

APPENDIX C – ACCESS MANAGEMENT STANDARDS AND MAINEDOT PERMITS

C.1 Access Management

Highways are principal transportation routes that accommodate many different types of trips, among them longer distance trips between towns and other distant destinations. Because they are the primary corridors for longer distance automobile and truck travel, highways are often designed to move traffic quickly. Nonetheless, many highways (with the exception of Interstate Highways, the Maine Turnpike, and other fully access-controlled routes) also provide access to abutting parcels to various degrees. Therefore, maintaining the efficiency and safety of highways is in part related to existing and proposed land use activity along those highways and how access to such activity is managed.

The frequency, location and configuration of access points (i.e., driveways or entrance roads) influence many aspects of a highway's performance and character. Access points, particularly those requiring left turns, can disrupt traffic flow and increase the potential for crashes. In densely developed areas with frequent access points, trips entering or exiting the highway can worsen congestion and increase crashes. In less developed areas where posted speeds are high (like Bath Road), occasional turning vehicles can be unexpected and crashes can be more severe. Management of how access is provided can address these safety and congestion issues, and also help communities preserve rural or historic character where appropriate to do so.

While the MaineDOT administers an access management program outside a municipality's urban compact area, ultimate responsibility and authority for the implementation of land use and access management in Maine lies primarily with the municipalities. Bath Road lies outside the urban compact area and therefore MaineDOT administers access permits. This Plan includes an introduction to access management; local and state access management processes and standards; an introduction to the MaineDOT Traffic Movement Permit process; and examples of best-practices solutions.

This Plan does not identify specific recommendations on how to correct existing deficiencies, but provides the framework for how driveway design is an important part of a healthy transportation corridor and what factors will need to be considered during the development process for a local site plan or Traffic Movement Permit approval.

C.2 Introduction to Access Management

Access Management is a set of techniques used to preserve highway capacity, manage highway congestion and reduce crashes. Examples include:

- Traffic signal spacing;
- Driveway location, spacing, and design;
- Use of service and frontage roads; and
- Land Use policies that control right-of-way access to highways.

Specific benefits of Access Management include:

- Preserve integrity of the roadway system
- Improve safety and highway capacity
- Extend *functional* life of the roadways
- Preserve public investment in infrastructure
- Preserve private investment in properties
- Provide a more efficient (and predictable) motorist experience
- Improve "thru" times through a corridor
- Improve aesthetics (less pavement, more green)

C.3 Town of Wiscasset and MaineDOT Driveway Standards

The following summarizes existing driveway design and construction standards per the Town of Wiscasset and MaineDOT.

Town of Wiscasset Ordinance (Site Plan Standards)

- Access into site. Vehicular access to and egress from the development shall be safe and convenient.
 - Any driveway or proposed street shall be designed so as to provide at least the minimum sight distance as noted below:

Posted Highway Speed (MPH)	Minimum Sight Distance (in feet)	MaineDOT (in feet)
2	25	20
3	30	25
3	35	30
4	40	36
4	45	42
5	50	49
5	55	57

- Points of access and egress shall be located to avoid hazardous conflict with existing turning movements and traffic flows.
- The grade of any proposed drive or street shall not be more than plus or minus 3% for a minimum of 40 feet, from the edge of travel way.
- The intersection of any access/egress drive or proposed street shall function at Level of Service D or better following development if the project will generate 100 or more peak hour trips or at a level which will allow safe access into and out of the project if less than 100 peak hour trips are generated.
- Where a lot has frontage on two or more streets, the primary access to and egress from the lot shall be provided from the street where there is less potential for traffic congestion and for traffic and pedestrian hazards. Access from other streets may be allowed by the Planning Board if it finds if it is safe and does not promote shortcutting through the site.
- Where it is necessary to safeguard against hazards to traffic and pedestrians and/or to avoid traffic congestion, and if required by the MaineDOT or if recommended by a traffic engineer, the Planning Board in consultation with the appropriate town official may require the applicant to provide turning lanes, traffic directional islands and traffic controls within public streets.
- Accessways shall be designed and have sufficient capacity to avoid queuing of entering vehicles on any public street.

- The following criteria shall be used to limit the number of accessways serving a proposed project:
 - No use which generates fewer than 100 vehicle trips per day shall have more than one two-way driveway onto a single roadway. Such accessway shall be no greater than 30 feet wide.
 - No use which generates 100 or more vehicle trips per day shall have more than two points of entry from and two points of egress to a single roadway. The combined width of all accessways shall not exceed 60 feet.
- Accessway location and spacing. Accessways shall meet the following standards:
 - Private entrances/exits shall be located at least 50 feet from the closest unsignalized intersection and 150 feet from the closest signalized intersection, as measured from the edge of the private entrances/exits to the edge of the intersection, excluding radii. This requirement may be reduced if the shape of the site does not allow conformance with this standard.
 - Private accessways in or out of a development shall be separated by a minimum of 75 feet where possible.

MaineDOT Standards (See <http://www.maine.gov/mdot/ppp/accessmgmt/index.htm>)

The following summarizes MaineDOT driveway standards per their Highway Driveway and Entrance Rules as they apply to Bath Road, which is characterized as a Retrograde Arterial. A Retrograde Arterial is defined by MaineDOT as a Mobility Arterial having an access-related crash-per-mile rate exceeding the 1999 statewide average for arterial highways of the same posted speed limit. A Mobility Arterial is defined as an arterial highway not located within an Urban Compact Area (none in Wiscasset) that has a posted speed limit of 40 mph or more and is:

- (1) Part of an arterial corridor located between Urban Compact Areas or Service Centers that carries an average annual daily traffic of at least 5,000 vehicles per day for at least 50% of its length, or
 - (2) Is part of a Retrograde Arterial Corridor located between Mobility Arterials described in (1).
- Number of Driveways - Except for forestry management and farming activities, lots on Mobility Arterials will be limited to one two-way or two one-way entrances, unless a waiver is granted.
 - Corner Clearance (distance to an intersection) - Mobility Arterial Corner Clearance. The minimum corner clearance for entrances onto Mobility Arterials must be no less than 125 feet.
 - Driveway Spacing

Minimum Entrance Posted Speed (MPH)	Spacing Standards Entrance Separation (Feet)
25 or less	Not applicable
30	Not applicable
35	Not applicable
40	175
45	265
50	350
55 or more	525

- Sight Distance (Mobility Corridor)

Applicable Speed (MPH)	Sight Distance (Feet)
20	Not applicable
25	Not applicable
30	Not applicable
35	Not applicable
40	580
45	710
50	840
55	990
60	1,150

- Driveway Width - If 30% or less of the traffic projected to use the proposed entrance will be larger vehicles, the width of a two-way entrance within the highway right of way must be between 22 and 30 feet inclusive, unless a waiver is granted. If more than 30% of the traffic projected to use the proposed entrance will be larger vehicles, the width of a two-way entrance within the highway right of way must be between 30 and 42 feet.
- Double Frontage Lots. Unless a waiver is granted, entrances for lots with frontage on a Non-compact Arterial and another public way will be restricted to the other public way, unless MaineDOT determines that queuing of traffic using an entrance off the other public way would interfere with traffic on the Non-compact Arterial due to insufficient lot frontage along the other public way. If the other public way is a mobility or retrograde arterial the entrance must be located on the highway frontage that allows the intent of this rule to be most effectively and efficiently met.

The following notes key differences between Town and MaineDOT standards. The more stringent rules apply.

- Sight Distance – MaineDOT sight distance standards are less than Town requirements with the exception of roads with a speed limit of 55 mph.
- Number of Driveways – MaineDOT limits lots to one two-way driveway or two one-way driveways. The Town allows for two driveways for developments that generate 100 or more daily vehicle trips.

- Corner Clearance – MaineDOT requires 125 feet of corner clearance while the Town requires 50 feet of clearance to an unsignalized intersection and 150 feet to a signalized intersection.
- Driveway Spacing - MaineDOT standards are greater than Town requirements. For 45 mph (the most common speed limit in the study area), MaineDOT requires 265 feet of separation while the Town requires 75 feet.

C.4 MaineDOT Driveway / Entrance Permits

A MaineDOT Driveway or Entrance permit is required under the following criteria.

- Driveways: less than 50 passenger car equivalents (PCE) per day. Examples:
 - Up to 5 dwelling units
 - Home-based occupations
 - Forest management & farming
 - Low-impact industrial (i.e., substations)
- Entrances: more than 50 PCEs/Day. Examples:
 - Over 5 dwelling units and housing developments
 - Retail, office or service business including department store, strip mall, convenience store, gas station, auto repair shop, restaurant, etc.

MaineDOT Access Management Rules

- Applies to State and State-Aid Highways (Bath Road) to:
 - Preserve Mobility
 - Preserve Safety
 - Reduce Negative Drainage impacts
 - Preserve Economic Productivity Related to Highways
 - Avoid Long-Term Cost of Adding New Highway Capacity
- Excludes Portions of highways located inside Urban Compact limits

Applicability

- Changes to access location, width, cross-section, grade or drainage characteristics
- Change in Use: Activity that will result in
 - Intermittent or seasonal use becoming permanent or year-round use
 - Increase in daily traffic from under 50 Passenger Car Equivalents PCE/Day or 99 PCE/Hour
 - Significant drainage risk
 - Exclusion - Change in ownership only

Three Levels

- Basic (Lower Classification Roads through Major Collectors)
- Mobility Arterials
 - Posted Speeds of 40 MPH or Greater
 - AADT of 5,000 or more
- Retrograde Arterials (incl. US Route 1 – Bath Road)
 - Mobility Arterials having Access-Related Crash Rates greater than the 1999 Statewide Average for Similar Arterials
 - Applicant must Avoid, Minimize or Mitigate Reduction in Safety or Posted Speed Limit

Design Considerations

- Sight Distance
- Spacing between Access Points
- Spacing of Access Points to Intersections
- Drainage Impacts
- Mitigation (Retrograde Arterials)
 - Signage, Lighting, Trimming Vegetation, etc.
 - Addition of Shoulders, Turn Lanes, Traffic Signals
 - Changes in Highway Alignment
 - In-Lieu Impact Fee Payments (Town or State)

Access Management Waivers

- Criteria that can be waived for reason
 - Access point spacing
 - Spacing from access points to intersections
 - Traffic signal spacing
 - Mobility Sight Distances
- Criteria that cannot be waived
 - Safety Sight Distances

C.5 MaineDOT Traffic Movement Permit Process

For developments that generate significant traffic levels, a Traffic Movement Permit (TMP) may be required. In many cases the TMP requires developers to prepare a traffic impact study assessing the impact the project may have on the public street system. Details of the TMP process are noted as follows.

Traffic Movement Permit (TMP) required:

- Project abuts any (public or private) road, and
- Project includes any construction, alteration or conversion of a site, building or development, and
- Adds 100 or more PCEs/ Peak Hour
 - Per ITE Trip Generation Guide
- Exemptions
 - Solid Waste Facility
 - Hazardous Waste Transfer or Storage Facility
 - Waste Oil Storage Facility or Biomedical Waste Facility

Off-Site Traffic Study Area Requirements

- 1st major intersection in each direction from entrances and exits
- Additional intersections where proposed development adds
 - 25 additional left-turns
 - 35 additional through-, right-turn or combined through- and right-turn
 - 35 additional (multiplying left-turn by 1.5) in combined left-turn plus through, or combined left-turn, through- and right-turn

APPENDIX D - MEETING NOTES

Meeting Notes

Bath Road Master Plan

October 4, 2012 Steering Committee

Prepared by: Tom Errico/Mitchell Rasor

Attendees

- Steering Committee
 - Wayne Averil
 - Don Jones
 - Gary Crosby
 - Peter West
 - Troy Cline
 - Heather Pitcher
 - Al Cohen
 - Ed Polewarczyk
 - Judy Colby
 - Laurie Smith
 - Misty Parker
 - Gerry Audibert
- Consultant Staff
 - Robert Faunce
 - Tom Errico
 - Mitchell Rasor

Agenda

- Introductions
- Review Draft Project Schedule
 - Misty reviewed the project schedule and noted that the next Steering Committee meeting would likely be in early December. The study is expected to be completed in May 2013.
 - The SC noted that public meeting schedule changed from prior information. Misty noted that the public meeting schedule was revised to give the public more material substance.
- Draft Mission Statement
 - Mitchell reviewed the draft Mission Statement
 - The SC asked what does adjacent to Bath Road mean? Mitchell noted that in general it included the land parcels that abut Bath Road.
 - The SC discussed the use of the description “auto-oriented” in describing the corridor. A consensus was reached that Bath Road is auto-orientated because of the lack of public transit and pedestrian/cyclist options. Mitchell noted that the plan would be assessing that issue.
 - The SC noted that multi-modal aspect will be a component of the Plan.
- Draft Existing Conditions Information - Transportation
 - Tom presented the existing traffic volume data collected in the corridor. The SC asked why the daily traffic volume at Ward Brook was substantially lower than at Old Bath Road (N). Tom noted that they were

from different years. Additionally, Tom noted that the methods for estimating AADT volumes were different. The Ward Brook location is not factored but an actual AADT, while the Old Bath Road (N) location is factored according to the state-wide factors applied by MaineDOT.

- Tom presented the existing level of service conclusions for both intersections and roadway segments. The SC was surprised that the level of service for Bath Road was 'D' when prior By-Pass studies indicated worse conditions. Gerry noted that the By-Pass conclusions were based upon long-term future growth conditions versus existing conditions.
 - Tom presented vehicle classification information and noted that while on a percent basis it is lower than other major roadways in the State, it has a significant number of trucks (900) on a daily basis.
 - Tom presented crash data and noted that there are no High Crash Locations per MaineDOT criteria in the study area. Tom noted that some segments had a number of collisions and poor access management conditions may be a factor.
 - Tom presented vehicle speed information and noted that speeds are generally consistent with posted speed limits with the exception of north of Old Bath Road where speeds are higher. However, speeds are significantly lower than the posted speed limit in the northbound direction during the PM peak hour due to existing congestion in the village area.
 - Tom presented examples of access management non-conformities (driveway spacing, corner clearance, driveway width, number of driveways). The SC asked how access management can affect traffic mobility and safety. Tom noted that unmanaged driveways have been proven to be a factor in higher crash rates and reduced mobility. Driver confusion is a factor in unsafe roads and impedes traffic flow. Additionally, vehicle turn movements occurring in close proximity to each other can result in higher crash rates and reduced mobility.
- Draft Existing Conditions Information - Zoning, Comprehensive Plan, and Land Use
 - Mitchell noted at the beginning of the presentation that the Town prepared a Comprehensive Plan in 2008 and that the planning process for this study should refer back to relevant recommendations for Bath Road. The recent adoption of the Village 2 District is a good example of implementing a recommendation of the Comprehensive Plan. It addresses the goal of limiting "strip" development from the town line to the village while promoting the appropriate scale and type of development and it introduces new standards for a transition zone to the Historic Village District.
 - Mitchell presented the Existing Conditions and Zoning Analysis Memo stating that the findings were summarized in the following areas: Zoning, Comprehensive Plan and the Land Use Ordinance Analysis; Character Areas; Visual Inventory; Environmental Constraints; and Infrastructure.

- The Comprehensive Plan emphasizes that the Town should prepare a specific Master Plan for Bath Road. This SC is directly related to guiding that effort.
- The primary recommendation from the Comprehensive Plan in regards to Bath Road is that it should not become a non-descript, over developed corridor, but that it should be attractive and diverse, adding to the value of Wiscasset as a tourist destination.
- Mitchell introduced the idea of “Character Areas” – different types and patterns of existing development along Bath Road. The five mapped character areas include: Traditional Roadside Development; New Development; Strip Development; Residential Development; and Residential Mixed Use Development. The SC commented that this was a new perspective of looking at the corridor. The SC noted that this might suggest future growth scenarios, such as a local business district from Grover’s Tire to Birch Point Road, but the SC also does not want to limit property rights.
- The Visual Inventory looked at different existing edge conditions along Bath Road including: Forested Edge; Commercial Edge; Field Edge; Power Lines; and Mixed Residential Edge. A SC member asked for clarification on “edge” and it was clarified that “edge” meant the character directly fronting the right of way.
- Mitchell described how “Objects” were also part of the Visual Inventory with descriptions of different types of signs. Examples included a free standing sign and a business where the extensive visibility of inventory in front of the building was the “sign” of the use, which to some might appear as clutter.
- Mitchell described how another important aspect of the Visual Inventory for Bath Road was the relationship between Sight Lines and Focal Points. Long sight lines are directly related to the nature of the rolling terrain - with low points at the four stream crossings - and general long and straight stretches of road segments that terminate in either developed or undeveloped focal points. The long sight lines – or views – down straight alignments of the corridor create segments that could potentially inform an overall vision for the corridor as a “place” with variations in character. Does a certain segment have a more rural feel with preserved stands of trees fronting Bath Road and does another segment have a more commercial feel with quality architecture, landscaping and signage?

The focal points directly relate to the long sight lines where in the distance the terrain rises and the road turns. These locations might become areas to preserve – such as a stand of trees – or areas where a project may be developed or redeveloped with a visible icon like a tower or steeple. As shown in the analysis, three of the high point / focal points are existing intersections: Route 144, Old Bath Road, and Birch Point Road. These

intersections might become more defined “nodes” providing well-planned access to new development on land not directly fronting Bath Road. In summary, Bath Road is comprised of a series of long sight lines terminating at focal points. The sight lines and focal points should inform the Master Plan, helping to implement the goal of the Comprehensive Plan by creating a diverse and attractive Bath Road rather than strip development from the town line to the village.

- Mitchell noted that an interesting finding from the Sight Lines and Focal Points analysis is that the major high points are located at existing intersections: Route 144; Old Bath Road; and Birch Point Road. It was also noted that the study area has two low points at either end comprised of water: Montsweag Brook and Holbrook Pond.
- In terms of Environmental Constraints it was noted that there is developable land along Bath Road, but the information from the Environmental Constraints Map should ultimately be cross-referenced with other analysis maps and the Comprehensive Plan to develop a better understanding of how the corridor could develop. This information may help the SC formulate a vision for future development potential in the corridor.
- Mitchell presented a map showing that water and sewer serve the area. There are no known capacity issues for future growth scenarios.
- General Comments
 - The SC asked what are the permitting implications of existing LOS's? Are these a limiting factor to take into account now in terms of future land use / capacity? Will you be able to predict traffic mitigating needs from the concept planning and growth scenarios? It was noted there is a specific MaineDOT Traffic Movement Permit process that requires projects to meet LOS standards and to implement mitigation improvements, if necessary. In general, this process focuses on intersections, as intersections generally are the controlling factor in roadway capacity. New organized development patterns may create less curb cuts and more defined intersections that would improve access / capacity coordinating the required traffic improvements, distributing the cost of these improvements, and streamlining permitting for developers.
 - The SC noted that three curb cuts at the Irving Station are needed and closing a curb cut is not recommended.
 - The SC noted that the report/graphics mislabeled the Market Place Plaza.

Meeting Notes

Bath Road Master Plan

December 17, 2012 Steering Committee

Prepared by: Tom Errico/Mitchell Rasor

Attendees

- Steering Committee
 - Wayne Averil
 - Don Jones
 - Gary Crosby
 - Peter West
 - Troy Cline
 - Heather Pitcher
 - Al Cohen
 - Ed Polewarczyk
 - Judy Colby
 - Laurie Smith
 - Misty Parker
 - Gerry Audibert
- Consultant Staff
 - Robert Faunce
 - Tom Errico
 - Mitchell Rasor

Agenda

- Introductions / Project Schedule
 - Misty reviewed the project schedule and noted that the next Steering Committee meeting would be in early February.
- Presentation of Traffic Volume Forecasts and Analysis
 - Tom presented information on the following:
 - Traffic Modeling Methodology.
 - Development assumptions for the Town of Wiscasset and the Bath Road Corridor.
 - PM Peak hour traffic volume changes between 2012 and 2030.
 - Anticipated Levels of service conclusions for intersections and the roadway segment in 2030.
 - Preliminary study area intersection improvement thoughts due to future traffic volume growth.
 - Example development types and their general access needs and traffic generation estimates.
 - Comments/questions from the Steering Committee:
 - What is the HCM 2-Lane analysis? Tom noted that it is an evaluation of the corridor as it relates to the ability of vehicles to travel the posted speed limit and opportunities to pass if slow vehicles are present. HCM is an acronym for Highway Capacity Manual, Transportation Research Board, the national publication on roadway capacity analysis.

- In respect to the example of a Big Box Store located on Bath Road and the levels of service conclusions, it was noted that while they meet MaineDOT permit standards, some movements are approaching unacceptable levels and vehicle queue lengths are very long. It was also noted that the example only illustrates improvement needs at the driveway and that a traffic study would need to evaluate nearby intersections and the study could require off-site mitigation needs.
 - It was noted by staff member that it is not necessarily the size of the development, but the use that determines the level of traffic.
 - Question whether introducing a signal at an intersection like Birch Point Road would just draw more local traffic to that signal, creating more congestion in addition to any new demand in the area. It was noted that shifts in traffic routings could take place due to ease of access onto Bath Road.
 - Question regarding situations where two exit lanes are created for a development how driver can see passed the other car. Noted that in some cases there are ways to stagger stop lines to maintain sight lines.
- Mitchell presented the following:
 - A Review of the “Character Areas” Map
 - A Review of Relevant Comprehensive Plan Goals for Bath Road
 - There was a question as to whether to “grow as a tourist destination” is appropriate. It was noted that while Bath Road is a regional corridor, that it should not lose a sense of local history and uses and that it should be developed in a manner as to not distract from the historic village by becoming anywhere USA. Bath Road accommodates different needs, but it is still part of Wiscasset.
 - It was noted that the “Welcome to Wiscasset” sign is not at the town line, but as one enters the historic village.
 - Presentation of Potential Development Areas
 - There was confusion about the stream buffer noted on the handout. It was noted that there is a buffer and the color copy did not depict it.
 - It was asked what criteria went into selection of the “Potential Development Area” noted on the Map. It was explained that on a “planning level” land areas that did not have environmental constraints such as wetlands, streams, and steep slopes were identified as having potential for development.
 - It was noted that for other land that does have potential environmental constraints, permitting projects become more difficult and specifically needing permits with MaineDEP (Site

Location Permit) and a National Resource Protection (NRPA) permit.

- Presentation of Visuals from other Corridors
 - It was asked whether the “Corridor, Transition, Center” graphic is Wiscasset specific. Mitchell noted that it was not, but that it is relevant to Wiscasset if one thinks in terms of the transition from Village, Village 2, to Bath Road.
- Introduction to Steering Committee Visioning Exercise

The basic structure of the exercise was presented: breakout groups with a facilitator, questions exercise, mapping exercise, and regroup to share thoughts. It was recommended to utilize the Comprehensive Plan goals and the Character Areas Map as resources. It was also noted that this is not a “site planning” exercise, but an exercise in looking ahead to the desired distribution and intensity of residential, retail, and non-retail uses – similar to creating a “future character areas map”.
- Steering Committee Visioning Exercise
 - Question Exercise

The Following questions were asked of the three groups:

1. What are the first words that come to mind when you think of Bath Road?

Summary of Responses:

- Summer traffic
- Dark
- Barren-no trees
- Accidents
- Commercial – anywhere USA
- Sign clutter
- Way it used to be
- Commercial
- Restaurants
- Way to go to Bath
- Traffic
- Franchise
- Unsafe for pedestrians
- Summer cyclists
- Service businesses
- Old local

2. What role does Bath Road play in the community?

Summary of Responses:

- Major corridor
- Connection to coast and south
- Business – services
- Commercial
- Thruway
- Local destination for services – more so than historic village
- Regional

3. What are the pros and cons of how Bath Road has developed?

Summary of Responses:

Pros

- Slow growth
- Most development has stayed
- Still some open space / undeveloped land
- Local businesses
- Convenience businesses
- Job opportunities
- Good mix of uses serving community

Cons

- Random development – parcel by parcel
- Accidents due to summer traffic
- Traffic is haphazard
- Hard to enter Bath Road from side roads
- Difficult to make left turns to side roads
- Road design – adds to congestion
- 1950's / 1960's development planning skipped this area (in comparison to limited access on Route 1 in Woolwich)
- Loss of rural aesthetic
- Need more development along Bath Road

4. If you could go back thirty years, what would you have done differently in planning development along Bath Road?

Summary of Responses:

- Not a regional road – create bypass
- More compact development
- More development with fewer restrictions from State in terms of traffic permits
- Bought more land for private development
- Bought certain properties to protect rural character
- Preserve / replace roadside vegetation
- Reconsider lot size requirements
- More connections between developments to reduce congestion

5. Looking forward, how would you encourage future development while meeting the goals of the adopted Comprehensive Plan?

Summary of Responses:

- Do not try and meet goals of the Comprehensive Plan – let development occur
- Do not impose any design standards
- This is problematic and complex
- Resolve impact fee burden – particularly for smaller businesses
- Try to find ways to protect certain lands from development

○ Mapping Exercise

Each breakout group was given a Potential Development Areas Map and asked to distribute retail, non-retail, and residential uses in the study area.

Each group had to identify the location of:

60 residential units (15 yellow stickies)
50,000 square feet of retail (10 red stickies)
100,000 square feet on non-retail (10 blue stickies)

Summary of Findings

Misty's Group:

Residential

Residential uses were clustered off of Bath Road in two locations: Along the developable area overlooking Montsweag Brook and in an infill area off of Page Avenue. Eight units of housing were located in two distinct areas to the east of Bath Road. In no case were residential uses shown fronting Bath Road. In terms of connectivity, the cluster of homes off of Page Avenue included a new connection to Old Bath Road. It also appears that the cluster of homes overlooking Montsweag Brook would either have common access to a frontage parcel at the Bath Road / Route 144 intersection or Old Bath Road.

Non-Retail

All non-retail uses (100,000 sf) were clustered between the homes overlooking Montsweag Brook and the back of development fronting Bath Road. There was the assumption that this could be a type of business park with access to a frontage parcel at the Bath Road / Route 144 intersection or Old Bath Road.

Retail

Retail uses (50,000 sf) were clustered in three locations. The first location is on the land behind Monkey C, that also has frontage on Route 144. It appears that this development would have common access on Route 144, not Bath Road. The second retail cluster was midway along Bath Road to the north and south of Bath Road on either side of the Maine Yankee ROW. It is assumed this is frontage development. The third cluster of development was on the parcel of land to the west of the Birch Point / Bath Road intersection. Again, this assumes frontage access on to Bath Road.

Bob's Group:

Residential

Residential uses (60 units) were either clustered in the area off of Page Avenue, absorbed into underutilized subdivisions, or scattered along the eastern side of Bath Road – with the highest concentration behind Big Al's. Road networks were depicted showing that developments either used

existing streets or create new single points of access on to Bath Road, such as to the west of the Birch Point Road / Bath Road intersection. Only residential uses were distributed between the southern Old Bath Road / Bath Road intersection and the village. All retail and non-retail uses are located to the south of the Old Bath Road / Bath Road intersection.

Non-Retail

All the non-retail uses (100,000 sf) were located between Montsweag Brook and the development fronting Bath Road. It is noted on the map that there would be a common access point at a frontage parcel at the Bath Road / Route 144 intersection.

Retail

Retail uses (50,000 sf) were clustered in the “New Development” area, with the highest concentration behind Monkey C. Some of this development has frontage on Bath Road, but most of the development is accessed from Route 144.

A second cluster of retail is located to the north of Shaw’s and shares one of the curb cuts to Shaw’s.

The third cluster of retail is infill on the western side of Bath Road and is “infill” frontage development, but shares access to Bath Road with existing points of access.

Mitchell’s Group

Residential

Residential uses (60 units) were either clustered in three locations to the west of Bath Road: Off of Page Avenue (providing access to Old Bath Road), to the south of the Maine Yankee ROW (providing access to Old Bath Road) and in a cluster overlooking Montsweag Brook with assumed access on to Old Bath Road.

Non-Retail

As with the retail uses, non-retail uses were dispersed along Bath Road, but not fronting directly on Bath Road. As with the other schemes the highest concentration of non-retail was the area behind the “New Development” (e.g. Irving, etc.) fronting Bath Road. This development as with the other schemes accessed Bath Road at the Route 144 intersection

and adjacent to the Irving Station. Other non-retail was located behind Wiscasset Ford, Big Al's, and to the west of the Birch Point Road/Bath Road intersection.

Retail

Of the three schemes, retail uses (50,000 sf) were most dispersed on this plan with all retail directly accessing Bath Road except for a development to the north of Maine Heritage Village with access to Old Bath Road (per the MaineDOT requirement for this parcel) and the potential for Route 144 access for development fronting Bath Road at the Route 144/Bath Road intersection. There was also a cluster of retail development at the Birch Point Road / Bath Road Intersection.

Common Themes:

Distribution:

Most uses, in general, were clustered in relationship to existing development trends. For example, all schemes showed a concentration of residential development off of Page Avenue. However, all three schemes showed a concentration of non-retail between Montsweag Brook and the existing development fronting Bath Road.

Most retail and non-retail uses were clustered near the Route 144/Bath Road intersection.

Access:

Residential and non-retail uses did not front on Bath Road. Opportunities were explored in every scheme to create connections between Bath Road, Old Bath Road, and Route 144.

Retail uses had the highest visibility along Bath Road, with some developments directly accessing Bath Road, but in many instances there shared common access points were identified.

Most retail and non-retail uses were clustered near the Route 144/Bath Road intersection.

Redevelopment / Infill

Besides Bob's scheme, which showed a unique approach to guiding growth to underutilized subdivisions (not redevelopment per se) no

redevelopment was shown along Bath Road. New development was shown fronting Bath Road.

Preservation of Open Space

None of the three plans depicted certain lands to be protected/conserved. There was a general trend to not develop land to the east of Bath Road, but these areas are in general not visible from Bath Road and would not contribute to a rural aesthetic.

However, the fact that most of the plans suggest common access points for development, even frontage retail, suggests there is an opportunity to maintain existing natural features as a type of buffer.

Improvements to Existing Traffic Issues

The plans did not identify existing areas of concern in terms of congestion or safety. However, the fact that the distribution of most uses identified new connections (Old Bath Road and Route 144 or shared access to Bath Road) suggests that the Steering Committee was aware of the negative implications of lot-by-lot curb cuts the length of Bath Road and the positive implications of creating new connectivity or routing traffic to an existing intersection such as Route 144, Page Avenue or Birch Point Road.

Meeting Notes

Bath Road Master Plan

February 13, 2013 Steering Committee

Prepared by: Tom Errico/Mitchell Rasor

Attendees

- Steering Committee
 - Wayne Averil
 - Don Jones
 - Gary Crosby
 - Peter West
 - Troy Cline
 - Heather Pitcher
 - Al Cohen
 - Ed Polewarczyk
 - Judy Colby
 - Laurie Smith
 - Misty Parker
 - Gerry Audibert
- Consultant Staff
 - Robert Faunce
 - Tom Errico
 - Mitchell Rasor

Agenda

- Introductions / Project Schedule
 - Misty reviewed the project schedule and noted that the Public Meeting would be in March given schedules and the need to prepare materials for the meeting.
- Review Study Mission Statement
 - Mitchell reviewed the Mission Statement. There were no comments.
- Review of Relevant Comprehensive Plan Goals for Bath Road
 - Mitchell reviewed the Mission Statement. There were no comments.
- Recap of Steering Committee Visioning Exercise
 - Mitchell reviewed the results of the Visioning Exercise – specifically the land use mapping exercise. SC member noted that the intensity of mixed uses at the Route 144 / Old Bath Road intersection was a common aspect of each plan.

- Draft Transportation Recommendations

Tom presented draft transportation recommendations as it relates to: 1) Intersection Improvements; 2) Corridor Improvements; 3) New Road Connections; and 4) Access Management. Comments included:

- SC member asked at what point is a signal required. What triggers this? Tom noted that there are specific criteria established by the Federal Highway Administration that generally include traffic volumes and crash history. These criteria must be met before a traffic signal is installed.
- SC member asked if land takings were required to make improvements. It was noted that signalization and access management would occur in the existing right-of-way. However, conceptual connectivity would occur outside the right-of-way and ideally be guided to a common access point on Bath Road – such as a new signalized intersection at Route 144 or Birch Point Road.
- A SC member asked why parallel connections are not located closer to the existing right-of-way rather than deeper in the property as shown. Tom noted that this would create safety issues with various turning movements in close vicinity to Bath Road. It was also noted that new parallel roads set deeper into properties adjacent to Bath Road would create new frontage, helping to tap the development potential of the land.
- A SC member noted that the northern entrance to the Marketplace Plaza provides better sight distances and the proposed improvements should direct people traveling north to use this entrance.
- A SC member noted that it appears in the draft transportation plan that the new southbound lane into McDonald's appeared to place the vehicles leaving the McDonald's driveway directly in front of the oncoming traffic, leaving little window of opportunity for vehicles to move to the northbound lane. Tom explained that the exit lane from McDonald's would extend beyond the entrance to McDonald's and the vehicles would have clear sight lines to the north of the oncoming southbound traffic. This, in theory, would ease the difficulty of making left-turn egress movements.
- As Tom proceeded to show access management issues and opportunities along Bath Road, when the presentation reached the Dunkin Donuts across from the Irving Station, a SC member noted that traffic movements in this area are complex and asked why a common

connection was not made at Oxhorn Road rather than creating curb cuts on Bath Road. Tom noted this could have been a possibility, but did not know the details of the permitting for the project.

- A discussion referencing the presentation regarding access issues with the Woolwich Cumberland Farms scenario was revisited. The project is only viable due to access to Route 127 at the back of the property – an example of a “parallel road” directing traffic to a common point at Route 1. Tom noted that vehicles may use the Route 127 / Route 1 intersection to head north on Route 1. A SC member noted that vehicles cannot turn north at the intersection and must proceed south to a loop road passing under Route 1 eventually connecting to the north bound lane. This access “can of worms” is the type of situation that can be avoided on Bath Road with planned access management.
- It was noted by a SC member that there are safety issues with school buses stopping across from Ames due to topography heading north, limiting the sight distance. There was a discussion regarding the regulations of where bus stops can be located, but that this specific situation needed to be addressed as soon as possible. It was noted that the buses are required to turn on the amber warning lights 200’ before a bus stop.
- It was noted by a SC member that the pavement markings should be revised such that a dedicated left-turn lane into Ames is illustrated.
- A SC member noted that there is a discussion to have Concord Trailways access their property (Miss Wiscasset Diner) coming north and that any curb cut closures or even a reduction in size would impact bus movements as well as the required access for delivery trucks. It was noted that Norm’s Auto, the Trading Post and the Miss Wiscasset Diner had numerous curb cuts and driveways while still maintaining the required access to the businesses. Tom noted that if Route 144 is signalized there are regulations regarding the distance to the nearest curb cut that must be met. A SC member noted that an access point off of Route 144 behind Norm’s was often used as a way of avoiding the Route 144 / Bath Road intersection. Tom noted that in the concept street connectivity diagram an access road was shown behind all of these properties, which would allow vehicles to reach the Route 144 intersection in an orderly manner. Misty noted that Norm owns 26 acres behind his property and this concept parallel road would also help connectivity to his land.

- A SC member asked why the Bath Road / Beechnut Hill Road intersection was not proposed for signalization. Tom replied that it did not have traffic volume levels or crash problems that would warrant a traffic signal.
- Bob noted that the Town has installed sewer and water along Bath Road to support growth. This infrastructure has additional capacity. It is Bath Road and the intersections that are near or over capacity. Planning for access management will encourage and allow for growth along Bath Road and the back lands while improving the capacity of Bath Road.
- It was noted that the McDonald's site has an access easement to the development parcel to the north and that a parking lot connection was made between Big Al's and the car wash – both examples of planned access management (inter parcel connectivity).
- Laurie noted that growth is going to happen. Educating the community regarding the importance of access management to enable growth is important. Laurie asked do we want Bath Road to be “anywhere” or should we use the Master Plan to guide growth in a manner that retains and adds to the integrity of Bath Road as a place, not just another regional arterial?
- Draft Land Use and Design Recommendations
 - Mitchell presented the previous analysis of Bath Road including the “Character Areas Map”, the “The Sight Lines and Focal Points Map” and the existing Zoning Map. The results of the SC Land Use Mapping exercise were also revisited.
 - Mitchell noted that there was a general relationship between the analyses, the goals of the Comprehensive Plan and the SC findings leading to three consistent areas of character and use. The proposed “zones” include:
 - “Bath Road Mixed Use” running from Woolwich to Old Bath Road south, west to Montsweag Brook and east to the residential neighborhoods. There are a number of undeveloped parcels in this area with development potential. This area is already seeing the greatest change. It was noted by the SC as having the greatest potential for a mix of uses – housing, retail, and non-retail – that could be supported by a new signalized intersection at Route 144, access to Old Bath Road, Route 144, and connections to existing frontage driveways such as the

northern entrance to Shaw's. Back lands would be accessed by a series of interconnected streets.

- “Bath Road Commercial” running north from Old Bath Road to Ward's Brook, but lacking the depth of the Bath Road Mixed Use due to residential development to the west and environmental restrictions to the east. No new connectivity behind the frontage development is envisioned. Thus the focus should be mitigating traffic and visual impacts with frontage development and redevelopment opportunities. This area was also noted for having straight rolling terrain and high points providing unbroken views of frontage development. This adds to the “strip” feel that should be mitigated with strategic access management and the preservation or enhancement of landscaping.
- “Village 3” running from Ward's Brook to the existing Village 2 District. This area – specifically between Grover Tire and Birch Point Road – already has a mix of local business, buildings set close to the road, and adjacent residential neighborhoods that could be expanded to help create a walkable “village” corridor node with streetscape improvements.
 - Misty noted that by encouraging high volume uses such as drive-thru's to locate elsewhere on Bath Road, congestion and back up traffic in the proposed “Village 3” will be relieved.
 - Tom noted that even if streetscape elements were introduced to this area such as sidewalks, crosswalks, street trees and streetlights, that bicycle lanes (shoulder space) will still be extended the length of Bath Road.
 - A new signalized intersection at Birch Point Road would make this area safer, provide access to new lands, and allow existing development to connect to a network of new streets allowing for easier movement throughout the area and opportunities for new frontage development. New parallel roads may also enable curb cut / driveway consolidation. An extension of Birch Point Road through undeveloped lands to Old Bath Road was central to the connectivity concept for this area.
 - Misty noted that like the proposed “Bath Road Mixed Use” that the proposed “Village 3” zone” has the potential for a depth of development to the east and west. New connectivity, including a Birch Point Road

signalized intersection would support this growth and mitigate traffic impacts.

- A SC member noted that the ideas for connectivity, access management and creating different zone areas make sense, but that it is important to meet with key stakeholders to discuss the recommendations in order to get their feedback and educate them on the benefits of the Master Plan recommendations. It was suggested that these meetings occur before the public meeting.

- Next Steps

- Select a Public Meeting date
- Meet with key stakeholders to discuss the concepts
- Schedule a SC debrief meeting following the Public Meeting










**Bath Road Master Plan
March 20, 2013 Public Meeting
Public Comments and Questions**

- How is Route 1 Camden traffic dispersed
- Why use 2011 data and not current traffic counts
- 2012 counts much smaller – fewer backups in 2012
- What is the basis for the residential and jobs growth projections
- Why not do improvements now; why wait for development to occur first
- How effective are turning lanes
- What is the relationship between the comp plan future land use plan and the BRMP
- Comp plan supports connectivity
- Backage road is good for aesthetics, successful elsewhere
- Backage road on north side of Route 1 behind Shell, Irving, mall is a good idea
- Backage road on the south side of Route 1 above RR tracks will help industrial park, Westport traffic and access to Shaws
- Connect Routes 1 and 27 via Old Bath Road
- Use telephone ROW that travels behind the Yellowfront for backage road and to connect Routes 1 and 27
- Why not develop field on north side of Birch Point Road
- Protect the open approach to the village and concentrate development elsewhere
- Block the north end of Old Bath Road to protect integrity of residential area
- Bypass lane stops at diner and is unsafe
- Add right turn lane NB at Route 144
- Extend third lane through entire corridor
- Pursue landscaped medians
- Manage growth but allow for Wiscasset's best interests
- Provide developers some certainty
- Street lights – only one in corridor; it is near Dunkin Donuts and doesn't work
- Which is safer – continuous or intermittent third lane
- Raised islands prevent drivers from using third lane for passing
- Plan needs to meet highest standards and reflect town's heritage

APPENDIX E - TRAFFIC ANALYSIS




















PM Peak Existing No Build
1: Old Bath Road (S) & Route 1

8/15/2013

						
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Volume (veh/h)	5	25	50	799	703	6
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.63	0.63	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	8	40	61	974	857	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1957	861	865			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1957	861	865			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	88	89	92			
cM capacity (veh/h)	65	352	787			
Direction, Lane #	SE 1	NE 1	SW 1			
Volume Total	48	1035	865			
Volume Left	8	61	0			
Volume Right	40	0	7			
cSH	203	787	1700			
Volume to Capacity	0.23	0.08	0.51			
Queue Length 95th (ft)	22	6	0			
Control Delay (s)	28.0	2.3	0.0			
Lane LOS	D	A				
Approach Delay (s)	28.0	2.3	0.0			
Approach LOS	D					
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization			93.0%	ICU Level of Service		F
Analysis Period (min)			15			












PM Peak Existing No Build
4: Shopping Center & Route 1

8/15/2013

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	11	4	5	12	3	83	4	854	23	55	726	19
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.71	0.71	0.71	0.84	0.84	0.84	0.87	0.87	0.87	0.96	0.96	0.96
Hourly flow rate (vph)	15	6	7	14	4	99	5	982	26	57	756	20
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			1			2						
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1936	1898	766	1881	1895	995	776			1008		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1936	1898	766	1881	1895	995	776			1008		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	48	91	98	70	94	67	99			92		
cM capacity (veh/h)	30	64	406	47	64	300	849			695		
Direction, Lane #	SE 1	NW 1	NE 1	SW 1	SW 2							
Volume Total	28	117	1013	57	776							
Volume Left	15	14	5	57	0							
Volume Right	7	99	26	0	20							
cSH	49	330	849	695	1700							
Volume to Capacity	0.58	0.35	0.01	0.08	0.46							
Queue Length 95th (ft)	55	39	0	7	0							
Control Delay (s)	151.7	36.3	0.2	10.6	0.0							
Lane LOS	F	E	A	B								
Approach Delay (s)	151.7	36.3	0.2	0.7								
Approach LOS	F	E										
Intersection Summary												
Average Delay			4.7									
Intersection Capacity Utilization			65.0%			ICU Level of Service				C		
Analysis Period (min)			15									










PM Peak Existing No Build
8: Route 144 & Route 1

8/15/2013

						
Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Volume (veh/h)	52	76	920	52	70	679
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.86	0.86	0.95	0.95	0.92	0.92
Hourly flow rate (vph)	60	88	968	55	76	738
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1886	996			1023	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1886	996			1023	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	12	70			89	
cM capacity (veh/h)	69	299			682	
Direction, Lane #	WB 1	NE 1	SW 1	SW 2		
Volume Total	149	1023	76	738		
Volume Left	60	0	76	0		
Volume Right	88	55	0	0		
cSH	147	1700	682	1700		
Volume to Capacity	1.01	0.60	0.11	0.43		
Queue Length 95th (ft)	189	0	9	0		
Control Delay (s)	136.8	0.0	10.9	0.0		
Lane LOS	F		B			
Approach Delay (s)	136.8	0.0	1.0			
Approach LOS	F					
Intersection Summary						
Average Delay			10.7			
Intersection Capacity Utilization			68.2%	ICU Level of Service		C
Analysis Period (min)			15			










PM Peak Existing No Build
11: Birch Point Road & Route 1

8/15/2013

						
Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Volume (veh/h)	5	33	976	17	51	788
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.73	0.73	0.85	0.85	0.97	0.97
Hourly flow rate (vph)	7	45	1148	20	53	812
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2076	1158			1168	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2076	1158			1168	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	87	81			91	
cM capacity (veh/h)	55	241			605	
Direction, Lane #	NW 1	NE 1	SW 1			
Volume Total	52	1168	865			
Volume Left	7	0	53			
Volume Right	45	20	0			
cSH	166	1700	605			
Volume to Capacity	0.31	0.69	0.09			
Queue Length 95th (ft)	31	0	7			
Control Delay (s)	36.2	0.0	2.5			
Lane LOS	E		A			
Approach Delay (s)	36.2	0.0	2.5			
Approach LOS	E					
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization			93.3%	ICU Level of Service		F
Analysis Period (min)			15			










PM Peak Existing No Build
13: Old Bath Road (N) & Route 1

8/15/2013

						
Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Volume (veh/h)	18	5	4	1028	836	22
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.72	0.72	0.91	0.91	0.98	0.98
Hourly flow rate (vph)	25	7	4	1130	853	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2003	864	876			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2003	864	876			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	62	98	99			
cM capacity (veh/h)	66	357	780			
Direction, Lane #	EB 1	NE 1	SW 1			
Volume Total	32	1134	876			
Volume Left	25	4	0			
Volume Right	7	0	22			
cSH	80	780	1700			
Volume to Capacity	0.40	0.01	0.52			
Queue Length 95th (ft)	39	0	0			
Control Delay (s)	76.8	0.2	0.0			
Lane LOS	F	A				
Approach Delay (s)	76.8	0.2	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			67.3%	ICU Level of Service		C
Analysis Period (min)			15			




















PM Peak Future No Build
1: Old Bath Road (S) & Route 1

8/15/2013

						
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Volume (veh/h)	17	29	60	905	830	23
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.63	0.63	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	27	46	73	1104	1012	28
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2276	1026	1040			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2276	1026	1040			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	32	84	89			
cM capacity (veh/h)	40	282	676			
Direction, Lane #	SE 1	NE 1	SW 1			
Volume Total	73	1177	1040			
Volume Left	27	73	0			
Volume Right	46	0	28			
cSH	87	676	1700			
Volume to Capacity	0.84	0.11	0.61			
Queue Length 95th (ft)	111	9	0			
Control Delay (s)	140.7	3.9	0.0			
Lane LOS	F	A				
Approach Delay (s)	140.7	3.9	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay			6.5			
Intersection Capacity Utilization			106.9%	ICU Level of Service		G
Analysis Period (min)			15			












PM Peak Future No Build
4: Shopping Center & Route 1

8/15/2013

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	12	4	6	13	3	91	4	973	25	61	829	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.71	0.71	0.71	0.84	0.84	0.84	0.87	0.87	0.87	0.96	0.96	0.96
Hourly flow rate (vph)	17	6	8	15	4	108	5	1118	29	64	864	22
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			1			2						
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2199	2158	874	2140	2154	1133	885			1147		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2199	2158	874	2140	2154	1133	885			1147		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	87	98	47	92	57	99			90		
cM capacity (veh/h)	16	43	352	29	43	249	773			616		
Direction, Lane #	SE 1	NW 1	NE 1	SW 1	SW 2							
Volume Total	31	127	1152	64	885							
Volume Left	17	15	5	64	0							
Volume Right	8	108	29	0	22							
cSH	27	212	773	616	1700							
Volume to Capacity	1.16	0.60	0.01	0.10	0.52							
Queue Length 95th (ft)	92	86	0	9	0							
Control Delay (s)	441.3	59.4	0.2	11.5	0.0							
Lane LOS	F	F	A	B								
Approach Delay (s)	441.3	59.4	0.2	0.8								
Approach LOS	F	F										
Intersection Summary												
Average Delay			9.8									
Intersection Capacity Utilization			71.9%			ICU Level of Service				C		
Analysis Period (min)			15									










PM Peak Future No Build
8: Route 144 & Route 1

8/15/2013

						
Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Volume (veh/h)	101	127	1028	67	77	754
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.86	0.86	0.95	0.95	0.92	0.92
Hourly flow rate (vph)	117	148	1082	71	84	820
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type			None			None
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2104	1117			1153	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2104	1117			1153	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	42			86	
cM capacity (veh/h)	49	254			610	
Direction, Lane #	WB 1	NE 1	SW 1	SW 2		
Volume Total	265	1153	84	820		
Volume Left	117	0	84	0		
Volume Right	148	71	0	0		
cSH	90	1700	610	1700		
Volume to Capacity	2.95	0.68	0.14	0.48		
Queue Length 95th (ft)	644	0	12	0		
Control Delay (s)	980.0	0.0	11.8	0.0		
Lane LOS	F		B			
Approach Delay (s)	980.0	0.0	1.1			
Approach LOS	F					
Intersection Summary						
Average Delay			112.4			
Intersection Capacity Utilization			76.3%	ICU Level of Service		D
Analysis Period (min)			15			







PM Peak Future No Build
11: Birch Point Road & Route 1

8/15/2013

						
Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Volume (veh/h)	40	122	1152	60	66	973
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.73	0.73	0.85	0.85	0.97	0.97
Hourly flow rate (vph)	55	167	1355	71	68	1003
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2530	1391			1426	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2530	1391			1426	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	5			86	
cM capacity (veh/h)	26	176			483	
Direction, Lane #	NW 1	NE 1	SW 1			
Volume Total	222	1426	1071			
Volume Left	55	0	68			
Volume Right	167	71	0			
cSH	73	1700	483			
Volume to Capacity	3.02	0.84	0.14			
Queue Length 95th (ft)	Err	0	12			
Control Delay (s)	Err	0.0	5.3			
Lane LOS	F		A			
Approach Delay (s)	Err	0.0	5.3			
Approach LOS	F					
Intersection Summary						
Average Delay			818.2			
Intersection Capacity Utilization			121.8%	ICU Level of Service		H
Analysis Period (min)			15			

PM Peak Future No Build
13: Old Bath Road (N) & Route 1












8/15/2013

						
Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations	W			W	W	
Volume (veh/h)	23	12	10	1243	982	29
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.72	0.72	0.91	0.91	0.98	0.98
Hourly flow rate (vph)	32	17	11	1366	1002	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2405	1017	1032			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2405	1017	1032			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	12	94	98			
cM capacity (veh/h)	36	291	681			
Direction, Lane #	EB 1	NE 1	SW 1			
Volume Total	49	1377	1032			
Volume Left	32	11	0			
Volume Right	17	0	30			
cSH	52	681	1700			
Volume to Capacity	0.93	0.02	0.61			
Queue Length 95th (ft)	102	1	0			
Control Delay (s)	230.6	0.9	0.0			
Lane LOS	F	A				
Approach Delay (s)	230.6	0.9	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay			5.1			
Intersection Capacity Utilization			83.4%	ICU Level of Service		E
Analysis Period (min)			15			

Route 144 and Bath Road
8: Route 144 & Route 1

Future Build Intersection

8/23/2013

						
Lane Group	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Volume (vph)	101	127	1028	67	77	754
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	100		0	175	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25	25		25	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.992			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1752	1615	1847	0	1787	1845
Flt Permitted	0.950				0.113	
Satd. Flow (perm)	1752	1615	1847	0	213	1845
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		137	9			
Link Speed (mph)	30		30			30
Link Distance (ft)	816		834			1762
Travel Time (s)	18.5		19.0			40.0
Peak Hour Factor	0.86	0.86	0.95	0.95	0.92	0.92
Heavy Vehicles (%)	3%	0%	2%	3%	1%	3%
Adj. Flow (vph)	117	148	1082	71	84	820
Shared Lane Traffic (%)						
Lane Group Flow (vph)	117	148	1153	0	84	820
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (ft)	20	20	100		20	100
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	20	6		20	6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type		Perm			Perm	
Protected Phases	2		4			8
Permitted Phases		2			8	

Route 144 and Bath Road
8: Route 144 & Route 1

Future Build Intersection
8/23/2013

	←	↖	↗	→	↙	↘
Lane Group	WBL	WBR	NET	NER	SWL	SWT
Detector Phase	2	2	4		8	8
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0		4.0	4.0
Minimum Split (s)	20.0	20.0	20.0		20.0	20.0
Total Split (s)	21.0	21.0	59.0	0.0	59.0	59.0
Total Split (%)	26.3%	26.3%	73.8%	0.0%	73.8%	73.8%
Maximum Green (s)	17.0	17.0	55.0		55.0	55.0
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	0.5	0.5	0.5		0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	Min	Min	None		None	None
Walk Time (s)	5.0	5.0	5.0		5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	10.1	10.1	49.9		49.9	49.9
Actuated g/C Ratio	0.15	0.15	0.73		0.73	0.73
v/c Ratio	0.45	0.42	0.85		0.54	0.61
Control Delay	34.7	10.8	15.4		21.4	7.1
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	34.7	10.8	15.4		21.4	7.1
LOS	C	B	B		C	A
Approach Delay	21.4		15.4			8.4
Approach LOS	C		B			A

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 68.3

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 13.3

Intersection LOS: B

Intersection Capacity Utilization 76.3%

ICU Level of Service D













Analysis Period (min) 15

Splits and Phases: 8: Route 144 & Route 1

← ø2	↗ ø4
21 s	59 s
	↘ ø8
	59 s

Old Bath Rd (S) and Bath Road
1: Old Bath Road (S) & Route 1












Future Build Intersection
8/23/2013

						
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Volume (veh/h)	17	29	60	905	830	23
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.63	0.63	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	27	46	73	1104	1012	28
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2262	1012	1040			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2262	1012	1040			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	34	84	89			
cM capacity (veh/h)	41	288	676			
Direction, Lane #	SE 1	SE 2	NE 1	NE 2	SW 1	SW 2
Volume Total	27	46	73	1104	1012	28
Volume Left	27	0	73	0	0	0
Volume Right	0	46	0	0	0	28
cSH	41	288	676	1700	1700	1700
Volume to Capacity	0.66	0.16	0.11	0.65	0.60	0.02
Queue Length 95th (ft)	61	14	9	0	0	0
Control Delay (s)	197.2	19.9	11.0	0.0	0.0	0.0
Lane LOS	F	C	B			
Approach Delay (s)	85.4		0.7		0.0	
Approach LOS	F					
Intersection Summary						
Average Delay			3.1			
Intersection Capacity Utilization			59.9%	ICU Level of Service		B
Analysis Period (min)			15			

Birch Point and Bath Road
11: Birch Point Road & Route 1







Future Build Intersection

8/23/2013

						
Lane Group	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Volume (vph)	40	122	1152	60	66	973
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	150		0	150	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25	25		25	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.993			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1805	1615	1869	0	1805	1881
Flt Permitted	0.950				0.061	
Satd. Flow (perm)	1805	1615	1869	0	116	1881
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		94	8			
Link Speed (mph)	30		30			30
Link Distance (ft)	2039		8162			3354
Travel Time (s)	46.3		185.5			76.2
Peak Hour Factor	0.73	0.73	0.85	0.85	0.97	0.97
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%
Adj. Flow (vph)	55	167	1355	71	68	1003
Shared Lane Traffic (%)						
Lane Group Flow (vph)	55	167	1426	0	68	1003
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (ft)	20	20	100		20	100
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	20	6		20	6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type		Perm			Perm	
Protected Phases	2		4			8
Permitted Phases		2			8	

Birch Point and Bath Road
11: Birch Point Road & Route 1

Future Build Intersection
8/23/2013

						
Lane Group	NWL	NWR	NET	NER	SWL	SWT
Detector Phase	2	2	4		8	8
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0		4.0	4.0
Minimum Split (s)	20.0	20.0	20.0		20.0	20.0
Total Split (s)	20.0	20.0	70.0	0.0	70.0	70.0
Total Split (%)	22.2%	22.2%	77.8%	0.0%	77.8%	77.8%
Maximum Green (s)	16.0	16.0	66.0		66.0	66.0
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	0.5	0.5	0.5		0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	Min	Min	None		None	None
Walk Time (s)	5.0	5.0	5.0		5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	9.7	9.7	66.1		66.1	66.1
Actuated g/C Ratio	0.12	0.12	0.79		0.79	0.79
v/c Ratio	0.26	0.62	0.97		0.75	0.68
Control Delay	36.3	26.7	27.6		58.7	7.6
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	36.3	26.7	27.6		58.7	7.6
LOS	D	C	C		E	A
Approach Delay	29.1		27.6			10.9
Approach LOS	C		C			B
Queue Length 50th (ft)	27	36	471		13	170
Queue Length 95th (ft)	48	65	#1023		#66	406
Internal Link Dist (ft)	1959		8082			3274
Turn Bay Length (ft)		150			150	
Base Capacity (vph)	321	364	1476		91	1484
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.17	0.46	0.97		0.75	0.68

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 83.8

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 21.1

Intersection LOS: C

Intersection Capacity Utilization 78.5%




ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.













Queue shown is maximum after two cycles.







Splits and Phases: 11: Birch Point Road & Route 1

 Ø2 20 s	 Ø4 70 s
	 Ø8 70 s

Birch Point with Rt Turn and Bath Road
11: Birch Point Road & Route 1

Future Build Intersection
8/23/2013

						
Lane Group	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Volume (vph)	40	122	1152	60	66	973
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	150		0	150	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25	25		25	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1805	1615	1881	1615	1805	1881
Flt Permitted	0.950				0.062	
Satd. Flow (perm)	1805	1615	1881	1615	118	1881
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		90		71		
Link Speed (mph)	30		30			30
Link Distance (ft)	2039		8162			3354
Travel Time (s)	46.3		185.5			76.2
Peak Hour Factor	0.73	0.73	0.85	0.85	0.97	0.97
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%
Adj. Flow (vph)	55	167	1355	71	68	1003
Shared Lane Traffic (%)						
Lane Group Flow (vph)	55	167	1355	71	68	1003
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (ft)	20	20	100	20	20	100
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	20	20	6	20	20	6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type		Perm		Perm	Perm	
Protected Phases	2		4			8
Permitted Phases		2		4	8	

						
Lane Group	NWL	NWR	NET	NER	SWL	SWT
Detector Phase	2	2	4	4	8	8
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	21.0	21.0	69.0	69.0	69.0	69.0
Total Split (%)	23.3%	23.3%	76.7%	76.7%	76.7%	76.7%
Maximum Green (s)	17.0	17.0	65.0	65.0	65.0	65.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min	None	None	None	None
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	9.8	9.8	64.1	64.1	64.1	64.1
Actuated g/C Ratio	0.12	0.12	0.78	0.78	0.78	0.78
v/c Ratio	0.26	0.61	0.92	0.06	0.74	0.68
Control Delay	35.5	27.0	20.7	0.9	57.3	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.5	27.0	20.7	0.9	57.3	7.8
LOS	D	C	C	A	E	A
Approach Delay	29.1		19.8			11.0
Approach LOS	C		B			B
Queue Length 50th (ft)	26	38	388	0	13	172
Queue Length 95th (ft)	48	66	#931	8	#64	410
Internal Link Dist (ft)	1959		8082			3274
Turn Bay Length (ft)		150			150	
Base Capacity (vph)	345	382	1477	1283	93	1477
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.44	0.92	0.06	0.73	0.68

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 81.9

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 17.1

Intersection LOS: B

Intersection Capacity Utilization 74.9%


ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 11: Birch Point Road & Route 1

 Ø2	 Ø4
21 s	69 s
	 Ø8
	69 s

SB Future Volumes
HCS 2010: Two-Lane Highways Release 6.3

Phone:
E-Mail:

Fax:

Directional Two-Lane Highway Segment Analysis

Analyst A. Greenlaw
Agency/Co. TYLI
Date Performed 12/14/2012
Analysis Time Period PM
Highway Route 1
From/To Route 144 to Flood Lane (N)
Jurisdiction
Analysis Year Existing
Description

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.88	
Shoulder width	6.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	88	%
Up/down	-	%	Access point density	39	/mi

Analysis direction volume, Vd 985 veh/h
Opposing direction volume, Vo 1250 veh/h

Average Travel Speed

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adj. factor,(note-5) fHV	1.000	1.000
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1119 pc/h	1420 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	9.8	mi/h

Free-flow speed, FFSd 50.3 mi/h

Adjustment for no-passing zones, fnp	0.7	mi/h
Average travel speed, ATSD	29.8	mi/h
Percent Free Flow Speed, PFFS	59.4	%

Percent Time-Spent-Following

SB Future Volumes

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fhv	1.000	1.000
Grade adjustment factor, (note-1) fg	1.00	1.00
Directional flow rate, (note-2) vi	1119 pc/h	1420 pc/h
Base percent time-spent-following, (note-4) BPTSfd	84.2 %	
Adjustment for no-passing zones, fnp	10.9	
Percent time-spent-following, PTSFd	89.0 %	

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.66	
Peak 15-min vehicle-miles of travel, VMT15	0	veh-mi
Peak-hour vehicle-miles of travel, VMT60	0	veh-mi
Peak 15-min total travel time, TT15	0.0	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	29.8	mi/h
Percent time-spent-following, PTSFd (from above)	89.0	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSp1	-	
Percent free flow speed including passing lane, PFFSp1	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFp1	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSp1	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3

	SB Future Volumes	
Flow rate in outside lane, vOL		1119.3
Effective width of outside lane, we		24.00
Effective speed factor, St		4.42
Bicycle LOS Score, BLOS		2.81
Bicycle LOS		C

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i (v_d or v_o) $\geq 1,700$ pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for $v > 200$ veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

NB Existing Volumes
HCS 2010: Two-Lane Highways Release 6.3

Phone:
E-Mail:

Fax:

Directional Two-Lane Highway Segment Analysis

Analyst	A. Greenlaw
Agency/Co.	TYLI
Date Performed	12/14/2012
Analysis Time Period	PM
Highway	Route 1
From/To	Route 144 to Flood Lane (N)
Jurisdiction	
Analysis Year	Existing
Description	

Input Data

Highway class	Class 1	Peak hour factor, PHF	0.88
Shoulder width	6.0 ft	% Trucks and buses	2 %
Lane width	12.0 ft	% Trucks crawling	0.0 %
Segment length	0.0 mi	Truck crawl speed	0.0 mi/hr
Terrain type	Level	% Recreational vehicles	2 %
Grade: Length	- mi	% No-passing zones	82 %
Up/down	- %	Access point density	39 /mi

Analysis direction volume, vd	1030	veh/h
Opposing direction volume, vo	945	veh/h

Average Travel Speed

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adj. factor,(note-5) fHV	1.000	1.000
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1170 pc/h	1074 pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	9.8	mi/h
Free-flow speed, FFSd	50.3	mi/h
Adjustment for no-passing zones, fnp	0.9	mi/h
Average travel speed, ATSD	32.0	mi/h
Percent Free Flow Speed, PFFS	63.6	%

Percent Time-Spent-Following

NB Existing Volumes

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fhv	1.000	1.000
Grade adjustment factor, (note-1) fg	1.00	1.00
Directional flow rate, (note-2) vi	1170 pc/h	1074 pc/h
Base percent time-spent-following, (note-4) BPTSfd	83.0 %	
Adjustment for no-passing zones, fnp	14.8	
Percent time-spent-following, PTSFd	90.7 %	

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.69	
Peak 15-min vehicle-miles of travel, VMT15	0	veh-mi
Peak-hour vehicle-miles of travel, VMT60	0	veh-mi
Peak 15-min total travel time, TT15	0.0	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	32.0	mi/h
Percent time-spent-following, PTSFd (from above)	90.7	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSp1	-	
Percent free flow speed including passing lane, PFFSp1	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFp1	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSp1	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45	
Percent of segment with occupied on-highway parking	0	
Pavement rating, P	3	

	NB Existing Volumes	
Flow rate in outside lane, vOL		1170.5
Effective width of outside lane, We		24.00
Effective speed factor, St		4.42
Bicycle LOS Score, BLOS		2.83
Bicycle LOS		C

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i (v_d or v_o) $\geq 1,700$ pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for $v > 200$ veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

SB Existing Volumes
HCS 2010: Two-Lane Highways Release 6.3

Phone:
E-Mail:

Fax:

Directional Two-Lane Highway Segment Analysis

Analyst	A. Greenlaw
Agency/Co.	TYLI
Date Performed	12/14/2012
Analysis Time Period	PM
Highway	Route 1
From/To	Route 144 to Flood Lane (N)
Jurisdiction	
Analysis Year	Existing
Description	

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.88	
Shoulder width	6.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	88	%
Up/down	-	%	Access point density	39	/mi

Analysis direction volume, Vd	945	veh/h
Opposing direction volume, Vo	1030	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.0	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor, (note-5) fHV	1.000		1.000	
Grade adj. factor, (note-1) fg	1.00		1.00	
Directional flow rate, (note-2) vi	1074	pc/h	1170	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed, (note-3) S _{FM}	-	mi/h
Observed total demand, (note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, (note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width, (note-3) fLS	0.0	mi/h
Adj. for access point density, (note-3) fA	9.8	mi/h

Free-flow speed, FFSd	50.3	mi/h
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Adjustment for no-passing zones, fnp	0.9	mi/h
Average travel speed, ATSD	31.9	mi/h
Percent Free Flow Speed, PFFS	63.6	%

Percent Time-Spent-Following

SB Existing Volumes

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fhv	1.000	1.000
Grade adjustment factor, (note-1) fg	1.00	1.00
Directional flow rate, (note-2) vi	1074 pc/h	1170 pc/h
Base percent time-spent-following, (note-4) BPTSfd	81.5 %	
Adjustment for no-passing zones, fnp	14.9	
Percent time-spent-following, PTSFd	88.6 %	

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.63	
Peak 15-min vehicle-miles of travel, VMT15	0	veh-mi
Peak-hour vehicle-miles of travel, VMT60	0	veh-mi
Peak 15-min total travel time, TT15	0.0	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	31.9	mi/h
Percent time-spent-following, PTSFd (from above)	88.6	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSp1	-	
Percent free flow speed including passing lane, PFFSp1	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFp1	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSp1	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45	
Percent of segment with occupied on-highway parking	0	
Pavement rating, P	3	

	SB Existing Volumes
Flow rate in outside lane, VOL	1073.9
Effective width of outside lane, w_e	24.00
Effective speed factor, S_t	4.42
Bicycle LOS Score, BLOS	2.79
Bicycle LOS	C

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i (v_d or v_o) $\geq 1,700$ pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for $v > 200$ veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

NB Future Volumes

HCS 2010: Two-Lane Highways Release 6.3

Phone:
E-Mail:

Fax:

Directional Two-Lane Highway Segment Analysis

Analyst A. Greenlaw
Agency/Co. TYLI
Date Performed 12/14/2012
Analysis Time Period PM
Highway Route 1
From/To Route 144 to Flood Lane (N)
Jurisdiction
Analysis Year Existing
Description

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.88	
Shoulder width	6.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	82	%
Up/down	-	%	Access point density	39	/mi

Analysis direction volume, vd 1250 veh/h
Opposing direction volume, vo 985 veh/h

Average Travel Speed

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adj. factor, (note-5) fHV	1.000	1.000
Grade adj. factor, (note-1) fg	1.00	1.00
Directional flow rate, (note-2) vi	1420 pc/h	1119 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed, (note-3) S FM - mi/h
Observed total demand, (note-3) V - veh/h

Estimated Free-Flow Speed:

Base free-flow speed, (note-3) BFFS 60.0 mi/h
Adj. for lane and shoulder width, (note-3) fLS 0.0 mi/h
Adj. for access point density, (note-3) fA 9.8 mi/h

Free-flow speed, FFSD 50.3 mi/h

Adjustment for no-passing zones, fnp 0.9 mi/h

Average travel speed, ATSD 29.7 mi/h

Percent Free Flow Speed, PFFS 59.1 %

Percent Time-Spent-Following

NB Future Volumes

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fhv	1.000	1.000
Grade adjustment factor, (note-1) fg	1.00	1.00
Directional flow rate, (note-2) vi	1420 pc/h	1119 pc/h
Base percent time-spent-following, (note-4) BPTSfd	87.8 %	
Adjustment for no-passing zones, fnp	10.8	
Percent time-spent-following, PTSFd	93.8 %	

Level of Service and Other Performance Measures

Level of service, LOS	E
Volume to capacity ratio, v/c	0.84
Peak 15-min vehicle-miles of travel, VMT15	0 veh-mi
Peak-hour vehicle-miles of travel, VMT60	0 veh-mi
Peak 15-min total travel time, TT15	0.0 veh-h
Capacity from ATS, CdATS	1700 veh/h
Capacity from PTSF, CdPTSF	1700 veh/h
Directional Capacity	1700 veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.0 mi
Length of two-lane highway upstream of the passing lane, Lu	- mi
Length of passing lane including tapers, Lpl	- mi
Average travel speed, ATSD (from above)	29.7 mi/h
Percent time-spent-following, PTSFd (from above)	93.8
Level of service, LOSd (from above)	E

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	- mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	- mi
Adj. factor for the effect of passing lane on average speed, fpl	-
Average travel speed including passing lane, ATSp1	-
Percent free flow speed including passing lane, PFFSp1	0.0 %

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	- mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	- mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-
Percent time-spent-following including passing lane, PTSFp1	- %

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSp1	E
Peak 15-min total travel time, TT15	- veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3

	NB Future Volumes	
Flow rate in outside lane, VOL		1420.5
Effective width of outside lane, w_e		24.00
Effective speed factor, S_t		4.42
Bicycle LOS Score, BLOS		2.93
Bicycle LOS		C

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i (v_d or v_o) $\geq 1,700$ pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for $v > 200$ veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.