REPORT OF THE
DEPARTMENT OF CORRECTIONS

Master Plan for Healthcare Services

[Final Report: Alternatives for Developing Additional Medical, Mental Health and Geriatric Facilities]

TO THE GOVERNOR AND
THE GENERAL ASSEMBLY OF VIRGINIA

HOUSE DOCUMENT NO. 27

COMMONWEALTH OF VIRGINIA
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A. Executive Summary

Purpose

The purpose of this study, a Master Plan for Healthcare Services, is to address and answer by recommendation, the following General Assembly directive to the Virginia Department of Corrections:

Item 387 #3c of the 2006 Acts of Assembly states:

> "The Department of Corrections shall provide a planning report on alternatives for developing additional medical, mental health, and geriatric facilities. The report shall consider the potential for cost savings through the expansion or replacement of the medical unit at Powhatan Correctional Center, the optimum mix of services and facilities at other facilities, the use of contract services, requirements for mental health services, requirements for geriatric services for older inmates, and financing options. Copies of an interim report, including a scope statement and work plan, shall be provided by October 16, 2006, and a final report by April 30, 2007, to the Secretary of Public Safety and the Chairmen of the Senate Finance and House Appropriations Committees."

The Master Plan for Healthcare Services study began in August 2006 and concludes the process of research, analysis, and recommendation as outlined in the Interim Report of October 16, 2006 to the General Assembly. Working with representatives from the Department of Corrections (DOC), Moseley Architects and HKS, Inc. (the Team) has developed facility recommendations to meet the future healthcare, including medical and mental health, needs of the male state responsible offender (SRO) population.

Female State Responsible Offender

For this study it was confirmed by the Department of Corrections that the Fluvanna Correctional Center for Women has adequate medical and mental health capacity to accommodate the projected healthcare needs of the female state responsible offender population for the foreseeable future; therefore only male SRO needs are addressed in this study. Current capacity at FCC includes 46 infirmary/medical beds, 46 acute mental health beds and 144 residential mental health beds for a total of 236 healthcare beds.

Process

In response to the General Assembly's request to "…..provide a planning report on alternatives for developing additional medical, mental health and geriatric facilities…." the Team structured a logical process to develop the Master Plan for Healthcare Services. Specific tasks completed by The Team included:

1. Analyzing historical male state responsible offender (SRO) healthcare utilization data from 2004 – 2006;

2. Benchmarking VA DOC's healthcare utilization rate with other comparable DOC's;

3. Assessing existing correctional healthcare facility conditions;

4. Reviewing the approved male SRO forecast for 2008 – 2012 provided by the DOC;

5. Forecasting male SRO for 2013 – 2032 solely for use in estimating future healthcare service needs for this study;

6. Confirming the healthcare services that will be provided at a correctional center site versus those that will be performed outside of the correctional institution;

7. Estimating future bed, diagnostic and treatment procedure room demand based upon forecasted male SRO population and healthcare use rates for 2017 through 2032;

8. Maximizing reuse of existing, appropriate DOC healthcare facilities;

9. Developing viable facility options for approval and acceptance, or rejection, for further development; and

10. Identifying potential financing options to fund construction of recommended future DOC healthcare facilities.

Department of Corrections – Existing Health Care Services

The following table shows the historical and projected male state responsible offender population for 1995 through 2012. Between 1995 and 2006 the male SRO population grew by 31% to 33,712 or approximately 2.8% annually. Projected population data for 2006 - 2012, based upon a 2.1% annual growth rate was provided by the Virginia Department of Corrections and approved by the Secretary of Public Safety. In summary, the DOC estimates that the male SRO population will increase by 13% between 2006 and 2012. This percentage increase is consistent with a 2007 study completed by the Pew Charitable Trusts that estimates the number of inmates in U.S. prisons "will likely rise nearly 13% during the next five years"[7].

Historical & Projected Male State Responsible Offender Population

	1995	2000	2004	2005	2006	2007	2008	2009	2010	2011	2012
Male SRO Population	25,723	28,781	33,239	33,159	33,712	34,340	34,744	35,307	36,090	37,031	38,110
Percentage Increase		11.9%	15.4%	-0.2%	1.7%	1.9%	1.2%	1.6%	2.2%	2.6%	2.9%

Source: Incarcerated Population FY 1995-2012 provided by the DOC

Today, the DOC provides the following levels of inpatient care: Infirmary, Assisted Living, and Mental Health – Acute, and Mental Health – Residential in a total of 482 beds. Existing bed capacity is deficient by 254 beds to meet the projected need of 736 beds in 2007. Current bed capacity and shortfall, by type, is designated as follows:

2007 Bed Capacity

- 104 beds – infirmary
- 40 beds – assisted living
- 81 beds – mental health – acute
- 257 beds – mental health – residential

2007 Bed Shortfall

- -10 beds – infirmary
- -17 beds – medical/surgical
- -98 beds – assisted living/skilled nursing
- -34 beds – medical Alzheimer's
- -34 beds – Axis II
- - 9 beds – mental health - acute
- -18 beds – mental health residential
- -34 beds – mental health - transitional

Specialty units such as Skilled Nursing, Medical Alzheimers, Axis II (personality disorder) and Mental Health – Transitional Care units are not currently provided.

Master Planning for Future Healthcare Facility Needs

Male SRO Population

Planning for the DOC's future healthcare facility needs is dependent upon the size of the male SRO population to be served and identifying the types of services that will be provided within a DOC facility versus those that will continue to be sent to a healthcare provider outside of the corrections system. Forecasting the male SRO population beyond a five-year time frame is risky as unknown environmental factors may affect the future population base. However, it is prudent to anticipate long-term needs, beyond a five-year time period, when planning for costly and essential correctional facilities that require years to plan, design, and build. Therefore, future male SRO population projections have been forecasted to 2032 for this master plan study, using a constant 2.1% annual growth rate to provide an indication of the potential healthcare facility need in 25 years.

Male SRO Forecasted Growth

	2007	2008	2009	2010	2011	2012	2017	2022	2027	2032
Male SRO Population	34,340	34,744	35,307	36,090	37,031	38,110	42,283	46,913	52,050	57,750

FY 2007 – 2012 Male SRO approved by the Secretary of Public Safety

FY 2017 – 2032 Male SRO forecasted for this study for use in determining future healthcare facility needs

The cost of contracting with outside healthcare providers, as well as the risk to the general public when transporting inmates, and associated transportation costs, has prompted the DOC to evaluate any healthcare services that could be provided more efficiently within the DOC system. It is a given that the necessary healthcare professionals, medical equipment and appropriately designed facilities are available to support this model. For the sake of this discussion, it is assumed that the level of care to be provided would be consistent with the level currently provided in a community hospital setting.

More complicated interventional and surgical cases, e.g., cardiovascular, neurological, would continue to be provided in an outside healthcare provider setting. One of the main objectives of internalizing these healthcare services into the DOC system is to provide access to a level of care typically found in a community hospital setting.

2017 Healthcare Needs

It is assumed that it will take a minimum of six years to gain all of the required approvals and funding allocations that are needed to plan, design and build future healthcare facilities to adequately serve the male SRO population. In 2017, when the male SRO population is projected to grow to 42,283 inmates, the inpatient bed need will increase to 906 beds, as follows:

2017 Bed Need

- 148 beds – infirmary
- 16 beds – medical/surgical
- 169 beds – assisted living/skilled nursing
- 42 beds – medical Alzheimer's
- 42 beds – Axis II
- 109 beds – mental health – acute
- 338 beds – mental health – residential
- 338 beds – mental health – transitional

2017 Bed Shortfall

- -44 beds – infirmary
- -16 beds – medical/surgical
- -129 beds – assisted living/skilled nursing
- -42 beds – medical Alzheimer's
- -42 beds – Axis II
- -28 beds – mental health - acute
- -81 beds – mental health residential
- -42 beds – mental health - transitional

2032 Potential Healthcare Needs

For long-term planning, diagnostic and inpatient bed need projections are forecasted out 25 years to 2032, the half-life of a building. The planning team strongly recommends that these long-term projections are periodically reviewed and updated to ensure that future decisions are made based upon the most accurate data available at the time. In 2032 when the male SRO population is expected to grow to 57,750 inmates, the inpatient bed need will increase to 1,241 beds as follows:

- 202 beds – infirmary
- 22 beds – medical/surgical
- 231 beds – assisted living/skilled nursing
- 58 beds – medical Alzheimer's
- 58 beds – Axis II
- 150 beds – mental health – acute
- 462 beds – mental health – residential
- 58 beds – mental health – transitional

Recommendation - Master Plan for Healthcare Services

Healthcare Facility Options

The Team considered seven healthcare facility options ranging from the minimum of maintaining the status quo to the maximum of a full replacement of all healthcare services in new construction at a new location. For the sake of the option development study, it was assumed that the DOC already owns adequate land to accommodate projected 2017 – 2032 site and building requirements.

Selected Option

The option (Option E) that maximizes reuse of the existing healthcare facility infrastructure locations and builds upon that structure was selected by the Team as the preferred option for future development. In this option, the DOC will continue providing geriatric services based at the Deerfield Correctional Center and mental health services primarily located at the Marion

Treatment Correctional Center, while initiating new medical services within the DOC system through a contracted healthcare service provider at the Powhatan Correctional Center. The five existing correctional healthcare center sites will be designated as follows:

- Deerfield Correctional Center – geriatric care
- Greensville Correctional Center – mental health care – residential & Axis II
- Brunswick Correctional Center – mental health care – residential care
- Marion Treatment Correctional Center – primary location for mental health care – acute, residential & transitional care
- Powhatan Correctional Center – medical & infirmary care, dialysis

Justification and Analysis

It is a challenge to develop funding for additional beds dedicated to inmate care. This study has shown the DOC that the healthcare delivery process is hampered by a lack of beds at present, while still providing constitutionally mandated care. If there were a way to add beds and develop major centers of inmate healthcare, the process of staff delivery of inmate care would be more efficient, safer for both the inmate and the staff, and would alleviate holding inmate patients in a more acute environment when a less intensive, "step-down" environment could be created.

As much as the correctional process seeks to graduate an inmate into the general population as a productive citizen, through levels of classification, the medical environment could do the same, only the graduation would be to the general incarcerated population. Likewise, those inmates that have no chance of release into the populace, there are also those medical inmates that may never be able to be released into the general incarcerated population for safety and control reasons and, therefore, require permanent or long-term medical units.

Preliminary Order of Magnitude Costs: Construction & Total Project Costs

The following table presents order of magnitude construction costs and total project costs for each of the recommended additions, as well as the freestanding option for the Powhatan Correctional Center.

Construction costs are for the physical building only. Total project costs include construction, equipment and furnishings, professional fees and expenses. Cost projections are calculated in **2012** dollars, utilizing a yearly inflation of 6.25%. 2012 is used as the mid-point of construction. Land acquisition and financing costs are not included in the preliminary opinion of probable costs.

Preliminary Order of Magnitude Costs to Meet 2017 Healthcare Facility Needs

No.	Facility	Square Footage	Renovation or New Construction	Projected Costs 2012	
				Construction Cost	Project Cost
1	Deerfield Correctional Center	79,961	New	$ 16,115,342	$ 24,001,138
2	Greensville Correctional Center *	47,765	New & Reno.	$ 9,122,077	$ 13,143,292
3	Marion Correctional Treatment Center	112,463	New	$ 23,995,050	$ 35,276,732
4	Powhatan Correctional Center - **Attached Model**	202,633	New	$ 122,890,081	$ 150,377,850
	Total	**442,822**		**$ 172,122,550**	**$ 222,799,012**
	OR				
5	Powhatan Correctional Center - **Freestanding Model**	242,424	New	$ 142,638,396	$ 171,810,328
	Total	**482,613**		**$ 191,870,865**	**$ 244,231,490**

* Includes 20,000 SF of renovation

Implementation Schedule

For the purposes of this study, it is assumed that January 1, 2009 is the earliest date to begin the detailed space programming and architectural design process for the expansion and renovation projects that are recommended in this study. For budgeting purposes, it was assumed that the earliest any or all projects would be completed and ready for occupancy is 2013.

Financing Options

Several options exist for financing the renovation and construction of the healthcare facility projects recommended in this study. Private healthcare facility operator(s) are available and offer a turn-key product to include everything from construction to professional staffing and facility operations for a per diem rate.

Another option would be for the DOC to finance construction projects using bond funds from the Virginia Public Building Authority (VPBA) as appropriated by the legislature. Or a private entity could propose some combination of construction, funding, and/or operations via the Public-Private Infrastructure and Education Act (PPEA). For the purposes of this study, traditional VPBA financing has been assumed as the preferred financing option as details about the other potential financing methods are not known at this time.

Potential Cost Savings

Reduced operating costs may occur within some medical expenses, such as transportation, outpatient post-operative inmate care, and some clinical procedures. For example, less transportation runs should be necessary with a centralized medical center, and also with adequate medical beds, fewer unplanned transfers would be required. Outpatient post-operative care currently occurs at local hospitals because DOC does not have a facility staffed with health care professionals in the areas needed such as critical care nurses, respiratory therapists, physical therapists, nurse anesthetist, and others. Current DOC facilities also cannot attract these professionals; however, a new medical facility would help to enable DOC to attract them. It is also anticipated that certain primary care clinical procedures such as gall bladder operations,

hernia repairs, and certain outpatient procedures such as endoscopies, CTs, and MRIs can also be performed in the new medical center rather than at local hospitals.

Costs included in a per diem rate at local hospitals include expenses above that which DOC would expect at a new medical center. For example, state of the art technology is available at many hospitals providing a "tertiary level", or the highest level of care. A DOC medical center would include only technology associated with a "primary level" of care, two levels down from tertiary care. High levels of overhead are also included in some local hospital rates. The difference in the cost of these levels of care and overhead charges should equate to a reduction in per diem costs when compared to local hospitals. Note that the "primary level" of care provided with a new facility would be expanded, therefore, when comparing current DOC medical costs to future anticipated medical costs, the per diem rate will increase.

Operating costs for a new medical center cannot be accurately estimated at this time for multiple reasons. First, the actual facility design is the next step in the process. Until a design is developed, security staffing cannot be calculated. Several private sector firms would be interested in providing the needed services, however the mix of professionals for which DOC would seek to contract has not been bundled at this time and until a solicitation is done, it is premature to assign a cost. In conclusion, potential cost savings, or increased costs, cannot be fully assessed until a design is prepared, contractual costs associated with medical staffing is available, and other staffing costs for a new facility are known.

End of Executive Summary

B. Master Plan for Healthcare Services

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The purpose of this study, a Master Plan for Healthcare Services, is to address and answer by recommendation, the following General Assembly directive to the Virginia Department of Corrections:

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Background

Inmates have a Constitutional right to healthcare that is grounded in the Eighth Amendment prohibiting cruel and unusual punishment. The legal system has further defined that healthcare is adequate and necessary if it meets the community standard of care. Therefore, the Department of Corrections (DOC) is charged by the Commonwealth of Virginia to provide healthcare to the offender that is equivalent to community healthcare and that is cost effective. Correctional facilities will provide varying levels of healthcare to offenders as their medical needs indicate.

> *"Today's inmates are older, sicker, and staying longer behind bars than ever before."*
> - U.S. Department of Justice

According to The Council of State Governments report, *Corrections Health Care Costs*[1], the number one 'change driver' for shaping trends in the United States is the 'Aging of America'. This report indicates that Americans are living longer and having fewer children. These two trends have produced a higher percentage of older people in the United States. As of 2005, there are approximately 78 million people in the baby boomer generation that are approaching retirement age. According to the U.S. Census Bureau, between the year 2000 and 2050 the number of people over age 65 will double; the number of people over age 85 will quadruple and by 2011 the first wave of the baby boomers will reach age 65. The older the general population becomes, the

older the prison population will become as well. The most salient point about the Aging of America and its impact on future health care needs is that people age 65 and over consume health care resources at a rate five (5) times higher than the general population.

A major contributing factor to the higher consumption rate is the care that is needed to treat Alzheimer's and other dementia diagnoses. Today, one in 10 persons over age 65 and nearly half of those over 85 has Alzheimer's disease (AD). A person with AD lives, on average, 3 – 20 years or more from the onset of symptoms and at some point that person will require 24-hour care[2].

> "Many states use the adjusted age of 50 to define an elderly inmate based upon multiple factors that typically lower the life expectancy and, correspondingly, the point at which 'old age' is reached in prisons. Life style factors that contribute to an accelerated aging process, both before and after incarceration, include drug and alcohol abuse; risky sexual behavior; lack of preventive healthcare, and other causes associated with poverty and lack of education" [3].

Over the past decade the percentage of inmates in the prison system age 50 and older has increased. From 1981 to 1990 the number of inmates in that age bracket more than doubled in the United States. In a similar report by the Southern Legislative Conference/The Council of State Government*, *The Aging Inmate Population: Southern States Outlook 2006*[4], there was a 115% increase in inmates age 50 and older between 1991 and 1997; during a time when the total inmate population only grew 84%[5]. From 1990 – 2004, the older DOC population in Virginia increased from 10% to 15% of the total inmate population. Table 1 shows the applicable DOC statistics for male SRO total and elderly male inmate populations in 1997 and 2006.

*The Southern Legislative Conference (SLC) consists of the following 16 states: Alabama, Arkansas, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia

Bibliography references are located in Appendix A.

Table 1 - VA DOC State Responsible Total Male & Elderly Male Inmates 1997 & 2006

	Total SRO Males	50+ Years of Age Elderly Male Inmates	% of Elderly Male Inmates
Year			
1997	26,365	1,501	5.7%
2006	33,712	3,908	11.6%
% Increase 1997 - 2006	27.9%	160.4%	
Crime Statistics			
Convicted of Violent Crime	19,221	2,573	13.4%
Convicted of Sex-Based Crime	3,756	872	23.2%
Rate of Recidivism	26.4%	24.0%	

Source: Virginia Department of Corrections

The overall aging population of the United States is one of the trends causing this increase in the aging inmate population; and another is more stringent sentencing mandates have been adopted for drug crimes, violent crimes, and crimes involving the use of a firearm. Most of the prisoners sentenced under these laws spend large portions of their lives, if not their entire lives, behind bars. Simply put, tougher laws keep people in prison longer. Almost three quarters of all inmates, both male and female, age 50 years or older are serving prison sentences of 10 years or more. Nationwide, the average 50+ inmate is serving a sentence of at least 15 years[1]. However, according to the DOC in Virginia, the total 50+ elderly inmate is serving even a longer average sentence of 17.7 years.

The *Bureau of Justice Statistics Bulletin 2006* states from 1995 to 2005, incarceration rates have risen an average of 14 percent, from 379 to 433 prisoners for every 100,000 U.S. residents. In Virginia in 2005, the incarceration rate exceeds the national average at 464 prisoners per 100,000 population.

Nationwide the cost of health care has jumped from $696 billion in 1990 to almost $2 trillion in 2006. The American Correctional Association has publicly stated that the two biggest problems facing corrections today are the rising health care cost and the aging inmate population. On a national level, the states' prison systems spent $3.3 billion in 2001, or about 12% of their total operating expenditures.

A review of recent literature publications and a telephone survey of the 16 Southern Legislative Conference states demonstrate that due to lack of funding for information technology and analysis, Departments of Corrections cannot electronically track and document healthcare utilization data as is commonly done in the private sector. This data is typically used to benchmark use rates, inpatient occupancy rates, length of stay, and other criteria that is essential in forecasting future healthcare service needs. As an example, in the private sector a hospital would have a detailed database showing its current and projected population base, primary and secondary market areas, and of market share. Using nationally published use rates, e.g[6], number of hospital admissions or emergency department visits per 1,000 population, it is a simple process to calculate the future need for inpatient beds and/or diagnostic services based upon an increased population or percentage of market share.

In the Corrections System, the baseline population and market share is clearly defined based upon the number of inmates in the system. However, there is not a corrections national data base that tracks historical use rates similar to the private sector on a state-by-state basis. With the lack of historical information on use rates, average length of stay, etc., it is difficult to accurately forecast future bed need. For example many correctional healthcare units are run at 100% bed occupancy, whereas in the private sector an 80% bed occupancy rate is common. When admitting a new patient to a unit that is 100% occupied it usually requires moving the most stable patient off of the unit to an alternate location even though that patient may still require the level of care provided on the unit. Without this type of historical information, future bed and diagnostic needs must be based on logical assumptions that are based upon private sector data, when appropriate.

R. Scott Chavez, Vice President of the National Commission on Correctional Healthcare, says that the prison healthcare industry lags behind its "free world" counterpart in a variety of ways, but also suffers from many of the same problems. He says the prison health system is highly fragmented between federal, state, county and city prisons and jails, with little or no communication, little outcome data or access to information technology and no reliable, current national statistics about the healthcare conditions and status of prisoners.

> 'We don't have good epidemiological information" Chavez says. "We need, and have recommended to Congress a unified clearinghouse of centralized surveillance. We need better data. One of the major changes we've seen is a great push to apply evidence-based medicine to (correctional) settings. But the public doesn't want to hear about the higher costs of accomplishing that, and institutions are doing more with less[7]."

Process

In response to the General Assembly's request to "…..provide a planning report on alternatives for developing additional medical, mental health and geriatric facilities…." the Team structured a logical process to develop the Master Plan for Healthcare Services. Specific tasks completed by The Team included:

1. Analyzing historical male state responsible offender (SRO) healthcare utilization data from 2004 – 2006;
2. Benchmarking VA DOC's healthcare utilization rate with other comparable DOC's;
3. Assessing existing correctional healthcare facility conditions;
4. Reviewing the approved male SRO forecast for 2008 – 2012 provided by the DOC;
5. Forecasting male SRO for 2013 – 2032 solely for use in estimating future healthcare service needs for this study;
6. Confirming the healthcare services that will be provided at a correctional center site versus those that will be performed outside of the correctional institution;
7. Estimating future bed, diagnostic and treatment procedure room demand based upon forecasted male SRO population and healthcare use rates for 2017 through 2032;
8. Maximizing reuse of existing, appropriate DOC healthcare facilities;
9. Developing viable facility options for approval and acceptance, or rejection, for further development; and
10. Identifying potential financing options to fund construction of recommended future DOC healthcare facilities.

C. Department of Corrections – Existing Health Care Services

Medical expenses for FY03 totaled approximately $91.3 million or $3,037 per inmate; 62.5% of these expenses were incurred for medical services provided by DOC correctional facilities. In FY 06, medical expenses totaled approximately $109.5 million or $3,637 per inmate; 68.1% of medical expenses were incurred within the DOC correctional facilities. In FY03 11.6% of the DOC's yearly expenditures were spent on healthcare; in FY06 the per cent spent on healthcare increased slightly to 11.9%[8].

The following table shows the historical and projected male state responsible offender population for 1995 through 2012. Between 1995 and 2006 the male SRO population grew by 31% to 33,712 or approximately 2.8% annually. Projected population data for 2006 - 2012, based upon a 2.1% annual growth rate was provided by the Virginia Department of Corrections and approved by the Secretary of Public Safety. In summary, the DOC estimates that the male SRO population will increase by 13% between 2006 and 2012. This percentage increase is consistent with a 2007 study completed by the Pew Charitable Trusts that estimates the number of inmates in U.S. prisons "will likely rise nearly 13% during the next five years"[7].

Table 2 - Historical & Projected Male State Responsible Offender Population

	1995	2000	2004	2005	2006	2007	2008	2009	2010	2011	2012
Male SRO Population	25,723	28,781	33,239	33,159	33,712	34,340	34,744	35,307	36,090	37,031	38,110
Percentage Increase		11.9%	15.4%	-0.2%	1.7%	1.9%	1.2%	1.6%	2.2%	2.6%	2.9%

Source: Incarcerated Population FY 1995-2012 provided by the DOC

Since 1995 the DOC has contracted with Anthem Blue Cross Blue Shield to issue reimbursement payments for all healthcare services that were provided to inmates outside of the DOC system, primarily at Virginia Commonwealth University Medical Center (VCU). These services consist of outpatient procedural care as well as varying levels of inpatient medical and surgical care. Table 3 shows the historical inpatient admission and outpatient case use rates for 2004 – 2006. During this three-year time frame, annual inpatient admissions have increased by 0.6% from a 2.8% admission rate in 2004 to a 3.4% admission rate in 2006 that reflects both the higher utilization rate associated with an aging population and overall rising acuity rates.

During this same time period, approximately 20% of the male SRO population was provided with a higher level of outpatient care at a contracted location, while basic primary care and sick call services were provided within the correctional centers.

Table 3 - **Male State Responsible Offender Utilization Rate**

	2004	2005	Change - 04/05		2006	Change - 05/06	
Male SRO Population	33,239	33,159	-80	-0.2%	33,712	553	1.7%
Inpatient Utilization Rate							
Admissions to Contracted Hospital	956	1,065	109	11.4%	1,137	72	6.8%
Percent of Admissions	2.8%	3.2%		14.3%	3.4%		6.3%
Bed Need	12	14	2	16.7%	15	1	7.1%
Patient Days	4,302	4,899	597	13.9%	5,458	559	11.4%
Average Length of Stay (Days)	4.5	4.6	0.1	2.2%	4.8	0.2	4.3%
Outpatient Utilization Rate							
Total Visits	6,864	6,266	-598	-8.7%	6,868	602	9.6%
Percentage of Visits	21%	19%		-9.5%	20%		5.3%

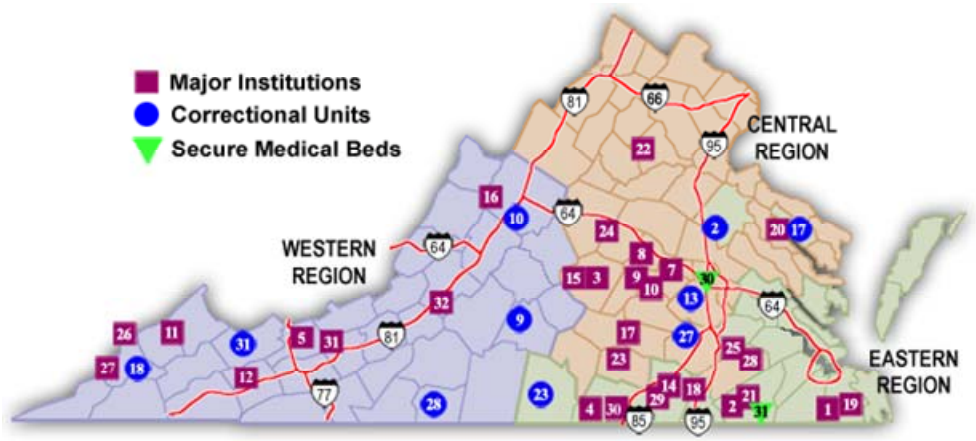
Planning Assumptions

FY 2004-2006 Male State Responsible Offender data provided by DOC

FY 2004 - 2006 Admission and Outpatient Utilization provided by Anthem Blue Cross/Blue Shield; annualized for 2004

Table 4 - Diagnostic & Outpatient Care

Primary healthcare and sick call services are provided at all correctional facilities referenced on the map below.



Major Institutions & Correctional Units	
16 Augusta Correctional Center	29 Lawrenceville Correctional Center
30 Baskerville Correctional Center	23 Lunenburg Correctional Center
5 Bland Correctional Center	12 Marion Treatment Center
32 Botetourt Correctional Center	30 Medical College of Virginia - MCV
14 Brunswick Correctional Center	4 Mecklenburg Correctional Center
15 Buckingham Correctional Center	17 Nottoway Correctional Center
2 Caroline Correctional Unit	28 Patrick Henry Correctional Unit
22 Coffeewood Correctional Center	13 Pocahontas Correctional Unit
10 Cold Springs Correctional Unit	9 Powhatan Correctional Center
21 Deerfield Correctional Center	31 Pulaski Correctional Center
10 Deep Meadow Correctional Center	26 Red Onion State Prison
27 Dinwiddie Correctional Unit	9 Rustburg Correctional Unit
3 Dillwyn Correctional Center	2 Southampton Correctional Center
24 Fluvanna Correctional Center	31 Southampton Memorial Hospital
18 Greensville Correctional Center	1 St. Brides Correctional Center
23 Halifax Correctional Unit	25 Sussex I State Prison
20 Haynesville Correctional Center	28 Sussex II State Prison
17 Haynesville Correctional Unit	31 Tazewell Correctional Unit
19 Indian Creek Correctional Center	8 Virginia Correctional Center for Women
7 James River Correctional Center	27 Wallens Ridge State Prison
11 Keen Mountain Correctional Center	18 Wise Correctional Unit

Source: VADOC

At a minimum, each correctional center site contains a dispensary for triaging sick inmates and administering medication; many centers provide basic radiology imaging (x-rays). Many correctional facilities provide short-term unfunded medical observation care that is intended for a minimal length of stay, ranging from a few hours to several days. Medical observation is used to provide some convalescent care and treat inmates in need of care that is not appropriate in the general population. Nursing and correctional officer staff coverage is currently not funded for medical observation patients, which means that inmates who are placed in medical observation require additional staffing costs.

Three male correctional centers, Deerfield, Greensville, and Powhatan are equipped with increased diagnostic and therapeutic capabilities as shown on the following chart. Currently all outpatient diagnostic testing and therapies, other than those listed below, are performed outside of the correctional system. The trauma room at the Powhatan Correctional Center is used to handle most minor injuries requiring suturing for Powhatan inmates, although it does not meet current codes or functional requirements. Any true trauma or emergent need is provided outside of the correctional system.

Table 5 - Existing DOC Diagnostic & Therapeutic Capability

No.	Diagnostic & Therapeutic Capability	Deerfield	Greensville	Powhatan
	Category			
1	Dental Exam/Operatory	✓	✓	✓
2	Diagnostic Radiology	✓	✓	✓
3	Dialysis		16	
4	General Exam Rooms	✓	✓	✓
5	Laboratory - Specimen Collection	✓	✓	✓
6	Medication Service	✓	✓	✓
7	Operating Room		2	1
8	Optometry		✓	✓
9	Telemedicine Hook-up	✓	✓	✓
10	Trauma Room			1

Outpatient Cases

Outpatients who require a variety of non-invasive procedures such as cardiovascular and neurological tests as well as high-tech imaging exams including CT and MRI scans are currently referred to an outside healthcare provider. Over the past three years, the number of outpatient referrals has remained flat. Table 6 shows the utilization rate for outpatient visits that were outsourced to outside healthcare providers from 2004 to 2006.

Table 6: Male Outpatient Utilization Rate

	2004	2005	2006
Male SRO Population	33,239	33,159	33,712
Outpatient Utilization Rate			
Cases	6,864	6,266	6,868
% Utilization per Total Male SRO Population	21%	19%	20%

Surgery

Historically, the level of healthcare services provided by the DOC has not included major invasive medical and surgical procedures. To date, all invasive surgical and endoscopic procedures have been scheduled with a healthcare provider outside of the corrections system. Table 7 shows the quantity of surgical and minor procedures that were outsourced to outside healthcare providers from 2004 – 2006. During this time period, the number of surgeries per total inmate population increased from 1.5% in 2004 to 1.7% in 2006.

Table 7 - Male Historical Surgical Case Volume

	2004	2005	Change 04/05		2006	Change 05/06	
Surgical/Minor Procedure Cases	480	488	8	1.7%	565	77	15.8%

Interventional (Invasive) Procedures

All non-surgical invasive procedures such as cardiac catheterization and peripheral vascular studies are also scheduled with an outside healthcare provider and will continue as such in the future.

Dialysis

Greensville Correctional Center houses all of the 16 dialysis stations that serve the male SRO population. Inmates requiring dialysis are treated three times per week in four-hour sessions. At present dialysis procedures are scheduled in three sessions per day M-W-F and one session on T-Th-Sa. The dialysis use rate is increasing for this high-risk population, primarily as a result of pre-incarceration increased drug and alcohol use and an increase in Hepatitis C patients. Current correctional facility planning standards to determine dialysis needs assume 0.20% of the male SRO population requires dialysis treatments. In addition to outpatient dialysis stations, a barrier-free housing unit is needed to accommodate the dialysis inmates.

Non-Invasive Diagnostic Testing

Diagnostic testing includes non-invasive exams for cardiovascular, neurological, pulmonary and radiological studies. Cardiovascular, neurological and pulmonary testing is currently provided by an outside healthcare provider. Routine diagnostic radiology (x-ray) equipment is located at most major correctional centers. For all other radiology screening, such as fluoroscopy, ultrasound, nuclear medicine, CT and MRI scan, etc., inmates are transported to a healthcare provider outside of the corrections system. This is one area of healthcare service that the DOC can bring within their system.

Transporting an inmate to an outside provider location for a diagnostic test or procedure typically requires anywhere from one to three days time when moving an inmate from the Western Region's correctional centers. Typically, two correctional officers accompany an inmate throughout the course of the medical test/procedure at a Department average raw hourly cost of $22.73 per officer; benefit and overhead costs are additional.

Inpatient Care

The following chart shows the distribution and location of the existing 482 inpatient beds that are available to support the 2007 male SRO population.

Table 8 - Existing Bed Allocation

No.	Existing Bed Allocation	Deerfield	Greensville	Brunswick	Marion	Powhatan	Total
	Inpatient Bed Type						
1	Infirmary	18	40			46	**104**
2	Assisted Living	40					**40**
3	Mental Health - Acute				81		**81**
4	Mental Health - Residential		80	94	71	12	**257**
	Total Capacity	***58***	***120***	***94***	***152***	***58***	***482***

Infirmary Care Levels

The DOC provides the following levels of healthcare within an infirmary setting for sick or injured inmates requiring pre- and post-surgical care, acute illness and injury, select chronic condition patients, assisted living and skilled care patients. These patients are currently accommodated in 86 beds, of which 40 beds are located at Greensville Correctional Center in a combination of single-bedded cells and three-bedded cells. The other 46 beds are located at the Powhatan Correctional Center in a mixture of single-bedded, double-bedded and four-bedded ward cells. An additional 18 beds have recently become operational at the Deerfield Correctional Center in 2007 for a total of 104 infirmary beds to serve an estimated 34,340 male SRO in 2007, which translates into one infirmary bed per 330 inmates.

The following definitions of patient care levels are referred to in the narrative of this report.

- Acute: sudden onset of a serious illness usually requiring hospital level of care
- Pre/post acute: before and after surgery, a procedure or illness
- Chronic: disease lasting three months or longer, where the patient is not suitable to return to the general population
- Assisted living: patient who requires assistance with one or two activities of daily living
- Skilled nursing: patient who requires assistance with three or more activities of daily living
- Convalescent care: recovery of a long duration that requires nursing intervention
- Geriatric: diagnosis, treatment, and prevention of disease in older patients

A patient's length of stay on an infirmary unit can last from days to months to years depending upon the diagnosis. The wide range of infirmary usage, nursing care requirements, and length of stay affects the efficient management of the unit. Table 9 shows the number of admissions to the Infirmary Units for years 2005 – 2006.

Table 9 - DOC Male Historical Infirmary Admissions

	2005	2006	Change 05/06
Total Admissions	617	786	+169
% Utilization*	1.8%	2.3%	27.3%

* Per cent of admissions per total male SRO population

Infirmary admissions increased by 27.3% from 2005 to 2006, reflecting a higher utilization rate. Recently, infirmary units have run above 95% occupancy on several occasions. Current planning standards are calculated for 75% - 80% occupancy to accommodate spikes in the daily census.

Overcrowding, on occasion, causes a ripple effect throughout the medical delivery system resulting in longer stays for inmates who are waiting to be discharged from a hospital outside of the corrections system into an infirmary bed when it becomes available. Premature release of an infirmary inpatient back to the general population to make way for a higher acuity patient or additional inmate transfers based upon a lack of an appropriate bed also negatively impacts patient care.

Single-bedded cells account for 29% of existing infirmary beds while 71% of existing infirmary beds are presently located in 2 – 4 bed wards with little or no capability to reduce the spread of communicable diseases. The National Commission on Correctional Healthcare report *Health Status of Soon To Be Released Inmates, 2004*, found that in 1996, an estimated 12% - 35% of those in the U.S. with communicable diseases passed through U.S. prisons; between 26% and 30% of inmates have some form of hepatitis and about 130,000 tested positive for TB. With this high-risk inmate population, adequate physical and air-flow separation is needed to minimize the risk of spreading communicable diseases. Recent studies have shown how single-bed cells have decreased the spread of infection, thereby, reducing the length of stay and associated operating costs.

Other sub-standard conditions on the existing infirmary units include the lack of piped-in oxygen and suction outlets and no private rooms that are equipped to handle the special needs for behavior management/medical patients.

Assisted Living

Today, the DOC provides only 40 assisted living beds at the Deerfield Correctional Center at a ratio of 1-bed per 858 inmates. Assisted living inmates require assistance with one or two activities of daily living. Current planning standards do not exist specifically for the corrections environment; community healthcare models are based upon one bed per 250[9] population and are an appropriate model to adapt to the corrections environment. With the aging of the population, the need for assisted living accommodations is projected to increase significantly. Using the current community planning standards would mean that the DOC needs 138 assisted living beds in 2007.

Mental Health Care

Marion Correctional Treatment Center (MCTC) was established in 1980 by the Virginia Department of Corrections as a maximum security facility to provide treatment services for acute mentally ill inmates. In 1988, MCTC was initially licensed as a 140-bed psychiatric facility by the Virginia Department of Mental Health, Mental Retardation and Substance Abuse Services (DMHMRSAS), which allows admission of inmates for involuntary treatment. Currently the Acute Program, licensed for 120 beds, is operating 81 beds, the Psychosocial Residential Program is licensed for and operates 71 beds, and an additional 48 cadre (non-mentally ill) beds are located at the Marion Correctional Treatment Center

Since 1992, MCTC has been accredited by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) under Behavioral Health services. Through a strategic planning process in 1993, MCTC identified the need for a licensed residential program to meet the needs of chronic mentally ill inmates, which was subsequently established on one of the housing units. All security levels of mentally ill offenders are accepted for acute and residential services. An additional 186 residential beds are located at the Greensville, Powhatan, and Brunswick Correctional Centers for a total of 257 residential beds to serve the male SRO population in 2007.

The National Commission on Correctional Health Care's report *Health Status of Soon To Be Released Inmates, 2004,* confirms that 20% - 25% of all inmates suffer from serious mental illness. Other government studies indicate that more than 60% of prison and jail inmates have mild or serious mental illnesses or substance-abuse problems. Based upon historical utilization rates, the DOC estimates that at any given time 1% of the mentally ill population requires acute care, which translates into a need for 90 acute mental health beds to serve the 2007 population. Similarly, the DOC estimates that at any given time 4% of the mentally ill population requires a form of residential care that translates into a need for 275 residential mental health beds to serve the 2007 population.

Acute Services Program – 81 Beds

Renovation is currently underway to renovate the MCTC multi-bedded cells into 81 private-bedded acute cells, which is a more appropriate arrangement to safely house this disparate inmate population. The Acute Program is licensed by DMHMRSAS to provide inpatient treatment to mentally ill inmates who require acute psychiatric services under involuntary commitment. The program receives patients who are in need of acute psychiatric care.

Patients admitted to the program display a full range of psychopathology and deficits in living, social, and cognitive skills. Thought disorders, affective disorders, and severe personality disorders are problems most frequently identified.

There are two treatment teams assigned to this program with each team consisting of a psychiatrist, psychology associate, clinical social worker, correctional counselor, and a registered nurse. A recreational therapist provides services to both treatment teams.

Presently, all inmates requiring acute mental healthcare, such as committed inmates, Axis II inmates (personality disorder), and Alzheimer's and dementia patients are housed on the same units. This arrangement does not permit the appropriate separation of these distinct patient types and their unique treatment and environmental needs.

Psychosocial Residential Program – 257 Beds

Of the 257 residential treatment beds currently provided by the DOC, 71 beds are located at MCTC, where the treatment program concentrates on improving and/or maintaining the cognitive, behavioral, and social impairments that are the negative symptoms of chronic mental illness. Examples of negative symptoms include emotional blunting, poor socialization, intellectual impairment, and deterioration in the ability to complete activities of daily living such as bathing and shaving. Reference Table 8 for a complete listing of all residential treatment bed locations.

There is one treatment team for the Residential Program that includes a psychology associate, a clinical social worker, two correctional counselors, psychiatric physician assistant, registered nurse, and a recreational therapist. A clinical social worker serves as program coordinator to approve admissions, discharges, and coordinates all services in the program.

Inpatient Bed Summary

For comparison purposes, Table 10 summarizes existing inpatient bed capacity of two similarly sized DOCs included in the Southern Legislative Conference/The Council of State Governments study. It is interesting to note that Virginia ranks significantly lower in the number of infirmary beds in comparison to North Carolina and Missouri. North Carolina allocates approximately five times more assisted living beds per inmate population than Virginia does.

Table 10 - Inmate Population/Beds - Selected Southern States

No.	Facility	2006	Inpatient Beds							
			Infirmary		Assisted Living		Mental Health Acute		Mental Health Residential	
		Total SRO Inmates	No. of Beds	Beds Per 1,000	No. of Beds	Beds Per 1,000	No. of Beds	Beds Per 1,000	No. of Beds	Beds Per 1,000
1	Missouri	30,997	193	6.2	58	1.9	42	1.4	296	9.5
2	North Carolina	36,663	164	4.5	222	6.1	140	3.8	192	5.2
3	Virginia	33,712	104	3.2	40	1.2	81	2.4	257	7.6

Note: Includes all inmates under the state's corrections department which would comprise all those in prison, jails, and in parole or other community-release programs, such as nursing homes of half-way houses

Source: Southern Legislative Conference/The Council of State Governments, December 2006

Existing Healthcare Facility Architectural Conditions

Table 11 provides a summary of existing DOC healthcare facility conditions and their potential for future expansion and renovation projects.

Table 11 - Architectural Evaluation - Existing Healthcare Facilities

No.	Facility	Existing	Year Built	Adequate for Expansion or Renovation	Comments
1	Deerfield Correctional Center	Yes	1994 - 2007	Yes - expansion	Minor renovation of existing housing units for skilled nursing and assisted living beds to meet 2017 needs. Acreage available for future expansion.
2	Greensville Correctional Center	Yes	1990	Yes - renovation & expansion	Renovation of existing 40-bed infirmary unit to include an addition for the 42-bed Axis II unit
3	Marion Correctional Treatment Center	Yes	1948	Yes - new construction	Adequate acreage for new construction of mental health services
4	Powhatan Correctional Center - Medical Unit	Yes	1982	No	Does not meet current building codes for fire safety and ventilation systems. Estimated renovation costs exceed cost of new construction. Adequate acreage for future expansion or replacement is available.
5	James River Correctional Center	Yes	1930 - 1950	No	Potential location for new healthcare facility, however, major utility systems require upgrading and the aging infrastructure of the existing facility is too small to support the medical center's needs; e.g., kitchen.
6	Southside Regional Medical Center - Petersburg	No	1950 - 1980	No	Facility analysis in 2001 concluded +/- $50M upgrade for current code and asbestos abatement requirements is needed. Additional capital needed to upgrade building infrastructure to meet stringent correctional safety and security standards. Not a viable site based upon multiple inmate transfers through Petersburg.

Summary of Existing DOC Healthcare Services

Table 12 summarizes the healthcare services provided by the DOC in 2007. In 2006, medical expenses totaled approximately $109.5 million, or $3,637 per inmate, with 68.1% of the costs incurred within the DOC correctional system.

Table 12: 2007 Capacity

No.	Scope	Need	Capacity	Shortfall	Comments
	Diagnostic & Treatment Services				
1	Operating Room	2	3	+1	2 OR - Greensville; 1 OR - Powhatan
2	Minor Procedure Room	2	0	-2	Colonoscopy, Endoscopy
3	Dialysis Station	18	16	-2	Greensville
4	Diagnostic Radiology	24	24	0	Located at most Correctional Centers
5	Fluoroscopy	1	2	+1	Greensville & Powhatan
6	Ultrasound	1	0	-1	
7	CT Scan	0.2	0	-0.2	Mobile Unit - One day per week
8	MRI Scan	0.2	0	-0.2	Mobile Unit - One day per week
9	Lithotripsy	0.1	0	-0.1	Mobile Unit - One day per month
10	Echocardiogram	1	0	-1	
11	EEG Lab	1	0	-1	
12	Pulmonary Function Lab	1	0	-1	
13	Outpatient Holding Beds	34	0	-34	
	Inpatient Beds				
14	Infirmary	121	104	-17	40 Beds - Greensville - existing 2007 46 Beds - Powhatan - existing 2007 18 Beds - Deerfield - existing 2007
15	New Medical/Surgical	10	0	-10	
16	Medical -Alzheimer's	34	0	-34	
	Subtotal - Infirmary/Medical	**165**	**104**	**-61**	
17	Assisted Living	138	40	-98	40 Beds - Deerfield - existing 2007
	Mental Health				
18	- Acute	90	81	-9	81 Beds - Marion - existing 2007 Licensed for 120 beds in multi-bedded cells; Renovation underway to create 81 private cells
19	- Axis II	34	0	-34	Self-mutilators
20	- Residential	275	257	-18	71 Beds - Marion - existing 2007 94 Beds - Brunswick - existing 2007 12 Beds - Powhatan - existing 2007 80 Beds - Greensville - existing 2007
21	- Transitional	34	0	-34	
	Subtotal - Mental Health	**433**	**338**	**-95**	
	Total - All Beds	**736**	**482**	**-254**	

D. Master Planning for Future Healthcare Facility Needs

Male SRO Population

Planning for the DOC's future healthcare facility needs is dependent upon the size of the male SRO population to be served and identifying the types of services that will be provided within a DOC facility versus those that will continue to be sent to a healthcare provider outside of the corrections system. Forecasting the male SRO population beyond a five-year time frame is risky as unknown environmental factors may affect the future population base. However, it is prudent to anticipate long-term needs, beyond a five-year time period, when planning for costly and essential correctional facilities that require years to plan, design, and build. Therefore, future male SRO population projections have been forecasted to 2032 for this master plan study, using a constant 2.1% annual growth rate to provide an indication of the potential healthcare facility need in 25 years.

Table 13 - Male SRO Forecasted Growth

	2007	2008	2009	2010	2011	2012	2017	2022	2027	2032
Male SRO Population	34,340	34,744	35,307	36,090	37,031	38,110	42,283	46,913	52,050	57,750

FY 2007 – 2012 Male SRO approved by the Secretary of Public Safety

FY 2017 – 2032 Male SRO forecasted for this study for use in determining future healthcare facility needs

The cost of contracting with outside healthcare providers, as well as the risk to the general public when transporting inmates has prompted the DOC to evaluate any healthcare services that could be provided more efficiently within the DOC system. Today, the DOC outsources approximately 32% of healthcare dollars to a contracted provider outside of the DOC system. It is assumed that the required healthcare professionals would be provided through a contract management group and that medical equipment and appropriately designed facilities are available. For the sake of this discussion, it is assumed that the level of care to be provided would be consistent with the level currently provided in a community hospital setting.

Representatives from Health Services of the DOC have reviewed historical data provided by Anthem Blue Cross, Blue Shield consisting of all DRGs (Diagnosis Related Group) charges approved for payment to contracted healthcare providers from 2004 – 2006. Of the more than 500 DRG categories, this group focused on a detailed review of the top DRG[10] diagnoses categories (listed in Appendix B) to determine those that would be appropriate to treat within the DOC system. The most common DOC DRGs are listed below.

1. Dental & Oral Disease except Extraction
2. Respiratory Signs & Symptoms w/o CC
3. Chest Pain
4. Other Disorders of the Eye Age greater than 17 years
5. FX, Sprain, STRN & DISL of Forearm
6. Disorders of the Liver except Malignancy
7. FX, Sprain, STRN & DISL of UPARM, LOWL
8. Other Digestive System Diagnoses
9. Trauma to the Skin, Subcut Tissue
10. Esophagitis, Gastroent & Misc Diges

Bibliography references are located in Appendix A.

More complicated interventional and surgical cases, e.g., cardiovascular, neurological, would continue to be provided in an outside healthcare provider setting. One of the main objectives of internalizing these healthcare services into the DOC system is to provide access to a level of care typically found in a community hospital setting.

Currently, approximately 32% of healthcare dollars are reimbursed to a contracted healthcare provider outside of the DOC system.

Diagnostic Services

Surgery/Minor Procedures

For planning purposes, it is assumed that 75% of future minor surgical and invasive minor procedure cases (e.g., colonoscopies) will be internalized into the DOC system. It is also anticipated that that the utilization rate will incrementally increase to 2.5% of the inmate population in 2032 to account for a higher acuity of the aging population. For comparison purposes in 2006 in Virginia, surgical cases totaled 9.7% of the state population.

Internalizing 75% of the cases shown in Table 14 to the DOC system from an outside healthcare provider requires two operating rooms and one multifunctional minor procedure room, as well as associated patient prep and post-anesthesia areas as outlined on Table 14 for years 2007, 2017, and 2032. In addition to the clinical space needs for these services, support space to decontaminate and sterilize surgical instrumentation, and store disposable and reusable supplies is also needed.

Table 14 - Projected Male SRO Surgical/Minor Procedures

	2007	2008	2009	2010	2011	2012	2017	2022	2027	2032
Male SRO Population	34,340	34,744	35,307	36,090	37,031	38,110	42,283	46,913	52,050	57,750
Surgical Cases in DOC	464	469	503	515	556	572	698	809	937	1,083
Cases Outsourced	154	156	168	171	185	190	232	270	312	361
Total Cases	**618**	**625**	**671**	**686**	**741**	**762**	**930**	**1,079**	**1,249**	**1,444**
% Utilization*	1.8%	1.8%	1.9%	1.9%	2.0%	2.0%	2.2%	2.3%	2.4%	2.5%

Planning Assumptions

FY 2007 - 2032 - 75% of surgical/minor procedure cases will be performed within the DOC network; 25% will be outsourced to an outside healthcare provider

* Percent of surgical cases per total male SRO population

Interventional Procedures

Invasive, high technology interventional procedures such as cardiac and peripheral vascular studies will continue to be outsourced to outside healthcare providers; dedicated space for these types of procedures is not included in future planning for DOC healthcare services

Outpatient Care

For future planning purposes, it is the opinion of experienced DOC medical personnel that 50% of the outpatient volume for non-invasive procedures that is currently provided at outsourced healthcare providers could be delivered within the DOC system given that necessary healthcare professionals, medical equipment and appropriately designed facilities are available. These services include EKGs, echocardiograms, ultrasound, and basic neurological exams (e.g. EEG,

EMG) and pulmonary function testing among others. Table 15 shows the projected number of cases that are anticipated to be provided both within the DOC system and outsourced. Another planning assumption used in this calculation is that the utilization percentage will also increase, reflecting the trend shown in the private sector.

Table 15 - Estimated Male State Responsible Offender Utilization Rate - Outpatient Exams/Tests

	2007	2008	2009	2010	2011	2012	2017	2022	2027	2032
Male SRO Population	34,340	34,744	35,307	36,090	37,031	38,110	42,283	46,913	52,050	57,750
Outpatient Utilization Rate										
Outpatient Cases in DOC	**3,434**	**3,648**	**3,884**	**4,151**	**4,444**	**4,573**	**5,074**	**5,630**	**6,246**	**6,930**
Outpatient Cases Outsourced	3,434	3,648	3,884	4,151	4,444	4,573	5,074	5,630	6,246	6,930
Total Cases	**6,868**	**7,296**	**7,768**	**8,301**	**8,887**	**9,146**	**10,148**	**11,259**	**12,492**	**13,860**
Increase		428	472	533	586	259	1,002	1,111	1,233	1,368
% Increase		6.2%	6.5%	6.9%	7.1%	2.9%	11.0%	10.9%	11.0%	11.0%
Percent of Inmates	20%	21%	22%	23%	24%	24%	24%	24%	24%	24%

Planning Assumptions

FY 2007 - 2032 - patient cases .6% annual increase to account for 15% aging population with higher use rates

FY 2007 - 2032 - assume 50% of outpatient cases will be seen within the DOC system and 50% of cases will be outsourced to outside healthcare providers

Internalizing diagnostic and treatment services within the DOC system that are currently outsourced to outside healthcare providers creates the need for a new function, the outpatient holding unit. This unit will be used to receive and prep pre-procedure patients (e.g. surgical, endoscopic, etc.) coming from any of the DOC correctional center institutions, as well as care for inmates recovering from these procedures prior to returning to their correctional center. The outpatient unit is anticipated to maximize patient throughput and minimize the length of stay in a healthcare setting. This unit will also provide mental health assessments to determine if commitment to the MCTC or another mental health unit is warranted. Another benefit of an outpatient holding unit is that short-term outpatients are not admitted to a more intensive infirmary setting, thereby leaving these beds available to accommodate inpatient volumes. As the DOC internalizes more diagnostic and treatment services and outpatient volume continues to grow, the need for outpatient holding beds is forecast to be 34 in 2007; 50 in 2017 and 70 in 2032. Presently, the DOC does not include any outpatient beds in its total bed inventory.

Dialysis

Table 16 identifies the need for outpatient dialysis stations. Based upon historical utilization trends, future need is projected to serve 0.20% of the male SRO population, translating into a need for two additional dialysis stations, or a total of 18 stations in 2007, 22 stations in 2017, and 29 stations in 2032. In addition to outpatient dialysis stations, a barrier-free housing unit, equipped with dialysis capabilities is needed to separate inmates requiring dialysis with access ports from the general population.

Table 16 - Estimated Male State Responsible Offender Utilization Rate for Dialysis

	2007	2008	2009	2010	2011	2012	2017	2022	2027	2032
Male SRO Population	34,340	34,744	35,307	36,090	37,031	38,110	42,283	46,913	52,050	57,750
Dialysis										
0.20% Inmates	69	70	71	72	74	76	85	94	104	114
Dialysis Stations	18	18	18	18	19	19	22	24	26	29

Planning Assumptions

FY 2007 - 2012 Male State Responsible Offender forecast provided by DOC

FY 2007 - 2032 0.18 - 0.20% of inmates require dialysis

Four cycles per week

Non-Invasive Diagnostic Testing

Non-invasive testing for routine modalities including ultrasound, echocardiograms, neurological and pulmonary testing are planned to be internalized into the DOC healthcare system. More complicated studies requiring high technology equipment such as cardiac nuclear medicine studies will continue to be outsourced.

Both CT (computed tomography) and MRI (magnetic resonance imaging) technologies are now considered a mainstream diagnostic tool. Projected volumes and the high cost of this technology does not justify permanently locating this high-tech equipment on a DOC site in the foreseeable future. However, to plan for future flexibility in accommodating this equipment, mobile technology pads will be provided to allow for the temporary docking of these mobile units (for example on one or more days per week) as the need arises.

Future Inpatient Bed Projections

Projected inpatient bed need for 2007, 2017 and 2032 is shown below in Table 17. Benchmark data used to calculate bed requirements is also included in the table. As a baseline for comparison purposes, bed need was also calculated for 2007. It is important to note that infirmary beds are deficient by 29% to meet today's need and dedicated medical Alzheimer's beds are not available. Furthermore, 10 new medical/surgical beds would be needed to accommodate 2007 patients who are currently treated at a contracted hospital. As of today, the DOC has only 65% of the required beds to meet 2007 needs.

Table 17 - Existing & Projected Bed Need

No.	Bed Category	Benchmark	2007				2017 - Projected			2032 - Projected		
			Male SRO	Bed Need	Existing Bed Quantity	Shortfall	Male SRO	Bed Need	Shortfall	Male SRO	Bed Need	Shortfall
	Infirmary/Medical Beds											
1	Infirmary	3.5 beds per 1,000 SRO	34,340	121	104	-17	42,283	148	-44	57,750	202	-98
2	NEW Medical/Surgical Beds	3.3% of inmates currently outsourced	34,340	10	0	-10	42,283	16	-16	57,750	22	-22
3	Medical Unit - Alzheimer's	0.5% of mental health population	34,340	34	0	-34	42,283	42	-42	57,750	58	-58
	Subtotal Infirmary/Medical Beds	5.0 beds per 1,000 SRO		**165**	**104**	-61		**206**	-102		**282**	-178
4	Assisted Living/Skilled Nursing	4.0 beds per 1,000 SRO	34,340	138	40	-98	42,283	169	**-129**	57,750	231	**-191**
	Mental Health Beds											
5	Mental Health - Acute	1.3% of mental health population	34,340	90	81	-9	42,283	109	-28	57,750	150	-69
6	Mental Health - Axis II (Personality Disorder	0.5% of mental health population	34,340	34	0	-34	42,283	42	-42	57,750	58	-58
7	Mental Health - Alzheimer's	**34 beds are accounted for in a medical unit setting**	34,340	0	0	0	42,263	0	0	57,750	0	0
8	Mental Health - Residential	4% of mental health population	34,340	275	257	-18	42,283	338	-81	57,750	462	-205
9	Mental Health - Transitional	0.5% of mental health population	34,340	34	0	-34	42,283	42	-42	57,750	58	-58
	Subtotal Mental Health			**433**	**338**	-95		**531**	**-193**		**728**	**-390**
	Total Beds			**736**	**482**	**-254**		**906**	**-424**		**1,241**	**-759**

Mental Health Bed Need: Assume 20% of population require mental health care; 1% of the 20% require acute care and 4% of the 20% require residential care

Four Assisted Living beds per 1,000. Source: State Long Term Health Care Sector 2005

In ten years when the male SRO population is projected to grow to 42,283, for the purpose of this study, total need will reach 906 beds, which nearly doubles current bed capacity; and in 25 years, when the male SRO population has increased by 68% to 57,750 inmates, the need will reach over 2.5 times current bed capacity, or 1,241 beds, which is an increase of 759 beds.

Infirmary Beds

Given the lack of a national or state correctional data base for use in projecting future infirmary bed need, information from *the American Hospital Association's 2007 Hospital Statistics* (a comprehensive reference source for analysis and comparison of hospital trends) was used as the starting point to calculate future infirmary bed need. In 2005, the most recent year that data is available; 2.3 inpatient beds per 1,000 population were available in Virginia. Infirmary bed need is calculated by inflating the bed per thousand population to 3.5 beds per 1,000 male SRO population to account for the higher acuity level of the inmate population and a longer length of stay in a non-capitated population environment. Future infirmary bed need is calculated using a 75% occupancy ratio to account for the irregular nature of peaks and valleys in the patient average daily census, thereby ensuring that there is adequate capacity to accommodate all patients during times of peak census. It is also assumed that the DOC's current infirmary admission criteria and length of stay will remain the same for future planning purposes. The type of patients to be cared for on the infirmary units include: acute, chronic care, and skilled nursing patients.

New Medical/Surgical Beds

Increasing the scope of healthcare services for medical and surgical procedures to be provided within the DOC network creates the need for new medical and surgical beds to accommodate patients with a higher acuity level. In addition to increased bed capacity, these patients will also require telemetry (vital signs monitoring), as well as respiratory therapy services.

Table 18 shows the forecast need for medical/surgical beds to accommodate the volume of patients that are currently (and projected) to be treated at a hospital outside of the corrections system, but will be treated at a DOC correctional facility in the future. Medical/surgical bed need calculations are also based upon a 0.5% annual increase in the admission rate and increasing the average length of stay from 4.6 days to 5.4 days in 2032 to account for the increasing number of older patients. Inpatient bed need is also calculated using a 75% occupancy ratio, which translates into a need for 10 beds in 2007, 16 beds in 2017 and 22 beds in 2032.

Table 18 - Estimated Male State Responsible Offender Utilization Rate - Inpatient

	2007	2008	2009	2010	2011	2012	2017	2022	2027	2032
Male SRO Population	34,340	34,744	35,307	36,090	37,031	38,110	42,283	46,913	52,050	57,750
Inpatient Utilization Rate										
Future Admissions to DOC	601	626	653	686	722	743	825	915	1,015	1,126
Percent of Inmates	2.9%	3.0%	3.1%	3.2%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%
Bed Need - 75% Occupancy	10	11	12	13	14	15	16	18	20	22
Patient Days	2,765	3,005	3,265	3,567	3,899	4,012	7,533	8,359	9,277	10,292
Average Length of Stay (Days)	4.6	4.8	5.0	5.2	5.4	5.4	5.4	5.4	5.4	5.4
Admissions to Contracted Hospitals	601	625	653	685	722	743	824	915	1,015	1,126
Total Admissions	1,202	1,251	1,306	1,371	1,444	1,486	1,649	1,830	2,030	2,252

Planning Assumptions

FY 2007 - 2012 Male State Responsible Offender forecast provided by DOC

FY 2007 - 2032 Admission rate .5% annual increase to account for 15% aging population with higher use rates

Assisted Living Beds

Aging of the male SRO population has the greatest impact on the need for assisted living beds. Inmates needing this level of care require fewer hours of nursing care than is provided on an infirmary unit but still require assistance with one or two activities of daily living. To provide the appropriate level of care to this growing population requires a significant increase in assisted living bed capacity.

To meet the DOC's assisted living bed need for 2007, at a standard ratio of one bed per 250 population, requires 138 beds. The existing 40 assisted living beds at the Deerfield Correctional Center accommodate only 29% of today's need. Based upon the projected male SRO population growth, 169 assisted living beds will be needed in 2017 and a total of 231 assisted living beds to satisfy the demand forecasted for 2032.

Mental Health Beds

Planning assumptions to calculate future mental health bed need assumes that 20% of all inmates are affected by some form of mental health diagnosis. Of this population, 1.3% require acute inpatient care, 4% require residential care, 1% requires a specialty care level, and the remainder are treated on an outpatient level.

Mental health bed capacity is forecasted to grow by 57% to 531 beds in 2017; an increase of 193 beds from the 338 beds currently in operation. Looking further to 2032, a total of 728 mental health beds will be needed to accommodate the forecast 57,750 male SRO population. In the 25 years between 2007 and 2032 bed need is projected to increase by 115%. As the inmate population increases at MCTC, the need for increased on-site medical capacity also increases to ensure that inmates are medically stable.

Included in the total mental health bed need projections are specialty beds that currently do not exist. For example, Axis II inmates, who are diagnosed with personality disorders, and are currently housed in an acute or residential setting, will now be housed in specialty units to maintain an appropriate separation between these disparate patient types. Planning for future mental health bed need also includes distinct transitional bed units where the primary focus of care is to prepare the inmate for release back into the general population.

For this study, transitional care beds are planned to be located at the MCTC; other viable options include locating the transitional care beds at a correctional center that houses the general population to facilitate integrating these inmates back into the general population.

SUMMARY

2017 Healthcare Needs

It is assumed that it will take a minimum of six years to gain all of the required approvals and funding allocations that are needed to plan, design and build future healthcare facilities to adequately serve the male SRO population. Therefore, future baseline projections are calculated for 2017 diagnostic and inpatient bed needs, as shown in Table 19. This information will be used as the basis to identify the optimal location for these new and/or expanded healthcare services, as well as the square footage that is necessary to support these services.

Table 19: 2017 Capacity

No.	Scope	2017 Need	2007 Capacity	Shortfall	Comments
	Diagnostic & Treatment Services				
1	Operating Room	2	3	+1	PMU not physicall adequate
2	Minor Procedure Room	1	0	-1	
3	Dialysis Station	22	16	-6	Relocate to Powhatan from Greensville
4	Diagnostic Radiology	30	24	-6	Located at most Correctional Centers
5	Fluoroscopy	1	2	+1	
6	Ultrasound	1	0	-1	
7	CT Scan	0.4	0	-0.4	Mobile Unit - 2 days per week
8	MRI Scan	0.4	0	-0.4	Mobile Unit - 2 days per week
9	Lithotripsy	0.1	0	-0.1	Mobile Unit - 1 day per month
10	Echocardiogram	1	0	-1	
11	EEG Lab	1	0	-1	
12	Pulmonary Function Lab	1	0	-1	
13	Outpatient Holding Beds	50	0	-50	50 Beds - Powhatan - new
	Inpatient Beds				
14	Infirmary	148	104	-44	130 Beds - Powhatan 18 Beds - Deerfield - existing
15	New Medical/Surgical	16	0	-16	16 Beds - Powhatan - new
16	Medical -Alzheimer's	42	0	-42	42 Beds - Deerfield - new
	Subtotal - Infirmary/Medical	**206**	**104**	**-102**	
17	Assisted Living/Skilled Nursing	169	40	-129	129 Beds - Deerfield - new
	Mental Health				
18	- Acute	109	81	-28	28 Beds - Marion - new
19	- Axis II	42	0	-42	42 Beds - Greensville - new
20	- Residential	338	257	-81	81 Beds - Marion - new
21	- Transitional	42	0	-42	42 Beds - Marion - new
	Subtotal - Mental Health	**531**	**338**	**-193**	
	Total - All Beds	**906**	**482**	**-424**	

2032 Potential Healthcare Needs

For long-term planning, diagnostic and inpatient bed need projections are forecasted out 25 years to 2032, the half-life of a building. The planning team strongly recommends that these long-term projections are periodically reviewed and updated to ensure that future decisions are made based upon the most accurate data available at the time. Locations of potential additions are included on the site plan diagrams to identify long-term options for potential growth. Long-term diagnostic and bed needs are shown in Table 20.

Table 20: 2032 Capacity

No.	Scope	2032 Need	2017 Capacity	Shortfall	Comments
	Diagnostic & Treatment Services				
1	Operating Room	2	3	+1	
2	Minor Procedure Room	1	1	0	
3	Dialysis Station	29	22	-7	Powhatan
4	Diagnostic Radiology	35	24	-11	Located at most Correctional Centers
5	Fluoroscopy	1	2	+1	
6	Ultrasound	2	1	-1	
7	CT Scan	0.8	0.4	-0.4	Mobile Unit - 4 days per week
8	MRI Scan	0.8	0.4	-0.4	Mobile Unit - 4 days per week
9	Lithotripsy	0.1	0.1	0	Mobile Unit - 1 day per month
10	Echocardiogram	2	1	-1	
11	EEG Lab	1	1	0	
12	Pulmonary Function Lab	1	1	0	
13	Outpatient Holding Beds	70	50	-20	20 beds - Powhatan - new
	Inpatient Beds				
14	Infirmary	202	148	-54	54 Beds - Powhatan - new
15	New Medical/Surgical	22	16	-6	6 Beds - Powhatan - new
16	Medical -Alzheimer's	58	42	-16	16 Beds - Deerfield - new
	Subtotal - Infirmary/Medical	**282**	**206**	**-76**	
17	Assisted Living/Skilled Nursing	231	169	-62	62 Beds - Deerfield - new
	Mental Health				
18	- Acute	150	109	-41	41 Beds - Marion - new
19	- Axis II	58	42	-16	16 Beds - Greensville - new
20	- Residential	462	338	-124	124 Beds - Marion - new
21	- Transitional	58	42	-16	16 Beds - Marion - new
	Subtotal - Mental Health	**728**	**531**	**-197**	
	Total - All Beds	**1,241**	**906**	**-335**	

E. Recommendation - Master Plan for Healthcare Services

Healthcare Facility Options

The Team considered seven healthcare facility options ranging from the minimum of maintaining the status quo to the maximum of a full replacement of all healthcare services in new construction at a new location. For the sake of the option development study, it was assumed that the DOC already owns adequate land to accommodate projected 2017 – 2032 site and building requirements.

- Option A – Maintain status quo.
  - If this approach is taken, the DOC will not be able to support future inmate population growth. Currently, the DOC is operating on a 254 total bed deficit; reference Table 17 for detailed bed deficiency summary.

- Option B – Maintain status quo, but add medical facilities with new correctional centers as they come on-line.
  - If this approach is taken, medical services will become further decentralized throughout the DOC system, which will increase transportation costs and cause a redundancy in clinical staffing, diagnostic equipment, and supplies. This model will have higher annual operating costs.

- Option C – Incrementally increase inpatient bed capacity at existing correctional centers to add needed beds for geriatric and mental health care: add medical beds to new correctional centers as they come on-line and maintain the PMU at the Powhatan Correctional Center.
  - If this approach is taken, medical services would await the opening of a new correctional center. Expanding the PMU to house required medical beds is not an option due to the building's existing code deficiencies.

- Option D – Acquire an existing healthcare facility to centralize medical care; expand geriatric and mental health services at existing correctional centers.
  - The existing Southside Regional Medical Center campus in Petersburg will become available for reuse when the Medical Center moves to a new location. A 2001 report estimated the cost to upgrade the 40+ year-old facility, to meet current hospital code requirements, at over $50 million dollars that included removing asbestos and lead paint. Millions of dollars in additional expenditures are needed to upgrade the basic building infrastructure to meet correctional safety and security requirements.

- **Option E – Replace the existing PMU with an addition to the Powhatan Correctional Center to house medical services; incrementally expand geriatric services at the Deerfield Correctional Center and mental health services at the Marion Treatment Correctional Center.**
  - This is the recommended option based upon maximum reuse of existing DOC healthcare facilities, existing clinical staffing, adjacency to the DOC transportation depot, and the flexibility to implement in multiple phases contingent upon funding availability.
  - PCC is centrally located within the state; it is readily accessible from I-64, and in close proximity to a significant number of male state responsible inmates who are housed in nearby correctional centers.

- Option F – Similar to Option E, except all recommended construction projects are built in one phase in lieu of incremental growth.
    - While the long-run capital cost would be less than Option E, total funding may not be available. In the event that funding is available Option F would supersede Option E as the recommended option.
- Option G – Build one centralized correctional healthcare center for all services; medical, geriatric, and mental health.
    - This option is cost prohibitive based upon the capital investment to locate all medical, geriatric, and mental health beds in one location, in new construction. This option necessitates relocating existing geriatric and mental health staff.

Option Recommendation

Note: Options E and F are similar in concept in that both consist of building a new healthcare facility at Powhatan. Alternatives within these options would be to either construct a new, stand alone healthcare facility or to construct a healthcare facility that is attached to the existing PCC. By attaching the new healthcare facility to the existing PCC, there is the potential to reduce new square footage requirements by utilizing existing support services and related capital costs. A freestanding facility could probably be more efficient in design; however it would contain more square footage and associated higher capital costs

Given the age and condition of the current Powhatan Correctional Center, the question of replacement of the entire facility arises. If a future replacement for the Powhatan Correctional Center were to be accomplished, it should be considered in conjunction with the new healthcare facility. With proper planning, the healthcare facility could be a phase of a larger plan if appropriate. Additionally, if planned together, economies can be planned where certain support areas can serve both the healthcare facility and potential facility replacement.

Option E is the recommended option as it maximizes reuse of the existing healthcare facility infrastructure locations and builds upon that structure. In this option, the DOC will continue providing geriatric services based at the Deerfield Correctional Center and mental health services primarily located at the Marion Treatment Correctional Center, while initiating new medical services within the DOC through a contracted healthcare service provider at the Powhatan Correctional Center. Reference Table 21 & 22. The five existing correctional healthcare center sites will be designated as follows:

- Deerfield Correctional Center – geriatric care
- Greensville Correctional Center – mental health care – residential & Axis II
- Brunswick Correctional Center – mental health care – residential care
- Marion Treatment Correctional Center – primary location for mental health care – acute, residential & transitional care
- Powhatan Correctional Center – medical & infirmary care, dialysis

Table 21 - 2017 Bed Allocation

No.	Inpatient Bed Type	Deerfield	Greensville	Powhatan	Brunswick	Marion	Total	Increase from 2007
1	Infirmary	18		130			**148**	+44
2	Skilled Nursing	80					**80**	+80
3	Medical/Surgical			16			**16**	+16
4	Medical - Alzheimer's	42					**42**	+42
5	Assisted Living	89					**89**	+49
6	Mental Health - Acute					109	**109**	+28
7	Mental Health - Axis II		42				**42**	+42
8	Mental Health - Residential		80	(-12)	94	164	**338**	+81
9	Mental Health - Transitional					42	**42**	+42
	Total	**229**	**122**	**146**	**94**	**315**	**906**	**+424**
	Bed increase from 2007	+171	+2	+88	0	163	**+424**	

Table 22 - 2032 Projected Bed Allocation

No.	Inpatient Bed Type	Deerfield	Greensville	Powhatan	Brunswick	Marion	Total	Increase from 2017
1	Infirmary	18		184			**202**	+54
2	Skilled Nursing	101					**101**	+21
3	Medical/Surgical			22			**22**	+6
4	Medical - Alzheimer's	58					**58**	+16
5	Assisted Living	130					**130**	+41
6	Mental Health - Acute					150	**150**	+41
7	Mental Health - Axis II		58				**58**	+16
8	Mental Health - Residential		80		94	288	**462**	+124
9	Mental Health - Transitional					58	**58**	+16
	Total	**307**	**138**	**206**	**94**	**496**	**1,241**	**+335**
	Bed increase from 2017	+78	+16	+60	0	+181	**+335**	

Each of the major correctional healthcare facility locations are described below. For discussion purposes, 2017 capacity projections are used. As stated earlier in this report, it is assumed that all locations have the ability to be expanded to provide adequate capacity to house 2032 projections, but at this time, forecasting a 25-year capacity need is tentative at best. Therefore, 2017 projections were used to identify more immediate facility needs and their associated construction and project costs.

Deerfield Correctional Center – Geriatric Care

- Deerfield becomes a centralized location for all DOC geriatric services
- Geriatric services include a total of 229 beds for 2017:
  - 18 infirmary beds
  - 80 skilled nursing beds
  - 42 medical Alzheimer's beds
  - 89 assisted living beds
- Geriatric bed capacity will increase by an additional 33% to 307 beds for 2032 needs.

Greensville Correctional Center

- Greensville becomes a supporting location for behavioral health inmates; services include 122 beds
    - Up to 42 Axis II and/or other beds
    - 86 residential mental health beds
- 40 existing infirmary beds are relocated to the Powhatan Correctional Center; this unit may be renovated and expanded to become an all private room Axis II and/or other bed unit to provide a new level of care for inmates that are not diagnosed as mentally ill, but are afflicted with affective disorders, and may require intensive therapy or isolation.
- As the Axis II bed unit designation is relatively new, flexibility would be provided to accommodate other related behavioral disorder needs.
- Dialysis relocates to the Powhatan Correctional Center; the vacated dialysis unit at Greensville would be renovated as needed.

Brunswick Correctional Center

- The existing 94 residential mental health beds will remain in operation.
- No additional healthcare-related programs are planned for the Brunswick Correctional Center in this study.

Marion Correctional Treatment Center

- Marion will remain the primary mental health care delivery site and will expand to 109 acute beds, 338 residential beds, and 42 new transitional beds for a total of 489 beds in 2017. Projected mental health capacity will increase by an additional 139 beds to meet anticipated need in 2032.
- All new beds are planned to be located in private rooms in new construction.

Powhatan Correctional Center

- Existing services located at the Powhatan Correctional Center include the Powhatan Reception and Classification Center (PRCC) and DOC transportation hub. Inmates are processed at PRCC for medical screening and placement.
- Centralized location in the State with convenient access from I-64; in close proximity to seven other male correctional center sites. Adequate land capacity to accommodate projected 2032 healthcare facility needs.
- Centralized site for all medical/infirmary beds, for lengths of stay in excess of 24 hours, and diagnostic & treatment services. PCC is located in close proximity to outside healthcare provider referral sites, (e.g. Virginia Commonwealth University Health System, St. Francis Hospital, etc.), for outsourced services.
- Medical/infirmary services include a total of 146 beds in 2017:
    - 130 infirmary beds
    - 16 medical beds

- Diagnostic & treatment services include:
  - Operating and minor procedure rooms
  - Diagnostic radiology, fluoroscopy, ultrasound, mobile CT and MRI scanners, mobile lithotripsy, non-invasive cardiology, neurology and respiratory testing
  - Dialysis stations – relocated from Greensville Correctional Center
  - Outpatient holding beds to accommodate overnight stays for inmates transferred from other correctional centers for tests and procedures
- The existing 12 residential mental health beds would be relocated to the Marion Correctional Treatment Center.
- There are two facility options to centralize medical/infirmary and diagnostic & treatment services at PCC:
  - Option 1 – demolish the existing Powhatan Medical Unit and attach the new healthcare facility to the existing correctional institution. This model requires approximately 202,633 SF and utilizes existing administrative/support services including: Administration, Business Office, and Education space, Human Resources, public entrance, and Food Service. Existing support areas such as Environmental Services, Maintenance, and Materials Management (general stores) need only incremental expansion to accommodate the increased capacity.
  - Option 2 - consists of building a freestanding independent healthcare facility on the PCC site. This model requires approximately 242,424 SF, and provides the separate administrative/support services for all the functions described in Option 1 above and may not require demolition of any existing buildings contingent upon the selected building siting. It provides flexibility in allowing replacement of PCC, should that be a consideration.

F. Justification and Analysis

It is a challenge to develop funding for additional beds dedicated to inmate care. This study has shown the DOC healthcare delivery process is hampered by a lack of beds at present, while still providing constitutionally mandated care. If there were a way to add beds and develop major centers of inmate healthcare, the process of staff delivery of inmate care would be more efficient, safer for both the inmate and the staff, and would alleviate holding inmate patients in a more acute environment when a less intensive "step-down" environment could be created.

As much as the correctional process seeks to graduate an inmate into the general population as a productive citizen, through levels of classification, the medical environment could do the same, only the graduation would be to the general incarcerated population. Likewise, those inmates that have no chance of release into the populace, there are also those medical inmates that may never be able to be released into the general incarcerated population for safety and control reasons and, therefore, require permanent or long-term medical units.

Preliminary Order of Magnitude Costs: Construction & Total Project Costs

Table 23 presents order of magnitude costs for and total project costs for each of the recommended additions, as well as the freestanding option for the Powhatan Correctional Center.

Construction costs are for the physical building only. Total project costs include construction, equipment and furnishings, professional fees and expenses. Cost projections are calculated in **2012** dollars, utilizing a yearly inflation of 6.25%. 2012 is used as the mid-point of construction. Land acquisition and financing costs are not included in the preliminary opinion of probable costs.

Table 23 - Preliminary Order of Magnitude Costs to Meet 2017 Healthcare Facility Needs

No.	Facility	Square Footage	Renovation or New Construction	Projected Costs 2012	
				Construction Cost	Project Cost
1	Deerfield Correctional Center	79,961	New	$ 16,115,342	$ 24,001,138
2	Greensville Correctional Center *	47,765	New & Reno.	$ 9,122,077	$ 13,143,292
3	Marion Correctional Treatment Center	112,463	New	$ 23,995,050	$ 35,276,732
4	Powhatan Correctional Center - **Attached Model**	202,633	New	$ 122,890,081	$ 150,377,850
	Total	**442,822**		**$ 172,122,550**	**$ 222,799,012**
	OR				
5	Powhatan Correctional Center - **Freestanding Model**	242,424	New	$ 142,638,396	$ 171,810,328
	Total	**482,613**		**$ 191,870,865**	**$ 244,231,490**

* Includes 20,000 SF of renovation

Implementation Schedule

For the purposes of this study, it is assumed that January 1, 2009 is the earliest date to begin the detailed space programming and architectural design process for the expansion and renovation projects that are recommended in this study. Beginning this next phase of work assumes that the Master Plan for Healthcare Services has been approved for use. For budgeting purposes, it was assumed that the earliest any or all projects would be completed and ready for occupancy is 2013.

Summation

	Date
• 2008 DOC Capital Budget Request	April 2007
• 2008 Authorization & Funding	July 2008
• Notice to Proceed – Architectural Professional Services	July 2008
• Programming & Planning – Fixes the detailed requirements of space, design, and cost	January 2009
• Schematic Design – Fixes the general design requirements and cost updates	August 2009
• Design Development – Fixes the detailed design and system requirements & cost updates	January 2010
• Construction Documents – Defines the parameters for construction	September 2010
• Bid & Negotiation	February 2011
• Construction Complete	February 2013
• Outfit & Test Equipment	May 2013
• Occupancy	May 2013

G. Financing Options

Several options exist for financing the renovation and construction of the healthcare facility projects recommended in this study. Private healthcare facility operator(s) are available and offer a turn-key product to include everything from construction to professional staffing and facility operations for a per diem rate.

Another option would be for the DOC to finance construction projects using bond funds from the Virginia Public Building Authority (VPBA) as appropriated by the legislature. Or a private entity could propose some combination of construction, funding, and/or operations via the Public-Private Infrastructure and Education Act (PPEA). For the purposes of this study, traditional VPBA financing has been assumed as the preferred financing option as details about the other potential financing methods are not known at this time.

Potential Cost Savings

Reduced operating costs may occur within some medical expenses, such as transportation, outpatient post-operative inmate care, and some clinical procedures. For example, less transportation runs should be necessary with a centralized medical center, and also with adequate medical beds, fewer unplanned transfers would be required. Outpatient post-operative care currently occurs at local hospitals because the DOC does not have a facility staffed with health care professionals in the areas needed such as critical care nurses, respiratory therapists, physical therapists, nurse anesthetist, and others. Current DOC facilities also cannot attract these professionals; however, a new medical facility would help to enable DOC to attract them. It is also anticipated that certain primary care clinical procedures such as gall bladder operations, hernia repairs, and certain outpatient procedures such as endoscopies, CTs, and MRIs can also be performed in the new medical center rather than at local hospitals.

Costs included in a per diem rate at local hospitals include expenses above that the DOC would expect at a new medical center. For example, state of the art technology is available at many hospitals providing a “tertiary level”, or the highest level of care. A DOC medical center would include only technology associated with a “primary level” of care, two levels down from tertiary care. High levels of overhead are also included in some local hospital rates. The difference in the cost of these levels of care and overhead charges should equate to a reduction in per diem costs when compared to local hospitals. Note that the “primary level” of care provided with a new facility would be expanded, therefore, when comparing current DOC medical costs to future anticipated medical costs, the per diem rate will increase.

H. Appendix

A. Bibliography

B. Most Common DRGs (Diagnosis Related Groups)

C. Space Program Summary

D. Preliminary Opinion of Probable Construction & Project Costs

Appendix A – Bibliography

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Appendix B – Most Common DRGs (Diagnoses)

D4	Congestive heart failure, non-hypertensive
D7	Acute cerebrovascular disease
D11	Chronic obstructive pulmonary disease and bronchiectasis
D12	Spondylosis intervertebral disc disorders, other back problems
D13	Non-specific chest pain
D14	Fluid and electrolyte disorders
D15	Biliary tract disorders
D16	Complication of device, implant, or graft
D19	Asthma
D20	Osteoarthritis
D21	Urinary tract infections
D22	Diabetes mellitus with complications
D24	Fracture of neck of femur (hip)
D26	Rehabilitative care, fitting of prostheses and adjustment of devices
D27	Complications of surgical procedures or medical care
D28	Skin and subcutaneous tissue infections
D29	Gastrointestinal hemorrhage
D31	Intestinal obstruction without hernia
D32	Fracture of lower limb
D39	Hypertension with complications and secondary hypertension
D41	Diverticulosis and diverticulitis
D43	Appendicitis and other appendiceal conditions
D44	Epilepsy, convulsions
D46	Acute bronchitis
D47	Respiratory failure, insufficiency, arrest (adult)
D48	Pancreatic disorders (not diabetes)
D49	Transient cerebral ischemia
D50	Syncope
D51	Phlebitis, thrombophlebitis, thromboembolism
D52	Calculus of urinary tract
D54	Aspiration pneumonitis, food/vomitus
D55	Occlusion or stenosis of pre-cerebral arteries
D57	Other fractures

D58 Other lower respiratory disease
D59 Abdominal hernia
D61 Esophageal disorders
D64 Other gastrointestinal disorders
D65 Abdominal pain
D66 Other and unspecified benign neoplasm
D68 Other mental conditions
D69 Gastritis and duodenitis
D70 Fracture of upper limb
D71 Peripheral and visceral atherosclerosis
D72 Senility and organic mental disorders
D73 Noninfectious gastroenteritis
D74 HIV infection
D76 Poisoning by other medications and drugs
D77 Intestinal infection
D78 Hyperplasia of prostate
D79 Cancer of colon
D81 Cancer of prostate
D82 Other nervous system disorders
D84 Other connective tissue disease
D85 Pleurisy, pneumothorax, pulmonary collapse
D86 Viral infection
D88 Deficiency and anemia
D91 Other circulatory disease
D92 Acute and unspecified renal failure
D94 Other bone disease and musculoskeletal deformities
D95 Sprains and strains
D96 Other upper respiratory infections

Appendix C

Virginia Department of Corrections — **Space Program**

Master Plan for Healthcare Services — **Summary**

Deerfield Correctional Center- 2017

No.	Room/Space	Unit Total	Comments
	Administrative Services		
1	Medical Records	572	
	Subtotal Administrative Services	**572**	
	Inpatient Services		122 new beds + 89 assisted living beds
2	42-Bed Medical Alzheimers Unit	16,650	
3	40-Bed Skilled Nursing Unit - A	15,780	
4	40-Bed Skilled Nursing Unit - B	15,780	
	Subtotal Inpatient Services	**48,210**	
	Support Services		
5	Environmental Services/Linen	954	
6	Materials Management	720	
7	Pharmacy	455	
8	Equipment Room	2,760	
	Subtotal Support Services	**4,889**	
	Total Department Gross SF	**53,671**	
	Mechanical/Electric (10%)	5,367	
	Circulation (21%)	11,271	
	Exterior Wall (5%)	2,684	
	Central Plant (4%)	2,147	
	Grand Total Building Gross SF	**75,139**	
		616	**SF/bed**

Virginia Department of Corrections — Space Program

Master Plan for Healthcare Services — Summary

Greensville Correctional Center - 2017

No.	Room/Space	Unit Total	Comments
	Inpatient Services		
1	42-Bed Axis II Unit	16,980	
	Subtotal Inpatient Services	**16,980**	
	Support Services		
2	Environmental Services/Linen	312	
3	Materials Management	240	
4	Equipment Room	2,300	
	Subtotal Support Services	**2,852**	
	Total Department Gross SF	**19,832**	
	Mechanical/Electric (10%)	1,983	
	Circulation (21%)	4,165	
	Exterior Wall (5%)	992	
	Central Plant (4%)	793	
	Grand Total Building Gross SF	**27,765**	
		661	**SF/bed**

Virginia Department of Corrections — **Space Program**

Master Plan for Healthcare Services — **Summary**

Marion Treatment Center - 2017

No.	Room/Space	Unit Total	Comments
	Administrative Services		
1	Medical Records	377	
	Subtotal Administrative Services	**377**	
	Inpatient Services		162 new beds
2	30-Bed Acute Unit	11,925	
3	30-Bed Residential Unit A	11,993	
4	30-Bed Residential Unit B	11,993	
5	30-Bed Residential Unit C	11,993	
6	42-Bed Transitional Unit	17,025	
	Subtotal Inpatient Services	**64,928**	
	Support Services		
7	Environmental Services/Linen	1,188	
8	Materials Management	360	
9	Pharmacy	377	
10	Food Service	1,080	
11	Equipment Room	3,450	
	Subtotal Support Services	**6,455**	
	Total Department Gross SF	**71,760**	
	Mechanical/Electric (10%)	7,176	
	Circulation (21%)	15,069	
	Exterior Wall (5%)	3,588	
	Central Plant (4%)	2,870	
	Grand Total Building Gross SF	**100,463**	
		620	**SF/bed**

Virginia Department of Corrections — Space Program

Master Plan for Healthcare Services — Summary

Powhatan Correctional Medical Center- Attached Model - 2017

No.	Room/Space	Unit Total	Comments
	Administrative Services		
1	Administration	1,971	
2	Central Security Station	2,366	
3	Inmate Receiving/Security	8,648	
4	Medical Records	1,378	
5	Physician Accommodations	533	
	Subtotal Administrative Services	**14,896**	
	Diagnostic & Therapeutic Services		
6	Chemotherapy	2,328	
7	Dialysis	5,018	
8	Laboratory - Body Holding	1,558	
9	OP Clinic	7,361	
10	50-Bed Outpatient Holding Unit	19,064	
11	Rehabilitation Services	4,358	
12	Surgery	13,827	
	Subtotal D&T Services	**53,513**	
	Inpatient Services		150 beds
13	30-Bed Medical/Surgical Unit	12,435	Medical/Surgical and Infirmary patients
14	30-Bed Infirmary Unit A	12,435	
15	30-Bed Infirmary Unit B	12,435	
16	30-Bed Infirmary Unit C	12,435	
17	30-Bed Infirmary Unit D	12,435	
	Subtotal Inpatient Services	**62,175**	
	Support Services		
18	Environmental Services/Linen	3,084	
19	Materials Management	1,752	
20	Pharmacy	2,418	
21	Plant Operations/Control Suite	0	Located in Central Energy Plant
22	Equipment Room	6,900	
	Subtotal Support Services	**14,154**	
	Total Department Gross SF	**144,738**	
	Mechanical/Electric (10%)	14,474	
	Circulation (21%)	30,395	
	Exterior Wall (5%)	7,237	
	Central Plant (4%)	5,790	
	Grand Total Building Gross SF	**202,633**	
		1,013	**SF/bed**

Virginia Department of Corrections — **Space Program**

Master Plan for Healthcare Services — **Summary**

Powhatan Correctional Medical Center - Freestanding Model - 2017

No.	Room/Space	Unit Total	Comments
	Administrative Services		
1	Administration	2,464	
2	Business Office	683	
3	Central Security Station	2,782	
4	Education	1,755	
5	Human Resources - Employee Health	1,141	
6	Inmate Receiving/Security	8,648	
7	Medical Records	1,378	
8	Physician Accommodations	533	
9	Public Entrance	2,638	
	Subtotal Administrative Services	**22,020**	
	Diagnostic & Therapeutic Services		
10	Chemotherapy	2,328	
11	Dialysis	5,018	
12	Laboratory - Body Holding	1,558	
13	OP Clinic	7,361	
14	50-Bed Outpatient Holding Unit	19,064	
15	Rehabilitation Services	4,358	
16	Surgery	13,827	
	Subtotal D&T Services	**53,513**	
	Inpatient Services		150 beds
17	30-Bed Medical/Surgical Unit	12,435	Medical/Surgical and Infirmary patients
18	30 -Bed Infirmary Unit A	12,435	
19	30 -Bed Infirmary Unit B	12,435	
20	30 -Bed Infirmary Unit C	12,435	
21	30 -Bed Infirmary Unit D	12,435	
22	Inmate Support Area	483	
	Subtotal Inpatient Services	**62,658**	
	Support Services		
23	Biomedical	562	
24	Environmental Services/Linen	3,642	
25	Food Service	7,919	
26	Information Systems	636	
27	Maintenance	3,258	
28	Materials Management	6,185	
29	Pharmacy	2,418	
30	Plant Operations/Control Suite	0	Located in Central Energy Plant
31	Equipment Room	10,350	
	- Emergency Response Storage	0	Exterior equipment storage
	Subtotal Support Services	**34,969**	

Virginia Department of Corrections — **Space Program**

Master Plan for Healthcare Services — **Summary**

Powhatan Correctional Medical Center - Freestanding Model - 2017

No.	Room/Space	Unit Total	Comments
	Total Department Gross SF	**173,160**	
	Mechanical/Electric (10%)	17,316	
	Circulation (21%)	36,364	
	Exterior Wall (5%)	8,658	
	Central Plant (4%)	6,926	
	Grand Total Building Gross SF	**242,424**	
		1,212	**SF/bed**

APPENDIX D - CONCEPT COSTS

PRELIMINARY ORDER OF MAGNITUDE COSTS

GLOBAL
GERIATRIC CARE ADDITION
DEERFIELD CORRECTIONAL FACILITY
VIRGINIA DEPARTMENT of CORRECTIONS

ASSUMPTIONS UNDERLYING OPINION OF PROBABLE COST

1.0	Average Cost of Correctional Nursing Home Construction in the United States as of January 2007 (per SF)	$	156.20
2.0	Geographic Factor for Central Virginia (Richmond)		0.850
3.0	Estimated Cost of Hospital (Geriatric Care) Construction as of January 2007 (per SF)	$	132.77
4.0	Assumed Mid-Point of Construction		03/01/12
5.0	Months From January 2007 to March 2012		75
6.0	Assumed Rate of Construction Inflation per Year		6.25%
7.0	Estimated Cost of Hospital Construction at Buy Out of project	$	184.63
8.0	Assumed Contractor's Contingency		10.00%
9.0	**Estimated Cost of Construction with Construction Contingency**	**$**	**203.10**
10.0	**Renovation Cost as a Percent of New Construction Cost**		**80%**

APPENDIX D - CONCEPT COSTS

PRELIMINARY ORDER OF MAGNITUDE COSTS

GERIATRIC CARE ADDITION
DEERFIELD CORRECTIONAL FACILITY
SUMMARY

	COST CATEGORY	GROSS SQ FT		$/GSF	TOTAL COST
0.1	**Nursing Home (New Construction)** (Including I-3 Occupancy)	75,140			$12,375,308
0.2	**Remodeling** (I-3 Occupancy)	4821			$626,642
		79,961		**163**	**13,001,950**
0.3	**Other Building Components**	0			$0
1.0	**BUILDING COST***	**79,961**		**163**	**13,001,950**
2.0	**Site Development**	12.1%	of Lines 0.1		$1,573,236
2.1	Site Preparation	2.0%	of Lines 0.1	$260,039	
2.2	Site Development	3.0%	of Lines 0.1	$390,059	
2.3	Site Utilities	5.0%	of Lines 0.1	$650,098	
2.4	Surveys/Test/Borings	0.1%	of Lines 0.1	$13,002	
2.5	Off-Site Development	2.0%	of Lines 0.1	$260,039	
2.6	Other	0.0%	of Lines 0.1	$0	
3.0	**Demolition**	0			$500,000
4.0	**Fixed Equipment Allowance**	8.0%	of Line 1.0		$1,040,156
5.0	**CONSTRUCTION COST**	79,961		$202	**$16,115,342**
6.0	**Movable Equipment/Furnishings**	20.8%	of Line 5.0		$3,351,555
6.1	Movable Equipment				
6.2	Information Systems				
6.3	Furnishings				
6.4	Signage & Graphics				
7.0	**Professional Fees**	13.7%	of Line 5.0		$2,203,276
7.1	A/E				
7.2	Interior Design/Furnishings				
7.3	Civil Engineering				
7.3	Graphic Design				
7.4	Landscape Architecture				
7.5	Medical Equipment Consultant				
7.6	Acoustics Consultant				
7.7	Elevator Consultant				
7.8	IT/AV Consultant				
7.9	Food Service Consultant				
7.10	Security Consultant				
7.11	Programming				
7.12	Pre-design (CON)				
7.13	Specialty Consultants				
8.0	**Administrative Costs**	4.5%	of Line 5.0		$719,430
8.1	Construction Testing				
8.2	Reimbursables				
8.3	Misc. Admin. Costs				
8.4	Survey				
9.0	**Owner Contingency**	10.0%	of Line 5.0		$1,611,534
10.0	**TOTAL PROJECT COST**	79,961		$300	**$24,001,138**

FOOTNOTES:

1. * Categories are explained below.
2. Excludes costs, if incurred, for removal/abatement of hazardous materials.
3. The figures shown represent an opinion only, and do not represent either a detailed cost estimate nor a guaranteed maximum price. Figures shown are based upon 2004 dollars. Figures do not include any estimates for the cost of: land acquisition; financing; off-site infrastructure upgrades or mitigation which might be required by regulatory jurisdictions; hazardous materials abatement/removal, or escalation costs outside of the construction contract (Items 5.0 - 10.0).

COST CATEGORIES:

1.0 BUILDING COST - Basic construction cost exclusive of fixed equipment - fixed equipment allowance is separate.

2.0 SITE DEVELOPMENT - Provides an allowance for: paving, striping, curbs and gutters for parking and site drainage; site utilities (exclusive of off-site improvements); landscaping and irrigation; site lighting; and directional signage.

2.1 DEMOLITION - Addresses the cost of building removal, if necessary, from the site. Demolition related to renovation is included in renovation cost per SF.

3.0 FIXED EQUIPMENT - Provides an allowance for major fixed medical or food service equipment. Fixed equipment is typically attached to the building structurally, mechanically or electrically by the Contractor or a vendor during or immediately following construction. Cost shown is an allowance only and the Owner is responsible for establishing the fixed equipment budget.

4.0 CONSTRUCTION COST - Building Cost plus allowances for: site development; fixed equipment; demolition of entire structures on the site; or other independent construction costs not easily incorporated into the Building Cost. Demolition associated with remodeling is included in the Building Cost per SF.

5.0 MOVABLE EQUIPMENT/FURNISHINGS (FF&E)- Provides an allowance for major movable medical equipment and furniture necessary to implement functional use of the building. Excludes Groups 3 and 4 equipment and medical supplies. Excludes artwork or accessories of interior design. Cost shown is an allowance only and the Owner is responsible for establishing the FF&E budget.

6.0 PROFESSIONAL DESIGN FEES - Provides an allowance for: basic architectural and engineering design services; interior design and sign graphic design services; and other specialty consultants normally included under the architects management and fee.

7.0 ADMINISTRATIVE COSTS - Provides an allowance for costs of: regulatory reviews and approvals; building permits; tests and inspections; reimbursable expenses of consultants; site surveys, or other special Consultants not normally retained by the Architect. Allowance, unless specifically noted otherwise, does not include the potential costs of mitigating environmental or community issues relative to the project. Cost shown is an allowance only and the Owner is responsible for establishing the final Administrative cost budget.

8.0 OWNER CONTINGENCY - Allowance for Owner-initiated changes in the design or construction after approval to proceed has been given to the design consultants or contractor.

9.0 ALLOWANCE - Specifically identified items which are not defined in cost categories but will be costs associated with the project. Owner shall confirm certain allowances.

10.0 PROJECT COST - Cumulative total of all cost categories identified in this Preliminary Opinion of Probable Cost.

APPENDIX D

PRELIMINARY ORDER OF MAGNITUDE COSTS

GLOBAL
MENTAL HEALTH & AXIS II
GREENSVILLE CORRECTIONAL FACILITY
VIRGINIA DEPARTMENT of CORRECTIONS

ASSUMPTIONS UNDERLYING OPINION OF PROBABLE COST

1.0	Average Cost of Correctional Nursing Home Construction in the United States as of January 2007 (per SF)	$	156.20
2.0	Geographic Factor for Central Virginia (Richmond)		0.850
3.0	Estimated Cost of Hospital Construction as of January 2007 (per SF)	$	132.77
4.0	Assumed Mid-Point of Construction		03/01/12
5.0	Months From January 2007 to March 2012		75
6.0	Assumed Rate of Inflation per Year		6.25%
7.0	Estimated Cost of Hospital Construction at Buy Out of project	$	184.63
8.0	Assumed Contractor's Contingency		10.00%
9.0	**Estimated Cost of Construction with Construction Contingency**	**$**	**203.10**
10.0	**Renovation Cost as a Percent of New Construction Cost**		**80%**

APPENDIX D

PRELIMINARY ORDER OF MAGNITUDE COSTS

MENTAL HEALTH & AXIS II
GREENSVILLE CORRECTIONAL FACILITY
SUMMARY

	COST CATEGORY	GROSS SQ FT	$/GSF	TOTAL COST
0.1	**Nursing Home (New Construction)** (Including I-3 Occupancy)	27,765		$4,579,445
0.2	**Remodeling** (I-2 Occupancy)	20,000		$2,599,637
		47,765	**150**	**7,179,081**
0.3	**Other Building Components**	0		$0
1.0	**BUILDING COST ***	**47,765**	**150**	**7,179,081**
2.0	**Site Development**	12.1% of Lines 0.1		$868,669
2.1	Site Preparation	2.0% of Lines 0.1	$143,582	
2.2	Site Development	3.0% of Lines 0.1	$215,372	
2.3	Site Utilities	5.0% of Lines 0.1	$358,954	
2.4	Surveys/Test/Borings	0.1% of Lines 0.1	$7,179	
2.5	Off-Site Development	2.0% of Lines 0.1	$143,582	
2.6	Other	0.0% of Lines 0.1	$0	
3.0	**Demolition**	0		$500,000
4.0	**Fixed Equipment Allowance**	8.0% of Line 1.0		$574,327
5.0	**CONSTRUCTION COST**	47,765	$191	**$9,122,077**
6.0	**Movable Equipment/Furnishings**	15.2% of Line 5.0		$1,384,521
6.1	Movable Equipment			
6.2	Information Systems			
6.3	Furnishings			
6.4	Signage & Graphics			
7.0	**Professional Fees**	13.9% of Line 5.0		$1,267,447
7.1	A/E			
7.2	Interior Design/Furnishings			
7.3	Civil Engineering			
7.3	Graphic Design			
7.4	Landscape Architecture			
7.5	Medical Equipment Consultant			
7.6	Acoustics Consultant			
7.7	Elevator Consultant			
7.8	IT/AV Consultant			
7.9	Food Service Consultant			
7.10	Security Consultant			
7.11	Programming			
7.12	Pre-design (CON)			
7.13	Specialty Consultants			
8.0	**Administrative Cost**	5.0% of Line 5.0		$457,039
8.1	Construction Testing			
8.2	Reimbursables			
8.3	Misc. Admin. Costs			
8.4	Survey			
9.0	**Owner Contingency**	10.0% of Line 5.0		$912,208
10.0	**TOTAL PROJECT COST**	47,765	$275	**$13,143,292**

FOOTNOTES:

1. * Categories are explained below.
2. Excludes costs, if incurred, for removal/abatement of hazardous materials.
3. The figures shown represent an opinion only, and do not represent either a detailed cost estimate nor a guaranteed maximum price. Figures shown are based upon 2004 dollars. Figures do not include any estimates for the cost of: land acquisition; financing; off-site infrastructure upgrades or mitigation which might be required by regulatory jurisdictions; hazardous materials abatement/removal, or escalation costs outside of the construction contract (Items 5.0 - 10.0).

COST CATEGORIES:

1.0 BUILDING COST - Basic construction cost exclusive of fixed equipment - fixed equipment allowance is separate.

2.0 SITE DEVELOPMENT - Provides an allowance for: paving, striping, curbs and gutters for parking and site drainage; site utilities (exclusive of off-site improvements); landscaping and irrigation; site lighting; and directional signage.

2.1 DEMOLITION - Addresses the cost of building removal, if necessary, from the site. Demolition related to renovation is included in renovation cost per SF.

3.0 FIXED EQUIPMENT - Provides an allowance for major fixed medical or food service equipment. Fixed equipment is typically attached to the building structurally, mechanically or electrically by the Contractor or a vendor during or immediately following construction. Cost shown is an allowance only and the Owner is responsible for establishing the fixed equipment budget.

4.0 CONSTRUCTION COST - Building Cost plus allowances for: site development; fixed equipment; demolition of entire structures on the site; or other independent construction costs not easily incorporated into the Building Cost. Demolition associated with remodeling is included in the Building Cost per SF.

5.0 MOVABLE EQUIPMENT/FURNISHINGS (FF&E)- Provides an allowance for major movable medical equipment and furniture necessary to implement functional use of the building. Excludes Groups 3 and 4 equipment and medical supplies. Excludes artwork or accessories of interior design. Cost shown is an allowance only and the Owner is responsible for establishing the FF&E budget.

6.0 PROFESSIONAL DESIGN FEES - Provides an allowance for: basic architectural and engineering design services; interior design and sign graphic design services; and other specialty consultants normally included under the architects management and fee.

7.0 ADMINISTRATIVE COSTS - Provides an allowance for costs of: regulatory reviews and approvals; building permits; tests and inspections; reimbursable expenses of consultants; site surveys, or other special Consultants not normally retained by the Architect. Allowance, unless specifically noted otherwise, does not include the potential costs of mitigating environmental or community issues relative to the project. Cost shown is an allowance only and the Owner is responsible for establishing the final Administrative cost budget.

8.0 OWNER CONTINGENCY - Allowance for Owner-initiated changes in the design or construction after approval to proceed has been given to the design consultants or contractor.

9.0 ALLOWANCE - Specifically identified items which are not defined in cost categories but will be costs associated with the project. Owner shall confirm certain allowances.

10.0 PROJECT COST - Cumulative total of all cost categories identified in this Preliminary Opinion of Probable Cost.

APPENDIX D - CONCEPT COSTS

PRELIMINARY ORDER OF MAGNITUDE COSTS

GLOBAL
MENTAL HEALTH & RESIDENTIAL CARE ADDITION
MARION CORRECTIONAL FACILITY
VIRGINIA DEPARTMENT of CORRECTIONS

ASSUMPTIONS UNDERLYING OPINION OF PROBABLE COST

1.0	Average Cost of Correctional Nursing Home Construction in the United States as of January 2007 (per SF)	$	156.20
2.0	Geographic Factor for Western Virginia (Roanoke)		0.870
3.0	Estimated Cost of Hospital Construction as of January 2007 (per SF)	$	135.89
4.0	Assumed Mid-Point of Construction		03/01/12
5.0	Months From January 2007 to March 2012		75
6.0	Assumed Rate of Inflation per Year		6.25%
7.0	Estimated Cost of Hospital Construction at Buy Out of project	$	188.98
8.0	Assumed Contractor's Contingency		10.00%
9.0	**Estimated Cost of Construction with Construction Contingency**	**$**	**207.88**
10.0	**Renovation Cost as a Percent of New Construction Cost**		**80%**

APPENDIX D - CONCEPT COSTS

PRELIMINARY ORDER OF MAGNITUDE COSTS

MENTAL HEALTH & RESIDENTIAL CARE ADDITION
MARION CORRECTIONAL FACILITY
SUMMARY

	COST CATEGORY	GROSS SQ FT	$/GSF	TOTAL COST
0.1	**Nursing Home (New Construction)** (Including I-3 Occupancy)	100,463		$17,966,424
0.2	**Remodeling** (I-2 Occupancy)	12000		$1,596,483
		112,463	**174**	**19,562,906**
0.3	**Other Building Components**	0		$0
1.0	**BUILDING COST***	**112,463**	**174**	**19,562,906**
2.0	**Site Development**	12.1% of Lines 0.1		$2,367,112
2.1	Site Preparation	2.0% of Lines 0.1	$391,258	
2.2	Site Development	3.0% of Lines 0.1	$586,887	
2.3	Site Utilities	5.0% of Lines 0.1	$978,145	
2.4	Surveys/Test/Borings	0.1% of Lines 0.1	$19,563	
2.5	Off-Site Development	2.0% of Lines 0.1	$391,258	
2.6	Other	0.0% of Lines 0.1	$0	
3.0	**Demolition**	0		$500,000
4.0	**Fixed Equipment Allowance**	8.0% of Line 1.0		$1,565,033
5.0	**CONSTRUCTION COST**	112,463	$213	**$23,995,050**
6.0	**Movable Equipment/Furnishings**	18.8% of Line 5.0		$4,522,078
6.1	Movable Equipment			
6.2	Information Systems			
6.3	Furnishings			
6.4	Signage & Graphics			
7.0	**Professional Fees**	14.0% of Line 5.0		$3,352,934
7.1	A/E			
7.2	Interior Design/Furnishings			
7.3	Civil Engineering			
7.3	Graphic Design			
7.4	Landscape Architecture			
7.5	Medical Equipment Consultant			
7.6	Acoustics Consultant			
7.7	Elevator Consultant			
7.8	IT/AV Consultant			
7.9	Food Service Consultant			
7.10	Security Consultant			
7.11	Programming			
7.12	Pre-design (CON)			
7.13	Specialty Consultants			
8.0	**Administrative Costs**	4.2% of Line 5.0		$1,007,164
8.1	Construction Testing			
8.2	Reimbursables			
8.3	Misc. Admin. Costs			
8.4	Survey			
9.0	**Owner Contingency**	10.0% of Line 5.0		$2,399,505
10.0	**TOTAL PROJECT COST**	112,463	$314	**$35,276,732**

FOOTNOTES:

1. * Categories are explained below.
2. Excludes costs, if incurred, for removal/abatement of hazardous materials.
3. The figures shown represent an opinion only, and do not represent either a detailed cost estimate nor a guaranteed maximum price. Figures shown are based upon 2004 dollars.
   Figures do not include any estimates for the cost of: land acquisition; financing;
   off-site infrastructure upgrades or mitigation
   which might be required by regulatory jurisdictions; hazardous materials abatement/removal, or
   escalation costs outside of the construction contract (Items 5.0 - 10.0).

COST CATEGORIES:

1.0 BUILDING COST - Basic construction cost exclusive of fixed equipment - fixed equipment allowance is separate.

2.0 SITE DEVELOPMENT - Provides an allowance for: paving, striping, curbs and gutters for parking and site drainage; site utilities (exclusive of off-site improvements); landscaping and irrigation; site lighting; and directional signage.

2.1 DEMOLITION - Addresses the cost of building removal, if necessary, from the site. Demolition related to renovation is included in renovation cost per SF.

3.0 FIXED EQUIPMENT - Provides an allowance for major fixed medical or food service equipment.
Fixed equipment is typically attached to the building structurally, mechanically or electrically by the Contractor or a vendor during or immediately following construction.
Cost shown is an allowance only and the Owner is responsible for establishing the fixed equipment budget.

4.0 CONSTRUCTION COST - Building Cost plus allowances for: site development; fixed equipment; demolition of entire structures on the site; or other independent construction costs not easily incorporated into the Building Cost. Demolition associated with remodeling is included in the Building Cost per SF.

5.0 MOVABLE EQUIPMENT/FURNISHINGS (FF&E)- Provides an allowance for major movable medical equipment and furniture necessary to implement functional use of the building. Excludes Groups 3 and 4 equipment and medical supplies. Excludes artwork or accessories of interior design.
Cost shown is an allowance only and the Owner is responsible for establishing the FF&E budget.

6.0 PROFESSIONAL DESIGN FEES - Provides an allowance for: basic architectural and engineering design services; interior design and sign graphic design services; and other specialty consultants normally included under the architects management and fee.

7.0 ADMINISTRATIVE COSTS - Provides an allowance for costs of: regulatory reviews and approvals; building permits; tests and inspections; reimbursable expenses of consultants; site surveys, or other special Consultants not normally retained by the Architect. Allowance, unless specifically noted otherwise, does not include the potential costs of mitigating environmental or community issues relative to the project.
Cost shown is an allowance only and the Owner is responsible for establishing the final Administrative cost budget.

8.0 OWNER CONTINGENCY - Allowance for Owner-initiated changes in the design or construction after approval to proceed has been given to the design consultants or contractor.

9.0 ALLOWANCE - Specifically identified items which are not defined in cost categories but will be costs associated with the project. Owner shall confirm certain allowances.

10.0 PROJECT COST - Cumulative total of all cost categories identified in this Preliminary Opinion of Probable Cost.

APPENDIX D

PRELIMINARY ORDER OF MAGNITUDE COSTS

GLOBAL
POWHATAN ATTACHED MODEL - MEDICAL
POWHATAN CORRECTIONAL - VaDOC

	ASSUMPTIONS UNDERLYING OPINION OF PROBABLE COST		
1.0	Average Cost of Hospital Construction in the United States as of January 2007 (per SF)	$	308.00
2.0	Geographic Factor for Richmond, Virginia		0.850
3.0	Estimated Cost of Hospital Construction as of March 2007 (per SF)	$	261.80
4.0	Assumed Mid-Point of Construction		03/01/12
5.0	Months From May 2007 to March 2012		75
6.0	Assumed Rate of Inflation per Year		6.25%
7.0	Estimated Cost of Hospital Construction at Buy Out of project	$	364.07
8.0	Assumed Contractor's Contingency		10.00%
9.0	**Estimated Cost of Construction with Construction Contingency**	**$**	**400.47**
10.0	**Renovation Cost as a Percent of New Construction Cost**		**80%**

APPENDIX D

PRELIMINARY ORDER OF MAGNITUDE COSTS

POWHATAN ATTACHED MODEL - MEDICAL
POWHATAN CORRECTIONAL - VaDOC
SUMMARY

	COST CATEGORY	GROSS SQ FT	$/GSF	TOTAL COST
0.1	**Hospital (New Construction)** (Including I-3 Occupancy)	202,633		$87,208,714
0.2	**Remodeling** (I-3 Occupancy)	0		$0
		202,633	**430**	**87,208,714**
0.3	**Other Building Components**	0		$0
1.0	**BUILDING COST**	**202,633**	**430**	**87,208,714**
2.0	**Site Development**	12.1% of Lines 0.1		$10,552,254
	2.1 Site Preparation	2.0% of Lines 0.1	$1,744,174	
	2.2 Site Development	3.0% of Lines 0.1	$2,616,261	
	2.3 Site Utilities	5.0% of Lines 0.1	$4,360,436	
	2.4 Surveys/Test/Borings	0.1% of Lines 0.1	$87,209	
	2.5 Off-Site Development	2.0% of Lines 0.1	$1,744,174	
	2.6 Other	0.0% of Lines 0.1	$0	
3.0	**Demolition**	0		$500,000
4.0	**Fixed Equipment Allowance**	8.0% of Line 1.0		$6,976,697
5.0	**CONSTRUCTION COST**	202,633	$519	**$105,237,665**
6.0	**Movable Equipment/Furnishings**	17.2% of Line 5.0		$18,095,666
	6.1 Movable Equipment			
	6.2 Information Systems			
	6.3 Furnishings			
	6.4 Signage & Graphics			
7.0	**Professional Fees**	13.4% of Line 5.0		$14,072,311
	7.1 A/E			
	7.2 Interior Design/Furnishings			
	7.3 Civil Engineering			
	7.3 Graphic Design			
	7.4 Landscape Architecture			
	7.5 Medical Equipment Consultant			
	7.6 Acoustics Consultant			
	7.7 Elevator Consultant			
	7.8 IT/AV Consultant			
	7.9 Food Service Consultant			
	7.10 Security Consultant			
	7.11 Programming			
	7.12 Pre-design (CON)			
	7.13 Specialty Consultants			
8.0	**Administrative Costs**	2.3% of Line 5.0		$2,448,442
	8.1 Construction Testing			
	8.2 Reimbursables			
	8.3 Misc. Admin. Costs			
	8.4 Survey			
9.0	**Owner Contingency**	10.0% of Line 5.0		$10,523,767
10.0	**TOTAL PROJECT COST**	202,633	$742	**$150,377,850**

FOOTNOTES:

1. * Categories are explained below.
2. Excludes costs, if incurred, for removal/abatement of hazardous materials.
3. The figures shown represent an opinion only, and do not represent either a detailed cost estimate nor a guaranteed maximum price. Figures shown are based upon 2004 dollars.
   Figures do not include any estimates for the cost of: land acquisition; financing;
   off-site infrastructure upgrades or mitigation
   which might be required by regulatory jurisdictions; hazardous materials abatement/removal, or
   escalation costs outside of the construction contract (Items 5.0 - 10.0).

COST CATEGORIES:

1.0 BUILDING COST - Basic construction cost exclusive of fixed equipment - fixed equipment allowance is separate.

2.0 SITE DEVELOPMENT - Provides an allowance for: paving, striping, curbs and gutters for parking and site drainage; site utilities (exclusive of off-site improvements); landscaping and irrigation; site lighting; and directional signage.

2.1 DEMOLITION - Addresses the cost of building removal, if necessary, from the site. Demolition related to renovation is included in renovation cost per SF.

3.0 FIXED EQUIPMENT - Provides an allowance for major fixed medical or food service equipment.
Fixed equipment is typically attached to the building structurally, mechanically or electrically by the Contractor or a vendor during or immediately following construction.
Cost shown is an allowance only and the Owner is responsible for establishing the fixed equipment budget.

4.0 CONSTRUCTION COST - Building Cost plus allowances for: site development; fixed equipment; demolition of entire structures on the site; or other independent construction costs not easily incorporated into the Building Cost. Demolition associated with remodeling is included in the Building Cost per SF.

5.0 MOVABLE EQUIPMENT/FURNISHINGS (FF&E)- Provides an allowance for major movable medical equipment and furniture necessary to implement functional use of the building. Excludes Groups 3 and 4 equipment and medical supplies. Excludes artwork or accessories of interior design.
Cost shown is an allowance only and the Owner is responsible for establishing the FF&E budget.

6.0 PROFESSIONAL DESIGN FEES - Provides an allowance for: basic architectural and engineering design services; interior design and sign graphic design services; and other specialty consultants normally included under the architects management and fee.

7.0 ADMINISTRATIVE COSTS - Provides an allowance for costs of: regulatory reviews and approvals; building permits; tests and inspections; reimbursable expenses of consultants; site surveys, or other special Consultants not normally retained by the Architect. Allowance, unless specifically noted otherwise, does not include the potential costs of mitigating environmental or community issues relative to the project.
Cost shown is an allowance only and the Owner is responsible for establishing the final Administrative cost budget.

8.0 OWNER CONTINGENCY - Allowance for Owner-initiated changes in the design or construction after approval to proceed has been given to the design consultants or contractor.

9.0 ALLOWANCE - Specifically identified items which are not defined in cost categories but will be costs associated with the project. Owner shall confirm certain allowances.

10.0 PROJECT COST - Cumulative total of all cost categories identified in this Preliminary Opinion of Probable Cost.

APPENDIX D

PRELIMINARY ORDER OF MAGNITUDE COSTS

GLOBAL
POWHATAN FREESTANDING MODEL - MEDICAL
POWHATAN CORRECTIONAL - VaDOC

	ASSUMPTIONS UNDERLYING OPINION OF PROBABLE COST		
1.0	Average Cost of Hospital Construction in the United States as of January 2007 (per SF)	$	308.00
2.0	Geographic Factor for Richmond, Virginia		0.850
3.0	Estimated Cost of Hospital Construction as of March 2007 (per SF)	$	261.80
4.0	Assumed Mid-Point of Construction		03/01/12
5.0	Months From May 2007 to March 2012		75
6.0	Assumed Rate of Inflation per Year		6.25%
7.0	Estimated Cost of Hospital Construction at Buy Out of project	$	364.07
8.0	Assumed Contractor's Contingency		10.00%
9.0	**Estimated Cost of Construction with Construction Contingency**	**$**	**400.47**
10.0	**Renovation Cost as a Percent of New Construction Cost**		**80%**

APPENDIX D

PRELIMINARY ORDER OF MAGNITUDE COSTS

POWHATAN FREESTANDING MODEL - MEDICAL
POWHATAN CORRECTIONAL - VaDOC
SUMMARY

	COST CATEGORY	GROSS SQ FT	$/GSF	TOTAL COST
0.1	**Correctional Hospital (New Construction)** (Including I-3 Occupancy)	242,424		$101,280,321
0.2	**Remodeling** (I-3 Occupancy)	0		$0
		242,424	**418**	**101,280,321**
0.3	**Other Building Components**	0		$0
1.0	**BUILDING COST**	**242,424**	**418**	**101,280,321**
2.0	**Site Development**	12.1% of Lines 0.1		$12,254,919
2.1	Site Preparation	2.0% of Lines 0.1	$2,025,606	
2.2	Site Development	3.0% of Lines 0.1	$3,038,410	
2.3	Site Utilities	5.0% of Lines 0.1	$5,064,016	
2.4	Surveys/Test/Borings	0.1% of Lines 0.1	$101,280	
2.5	Off-Site Development	2.0% of Lines 0.1	$2,025,606	
2.6	Other	0.0% of Lines 0.1	$0	
3.0	**Demolition**	0		$500,000
4.0	**Fixed Equipment Allowance**	8.0% of Line 1.0		$8,102,426
5.0	**CONSTRUCTION COST**	242,424	$504	**$122,137,666**
6.0	**Movable Equipment/Furnishings**	20.8% of Line 5.0		$25,359,102
6.1	Movable Equipment			
6.2	Information Systems			
6.3	Furnishings			
6.4	Signage & Graphics			
7.0	**Professional Fees**	13.6% of Line 5.0		$16,602,682
7.1	A/E			
7.2	Interior Design/Furnishings			
7.3	Civil Engineering			
7.3	Graphic Design			
7.4	Landscape Architecture			
7.5	Medical Equipment Consultant			
7.6	Acoustics Consultant			
7.7	Elevator Consultant			
7.8	IT/AV Consultant			
7.9	Food Service Consultant			
7.10	Security Consultant			
7.11	Programming			
7.12	Pre-design (CON)			
7.13	Specialty Consultants			
8.0	**Administrative Costs**	2.1% of Line 5.0		$2,528,976
8.1	Construction Testing			
8.2	Reimbursables			
8.3	Misc. Admin. Costs			
8.4	Survey			
9.0	**Owner Contingency**	4.2% of Line 5.0		$5,181,902
10.0	**TOTAL PROJECT COST**	242,424	$709	**$171,810,328**

FOOTNOTES:

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COST CATEGORIES:

1.0 BUILDING COST - Basic construction cost exclusive of fixed equipment - fixed equipment allowance is separate.

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4.0 CONSTRUCTION COST - Building Cost plus allowances for: site development; fixed equipment; demolition of entire structures on the site; or other independent construction costs not easily incorporated into the Building Cost. Demolition associated with remodeling is included in the Building Cost per SF.

5.0 MOVABLE EQUIPMENT/FURNISHINGS (FF&E)- Provides an allowance for major movable medical equipment and furniture necessary to implement functional use of the building. Excludes Groups 3 and 4 equipment and medical supplies. Excludes artwork or accessories of interior design. Cost shown is an allowance only and the Owner is responsible for establishing the FF&E budget.

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10.0 PROJECT COST - Cumulative total of all cost categories identified in this Preliminary Opinion of Probable Cost.