford was a chartered town for 100 years (1836 to 1936), the

village maintained its own roads. Following the loss of its charter, maintenance of the roads reverted to the Virginia Highway Department and subsequently VDOT.

Historically, the elevations of some of the roads in the village were generally lower than they are today, especially near the wooden bridge, which reported was originally a ford and then a small stone arch bridge (which sets precedence for a new "hump back" bridge). In 1937 era photographs, the crown of the road along Main Street and the ditch on the west side appeared to have a significant elevation difference. (See photo below.)

Main Street, 1937

Recently, citizens have expressed concerns over the elevation of the pavements along Main Street and in the vicinity of the Main Street/Second Street intersection, compared with the sidewalk elevation. Pedestrian access and parking is difficult in places, and drainage is poor.

Through field observations, the pavements within the Village were observed to be in generally good condition. In addition to the observations, the study team obtained cores of the asphalt pavement to determine its existing thicknesses. The majority of the cores were taken outside of the line of sanitary sewer lines. The thickness of the cores ranged from 4-1/2 inches to 7-3/4 inches. See photo of cores below. Tables of the results of this coring are included in *Appendix J*. It was determined that the asphalt pavement along the roads in Waterford is not unusually thick, but that the original crown of the road was generally followed.

According to representatives from the Leesburg Residency of VDOT, when the sanitary sewer system was installed in the mid 1970's (as-builts are dated 1975), the pavement along the roadways was removed and VDOT resurfaced the streets with "a couple of inches" of asphalt.

Pavement Cores, April 2003

Over the last 28 years, additional asphalt lifts have been placed periodically. In addition, the gravel ditches in front of the Tin Shop and proceeding along lower Main Street were also paved due to erosion from stormwater. It is apparent from field observations that as successive layers have been placed, and when the gravel ditch was paved, curbs and gutters have lost some effectiveness, drainage problems were exacerbated, and pedestrian access and parking became more difficult in some locations.

3.2.4 Right-of-Way

It was concluded from the documentation research and discussions with VDOT that roads within the Village of Waterford do not exist on VDOT or County right-of-way. Instead, prescriptive easements (generally 30 feet wide) were established for the roads in the village, and the Commonwealth of Virginia took over road maintenance as a result of (1) the Town of Waterford giving up their charter and (2) the Commonwealth taking over maintenance of all county roads under the Byrd Act of 1932. In the future, final design and construction of improvements to bury wires, tame traffic, and fix drainage will need to address the issue of access through and along these prescriptive easements.

3.2.5 Conclusions on Roads, Sidewalks, & Pavements

From the findings, several conclusions can be drawn:

- The pattern of development over 250 years is not only evident in the residences and other structures, it is also evident in the roads themselves.
- The roads through the Village of Waterford are used by commuters in Loudoun County as arterials, but they act like and resemble rural, neighborhood streets.
- Lowering some portions of the roads will enhance traffic calming measures, improve drainage, and restore

historic elevations.

- Realigning roads horizontally will also enhance traffic calming measures—and protect historic structures like the Mill.
- With the many instances of pedestrians sharing the road with motorists, additional sidewalks and pathways are needed, especially for school children.
- Improving, connecting, and extending the network of sidewalks and walking paths will enhance pedestrian safety, as well as access to the elementary school.
- Vehicle parking needs are currently addressed by on-street parking and very few driveways. The shortage of adequate on-street and off-street parking is a challenge for residents, visitors, and tourists.

3.2.6 Consensus Recommendations

In support of traffic calming measures, roadway alignment, pavement, and sidewalk alternatives considered included:

- Minor horizontal realigning of roads away from historic structures, such as the Mill
- Vertical realignment, including lowering the surface of Main Street between Second and the Mill, and lowering the surface of the Corner Store intersection
- Repair of roadways, curbs, gutters, and sidewalks
- Extension of existing sidewalks to provide better pedestrian access throughout the village

Main Street

Second Street

3.3 Stormwater Management

WHGA, in close coordination with Kimley-Horn, completed an investigation and engineering study to establish alternative designs addressing drainage areas within the study area. WHGA and Kimley-Horn analyzed the data collected during field surveys and condition assessments and developed solutions for the existing drainage problems, such as the lack of curbs, gutters, and appropriate drainage inlets with respect to the existing asphalt pavement.

Prior to initiating the engineering analysis, WHGA coordinated with state and local agencies to help develop a base map for the study, as discussed in Chapter 1 of this report. With respect to stormwater management (as well as sanitary sewer and other utilities), WHGA met and/or had discussions with the LCSA and the VDOT to acquire base information for this study. WHGA acquired as-built information for the existing sanitary sewer from LCSA and digitized the as-built information and oriented this information to align with the physical features shown in the aerial topographic survey.

WHGA also completed a site visit to identify the existing storm sewer network for inclusion into the base map to facilitate the preliminary drainage analysis. It should be noted that no water service exists in the village. Homes and other buildings rely on wells.

3.3.1 Existing Drainage System

WHGA conducted a detailed site analysis of the existing storm drainage within Waterford and concluded that there are seven major outfall locations within the project area. *Appendix K* contains descriptions of the existing outfalls.

Runoff in the Village of Waterford drains primarily via sheet flow around existing houses and buildings into small roadside swales/ditches. From the roadside swales/ditches, runoff flows either through small storm sewer systems or culverts into the seven outfall locations. Of note is existing drainage channel that runs down Water Street, under Main Street and Second Street, and under the historic structures of the Corner Store and the old Tin Shop, as shown in the photos at right.

Drainage channel along Water Street

Culvert under Corner Store and Second St.

Drainage swale under Tin Shop

A number of problem areas with the storm drainage were observed:

- Many roadside ditches have been eliminated over the years to allow for additional parking.
- A majority of culverts along the roads have been either crushed or are clogged with silt and debris.
- Existing roadside ditches and/or storm sewers do not adequately handle the storm runoff based on current VDOT standards.
- Gutters and inlets to pick up the stormwater runoff along the roadways are inadequate.
- The outfalls are generally inadequate to handle the storm events, resulting in localized flooding.

With respect to water quality, there are currently no best management practices (BMP) evident within Waterford, based upon site visits and a review of the aerial topographic data. The stormwater runoff typically flows directly into South Fork Catoctin Creek without any practical BMP measures.

3.3.2 Stormwater Management Analysis

The analysis of the conceptual stormwater drainage alternatives considered the following:

- Investigating upgrades to the existing storm drainage system along the roadways, in conjunction with specific traffic calming improvements
- Identifying needed improvements to drainage outfalls, in concert with upgrades to the drainage system components at the traffic calming measures
- Identifying possible BMP measures that may be incorporated into selected storm drainage upgrades where appropriate and/or cost effective

3.3.3 Conclusions on Stormwater Management Alternatives

Based upon the analysis, it was concluded that the best approach to "fix the drainage" in Waterford was to recognize the historic nature of the village and minimize any potential negative impacts of storm drainage improvements, while upgrading the storm drainage system within appropriate areas of the village to current County and VDOT standards. In combination with traffic calming measures, such efforts could therefore include the following improvements:

- Repair curbs and inlets
- Extend curbs
- Add gutters and inlets
- Regrade and improve ditches
- Replace existing and add new pipe culverts
- Clean out and upgrade existing outfalls
- Reroute drainage away from historic structures

Based on the historical character of Waterford and given the linear nature of future projects, no BMP or stormwater management facilities should be required be required by Loudoun County. If the need for BMP's become a concern during final design, two approaches can be considered:

- Request a waiver for stormwater management and/or BMP based on the historic nature of Waterford and given the linear improvements being proposed, or
- Install structural and/or non-structural storm water management and BMP facilities in specific areas

If structural and/or non-structural measures are ultimately required, different methodologies that could be employed throughout Waterford are:

- Retention/detention basins
- Sediment Forebays
- Landscaping to promote BMP
- Constructed stormwater wetlands
- Infiltration practices
- Bio-retention
- Grassed/vegetated swales
- Manufactured BMP systems

These different methodologies will have varying impacts to the character of Waterford. Retention/detention basins and sediment forebays (to a lesser degree) will result in significant impacts to the project area and are considered impractical. Less obtrusive BMP methods would include landscaping to promote BMP, infiltration practices, bio-retention, grassed/vegetated swales, and manufactured BMP systems. Upon review of the possible traffic calming areas and the study area soil, infiltration practices may also be impractical.

With regards to stormwater drainage alternatives, design should follow current VDOT standards or obtain waivers for nontraditional storm drainage design. There are a number of standard VDOT structures such as DI-2, DI-12 and others that can be used within Waterford. Potential waivers of Loudoun County/VDOT standards that might be required are structure depths, minimum pipe or gutter sizes, type of pipe material, or adding bio-retention or manufactured BMP systems to VDOT's storm sewer system.

Of note would be the use of a narrow valley gutter as shown in **Figure 3-6**. VDOT standard width for such a gutter is 4 feet. If a gutter of only 2 feet is used in the final design,

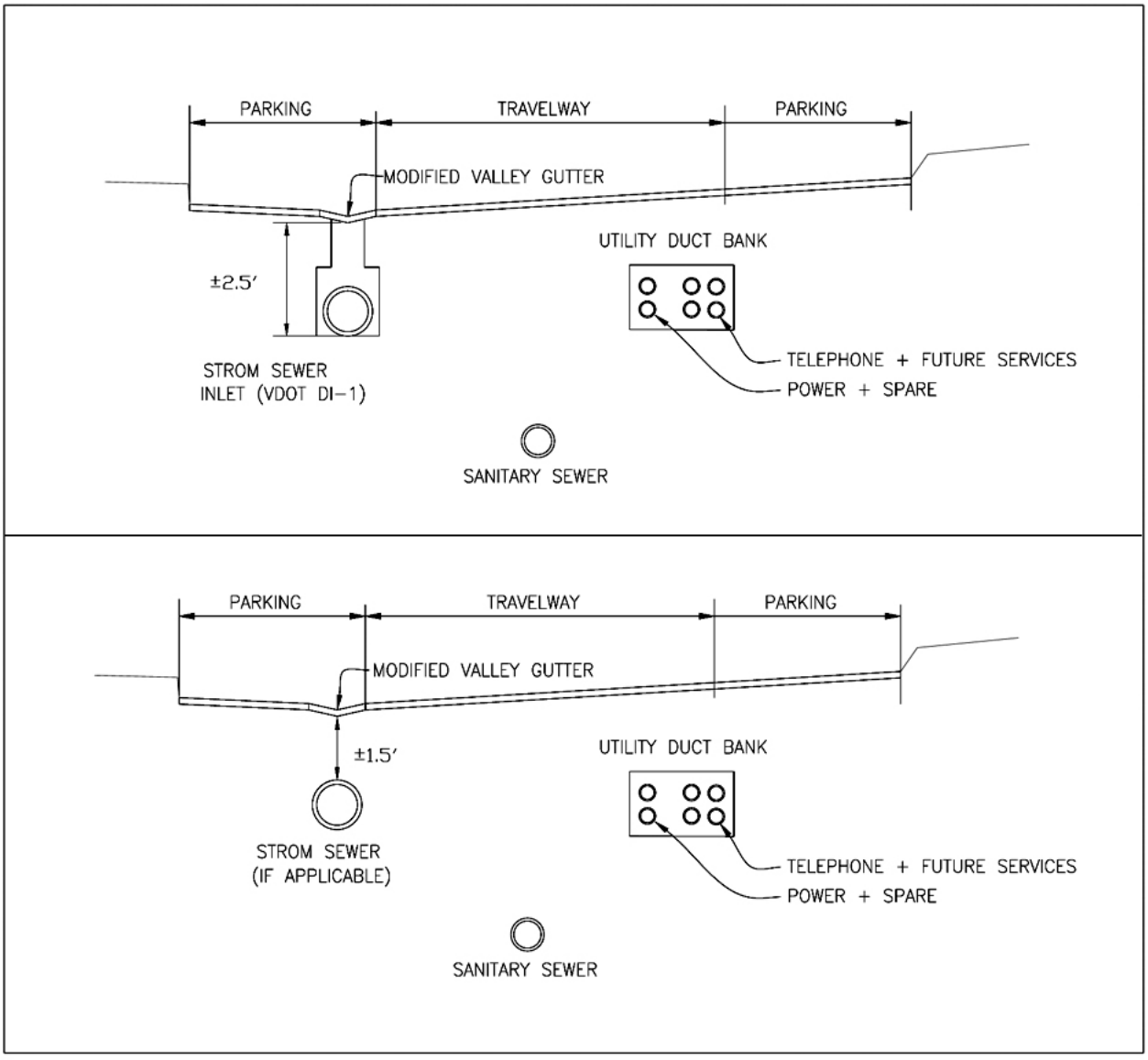
Antiquated Culvert along Water Street

as was done recently for the U.S. Route 50 project in Middleburg, Virginia, the valley gutter would need to go through VDOT's Design Exception process (IIM-LD-227.1), assuming the drainage system would be owned and maintained by VDOT.

Note also in **Figure 3-6** the location and configuration of the utility duct bank. The possible placement of conduits for electrical, telephone, and future services is described in the next section of this report. Note also the approximate location of the sanitary sewer. The future construction of stormwater drainage and installation of utility duct banks will need to avoid existing utilities such as sanitary sewer pipe and manholes.

Overall, the stormwater system in the Village of Waterford does not adequately handle significant storm events. Water from storms should be rerouted away from historic structures and made to flow away from streets and sidewalks to enhance safety and the historic character of the village.

Figure 3-6 POSSIBLE PAVEMENT SECTIONS FOR MAIN STREET



3.4 Power and Telephone Wires

B2E, in close coordination with Kimley-Horn, conducted an engineering study to analyze and develop possible alternatives for electrical and telephone utility relocation, in concert with the development of traffic calming, drainage, and roadway alternatives. B2E conducted a field inventory and condition assessment of existing electrical and telephone services. This effort included meetings and discussions with Loudoun County electrical inspectors, Dominion Virginia Power (DVP), and Verizon Telephone, as well as discussions with Adelphia Cable. The data collected during field surveys and condition assessments was analyzed and conclusions drawn as to the logical methods for relocating and burying the wires, removing poles, and placing transformers in appropriate locations.

3.4.1 Existing Conditions

Electrical: The Village of Waterford exists with a complete overhead power distribution plant. Waterford electrification began in the early 1920s, and this initial electrification process lasted over a period of 2 to 3 years. The current infrastructure includes conventional wooden utility poles, medium- and high-voltage class distribution cables, pole-mounted transformers, and various secondary "T" taps. The entire distribution system is owned and maintained by DVP, Leesburg District Office.

As shown in **Figure 3-7** and in the photos in this section of the report, Waterford has primarily a single-phase system. There is one minor segment of three-phase power on the southeast perimeter of the Village which serves the Waterford Elementary School. A three-phase to single-phase switching facility exists on Fairfax Street adjacent to the Old Waterford School. At this facility, two single-phase services are derived (phases B and C).

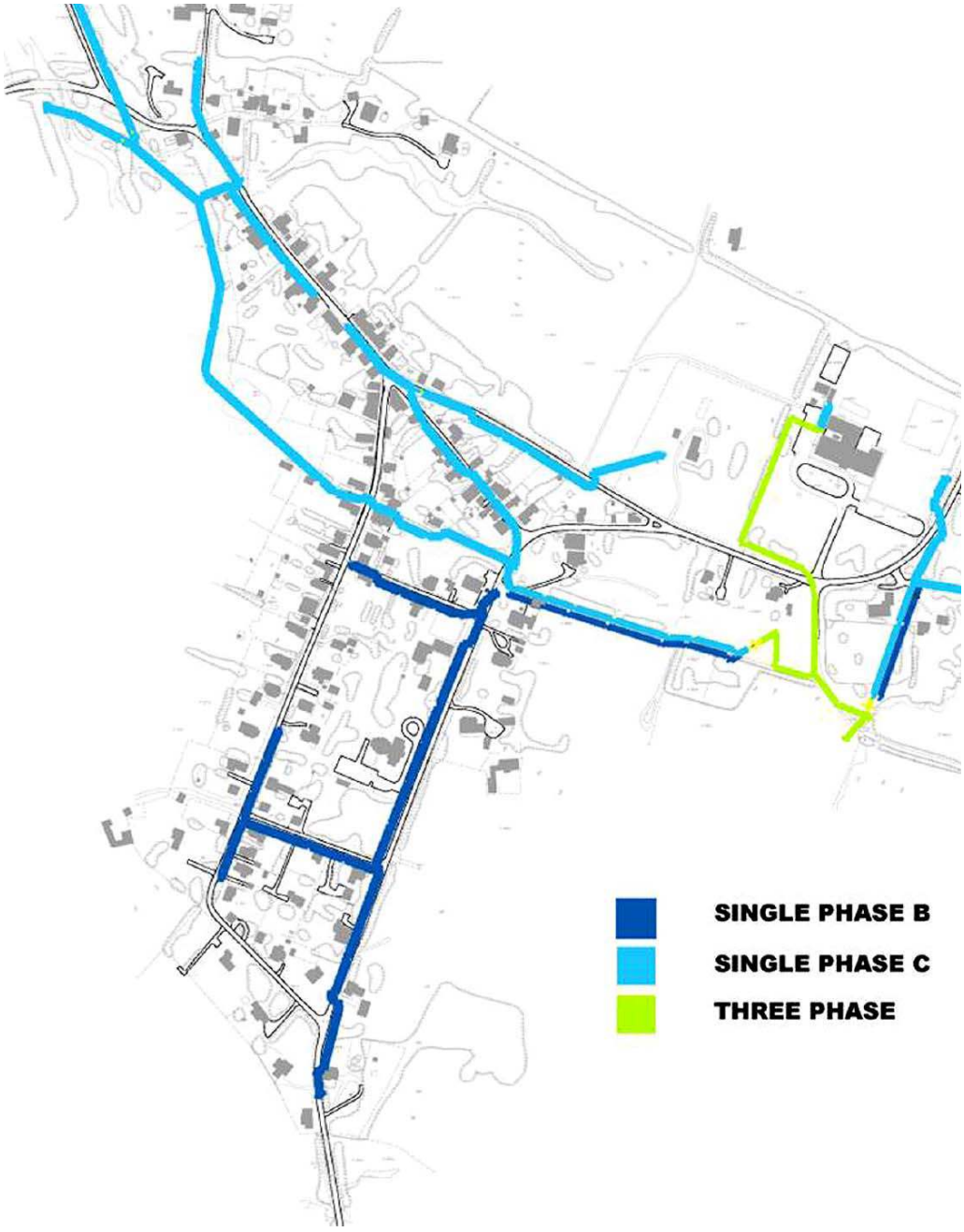
Phases B and C run parallel along Fairfax Street to the intersection of Fairfax and High Streets. At High Street, Phase B runs west to southeast along High Street with branches extending north to Second Street. Phase B follows Second Street east, and then turns north at intersection of Second and Church Streets to open land. Phase B then runs east behind Main Street on open land to the vicinity of the Mill. Behind the Mill, Phase B meets Old Wheatland Road and runs north of town.

Phase C routes east to southeast along High Street and turns north at Main Street. Phase C runs down Main Street. It is split in several locations to serve structures on Main and Water Streets. Phase C continues on Main Street, past the Mill, and then out of the Village.

Telephone: As shown in the photos, the Village of Waterford is served by overhead telephone line service. Telephone service has existed in Waterford since approximately 1895. Currently, the service is owned and maintained by Verizon, which owns a switching facility adjacent to the village. The existing overhead telephone lines share the wooden poles with DVP's electrical distribution system.

Individual telephone services are typically tapped off the telephone distribution system and are fed overhead into individual buildings. Within the village, a small number of these services are routed down wooden poles and provided underground to the buildings.

Figure 3-7 EXISTING OVERHEAD ELECTRICAL NETWORK



Cable Service: Currently, cable telecommunications service does not exist in the Village of Waterford. Television services are provided either by private antenna or satellite reception equipment. Access to the internet and world wide web service is either by telephone lines or by digital satellite equipment. Adelphia Cable reported that there are no current plans to expand cable telecommunications or high-speed internet services into the village.

3.4.2 Conclusions on Burying the Wires

From the analysis of existing conditions and possible alternatives to bury the wires in the Village of Waterford, the study team developed findings and drew conclusions with respect to the electrical and telephone distribution system and the metered services to individual buildings. Potential challenges to successfully burying the wires have also been identified.

New Underground Power Distribution: To minimize electrical service disruption, the installation of new underground power distribution will need to be accomplished prior to demolition of any overhead service to allow electrical service to the individual residences to continue. It is anticipated such an installation would be phased on a street-by-street basis to allow a gradual and controlled conversion from overhead to underground service. Specific phasing would be determined during final design.

As shown in **Figure 3-8**, the most practical location to bury power lines is within the prescriptive easements under the streets of the village or adjacent to the edges of pavement. Typically, the minimum burial depth will be 36" below grade. As shown previously in **Figure 3-6**, electric and telephone wires can be buried in a single duct bank. Such a duct bank can also include spare conduits for future services, and it would require separate junction boxes or manholes for access to the power and telephone lines.

It is anticipated that DVP will require between 20 and 30 pad-mounted transformers throughout the village. These transformers will be distribution-level transformers changing voltage from medium/high (7.2 to 34.5 kilovolts) to residential user voltage at 240 volts, single phase. Each transformer will likely sit on a concrete pad, approximate 5' X 8' in size. The actual dimensions will need to be determined during final design based on DVP's assessment of individual transformer kilovolt-amp (kVA) sizing.

The alternative to burying the transformers was investigated, and it was determined that DVP does not have a single-phase transformer for underground application. If an underground type transformer did exist, constructing large vaults with grates or other covering would not be consistent with the character of the village, and it would significantly increase the cost of burying the wires.

To minimize the disruption to the historic viewsheds (i.e., make the transformers as inconspicuous as possible), the transformers may be screened on three sides. Each screening scenario will require a 3-foot clearance around the 3 sides for DVP access. The front side (access door) must have a minimum clearance of 10 feet for power company maintenance and safety needs.

Transformer Placed out of View

In addition, each transformer will likely require an easement for private property location and access. Additionally, there may need to be up to six pad-mounted switches used as circuit tapping devices to "tee" distribution power based on the routing needs generated by the final design. This equipment will be a similar size to the transformers and will likely also require easements on private property. Also similar to the transformers, these devices may be buried, screened, or otherwise enclosed on three sides.

The in-street distribution system will require the installation of buried manhole structures. These structures should be pre-cast or field-erected concrete with metal access covers flush with the finished roadway surface. The structures are necessary to facilitate pulling cable and limit cable pulling stress.

In some cases, the structures allow a suitable, controlled space to "tap" underground cables. These structures may be spaced 500 to 700 feet apart. The actual spacing and placement will be determined during the design for the construction phase of the project. Telephone or systems other than electrical power distribution may not share these manholes, according to electrical code.

Figure 3-8 PROPOSED UNDERGROUND ELECTRICAL AND TELEPHONE NETWORK

Waterford

Bury the Wires and Tame the Traffic

New Metered Services for Power: As the underground electrical distribution system is installed over a given phase, it is anticipated that underground laterals can simultaneously be installed to individual buildings. The service laterals can typically be underground type SE cable placed by direct burial within trenches. Where the secondary service cables cross under pavement, roadway, or structure, the cable should be routed within schedule 40 PVC conduit. There are various issues associated with routing services to individual buildings. Through the final design process, each building will require a review to design a lateral to fit each unique condition.

New Underground Telephone Distribution: Burying the telephone distribution system will also require a phased, street-by-street implementation approach similar to burying the electrical distribution system. It is anticipated that the telephone lines would be buried in the same right-of-way or easement path as the electrical lines with a linear separation to be determined during the final design. The lines would be routed down the streets to distribution pedestals centrally located on private property to facilitate distribution to approximately 6 to 8 buildings per pedestal. The bulk distribution lines would need to be routed underground in duct banks below or adjacent to paved areas. The telephone company at its discretion may elect to use direct burial type cable where service does not lie below pavement or a structure.

The distribution of bulk telephone lines should include below-grade junction boxes or manhole structures. There should be a separate network of structures from those installed for electrical power distribution. The telephone manholes would be used both to facilitate cable pulling and to splice or tap cables. The manholes would be concrete with flush, metal roadway access louvers. It is anticipated the structures would be 500 to 700 feet apart. Final spacing and placement should be a collaborative effort between Verizon and design engineers during preparation of construction documents for a future project.

New Underground Telephone Services: Individual telephone services should be routed from Verizon distribution pedestals underground to each building with service. It is anticipated that the underground service will enter each building at the same point as the existing overhead service. Where underground or grade-level impediments restrict entry into a building, the service can transition from underground and be wall-mounted, horizontally to the existing service point.

New Cable Distribution: A future program to "bury the wires" in the Village of Waterford is anticipated to include a buried spare conduit system for the future provision of commercial cable TV and cable based, broadband internet service. Currently, the cable provider would be Adelphia Cable, headquartered in Sterling, Virginia. It was reported by Adelphia to the project team that there are no immediate plans to initiate service in Waterford. Based on service demand from the area, Adelphia will periodically review their service plans.

Any future cable conduit system will be closely routed with buried telephone service. At this time, it is anticipated the cable service conduits will share manhole installations with the telephone distribution network. Actual pull and junction structures used for the cable network should be designed and placed during development of construction documents. The route of the cable should be within the right-of-way easements of each street.

New Cable Service: At such time when cable TV and broadband cable systems are installed in the village, services to individual buildings would be routed based on owner requests to initiate service with the provider. Typically,

these services would be routed from the street by direct burial methods to an entry point at the building. Entry points would be decided on a case-by-case basis, pending television or computer equipment locations within the individual building. Where the provider must cross under pavement or structures, the cable should be routed in schedule 40 PVC conduits.

3.4.3 Potential Challenges with Burying the Wires

Overall, based on research of existing records and information gathered during meetings with DVP, Verizon Communications, and Loudoun County electrical inspectors, it was determined that burying the wires is feasible, especially if performed in conjunction with construction of traffic calming and roadway and drainage improvements. Burial of lines can occur within the prescriptive easements of the streets, and underground telephone service would follow the same general path of the underground electric service. Any future cable or high-speed internet service would also follow the underground power. A trench with conduits for power and telephone, separated by a distance to be determined during design, would be feasible. This duct bank could include spare conduits for future cable and internet services.

Thus, the analysis of alternatives for burying the wires resulted in a straightforward concept of relocating overhead wires to underground ducts along the streets (under or adjacent to the pavement), removing poles, installing above-ground transformers, and connecting to existing homes and other structures. To make the concept a reality, the future design and construction of an underground electric and telephone system would need to overcome several challenges.

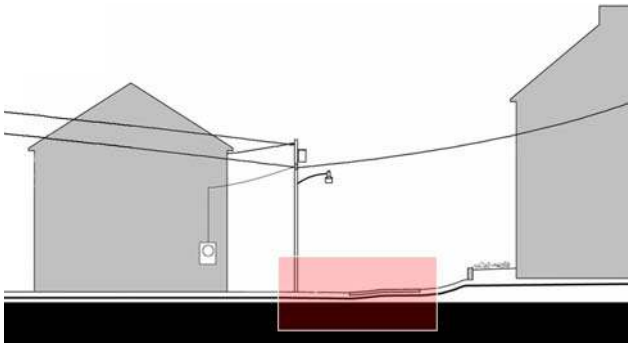
As shown in **Figure 3-9**, some of the conditions observed during surveys that may conflict with underground routing of electric and telephone cabling, or create additional challenges, include:

- Conflicts with water wells
- Conflicts with sewer mains and laterals
- Conflicts with fuel oil and other types of piping installations
- Conversion of existing power service entries into homes that do not meet current codes and are deemed by inspectors to be unsafe
- Excessive building repairs due to existing routing of overhead service attached to roofs, overhangs, siding, shutters, etc.
- Conflicts with public sidewalks and masonry step structures, retaining walls, and paved areas of private properties such as patios and driveways

Multiple buildings exist in the village that are already served by underground secondary service laterals. These services are routed down utility line poles, underground, and then up to a utility company meter typically mounted on the exterior sidewall. During the “bury the wires” phase of a future construction project, these existing service laterals will require little or no modification.

Existing Underground Service

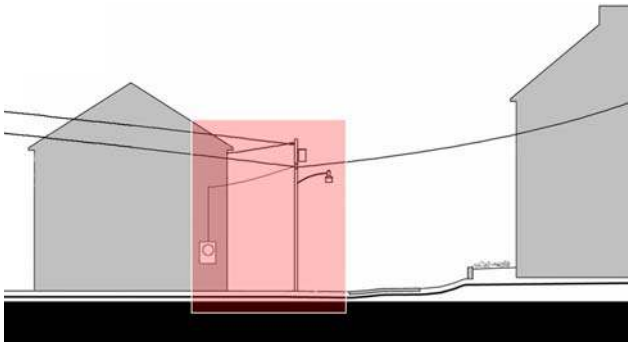
Figure 3-9 BURY THE WIRES ISSUES



Area 1 – VDOT Easement

Issues:

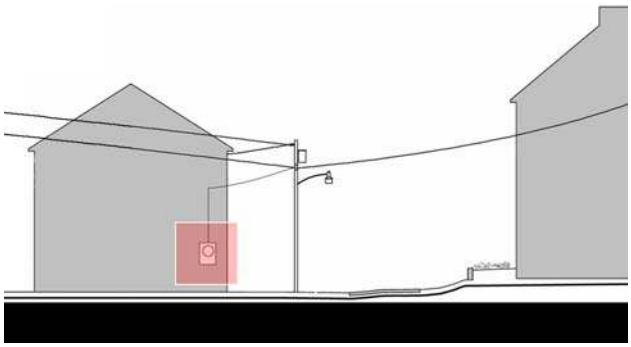
- Coordination with sanitary sewer lines
- Crossing of easements
- Placement of electrical and telephone/cable, or conduit and manhole structures
- Identifying any historically significant or abandoned structures such as buried drain lines, ducts, etc.
- Digging up street for utility maintenance and repairs
- VDOT approval on burial of utilities



Area 2 – VDOT Easement to House

Issues:

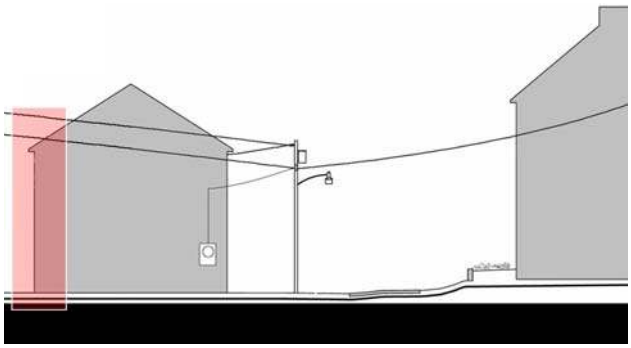
- Transition of services into private property
- Coordinating electrical with other utilities that may also be transitioning onto private property
- Means of crossing extraordinary lot conditions, such as significant pavements, severe changes in elevations, retaining walls, or existing structures such as steps, wells, footings



Area 3 - House

Issues:

- Ability to maintain meters in the same location on structure
- May need exterior service disconnect in addition to new meter due to cable routing and entry conditions
- Repair of facade elements due to removal of existing overhead service accessory hardware
- Eventual location of transformer on private lots
- Loudoun County electrical inspection due to certain existing conditions and work by private electrical contractors
- Possible necessity of individual permits associated with any work undertaken by private electrical contractors
- Route of cable on private property possible conflicting with homeowner's use of property



Area 4 – Back of Building

Issues:

- Gardens, pools, or other improvements
- Sheds, barns, or other utility structures
- Requirement for more easement paths due to cable path not being directly off of street

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Additionally, as shown in the photo below, there are buildings with overhead masts routed down through roofs and overhang structures. These buildings will require structure roofing and flashing (weatherproofing) repairs upon dismantling of the overhead service.

Typically, the meter bases will be provided and installed by private contractors. The private contractor will also connect meter load-size cable between the meter and the existing service panel board of the building. DVP will likely make final line-side utility termination at the meter and also provide and install the metering instrument into the meter base.

Subject to individual review by Loudoun County permitting officials, existing services may be required to have an additional service-rated disconnect installation at the service entry point into the building. This requirement would be due to an existing condition where the metered service cable distance to the actual home or building panel board is interpreted to not comply with distance limitations and service over-current parameters indicated in the National Electric Code.

There may also be a requirement to place service-rated disconnects at service entry point(s) where high fault current conditions will exist. At the time of final design, DVP should provide actual fault currents available at each transformer to the design team. Where available fault currents exceed ratings of existing equipment, current limiting disconnect (fusing) may be installed to limit the potential fault energy.

Once the underground power and telephone systems are in place along a particular street, the task would then be to connect these underground systems to individual services along the street. After the individual services for both power and telephone are in place and operational, the overhead conductor and cables and pole structures can then be removed.

Regarding right-of-way along the streets of Waterford, it was reported by VDOT that individual lot boundaries extend to the centerline of the streets. Therefore, it may be necessary for DVP and Verizon to obtain a significant number of individual easements for the buried lines as they cross the properties.

3.5 Lighting

B2E and Kimley-Horn investigated the existing lighting within the Village of Waterford. Through close coordination with Loudoun County and Waterford representatives and citizens, alternatives were developed for lighting the village, consistent with its historic character and NHL status.

3.5.1 Existing Lighting

As shown in **Figure 3-10**, minimal street and public area lighting exists throughout the village. Waterford is currently equipped with 21 mercury vapor based street lamps mounted directly to utility poles. (See examples in the photos shown in this section.) The existing lamps are outdated, reflector and cobra-head type units, estimated to be approximately 250 watts. The lamps appear to be well past their useful life. The foot candle readings taken during a lighting survey of the village at 4 AM indicate low levels of lighting from the center of the fixtures to approximately 40-feet from center. The readings indicate an average of less than 1-foot candle at every fixture. Beyond a line 40 feet away, this level quickly drops to zero foot candles.

3.5.2 Conclusions on Lighting the Village

There were numerous options that the study team explored for public area street and pedestrian lighting within the village. Various design options that are possible include:

- No public street lighting
- Extensive public street lighting on each major street in the village
- Partial lighting, such as lighting Main Street only in combination one or two lights at corners of other streets and with increased lighting in pedestrian areas

Based on discussions with Loudoun County and Waterford representatives and citizens, any lighting designed for the village would need to have, at a minimum, the following features:

- Historically replicated or compatible poles
- Historically replicated or compatible head and globe assemblies
- Color-corrected lamps such as metal halide to ensure quality light and economical life cycle
- Fixtures confirming to “International Dark Sky” parameters with respect to vertical light pollution
- Fixtures that minimize light trespass

Figure 3-10 EXISTING LIGHTING IN THE VILLAGE

Any new lighting fixtures should be based on older, decorative fixtures that are historically inherent to the Village of Waterford. Such fixtures should be a classical coach-lantern type E or globe types associated with older, period gas lamp-type street lighting. Poles would contain an appropriate amount and style of ornamental design.

Due to its orange/yellow hue, high or low pressure sodium lamps should not be considered for the village. In addition, pole placement and spacing will depend on final wattages and specific distribution patterns of fixtures selected during the construction document phase of the a future project.

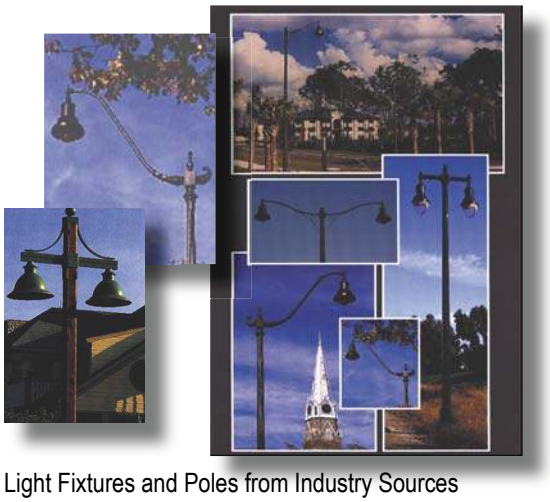
Several options for lighting heights are possible, including lighting each major street or lighting selected areas with higher roadway lighting (30+ feet), pedestrian level lighting (8 to 12 feet), or low level lighting (3 to 5 feet). Another option explored was lighting the facades of selected buildings along Main Street.

Standard Dominion Virginia Power Light Fixtures

3.5.3 Available Fixtures and Potential Metering

There are two options for lighting in the village and metering these lights:

- Make use of available DVP fixture and poles (see photos right)
- Provide fixtures from industry sources, not included in the standard DVP streetscape fixture offerings (see photos on right)



Light Fixtures and Poles from Industry Sources

The first option would have DVP maintaining and powering the fixtures. A fee from DVP would be determined based on quantity and type of fixture selected. The fixture offerings from DVP are limited in architectural appeal and relevance to the historic compatibility with Waterford. Additionally, DVP offers no lower level foot lights, pathway, or bollard lights.

The second option would require the Waterford Foundation or some other entity to procure and utilize the service of a contractor or vendor to maintain the fixtures. The village would also have to arrange for metered power from DVP and separately pay DVP for energy costs.

3.6 Environmental & Historic Resources Review

During the engineering studies described in this chapter, environmental and historic resources experts were consulted as to the potential impacts to wetlands, trees, historic properties, and the overall National Historic Landmark status of the village. At a team meeting on April 30, 2003, findings and design alternatives from the engineering studies were discussed in detail. It was concluded that the alternatives for traffic calming, drainage improvements, utility relocations, and lighting would likely have "no adverse impact" on the NHL status. The alternatives proposed were found to be relatively benign, and in fact, would enhance the NHL status of the village.

3.7 *Concept Plan Workshop*

The various alternatives developed from the engineering analyses were presented at the Concept Plan Workshop on May 27, 2003, held in the Aspen Room at the Loudoun County facility on Trailview Boulevard in Leesburg. In attendance were representatives from Loudoun County Department of General Services, Loudoun County Planning Department, VDOT, the Waterford Citizens Association, the Waterford Foundation, and the Waterford Elementary School Parent Teachers Organization. The consultant team facilitated discussions on the alternative concepts for each facet of the study to bury the wires and tame the traffic. The day-long workshop resulted in a set of preferred concepts for taming the traffic, realigning the roadways, fixing the drainage, burying the wires, and lighting the village.

Concepts that emerged as preferred by the Waterford representatives were those that were most consistent with the character of a rural historic village. The use of native materials (stone, pavers, brick, gravel, etc.) was encouraged. The inclusion of above-ground transformers was accepted. Also, the group decided on a period lighting fixture for use in pedestrian level lighting applications (8 to 12 feet from the roadway or sidewalk), eliminating the DVP fixture options and the roadway, low-level, and building facade lighting options.

"Taming the traffic" alternatives garnered the most attention during this workshop. Through a presentation of the alternatives, followed by a group discussion and an exercise of looking at all the roads and intersections of the village, specific traffic calming measures were accepted, while others were rejected. Subtle uses of native materials to highlight edges of pavement and intersections were preferred. The intrusiveness of traffic circles or roundabouts was eliminated.

A summary of the traffic calming measures considered is included in **Table 3-4**. Meeting materials and from the Concept Plan Workshop are included in *Appendix M.*

TRAFFIC CALMING MEASURES CONSIDERED	BENEFITS	CONCERNS	PUBLIC SUPPORT?	STATUS
EDUCATION AND ENFORCEMENT				
Radar speed trailer	Driver awareness of speed	Urban look is out of character	no	Rejected for village streets
Law enforcement	Enforce $200 fine for speeding to alter driver behavior.	Speeding problem returns in between enforcement	yes	Recommended
Area-wide education	Sends message to most motorists that speeding in village is unacceptable.	“Rogue” drivers ignore message	yes	Recommended
LESS RESTRICTIVE MEASURES				
Traffic calming signs and striping	Reinforces area education efforts and narrows lanes.	Sign and paint pollution	no	Rejected
STOP signs	A traffic control device that is effective when obeyed	Unwarranted installations routinely disobeyed	yes	One recommended for eastbound Main Street at Second Street
Pavers along roadway edge lines (stone, brick, and/or concrete resembling native materials), one foot wide, flush with surface	Encourages motorists to avoid driving on them due to rumble effect. Motorists slow down when lane width is narrowed.	May not slow “rogue” speeders	yes	Recommended Anticipate 3 – 5 mph reduction when used with median pavers
Pavers in roadway “median,” one to four feet wide	Encourages motorists to avoid driving on them due to rumble effect. Motorists slow down when lane width is narrowed.	Snow plows may chip pavers if raised high off road surface	yes	Recommended Anticipate 3 – 5 mph reduction when used with edge pavers
Valley gutters, 2 feet wide (design exception to VDOT standard)	Defines edge of road/travel lane, improves drainage	Non-standard width requires design exception process	yes	Recommended along Main Street and other appropriate locations
Raised center island to narrow street	Forces slowing effect with horizontal deflection in the path of vehicles	Out of character for village streets	no	Rejected
Bulb-out with tree(s) and landscaping to narrow street width	Forces slowing effect with horizontal deflection in the path of vehicles	Good sight distance in both directions is key	yes	Recommended
Trees in place of utility poles	Can force slowing effect if adjacent to roadway	Needs to be done on a case-by-case basis	yes	Recommended in appropriate locations
Stone walls and steps adjacent to road	Reduces field-of-vision for motorist that will effect slowing	Potential safety hazard – should be off road edge; may restrict pedestrians	yes	Further consideration recommended for specific sites
Reduced radii of curves on intersection corners	Forces slower right-turn movements	Occasional oversized vehicle may need full width of road to turn	yes	Recommended
MORE RESTRICTIVE				
Speed activated traffic signals	Detects speed of oncoming vehicles and goes red if speed limit exceeded	Urban effect	no	Rejected
Intersection traffic circles	Forces slowing effect with horizontal deflection in the path of vehicles	All but the corner store intersection are too small	no	Rejected
Roundabouts	Related to historic pole in center of intersection at Corner Store.	Out of character	no	Rejected
Speed bumps and dips	Forces slowing effect with vertical deflection in the path of vehicles	Jarring effect; out of character	no	Rejected
Speed tables	Forces slowing effect with gradual vertical deflection in the path of vehicles	Some jarring effect	yes	Recommended in two locations—Corner Store intersection and Water Street mid block
Hump back bridge	Forces slowing effect with gradual vertical deflection in the path of vehicles	Some jarring effect; design needs to conform to village character	yes	Recommended in one location—replace wooden bridge over Tannery Creek
Lower roadway	Enhances opportunities for vertical deflection with speed tables or hump back bridge	Temporary interruptions during construction	yes	Recommended for Corner Store intersection and Lower Main Street

FIGURE 3-4
Traffic Calming Measures Considered, Rejected, and Recommended for the Village of Waterford

FIGURE 3-4
Traffic Calming Measures Considered, Rejected, and Recommended for the Village of Waterford

4 - Recommendations

Waterford

"Bury the Wires and Tame the Traffic"

4. RECOMMENDATIONS

Following the Concept Plan Workshop, the consultant team developed and compiled a comprehensive set of recommendations, described below, and a set of concept plans, included at the end of this chapter.

4.1 Tame the Traffic

To tame the traffic in the Village of Waterford, recommendations include modifications and enhancements to the roads, street corners, sidewalks, drainage systems, and roadside trees and landscaping. Taking a holistic approach for the entire village and considering feedback from citizens, the following types of traffic calming measures are recommended for various locations throughout the village:

- Pavers (stone, brick, and/or concrete resembling stone or cobbles), one-foot wide, consistent with native materials and flush with the roadway surface, used to define edges of pavement at specific locations and/or narrow the travel lanes
- Pavers, one to four feet wide, flush with the roadway surface, used to define the roadway centerline at specific locations to horizontally displace traffic and narrow travel lanes
- Valley gutters, 2-feet wide (non-standard), at the edges of roadways to define the travel lanes and improve drainage
- Reduced radius at corners of intersections to slow traffic and/or discourage rolling stops
- "Bulb-outs" along the roadway and at intersections, with stone or concrete curbing, to add trees and landscaping, define parking areas, and add sidewalk area at corners
- Series of alternative "bulb-outs" with trees to provide a "chicane" effect on traffic
- "Speed tables" or raised sections of roadway to vertically displace traffic and allow easier pedestrian access
- Pavers and/or stamped concrete used at intersections to provide a variation in pavement surface, highlighting the intersection and presence of pedestrians, flush with approaching roadways, or as part of a speed table
- "Hump back bridge" in place of the wooden bridge over Tannery Creek to vertically displace traffic
- Lowering of roadway segments in some locations to allow for bulb-outs, speed tables, and hump back bridges (as well as safer pedestrian access and improved drainage)
- Addition and extension of sidewalks and walking paths along the roadway, separated by landscaping and/or pavers to narrow and/or define the edge of the travel lane
- Addition/modification of trees and landscaping along the roadways and at intersections (often in concert with other measures)
- Minimum signage at specific locations in the village to meet safety and regulatory requirements and to enhance traffic calming throughout the village

These traffic calming measures should result in a slight reduction in the average speed of vehicles within the village and a significant reduction in the speed of "rogue" drivers who grossly exceed reasonable speeds. Pedestrians and pets in the village will benefit. The measures are "traffic neutral," that is, concepts do not result in increased capacity in response to growing traffic volumes in the region. The capacity of the streets in Waterford will remain constant. Motorists will be able to progress through town at slow but reasonable speeds.

These recommended measures are shown graphically in the Concept Plans of this study discussed and shown in this chapter.

4.2 Fix the Drainage

To support the recommended traffic calming measures, improvements to stormwater drainage should also be implemented. The concepts recommended will correct the drainage problems along Second Street and Main Street, from the Tin Shop to the existing wooden bridge. Specifically, recommended drainage improvements include:

- Clarke's Gap Road/High Street/Factory Street Intersection:
  - Regrade the roadside ditches along High Street, Clarke's Gap Road, and Factory Street.
  - Install standard VDOT DI-5, DI-7 or DI-12 inlets along the east and west side of High Street. The inlets should collect flow from the improved ditches along High Street and convey the runoff into an existing ditch along the west side of High Street.

- Factory Street – from Second Street to High Street:
  - Regrade the roadside ditches along both sides of Factory Street.
  - Install two standard VDOT DI-5, DI-7 or DI-12 inlets to collect flow from the improved ditches. The storm system should convey flow down the property lines of the adjoining lots into the open field to the south of Factory Street. The outfalls of the system will need to be improved to handle concentrated runoff.

- High Street – from Factory Street to Upper Main Street
  - Regrade the roadside ditches along High Street
  - Replace driveway culverts along High Street
  - Replace the existing culvert under High Street near Church Street with a larger diameter pipe to increase capacity

- Janney Street:
  - Re-grade the roadside ditches along both sides of Janney Street
  - Install standard VDOT DI-5, DI-7 or DI-12 inlets to collect flow from the improved ditches. The storm sewer would extend toward and connect with the system along Second Street

- Patrick Street
  - Replace the curb and gutter along Patrick Street
  - Install standard VDOT DI-2 inlets along Patrick Street extending towards and connecting with the system along Second Street

- High Street/Butcher's Row/Upper Main Intersection
  - Re-grade the roadside ditches along High Street, Butcher's Row and Upper Main
  - Replace the culvert under upper Main Street, which will discharge into the re-graded roadside ditch of High Street and to the channel along Church Street

- Second Street – from Factory Street to Church Street
  - Re-grade the roadside ditches along Second Street from Factory Street to approximately 200' beyond Church Street.
  - Install standard VDOT DI-5, DI-7, or DI-12 inlets near the intersection of Second Street and Janney Street. The storm sewer in this area will collect runoff from the inlets along Second Street with additional runoff coming from the storm sewer along Janney Street. This storm sewer will outfall into a ditch along the existing gravel drive from Janney Street, which will need to be re-graded to accept the additional runoff.
  - A second storm sewer component is proposed near the intersection of Church Street. This component would collect runoff from the inlets along Patrick Street and Church Street. The storm sewer discharges to the back of lots across from Church Street to the existing field pond west of Second Street. This pond may be converted into a BMP retention basin (if required).

- Corner Store Intersection
  - Replace the existing storm sewer within the intersection. The existing system outfalls under a building. The proposed system would collect runoff from an existing structural channel and convey it to the west side of the intersection to a new outfall, which discharges to an existing channel. This existing channel may be redirected into the converted BMP pond, to enhance water quality for the project (if required).
  - An additional storm sewer component would be connected to the system described above, which would collect runoff from the west side of Second Street, just past Church Street.
  - One of the proposed traffic calming measures proposes to install a small green space along the west side of Second Street. This green space may provide an opportunity to construct a bio-retention area if BMP measures are required.

- Upper Main Street – from High Street to Corner Store: No major drainage improvements are proposed for this area.

- Lower Main Street – from Second Street to First Street
  - Install a valley gutter along the southwest side of Lower Main Street.
  - Install modified VDOT DI-1 or DI-7 inlets to collect runoff from the valley gutter. The storm sewer would outfall into an existing unnamed tributary to South Fork Catoctin Creek.

- Main Street/First Street/Liggett Street Intersection
  - Regrade the roadside ditches to promote positive flow
  - Replace any culverts as required to provide positive flow.

- First Street – from Catoctin Creek to Old Mill
  - Regrade the existing roadside ditches.
  - Install/replace storm sewer culverts where necessary to provide positive flow.

- Water Street- Main Street to Loyalty Road
  - Regrade the roadside ditches to the south of Water Street to collect runoff generated by the adjoining properties.
  - Install a storm sewer component on the north side of Water Street underneath the proposed trail from Lower Main Street to the school. This storm sewer would collect flow by standard VDOT DI-1 or DI-7 inlets adjacent to the trail and will outfall into the existing stream channel on the south side of Water Street.

- Butcher's Row/Water Street/Loyalty Road Intersection: A storm sewer component is proposed to collect flow from improved ditches along Butcher's Row and High Street. This storm sewer will outfall into the improved ditch along the north side of Water Street and then to the storm sewer system along Water Street.

- Loyalty Road – from Butcher's Row to north of Brown's Lane
  - Re-grade the roadside ditches.
  - Replace the culvert under the school entrance and install any other culverts as warranted to provide positive flow.

Based upon the summary of proposed drainage improvements, additional BMP measures in addition those specifically noted above (if ultimately required) include:

- Convert all improved roadside ditches and any improved outfall ditches to BMP vegetated swales.
- Install manufactured BMP systems at all storm sewer inlets.

These recommended drainage improvements are shown graphically in the Concept Plans for this study included at the end of this chapter.

4.3 Bury the Wires

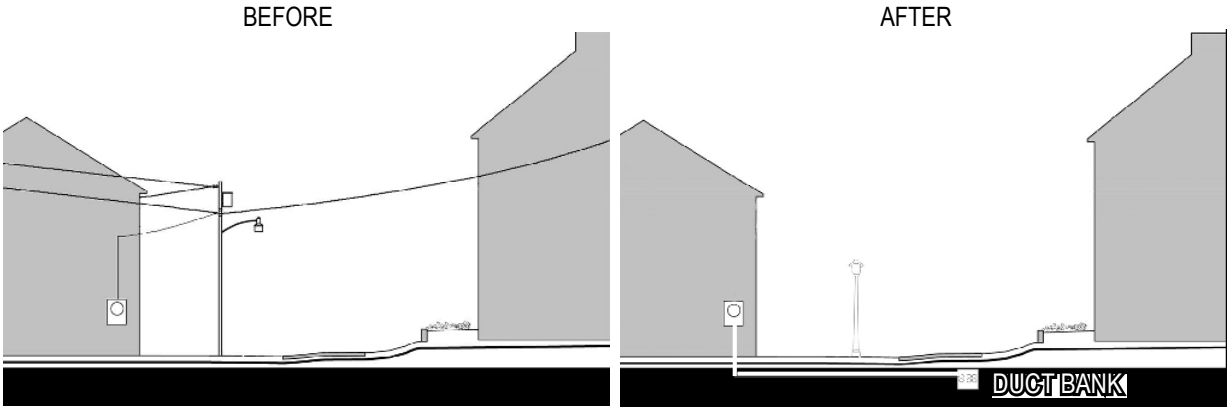
The recommended extent of burying the wires extends from just west of the First Street bridge over Catoctin Creek and just north of First Street on Clover Hill Road to north of the Loyalty Road/Brown's Lane intersection and approximately 1/4 mile south of the Clarks Gap Road/Factory Street/High Street intersection.

The Recommendations for relocating overhead wires to underground services include:

- Underground electric service generally following the streets in Waterford, either under the pavement or adjacent to the road
- Underground telephone service following the same general path as the underground electric service
- Conduits for power and telephone as a duct bank in a single trench, with conduits separated by an appropriate distance to be determined during design
- Spare conduits in this same duct bank for additional electric service, additional telephone services, and possible future cable and Internet services
- Above-ground transformers in appropriate locations, screened or otherwise hidden from view of pedestrians and motorists, if possible, through strategic placement, addition of shrubs, construction of screen walls, etc.

BEFORE

AFTER



Typical section showing the conversion from overhead to underground wires and the addition of historically sensitive lighting

4.4 Light the Village

Based on feedback from Waterford representatives, historically correct lighting is recommended consisting of the following:

- A fixture similar to an existing coach-lantern type (shown in photo) with a decorative pole, consistent with the character of the village, conforming to "dark sky" standards, and minimizing light trespass onto private properties
- Pedestrian level lighting at 8 to 12 feet above roadway or sidewalk elevations
- Placement of lights in appropriate locations to address safety concerns for pedestrians and motorists
- Metering at key points along the new underground distribution grid to feed the new public lighting. One possible placement is near transformers or tap switches to utilize those landscape and fencing provisions to aid in screening meters.

It is further recommended that during final design phase, a point-to-point photometric study be performed on the lighting. Such a computation should be performed incorporating individual fixtures and clusters of fixtures. Such a computation should also be generated on a software package, e.g. Lite-Pro. The computation should include any major obstructions of the proposed fixtures within the project area.

4.5 Concept Plans & Final Report Presentations

The recommended concepts from this preliminary engineering study were presented to the citizens of Waterford on July 17, 2003 in a public meeting. The consultant team facilitated a discussion with the group, and feedback was very positive. Comments suggested minor alterations to the measures, but overall, the recommendations were accepted as consistent with the character of the village and as potential improvements that will meet the goals of the village to bury the wires and tame the traffic. Meeting materials and a summary of the input are included in *Appendix M*.

On September 4, 2003, the final report of this study was presented to the citizens of Waterford. Each aspect of the report was presented graphically on presentation boards for viewing by the citizens during this meeting and afterwards. A brief presentation was made of the boards and questions were answered regarding specific recommendations. The boards were provided to Loudoun County and the Waterford Foundation. The information shown on the boards is included throughout this report.

4.6 Preserve the Heritage

All of the measures recommended in this study were reviewed by the Kimley-Horn team members specializing in environmental regulations, archaeology, and historic preservation. It is anticipated that none of the measures will have an adverse impact on the village's NHL status. In fact, FHWA confirmed on July 28, 2003 that NEPA requirements for the improvements will include a Categorical Exclusion, with Section 106 documentation and potentially a programmatic Section 4(f) document (in accordance with NEPA and NHPA). A copy of this NEPA Concurrence is included in *Appendix N*.

4.7 Concept Plans

To bury the wires and tame the traffic in the Village of Waterford, this study recommends modifications and enhancements to the power and telephone services and to the roads, street corners, sidewalks, drainage systems, and roadside trees and landscaping. In close coordination with Loudoun County and representatives from the Waterford Foundation, Waterford Citizens Association, and the Waterford Elementary Parent Teacher Organization, the Kimley-Horn team has developed a series of Concept Plans (included at the end of this chapter) for traffic calming, roadway realigning, drainage, utility relocations, and lighting, consistent with the character of the village. As shown in **Figure 4-1**, these concept plans cover the entire Village of Waterford study area.

FIGURE 4-1 CONCEPT PLAN KEY MAP

CONCEPT PLAN 1: FIRST STREET AND MAIN STREET

BEFORE

AFTER

First Street and Clover Hill Road

Description

Visitors entering Waterford from the northwest first notice the unique character of the Village upon sight of the old Mill. The traveler is on rural roads before crossing Catoctin Creek on a concrete bridge, which is on a horizontal curve that is super-elevated, giving the motorist an opportunity to comfortably speed up as they enter Waterford. The bridge provides 15-foot wide lanes for each direction of travel. There is a 400-foot-long stretch of First Street between the bridge and the Mill. First Street does not have a speed limit sign. Nearly 90 percent of vehicles were observed exceeding 20 mph with 64 percent exceeding 25 mph. Traffic counts obtained from VDOT indicated 750 vehicles per day use First Street, however, counts conducted in April 2003 for this study tallied an average of 1,660 vehicles per day. There is no roadway striping on First Street or the bridge over Catoctin Creek.

Clover Hill Road intersects First Street as a skewed "T" intersection on the east side of the Catoctin Creek bridge. The only traffic control at the intersection is a stop sign on Clover Hill Road. The volume of traffic on Clover Hill Road is very low, observed in April 2003 during the morning and afternoon peak traffic periods with less than 15 vehicles per hour.

The sharp horizontal curve at the intersection of Main Street, First Street, John Brown's Road, and Bond Street creates an existing traffic calming measure. The number of vehicles turning to and from John Brown's Road and Bond Street is assumed to be very light, except perhaps during events at the nearby church.

While "Beauregard" the statuesque lion oversees the intersection from his promontory, the infrequent motorist misjudges the inside of the roadway curve and sometimes collides with the edge of the old Mill building. These mishaps are evidenced by the chipped bricks on the corner of the building a few feet above ground level. The roadway is 22 feet wide through the curve and on the approaches along both First and Main Streets.

Recommendations

It is important to preserve the historic relationship of rural transition to the village by maintaining the old Mill as the first hint of entering a populated area. In no other place is it critical to follow the community's mantra "less is more." The following traffic calming measures and other modifications are proposed for this area of the village:

- Reduce the speed of vehicles entering the village by painting a double-yellow centerline stripe on the bridge over Catoctin Creek.
- For a length of 15 feet, place concrete pavers one foot in width that resemble stone or cobbles in the median of First Street beginning at the east end of the bridge over Catoctin Creek. Do not paint a centerline stripe on the cobbles or asphalt, only on the bridge surface.
- Reduce corner radii of the Clover Hill Road intersection by realigning to more closely resemble a "T."

Waterford

Bury the Wires and Tame the Traffic

BEFORE

AFTER

Main Street and John Brown Road

- Plant vegetation on both sides of Clover Hill Road close to the intersection with First Street to enclose the visual field-of-view for motorists crossing the Catoctin Creek bridge on their way into the Village.
- To reduce the frequency of vehicles crashing into the northeast corner of the old Mill building, rebuild First Street to its present width of 19 feet of pavement by moving the street a few feet to the north.
- Remove the utility pole that sits a few feet off of the north side of First Street and pave from the site of the old pole back to the existing pavement on First Street.
- Remove a few feet of existing asphalt on the south side near the Mill building and replace it with a combination of edge treatment and historic-looking walking path surface treatment. The recommended edge treatment would be one foot wide with exposed aggregate stone and/or crushed red brick material to match the facade of the Mill.
- The walking path would be no more than two feet in width and provide a surface that primarily complements that historic structure and secondarily avoids vehicular encroachment so that the stray pedestrian can pass safely. (It is not the intent that the recommendations at this location meet the requirements of the Americans with Disabilities Act since there are no suitable walkways near this spot.)
- Maintain present promontory for "Beauregard" the leonine statue watching over the intersection of First Street, Main Street, Bond Street, and John Brown's Road.
- Plant vegetation on both sides of John Brown's Road close to the intersection with First Street to enclose the visual field-of-view for approaching motorists. The narrowed field-of-vision will naturally cause motorists to slow down.
- Avoid roadway encroachment on the workshop building that sits near the southeast corner of the intersection of First Street, Main Street, Bond Street and John Brown's Road.

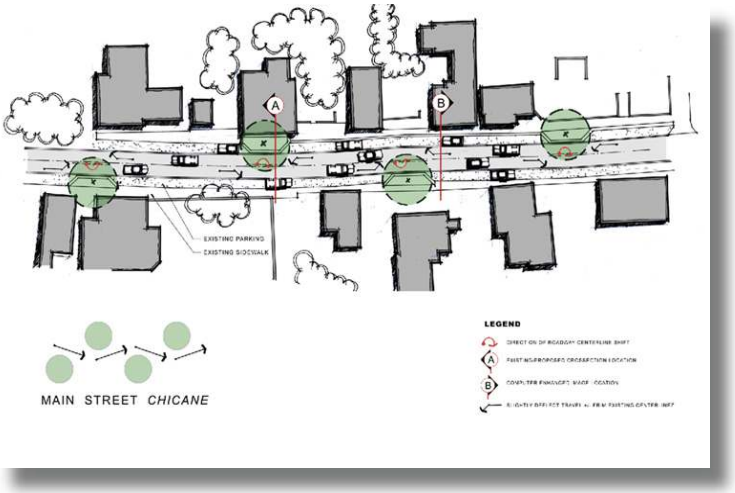
Anticipated Results

The behavior of "rogue" drivers who grossly exceed the reasonable speed of 25 mph should be altered with these measures. The spacing of about 400 feet between the existing traffic calming measure (sharp curve) at the old Mill and the recommended calming measure at the Catoctin Creek bridge is appropriate for encouraging 25 mph speeds (Source: *ITE Traffic Calming – State of the Practice*, 1999, p. 63).

The combination of measures at the Catoctin Creek bridge location will encourage motorists traveling eastbound to "hug" the curve rather than encroach into the median, thereby reducing vehicle speeds through the curve. The narrowed field-of-vision caused by additional trees and landscaping will naturally cause motorists to slow down.

It may be possible to sharpen the already tight horizontal curve where lower Main Street turns around the Mill and becomes First Street. A sharper curve will promote even slower speeds in the immediate vicinity. The recommended lateral shift in the alignment of First Street will reduce the frequency of collisions with the Mill building, improve the safety and security of pedestrians passing near the Mill, and slightly increase the sight distance for Main Street traffic of oncoming vehicles.

CONCEPT PLAN 2: MAIN STREET



Description

Main Street in Waterford is lined with the majority of the 19th century structures in the village. Consistent with the 19th century design, this narrow road is just wide enough to allow two cars to pass each other, if one pulls over to allow the other to pass. Cars are allowed to park on either side of the road, and some trees exist at the edge of pavement, creating additional obstacles.

The pavement width varies along this corridor. The total width between curbs/sidewalks is 30 feet, consistent with the prescriptive easement owned by the Commonwealth of Virginia for the roadway. For 750 feet, from the Post Office to the wooden bridge, vehicles must navigate through the obstacles of parked cars, trees, and on-coming traffic. However, when the road is clear, motorists have been observed to travel at speeds greater than the 20 mph speed limit. West of the wooden bridge, the asphalt is narrow (approximately 18 feet), and drivers must slow as they approach the corner of the old mill building at the First Street/Bond Street intersection.

On either side of the wooden bridge, it is apparent that the roadway elevation is higher than its historic elevations. The sidewalk to the east of the bridge and the areas to the west of the bridge are approximately 2 feet lower than the roadway.

On the south side of Main Street, east of the bridge, the asphalt slopes sharply down to the old curb. The asphalt slope actually begins at the top of the crest near the Post Office and continues to a culvert just before the wooden bridge, growing wider and deeper. According to VDOT, this sloped pavement was the result of paving an eroding roadside ditch. Drainage along Lower Main Street consists of the paved ditch, but is otherwise undefined. Citizens have expressed concerns over the height of the roadway and the presence of the sloping asphalt. Pedestrian and vehicle safety is an issue.

The sidewalks along Main Street are made of a variety of materials, including brick, stone, gravel, and sand. Trees and utility poles sometimes interrupt the sidewalk, as well as the parking areas along the roadway. Citizens have indicated that the presence of the trees along the roadway, as well as the parked cars, is preferred. Both the trees and the cars provide traffic calming.

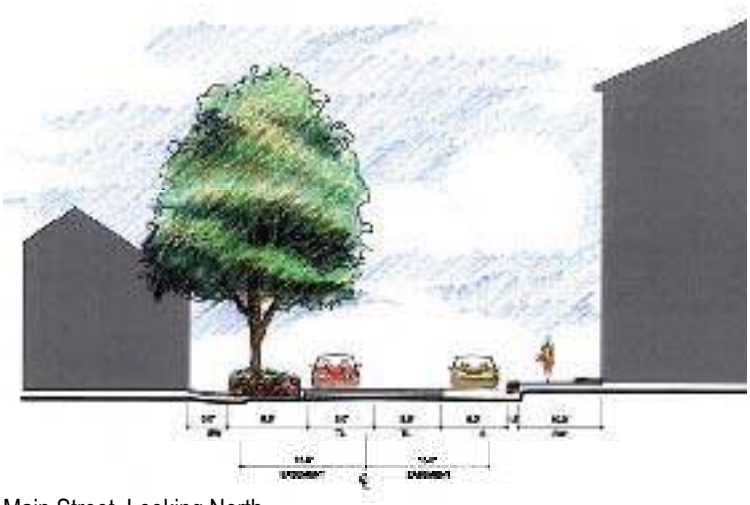
BEFORE

AFTER

Main Street at Bridge over Tannery Creek

Waterford

Bury the Wires and Tame the Traffic



Main Street, Looking North

Recommendations

The following traffic calming measures and other modifications are proposed for lower Main Street:

- Lower the elevation of the roadway along the length from the Corner Store intersection to the wooden bridge.
- Lower the elevation of the roadway just west of the wooden bridge and match elevation of the First Street/ Bond Street intersection.
- Replace the wooden bridge with a concrete "hump back bridge," with a stone veneer resembling native materials. Lowered roadway on either side of bridge will provide the needed change in elevation.
- Add concrete pavers, 1 foot in width, resembling stone or cobbles, along the north edge of the roadway asphalt.
- Add valley gutter (2 feet wide) along south edge of roadway.
- On either side of the roadway, improve the remaining 6 feet of parking areas to the curb line.
- Repair existing sidewalks and curbs with native materials, consistent with existing materials in place (i.e, brick, stone, etc.).
- Install bulb-out to protect existing trees and provide traffic calming measure.
- In appropriate locations, plant additional trees and install bulb-outs.
- Install inlets in valley gutter to convey drainage toward creek at new hump back bridge. Add pipe culvert and install new outfall at creek.
- Improve ditches west of the new hump back bridge and install inlet and pipe pipe culvert to convey drainage from north of the road to the south and on to the creek.
- Consider in-line treatment of stormwater or modification to creek downstream of bridge to treat/retain stormwater with pond or state-of-the-art in-line treatment system.
- Plant trees at appropriate locations.
- Add pedestrian level light poles and fixtures at appropriate locations.

BEFORE

AFTER

Main Street, Looking North

Waterford

Bury the Wires and Tame the Traffic

Anticipated Results

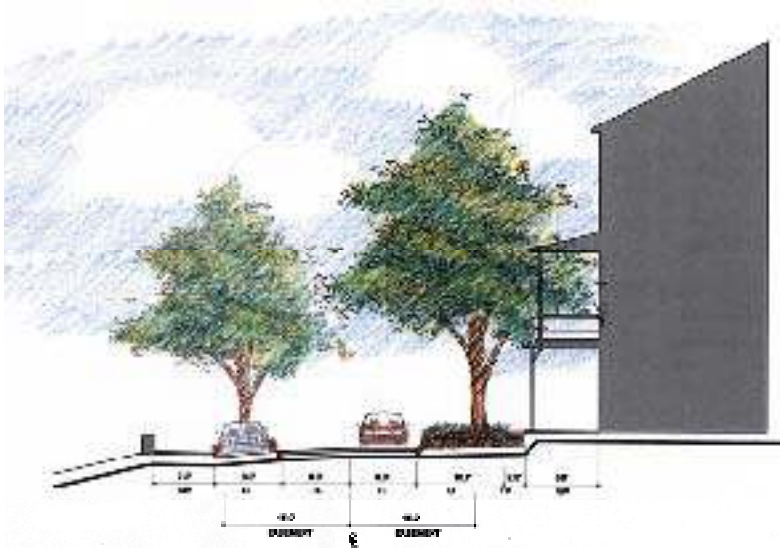
Lowering the roadway from 1 to 2 feet will return Main Street to its historic elevations and allow a hump back bridge to provide an aesthetic crossing and a traffic calming measure. Defining the edges of roadway along the length of lower Main Street will appear to narrow the travel way, and it will better designate parking areas. While speeds are not a major concern along this segment, the "rumbling" effect of the pavers will cause drivers to slow and remain in the lane. The resulting series of bulb-outs (with trees) and parking areas should provide a "chicane" effect for traffic, creating the need for opposing traffic to alternate through parked cars and trees.

Drainage improvements will complete the project and allow a better flow of drainage from the Corner Store intersection and along Main Street. The resulting width of asphalt roadway should about 15-16 feet, and it should slope toward the valley gutter. Each parking area should also slope to valley gutter. Additional trees will improve aesthetics. Additional lighting will provide a measure of safety for motorists and pedestrians.

BEFORE

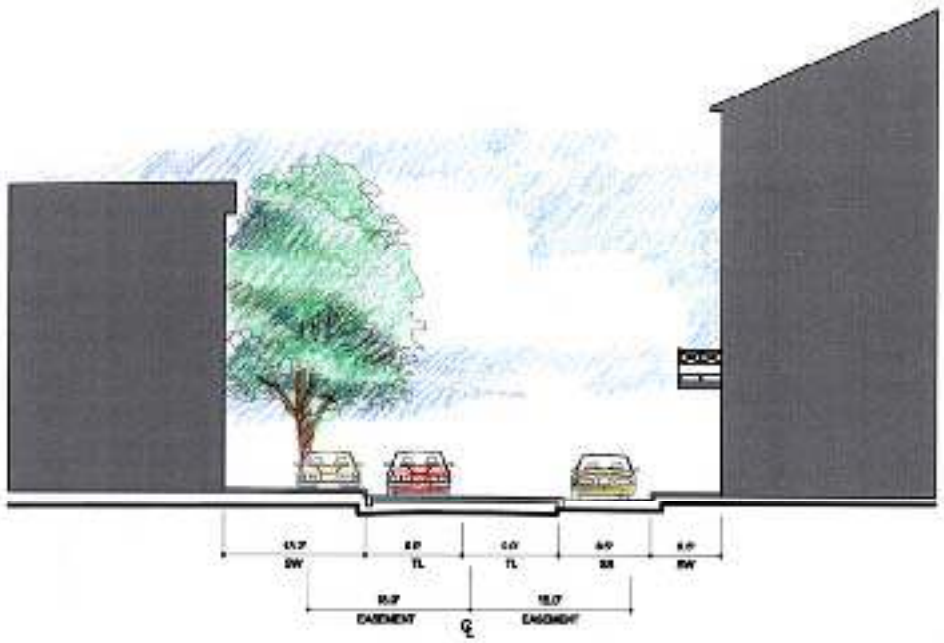
AFTER

Main Street, Looking Southeast



Main Street, Looking North

CONCEPT PLAN 3: MAIN STREET, SECOND STREET, AND WATER STREET



Description

The intersection of Main Street, Second Street, and Water Street is the historic center of the Village of Waterford. The Corner Store is one of the most recognizable structures in historic photos of Waterford. Other prominent buildings at this intersection include the Pink House, Post Office, Insurance Building (Map Maker's Shop), and the Tin Shop. This intersection handles 1,800 to 2,000 vehicles per day, while accommodating a significant number of pedestrians that frequent the Post Office, Corner Store, and the convenience store just south of this intersection. Also, many vehicles park along the edges of this intersection.

The approaches of Second Street, upper Main Street (coming down the hill), and Water Street are controlled with stop signs. However, the approach from lower Main Street is not stop controlled, and numerous comments were received by the study team about concerns with vehicles rounding the corner from lower Main Street to Second Street at too high a speed, especially given the presence of pedestrians.

At this intersection, the pavement is generally at a higher level than the adjacent sidewalks, especially along the west side of the intersection, along curve from lower Main Street to Second Street. Concerns were also voiced by the citizens about the lack of safe pedestrian access at this location, i.e., having to step up a steep slope from the sidewalk to cross the road.

In addition, concerns were voiced about poor drainage in this location, especially at the sidewalk linking the Post Office and the Tin Shop. Some curb and gutter exists in this location, but the asphalt is typically at the top of the curb. The historic structures are often exposed to stormwater at the bases of the buildings along the sidewalk, creating the potential for damage to these buildings.

A unique drainage system exists through this intersection. An old concrete channel along Water Street leads to a pipe culvert that conveys drainage from the corner of Water Street and Upper Main Street to under the Corner Store, under Second Street, and under the Tin Shop. The outfall of this system, downstream of the Tin Shop, is in need of maintenance.

Waterford

Bury the Wires and Tame the Traffic

Recommendations

The following traffic calming measures and other modifications are proposed:

- Lower the elevation of the roadway at this intersection to match the elevation of the adjacent sidewalks, considering slope of the intersection pavement for drainage purposes.
- Lower the approaching roadways of Second Street, lower Main Street, and Water Street to 6 inches lower than the finished elevation of the intersection to provide a speed table at this intersection.
- Replace asphalt pavement at the intersection with concrete pavers resembling stone or similar native material. Pavers or a similar material would be used for the extent of the speed table.
- Add concrete pavers, 1 foot in width, resembling stone or cobbles, along the edges of pavement for all approaches to the intersection and at all corners.
- Add stop sign for lower Main Street approach to intersection.
- At the corner of lower Main Street and Second Street, expand the brick sidewalk and provide a landscaped bulb-out, reducing the radius of the corner and reducing width of each roadway crossing for pedestrians.
- At the corner of Second Street and upper Main Street, convert the gravel area in front of the corner store to a brick sidewalk, and reduce the radius. Allow parking in this location, if desired by the citizens.
- At the corner of upper Main Street and Water Street, add section of brick sidewalk and reduce corner radius.
- Along the north side of the intersection, connecting Water Street and lower Main Street, repair the existing brick sidewalk, and extend the sidewalk to the east, adding brick pavers, to connect sidewalk with gravel path extending down the hill on Water Street (see discussion for Water Street improvements). Provide gravel parking area between brick sidewalk and intersection.
- Repair and modify the drainage system in this location. Replace the existing system under the historic structures by picking up flow from an improved drainage system on the north side of Water Street. Add inlets and pipe culvert under Water Street at this intersection, connecting to improved inlet at the corner of upper Main and Water Streets. Add pipe culvert under the intersection, away from the Corner Store, to the area between the Insurance Building and the Post Office. Add inlet at this location and provide pipe culvert to new outfall beyond the two building
- Remove the existing pipe culvert under Second Street between the Corner Store and the Tin Shop. This culvert would no longer be necessary, and its removal will facilitate lowering the roadway in this location.
- Mill and overlay the asphalt of all the approaches to the intersection, prior to the start of the speed table.
- Repair all sidewalks at the intersection.
- Plant trees at appropriate locations.
- Add pedestrian level light poles and fixtures at appropriate locations.

BEFORE

AFTER

Main Street / Second Street / Water Street

Waterford

Bury the Wires and Tame the Traffic

Anticipated Results

Creating a speed table – while still lowering the elevation of the approaches to the intersection as well as the intersection itself – should provide a traffic calming measure consistent with the nature of this intersection. Pedestrian access will be improved. Vehicles will slow prior to the intersection due to the speed table and its vertical displacement, as well as the appearance of a pedestrian plaza type environment.

Bulb-outs at the corners and a reduction in the corner radii will further slow vehicles and enhance pedestrian safety, reducing the distance that pedestrians will need to cross the streets. Edge pavers will better define the intersection, parking areas, and sidewalks, as well as act to hold the concrete pavers and the brick sidewalks in place.

Adding a stop sign to the only approach that does not have a stop sign provides additional safety measure, especially given the propensity of traffic to turn right with minimal sight distance.

Drainage improvements will remove the threat of stormwater from under the Corner Store and the Tin Shop, protecting the historic structures. New inlets and sidewalk improvements, as well as lowering the roadway, will correct the drainage problems on the sidewalks and further protect the historic structures. Additional trees will improve aesthetics. Additional lighting will provide a measure of safety for motorists and pedestrians.

BEFORE

AFTER

Second Street / Main Street

CONCEPT PLAN 4: SECOND STREET AND PATRICK STREET

Description

Unlike High Street's rural through-street appearance, Second Street clearly has a residential look. While relatively narrow (approximately 18 feet wide), its long straight length tempts drivers to exceed the 20 mph speed limit. Edges of the asphalt pavement are extended by narrow gravel shoulders, which appear to be used often. Dozens of vehicles park along this street, and driveways serve the many houses.

Daily traffic along Second Street is approximately 1,500 vehicles. Average speeds exceed the 20 mph speed limit by 5 to 10 mph. About 80 percent of vehicles were observed exceeding 20 mph with 39 percent exceeding 25 mph. Opposing vehicles also slow traffic. The intersections with Patrick and Church Streets are defined only with signs and asphalt pavement and don't necessarily slow the traffic, unless vehicles are entering Second Street. As with all speed limit signs in the village, the regulatory speed limit signs on Second Street have an additional sign stating $200 will be added to any speeding fines. There are no other traffic control devices, and there are no pavement markings.

Roadside ditches and several culverts convey stormwater away from Second Street and toward Catoctin Creek, but many of the ditches are in need of repair. Standing water was observed along the roadsides well after storms. Drainage inlets appeared clogged and overgrown.

Patrick Street serves as unwanted shortcut for traffic traveling through Waterford to and from points northwest of the village. The street is a narrow roadway (approximately 14 feet) paved from Second Street to High Street. Parallel to the street is a concrete curb and brick sidewalk in various states of repair. Traffic on this street is relatively light, with approximately 300 vehicles per day, and pedestrians were observed to use this street frequently. The approach to Second Street is control by a stop sign.

BEFORE

AFTER

Second Street at Church Street

Waterford

Bury the Wires and Tame the Traffic

Recommendations

The following traffic calming measures and other modifications are proposed:

- At Patrick Street, reduce the radius of each corner to 20 feet, and add concrete pavers along the corners. Connect curb and gutter drainage system to Second Street drainage system.
- At Church Street, define parking area with concrete pavers along edges of intersection. Also, install a planter box or tree well and tree, with concrete or granite curbing at the northeast corner of the intersection.
- At the approximate midway point between Janney and Patrick Streets, add trees and provide concrete or stone curbing and speed table along Second Street to protect the trees and provide a narrowing effect for traffic.
- Regrade, repair, and reseed roadside ditches along Second Street to better convey stormwater, eliminate ponding, and fix erosion. Repair and/or replace intersection and driveway culverts.
- Improve ditch along the east side of Second Street to the south of Patrick Street. Repair/modify storm sewer system to collects flows from inlets at Patrick Street and Church Street.
- Mill and overlay the asphalt along the length of Second Street.
- Repair sidewalks along Second Street and add new sidewalks/walking paths to connect the existing sidewalks.
- Repair brick sidewalk along the entire length of Patrick.
- Add curb and gutter between brick sidewalk and roadway, with intermittent inlets collecting runoff from entire width of roadway and conveying runoff towards Second Street, joining the drainage system at that location.
- Plant trees at appropriate locations.
- Add pedestrian level light poles and fixtures at intersections and driveways and other appropriate locations.

BEFORE

AFTER

Second Street at Patrick Street

Anticipated Results

Defining the edges of roadway along portions of Second Street, will appear to narrow the travel way and minimize the use of what is now the extra width due to the narrow gravel shoulders. The "rumbling" effect of the pavers will cause drivers to slow and remain in their travel lanes. This measure should reduce speeds by 3 to 5 miles per hour.

The addition of a speed table at the approximate midway point between Janney and Patrick Streets will provide a mid-block traffic calming measure to minimize the speeding between the intersections.

The reduction in the corner radii of the intersections with Patrick Street will minimize slow and roll traffic at the stop signs, reducing speeds on the side streets and discouraging shortcuts. Turning left off of southbound Second Street will also be more difficult with the smaller radius and will discourage shortcuts on Patrick Street. An improved brick sidewalk will enhance the walking experience of residents and visitors.

Additional trees and lighting will enhance safety and provide a pedestrian feel to the roadway, further calming traffic.

BEFORE

AFTER

Second Street Mid-Block

CONCEPT PLAN 5: SECOND STREET, JANNEY STREET, AND FACTORY STREET

Description

As discussed for Concept Plan 4, Second Street's long and narrow look tempts drivers to exceed the 20 mph speed limit. The sharp curve connecting Factory Street (10 mph cautionary speed limit) slows southbound traffic. Opposing vehicles also slow traffic. The intersection with Janney Street is defined only with signs and asphalt pavement and don't necessarily slow the traffic, unless vehicles are entering Second Street.

Janney Street is a narrow roadway (approximately 14 feet) paved only from Second Street for approximately 200 feet and again just before High Street. The road is gravel otherwise. Traffic on this street is light, with approximately 350 vehicles per day. The gravel provides a natural calming affect. The approaches to both Second Street and High Street are controlled by stop signs.

Factory Street links Second Street to Clarkes Gap Road and High Street in a straight path. Motorists were observed increasing speed along this roadway, especially heading toward Clarks Gap Road. Daily volumes range between 500 and 600 vehicles. The stop sign at High Street / Clarkes Gap Road causes travelers to slow on Factory. Traveling westbound on Factory, drivers slow as they approach the sharp curve (15 mph cautionary speed limit) to Second Street.

BEFORE

AFTER

Second Street at Janney Street

BEFORE

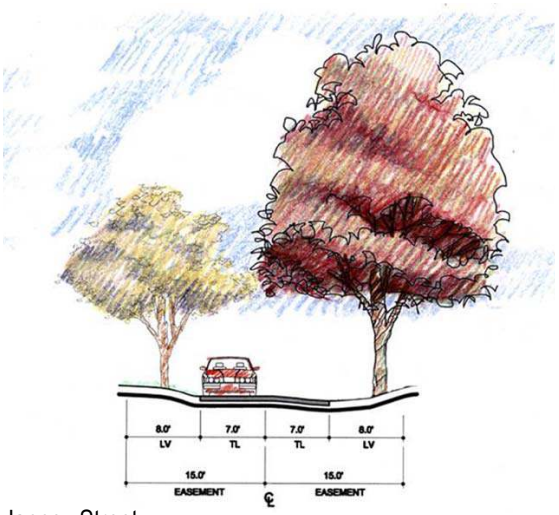
AFTER

Factory Street

Recommendations

The following traffic calming measures and other modifications are thus proposed:

- At Janney Street, widen Second Street approaches by 4 feet and add centerline pavers for 50 feet on either side of intersection, tapering from 1 foot to 4 feet at the intersection.
- Reduce the radius of each corner of Janney Street to 20 feet, and add concrete pavers along the corners to 50 feet east of the intersection.
- Regrade, repair, and reseed roadside ditches along Second Street to better convey stormwater, eliminate ponding, and fix erosion. Repair and/or replace intersection and driveway culverts.
- Repair and/or replace the culvert at the intersection of Second Street and Factory Street. Repair outfall.
- Repair/replace storm sewer system is near the intersection of Second Street and Janney Street. Inlets along the east and west side of Second Street collect runoff, and additional flow is collected from storm sewer running along Janney Street. Repair outfall and regrade ditch along existing gravel drive.
- Add trees at the midway point on Factory between Second Street and High Street (replacing existing utility pole)
- Protect above trees with a bulb-out of concrete pavers or granite curbing along the edge of the roadway, connecting with the existing sidewalk
- Improve the drainage ditch at the above location on either side of Factory Street. This improvement should include regarded/repair ditches along Factory Street, conveying flow down the existing swale along property lines between the nearby lots, to improved outfalls along the back of the lots into the open field.
- Option: Add concrete pavers, 1 foot in width, along both edges of pavement along the length of Factory Street and around the corner transitioning to Second Street.
- Mill and overlay the asphalt.
- Repair and add sidewalks and walking paths
- Regrade and repair gravel portion of Janney Street.
- Regrade and repair of roadsides ditches along both sides of Janney Street, connecting to storm sewers along Second Street.
- Plant trees at appropriate locations throughout.
- Add pedestrian level light poles and fixtures at appropriate locations.



Janney Street

Anticipated Results

Defining the edges of roadway on Second Street (including as an option the curve to Factory Street) will appear to narrow the travel way and minimize the use of what is now the extra width due to the narrow gravel shoulders. The "rumbling" effect of the pavers will cause drivers to slow and remain in their travel lanes. This measure should reduce speeds by 3 to 5 miles per hour.

The slight widening of Second Street at Janney Street, and the addition of centerline pavers will horizontally displace traffic, further reducing speeds. The reduction in the corner radii of the intersections with Janney Street will minimize slow-and-roll traffic at the stop signs, reducing speeds on the side streets and discouraging shortcuts. Turning left off of southbound Second Street will also be more difficult with the smaller radius.

The addition of trees and curb at the midway point along Factory Street will provide a pinching effect resulting in slower speeds in this location. Lighting will enhance vehicle and pedestrian safety. Drainage improvements will better convey stormwater along Factory Street and to drainage outfalls away from the street, improving safety during storms. The reduction in the corner radii of the intersections with Second and Janney will minimize slow and roll traffic, thus reducing the speeds and discouraging shortcuts on Janney Street.

CONCEPT PLAN 6: CLARKES GAP ROAD, HIGH STREET, AND FACTORY STREET

Description

At this location, traffic from the south proceeds from Clarks Gap, rounds a sharp curve (15 mph cautionary speed limit), and enters the village at this intersection. Speeds in the vicinity of this intersection were measured well in excess of the 25 mph speed limit. Over 95 percent of vehicles were observed traveling more than 25 mph, with 71 percent traveling more than 35 mph. The daily traffic volume was measured at approximately 1,500 vehicles in each direction. The centerline double yellow striping of Clarks Gap road ends at this intersection and does not exist on any of the roads in the village (or just north and west of the village).

The Factory Street approach is controlled by a stop sign, but the angle of the intersection and the large corner radius was observed to lead many motorists to roll through the stop from Factory Street to southbound Clarks Gap Road. Vehicles proceeding both north and south on High Street are slowed by the existing horizontal and vertical curves, but pavement is wide enough and traffic light enough to lead some motorists to travel through the intersection and on to points south and north at speeds greater than 25 mph.

Recommendations

The following traffic calming measures and other modifications are proposed:

- Add concrete pavers, 1 foot in width, resembling stone or cobbles, along edges of pavement 300 feet south of the intersection, and 150 feet north and west of the intersection.
- Add concrete pavers at the centerline of Clarks Gaps and High Street, 100 feet north and south of the intersection, tapering from 1 foot at the points furthest from the intersection to 4 feet at the intersection, with a gap across the intersection.
- Widen Clarks Gap Road and High Street at the intersection by 4 feet to accommodate the above centerline treatment.
- Reduce the radius on southwest corner from over 40 feet to 25 feet.
- Mill and overlay the asphalt throughout the intersection.
- Add a valley gutter along the east side of High Street (in place of pavers) with inlets at appropriate locations to collect flow from improved ditches.
- Add pipe culvert to convey flow from east side of intersection to west side, to existing ditch, to existing stream channel.
- Regrade and seed all roadside ditches to improve stormwater flow.
- Plant trees at appropriate locations.
- Add pedestrian level light poles and fixtures (light fixture 8-12 feet above roadway) at the intersection.

Anticipated Results

Defining the edges of roadway in advance of the intersection will appear to narrow the travel way and alert the motorist of the upcoming intersection. The centerline pavers will further define the travel lane and slightly displace vehicles horizontally as they proceed through the intersection. The "rumbling" effect of the pavers will cause drivers to slow and remain in their travel lanes. These measures combined should reduce speeds by 3 to 5 miles per hour.

The reduction in the southwest corner radius will make rolling through the stop sign more difficult for the typical motorist, reducing the number of vehicles that slow and go, and thus reducing the speed on Factory Street. Drainage improvements will better convey stormwater through and away from this intersection. Additional trees and lighting will enhance the appearance of the intersection and provide a measure of safety.

BEFORE

AFTER

Clarkes Gap Road at Factory Street

CONCEPT PLAN 7: HIGH STREET AND JANNEY STREET
CONCEPT PLAN 8: HIGH STREET AND PATRICK STREET

BEFORE

AFTER

Second Street at Janney Street

Description

High Street is a relatively narrow roadway (approximately 18 feet in pavement width), with worn edges of pavement, very narrow gravel shoulders in some locations, and roadway ditches exhibiting erosion and overgrowth of vegetation (especially on the east side) and ponding (on the west side). This section of High Street is not marked with a centerline.

There are no traffic control devices such as stop signs along this section of roadway. The narrow road and the crest at the approximate midway point of this segment serve to slow some traffic, especially when vehicles are approaching each other. However, while the speed limit is 25 mph, some vehicles were observed to be traveling considerably above the speed limit, especially heading downhill from the approximate midway point toward Clarkes Gap Road. Traffic volumes range from 600 to 1,000 vehicles, along this segment. Speeds were measured east of the Patrick Street intersection to be 5-10 mph over the 25 mph speed limit.

BEFORE

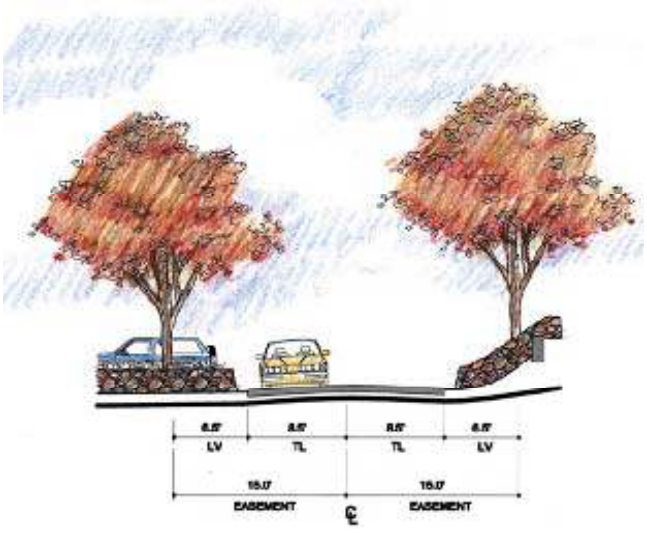
AFTER

High Street Mid-Block

Recommendations

The following traffic calming measures and other modifications are proposed:

- At Janney Street, reduce the radius of each corner to 20 feet, and add concrete pavers along the corners to 50 feet west of the intersection.
- At Patrick Street, reduce the radius of each corner to 20 feet, and add concrete pavers along the corners.
- Enhance the existing stone and concrete staircases on the east side of High Street with additional pavers, additional stone walls, and landscaping.
- Regrade, repair, and reseed roadside ditches along High Street to better convey stormwater, eliminate ponding, and fix erosion. Repair and/or replace intersection and driveway culverts.
- On the crest of the High Street hill between Janney and Patrick Streets, add centerline and edge pavers to High Street.
- Mill and overlay the asphalt along the length of High Street.
- Plant trees at appropriate locations.
- Add pedestrian level light poles and fixtures at intersections, driveways, and other appropriate locations.
- Option: Add sidewalk/walking path along west side of High Street, linking Patrick and Janney Streets.



High Street at Church Parking Lot

BEFORE

AFTER

High Street at Patrick Street

Anticipated Results

Defining the edges of roadway at the intersections will appear to narrow the travel way and minimize the use of what is now the extra width due to the narrow gravel shoulder. The centerline pavers will separate on-coming traffic and narrow the travel lanes. The "rumbling" effect of the pavers will cause drivers to slow and remain in their travel lanes. These measures should reduce speeds by 3 to 5 miles per hour.

Additional trees and the enhancement of the staircases just off the roadway will provide a narrowing effect, further calming traffic. The reduction in the corner radii of the intersections with Janney Street and Patrick Street will minimize slow and roll traffic, thus reducing the speeds and discouraging shortcuts on those streets.

CONCEPT PLAN 9: BUTCHERS ROW, MAIN STREET, AND WATER STREET

BEFORE

AFTER

High Street/Butchers Row at Main Street

Description

High Street and Butchers Row meet at the intersection with the top of Main Street in a horizontal and vertical curve that result in short sight distances. Plenty of trees provide a canopy that make this a quaint intersection, but they contribute to the lack of sight distance. Edges of pavement are undefined, and the large radius at each corner of Main Street and the gravel shoulders gives motorists the appearance of a wide through street. The driveway to the Old Waterford School near this intersection contributes to the concerns of speeding traffic and short sight distances. Both Patrick Street and Main Street provide pedestrians access to functions at the Old School, however, no formal pedestrian crossing exists in this area.

Daily traffic along Butchers Row through this intersection is approximately 1,500 vehicles. Speeds are generally 5 to 10 mph greater than the posted speed limit of 25 mph. The sight distances tend to slow some traffic, especially when vehicles are approaching each other. However, with the relatively light volumes, some vehicles were observed to be traveling considerably above the speed limit.

There are no traffic control devices such as stop signs along this section of roadway. This section of High Street/ Butchers Row is not marked with a centerline. Main Street is signed as a one-way street away from the intersection and down a steep hill toward the Corner Store. Residences line each side of this narrow (14 feet wide) street. Cars park on either side of the street. Traffic volumes are approximately 200 vehicles per day. Speed has not been an issue, given the stop condition at the bottom of the hill. Drainage is provided by roadside ditches that are in need of general maintenance.

Water Street is a narrow 14-foot wide street connecting the northeastern entryway into Waterford with Main Street. The 900-foot stretch from Main Street to Loyalty Road is characterized by a dense tree canopy and few buildings. An historic hedgerow exists on the north side of the street. Near Main Street, an open U-shaped concrete channel provides a nostalgic element. Water Street is lightly traveled, with 300 vehicles per day (counted in April 2003), compared with over 1,400 vehicles per day on Loyalty Road near its intersection with Water Street. A much higher proportion of Loyalty Road traffic uses High Street than Water Street. Nearly 90 percent of vehicles were observed traveling more than 20 mph, with 63 percent exceeding 25 mph and 31 percent exceeding 30 mph.

An important observation is the direct link that Water Street provides between the Waterford Elementary School and Main Street – the community center of Waterford. The narrow pavement on Water Street, combined with no suitable shoulder to walk on, creates a challenge for pedestrians. Water Street is not safe for young pedestrians, despite a desire to for children and adults to be able to walk between the school and Main Street.

The northeastern access into the Village of Waterford on Loyalty Road splits at this intersection with relatively high-speed turns to Water Street and to Butchers Row. The “T” intersection is characterized by a change in elevation and a center circular island with a utility pole placed inside the island. Based on morning and afternoon peak hour traffic counts conducted in April 2003, about 85 to 90 percent of traffic on Loyalty Road continues on Butchers Row. The only traffic control at this intersection is a STOP sign for the approach on Water Street.

Waterford

Bury the Wires and Tame the Traffic

Recommendations

The following traffic calming measures and other modifications are proposed:

- Replace the asphalt roadway surface at the Main Street/High Street/Butchers Row intersection with wide concrete paving blocks, textured to resemble small cobble stones, approximately 50 feet north, south, and west of the intersection.
- Add concrete pavers, 1 foot in width, resembling stone or cobbles, along the edges of High Street and Butchers Row, as well as along Main Street for approximately 50 feet, and along Fairfax Street for approximately 50 feet.
- Reduce the radius of each corner with Main Street to 25 feet.
- Reduce the radius of each corner with Fairfax Street to 25 feet.
- Regrade and repair of ditches. Repair or replace the culverts.
- Add pedestrian level light poles and fixtures at appropriate locations at this intersection and at the adjacent driveways.
- Define the edges of pavement and parking areas along Main Street by adding concrete pavers.
- Match the elevation of the roadway of Main Street at the bottom of the hill with the elevation of the speed table. An additional change in elevation (i.e., a rise to the speed table) is not necessary at this location.
- Plant trees at appropriate locations.
- Add pedestrian level light poles and fixtures at appropriate locations.
- Build a speed table on Water Street.
- Build a walkway on the north side of Water Street to connect the Waterford Elementary School with Main Street. The surface material should be weather-proof and should be designed to meet the requirements of the Americans with Disabilities Act.
- At the intersection of Butchers Row, Loyalty Road, and Water Street, modify the center island. Reduce the radius of the curve on the northern edge of Loyalty Road connecting to Water Street to slow traffic as motorists transition to Water Street. Replace the asphalt with planted materials including trees that can be limbed-up to provide sight distance under the tree canopy for motorists at the intersection.
- Plant street trees at appropriate locations along the north side of Loyalty Road.
- Add concrete pavers, one foot in width, resembling stone or cobbles, along the edges of pavement.
- Repair and/or replace the culvert under Water Street running along the north side of Butchers Row.
- Avoid encroachment on the stone wall at the west side of the intersection.

Anticipated Results:

Defining the edges of the roadway, including the smaller corners of the intersection with Main Street will appear to narrow the travel way and minimize the use of what is now the extra width due to the gravel shoulder and large corners. The “rumbling” effect of the pavers will also cause drivers to slow and remain in their travel lanes. The further measure of concrete pavement with small cobbles provides a change

BEFORE

AFTER

Water Street

in roadway surface. The cobbling is intended to provide a different feel to the driver, but it is meant to be much less noisy to the residents than larger cobble stones. These combined measures should reduce speeds by up to 5 miles per hour at this intersection.

Additional trees and the lighting will enhance the narrowing effect, further calming traffic and providing a measure of safety.

Defining the edges of roadway along the length of Main Street (the Big Hill) will better designate parking areas. While speeds are not a major concern along this segment, the "rumbling" effect of the pavers will cause drivers to slow and remain in the lane.

Drainage improvements will complete the project and allow a better flow of drainage to the improvements at the Corner Store intersection. Additional trees will improve aesthetics. Additional lighting will provide a measure of safety for motorists and pedestrians.

While the proportion of vehicles using Water Street that speed is comparable to other Waterford study streets, the volume of 300 vehicles per day is considerably lower. While an adjacent walkway may not seem to be a priority, it is nevertheless recommended by the study team as a considerable community amenity that will enhance the safety and security of not only schoolchildren, but all pedestrians who use it. The recommended speed table to correspond with an improved pipe culvert is another amenity that will reinforce the importance of the conveyance of water along Water Street.

Making Water Street more of a "T" with Butchers Row and Loyalty Road, turning vehicles will slow, and when other vehicles are trailing, this will have the affect of slowing all vehicles as the lead vehicle turns onto Water Street.

Defining the edges of roadway along the length of Loyalty Road and Butchers Row, including the curves, will appear to narrow the travel way. The narrowing of the intersection should reduce vehicular speeds on the transition from Loyalty Road to Water Street significantly in that the recommendation is for a 20 miles per hour design speed.

BEFORE

AFTER

Butchers Row, Water Street, and Loyalty Road

BEFORE

AFTER

Loyalty Road, Butchers Row, and Water Street

CONCEPT PLAN 10: LOYALTY ROAD AT SCHOOL ENTRANCE
CONCEPT PLAN 11: LOYALTY ROAD AT BROWNS LANE

Description

The northeastern access into the Village of Waterford is on Loyalty Road. The roadway is 19 feet wide with grass drainage ditches on both sides. The entry is marked with traffic signs posted for 25 mph speed limit, school flashing signal, School Bus Stop Ahead, and curve ahead. The intersection of Loyalty Road and Browns Lane is a "T" intersection near the study area limits. Browns Lane has a steep uphill approach to the intersection with Loyalty Road with a STOP sign for traffic approaching on Browns Lane. Vehicular speeds recorded in April 2003 show that 72 percent of all vehicles exceeded the 25 mph speed limit while 33 percent exceeded 30 mph. These were recorded in both directions on Loyalty Road between the Waterford Elementary School entrance and the Butchers Row/Water Street intersection. The traffic count at this location shows an average of 1,430 vehicles per day.

The intersection of Loyalty Road and the Waterford Elementary School is controlled by STOP signs on the side streets; that is, Loyalty Road traffic does not stop. While traffic counts at the intersection are not available, it is not likely there is enough traffic to warrant a traffic signal. The subject of signalized intersections was discussed with citizens and the stakeholder group during this study and strongly rejected by local citizens as too urban in design.

BEFORE

AFTER

Loyalty Street at Elementary School Entrance

Recommendations

The following traffic calming measures and other modifications are proposed:

- Reduce the radius of the curves on the northeastern and southeastern corners of the intersection of Loyalty Road and Browns Lane to slow traffic as motorists turn on and off of Loyalty Road. Replace the asphalt with planted materials including trees that can be limbed-up to provide sight distance under the tree canopy for motorists at the intersection.
- Add concrete pavers, one foot in width, resembling stone or cobbles, along the edges of pavement from Browns Lane to Butchers Row.
- Reduce the radius of the curves on the southeastern and southwestern corners of the intersection of Loyalty Road/Waterford Elementary School/Old Waterford Road to slow traffic as motorists turn on and off of Loyalty Road. Replace the asphalt with planted materials including trees that can be limbed-up to provide sight distance under the tree canopy for motorists at the intersection.

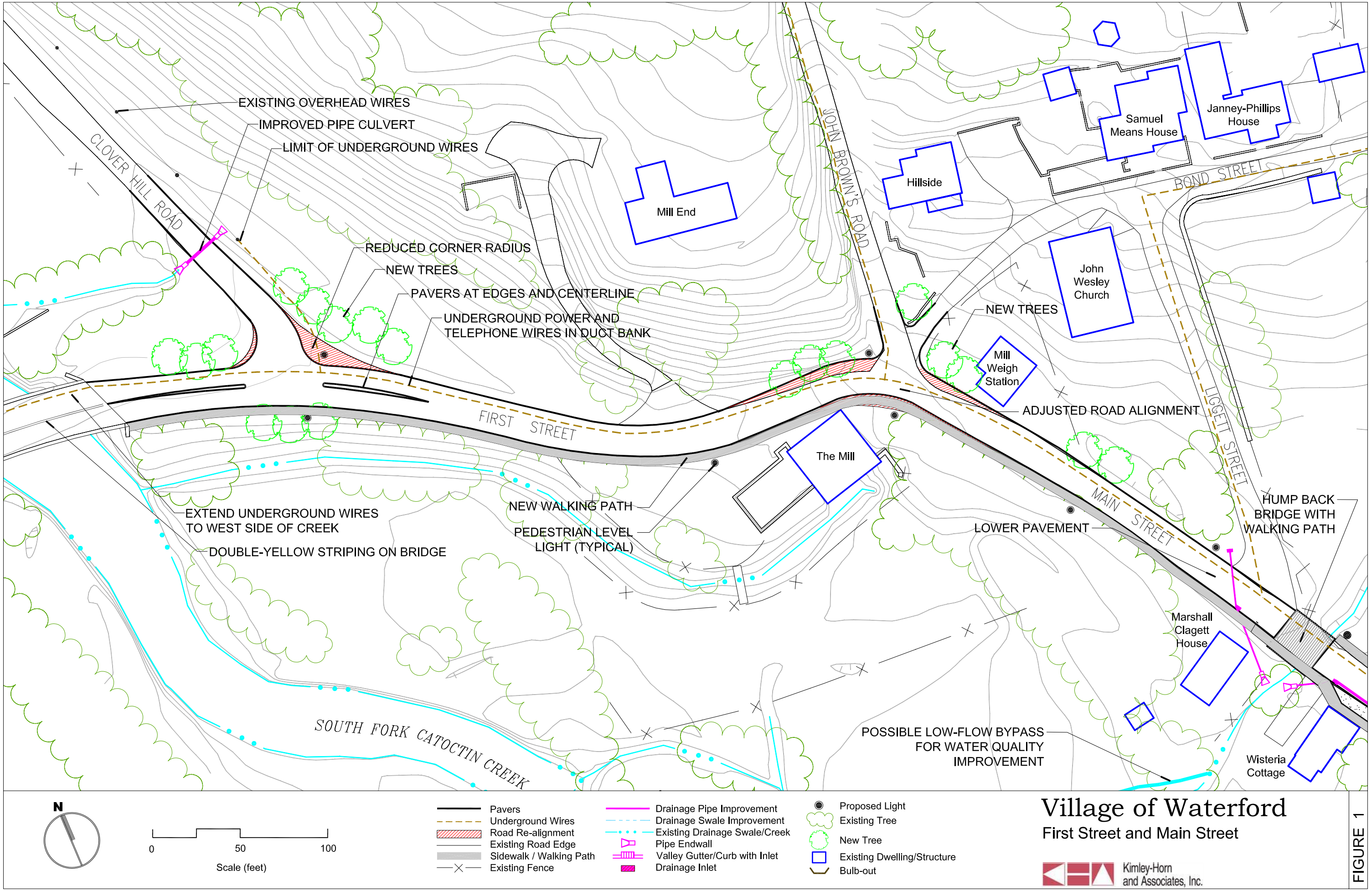
Anticipated Results

The recommended measures along Loyalty Road should reduce vehicular speeds by 3 to 5 miles per hour and reduce the number of rogue speeders.

BEFORE

AFTER

Loyalty Street at Brown's Lane

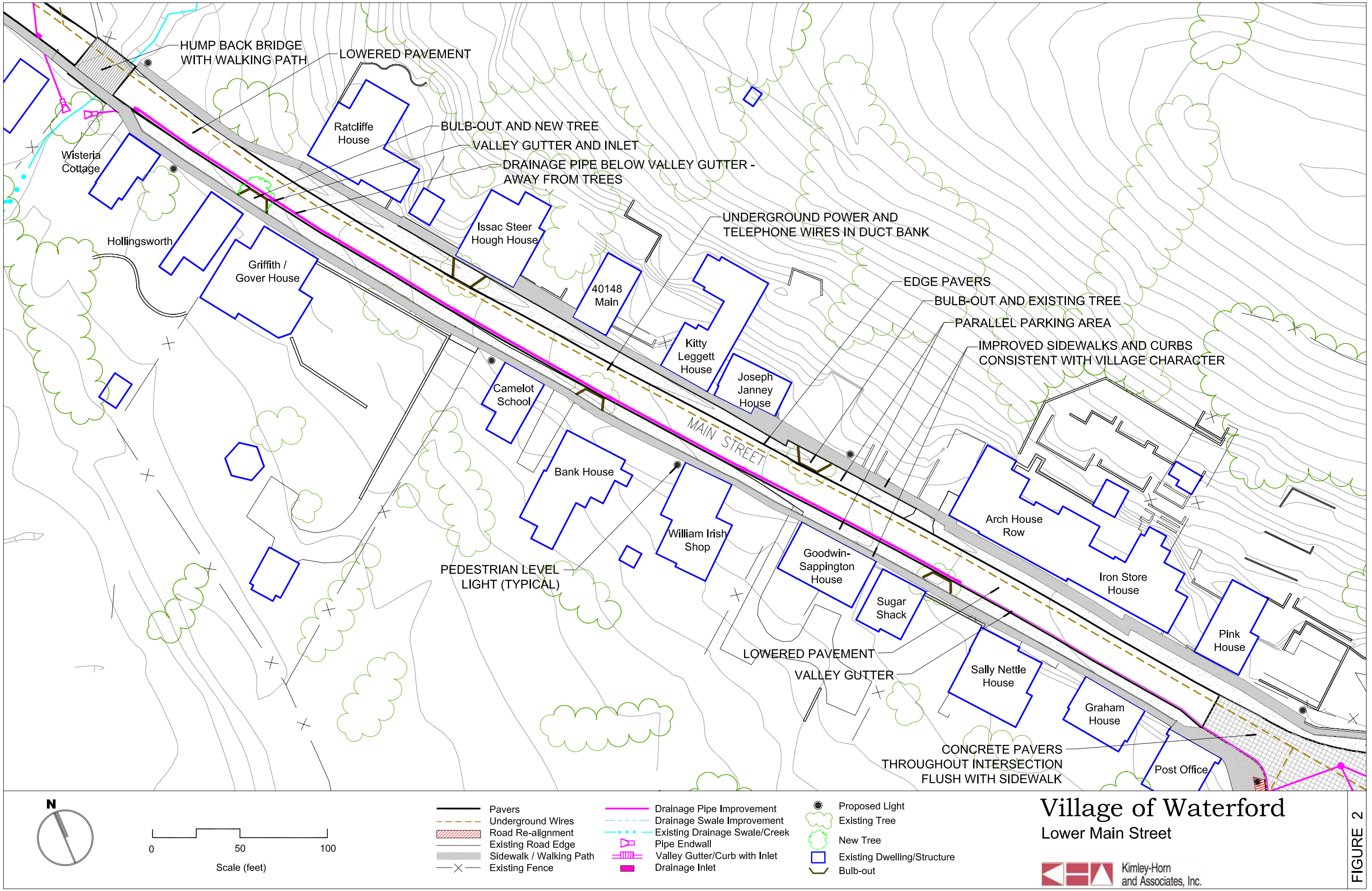


Village of Waterford

First Street and Main Street

Kimley-Horn and Associates, Inc.

FIGURE 1

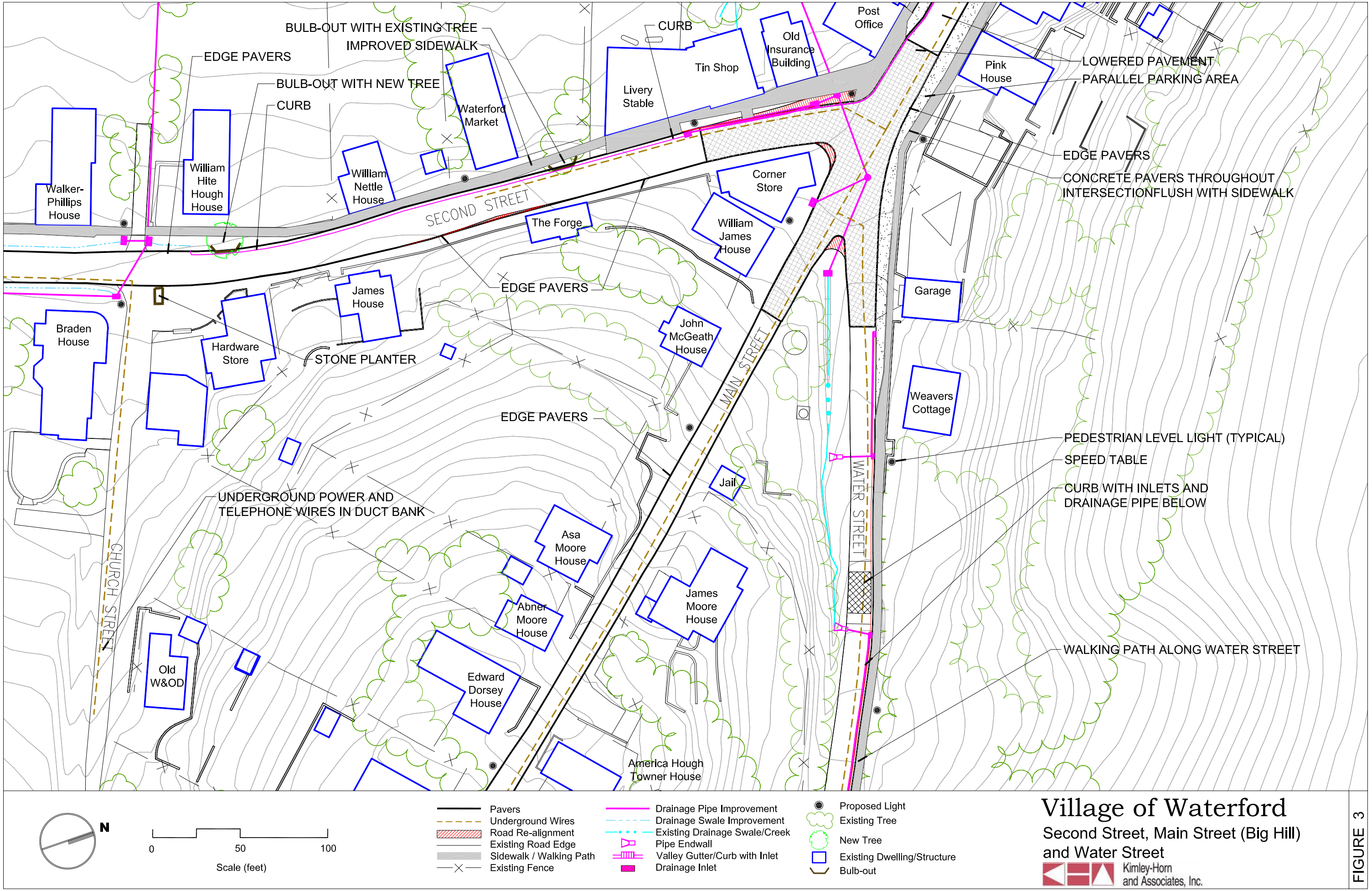


Village of Waterford

Lower Main Street

Kimley-Horn and Associates, Inc.

FIGURE 2



Village of Waterford

Second Street, Main Street (Big Hill) and Water Street

Kimley-Horn and Associates, Inc.

FIGURE 3

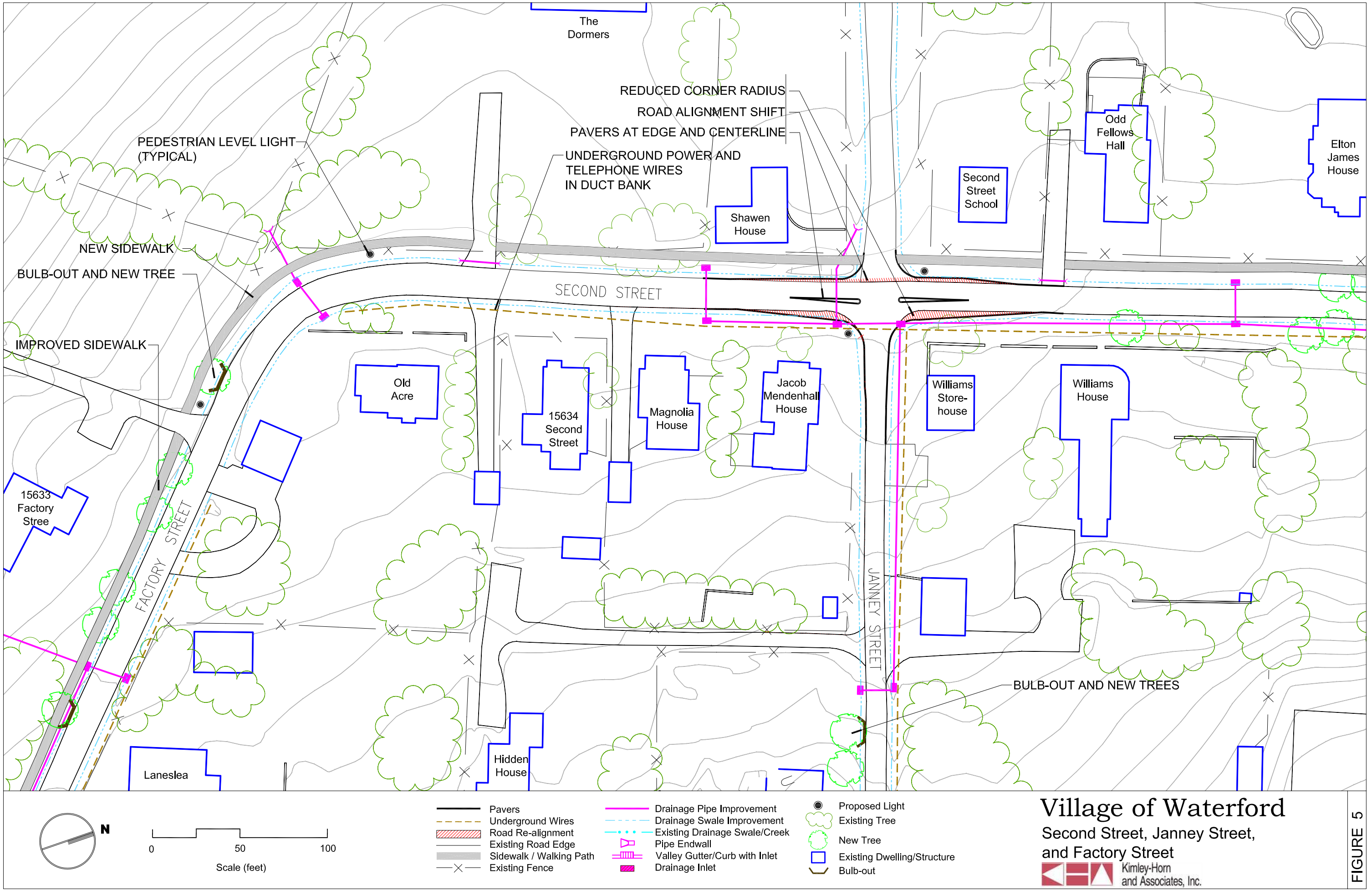
UNDERGROUND POWER AND TELEPHONE WIRES IN DUCT BANK
EDGE PAVERS
SPEED TABLE
NEW TREES
Flavius Beans House
Ashbury Johnson House
Mahlon Schooley House
Parker-Bennet House
Merchant House
Catoctin Creek
Samuel Hough House
Doctors House
SECOND STREET
Samuel Steer House
Sunnyside
Trouble Enough Indeed
Robin House
EDGE PAVERS
REDUCED CORNER RADIUS
PEDESTRIAN LEVEL LIGHT (TYPICAL)
CURB AND INLETS WITH PIPE BELOW
BULB-OUT AND NEW TREE
IMPROVED SIDEWALK
IMPROVED ROAD SURFACE
Other Old Insurance Building
Lemuel Smith House
PATRICK STREET
N
0
50
100
Scale (feet)
Pavers
Underground Wires
Road Re-alignment
Existing Road Edge
Sidewalk / Walking Path
Existing Fence
Drainage Pipe Improvement
Drainage Swale Improvement
Existing Drainage Swale/Creek
Pipe Endwall
Valley Gutter/Curb with Inlet
Drainage Inlet
Proposed Light
Existing Tree
New Tree
Existing Dwelling/Structure
Bulb-out

Village of Waterford

Second Street and Patrick Street

Kimley-Horn and Associates, Inc.

FIGURE 4



Village of Waterford

Second Street, Janney Street, and Factory Street

Kimley-Horn and Associates, Inc.

FIGURE 5

Mill Run

IMPROVED SIDEWALK

Laneslea

UNDERGROUND POWER AND TELEPHONE WIRES IN DUCT BANK

FACTORY STREET

Leslie Myers House

Boxwood Walk

REDUCED TURNING RADIUS

PAVERS AT EDGES AND CENTERLINE

NEW TREES

PEDESTRIAN LEVEL LIGHT (TYPICAL)

HIGH STREET

Coale's Blacksmith Shop

Ephraim Schooley House

MINOR ROAD RE-ALIGNMENT TO ACCOMODATE CALMING MEASURE

15676 High Street

CLARKES GAP ROAD

N

0 50 100

Scale (feet)

Pavers
Underground Wires
Road Re-alignment
Existing Road Edge
Sidewalk / Walking Path
Existing Fence

Drainage Pipe Improvement
Drainage Swale Improvement
Existing Drainage Swale/Creek
Pipe Endwall
Valley Gutter/Curb with Inlet
Drainage Inlet

Proposed Light
Existing Tree
New Tree
Existing Dwelling/Structure
Bulb-out

Village of Waterford

Clarkes Gap Road, High Street, and Factory Street

Kimley-Horn and Associates, Inc.

FIGURE 6

JANNEY STREET

Simms House

40171 Janney Street

Steer-Devine House

Loudoun Mutual Insurance Company

PEDESTRIAN LEVEL LIGHT (TYPICAL)

LOW ROCK WALL WITH LANDSCAPING

UNDERGROUND POWER AND TELEPHONE WIRES IN DUCT BANK

HIGH STREET

PAVERS AT EDGE AND CENTERLINE

REDUCED CORNER RADIUS

N

0 50 100

Scale (feet)

Pavers
Underground Wires
Road Re-alignment
Existing Road Edge
Sidewalk / Walking Path
Existing Fence

Drainage Pipe Improvement
Drainage Swale Improvement
Existing Drainage Swale/Creek
Pipe Endwall
Valley Gutter/Curb with Inlet
Drainage Inlet

Proposed Light
Existing Tree
New Tree
Existing Dwelling/Structure
Bulb-out

Village of Waterford

High Street and Janney Street

Kimley-Horn and Associates, Inc.

FIGURE 7

Monroe Hough House

The Captain's House

PATRICK STREET

IMPROVED SIDEWALK

CURB AND INLETS WITH PIPE BELOW

Presbyterian Manse

Catoctin Presbyterian Church

PEDESTRIAN LEVEL LIGHT (TYPICAL)

PAVERS AT EDGE AND CENTERLINE

REDUCED CORNER RADIUS

Waterford Baptist Church

UNDERGROUND POWER AND TELEPHONE WIRES IN DUCT BANK

NEW TREES

Methodist Church

HIGH STREET

ENHANCED LOW STONE WALL

Huntley Farm

Edith Walker House

40231 Fairfax Street

REDUCED CORNER RADIUS

PAVERS AT EDGE AND CENTERLINE

CONCRETE PAVERS THROUGHOUT INTERSECTION (NOT A SPEED TABLE)

N

0 50 100

Scale (feet)

Pavers
Underground Wires
Road Re-alignment
Existing Road Edge
Sidewalk / Walking Path
Existing Fence

Drainage Pipe Improvement
Drainage Swale Improvement
Existing Drainage Swale/Creek
Pipe Endwall
Valley Gutter/Curb with Inlet
Drainage Inlet

Proposed Light
Existing Tree
New Tree
Existing Dwelling/Structure
Bulb-out

Village of Waterford

High Street and Patrick Street

Kimley-Horn and Associates, Inc.

FIGURE 8

UNDERGROUND POWER AND
TELEPHONE WIRES
IN DUCT BANK

EDGE PAVERS

WALKING PATH

CURB AND INLETS WITH PIPE BELOW

PEDESTRIAN LEVEL LIGHT (TYPICAL)

ALTERNATE WALKING PATH ROUTE

EDGE PAVERS

NEW TREES

REDUCED CORNER RADIUS

WATER STREET

America
Hough
Towner
House

UNDERGROUND POWER AND
TELEPHONE WIRES IN DUCT BANK

EDGE PAVERS

James
Lewis
House

Mahlon
Myers
House

MODIFIED ISLAND
WITH EDGE PAVERS
AND LANDSCAPING

MAIN STREET

Charles
and George
Schooley
House

Lloyd
Curtis
House

Market
Hill

BUTCHERS ROW

Hough
House

Old School

Myers-
Haines
House

Methodist
Church

PAVERS AT EDGE AND CENTERLINE

REDUCE CORNER RADIUS

CONCRETE PAVERS
THROUGHOUT INTERSECTION
(NOT A SPEED TABLE)

N

0 50 100

Scale (feet)

Pavers
Underground Wires
Road Re-alignment
Existing Road Edge
Sidewalk / Walking Path
Existing Fence

Drainage Pipe Improvement
Drainage Swale Improvement
Existing Drainage Swale/Creek
Pipe Endwall
Valley Gutter/Curb with Inlet
Drainage Inlet

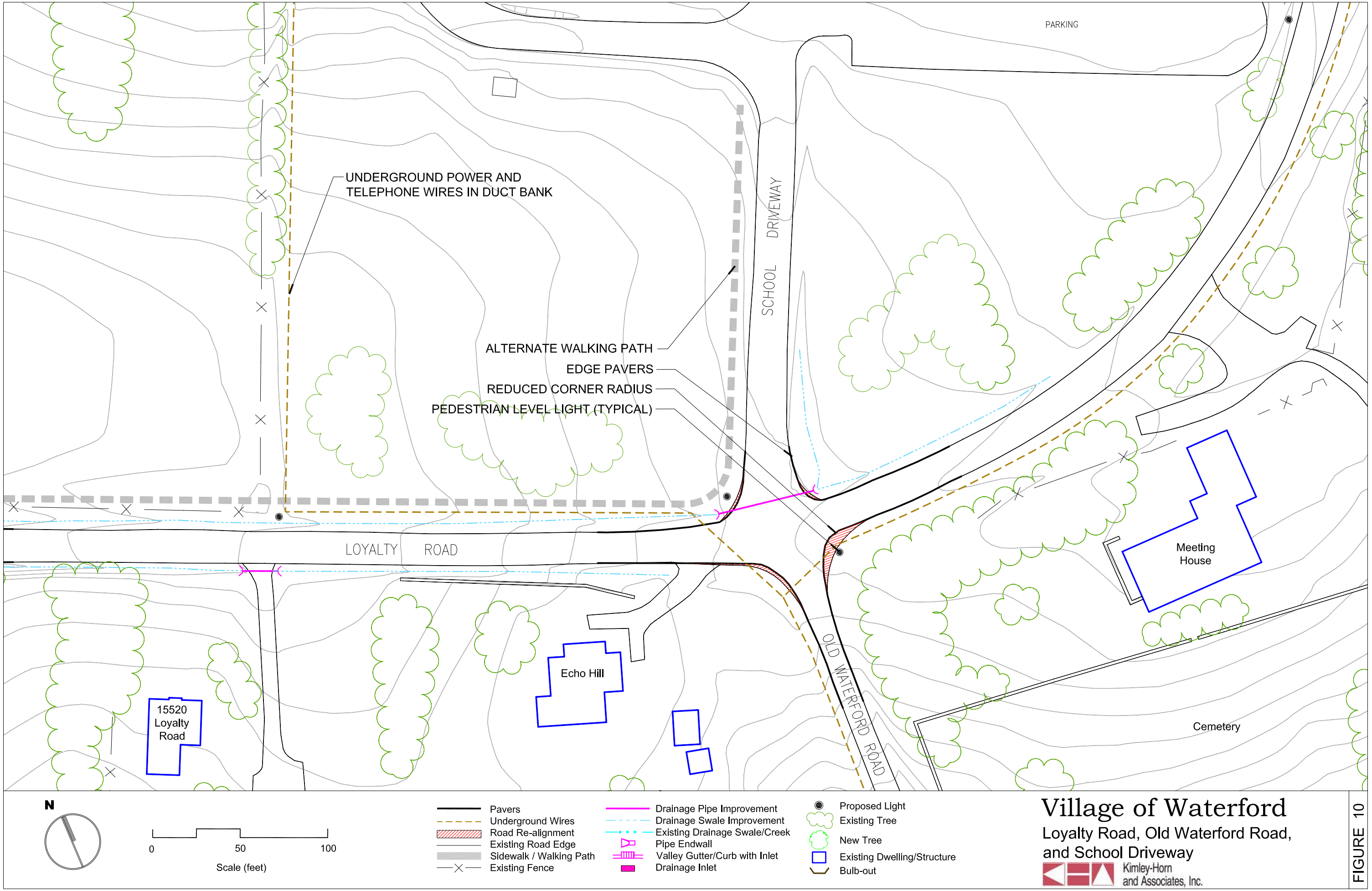
Proposed Light
Existing Tree
New Tree
Existing Dwelling/Structure
Bulb-out

Village of Waterford

Butchers Row, Main Street,
and Water Street

Kimley-Horn
and Associates, Inc.

FIGURE 9

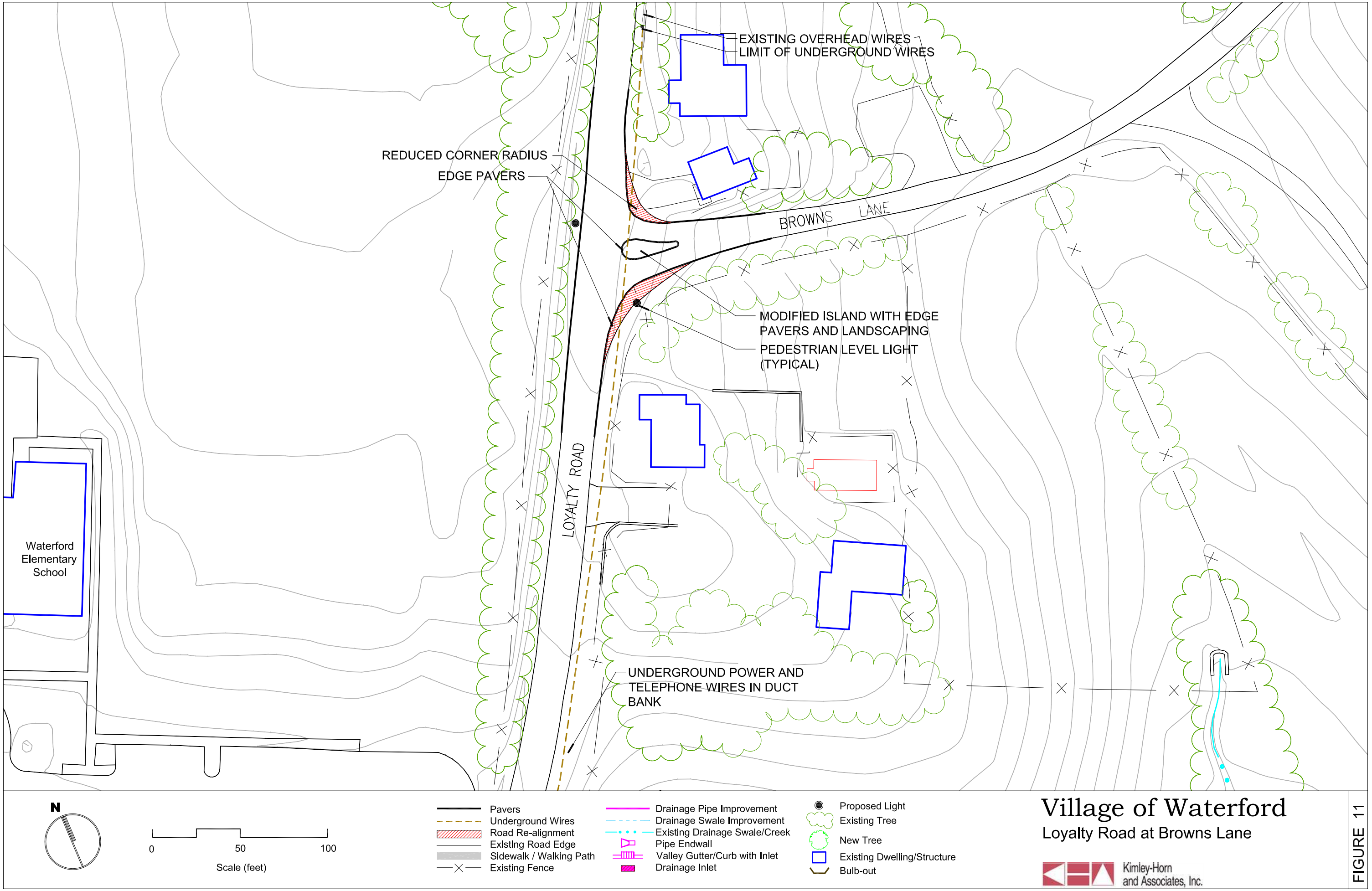


Village of Waterford

Loyalty Road, Old Waterford Road, and School Driveway

Kimley-Horn and Associates, Inc.

FIGURE 10



Village of Waterford

Loyalty Road at Browns Lane

Kimley-Horn and Associates, Inc.

FIGURE 11

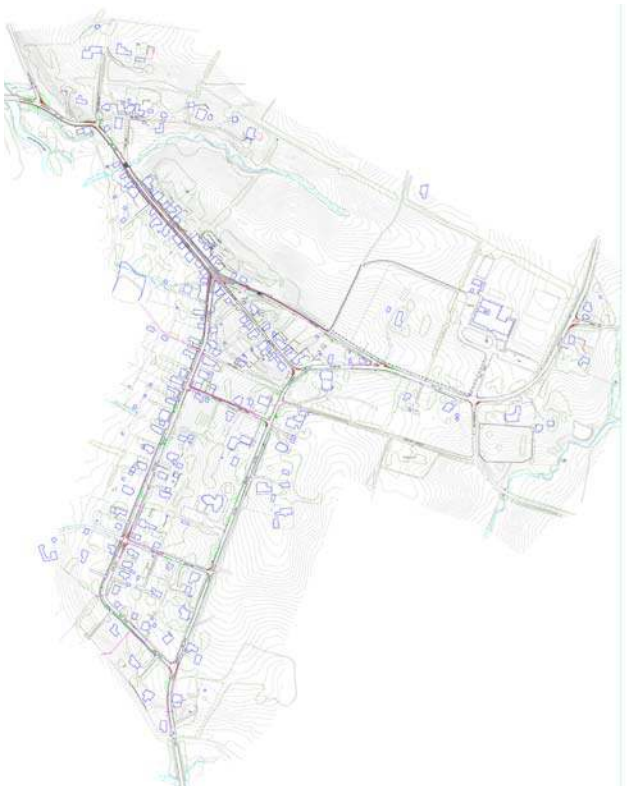
5 - Implementation

Waterford

"Bury the Wires and Tame the Traffic"

5. IMPLEMENTATION

It is intended that this final report of findings, recommendations, and concept plans will serve as a planning tool for future implementation of traffic safety and infrastructure improvements and of historic preservation efforts for the Village of Waterford. The next steps in the planning process involve completing the environmental documentation and obtaining funding for the improvements. Following these steps, an appropriate public entity or public-private partnership could execute the design and construction of a program of projects to make the concept plans a reality.



5.1 Preliminary Estimates of Project Cost

Based on the concept plans developed in this study, planning-level project budget estimates were prepared by the Kimley-Horn team to assist in implementing the next steps in the planning process. Planning level unit costs were applied to aspects of the concept designs for burying the wires, taming the traffic, fixing the drainage, and lighting the village. The result was a preliminary cost estimate for construction, engineering design and construction administration, mobilization, maintenance of traffic, easements, permits, and contingencies. These planning-level estimates of project costs can be summarized as shown in **Table 5-1**.

TABLE 5-1
Preliminary Estimates of Project Costs

Project Item	Preliminary Costs
Traffic calming measures (2.4 miles of roadway, 12 intersections)	$ 2,800,000
Drainage improvements associated with traffic calming	600,000
Pedestrian-level lighting consistent with village character	700,000
Electric service relocation from overhead lines to underground ducts	5,700,000
Telephone service relocation from overhead lines to underground ducts	2,900,000
Utility service connections to existing structures	800,000
Total in 2003 Dollars:	**$ 13,500,000**
2005 Dollars:	$ 14,200,000
2008 Dollars:	$ 15,300,000

Note:
1. The escalation factors used to project 2005 and 2008 cost estimates were 2.4% in 2004 and 2005, 2.5% in 2006, 2.7% in 2007, 2.8% in 2008, per U.S. President's Office of Management and Budget.
2. A detailed breakdown of the prelimnary estimate is included in *Appendix O.*

5.2 Design and Construction Considerations

During the development of concept plans, the study team consistently verified the feasibility of the solutions with respect to the ability to design and construct such improvements in the future, within the constraints of the physical layout of the village and the nature of the historic properties.

Given this initial analysis by the study team, future planners should consider the following design philosophies:

- Detailed design of traffic calming, pavement, sidewalk, stormwater, utility, and lighting improvements needs to remain consistent with the historic character of Waterford.
- Native and historically correct materials should be used.
- Traffic calming measures should be subtle, but effective.
- Pedestrian access should be a priority.
- Above-ground transformers should be placed strategically to minimize the intrusion on the historic viewsheds and to limit impacts to archaeological resources.
- The community's motto of "less is more" should be followed.

With respect to the final design and construction, the following considerations should be made:

- Designs should be analyzed with respect to constructability. Given the concept plan for lower Main Street, for instance, temporary parking will be required to lower the pavement and construct the new roadway. Traffic will need to be managed along Main Street and in other construction areas. Long term lane closures and temporary traffic signals may be necessary to safely construct the projects.

- Noise and vibration from construction equipment will also need to be managed, given the historic structures and the close vicinity of the residences. In general, construction phasing will need to be planned in a logical sequence that minimizes disruption to the citizens of Waterford.

- Traffic calming designs should be analyzed with respect to safety. Blunt ends of any bridge parapet walls will not be allowed. The constraints of "clear zones" at the edges of the roadways (the areas that should be free of obstructions) need to be considered when designing and installing measures such as trees and stone walls. Given the 20 mph and 25 mph speed limits, and the roadside trees that exist today, such constraints may be minimized.

- Placing utilities underground is typically challenging in narrow streets like those of the Village of Waterford. The future design will need to manage potential conflicts with drainage pipes, inlets, sanitary sewer, the ducts for power, telephone, and any other service. Water service may be an additional option for the village in a future design.

- Current standards of design will need to be followed. If VDOT is the design approving authority, some measures may need to go through a design exception process, similar to the process that the U.S. Route 50 project successfully went through over the past year.

- Traffic calming and other improvements need to be checked for maintainability: Edge and centerline pavers require a solid design and sound construction to not become a maintenance headache. Also, snow removal was a major considering in the decision to not have narrow lanes and raised medians and/or curbs. Pavers that are flush with the roadway surface will allow snow plows to more efficiently work the streets.

- Placement of transformers and switching equipment on private property will require coordination with property owners, the utility companies, and other parties.

- Coordination of new underground secondary service and metering on existing properties with inherent obstacles such as pavement, wall structures, wells, panelboard locations, etc. will be necessary.

- Older residential panelboards may have potential problems and high fault-current values, present when Utility Company sets new, pad mounted transformers. Where new fault current values exceed ratings of older equipment, an additional expense of current-limiting fuses installed in service switches may be incurred. This will have to be studied in detail during final design.

- Public area lighting for the village may require a maintenance contract with an appropriate independent vendor. The power cost may have to be paid for by the community. Should the Village of Waterford elect to use standards DVP street lighting fixtures, DVP will handle

maintenance and the cost will be based on a standard fee for this service. However, the DVP fixtures available are limited in their architectural appeal.

5.3 Summary and Closing

As requested by Loudoun County, Virginia, Kimley-Horn and Associates, Inc. has conducted a preliminary engineering study to develop alternative designs to bury the overhead wires and tame the traffic in the historic Village of Waterford. Based on a thorough understanding of the background for this project, the Kimley-Horn team has worked closely with staff from the Loudoun County Department of General Services and representatives from Village of Waterford organizations, including the Waterford Citizens Association, the Waterford Elementary School Parent Teacher Organization, and the Waterford Foundation.

This project has achieved a consensus-based set of practical solutions, culminating in a set of Concept Plans for the Village of Waterford that will include a logical program of traffic calming measures, utility relocations, and overall infrastructure improvements that will preserve the character of the village. The intent is that the citizens and supporters of the Village of Waterford will be able to take the concept plans to the next steps in the planning and design process.

The preliminary engineering work should provide the basis for final design and be sufficient to support future marketing and fund raising activities. This project affords Waterford the opportunity to restore to the entire Village to its historic best by freeing it from the overhead wires, the concerns of speeding vehicles, and the presence of standing water after storms.

The team of Kimley-Horn, B2E, WHGA, WEG, and LBG has appreciated the opportunity to assist Loudoun County and the Village of Waterford in developing concepts for burying the wires, taming the traffic, and preserving the heritage of this National Historic Landmark. It is hoped that this report will serve the citizens of Waterford and Loudoun County well as they plan for the future.

America is blessed with historic architecture, landscapes, and communities. Every one tells a story about the past and provides insight for the future.

- First Lady Laura Bush, Preserve America Initiative

Appendices

Waterford

"Bury the Wires and Tame the Traffic"

"Bury the Wires and Tame the Traffic"
Waterford, VA

Preliminary Engineering Study and Concept Plans

FINAL REPORT

APPENDICES

Appendix A
Reference Documents

"Bury the Wires and Tame the Traffic"
Waterford, VA

Preliminary Engineering Study and Concept Plans

FINAL REPORT

APPENDIX A

REFERENCE DOCUMENTS

1. "A Brief History of Waterford, Virginia." Waterford Foundation. Accessible on the Waterford Foundation website, www.waterfordva.org. 2001.

2. Institute of Transportation Engineers. "Traffic Calming: State of the Practice." 2003.

3. John E. Divine with Bronwen & John Souders. When Waterford and I Were Young, Waterford Foundation, Inc. 1997.

4. Land Ethics. "Waterford Walking Trails, A Trail System for the National Historic Landmark." Study for The Waterford Foundation. August 1992.

5. Land Ethics, and Dodson Associates. "Linking the Past to the Future: A Landscape Strategy for Waterford, Virginia." Prepared by Land Ethics and Dodson Associates for the Waterford Foundation and the National Park Service, Preservation Assistance Division. On file at the office of the Waterford Foundation, Waterford, and at the Virginia Department of Historic Resources, Richmond. 1992.

6. Lewis, John G. Architectural Survey of the Older and Historic Structures in the Town of Waterford, Virginia. On file at the Virginia Department of Historic Resources, Richmond. 1999.

7. Loudoun County Department of Planning, Zoning, and Community Development. Waterford Area Management Plan. October 1987.

8. Loudoun County Department of Planning. "Comprehensive Plan" and "Countywide Transportation Plan." 2001.

9. "Summary from the June 10, 1999 Village Meeting on the Waterford Bury the Wires and Tame the Traffic TEA-21 Initiative," obtained from the TEA-21 Grant Application Package.

10. TEA-21 Enhance Grant Application Package, Assembled by the Waterford Foundation, Waterford Citizens Association, and others. January 2001.

11. Virginia Historic Landmarks Commission. National Register of Historic Places, Inventory-Nomination Form: Waterford Historic District. On file at the office of the Waterford Foundation, Waterford, and at the Virginia Department of Historic Resources, Richmond. 1969.

12. "Walk With Us Through Waterford, Virginia, A National Historic Landmark District," Waterford Foundation, Inc., 1999.

Appendix B
Agency Coordination Letter and Distribution List

February 14, 2003

«Name», «Title»
«Department»
«Company»
«Address1»
«Address2»
«City», «State» «PostalCode»

mailing list attached

RE: Loudoun County Project for Preliminary Engineering Services
to "Bury the Wires and Tame the Traffic" in Waterford, Virginia
TEA-21 Project # EN98-053-137, PE101

«FirstName»,

Loudoun County is assisting the Village of Waterford in developing conceptual designs and preliminary cost estimates to improve traffic and pedestrian safety throughout the Village and to place overhead utility lines underground, while preserving the historic character of the Village. On January 27, 2003, a contract was awarded to a consulting team to assist the County and the Village in accomplishing these planning-level designs and estimates. Your coordination and input is requested in helping us complete this project.

Over the next 6 months, the consultant team, led by Kimley-Horn and Associates, will work closely with representatives from the Village of Waterford and the Loudoun County Department of General Services to provide preliminary engineering services for this planning project entitled "Bury the Wires and Tame the Traffic." The consultant team will be required to coordinate closely with you and your organization during the study of alternatives and the development of concept designs. For these designs to be taken to the next step in the planning, design, and construction process, it is essential that we understand the feasibility of concepts, as well as estimated costs of implementation.

The project is being substantially funded through a federal Transportation Equity Act (TEA-21) award administered through Loudoun County and the Virginia Department of Transportation (VDOT). The Village of Waterford is a National Historic Landmark District, and it is currently experiencing the challenges associated with growth of traffic in Loudoun County. In addition to slowing the traffic, the citizens have requested the consideration of relocating the overhead utility wires, fixing pavement, and improving storm drainage as part of potential traffic safety improvements. Thus, the goal of this project is to develop a set of practical solutions, culminating in a master plan for the Village of Waterford that will include a logical program of traffic calming measures, utility relocations, and overall infrastructure improvements, with a mindset toward preserving the character of the village.

Input from citizens of Waterford will be sought during this planning project. Two public meetings are planned: one in March 2003 to gather information and one in July 2003 to present findings and preliminary conceptual designs. The consultant team will coordinate throughout the study period with representatives of the Waterford Citizens' Association, Waterford Parent Teacher Organization, and Waterford Foundation. In addition, the consultant team will interface with representatives from appropriate local, state, and federal agencies, as well as current utility providers.

During the course of this project, transportation and electrical engineers, surveying crews, environmental scientists, archaeologists, and historians will be gathering information essential to performing engineering studies and developing planning-level solutions that will include aspects of:

- Traffic calming
- Utility relocations
- Stormwater management
- Roadway pavement repair and realignment (with consideration of rights-of-way and easements)
- Historic preservation
- Complementary landscaping/streetscaping schemes and street lighting schemes
- Environmental compliance
- Conceptual plans and outline specifications
- Project budget estimates for use by the Village of Waterford in planning for future final design and subsequent construction of the project.

Coordination with your organization will be critical to our success. Please work with our consultants as they gather information, develop alternatives, and determine the feasibility of solutions for the Village.

Thank you in advance for your assistance during this project. If you have questions or require additional information, please contact Sheryl Gates, Grants Project Manager, Loudoun County Department of General Services, at 703-737-8441.

Richard E. Pezzullo, P.E.
Assistant Director

cc: Sheryl Gates, Loudoun County Department of General Services
Tom Trask, Purchasing
Terrie Laycock, County Administration
Terry Arney, Waterford Citizens' Association
Eric Breitkreutz, Waterford Foundation
Mark Koblos, Waterford Foundation
John Martin, Kimley-Horn and Associates
Scott Mingonet, Kimley-Horn
Roger Henderson, Kimley-Horn
Nick Santore, B2E Consulting Engineers
Bill Ackman, William H. Gordon Associates
Loretta Cummings, Williamsburg Environmental Group
Eric Voigt, Louis Berger
Phil Pendleton, Louis Berger

Preliminary Engineering Services
to
"Bury the Wires and Tame the Traffic"
Waterford, VA

AGENCIES/UTILITIES FOR COORDINATION

LOUDOUN COUNTY OFFICES (TRANSPORTATION / CIVIL)		
NAME / ADDRESS	**PHONE / FAX / EMAIL**	**NOTES**
John Clark, Director **Office of Transportation Services** Loudoun County 1 Harrison Street, SE / 3rd Floor PO Box 7000 Leesburg, Virginia 20177-7000	Bus: (703) 737-8514 Fax: (703) 737-8513 E-mail: jclark@loudoun.gov	
Jay Snyder, Director **Department of General Services** 211 Gibson Street, NW, Suite 123 Leesburg, VA 20176	Bus: (703) 771-5552 Fax: (703) 771 5553 E-mail: jsnyder@loudoun.gov	David Ward, GIS Analyst Bus: 703-737-8670 Fax: 703-737-8008 Cell: 571-233-0266
Larry Stipek, Director **Office of Mapping and Geographic Information** 1 Harrison Street, SE / 2nd Floor PO Box 7000 Leesburg, Virginia 20177-7000	Bus: 703-777-0552 Fax: 703-771-5075 E-Mail: lstipek@loudoun.gov	
Terrance Wharton, Director **Department of Building and Development** Loudoun County 1 Harrison Street, S.E. Box 7000 Leesburg, VA 20177-7000	Bus: 703-771-5143 Fax: 703-771-5215 E-Mail: twharton@loudoun.gov	
Dr. David Goodfriend, Director **Department of Health** Loudoun County 1 Harrison Street, S.E., Box 7000 Leesburg, VA 20177-7000 703-777-0234	Bus: 703-771-5829 Fax: 703-777-0523 E-mail: dgoodfri@loudoun.gov	
Julie Pastor, Director Department of Planning Loudoun County 1 Harrison Street, SE; 3rd Floor PO Box 7000 Leesburg, VA 20177-7000	Bus: 703-777-0246 Fax: 703-777-0441 E-mail: jpastor@loudoun.gov	

LOUDOUN COUNTY SANITATION AUTHORITY (LCSA)		
Tony Dawood, Marc Schwartz, Paul Bodkin Loudoun County Sanitation Authority 880 Harrison Street, SE P.O. Box 4000 Leesburg, Virginia 20177-1403	703-478-8016 703-779-2750 (FAX)	

VDOT		
Paul Kraucunas, Tom Van Poole,Rashid Siraj, Kevin Nelson **Northern Virginia District** **Virginia Department of Transportation** 14685 Avion Parkway Chantilly, VA 20151	703-383-2424 703-383-2070 (FAX)	
Steve Tyrell (TEA-21) **Leesburg Residency** **Virginia Department of Transportation**	703-737-2033 FAX: 703-771-2528	Leesburg contact for technical design questions.
Wade Chenault VDOT 1401 E. Broad Street Richmond, VA 23219	804-786-2264	Started as County contact person prior to passing to Pam Liston
Pamela M. Liston Transportation Engineering Senior **Programming and Scheduling Division** **Virginia Department of Transportation** 1401 East Broad Street Richmond, VA 23219	804-786-2734 FAX: 804-371-8719 Liston_pm@vdot.state.va.us	County contact for project overall
Nicholas M. Nies Environmental Specialist VDOT 1401 E. Broad Street Richmond, VA 23219	804-786-1092 FAX: 804-786-7401	

UTILITY COMPANIES		
Electric Utility: Dominion Virginia Power Mr. Ed Bradley Supervisor of Project Design 3901 Fair Ridge Drive Fairfax, Virginia 22033		
Telephone Utility: VERIZON Engineering Outside Plant Mr. David Harrison, Project Engineer 319 E. Market Street Leesburg, Virginia 20175		
Cable Utility: ADELPHIA CABLE Mr. Ken Crooks Commercial Agreements 45745 Nokes Boulevard Sterling, Virginia 20166		

TEA-21 PROJECT CONTACTS		
Lily A. Richards **Archaeologist and Historian** Division of Resources Services and Review Department of Historic Resources 2801 Kensington Avenue Richmond, VA 23221	804-367-2323, ext. 140 Fax: 804-367-2391 lrichards@dhr.state.va.us	

Wendy M. Kedzierski Environmental Engineer Virginia **Department of Environmental Quality** 629 E. Main Street / P.O. Box 10009 Richmond, VA 23240	804-698-4503 FAX: 804-698-4347 wmkedziers@deq.state.va.us	

ARCHITECTURAL HISTORY / ARCHAEOLOGY		
Virginia E. McConnell Easement Program / Tax Act Program **Virginia Department of Historic Resources** 2801 Kensington Avenue Richmond, VA 23221	(804) 367-2323 x 137 (804) 367-2391 FAX gmcconnell@dhr.state.va.us	
Calder Loth Senior Architectural Historian**Virginia Department of Historic Resources** 2801 Kensington Avenue Richmond, VA 23221	(804) 367-2323 x 113 (804) 367-2391 FAX cloth@dhr.state.va.us	
Ms. Ethyl Eaton Manager Office of Review and Compliance**Virginia Department of Historic Resources** 2801 Kensington Avenue Richmond, VA 23221	(804) 367-2323 x 112	
Ms. Jackie Keeney District Cultural Resource Manager **Virginia Department of Transportation Fredericksburg District** 87 Deacon Road Fredericksburg, VA 22405	(540) 899-4140 Jackie.Keeney@VirginiaDOT.org	
Mr. Antony F. Opperman Preservation Program Manger**Virginia Department of Transportation Central Office** 1401 E. Broad Street Richmond, VA 23219	(804) 371-6749 A.Opperman@VirginiaDOT.org	
George O. Siekkinen, Jr. Senior Architect **National Trust for Historic Preservation** **1785 Massachusetts Ave., NW** **Washington, DC 20036**	(202) 588-6159 (202) 588-6232 FAX george_siekkinen@nthp.org	
Harriet C. Maloney Easement Monitor**Virginia Outdoors Foundation** **Aldie Mill** 39395 John Mosby Highway P.O. Box 322 Aldie, VA 20105	(703) 327-6118 (703) 327-6444 FAX caffeyh@aol.com	
Lisa M. Kolakowsky Historian, National Historic Landmarks **National Park Service** 200 Chestnut Street, Suite 367 U.S. Customs House Philadelphia, PA 19106	(215) 597-7946 (215) 597-5747 FAX lisa_kolakowsky@nps.org	I don't know if Lisa is the right person to contact with the NPS, but she is a start and could point you in the right direction or forward information to the right person/people.

		– Eric Voigt
Mr. Terry R. Carlstrom, Director **National Capital Region** **National Park Service** 1100 Ohio Drive, SW Washington, D.C. 20242	(202) 619-7222	
MaryAnn Naber Federal Preservation Officer **Federal Highway Administration** **Office of Human Environment** HEPE, Room 3222 400 7th Street, SW Washington, D.C. 20590	(202) 366-2060 MaryAnn.Naber@ fhwa.dot.gov	
Heidi E. Siebentritt Planner/Historic Preservation Coordinator **Loudoun County Historic District Review Committee** **Loudoun County Department of Planning** 1 Harrison St., SE, 3rd Floor P.O. Box 7000 Leesburg, VA 20177-7000	(703) 777-0246 (703) 777-0441 FAX hsiebent@co.loudoun.va.us	(I believe Heidi is still on maternity leave, but calling that number should get you someone covering for her.)
Michael Kane Program Manager Purchase of Development Rights Program County of Loudoun 1 Harrison St., SE, 2nd Floor P.O. Box 7000 Leesburg, VA 20177-7000	(703) 737-8868 (703) 771-5075 FAX mkane@co.loudoun.va.us	I am not sure who the contact person would be for the easements held by Loudoun County on some of our fields. Perhaps Dick and Sheryl with General Services know. If not, here would be a good place to start. - Eric Voigt

INTERAGENCY ENVIRONMENTAL COORDINATION COMMITTEE		
Department of Agriculture and Consumer Services Mr. Keith Tignor 1100 Bank Street Richmond, VA 23219 Alternate: Mr. Frank Fulgham	(804) 786-3515 371-7793 FAX ktignor@vdacs.state.va.us (804) 786-3515	
Department of Conservation and Recreation Mr. Derral Jones 203 Governor Street, Suite 326 Richmond, VA 23219 Alternate: Ms. Synthia Waymack	(804) 786-1119 371-7899 FAX (804) 786-4379 swaymack@dcr.state.va.us	
Department of Environmental Quality Air Division Ms. Sonya Lewis-Cheatham 629 East Main Street Richmond, VA 23219	(804) 698-4407 698-4410 FAX salewis-ch@deq.state.va.us	
Department of Environmental Quality Waste Division/Office of Technical Assistance Mr. Artie Kapell 629 East Main Street Richmond, VA 23219	(804) 698-4251 698-4327 FAX alkapell@deq.state.va.us	
Department of Environmental Quality Water Division Dr. Ellen Gilinsky 629 East Main Street Richmond, VA 23219 Alternate: Ms. Carolyn Browder	(804) 698-4375 698-4032 FAX egilinsky@deq.state.va.us (804) 698-4420	
Department of Forestry Mr. Mike Foreman 900 Natural Resources Drive, Suite 800 Charlottesville, VA 22903	(434) 977-6555 296-2369 FAX foremanm@dof.state.va.us	
Department of Health Office of Water Programs Ms. Susan Douglas 1500 East Main Street Richmond, VA 23219	(804) 371-2883 225-4539 FAX sdouglas@vdh.state.va.us	
Department of Historic Resources Mr. Marc Holma 2801 Kensington Avenue Richmond, VA 23221	(804)367-2323 x 10 367-2391 FAX mholma@dhr.state.va.us	

Marine Resource Commission Mr. Jay Woodward P.O. Box 756 Newport News, VA 23607 Alternate: Mr. Tony Watkinson	(757) 247-8032 247-8062 FAX jwoodward@mrc.state.va.us (757) 247-2255	
Department of Mines, Minerals, Energy Mr. Gerry Wilkes P.O. Box 3667 Charlottesville, VA 22903	(434) 951-6364 951-6366 FAX gwilkes@geology.state.va.us	
Department of Transportation Environmental Division Mr. Earl T. Robb 1401 East Broad Street Richmond, VA 23219 Alternate: Ms. Brennan Snyder	(804) 786-4559 786-7401 FAX (804) 371-6733 snyder_bb@vdot.state.va.us	
Virginia Outdoors Foundation Ms. Leslie H. Grayson P.O. Box 322 Aldie, VA 20105	(703) 327-6118 327-6444 FAX voflgray@aol.com	
Department of Game and Inland Fisheries Mr. Ray Fernald 4010 West Broad Street/P.O. Box 11104 Richmond, VA 23230-1104 Alternate: Mr. Brian Moyer	(804) 367-8999 367-2427 FAX (804) 367-2733 bmoyer@dgif.state.va.us	

Appendix C
Summary from June 10, 1999 Village Meeting

SUMMARY FROM THE JUNE 10, 1999 VILLAGE MEETING ON THE WATERFORD BURY THE WIRES AND TAME THE TRAFFIC TEA-21 INITIATIVE

Lighting

In the grant, provisions were made for historically appropriate streetlights. We have brought an original Waterford streetlight for your review and would like your input as to type and placement of street lamps.

Consensus: The residents were in favor of historically appropriate streetlights.
The Chair of the task force has found an example of an old Waterford street light. The Village has concerns as to placement and safety.

Village Chairperson: Robert Thompson, 882-4104

Trees (see next section for consensus items)

In the grant, provisions were made for protection and maintenance of streetside landscape and street trees. You should know that VDOT has already made copies of the Waterford tree survey and is very aware of the need to keep the trees intact.

Village Chairperson: Kitty Rose , 882-3696

Sidewalks/Paths

In the grant, provisions were made for historically appropriate sidewalks/paths. We would like your input as to the type and placement of sidewalks/paths.

Village Chairperson/s: Skip Couser, 882-4459, Beth Erickson, 882-4758

Items of Significance with regard to both Trees and Sidewalks/Paths:

- A vote was taken to ascertain if anyone wanted the entire Village to have paved concrete sidewalks. The result of the vote was, 40+ people opposed, 2 in favor.

- During the discussion, it was determined that the residents do not want wide scale sidewalk expansion; however, they do want to make sure that safety concerns are addressed.

- The residents are concerned with speeding as it relates to safety. The residents were happy to learn that VDOT is in the process of printing the $200 fine for exceeding the speed limit signs that were approved by the Board of Supervisors in March of 1999.

Consensus for Both Trees and Sidewalks/Paths:

- Residents were in favor of keeping things as they are in the Village to the greatest extent possible; however, the residents are concerned about safety.

- The residents and the Waterford Elementary School Parent Teacher Organization (PTO) are concerned about the safety of the children in the Village. The PTO would like to see a path from the school into the Village (possibly through the Foundation's Water Street Meadow). The residents are also concerned about safety within the Village itself.

Road Surface/Drainage/Traffic Taming

In the grant, provisions were made for burying the wires and taming the traffic. This provision impacts the road surface, drainage, and traffic taming.

Village Chairperson/s: Tom Edmonds, 882-4471, John White, 882-4090

Item of Significance:

The residents would like the Village character to remain as it is today.

Consensus – Road Surface/Traffic Taming:

The residents would like some type of traffic taming device to slow traffic. The Road Surface/Traffic Taming Committee would like to work with VDOT to develop solutions.

Consensus – Drainage:

The residents would like the drainage problems in the Village corrected.

Transformers

In the grant, provisions were made for burying the wires (which would include: Virginia Power, Bell Atlantic, and Cable). When the wires are buried, the poles will be eliminated; however, transformers will need to be installed.

Village Chairperson: Dave Godfrey, 882-3280

Consensus: The residents would like the transformers buried if possible. In addition, they are also interested in learning about the size and placement of transformers.

Homeowner Costs

In the grant, provisions were included which would allow for the cost of residential hook-up to be defrayed by the grant. When the wires are buried, there will be fees involved in connecting to the new service. Attached please find a document, which may answer some of your concerns.

Village Chairperson: Ed Good, 882-3592

Item of Significance: The residents appreciated learning about the many different aspects of this project. Concern was expressed with regard to cost.

Final Comment from the Village Meeting held on June 10, 1999

"The Village of Waterford is supportive of burying the wires and taming the traffic. We want the village to look much like it does today. We'd like to keep our sidewalks as they exist today, we'd like our trees to exist as they do today and we'd like the drainage problems to be corrected. We'd like to see historically correct streetlights in the village and we'd like to see traffic tamed."

Our motto is: "Less is more."

Appendix D
Project Meeting for Waterford Citizens - March 6, 2003

BURY THE WIRES
&
TAME THE TRAFFIC

PROJECT MEETING
FOR
WATERFORD CITIZENS

Thursday, March 6, 2003
7:00 p.m.
Old School Auditorium

The project is moving forward and needs your input!

Kimley-Horn and Associates will give a presentation on the project and request feedback for areas of concern

Waterford and Waterford area citizens are urged to attend this meeting to get further information, ask questions, and voice your desires for the project.

Waterford Citizens' Association
PO Box 109, Waterford, VA 20197
www.waterfordva-wca.org

February 6, 2003

Members of the Waterford Citizens' Association

RE: Loudoun County Project for Preliminary Engineering Services to "Bury the Wires and Tame the Traffic" in Waterford, Virginia

Below is a communication we received from Loudoun County about the status of this project:

Loudoun County is assisting the Village of Waterford in developing conceptual designs and cost estimates to improve traffic and pedestrian safety throughout the Village and to place overhead utility lines underground, while preserving the historic character of the Village. On January 27, 2003, a contract was awarded to a consulting team to assist the County and the Village in accomplishing these planning-level designs and estimates. Over the next 6 months, the consultant team, led by Kimley-Horn and Associates, will work closely with representatives from the Village of Waterford and the Loudoun County Department of General Services to provide Preliminary Engineering Services for this planning project entitled "Bury the Wires and Tame the Traffic."

The Village of Waterford is currently experiencing the challenges associated with growth of traffic in Loudoun County. In addition, the citizens have requested consideration for relocating the overhead utility wires, fixing pavement, and improving storm drainage as part of potential traffic safety improvements.

Thus, the goal of this project is to develop a set of practical solutions, culminating with a master plan for the Village of Waterford that will include a logical program of traffic calming measures, utility relocations, and overall infrastructure improvements that will preserve the character of the village. The intent is that the stakeholders of the study will be able to take the master plan to the next steps in the planning, design, and construction process. The project is being substantially funded through a federal Transportation Equity Act (TEA-21) award administered through Loudoun County and the Virginia Department of Transportation (VDOT).

Input from citizens and friends of Waterford will be sought during this planning project. Two public meetings are planned – one in March 2003 to gather information and one in July 2003 to present findings and concept designs. In addition, the consultant team will coordinate throughout the study period with representatives of the Waterford Citizens' Association, Waterford Parent Teacher Organization, and Waterford Foundation.

The consultant will conduct activities within the Village, including collection of information on traffic, historic structures, environmental issues, and conditions of pavement, sidewalks, and utilities. Surveying crews, engineers, environmental scientists, and historians will be gathering information critical to performing engineering studies and developing planning-level solutions that will include aspects of:

- Traffic calming
- Utility relocations
- Storm water management
- Roadway pavement repair and realignment with consideration of rights-of-way and easements
- Historic preservation
- Complementary landscaping/streetscaping schemes and street lighting schemes
- Environmental compliance
- Conceptual plans and outline specifications
- Project budget estimates for use by the Village of Waterford in planning for future final design and subsequent construction of the project.

For additional information on this project, please contact: Terry Arney, Waterford Citizens' Association project liaison, (540) 882-3847, tarney@mediasoft.net or Eric Breitkreutz, Executive Director, Waterford Foundation, Inc. (540) 882-3018, execdir@waterfordva.org.

As soon as I hear of the date of the March meeting, I will be in touch.

Ed Lehmann

Ed Lehmann
President
Waterford Citizens' Association

VILLAGE OF WATERFORD
Loudoun County, Virginia

"Bury the Wires and Tame the Traffic"
Preliminary Engineering Services Project

PROJECT MEETING FOR WATERFORD CITIZENS

Waterford Citizens' Association (WCA)
Waterford School Parent Teacher Organization (PTO)
Waterford Foundation, Inc. (WFI)

Thursday, March 6, 2003, 7 PM
Old Waterford School

AGENDA

7:00 PM	WELCOMING REMARKS	Eric Breitkreutz, Waterford Foundation
7:10	INTRODUCTION OF PROJECT	John Martin, Kimley-Horn and Associates
7:15	"VISION AND VALUES" GROUP ACTIVITY	Dan Burden, Facilitator
7:30	PRESENTATION: "SUCCESS STORIES"	Dan Burden
8:00	"SHOW US" ACTIVITY	Group activity
8:45	SUMMARY: "VISION AND VALUES"	Dan Burden / Kimley-Horn Team
8:55	NEXT STEPS	John Martin / Eric Breitkreutz
9:00	ADJOURN	

"Bury the Wires and Tame the Traffic"
Waterford, Virginia

Project Meeting for Waterford Citizens
March 6, 2003

CORE VALUES

During the Project Meeting for Waterford Citizens, the participants were asked to write down words or phrases on individual post-it notes that describe what they value most about the village. Listed below are these "core values" from the citizens. The numbers shown in parentheses indicate the number post-it notes turned in showing that value.

- Ability to enable others to appreciate value of history Waterford offers
- Accessible
- Agricultural oriented
- Appreciation
- Architectural character
- Architectural integrity
- Attractive
- Authentic (2)
- Beautification consistent with historically accurate landscapes
- Beautiful
- Beautiful old buildings
- Beauty (5)
- Beauty of the scenery
- Bigger school
- Boxwood gardens
- Buildings and houses
- Bucolic
- Caring
- Character
- Charm (2)
- Clean (2)
- Cleanliness
- Comfortable
- Cared for
- Close knit feel
- Closeness of neighbors
- Community (2)
- Community involvement
- Community based school
- Community spirit
- Consideration
- Dedicated (2)
- Diverse (2)
- Family
- Friendliness (2)
- Friendly (7)
- Friendship
- Glimpse of the past/history
- Good landscaping
- Green (2)
- Healthy trees
- Historic (10)
- Historic ambiance
- Historic feeling
- Historic character
- Historic preservation (2)
- Historical (2)
- History (6)
- Home
- Hominess
- Horse friendly/rural character
- Integrity
- Integrity of the architecture
- Intrinsic beauty
- Learning environment about our past
- Low traffic
- Maintained
- Natural
- Natural beauty
- Natural protected environment
- Neighbors
- Neighborhood
- Old
- Old time ambience
- Open
- Open
- Original
- Parking (2)
- Patience
- Peaceful (5)
- Peacefulness
- Pedestrian
- Pedestrian friendly (2)
- Plain
- Preservation minded
- Preservation of Waterford as National Historical Landmark
- Preserved (4)
- Preserving the past
- Pub
- Quaint
- Quiet (11)
- Quiet beauty of the views
- Quietness
- Quietude
- Re-incorporation
- Relaxed
- Respect for our history & heritage
- Restored
- Reverence
- Rural
- Rural character
- Rural unchanged from today
- Rural village setting/green
- Safe (4)
- Safety
- Security
- Sense of community (2)
- Sense of peace
- Serene
- Serenity
- Simple
- Slow
- Small
- Small town people interaction
- Special
- Stillness
- Spirit of community
- Standard setting
- Stimulation
- Strong community spirit
- Strong sense of family/community
- The peaceful environment
- Thriving
- Tolerance
- Tranquil (2)
- Tranquility (3)
- Trees
- Unchanged from today
- Unique (3)
- Uniqueness
- View
- Views
- Walker friendly
- Warm/friendly
- Well maintained
- Welcoming
- Wireless

"Bury the Wires and Tame the Traffic"
Waterford, Virginia

Project Meeting for Waterford Citizens
March 6, 2003

20-YEAR VISIONS

During the Project Meeting for Waterford Citizens, the participants were asked to write down their visions for what the village will be in 20 years. Listed below are these 20-year visions from the citizens.

A town where a dog can sleep on Main St in front of the post office – walkable, bike able, equestrian friendly

Comfortable retreat from parking lot called Rt. 7

Visually much the same, less high speed traffic, safer for pedestrians, pets and kids. Less noise, less speed, less traffic

Protected, tranquil, green, family-filled, lots of outdoor life and activity, fresh air and water, well maintained, visually pleasing

SAME – less traffic/better behaved traffic and parking. Healthy trees, well preserved buildings

Physically unchanged, less traffic, more water

US model of a well-preserved rural historic village

No wires

Calmer traffic-wise and have a by-pass

A quieter country village with less traffic and noise

A community that has maintained the relationship of the land surrounding the town to the townscape with traffic alleviated to a degree

Protected from the encroachment of development with its associated traffic, density and hecticness

The location of my home in a sound, viable house as opposed to a non-viable house

Cobblestone streets, gas lights, people who haven't fixed up their homes to do so

To look and feel like it did in the 1700's, similar to Harper's Ferry. Traffic diverted

No wires. Little traffic. Sidewalks, street lights. All else the same.

The flavor/character much the same but subtly enhanced to allow better strolling through all of town, more respectful traffic (cars more aware of pedestrians/bicyclists) and improved historic feel

Look essentially the same and will remain a National Historic Landmark and a good community with less traffic

The streets will return to slow car traffic where the drivers would feel comfortable stopping and chatting with passersby or looking at the historic names. A place where children are safe to play, bike and walk along the streets. NO power or phone lines visible.

Closer to it's appearance in 1900 (but in better repair and more liveable.) Fewer cars, no wires, still a rural feel. Not a plastic, overdone restoration.

A living, evolving village that does not change much. Enhancing without sterilizing the community. Without pass-through traffic. I don't want to wait 20 years.

Rural village, safely accessible by foot (not just by car and SUV). An oasis. Equestrian friendly.

The same as today, but with no lines

Will not look much different than today except the wires will be buried, old looking street lights will line the streets, traffic will be slowed and limited

Much the same, no overhead wires would be nice. A well-maintained community with active members

Minimal traffic (no thru roads) – accessible to residents and visitors –no overhead wires – no paved sidewalks –plantings that visually slow down cars – off street lighting

The same as today with no wires

Maintain sense of community; maintain its historic feel; safe place to live

Same with no power lines

A bucolic village with brick and stone walkways and closed to thru traffic

Speed limit 15MPH. All wires buried. No new construction. Cobblestone streets

Same but with no overhead wires and poles, fewer autos parked, and street level at town center back to where it was in 1937 (water runs into my office)

A place where all Americans can come and see a pre-industrial village and its surrounding rural environment, and where they can participate in a living community to recreate a sense of their past

My grandchildren will be able to come to Waterford and see what it was like in the 1800's in a village in Virginia

Essentially the same; safer streets; safer for the historic structures; safer for residents and visitors; history preserved

Remain as it is now with its current historical look. That visitors will still feel that they are transferred back in time when here

Historically appropriate as possible. Buried utilities including: Electric, Communication conduit, gas lines, gas lights. Restored sidewalks. Bypasses built

Maintain rural historic character with slower traffic that allows enjoyment for citizens and visitor pedestrians alike

Well-maintained homes and landscaping with much less thru traffic

A beautiful, walkable landscaped village with drivers primarily consisting of village residents. Not a drive-thru village but a drive-around village

"Bury the Wires and Tame the Traffic"
Waterford, Virginia

Project Meeting for Waterford Citizens
March 6, 2003

INPUT FROM BREAK-OUT GROUPS

During the Project Meeting for Waterford Citizens, the participants separated into three groups and wrote ideas on maps that showed the roads and buildings within and adjacent to the village. These break-out groups were asked to capture their specific issues, concerns, and ideas on the maps. Listed below are the notes from each of these groups.

Group 1 – Issues, Concerns, Ideas

- Serious Ped Drop offs
- Every time the road is paved, the drainage problem gets worse
- Replace town horse
- High St. and Second St are treated by drivers as straight-aways, badly needs traffic calming
- Can't see oncoming traffic from south
- Keep Waterford unique so Dan can say we are like no other in country.
- Whole town—don't build suburb sidewalks! Sidewalks could be old sidewalks or bricks or flagstones or oyster shell paths
- Whole town-when putting in lights watch light in windows of houses. Love the old gaslights in Chuck's garden & in front of Chamberlin's and Thompson house
- Don't turn us into Williamsburg or a suburb looking town
- Entire town have historic looking or "low-key" signage. VDOT [signs] are too shiny and ugly
- Pavement 2' higher than initial 1937 paving. Water spills into buildings on W. side of Second St.
- Sidewalk impossible to walk on 2nd St
- Unchecked speeding where people cross from P.O.
- Cars too fast – some hit gully
- Dangerous blind spots for all traffic
- Road shoulders are too steep
- Street should drain down the middle
- Congested parking
- Traffic speed
- Unsafe for pedestrians
- Trucks gun up for hill and ride over yellow line
- Any car stopped at pt "A" is not visible to car at pt "B" (increasing occurrence)
- Unsafe pedestrian corridor-traffic too fast
- Throughout village – ankle-turning road edge dropoffs
- Traffic speed
- Ditch too deep
- Street trees need to be replaced as they die
- Bypass
- Pedestrian pinch either trespass or spill onto road at blind hill
- Spotty, intermittent variable substances (8 types in 2 blocks)
- Great place for tree canopy
- Unsafe walking/riding-significant ditch drop-off
- Unsightly curve signs (VDOT)
- Stop folks from having to honk at corner
- Path problem-traffic pinch point-dangerous!

Group 2 – Issues, Concerns, Ideas

- Slow down signage
- Bigger circle to slow down
- Possible walks to school
- Lower pavement-curbs are covered over
- Speeding
- Improve for walking/biking
- Floods at culvert
- 3-way stop (design solution)
- Horse watering trough
- High speed drainage
- Insufficient parking
- Very congested
- Make bridge 1 car at a time
- Too many parked cars
- Drainage problem
- People traveling uphill should have right-of-way vs. people traveling downhill
- Slow speed over bridge
- No parking space for events
- Mill at risk of damage and poor sightline
- Lower bridge and road
- Drainage
- Needs trees
- Cut down road
- Traffic circle
- Water runs down Church St. across 2nd St
- High hump in road
- Traffic speed and noise
- 90-degree culvert backs up
- Speeding
- Unfunctional culvert
- Speed
- By-pass idea – move [traffic]
- Would need to be designed as a country road since 662 needs to be slowed, too

Group 3 – Issues, Concerns, Ideas

- "Hidden" by-pass, trees, high bank to 662
- No walkways needed from school
- Safe walkways to/from school
- Rumble strips to entrances of village
- Invisible stop signs
- Less lights
- Blind hill
- Speedway (High St, Clarkes Gap, Janney St, Patrick St)
- Speedway (High St, 2nd St)
- No sidewalks anywhere
- Street light too bright
- Blind curve
- Too fast (Main St)
- Speed increase (2nd St)
- Sidewalks
- Dangerous speeds
- Ugly light
- Circle
- Ugly light
- Ugly utility pole
- Poor drainage
- Elevated road surface
- No sidewalks anywhere
- One-way traffic
- No streetlights
- Drainage a problem in entire village
- Main St is a speedway
- Drive too fast around the mill
- Bridge is too wide-cars speed
- Stone bridge (bypass)

"Bury the Wires and Tame the Traffic"
Waterford, Virginia

Project Meeting for Waterford Citizens
March 6, 2003

CITIZEN ISSUES AND COMMUNITY VOTE

As a concluding exercise during the Project Meeting for Waterford Citizens, the group was asked to provide major issues or concerns for the village that needed to be addressed by the study to "bury the wires and tame the traffic." These issues were voiced and then recorded on poster-sized paper. Subsequently, the participants were asked to "vote" on the issues by placing a dot (red sticker) next to the issues they believed were most important. Each participant was allowed seven votes and could place all of the dots on one issue or spread their votes among multiple issues.

Listed below are the issues and concerns voiced by the citizens during this exercise, preceded by the number of votes each issues or concern received.

28 Maintain/preserve character
22 Traffic speed
21 Tree Canopy
19 Bury wires
18 Hidden and expandable utility system
17 Traffic diversion (the "bypass")
16 Traffic volume
12 Drainage
9 (Re)placement of trees/maintain existing trees
9 Water
9 Less lighting
7 Make historic-looking streets authentic
7 Safe walk to school
7 Better lighting for evening stroll
7 Authentic looking streets
6 Lower pavement level
6 Eliminate commuter traffic
6 Bicycle-friendly Waterford (including approach roads)
5 Less asphalt (thickness)
5 Visitor friendly Waterford
4 Safe walkways
3 Parking
3 Safe walkways
2 Restore street function
2 Broadband cable access
2 Bicycle un-friendly
1 Sign friendly (proper, tasteful)
0 Construction vehicles
0 Adequate parking at post office
0 Allow construction/farm vehicles
0 Eliminate dangerous corners

VILLAGE OF WATERFORD
Loudoun County, Virginia

"Bury the Wires and Tame the Traffic"
Preliminary Engineering Services Project

PUBLIC MEETING FOR WATERFORD CITIZENS
Thursday, March 6, 2003

FEEDBACK FORM

1. What is your vision for the Village of Waterford, 20 years from now?

2. What do you value most about the Village of Waterford?

3. In your opinion, what are the main issues in the Village that the "Bury the Wires and Tame the Traffic" project needs to address?

4. Other comments?

Your information: ☐ Resident of Waterford ☐ Neighbor ☐ Other: _____

Name(s): _____

Address: _____

Phone: _____

Email: _____

Please fill out form and leave with Kimley-Horn team member at the March 6 meeting.

You may also **mail** form to:
John Martin / Scott Mingonet
Kimley-Horn and Associates, Inc.
13755 Sunrise Valley Drive, Suite 450
Herndon, VA 20171

You may also **email** your comments to:

Waterford@kimley-horn.com

Please succinctly categorize your comment in the subject box so the team clearly understands your issue/comment.

Please send in all comments by March 28, 2003

Appendix E
Essays on Waterford's History

HISTORIC WATERFORD, VIRGINIA
An Overview

by
Phillip E. Pendleton, Architectural Historian
The Louis Berger Group, Inc.
March 2003

The Early Years

The remarkably well preserved rural village of Waterford received its first settlers in about 1733. The initial homesteaders were Quakers of English background from Bucks County, Pennsylvania. Waterford is situated between a relatively steep bluff slope and the South Fork of the Catoctin Creek, its houses and other buildings hugging the sides of the bluff and of a broad gully that dissects the village area. This topography provided a good run of quickly descending water and so presented a suitable site for a grain mill and a sawmill, which were soon established by the Janney family, the first settlers, in the vicinity of the extant circa 1820 mill building. The land around Waterford was well adapted for the growing of wheat, which could be made into flour at Janney's mill. Wheat was a crop for which the colonial Pennsylvanians already well understood the methods of cultivation, harvesting and storage, while wheat flour was the commodity that formed the agricultural engine of the Mid-Atlantic region's great rural prosperity in the eighteenth and early nineteenth centuries. By 1741, as other Quakers from the Delaware Valley region moved in next to the Janneys, settling the larger area surrounding the Waterford site, there was a need for a Friends meetinghouse, and one was constructed of log in that year. The log meetinghouse was replaced with a two-story one built of stone masonry in 1761 (Waterford Foundation 2001; Land Ethics and Dodson Associates 1992:20-24).

Growth of the Village

The hamlet that would become Waterford evidently began to coalesce around the middle of the eighteenth century, as the holders of large tracts made deals on a gradual, piecemeal basis to create small properties for craftsmen and others who were drawn by the presence of the mill and the meetinghouse. This was a common pattern for the initial development of backcountry urban places in early America. If Waterford were typical, one of the first to purchase a village plot was an inn- or tavernkeeper, thereby realizing the classic triumvirate of mill, tavern and house of worship. The first subdivision of a tract to provide a group of lots, made to facilitate the growth of the village, was undertaken in 1792. As additional lot divisions took place in 1800 and 1812, Waterford practically attained its present spatial configuration within a few decades of the beginning of its development as an urban place. Thus the village today represents an instance of the preservation of an early-nineteenth-century community that, at least in this aspect of geographical extent, is rather extraordinary for this country. Waterford's inhabitants obtained a charter via legislative action of the Virginia Assembly in 1801, and in 1811 Waterford was incorporated as a town, complete with a governing council (Waterford Foundation 2001; Land Ethics and Dodson Associates 1992:25, 33; Lewis 1980:1).

In the 1810s, Waterford was also entering its halcyon age, becoming a local center of some importance for retail commerce and the artisanal crafts such as blacksmithing and coopering that were essential to the rural economy. The relationship between the inhabitants of the village and their neighbors in the surrounding countryside was necessarily a close one; in fact, some village dwellers cultivated land and raised livestock on farmsteads that they owned nearby. The Federal Census of 1810 recorded 43 households dwelling in the village. Waterford was described in 1834 as a village inhabited by approximately 400 people living in about seventy dwellings. There was a tannery, a chairmaking shop and a workshop manufacturing boots and shoes. Waterford's surviving assemblage of historic architecture includes approximately 57 major buildings dating before 1834, about 51 of these having been dwellings during the early period. This high proportion of surviving houses, about 73%, shows just how truly intact the village is, with reference to its architectural character as it completed its formative stage of the early nineteenth century (Waterford Foundation 2001; Virginia Historic Landmarks Commission 1969; Land Ethics and Dodson Associates 1992:33).

As the village grew in the final years of the eighteenth century and the early decades of the next century, more Quaker families came from Pennsylvania, along with Ulster Scots and people of German cultural heritage who adhered to the Presbyterian and Lutheran churches respectively. Baptists and Methodists also came, from eastern Virginia and elsewhere. An interesting aspect of local life was the presence by the late eighteenth century of a substantial proportion of free African-Americans among the local population, as well as slaves. In 1830, free black people, who were frequently craftsmen in early-nineteenth-century Virginia, made up a full quarter of the village's heads of household. Such a large proportion of free blacks was unusual among the state's communities, especially in a rural setting (Waterford Foundation 2001; Virginia Historic Landmarks Commission 1969).

From the time of initial settlement onward, due to the Pennsylvania influence among Waterford's inhabitants, the vernacular architectural landscape was characterized by a mingling of building forms associated with the Delaware Valley and Chesapeake regions. Brick masonry construction, with the principal or front façade of a building typically laid up in the more expensive Flemish bond during the eighteenth and early nineteenth centuries, was known in the Delaware Valley in that era but was more common in Virginia. Waterford's early brick buildings frequently present well expressed Federal-style detail including jack arches over the window openings and molded cornices and entry architraves. The Pennsylvania architectural tradition can be seen in the corner-notched log and fully developed stone masonry construction techniques. For each of these methods, there are a half-dozen or so specimens that survive from the settlement's early decades (Waterford Foundation 2001).

The Pennsylvania vernacular influence in Waterford can also be detected in the embankment siting that is represented by many examples due to the sloping topography. Especially common in early southeastern and south-central Pennsylvania, the practice of building on an embanked site enabled a house design incorporating two primary entries, each providing access to a discrete section of the house. The entry on the cellar or basement level led into the part of the house where the kitchen and the food storage area were commonly located, a

place of heavy work in that era. In a commercial and service village such as Waterford, this would generally also be the location of the store or workshop space. The first-story entry, which might be located on a different elevation (i.e., face of the building) than the basement entry, or might be situated above the basement entry with access via a porch, led into the house's formal space and typically boasted a more decorative design for its woodwork (Waterford Foundation 2001).

In 1860, on the eve of the Civil War, Waterford enjoyed the status of Loudoun County's second largest town, serving as the commercial and service center for the northern quarter of the county. The censustaker in that year found the village to be home to seven merchants as well as blacksmiths, tailors, shoemakers, cabinetmakers, saddlers, a confectioner, a tinsmith, and an ambrotypist (the ambrotype being an early variant of the photographic process), and several proprietors of hotels and taverns (Land Ethics and Dodson Associates 1992:34).

The War Years

The war, which ran 1861-1865, had a major impact on Waterford, cutting short the village's continued development as a business center and exacting a heavy material and emotional toll on local families and their properties. Many would never recover. The local inhabitants descended from Pennsylvania families tended to the Unionist side in their convictions, although many of these, as staunch Quakers, were pacifists. There were also many pro-Confederate inhabitants in and around the village. Some of the local Unionists went northward, while others, led by miller Samuel Means, formed a partisan military organization, the Loudoun Rangers. Mustered in as a regular Union Army unit consisting of two companies in June 1862, the Loudoun Rangers operated as an independent command, frequently fighting against Confederate partisans native to northern Virginia, including the battalion led by the noted cavalryman John Singleton Mosby. An extended gunfight between the Loudoun Rangers and Confederate troopers commanded by Elijah White took place in and around the Waterford Baptist Church in August 1862, and several other small but sharp incursions were made on Waterford Unionists by the Confederate partisans. Situated amidst a larger area that endured three or more devastating years as a sort of "no man's land," Waterford apparently enjoyed an intermittent status as a Unionist enclave. Three young women of the village, Sarah Ann Steer and sisters Lida and Lizzie Dutton, ran a pro-Union newspaper, the *Waterford News* (Waterford Foundation 2001; Land Ethics and Dodson Associates 1992:34).

Local families on both sides of the political divide suffered severely from exactions made on livestock and supplies by military commissaries and passing army units, and from the depredations of individual marauders. In November 1864, war's heavy hand fell on many Loudoun Valley farmsteads and mills as Union Army authorities determined on laying the area waste to deprive Mosby and his men of subsistence. The Northern troops seized livestock, destroyed crops, and burned some 230 barns and 8 mills in the valley, many of these properties located in and around Waterford. Perhaps apologies were expressed in the many instances in which the troops knowingly put Unionist property to the torch (Waterford Foundation 2001; Land Ethics and Dodson Associates 1992:34).

War's Aftermath: Waterford's "Rip Van Winkle" Period

In the years following the war, although community life continued, Waterford was not able to regain its earlier vitality. Many former neighborhood families had spent the war years in Northern states. Some returned but others, pausing to consider the unpromising economic outlook in Virginia and the potential for rancor with the ex-Confederates in the Waterford vicinity, departed for the Midwest or remained where they were in the North. On the other hand, an element in Waterford's population that made a definite effort to persevere on their home ground consisted of the African-American residents. The village's surviving buildings dating to the period between 1865 and 1900 include three that were constructed for institutions created by local black people to enhance and reinforce their community life. These properties include the Second Street School, which had 38 pupils when it opened in 1869, the John Wesley Church, built for the African Methodists in 1891, and the Odd Fellows Hall, constructed for a black fraternal organization in 1893. There are also at least three surviving historic dwellings that are known to have been built for African-Americans during this period, as well as other older houses that were owned by black families at that time. The 1910 Federal Census counted six African-Americans who owned their own farmsteads in and around Waterford (Waterford Foundation 2001; Land Ethics and Dodson Associates 1992:26).

Waterford's return to prosperity was hampered considerably in the 1870s when railroad developers passed the village by. As the late nineteenth century and the opening years of the twentieth proceeded, the rising surge of factory-made goods that characterized the national scene made it increasingly difficult for the small-scale artisan to continue to operate. This was the sort of workshop producer that had made up much of Waterford's population. The trend toward mass production resulted in the gradual closing down of businesses and moving away of families in Waterford, as it did in villages and small towns elsewhere in the eastern United States. For decades, local country people continued to patronize Waterford businesses, although they were also strongly drawn to do business in villages served by the railroads, where goods were more readily available. Purcellville, which received the rail line, in a sense took over the economic and geographic role that Waterford had once filled. The decline in the village's volume of business as a commercial and service center took place at a rate that was very slow, but certain (Waterford Foundation 2001; Land Ethics and Dodson Associates 1992:34-36).

For Waterford, the Great Depression years of the 1930s seem to have represented a cloud with a silver lining. The village had already touched bottom in terms of population level and economic wherewithal, a situation that received belated recognition in 1936, when the community lost its incorporation as a town because it was unable to meet the expenses of town government. A perhaps somewhat ironic aspect of the community's decades of decline and neglect was that the surviving building stock was in an impressive state of preservation in the sense that properties had escaped modification. The people with adequate funds had largely been absent, and so for the most part houses had not been altered and updated to conform with changing patterns in lifeways, or torn down to make way for new houses. The proportion of construction surviving in Waterford that dates to the period between 1865 and

1930, numbering about 35 of the approximately 108 major buildings of historic age[1] in town, or 32%, is probably much lower than is typical for the older communities of the eastern United States. In addition to a number of typically plain examples of the regional vernacular from that period, Waterford's buildings from those years include some interesting, relatively small-scale specimens of Victorian commercial vernacular architecture, and a handful of buildings that nicely express the influence of the Queen Anne and the Colonial Revival styles (Waterford Foundation 2001).

The Preservation Renaissance

When the newly formed Historic American Buildings Survey carried out a program of photodocumentation for Waterford's architectural treasures in 1937, the agency was endorsing a recognition the place was already receiving as an extraordinarily intact rural village of an earlier era. The national movement for historic preservation had enjoyed a new burst of vigor in the 1920s, and there had been a related resurgence of the American upper-middle-class family's impulse to "return to the land." In the1930s, as a local expression of these trends, new people from Washington and its environs had begun trickling into the Waterford neighborhood in hopes of enjoying the fresh country air and a slower-paced life. Many of these families chose to renovate existed houses in the village. The roads in Waterford were paved for the first time in 1936, perhaps as a result of the renewed attention (Waterford Foundation 2001; Land Ethics and Dodson Associates 1992:34).

By the later years of the 1930s, several local families were increasingly devoting their time and resources to the protection and promotion of Waterford's historic physical character. These efforts attained a concrete organizational form with the establishment of the Waterford Foundation in 1943. The foundation's mission was to "revive and stimulate a community interest in recreating the town of Waterford as it existed in previous times with its varying crafts and activities." An arts and craft exhibition was organized for October 1944—the Waterford Fair has been an autumn tradition ever since. In 1970, the village became a National Historic Landmark, in effect a member of the elite upper tier of National Register resources. The NHL boundary extends to encompass the farmstead properties immediately surrounding the village (Waterford Foundation 2001).

The last third of a century has seen ever mounting developmental pressure on the vicinity of the village as the northern Virginia suburban region has continued to experience a high rate of growth in housing and commercial properties. In 1974, the Waterford Foundation responded to this threat to the village's historic integrity with a program of easements designed to protect historic properties from inappropriate change. As of 2001, there were 68 such easements in place within the village's National Historic Landmark area (Waterford Foundation 2001).

[1] "Historic age" refers to the National Park Service age criterion for National Register eligibility, which directs that an eligible property be more than 50 years of age, unless it demonstrates exceptional historic or architectural significance.

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Waterford's Significance

Phillip E. Pendleton, Architectural Historian
The Louis Berger Group, Inc.
June 2003

In the America of the early 21st century, Waterford clearly represents a place apart. A National Historic Landmark since 1970, Waterford began attracting special notice from preservationists for its character as an unspoiled rural village during the 1930s. A fairly comprehensive photographic study was compiled by the Historic American Buildings Survey, the Federal agency charged with the documentation of architectural resources of outstanding historic value, in 1937. Local citizens, recognizing their community's nature as a treasure piece of historic landscape and regional vernacular architecture, founded the Waterford Foundation in 1943 to ensure the protection of this rich heritage. There are approximately 2,200 National Historic Landmarks in the United States, places that have been officially recognized as bearing exceptional significance in regard to the physical representation of American history.

Waterford today is almost unique in the eastern United States. It is so significant to our national cultural legacy as to merit the elevated status of National Historic Landmark, for the thoroughness with which the visual demarcation between the 19th–century village as an urban place and the surrounding countryside of farmsteads, pastures, and fields has persisted. There may be automobiles in the village, there may be power lines, there may be some modern dwellings (well designed to blend in with the old architecture for the most part), because Waterford is a lived-in, modern community—but, due to the absence of quick-stop stores and other elements of today's standard small town's periphery, the nature of the place as a village that evolved during the early 1800s is readily visible to the resident or visitor. In this sense, Waterford may present the opportunity for greater insight, or certainly a different sort of insight, into the look and feel of an historic community than that offered by a museum village such as Colonial Williamsburg or Old Sturbridge Village, where the visual character of the landscape is in some measure contrived. Walk a piece along one of the three "gateway" roads that lead into and out from the village, and you can gather an impression of the closely intertwined social and economic connections between village and surrounding countryside that must have characterized the past life of the community.

In addition to the historic spatial pattern of the settlement, with Waterford's configuration of constituent lots practically the same as it was in 1812, the historic architecture itself is impressively intact—about three quarters of the houses that stood in 1834 are still standing. Only a few of America's communities that old could make such a claim. Waterford's body of early architecture represents a fairly broad spectrum of the design forms, construction techniques, and decorative elements seen in the vicinity during the early 1800s, and exhibit the intriguing, and very American, mingling of Pennsylvania and Virginia vernacular architectural traditions that occurred during that time in this part of northern Virginia. Waterford's buildings dating to the late 19th and early 20th centuries, which bear testimony to the effort to regain the town's vitality following the Civil War, are also of interest as examples of a variety of styles and forms from that period. Especially noteworthy are the

village's many institutional and commercial buildings that date to the full span of Waterford's history and that so well embody and express the historic life of the community, including churches, schools, mills, stores and workshops.

In the case of Waterford, the "historic life of the community" has apparently been one of considerable texture and variation. As the historian or archaeologist studies the small communities of America's past, and considers them within the context of the larger cultural region or group of inhabitants, he or she not infrequently has to remark upon the exceptionality of a given place or neighborhood, a community whose history does not fit right into the general pattern of the broader area around it. This departure from the predominant regional pattern demands recognition as a prominent phenomenon in American history, with Waterford as a striking example. Waterford's exceptionality was there from the commencement, when Friends or Quakers from southeastern Pennsylvania initiated the local settlement in 1733, and continued as the town evolved during the early to mid 1800s.

A preservationist writing in 1992 described how the village's integrity, i.e., its retention of the physical characteristics that make it historically significant, enable Waterford to exemplify its historic development as a rural community based on grain milling and other services and institutional functions that the village inhabitants provided for the surrounding farming neighborhood. The topography of the landscape, which facilitated the waterpower necessary to run mills and which was also located amidst a larger area that was well suited to the cultivation of grains including wheat, is expressed as well in the placement of roads and buildings, and in the pattern of agricultural land use. This pattern on the land is there to be traced, seen also in archaeological resources and ruins, and in fences, hedgerows, plantings and other landscape elements. But, as the writer put it, "Waterford is a unique, non-renewable resource—once changed, it will be lost forever." The exurban residential development, currently tending toward a transformation of the rural landscape in much of the village's larger vicinity, poses an ongoing, omnipresent threat.

FARM, MILL, AND MARKET
An Introduction to the Transportation History of Waterford, Virginia

Memo for FHWA by John Souder, Waterford Resident
February 2003

For a variety of reasons, federal, state, and local government agencies have all deemed the Waterford National Historic Landmark District an important resource worth preserving. This overview summarizes aspects of the district relating to transportation history.

In brief, the district encompasses an early road network that was put in place in the 18th century primarily to transport cereal grains from surrounding farms to a water-powered mill and to ship the resulting flour to distant markets. Since then, the only change to that network has been a small grid of streets that was laid out shortly after 1800 to serve the village that grew up around the mill. What exists today is an intact, documentable example of a colonial-era transportation system radiating from a mill that, in turn, attracted a variety of other support services typical of a self-sufficient early American farming community. Because there have been so few modern intrusions into this landscape, the early history is readily apparent to visitors.

The essential details of that history are as follows:

In 1733 and 1740 two Quaker brothers-in-law from Bucks County, Pennsylvania, purchased from colonial land speculators two adjacent parcels in the Loudoun Valley of Virginia totaling 703 acres. Those empty acres would became the core of the Waterford Historic Landmark District.

Except for a handful of German settlers who had preceded the two Quakers by just a few years, the valley was essentially unpopulated. The native Americans had been pushed west of the Blue Ridge Mountains by the Treaty of Albany, concluded in 1722. There was no village and no roads other than rough trails.

The first of these Quakers to arrive, Amos Janney, was a farmer, surveyor, and entrepreneur. Recognizing the power potential of Catoctin Creek and Balls Run, which flowed through his land, Janney promptly built a small mill to process his grain and that of other Quaker farmers who arrived in increasing numbers through the 1760s.

At about the same time, in 1748, the colonial government in Williamsburg enacted legislation providing that "the several county courts of this dominion have, and shall have power, by their order, from time to time, to direct the alteration of public roads already made,

> "The German, Scotch-Irish, and Quaker immigrants from Pennsylvania were accustomed to growing grain . . . their settling of Upper Loudoun 1735-1775 coincided with a renewed interest in the growing of wheat to meet the increased demands of the British market."
>
> *Helen Hirst Marsh, "Early Loudoun Water Mills," reprinted in Loudoun Historical Society Bulletin, 1997.*

or hereafter to be made . . . in such places as to them shall seem convenient, for passing to, and from . . . the court house of every county, the parish churches, and all public mills, and ferries."[1]

Amos Janney died in 1747, but his son Mahlon Janney by the early 1760s expanded and modernized his father's mill. His mill dam, millrace, and mill building still exist.

> "Stores and other accouterments of town life often evolved where a mill or church had been established during the colonial era. For example, towns emerged around the establishment of mills at Aldie and Waterford."
>
> Charles P. Poland, Jr., *From Frontier to Suburbia*, Walsworth Publishing Company, Marceline, Missouri, 1976, p. 69.

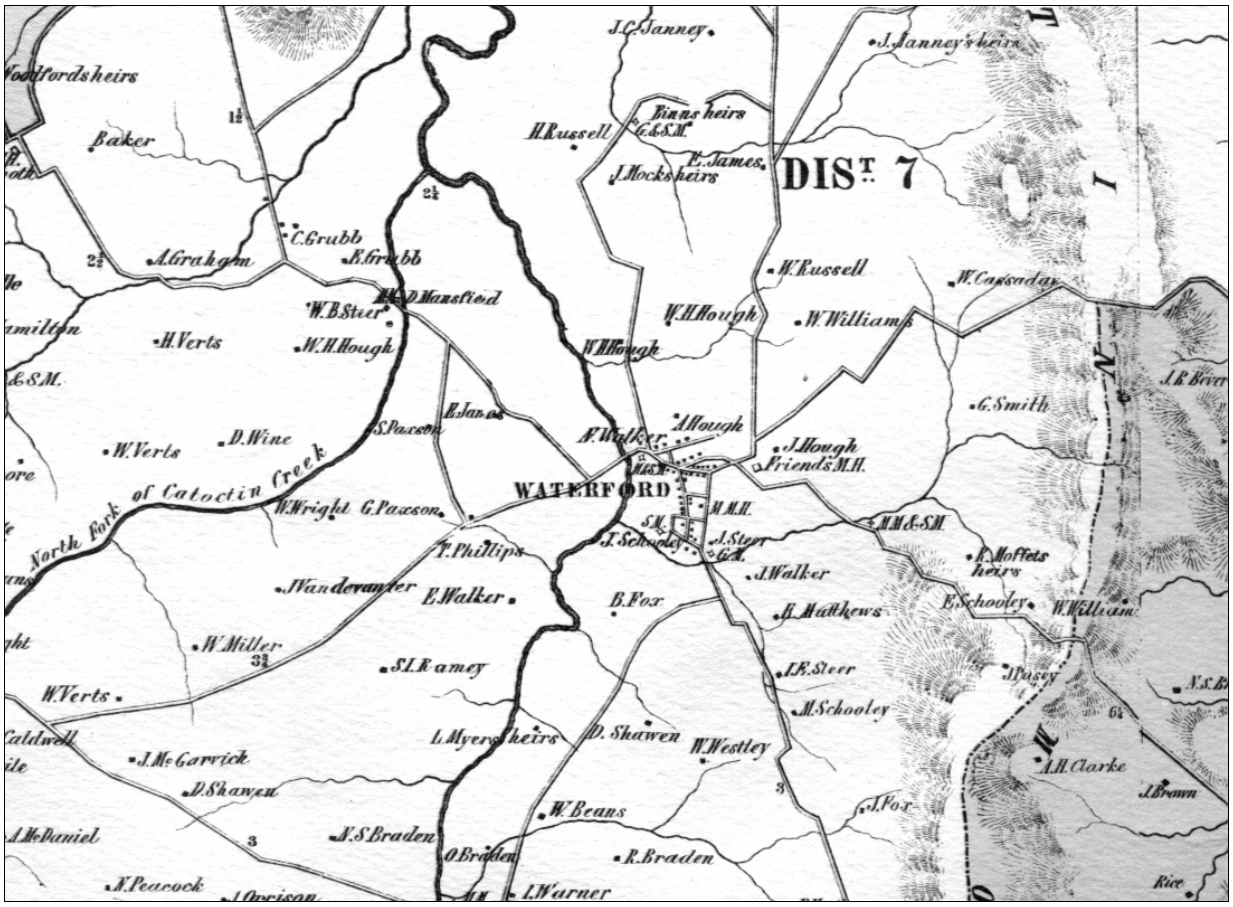
From the beginning, the mill was the commercial center of a farming area several miles in radius. It is clear from early deed records that roads developed quickly as spokes of a wheel with the mill as the hub. The settlement that grew up around that hub was called simply "Janney's Mill." It appears as such in early road petitions. In 1762, for example, the county court appointed four men "to site a new Road from Jenny's [Janney's] Mill into the main Road leading from Leesburgh to Clapham's & Noland's Ferries" on the Potomac River.[2] These ferries offered access to the port of Baltimore, an early and important market for Loudoun Valley farmers.

A few years later petitioners were seeking better access *to* the mill.

> To the Worshipfull court of Loudoun
> Gentlemen
> We your petitioners Humbly sheweth that we labour under Great difficulty for want of a Road leading to Mahlon Janneys Mill through our settlement. We therefore Pray your Worships to order a Road to be laid out & Opened through our Settlement the most convenient & Beste way to said Mill.
>
> *Loudoun County Road Case #46, March 1774*

The village was finally renamed "Waterford" around 1790. By then the Loudoun Valley and adjacent areas across the Potomac River in Maryland had become famous as the "breadbasket of the Revolution."[3] In those years large quantities of grain flowed through Waterford to be ground into flour and shipped to markets along the eastern seaboard and beyond to Europe and the Caribbean. The principal routes ran north to the river (Rts. 662, 665 and 681) and south (Rt. 662) through the county seat of Leesburg and thence to Georgetown and Alexandria.

[1] William W. Henning, ed., *Statutes at Large, Being a Collection of All the Laws of Virginia*, Samuel Pleasants, Richmond, 1819-23, Vol. VI, p. 64.
[2] Loudoun County Court Order Book A, p. 622.
[3] Asa Moore Janney, Loudoun County historian, videotaped interview, 2000.



In the early 1817 Robert Braden purchased the Waterford mill. The following year he and another Waterford businessman, Asa Moore, were co-directors of a company formed to "turnpike" the road to the nearest ports.[4]

The mill business continued to drive local road improvements. One priority was the bridging of Catoctin Creek just a block from the mill. In poor weather, the lack of a bridge blocked passage to and from the northern part of the county. In the 1830s the mill owner at that time, Thomas Phillips, headed a successful petition drive for such a bridge. The resulting covered bridge served for more than 50 years until it was swept away at the time of the Great Johnstown Flood. (The present bridge is the fourth on the site. The design of the original wooden bridge as well as photographs of a later steel truss bridge survive.)

Notice.

PROPOSALS for turnpiking the road from Leesburg to Alexandria & George Town as authorised by law will be received, addressed to either of the subscribers, until Tuesday the 24th day of June next Persons desirous of undertaking any part of the road, will be shewn the ground, and the location of said road by applying to Samuel Carr or John Littlejohn, in Leesburg.

JOHN LITTLEJOHN, *Pres't.*
ASA MOORE,
ROBT. BRADEN,
—— SMITH,
A. MAINS,
Directors.
SAMUEL CARR, *Secretary.*

May 20.—[3w.

[4] *Genius of Liberty*, Leesburg, Virginia, May 20, 1818.

Thomas Phillips also spearheaded other transportation initiatives, not all of them as successful, to improve access to and from his mill. In the 1830s he received state approval to construct a railroad from the mouth of Catoctin Creek on the Potomac south through the Loudoun Valley to the town of Upperville in neighboring Fauquier County.[5] There was also talk of a canal linking Waterford to the Potomac. Neither project got off the ground.

The Waterford area *c.*1850. An extensive road network radiates from the mill village, serving the surrounding Loudoun Valley, including the farmers whose names appear. The Potomac River lies a few miles to the north and east of Waterford. All of the roads were in place before 1800.

At the outbreak of the Civil War in 1861, the Waterford mill remained one of the most important in the county, and its owner, Samuel Means, was one of the county's wealthier citizens. He maintained several teams of horses and wagons to ship flour and other goods up to and across the Potomac at Point of Rocks, Maryland, where he owned warehouses and where the mill's output was transferred to the B&O Railroad or C&O Canal for delivery to Baltimore and Washington.

The Waterford Mill and its race, 1905

Six-horse team and wagon at the mill, early 1900s

[5] *Ibid.*, January 17 & 24, 1835.

Miller Means, incidentally, figured prominently in Waterford's Civil War history. When he refused to throw in with the Confederacy, the rebels sacked his mill and confiscated his horses. In response, Means raised a Union cavalry battalion from among his north Loudoun neighbors. He had a direct commission from Secretary of War Stanton. His Independent Loudoun Virginia Rangers were one of the only organized units in what is now Virginia to fight for the North. Unfortunately, Means's commercial losses from the war and his poisoned relations with pro-Confederate farmers left him ruined after the war.

Ironically, modern transportation eventually doomed Waterford's mill-based economy. The railroad that finally came to the Loudoun Valley in the 1870s bypassed the village. Farmers and other local producers and consumers increasingly looked elsewhere for milling services, and the great grain-producing areas of the Midwest undercut the market for locally-produced flour. Loudoun farmers shifted the basis of their economy to dairy operations.

But Waterford's stagnation and decline had a silver lining. Because the mill and other commercial and residential buildings were no longer worth expanding—or even demolishing for new enterprises, the village's past was almost perfectly preserved. That unique state of preservation was the basis of Waterford's designation as a National Historic Landmark District.

All parties to that designation agree that preservation of the agricultural setting of the village—not just its buildings—is critical to its continued historic significance. That significance, as this memorandum has argued, includes an unaltered transportation network centered on the mill.

One farm, in particular, dominates the western portion of the Landmark. That property is now on the market and slated for the maximum of residential housing that county zoning permits. This property adjoins the mill and encompasses the mill dam and pond on Catoctin Creek and much of the mile-long millrace. For many of the years between 1740 and the present, the owner of the mill has also owned much, if not all, of the farm. These men include Amos and Mahlon Janney and Thomas Phillips. The farm, in fact, remained in the Phillips family until the 1950s.

Loss of the farm to development—with inevitable "improvements" to adjacent Virginia Scenic Byways—would destroy for visitors and the traveling public the 250-year-old visual connection between the mill, the village, and the transportation network that grew up around them.

Endangered Waterford National Historic Landmark
Written by Tony Horwitz, 2003

The 1969 nomination of Waterford, Virginia, as a National Historic Landmark stated: "A major factor in Waterford's character is the unspoiled open rolling landscape which surrounds the village and enhances its integrity." Now that landscape is under threat. The 144-acre farm that enfolds Waterford and defines its rural heritage has been sold to a real estate company. If the company proceeds with its plans to build fourteen homes on the property—ten percent of the entire acreage within the Historic Landmark—Waterford could lose its national heritage status.

The threatened acreage, Phillips Farm, frames the village with a pastoral expanse of field, stream, floodplain and ridgeline. This isn't simply Waterford's backyard; it's America's. When a pioneer named Amos Janney founded the village in the Blue Ridge foothills in 1733, Virginia's piedmont formed the frontier of a colonial America that had yet to push past the Appalachians. In the early 1800s, Waterford grew with the new nation into a bustling commercial center for the surrounding farmland, and became a distinctive corner of the South: a largely Quaker town that welcomed free blacks, a quarter of Waterford's population.

The Civil War marked a watershed in the town's history, as it did in the nation's. Split between anti-slavery Quakers and farmers who supported the Confederacy, Waterford was the rare community where brother really did fight against brother. Quakers, though anti-war, raised two cavalry companies, the only organized Federal force from Virginia. Many of their neighbors and kinsmen joined the local Confederate battalion. A skirmish between the two forces erupted in a Waterford cornfield in 1862; the Baptist Church on Waterford's High Street still bears the scars of battle. After the Union men surrendered, one of the rebels recognized his brother among the prisoners and tried to kill him. Two other skirmishes were fought in fields adjoining Phillips Farm, one of them involving Mosby's Raiders. The graves of Union and Confederate soldiers lie side by side in Waterford's historic cemetery. Nearby are graves of African-Americans who went north and joined the famed 54th Massachusetts, celebrated in the movie "Glory."

Waterford's location, near the Potomac and within a county bounded by Maryland and West Virginia, also placed it near the heart of the broader conflict. Union and Confederate Armies marched through Waterford on their way to and from Gettysburg. Waterford lies midway between Manassas and Antietam; residents could hear the latter battle, twenty miles away. The village is fifteen miles from Monocacy and Harper's Ferry, and just five miles from Ball's Bluff. Visitors to all of these prominent National Park Service sites often stop in Waterford.

But what most distinguishes Waterford isn't its connection to major events. Nor is this a grand place, like Mount Vernon or Monticello. Rather, the modest village homes, and their rural surrounds, preserve the templates of ordinary 18th and 19th century American lives. The threatened property is crucial to this history. If you take a few steps beyond Williamsburg's colonial center, you enter the neon 21st century. But walk behind the log

cabins and brick homes along Waterford's Main Street and you'll find yourself in farmland and meadow that sustained this community for centuries, and sustains it still. While so much of America's agricultural land has been lost, these acres are still a working cattle farm. Catoctin Creek, which powered Waterford's grist mill and provided the reason for the village's founding, winds through Phillips Farm. The floodplain on either side of the creek is a rich natural habitat for blue heron and other migratory birds. The ridgeline offers the best spot from which to view the layout of Waterford's village, which hasn't changed in 150 years.

This farmland also forms the backdrop to Waterford's annual fair, during which Civil War reenactors fight beside the creek and children ride on agricultural equipment through the fields. Villagers whose land adjoins Phillips Farm open their historic homes and yards to the fair's 30,000 visitors—the largest tourist gathering in Loudoun County—so everyone can share the modest scale and rural feel of earlier America. Villagers will endeavor to do the same with Phillips Farm, if it is preserved under the auspices of the non-profit Waterford Foundation. Interpreted nature and historical trails would provide public access to a patch of traditional farmland at a time when so much of the greater Washington area is becoming suburbanized. This would also complement the many public and educational activities already available in Waterford, including living history programs for elementary school students at the one-room schoolhouse on Second Street, which was created by the Freedmen's Bureau two years after the Civil War and served African-American students until 1957.

If the farmland surrounding Waterford is developed, the village will become a very different place: a collection of quaint houses hemmed in by sprawl and shorn of its rural context. Future generations will have lost the opportunity to know America as it once was. The fine, frail thread that binds here and now to there and then will have been cut. That is why the proposed development of land within the National Historic Landmark threatens not only Waterford's heritage, but America's.

Sources:

Loudoun County and the Civil War by John Devine.

The Civil War Day by Day, by E.B. and Barbara Long.

The Civil War Sourcebook, by Chuck Lawless.

The New York Times, August 9, 1995

To Talk Is Treason: Quakers of Waterford, Virginia, on Life, Love, Death & War in the Southern Confederacy, by John Devine and Bronwyn and John Souders.

Waterford National Historic Landmark: Its Significance and Protection, the Waterford Foundation

Appendix F
U.S. Army Corps of Engineers Wetlands Confirmation

WILLIAMSBURG
ENVIRONMENTAL
GROUP, INC.

Environmental Consultants

March 31, 2003

Mr. Ron Stouffer
Regulatory Branch
U. S. Army Corps of Engineers
18139 Triangle Shopping Plaza, Suite 213
Dumfries, Virginia 22026

Re: **Confirmation of Wetland Boundaries**
Waterford Historic District, Loudoun County, Virginia
Latitude: 039° 11' 13.86"N Longitude: 077° 36' 38.58"W
WEG Project #1725

Applicant: Loudoun County
c/o Mr. John Martin
Kimley-Horn and Associates, Inc.
9411 Lee Highway, Suite A
Fairfax, Virginia 22031

Dear Mr. Stouffer:

The Williamsburg Environmental Group (WEG) has been retained by Loudoun County through Kimley-Horn and Associates, Inc. to conduct a detailed wetland investigation on the above-referenced project. The approximate 137+/- acre site encompassing the historic Village of Waterford, and is located within the South Fork of the Catoctin Creek drainage basin in Loudoun County, Virginia (Figure 1-1). The site is situated approximately 5 miles northwest of Leesburg and can be accessed primarily by Main Street, Water Street, High Street, and Second Street (Figure 1-2).

Offsite Evaluation – Prior to conducting fieldwork, WEG consulted the USGS 7.5-minute Topographical Quadrangle Map for Waterford, Virginia (1984 revision), the *National Wetlands Inventory Interactive Mapper* (NWI), administered by the U. S. Fish and Wildlife Service, and the 2000 *on-line Loudoun County Mapping System, Loudoun County, Virginia*, as prepared by the Natural Resources Conservation Service (NRCS). The USGS quad map shows a moderately sloping site comprised of the town of Waterford, and cleared and forested land. In addition, a tributary of South Fork Catoctin Creek is located adjacent to the eastern and southern town limits, while the South Fork of Catoctin Creek is located just within the northwestern town limits. The NWI map depicts no wetland features within the project boundaries. Additionally, the soil survey indicates the site is underlain primarily by Percellville and Middleburg series. None of the soils mapped within the town limits are classified by the NRCS as hydric.

Onsite Evaluation – Fieldwork was conducted during February and March 2003 using the Routine Determination Method as outlined in the 1987 *Corps of Engineers Wetland Delineation Manual*. Wetland flags were placed in the field by WEG and sequentially numbered to provide an onsite record of the location of wetlands and other water features. The data sheets used in this

investigation are attached, along with the Delineation Map showing the approximate limits of wetlands and other water features, as well as data point locations.

Site Description – The majority of wetlands identified by WEG within the project limits may be classified as emergent. Wetland vegetation is typified by species of sedge (*Carex* spp.), and soft rush (*Juncus effuses*). The transition from wetlands to uplands was generally identified by a vegetation community change. Additionally, stream channels exist within the northwestern portion of the project site. Streams channels adjacent to the project site can be found to the east, south and west.

On behalf of our client, WEG respectfully requests that the Corps confirm our wetland delineation. We would appreciate the opportunity to meet with you on site to present our fieldwork. Please call to set up a meeting date or to discuss any questions regarding our investigation.

Thank you for your cooperation in this matter.

Sincerely,

Joseph P. Fiorello, PWS
Ecologist II

Enclosures

cc: Mr. John Martin, Kimley-Horn and Associates, Inc.

U.S. Army Corps of Engineers, Norfolk District
Northern Virginia Field Office
18139 Triangle Plaza, Suite 213
Dumfries, VA 22026

May 28, 2003

Project Number: 03-B0323

Waterway: South Fork Catoctin Creek

1. Participant:
Loudoun County
c/o Kimley-Horn and Associates, Inc.
Attn: Mr. John Martin
9411 Lee Highway, Suite A
Fairfax, VA 22031

2. Authorized Agent:
Williamsburg Environmental Group, Inc.
Attn: Mr. Joseph Fiorello
Suite 160
46030 Manekin Plaza
Sterling, VA 20166-9807

3. Project Location:
The project is located on an approximately 137-acre parcel emcompassing the Town of Waterford in Loudoun County, Virginia.

4. Project Description:
The project consists of the confirmation of a wetland delineation for the subject tract. The project is called Waterford Historic District.

5. Findings

A site inspection has verified that waters and/or wetlands regulated under Section 404 of the Clean Water Act (33 U.S.C. 1344) exist at the location stated above. The delineation, described by letter, report and plans by Williamsburg Environmental Group, Inc. dated March 31, 2003 and revisions dated May 5, 2003, is in accordance with the 1987 Corps of Engineers Wetland Delineation Manual and 33 CFR 328.3 (a). Your rights and options regarding an administrative appeal of this determination may be found at 33 CFR Part 331 or http://usace.army.mil/inet/functions/cw/cecwo/reg. This confirmation is valid for five years from the date of this letter unless new information warrants revision of the delineation before the expiration date.

6. Corps Contact: Mr. Ron Stouffer at 703-221-6967

Bruce F. Williams
Chief, Northern Virginia Regulatory Section

NAO FL 13 REVISED DEC 90

WILLIAMSBURG
ENVIRONMENTAL
GROUP, INC.

Environmental Consultants

June 2, 2003

Mr. John Martin
Kimley-Horn and Associates, Inc.
9411 Lee Highway, Suite A
Fairfax, Virginia 22031

Re: Waterford Historic District
Corps Confirmation Letter
WEG Job No. 1725

Dear Mr. Martin:

Williamsburg Environmental Group, Inc. (WEG) is pleased to provide you with the attached wetland confirmation letter received from the U.S. Army Corps of Engineers (Corps) for the above referenced site. This letter confirms the wetland delineation work performed by WEG, and depicted on the attached map. Changes were made to the map you had received subsequent to our visit with the Corps. The changes include the addition of a stream channel and linear wetland along Water Street. The confirmation is valid for a period of five (5) years, expiring on May 30, 2008.

WEG appreciates the opportunity to provide Kimley-Horn and Associates, Inc. with environmental services for the Waterford Historic District, and looks forward to providing additional support as needed. If you have any questions concerning this correspondence or the project in general, please feel free to contact Ms. Loretta Cummings or myself at your convenience.

Sincerely,

Joseph Fiorello, PWS
Ecologist II

Attachments

46030 Manekin Plaza, Suite 160 • Sterling, Virginia 20166-9807 • (703) 406-1390 • FAX (703) 406-1385

Appendix G
Tree Survey Database List

SURVEY OF TREES IN THE VILLAGE

TREE NO.	BOTANICAL NAME	COMMON NAME	DBH	HT	SPR	CONDITION	COMMENTS
1	Acer rubrum	Red Maple	52.1	41	30	Poor	Has been heavily pruned. A 10 to 12 foot stump with some regenerative growth. Lots of rot evident in old wounds as well as concrete which has been used to try to seal cavities.
2	Cornus florida	Flowering Dogwood	10	20	21	Good	
3	Cornus florida	Flowering Dogwood	6	14	15	Poor	Severe pruning evident. Large amount of dead wood in crown.
4	Cornus florida	Flowering Dogwood	6	10	10	Poor	Severe pruning evident. Only small amount of crown left.
5	Malus spp.	Crab Apple (cal.)	12	10	10	Fair	Needs maintenance
6	Cornus florida	Flowering Dogwood	6	10	5	Poor	Only one stem of a multi-stem tree remains. Some evidence of rot and very little branching.
7	Robinia pseudoacacia	Black Locust	32.5	76	45	Fair	Some rot evident. Only 6 ft from pavement.
8	Juglans nigra	Black Walnut	22.5	58	43	Fair	Some signs of decline. Broken limbs
9	Gymnocladus dioicus	Kentucky Coffeetree	18	65	27	Fair	Heavy limb on road side of tree; can be struck by taller vehicles. Ivy growing on trunk to 20 ft.
10	Pinus echinata	Shortleaf Pine	8	43	22	Poor	Dead or dying.
11	Pinus echinata	Shortleaf Pine	8	48	12	Fair	
12	Pinus echinata	Shortleaf Pine	8	43	15	Poor	Terminal leader cut by power company.
13	Pinus echinata	Shortleaf Pine	9	40	16	Poor	Dead or dying.
14	Pinus echinata	Shortleaf Pine	6	44	14	Poor	Dead or dying.
15	Pinus virginiana	Virginia Pine	14	63	35	Good	
16	Malus spp.	Crab Apple	12	19	27	Fair	Some decay in old prune scars
17	Malus spp.	Crab Apple	8	9	7	Good	Good for pollarded Tree
18	Malus spp.	Crab Apple	8	9	7	Fair	One side of bole showing decay-also pollarded
19	Betula popunifolia	Gray Birch	20.4	37	18	Good	Basal measurement
20	Acer saccharum	Sugar Maple	19	45	61	Fair	Powerline passes through the crown-has been severely pruned
21	Acer rubrum	Red Maple	5	27	25	Good	
22	Ilex attenuata	Foster Holly	12	21	15	Good	Basal measurement
23	Acer saccharinum	Silver Maple	54	72	69	Good	
24	Ilex hybrida	Nelly Stevens Holly	2	10	8	Good	
25	Lagerstroemia spp	Crape Myrtle	1	12	8	Good	Basal measurement
26	Lagerstroemia spp	Crape Myrtle	1	12	8	Good	Basal measurement
27	Acer platanoides	Norway Maple	28	69	45	Fair	Heavily pruned on house side-Ivy to 20'
28	Acer platanoides	Norway Maple	31	73	48	Good	
29	Pyrus malus	Apple	8	22	24	Fair	Overtopped by other trees
30	Acer rubrum	Red Maple	47.5	70	51	Fair	Good bud production in crown, but bole appears to be partially hollow, basal measurement
31	Acer rubrum	Red Maple	25	64	30	Fair	Appears to have been pruned, but in good shape
32	Robinia pseudoacacia	Black Locust	20	62	42	Good	
33	Acer rubrum	Red Maple	37	58	33	Poor	Majority of crown is gone, in decline
34	Picea glauca	White Spruce	4	10	8	Good	
35	Robinia pseudoacacia	Black Locust	16	68	38	Good	
36	Picea abies	Norway Spruce	16	62	36	Good	
37	Cornus florida	Flowering Dogwood	6	18	10	Poor	Only one functioning limb
38	Malus sp.	Crab Apple	8	20	21	Good	Needs maintenance
39	Malus sp.	Weeping Crab Apple	10	22	18	Good	
40	Juniperus virginiana	Red Cedar	3	13	10	Good	Basal measurement
41	Picea abies	Norway Spruce	18	74	27	Good	Ivy growing to 30'
42	Picea abies	Norway Spruce	15	68	24	Good	
43	Picea abies	Norway Spruce	15	68	26	Good	

SURVEY OF TREES IN THE VILLAGE

TREE NO.	BOTANICAL NAME	COMMON NAME	DBH	HT	SPR	CONDITION	COMMENTS
44	Picea abies	Norway Spruce	12	61	18	Good	
45	Aesculus octandra	Sweet Buckeye	26.7	82	42	Good	
46	Aesculus octandra	Sweet Buckeye	31.2	84	36	Good	
47	Acer saccharum	Sugar Maple	45.1	78	60	Fair	Double trunk with some inclusion; has been cabled
48	Acer saccharum	Sugar Maple	32.2	83	42	Good	
49	Acer saccharum	Sugar Maple	39.6	59	48	Fair to Poor	Rot in cavities where several limbs have been removed, also a cavity at base
50	Acer nigrum	Black Maple	14.8	44	35	Fair	Slight crown maintenance for streetside cables not affecting health
51	Acer nigrum	Black Maple	16.2	43	33	Fair	Slight crown maintenance for streetside cables not affecting health
52	Tilia americana	American Basswood	31.8	75	57	Fair	Has been severely pruned-needs maintenance
53	Tilia americana	American Basswood	34.8	68	36	Fair	Has one heavy branch at poor angle-Large sap flow at juncture
54	Tilia americana	American Basswood	35.2	78	52	Good	
55	Acer saccharinum	Silver Maple	20.0	60	30	Good	
56	Carpinus caroliniana	Ironwood	11.7	31	21	Poor	Heavily pruned for powerline
57	Carpinus caroliniana	Ironwood	21.5	34	25	Fair to Poor	Heavy pruning, some rot at prune scars, basal measurement
58	Ulmus rubra	Slippery Elm	34.8	88	70	Good	
59	Acer saccharinum	Silver Maple	53.7	88	66	Good	
60	Celtis occidentalis	American Hackberry	15.1	65	33	Good	
61	Celtis occidentalis	American Hackberry	10.4	49	21	Good	
62	Prunus serotina	Black Cherry	13	48	33	Good	Basal measurement
63	Cornus florida	Flowering Dogwood	8	21	20	Poor	A lot of dieback
64	Cornus florida	Flowering Dogwood	11	27	18	Fair	Woodpecker damage-guy wire from pole runs through the tree, basal measurement
65	Juglans nigra	Black Walnut	14.8	65	29	Poor	Bole rot on one side
66	Prunus serotina	Black Cherry	15.9	61	35	Fair	Upper canopy broken
67	Celtis occidentalis	American Hackberry	19.7	80	40	Fair	Some cutting, rupture of lower bole, basal measurement
68	Acer saccharum	Sugar Maple	16.7	56	45	Good	Has been topped for powerlines
69	Juglans nigra	Black Walnut	15.6	87	35	Good	Some lower limb pruning
70	Juglans nigra	Black Walnut	6,7	35	15	Good	Some lower limb pruning
71	Juglans nigra	Black Walnut	17.4	73	45	Good	Some lower limb pruning
72	Acer saccharum	Sugar Maple	34.3	74	51	Good	Powerline passes through it
73	Acer saccharum	Sugar Maple	16	44	33	Fair	Has been pruned by power company-not responding well
74	Robinia pseudoacacia	Black Locust	24.5	89	62	Good	One bad limb
75	Juglans nigra	Black Walnut	13.8	66	25	Fair	Some lower limb pruning
76	Picea pungens	Blue Spruce	18.8	81	24	Good	
77	Cornus florida	Flowering Dogwood	8	22	21	Poor	A lot of dead, rotten wood-tree is breaking up-Ivy growing in it
78	Cornus florida	Flowering Dogwood	17.2	34	24	Good	Basal measurement
79	Acer saccharum	Sugar Maple	27.6	86	57	Good	
80	Cornus florida	Flowering Dogwood	5	22	19	Fair	Sparse top
81	Prunus spp	Ornamental Cherry	12	18	24	Fair	The larger limbs have been topped and there is rot in these wounds, basal measurement
82	Morus rubra	Red Mulberry	31	74	50	Fair to Poor	Heavily pruned street side, overgrown with English ivy
83	Acer saccharum	Sugar Maple	43	76	63	Poor	A lot of deadwood-evidence of hollows-hollows in old scars
84	Prunus serotina	Black Cherry	10	54	36	Fair	A couple of dead lower branches
85	Quercus prinus	Chestnut Oak	11.8	30	40	Good	
86	Cornus florida	Flowering Dogwood	7	23	25	Fair	Scar on bole showing decay
87	Robinia pseudoacacia	Black Locust	23	67	42	Fair	One side of top is split and failing

SURVEY OF TREES IN THE VILLAGE

TREE NO.	BOTANICAL NAME	COMMON NAME	DBH	HT	SPR	CONDITION	COMMENTS
88	Robinia pseudoacacia	Black Locust	23	76	45	Good	
89	Gymnocladus dioicus	Kentucky Coffeetree	18	46	42	Good	
90	Acer saccharum	Sugar Maple	29	45	25	Poor	Approx. 50% dead, overgrown with English ivy
91	Morus rubra	Red Mulberry	13.4	42	20	Fair	Sap leak on bole apparent
92	Morus alba	Mulberry	24.6	57	25	Good	Basal measurement
93	Morus rubra	Red Mulberry	18.3	36	22	Good	Basal measurement
94	Acer saccharinum	Silver Maple	38	55	45	Good to Fair	Slight lower stem rot, basal measurement
95	Acer platanoides	Norway Maple	42.2	66	72	Good	
96	Celtis occidentalis	American Hackberry	8.6	41	24	Good	
97	Celtis occidentalis	American Hackberry	5.3	35	18	Good	
98	Celtis occidentalis	American Hackberry	5.2	31	17	Good	
99	Ulmus americana	American Elm	14	59	44	Fair	Needs maintenance
100	Juglans nigra	Black Walnut	6	42	10	Good	
101	Acer saccharum	Sugar Maple	6	40	18	Good	
102	Plantanus occidentalis	Sycamore	9	47	27	Good	
103	Picea pungens	Blue Spruce	14	42	20	Good	
104	Oxydendrum arboreum	Sourwood	7.6	34	18	Good	
105	Acer rubrum	Red Maple	4	21	12	Good	
106	Cornus florida	Flowering Dogwood	12	16	33	Good	Basal measurement
107	Cornus florida	Flowering Dogwood	4, 4	15	24	Poor	A lot of dieback - one side almost completely dead - overtopped by tree #109, basal measurement
108	Cornus florida	Flowering Dogwood	6	23	21	Fair to Poor	Woodpecker damage- main stem has a lot of deadwood
109	Tilia americana	American Basswood	28	72	66	Good	Crown not symmetrical due to powerline pruning
110	Koelreuteria paniculata	Golden Rain Tree	24.1	57	45	Good	Leaning out over street and powerline
111	Prunus spp	Ornamental Cherry	11.1	28	26	Good	
112	Prunus spp	Ornamental Cherry	11.8	28	32	Good	
113	Cornus florida	Flowering Dogwood	11	18	25	Good	
114	Cornus florida	Flowering Dogwood	10.1	20	30	Good	Basal measurement
115	Acer rubrum	Red Maple	6	28	14	Good	
116	Populus deltoides	Common Cottonwood	37.5	92	72	Good	
117	Lagerstroemia spp	Crape Myrtle	1	10	10	Good	Basal measurement
118	Lagerstroemia spp	Crape Myrtle	2	11	13	Good	
119	Lagerstroemia spp	Crape Myrtle	1	10	10	Good	Basal measurement
120	Picea abies	Norway Spruce	18	75	35	Good	
121	Acer platanoides	Norway Maple	40	81	54	Good	
122	Cornus florida	Flowering Dogwood	8	13	18	Good	
123	Malus spp.	Crab Apple	6	11	18	Good	
124	Cornus florida	Flowering Dogwood	10	18	22	Good	
125	Oxydendrum arboreum	Sourwood	7	54	33	Good	Growing right against stone wall, so can't grow much bigger without conflict
126	Acer saccharinum	Silver Maple	23.3	66	68	Good	Some powerline pruning; part of top is dead-ivy
127	Acer saccharum	Sugar Maple	20	58	42	Fair	Growing up to 30'; ivy growing to 15'
128	Acer saccharum	Sugar Maple	18.4	65	47	Good	
129	Acer platanoides	Norway Maple	15.6	64	42	Good	Somewhat one-sided crown due to powerline
130	Acer platanoides	Norway Maple	18	70	42	Fair	Some concern about rooting strength on slope; hollow at old pruning scar

SURVEY OF TREES IN THE VILLAGE

TREE NO.	BOTANICAL NAME	COMMON NAME	DBH	HT	SPR	CONDITION	COMMENTS
131	Acer platanoides	Norway Maple	22.4	69	48	Poor	Hollow; lots of galls
132	Acer saccharum	Sugar Maple	6	25	29	Good	
133	Juglans nigra	Black Walnut	24	45	79	Fair	Rot at base; English and Poison Ivy growing to 40'
134	Hibiscus syriacus	Rose of Sharon	12	16	15	Good	Measurement taken at basal height; leaning out to road; under powerline
135	Castanea pumila	Allegheny Chinkapin	7	38	30	Good	
136	Acer platanoides	Norway Maple	23.8	68	54	Fair to Poor	Large hollow cavity at 10'
137	Acer platanoides	Norway Maple	14	60	30	Good to Fair	Some signs of rot and hollows at old scars
138	Acer platanoides	Norway Maple	26.5	69	54	Good	Some dead in top; powerline runs through canopy
139	Acer platanoides	Norway Maple	25.4	42	30	Poor	Barbed wire grown into root; a lot of dead in top; powerline passing through
140	Acer platanoides	Norway Maple	23.8	68	42	Fair	Same as above; less dead
141	Acer saccharum	Sugar Maple	13.2	52	36	Good	
142	Acer saccharum	Sugar Maple	11	43	32	Good	
143	Hibiscus syriacus	Rose of Sharon	19	56	51	Good	Measurement taken at basal height; powerline passing through
144	Malus sp.	Crab Apple	6	22	24	Fair	Poorly pruned
145	Chamaecyparis obtusa	Hinoki falsecypress	10	34	21	Good	
146	Cornus florida	Flowering Dogwood	7	18	18	Fair	Measurement taken at basal height; some dead in crown; some decay on stem
147	Prunus sp.	Ornamental Cherry	21.2	41	48	Good	Smooth bark with cross lenticels
148	Acer saccharinum	Silver Maple	4	22	12	Good	
149	Acer saccharinum	Silver Maple	6.5	27	18	Good	
150	Acer platanoides	Norway Maple	13	78	42	Fair	Powerline rubbing up against on road side
151	Juglans nigra	Black Walnut	18	69	39	Good	
152	Juglans nigra	Black Walnut	16.3	72	38	Good	
153	Ulmus americana	American Elm	40.1	63	60	Good	Measurement taken at basal height; triple stem; some wounds from old scars
154	Acer rubrum	Red Maple	7.2	29	19	Good	
155	Acer rubrum	Red Maple	8.5	27	21	Good	Measurement taken at basal height; double stem
156	Acer platanoides	Norway Maple	26.2	75	54	Good	Ivy growing to 20'
157	Prunus serotina	Black Cherry	13.5	78	36	Good	
158	Plantanus occidentalis	Sycamore	28	89	66	Good	
159	Robinia pseudoacacia	Black Locust	24	72	36	Fair	Some dead top; entire tree covered with ivy
160	Celtis occidentalis	American Hackberry	20.2	73	54	Good	
161	Acer saccharum	Sugar Maple	12	42	30	Good	
162	Fraxinus americana	White Ash	26	71	43	Good	Some rot in old branch scars
163	Fraxinus americana	White Ash	26.2	66	48	Good	Prune up some
164	Ulmus americana	American Elm	22.3	72	66	Good	
165	Fraxinus americana	White Ash	23.5	94	60	Good	
166	Acer saccharinum	Silver Maple	13	48	33	Fair to Poor	Leaning over road; rot in several cavities left by branches breaking-off
167	Acer saccharinum	Silver Maple	40.2	85	66	Good	
168	Robinia pseudoacacia	Black Locust	17.1	68	36	Fair	Large broken limb; one-sided crown
169	Juglans nigra	Black Walnut	11	48	30	Fair	One-side crown; over-topped by #168
170	Acer rubrum	Red Maple	7	21	34	Good	
171	Acer rubrum	Red Maple	14	19	40	Good	Measurement taken at basal height; triple stem
172	Acer rubrum	Red Maple	14	30	43	Good	Measurement taken at basal height; triple stem
173	Fraxinus americana	White Ash	10	48	35	Good	
174	Acer platanoides	Norway Maple	27	47	39	Good	Measurement taken at basal height; multiple stems (4)

SURVEY OF TREES IN THE VILLAGE

TREE NO.	BOTANICAL NAME	COMMON NAME	DBH	HT	SPR	CONDITION	COMMENTS
175	Acer saccharinum	Silver Maple	42.4	73	63	Fair to Poor	Main stem hollow and rotting-
176	Ulmus americana	American Elm	27	67	55	Good	
177	Prunus serotina	Black Cherry	15.5	47	33	Good to Fair	Double stem: main stem=good, other stem=fair
178	Cornus florida	Flowering Dogwood	11.5	15	15	Poor	Heavily pruned; 90% English Ivy
179	Cornus florida	Flowering Dogwood	11	15	13	Poor	Heavily pruned; 90% English Ivy
180	Picea abies	Norway Spruce	34.2	62	48	Good	English ivy dominant on bole
181	Juniperis virginiana	Eastern Red Cedar	11.2	32	16	Good	
182	Juniperis virginiana	Eastern Red Cedar	16.2	49	15	Good	
183	Juniperis virginiana	Eastern Red Cedar	11.9	38	16	Good	
184	Pinus strobus	White Pine	18.4	61	39	Good to Fair	Some lower ice damage
185	Pinus strobus	White Pine	16.8	58	38	Good to Fair	Some lower ice damage
186	Juniperis virginiana	Eastern Red Cedar	13.3	35	15	Good	
187	Juniperis virginiana	Eastern Red Cedar	12.2	41	18	Good	
188	Juniperis virginiana	Eastern Red Cedar	14	39	18	Good	
189	Acer rubrum	Red Maple	19	38	25	Good	Measurement taken at basal height
190	Juniperis virginiana	Eastern Red Cedar	15.5	32	13	Good	
191	Plantanus occidentalis	Sycamore	26.2	68	41	Good	Measurement taken at basal height
192	Ulmus americana	American Elm	15	56	24	Good to Fair	Measurement taken at basal height; bole divided at 2' up base
193	Ulmus americana	American Elm	12.3	53	26	Good	
194	Tilia americana	American Basswood	33.6	68	29	Fair	Large branches pruned
195	Acer rubrum	Red Maple	4	27	9	Good to Fair	Scar on lower bole
196	Tilia americana	American Basswood	25.2	67	32	Fair to Poor	Pruning; exfoliation of bark on lower bole
197	Acer platanoides	Norway Spruce	18.2	58	32	Good	
198	Acer saccharum	Sugar Maple	13.8	35	32	Fair	Powdery mildew; sapsucker holes; some lower limb mortality
199	Cersis canadensis	Redbud	15	25	22	Fair	Pruned; some bark exfoliation
200	Carya ovata	Shagbark Hickory	25.5	67	66	Good	
201	Acer platanoides	Norway Maple	27	57	40	Fair	
202	Juglans nigra	Black Walnut	17.2	67	30	Good	
203	Juglans nigra	Black Walnut	16.4	51	28	Fair	Lower stem rot
204	Juglans nigra	Black Walnut	13.5	57	18	Fair	Very narrow crown
205	Robinia pseudoacacia	Black Locust	18.5	66	18	Fair	Lower bole rot
206	Robinia pseudoacacia	Black Locust	32.5	54	15	Poor	Mostly dead, fungus and rot prevalent
207	Juglans nigra	Black Walnut	17.5	61	22	Good to Fair	Some lower stem rot
208	Juglans nigra	Black Walnut	17.5	54	25	Good	
209	Juglans nigra	Black Walnut	8.5	50	15	Fair	Lower stem mortality
210	Juglans nigra	Black Walnut	15.4	46	25	Good	
211	Ulmus rubra	Slippery Elm	23.5	28	17	Fair	Some pruning, English ivy growth, basal measurement
212	Acer platanoides	Norway Maple	29	44	45	Fair to Poor	Extensive pruning, some gall formation
213	Acer saccharum	Sugar Maple	31.6	66	55	Good to Fair	Heavy pruning on street side, basal measurement
214	Malus pumilia	Apple	14.5	41	32	Poor	Heavy woodpecker damage and street side pruning
215	Magnolia grandiflora	Southern Magnolia	.5,5.0	33	18	Fair	Some pruning, English ivy growth, basal measurement
216	Acer saccharinum	Silver Maple	36.2	76	50	Good to Fair	Some pruning
217	Acer saccharinum	Silver Maple	29.9	59	42	Good to Fair	Some pruning
218	Acer saccharum	Sugar Maple	12.8	48	31	Fair	Powdery mildew and sapsucker holes

SURVEY OF TREES IN THE VILLAGE

TREE NO.	BOTANICAL NAME	COMMON NAME	DBH	HT	SPR	CONDITION	COMMENTS
219	Acer saccharinum	Silver Maple	12.4	58	25	Good to Fair	Diagonal habit due to roadside ditch
220	Acer platanoides	Norway Maple	12.8	49	30	Good to Fair	Lower bole with surface damage on street side (slight)
221	Acer platanoides	Norway Maple	12.9	46	22	Fair	Heavily pruned
222	Acer platanoides	Norway Maple	36.6	80	55	Good to Fair	Some lower stem bark exfoliation
223	Acer platanoides	Norway Maple	26	67	45	Fair	Heavy pruning and lower bark exfoliation
224	Acer platanoides	Norway Maple	23.6	43	27	Poor	Heavily pruned on all sides; bark exfoliation and cavities at prune scars; historically cabled
225	Quercus palustris	Pin Oak	18.6	67	40	Good	Some lower pruning
226	Quercus palustris	Pin Oak	9.3	48	20	Good	Some lower pruning
227	Acer platanoides	Norway Maple	20.1	53	32	Fair	Heavy lower pruning and some cavities at prune scars
228	Acer platanoides	Norway Maple	29.8	54	44	Good to Fair	Some cavity formation in prune scars and upper branch deadfall
229	Acer saccharum	Sugar Maple	21.9	61	48	Fair	Powdery mildew and sapsucker holes
230	Acer platanoides	Norway Maple	33	70	42	Fair	Heavy pruning
231	Aesculus hippocastanum	Horse chestnut	25	57	39	Fair to Poor	Deep cavity in lower bole
232	Aesculus hippocastanum	Horse chestnut	15.3	41	30	Fair	Some cavity
233	Acer saccharinum	Silver Maple	51	41	30	Poor	Mostly dead, topped
234	Celtis occidentalis	American Hackberry	21.5	73	35	Good	
235	Quercus imbricaria	Shingle Oak	13	31	25	Fair	Heavy top pruning for powerline
236	Juglans nigra	Black Walnut	24.8	80	49	Good to Fair	Some lower bole exfoliation
237	Juglans nigra	Black Walnut	27.5	76	51	Good to Fair	Some pruning and limb fall
238	Acer rubrum	Red Maple	14.2	41	32	Fair	Some pruning for powerlines
239	Abies fraseri	Fraser Fir	7	28	15	Good	
240	Picea abies	Norway Maple	15.3	35	49	Fair	Some pruning
241	Acer platanoides	Norway Maple	12.2	42	40	Good to Fair	Ivy-lower 1/4
242	Cornus florida	Flowering Dogwood	12	23	18	Good	Foliage slightly reduced on north side
243	Picea pungens	Blue Spruce	12	31	19	Good to Fair	
244	Acer rubrum	Red Maple	13.1	56	32	Good	
245	Prunus serotina	Black Cherry	16.7	53	22	Fair	Some stemfall; ivy-lower 1/4
246	Celtis occidentalis	American Hackberry	15	55	25	Good	
247	Ulmus americana	American Elm	14.4	41	30	Fair to Poor	Heavy pruning for powerline (adjacent Locust dead)
248	Acer platanoides	Norway Maple	9.5	38	15	Fair to Poor	Pruned
249	Morus alba	White Mulberry	14.2	32	25	Fair	Some lower exfoliation of bark
250	Acer platanoides	Norway Maple	18.5	50	28	Good to Fair	Lower bole with Poison Ivy and wire fence (wrapped)
251	Ulmus americana	American Elm	52	72	75	Good to Fair	Multiple stem split
252	Juglans nigra	Black Walnut	17	66	32	Fair	Upper stem split
253	Ulmus americana	American Elm	30.5	68	50	Fair	Upper stemfall scars uneven; some cavity formation
254	Robinia pseudoacacia	Black Locust	16.7	58	37	Fair	Stem mortality mid crown near house
255	Acer saccharinum	Silver Maple	59.7	70	60	Fair	Ivy, Poison Ivy-lower 1/4; large stemfall scar with cavity on north side
256	Robinia pseudoacacia	Black Locust	16.5	62	25	Fair to Poor	Upper stem loss; Poison Ivy-lower 1/2
257	Prunus serotina	Black Cherry	14.2	60	28	Fair	
258	Ulmus americana	White Mulberry	16.5	43	52	Good to Fair	
259	Juglans nigra	Black Walnut	14	57	30	Fair	
260	Cornus florida	Flowering Dogwood	11.2	16	20	Good to Fair	
261	Acer saccharinum	Silver Maple	37.6	45	40	Poor	Heavily pruned, topped-scars and cavity formation throughout
262	Acer platanoides	Norway Maple	20.2	61	51	Good	Behind stone wall, some pruning

SURVEY OF TREES IN THE VILLAGE

TREE NO.	BOTANICAL NAME	COMMON NAME	DBH	HT	SPR	CONDITION	COMMENTS
263	Acer platanoides	Norway Maple	31.9	53	44	Good	Behind stone wall, some pruning
264	Acer saccharum	Sugar Maple	12.5	46	29	Good to Fair	Powdery mildew and sapsucker holes
265	Acer saccharum	Sugar Maple	13.7	44	31	Good to Fair	Powdery mildew and sapsucker holes
266	Juglans nigra	Black Walnut	16.5	52	32	Fair	Lower bole divided near base
267	Acer saccharinum	Silver Maple	27.5	74	54	Good	Some mid-story stemfall
268	Acer saccharum	Sugar Maple	10	50	28	Good to Fair	Powdery mildew and sapsucker holes, some lower bark exfoliation
269	Acer saccharum	Sugar Maple	12.3	51	32	Good	Powdery mildew, some sapsucker holes
270	Acer saccharum	Sugar Maple	8.2	34	27	Fair to Poor	Powdery mildew, some sapsucker holes, large scar mid-bole w/ cavity
271	Pinus strobus	White Pine	9.1	45	22	Good	English Ivy 1/4 bole
272	Acer saccharinum	Silver Maple	12.2	51	36	Good	English Ivy 1/4 bole
273	Acer rubrum	Red Maple	11	31	20	Fair	Prune scars with slight cavity formation
274	Acer saccharum	Sugar Maple	23.5	61	52	Fair	Some pruning and lower bark exfoliation
275	Juglans nigra	Black Walnut	36	54	63	Fair to Poor	Divided 4' up bole, scar lower bole, >90% ivy-covered, lower bole hollow
276	Acer platanoides	Norway Maple	21.9	53	51	Good	Upper stemfall
277	Ulmus americana	White Mulberry	27.3	41	32	Good to Fair	Upper stemfall
278	Acer saccharinum	Silver Maple	42	56	72	Fair to Poor	Deep cavities, significant stemfall, Poison Ivy 1/2 bole, lateral stems compromised
279	Quercu rubra	Northern Red Oak	30.6	77	67	Good	
280	Prunus sp.	Ornamental Cherry	14	36	27	Good to Fair	Lower bole divided near base
281	Liriodendron tulipifera	Tulip Tree	21	77	42	Good	
282	Liriodendron tulipifera	Tulip Tree	18.3	65	40	Good	
283	Acer saccharum	Sugar Maple	11.3	39	15	Fair	Pruned
284	Acer saccharinum	Silver Maple	44.9	77	36	Fair to Poor	Heavy pruning on larger stems, topped
285	Acer saccharinum	Silver Maple	34.6	67	42	Fair to Poor	Heavy pruning on larger stems, topped
286	Acer saccharinum	Silver Maple	46.1	74	52	Fair to Poor	Heavy pruning on larger stems, topped
287	Acer saccharinum	Silver Maple	48.6	67	60	Fair to Poor	Heavy pruning on larger stems, topped
288	Plantanus occidentalis	Sycamore	63.7	112	62	Good to Fair	Heavy pruning on larger stems, topped

Appendix H
Contributing Parcels/ Archaeological Potential Database List

NHL DISTRICT CONTRIBUTING PARCELS AND ARCHAEOLOGICAL POTENTIAL

PIN	TAX MAP NO.	CURRENT OWNER	ADDRESS / LOCATION	CONTRIB?	BUILDING NAME	BLDG DATE	POTENTIAL?	SITE DETAIL	SITE DATE
Beginning at South end of town, on east side of Clarkes Gap Road, proceeding northward									
304366999	/28/A/1/I///1/	Ruth U. Smith	15716 Clarkes Gap Road	Yes	Ephraim Schooley House	c. 1825	Yes	1875 map indicates additional building present (apparently other than dwelling)	Pre 1875
304466318	/28/A/1/I///3/	W. Thomas & Susan S. McMahon	15676 High Street	Yes	Schooley House	c. 1880	Yes	1875 map indicates 2 additional buildings associated with Reuben M. Schooley Wago	Pre 1875
Beginning at South end, proceeding northward along west side of Clarkes Gap/Factory/Second									
304364880	/28/A/1/A//47/	Ruth C. & Patricia Shoaf	15715 Clarkes Gap Road	Yes	Coale's Blacksmith Shop	c. 1821	Yes	1875 map indicates additional building	Pre 1875
304464304	/28/A/1/A//46/	Sally M. McConnell & T. Bringier	15707 Clarkes Gap Road	Yes	Boxwood Walk	c. 1818	No		
304463314	/28/A/1/A//45/	Terry O. & Diana H. Arney	15679 Factory Street	No		1970	No		
304461530	/28/A/1/A//45B	Anthony & Theresa A. Crowley	15653 Factory Street	No		1979	No		
304461045	/28/A/1/A//45A	Ruth Whitlock, Owen Metzger et al			VACANT				
304461160	/28/A/1/A//44/		Attached To 15635 Second Street/Second Street, Immediately South Of 15635				Yes	unidentified building	1875
304461171	/28/A/1/A//43/	Jill Predmore Beach	15635 Second Street	Yes	Dormers	c. 1805	No		
304461782	/28/A/1/A//42/	Ann M. Anderson	15619 Second Street	Yes	Shawen House	c. 1850	No		
304462192	/28/A/1/A//41/	Waterford Foundation, Inc.	15611 Second Street	Yes	Second Street School	1867	No		
303161502	/28/A/1/A//40/	Henry Wilson & Carolynn Ann Taylor	15603 Second Street	Yes	Odd Fellows Hall	1893	No		
303162307	/28/A/1/A//50/		Attached To 15591 Second Street		VACANT				
303162714	/28/A/1/A//49/	Stephen & Barbara L. Rubin	15591 Second Street	Yes	Elton James House	1896	No		
303162920	/28/A/1/A//48/		Attached To 15591 Second Street		VACANT				
303163227	/28/A/1/A//38/	Nicholas M. & Katherine W. Ratcli	15575 Second Street	Yes	Flavius Beans House	c. 1899	No		
303163535	/28/A/1/A//37/	Colin R. & Debra E. Clarke	15567 Second Street	Yes	Asbury Johnson House	1886	No		
303163845	/28/A/1/A//36/	W. B., III, & Margaret T. Morton	15555 Second Street	Yes	Mahlon Schooley House	1817	No		
303160752	/28/A/1/A//36A/		Attached To 15555 Second Street		VACANT				
303164456	/28/A/1/A//34/	Thomas N. Edmonds & S. Richardson	15547 Second Street	Yes	Parker-Bennett House	c. 1825	No		
303164962	/28/A/1/A//33/	Timothy H. & Antonia W. McGinn	15539 Second Street	Yes	Merchant House	c. 1907	Yes	small building at front of lot, owned by T. McKenny Heirs, 1875; apparently also	Pre 1853
303165067	/28/A/1/A//30A	Anthony Horwitz & Geraldine Brook	15533 Second Street	Yes	Catoctin Creek	c. 1820	No		
303165075	/28/A/1/A//30/	Neil C. Hughes & Kathleen Pope	15527 Second Street	Yes	Samuel Hough House	c. 1818	No		
303165281	/28/A/1/A//29/	Kurt & Beth Erickson	15523 Second Street	Yes	Doctor's House	c. 1819	No		
303165688	/28/A/1/A//28/	Linda Speaks Tribby	15511 Second Street	Yes	Walker-Phillips House	c. 1830	Yes	Dr. J. H. Moore Office, 1875	1875
303161894	/28/A/1/A//32/		Attached To 15511 Second Street		VACANT				
303265701	/28/A/1/A//27/	William B. Hart, Jr.	15505 Second Street	Yes	William Hite Hough House	c. 1818	No		
303265808	/28/A/1/A//26/	Claude C. Gravatt, Jr., & Ann Tee	15493 Second Street	Yes	William Nettle House	1822	No		
303266114	/28/A/1/A//25/	Linda L. Landreth	15487 Second Street	Yes	Waterford Market	1883	No		
303266721	/28/A/1/A//24/	Peter C. & Joan M. Thomas	15483 Second Street	Yes	(1) Livery Stable; (2) Red Barn	(1) c. 1851; (2) 1921	No		
303266725	/28/A/1/A//22/	Waterford Foundation, Inc.	15481 Second Street	Yes	Tin Shop	c. 1894	No		
303266929	/28/A/1/A//21/	Eugene M. & Annette M. Scheel	15479 Second Street	Yes	Old (1st) Insurance Building	1872	No		
From intersection of Main Street with Second and Water Streets, proceeding northwest									
303266933	/28/A/1/A//20/	Paul E. & Adene Rose	40175 Main Street	Yes	Post Office	c. 1880	No		
303266235	/28/A/1/A//19/	J. Douglass & Julie A. Lea	40171 Main Street	Yes	Graham House	c. 1810	No		
303265536	/28/A/1/A//19B		Attached To 40171 Main Street		VACANT				
303266241	/28/A/1/A//19A	Chesapeake & Potomac Telephone	40167 Main Street	Yes	Sally Nettle House (Phone Company)	c. 1810	No		
303264936	/28/A/1/A//18/		Attached To 40167 Main Street		VACANT		Yes	Dwelling of James H. Silcott, 1875; something present on 1853 map, but difficult	Pre 1853
303264942	/28/A/1/A//16/	Michael H. Endres	40159 Main Street	No	Log	c. 1965	No		
303264248	/28/A/1/A//15/	Adam S. Blum	40157 Main Street	Yes	Goodwin-Sappington House	c. 1803	No		
303264252	/28/A/1/A//14/	Esther E. Keating	40155 Main Street	Yes	Goodwin-Sappington Shop	c. 1803	Yes	Dwelling of Charles J. Towner	1875
303263654	/28/A/1/A//11/	Anne C. Smith	40153 Main Street	Yes	William Irish Shop	c. 1810	No		
303263559	/28/A/1/A//10/	David W. & Carolee K. Chamberlin	40149 Main Street	Yes	Bank House	c. 1810	No		
303262972	/28/A/1/A///9/	Raymond F. Daffner & K. Elias	40145 Main Street	Yes	Camelot School	c. 1820	No		
303262577	/28/A/1/A///5/		Attached To 40139 Main Street./Between 40139 And 40145 Main Street		VACANT		Yes	2 adjg bldgs, S. A. Gover Store & PO, 1875; something evidently present hard	Pre 1853

NHL DISTRICT CONTRIBUTING PARCELS AND ARCHAEOLOGICAL POTENTIAL

PIN	TAX MAP NO.	CURRENT OWNER	ADDRESS / LOCATION	CONTRIB?	BUILDING NAME	BLDG DATE	POTENTIAL?	SITE DETAIL	SITE DATE
303262286	/28/A/1/A///4/	Cornelia Keller Biddle	40139 Main Street	Yes	Griffith-Gover House	c. 1800	No		
303261991	/28/A/1/A///3A	Joseph W. Keating, Jr.	40135 Main Street	Yes	Hollingsworth-Lee House	c. 1827	No		
303261597	/28/A/1/A///3/	W. Bowman, III, & Abigail T. Cutt	40129 Main Street	Yes	Wisteria Cottage	c. 1810	No		
303361401	/28/A/1/A///2/	Charles M. & Priscilla C. G. Broo	40125 Main Street	Yes	Marshall Claggett House	c. 1870	No		
303360508	/28/A/1/A///1/	Waterford Foundation, Inc.	40105 Main Street	Yes	The Mill	c. 1825	No		
Northwest end of town, proceeding eastward along north side of First/Bond Streets									
303359330	/28/A/1/B//1/	Janet B. Kitselman	40090 First Street	Yes	Mill End	c. 1814	No		
303368789	/28/////////31A	Richard L. Storch	40120 Bond Street	Yes	Hague-Hough House	c. 1741, c. 1790	No		
303361627	/28/A/1/B///3/	David E. & Ellen J. Banker	40108 Bond Street	Yes	Hillside	c. 1809	No		
South side of Bond Street									
303362109	/28/A/1/B///5/	Waterford Foundation, Inc.	40125 Bond Street	Yes	John Wesley Church	1891	Yes	Unidentified building, 1853, livery Stable, 1875, toward south end of parcel	Pre 1853
Return to north side of Bond, heading east									
303362527	/28/A/1/B///4/	Christopher C. Belland	40128 Bond Street	Yes	Samuel Means House	c. 1762	Yes	Dwelling of J. Phillips, 1853, Elizabeth Phillips, 1875, on west side of parcel	Pre 1853
303363727	/28/A/2/////1/	W. Bowman, III & Abigail T. Cutte	40132 Bond Street	Yes	Janney-Phillips House	c. 1782, c. 1800	No		
303365322	/28/A/2/////2/	Paul E & Adene Rose	40150 Bond Street	Yes	Moore-Bond House	c. 1810	No		
303268392	/28/A/2/////4/	Nicholas Tiscione & K. Prior	40170 Bond Street	No		1996	No		
South side of Bond Street, east end									
303265697	/28/A/2/////6/	C. Edward & Margaret K. Good	40164 Bond Street	No		1995	No		
303363605	/28/A/2//7/	Waterford Foundation, Inc.	South Of Bond Street., NE Of Main Street	Yes	Barn	c. 1900	Yes	Tan Yard, 1853 & 1875, on north side of Stream; Building, 1853 map label indeciph	Pre 1853
From NW end, proceeding along Main Street to SE									
303264085	/28/A/1/B///8/	Cathleen A. Magennis	40138 Main Street	Yes	Ratcliffe House	c. 1809	No		
303264578	/28/A/1/B///9/	Karl & Katherine Riedel	40142 Main Street	Yes	Isaac Steer Hough House	1886	Yes	Dwelling of J. D. Simmons, 1853, to NW side, Machine Shop, 1853, to SE side; Dwel	Pre 1853
303265377	/28/A/1/B//10/	Richard K. Riddell	40148 Main Street	Yes	M. J. Hough House	c. 1870	Yes	Unidentified building	1853
303265872	/28/A/1/B//11/	J. Michael Stump & Paige S. Cox	40152 Main Street	Yes	Kitty Leggett House	c. 1791, rebuilt c. 19	No		
303266066	/28/A/1/B//12/	Rodney A. & Caroline B. Pelton	40154 Main Street	Yes	Joseph Janney House	c. 1784	No		
303266262	/28/A/1/B//13/	R. E. Collins	40156 Main Street		VACANT		Yes	Shop, 1853; Dwelling of Sarah Matthews, 1875	1853
303266750	/28/A/1/B//14/	Richard L. Storch	40158 Main Street	Yes	Brick building, NW end of Arch Row	(1) c. 1800; (2) c. 18	No		
303267449	/28/A/1/B//15/	Wm. M. Mularie & Susan Williams	40162 Main Street	Yes	5 adjoining historic buildings, Arch Row	(1) c. 1810 ; (2) c. 18	No		
303267444	/28/A/1/B//16/	Wm. M. Mularie & Susan Williams	40172 Main Street	Yes	Iron Store House	c. 1816	No		
303267641	/28/A/1/B//18/	Eugene A. & Mary S. Couser	40174 Main Street	Yes	Pink House (Lewis Klein Inn)	c. 1820	No		
Water Street, north side, proceeding eastward									
303267938	/28/A/1/B//19/	Elaine E. Head	NE Side Of Intersection Of Main, Water And Second Streets, Immed East Of Pink		VACANT		Yes	Building on Louis Shucey lot, apparently secondary	1875
303268437	/28/A/1/B//22/	Timothy W. & Linda S. Glidden	NE Side Jct Of Main, Water And Second Streets, Immediately West Of Weaver's Cottage		VACANT		Yes	3 buildings on Daniel Wine lot	1875
303268735	/28/A/1/B//23/	Charles G. & Marie C. Anderson	40188 Water Street	Yes	Weaver's Cottage	c. 1818	Yes	possible bldg depicted at east end, on 1853 map; dwelling of Alfred Craven at eas	Pre 1853
30327529	/28/A/1/B//26/	William J. & Rosemary S. Lauth	North Side Of Water Street, East Of Weaver's Cottage		VACANT		Yes	Building owned by Minor's Heirs, 1875; probably dwelling of H. Miner, 1853 map	Pre 1853
Big Hill segment of Main Street, proceeding to SE from junction with Water and Second									
303268922	/28/A/1/C///1/	Town of Waterford	40192 Main Street	Yes	Jail	c. 1813	No		

NHL DISTRICT CONTRIBUTING PARCELS AND ARCHAEOLOGICAL POTENTIAL

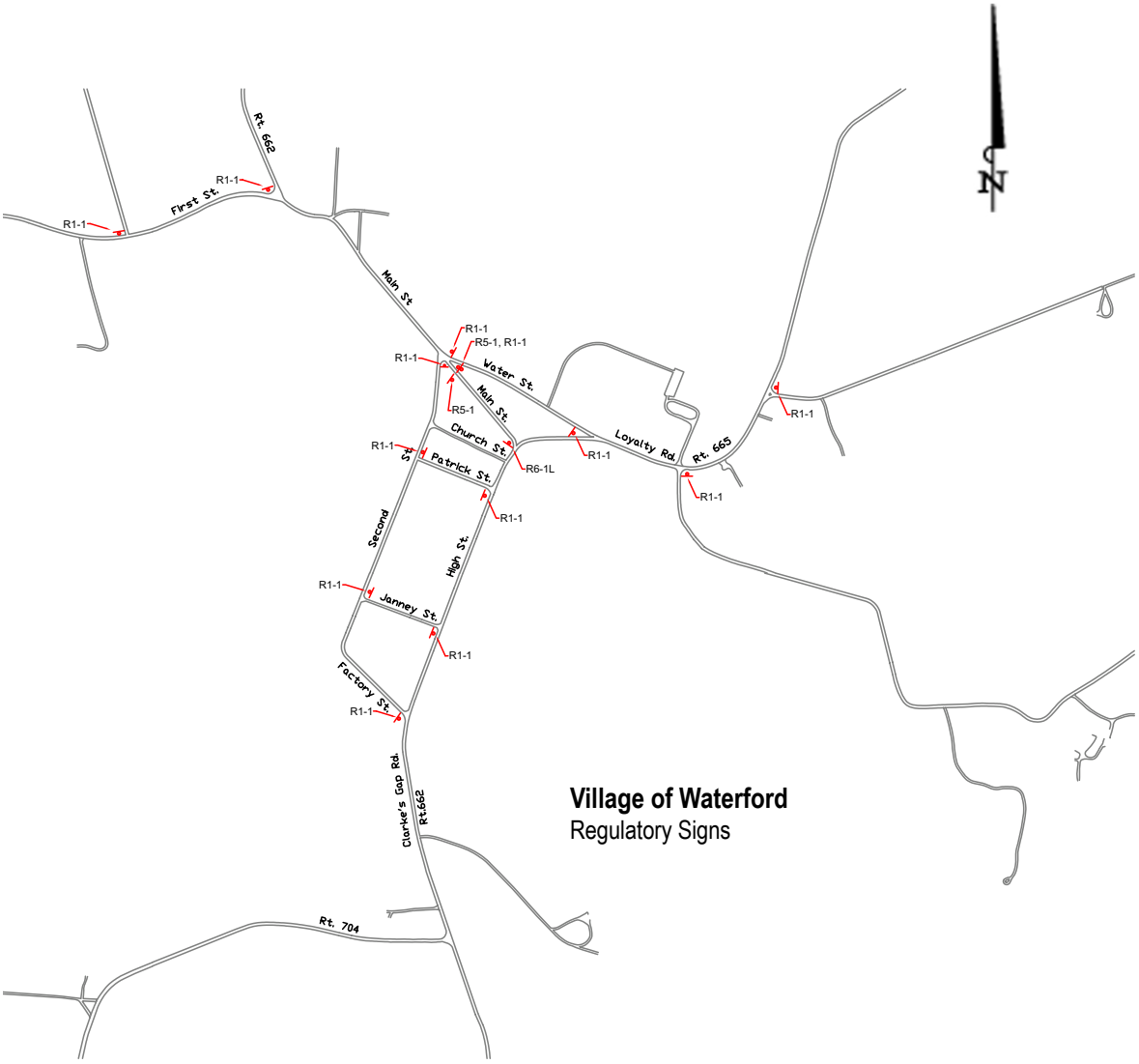
PIN	TAX MAP NO.	CURRENT OWNER	ADDRESS / LOCATION	CONTRIB?	BUILDING NAME	BLDG DATE	POTENTIAL?	SITE DETAIL	SITE DATE
303270113	/28/A/1/C///2/	Brian & Kathryn Caskie	40194 Main Street	Yes	James Moore House	c. 1810	No		
303270808	/28/A/1/C///3/	Brian & Kathryn Caskie	40200 Main Street	Yes	America Hough Towner House	c. 1852	Yes	1875 map indicates presence of additional buildings	Pre 1875
303171998	/28/A/1/C///6/	Ruth Bentley & O. L. Mahan, Trs	40210 Main Street	Yes	Chas. & George Schooley Hse	c. 1812	No		
303172496	/28/A/1/C///7/	Ruth Bentley & O. L. Mahan, Trs	40216 Main Street	Yes	Lloyd Curtis House	c. 1820	No		
Butchers Row, north side, going east									
303173090	/28/A/1/C///8/	Kevin C. & Suzanne S. Chadwick	15545 Butchers Row	Yes	Market Hill	c. 1800	Yes	1875 map indicates presence of additional building	Pre 1875
303174687	/28/A/1/C//10/	Sandra L. McGowan	15533 Butchers Row	Yes	Mahlon Myers House	c. 1820	Yes	Dwelling of George W. Russell, west side of lot	1875
303175784	/28/A/1/C//11/	Gregg W. Stuessi	15525 Butchers Row	Yes	James Lewis House	1877	No		
Big Hill segment of Main Street, SW side, beginning at Corner Store and proceeding to High									
303267725	/28/A/1/D///1/	Waterford Foundation, Inc.	40183 Main Street	Yes	Corner Store	c. 1900	No		
303267816	/28/A/1/D///2/	Elizabeth Haden Smith	40187 Main Street	Yes	William James House	c. 1856	No		
303268510	/28/A/1/D///3/	Sarah A. Ferguson	40191 Main Street	Yes	John McGeath House [sic: noted as 40193 Main by Foundation]	c. 1818	No		
303268907	/28/A/1/D///6/	Kirk Cizerle & Shelley Drumheller	40193 Main Street	Yes	Asa Moore House [sic: noted as 40195 Main by Foundation]	c. 1803	No		
303269001	/28/A/1/D///8/	Eugene M. & Annette M. Scheel	40197 Main Street	Yes	Abner Moore House	c. 1802	No		
303169094	/28/A/1/D///9/	Philip D. Paschall & Elizabeth Co	40203 Main Street	Yes	Edward Dorsey House	c. 1820	No		
303169590	/28/A/1/D//10/	Ruth Bentley & O. L. Mahan, Trs	40205 Main Street	Yes	Hough House	c. 1813	No		
303170484	/28/A/1/D//11/	Steven A. & Barbara M. Soechtig	40215 Main Street	Yes	Myers-Haines House	1803	No		
303171175	/28/A/1/D//12/	J. Jackson & Susan M. Walter	40221 Main Stree	Yes	Methodist Church	1877	No		
Church Street, north side									
303169888	/28/A/1/D//10A	Ruth S. Bentley	40200 Church Street	No		c. 1975	No		
Second Street, east side, going southward									
303267413	/28/A/1/D///2A	Waterford Foundation, Inc.	15484 Second Street	Yes	"The Forge"	c. 1820	No		
303267504	/28/A/1/D///4/	Mary Lillian Dudley	15496 Second Street	Yes	James House	c. 1890	No		
303167394	/28/A/1/D///5A	Waterford Foundation, Inc.	15502 Second Street	Yes	Hardware Store	c. 1860	No		
303168178	/28/A/1/E///1/	Peter J. & Lynda C. Buck	15512 Church Street	Yes	Braden House	c. 1818	No		
303167973	/28/A/1/E///2/	J. Michael Stump & Paige S. Cox	15520 Second Street	Yes	Lemuel Smith House	c. 1917	No		
303166157	/28/A/1/F///1/		40169 Patrick Street [attached to 15552 Second Street] (S Side, At Jct W/ Seco		VACANT		Yes	Dwelling of Jacob Scott	1875
303166040	/28/A/1/F///4/	William H. & Carolyn Hunley	15552 Second Street	No		c. 1972	No		
303165629	/28/A/1/F///4A	Lang Elizabeth Lloveras	15570 Second Street	Yes	Sunnyside	c. 1852	No		
303165216	/28/A/1/G///1/	Edward Lehmann & Edith Crockett	15580 Second Street	Yes	Samuel Steer House	c. 1852	No		
303164811	/28/A/1/G///1B	Frank G. & Mary S. Kenesson	15584 Second Street	No		1988	Yes	Baptist Church	1853
304464193	/28/A/1/G///6A	Robert C. & Marsha A. Thompson	15606 Second Street	Yes	Williams House	c. 1815	No		
304463983	/28/A/1/G///6B		15612 Second Street [attached to 15606 Second Street]	Yes	Williams Storehouse	c. 1801	No		
304463175	/28/A/1/H///1/	Robert & Judy Jackson	15620 Second Street	Yes	Jacob Mendenhall House	c. 1815	No		
304462969	/28/A/1/H///2/	Debra Jean Burke & Dannie Gray	15626 Second Street	No	Magnolia House	1941	No		
304462564	/28/A/1/H///3/	Miriam O. Westervilt	15634 Second Street	No		1989	Yes	J. S., 1853; Building owned by Silas Corbin, 1875	1853
304462650	/28/A/1/H//11/	Joel L. & Sherry A. Satin	15640 Second Street	Yes	Old Acre	c. 1825	Yes	1875 map shows one additional building, 1853 map probably ditto, associated with	Pre 1853
Factory Street, north side, going eastward									
304463641	/28/A/1/H//10/	Brian D. & Anne M. B. Hardy	15668 Factory Street	Yes	Laneslea	1902	No		
304465127	/28/A/1/H///9/	Janet Myers Jewell	15674 Factory Street	Yes	Leslie Myers House	1924	No		
Properties on E-W cross Streets, moving from north to south									
303167170	/28/A/1/E///3/	Nicholas L. & Randall J. James	40170 Patrick Street (N Side, At Jct W/ Second Street.)	Yes	Old (3rd) Insurance Company Building	c. 1902	No		
303168663	/28/A/1/E///4/	Paul E. & Adene Rose	40186 Patrick Street (N Side)	Yes	Captain's House	c. 1906	No		
303167352	/28/A/1/F///2/	Thomas & Christy Hertel	40189 Patrick Street (S Side)	Yes	Monroe Hough House	c. 1887	No		
304464671	/28/A/1/H///5/	William R. & Virginia H. Rhodes	40153 Janney Street (S Side)	Yes	Simms House	c. 1900	Yes	Building owned by Silas Corbin	1875

NHL DISTRICT CONTRIBUTING PARCELS AND ARCHAEOLOGICAL POTENTIAL

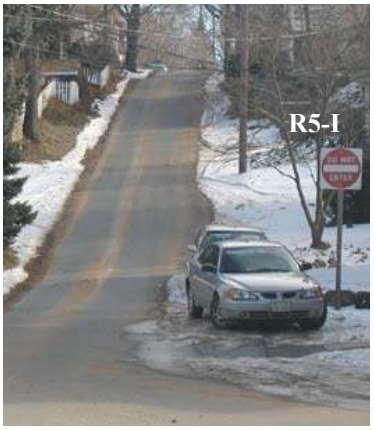
PIN	TAX MAP NO.	CURRENT OWNER	ADDRESS / LOCATION	CONTRIB?	BUILDING NAME	BLDG DATE	POTENTIAL?	SITE DETAIL	SITE DATE
304466461	/28/A/3/////1/	Kenneth F. & Michelle K. Dunne	40171 Janney Street (S Side, At Jct W/ High Street.)	No		c. 1992	No		
304464459	/28/A/1/H///4/	Laura Lee Shaw	40143 Janney Street (S Side, Set Back On Private Lane)	Yes	Hidden House	c. 1820, c. 1890	No		
High Street, west side, proceeding northward									
304465751	/28/A/1/H///7/	Joseph C., II, & Elizabeth Gibson	15655 High Street	Yes	Steer-Divine House	c. 1850	No		
303167107	/28/A/1/G///5/	Loudoun Mutual Insurance Company	15609 High Street	No	Insurance Co. office (4th bldg)	1949	No		
303167929	/28/A/1/F///3A	attached to Presbyterian Church	15577 High Street	No		1955	No		
303168846	/28/A/1/F///3/	Catoctin Presbyterian Church	15565 High Street	Yes	Church	1882	No		
303170263	/28/A/1/E///5/	Waterford Baptist Church	15545 High Street	Yes	Church	c. 1853	No		
High Street, east side, going northward									
303170515	/28/A/1/I//10A	Hans C. & Elizabeth I. Hommels	15578 High Street	Yes	Huntley Farm	c. 1836, c. 1892	No		
303171840	/28/A/1/I///7/	David R. & Evelyn A. Godfrey	15550 High Street	Yes	Edith Walker House	1897	No		
303171852	/28/A/1/I///8/	Shirley B. Nickels	40231 Fairfax Street (S Side, At Jct W/ High Street.)	Yes	Brick house	1915	Yes	Dwelling of E. Neale, 1853; of Henry Verts, 1875	1853
304473640	/28////////25A	Construction Intermediary et al	40273 Fairfax Street (Farmstead Set Back On SE Edge Of Village)		[No architectural data at present]				
303174967	/28/A/1/I//12/	Waterford Foundation, Inc.	40222 Main Street (Across From SE Terminus Of Main Street.)	Yes	Old School	1910	No		
NE end of village, proceeding eastward along Water/Butchers/Loyalty									
303277303	/28///9/////3/	Matthew D. & Valerie F. Custer	40266 Water Street (N Side, By Jct W/ Butchers)	Yes	Moxley Hall	c. 1860	No		
303178764	/28/A/1/I//13/	Ray G. Hartl	15520 Butchers Row (S Side, By Jct W/ Loyalty)	No	Brick-veneer frame house	c. 1940	No		
303180549	/28/A/1/I//14/	David A. & Valerie T. Hostman	15514 Loyalty Road (S Side)	Yes	Echo Hill	c. 1890	No		
303184199	/28////////30/	Loudoun County School Board	15513 Loyalty Road (N Side)	No	Modern school		No		
303186954	/28/A/1/I//15/	William B. & Martha S. Baines	15510 Loyalty Road (SE Side)	Yes	Fairfax Meetinghouse	1761, 1771	Yes	Friends Schoolhouse and [Wagon] Shed	1853
303188489	/28////////29/	James P. Hutton & Mary T. Foran	15498 Loyalty Road (SE Side)	Yes	Brick house	c. 1810	No		
303288314	/28////////29A	Thomas M. Dunlap	15484 Loyalty Road (SE Side)	Yes	Frame house	1929	No		
303290534	/28////////40A	Carter M. & Amy M. French	15452 Loyalty Road (SE Side)		[No architectural data at present]				

Appendix I
Sign Inventory

SIGN SURVEY

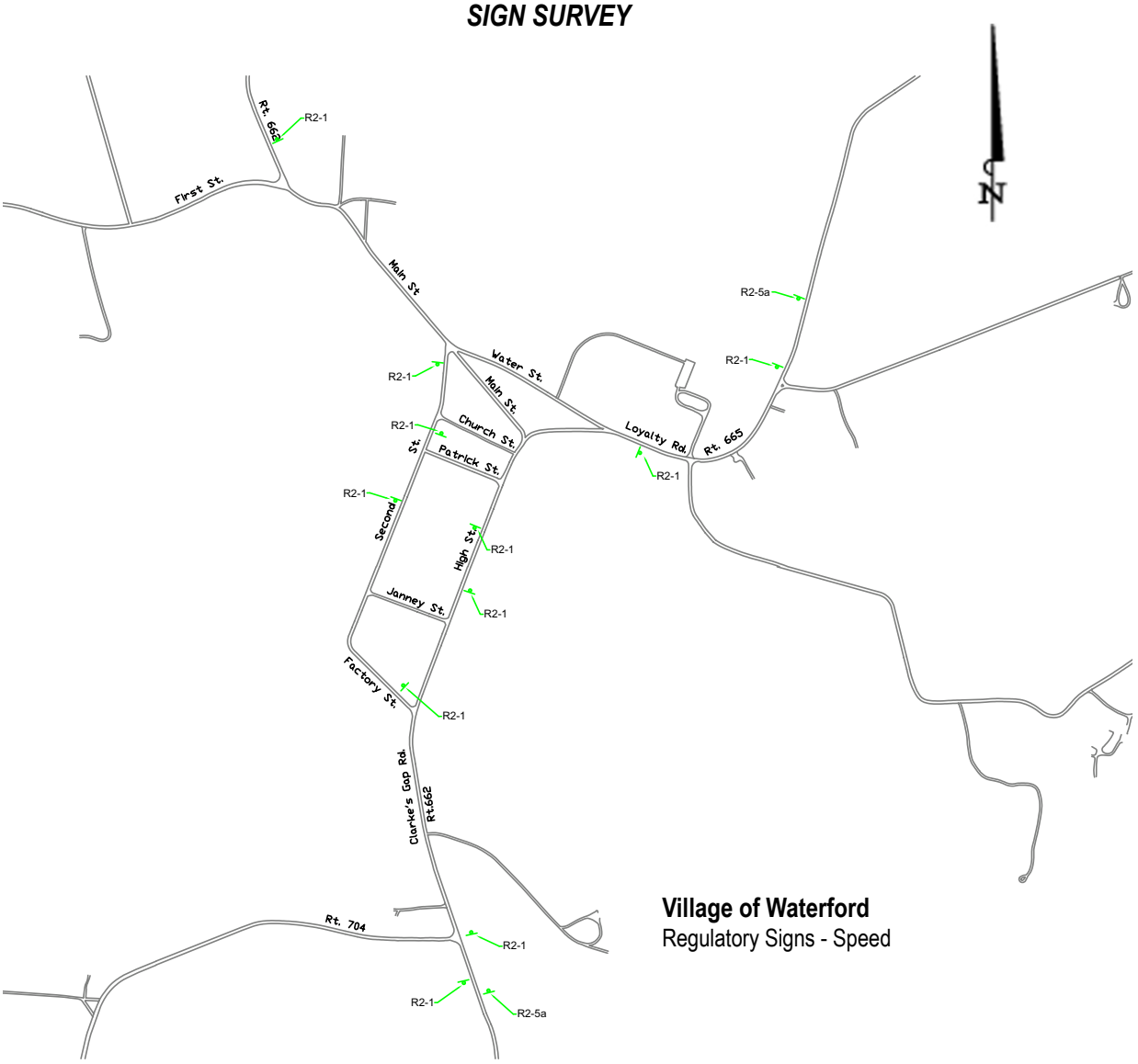

Rt. 662
First St.
R1-1
Main St.
R1-1
R5-1, R1-1
Water St.
R5-1
Church St.
Patrick St.
R6-1L
Loyalty Rd.
Rt. 665
Second
High St.
Janney St.
Factory St.
Clarke's Gap Rd.
Rt.662
Rt. 704
Village of Waterford
Regulatory Signs


STOP
RI-I


R5-I


ONE WAY
R6-1R

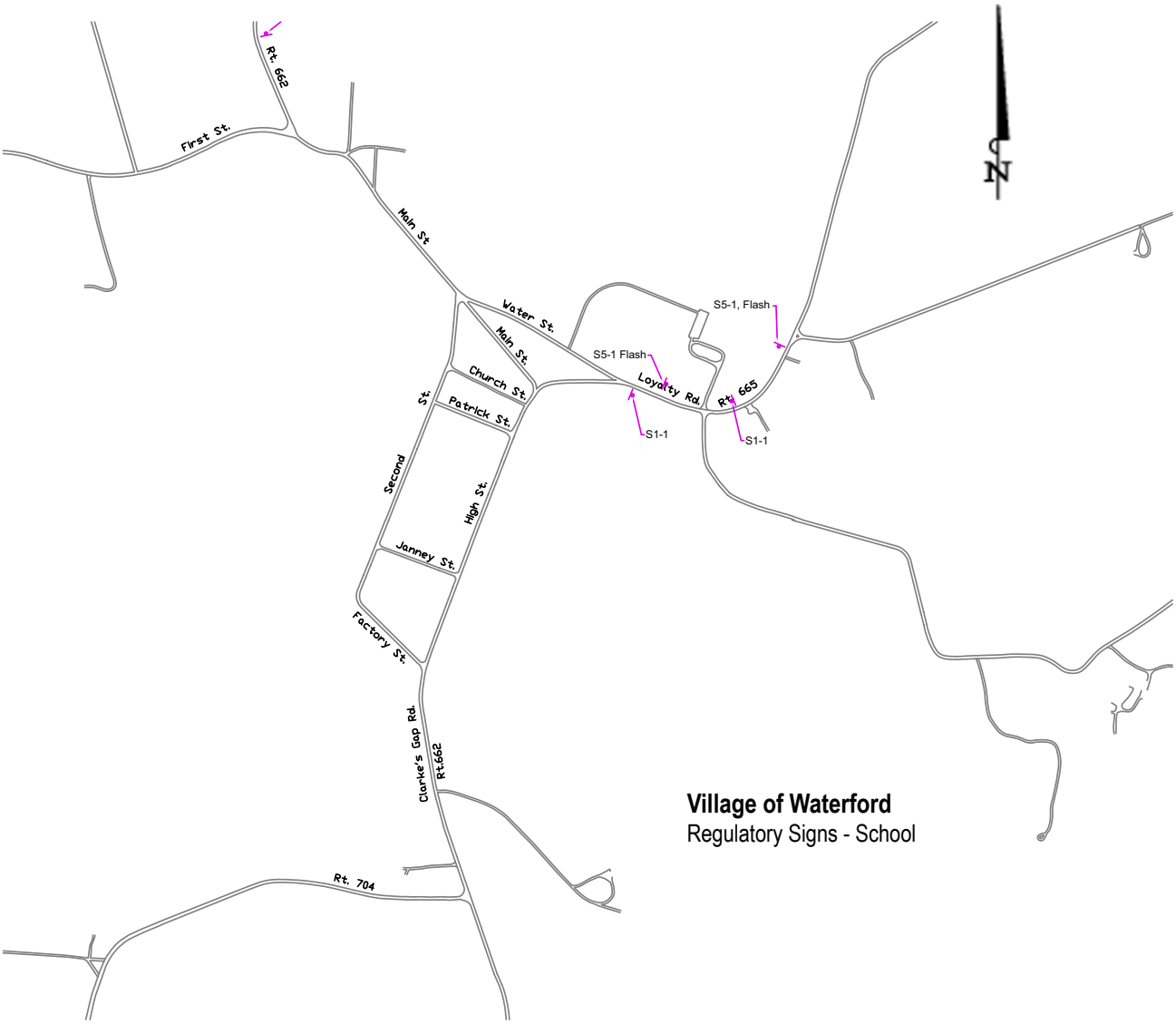
SIGN SURVEY

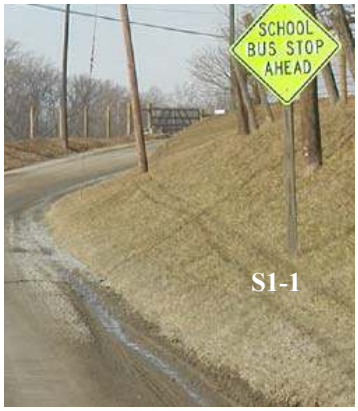

Rt. 665
R2-1
First St.
Main St.
Water St.
Main St.
Church St.
Patrick St.
Loyalty Rd.
Rt. 665
R2-5a
R2-1
Second St.
High St.
Janney St.
Factory St.
Clarke's Gap Rd.
Rt.662
Rt. 704
R2-5a
N
Village of Waterford
Regulatory Signs - Speed


SPEED
LIMIT
25
ADDITIONAL
$100 FINE
R2-1


REDUCED
SPEED
AHEAD
R2-5

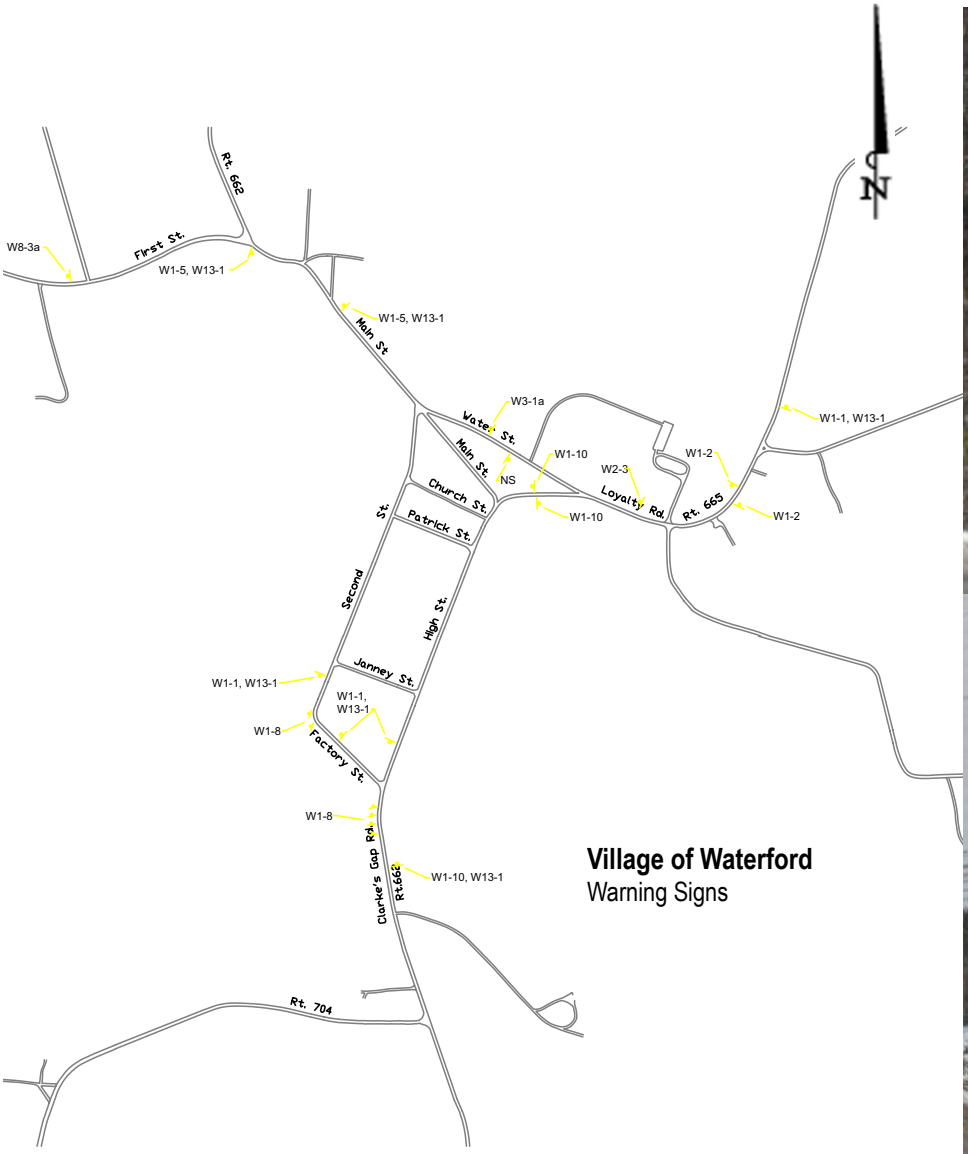
SIGN SURVEY


Rt. 662
First St.
Main St
Water St.
Main St.
Church St.
Patrick St.
St.
Second
High St.
Janney St.
Factory St.
Clarke's Gap Rd.
Rt.662
Rt. 704
S5-1, Flash
S5-1 Flash
Loyalty Rd.
Rt. 665
S1-1
S1-1
N
Village of Waterford
Regulatory Signs - School


SCHOOL
BUS STOP
AHEAD
S1-1


20
S5-1

SIGN SURVEY


W8-3a
First St.
W1-5, W13-1
Rt. 662
W1-5, W13-1
Main St
W3-1a
Water St.
Main St.
NS
W1-10
W2-3
W1-2
Loyalty Rd.
Rt. 665
W1-2
W1-10
W1-1, W13-1
Church St.
Patrick St.
Second St
High St.
Janney St.
W1-1, W13-1
W1-1, W13-1
W1-8
Factory St.
W1-8
Clarke's Gap Rd.
Rt.662
W1-10, W13-1
Rt. 704
Village of Waterford
Warning Signs


W3-1A


WATCH FOR TURNING VEHICLES
non-standard


W1-10


W1-8

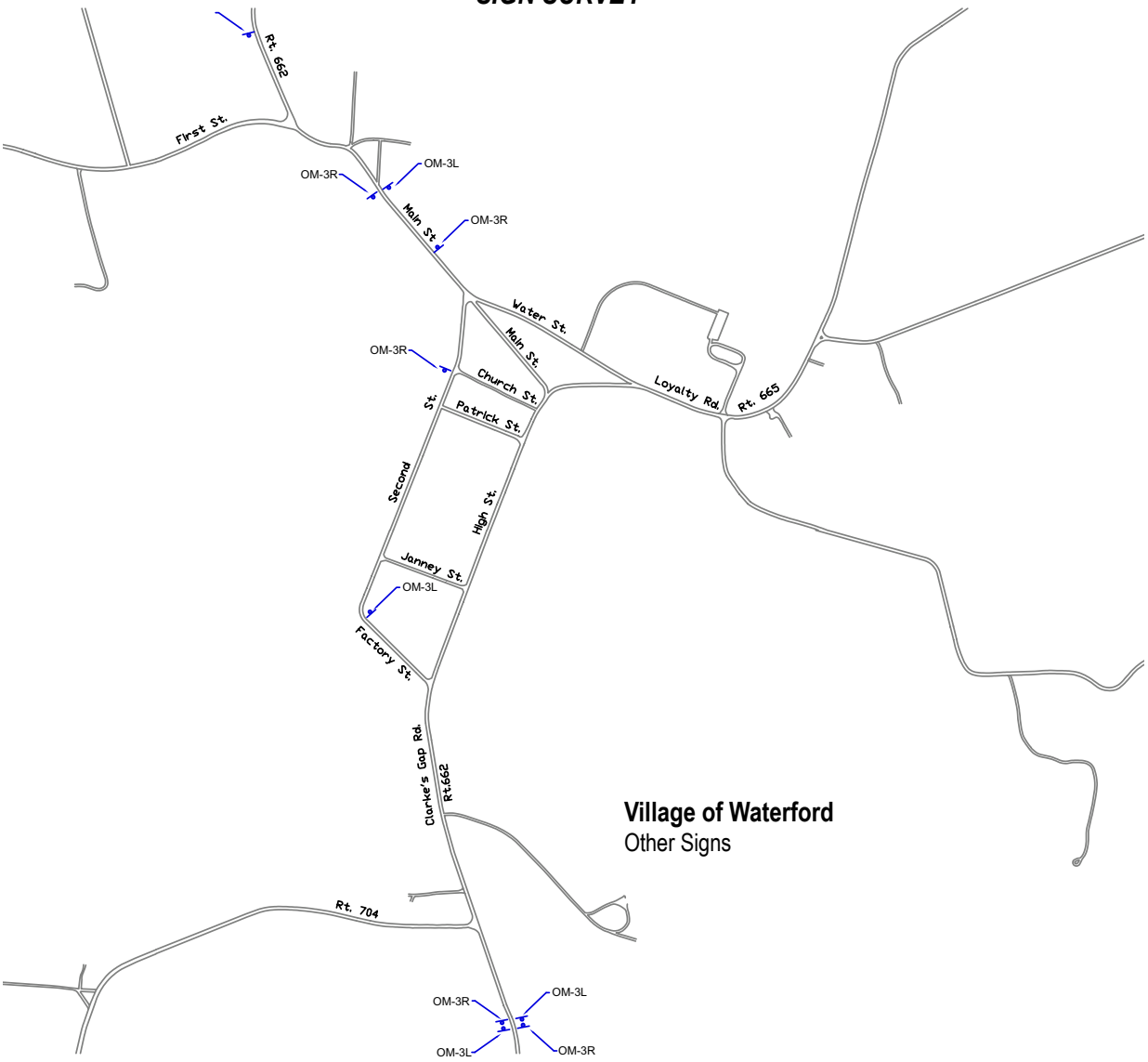

W1-2R


W1-5R
W13-1
15
M.P.H.


W2-3R


W1-1
W13-1
20
M.P.H.

SIGN SURVEY


Rt. 662
First St.
OM-3R
OM-3L
Main St.
OM-3R
Water St.
Main St.
OM-3R
Church St.
Loyalty Rd.
Rt. 665
St.
Patrick St.
Second
High St.
Janney St.
OM-3L
Factory St.
Clarke's Gap Rd.
Rt.662
Village of Waterford
Other Signs
Rt. 704
OM-3R
OM-3L
OM-3L
OM-3R


BRIDGE
WEIGHT
LIMIT
15
TONS
R12-1


OM-3R

Appendix J
Pavement Coring Results

ENGINEERING CONSULTING SERVICES, LTD.
Geotechnical ▪ Construction Materials ▪ Environmental

April 29, 2003

Mr. John R. Martin, P.E.
Kimley-Horn
13755 Sunrise Valley Drive
Suite 450
Herndon, VA 20171

ECS Job No. 8680

Reference: Waterford Coring

Dear Mr. Martin:

ECS, Ltd. was contracted to core drill and obtain asphalt samples at ten locations which you selected. Samples of subbase / subgrade were collected from each core location. The core holes were filled with asphalt cold-patch. Attached please find asphalt thicknesses along with classifications for the subbase. We appreciate the opportunity to work with you. Please let us know if we can be of further assistance.

Respectfully,

ENGINEERING CONSULTING SERVICES, LTD.

Nathan C. Smith
Project Engineer

Stanley J. Murphy, P.E.
Principal Engineer

NCS/i:/fieldsrv/ltr/8680

Waterford Coring

Asphalt Thickness and Subbase Classification

Core #	Total Core Thickness	Top Lift Thickness	2nd Lift Thickness	3rd Lift Thickness	4th Lift Thickness	Subbase Classification
1	4 1/2"	1"	3 1/2"	N/A	N/A	GW
2	6 1/4"	1 3/4"	3"	1 1/2"	N/A	GW
3	5 1/2"	1 3/4"	3 3/4"	N/A	N/A	GW
4	5 1/4"	1 1/2"	1 1/4"	2 1/2"	N/A	GW
5	7 3/4"	1 3/4"	1 1/4"	2"	2 3/4"	SC
6	5"	2 1/2"	2 1/2"	N/A	N/A	GP
7	4 1/2"	2"	1 1/2"	1"	N/A	SW
8	5 1/2"	2"	1 3/4"	1"	3/4"	GW
9	6 1/2"	2"	2 1/2"	2"	N/A	GC
10	4 1/2"	1 1/2"	3/4"	3/4"	1 1/2"	GC

Note: Individual lift thicknesses based on visual observations of breaking planes and/or aggregate size and/or color variation.

Subbase Observations

1	GW - Well graded gravel w/ sand (dark brown)
2	GW - Well graded gravel w/ sand & rock fragments (dark brown)
3	GW - Well graded gravel w/ sand (dark brown)
4	GW - Well graded gravel w/ sand (gray-brown)
5	SC - Clayey sand w/ gravel (medium brown)
6	GP - Poorly graded gravel w/ sand (dark brown)
7	SW - Well graded medium sand w/ gravel (dark brown)
8	GW - Well graded gravel w/ sand & rock fragments (dark brown)
9	GC - Clayey gravel w/ sand (dark brown)
10	GC - Clayey gravel w/ sand (dark brown)

Note: Fist-sized quartzite cobble in core #2 subbase

Core Locations

1	6' off curb at 15479 2nd St.
2	Middle of intersection of Water St., Main St., and 2nd St.
3	8' off curb at 40175 Main St.
4	10' off curb at Verizon phone pole NW of post office on Main St.
5	15' off East corner of house at 40129 Main St.
6	19' off stone wall between 40138 and 40142 Main St.
7	17' off light post in front of 40149 Main St.
8	9'6" off stone wall at 15496 2nd St.
9	16' off house at 15483 2nd St.
10	20' off garage door at 40188 Water St.

Appendix K
Stormwater Facilities Inventory

"Bury the Wires and Tame the Traffic"
Waterford, Virginia

Existing Drainage Outfalls and Possible Upgrades within the Village of Waterford

Outfall A

The drainage area for Outfall "A" is located in the vicinity of the intersection of Factory Street and High Street. Stormwater runoff in this area sheet flows towards Factory Street. Small roadside ditches carry water down Factory Street in the direction of Second Street. A portion of the runoff flows from the northeast side to the southwest side of Factory Street via a culvert under Factory Street in front of the property located at 15668 Factory Street. A roadside ditch on the southeast side of the street conveys runoff towards the intersection with Second Street. A pair of culverts in the vicinity of the intersection conveys runoff from the east side of the intersection to the west side. Runoff is discharged to an existing swale along the fence line adjacent to the property located at 15653 Factory Street and outfalls into an open field area.

Outfall B

The drainage area for Outfall "B" is located between High Street and Second Street to the north and south of Janney Street. Runoff in this area sheet flows northwest towards Second Street. Water flows either over Second Street or under Second Street via several small culverts. On the northwest side of Second Street, runoff is discharged down a gravel driveway ditch and into an open field area. Several of the culverts under driveways along both sides of Second Street, as well as culverts under Second Street itself are ineffective at conveying any substantial amount of stormwater runoff due to crushing, clogging, and burying of culvert inlet and outlets. This has created ponding areas at culvert inlets and outlets.

Outfall C

The drainage area for Outfall "C" is also located between High Street and Second Street. Runoff in this area sheet flows northwest toward Second Street. Runoff then sheet flows over Second Street and flows through some small swales around houses and buildings on the northwest side of Second Street. Runoff is discharged into an open field area. Roadside ditches along Second Street are not graded effectively enough to allow for adequate flow. As a result, stormwater runoff ponds in these ditches.

Outfall D

The drainage area for Outfall "D" encompasses the area between High Street and Second Street north to Main Street. It also includes an area east of High Street. Runoff from the area east of High Street sheet flows northwest and passes through a culvert under High Street at the intersection with Church Street. Runoff flows in roadside ditches along Church Street and Patrick Street towards Second Street. Along Second Street, runoff sheet flows over the road or is conveyed through a culvert under Second Street between the properties located at 15511 and 15505 Second Street. This culvert outfalls at the back of the two lots into an open field area. Roadside ditches along Second Street are not graded effectively enough to allow for adequate flow. As a result, stormwater runoff ponds in these ditches.

Outfall E

The drainage area for Outfall "E" encompasses an area north of Water Street extending east to Loyalty Road. Stormwater runoff sheet flows southwest towards Water Street. A stream channel

collects this runoff and flows northwest along the northeast side of Water Street. The stream channel then flows from the northeast side to the southwest side of Water Street via a culvert under Water Street. A man-made channel conveys flow northwest along the southwest side of Water Street to the intersection with Main Street. A storm system conveys the flow under the intersection and outfalls into an open channel under an existing building on the west side of the intersection.

Outfall F

The drainage area for Outfall "F" includes roadside ditches along the east and west side of Main Street. The roadside ditches convey runoff into a natural drainage channel into the floodplain of South Fork Catoctin Creek.

Outfall G

Outfall "G" is at an existing bridge crossing of Main Street over South Fork Catoctin Creek.

Possible BMP/Storm Drainage Upgrades Associated with Traffic Calming Measures

Location	Possible Upgrades
Intersection: Main St & Clover Hill Rd	Possible BMP Measures: Bio-retention; manufactured BMP systems Possible Upgrades: Storm drainage collection points and conveyance system to outfall "G"
Intersection: Main St, Water St, & Second St	Possible BMP Measures: Bio-retention; manufactured BMP systems Possible Upgrades: Storm drainage relocation; gutter collection system
Main Street (segment between Second St and Bond St)	Possible BMP Measures: Manufactured BMP systems Possible Upgrades: Gutter collection system with associated storm drainage
Second Street (between Main St and Church St)	Possible BMP Measures: Manufactured BMP systems Possible Upgrades: Gutter collection system with associated storm drainage
Second Street (between Church St and Factory St)	Possible BMP Measures: Grass-lined swales, bio-retention; manufactured BMP systems Possible Upgrades: Improve roadside swales; provide gutter collection system; upsize, extend culverts, storm sewer to adequate outfalls
Intersection: Water St & High St	Possible BMP Measures: Grass-lined swales, bio-retention; manufactured BMP systems Possible Upgrades: Collection / conveyance of flow from High Street across Water Street to existing swales
Intersection: Loyalty Rd & Old Waterford Rd	Possible BMP Measures: Grass-lined swales, bio-retention, manufactured BMP systems Possible Upgrades: Improve existing culverts and grading as appropriate
Intersection: Factory St & High St	Possible BMP Measures: Grass-lined swales, bio-retention, manufactured BMP systems Possible Upgrades: Improve existing culverts and grading as appropriate
High Street (between Water St and Factory St)	Possible BMP Measures: Grass-lined swales, bio-retention, Manufactured BMP systems Possible Upgrades: Improve existing culverts and roadside ditches and grading as appropriate

Appendix L
Concept Plan Workshop
May 27, 2003

You are cordially invited to participate in the

CONCEPT PLAN WORKSHOP
FOR
The Village of Waterford
"Bury the Wires and Tame the Traffic"

9:00AM – 4:00PM
Tuesday, May 27th & Wednesday, May 28th

Aspen Room
908 Trailview Boulevard
Leesburg, VA

Your participation is encouraged as we work through the final steps in crafting a concept plan for the Village of Waterford. The efforts of the past few months, combining citizen input, data collection, and engineering studies, will provide the mechanism for the citizens of Waterford to move into the next steps as they work together to "Bury the Wires and Tame the Traffic" in their village.

R.S.V.P. to Sheryl Gates at
703-737-8441 or sgates@loudoun.gov

"Bury the Wires and Tame the Traffic"
Preliminary Engineering Services Project
Village of Waterford, Virginia

CONCEPT PLAN WORKSHOP

Tuesday, May 27, 2003

AGENDA

Introductions

Process of Concept Plan Workshop

Framing of Issues

Overview of Draft Concept Plans

- Overall concept plans for Village of Waterford / Review of traffic / roads / power / drainage / trees / wetlands/ historical properties / archaeological issues
- Concepts for utility relocations: plans, typical sections, photos
- Concepts for traffic calming measures: plans, sections, sketches, photos for locations throughout Village

Group Discussion of Draft Concepts

Lunch

Group Review of Options and Alternatives

Summary of Preferred Concept Plans

Vision for study documents:

- "Marketing Piece"
- Final Report
- Environmental document

Note: Workshop will continue on Wednesday morning, May 28, if necessary to continue discussions.

Appendix M
Concept Plan Presentation
July 17, 2003

VILLAGE OF WATERFORD
Loudoun County, Virginia

"Bury the Wires and Tame the Traffic"
Preliminary Engineering Study

CONCEPT PLAN PRESENTATION

Waterford Citizens' Association (WCA)
Waterford School Parent Teacher Organization (PTO)
Waterford Foundation, Inc. (WFI)

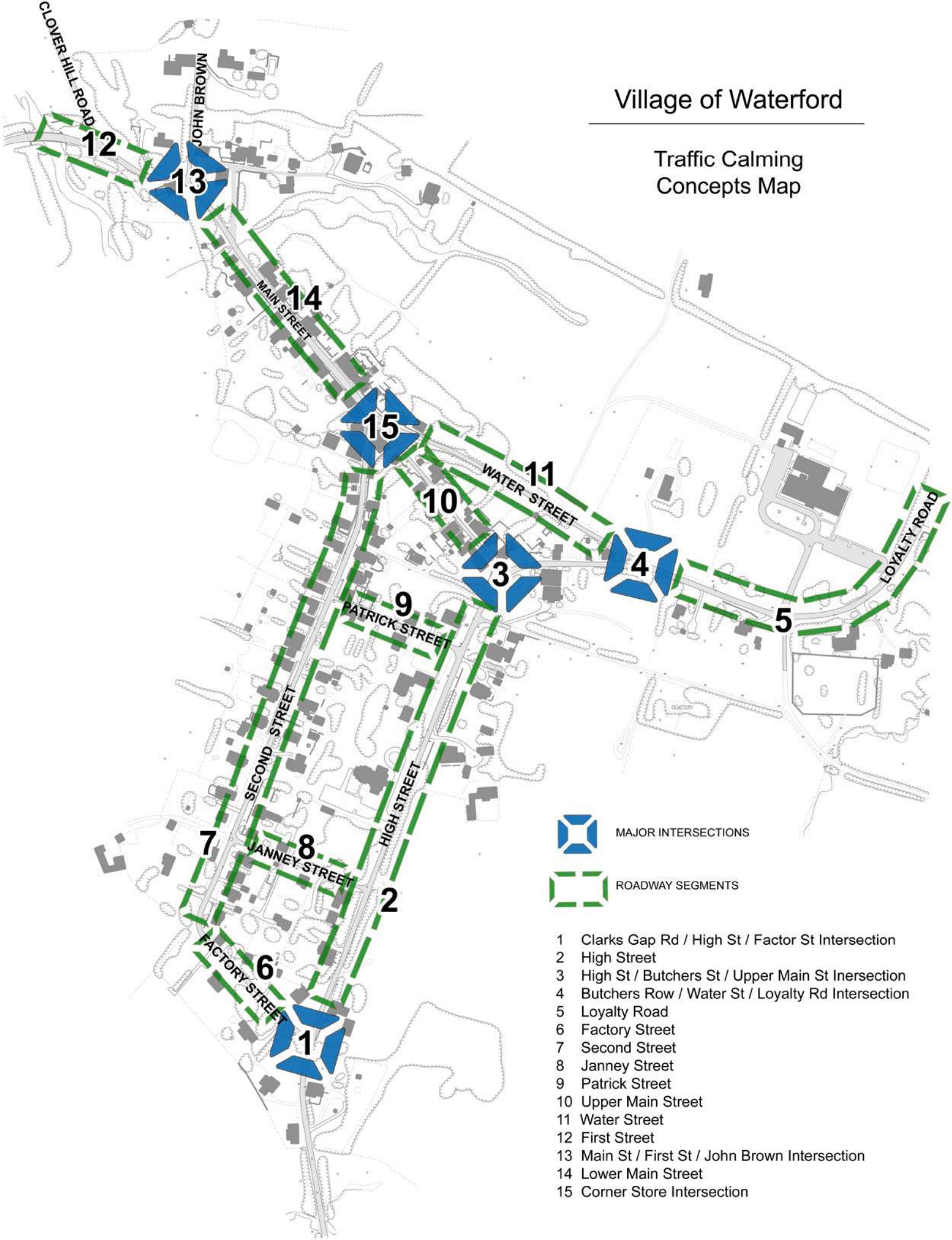
Thursday, July 17, 2003, 7 PM
Old Waterford School

AGENDA

7:00 PM	WELCOME	Ed Lehmann Waterford Citizens Association Eric Breitkreutz, Waterford Foundation
7:10	OVERVIEW OF PROJECT	John Martin, Kimley-Horn and Associates
7:15	PRESENTATION OF STUDY FINDINGS AND RECOMMENDATIONS - Preserve the landmark - Bury the wires - Light the village - Tame the traffic … and fix the drainage	Dan Burden, Facilitator
8:00	GROUP DISCUSSION	Dan Burden, Facilitator
8:45	NEXT STEPS	Ed Lehmann / Eric Breitkreutz / John Martin
9:00	ADJOURN	

Village of Waterford

Traffic Calming Concepts Map



1 Clarks Gap Rd / High St / Factor St Intersection
2 High Street
3 High St / Butchers St / Upper Main St Inersection
4 Butchers Row / Water St / Loyalty Rd Intersection
5 Loyalty Road
6 Factory Street
7 Second Street
8 Janney Street
9 Patrick Street
10 Upper Main Street
11 Water Street
12 First Street
13 Main St / First St / John Brown Intersection
14 Lower Main Street
15 Corner Store Intersection

"Bury the Wires and Tame the Traffic"
Village of Waterford

Concept Plan Presentation

MEETING NOTES

INDEX CARDS

The following comments were obtained from the Waterford citizens and neighbors who attended the presentation on July 17, 2003 and who wrote comments on index cards for use by the study team:

- Visibility at the curve on High Street and Butchers Row when bearing right from high to Butchers Row is dangerously limited if making left turn to Main St must be improved.
- Excellent job! It looks like you get it. Keep it rural and simple. Use local materials whenever possible to maintain character (i.e. stone walls use Virginia stone).
- Are you using Dietz lights? Those are what were here ad are available in electric now. Bob Thompson 882-4104 has info.
- Try not to change sidewalks.
- Landscape with drought-resistant trees, we have lost so many (10) huge trees in just 7 years. No one will water.
- Waterford has a garden club who could provide input on flowers.
- Use red brick in place of pavers in the middle and edges of the streets.
- You recommended that the buildings in Waterford be lighted – I think this would change the character of Waterford. [Note: Lighting buildings was not a recommendation of the study, since such lighting is not consistent with the village character.]
- Change in color tone of roadway rather than darker, would prefer tanner (dirt) tones.
- Retain sense of idiosyncrasies.
- General scheme was good.
- Reworking around Post Office was too regular and pretty – leave the rocks and stump.
- Waterford gardeners club would be happy to help with the flowers (a lot of bulbs planted last year).
- We live at 40152 Main St. Automobiles swerve into our parking area when traffic is heavy. What can be done to this area to stop this from occurring?
- I suggest you re-work the bridge design treatment you have on Water Street near the center of town, possibly carrying the pavement treatment from the center of town and eliminating the side walls.
- There is excessive speeding and large trucks on Water and Butchers Row, and I don't think they will be slowed by the changes presented although I like them. Have you considered speed camera enforcement of major roads in conjunction with your changes?

- Help with selecting planting choices. We have rock wall and stairs on east side of High Street. What sort of ground cover will hold the soil, cover well, and not harm the rock walls?
- Thank you for your sensitivity to our village.
- Vary the materials but keep all muted and natural. Planting should have some historical precedent – not overly groomed or massed. Keep in mind that annuals, deciduous plants are invisible for half the year.
- Leave rough / unimproved areas wherever not needed for safety, calming.

DISSCUSSION COMMENTS

During a group discussion, the following general comments were captured following the presentation:

- Quality of landscaping and materials are important points.
- Keep the soul of Waterford.
- Small group of citizens needs to review designs every step of the way.
- Waiver from VDOT
- Construction trucks
- Second and Church St. 'Blob'
- @ Post Office – avoid dark pavement, go with cobbled look.
- 10 mph curve at Second and Factory needs a raised centered median.
- Favor irregularity, avoid uniformity. Keep tree stump at Post Office.
- Next phase of design – Citizens review material samples.
- Presentation – over use of linear granite materials
- Rubber bladed European snow plows
- Ditches are dangerous but charming.
- Move road away from Mill w/ granite curb.
- Lower Main operates as a yield street.
- Water Street – no to walls, extend paving from Post Office intersection.
- Historic – not too many lights but some records (of past light placement) exist.
- Waterford fund to maintain lights.
- Home owners will have input into locations of lights (8-12ft).
- Get rid of VDOT lights; light for pedestrians.

Appendix N
NEPA Concurrence on Study Results and Concept Plans

WILLIAMSBURG ENVIRONMENTAL GROUP, INC.

RECEIVED
AUG 2 1 2003
KHA-NOVA
Environmental Consultants

LETTER OF TRANSMITTAL

Attn: John Martin

Date: August 11, 2003

To: Kimley-Horn
13755 Sunrise Valley Drive
Suite 450
Herndon VA 20171

Project #: 1725

Reference: Waterford

From: Loretta Cummings
Senior Regulatory Specialist

cc: Dick Pezzullo

WE ARE SENDING YOU:

- ☐ Plans
- ☐ Prints
- ☐ Copies
- ☐ Contracts
- ☐ Literature
- ☐ Report
- ☐ Samples
- ☒ Letters
- ☐ Other:

REASON:

- ☐ As per your request
- ☐ For your signature
- ☐ For your review/comments
- ☒ For your use/files
- ☐ Other:

SENT BY:

- ☒ Mail
- ☐ Overnight Carrier:
- ☐ Courier:
- ☐ Other:

COPIES	DATED	DESCRIPTION
1	7-28-03	NEPA Concurrence

Notes:

Attached is the NEPA concurrence letter from the Federal Highway Administration. This is the first step of the document process. Please keep it in your files.

Loretta Cummings

L:\1700s\1725-Waterford\Correspondence\Concurrence transmittal.doc

To: Mr. Jerry Combs
From:
Loretta B. Cummings
Senior Regulatory Specialist
Williamsburg Environmental Group, Inc.
46030 Manekin Plaza, Suite 160
Sterling, Virginia 20166

Date: 7/22/03

NEPA DOCUMENTATION
CONCURRENCE FORM

Project: Waterford Historic District – National Landmark
#EN98-053-137, PE101
Location: Limits of the Historic District
Federal Project Number: Federally Funded; T-21 Grant
City/County: Loudoun County
PPMS ID #:
Loudoun County RFP: QQ-00963

Description: This grant in known as the "Hide the Wires, Tame the Traffic" project. Its purpose is to improve the intrinsic historic nature of this National Historic Landmark by eliminating the overhead utility lines and poles and reducing traffic speeds. The utilities will be buried under the road pavement. Traffic taming measures that do not detract from the historic nature of the area will be employed to slow traffic and create a safer pedestrian area.

This goal of this project is to work with the Department of Historic Resources and the Waterford Foundation and Waterford Citizens Group to create a project that achieves a "no impact" or "no adverse impact" to the National Historic Landmark village.

Attachments:

Map XX
SERP PEI
Other XX DHR, DCR, USACOE Correspondence

Suggested Level of NEPA Document:

CE X with Section 106 documentation and potentially a Programmatic Section 4(f)
EA
EIS

Comments: Extensive coordination has already occurred and will continue to occur between the Waterford Foundation, the Waterford Citizens Group, the Parent/Teachers Association, Loudoun County and the Department of Historic Resources. Architectural historians and Section 106 compliance specialists have been involved with the preliminary planning and will be intricately

involved in project development and compliance review. The primary environmental concern is the historic nature of the project area.

Several intermittent and one perennial stream exist within the project area. State Program General Permits may be required if bridge alterations on the intermittent streams are included in the traffic calming measures.

There are no threatened or endangered species in the area. Traffic volumes do not warrant an air or noise study. Properties under protective easements do exist around the historic district but are not anticipated to be impacted.

We concur with the suggested level of NEPA document.

FHWA Approval

07/28/2003
Date

TOTAL P.02

Appendix O
Preliminary Cost Estimates

"Bury the Wires and Tame the Traffic"
Waterford, Virginia

PRELIMINARY ENGINEERING STUDY AND CONCEPT PLANS

PRELIMINARY ESTIMATES OF PROJECT COSTS

Project Item		Preliminary Cost
Traffic calming measures (2.4 miles of roadway, 12 intersections)	$	2,800,000
Drainage improvements associated with traffic calming	$	600,000
Roadway and pedestrian lighting consistent with village character	$	700,000
Electric service relocation from overhead lines to underground ducts	$	5,700,000
Telephone service relocation from overhead lines to underground ducts	$	2,900,000
Utility service connections to existing structures	$	800,000
Total in 2003 Dollars:	**$**	**13,500,000**
2005 Dollars:	$	14,200,000
2008 Dollars:	$	15,400,000

Notes:

1. Costs are preliminary in nature and based on concept designs developed by consultant team in close coordination with representatives from the Village of Waterford.
2. Escalation factors used to project 2005 and 2008 cost estimates: 2.4% in 2004 and 2005, 2.5% in 2006, 2.7% in 2007, 2.8% in 2008, per U.S. President's Office of Management and Budget.
3. Costs include construction, engineering design and construction administration, mobilization, maintenance of traffic, easements, permits, and contingencies.
4. Costs assume that all items will be constructed as part of a total, phased project.

"Bury the Wires and Tame the Traffic"
Waterford, Virginia
PRELIMINARY ENGINEERING STUDY AND CONCEPT PLANS

PRELIMINARY ESTIMATES OF PROJECT COSTS

TRAFFIC CALMING AND ROADWAY IMPROVEMENTS

SUMMARY

PROJECT LOCATION	PRELIMINARY COST
Clarkes Gap Road/High Street/Factory Street Intersection	$ 88,000.00
Factory Street - Second Street to High Street	$ 15,000.00
High Street - Factory Street to Upper Main Street	$ 89,000.00
Janney Street - Second Street to High Street	$ 73,000.00
Patrick Street - Second Street to High Street	$ 410,000.00
High Street/Butchers Row/Upper Main Intersection	$ 58,000.00
Second Street - Factory Street to Church Street	$ 175,000.00
Corner Store Intersection	$ 408,000.00
Main Street Hill	$ 69,000.00
Lower Main Street - Second Street to First Street	$ 569,000.00
Main Street/First Street/Liggett Intersection	$ 48,000.00
First Street - Catoctin Creek to Old Waterford Mill	$ 99,000.00
Water Street - Main Street to Loyalty road	$ 233,000.00
Butchers Row/Water Street/Loyalty Road Intersection	$ 66,000.00
Loyalty Road - Butchers Row to North of Brown's Lane	$ 125,000.00
TOTAL	**$ 2,525,000.00**
Alternate 1 - Mill/Overlay Additional Roadways	$ 324,000.00
Total from Part 1	$ 2,525,000.00
TOTAL WITH ALTERNATE	**$ 2,849,000.00**
TOTAL ROUNDED	**$ 2,800,000.00**

"Bury the Wires and Tame the Traffic"
Waterford, Virginia
PRELIMINARY ENGINEERING STUDY AND CONCEPT PLANS

PRELIMINARY ESTIMATES OF PROJECT COSTS

TRAFFIC CALMING AND ROADWAY IMPROVEMENTS

CLARKES GAP ROAD - Clarkes Gap Road/High Street/Factory Street Intersection

	ITEM	QUANTITY	UNIT	UNIT PRICE	COST
1	Excavation	25	CY	$ 16.00	$ 400.00
2	Embankment	20	CY	$ 20.00	$ 400.00
3	Sawcut and Remove Asphalt Pavement	57	SY	$ 5.00	$ 285.00
4	Mill Existing Pavement	1,260	SY	$ 4.00	$ 5,040.00
5	8" Aggregate Base	296	SY	$ 10.00	$ 2,960.00
6	4" Asphalt Base Course	-	SY	$ 15.00	$ -
7	2" Asphalt Pavement	1,260	SY	$ 8.00	$ 10,080.00
8	2" Asphalt Stabilized Open-Graded Gravel	296	SY	$ 4.00	$ 1,184.00
9	Granite Curb	-	LF	$ 40.00	$ -
10	Brick Pavers	-	SF	$ 15.00	$ -
11	Concrete Pavers	296	SY	$ 45.00	$ 13,320.00
12	4' Concrete Sidewalk	-	LF	$ 25.00	$ -
13	Brick Sidewalk	-	SF	$ 8.00	$ -
14	Gravel Path	-	SY	$ 1.50	$ -
15	Gravel Parking Lot	-	SY	$ 18.00	$ -
16	Seed and Mulch	550	SY	$ 2.00	$ 1,100.00
17	Landscaping	1	LS	$ 5,000.00	$ 5,000.00
18	2' Stone Wall	-	LF	$ 40.00	$ -
19	Stone-faced bridge	-	LS	$ 96,000.00	$ -
20	Temporary Traffic Signal	-	LS	$ 25,000.00	$ -
21	Adjust Sanitary Sewer Manhole Elevation	2	EA	$ 2,500.00	$ 5,000.00
				TOTAL	**$ 44,769.00**
			Mobilization	25%	$ 11,200.00
			Maintenance of Traffic	25%	$ 11,200.00
			Engineering	10%	$ 4,480.00
			Bonds & Permits	15%	$ 6,720.00
			Contingency	20%	$ 8,960.00
				TOTAL	**$ 87,329.00**
				ROUNDED TOTAL	**$ 88,000.00**

"Bury the Wires and Tame the Traffic"
Waterford, Virginia
PRELIMINARY ENGINEERING STUDY AND CONCEPT PLANS

PRELIMINARY ESTIMATES OF PROJECT COSTS

TRAFFIC CALMING AND ROADWAY IMPROVEMENTS

FACTORY STREET - Second Street to High Street

	ITEM	QUANTITY	UNIT	UNIT PRICE	COST
1	Excavation	12	CY	$ 16.00	$ 192.00
2	Embankment	4	CY	$ 20.00	$ 80.00
3	Sawcut and Remove Asphalt Pavement	22	SY	$ 5.00	$ 110.00
4	Mill Existing Pavement	-	SY	$ 4.00	$ -
5	8" Aggregate Base	22	SY	$ 10.00	$ 220.00
6	4" Asphalt Base Course	-	SY	$ 15.00	$ -
7	2" Asphalt Pavement	-	SY	$ 8.00	$ -
8	2" Asphalt Stabilized Open-Graded Gravel	22	SY	$ 4.00	$ 88.00
9	Granite Curb	-	LF	$ 40.00	$ -
10	Brick Pavers	-	SF	$ 15.00	$ -
11	Concrete Pavers	22	SY	$ 45.00	$ 990.00
12	4' Concrete Sidewalk	-	LF	$ 25.00	$ -
13	Brick Sidewalk	-	SF	$ 8.00	$ -
14	Gravel Path	-	SY	$ 1.50	$ -
15	Gravel Parking Lot	-	SY	$ 18.00	$ -
16	Seed and Mulch	44	SY	$ 2.00	$ 88.00
17	Landscaping	1	LS	$ 5,000.00	$ 5,000.00
18	2' Stone Wall	-	LF	$ 40.00	$ -
19	Stone-faced bridge	-	LS	$ 96,000.00	$ -
20	Temporary Traffic Signal	-	LS	$ 25,000.00	$ -
21	Adjust Sanitary Sewer Manhole Elevation	-	EA	$ 2,500.00	$ -
				TOTAL	**$ 6,768.00**
			Mobilization	25%	$ 1,700.00
			Maintenance of Traffic	50%	$ 3,390.00
			Engineering	10%	$ 680.00
			Bonds & Permits	15%	$ 1,020.00
			Contingency	20%	$ 1,360.00
				TOTAL	**$ 14,918.00**
				ROUNDED TOTAL	**$ 15,000.00**

"Bury the Wires and Tame the Traffic"
Waterford, Virginia
PRELIMINARY ENGINEERING STUDY AND CONCEPT PLANS

PRELIMINARY ESTIMATES OF PROJECT COSTS

TRAFFIC CALMING AND ROADWAY IMPROVEMENTS

HIGH STREET - Factory Street to Upper Main Street

	ITEM	QUANTITY	UNIT	UNIT PRICE	COST
1	Excavation	180	CY	$ 16.00	$ 2,880.00
2	Embankment	30	CY	$ 20.00	$ 600.00
3	Sawcut and Remove Asphalt Pavement	14	SY	$ 5.00	$ 70.00
4	Mill Existing Pavement	-	SY	$ 4.00	$ -
5	8" Aggregate Base	350	SY	$ 10.00	$ 3,500.00
6	4" Asphalt Base Course	-	SY	$ 15.00	$ -
7	2" Asphalt Pavement	-	SY	$ 8.00	$ -
8	2" Asphalt Stabilized Open-Graded Gravel	350	SY	$ 4.00	$ 1,400.00
9	Granite Curb	-	LF	$ 40.00	$ -
10	Brick Pavers	-	SF	$ 15.00	$ -
11	Concrete Pavers	350	SY	$ 45.00	$ 15,750.00
12	4' Concrete Sidewalk	-	LF	$ 25.00	$ -
13	Brick Sidewalk	-	SF	$ 8.00	$ -
14	Gravel Path	-	SY	$ 1.50	$ -
15	Gravel Parking Lot	-	SY	$ 18.00	$ -
16	Seed and Mulch	890	SY	$ 2.00	$ 1,780.00
17	Landscaping	1	LS	$ 15,000.00	$ 15,000.00
18	2' Stone Wall	200	LF	$ 40.00	$ 8,000.00
19	Stone-faced bridge	-	LS	$ 96,000.00	$ -
20	Temporary Traffic Signal	-	LS	$ 25,000.00	$ -
21	Adjust Sanitary Sewer Manhole Elevation	-	EA	$ 2,500.00	$ -
				TOTAL	**$ 48,980.00**
			Mobilization	15%	$ 7,350.00
			Maintenance of Traffic	20%	$ 9,800.00
			Engineering	10%	$ 4,900.00
			Bonds & Permits	15%	$ 7,350.00
			Contingency	20%	$ 9,800.00
				TOTAL	**$ 88,180.00**
				ROUNDED TOTAL	**$ 89,000.00**

"Bury the Wires and Tame the Traffic"
Waterford, Virginia
PRELIMINARY ENGINEERING STUDY AND CONCEPT PLANS

PRELIMINARY ESTIMATES OF PROJECT COSTS

TRAFFIC CALMING AND ROADWAY IMPROVEMENTS

JANNEY STREET - Second Street to High Street

	ITEM	QUANTITY	UNIT	UNIT PRICE	COST
1	Excavation	90	CY	$ 16.00	$ 1,440.00
2	Embankment	60	CY	$ 20.00	$ 1,200.00
3	Sawcut and Remove Asphalt Pavement	-	SY	$ 5.00	$ -
4	Mill Existing Pavement	-	SY	$ 4.00	$ -
5	8" Aggregate Base	172	SY	$ 10.00	$ 1,720.00
6	4" Asphalt Base Course	-	SY	$ 15.00	$ -
7	2" Asphalt Pavement	-	SY	$ 8.00	$ -
8	2" Asphalt Stabilized Open-Graded Gravel	172	SY	$ 4.00	$ 688.00
9	Granite Curb	770	LF	$ 40.00	$ 30,800.00
10	Brick Pavers	-	SF	$ 15.00	$ -
11	Concrete Pavers	-	SY	$ 45.00	$ -
12	4' Concrete Sidewalk	-	LF	$ 25.00	$ -
13	Brick Sidewalk	-	SF	$ 8.00	$ -
14	Gravel Path	-	SY	$ 1.50	$ -
15	Gravel Parking Lot	-	SY	$ 18.00	$ -
16	Seed and Mulch	345	SY	$ 2.00	$ 690.00
17	Landscaping	1	LS	$ 5,000.00	$ 5,000.00
18	2' Stone Wall	-	LF	$ 40.00	$ -
19	Stone-faced bridge	-	LS	$ 96,000.00	$ -
20	Temporary Traffic Signal	-	LS	$ 25,000.00	$ -
21	Adjust Sanitary Sewer Manhole Elevation	-	EA	$ 2,500.00	$ -
				TOTAL	**$ 41,538.00**
			Mobilization	10%	$ 4,160.00
			Maintenance of Traffic	20%	$ 8,310.00
			Engineering	10%	$ 4,160.00
			Bonds & Permits	15%	$ 6,240.00
			Contingency	20%	$ 8,310.00
				TOTAL	**$ 72,718.00**
				ROUNDED TOTAL	**$ 73,000.00**

"Bury the Wires and Tame the Traffic"
Waterford, Virginia
PRELIMINARY ENGINEERING STUDY AND CONCEPT PLANS

PRELIMINARY ESTIMATES OF PROJECT COSTS

TRAFFIC CALMING AND ROADWAY IMPROVEMENTS

PATRICK STREET - Second Street to High Street

	ITEM	QUANTITY	UNIT	UNIT PRICE	COST
1	Excavation	85	CY	$ 16.00	$ 1,360.00
2	Embankment	10	CY	$ 20.00	$ 200.00
3	Sawcut and Remove Asphalt Pavement	520	SY	$ 5.00	$ 2,600.00
4	Remove Curb, Sidewalks	115	SY	$ 8.00	$ 920.00
5	Mill Existing Pavement	125	SY	$ 4.00	$ 500.00
6	8" Aggregate Base	520	SY	$ 10.00	$ 5,200.00
7	4" Asphalt Base Course	-	SY	$ 15.00	$ -
8	2" Asphalt Pavement	125	SY	$ 8.00	$ 1,000.00
9	2" Asphalt Stabilized Open-Graded Gravel	520	SY	$ 4.00	$ 2,080.00
10	Granite Curb	350	LF	$ 40.00	$ 14,000.00
11	Brick Pavers	4,500	SF	$ 15.00	$ 67,500.00
12	Concrete Pavers	80	SY	$ 45.00	$ 3,600.00
13	4' Concrete Sidewalk	-	LF	$ 25.00	$ -
14	Brick Sidewalk	1,400	SF	$ 8.00	$ 11,200.00
15	Gravel Path	-	SY	$ 1.50	$ -
16	Gravel Parking Lot	-	SY	$ 18.00	$ -
17	Seed and Mulch	235	SY	$ 2.00	$ 470.00
18	Landscaping	1	LS	$ 4,000.00	$ 4,000.00
19	2' Stone Wall	-	LF	$ 40.00	$ -
20	Temporary Traffic Signal	-	LS	$ 25,000.00	$ -
21	Adjust Sanitary Sewer Manhole Elevation	2	EA	$ 2,500.00	$ 5,000.00
					$ 114,630.00
				TOTAL	**$ 234,260.00**
			Mobilization	10%	$ 23,430.00
			Maintenance of Traffic	20%	$ 46,860.00
			Engineering	10%	$ 23,430.00
			Bonds & Permits	15%	$ 35,140.00
			Contingency	20%	$ 46,860.00
				TOTAL	**$ 409,980.00**
				ROUNDED TOTAL	**$ 410,000.00**

"Bury the Wires and Tame the Traffic"
Waterford, Virginia
PRELIMINARY ENGINEERING STUDY AND CONCEPT PLANS

PRELIMINARY ESTIMATES OF PROJECT COSTS

TRAFFIC CALMING AND ROADWAY IMPROVEMENTS

HIGH STREET - High Street/Butchers Row/Upper Main Intersection

	ITEM	QUANTITY	UNIT	UNIT PRICE	COST
1	Excavation	50	CY	$ 16.00	$ 800.00
2	Embankment	10	CY	$ 20.00	$ 200.00
3	Sawcut and Remove Asphalt Pavement	408	SY	$ 5.00	$ 2,040.00
4	Mill Existing Pavement	-	SY	$ 4.00	$ -
5	8" Aggregate Base	585	SY	$ 10.00	$ 5,850.00
6	4" Asphalt Base Course	-	SY	$ 15.00	$ -
7	2" Asphalt Pavement	-	SY	$ 8.00	$ -
8	2" Asphalt Stabilized Open-Graded Gravel	585	SY	$ 4.00	$ 2,340.00
9	Granite Curb	-	LF	$ 40.00	$ -
10	Brick Pavers	355	SF	$ 15.00	$ 5,325.00
11	Concrete Pavers	230	SY	$ 45.00	$ 10,350.00
12	4' Concrete Sidewalk	-	LF	$ 25.00	$ -
13	Brick Sidewalk	-	SF	$ 8.00	$ -
14	Gravel Path	-	SY	$ 1.50	$ -
15	Gravel Parking Lot	-	SY	$ 18.00	$ -
16	Seed and Mulch	53	SY	$ 2.00	$ 106.00
17	Landscaping	1	LS	$ 4,000.00	$ 4,000.00
18	2' Stone Wall	-	LF	$ 40.00	$ -
19	Stone-faced bridge	-	LS	$ 96,000.00	$ -
20	Temporary Traffic Signal	-	LS	$ 25,000.00	$ -
21	Adjust Sanitary Sewer Manhole Elevation	-	EA	$ 2,500.00	$ -
				TOTAL	**$ 31,011.00**
			Mobilization	10%	$ 3,110.00
			Maintenance of Traffic	30%	$ 9,310.00
			Engineering	10%	$ 3,110.00
			Bonds & Permits	15%	$ 4,660.00
			Contingency	20%	$ 6,210.00
				TOTAL	**$ 57,411.00**
				ROUNDED TOTAL	**$ 58,000.00**

"Bury the Wires and Tame the Traffic"
Waterford, Virginia
PRELIMINARY ENGINEERING STUDY AND CONCEPT PLANS

PRELIMINARY ESTIMATES OF PROJECT COSTS

TRAFFIC CALMING AND ROADWAY IMPROVEMENTS

SECOND STREET - Factory Street to Church Street

	ITEM	QUANTITY	UNIT	UNIT PRICE	COST
1	Excavation	230	CY	$ 16.00	$ 3,680.00
2	Embankment	30	CY	$ 20.00	$ 600.00
3	Sawcut and Remove Asphalt Pavement	350	SY	$ 5.00	$ 1,750.00
4	Mill Existing Pavement	1,215	SY	$ 4.00	$ 4,860.00
5	8" Aggregate Base	470	SY	$ 10.00	$ 4,700.00
6	4" Asphalt Base Course	-	SY	$ 15.00	$ -
7	2" Asphalt Pavement	1,215	SY	$ 8.00	$ 9,720.00
8	2" Asphalt Stabilized Open-Graded Grave	470	SY	$ 4.00	$ 1,880.00
9	Granite Curb	-	LF	$ 40.00	$ -
10	Brick Pavers	2,050	SF	$ 15.00	$ 30,750.00
11	Concrete Pavers	-	SY	$ 45.00	$ -
12	4' Concrete Sidewalk	-	LF	$ 25.00	$ -
13	Brick Sidewalk	3,200	SF	$ 8.00	$ 25,600.00
14	Gravel Path	-	SY	$ 1.50	$ -
15	Gravel Parking Lot	-	SY	$ 18.00	$ -
16	Seed and Mulch	970	SY	$ 2.00	$ 1,940.00
17	Landscaping	1	LS	$ 5,000.00	$ 5,000.00
18	2' Stone Wall	50	LF	$ 40.00	$ 2,000.00
19	Stone-faced bridge	-	LS	$ 96,000.00	$ -
20	Temporary Traffic Signal	-	LS	$ 25,000.00	$ -
21	Adjust Sanitary Sewer Manhole Elevation	3	EA	$ 2,500.00	$ 7,500.00
				TOTAL	**$ 99,980.00**
				Mobilization 10%	$ 10,000.00
				Maintenance of Traffic 20%	$ 20,000.00
				Engineering & Construction Admin 10%	$ 10,000.00
				Bonds & Permits 15%	$ 15,000.00
				Contingency 20%	$ 20,000.00
				TOTAL	**$ 174,980.00**
				ROUNDED TOTAL	**$ 175,000.00**

"Bury the Wires and Tame the Traffic"
Waterford, Virginia
PRELIMINARY ENGINEERING STUDY AND CONCEPT PLANS

PRELIMINARY ESTIMATES OF PROJECT COSTS

TRAFFIC CALMING AND ROADWAY IMPROVEMENTS

CORNER STORE INTERSECTION - Water Street/2nd Street/Main Street intersection

	ITEM	QUANTITY	UNIT	UNIT PRICE	COST
1	Excavation	1,050	CY	$ 16.00	$ 16,800.00
2	Embankment	22	CY	$ 20.00	$ 440.00
3	Sawcut and Remove Asphalt Pavement	765	SY	$ 5.00	$ 3,825.00
4	Mill Existing Pavement	-	SY	$ 4.00	$ -
5	8" Aggregate Base	1,130	SY	$ 10.00	$ 11,300.00
6	4" Asphalt Base Course	-	SY	$ 15.00	$ -
7	2" Asphalt Pavement	-	SY	$ 8.00	$ -
8	2" Asphalt Stabilized Open-Graded Gravel	1,130	SY	$ 4.00	$ 4,520.00
9	Granite Curb	280	LF	$ 40.00	$ 11,200.00
10	Brick Pavers	6,872	SF	$ 15.00	$ 103,080.00
11	Concrete Pavers	365	SY	$ 45.00	$ 16,425.00
12	4' Concrete Sidewalk	290	LF	$ 25.00	$ 7,250.00
13	Brick Sidewalk	460	SF	$ 8.00	$ 3,680.00
14	Gravel Path	-	SY	$ 1.50	$ -
15	Gravel Parking Lot	20	SY	$ 18.00	$ 360.00
16	Seed and Mulch	3,525	SY	$ 2.00	$ 7,050.00
17	Landscaping	1	LS	$ 4,000.00	$ 4,000.00
18	2' Stone Wall	40	LF	$ 40.00	$ 1,600.00
19	Stone-faced bridge	-	LS	$ 96,000.00	$ -
20	Temporary Traffic Signal	1	LS	$ 25,000.00	$ 25,000.00
21	Adjust Sanitary Sewer Manhole Elevation	4	EA	$ 2,500.00	$ 10,000.00
				TOTAL	**$ 226,530.00**
			Mobilization	10%	$ 22,660.00
			Maintenance of Traffic	25%	$ 56,640.00
			Engineering	10%	$ 22,660.00
			Bonds & Permits	15%	$ 33,980.00
			Contingency	20%	$ 45,310.00
				TOTAL	$ 407,780.00
				ROUNDED TOTAL	$ 408,000.00

"Bury the Wires and Tame the Traffic"
Waterford, Virginia
PRELIMINARY ENGINEERING STUDY AND CONCEPT PLANS

PRELIMINARY ESTIMATES OF PROJECT COSTS

TRAFFIC CALMING AND ROADWAY IMPROVEMENTS

MAIN STREET HILL - High Street to Corner Store Intersection

	ITEM	QUANTITY	UNIT	UNIT PRICE	COST
1	Excavation	45	CY	$ 16.00	$ 720.00
2	Embankment	15	CY	$ 20.00	$ 300.00
3	Sawcut and Remove Asphalt Pavement	-	SY	$ 5.00	$ -
4	Mill Existing Pavement	1,140	SY	$ 4.00	$ 4,560.00
5	8" Aggregate Base	1,140	SY	$ 10.00	$ 11,400.00
6	4" Asphalt Base Course	-	SY	$ 15.00	$ -
7	2" Asphalt Pavement	-	SY	$ 8.00	$ -
8	2" Asphalt Stabilized Open-Graded Gravel	-	SY	$ 4.00	$ -
9	Granite Curb	-	LF	$ 40.00	$ -
10	Brick Pavers	-	SF	$ 15.00	$ -
11	Concrete Pavers	-	SY	$ 45.00	$ -
12	4' Concrete Sidewalk	-	LF	$ 25.00	$ -
13	Brick Sidewalk	2,400	SF	$ 8.00	$ 19,200.00
14	Gravel Path	-	SY	$ 1.50	$ -
15	Gravel Parking Lot	-	SY	$ 18.00	$ -
16	Seed and Mulch	535	SY	$ 2.00	$ 1,070.00
17	Landscaping	1	LS	$ 2,000.00	$ 2,000.00
18	2' Stone Wall	-	LF	$ 40.00	$ -
19	Stone-faced bridge	-	LS	$ 96,000.00	$ -
20	Temporary Traffic Signal	-	LS	$ 25,000.00	$ -
21	Adjust Sanitary Sewer Manhole Elevation	-	EA	$ 2,500.00	$ -
				TOTAL	**$ 39,250.00**
			Mobilization	10%	$ 3,930.00
			Maintenance of Traffic	20%	$ 7,850.00
			Engineering	10%	$ 3,930.00
			Bonds & Permits	15%	$ 5,890.00
			Contingency	20%	$ 7,850.00
				TOTAL	**$ 68,700.00**
				ROUNDED TOTAL	**$ 69,000.00**

"Bury the Wires and Tame the Traffic"
Waterford, Virginia
PRELIMINARY ENGINEERING STUDY AND CONCEPT PLANS

PRELIMINARY ESTIMATES OF PROJECT COSTS

TRAFFIC CALMING AND ROADWAY IMPROVEMENTS

LOWER MAIN STREET - Second Street to First Street

	ITEM	QUANTITY	UNIT	UNIT PRICE	COST
1	Excavation	515	CY	$ 16.00	$ 8,240.00
2	Embankment	60	CY	$ 20.00	$ 1,200.00
3	Sawcut and Remove Asphalt Pavement	500	SY	$ 5.00	$ 2,500.00
4	Mill Existing Pavement	1,530	SY	$ 4.00	$ 6,120.00
5	8" Aggregate Base	490	SY	$ 10.00	$ 4,900.00
6	4" Asphalt Base Course	-	SY	$ 15.00	$ -
7	2" Asphalt Pavement	1,530	SY	$ 8.00	$ 12,240.00
8	2" Asphalt Stabilized Open-Graded Gravel	490	SY	$ 4.00	$ 1,960.00
9	Granite Curb	1,500	LF	$ 40.00	$ 60,000.00
10	Brick Pavers	-	SF	$ 15.00	$ -
11	Concrete Pavers	490	SY	$ 45.00	$ 22,050.00
12	4' Concrete Sidewalk	-	LF	$ 25.00	$ -
13	Brick Sidewalk	3,600	SF	$ 8.00	$ 28,800.00
14	Gravel Path	-	SY	$ 1.50	$ -
15	Gravel Parking Lot	-	SY	$ 18.00	$ -
16	Seed and Mulch	180	SY	$ 2.00	$ 360.00
17	Landscaping	1	LS	$ 5,000.00	$ 5,000.00
18	2' Stone Wall	-	LF	$ 40.00	$ -
19	Stone-faced bridge	1	LS	$ 96,000.00	$ 96,000.00
20	Temporary Traffic Signal	1	LS	$ 25,000.00	$ 25,000.00
21	Adjust Sanitary Sewer Manhole Elevation	4	EA	$ 2,500.00	$ 10,000.00
				TOTAL	**$ 284,370.00**
			Mobilization	10%	$ 28,440.00
			Maintenance of Traffic	50%	$ 142,190.00
			Engineering	5%	$ 14,220.00
			Bonds & Permits	15%	$ 42,660.00
			Contingency	20%	$ 56,880.00
				TOTAL	**$ 568,760.00**
				ROUNDED TOTAL	**$ 569,000.00**

"Bury the Wires and Tame the Traffic"
Waterford, Virginia
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PRELIMINARY ESTIMATES OF PROJECT COSTS

TRAFFIC CALMING AND ROADWAY IMPROVEMENTS

FIRST STREET - Main Street/First Street/Liggett Intersection

	ITEM	QUANTITY	UNIT	UNIT PRICE	COST
1	Excavation	100	CY	$ 16.00	$ 1,600.00
2	Embankment	20	CY	$ 20.00	$ 400.00
3	Sawcut and Remove Asphalt Pavement	46	SY	$ 5.00	$ 230.00
4	Mill Existing Pavement	860	SY	$ 4.00	$ 3,440.00
5	8" Aggregate Base	145	SY	$ 10.00	$ 1,450.00
6	4" Asphalt Base Course	65	SY	$ 15.00	$ 975.00
7	2" Asphalt Pavement	925	SY	$ 8.00	$ 7,400.00
8	2" Asphalt Stabilized Open-Graded Gravel	80	SY	$ 4.00	$ 320.00
9	Granite Curb	-	LF	$ 40.00	$ -
10	Brick Pavers	-	SF	$ 15.00	$ -
11	Concrete Pavers	80	SY	$ 45.00	$ 3,600.00
12	4' Concrete Sidewalk	-	LF	$ 25.00	$ -
13	Brick Sidewalk	-	SF	$ 8.00	$ -
14	Gravel Path	50	SY	$ 1.50	$ 75.00
15	Gravel Parking Lot	-	SY	$ 18.00	$ -
16	Seed and Mulch	180	SY	$ 2.00	$ 360.00
17	Landscaping	1	LS	$ 1,500.00	$ 1,500.00
18	2' Stone Wall	-	LF	$ 40.00	$ -
19	Stone-faced bridge	-	LS	$ 96,000.00	$ -
20	Temporary Traffic Signal	-	LS	$ 25,000.00	$ -
21	Adjust Sanitary Sewer Manhole Elevation	2	EA	$ 2,500.00	$ 5,000.00
				TOTAL	**$ 26,350.00**
			Mobilization	10%	$ 2,640.00
			Maintenance of Traffic	25%	$ 6,590.00
			Engineering	10%	$ 2,640.00
			Bonds & Permits	15%	$ 3,960.00
			Contingency	20%	$ 5,270.00
				TOTAL	**$ 47,450.00**
				ROUNDED TOTAL	**$ 48,000.00**

"Bury the Wires and Tame the Traffic"
Waterford, Virginia
PRELIMINARY ENGINEERING STUDY AND CONCEPT PLANS

PRELIMINARY ESTIMATES OF PROJECT COSTS

TRAFFIC CALMING AND ROADWAY IMPROVEMENTS

FIRST STREET - Catoctin Creek to Old Waterford Mill

	ITEM	QUANTITY	UNIT	UNIT PRICE	COST
1	Excavation	45	CY	$ 16.00	$ 720.00
2	Embankment	10	CY	$ 20.00	$ 200.00
3	Sawcut and Remove Asphalt Pavement	330	SY	$ 5.00	$ 1,650.00
4	Mill Existing Pavement	555	SY	$ 4.00	$ 2,220.00
5	8" Aggregate Base	350	SY	$ 10.00	$ 3,500.00
6	4" Asphalt Base Course	170	SY	$ 15.00	$ 2,550.00
7	2" Asphalt Pavement	725	SY	$ 8.00	$ 5,800.00
8	2" Asphalt Stabilized Open-Graded Gravel	180	SY	$ 4.00	$ 720.00
9	Granite Curb	-	LF	$ 40.00	$ -
10	Pavement Markings	100	LF	$ 1.50	$ 150.00
11	Brick Pavers	-	SF	$ 15.00	$ -
12	Concrete Pavers	180	SY	$ 45.00	$ 8,100.00
13	4' Concrete Sidewalk	-	LF	$ 25.00	$ -
14	Brick Sidewalk	-	SF	$ 8.00	$ -
15	Gravel Path	-	SY	$ 1.50	$ -
16	Gravel Parking Lot	-	SY	$ 18.00	$ -
17	Seed and Mulch	160	SY	$ 2.00	$ 320.00
18	Landscaping	1	LS	$ 1,500.00	$ 1,500.00
19	2' Stone Wall	-	LF	$ 40.00	$ -
20	Temporary Traffic Signal	-	LS	$ 25,000.00	$ -
21	Adjust Sanitary Sewer Manhole Elevation	-	EA	$ 2,500.00	$ -
					$ 27,430.00
				TOTAL	**$ 54,860.00**

Mobilization	10%	$	5,490.00
Maintenance of Traffic	25%	$	13,720.00
Engineering	10%	$	5,490.00
Bonds & Permits	15%	$	8,230.00
Contingency	20%	$	10,980.00
TOTAL		**$**	**98,770.00**
ROUNDED TOTAL		**$**	**99,000.00**

"Bury the Wires and Tame the Traffic"
Waterford, Virginia
PRELIMINARY ENGINEERING STUDY AND CONCEPT PLANS

PRELIMINARY ESTIMATES OF PROJECT COSTS

TRAFFIC CALMING AND ROADWAY IMPROVEMENTS

WATER STREET - Main Street to Loyalty Road

	ITEM	QUANTITY	UNIT	UNIT PRICE	COST
1	Excavation	70	CY	$ 16.00	$ 1,120.00
2	Embankment	10	CY	$ 20.00	$ 200.00
3	Sawcut and Remove Asphalt Pavement	-	SY	$ 5.00	$ -
4	Mill Existing Pavement	1,320	SY	$ 4.00	$ 5,280.00
5	8" Aggregate Base	125	SY	$ 10.00	$ 1,250.00
6	4" Asphalt Base Course	-	SY	$ 15.00	$ -
7	2" Asphalt Pavement	1,320	SY	$ 8.00	$ 10,560.00
8	2" Asphalt Stabilized Open-Graded Gravel	125	SY	$ 4.00	$ 500.00
9	Granite Curb	-	LF	$ 40.00	$ -
10	Brick Pavers	-	SF	$ 15.00	$ -
11	Concrete Pavers	125	SY	$ 45.00	$ 5,625.00
12	4' Concrete Sidewalk	-	LF	$ 25.00	$ -
13	Brick Sidewalk	-	SF	$ 8.00	$ -
14	Gravel Path	420	SY	$ 1.50	$ 630.00
15	Gravel Parking Lot	-	SY	$ 18.00	$ -
16	Seed and Mulch	1,025	SY	$ 2.00	$ 2,050.00
17	Landscaping	1	LS	$ 2,000.00	$ 2,000.00
18	2' Stone Wall	-	LF	$ 40.00	$ -
19	Stone-faced bridge	1	LS	$ 96,000.00	$ 96,000.00
20	Temporary Traffic Signal	-	LS	$ 25,000.00	$ -
21	Adjust Sanitary Sewer Manhole Elevation	3	EA	$ 2,500.00	$ 7,500.00
				TOTAL	**$ 132,715.00**
			Mobilization	10%	$ 13,280.00
			Maintenance of Traffic	20%	$ 26,550.00
			Engineering	10%	$ 13,280.00
			Bonds & Permits	15%	$ 19,910.00
			Contingency	20%	$ 26,550.00
				TOTAL	**$ 232,285.00**
				ROUNDED TOTAL	**$ 233,000.00**

"Bury the Wires and Tame the Traffic"
Waterford, Virginia
PRELIMINARY ENGINEERING STUDY AND CONCEPT PLANS

PRELIMINARY ESTIMATES OF PROJECT COSTS

TRAFFIC CALMING AND ROADWAY IMPROVEMENTS

BUTCHERS ROW - Butchers Row/Water Street/Loyalty Road Intersection

	ITEM	QUANTITY	UNIT	UNIT PRICE	COST
1	Excavation	85	CY	$ 16.00	$ 1,360.00
2	Embankment	20	CY	$ 20.00	$ 400.00
3	Sawcut and Remove Asphalt Pavement	-	SY	$ 5.00	$ -
4	Mill Existing Pavement	725	SY	$ 4.00	$ 2,900.00
5	8" Aggregate Base	170	SY	$ 10.00	$ 1,700.00
6	4" Asphalt Base Course	-	SY	$ 15.00	$ -
7	2" Asphalt Pavement	725	SY	$ 8.00	$ 5,800.00
8	2" Asphalt Stabilized Open-Graded Gravel	170	SY	$ 4.00	$ 680.00
9	Granite Curb	-	LF	$ 40.00	$ -
10	Brick Pavers	-	SF	$ 15.00	$ -
11	Concrete Pavers	170	SY	$ 45.00	$ 7,650.00
12	4' Concrete Sidewalk	-	LF	$ 25.00	$ -
13	Brick Sidewalk	-	SF	$ 8.00	$ -
14	Gravel Path	68	SY	$ 1.50	$ 102.00
15	Gravel Parking Lot	-	SY	$ 18.00	$ -
16	Seed and Mulch	270	SY	$ 2.00	$ 540.00
17	Landscaping	1	LS	$ 3,000.00	$ 3,000.00
18	2' Stone Wall	50	LF	$ 40.00	$ 2,000.00
19	Stone-faced bridge	-	LS	$ 96,000.00	$ -
20	Temporary Traffic Signal	-	LS	$ 25,000.00	$ -
21	Adjust Sanitary Sewer Manhole Elevation	3	EA	$ 2,500.00	$ 7,500.00
				TOTAL	**$ 33,632.00**
				Mobilization 10%	$ 3,370.00
				Maintenance of Traffic 40%	$ 13,460.00
				Engineering 10%	$ 3,370.00
				Bonds & Permits 15%	$ 5,050.00
				Contingency 20%	$ 6,730.00
				TOTAL	**$ 65,612.00**
				ROUNDED TOTAL	**$ 66,000.00**

"Bury the Wires and Tame the Traffic"
Waterford, Virginia
PRELIMINARY ENGINEERING STUDY AND CONCEPT PLANS

PRELIMINARY ESTIMATES OF PROJECT COSTS

TRAFFIC CALMING AND ROADWAY IMPROVEMENTS

LOYALTY ROAD - Butchers Row to North of Brown's Lane

	ITEM	QUANTITY	UNIT	UNIT PRICE	COST
1	Excavation	25	CY	$ 16.00	$ 400.00
2	Embankment	10	CY	$ 20.00	$ 200.00
3	Sawcut and Remove Asphalt Pavement	-	SY	$ 5.00	$ -
4	Mill Existing Pavement	2,445	SY	$ 4.00	$ 9,780.00
5	8" Aggregate Base	260	SY	$ 10.00	$ 2,600.00
6	4" Asphalt Base Course	-	SY	$ 15.00	$ -
7	2" Asphalt Pavement	2,445	SY	$ 8.00	$ 19,560.00
8	2" Asphalt Stabilized Open-Graded Gravel	260	SY	$ 4.00	$ 1,040.00
9	Granite Curb	-	LF	$ 40.00	$ -
10	Brick Pavers	-	SF	$ 15.00	$ -
11	Concrete Pavers	260	SY	$ 45.00	$ 11,700.00
12	4' Concrete Sidewalk	-	LF	$ 25.00	$ -
13	Brick Sidewalk	-	SF	$ 8.00	$ -
14	Gravel Path	300	SY	$ 1.50	$ 450.00
15	Gravel Parking Lot	-	SY	$ 18.00	$ -
16	Seed and Mulch	400	SY	$ 2.00	$ 800.00
17	Landscaping	1	LS	$ 4,000.00	$ 4,000.00
18	2' Stone Wall	-	LF	$ 40.00	$ -
19	Stone-faced bridge	-	LS	$ 96,000.00	$ -
20	Traffic Signal @ School	1	LS	$ 25,000.00	$ 25,000.00
21	Adjust Sanitary Sewer Manhole Elevation	2	EA	$ 2,500.00	$ 5,000.00
				TOTAL	**$ 80,530.00**
			Mobilization	10%	$ 8,060.00
			Maintenance of Traffic	20%	$ 16,110.00
			Engineering	5%	$ 4,030.00
			Bonds & Permits	10%	$ 8,060.00
			Contingency	10%	$ 8,060.00
				TOTAL	**$ 124,850.00**
				ROUNDED TOTAL	**$ 125,000.00**

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TRAFFIC CALMING AND ROADWAY IMPROVEMENTS

ALTERNATE 1 - Mill and overlay streets not part of previous projects

	ITEM	QUANTITY	UNIT	UNIT PRICE	COST
1	Excavation	-	CY	$ 16.00	$ -
2	Embankment	-	CY	$ 20.00	$ -
3	Sawcut and Remove Asphalt Pavement	-	SY	$ 5.00	$ -
4	Mill Existing Pavement	15,000	SY	$ 4.00	$ 60,000.00
5	8" Aggregate Base	-	SY	$ 10.00	$ -
6	4" Asphalt Base Course	-	SY	$ 15.00	$ -
7	2" Asphalt Pavement	15,000	SY	$ 8.00	$ 120,000.00
8	2" Asphalt Stabilized Open-Graded Gravel	-	SY	$ 4.00	$ -
9	Granite Curb	-	LF	$ 40.00	$ -
10	Brick Pavers	-	SF	$ 15.00	$ -
11	Concrete Pavers	-	SY	$ 45.00	$ -
12	4' Concrete Sidewalk	-	LF	$ 25.00	$ -
13	Brick Sidewalk	-	SF	$ 8.00	$ -
14	Gravel Path	-	SY	$ 1.50	$ -
15	Gravel Parking Lot	-	SY	$ 18.00	$ -
16	Seed and Mulch	-	SY	$ 2.00	$ -
17	Landscaping	-	LS	$ -	$ -
18	2' Stone Wall	-	LF	$ 40.00	$ -
19	Stone-faced bridge	-	LS	$ 96,000.00	$ -
20	Regrade Ditch	-	LF	$ 6.50	$ -
21	Concrete Valley Gutter	-	LF	$ 15.00	$ -
22	Curb Inlet	-	EA	$ 2,500.00	$ -
23	Grate Inlet (DI-12)	-	EA	$ 1,200.00	$ -
24	24" RCP	-	LF	$ 40.00	$ -
25	18" RCP	-	LF	$ 28.00	$ -
26	12" RCP	-	LF	$ 22.00	$ -
27	2' Headwall	-	EA	$ 1,500.00	$ -
28	Stone Outfall Treatment	-	EA	$ 500.00	$ -
29	Temporary Traffic Signal	-	LS	$ 25,000.00	$ -
30	Adjust Sanitary Sewer Manhole Elevation	-	EA	$ 2,500.00	$ -
				TOTAL	**$ 180,000.00**
			Mobilization	10%	$ 18,000.00
			Maintenance of Traffic	25%	$ 45,000.00
			Engineering	10%	$ 18,000.00
			Bonds & Permits	15%	$ 27,000.00
			Contingency	20%	$ 36,000.00
				TOTAL	**$ 324,000.00**

Village of Waterford
"Tame the Traffic/ Bury the Wires"
Stormwater Management - Preliminary Cost Estimate

Item	Unit	Unit Cost	Quantity	Total
General				
Mobilization	EA	$5,500.00	1	$5,500
Field Office	EA	$2,500.00	1	$2,500
Ditch Improvements				
Rough/Fine Grading	SY	$2.28	5697	$12,989
Sodding	SY	$5.00	5697	$28,485
Storm Sewer Improvements				
Install/Replace Storm Sewer	LF	$52.53	3150	$165,470
Install Trench Drain	LF	$46.00	856	$39,376
Trench Dewatering	LF	$9.45	3750	$35,438
Select Backfill	LF	$6.83	3750	$25,613
End Sections	EA	$672.00	9	$6,048
Manholes	EA	$1,992.00	3	$11,952
Rip-Rap	SY	$44.88	100	$8,976
Inlet Structures	EA	$4,050.00	30	$121,500
Exisiting Pond Improvements				
Improve pond to BMP Facility	EA	$45,000.00	1	$45,000

TOTAL:	$508,846
+20% CONTINGENCIES:	$101,769
GRAND TOTAL:	$610,700
ROUNDED TOTAL:	$600,000

Notes:
1. Estimate assumes that traffic calming and other roadway improvements will be done in conjunction with drainage improvements.
2. Any design, mobilization, maintenance of traffic, bonds, and permits will be paid by other portions of the "tame the traffic" project.

"Bury the Wires and Tame the Traffic"
Waterford, Virginia
PRELIMINARY ENGINEERING STUDY AND CONCEPT PLANS
PRELIMINARY ESTIMATES OF PROJECT COSTS

ELECTRICAL - PRELIMINARY PLANNING COST ESTIMATE		
Single Phase ≈ 12,000 feet (Estimate 185 services)		
PVC Conduit, 4" x 2, $12/ft. (w/fittings)	$	144,000
Trenching, 36" deep, w/backfill $6.00 ft.	$	72,000
Conductors (# 1/10 w/ground) (2 cables) $5 ft.	$	120,000
Transformers; estimate 37 @ $50,000	$	1,850,000
Tap Switching estimate 5 @ $30,000	$	150,000
Man Holes @ 500 o.c. 24 x $8,000 each (including prep & splice)	$	192,000
Demo O.H. service @ #20 ft.	$	240,000
Subtotal: 1 Φ Service	$	2,768,000
Three Phase Service ≈ 4,000 ft.		
PVC Conduit, 4" x 2, $12/ft. (w/fittings)	$	96,000
Trenching, 36" deep, w/backfill @ $6.00	$	24,000
Conductors Δ (3Φ) (3 cables)	$	60,000
Manholes @ 500 8 x $8,000 (Including prep & splicing)	$	64,000
Transistion @ closure station (x 2) (Misc. Transistion Equip.)	$	100,000
Transformer @ school	$	60,000
1 Φ taps @ school for trailers (2 @ $30,000)	$	60,000
Subtotal: 3 Φ Distribution	$	464,000
Subtotal - Electrical	$	3,232,000
Mobilization 20%	$	646,400
Engineering / Construction Admin 12%	$	387,840
Bonds, Permits, and Easements 20%	$	646,400
Contingency 25%	$	808,000
Total - Electrical	$	5,720,640
Rounded Total - Electrical	**$**	**5,700,000**

TELEPHONE - PRELIMINARY PLANNING COST ESTIMATE		
Assume 50% of Electrical Estimate	$	2,860,320
Rounded Total - Telephone	**$**	**2,900,000**

LIGHTING - PRELIMINARY PLANNING COST ESTIMATE		
Lighting @ $4,000 x 80 total lights	$	320,000
Install @ $2,500 x 80 total lights	$	200,000
Subtotal - Lighting	$	520,000
Engineering / Construction Admin 10%	$	52,000
Contingency 20%	$	104,000
Total - Lighting	$	676,000
Rounded Total - Roadway and Pedestrian Lighting	**$**	**700,000**

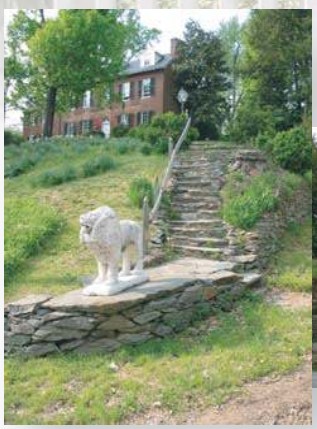
Notes:
1. Preliminary cost estimate is not to be construed as a final construction level estimate.
2. Cost includes install of duct bank and spare conduits.
3. Costs assume construction will be accomplished in concert with traffic calming, roadway, and drainage improvements in the Village of Waterford.

"Bury the Wires and Tame the Traffic"
Waterford, Virginia
PRELIMINARY ENGINEERING STUDY AND CONCEPT PLANS
PRELIMINARY ESTIMATES OF PROJECT COSTS

PRELIMINARY COST ESTIMATE *
ELECTRICAL/TELEPHONE SERVICE CONNECTIONS

Potential Easements (estimate 185 services)		
Utility Company recording cost of each easement x $30 ea.	$	5,550.00
Right of way engineering per easement x $50 ea	$	9,250.00
Utility Company drafting / planning x $75 ea	$	13,875.00
Subtotal - Easements	$	28,675.00
Legal Fees, County Fees, Contingencies, etc. (50%)	$	14,337.50
Total Estimate - Easements	**$**	**43,012.50**
Simple Service Connection		
Telephone Connection (Lump Sum)	$	300.00
Conductors; Direct Bury Type SE; 100 feet; 200 ampere	$	900.00
200 Ampere Meter	$	300.00
Demolition of old service: Lump sum	$	250.00
Minor Siding Repair	$	150.00
Subtotal - Simple Service Connection	$	1,900.00
Engineering, Fees, Contingencies, etc. (50%)	$	950.00
Total - One Service Connection	**$**	**2,850.00**
Anticipated Typical Service Connection		
Telephone Connection (Lump Sum)	$	300.00
Conductors; Direct Bury Type SE; 100 Feet; 200 ampere	$	900.00
200 Ampere Meter	$	300.00
Demolition of old service: Lump Sum	$	400.00
Siding and Pavement Repair	$	600.00
Subtotal - Typical Service Connection	$	2,500.00
Engineering, Fees, Contingencies, etc. (50%)	$	1,250.00
Total - One Typical Service Connection	**$**	**3,750.00**
Complex Service Connection		
Telephone Connection (Lump Sum)	$	400.00
Conductors; Direct Bury Type SE; 200 Feet; 200 Ampere	$	1,800.00
200 Ampere Meter	$	300.00
Demolition of old service: Lump sum	$	500.00
Siding and Pavement Repair	$	1,000.00
House mounted pullbox	$	150.00
Subtotal - Complex Service Connection	$	4,150.00
Engineering, Fees, Contingencies, etc. (50%)	$	2,075.00
Total - One Complex Service Connection	**$**	**6,225.00**
SUMMARY - ELECTRICAL / TELEPHONE SERVICE CONNECTIONS		
Easements (estimate 185)	$	43,012.50
Simple Service Connections (estimate 60)	$	171,000.00
Typical Service Connections (estimate 85)	$	318,750.00
Complex Service Connections (estimate 40)	$	249,000.00
TOTAL SERVICE CONNECTIONS AND EASEMENTS	$	781,762.50
ROUNDED TOTAL	$	800,000.00

* This document is not to be construed as a final construction level estimate. It is a preliminary estimate based on general information known to date.



OCTOBER 2003

Bury the Wires and Tame the Traffic
Village of Waterford, Virginia

Kimley-Horn
and Associates, Inc.

Binder Inserts:
Front Cover
Back Cover
Spine

Waterford

Photo by Laura L. Shaw

"Bury the Wires and Tame the Traffic"

Waterford, Virginia

Preliminary Engineering Study and Concept Plans

FINAL REPORT

Prepared for:
Loudoun County, Virginia

Prepared by:

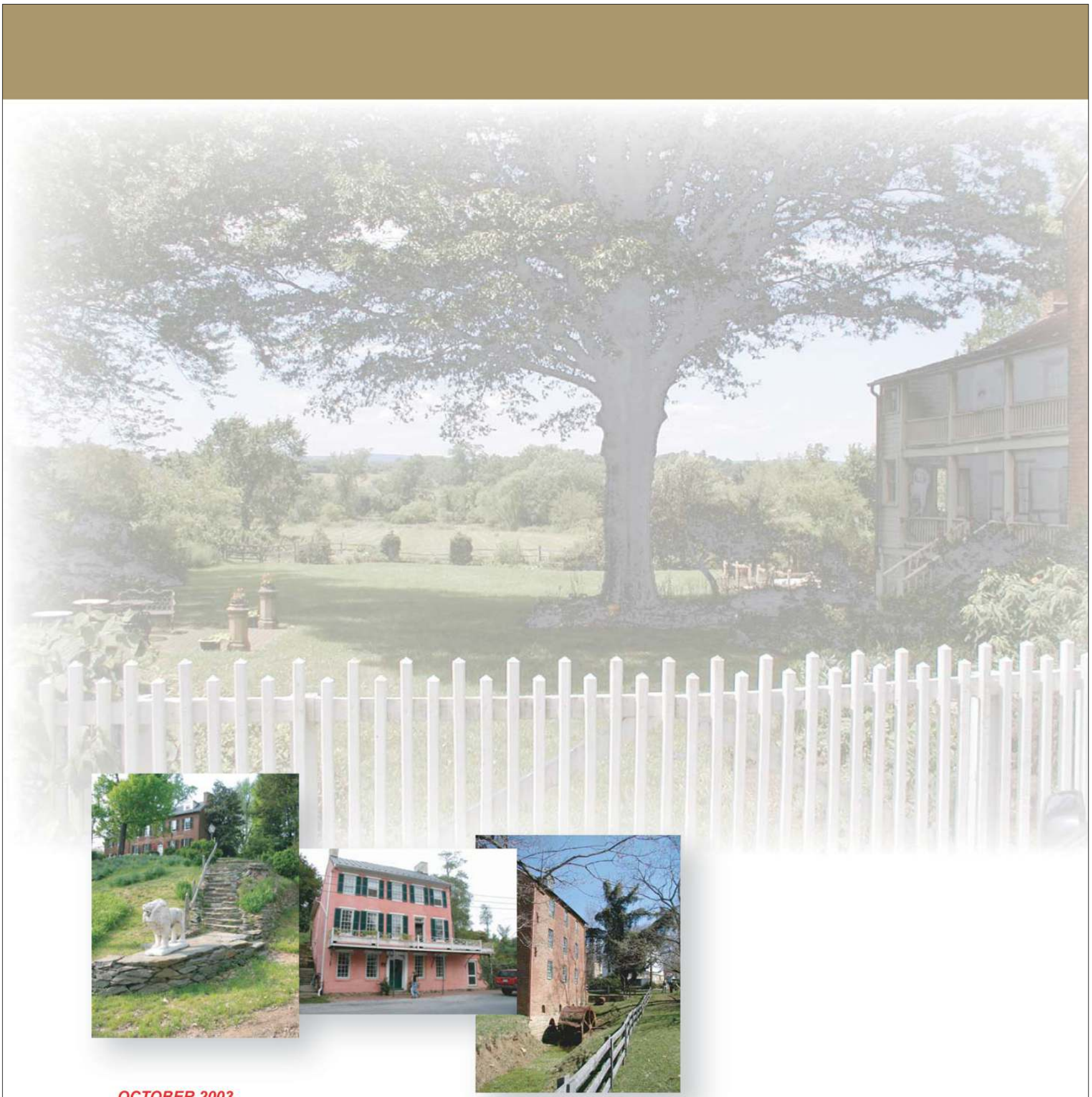
Kimley-Horn and Associates, Inc.

with:

B2E Consulting Engineers, P.C.
William H. Gordon Associates, Inc.
Williamsburg Environmental Group, Inc.
The Louis Berger Group, Inc.
Walkable Communities, Inc.

in coordination with
Waterford Foundation, Inc.
Waterford Citizens Association
Waterford Elementary School Parent Teacher Organization

OCTOBER 2003



OCTOBER 2003

Bury the Wires and Tame the Traffic
Village of Waterford, Virginia

Kimley-Horn and Associates, Inc.

Waterford

"Bury the Wires and Tame the Traffic"

Preliminary Engineering Study and Concept Plans

Final Report

Kimley-Horn and Associates, Inc.

Waterford

"Bury the Wires and Tame the Traffic"

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