

Appendix:
Alternatives Analysis, Projections



2002 Comprehensive Plan
Queen Anne's County, Maryland

Adopted by the Queen Anne's County Commissioners on May 21, 2002

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Queen Anne's County, Maryland

*Recommended for Adoption by the
Queen Anne's County Planning Commission
on January 10, 2002*

*Adopted by the
Commissioners of Queen Anne's County
on May 21, 2002*

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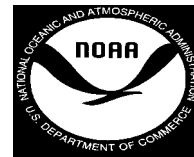
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1.0 Moving to the Next Level of Planning

After successfully laying the groundwork for rural preservation and designated Growth Areas, Queen Anne's County is faced with the challenge of moving to the next level of plan implementation: matching its plans with infrastructure capacity/expansions and evaluating the costs and benefits of these options. Rather than jumping straight to developing a plan, the selected approach was to define distinct choices for the County's future development by creating two different alternatives or options. These were then tested and the results used to inform the County and its residents about trade-offs and potential impacts and to ultimately select a preferred direction that provided the basis for plan-making.

This Appendix to the Comprehensive Plan includes an overview of:

- how and why plan alternatives were developed as part of the plan development process,
- how the 20-year housing and employment projections were developed,
- the results of the alternatives assessment and their infrastructure impacts, and
- why one alternative was selected as the preferred option for the County and the basis for the comprehensive plan.

This discussion is supplemented by several attachments, which provide more detail on the alternatives assessment.

2.0 Why Define and Assess Plan Alternatives?

The County is at a crossroads in implementing its plans. Over the last 15 years, the County has implemented a number of regulations and policies aimed at preserving the rural northern portion of the County and preserving its agricultural base and economy. By 1997, the County had also designated and adopted plans for six Growth Areas (Stevensville, Chester, Kent Narrows, Grasonville, Queenstown and Centreville), which are the preferred locations for much of the County's future growth. Since infrastructure is one of the main determinants for where future growth occurs, the Comprehensive Plan Update includes policy direction on how much, where, and when public infrastructure (primarily sewer service, public water, roads and schools) will be provided. The definition and assessment of plan options or alternatives helped the County decide which strategies are preferred.



3.0 How the Plan Alternatives Were Developed

Based on the comments received about the major issues to be resolved from the CAC, TAC, general public and the County's Planning Staff, the County's comprehensive planning consultant team developed two preliminary alternatives for the future development of the County. After review and sign-off by the CAC and TAC, the consultant team developed sub-county household and employment projections and examined the alternatives for their impacts on sewer, water, schools and roads and their relative public costs. The consultant team also reviewed their impacts on the County's ability to preserve and enhance agricultural uses and rural character.

4.0 Overview of Two Plan Alternatives

This section reviews the two plan alternatives that were developed and assessed. Additional details are included in Attachment A.

Modest Investment: This option identifies the impacts if a modest investment approach is continued. Based on current infrastructure improvement and investment policies (modest investment in sewer and water to address problem areas and more immediate needs only, continued school construction but coupled with a continued heavy reliance on school relocatables to deal with crowding issues, etc.), growth is projected and allocated assuming little deviation from current policies by the County. In this option, more development will likely be "pushed" into rural areas by the lack of infrastructure availability in the Growth Areas, increasing pressures on the County's agricultural areas, rural and sensitive areas.

The main facets of this option are:

- modest expansion of sewer service for Growth Areas, which will inhibit the growth potential of these areas,
- growth pressures will increase on rural areas resulting in a more dispersed, suburban development pattern,
- lack of public water and sewer service for the Growth Areas will increase the amount of development on well and septic within the Growth Areas on larger lots. This will reduce the development potential of the Growth Area and may place additional development pressures elsewhere,
- no large-scale improvements in water service,
- minimal improvements to the roadways ,
- continued heavy reliance on school relocatables to deal with school crowding, and
- continuation of policies to protect agricultural lands but no increase in easement funding.



Substantial Investment: This option seeks to plan for and implement the infrastructure necessary to implement the Growth Areas. The County’s 1993 Comprehensive Plan identifies these areas for development but heretofore the County has not planned for or implemented the infrastructure necessary to permit their development. By investing in infrastructure, the County can expect to accommodate more of its growth in existing communities and thus decrease pressures on the County’s important but fragile agricultural economy and way of life.

The main facets of this option are:

- substantial expansion of sewer and water service for Growth Areas to provide an incentive for growth to occur in the Growth Areas and reduce development pressures on the County’s rural and agricultural areas,
- implementation of the Growth Area plan recommendations for roadways as well as other necessary road improvements,
- phasing of growth with available road capacity through the use of level of service standards,
- re-assessment of school projections and reliance on trailers, and
- additional funding for agricultural easements.

A Quick Comparison of the Options

Elements of the Options	Plan Options	
	Modest Investment	Substantial Investment
Economic Development	Economic development is constrained by the lower level of sewer & water availability.	Key lands identified & preserved for employment/tourism development; new industrial park site identified; conference center site ear-marked; County actively seeks retirement and 2 nd home market.
Impacts on the Rural North	Development pressures mount as Growth Areas cannot absorb sufficient development because of infrastructure constraints. More prime agriculture areas developed and the rural heritage of the County is diminished.	Growth Areas absorb a substantial portion of the County's development. Development in the north County is directed to incorporated towns.
Growth Management Implications	Growth is more dispersed; rural lands developed in suburbanizing pattern; County tax dollars stretched thin to provide “urban” services throughout the County rather than focusing scarce dollars on Growth Areas and rural service levels elsewhere in terms of road construction and other infrastructure.	Infrastructure provision in the Growth Areas acts as an incentive to “steer” growth to these areas; reduced development pressures on agricultural rural areas. Adequate Public Facilities Ordinance allows County to phase development with the availability of infrastructure.



Sewer Service	Existing Kent Narrows/Stevensville/Grasonville (KN/S/G) treatment plant expanded (to 3 MGD capacity) to meet short term demand but not enough to provide adequate capacity to allow development of the Growth Areas. Collection system upgrades necessary to maintain system functionality/quality. Only modest enhancements to Queenstown & Centreville treatment plants, hampering growth of these areas. Sewer provided to some areas of Southern Kent Island to correct septic failures	Existing KN/S/G treatment plant expanded (to 5 MGD capacity) to provide for the full development of the County's western-most Growth Areas. Collection system upgrades necessary to maintain system functionality/quality. Queenstown area tied into KN/S/G system. Centreville system upgraded to permit development of the Growth Area. Sewer service provided to some areas of Southern Kent Island to correct septic failures.
Water Service	No major improvements made to existing patchwork system of small, separate plants. Provide water service to Southern Kent Island in tandem with sewer service (see below).	Existing water system integrated & expanded. New wells may be drilled west of Queenstown to provide expanded service. Provide water service to Southern Kent Island in tandem with sewer service (see below).
Transportation	Limited road improvements to address specific congested or dangerous conditions. Minimal bicycle/pedestrian improvements. Assess transit service.	More extensive road improvements. More substantial bicycle/pedestrian improvements. Assess transit service.
Schools	Continued reliance on relocatable classrooms, redistricting to balance school capacity with enrollment to reduce new school needs.	Reduced reliance on relocatable classrooms. Revisit enrollment projections based on both existing trends & accelerated growth rates.
Development of Growth Areas	Modest infrastructure improvements made that support additional <i>development only in the short-to mid-term</i> but not enough to absorb demand.	Infrastructure provided to support development of these areas.
Southern Kent Island (SKI)	Sewer service provided to Romancock and Kent Island Estates to address failing septic problems. Water service provided in tandem. No additional sewer service provided on Southern Kent Island. MD 8 widened at northern end.	Sewer service provided to Romancock & Kent Island Estates to address failing septic problems. Limited additional sewer service provided adjacent to this area. Water service provided in tandem. MD 8 widened at the middle & northern portions.
Dominion & Marling Farms	Sewer service provided address long-standing failing septic problems.	Sewer service provided address long-standing failing septic problems.
Parks & Recreation	Focus on providing active & passive recreation at the community level. Also continue to provide other regional sites for tourism uses.	Focus on providing active & passive recreation at the community level. Also continue to provide other regional sites for tourism uses.
Stormwater Management	Address Southern Kent Island & Cloverfields problems.	Assess stormwater tools Countywide including regional and on-site approaches.



5.0 Housing and Employment Projections

Introduction

For the purposes of testing the impacts of the two planning options for the County, the comprehensive plan consultants developed 20-year housing unit and job projections. This description explains the methodology and assumptions made for each plan option: Modest Investment and Enhanced Investment.

For each of these two plan options, the consultant team developed two housing projections: one assuming 400 new units coming on line per year (reflecting the ten-year average) and one at an accelerated level of 600 units per year. The level of job creation is varied by plan alternative reflecting the different emphasis of the two options.

A brief description of projection assumptions is including below followed by tables for the 20-year projections. A detailed review of the projection methodology is included in Attachment B including 20-year and annual projection tables.

Modest Investment

Trend Growth (Assumed 400 Units/Year)

The following information was used to make projections for this plan option:

- previous trends based on 10-year housing permits for the allocation of units by County sub-area,
- projected capacity constraints of sanitary sewer treatment plants to serve Growth Areas, and
- total jobs projected using a job to housing ratio for new development, and sub-area allocation based on the availability of vacant non-residentially zoned land.

Residential

The residential allocation is based largely on the past 10-year trend in residential building permits by election district and the projected availability (or lack of) public utilities, specifically public sewer service. Since sewer service under this plan option will be more constrained, it is assumed that some development will be deflected to non-Growth Areas and that within the Growth Areas, some residential development will occur on well and septic on larger lots.



Non-Residential

For the non-residential development, this plan option assumes that Growth Area infrastructure constraints will hamper employment growth in the County. An overall County jobs to housing ratio of approximately 0.60 is assumed a rather low ratio reflecting the County's continued development as a residential community with a large proportion of the working population commuting to other jurisdictions for employment. Jobs were then allocated at the sub-County level based on the relative proportion of total available and undeveloped non-residentially zoned land within each election district and Growth Area.

Accelerated Growth (Assuming 600 Units/Year)

Residential

The 600 units per year is based on the availability of public sewer and increased the residential capture of the northern County election districts and the Queenstown and Centreville Growth Areas to a greater extent than the Chester, Stevensville, Kent Narrows and Grasonville Growth Areas.

Non-Residential

The overall County jobs to housing ratio was held at 0.60. At the sub-county level, job allocations were assumed to be based on the proportional reservoir of available and undeveloped employment lands.

Enhanced Investment

Trend Growth (Assuming 400 Units/Year)

Residential

Since this plan option assumes a more expansive public sewer system to serve the Growth Areas, more development is assumed to occur in the Growth Areas than under the Modest Investment option. In addition, all development within the Growth Areas is assumed to occur on public sewer.

Non-Residential

As with the Modest Investment Plan option, an overall jobs to housing ratio is assumed and then sub-County allocations are projected. However, in this option, a jobs to housing ratio of approximately 0.90 is used since the County is assumed to be able to attract more employment because of the availability of public infrastructure and intensified support for business formation. At the sub-county level, the Growth Areas capture a larger



proportion of the jobs. However, since there are more jobs overall than in the Modest Investment option, a substantial number of jobs are also added to the County's other areas.

Accelerated Growth (Assuming 600 Units/Year)

Residential

As the Stevensville, Chester, Kent Narrows and Grasonville Growth Areas mature, this option assumes that Queenstown and Centreville will develop at an overall higher proportional rate. Development also increases in the northern portion of the County and other non-Growth Areas.

Non-Residential

The overall jobs to housing ratio of the new development is assumed to remain at 0.90 but because of the higher number of housing units, the job growth will be higher.

Tables 1 and 2 show the growth for the 20-year planning horizon by using sub-area and the percent of the development assumed to be served by public sewer.

Table 1: 20-Year Projection, Trend Growth

	Modest Investment, Trend Growth				Enhanced Investment, Trend Growth			
	Units	% Served by Sewer	Jobs	% Served by Sewer	Units	% Served by Sewer	Jobs	% Served by Sewer
Stevensville, Chester, Kent Narrows, Grasonville	4,300	72%	1,400	100%	4,700	100%	4,600	100%
Queenstown	100	0%	300	0%	500	100%	500	100%
Centreville	500	80%	700	57%	900	100%	700	100%
<i>Total Growth Areas</i>	<i>4,900</i>	<i>71%</i>	<i>2,400</i>	<i>75%</i>	<i>6,100</i>	<i>100%</i>	<i>5,800</i>	<i>100%</i>
All Other Areas								
ED 1	400	0%	200	0%	200	0%	200	0%
ED 2	400	0%	600	0%	200	0%	300	0%
ED 3	300	0%	400	0%	200	0%	300	0%
ED 4	800	65%	200	0%	500	100%	200	0%
ED 5	200	0%	400	0%	200	0%	100	0%
ED 6	400	0%	200	0%	200	0%	200	0%
ED 7	600	0%	600	0%	400	0%	400	0%
<i>Total Other Areas</i>	<i>3,100</i>	<i>26%</i>	<i>2,600</i>	<i>0%</i>	<i>1,900</i>	<i>26%</i>	<i>1,700</i>	<i>0%</i>
Total	8,000	54%	5,000	36%	8,000	83%	7,500	77%
% in Growth Areas	61%		48%		76%		77%	



Table 2: 20-Year Projection, Accelerated Growth

	Modest Investment, Trend Growth				Enhanced Investment, Trend Growth			
	Units	% Served by Sewer	Jobs	% Served by Sewer	Units	% Served by Sewer	Jobs	% Served by Sewer
Stevensville, Chester, Kent Narrows, Grasonville	5,200	60%	2,100	67%	5,900	100%	5,700	100%
Queenstown	200	0%	400	0%	1,000	100%	1,000	100%
Centreville	900	44%	1,100	36%	1,800	100%	1,400	100%
<i>Total Growth Areas</i>	<i>6,300</i>	<i>56%</i>	<i>3,600</i>	<i>50%</i>	<i>8,700</i>	<i>100%</i>	<i>8,100</i>	<i>100%</i>
All Other Areas								
ED 1	700	0%	400	0%	400	0%	300	0%
ED 2	700	0%	800	0%	400	0%	600	0%
ED 3	600	0%	600	0%	400	0%	500	0%
ED 4	1,500	35%	400	0%	800	65%	200	0%
ED 5	400	0%	400	0%	200	0%	300	0%
ED 6	700	0%	400	0%	400	0%	300	0%
ED 7	1,100	0%	900	0%	700	0%	700	0%
<i>Total Other Areas</i>	<i>5,700</i>	<i>26%</i>	<i>3,900</i>	<i>0%</i>	<i>3,300</i>	<i>24%</i>	<i>2,900</i>	<i>0%</i>
Total	12,000	42%	7,500	24%	12,000	79%	11,000	74%
% in Growth Areas	53%		48%		73%		74%	

6.0 Assessment of Plan Alternatives

This section provides a summary of the technical results of the infrastructure assessment of the alternative Comprehensive Plan options. The County’s Comprehensive Plan consultants conducted the assessment to determine what infrastructure (schools, transportation and sanitary sewer and water systems) would be needed to serve the plan alternatives and the costs associated with these improvements. This rigorous focus on infrastructure was key because of its importance in directing and shaping the County’s growth and development.

What are the Major Infrastructure Differences Among the Plan Options?

The table below provides a quick summary of the major infrastructure features and differences among plan options. More details are included in Attachments C through E.



Major Elements by Plan Option

Infrastructure Investment Growth	Modest Trend	Modest Accelerated	Enhanced Trend	Enhanced Accelerated
<u>Schools (# of new)</u>				
Elementary Schools	3	5	4	5
Middle Schools	0	1	1	1
High Schools	0	1	1	1
Trailers	56	25	9	14
<u>Transportation</u>				
There are relatively small variations among the options including the improvements to MD 8 on Southern Kent Island and to MD 304 between Centreville and US 301.				
<u>Sanitary Sewer</u>				
Expansion to KN/S/G Plant	3 MGD	3 MGD	4 MGD	4-5 MGD
Upgrade KN/S/G Force Main	Yes	Yes	Yes	Yes
Kent Island Estates/Romancoke/Dominion Marling Farms	Service provided	Service provided	Service provided	Service provided
Queenstown Growth Area Service	No improvements	No improvements	Provided service via potential tie in to Grasonville system	Provided service via potential tie in to Grasonville system
Centreville Growth Area Service	No improvements beyond Town planned plan expansion	No improvements beyond Town planned plan expansion	No improvements beyond Town planned plan expansion	Provided service via potential tie in to Grasonville system via Queenstown
<u>Water</u>				
Northern Kent Island	Northern Kent Island water system consolidation	Northern Kent Island water system consolidation	Northern Kent Island water system consolidation	Northern Kent Island water system consolidation
Kent Island Estates / Romancoke/Dominion/ Marling Farms	Service provided	Service provided	Service provided	Service provided
Chester	No service expansion	No service expansion	Water service expansion & interconnection to Kent Narrows	Water service expansion & interconnection to Kent Narrows
Grasonville	No service expansion	No service expansion	Water service expansion	Water service expansion
Queenstown	No service expansion	No service expansion	Water service interconnection to Kent Narrows	Water service interconnection to Kent Narrows
Centreville	Current system is adequate	Current system is adequate	Current system is adequate	Current system is adequate



Findings in a Nut Shell: How Do Plan Options Measure Up?

Earlier in the Plan Update process the TAC, CAC and citizens were asked to identify the key issues and opportunities that the County faced with respect to growth and development. The result was a set of high priority issues that the Plan Update should address. How well, then, do the plan options address these issues? The chart below shows if the plan option addresses the issues well, partially, or not at all.

Key Issues/Opportunities

- Providing infrastructure to serve Growth Areas and relieve growth pressures on rural areas
- Paying for growth
- Maintaining/improving the quality of life – leisure time activities, parks & recreation, schools, health & human services, activities for youth
- Protecting and improving agriculture & the seafood industry
- Protecting the environment, rivers and streams
- Capitalize on rural lifestyle, natural amenities and environment
- Strategic location to capture more tourism dollars
- Identify and preserve lands for employment
- Establish new rules of the game for larger-scale corporate developers
- Take advantage of new political leadership and momentum

Table 2: How the Plan Options Measure Up Against Key Issues

Key Issues	Modest Investment	Enhanced Investment
Infrastructure Improvements	◐	●
Ability/Tools to pay for growth	◐	◐
Improving quality of life	◐	●
AG/Rural preservation	○	●
Environmental protection	◐	◐
Job growth emphasis	○	●

Legend:

- Addresses Issue Well
- ◐ Addresses Issue Partially
- Does Not Address Issue

What are the Capital Costs for Schools, Sewer, Water and Transportation Infrastructure? What portion of these Estimated Costs will be borne by the County?

The following two tables show the total estimated capital costs and the estimated County portion of those costs over twenty years. How these costs stack up against the County’s historical expenditure is also presented.



Table 3: Estimated Infrastructure Needs by Plan Option (in \$millions) 2000 – 2020

Infrastructure	Plan Option by Growth Forecast			
	Modest Investment		Enhanced Investment	
	Trend	Accelerated	Trend	Accelerated
Schools	\$59	\$109	\$100	\$109
Transportation	\$86	\$100	\$86	\$92
Wastewater *	\$50 -\$58	\$50 -\$58	\$60-\$70	\$70-\$85
Water *	\$16-\$18	\$16-\$18	\$24-\$26	\$26-\$29
Total	\$211 -\$221	\$275-\$285	\$270-\$282	\$297-\$315

* The upper end of the range of wastewater and water costs provides for more generous estimating contingency

Table 4: Estimated County Portion of Infrastructure Needs (in \$millions) 2000-2020

Infrastructure	Plan Option by Growth Forecast			
	Modest Investment		Enhanced Investment	
	Trend	Accelerated	Trend	Accelerated
Schools	\$51	\$86	\$80	\$85
Transportation	\$33	\$33	\$33	\$33
Wastewater *	\$50 -\$58	\$50 -\$58	\$60-\$70	\$70-\$85
Water *	\$16-\$18	\$16-\$18	\$24-\$26	\$26-\$29
Total	\$150-\$160	\$185-\$195	\$197-\$209	\$214-\$232

* The upper end of the range of wastewater and water costs provides for more generous estimating contingency

Infrastructure Costs as Compared to Past County Investment

The following Figures 1 and 2 show the County’s historical investment in infrastructure. Figures 3 and 4 show the estimated cost of the plan options versus the historical investment levels.

Figure 1: County’s Historical Investment in Infrastructure (FY 1990-1999)

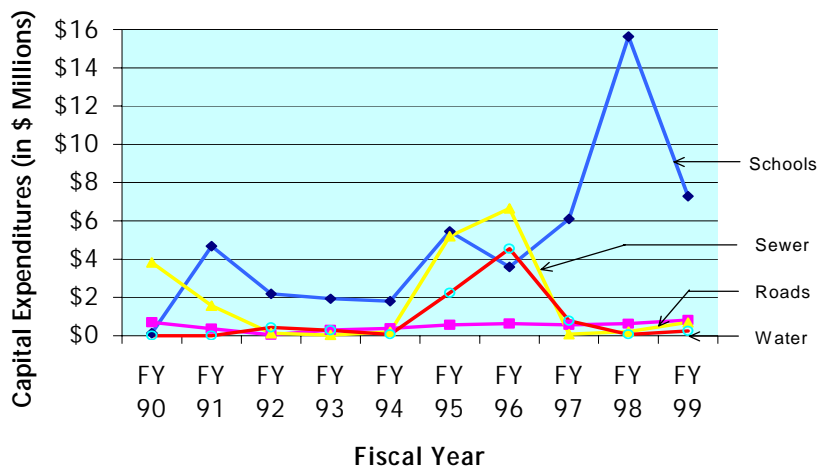


Figure 2: County's Average Annual Infrastructure Investment, FY 1990-1999 (in \$ millions)

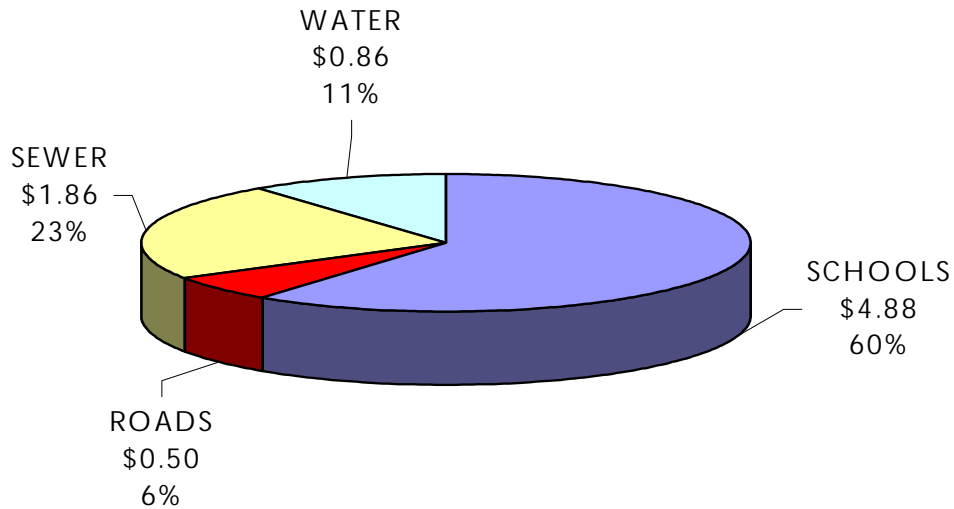


Figure 3: Historical Investment vs. Plan Option (in \$ millions)

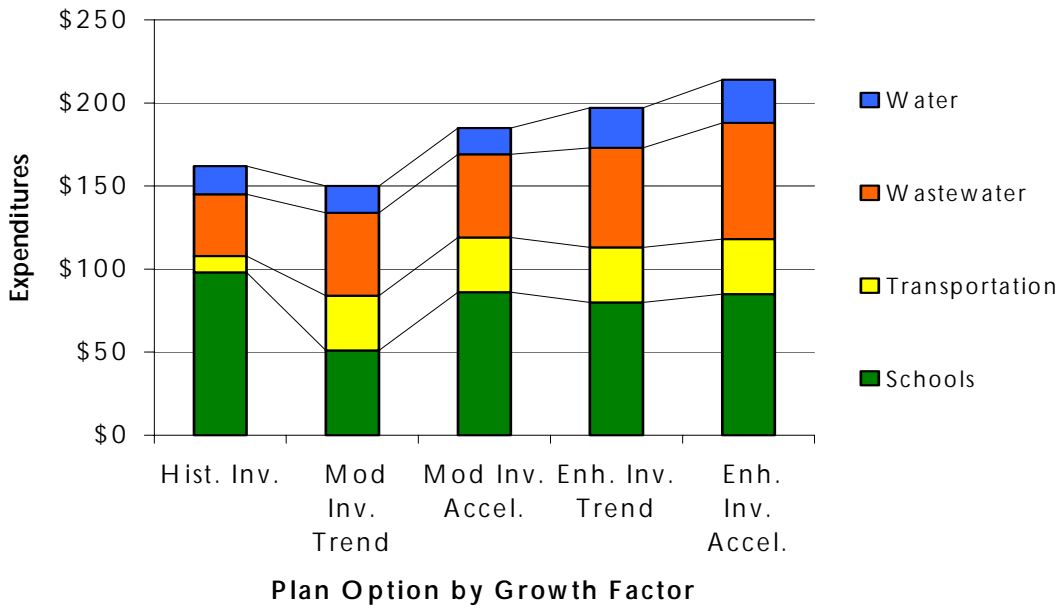
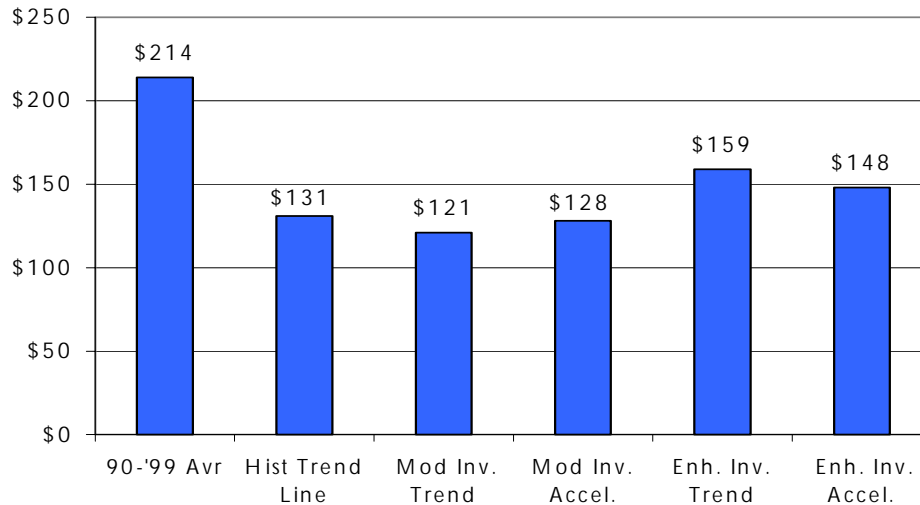


Figure 5: Per Capita Infrastructure Investment vs. Plan Options – Based on 2020 Projected Population (in constant dollars)



7.0 Preferred Plan Option

The County Commissioners and the Planning Commission reviewed the alternatives analysis, assumptions and results to understand the trade-offs between plan options. In the end, the Enhanced Investment option was selected. The Planning consultants and County staff were directed to develop the draft comprehensive plan based on the Enhanced Investment option.

Moving to the Next Level of Planning. After successfully laying the groundwork for rural preservation and designated Growth Areas, the County now needs to move to the next level of planning by implementing infrastructure to facilitate Growth Area development and further protect rural character.

Coordinated Land Use and Infrastructure Planning. If the Enhanced Investment option is pursued, the Comprehensive Plan - the County's key policy document on land use and development - will for the first time be linked with infrastructure planning. This is a major accomplishment.

Commitment to Serve Existing Needs as the Basis for Requiring New Growth to Pay its Fair Share. As the County continues to grow and attract both small and increasingly larger-scale developments, it must have a plan in-place that outlines the County's commitment to infrastructure investment that serves existing needs **and** plans for how it will deal with the impacts related to new growth. Increased investment is needed to serve



the County's existing residents and businesses - water service, sewer line replacement and road enhancements to improve safety and mobility, etc. This is needed so the County can establish a level of service standard for new growth and in the future, enact planning tools and adjust impact fees so as to ensure that existing residents don't pay for the costs of new growth.

Conserving the Rural Portions of the County. The County must aggressively seek to attract development to its Growth Areas so that the rural areas can be conserved. While growth will certainly continue in the County's rural areas (subject to zoning and Critical Area laws) based on market forces and preferences, the County needs to provide infrastructure in the Growth Areas as one way of relieving some of the development pressures on the rural areas.

Economic Development. Until recent decades, the County's economy was predominantly agricultural and water-based. Today, the County is predominantly residential-based with more than half of working residents commuting to other areas for employment. The County's jobs to housing ratio - an indicator of the relative predominance of jobs versus households - is one of the lowest in the State (only Cecil and Calvert have lower ratios). One of the key factors in the County's ability to capture new job growth will be the careful assessment and investment in infrastructure (sewer, water, roads, telecommunications and schools) to promote businesses expansion and development in the County.

Real Infrastructure Constraints Exist. Without increased investment in infrastructure over the next 20 years, the County will not be able to implement its adopted Growth Area community plans - there will just not be enough sewer, water or road capacity.

Fostering Inter-jurisdictional and Regional Planning. Growth does not recognize political boundaries and so our focus on planning should always consider regional and inter-jurisdictional impacts. The County must continue to work cooperatively with the independent towns within its boundaries so that the Growth Areas of Centreville and Queenstown can develop under the County's smart growth plans. The Enhanced Infrastructure investment option will foster and necessitate a close working relationship between governments and their staffs to realize the development of these areas.

Quality of Life. The County must plan for and implement the infrastructure that is necessary to support and enhance the quality of life that makes the County so attractive. Amenities such as public gathering places and civic spaces that provide opportunities to



enhance civic pride and interaction are also an important part of the mix. They can be provided through joint public/private efforts as part of the development process.

Projections

It was assumed that between 2000-2020 that the County would have approximately 500 new housing units per year, the midpoint between the trend and accelerated growth projections. At an average of 2.5 persons per household, this equals 1,250 persons per year.

New jobs are anticipated to form at a rate of 0.9 for each new housing unit for a total of 450 new jobs per year on average.



Attachment A

Description of the Two Plan Alternatives

Two plan options are outlined: Modest Investment and Substantial Investment. Each one is capsulized under the subheading “Main Premise” and then further described under other subheadings specific to geographic sub-areas of the County as well as the related land use, roads, sewer, water, schools and other assumptions.

Option A. Modest Investment

Main Premise

This option identifies the impacts if a current approach is continued. Based on current infrastructure improvement investment and policies, growth is projected and allocated assuming little deviation from current policies by the County. In this option, more development will likely be “pushed” into rural areas by the lack of infrastructure availability in the Growth Areas, increasing pressures on the County’s agricultural areas. In addition, lack of public water and sewer service for the Growth Areas will increase the amount of development on well and septic within the Growth Areas on larger lots. This will reduce the development potential of the Growth Area and may place additional development pressures elsewhere.

Rural Northern Portion of the County

(Note: The assumptions for the northern portion of the County are very similar for both options as these are seen as critically important under any plan option for the County. However, there are some differences in emphasis.)

Land Use Assumptions and Preliminary Implementation Ideas

- There is a need to provide for some economic and residential development in this portion of the County and to proactively manage growth pressures from Delaware and increasing traffic on US 301.
- Focus growth in incorporated towns such as Church Hill, Sudlersville and Millington.
- Zoning Ordinance is revised to include design standards for cluster developments as Agricultural district zoning densities remain unchanged.
- Zoning Ordinance revised to include a new rural cross-roads commercial zoning district for unincorporated communities like Kingstown and Crumpton.
- TDR and non-contiguous development techniques are revised to better facilitate agricultural preservation and large contiguous blocks of the most tillable soils.



Transportation Assumptions and Preliminary Implementation Ideas

- Assume minimal County investment in improving roads in rural areas beyond routine maintenance.
- Actively pursue State-funded improvement of the dangerous US 301 intersections to interchanges.

Sewer and Water Assumptions and Preliminary Implementation Ideas

- No expansion of public sewer and water facilities except limited town annexations to the extent sewer and water capacity exists.

Schools Assumptions and Preliminary Implementation Ideas

- Assume the current dependency on relocatable classrooms is maintained and that School District lines are redrawn as necessary to balance out school capacity with enrollment to reduce the need for new schools County-wide.

Stevensville, Chester, Kent Narrows and Grasonville Growth Areas

Land Use Assumptions and Preliminary Implementation Ideas

- Assume these areas to capture the majority of Growth Area development.

Transportation Assumptions and Preliminary Implementation Ideas

- Assume some improvements to congested intersections but not the extent of the improvements recommended in the adopted community plans.

Sewer and Water Assumptions and Preliminary Implementation Ideas

- Expand the Kent Narrows/Stevensville/Grasonville (KN/S/G) sewer treatment plant from existing 2 MGD capacity to 3 MGD.
- Upgrade the existing KN/S/G sanitary sewer collection system.
- Extend sewer service in a phased approach within Growth Areas (some portions may not be served in the short- or medium-term)
- Water service where not present today is limited by Aquia Aquifer withdrawal limits set by the State. Much of Grasonville is not currently served by public water. Water from the Magothy Aquifer will cost substantially more to treat than water from Aquia due to high iron levels.
- Expansions to water service will continue in an ad hoc manner.

Schools Assumptions and Preliminary Implementation Ideas

- Assume the current dependency of relocatable classrooms is maintained and that School District lines are redrawn as necessary to balance out school capacity with enrollment to reduce the need for new schools County-wide.



Queenstown Growth Area

Land Use Assumptions and Preliminary Implementation Ideas

- Assume only modest increases in development within Queenstown Growth Area adjacent to existing sewer and water service based on a general lack of sewer and water infrastructure availability and limited opportunity for capacity increase (see sewer and water assumptions below).

Transportation Assumptions and Preliminary Implementation Ideas

- Assume some improvements to unsafe or congested intersections but not the extent of the improvements recommended in the adopted community plan.

Sewer and Water Assumptions and Preliminary Implementation Ideas

- Sewer capacity is limited by existing facility size and only modest expansions are planned. Any expansions of service will be to serve areas adjacent to existing service.
- Explore the possible use of spray irrigation as an alternative for County planned development areas in the transition area between future town annexation areas and the County.
- Assume water service will continue in an ad hoc manner.

Schools Assumptions and Preliminary Implementation Ideas

- Assume the current dependency of relocatable classrooms is maintained and that School District lines are redrawn as necessary to balance out school capacity with enrollment to reduce the need for new schools County-wide.

Centreville Growth Area

Land Use Assumptions and Preliminary Implementation Ideas

- Market for growth in this Growth Area is not as strong as the western-most Growth Areas.
- Residential buildout calculations for the Centreville Growth Area show a potential of 4,200 to 6,400 additional units based on existing developable lands and zoning. The current Town plans to expand the treatment plant will only accommodate approximately 15% of the residential potential.
- Show phasing of development out from the existing core Town service area.

Transportation Assumptions and Preliminary Implementation Ideas

- Assume some improvements to congested intersections but not the extent of the improvements recommended in the adopted community plan.

Sewer and Water Assumptions and Preliminary Implementation Ideas

- Existing sewer and water capacity is limited. Current Centreville plans to expand the sewer treatment plant from 375,000 to 500,000 gallons per day capacity will only accommodate an additional 500 housing units.



- Explore the possible use of spray irrigation as an alternative for County planned development areas in the transition area between future town annexation areas and the County.

Schools Assumptions and Preliminary Implementation Ideas

- Assume the current dependency of relocatable classrooms is maintained and that School District lines are redrawn as necessary to balance out school capacity with enrollment to reduce the need for new schools County-wide.

Southern Kent Island (SKI)

Land Use Assumptions and Preliminary Implementation Ideas

- Assume the zoning and plan designations for this area will not change.

Transportation Assumptions and Preliminary Implementation Ideas

- Improve MD 8 to 4-lanes in the northern portion of Southern Kent Island. Need to identify funding sources.

Sewer and Water Assumptions and Preliminary Implementation Ideas

- Address failing septic areas at Romancoke and Kent Island by extending public sewer service to this area and very limited other areas to deal with failing septic issues but do not serve any additional Southern Kent Island areas due to the resultant increase in traffic volumes along MD 8.
- Seek full-cost grant from MDE for access-controlled force main to serve areas of failing septic and to safeguard water quality, otherwise, the costs will have to be passed on to Southern Kent Island customers.
- Assume water service provided in tandem with new sewer service.

Other Assumptions and Preliminary Implementation Ideas

- Address drainage issues through regional stormwater management or a combination of on-site and regional management approaches.

Dominion and Marling Farms

Land Use Assumptions and Preliminary Implementation Ideas

- Assume the zoning and plan designations for this area will not change.

Sewer and Water Assumptions and Preliminary Implementation Ideas

- Address failing septic areas in Dominion and Marling Farms South of Chester on MD 552 via connection to a pump station located to the north.

Option B. Substantial Investment Alternative

Main Premise

Plan for and implement the infrastructure necessary to implement the Growth Areas. The County's current Comprehensive Plan has identified these areas for development but



heretofore the County has not planned for or implemented the infrastructure necessary to permit their development. By investing in infrastructure, the County can expect to accommodate more of its growth in existing communities and thus decrease pressures on the County's important but fragile agricultural economy and way of life.

Rural Northern Portion of the County

(Note: The assumptions for the northern portion of the County are very similar for both options as these are seen as critically important under any plan option for the County. However, there are some differences in emphasis.)

Land Use Assumptions and Preliminary Implementation Ideas

- There is a need to provide for some economic and residential development in this portion of the County and to proactively manage growth pressures from Delaware and increasing traffic on US 301.
- Focus growth in incorporated towns such as Church Hill, Sudlersville and Millington.
- Zoning Ordinance is revised to include design standards for cluster developments as agricultural district zoning densities remain unchanged.
- Zoning Ordinance revised to include a new rural cross-roads commercial zoning district for unincorporated communities like Kingstown and Crumpton.
- TDR and non-contiguous development techniques are revised to better facilitate agricultural preservation.
- Additional County funding is earmarked to purchase easements on agricultural lands.
- Scenic roadways and viewsheds designated and protected especially MD 213 and MD 18 north of US 301.

Transportation Assumptions and Preliminary Implementation Ideas

- Assume minimal County investment in improving roads in rural areas beyond routine maintenance.
- Consider implementing a level of service requirement (at a higher level of service than for more developed Growth Areas) for new subdivision approvals to reduce the strain on State and County roads and phase development with available road capacity.

Sewer and Water Assumptions and Preliminary Implementation Ideas

- No expansion of public sewer and water facilities except limited town annexations to the extent sewer and water capacity exists.

Schools Assumptions and Preliminary Implementation Ideas

- Carefully scrutinized the location of new, currently unplanned schools in the northern area so as to limit incentives for extensive rural area development.

Stevensville, Chester, Kent Narrows and Grasonville Growth Areas

Land Use Assumptions and Preliminary Implementation Ideas

- Identify and preserve key areas for employment.



- Consider relocation of the Bay Bridge Airport and redevelopment/reservation of that prime land for employment uses long-term.
- As older strip retail becomes obsolete along US 50/301 and MD 18, consider County purchase and land banking of these for future employment.
- Consider the development of a conference center/hotel facility.

Transportation Assumptions and Preliminary Implementation Ideas

- Implement the road improvements recommended in the adopted Growth Area plans
- Establish level of service standards for Growth Areas and phase development with the available road capacity, but ensure that development in Growth Areas is not made prohibitively costly, resulting in leapfrogging to rural areas or to well and septic development within Growth Areas.

Sewer and Water Assumptions and Preliminary Implementation Ideas

- Expand the KN/S/G wastewater treatment plant capacity initially to 3 MGD then to 4 MGD and ultimately to 5 MGD.
- Serve all of these Growth Areas with public sewer service.
- Upgrade the existing KN/S/G sanitary sewer collection system.
- Drill new deeper wells in Queenstown and tie-in to an upgraded and integrated existing water system to provide enhanced water service to Queenstown, Grasonville, Kent Narrows, Chester and Stevensville.

Schools Assumptions and Preliminary Implementation Ideas

- Revisit enrollment projections based on both existing trends & accelerated growth rates.

Queenstown Growth Area

Land Use Assumptions and Preliminary Implementation Ideas

- Consider establishment of an enterprise zone in Queenstown.
- Actively pursue a Federal telecommuting center for Queenstown or Centreville.

Transportation Assumptions and Preliminary Implementation Ideas

- Implement the community plan road improvement recommendations.

Sewer and Water Assumptions and Preliminary Implementation Ideas

- Drill new deeper wells in Queenstown and tie-in the existing water system to provide enhanced water service to Queenstown, Grasonville, Kent Narrows, Chester and Stevensville.
- Connect Queenstown Growth Area into the KN/S/G sewer treatment plant.

Schools Assumptions and Preliminary Implementation Ideas

- Revisit enrollment projections based on both existing trends & accelerated growth rates.



Centreville Growth Area

Land Use Assumptions and Preliminary Implementation Ideas

- Actively pursue a Federal telecommuting center for Queenstown or Centreville.
- Through agreement between the Town and County, plan for and implement a substantial expansion to the town's sewer treatment capacity to facilitate development of this Growth Area.

Transportation Assumptions and Preliminary Implementation Ideas

- Implement the community plan road improvement recommendations as well as others deemed necessary.

Sewer and Water Assumptions and Preliminary Implementation Ideas

- Expand the wastewater treatment plant capacity to 1 MGD and develop wells to serve Growth Area in a phased approach.
- Provide sewer service to the County facilities and employment uses at the US 301/MD 304 intersection.

Schools Assumptions and Preliminary Implementation Ideas

- Revisit enrollment projections based on both existing trends & accelerated growth rates.

Southern Kent Island (SKI)

Land Use Assumptions and Preliminary Implementation Ideas

- Assume the zoning and plan designations for this area will not change but that because of sewer service extensions to address failing septic systems, some additional growth will occur.

Transportation Assumptions and Preliminary Implementation Ideas

- Improve MD 8 to 4-lanes in the middle and northern portion of Southern Kent Island. Identify funding sources.

Sewer and Water Assumptions and Preliminary Implementation Ideas

- Address failing septic areas at Romancoke and Kent Island Estates on Southern Kent Island by extending public sewer service to this area and perhaps some small additional areas but do not "open up" the rest of the area.
- Seek funding from MDE for access-restrained force main to serve areas of failing septic and to safeguard water quality, otherwise cost will have to be passed on to Southern Kent Island customers. Because of additional growth capacity, this cost to residents will be somewhat less than in the Modest Investment option.
- Assume water service provided in tandem with new sewer service.

Schools Assumptions and Preliminary Implementation Ideas

- Revisit enrollment projections based on both existing trends & accelerated growth rates.



Dominion and Marling Farms

Land Use Assumptions and Preliminary Implementation Ideas

- Assume the zoning and plan designations for this area will not change.

Sewer and Water Assumptions and Preliminary Implementation Ideas

- Address failing septic areas in Dominion and Marling Farms south of Chester on MD 552 via connection to a pump station located to the north.

Other Assumptions and Preliminary Implementation Ideas

- County to consider subsidizing work force training courses at Chesapeake College for employees of new or expanded businesses.
- Identify a site and purchase land for a second County industrial park.
- Aggressively participate in providing telecommunications infrastructure to make the County more attractive for telecommuting and telecommunications-related businesses.
- Assess tools for stormwater management including on-site techniques such as low impact development as well as regional approaches.
- Review the method used to determine public safety staffing needs to ensure that the County has a satisfactory ratio of personnel to residents and businesses.
- Parks and recreation: focus efforts on providing local and community-level active and passive recreation parks to serve existing and new residents. Also maintain regional park and water access efforts for eco-tourism and economic development.
- Need to establish a rail policy so if major rail lines are deemed excess by the rail companies, the County will have a process in place to decide whether to purchase the track and right-of-way for continued rail use or alternative transportation and recreation or both.



Attachment B

Projections for Queen Anne's County

Introduction

For the purposes of testing the impacts of the two planning options for the County, the Comprehensive Plan consultants developed 20-year housing unit and job projections. This description explains the methodology and assumptions made for each plan option: Modest Investment and Enhanced Investment.

For each of these two plan options, the consultant team developed two housing projections: one assuming 400 new units coming on line per year (reflecting the ten-year average) and one at an accelerated level of 600 units per year. The level of job creation is varied by plan alternative reflecting the different emphasis of the two options.

The review of the projection methodology below first outlines the Modest Investment alternative followed by the Enhanced Investment option. Tables for the annual and the 20-year projects follow these written descriptions.

Option A, Modest Investment

Trend Growth (400 Units/Year)

The following information was used to make projections for this plan option:

- Previous trends based on 10-year housing permits for the allocation of units by County sub-area.
- Projected capacity constraints of sanitary sewer treatment plants to serve Growth Areas.
- Total jobs projected using a job to housing ratio for new development. Sub-area allocation based on the availability of vacant non-residentially zoned land.

Residential

The residential allocation is based largely on the past 10-year trend in residential building permits by election district and the projected availability (or lack of) public utilities, specifically public sewer service. Within Election Districts 3, 4, and 5 the projected residential development was allocated between the Growth Areas and non-Growth Area portions of the Districts. Residential development for the other County Election Districts was also projected. Table 1 shows the assumptions made about the capture for each



election district and the percentage and number split between Growth and non-Growth Areas in Election Districts 3, 4, and 5.

Since sewer service under this plan option will be more constrained, it is assumed that some development will be deflected to non-Growth Areas and that within the Growth Areas, some residential development will occur on well and septic on larger lots.

All existing improved lots within Kent Island Estates and Romanoke are assumed to gain sewer service to address long-standing and serious problems with failing septic systems and potential harm to the ground water supply. In addition, another 475 additional unimproved lots in this area are assumed to gain access to public sewer. This number is based on the assumption of maximum lot consolidation based on existing patterns of common ownership in the area.

Non-Residential

For the non-residential development, this plan option assumes that Growth Area infrastructure constraints will hamper employment growth in the County. We assume an overall County jobs to housing ratio of approximately 0.60 -- a rather low ratio reflecting the County's continued development as a residential community with a large proportion of the working population commuting to other jurisdictions for employment. Jobs were then allocated at the sub-county level based on the relative proportion of total available and undeveloped non-residentially zoned land within each election district and Growth Area.

Accelerated Growth (600 Units/Year)

Residential

The 600 units per year were allocated based on the availability of public sewer and increased the residential capture of the northern County election districts and the Queenstown and Centreville Growth Areas to a greater extent than the Chester, Stevensville, Kent Narrows and Grasonville Growth Areas. As with the trend growth above, all existing improved lots within Kent Island Estates and Romanoke are assumed to gain sewer service to address long-standing and serious problems with failing septic systems and potential harm to the ground water supply. In addition, another 475 additional unimproved lots in this area are assumed to gain access to public sewer. This number is based on the assumption of maximum lot consolidation based on existing patterns of common ownership in the area.



Non-Residential

The overall County jobs to housing ratio was held at 0.60. At the sub-county level, job allocations were assumed to be based on the proportional reservoir of available and undeveloped employment lands.

Option B, Enhanced Investment

Trend Growth (400 Units/year)

Residential

Since this plan option assumes a more expansive public sewer system to serve the Growth Areas, more development is assumed to occur in the Growth Areas than under the Modest Investment Option. In addition, all development within the Growth Areas is assumed to occur on public sewer.

As with the Modest Investment Option, all existing improved lots within Kent Island Estates and Romanoke are assumed to gain sewer service to address long-standing and serious problems with failing septic systems and potential harm to the ground water supply. In addition, another 475 additional unimproved lots in this area are assumed to gain access to public sewer. This number is based on the assumption of maximum lot consolidation based on existing patterns of common ownership in the area.

Non-Residential

As with the Modest Investment Option, an overall jobs to housing ratio is assumed and then sub-County allocations are projected. However, in this option, a jobs to housing ratio of approximately 0.90 is used since the County is assumed to be able to attract more employment because of the availability of public infrastructure and intensified support for business formation. Since there are more jobs overall than in the Modest Investment Option, a substantial number of jobs are also added to the County's other areas.

Accelerated Growth (600 Units/Year)

Residential

As the Stevensville, Chester, Kent Narrows and Grasonville Growth Areas mature, this option assumes that Queenstown and Centreville will develop at an overall higher proportional rate. Development also increases in the northern portion of the County and other non-Growth Areas.

As above, all existing improved lots within Kent Island Estates and Romanoke are assumed to gain sewer service to address long-standing and serious problems with failing



septic systems and potential harm to the ground water supply. In addition, another 475 additional unimproved lots in this area are assumed to gain access to public sewer. This number is based on the assumption of maximum lot consolidation based on existing patterns of common ownership in the area.

Non-Residential

The overall jobs to housing ratio of the new development is assumed to remain at 0.90 but because of the higher number of housing units, the job growth will also be higher than the Trend Growth option.

Tables 2 and 3 show the assumed *annual* housing unit and job growth by County sub-area and the percentage of the growth occurring in the County's Growth Areas for both plan options. Tables 4 and 5 show the growth for the *20-year* planning horizon and the percent of the development assumed to be served by public sewer.

Table 1: Sub-area Residential Allocation Assumption, Modest Investment

	ED Annual Historic Permits	Allocation by Percent of 400	Number Allocated (Rounded)
Election District 4			
Assumed Capture	190		
Stevensville GA		35%	65
Chester GA		35%	65
Kent Narrows GA		10%	20
Assumed Part in Growth Areas		80%	150
Assumed Part in Other		20%	40
Election District 5			
Assumed Capture	80		
Grasonville GA		80%	65
Queenstown GA		5%	5
Assumed Part in Growth Areas		85%	70
Assumed Part in Other		15%	10
Election District 3			
Assumed Capture	40		
Centreville GA		50%	20
Assumed Part in Other		50%	20
Election District 1	20	100%	20
Election District 2	20	100%	20
Election District 6	20	100%	20
Election District 7	30	100%	30
Total	400		400



Table 2: Annual Projections, Trend Growth (400 Units/year)

	Modest Investment, Trend Growth		Enhanced Investment, Trend Growth	
	Units	Jobs	Units	Jobs
Stevensville, Chester, Kent Narrows, Grasonville Queenstown Centreville Total Growth Areas	215 5 25 245	70 15 35 120	235 25 45 305	230 25 35 290
All Other Areas				
ED 1	20	10	10	10
ED 2	20	30	10	15
ED 3	15	20	10	15
ED 4	40	10	25	10
ED 5	10	20	10	5
ED 6	20	10	10	10
ED 7	30	30	20	20
Total Other Areas	155	130	95	85
Total	400	250	400	375
<i>% in Growth Areas</i>	<i>61%</i>	<i>48%</i>	<i>76%</i>	<i>77%</i>

Table 3: Annual Projections, Accelerated Growth (600 Units/Year)

	Modest Investment, Accelerated Growth		Enhanced Investment, Accelerated Growth	
	Units	Jobs	Units	Jobs
Stevensville, Chester, Kent Narrows, Grasonville Queenstown Centreville Total Growth Areas	260 10 45 315	105 20 55 180	295 50 90 435	285 50 70 405
All Other Areas				
ED 1	35	20	20	15
ED 2	35	40	20	30
ED 3	30	30	20	25
ED 4	75	20	40	10
ED 5	20	20	10	15
ED 6	35	20	20	15
ED 7	55	45	35	35
Total Other Areas	285	195	165	145
Total	600	375	600	550
<i>% in Growth Areas</i>	<i>53%</i>	<i>48%</i>	<i>73%</i>	<i>74%</i>



Table 4: 20-Year Projections, Trend Growth

	Modest Investment, Trend Growth				Enhanced Investment, Trend Growth			
	Units	% Served by Sewer	Jobs	% Served by Sewer	Units	% Served by Sewer	Jobs	% Served by Sewer
Stevensville, Chester, Kent Narrows, Grasonville Queenstown Centreville	4,300	72%	1,400	100%	4,700	100%	4,600	100%
Total Growth Areas	4,900	71%	2,400	75%	6,100	100%	5,800	100%
All Other Areas								
ED 1	400	0%	200	0%	200	0%	200	0%
ED 2	400	0%	600	0%	200	0%	300	0%
ED 3	300	0%	400	0%	200	0%	300	0%
ED 4	800	65%	200	0%	500	100%	200	0%
ED 5	200	0%	400	0%	200	0%	100	0%
ED 6	400	0%	200	0%	200	0%	200	0%
ED 7	600	0%	600	0%	400	0%	400	0%
Total Other Areas	3,100	26%	2,600	0%	1,900	26%	1,700	0%
Total	8,000	54%	5,000	36%	8,000	83%	7,500	77%
<i>% in Growth Areas</i>	<i>61%</i>		<i>48%</i>		<i>76%</i>		<i>77%</i>	

Table 5: 20-Year Projection, Accelerated Growth

	Modest Investment, Accelerated Growth				Enhanced Investment, Accelerated Growth			
	Units	% Served by Sewer	Jobs	% Served by Sewer	Units	% Served by Sewer	Jobs	% Served by Sewer
Stevensville, Chester, Kent Narrows, Grasonville Queenstown Centreville	5,200	60%	2,100	67%	5,900	100%	5,700	100%
Total Growth Areas	6,300	56%	3,600	50%	8,700	100%	8,100	100%
All Other Areas								
ED 1	700	0%	400	0%	400	0%	300	0%
ED 2	700	0%	800	0%	400	0%	600	0%
ED 3	600	0%	600	0%	400	0%	500	0%
ED 4	1,500	35%	400	0%	800	65%	200	0%
ED 5	400	0%	400	0%	200	0%	300	0%
ED 6	700	0%	400	0%	400	0%	300	0%
ED 7	1,100	0%	900	0%	700	0%	700	0%
Total Other Areas	5,700	26%	3,900	0%	3,300	24%	2,900	0%
Total	12,000	42%	7,500	24%	12,000	79%	11,000	74%
<i>% in Growth Areas</i>	<i>53%</i>		<i>48%</i>		<i>73%</i>		<i>74%</i>	



Attachment C

Schools Projections Methodology and Estimated Costs

The following narrative describes the methodology used to convert household projections to public school enrollment projections and related capital expenditures. The first two steps project the annual increase in public school pupil generation by Election District (Tables 1, 2, & 3). In step 3, these projections were converted to School Districts to complete the analysis.

- 1 The projected new housing units by Election District were disaggregated into single-family and multi-family units. A split of approximately 15% multi-family and 85% single-family was used. (In 1990, the split was 14% to 86%). All the multi-family units were assumed to be in Election Districts 3, 4, and 5. Table 1 shows the annual single-family and multi-family units by plan option. As the reader will recall, the plan options are defined as: A. Modest Investment and B. Enhanced Investment. For each option, two growth rates are assumed: Trend Growth (at 400 units per year) and Accelerated Growth (600 units per year).
- 2 To project the pupil generation by type of dwelling unit, the plan consultants used factors developed in 1996 by Tischler & Associates, Inc. as part of that firm's in-depth analysis of the County's levels of service standards for a fiscal impact study and recommendations. However, these factors were augmented by approximately 1.3 times the Tischler factors to more accurately reflect the County's pupil generation rates. These adjusted factors (see Table 2) were multiplied by the projected new units to yield the new pupil generation. Table 3 shows the resulting projected annual enrollment increase.
- 3 In this step the projections by Election District were assigned to School Districts. Since there is only some convergence between election districts and School Districts, a best fit was approximated. This is probably adequate given the level of this analysis and the understanding that School Districts can and may change in the future. Table 4 shows the assumed cross-tabulation between election and School Districts. The School Districts are named for the school within the district.
- 4 Tables 5 through 8 show the projected new students, existing School District capacity and projected surpluses or shortages. This analysis is completed under two



different assumptions. One assumes no change in the current use of relocatables and one the other assumes no relocatables. For this analysis, it was assumed that “existing” capacity and existing relocatable capacity include the currently programmed improvements to several schools and two new schools: the third elementary school on Kent Island and a Kent Island-Grasonville middle school.

Table 1: Annual Single Family & Multi-Family Units by Plan Option

Option A: Modest Investment, Trend Growth			
Election District	Total Units	SF Units	MF Units
1	20	20	0
2	20	20	0
3	40	33	7
4	200	166	34
5	70	58	12
6	20	20	0
7	30	30	0
Totals	400	347	53
Option A: Modest Investment, Accelerated Growth			
1	35	35	0
2	35	35	0
3	75	62	14
4	270	221	49
5	95	78	17
6	35	35	0
7	55	55	0
Totals	600	521	79
Option B: Enhanced Investment, Trend Growth			
1	10	10	0
2	10	10	0
3	55	47	8
4	25	21	4
5	270	229	41
6	10	10	0
7	20	20	0
Totals	400	347	53
Option B: Enhanced Investment, Accelerated Growth			
1	20	20	0
2	20	20	0
3	110	92	18
4	40	34	6
5	355	298	57
6	20	20	0
7	35	35	0
Totals	600	520	80

Source: LDR International, Inc



Table 2: Pupil Generation Factor by Type of Dwelling Unit

Level	SF	MF
Elementary School	0.24518	0.16717
Middle School	0.12259	0.08918
High School	0.12259	0.08918
Total	0.5	0.3

Source: Tischler & Associates, Inc

Table 3: Projected Annual Enrollment Increase

Option A: Modest Investment, Trend Growth				
Election District	Elementary School	Middle School	High School	Total
1	5	2	2	
2	5	2	2	
3	9	5	5	
4	46	23	23	
5	16	8	8	
6	5	2	2	
7	7	4	4	
Totals	94	47	47	189
Option A: Modest Investment, Accelerated Growth				
1	9	4	4	
2	9	4	4	
3	17	9	9	
4	62	31	31	
5	22	11	11	
6	9	4	4	
7	13	7	7	
Totals	141	71	71	283
Option B: Enhanced Investment, Trend Growth				
1	2	1	1	
2	2	1	1	
3	13	6	6	
4	47	24	24	
5	22	11	11	
6	2	1	1	
7	5	2	2	
Totals	94	47	47	189
Option B: Enhanced Investment, Accelerated Growth				
1	5	2	2	
2	5	2	2	
3	26	13	13	
4	61	31	31	
5	31	16	16	
6	5	2	2	
7	9	4	4	
Totals	141	71	71	283

Source: LDR International, Inc.



Table 4: Election School District Cross-Tab

School District	Election District
Elementary School Districts	
Kent Island	4
Grasonville	5
Centreville	3, 6
Church Hill	7
Sudlersville	1
Middle School Districts	
Stevensville	4
Centreville	3, 5, 6
Sudlersville	1, 2, 7
High School Districts	
Kent Island	4, 5
Queen Anne's	1, 2, 3, 6, 7

Source: LDR International, Inc.

Tables 5 through 8 show the need for new schools by plan option and growth. The analysis uses the County's specifications for new school capacity of 600 students for an elementary school, 800 for a middle school and 1,200 students for a high school. This analysis indicates where new schools are likely to be needed by school level and plan option. The following summarizes the findings shown on the tables.

Elementary Schools

Option A: Modest Investment, Trend Growth

- Need for one additional Kent Island elementary school within the 20-year horizon assuming the retention of existing relocatable capacity (it would be two if relocatable capacity were replaced). This is in addition to the already programmed third elementary school on Kent Island.
- The Grasonville District will be substantially over-capacity but can be handled with relocatable units.
- Centreville and Sudlersville Districts will both be substantially over-capacity.
- The Church Hill District is projected to be just below capacity.

Summary: Therefore, our estimate includes three new schools to serve the needs of the Kent Island, Centreville and Sudlersville Districts and relocatable units to serve the needs of the Grasonville District.

Option A: Modest Investment, Accelerated Growth

- Strong need for two additional Kent Island elementary schools within the 20-year horizon. This is in addition to the already programmed third elementary school on Kent Island.



- Need for an additional elementary school in the Grasonville District.
- Need for an additional school in both the Centreville and Sudlersville School Districts.
- The Church Hill District is projected to have a slight capacity shortfall by the end of the 20-year horizon.

Summary: Based on the above analysis, the new schools estimate includes two new schools to serve Kent Island, one new school to serve the Grasonville District, one new school for the Centreville District and one new school for the Sudlersville District. Two relocatable units are assumed to serve the Church Hill District.

Option B: Enhanced Investment, Trend Growth

- Two new schools in the Kent Island District assuming no use of relocatables. This is in addition to the already programmed third elementary school on Kent Island.
- Substantial capacity shortages in Grasonville and Centreville Districts, with less severe capacity shortages in the Sudlersville District. Some surplus capacity projected in the Church Hill District.

Summary: Based on the above analysis, two new schools are assumed for the Kent Island District, one for the Grasonville District and one for the Centreville District. Relocatable units are assumed to handle the need in the Sudlersville District.

Option B: Enhanced Investment, Accelerated Growth

- Need for two new schools in the Kent Island District assuming no use of relocatables. This is in addition to the already programmed third elementary school on Kent Island.
- The Grasonville District will also have a substantial capacity shortfall, requiring a new school.
- New school is warranted for the Centreville District.
- Substantial capacity shortfall is projected in the Sudlersville District, necessitating a new school.
- The Church Hill District is projected to have a slight capacity surplus.

Summary: Based on the above analysis, two new schools for the Kent Island District (assuming no use of relocatables), one for the Grasonville District, one for the Centreville District and one for the Sudlersville District.

Middle Schools

Option A: Modest Investment, Trend Growth

- The Centreville District is projected to have a capacity shortfall, the Sudlersville District will have a slight capacity shortfall, and the Kent Island District will have a substantial capacity surplus because of the programmed Kent Island-Grasonville new school.



Summary: Given these projections, no new schools are anticipated. Relocatable units are assumed to be used in the Centreville and Sudlersville Districts.

Option A: Modest Investment, Accelerated Growth

- A substantial capacity shortfall is projected for the Centreville District.
- The Sudlersville District is projected to have a less severe shortfall than the Centreville District.
- A substantial capacity surplus is projected in the Kent Island District.

Summary: Based on the above analysis, one new school to serve the Centreville District is projected to be needed. Relocatables are assumed to be used in the Sudlersville District.

Option B: Enhanced Investment, Trend Growth

- Capacity shortfall projected in the Centreville District.
- Substantial capacity surplus in the Kent Island District and a slight capacity surplus in the Sudlersville District.

Summary: Based on the above analysis, one new school assumed for the Centreville District.

Option B: Enhanced Investment, Accelerated Growth

- Substantial capacity shortage is projected in the Centreville District.
- Capacity surplus projected in the Kent Island District.
- A slight capacity shortfall is projected in the Sudlersville District but not enough to warrant a new school.

Summary: Based on the above analysis, one new school is projected for the Centreville District. Relocatable units are assumed for the Sudlersville District.

High Schools

Option A: Modest Investment, Trend Growth

- The Kent Island District is projected to have a capacity shortfall and Queen Anne's District is projected to operate only slightly above capacity by the end of the planning.

Summary: No new schools are projected; relocatable units are assumed to address shortages at Kent Island and Queen Anne's Districts.



Option A: Modest Investment, Accelerated Growth

- Kent Island District is projected to have a substantial capacity shortfall whereas the Queen Anne's District shortfall will be less severe.

Summary: One new school is assumed for the Kent Island District; relocatables are assumed to address the Queen Anne's District capacity shortfall.

Option B: Enhanced Investment, Trend Growth

- Kent Island District is projected to have a capacity shortfall. The Queen Anne's District is projected to have a very slight capacity shortfall by the end of the planning horizon.

Summary: One new school is projected for the Kent Island District.

Option B: Enhanced Investment, Accelerated Growth

- The Kent Island District is projected to have a substantial capacity shortfall.
- The Queen Anne's District shortfall will be more minimal than the Kent Island District.

Summary: One new high school is assumed for the Kent Island District; relocatable units to address the shortfall in the Queen Anne's District.



Table 5: Option A – Modest Investment with Trend Growth

Projected Enrollment by School District											
	Annual Increase in Students	20 Year Increase in Students	1999 Enrollment	Enrollment: Increase + existing	Existing Capacity ¹	Projected (Shortfall) / Surplus	Existing Relocatable Capacity ²	Projected Capacity w/out Relocatables	(Shortfall)/ Surplus w/out Relocatables	New Schools Needed w/ Relocatables	New Schools Needed w/out Relocatables
<u>Elementary School District</u>											
Kent Island	46	928	1,351	2,279	1,645	(634)	260	1,385	(894)	1.1	1.5
Grasonville	16	324	335	659	500	(159)	0	500	(159)	0.3	0.3
Centreville	14	284	776	1,060	819	(214)	0	819	(241)	0.4	0.4
Church Hill	5	98	264	362	399	37	0	399	37	(0.1)	(0.1)
Sudlersville	12	245	383	628	349	(279)	0	349	(279)	0.5	0.5
Total	94	1,879	3,109	4,988	3,712	(1,276)	260	3,452	(1,536)	2.1	2.6
<u>Middle School District</u>											
Stevensville	23	468	747	1,215	1,600	385	0	1,600	385	(0.5)	(0.5)
Centreville	15	306	591	897	725	(172)	40	685	(212)	0.2	0.3
Sudlersville	9	172	330	502	450	(52)	0	450	(52)	0.1	0.1
Total	47	946	1,668	2,614	2,775	161	40	2,735	121	(0.2)	(0.2)
<u>High School District</u>											
Kent Island	32	631	929	1,560	1,200	(360)	0	1,200	(360)	0.3	0.3
Queen Anne's	16	314	968	1,282	1,247	(35)	0	1,247	(35)	0.03	0.03
Total	47	946	1,897	2,843	2,447	(396)	0	2,447	(396)	0.3	0.3

Source: LDR International, Inc.

Notes:

Assumed Capacities of New Facilities:

- 600 Elementary School
- 800 Middle School
- 1,200 High School

¹ Includes a third elementary school on Kent Island, a new MS (KI-Grasonville), and upgrades to Sudlersville ES and MS, Centreville ES which are programmed in CIP

² Relocatables at Kennard & Sudlersville ES & MS and Queen Anne's HS assumed to be removed when expansion completed.



Table 6: Option A – Modest Investment with Accelerated Growth

	Projected Enrollment by School District										
	Annual Increase in Students	20 Year. Increase in Students	1999 Enrollment	Enrollment: Increase + existing	Existing Capacity ¹	Projected (Shortfall) / Surplus	Existing Relocatable Capacity ²	Projected Capacity w/out Relocatables	(Shortfall)/ Surplus w/out Relocatables	New Schools Needed w/ Relocatables	New Schools Needed w/out Relocatables
<u>Elementary School District</u>											
Kent Island	62	1,248	1,351	2,599	1,645	(954)	260	1,385	(1,214)	1.6	2.0
Grasonville	22	439	335	774	500	(274)	0	500	(274)	0.5	0.5
Centreville	26	518	776	1,294	819	(475)	0	819	(475)	0.8	0.8
Church Hill	9	172	264	436	399	(37)	0	399	(37)	0.06	0.06
Sudlersville	22	441	383	824	349	(475)	0	349	(475)	0.8	0.8
Total	141	2,819	3,109	5,928	3,712	(2,216)	260	3,452	(2,476)	3.7	4.1
<u>Middle School District</u>											
Stevensville	31	630	747	1,377	1,600	223	0	1,600	223	(0.3)	(0.3)
Centreville	24	482	591	1,073	725	(348)	40	685	(388)	0.4	0.49
Sudlersville	15	306	330	636	450	(186)	0	450	(186)	0.2	0.2
Total	71	1,418	1,668	3,086	2,775	(311)	40	2,735	(351)	0.4	0.4
<u>High School District</u>											
Kent Island	43	851	929	1,780	1,200	(580)	0	1,200	(580)	0.5	0.5
Queen Anne's	28	567	968	1,535	1,247	(288)	0	1,247	(288)	0.24	0.24
Total	71	1,418	1,897	3,315	2,447	(868)	0	2,447	(868)	0.7	0.7

Source: LDR International, Inc.

Notes:

Assumed Capacities of New Facilities:

600 Elementary School

800 Middle School

1,200 High School

¹ Includes a third elementary school on Kent Island, a new MS (KI-Grasonville), and upgrades to Sudlersville ES and MS, Centreville ES which are programmed in CIP

² Relocatables at Kennard & Sudlersville ES &MS and Queen Anne's HS assumed to be removed when expansion completed.



Table 7: Option B – Enhanced Investment with Trend Growth

	Projected Enrollment by School District										
	Annual Increase in Students	20 Year. Increase in Students	1999 Enrollment	Enrollment: Increase + existing	Existing Capacity ¹	Projected (Shortfall) / Surplus	Existing Relocatable Capacity ²	Projected Capacity w/out Relocatables	(Shortfall)/ Surplus w/out Relocatables	New Schools Needed w/ Relocatables	New Schools Needed w/out Relocatables
<u>Elementary School District</u>											
Kent Island	47	934	1,351	2,285	1,645	(640)	260	1,385	(900)	1.1	1.5
Grasonville	22	443	335	778	500	(278)	0	500	(278)	0.5	0.5
Centreville	15	306	776	1,082	819	(263)	0	819	(263)	0.4	0.4
Church Hill	2	49	264	313	399	86	0	399	86	(0.1)	(0.1)
Sudlersville	7	147	383	530	349	(181)	0	349	(181)	0.3	0.3
Total	94	1,880	3,109	4,989	3,712	(1,277)	260	3,452	(1,537)	2.1	2.6
<u>Middle School District</u>											
Stevensville	24	470	747	1,217	1,600	383	0	1,600	383	(0.5)	(0.5)
Centreville	19	377	591	968	725	(243)	40	685	(283)	0.3	0.4
Sudlersville	5	98	330	428	450	22	0	450	22	(0.0)	(0.0)
Total	47	946	1,668	2,614	2,775	161	40	2,735	121	(0.2)	(0.2)
<u>High School District</u>											
Kent Island	35	694	929	1,623	1,200	(423)	0	1,200	(423)	0.4	0.4
Queen Anne's	13	252	968	1,220	1,247	27	0	1,247	27	(0.02)	(0.02)
Total	47	946	1,897	2,843	2,447	(396)	0	2,447	(396)	0.3	0.3

Source: LDR International, Inc.

Notes:

Assumed Capacities of New Facilities:

- 600 Elementary School
- 800 Middle School
- 1,200 High School

¹ Includes a third elementary school on Kent Island, a new MS (KI-Grasonville), and upgrades to Sudlersville ES and MS, Centreville ES which are programmed in CIP

² Relocatables at Kennard & Sudlersville ES & MS and Queen Anne's HS assumed to be removed when expansion completed.



Table 8: Option B – Enhanced Investment with Accelerated Growth

	Projected Enrollment by School District										
	Annual Increase in Students	20 Year. Increase in Students	1999 Enrollment	Enrollment: Increase + existing	Existing Capacity ¹	Projected (Shortfall) / Surplus	Existing Relocatable Capacity ²	Projected Capacity w/out Relocatables	(Shortfall)/ Surplus w/out Relocatables	New Schools Needed w/ Relocatables	New Schools Needed w/out Relocatables
<u>Elementary School District</u>											
Kent Island	61	1,213	1,351	2,564	1,645	(919)	260	1,385	(1,179)	1.5	2.0
Grasonville	31	629	335	964	500	(464)	0	500	(464)	0.8	0.8
Centreville	31	610	776	1,386	819	(567)	0	819	(567)	0.9	0.9
Church Hill	5	98	264	362	399	37	0	399	37	(0.1)	(0.1)
Sudlersville	13	270	383	653	349	(340)	0	349	(304)	0.5	0.5
Total	141	2,820	3,109	5,929	3,712	(2,217)	260	3,452	(2,477)	3.7	4.1
<u>Middle School District</u>											
Stevensville	31	611	747	1,358	1,600	242	0	1,600	242	(0.3)	(0.3)
Centreville	31	624	591	1,215	725	(490)	40	685	(530)	0.6	0.7
Sudlersville	9	184	330	514	450	(64)	0	450	(64)	0.08	0.08
Total	71	1,419	1,668	3,087	2,775	(312)	40	2,735	(352)	0.4	0.4
<u>High School District</u>											
Kent Island	46	928	929	1,857	1,200	(657)	0	1,200	(657)	0.5	0.5
Queen Anne's	25	491	968	1,459	1,247	(212)	0	1,247	(212)	0.2	0.2
Total	71	1,419	1,897	3,316	2,447	(869)	0	2,447	(869)	0.7	0.7

Source: LDR International, Inc.

Notes:

Assumed Capacities of New Facilities:

600 Elementary School

800 Middle School

1,200 High School

¹ Includes a third elementary school on Kent Island, a new MS (KI-Grasonville), and upgrades to Sudlersville ES and MS, Centreville ES which are programmed in CIP

² Relocatables at Kennard & Sudlersville ES &MS and Queen Anne's HS assumed to be removed when expansion completed.



Cost Estimates

Based on the above analysis and on information from the County's Finance Office about the capital costs associated with the construction of new schools, the following preliminary cost estimates were developed. The following are the assumed per school capital costs. Land costs, estimated by LDR, are also included. Also noted is the cost per relocatable unit (or trailer), which each are assumed to accommodate approximately 20 students.

- Elementary School: \$8.04 million
- Middle School: \$12.07 million
- High School: \$24 million
- Relocatable units: \$60,000

Listed below are the budgeted capital expenditures for new schools and renovations to existing facilities that are included in the County's five-year budget:

- Kennard renovation
- Sudlersville Elementary School renovation
- Queen Anne's High School renovation
- Centreville Elementary School Renovation
- New Kent Island Elementary School
- New Grasonville-Kent Island Middle School

Table 9 shows the cost estimates by Plan Option and growth rate.

Table 9: Preliminary Cost Estimates (in \$ million) 2000 –2020

Schools	Modest Investment				Enhanced Investment			
	Trend Growth		Accelerated Growth		Trend Growth		Accelerated Growth	
	Number	Cost	Number	Cost	Number	Cost	Number	Cost
Elementary School	3	\$24.1	5	\$ 40.2	4	\$ 32.1	5	\$ 40.1
Middle School	0	\$ -	1	\$ 12.0	1	\$ 12.0	1	\$ 12.0
High School	0	\$ -	1	\$ 24.0	1	24.0	1	\$ 24.0
Relocatable Units	56	\$ 3.4	25	\$ 1.5	9	\$ 0.5	14	\$ 0.8
Budgeted improvements		\$ 31.6		\$ 31.6		\$ 31.6		\$ 31.6
Total Schools	3	\$ 59.1	7	\$ 109.3	6	\$ 100.3	7	\$ 108.6

* FY 2000 – 2005 budget improvements include: QAC High School, Centreville Elementary School, and Sudlersville renovations & new Elementary School & new Middle School.

Source: LDR International, Inc.; budgeted improvements from QAC Finance Office



Attachment D

Transportation Assessment

MEMO TO: Jane Dembner
LDR International, Inc.
FROM: Harvey R. Joyner, P.E.
DATE: November 27, 1999
SUBJECT: Queen Anne's County Transportation Improvement Needs Associated
With Alternative Planning Options and Growth Forecasts

This memo provides preliminary conclusions on transportation improvement needs for Queen Anne's County as related to the Option A (Modest Investment) and Option B (Enhanced Investment) planning options and Trend and Accelerated growth forecasts for each planning option. In effect, I assessed four scenarios representing combinations of planning option and growth forecast:

- Modest Investment / Trend Growth
- Modest Investment / Accelerated Growth
- Enhanced Investment / Trend Growth
- Enhanced Investment / Accelerated Growth

The number of jobs added to the County over the next 20 years ranged from a low of 5,000 under the Modest Investment / Trend Growth scenario to 11,000 under the Enhanced Investment / Accelerated Growth scenario. County growth in households ranged from 8,000 for Trend Growth to 12,000 for Accelerated Growth with no difference between planning options.

As a general observation and preview of the results of the needs analysis, transportation improvements needs do not vary substantially among the four scenarios. In a few cases the concentration of development under a particular scenario within a constrained area, such as the southern part of the MD 8 corridor on Kent Island, produced the need for an improvement uniquely associated with that scenario. However, in most cases the differences among scenarios were not great enough to produce significantly different conclusions as to needed transportation facilities.

I have not estimated future traffic on US 50 and US 301. Any future improvements to these routes will clearly be the State's responsibility, and because of their role as important through traffic corridors, growth in through traffic will likely be as significant (or more so) as the effects of new, local traffic on these routes. Queen Anne's County



should ensure that effective alternatives to these routes are developed for local, intra-county travel, especially during peak summer traffic periods. This is a major reason why improvements to MD 18, which parallels critical sections of both US 50 and US 301, are so important to the County.

My assessment also assumes that most of the trips by non-County residents that would be attracted by retail growth in the Queenstown and Kent Island areas will use these two primary routes. Thus, the County should pay particular attention to the local routes that link the retail areas to interchanges on these routes.

Methodology and Basic Assumptions

A sketch planning approach was employed in estimating future transportation improvement needs for each of the four planning/growth scenarios described above.

An average daily trip generation rate of ten vehicle trips per household was used to translate growth in households to growth in vehicular travel. This is an average household trip rate from the Institute of Transportation Engineers' handbook on trip generation. I don't know of any hard data on trip generation for Queen Anne's County, but I would say that if anything, this is erring on the high side, given my impressions of the County's demographics. Trip estimates were then boosted by another 10 percent to account for non-household travel, such as travel by non-County residents.

Household trips were estimated for subareas, such as the County's Growth Areas and those parts of election Districts falling outside the Growth Areas. Trips were aggregated by major traffic shed and assigned to appropriate routes. Estimated growth in vehicle trips was added to the latest traffic counts provided by the SHA to produce an estimate of total future traffic on major routes. Where appropriate, traffic generation from a sector of the County was split among two or more routes that serve the sector.

After developing rough estimates of future traffic in major corridors, traffic level of service threshold assumptions were applied to determine improvement needs. Based on Highway Capacity Manual material and other sources, I used 16,000 ADT as the threshold for warranting a four-lane cross-section on a State arterial route in developed or developing areas and 12,000 ADT on a town or County route. Thus, an existing two-lane State route would warrant widening to four lanes, if traffic growth over the next 20 years will push its volume over 16,000 ADT. Underlying assumptions include a 60/40 directional split of peak period traffic and a peak hour volume that is 10 percent of the



ADT. The lower threshold was used for town or County routes because of the likelihood of more frequent access points, greater roadside friction, and more constrained cross-sections. These volume relationships reflect roughly level of service (LOS) D on a 2-lane route, and their use assumes that the roadway system will be planned to operate at LOS D or better.

The cost of needed improvements was estimated by applying per-mile unit costs to different types of improvements:

- Upgrade an existing substandard two-lane road to an improved cross-section with shoulders or curb and gutter (as appropriate by area): \$2 million/mile.
- Widen an existing two-lane road to a four-lane undivided cross-section with intersection left-turn lanes at roughly a quarter-mile interval: \$4 million/mile.
- Construct a new, two-lane road with shoulders or curb and gutter and intersection left-turn lanes at roughly a quarter-mile interval: \$3 million/mile.
- Construct a new four-lane, undivided road with intersection left-turn lanes at roughly a quarter-mile interval: \$5 million/mile.
- Construct a new, diamond interchange with a four-lane road bridging over a four-lane divided road: \$5 million/interchange.
- Bridge construction over a stream or river: \$160 per square foot of deck.

The above costs exclude right-of-way and environmental mitigation, but include all other design and construction costs, as well as traffic signalization and signs. They are based broadly upon SHA cost information, as modified by PTG experience.

The following discussion of transportation needs is broken into three geographic areas:

- West County: election Districts 4 and 5.
- Central County: election district 3
- East County: election districts 1, 2, 6, and 7.

Within each of the three geographic areas, proposed improvements are described by highway route or corridor, noting any differences in transportation improvements among the four scenarios.

West County

MD 8 Corridor. The section of MD 8 just south of US 50 now carries 17,000 vehicles per day, which suggests that it already warrants widening to four lanes. Under all future scenarios, four-laning is warranted for the northern section of the corridor. I have assumed that widening would extend 3.4 miles south to Batts Neck Road, which is an important tributary road on the peninsula. This widening would cost \$13.6 million.



South of Batts Neck Road, widening to four lanes will be warranted only under the Modest Investment / Accelerated Growth scenario, because of the higher growth in households for this area under that scenario. I have assumed widening south to the intersection of MD 8 and Kent Point Road, a distance of 3.6 miles, at a cost of \$14.4 million.

For the other three scenarios, the existing two-lane road from Batts Neck Road south to Romancoke should be adequate to meet future needs. The existing road has an excellent cross-section with paved shoulders and should require only routine resurfacing.

Cost Summary: Modest Investment / Accelerated Growth - \$28.0 million

All other scenarios - \$13.6 million.

MD 18 (Stevensville Area). The Stevensville Community Plan calls for access and intersection improvements on MD 18 (Business Parkway and Love Point Road) north of US 50/301. The combination of MD 18 and Old Love Point Road should be adequate to accommodate future traffic under any of the scenarios, if the improvements described in the plan are implemented. It should not be necessary to widen any of these routes to four lanes. MD 18 should be upgraded to an improved two-lane cross-section with left-turn lanes at key intersections for the 0.9-mile section between Love Point Road and Old Love Point Road at a cost of \$1.8 million.

The community plan also calls for the construction of a new connector between MD 18 and Old Love Point Road just north of Kent Island High School. This new, 0.3-mile link would improve circulation flexibility in this area and could be built for approximately \$0.9 million.

The Stevensville Community Plan also includes a proposed, new service road connection between south Stevensville and south Chester for the purpose of the public health safety and welfare. This facility would run along the south side of US 50/301 between Thompson Creek Road and Cox Neck Road and would provide an alternative to MD 18 for local, east-west travel. At present traffic between south Stevensville and south Chester must take a somewhat circuitous route that uses MD 18 and crosses US 50/301 twice, although the eastbound component of this traffic can also use US 50/301. MD 18 was recently improved between Stevensville and Chester, including the replacement of an obsolete bridge over Cox Creek. It should be adequate to accommodate local, east-west traffic for the next several years, however the service road proposal may be an alternative to widening MD 18 later in the 20-year planning period.



The Chester portion of the proposed service road would impact the existing Harborview community and extensive involvement of local residents would be essential in pursuing this project. Possibly one or two dwelling units and/or an unidentified commercial building may have to be acquired on the east side of Cox Creek to provide a slot for connecting the service drive to an improved Harborview street. Probably the best candidate would be Sherman Road, which is immediately adjacent to US 50/301 and has development (residential) only on its south side. If the Sherman Road alignment is used, some right-of-way acquisition will also be required at the east end of the project at its connection to Cox Neck Road. Excluding right-of-way, the project will cost approximately \$4.5 million for a 1.1-mile section between Thompson Creek Road and Cox Neck Road, including a bridge over Cox Creek. It should be noted that this improvement does not appear in the Chester Community Plan.

Cost Summary: All scenarios – \$2.7 million without the service road connector.
\$7.2 million with the service road connector.

MD 18 (Chester Area). As the “Main Street” of western Queen Anne’s County, MD 18 will require upgrading throughout the string of Growth Areas that it traverses. Widening to four lanes should not be necessary; in fact, it is advantageous to develop, where possible parallel sections of a limited grid street system that provide alternative routes for local traffic and access to developing areas. However, during the 20-year planning period, MD 18 between MD 552 (Dominion Road) and the expressway interchange just west of Kent Narrows will require upgrading. This upgrading would include pavement reconstruction, intersection and driveway improvements, signs, and signalization, while retaining basically a two-lane cross-section with left-turn lanes at key intersections. This section totals 1.4 miles in length, and the proposed improvements would cost approximately \$2.8 million.

Cost Summary: All scenarios - \$2.8 million.

New Connector Road in Chester: The Chester Community Plan proposes a new connector road that would provide relief to MD 18 and access to developing areas, as well as a second overpass of US 50/301 to link the northern and southern sections of Chester. It would begin at Cox Neck Road and extend east on a new alignment to Dominion Road. East of Dominion, it would use a section of Goodhand Creek Road and then turn north to connect to Shamrock Road. It would use Shamrock Road and a new overpass of the expressway to reach Piney Creek Road. A two-lane cross-section with shoulders would be adequate, including left-turn lanes at key intersections. It would



include 1.5 miles of new alignment, 0.7-mile of reconstructed roadway, and a bridge over US 50/301 for a total cost of \$8.0 million.

This is a useful project that addresses several long-term access and circulation needs in Chester. It could be developed in stages and may present opportunities to partner with developers in building portions of the route. Implementation priorities for sections of the route will likely depend upon the timing and location of future development.

Cost Summary: All scenarios - \$8.0 million.

MD 18 (Grasonville Area): It is proposed that a 3.4-mile section of MD 18 through Grasonville be improved to an upgraded two-lane cross-section with left-turn lanes at key intersections. The Grasonville Community Plan calls for improving the section from approximately a half-mile west of Chester River Beach Road to Sawmill Lane. I would suggest that the improvement be extended further east beyond Sawmill Lane to the boundary of the Queenstown Growth Area at US 50. The cost of this improvement would be approximately \$6.8 million. It could be implemented in stages with the section between Chester River Beach Road and Nesbitt Road receiving the earliest priority.

It may be necessary or desirable to develop a new connector paralleling MD 18 to the south across Grasonville between Perry Corner Road and Grasonville Cemetery Road, similar to the route discussed earlier for Chester. Such a route would provide relief for MD 18 and access to a potential development area.

Cost Summary: All scenarios - \$6.8 million.

Queenstown Area: The Queenstown Community Plan proposes significant changes and improvements to the local road system. The two key features of these proposals are (1) the elimination of at-grade crossings on US 50 and US 301, and (2) the creation of a rational street network to serve the triangular Growth Area between these two major arterials. I concur with the plan proposals, and if implemented, they should adequately address traffic capacity and safety needs and objectives for the Growth Area.

The primary improvement proposals for this area include:

MD 18 Grade Separation at US 50: The SHA is planning to upgrade US 50 to a six-lane expressway between the US 301 junction and Talbot County. As part of that effort, MD 18 should be grade-separated from US 50 to provide continuity for local pedestrian and vehicular traffic movement on MD 18. While it would be possible to develop ramps



to and from the south on US 50 at MD 18 (e.g. provide at least a partial interchange), this is not proposed because of the preference to develop a full interchange between US 50 and Greenspring Road, a short distance to the south. The cost of the MD 18 overpass is estimated at \$2.0 million.

Greenspring Road: This route forms the eastern base of the Queenstown commercial triangle and is proposed to have interchanges with both US 50 and US 301. The community plan calls for its reconstruction as a controlled-access, four-lane, divided boulevard. It would be straightened near its crossing of US 301 and its connection to MD 18 north of US 301. To facilitate the development of the Greenspring/US 50 interchange, Del Rhodes Avenue would be realigned to tie into Greenspring Road north of the interchange. The improvement of 0.9-mile of Greenspring Road would cost approximately \$3.6 million and the realignment of 0.3-mile of Del Rhodes Avenue as a two-lane facility would add \$0.6 million. The two interchanges with US 50 and US 301 would cost a total of \$10 million.

Service Road on south side of US 50: A service road will be needed along the south side of US 50 between MD 18 and the Greenspring Road interchange to provide local access to Sportsman Neck Road and the development area on that side of US 50. A two-lane road with left-turn lanes should be adequate. The road must include a short bridge over the Wye River. The length of this project is 1.4 miles and its cost would be approximately \$5.2 million, including the river crossing.

Other roadway improvements will be needed to provide access to development parcels in the Growth Area, but it is not possible at this time to say what facilities will be needed. Financial participation by developers should be sought in building these roads.

With the construction of the Greenspring Road interchange at US 301, the existing at-grade intersections at MD 18 (Chesapeake Village Road) and MD 456 (Del Rhodes Avenue) should be closed or possibly limited to right-turns in-and-out only to eliminate the safety hazard of crossing traffic. More detailed study of traffic operations on this section of US 301 will be needed to determine an appropriate and safe design. MD 18 might then be re-routed through the Growth Area via Del Rhodes Avenue and Greenspring Road.

Cost Summary: All scenarios - \$21.4 million. The SHA's US 50 project should cover the costs of the MD 18 overpass, the Greenspring Road interchange, and the service road



(\$12.2 million), leaving \$9.2 million in costs for the US 301 interchange and the Greenspring Road and Del Rhodes Avenue improvements.

Central County

This sector of the County includes election district 3 and the Centreville Growth Area. Within the Centreville Growth Area, the projected increase in households ranges from 500 under Modest Investment / Trend Growth to 1,800 under Enhanced Investment / Accelerated Growth. Similarly, job growth ranges from 700 under the two Trend Growth scenarios to 1,400 under the Enhanced Investment / Accelerated Growth scenario. Outside the Centreville area, growth in the remainder of election district 3 will be more modest: a maximum of 600 households and 600 jobs under the Enhanced Investment / Trend Growth scenario.

Looking at the Centreville Growth Area, most future development is likely to occur southeast of town between Centreville and US 301. Concentration of growth on this side of the community will also focus growth in traffic upon this area, especially on MDs 213, 304, and 305. It also requires the development of street infrastructure to provide access to potential development sites, and this underscores the importance of the new collector routes that are proposed in the Centreville Community Plan. These proposals call for Rolling Bridge Road to be extended north from MD 304 to a connection with MD 213 north of Centreville to provide a north-south cross-community route. This project will relieve potential congestion in downtown Centreville by providing an alternative route to US 301 and the new development areas for traffic from the north. This proposed route measures 2.9 miles from MD 213 to US 301 with 2.6 miles of new route construction and 0.3-mile of existing road reconstruction. Total improvement cost is \$8.4 million.

Other elements of new street infrastructure in the prime Growth Area include the improvement of Taylor's Mill Road as an east-west collector and the extension of Little Kidwell Lane to Taylor's Mill Road as an additional north-south collector. Future traffic volumes on all three collectors are likely to be in the range of 4,000 to 7,000 vpd, which is well within the capacity of a two-lane road with left-turn lanes at key intersections. The Taylor's Mill Road project includes 1.8 miles of upgrading an existing two-lane road to an improved two-lane cross-section at a cost of \$3.6 million. The Kidwell Lane extension is 1.1 miles of new two-lane construction at a cost of \$3.3 million.

In addition to these collector routes, other street infrastructure will be needed between Centreville and US 301, especially east of the Rolling Bridge Road collector.



Development of a rough grid system of routes in the Growth Area will offer the most sustainable, long-term transportation investment.

MD 213 between Centreville and US 301 currently carries about 14,000 vpd, which is nearing the warrants for a four-lane cross-section. Growth under any of the four scenarios will push volumes on this route to at least 20,000 vpd in the vicinity of US 301, requiring widening to four-lanes with left-turn lanes from just north of Taylor's Mill Road south to US 301. Improvements to this 0.6-mile section will cost \$2.4 million. Access control measures should be applied to limit the proliferation of driveways in this section. Traffic volumes on MD 213 north of this point into Centreville will be constrained by the capacity of streets in the town that feed this section of MD 213 and are unlikely to warrant four lanes.

MD 304 will be significantly impacted by new growth. The current volume on MD 304 between Centreville and US 301 is approximately 6,000 vpd and is adequately served by a good two-lane cross-section with paved shoulders. The projected growth in jobs and households in the surrounding area will push volumes on this section of MD 304 to the threshold of warranting four lanes during the 20-year planning period, especially under the Enhanced Investment / Accelerated Growth scenario. I would recommend four lanes with left-turn lanes at key intersections on MD 304 under that scenario from US 301 to roughly the present town limits, which is a distance of about 1.8 miles. This improvement would cost roughly \$7.2 million. Access management measures should be applied to control driveways and preserve route efficiency.

Under the other scenarios, the existing two-lane cross-section should be adequate with modest improvements. I would recommend reserving right-of-way for an eventual four lanes, applying access management measures, and making improvements to key intersections. This level of improvement could cost roughly \$1.5 million.

The growth in traffic on MD 304 will exacerbate the existing hazardous conditions at its intersection with US 301. Under all of the scenarios, construction of an interchange at this location will be desirable to ensure safe and efficient traffic movement. The estimated cost of a diamond intersection here is roughly \$5.0 million.

MD 305 currently carries about 2,000 vpd in the section between Centreville and US 301. Its future volume may grow to 7,000 to 8,000 vpd. The existing route should be able to accommodate the projected volumes.



As noted earlier, Rolling Bridge Road is proposed to be developed as a north-south collector. Eventually, as US 301 is upgraded by the SHA to a fully access-controlled expressway with no at-grade intersections, Rolling Bridge Road should have an overpass, but an interchange will not be warranted, especially given its proximity to interchanges at MDs 213 and 304. The cost of the overpass would be part of the US 301 improvement costs.

Outside the Centreville Growth Area, I do not foresee the need for other route widening or major route upgrading beyond normal maintenance in election district 3. However, one route section to watch under the higher growth scenario is the one-mile section of MD 213 between US 301 and MD 309. This section currently has an ADT of about 6,000 vehicles, and depending upon how much growth spills south of US 301, it could have future volumes in the range of 10,000 to 13,000 vehicles.

Cost Summary: All scenarios - \$15.3 million for three collector routes.

\$ 2.4 million for MD 213.

\$ 5.0 million for MD 304 interchange.

Enhanced Investment / Accelerated Growth - \$7.2 million for MD 304.

All scenarios except SI/AG - \$1.5 million for MD 304.

East County

This sector is the most rural part of the County and consists of election districts 1, 2, 6, and 7. The most growth for this sector would come under the Modest Investment / Accelerated Growth scenario in which it would claim 26 percent of the growth in households and 33 percent of the job growth. But, this growth would be spread over a large area, which would also spread the resulting traffic over many routes. Only in election districts 2 and 7 would the growth under this scenario begin to focus upon certain routes and warrant consideration of possible improvements.

MD 213 currently has an ADT of 9,000 between Chestertown and Church Hill. Future volumes on this section could approach 16,000 vpd, which falls within the warrants for a four-lane cross-section in rural areas. However, volumes will also be constrained by limited capacity to the north on MD 213, as it crosses the Chester River and passes through Chestertown. The existing river bridge and approach into Chestertown is only two lanes wide.

This is a borderline situation in terms of recommending future widening within the planning period. The existing road is an excellent two-lane facility with wide, paved



shoulders, and its capacity could be further enhanced with modest improvements to a few key intersections and the application of access control measures to limit the proliferation of driveways.

Similar improvements on MD 544 near Kings Town and MD 213 may be warranted, especially if some of the new development in that area relies upon that route for its primary access.

Cost Summary: All scenarios - \$2.0 million for intersection improvements on MD 213 and MD 544 in the Kings Town area.

Public Transportation

Under all of the planning/growth scenarios, the growth in households will be greater than the in-County growth in jobs. Commuting to jobs outside the County will continue to increase with continued emphasis on commuting westward across the Chesapeake Bay to Annapolis, Baltimore, and Washington. The County should encourage and support increased park-ride and commuter bus service for those residents who choose to work outside the County. Commuter bus service should ideally be extended east to tap all of the Kent Island and Grasonville/Queenstown Growth Areas, and locations for small park-ride lots near points of access to US 50/301 should be developed. The SHA or MTA may be willing partners in this effort along with the private commuter bus operator.

With the projected growth in jobs and housing in the western Growth Areas, there may be a market for the development of a transit shuttle that would operate along MD 18 from Centreville or Queenstown to Stevensville and perhaps even south toward Romancoke as that peninsula develops. It would provide access for local residents to jobs, shopping, recreation, and medical services. The potential for such service is enhanced by the concentration of much of the development in these areas within walking distance of MD 18. The transit shuttle could employ small buses (20-25 passenger capacity), which would be compatible with the scale of MD 18 and the land use along the route. Funding to support such service could come from a special assessment district tax covering the area served, contributions from local businesses and the County government, the MTA, and farebox revenues from a modest fare. The fare should not be too high, because a goal of the service should be to encourage transit ridership and reduce local vehicular traffic.



Pedestrian and Bicycle Facilities

The community growth plans have done a good job of identifying needed pedestrian and bicycle facilities. Roadway improvements should incorporate provisions for bicycle use through paved shoulders and wider curb lanes in sections with curb and gutter. Effective signing of bicycle and pedestrian facilities and routes will be especially important for recreational users.



Attachment E

Sewer and Water Assumptions and Cost Estimates

Option A: Modest Investment Trend Growth

Area	Infrastructure Element	Capital Cost Opinion	
		Low	High
Kent Narrows/ Stevensville/ Grasonville	Expand/ Upgrade WWTP to 3 MGD for BNR	\$ 18,250,00	\$ 22,250,000
	Force Main Replacement / Expand from Grasonville to WWTP	\$ 5,000,000	\$ 5,500,000
	Northern Kent Island Water Sub-district Consolidation	\$ 2,400,000	\$ 2,700,000
Southern Kent Island (Kent Island Estates/ Romancoke)	Serve Uncorrectable Septic System Failures with Water/Wastewater		
	Water System 0.5 MGD WTP; 1.5 MG Elevation Tank 2 Wells; Ground Storage/Booster Station; Distribution System	\$ 9,000,000	\$ 10,000,000
	Wastewater System Vacuum Collection System; 3 collection station; pumping station; 12" force main to KN/S/G WWTP	\$ 19,000,000	\$ 21,000,000
Dominion/Marling Farms	Serve uncorrectable septic system failures with water/wastewater		
	Water system 0.25 MGD WTP; 0.5 MG elevation tank; 1 well; ground storage/booster station; distribution system	\$ 5,000,000	\$ 5,500,000
	Wastewater system Vacuum collection system; 2 collection stations; 6" force mains to MD 522; 8"/10" force main to P.S. #2	\$ 8,000,000	\$ 9,000,000
Option A Trend Growth Total		\$ 66,650,000	\$ 75,950,000
Option A Trend Growth Total	Rounded	\$ 65,000,000	\$ 75,000,000



Option A: Modest Investment Accelerated Growth

Area	Infrastructure Element	Capital Cost Opinion	
		Low	High
Kent Narrows/ Stevensville/ Grasonville	Expand/ Upgrade WWTP to 3 MGD for BNR	\$ 18,250,000	\$ 22,250,000
	Force Main Replacement / Expand from Grasonville to WWTP	\$ 5,000,000	\$ 5,500,000
	Northern Kent Island Water Sub-district Consolidation	\$ 2,400,000	\$ 2,700,000
Southern Kent Island (Kent Island Estates/ Romancoke)	Serve Uncorrectable Septic System Failures with Water/Wastewater		
	Water System 0.5 MGD WTP; 1.5 MG Elevation Tank 2 Wells; Ground Storage/Booster Station; Distribution System	\$ 9,000,000	\$ 10,000,000
	Wastewater System Vacuum Collection System; 3 collection station; pumping station; 12" force main to KN/S/G WWTP	\$ 19,000,000	\$ 21,000,000
Dominion/Marling Farms	Serve uncorrectable septic system failures with water/wastewater		
	Water system 0.25 MGD WTP; 0.5 MG elevation tank; 1 well; ground storage/booster station; distribution system	\$ 5,000,000	\$ 5,500,000
	Wastewater system Vacuum collection system; 2 collection stations; 6" force mains to MD 522; 8"/10" force main to P.S. #2	\$ 8,000,000	\$ 9,000,000
Option A Accelerated Growth Total		\$ 66,650,000	\$ 75,950,000
Option A Accelerated Growth Total	Rounded	\$ 65,000,000	\$ 75,000,000



Option B: Enhanced Investment Trend Growth

Area	Infrastructure Element	Capital Cost Opinion	
		Low	High
Kent Narrows/ Stevensville/ Grasonville	Expand/ Upgrade WWTP to 3 MGD for BNR	\$ 18,250,00	\$ 22,250,000
	Expand/Upgrade BNR WWTP from 3 MGD to 4 MGD; Upgrade Effluent P.S./Outfall Diffusers	\$ 6,900,000	\$ 8,500,000
	Force Main Replacement / Expand from Grasonville to WWTP	\$ 5,000,000	\$ 5,500,000
	Northern Kent Island Water Sub-district Consolidation	\$ 2,400,000	\$ 2,700,000
	Chester: Water Service Distribution		
	Water System interconnection (Chester to Kent Narrows West 16" Main)	\$ 1,700,000	\$ 1,900,000
	Grasonville In-fill Water Distribution	\$ 2,700,000	\$ 2,900,000
Queenstown	Queenstown Growth Area		
	Wastewater System Pumping Station; 8" force main to main force main in Grasonville Abandon WWTP and pump Flow new P.S. Interconnect water system with Growth Area system	\$ 3,000,000	\$ 3,400,000
	Water interconnection (Queenstown to Kent Narrows East) 16" line to tie water systems together	\$ 2,900,000	\$ 3,200,000
Southern Kent Island (Kent Island Estates/ Romancoke)	Serve Uncorrectable Septic System Failures with Water/Wastewater		
	Water System 0.5 MGD WTP; 1.5 MG Elevation Tank 2 Wells; Ground Storage/Booster Station; Distribution System	\$ 9,000,000	\$ 10,000,000
	Wastewater System Vacuum Collection System; 3 collection station; pumping station; 12" force main to KN/S/G WWTP	\$ 19,000,000	\$ 21,000,000
Dominion/Marling Farms	Serve uncorrectable septic system failures with water/wastewater		
	Water system 0.25 MGD WTP; 0.5 MG elevation tank; 1 well; ground storage/booster station; distribution system	\$ 5,000,000	\$ 5,500,000
	Wastewater system Vacuum collection system; 2 collection stations; 6" force mains to MD 522; 8"/10" force main to P.S. #2	\$ 8,000,000	\$ 9,000,000
Option B Trend Growth Total		\$ 83,850,000	\$ 95,850,000
Option B Trend Growth Total	Rounded	\$ 85,000,000	\$ 95,000,000



Option B: Enhanced Investment Accelerated Growth

Area	Infrastructure Element	Capital Cost Opinion	
		Low	High
Kent Narrows/ Stevensville/ Grasonville	Expand/ Upgrade WWTP to 3 MGD for BNR	\$ 18,250,00	\$ 22,250,000
	Expand/Upgrade BNR WWTP from 3 MGD to 4 MGD; Upgrade Effluent P.S./Outfall Diffusers	\$ 6,900,000	\$ 8,500,000
	Expand/Upgrade BNR WWTP from 4 MGD to 5MGD	\$ 2,800,000	\$ 2,800,000
	New Bay Outfall at 5 MGD		\$ 5,000,000
	Force Main Replacement / Expand from Grasonville to WWTP to receive Queenstown/Centreville flows	\$ 6,300,000	\$ 700,000
	Northern Kent Island Water Sub-district Consolidation	\$ 2,400,000	\$ 2,700,000
	Chester: Water Service Distribution	\$ 2,500,000	\$ 2,700,000
	Water System interconnection (Chester to Kent Narrows West 16" Main)	\$ 1,700,000	\$ 1,900,000
	Grasonville In-fill: Water Distribution	\$ 2,700,000	\$ 2,900,000
Queenstown	Queenstown Growth Area		
	Wastewater System Pumping Station; 8" force main to main force main in Grasonville Abandon WWTP and pump Flow new P.S. Interconnect water system with Growth Area system	\$ 3,000,000	\$ 3,400,000
	Water interconnection (Queenstown to Kent Narrows East) 16" line to tie water systems together	\$ 2,900,000	\$ 3,200,000
Centreville	Abandon Existing WWTP and Pump to KN/S/G BNR WWTP Pumping station to pump to Queenstown pumping station; 12" force main	\$ 5,000,000	\$ 5,500,000
Southern Kent Island (Kent Island Estates/ Romancoke)	Serve Uncorrectable Septic System Failures with Water/Wastewater		
	Water System 0.5 MGD WTP; 1.5 MG Elevation Tank 2 Wells; Ground Storage/Booster Station; Distribution System	\$ 9,000,000	\$ 10,000,000
	Wastewater System Vacuum Collection System; 3 collection station; pumping station; 12" force main to KN/S/G WWTP	\$ 19,000,000	\$ 21,000,000
Dominion/Marling Farms	Serve uncorrectable septic system failures with water/wastewater		
	Water system 0.25 MGD WTP; 0.5 MG elevation tank; 1 well; ground storage/booster station; distribution system	\$ 5,000,000	\$ 5,500,000
	Wastewater system Vacuum collection system; 2 collection stations; 6" force mains to MD 522; 8"/10" force main to P.S. #2	\$ 8,000,000	\$ 9,000,000
Option B Accelerated Growth Total		\$ 83,850,000	\$ 95,850,000
Option B Accelerated Growth Total	Rounded	\$ 85,000,000	\$ 95,000,000

